CUSTOM AIR HANDLING UNIT SUBMITTAL

PROJECT:

Dayton Childrens Ambulatory

Original Submittal Date: Aug 9, 2021

Revision: 2

Current Version Date: Aug 19, 2021

Prepared By: JS, EL

EQ: 21580

Location: Dayton, OH

Sales Office: Cincinnati, OH

Sales Person: Nick Brown, Kyle Kurtz

Equipment Tag(s):

AHU-63, AHU-64

REVIEWED BY HEAPY

FOR GENERAL CONFORMANCE WITH INFORMATION PRESENTED IN THE CONTRACT DOCUMENTS ONLY.

APPROVED AS NOTED

BY: Derek Shaw / Billy Frank DATE: 8/26/2021

Provide roof curb and wind loading calculations in seperate submittal

Submittal approval dates are the basis for determining manufacturing lead times. Manufacturing will not begin and shipping dates will not be issued until approved, stamped submittal drawings are received. Performance, openings and dimensions may vary from contract documents. Return of approved drawings constitutes acceptance of these variances.

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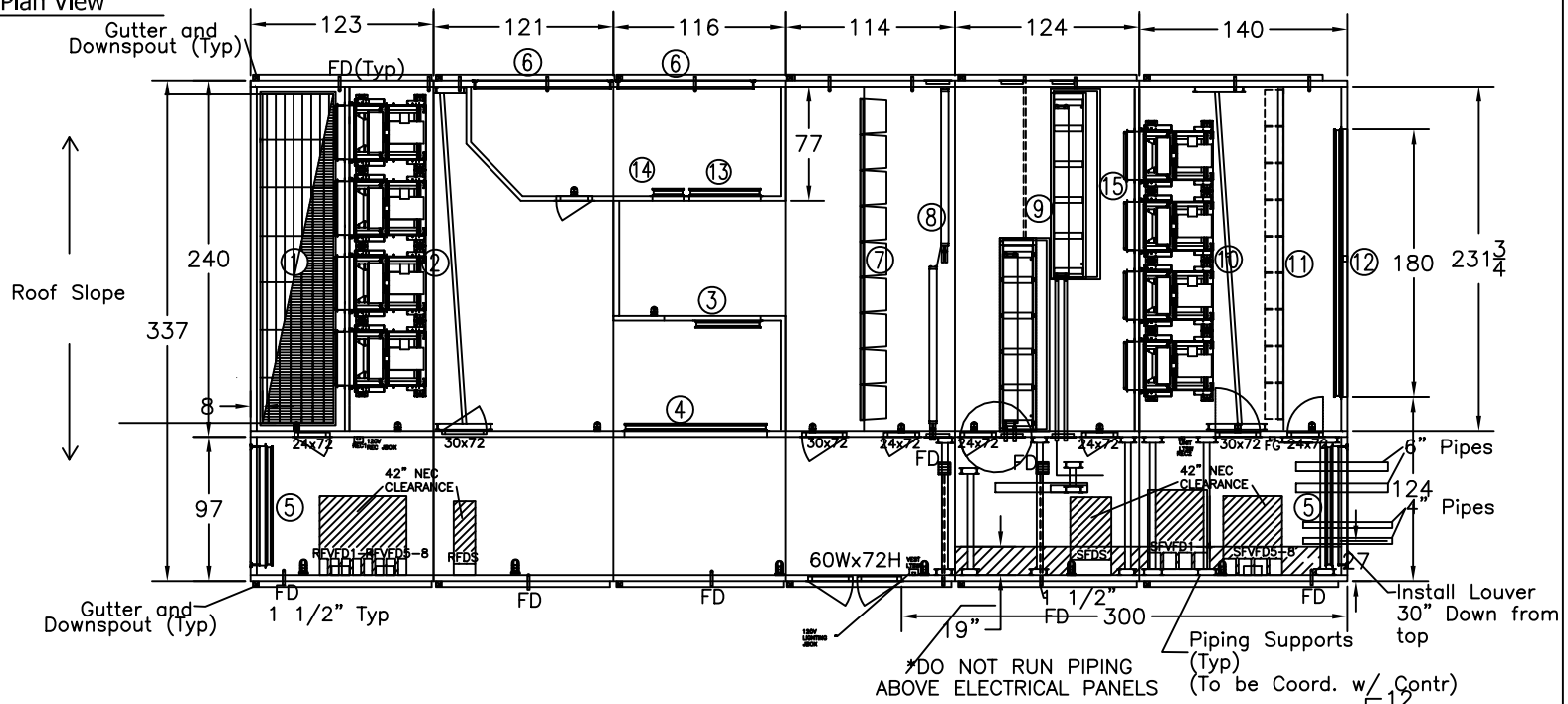
NOTES: Roof has rubber membrane.
Gutters and downspouts provided.

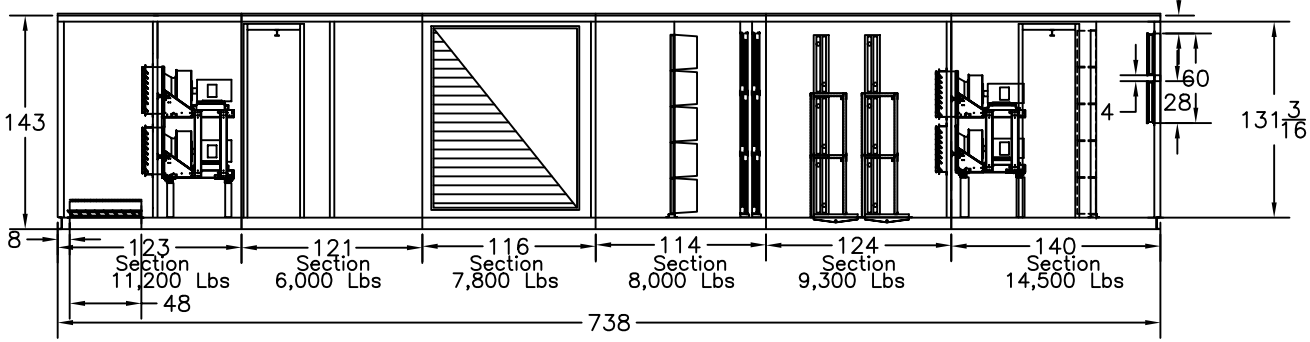
EQUIPMENT LIST

1. RA Opening – 220x48 SMOKE DAMPERS w/ 2" Flanges
2. Return Fans (8) MPQN 27" – 10 HP
3. Return Damper 44" x 120"
4. Exhaust Damper 96" x 120"
5. Exhaust Louver + Damper (2) 80" x 110"
6. OA Louver 92" W x 120"H
7. 2" MERV 8 + 22" Bag Filters (45) 24" x 24"
8. Heating Coils (6) 39" x 102"
9. Cooling Coil (6) 36" x 111"
10. Supply Fans (8) MPQN 24.5" – 30 HP
11. HEPA Filters–(Frames Only) (45) 24" x 24"
12. Supply Air SMOKE DAMPERS 2@ 180 x 28
13. Outside Air Damper 48"W x 120"H
14. Min Outside Air Damper 21"W x 120"H

2 Plan View



1 Elevation View



#	Revision:	Date:	Rev.By:
1	alum const wt,OA Lvr Size	8–10–21	JS
2	per comments	8–18–21	JS

Drawn By:
Date: 8–9–21
Block/Text Multiplier:

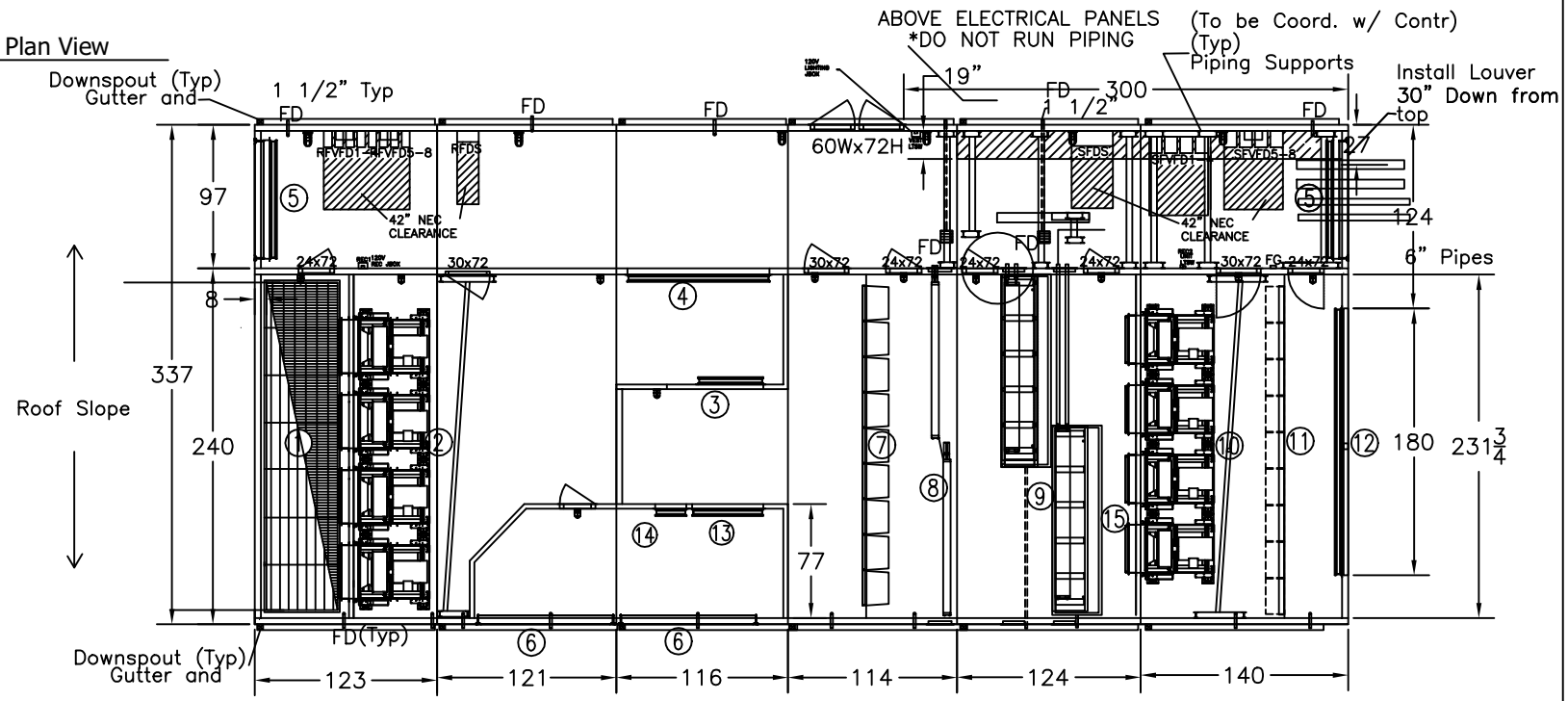
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES

Type:	Outdoor	Unit Exterior ga.:	18	Project Name:	Dayton Childrens Ambulatory
Mounting:	Curb	Wall Insul./Int. ga.:	3" / 20	Job EQ#:	21580
Base Peimeter:	8	Doors:	(see drawing)	Sales Order#:	
Floor Surface Thickness:	14	Lighting Type:	LED	Dwg. Name:	
Floor Insul./Underliner ga:	4" / 20	Isolation Type:	SWSR– 2A	Unit CFM:	85,000
				Unit Tag:	AHU–63
				Sales Office:	
				Shipping Wt.:	Approx. lbs.

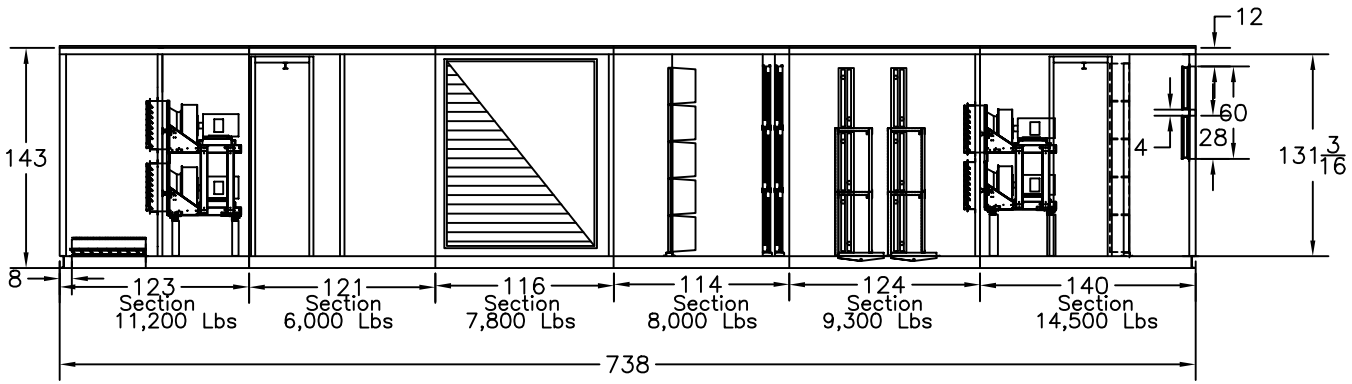
TRANE™ Custom Air Handlers

NOTES: Roof has rubber membrane.
Gutters and downspouts provided.

2 Plan View



1 Elevation View



EQUIPMENT LIST

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5. Exhaust Louver + Damper (2) 80" x 110"
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				Shipping Wt.:	Approx. lbs.

TRANE™ Custom Air Handlers

UNIT CONSTRUCTION

BASE FRAME		– Aluminum beam perimeter with removable lifting lugs. – Aluminum structural intermediate supports installed at a maximum of 24” centers. – **Removable aluminum grating provided over openings and dampers mounted in the floor.** . –
CABINET	FLOOR	– Surface consists of continuous welded 3/16” aluminum treadplate – .050 aluminum solid floor under-liner. – 1 ½ ” aluminum floor drains as indicated on the drawings. Drains are stubbed through the perimeter channel. All trapping is by others. – 2” turned up lip to create a waterdam at each section and all opening in the base but not at the section splits in the corridor. –
	WALLS (exterior)	– 4" Class “A” thermal break panel construction. – .063 embossed aluminum solid exterior. – .050 aluminum solid inner liner. – Internal tunnel walls (i.e. fan/damper/blender walls) are un-insulated, aluminum single wall C-panels. – Cabinet is designed to meet L/200 at 12” w.g. in positive sections and -12” in negative sections. –
	Interior Corridor walls	– 4" Class “A” thermal break panel construction – .063 aluminum solid exterior. – .050 aluminum solid inner liner. –
	ROOF	– 4" Class “A” thermal break panel construction – .063 aluminum solid exterior. – .050 aluminum solid inner liner. – Outdoor units have rubber membrane roof – Outdoor unit roof is sloped for drainage. Minimum 1/8” per foot but no less than 1” slope. – Center pitched draining to both sides. Gutters and downspouts are provided. – –
	SAFING	– All safing will be galvanized safing unless otherwise stated. – Cooling coil safing will be stainless steel – Heating coil safing will be aluminum – Filter rack safing will be aluminum
INSULATION		– 4”-R26.7 Injected foam installed in walls and roof. Foam is polyurethane foam isocyanate – 3”-R20 polyurethane foam sprayed onto the underside of the floor liner. –
EXTERIOR PAINT		– Unit color will be Trane Slate Grey. – Paint system to meet 1000hr salt spray requirements – .

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DRAIN PANS		– 16 ga. stainless steel, double-sloped insulated drain pans with 1-1/2in stainless steel MPT drain. All traps furnished and installed in field by others. – 16 ga. stainless steel intermediate drain pans on units with multiple stacked coils – Intermediate pans drain to the bottom pan via dual 1" PVC downspouts. –
ACCESS DOORS	• Door thickness • Exterior material • Interior material • Insulation • Handles • Hinge • Windows	– 4" – .063 aluminum (embossed aluminum for exterior doors) – .050 aluminum – 2.25#/ft3 polyurethane foam insulation – Allegis – Continuous stainless steel piano Hinge – 8"x12" wire glass, Thermal – All doors are thermal break design –
ROOFCURB		– Roofcurb provided by others. – Roofcurb submittal needs to be co-coordinated with onsite contractor and AHU manufacturer. Send roof curb drawing when available. – All openings in the base will be framed out with a channel height that is 2" smaller than the AHU perimeter channel height. This applies to all units except those with 4" perimeters. These units will have base openings framed out with 4" channel. –
UNIT SUPPORT REQUIREMENTS		– Unit is shipped in sections. Sections to be assembled at the jobsite. See IOM shipped with unit for details. – Unit requires full perimeter support. Units shipped in multiple sections require additional support at each of the shipping split locations. – Installation co-ordination and AHU mounting details need to be made available to AHU manufacturer for review to ensure no interference issues occur at the jobsite. Installation contractor is responsible for providing these details to the AHU manufacturer. Contractor to work with local Trane office and AHU manufacturer. –
FILTER GAGES		– Filter gages are surface mounted to the AHU casing. A combination of aluminum tubing and black poly tubing is used to pipe to the high/low port of the filter gage to either side of the filter frames. – **Note: Separate gauges to be provided for pre and final filter banks** –
COIL RACKS		– Cooling coil racks are stainless steel – Heating coil racks are galvanized steel – Coils are removed through removable access plugs. –

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MOTOR REMOVAL RAIL	– Structural steel I-beam installed in the fan section to facilitate motor removal. – Motor hoisting mechanism not included. – Beam trolley mechanism is not included
CORIDOR PIPE CHASES AND/OR ELECTRICAL CHASES **EC & HC to coordinate prior to final AHU release**	– Pipe chases and electrical chases can be provided in the service corridor. Chase sizes and locations coordinated during the submittal approval process need to be reviewed and approved by the installation contractor to confirm the locations meet the needs of the project. If no chases are shown on the approved submittal drawing then no chases will be provided. – **NOTE: Any additional piping and electrical penetrations not currently shown must be located by contractor before release is accepted.**
PIPE CONNECTIONS	– The supply and return connections will be extended through the casing wall but the vent and drain on the inside coil bank will be left inside the unit.. – Pipe penetrations are sealed with Rubber grommets, or if space restraints exist, sheet metal collars rings. – Pipe extension material is Sch. 40 blk pipe – Vent and drain material is Sch. 40 blk pipe – .
SHIP LOOSE	– 2 sets of pre-filters provided – 2 sets of final-filters (bag filters) provided – All Filters will be provided by the factory, boxed and shipped inside the AHU sections. Storage, handling, and installation at the jobsite is the responsibility of others. – Filter clips – Equipment IOMs - AHU - VFDs - Special equipment IOM
FAN VIBRATION	– Fans are balanced at the fan manufacturer's facility. Vibration level to meet BV-3 balance levels. Additional vibration levels, BV-4 and BV-5 are available for additional charges. Contact factory if additional vibration is required. – **Vibration isolators are VMC model AMSR-2B**

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ELECTRICAL

- Units are ETL labeled
- See included electrical diagram
- ABB ACH580 VCR VFD with Bypass Provided.
- VFDs are Wired to Motors. (Aux Switch Provided.)
- Single Point Power for Fans and 120V Load Center Provided.
- All Enclosures and VFDs within Vestibule will be Nema 1.
- EMT Conduit, Zinc Die-cast Compression Connector, and Flexible metal Conduit (FMC) are standard conduits.
- Power wiring splices are connected with a power distribution block mounted in a NEMA 1 enclosure located on the ceiling/sidewall of the unit. Control wiring splices are connected with MOLEX type connectors mounted in a NEMA 1 enclosure located on the ceiling/sidewall of the unit.
- Electrical enclosures downstream (2 feet) of the cooling coil and downstream of the humidifier grid are to be rated for 'damp location'.

Standard Lighting is Standard Single Pole 15A Switch, Marine Glass Globe with Wire Guard, 10W LED, and Standard 20A GFIC Receptacles.

TESTING

- Unit will be tested for leakage to confirm a maximum leakage rate to meet ½% flow at 1.25 times design static pressure. Positive pressure for positive sections, and negative test for negative sections.
- **Drawing has been added to indicate how testing is done. Testing is only provided in the factory.**
- 2 plane (X,Y) Vibration test will be performed on the fan/motor assembly. Vibration levels to meet .157 inch peak.

HC to confirm pipe support locations

Pipe Supports

Piping supports have been added to drawing. Note pipes have been moved further away from inside wall to allow for NEC clearances.

- When controlled in a bank of fans, these fan units must be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.
-

Spec section 23 73 23 3.5 B requires field leakage testing.

The unit shall be leakage tested in the field by the TAB contractor. The casing leakage test shall verify that unit casing leakage is less than 1/2% of design air flow at 1-1/4 times the design static pressure. The unit shall be sealed; pressure sections shall be put under positive pressure and suction sections shall be put under negative pressure. The leakage shall be measured in each section using a calibrated orifice plate. The total casing leakage (positive plus negative) shall be considered the sum of the positive and negative leakage.

Any unit modifications necessary as a result of testing not meeting specified performance levels shall be done by the unit manufacturer at no additional cost. The Owners representative/Engineer shall have the option to witness all tests. A formal written report including all test procedures and accepted results shall be submitted to the Engineer.

Failure to pass leakage test will subject the AHU manufacturer to penalties based on the total summation of energy cost for the additional casing leakage above 1/2% extended thru a 10-year operating period up to a maximum of 5% of the air handling unit value.

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Job Specific Testing requirements for Production	

Job Name ------	Dayton Children's Hospital
Eq Number -----	21580
Sales Order ----	

CUSTOMER WITNESS (YES/NO) NO

	LEAKAGE TEST REQUIREMENTS					DEFLECTION TEST REQUIREMENTS				AIRFLOW TEST			VIBRATION TEST
		POSITIVE TEST		NEGATIVE TEST									
AHU TAG	TOTAL ALLOWABLE LEAKAGE IN CFM (POS & NEG. COMBINED	TEST PRESSURE inches W.C.	C W	TEST PRESSURE inches W.C.	C W	DEFLECTION SPEC. EX. L/200	ALLOWABLE PANEL DEFLECTION inches	TEST PRESSURE inches W.C.	C W	MEASUREMENT METHOD, PITOT TRAVERSE / PIEZOMETER	TEST DUCT SIZE	C W	YES/ NO
AHU-63	425	7.25 and 3.9"	N	2.2"	N	N/A	N/A	N/A	N	N/A	N/A	N	Y
AHU -64	425	7.25 and 3.9"	N	2.2"	N	N/A	N/A	N/A	N	N/A	N/A	N	Y

REFER TO TEST PLAN DRAWING FOR CALCULATION

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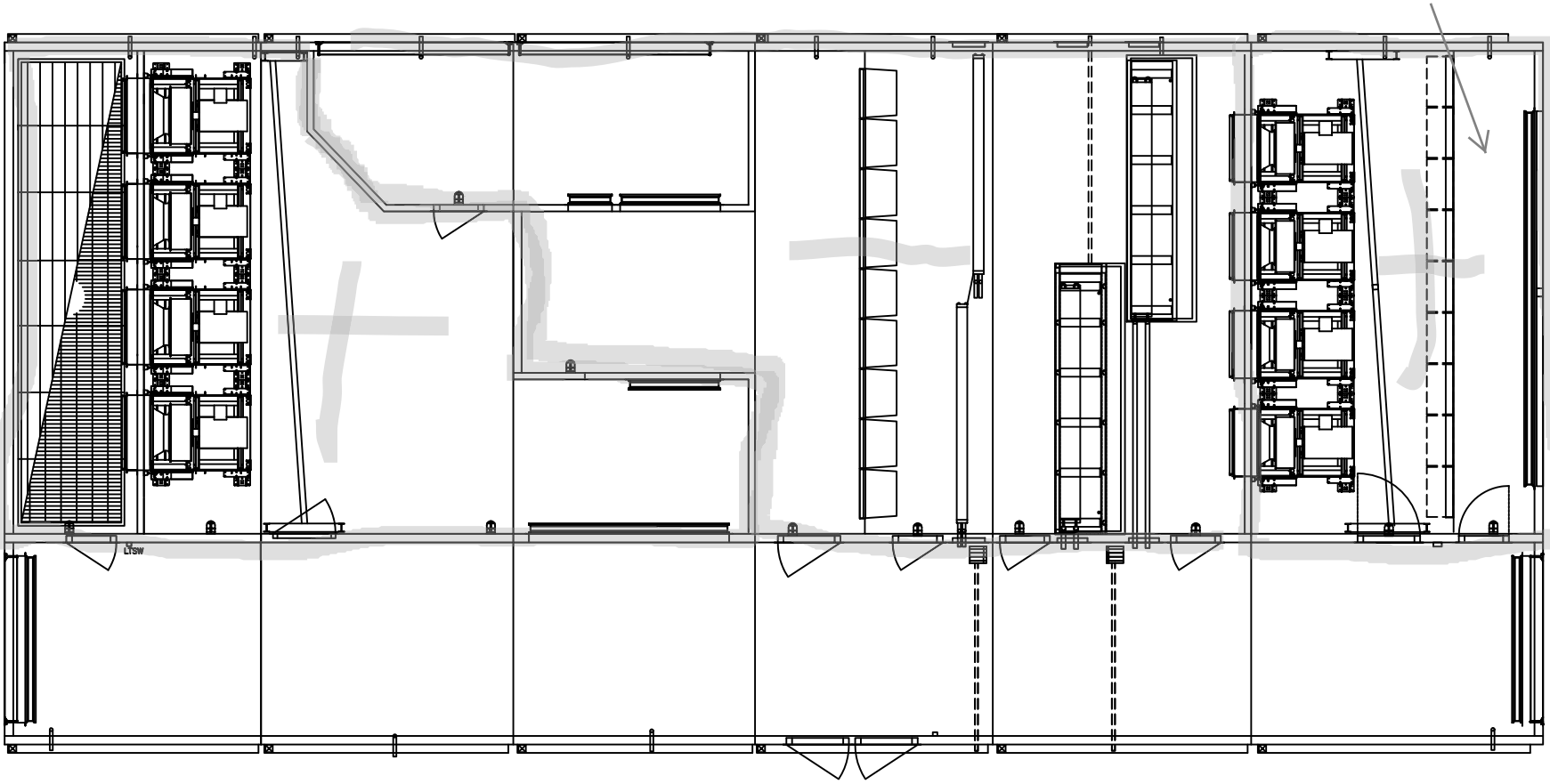
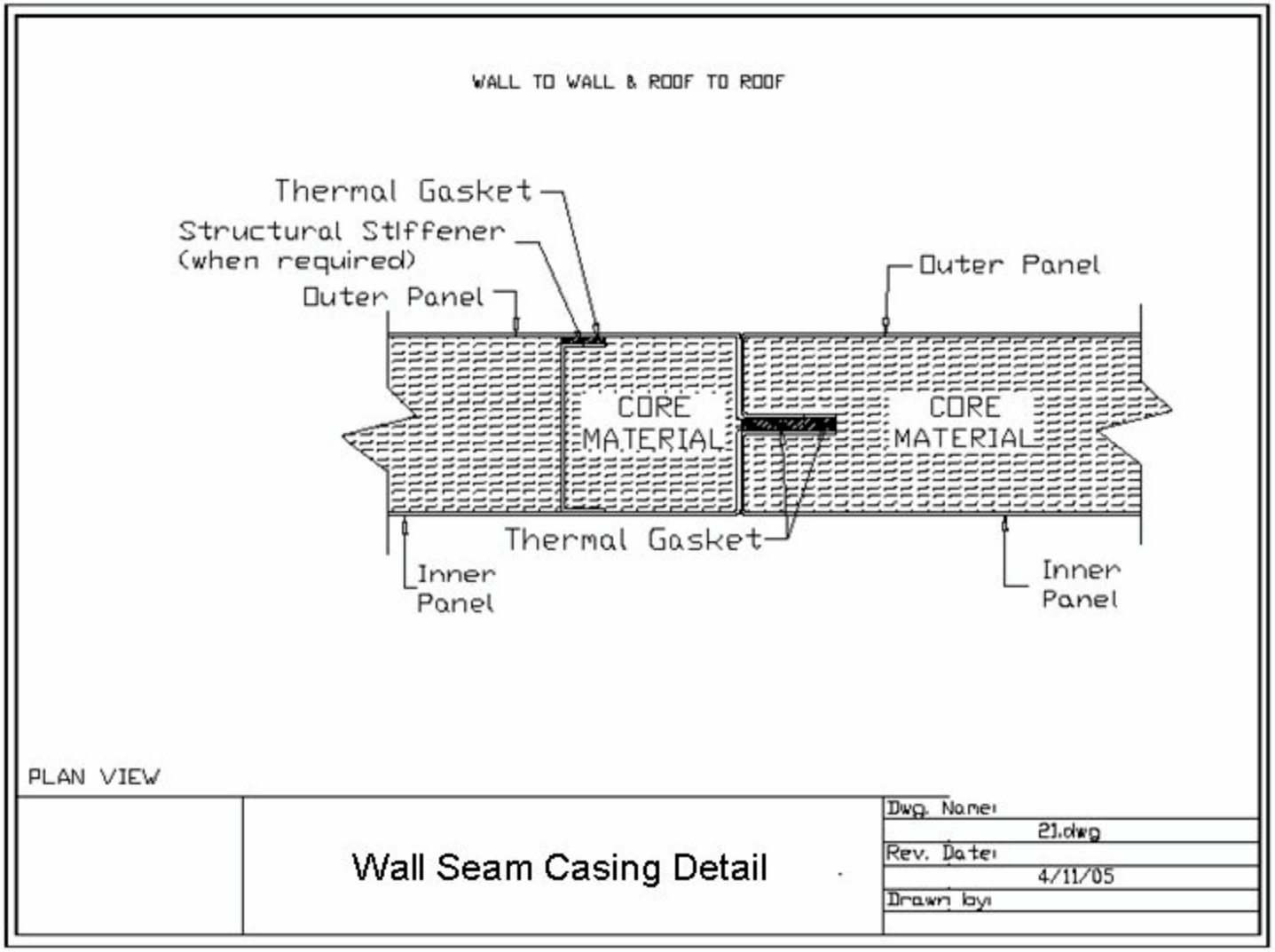
Pressure testing:
2.5" ESP +.62" ISP=3.12" X 1.25 = 3.9"
Note: The area at the intake of the return fans although negative will be tested along with the positive pressure side as positive.

Negative Pressure Test:
.09" Lvrs+.1" Dprs+.23 PreFilt +.39 Bag Filt+ .95" Filt Load= -1.76"X1.25= 2.2"

Disch Pressure Test:
4" ESP+ 1.7"HEPA (Dirty)+ .1"Dprs = 5.8" x 1.25 =+7.25



Trane custom class “a” thermal break



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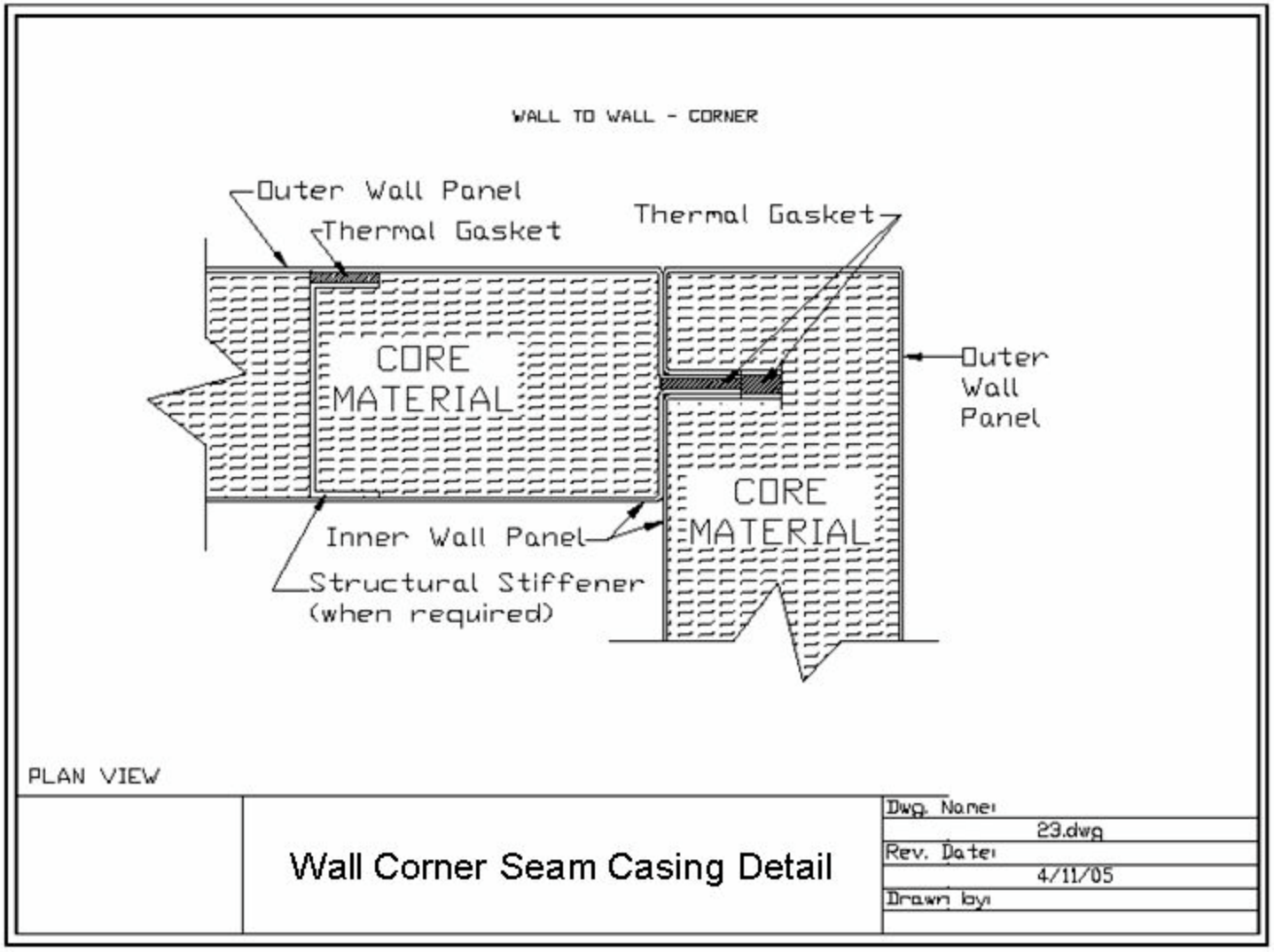

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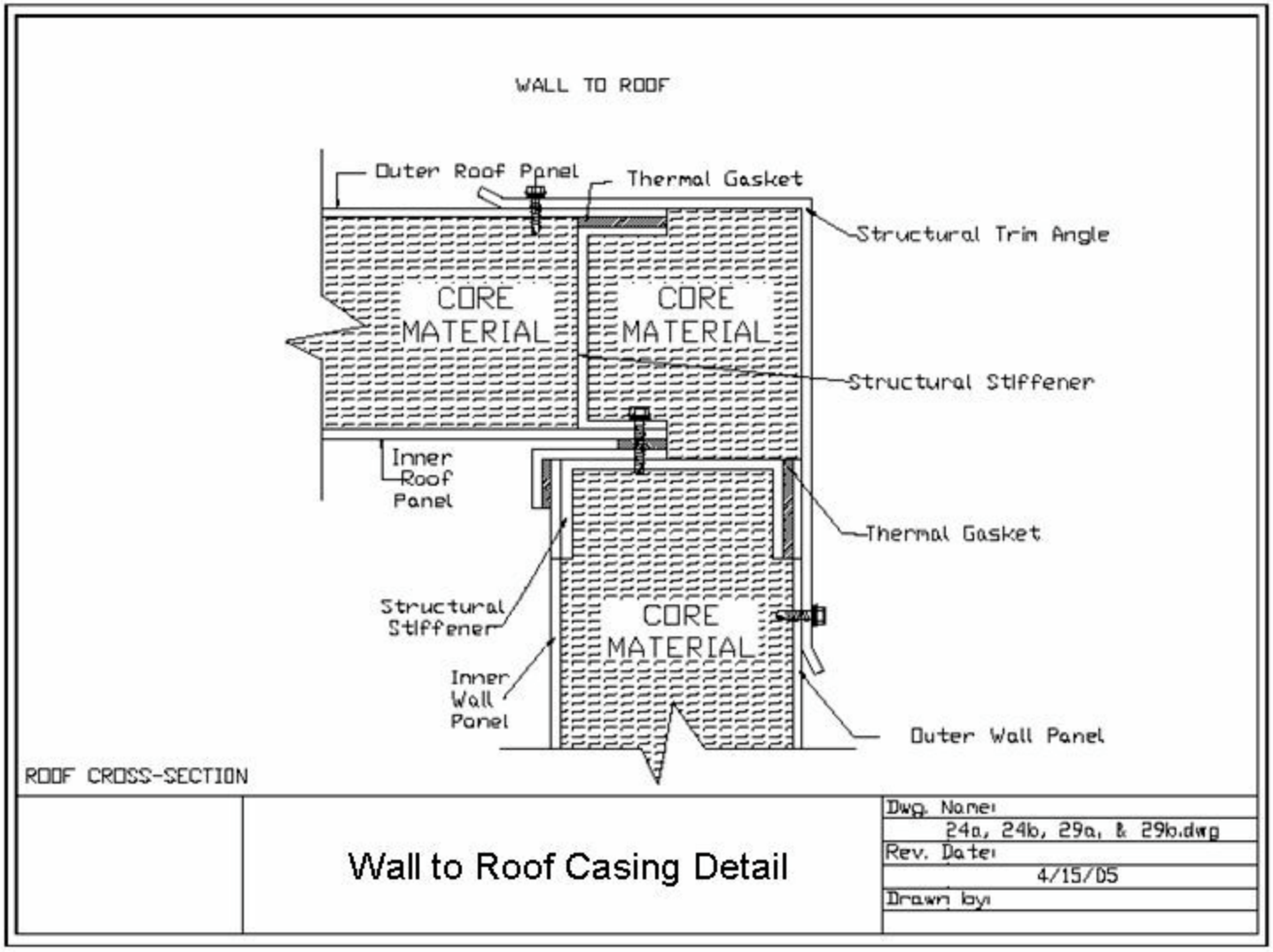
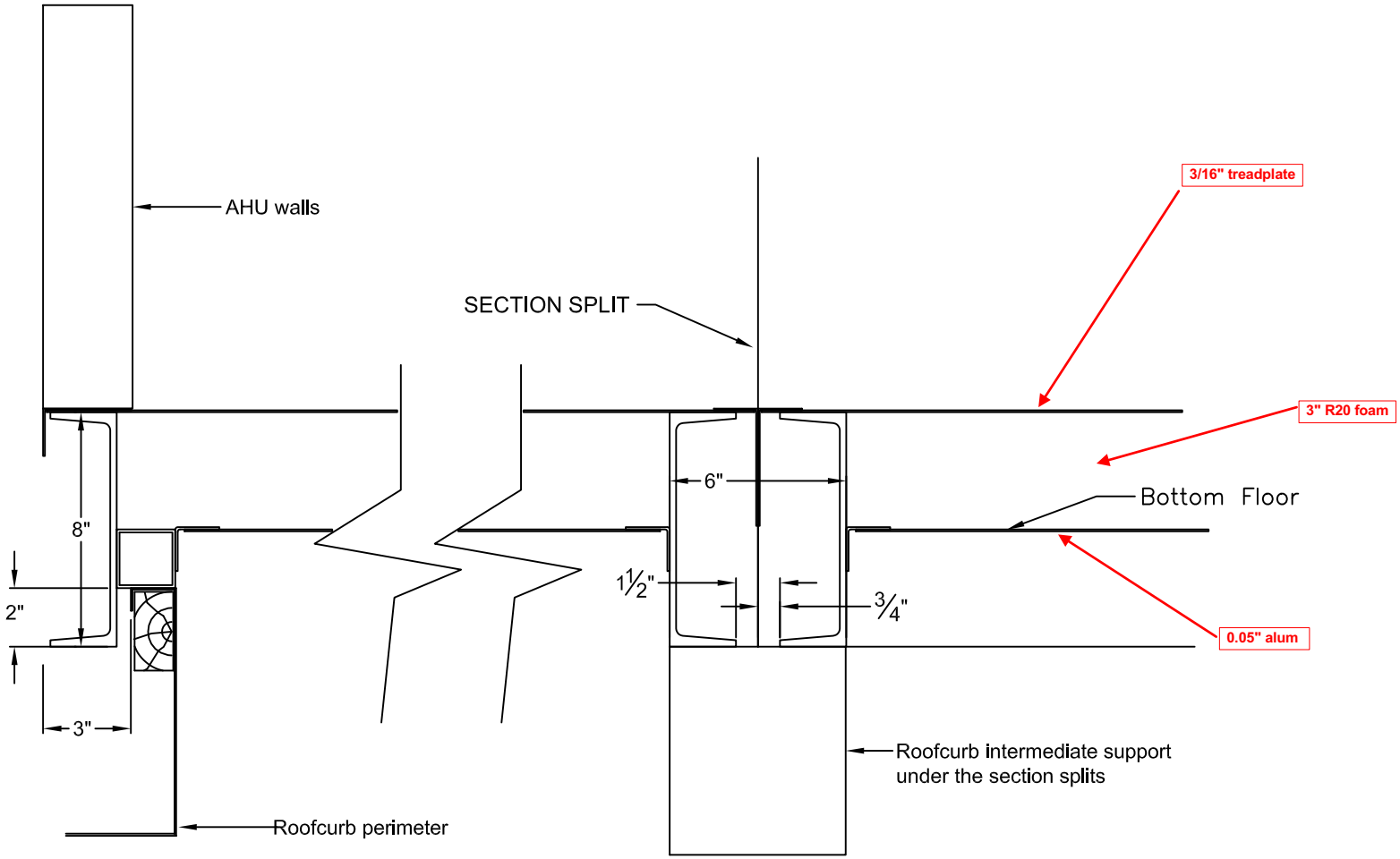


REVISIONS				
BY	REV	DESCRIPTION	DATE	APPROVED



PRODUCTION DRAWINGS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS: DECIMALS: ANGLES:
±1/16 .X ±0.03 ±0.5°
.XX ±0.01
.XXX±0.005
---DO NOT SCALE DRAWING---

APPROVALS	DATE
DWN BY	
ENGINEER	

AHT
MOUNTING

⚠ –REPRESENTS REVISION CHANGE

Typical Section Split
BASE DETAILS

SIZE	SO.#	EQ.#	REV
B	UNIT TAG:	SHEET OF	0

SUPPLY AND RETURN FANS

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TSP Calculation Worksheet

Job Name	DCH
EQ Number	21580
Date	8/18/2021

Component	A.P.D.
Supply fan	AHU#1
louvers	0.09
OA Dampers	0.1
Pre filters (clean)	0.23
Final filters (clean)	0.39
Heating coils	0.1
Cooling coils	0.62
Backdraft dampers	0.05
Hepa filters (initial)	1.4
Filter loading	1.24
Safety APD allowance	0.5
Fan System effect-SE#1	0.28
Discharge System effect-SE#2	0.25
ISP	5.25
ESP (Given)	4
TSP	9.25

Component	A.P.D.										
Return/Exhaust fan	AHU#1	0	0	0	0	0	0	0	0	0	0
Return damper	0.05										
Return damper	0.05										
Exh dampers	0.05										
louvers	0.1										
Safety APD allowance	0.2										
Fan System effect-SE#1	0.17										
Discharge System effect-SE#2	0										
ISP	0.62										
ESP (Given)	2.5										
TSP	3.12										

Supply fans

Fan Data	
Wheel Diameter/Type/Class	24.5 DDP CL3 Plenum SWSI Class 3
Fan Set	Trane DDP 4X2 100%
Number of Fans	8
Drive Location	Drive right hand
Blades	Improved sound-lowest overall,less spike
Fan Performance	
Airflow	85000 cfm
Total Static Pressure	9.250 in H2O
Total Brake Power	179.914 hp
Operating Speed	2286 rpm
Unit Static Efficiency	68.89 %
Fan Design Temp	70.00 F
Motor Interface Options	
Selection Type	Motor interface options: None
Voltage	Motor voltage: 460/3
VFD Frequency	Motor hertz: 77.00

Motor Data	
Power / Fan	Motor horsepower per fan: 30 HP
Voltage	Motor voltage: 460/3
Speed	Motor RPM: 1800
Class	Motor enclosure: Premium Efficient TEFC
Efficiency	Full load motor efficiency: 94.20
Part Load Efficiency	Part load motor efficiency: 90.10
Fan Section Options	
Insulation	No
Plenum Fan Protective Enclosure	No
Coplanar Separation	No

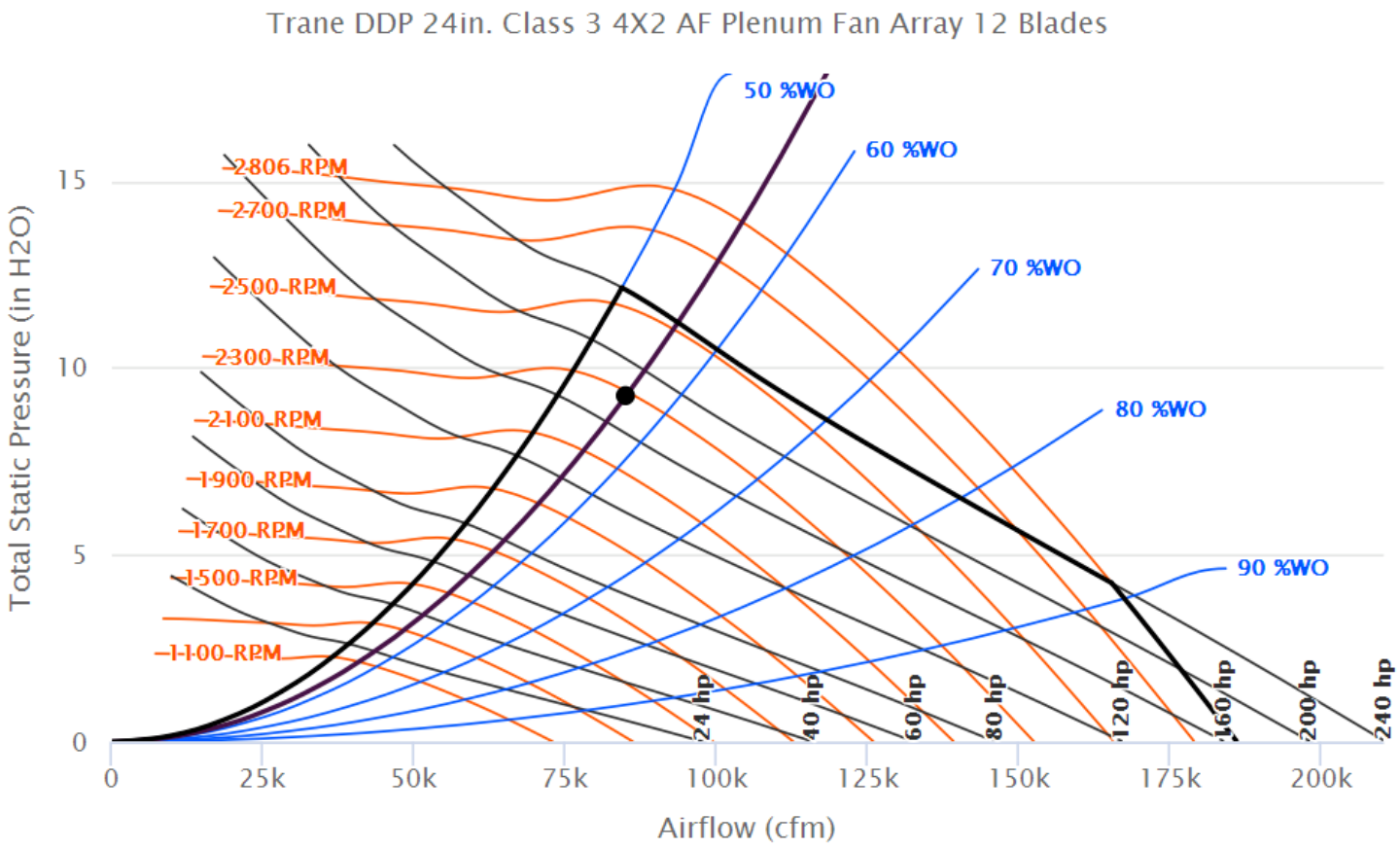
Pressure Drop in (in w.g.)

Supply fan	
Fan	9.25
Internal Static Pressure	**5.25**
External Static Pressure	**4**
Total Static Pressure	**9.25**

Fan Details

Unit Size	24UF	**Operating Brake Power**	179.914 hp
Motor Frequency	77.00 Hz	**Altitude**	0.00 ft
Operating Airflow	85,000 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	9.250 in H2O	**Efficiency**	68.89 %
Operating RPM	2,286 rpm		

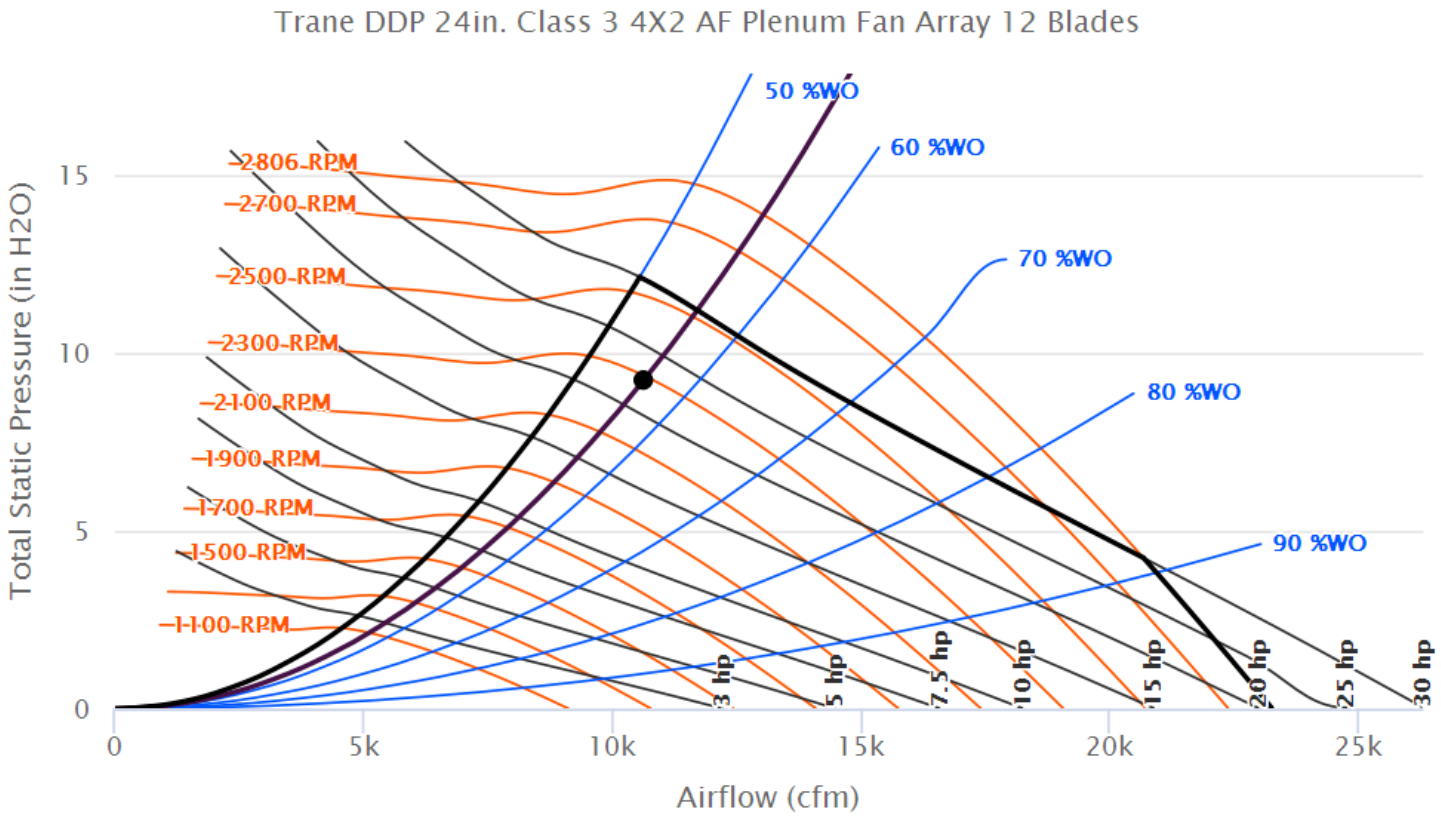
Trane DDP 24in. Class 3 4X2 AF Plenum Fan Array 12 Blades



Fan Details

Unit Size	24UF	**Operating Brake Power**	22.489 hp
Motor Frequency	77.00 Hz	**Altitude**	0.00 ft
Operating Airflow	10,625 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	9.250 in H2O	**Efficiency**	68.89 %
Operating RPM	2,286 rpm		

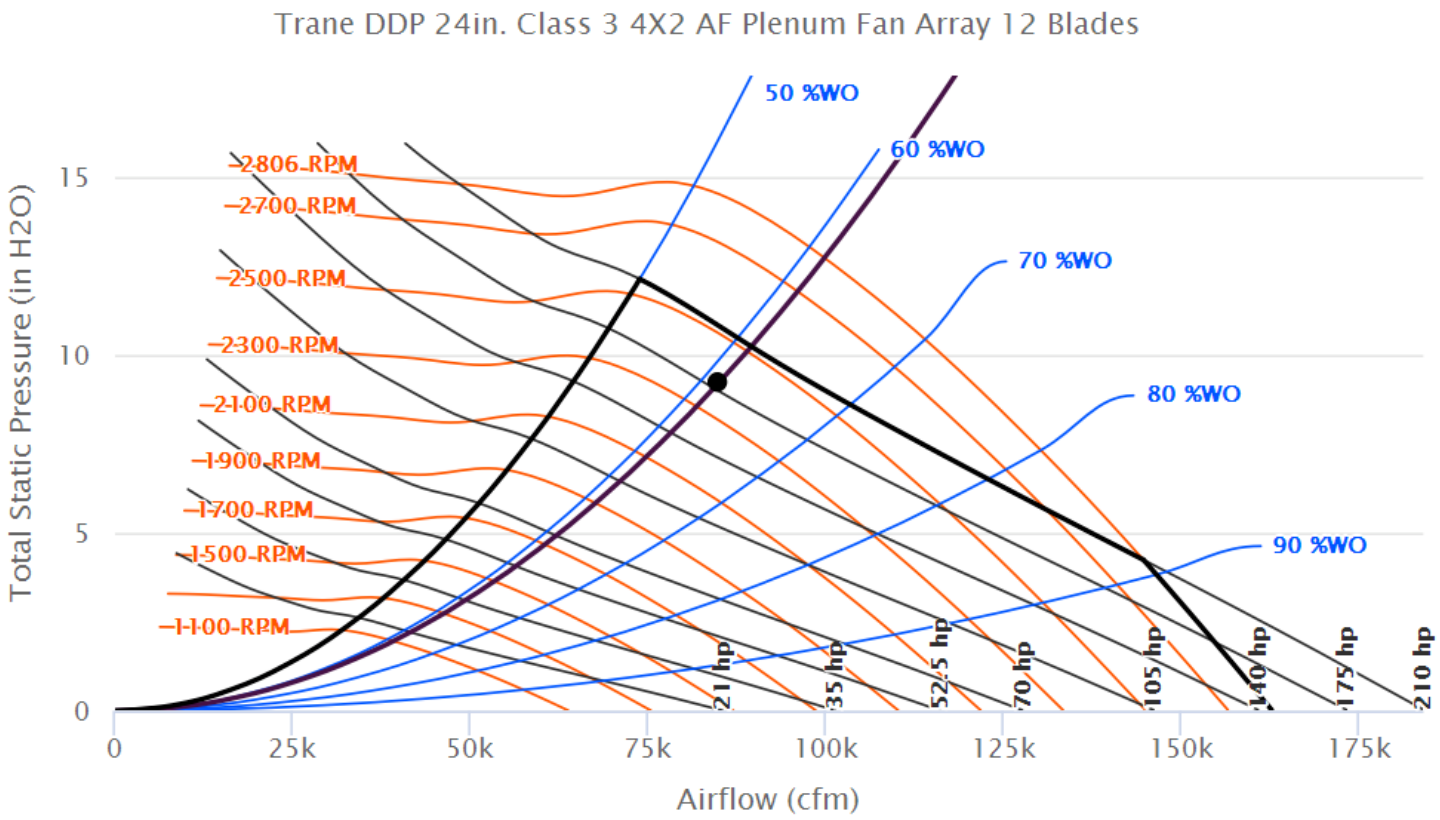
Trane DDP 24in. Class 3 4X2 AF Plenum Fan Array 12 Blades – Single Fan



Fan Details

Unit Size	24UF	**Operating Brake Power**	180.174 hp
Motor Frequency	80.00 Hz	**Altitude**	0.00 ft
Operating Airflow	85,000 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	9.250 in H2O	**Efficiency**	68.79 %
Operating RPM	2,388 rpm	**Redundancy**	100.00 %

Trane DDP 24in. Class 3 4X2 AF Plenum Fan Array 12 Blades – One Fan Down



RETURN FANS

Fan Data	
Wheel Diameter/Type/Class	27 DDP CL3 Plenum SWSI Class 3
Fan Set	Trane DDP 4X2 100%
Number of Fans	8
Drive Location	Drive right hand
Blades	Improved sound-lowest overall,less spike

Fan Performance	
Airflow	80000 cfm
Total Static Pressure	3.150 in H2O
Total Brake Power	55.823 hp
Operating Speed	1325 rpm
Unit Static Efficiency	71.17 %
Fan Design Temp	70.00 F

Motor Interface Options	
Selection Type	Motor interface options: None
Voltage	Motor voltage: 460/3
VFD Frequency	Motor hertz: 67.00

Motor Data	
Power / Fan	Motor horsepower per fan: 10 HP
Voltage	Motor voltage: 460/3
Speed	Motor RPM: 1200
Class	Motor enclosure: Premium Efficient TEFC
Efficiency	Full load motor efficiency: 91.01
Part Load Efficiency	Part load motor efficiency: 83.11

Fan Section Options	
Insulation	No
Plenum Fan Protective Enclosure	No
Coplanar Separation	No

Doors

	Position	Size	Swing	Construction	Secured Access	Hinge Location	Allegis standard Latch	Clear pane Window	Test Port
Door 1	Right	24" door opening x 60.000 in	Door 1 outward swing	Standard door	Tool locking	Left	2.00		

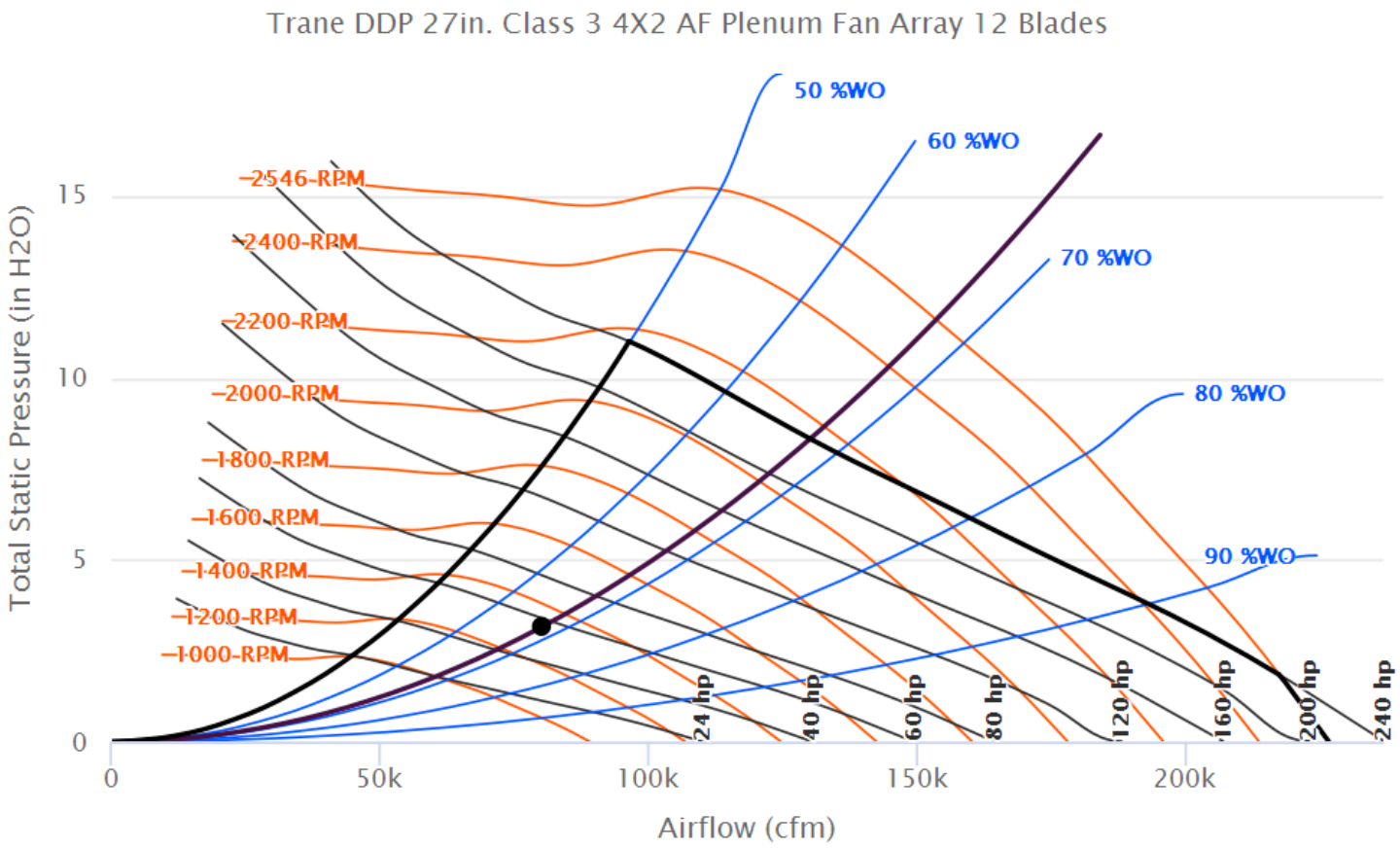
Pressure Drop in (in w.g.)

Supply fan	
Fan	3.12
Internal Static Pressure	**.62**
External Static Pressure	**2.5**
Total Static Pressure	**3.12**

Fan Details

Unit Size	27UF	**Operating Brake Power**	55.823 hp
Motor Frequency	67.00 Hz	**Altitude**	0.00 ft
Operating Airflow	80,000 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	3.150 in H2O	**Efficiency**	71.17 %
Operating RPM	1,325 rpm		

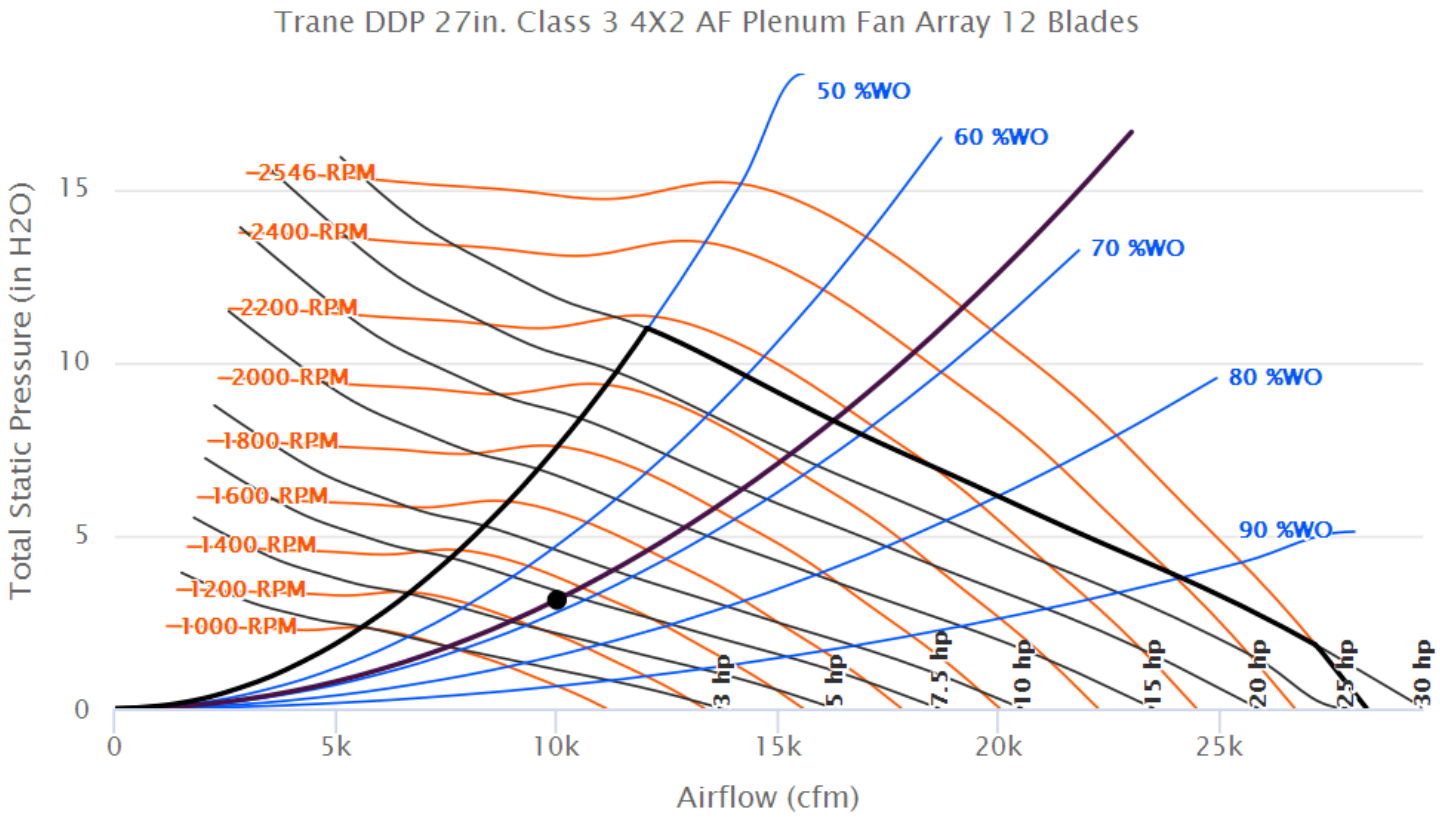
Trane DDP 27in. Class 3 4X2 AF Plenum Fan Array 12 Blades



Fan Details

Unit Size	27UF	**Operating Brake Power**	6.978 hp
Motor Frequency	67.00 Hz	**Altitude**	0.00 ft
Operating Airflow	10,000 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	3.150 in H2O	**Efficiency**	71.17 %
Operating RPM	1,325 rpm		

Trane DDP 27in. Class 3 4X2 AF Plenum Fan Array 12 Blades – Single Fan

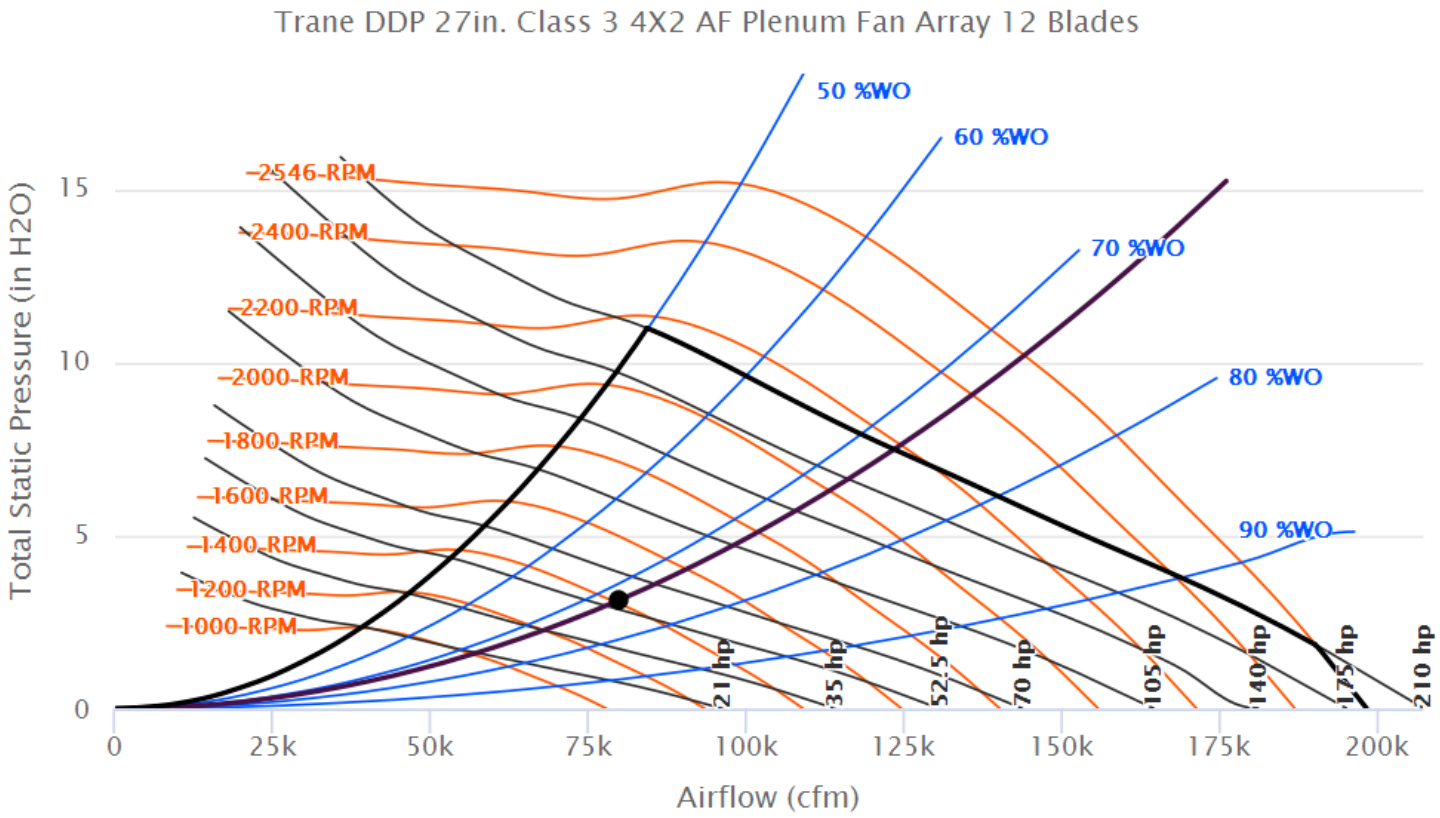


ONE FAN DOWN

Fan Details

Unit Size	27UF	**Operating Brake Power**	57.228 hp
Motor Frequency	71.00 Hz	**Altitude**	0.00 ft
Operating Airflow	80,000 cfm	**Design Temp.**	70.00 F
Operating Static Pressure	3.150 in H2O	**Efficiency**	69.42 %
Operating RPM	1,413 rpm	**Redundancy**	100.00 %

Trane DDP 27in. Class 3 4X2 AF Plenum Fan Array 12 Blades – One Fan Down



SUPPLY FAN MOTORS
Includes shaft grounding ring

BALDOR • RELIANCE

Product Information Packet

EHM4104T

30HP,1770RPM,3PH,60HZ,286T,1060M,TEFC,F1

Part Detail

Revision:	S	**Status:**	PRD/A	**Change #:**		**Proprietary:**	No
Type:	AC	**Elec. Spec:**	10WGY648	**CD Diagram:**	CD0005	**Mfg Plant:**	
Mech. Spec:	10H756	**Layout:**	10LYH756	**Poles:**	04	**Created Date:**	12-12-2011
Base:	RG	**Eff. Date:**	09-02-2020	**Leads:**	9#10		

Specs

Catalog Number:	EHM4104T	**Heater Indicator:**	No Heater
Product Complexity Level:	Standard	**Insulation Class:**	F
Enclosure:	TEFC	**Inverter Code:**	Inverter Ready
Frame:	286T	**KVA Code:**	J
Frame Material:	Iron	**Lifting Lugs:**	Standard Lifting Lugs
Output @ Frequency:	30.000 HP @ 60 HZ	**Locked Bearing Indicator:**	Locked Bearing
Synchronous Speed @ Frequency:	1800 RPM @ 60 HZ	**Motor Lead Quantity/Wire Size:**	9 @ 10 AWG
Voltage @ Frequency:	460.0 V @ 60 HZ	**Motor Lead Exit:**	Ko Box
	230.0 V @ 60 HZ	**Motor Lead Termination:**	Flying Leads
XP Class and Group:	None	**Motor Type:**	1060M
XP Division:	Not Applicable	**Mounting Arrangement:**	F1
Agency Approvals:	CSA	**Power Factor:**	79
	CSA EEV	**Product Family:**	General Purpose
	UR	**Pulley End Bearing Type:**	Ball
Auxillary Box:	No Auxillary Box	**Pulley Face Code:**	Standard
Auxillary Box Lead Termination:	None	**Pulley Shaft Indicator:**	Standard
Base Indicator:	Rigid	**Rodent Screen:**	None
Bearing Grease Type:	Polyrex EM (-20F +300F)	**Shaft Extension Location:**	Pulley End

Blower:	None	**Shaft Ground Indicator:**	Mounting Provisions Only
Current @ Voltage:	78.000 A @ 208.0 V	**Shaft Rotation:**	Reversible
	76.000 A @ 230.0 V	**Shaft Slinger Indicator:**	No Slinger
	38.000 A @ 460.0 V	**Speed Code:**	Single Speed
Design Code:	A	**Motor Standards:**	NEMA
Drip Cover:	No Drip Cover	**Starting Method:**	Direct on line
Duty Rating:	CONT	**Thermal Device - Bearing:**	None
Electrically Isolated Bearing:	Not Electrically Isolated	**Thermal Device - Winding:**	None
Feedback Device:	NO FEEDBACK	**Vibration Sensor Indicator:**	No Vibration Sensor
Front Face Code:	Standard	**Winding Thermal 1:**	None
Front Shaft Indicator:	None	**Winding Thermal 2:**	None

Nameplate NP2138L

CAT.NO.	EHM4104T			**P/N**				**ENCLOSURE**	TEFC		
SPEC.	10H756Y648G1	**CC**	010A	**FRAME**	286T			**S/N**			
HP	30			**CLASS**	F	**HZ**	60				
RPM	1770			**PH**	3	**DES**	A				
VOLT	230/460							**KVA-CODE**	J	**ODE BRG**	6309
AMP	76/38					**USABLE AT 208V**	78			**DE BRG**	6311
RATING	40C AMB-CONT					**GREASE**	POLYREX EM				
NEMA-NOM-EFF	93.6	**PF**	79	**SER.F.**	1.15						
HTR-VOLTS		**HTR-AMPS**									

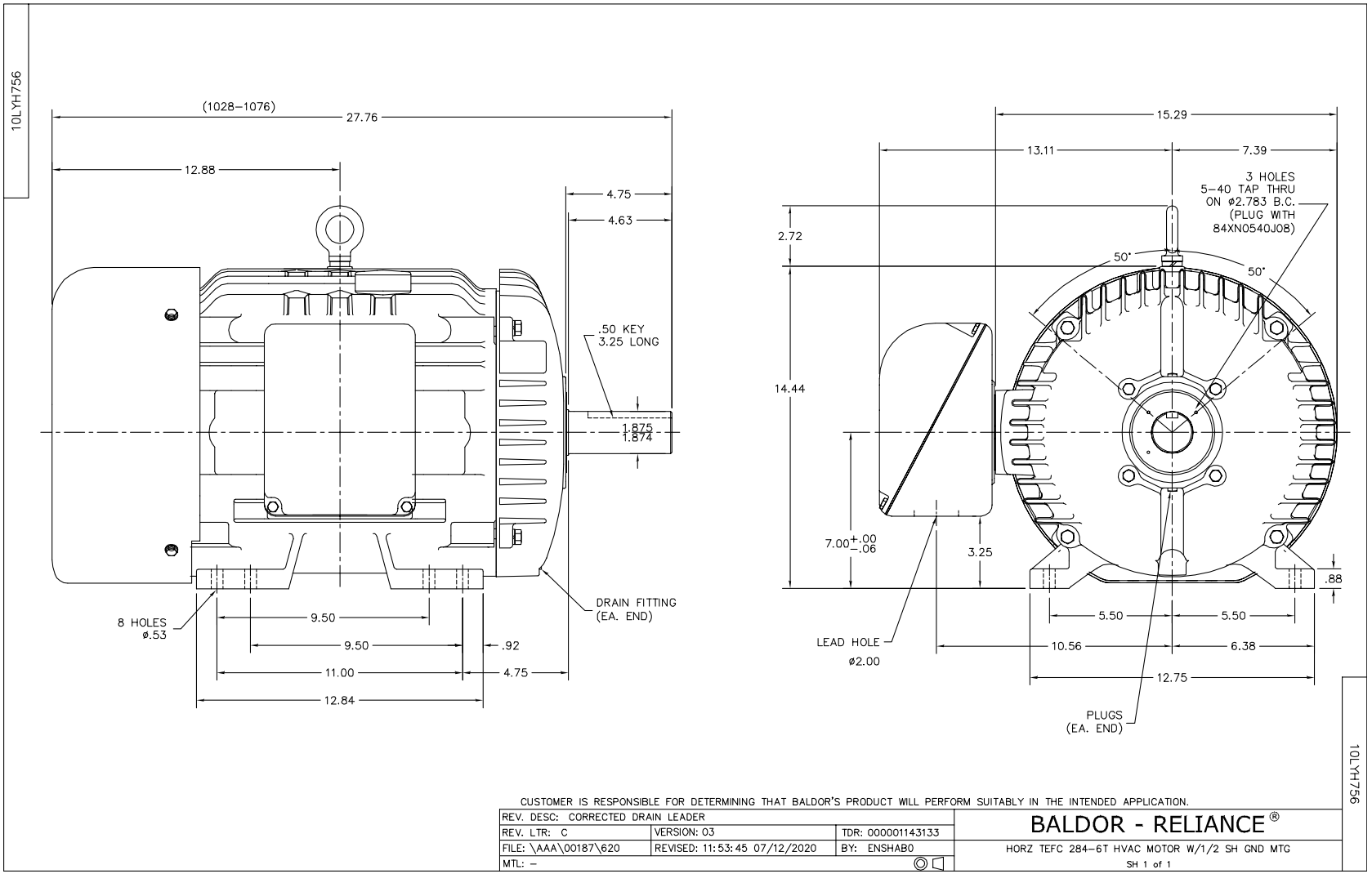
AC Induction Motor Performance Data
Record # 53027
Typical performance - not guaranteed values

Winding: 10WGY648-R002 **Type:** 1060M **Enclosure:** TEFC

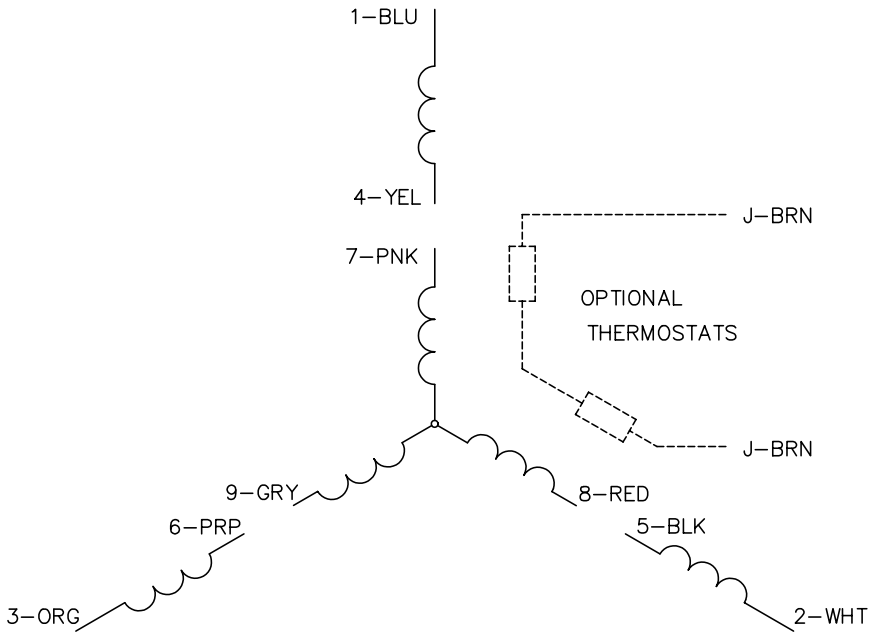
Nameplate Data			460 V, 60 Hz: High Voltage Connection	
Rated Output (HP)		30	**Full Load Torque**	88.9 LB-FT
Volts		230/460	**Start Configuration**	direct on line
Full Load Amps		76/38	**Breakdown Torque**	314 LB-FT
R.P.M.		1770	**Pull-up Torque**	151 LB-FT
Hz	60 **Phase**	3	**Locked-rotor Torque**	172 LB-FT
NEMA Design Code	A **KVA Code**	J	**Starting Current**	274 A
Service Factor (S.F.)		1.15	**No-load Current**	19.3 A
NEMA Nom. Eff.	93.6 **Power Factor**	79	**Line-line Res. @ 25ºC**	0.182 Ω
Rating - Duty		40C AMB-CONT	**Temp. Rise @ Rated Load**	55°C
S.F. Amps			**Temp. Rise @ S.F. Load**	66°C
			Locked-rotor Power Factor	32
			Rotor inertia	4.77 LB-FT2

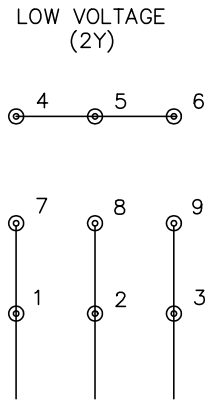
Load Characteristics 460 V, 60 Hz, 30 HP

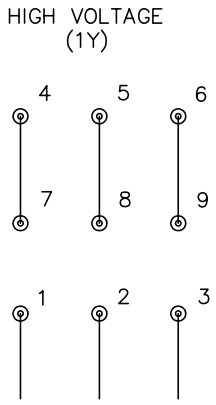
% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor	38	60	70	79	81	82	80
Efficiency	90	93.4	94.2	94.3	93.8	93.2	94
Speed	1795	1789	1783	1777	1771	1763	1773
Line amperes	21	25.5	32.1	37.6	46.3	54.8	42.8


10LYH756
(1028–1076)
27.76
12.88
4.75
4.63
.50 KEY
3.25 LONG
1.875
1.874
8 HOLES
ø.53
9.50
9.50
.92
11.00
4.75
12.84
DRAIN FITTING
(EA. END)
15.29
13.11
7.39
3 HOLES
5–40 TAP THRU
ON ø2.783 B.C.
(PLUG WITH
84XN0540J08)
2.72
50°
50°
14.44
7.00 +.00 −.06
3.25
.88
LEAD HOLE
ø2.00
5.50
5.50
10.56
6.38
12.75
PLUGS
(EA. END)
10LYH756
CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT BALDOR'S PRODUCT WILL PERFORM SUITABLY IN THE INTENDED APPLICATION.
REV. DESC: CORRECTED DRAIN LEADER
REV. LTR: C
VERSION: 03
TDR: 000001143133
FILE: \AAA\00187\620
REVISED: 11:53:45 07/12/2020
BY: ENSHAB0
MTL: –
BALDOR - RELIANCE®
HORZ TEFC 284–6T HVAC MOTOR W/1/2 SH GND MTG
SH 1 of 1

CD0005







NOTES:

1. INTERCHANGE ANY TWO LINE LEADS TO REVERSE ROTATION.
2. OPTIONAL THERMOSTATS ARE PROVIDED WHEN SPECIFIED.
3. ACTUAL NUMBER OF INTERNAL PARALLEL CIRCUITS MAY BE A MULTIPLE OF THOSE SHOWN ABOVE.
4. LEAD COLORS ARE OPTIONAL. LEADS MUST ALWAYS BE NUMBERED AS SHOWN.

CD0005

REV. DESC: REVISE TO SHOW OPTIONAL COLORS			BALDOR ELECTRIC Co.
REV. LTR: E	BY: JLP	REVISED: 01/19/99 10:15	TDR: 0171435
CD0005		FILE: AAA00005140	MDL: –
		MTL: –	3PH, DV, 9 LEADS

RETURN FAN MOTORS
Includes shaft grounding ring

BALDOR • RELIANCE

Product Information Packet

EM2332T-G

10HP,1180RPM,3PH,60HZ,256T,0960M,TEFC,F1

Part Detail

Revision:	P	**Status:**	PRD/A	**Change #:**		**Proprietary:**	No
Type:	AC	**Elec. Spec:**	09WGT193	**CD Diagram:**	CD0005	**Mfg Plant:**	
Mech. Spec:	09J359	**Layout:**	09LYJ359	**Poles:**	06	**Created Date:**	08-21-2015
Base:	RG	**Eff. Date:**	10-02-2018	**Leads:**	9#12		

Specs

Catalog Number:	EM2332T-G	**Heater Indicator:**	No Heater
Enclosure:	TEFC	**Insulation Class:**	H
Frame:	256T	**Inverter Code:**	Inverter Ready
Frame Material:	Iron	**KVA Code:**	H
Output @ Frequency:	10.000 HP @ 60 HZ	**Lifting Lugs:**	Standard Lifting Lugs
Synchronous Speed @ Frequency:	1200 RPM @ 60 HZ	**Locked Bearing Indicator:**	Locked Bearing
Voltage @ Frequency:	460.0 V @ 60 HZ	**Motor Lead Quantity/Wire Size:**	9 @ 12 AWG
	230.0 V @ 60 HZ	**Motor Lead Exit:**	Ko Box
XP Class and Group:	None	**Motor Lead Termination:**	Flying Leads
XP Division:	Not Applicable	**Motor Type:**	0960M
Agency Approvals:	UR	**Mounting Arrangement:**	F1
	CSA EEV	**Power Factor:**	72
	CSA	**Product Family:**	General Purpose
Auxillary Box:	No Auxillary Box	**Pulley End Bearing Type:**	Ball
Auxillary Box Lead Termination:	None	**Pulley Face Code:**	Standard
Base Indicator:	Rigid	**Pulley Shaft Indicator:**	Standard
Bearing Grease Type:	Polyrex EM (-20F +300F)	**Rodent Screen:**	None
Blower:	None	**Shaft Extension Location:**	Pulley End

Current @ Voltage:	14.100 A @ 460.0 V
	28.200 A @ 230.0 V
	30.000 A @ 208.0 V
Design Code:	B
Drip Cover:	No Drip Cover
Duty Rating:	CONT
Electrically Isolated Bearing:	Not Electrically Isolated
Feedback Device:	NO FEEDBACK
Front Face Code:	Standard
Front Shaft Indicator:	None

Shaft Ground Indicator:	Shaft Grounding
Shaft Rotation:	Reversible
Shaft Slinger Indicator:	Shaft Slinger
Speed Code:	Single Speed
Motor Standards:	NEMA
Starting Method:	Direct on line
Thermal Device - Bearing:	NONE (OLD)
Thermal Device - Winding:	None
Vibration Sensor Indicator:	No Vibration Sensor
Winding Thermal 1:	None
Winding Thermal 2:	None

Nameplate NP3441L

CAT.NO.	EM2332T-G								
SPEC.	09J359T193G1								
HP	10								
VOLTS	230/460								
AMP	28.2/14.1								
RPM	1180								
FRAME	256T		HZ	60			PH	3	
SER.F.	1.15	CODE	H	DES	B	CL	H		
NEMA-NOM-EFF	91	PF	72						
RATING	40C AMB-CONT								
CC	010A			USABLE AT 208V	30				
DE	6309			ODE	6208				
ENCL	TEFC	SN							
VPWM INVERTER READY									
CT6-60H(10:1)VT3-60H(20:1									

AC Induction Motor Performance Data

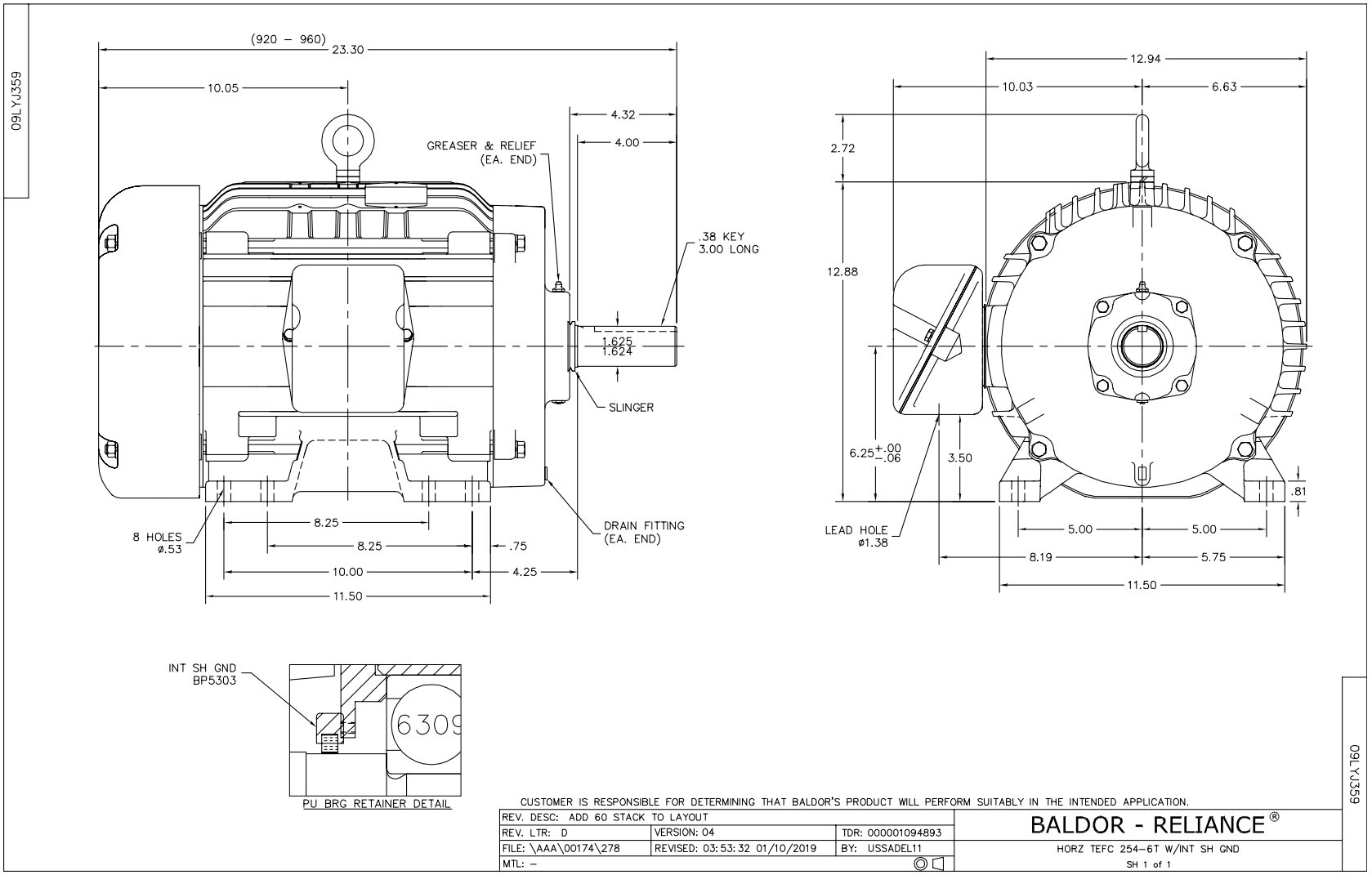
Record # 52520 - Typical performance - not guaranteed values

Winding: 09WGT193-R005	**Type:** 0960M	**Enclosure:** TEFC

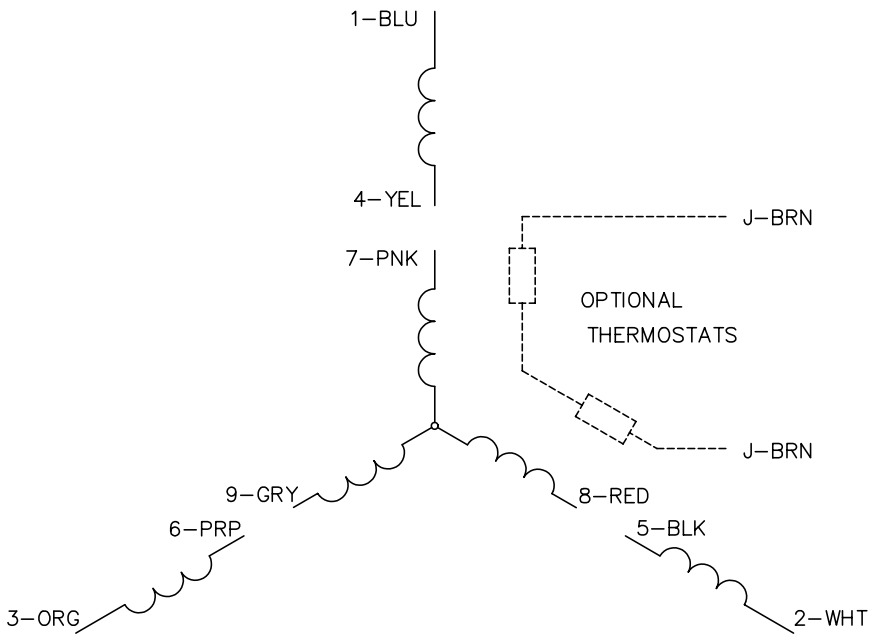
Nameplate Data				460 V, 60 Hz: High Voltage Connection	
Rated Output (HP)	10			Full Load Torque	44.3 LB-FT
Volts	230/460			Start Configuration	direct on line
Full Load Amps	28.2/14.1			Breakdown Torque	121 LB-FT
R.P.M.	1180			Pull-up Torque	50.6 LB-FT
Hz	60	Phase	3	Locked-rotor Torque	67 LB-FT
NEMA Design Code	B	KVA Code	H	Starting Current	81 A
Service Factor (S.F.)	1.15			No-load Current	6.84 A
NEMA Nom. Eff.	91	Power Factor	72	Line-line Res. @ 25ºC	0.746 Ω
Rating - Duty	40C AMB-CONT			Temp. Rise @ Rated Load	38°C
S.F. Amps				Temp. Rise @ S.F. Load	46°C
				Locked-rotor Power Factor	24.9
				Rotor inertia	4.82 LB-FT2

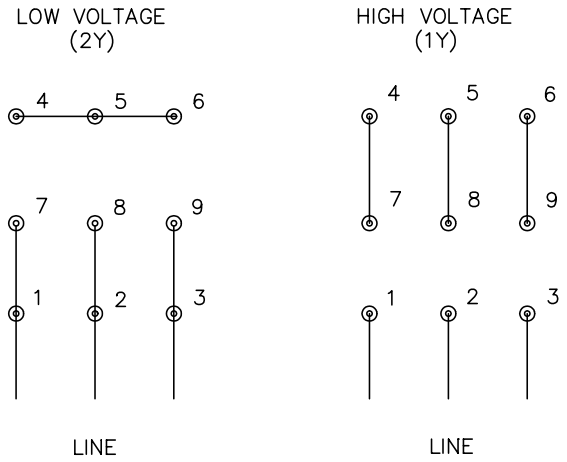
Load Characteristics 460 V, 60 Hz, 10 HP

% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor	36	57	67	72	74	75	73
Efficiency	85.8	90.7	91.9	91.7	91.1	89.4	91.3
Speed	1195	1191	1186	1181	1174	1166	1177
Line amperes	7.45	9.13	11.4	14.1	17.3	21.1	16


09LYJ359
(920 – 960)
23.30
10.05
4.32
4.00
GREASER & RELIEF
(EA. END)
.38 KEY
3.00 LONG
1.625
1.624
SLINGER
DRAIN FITTING
(EA. END)
8 HOLES
ø.53
8.25
8.25
.75
10.00
4.25
11.50
12.94
10.03
6.63
2.72
12.88
6.25 +.00 -.06
3.50
.81
LEAD HOLE
ø1.38
5.00
5.00
8.19
5.75
11.50
INT SH GND
BP5303
6309
PU BRG RETAINER DETAIL
09LYJ359
CUSTOMER IS RESPONSIBLE FOR DETERMINING THAT BALDOR'S PRODUCT WILL PERFORM SUITABLY IN THE INTENDED APPLICATION.
REV. DESC: ADD 60 STACK TO LAYOUT
REV. LTR: D
VERSION: 04
TDR: 000001094893
FILE: \AAA\00174\278
REVISED: 03:53:32 01/10/2019
BY: USSADEL11
MTL: –
BALDOR - RELIANCE®
HORZ TEFC 254–6T W/INT SH GND
SH 1 of 1

CD0005





NOTES:

1. INTERCHANGE ANY TWO LINE LEADS TO REVERSE ROTATION.
2. OPTIONAL THERMOSTATS ARE PROVIDED WHEN SPECIFIED.
3. ACTUAL NUMBER OF INTERNAL PARALLEL CIRCUITS MAY BE A MULTIPLE OF THOSE SHOWN ABOVE.
4. LEAD COLORS ARE OPTIONAL. LEADS MUST ALWAYS BE NUMBERED AS SHOWN.

CD0005

REV. DESC: REVISE TO SHOW OPTIONAL COLORS			BALDOR ELECTRIC Co.
REV. LTR: E	BY: JLP	REVISED: 01/19/99 10:15	TDR: 0171435
CD0005		FILE: AAA00005140	MDL: –
		MTL: –	3PH, DV, 9 LEADS

COOLING AND HEATING COILS

Trane 9900 Aire Circle, Fort Smith, AR 72916 Phone: (479) 648-7402 Fax: (479) 648-7499

Job Name: 21580 coils
Prepared By:
Unit Tag: CC-1
Quantity: 1

Cooling Coil

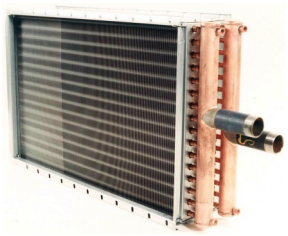
Performance shown is for one coil bank of three coils. There are two banks of three coils in the airstream for 85,000 cfm

Equipment Details

Coil utilization	Shipping coil

Coil Construction

Model Number	DW0B37111G0EB138BACB00B**********
System type	Chilled Water W
Rows	6
Tube matl/wall thickness	.024 (0.610 mm) copper
Nominal fin spacing	138 fins per foot
Fin material	Aluminum
Fin type	Prima-flo E Standard
Actual coil face area	28.91
Nominal coil height	37" (940 mm)
Finned length	111" (2819 mm)
Casing option	Stainless
Turbulators	No
Rigging weight	2125.0 lb
Installed weight	2704.5 lb
Tube matl/wall thickness	.024 (0.610 mm) copper



Coil Performance

Capacity	
Total capacity	1755.35 MBh
Sensible Capacity	1350.54 MBh
Air	
Elevation	0.00 ft
Actual airflow	42500 cfm
Entering dry bulb	80.10 F
Entering wet bulb	65.10 F
Leaving dry bulb	51.20 F
Leaving wet bulb	50.95 F
APD	0.623 in H2O
Face velocity	490 ft/min

Fluid	
Standard fluid flow rate	247.50 gpm
Entering fluid temp	42.00 F
Leaving water temperature	56.13 F
Fluid PD	9.44 ft H2O
Fluid velocity	3.74 ft/sec
Fluid type	Water
Fouling factor	0.00000 hr-sq ft-deg F/Btu
Volume	23.09 gal
Coil bank volume	69.26 gal
Reynolds number	13257.79 Each
AHRI 410 Classification	
AHRI 410 classification	AHRI ACHC certified
Data generation date	8/9/2021
Trane Select Assist update number	2500

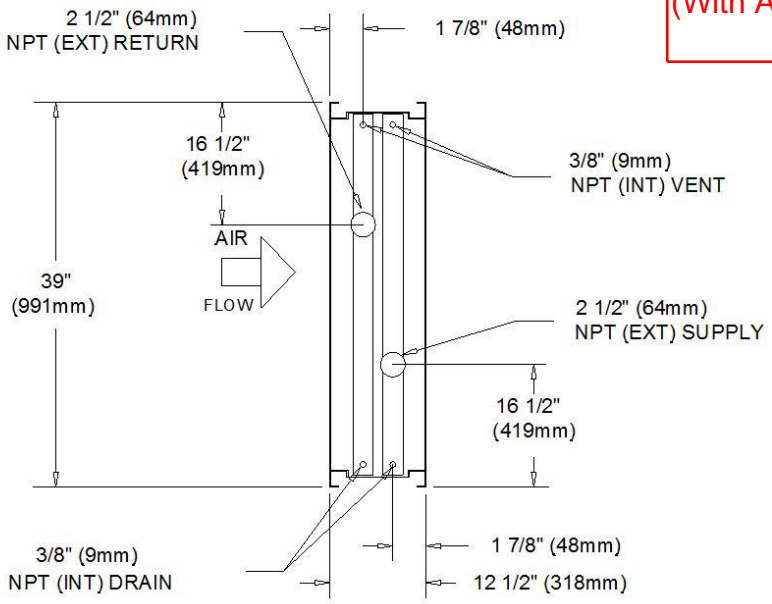
Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

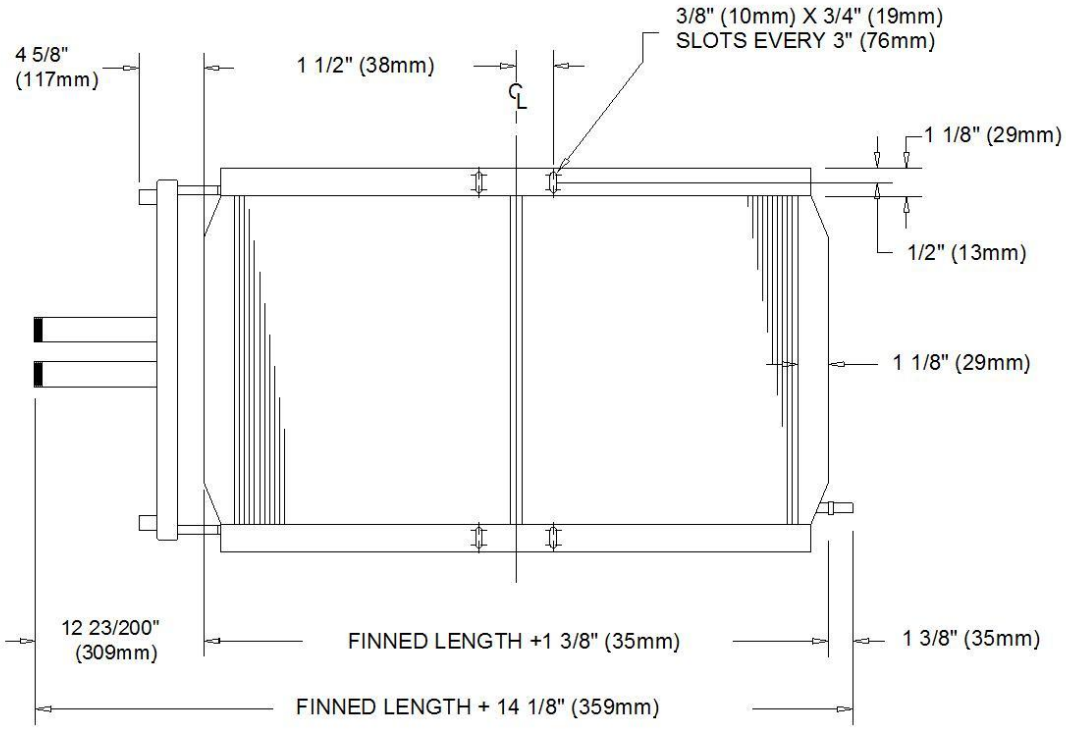
Coil Bank Details

Actual airflow	Total capacity	Sensible Capacity	Standard fluid flow rate	Fluid PD	Volume	Nominal coil height	Rigging weight	Installed weight
14167 cfm	585.12 MBh	450.18 MBh	82.50 gpm	9.44 ft H2O	23.09 gal	37" (940 mm)	708.3 lb	901.5 lb
14167 cfm	585.12 MBh	450.18 MBh	82.50 gpm	9.44 ft H2O	23.09 gal	37" (940 mm)	708.3 lb	901.5 lb
14167 cfm	585.12 MBh	450.18 MBh	82.50 gpm	9.44 ft H2O	23.09 gal	37" (940 mm)	708.3 lb	901.5 lb

37" W 6 ROW
LEFT HAND

CC-63 is LEFT HAND
(With Air IN FACE)
CC-64 is RIGHT HAND
(With Air In Face)





HEATING COIL

EZ-Coil Selection Software

Version: 5.1.0.0

Information

Project: FTS - EQ 21580 DCH Ambulatory
Coil Name: HWC
Coil ID: 297824
Date: 8/9/2021 11:56:20 AM
Model #: HWC01C10-39.00x102.00R
Quote No: 101168-004

Physical Data

Mode: Heating
Coils/Bank: 6
Fin Type: 5/8" 1.5" x 1.299" Waffle
Fin Height: 39"
Fin Length: 102"
Rows: 1
Fins/Inch: 10
Circuiting: 7 Feeds
Opp End Connections: No
Dry Weight (ea.): 118 Lbs.
Turbulators: No

Materials

Fin Matl: Aluminum 0.0075 in.
Tube Matl: Copper 0.025 in.
Conn Size: 1.5 | # Conn: 1

Internal Fluid

Fluid: Water
Ent Fluid Temp: 140 °F
GPM: 126.00

Airside

Airflow: 55,000.0 SCFM
Altitude: 0 ft.
Ent. DB: 33.8 °F
LDB Req'd: 65 °F

Construction

Coil Hand: Right
Casing Matl: 16 Ga Galv Steel
Casing Type: Flanged
Connection Matl: Carbon Steel
Connection Type: MPT

Performance

Description	UOM	Water Perf.
Model		HWC01C10-39.00x102.00R
Rows/FPI	fpi	1 / 10.0
Total Capacity / Per Coil	MBH	1,941.6 / 323.6
Sensible Capacity / Per Coil	MBH	1,941.6 / 323.6
Lvg Air DB	°F	66.4
Face Velocity	Sfpm	331.83
Lvg Fluid Temp	°F	109.3
Fluid Flow Rate / Per Coil	GPM	126.00 / 21.00
Air Pressure Drop	in. H2O	0.05
Fluid Pressure Drop	Ft. H2O	5.4
Coil Circuiting		7 Feeds
Connection Size	NPS	1.5"
Fluid Velocity	fps	4.19
Dry/Operating Weight (ea.)	Lbs	118 / 151

Special Notes:

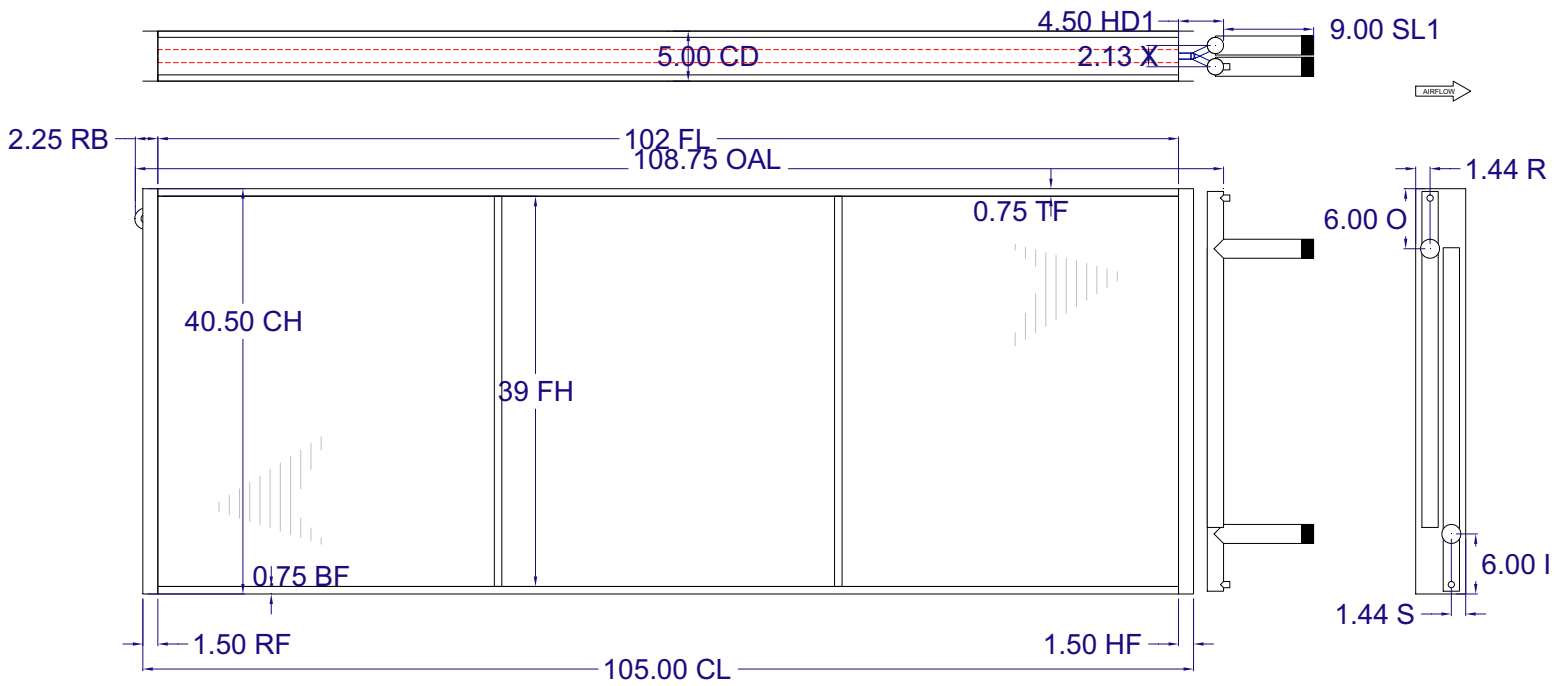
Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.
Performance includes no fouling factor allowance.

440 Industrial Drive * Moscow, TN * 888-302-6049
PH:901-877-3333 * Fax:901-877-3335 * Email: sales@coilmastercorp.com * www.coilmastercorp.com

LIFTING LUGS REQUIRED

HC-63 is RIGHT HAND (With Air IN BACK OF HEAD)

HC-64 is LEFT HAND (With Air IN BACK OF HEAD)



TUBE MATERIAL
0.625 x 0.025
Copper Smooth
FIN MATERIAL
10 Fins Per Inch
0.0075 Aluminum
V Waffle
CASING MATERIAL
16 Ga.
Galvanized Steel
COIL TUBE FACE
Tube Face = 26
CIRCUITING
6 Feed/ 4 Pass
1 Feed/ 2 Pass
HEADER MATERIAL
Type L Copper
SUPPLY CONN SIZE
1.625" OD Header
1.5" MPT-Steel
RETURN CONN SIZE
1.625" OD Header
1.5" MPT-Steel
FASTENER TYPE
Rivets
DRY WEIGHT
118.5 Lbs. Per Coil
INTERNAL VOLUME
3.93 Gal Per Coil

TUBE SUPPORTS RECOMMENDED FOR COILS OVER 50" LONG

ALL COILS ARE TESTED WITH 550 P.S.I. DRY NITROGEN

COIL HAND CONSISTENT WITH INDUSTRY STANDARD

DRAWING CREATED 8/6/2021 12:09:56 PM

Casing Style: Flanged Stacking Flanges: True

Coil ID = 297824

ROWS	X	FH	FL	CH	CL	CD	HD	OAL	SL	I	S	O	R	TF	BF	HF	RF	RB
1.00	2.13	39.00	102.00	40.50	105.00	5.00	4.5	108.75	9.00	6.00	1.44	6.00	1.44	0.75	0.75	1.50	1.50	2.25

COILMASTER

ALL DIMENSIONS ARE IN INCHES
STANDARD TOLERANCES APPLY

NOTES:

Tag: HWC

WO #

Item: 001 Rev: A

Qty: 6

H. Earnheart

HWC01C10-39.00x102.00R

Smoke dampers shall also include an end switch (for positive proof open) tied to the B.A.S., and remote test station. Remote test station shall include L.E.D. indicator lights for damper status (open/closed) and push button to cycle damper to normal/closed/override positions.

Damper Schedule

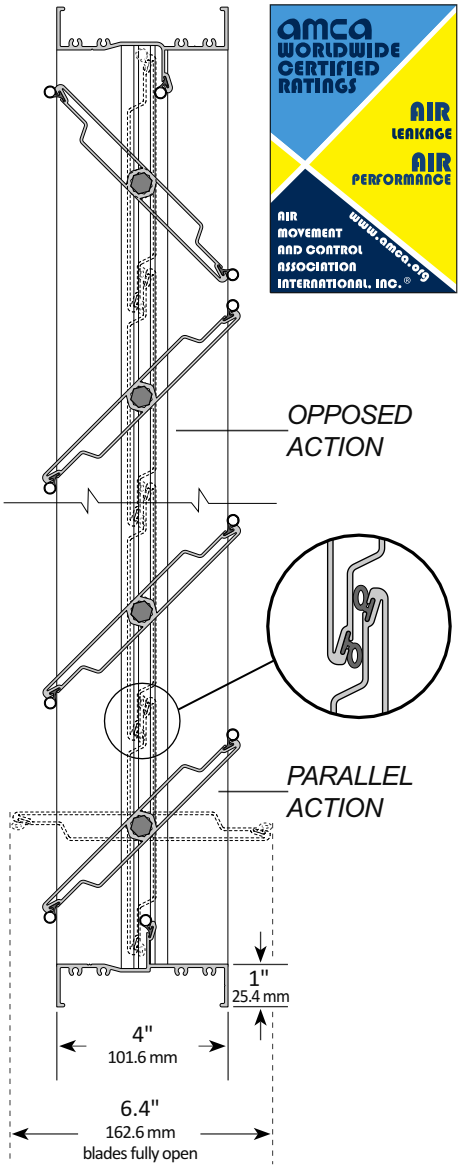
ATC, EC, & Fire Alarm Contractor to coordinate power to and control of smoke dampers. Associated smoke detector(s) to be mounted inside unit at inlet and dicharge plenums.

Unit No.	Qty.	Service	Damper WXH (in)	CFM	Velocity (FPM)	**Approx. PD (in H20)**	Blade Action	Manufacturer	Model	Feature Codes
AHU-63, AHU-64	1	**Return (SMOKE)**	**220x48 (7 Sections)**	**80000**	**1090**	**.05**	Horizontal and Opposed	Tamco	**1000 SM**	ERF
AHU-63, AHU-64	1	Relief	96x120	80000	1000	**.02**	Horizontal and Opposed	Tamco	1000	ERF
AHU-63, AHU-64	2	Relief	80x110	40000	655	**.01**	Horizontal and Opposed	Tamco	**9000**	ERF
AHU-63, AHU-64	1	Return	**44x120**	**58750**	**1602**	**.06**	Horizontal and **Parallel**	Tamco	1000	ERF
AHU-63, AHU-64	1	Outside Air	**48x120**	**58750**	**1468**	**.06**	Horizontal and **Parallel**	Tamco	**9000**	ERF
AHU-63, AHU-64	1	Min. Outside	**21x120**	**21250**	**1214**	**.04**	Horizontal and **Parallel**	Tamco	**9000**	ERF
AHU-63, AHU-64	1	**SUPPLY (SMOKE)**	**(2)180 x 28 5 sections each**	**85000**	**1214**	**.08**	**Horizontal and Opposed**	**Tamco**	**1000 SM**	**ERF**

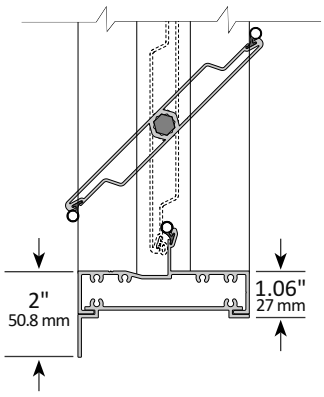
SUBMITTAL DATA | Series 1000 Air-Foil Control Damper

SP – Standard Profile

In Duct or
Flanged to Duct
Install Types



Extended Rear Flange
Install Type



1. Extruded aluminum *(6063-T5)* damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type.
2. Blades are maximum 6" *(152.4 mm)* deep extruded aluminum *(6063-T5)* air-foil profiles. All blades are symmetrically pivoted.
3. Blade seals are extruded EPDM. Frame seals are extruded silicone. Seals are secured in an integral slot within the aluminum extrusions. Blade and frame seals are mechanically fastened to prevent shrinkage and movement over the life of the damper.
4. Bearings are composed of a Celcon inner bearing - fixed around a 7/16" *(11.11 mm)* aluminum hexagon blade pivot pin - rotating within a polycarbonate outer bearing inserted in the frame. This eliminates action between metal-to-metal or metal-to-plastic riding surfaces.
5. Adjustable 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are zinc-plated steel. These provide a positive connection to blades and linkage.
6. Aluminum and corrosion-resistant zinc-plated steel linkage hardware is installed in the frame side, complete with cup-point trunnion screws for a slip-proof grip.
7. Dampers are designed for operation in temperatures ranging from -40°F *(-40°C)* to 212°F *(100°C)*.
8. Leakage Class 1A at 1 in. w.g. *(0.25 kPa)* static pressure differential. Standard air leakage data is certified under the AMCA Certified Ratings Program.
9. Dampers are custom made to required size, without blanking off free area. The blade stop is set at a fixed height and is a continuous and integral part of the top and bottom frames.
10. Dampers are available with either opposed blade action or parallel blade action.
11. Dampers are available in four install types: Installed In Duct, Flanged to Duct, Extended Rear Flange, and Square to Round Transition. *(See Install Types pages for details.)*
12. Installation of dampers must be in accordance with TAMCO's current on-line installation guidelines. *(Printed installation guidelines are provided with each damper shipment, however all technical information available on TAMCO's web site at www.tamcodampers.com supersedes information contained within printed versions.)*
13. Intermediate structural support is required to resist applied pressure loads for dampers that consist of two or more sections in both height and width. *(See TAMCO Aluminum Damper Installation Guidelines.)*

OPTIONS FOR SP – STANDARD PROFILE:

For each option listed, replace the lines above with their corresponding lines below.

ET - ELEVATED TEMPERATURE OPTION:

(This is not a UL/ULC approved product. For UL/ULC Approved Smoke Dampers refer to Series 1000 SM or 1000 SM-M Submittal Data.)

3. Blade and frame seals are extruded silicone, secured in an integral slot within the aluminum extrusions. Seals are mechanically fastened to prevent shrinkage and movement over the life of the damper.
4. Bearings are composed of a bronze oilite inner bearing - fixed around a 7/16" *(11.11 mm)* aluminum hexagon blade pivot pin - rotating within a bronze oilite outer bearing inserted in the frame.
6. Aluminum and corrosion-resistant zinc-plated steel linkage hardware is installed in the frame side, complete with cup-point trunnion screws for a slip-proof grip. Trunnion bearing is bronze oilite.
7. Dampers are designed for operation in temperatures ranging from -40°F *(-40°C)* to 300°F *(149°C)*.

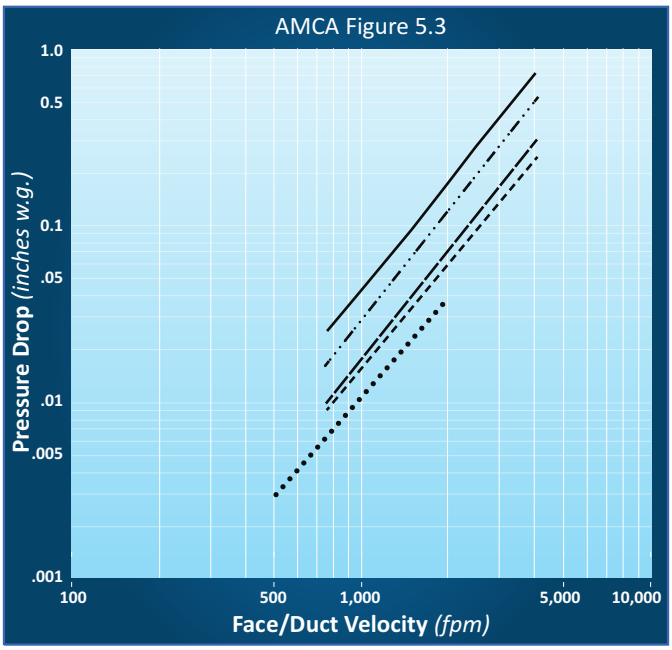
MR - MOISTURE RESISTANCE OPTION:

1. Extruded aluminum *(6063-T5)* damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type. Frame is assembled using stainless steel screws.
5. Adjustable 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are stainless steel. These provide a positive connection to blades and linkage.
6. Aluminum and stainless steel linkage hardware is installed in the frame side, complete with stainless steel cup-point trunnion screws for a slip-proof grip.

SW - SALT WATER RESISTANCE OPTION:

1. Extruded aluminum *(6063-T5)* damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type. Aluminum frame is clear anodized to a minimum depth of 0.7 mil *(18 microns)*. Frame is assembled using stainless steel screws.
2. Blades are maximum 6" *(152.4 mm)* deep extruded aluminum *(6063-T5)* air-foil profiles, clear anodized to a minimum depth of 0.7 mil *(18 microns)*. All blades are symmetrically pivoted.
3. Blade and frame seals are extruded silicone, secured in an integral slot within the aluminum extrusions. Seals are mechanically fastened to prevent shrinkage and movement over the life of the damper.
5. Adjustable 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are stainless steel. These provide a positive connection to blades and linkage.
6. Clear anodized aluminum and stainless steel linkage hardware is installed in the frame side, complete with stainless steel cup-point trunnion screws for a slip-proof grip.

VELOCITY VS. PRESSURE DROP



LEGEND:

12" x 12" —— *(305 mm x 305 mm)*

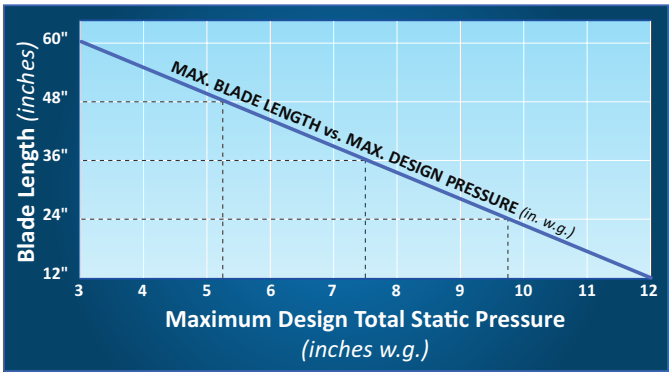
24" x 24" – – – *(610 mm x 610 mm))*

48" x 12" –·–·– *(1220 mm x 305 mm)*

12" x 48" —— *(305 mm x 1220 mm)*

36" x 36" • • • *(915 mm x 915 mm)*

BLADE DESIGN PRESSURE LIMITATIONS



Series 1000 dampers with SP – Standard Profile, whose blade length exceeds the maximum design pressure, may be reconfigured to maintain a blade length compatible with the required system pressure by increasing the number of sections per damper and thereby reducing each damper section's blade length. Appropriate intermediate structural support will be required for all multiple-section damper assemblies. *(Refer to line 13 of the Submittal Data and to TAMCO's Aluminum Damper Installation Guidelines.)*

Example:

A single-section damper of 60"w x 36"h *(1524 mm x 915 mm)* at 5 in. w.g. *(1.24 kPa)* would need to be built in two sections of 30"w x 36"h *(762 mm x 915 mm)*.

T.A. Morrison & Co. Inc. certifies that the TAMCO Series 1000 Air-Foil Control Damper with SP – Standard Profile shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air leakage and air performance ratings.

FIG. 5.3 Test damper is fully ducted with a 5 diameter duct run upstream, and a 6 diameter duct run downstream.

Pressure drop values are based on Flanged to Duct install type. Pressure drop will be greater for In Duct install type dampers.

TAMCO LEAKAGE RATING

Damper Width inches *(mm)*	1 in. w.g. *0.25 kPa*	4 in. w.g. *1.0 kPa*	6 in. w.g. *1.5 kPa*	8 in. w.g. *2.0 kPa*
0.0 to 12.0 *(0 to 305)*	**1A**	**1**	**1**	**1**
12.1 to 36.0 *(306 to 915)*	**1A**	**1**	**1**	**1**
36.1 to 48.0 *(916 to 1220)*	**1A**	**1**	**n/a**	**n/a**
48.1 to 60.0 *(1221 to 1524)*	**1A**	**1**	**n/a**	**n/a**

Leakage testing was conducted in accordance with ANSI/AMCA Standard 500-D. Data are based on a torque of 60 in-lbs *(73.0 N-m/m²)* for a 12" x 48" damper and 84 in-lbs *(102.2 N-m/m²)* for a 48" x 36" damper. ANSI/AMCA Standard 500-D states that air leakage is based on operation between 32°F *(0°C)* and 120°F *(49°C)*.

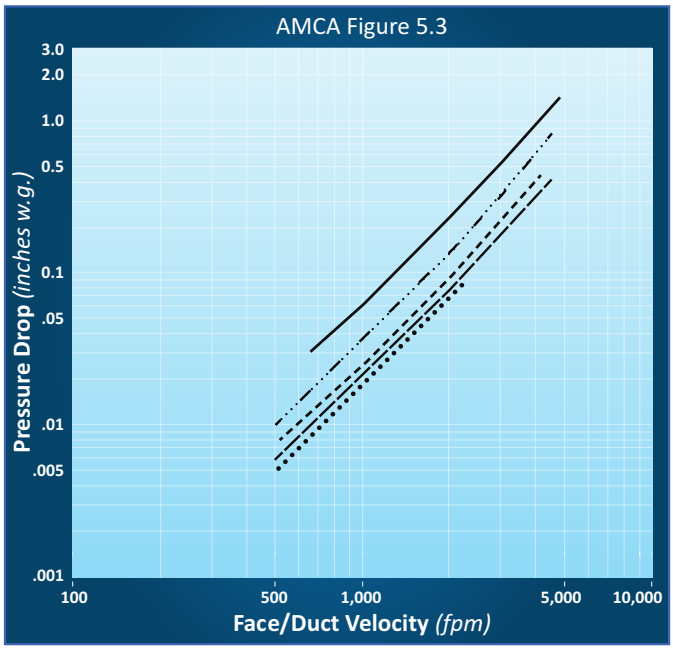
The following sizes of TAMCO Series 1000 dampers with SP – Standard Profile were tested:
12" x 48" *(305 mm x 1220 mm)*, 48" x 36" *(1220 mm x 915 mm)*, 60" x 36" *(1524 mm x 915 mm)*.

AMCA LEAKAGE CLASS DEFINITIONS

Pressure / Class	LEAKAGE CFM/ft² *(l/s/m²)* 1 in. w.g. *0.25 kPa*	4 in. w.g. *1.0 kPa*	6 in. w.g. *1.5 kPa*	8 in. w.g. *2.0 kPa*
1A	3 *(15.2)*	n/a	n/a	n/a
1	4 *(20.3)*	8 *(40.6)*	9.8 *(49.8)*	11.3 *(57.4)*
2	10 *(50.8)*	20 *(102)*	24.5 *(125)*	28.3 *(144)*
3	40 *(203)*	80 *(406)*	98 *(498)*	113 *(574)*

***NOTE:** TAMCO Leakage Class Rating is not provided for dampers measuring more than 36" *(915 mm)* wide at 6 in. w.g. *(1.5 kPa)* and at 8 in. w.g. *(2.0 kPa)*, as the recommended blade length is exceeded at these static pressures. *(Refer to the Blade Design Pressure Limitations Chart.)*

VELOCITY VS. PRESSURE DROP



LEGEND:

12" x 12" ——
(305 mm x 305 mm)

24" x 24" – – –
(610 mm x 610 mm)

48" x 12" –·–·–
(1220 mm x 305 mm)

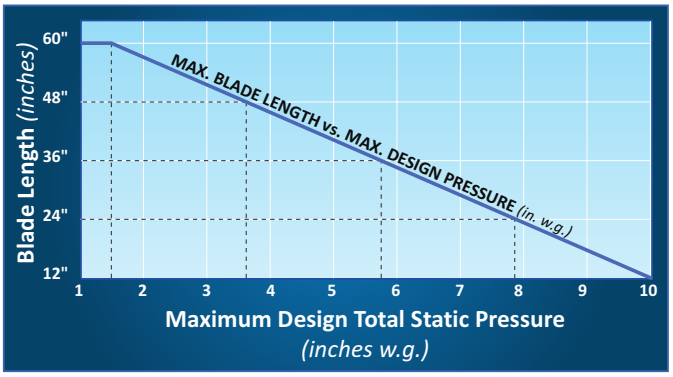
12" x 48" — —
(305 mm x 1220 mm)

36" x 36" • • •
(915 mm x 915 mm)

FIG. 5.3 Test damper is fully ducted with a 5 diameter duct run upstream, and a 6 diameter duct run downstream. Air Performance testing was conducted in accordance with ANSI/AMCA Standard 500-D.

Pressure drop values are based on Flanged to Duct install type. Pressure drop will be greater for In Duct install type dampers.

BLADE DESIGN PRESSURE LIMITATIONS



Series 1000 dampers NP – Narrow Profile, whose blade length exceeds the maximum design pressure, may be reconfigured to maintain a blade length compatible with the required system pressure by increasing the number of sections per damper and thereby reducing each damper section's blade length. Appropriate intermediate structural support will be required for all multiple-section damper assemblies. *(Refer to line 13 of the Submittal Data and to TAMCO's Aluminum Damper Installation Guidelines.)*

Example:

A single-section damper of 60"w x 36"h *(1524 mm x 915 mm)* at 5 in. w.g. *(1.24 kPa)* would need to be built in two sections of 30"w x 36"h *(762 mm x 915 mm)*.

VELOCITY VS. PRESSURE DROP

SIZE *inches*	VELOCITY *fpm*	PRESSURE DROP *(inches w.g.)*					
		AMCA Fig. 5.4 *(Intake)*			AMCA Fig. 5.5 *(Exhaust)*		
		DAMPER & SYSTEM	SYSTEM ONLY	DAMPER ONLY	DAMPER & SYSTEM	SYSTEM ONLY	DAMPER ONLY
12 X 48	1000	0.157	0.166	-0.008	0.143	0.155	-0.012
	2000	0.625	0.654	-0.029	0.596	0.638	-0.042
	3000	1.388	1.482	-0.094	1.332	1.458	-0.126
24 X 24	1000	0.154	0.164	-0.010	0.155	0.159	-0.004
	2000	0.615	0.658	-0.043	0.650	0.653	-0.003
	3000	1.408	1.478	-0.069	1.459	1.471	-0.012
36 X 36	1000	0.157	0.172	-0.015	0.152	0.157	-0.005
	2000	0.628	0.685	-0.057	0.614	0.634	-0.020
	3000	1.401	1.547	-0.146	1.382	1.427	-0.045
48 X 12	1000	0.140	0.166	-0.025	0.133	0.155	-0.023
	2000	0.547	0.654	-0.107	0.546	0.638	-0.092
	3000	1.211	1.482	-0.271	1.233	1.458	-0.225
48 X 48	1000	0.163	0.169	-0.006	0.146	0.155	-0.009
	2000	0.646	0.673	-0.027	0.588	0.613	-0.025
	3000	1.461	1.520	-0.058	1.296	1.394	-0.098

FIG. 5.4 Test damper is located at the entrance of a plenum.

FIG. 5.5 Test damper is located at the exit of a plenum.

Air Performance testing was conducted in accordance with ANSI/AMCA Standard 500-D.

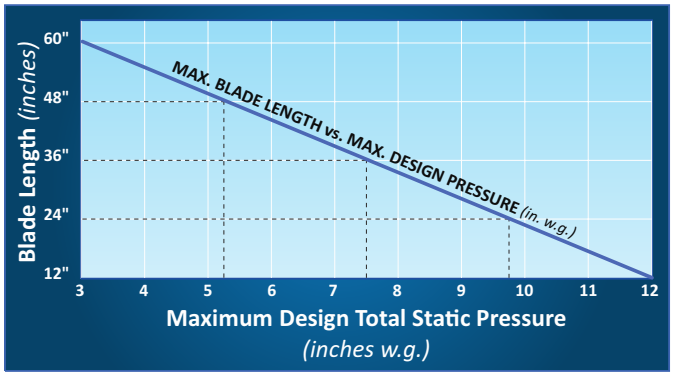
Pressure drop values are based on Flanged to Duct install type. Pressure drop will be greater for In Duct install type dampers.

The table above shows AMCA Figure 5.4 (intake) and Figure 5.5 (exhaust) pressure drop test results for a range of opening sizes. Pressure drop tests were conducted for each of the following:

- System Only. (No damper installed in the opening.)
- Damper & System. (TAMCO damper installed in the opening.)

The third column (Damper Only) under each AMCA Figure shows what effect the TAMCO WP dampers have on the airflow through each opening size. This is calculated by subtracting the Damper and System results from the System Only results. The pressure drop for WP TAMCO dampers is less than the pressure drop of the opening alone.

BLADE DESIGN PRESSURE LIMITATIONS



Series 1000 dampers with WP – Wide Profile, whose blade length exceeds the maximum design pressure, may be reconfigured to maintain a blade length compatible with the required system pressure by increasing the number of sections per damper and thereby reducing each damper section's blade length. Appropriate intermediate structural support will be required for all multiple-section damper assemblies. *(Refer to line 13 of the Submittal Data and to TAMCO's Aluminum Damper Installation Guidelines.)*

Example:
A single-section damper of 60"w x 36"h *(1524 mm x 915 mm)* at 5 in. w.g. *(1.24 kPa)* would need to be built in two sections of 30"w x 36"h *(762 mm x 915 mm)*.

INSTALL TYPES | Series 1000

Air-Foil Control Damper

- Always provide opening width and height dimensions, when ordering.
- Width dimension is always parallel to blades.
- Height dimension is always perpendicular to blades.

INSTALLED IN DUCT TYPE

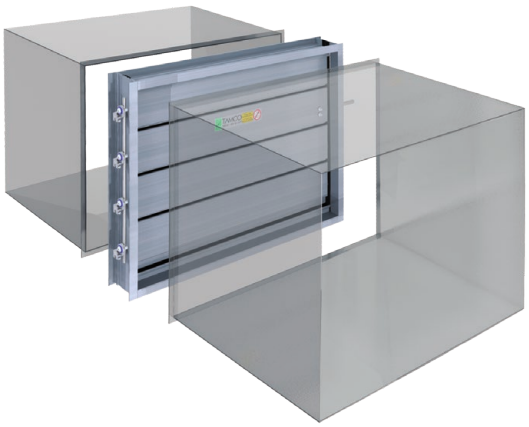
- Applies to SP and NP Profiles only. Not available for WP Profile.
- Finished damper O.D. is ½" *(12.7 mm)* less than opening width and height dimensions.

MINIMUM SECTION SIZE:	
6½"w x 6¾"h	*(166 mm x 172 mm)*
MAXIMUM SECTION SIZE:	
25 ft²	*(2.3 m²)*
60"w x 60"h or	*(1524 mm x 1524 mm) or*
48"w x 75"h	*(1220 mm x 1905 mm)*

FLANGED TO DUCT TYPE

- For SP and NP Profiles, finished damper O.D. is 2" *(50.8 mm)* greater than opening width and height dimensions.
- For WP Profile, finished damper O.D. is 3.25" *(82.6 mm)* greater than opening width and height dimensions.

MINIMUM SECTION SIZE:	
4½"w x 4¼"h	*(115 mm x 108 mm)*
MAXIMUM SECTION SIZE:	
25 ft²	*(2.3 m²)*
60"w x 60"h or	*(1524 mm x 1524 mm) or*
48"w x 75"h	*(1220 mm x 1905 mm)*



EXTENDED REAR FLANGE TYPE

- Applies to SP and NP Profiles only. Not available for WP Profile.
- Finished damper O.D. is 4" *(101.6 mm)* greater than opening width and height dimensions.

MINIMUM SECTION SIZE:	
4½"w x 4¼"h	*(115 mm x 108 mm)*
MAXIMUM SECTION SIZE:	
25 ft²	*(2.3 m²)*
60"w x 60"h or	*(1524 mm x 1524 mm) or*
48"w x 75"h	*(1220 mm x 1905 mm)*

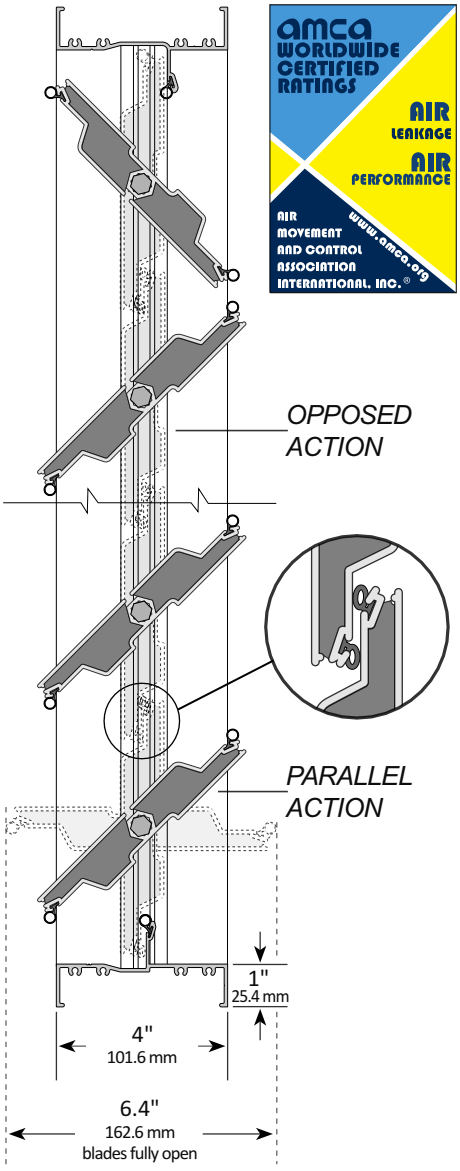
- Extended Rear Flange install type dampers are not designed so that the front of the damper may be inserted into an opening, as the side frame members extend to the full height of the rear flange.

SUBMITTAL DATA | Series 9000 Thermally Insulated Damper with Thermally Broken Blades

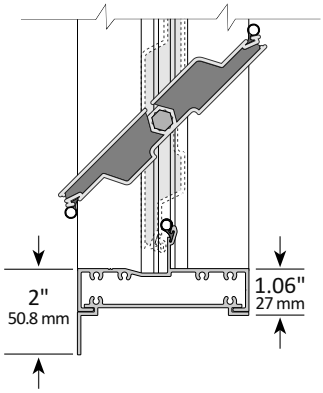
SP – Standard Profile

OSA Dampers, Relief

In Duct or Flanged to Duct Install Types



Extended Rear Flange Install Type



1. Extruded aluminum *(6063-T5)* damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type.
2. Blades are maximum 6" *(152.4 mm)* deep extruded aluminum *(6063-T5)* air-foil profiles, internally insulated with expanded polyurethane foam and thermally broken. Complete blade has an insulating factor of R-2.29. All blades are symmetrically pivoted.
3. Blade seals are extruded EPDM. Frame seals are extruded silicone. Seals are secured in an integral slot within the aluminum extrusions. Blade and frame seals are mechanically fastened to prevent shrinkage and movement over the life of the damper.
4. Bearings are composed of a Celcon inner bearing - fixed around a 7/16" *(11.11 mm)* aluminum hexagon blade pivot pin - rotating within a polycarbonate outer bearing inserted in the frame. This eliminates action between metal-to-metal or metal-to-plastic riding surfaces.
5. Adjustable 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are zinc-plated steel. These provide a positive connection to blades and linkage.
6. Aluminum and corrosion-resistant zinc-plated steel linkage hardware is installed in the frame side, complete with cup-point trunnion screws for a slip-proof grip.
7. Dampers are designed for operation in temperatures ranging from -40°F *(-40°C)* to 212°F *(100°C)*.
8. Leakage Class 1A at 1 in. w.g. *(0.25 kPa)* static pressure differential. Standard air leakage data is certified under the AMCA Certified Ratings Program.
9. Dampers are custom made to required size, without blanking off free area. The blade stop is set at a fixed height and is a continuous and integral part of the top and bottom frames.
10. Dampers are available with either opposed blade action or parallel blade action.
11. Dampers are available in four install types: Installed In Duct, Flanged to Duct, Extended Rear Flange, and Square to Round Transition. *(See Install Type pages for details.)*
12. Installation of dampers must be in accordance with TAMCO's current on-line installation guidelines. *(Printed installation guidelines are provided with each damper shipment, however all technical information available on TAMCO's web site at www.tamcodampers.com supersedes information contained within printed versions.)*
13. Intermediate structural support is required to resist applied pressure loads for dampers that consist of two or more sections in both height and width. *(See TAMCO Aluminum Damper Installation Guidelines.)*

OPTIONS FOR SP – STANDARD PROFILE:
For each option listed, replace the lines above with their corresponding lines below.

SC - SEVERE COLD TEMPERATURE OPTION:

3. Blade and frame seals are extruded silicone, for reduced air leakage at colder temperatures. Blade and frame seals are secured in an integral slot within the aluminum extrusions and are mechanically fastened to prevent shrinkage and movement over the life of the damper.

MR - MOISTURE RESISTANCE OPTION:

1. Extruded aluminum *(6063-T5)* damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type. Frame is assembled using stainless steel screws.
5. Adjustable 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are stainless steel. These provide a positive connection to blades and linkage.
6. Aluminum and stainless steel linkage hardware is installed in the frame side, complete with stainless steel cup-point trunnion screws for a slip-proof grip.

SW - SALT WATER RESISTANCE OPTION:

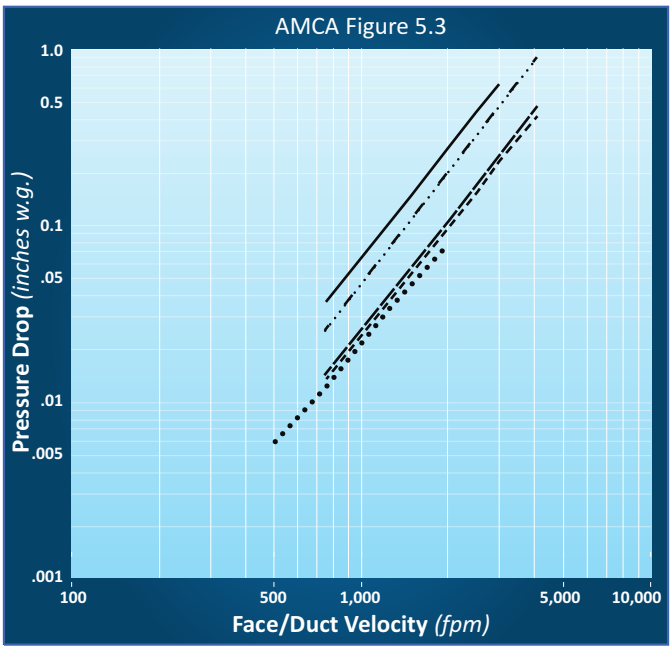
1. Extruded aluminum *(6063-T5)* damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type. Aluminum frame is clear anodized to a minimum depth of 0.7 mil *(18 microns)*. Frame is assembled using stainless steel screws.
2. Blades are maximum 6" *(152.4 mm)* deep extruded aluminum *(6063-T5)* air-foil profiles, internally insulated with expanded polyurethane foam and thermally broken. Complete blade has an insulating factor of R-2.29. All blades are symmetrically pivoted. Extruded aluminum blades are clear anodized to a minimum depth of 0.7 mil *(18 microns)*.
3. Blade and frame seals are extruded silicone, for reduced air leakage at colder temperatures. Blade and frame seals are secured in an integral slot within the aluminum extrusions and are mechanically fastened to prevent shrinkage and movement over the life of the damper.
5. Adjustable 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are stainless steel. These provide a positive connection to blades and linkage.
6. Clear anodized aluminum and stainless steel linkage hardware is installed in the frame side, complete with stainless steel cup-point trunnion screws for a slip-proof grip.

PERFORMANCE DATA | Series 9000 Thermally Insulated Damper with Thermally Broken Blades

SP – Standard Profile

With no Option or with MR Option

VELOCITY VS. PRESSURE DROP



LEGEND:

12" x 12" —— *(305 mm x 305 mm)*

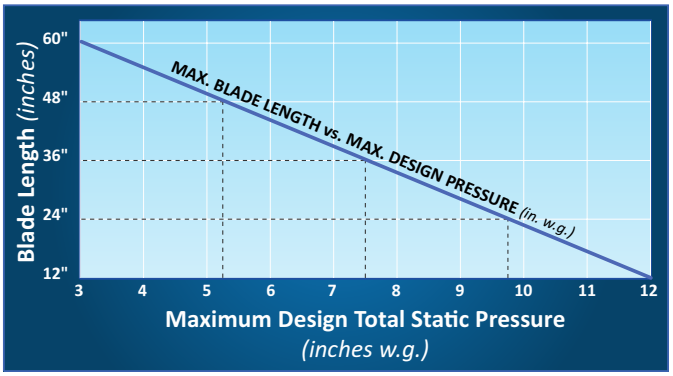
24" x 24" – – – *(610 mm x 610 mm))*

48" x 12" –·–·– *(1220 mm x 305 mm)*

12" x 48" —— *(305 mm x 1220 mm)*

36" x 36" • • • *(915 mm x 915 mm)*

BLADE DESIGN PRESSURE LIMITATIONS



Series 9000 dampers with SP – Standard Profile, whose blade length exceeds the maximum design pressure, may be reconfigured to maintain a blade length compatible with the required system pressure by increasing the number of sections per damper and thereby reducing each damper section's blade length. Appropriate intermediate structural support will be required for all multiple-section damper assemblies. *(Refer to line 13 of the Submittal Data and to TAMCO's Aluminum Damper Installation Guidelines.)*

Example:

A single-section damper of 60"w x 36"h *(1524 mm x 915 mm)* at 5 in w.g. *(1.24 kPa)* would need to be built in two sections of 30"w x 36"h *(762 mm x 915 mm)*.

T.A. Morrison & Co. Inc. certifies that the TAMCO Series 9000 Thermally Insulated Damper, with Thermally Broken Blades, no Option or MR Options, and SP – Standard Profile shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air leakage and air performance ratings.

FIG. 5.3 Test damper is fully ducted with a 5 diameter duct run upstream, and a 6 diameter duct run downstream.

Pressure drop values are based on Flanged to Duct install type. Pressure drop will be greater for In Duct install type dampers.

TAMCO LEAKAGE RATING

Damper Width inches *(mm)*	1 in. w.g. *0.25 kPa*	4 in. w.g. *1.0 kPa*
0.0 to 12.0 *(0 to 305)*	1A	1
12.1 to 36.0 *(306 to 915)*	1A	1
36.1 to 48.0 *(916 to 1220)*	1A	1
48.1 to 60.0 *(1221 to 1524)*	1A	1

Leakage testing was conducted in accordance with ANSI/AMCA Standard 500-D, Figure 5.4. Data are based on a torque of 10.8 in-lb/ft² *(13.1 N-m/m²)* and a minimum of 70 in-lb *(7.9 N-m)* applied to close and seat the opposed blade damper during the test. Air leakage is based on operation between 32°F *(0°C)* and 120°F *(49°C)*.

The following sizes of TAMCO Series 9000 dampers with no Option or MR Option, and SP – Standard Profile were tested:
12" x 48" *(305 mm x 1220 mm)*, 36" x 36" *(915 mm x 915 mm)*, 48" x 36" *(1220 mm x 915mm)*, 60" x 36" *(1524 mm x 915 mm)*.

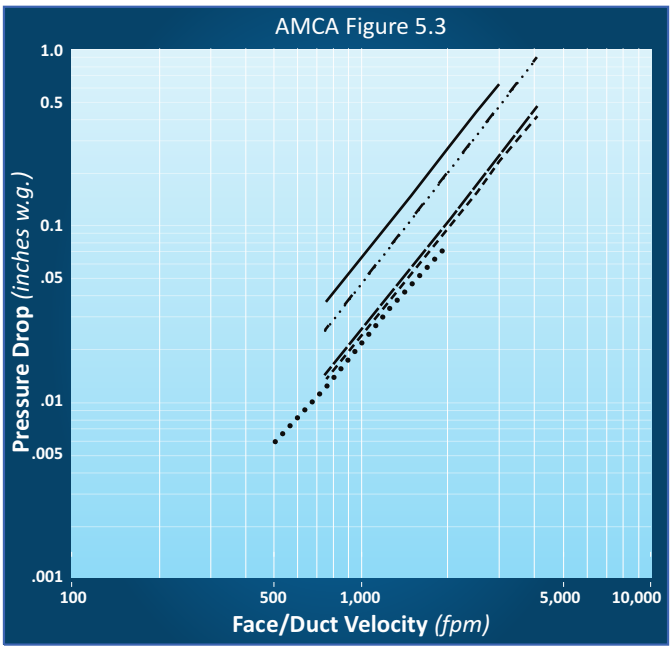
AMCA LEAKAGE CLASS DEFINITIONS

Pressure / Class	LEAKAGE CFM/ft² *(l/s/m²)* 1 in. w.g. *0.25 kPa*	4 in. w.g. *1.0 kPa*
1A	3 *(15.2)*	n/a
1	4 *(20.3)*	8 *(40.6)*
2	10 *(50.8)*	20 *(102)*
3	40 *(203)*	80 *(406)*

PERFORMANCE DATA | Series 9000 Thermally Insulated Damper with Thermally Broken Blades

SP – Standard Profile
With SC or SW Options

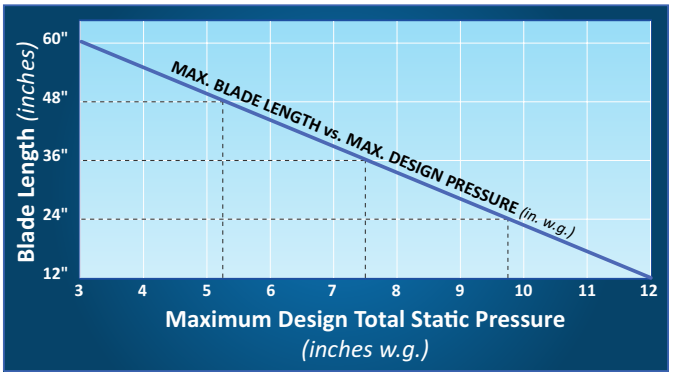
VELOCITY VS. PRESSURE DROP



LEGEND:

12" x 12" —— *(305 mm x 305 mm)*
24" x 24" – – – *(610 mm x 610 mm))*
48" x 12" –·–·– *(1220 mm x 305 mm)*
12" x 48" —— *(305 mm x 1220 mm)*
36" x 36" • • • *(915 mm x 915 mm)*

BLADE DESIGN PRESSURE LIMITATIONS



Series 9000 dampers with SP – Standard Profile, whose blade length exceeds the maximum design pressure, may be reconfigured to maintain a blade length compatible with the required system pressure by increasing the number of sections per damper and thereby reducing each damper section's blade length. Appropriate intermediate structural support will be required for all multiple-section damper assemblies. *(Refer to line 13 of the Submittal Data and to TAMCO's Aluminum Damper Installation Guidelines.)*

Example:
A single-section damper of 60"w x 36"h *(1524 mm x 915 mm)* at 5 in. w.g. *(1.24 kPa)* would need to be built in two sections of 30"w x 36"h *(762 mm x 915 mm)*.

T.A. Morrison & Co. Inc. certifies that the TAMCO Series 9000 Thermally Insulated Damper, with Thermally Broken Blades, SC or SW Options, and SP – Standard Profile shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air leakage and air performance ratings.

FIG. 5.3 Test damper is fully ducted with a 5 diameter duct run upstream, and a 6 diameter duct run downstream.

Pressure drop values are based on Flanged to Duct install type. Pressure drop will be greater for In Duct install type dampers.

TAMCO LEAKAGE RATING

Damper Width inches *(mm)*	1 in. w.g. *0.25 kPa*	4 in. w.g. *1.0 kPa*	6 in. w.g. *1.5 kPa*	8 in. w.g. *2.0 kPa*
0.0 to 12.0 *(0 to 305)*	1A	1	1	1
12.1 to 36.0 *(306 to 915)*	1A	1	1	1
36.1 to 48.0 *(916 to 1220)*	1A	1	1	1
48.1 to 60.0 *(1221 to 1524)*	1A	1	n/a	n/a

Leakage testing was conducted in accordance with ANSI/AMCA Standard 500-D, Figure 5.4. Data are based on a torque of 10.8 in-lb/ft² *(13.1 N-m/m²)* applied to close and seat the opposed blade damper during the test. Air leakage is based on operation between 32°F *(0°C)* and 120°F *(49°C)*.

The following sizes of TAMCO Series 9000 dampers with SC or SW Options, and SP – Standard Profile were tested:
12" x 48" *(305 mm x 1220 mm)*, 36" x 36" *(915 mm x 915 mm)*, 48" x 36" *(1220 mm x 915mm)*, 60" x 36" *(1524 mm x 915 mm)*.

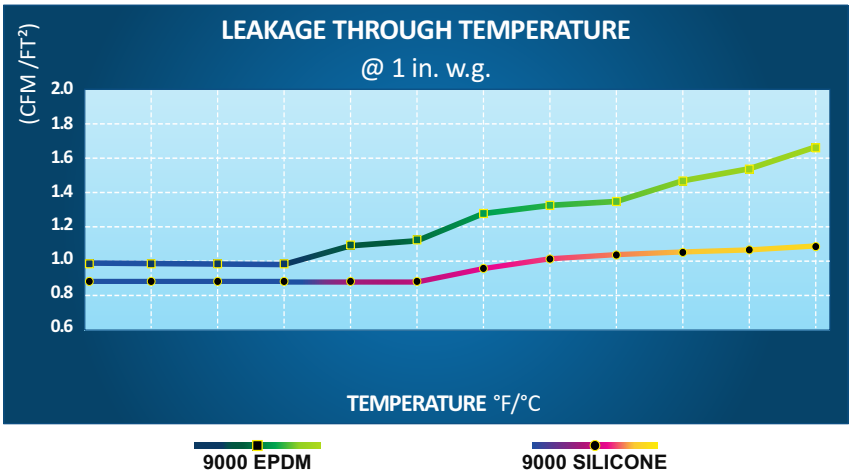
AMCA LEAKAGE CLASS DEFINITIONS

Pressure / Class	LEAKAGE CFM/ft² *(l/s/m²)* 1 in. w.g. *0.25 kPa*	4 in. w.g. *1.0 kPa*	6 in. w.g. *1.5 kPa*	8 in. w.g. *2.0 kPa*
1A	3 *(15.2)*	n/a	n/a	n/a
1	4 *(20.3)*	8 *(40.6)*	9.8 *(49.8)*	11.3 *(57.4)*
2	10 *(50.8)*	20 *(102)*	24.5 *(125)*	28.3 *(144)*
3	40 *(203)*	80 *(406)*	98 *(498)*	113 *(574)*

***NOTE:** TAMCO Leakage Class Rating is not provided for dampers measuring more than 48" *(1220 mm)* wide at 6 in. w.g. *(1.5 kPa)* and at 8 in. w.g. *(2.0 kPa)*, as the recommended blade length is exceeded at these static pressures. *(Refer to the Blade Design Pressure Limitations Chart.)*

STANDARD VS. SILICONE UPGRADE OPTION SEALS

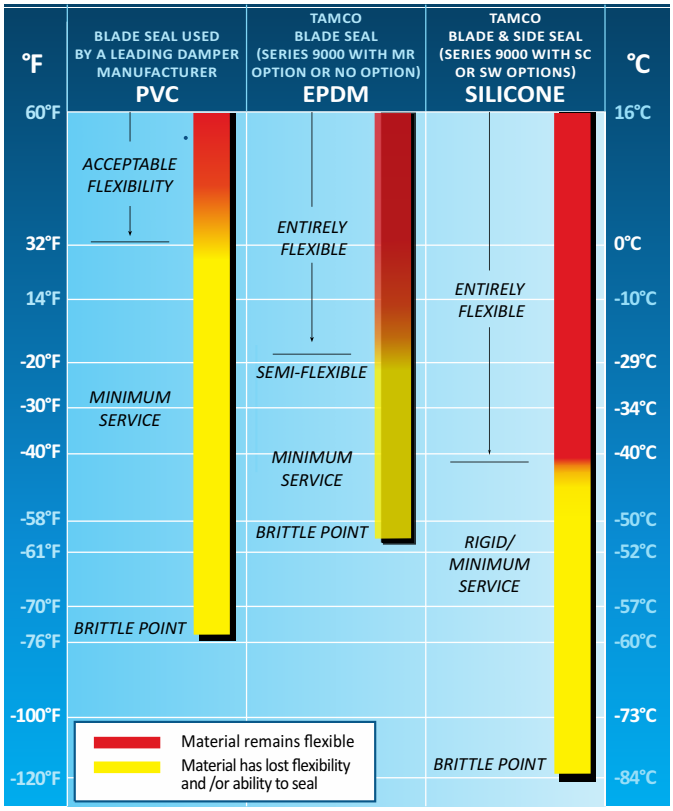
LEAKAGE COMPARISON GRAPH



Damper tests were conducted in a laboratory cold room to determine the effects of colder and severe cold temperatures *(down to -40°F (-40°C))* on sealing gaskets and leakage rates.

NOTE: Leakage rates shown in this graph are not licensed to bear the AMCA Seal. There is no AMCA standard dealing with the testing of leakage in temperatures below 32°F (0°C).

GASKET AND SEAL PERFORMANCE COMPARISON GRAPH



Minimum service temperatures and brittle points are as stated by material manufacturers. Flexibility, rigidity, and suitability status of various materials were determined by observation and operation of

ו both cold ro

INSTALL TYPES | Series 9000

Thermally Insulated Damper with Thermally Broken Blades

- Always provide opening width and height dimensions, when ordering.
- Width dimension is always parallel to blades.
- Height dimension is always perpendicular to blades.

INSTALLED IN DUCT TYPE

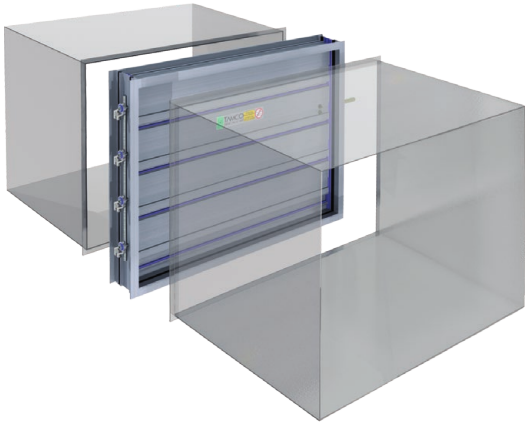
- Applies to SP and NP Profiles only. Not available for WP Profile.
- Finished damper O.D. is ½" *(12.7 mm)* less than opening width and height dimensions.

MINIMUM SECTION SIZE:	
6½"w x 6¾"h	*(166 mm x 172 mm)*
MAXIMUM SECTION SIZE:	
25 ft²	*(2.3 m²)*
60"w x 60"h or	*(1524 mm x 1524 mm) or*
48"w x 75"h	*(1220 mm x 1905 mm)*

FLANGED TO DUCT TYPE

- For SP and NP Profiles, finished damper O.D. is 2" *(50.8 mm)* greater than opening width and height dimensions.
- For WP Profile, finished damper O.D. is 3.25" *(82.6 mm)* greater than opening width and height dimensions.

MINIMUM SECTION SIZE:	
4½"w x 4¼"h	*(115 mm x 108 mm)*
MAXIMUM SECTION SIZE:	
25 ft²	*(2.3 m²)*
60"w x 60"h or	*(1524 mm x 1524 mm) or*
48"w x 75"h	*(1220 mm x 1905 mm)*



EXTENDED REAR FLANGE TYPE

- Applies to SP and NP Profiles only. Not available for WP Profile.
- Finished damper O.D. is 4" *(101.6 mm)* greater than opening width and height dimensions.

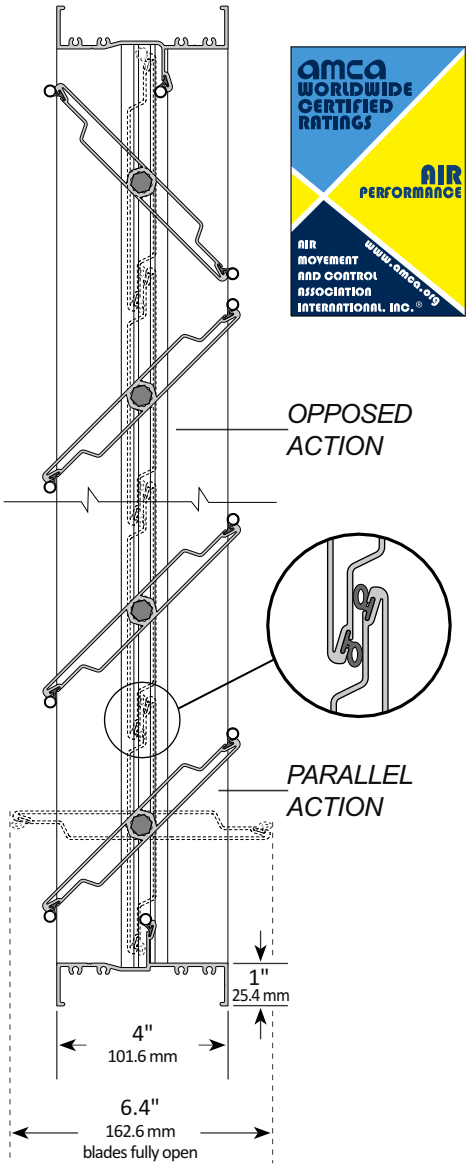
MINIMUM SECTION SIZE:	
4½"w x 4¼"h	*(115 mm x 108 mm)*
MAXIMUM SECTION SIZE:	
25 ft²	*(2.3 m²)*
60"w x 60"h or	*(1524 mm x 1524 mm) or*
48"w x 75"h	*(1220 mm x 1905 mm)*

- Extended Rear Flange install type dampers are not designed so that the front of the damper may be inserted into an opening, as the side frame members extend to the full height of the rear flange.

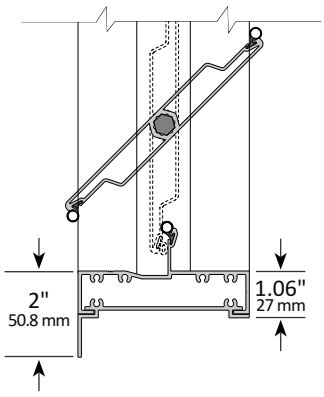
SUBMITTAL DATA | Series 1000 SM

UL/ULC Approved Two-Position Smoke Damper

In Duct or Flanged to Duct Install Types



Extended Rear Flange Install Type



Leakage Rating:	Class 1
Operational Rating:	Airflow: 2000 fpm *(10.2 m/s)*. Rated for airflow in either direction.
	Temperature: 250°F *(121°C)*
	Pressure: 4" w.g. *(1 kPa)* static pressure differential
Fail Position:	Closed

STANDARD CONSTRUCTION:

1. Extruded aluminum *(6063-T5)* smoke damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type.
2. Blades are maximum 6" *(152.4 mm)* deep extruded aluminum *(6063-T5)* air-foil profiles. All blades are symmetrically pivoted.
3. Blade and frame seals are specially designed and engineered extruded silicone. Seals are secured in an integral slot within the aluminum extrusions. Blade and frame seals are mechanically fastened to prevent shrinkage and movement over the life of the damper.
4. Bearings are composed of a bronze oilite inner bearing - fixed around a 7/16" *(11.11 mm)* aluminum hexagon blade pivot pin - rotating within a bronze oilite outer bearing inserted in the frame.
5. The 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are zinc-plated steel. These provide a positive connection to blades and linkage.
6. Aluminum and corrosion-resistant zinc-plated steel linkage hardware is installed in the frame side, complete with cup-point trunnion screws for a slip-proof grip. Trunnion bearing is bronze oilite.
7. Smoke dampers are designed for operation in temperatures ranging from -40°F *(-40°C)* to 250°F *(121°C)*.
8. Smoke dampers are custom made to required size, without blanking off free area. The blade stop is set at a fixed height and is a continuous and integral part of the top and bottom frames.
9. Smoke dampers are available with either opposed blade action or parallel blade action.

CONSTRUCTION OPTIONS:

For each option listed, replace the lines above with their corresponding lines below.

MR - MOISTURE RESISTANCE OPTION:

1. Extruded aluminum *(6063-T5)* smoke damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type. Frame is assembled using stainless steel screws.
5. The 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are stainless steel. These provide a positive connection to blades and linkage.
6. Aluminum and stainless steel linkage hardware is installed in the frame side, complete with stainless steel cup-point trunnion screws for a slip-proof grip. Trunnion bearing is bronze oilite.

SW - SALT WATER RESISTANCE OPTION:

1. Extruded aluminum *(6063-T5)* smoke damper frame is not less than 0.080" *(2.03 mm)* in thickness. Damper frame is 4" *(101.6 mm)* deep x 1" *(25.4 mm)*, with mounting flanges on both sides of frame. Damper frame has a 2" *(50.8 mm)* mounting flange on the rear of the damper, when ordered as Extended Rear Flange install type. Aluminum frame is clear anodized to a minimum depth of 0.7 mil *(18 microns)*. Frame is assembled using stainless steel screws.
2. Blades are maximum 6" *(152.4 mm)* deep extruded aluminum *(6063-T5)* air-foil profiles, clear anodized to a minimum depth of 0.7 mil *(18 microns)*. All blades are symmetrically pivoted.
5. The 7/16" *(11.11 mm)* hexagonal drive rod, U-bolt fastener, and hexagonal retaining nuts are stainless steel. These provide a positive connection to blades and linkage.
6. Clear anodized aluminum and stainless steel linkage hardware is installed in the frame side, complete with stainless steel cup-point trunnion screws for a slip-proof grip. Trunnion bearing is bronze oilite.

TAMCO® Series 1000 SM meets the requirements for smoke dampers established by:
UL 555S/ULC-S112.1 File R16679
National Fire Protection Association:
NFPA Standards 80, 90A, 92, 101, 105
California State Fire Marshall Listing#:
3230-2116:0100

SUBMITTAL DATA | Series 1000 SM

UL/ULC Approved Two-Position Smoke Damper

TAMCO® Series 1000 SM meets the requirements for smoke dampers established by:
UL 555S/ULC-S112.1 File R16679
National Fire Protection Association:
NFPA Standards 80, 90A, 92, 101, 105
California State Fire Marshall Listing#:
3230-2116:0100

MAXIMUM SINGLE-SECTION OPENING SIZE:	
36"w x 48"h	*(915 mm x 1220 mm)*
MAXIMUM MULTI-SECTION OPENING SIZES:	
144"w x 96"h	*(3658 mm x 2438 mm)*
288"w x 48"h	*(7316 mm x 1220 mm)*

INSTALLATION:

10. Smoke dampers may be mounted vertically *(standing up/horizontal airflow)* with blades running horizontally, or mounted horizontally *(lying down/vertical airflow).*
11. Dampers are available in four install types: Installed In Duct, Flanged to Duct, Extended Rear Flange, and Square to Round Transition. *(See Install Types pages for details.)*
12. Multi-section smoke dampers may require field assembly of sections.
13. Installation of dampers must be in accordance with TAMCO's current UL/ULC Approved Smoke Damper Installation Guidelines. *(Printed installation guidelines are provided with each damper shipment, however all technical information available on TAMCO's web site at www.tamcodampers.com supersedes information contained within printed versions.)*

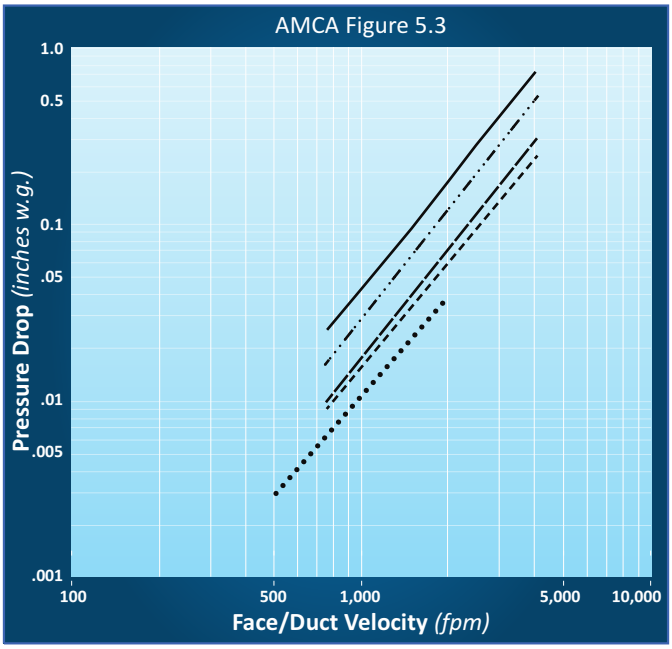
ACTUATORS:

14. UL 555S/ULC-S112.1 requires that all actuators for smoke dampers be factory mounted. Approved actuators are Belimo and Honeywell.
15. Voltage: 24, 120, or 230 vac, single phase, two-position control.
16. Mounting: Internal or external actuator mounting. *(All smoke dampers with internally mounted actuators, will be mounted on a jackshaft. If actuator side of damper is to be connected to duct work, smoke damper assembly will have to be installed in a sleeve.)*
17. Options: Auxiliary switches.
18. Actuator quantity and location requirements are shown in, and must be in accordance with, TAMCO UL/ULC Approved Smoke Damper Configurations.

PERFORMANCE DATA | Series 1000 SM

UL/ULC Approved Two-Position Smoke Damper

VELOCITY VS. PRESSURE DROP



LEGEND:

12" x 12" ——
(305 mm x 305 mm)

24" x 24" - - -
(610 mm x 610 mm))

48" x 12" -·-·-
(1220 mm x 305 mm)

12" x 48" — —
(305 mm x 1220 mm)

36" x 36" • • •
(915 mm x 915 mm)

T.A. Morrison & Co. Inc. certifies that the TAMCO Series 1000 SM UL/ULC Approved Two-Position Smoke Damper with no option, or with MR or SW Options shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings.

FIG. 5.3 Test damper is fully ducted with a 5 diameter duct run upstream, and a 6 diameter duct run downstream.

Pressure drop values are based on Flanged to Duct install type. Pressure drop will be greater for In Duct install type dampers.

Smoke dampers shall also include an end switch (for positive proof open) tied to the B.A.S., and remote test station. Remote test station shall include L.E.D. indicator lights for damper status (open/closed) and push button to cycle damper to normal/closed/override positions.

INSTALL TYPES | Series 1000 SM

UL/ULC Approved Two-Position Smoke Damper

- Always provide opening width and height dimensions, when ordering.
- Width dimension is always parallel to blades.
- Height dimension is always perpendicular to blades.

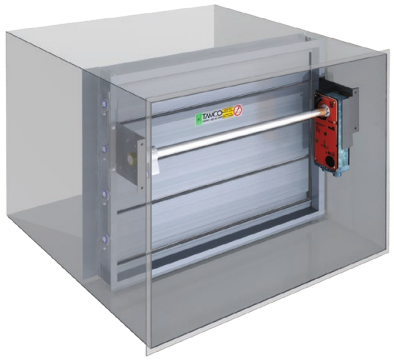
INSTALLED IN DUCT TYPE

- Finished damper O.D. is ¼" *(6.4 mm)* less than opening width and height dimensions.

MINIMUM SECTION SIZE:	
11”w x 8.25”h	*(280 mm x 210 mm)*
MAXIMUM SECTION SIZE:	
12 ft²	*(1.1 m²)*
36”w x 48”h	*(915 mm x 1220 mm)*

INTERNAL ACTUATOR

Must be inserted in a sleeve or opening.



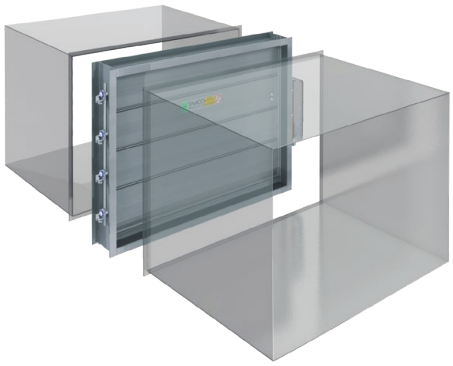
FLANGED TO DUCT TYPE

- Finished damper O.D. is 2" *(50.8 mm)* greater than opening width and height dimensions.

MINIMUM SECTION SIZE:	
11”w x 6”h	*(280 mm x 153 mm)*
MAXIMUM SECTION SIZE:	
12 ft²	*(1.1 m²)*
36”w x 48”h	*(915 mm x 1220 mm)*

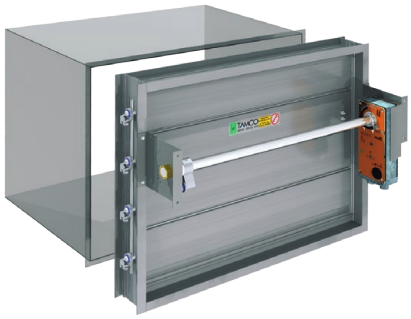
EXTERNAL ACTUATOR

Both front and rear flanges can be mounted to opening surfaces.



INTERNAL ACTUATOR

Only rear flange can be mounted to opening surface.



EXTENDED REAR FLANGE TYPE

- Finished damper O.D. is 4" *(101.6 mm)* greater than opening width and height dimensions.

MINIMUM SECTION SIZE:	
11”w x 6”h	*(280 mm x 153 mm)*
MAXIMUM SECTION SIZE:	
12 ft²	*(1.1 m²)*
36”w x 48”h	*(915 mm x 1220 mm)*

- Extended Rear Flange install type dampers are not designed so that the front of the damper may be inserted into an opening, as the side frame members extend to the full height of the rear flange.

EXTERNAL ACTUATOR

Both front and rear flanges can be mounted to opening surfaces.

INTERNAL ACTUATOR

Only rear flange can be mounted to opening surface.

Louver Schedule

Unit No.	Qty.	Service	Louver WXH (in)	CFM	Face Velocity (FPM)	Free Area Velocity (FPM)	Manufacturer	Model	Depth	Pressure Drop	Bird Screen	Insect Screen
AHU-63, AHU-64	2	OSA	92 x 120	42,000 EA	521	811	Ruskin	ELF6350DMP	6"	.09"	Yes	No
AHU-63, AHU-64	2	EXHAUST	80 x 110	40,000 EA	654	1047	Ruskin	ELF6375DX	6"	.10"	Yes	No

ELF6350DMP

Drainable Stationary Louver
Extruded Aluminum

RUSKIN
AUTHORITY IN AIR CONTROL

APPLICATION

The ELF6350DMP is a 6" deep extruded aluminum stationary louver that is designed to protect air intake and exhaust opening on exterior walls. This louver is designed with a drainable gutter system channeling water from the blades to downspouts in the jambs, where water is exhausted out of the front of the louver.

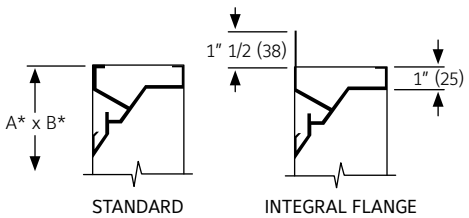
STANDARD CONSTRUCTION

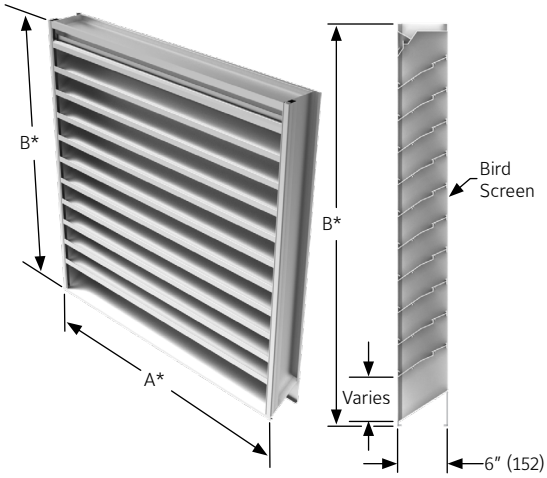
Frame	6" (152) deep, 6063T6 extruded aluminum, .125" (3.2) nominal wall thickness. Downspouts and caulking surfaces provided.
Blades	6063T6 extruded aluminum with .090" (2.3) nominal wall thickness. Drainable blades are positioned at 35° angle and spaced approximately 4" (102) center to center.
Screen	5/8" x .040" (16 x 1) expanded, flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.
Finish	Mill.
Minimum Size	12"w x 12"h (305 x 305).
Approximate Shipping Weight	6 lbs./ft. (29.3 kg/m²).
Maximum Factory Assembly Size	Single sections shall not exceed 120"w x 90"h (3048 x 2286) or 90"w x 120"h (2286 x 3048). Louvers larger than the maximum factory assembly size will require field assembly of smaller sections.
Supports	Louvers may be provided with rear mounted blade supports that increase overall louver depth depending on louver size, assembly configuration or windload.

FEATURES

- 62% Free Area
- Beginning point of water penetration above 1,250 fpm free area velocity
- Published performance ratings based on testing in accordance with AMCA Publication 511
- High performance frame system with drainable head collects and removes water to provide excellent water penetration performance
- Drain gutter in each blade minimizes water cascade between blades
- Continuous blades up to 120" (3048)
- All aluminum construction for low maintenance and high resistance to corrosion
- All welded construction

FRAME CONSTRUCTION





5 YEAR LIMITED WARRANTY

ISO9001 CERTIFIED

VARIATIONS

Variations to the basic design of the louvers are available at additional cost. They include:

- Extended sill
- Hinged frame
- Front or rear security bars
- Filter racks
- Triangular and round options
- Integral flange
- A variety of bird and insect screens
- Selection of finishes: prime coat, 50% PVDF (modified fluoropolymer), epoxy, Pearledize, 70% PVDF, clear and color anodize. (Some variation in anodize color consistency is possible)

Consult Ruskin for other special requirements.

Note:
- Dimensions in inches, parenthesis ( ) indicate millimeters.
- Units can be furnished actual size or with size deducts.

FREE AREA GUIDE

Free Area Guide shows free area in ft² and m² for various sizes of ELF6350DMP.

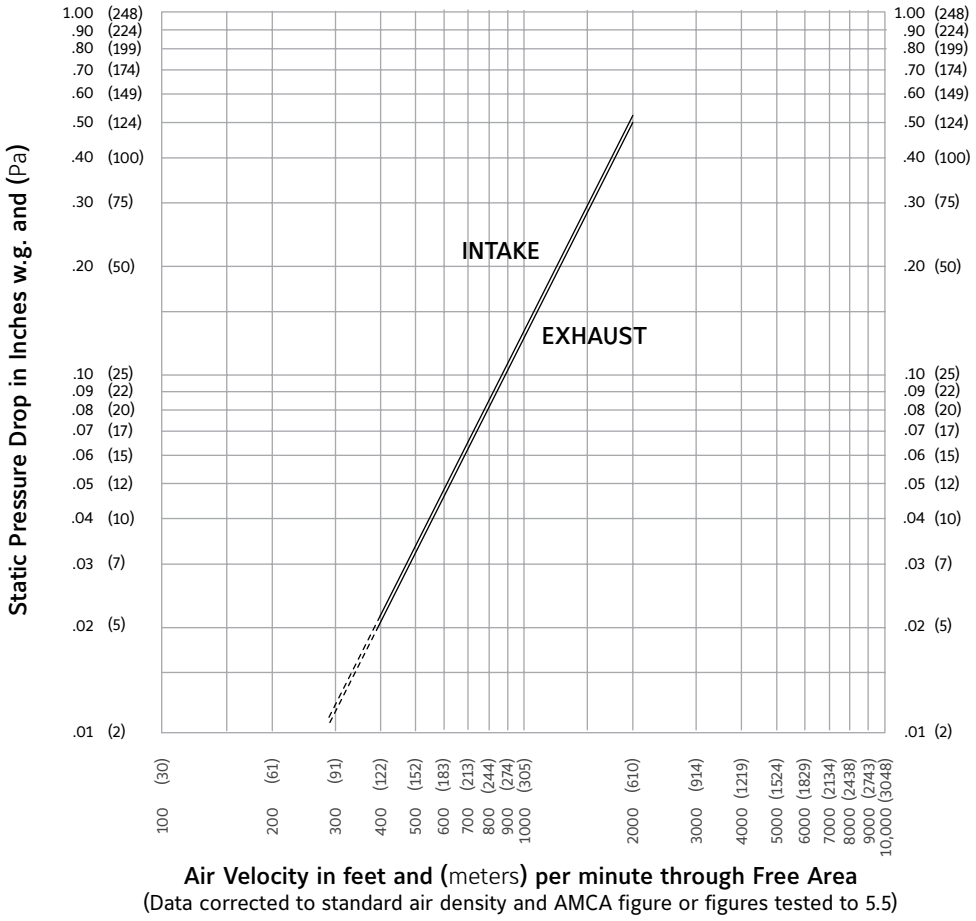
Width – Inches and Meters

Height – Inches and Meters

HEIGHT	12 0.30	18 0.45	24 0.60	30 0.75	36 0.90	42 1.05	48 1.20	54 1.35	60 1.50	66 1.65	72 1.80	78 1.95	84 2.10	90 2.25	96 2.40	102 2.55	108 2.70	114 2.85	120 3.00
12 0.30	**0.29** 0.03	**0.46** 0.04	**064** 0.06	**0.81** 0.08	**0.98** 0.09	**1.16** 0.11	**1.33** 0.12	**1.50** 0.14	**1.68** 0.16	**1.85** 0.17	**2.02** 0.19	**2.20** 0.20	**2.37** 0.22	**2.54** 0.24	**2.71** 0.25	**2.89** 0.27	**3.06** 0.28	**3.23** 0.30	**3.41** 0.32
18 0.45	**0.63** 0.06	**1.01** 0.09	**1.38** 0.13	**1.76** 0.16	**2.14** 0.20	**2.51** 0.23	**2.89** 0.27	**3.26** 0.30	**3.64** 0.34	**4.02** 0.37	**4.39** 0.41	**4.77** 0.44	**5.15** 0.48	**5.52** 0.51	**5.90** 0.55	**6.27** 0.58	**6.65** 0.62	**7.03** 0.65	**7.40** 0.69
24 0.60	**0.97** 0.09	**1.55** 0.14	**2.13** 0.20	**2.71** 0.25	**3.29** 0.31	**3.87** 0.36	**4.45** 0.41	**5.03** 0.47	**5.61** 0.52	**6.19** 0.58	**6.76** 0.63	**7.34** 0.68	**7.92** 0.74	**8.50** 0.79	**9.08** 0.84	**9.66** 0.90	**10.24** 0.95	**10.82** 1.01	**11.40** 1.06
30 0.75	**1.23** 0.11	**1.97** 0.18	**2.70** 0.25	**3.44** 0.32	**4.17** 0.39	**4.90** 0.46	**5.64** 0.52	**6.37** 0.59	**7.11** 0.66	**7.84** 0.73	**8.58** 0.80	**9.31** 0.87	**10.05** 0.93	**10.78** 1.00	**11.51** 1.07	**12.25** 1.14	**12.98** 1.21	**13.72** 1.28	**14.45** 1.34
36 0.90	**1.57** 0.15	**2.51** 0.23	**3.45** 0.32	**4.38** 0.41	**5.32** 0.49	**6.26** 0.58	**7.20** 0.67	**8.13** 0.76	**9.07** 0.84	**10.01** 0.93	**10.95** 1.02	**11.88** 1.11	**12.82** 1.19	**13.76** 1.28	**14.70** 1.37	**15.63** 1.45	**16.57** 1.54	**17.51** 1.63	**18.45** 1.72
42 1.05	**1.83** 0.17	**2.93** 0.27	**4.02** 0.37	**5.11** 0.48	**6.20** 0.58	**7.30** 0.68	**8.39** 0.78	**9.48** 0.88	**10.57** 0.98	**11.67** 1.08	**12.76** 1.19	**13.85** 1.29	**14.94** 1.39	**16.04** 1.49	**17.13** 1.59	**18.22** 1.69	**19.31** 1.80	**20.41** 1.90	**21.50** 2.00
48 1.20	**2.17** 0.20	**3.47** 0.32	**4.76** 0.44	**6.06** 0.56	**7.36** 0.68	**8.65** 0.80	**9.95** 0.93	**11.24** 1.05	**12.54** 1.17	**13.83** 1.29	**15.13** 1.41	**16.43** 1.53	**17.72** 1.65	**19.02** 1.77	**20.31** 1.89	**21.61** 2.01	**22.90** 2.13	**24.20** 2.25	**25.50** 2.37
54 1.35	**2.43** 0.23	**3.88** 0.36	**5.33** 0.50	**6.79** 0.63	**8.24** 0.77	**9.69** 0.90	**11.14** 1.04	**12.59** 1.17	**14.04** 1.31	**15.49** 1.44	**16.94** 1.58	**18.39** 1.71	**19.84** 1.85	**21.29** 1.98	**22.75** 2.12	**24.20** 2.25	**25.65** 2.39	**27.10** 2.52	**28.55** 2.66
60 1.50	**2.77** 0.26	**4.43** 0.41	**6.08** 0.57	**7.74** 0.72	**9.39** 0.87	**11.04** 1.03	**12.70** 1.18	**14.35** 1.33	**16.01** 1.49	**17.66** 1.64	**19.31** 1.80	**20.97** 1.95	**22.62** 2.10	**24.27** 2.26	**25.93** 2.41	**27.58** 2.57	**29.24** 2.72	**30.89** 2.87	**32.54** 3.03
66 1.65	**3.11** 0.29	**4.97** 0.46	**6.83** 0.64	**8.69** 0.81	**10.54** 0.98	**12.40** 1.15	**14.26** 1.33	**16.11** 1.50	**17.97** 1.67	**19.83** 1.84	**21.68** 2.02	**23.54** 2.19	**25.40** 2.36	**27.25** 2.53	**29.11** 2.71	**30.97** 2.88	**32.83** 3.05	**34.68** 3.23	**36.54** 3.40
72 1.80	**3.37** 0.31	**5.39** 0.50	**7.40** 0.69	**9.41** 0.88	**11.42** 1.06	**13.44** 1.25	**15.45** 1.44	**17.46** 1.62	**19.47** 1.81	**21.48** 2.00	**23.50** 2.19	**25.51** 2.37	**27.52** 2.56	**29.53** 2.75	**31.54** 2.93	**33.56** 3.12	**35.57** 3.31	**37.58** 3.49	**39.59** 3.68
78 1.95	**3.72** 0.35	**5.93** 0.55	**8.15** 0.76	**10.36** 0.96	**12.58** 1.17	**14.79** 1.38	**17.01** 1.58	**19.22** 1.79	**21.44** 1.99	**23.65** 2.20	**25.87** 2.41	**28.08** 2.61	**30.30** 2.82	**32.51** 3.02	**34.73** 3.23	**36.94** 3.44	**39.16** 3.64	**41.37** 3.85	**43.59** 4.05
84 2.10	**3.98** 0.37	**6.35** 0.59	**8.72** 0.81	**11.09** 1.03	**13.46** 1.25	**15.83** 1.47	**18.20** 1.69	**20.57** 1.91	**22.94** 2.13	**25.31** 2.35	**27.68** 2.57	**30.05** 2.79	**32.42** 3.01	**34.79** 3.24	**37.16** 3.46	**39.53** 3.68	**41.90** 3.90	**44.27** 4.12	**46.64** 4.34
90 2.25	**4.32** 0.40	**6.89** 0.64	**9.46** 0.88	**12.04** 1.12	**14.61** 1.36	**17.18** 1.60	**19.76** 1.84	**22.33** 2.08	**24.90** 2.32	**27.48** 2.56	**30.05** 2.79	**32.62** 3.03	**35.20** 3.27	**37.77** 3.51	**40.34** 3.75	**42.92** 3.99	**45.49** 4.23	**48.06** 4.47	**50.64** 4.71
96 2.40	**4.58** 0.43	**7.30** 068	**10.03** 0.93	**12.76** 1.19	**15.49** 1.44	**18.22** 1.69	**20.95** 1.95	**23.68** 2.20	**26.40** 2.46	**29.13** 2.71	**31.86** 2.96	**34.59** 3.22	**37.32** 3.47	**40.05** 3.72	**42.78** 3.98	**45.50** 4.23	**48.23** 4.49	**50.96** 4.74	**53.69** 4.99
102 2.55	**4.92** 0.46	**7.85** 0.73	**10.78** 1.00	**13.71** 1.28	**16.64** 1.55	**19.57** 1.82	**22.51** 2.09	**25.44** 2.37	**28.37** 2.64	**31.30** 2.91	**34.23** 3.18	**37.16** 3.46	**40.10** 3.73	**43.03** 4.00	**45.96** 4.27	**48.89** 4.55	**51.82** 4.82	**54.75** 5.09	**57.68** 5.36
108 2.70	**5.26** 0.49	**8.39** 0.78	**11.53** 1.07	**14.66** 1.36	**17.80** 1.65	**20.93** 1.95	**24.06** 2.24	**27.20** 2.53	**30.33** 2.82	**33.47** 3.11	**36.60** 3.40	**39.74** 3.70	**42.87** 3.99	**46.01** 4.28	**49.14** 4.57	**52.28** 4.86	**55.41** 5.15	**58.55** 5.44	**61.68** 5.74
114 2.85	**5.52** 0.51	**8.81** 0.82	**12.10** 1.13	**15.39** 1.43	**18.68** 1.74	**21.97** 2.04	**25.26** 2.35	**28.55** 2.65	**31.84** 2.96	**35.13** 3.27	**38.42** 3.57	**41.70** 3.88	**44.99** 4.18	**48.28** 4.49	**51.57** 4.80	**54.86** 5.10	**58.15** 5.41	**61.44** 5.71	**64.73** 6.02
120 3.00	**5.86** 0.54	**9.35** 0.87	**12.84** 1.19	**16.34** 1.52	**19.83** 1.84	**23.32** 2.17	**26.81** 2.49	**30.31** 2.82	**33.80** 3.14	**37.29** 3.47	**40.79** 3.79	**44.28** 4.12	**47.77** 4.44	**51.26** 4.77	**54.76** 5.09	**58.25** 5.42	**61.74** 5.74	**65.24** 6.07	**68.73** 6.39

PRESSURE DROP

Test size 48" x 48" (1219 X 1219)
Ratings do not include the effect of a bird screen.



Air Velocity in feet and (meters) **per minute through Free Area**
(Data corrected to standard air density and AMCA figure or figures tested to 5.5)

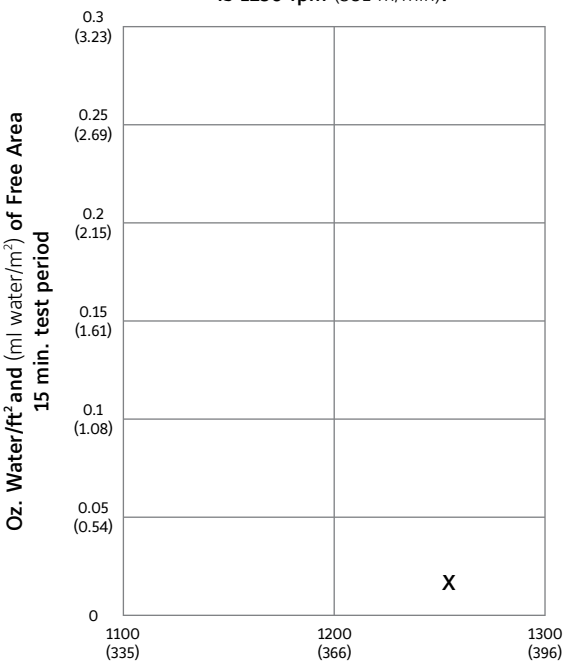
Ruskin Manufacturing Company certifies that the ELF6350DMP louvers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings and water penetration ratings only.

PERFORMANCE DATA

AMCA Standard 500 provides a reasonable basis for testing and rating louvers. Testing to AMCA 500 is performed under a certain set of laboratory conditions. This does not guarantee that other conditions will not occur in the actual environment where louvers must operate.

The louver system should be designed with a reasonable safety factor for louver performance. To ensure protection from water carryover, design with a performance level somewhat below maximum desired pressure drop and .01 oz./sq. ft. of water penetration.

Water penetration
Test size 48" wide X 48" high (1219 X 1219)
Beginning point of water penetration at .01 oz./sq.ft. is 1250 fpm (381 m/min).



SUGGESTED SPECIFICATION

Furnish and install louvers as hereinafter specified where shown on plans or as described in schedules. Louvers shall be stationary drainable type with drain gutters in each blade and downspouts in jambs and mullions. Louvers shall have a minimum of 62% free area based on a 48" wide x 48" high (1219 x 1219) size. Stationary drainable blades shall be contained within a 6" (152) frame. Louver components (heads, jambs, sills, blades, & mullions) shall be factory assembled by the louver manufacturer. Louver sizes too large for shipping shall be built up by the contractor from factory assembled louver sections to provide overall sizes required. Louver design shall limit span between visible mullions to 10 feet (3) and shall incorporate structural supports required to withstand a windload of 30 lbs. per sq. ft. (1.44kPa) (equivalent of a 110 mph wind [177 KPH] – specifier may substitute any loading required).

Louvers shall be Ruskin model ELF6350DMP extruded 6063T6 aluminum alloy construction as follows:

Frame: 6" (152) deep, 0.125" (3.2) wall thickness.

Blades: 0.90" (2.3) wall thickness. Drainable blades positioned at 35° angle and spaced approximately 4" (102) center to center.

Screen: 5/8" x .040" (16 x 1) expanded, flattened aluminum in removable frame.

Finish: Select finish specification from Ruskin Finishes Brochure.

Published louver performance data bearing the AMCA Certified Ratings Seal for Air Performance & Water Penetration must be submitted for approval prior to fabrication and must demonstrate pressure drop and water penetration equal to or less than the Ruskin model specified.

LINKS TO IMPORTANT DOCUMENTS

Document Title
Paint Finishes and Color Guide
Limited Warranty Document

RUSKIN®
AUTHORITY IN AIR CONTROL
3900 Doctor Greaves Road
Grandview, MO 64030
Website: www.ruskin.com
Phone: (816) 761-7476

RUSKIN®

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

ELF6375DX and ~~ELF6375DXH~~ DRAINABLE STATIONARY LOUVERS

EXTRUDED ALUMINUM LOUVER

STANDARD CONSTRUCTION

FRAME
6" (152) deep, 6063T5 extruded aluminum. ELF6375DX 1 – .081" (2.1) nominal wall thickness. ELF6375DXH – .125" (3.2) nominal wall thickness. Downspouts and caulking surfaces provided.

BLADES
6063T5 extruded aluminum.
ELF6375DX – .081" (2.1) nominal wall thickness. ELF6375DXH – .125" (3.2) nominal wall thickness. Drainable blades are positioned at at 37 1/2° angle and spaced approximately 5 29/32" (150) center to center.

SCREEN
3/4" x .051" (19 x 1.3) expanded, flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.

FINISH
Mill.

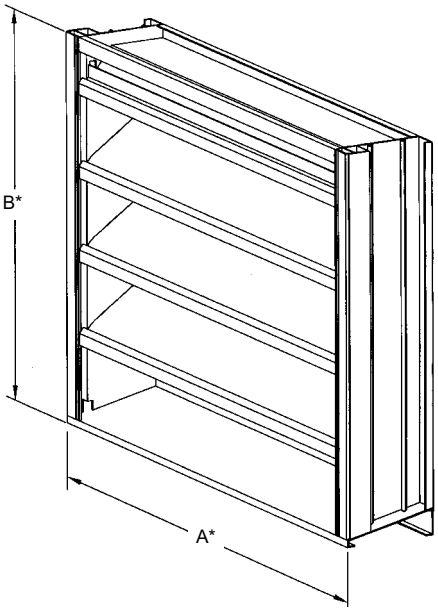
MINIMUM SIZE
12"w x 12"h (305 x 305).

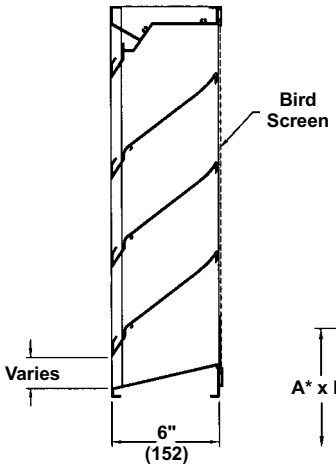
APPROXIMATE SHIPPING WEIGHT
ELF6375DX - 4 lbs./ft.^{2} (19.5 kg /m^2)
ELF6375DXH - 6 lbs./ft.^{2} (29.3kg /m^2)

MAXIMUM FACTORY ASSEMBLY SIZE
Shall be 75 sq. ft. (7m^2) per section, not to exceed 120"w x 90"h (3048 x 2286) or 90"w x 120"h (2286 x 3048).
Louvers larger than the maximum factory assembly size will require field assembly of smaller sections.

SUPPORTS
Louvers may be provided with rear mounted blade supports that increase overall louver depth depending on louver size, assembly configuration or windload.

Consult Ruskin for additional information.





FEATURES

The ELF6375DX and ELF6375DXH offers:

- 57% Free Area.
- Published performance ratings based on testing in accordance with AMCA Publication 511.
- High performance frame system with drainable head collects and removes water to provide excellent water penetration performance.
- Drain gutter in each blade minimizes water cascade between blades.
- Architecturally styled, hidden mullions allowing continuous line appearance up to 120" (3048).
- Aluminum construction for low maintenance and high resistance to corrosion.
- All welded construction.

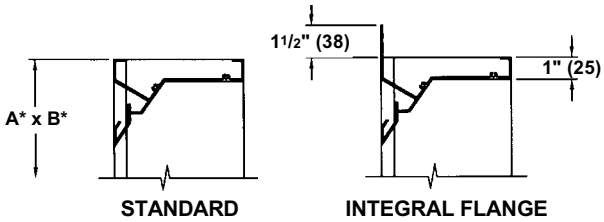
VARIATIONS

Variations to the basic design of these louvers are available at additional cost. They include:

- Extended sill.
- Hinged frame.
- Front or rear security bars.
- Filter racks.
- A variety of bird and insect screens.
- Selection of finishes: prime coat, baked enamel (modified fluoropolymer), epoxy, Acrodize, Kynar, clear and color anodize. (Some variation in anodize color consistency is possible.)

Consult Ruskin for other special requirements.

FRAME CONSTRUCTION



STANDARD INTEGRAL FLANGE

Dimensions in inches, parenthesis ( ) indicate millimeters.

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

TAG	QTY.	SIZE		FRAME	VARIATIONS
		A*-WIDE	B*-HIGH		

PROJECT **LOCATION**
ARCH./ENGR. **CONTRACTOR**
REPRESENTATIVE **DATE**

SUGGESTED SPECIFICATION

Furnish and install louvers as hereinafter specified where shown on plans or as described in schedules. Louvers shall be stationary drainable type with drain gutters in each blade and downspouts in jambs and mullions. Louvers shall have a minimum of 57% free area based on a 48" wide x 48" high (1219 x 1219) size. Stationary drainable blades shall be contained within a 6" (152) frame. Louver components (heads, jambs, sills, blades, & mullions) shall be factory assembled by the louver manufacturer. Louver sizes too large for shipping shall be built up by the contractor from factory assembled louver sections to provide overall sizes required. Louver design shall limit span between visible mullions to 10 feet (3) and shall incorporate structural supports required to withstand a windload of 20 lbs. per sq. ft. (.96kPa) (equivalent of a 90 mph wind [145 KPH] wind – specifier may substitute any loading required).

Louvers shall be Ruskin Model ELF6375DX or ELF6375DXH extruded 6063T5 aluminum construction as follows:

Frame: 6" (152) deep. ELF6375DX - .081" (2.1) nominal wall thickness. ELF6375DXH - .125" (3.2) nominal wall thickness.

Blades: ELF6375DX - .081" (2.1) nominal wall thickness. ELF6375DXH - .125" (3.2) nominal wall thickness. Drainable blades are positioned at 37 1/2° angle and spaced approximately 5 29/32" (150) center to center.

Screen: 3/4" x .051" (19 x 1.3) expanded, flattened aluminum in removable frame.

Finish: Select finish specification from Ruskin Finishes Brochure.

Published louver performance data bearing the AMCA Certified Ratings Seal for Air Performance & Water Penetration must be submitted for approval prior to fabrication and must demonstrate pressure drop and water penetration equal to or less than the Ruskin model specified.

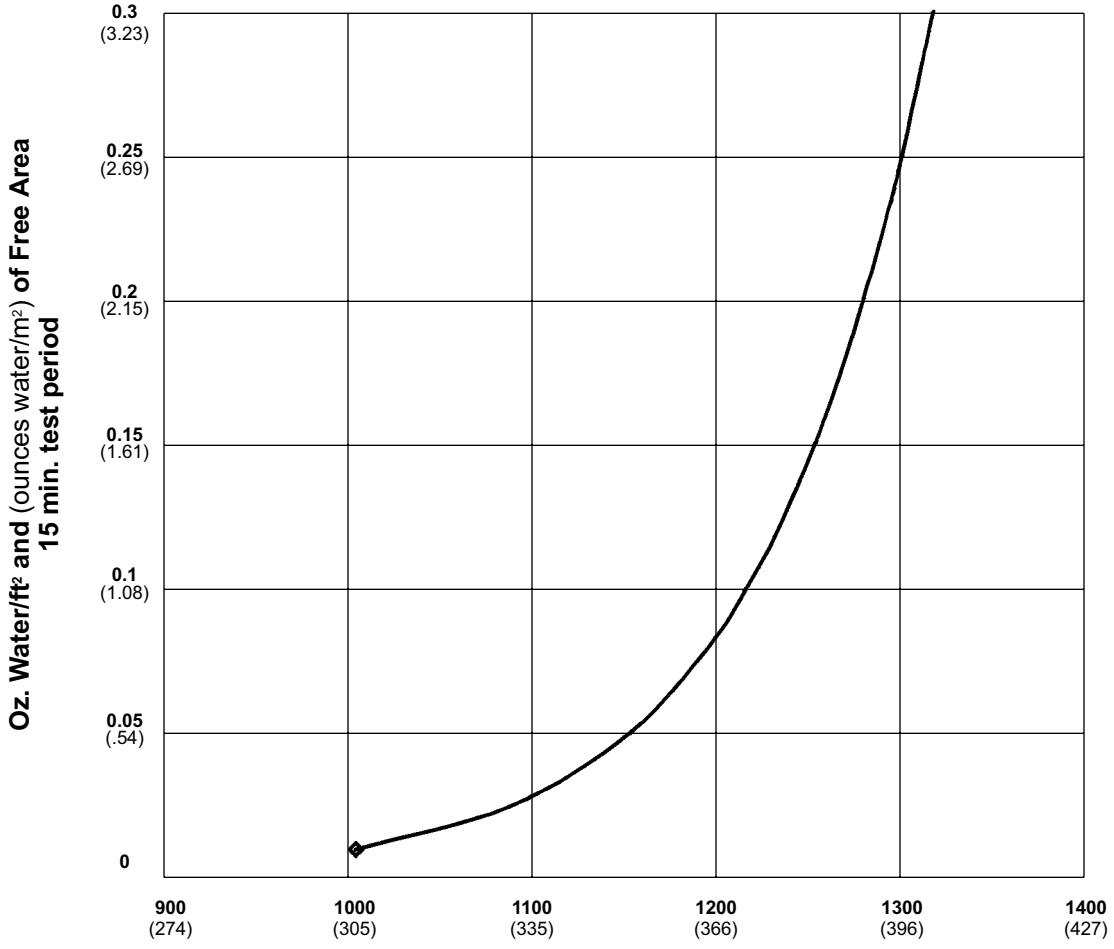
PERFORMANCE DATA

AMCA Standard 500 provides a reasonable basis for testing and rating louvers. Testing to AMCA 500 is performed under a certain set of laboratory conditions. This does not guarantee that other conditions will not occur in the actual environment where louvers must operate.

The louver system should be designed with a reasonable safety factor for louver performance. To ensure protection from water carryover, design with a performance level somewhat below maximum desired pressure drop and .01 oz./sq. ft. of water penetration.

WATER PENETRATION

Test size 48" wide x 48" high (1219 x 1219)
Beginning point of water penetration at .01 oz./sq. ft. is 1023 fpm (312 m/min)**.**



FREE AREA GUIDE

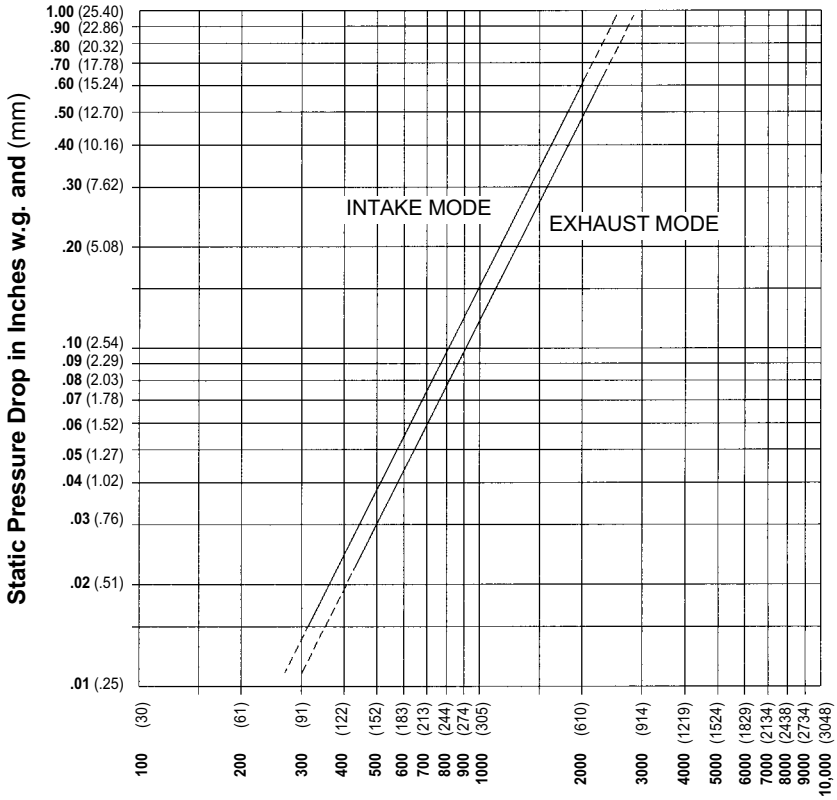
Free Area Guide shows free area in ft² and m² **for various sizes of ELF6375DX and ELF6375DXH.**

Width – Inches and Meters

Height – Inches and Meters

	12 0.30	**18** 0.46	**24** 0.61	**30** 0.76	**36** 0.91	**42** 1.07	**48** 1.22	**54** 1.37	**60** 1.52	**66** 1.68	**72** 1.83	**78** 1.98	**84** 2.13	**90** 2.29	**96** 2.44	**102** 2.59	**108** 2.74	**114** 2.90	**120** 3.05
12 0.30	**0.31** 0.03	**0.49** 0.05	**0.67** 0.06	**0.86** 0.08	**1.04** 0.10	**1.22** 0.11	**1.41** 0.13	**1.59** 0.15	**1.77** 0.16	**1.96** 0.18	**2.14** 0.20	**2.32** 0.22	**2.51** 0.23	**2.69** 0.25	**2.88** 0.27	**3.06** 0.28	**3.25** 0.30	**3.43** 0.32	**3.61** 0.34
18 0.46	**0.58** 0.05	**0.93** 0.09	**1.28** 0.12	**1.63** 0.15	**1.98** 0.18	**2.32** 0.22	**2.68** 0.25	**3.03** 0.28	**3.37** 0.31	**3.73** 0.35	**4.08** 0.38	**4.42** 0.41	**4.77** 0.44	**5.13** 0.48	**5.48** 0.51	**5.82** 0.54	**6.18** 0.57	**6.52** 0.61	**6.87** 0.64
24 0.61	**0.86** 0.08	**1.38** 0.13	**1.89** 0.18	**2.40** 0.22	**2.92** 0.27	**3.43** 0.32	**3.96** 0.37	**4.47** 0.42	**4.98** 0.46	**5.50** 0.51	**6.02** 0.56	**6.53** 0.61	**7.05** 0.66	**7.57** 0.70	**8.09** 0.75	**8.60** 0.80	**9.12** 0.85	**9.63** 0.89	**10.15** 0.94
30 0.76	**1.14** 0.11	**1.82** 0.17	**2.50** 0.23	**3.18** 0.30	**3.87** 0.36	**4.54** 0.42	**5.24** 0.49	**5.92** 0.55	**6.59** 0.61	**7.28** 0.68	**7.97** 0.74	**8.64** 0.80	**9.33** 0.87	**10.01** 0.93	**10.70** 0.99	**11.37** 1.06	**12.06** 1.12	**12.74** 1.18	**13.42** 1.25
36 0.91	**1.41** 0.13	**2.26** 0.21	**3.11** 0.29	**3.95** 0.37	**4.80** 0.45	**5.64** 0.52	**6.52** 0.61	**7.35** 0.68	**8.18** 0.76	**9.04** 0.84	**9.89** 0.92	**10.73** 1.00	**11.58** 1.08	**12.44** 1.16	**13.29** 1.24	**14.13** 1.31	**14.98** 1.39	**15.82** 1.47	**16.67** 1.55
42 1.07	**1.69** 0.16	**2.70** 0.25	**3.72** 0.35	**4.72** 0.44	**5.75** 0.53	**6.74** 0.63	**7.79** 0.72	**8.79** 0.82	**9.79** 0.91	**10.81** 1.00	**11.83** 1.10	**12.83** 1.19	**13.86** 1.29	**14.88** 1.38	**15.89** 1.48	**16.90** 1.57	**17.92** 1.67	**18.92** 1.76	**19.94** 1.85
48 1.22	**1.97** 0.18	**3.15** 0.29	**4.33** 0.40	**5.50** 0.51	**6.69** 0.62	**7.86** 0.73	**9.08** 0.84	**10.24** 0.95	**11.40** 1.06	**12.59** 1.17	**13.78** 1.28	**14.95** 1.39	**16.14** 1.50	**17.33** 1.61	**18.51** 1.72	**19.68** 1.83	**20.87** 1.94	**22.04** 2.05	**23.23** 2.16
54 1.37	**2.24** 0.21	**3.59** 0.33	**4.94** 0.46	**6.27** 0.58	**7.63** 0.71	**8.96** 0.83	**10.35** 0.96	**11.67** 1.08	**13.00** 1.21	**14.35** 1.33	**15.71** 1.46	**17.04** 1.58	**18.40** 1.71	**19.75** 1.84	**21.10** 1.96	**22.44** 2.09	**23.79** 2.21	**25.12** 2.33	**26.48** 2.46
60 1.52	**2.52** 0.23	**4.03** 0.37	**5.55** 0.52	**7.05** 0.66	**8.57** 0.80	**10.06** 0.93	**11.62** 1.08	**13.12** 1.22	**14.60** 1.36	**16.13** 1.50	**17.65** 1.64	**19.14** 1.78	**20.67** 1.92	**22.19** 2.06	**23.71** 2.20	**25.21** 2.34	**26.73** 2.48	**28.22** 2.62	**29.75** 2.76
66 1.68	**2.80** 0.26	**4.47** 0.42	**6.16** 0.57	**7.82** 0.73	**9.51** 0.88	**11.17** 1.04	**12.90** 1.20	**14.56** 1.35	**16.20** 1.51	**17.90** 1.66	**19.59** 1.82	**21.24** 1.97	**22.94** 2.13	**24.63** 2.29	**26.31** 2.44	**27.98** 2.60	**29.67** 2.76	**31.32** 2.91	**33.01** 3.07
72 1.83	**3.08** 0.29	**4.92** 0.46	**6.76** 0.63	**8.59** 0.80	**10.45** 0.97	**12.27** 1.14	**14.18** 1.32	**16.00** 1.49	**17.81** 1.66	**19.67** 1.83	**21.53** 2.00	**23.35** 2.17	**25.21** 2.34	**27.07** 2.52	**28.91** 2.69	**30.74** 2.86	**32.60** 3.03	**34.42** 3.20	**36.28** 3.37
78 1.98	**3.35** 0.31	**5.36** 0.50	**7.37** 0.68	**9.37** 0.87	**11.40** 1.06	**13.38** 1.24	**15.45** 1.44	**17.44** 10.91	**19.41** 1.80	**21.44** 1.99	**23.47** 2.18	**25.45** 2.37	**27.48** 2.55	**29.51** 2.74	**31.52** 2.93	**33.51** 3.11	**35.54** 3.30	**37.52** 3.49	**39.55** 3.68
84 2.13	**3.63** 0.34	**5.80** 0.54	**7.98** 0.74	**10.14** 0.94	**12.34** 1.15	**14.48** 1.35	**16.73** 1.00	**18.88** 1.75	**21.02** 1.95	**23.21** 2.16	**25.41** 2.36	**27.55** 2.56	**29.75** 2.76	**31.94** 2.97	**34.12** 3.17	**36.28** 3.37	**38.48** 3.58	**40.62** 3.77	**42.82** 3.98
90 2.29	**3.91** 0.36	**6.25** 0.58	**8.59** 0.80	**10.92** 1.01	**13.28** 1.23	**15.59** 1.45	**18.01** 1.67	**20.32** 1.89	**22.62** 2.10	**24.98** 2.32	**27.35** 2.54	**29.65** 2.76	**32.02** 2.98	**34.38** 3.19	**36.73** 3.41	**39.05** 3.63	**41.41** 3.85	**43.72** 4.06	**46.09** 4.28

PRESSURE DROP



Ratings do not include the effect of a bird screen.

Ruskin Manufacturing Company certifies that the ELF6375DX and ELF6375DXH Louvers shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings and water penetration ratings only.

Filter Schedule

Filters are future. Do not provide with unit. Frame only

Unit No.	Filter Type	CFM	Face Velocity (FPM)	Filter Qty & Size	Fastener Type	Frame Type	Manufacturer	Filter Model	Gauge	Access	No. of Sets
RTU-1	Hepa	85000	472	(45) 24x24	SWINGBOLT	Galv. MagnaFrame II	AAF	Astrocel HCX	DM2003 LT Magnehelic	Upstream	2
RTU-1	Prefilter - Pleated	0	0	(45) 24x24	C-86	Galv. Std No. 8	AAF	2" Perfect pleat	DM2003 LT Magnehelic	Upstream	2
RTU-1	Final filter - Bag	0	0	(45) 24x24	C-70	Shares frame with prefilter	AAF	DRIPAK 2000 6P	**Gauge for each filter bank**	Upstream	2

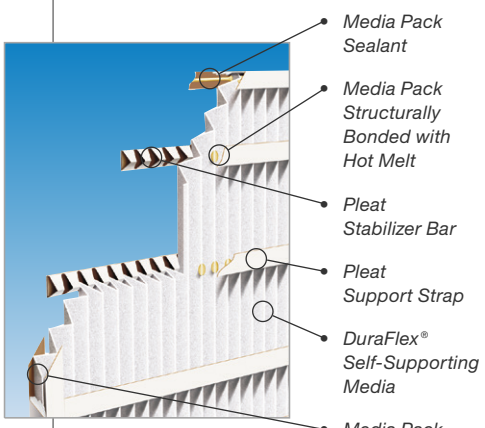
THE WORLD LEADER IN CLEAN AIR SOLUTIONS

PerfectPleat® HC M8

(High Capacity MERV 8)

EXTENDED SURFACE PLEATED PANEL FILTERS

- Highest performing self-supported pleated filter
- Mechanical efficiency – does not rely on electret charge technology
- Self-supporting DuraFlex® media made from virgin fiber; no wire support needed
- Consistent media with controlled fiber size and blend
- Available in 1″, 2″ and 4″ models
- Environmentally friendly – no dies, no metal, fully incinerable
- Patented media, filter design, and manufacturing process. Patents covered under one or more of the following US 6398839 B2; US 6254653 B1; US 6159318; US 6165242; US 6387140 B1 (1″ model only)



PerfectPleat® HC M8 2″ Filter Construction

The PerfectPleat HC M8 filter is designed to consistently increase efficiency throughout the service life of the filter. The PerfectPleat HC M8 filter has approximately 25% more media than our standard capacity filter, and is ideal for applications where pleated filters are currently in use and higher performance is desired. They have an initial MERV 8 rating respectively, but the efficiency increases significantly when dust holding begins. PerfectPleat HC M8 filters have distinctive self-supporting characteristics that allow a pleating pattern, which promotes airflow and maximizes dust holding capacity (DHC). Lower pressure drop and higher DHC means reductions in energy consumption and operating costs.

Superior Design and Construction

The perimeter frame is constructed from the highest wet-strength 28 pt. beverage carrier board, securely bonded to the media pack. The 1″ model employs three supporting straps on the air entering and air leaving sides of the filter to control pleat spacing and support the media pack in the perimeter frame.

Support straps on the air entering side are used in combination with uniquely designed pleat stabilizers on the air-leaving side of the 2″ model to provide additional strength. The support straps and pleat stabilizers ensure integrity against turbulent airflow. The 2″ filter resists crushing and abuse and provides excellent lateral stability for installation in side-access systems.

The 4″ model utilizes a two piece die cut frame with integral pleat spacers on the air leaving side. Pleat spacing is controlled by straps bonded to the air entering side and the multiple rows of pleat spacers on the air leaving side. The pleat spacers also ensure the pleats remain open during use, maximizing filter life.

DuraFlex® Media—Patented Media Design

Uniform size virgin fibers are assembled in closely controlled blends to create a media that is both self-supporting and consistent in performance. When pleated, DuraFlex media will hold its shape without the wire support characteristic of conventional pleated filters. That means no potential for the formation of rust and safer handling. With the superior resiliency of DuraFlex media and no need for wire support, PerfectPleat HC M8 filters can sustain significant abuse and maintain their shape and pleat spacing. The absence of wire also makes the filter totally incinerable, which can simplify disposal.

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PerfectPleat® HC M8 Filters

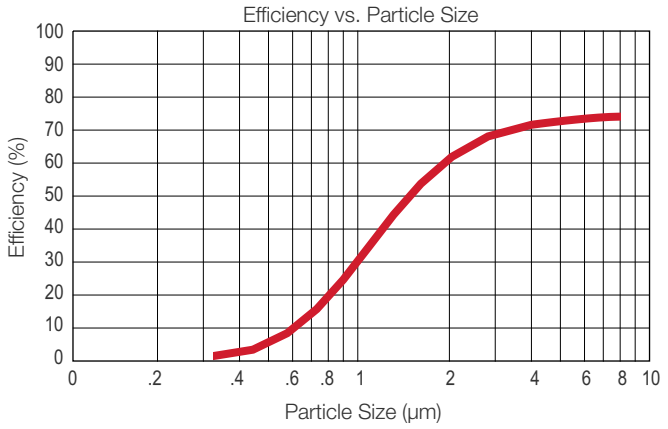
Performance Data

Filter	Pleats Per Linear Foot	Rated Initial Resistance (in. w.g.) 300 FPM	500 FPM	625 FPM	Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits
1″ PerfectPleat HC M8	15	.23	.42	–	1.0	8	150°F (66°C)
2″ PerfectPleat HC M8	15	.12	.23	.34	1.0	8	150°F (66°C)
4″ PerfectPleat HC M8	11	.12	.25	.38	1.0	8	200°F (93°C)

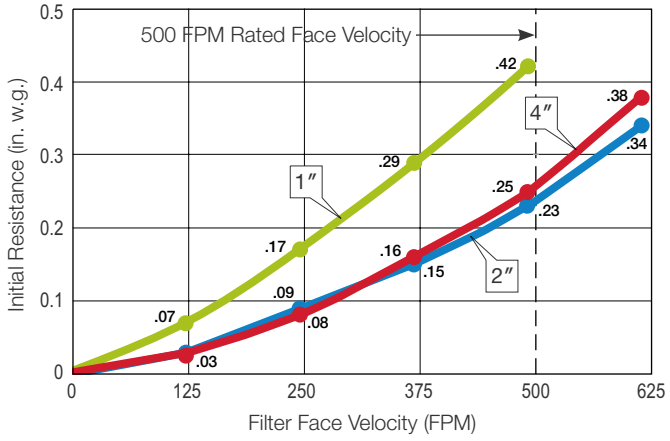
All performance data is based on ASHRAE Standard 52.2. Performance tolerance conforms to Section 6.4 of ANSI/AHRI Standard 850-2013.

***Underwriters Laboratories Classification** – PerfectPleat HC M8 filters are UL Classified. Testing was performed according to UL Standard 900.*

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



Product Information – Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow (SCFM) 300 FPM	500 FPM	625 FPM	Pleats Per Filter
10 x 10 x 1	9½ x 9½ x ¾	200	350	–	11
10 x 20 x 1	9½ x 19½ x ¾	400	700	–	11
12 x 12 x 1	11½ x 11½ x ¾	300	500	–	14
12 x 20 x 1	11½ x 19½ x ¾	500	850	–	14
12 x 24 x 1	11⅜ x 23⅜ x ¾	600	1000	–	14
14 x 20 x 1	13½ x 19½ x ¾	600	1000	–	16
14 x 25 x 1	13½ x 24½ x ¾	750	1200	–	16
15 x 20 x 1	14½ x 19½ x ¾	650	1050	–	17
16 x 16 x 1	15½ x 15½ x ¾	550	900	–	19
16 x 20 x 1	15½ x 19½ x ¾	650	1100	–	19
16 x 25 x 1	15½ x 24½ x ¾	850	1400	–	19
18 x 20 x 1	17½ x 19½ x ¾	750	1250	–	21
18 x 24 x 1	17⅜ x 23⅜ x ¾	900	1500	–	21
18 x 25 x 1	17½ x 24½ x ¾	950	1550	–	21
20 x 20 x 1	19½ x 19½ x ¾	850	1400	–	24
20 x 25 x 1	19½ x 24½ x ¾	1050	1750	–	24
24 x 24 x 1	23⅜ x 23⅜ x ¾	1200	2000	–	29
25 x 25 x 1	24½ x 24½ x ¾	1300	2200	–	30
10 x 20 x 2	9½ x 19½ x 1¾	400	700	850	11
12 x 20 x 2	11½ x 19½ x 1¾	500	850	1050	14
12 x 24 x 2	11⅜ x 23⅜ x 1¾	600	1000	1250	14
14 x 25 x 2	13½ x 24½ x 1¾	750	1200	1500	16
15 x 20 x 2	14½ x 19½ x 1¾	650	1050	1300	17
15 x 25 x 2	14½ x 24½ x 1¾	800	1300	1650	17
16 x 16 x 2	15½ x 15½ x 1¾	550	900	1100	19
16 x 20 x 2	15½ x 19½ x 1¾	650	1100	1400	19
16 x 24 x 2	15⅜ x 23⅜ x 1¾	800	1350	1650	19
16 x 25 x 2	15½ x 24½ x 1¾	850	1400	1750	19
18 x 24 x 2	17⅜ x 23⅜ x 1¾	900	1500	1900	21
18 x 25 x 2	17½ x 24½ x 1¾	950	1550	1950	21
20 x 20 x 2	19½ x 19½ x 1¾	850	1400	1750	24
20 x 24 x 2	19⅜ x 23⅜ x 1¾	1000	1650	2100	24
20 x 25 x 2	19½ x 24½ x 1¾	1050	1750	2150	24
24 x 24 x 2	23⅜ x 23⅜ x 1¾	1200	2000	2500	29
25 x 25 x 2	24½ x 24½ x 1¾	1300	2150	2700	30
12 x 24 x 4	11⅜ x 23⅜ x 3¾	600	1000	1250	10
16 x 20 x 4	15⅜ x 19⅜ x 3¾	650	1100	1400	13
16 x 25 x 4	15⅜ x 24⅜ x 3¾	850	1400	1750	13
18 x 24 x 4	17⅜ x 23⅜ x 3¾	900	1500	1875	15
20 x 20 x 4	19⅜ x 19⅜ x 3¾	850	1400	1750	17
20 x 25 x 4	19⅜ x 24⅜ x 3¾	1050	1750	2150	17
24 x 20 x 4	23⅜ x 19⅜ x 3¾	1000	1650	2100	17
24 x 24 x 4	23⅜ x 23⅜ x 3¾	1200	2000	2500	21
25 x 29 x 4	24⅜ x 28⅜ x 3¾	1500	2500	3150	26

Energy savings may be realized by operating the PerfectPleat HC M8 filters to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost of Ownership analysis for your specific application.

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ISO Certified Firm

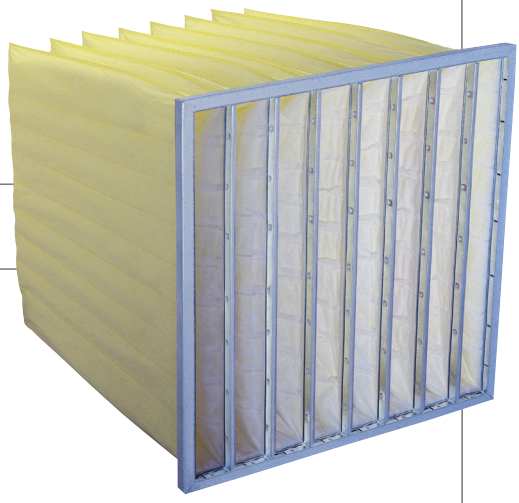
AFP-1-210B 01/17

THE WORLD LEADER IN CLEAN AIR SOLUTIONS

DriPak® 2000

(with Layered, Meltblown Synthetic Media)

EXTENDED SURFACE POCKET FILTERS



- High-loft, layered, meltblown synthetic media improves performance
- Ultrasonically welded pocket spacers and edges
- Available in four efficiencies: MERV 15, MERV 14, MERV 12, and MERV 8
- Available with antimicrobial

DriPak® 2000 Filter

Designed for high performance in demanding operating conditions, the DriPak 2000 extended surface pocket filters can function as prefilters or final filters where clean air is a necessity.

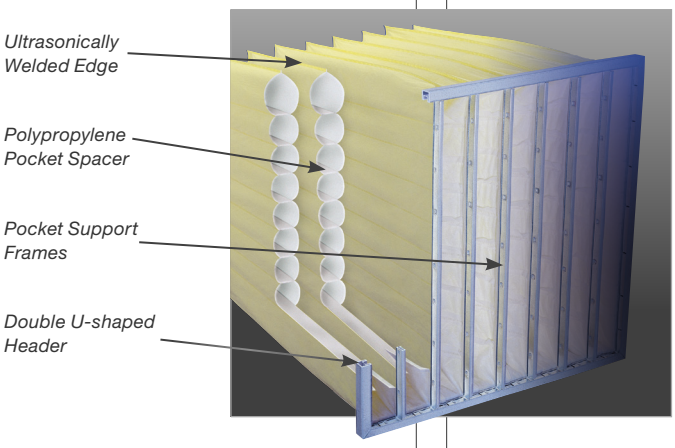
DriPak 2000 filters are ideal for healthcare facilities, automotive paint booths, commercial buildings, and a variety of industrial applications. Designed and manufactured by AAF Flanders, pioneers in extended surface pocket filters, the ultrasonically welded DriPak 2000 filter raises the industry standard for value and performance.

Now Better Than Ever

Today's DriPak 2000 filter features a unique, ultrasonically welded pocket configuration that guarantees complete pocket inflation and eliminates crowding or leakage. Reinforced pocket support frames eliminate flexing or buckling, even in a turbulent operating environment.

The DriPak 2000 filter is available in four efficiencies, MERV 15, MERV 14, MERV 12, and MERV 8, to meet the requirements of your HVAC system.

The DriPak 2000 filter with antimicrobial is designed specifically to improve Indoor Air Quality (IAQ). Air filters trap and concentrate particulate air contaminants, including viable fungal and bacterial spores. The presence of the antimicrobial preservative in the filter media is intended to preserve the integrity of the media throughout the useful life of the filter. Antimicrobial preservatives are not meant to increase the efficiency of the filter, nor to kill microorganisms “on the fly” as they pass through a filter.



IAQ Engineered

The DriPak 2000 filter is made from layered, meltblown synthetic media protected by a scrim on the air leaving side. Layering the media provides both a high efficiency final filter layer that effectively filters fine particulate and an integral lofted prefilter layer that captures larger particulate. Meltblown synthetic media is stronger than fiberglass, non-shedding, and water resistant.

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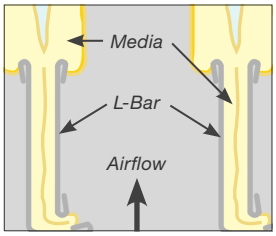
DriPak® 2000 Filters

Designed for Performance

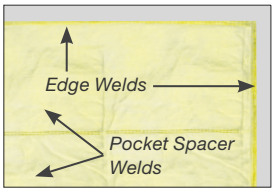
DriPak 2000 filters employ a sturdy pocket design that includes ultrasonic welding to ensure leak-free pockets. Interlocked support frames attached to the pockets prevent flexing and buckling during full inflation. The double U-shaped, reinforced header forms a solid container for the pocket support frames.



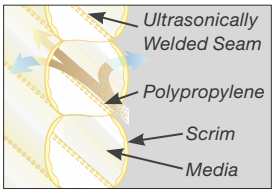
Interlocked Pocket Support Frames

Ultrasonically Welded Pocket Construction

The DriPak 2000 filter ultrasonically welded pocket construction features ribbons of fabric sealed inside the pockets to create aerodynamic channels. This eliminates the needle holes associated with span stitching. The contoured shape of the pocket allows full inflation without crowding or restricting airflow to ensure full media utilization and long service life.



Ultrasonic Welds



Leak-Free Welded Pocket Spacer

Product Information

Efficiencies
MERV 15, MERV 14, and MERV 12
Face Dimensions: 24 x 24, 24 x 20, 20 X 24, 20 x 20, and 12 x 24
Depths: 12, 15, 21, 26, 30, and 36

MERV 8
Face Dimensions: 24 x 24, 24 x 20, 20 X 25, 20 x 24, 20 x 20, 16 X 25, 16 x 20, and 12 x 24
Depths: 12, 15, 19, 22, and 30

DriPak 2000 filters are available in pocket and face dimension combinations from 12 x 24 - 3-pocket to 24 x 24 - 10-pocket. See Engineering Data Sheet AFP-7-114.

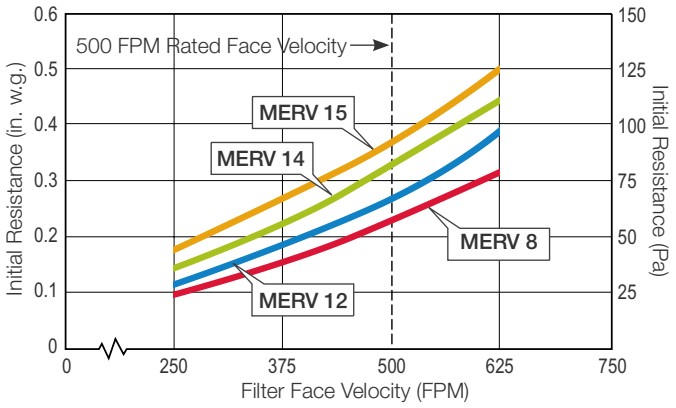
Gaskets and Loops – Gaskets, for side access systems or other applications which require gaskets, and pocket support loops are available on all DriPak 2000 filters.

Classifications – DriPak 2000 filters are UL Classified. Testing was performed according to UL Standard 900 and ULC-S111.

Temperature Limits – DriPak 2000 filters, operating with fan on, are designed for a continuous operating temperature of 200˚F or 93˚C.

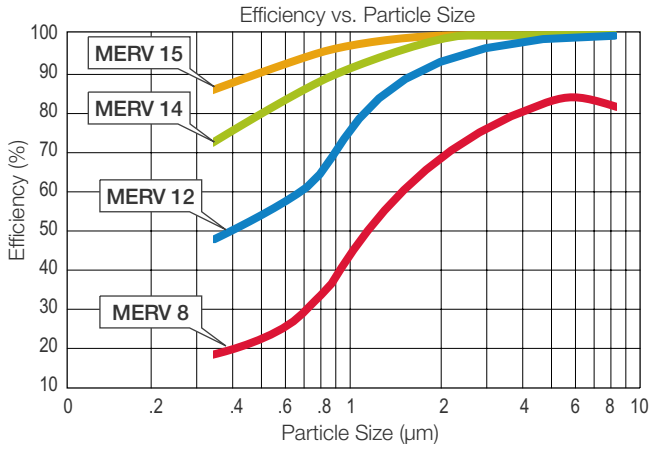
Operating Data

Initial Resistance vs. Filter Face Velocity



MERV 15, 14 & 12 based on 24″ x 24″ x 30″ – 8 pocket filter.
MERV 8 based on 24″ x 24″ x 19″ – 6 pocket filter.

Composite Minimum Efficiency Curve



Tested in accordance with ASHRAE Standard 52.2.

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

ISO Certified Firm AFP-1-114Q 01/17

Magna-Frame II

Advantages

- **Guaranteed to provide a scannable seal on the downstream side when filter elements are properly installed**
- **Dimensionally compatible with HVAC system configurations(actual nominal frame size matches typical HVAC frame sizes)**
- **Multiple prefilter options possible**

Typical applications: Built-up bank HEPA/ULPA filter frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.
Construction: 14-gauge galvanized steel frame with flat filter seal flange to seal against gasket on HEPA/ULPA filter. Will accept nominal dimension filters with appropriate swing bolts. Frames are pre-punched for bolt-together assembly. Annular based dimples help to align filter and recess assembly bolts.
Filters: 6" or 12" deep nominal size HEPA/ULPA filters.
Additional data: Available in stainless steel, consult factory.

See Literature 2303B for more details.

Magna-Frame II (H x W, inches)	Holds Absolute Filter Size	Per Carton Weight (lbs)	Per Carton Cube (sq. ft.)	Airflow Standard/High Capacity (cfm)	Swing Bolts Required per Frame
24.00 x 24.00	23.38 x 23.38	20.50	2.78	1100/2000	4
24.00 x 12.00	23.38 x 11.38	13.50	1.50	460/850	4
12.00 x 24.00	11.38 x 23.38	13.50	1.50	460/850	2
24.62 x 24.62	24.00 x 24.00	21.00	2.78	1100/2000	4
24.62 x 12.62	24.00 x 12.00	14.00	1.50	460/850	4
12.62 x 24.62	12.00 x 24.00	14.00	1.50	460/850	2

Dwyer

SERIES 2000

MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES

Indicate Positive, Negative or Differential, Accurate within 1%

Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

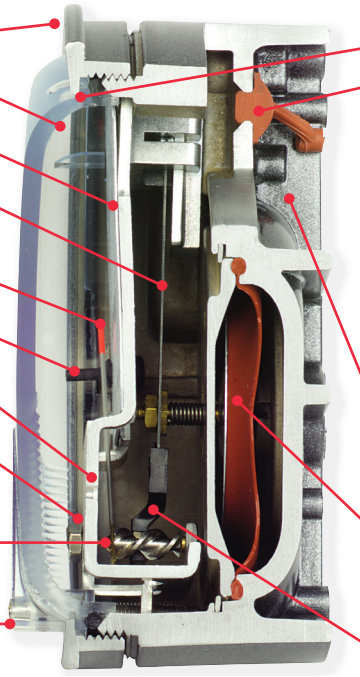
Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.



O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023" clearance when gage is surface mounted. Do not obstruct the gap created by these pads.
The blowout plug is not used on models above 180" of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings of any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

MODEL CHART

Model	Range, Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range, PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30

Model	Range, CM of Water
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

Model	Range, MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10

Model	Range, Pa
2000-60NPA†••	10-0-50
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

Model	Range, in w.c./ Velocity F.P.M.
2000-00AV†••	0-.25/ 300-2000
2000-0AV†•	0-.50/ 500-2800
2001AV	0-1.0/ 500-4000
2002AV	0-2.0/ 1000-5600
2005AV	0-5.0/ 2000-8800
2010AV	0-10/ 2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

†These ranges calibrated for vertical scale position • Accuracy ±3% •• Accuracy ±4% *MP option standard **HP option standard

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® gage that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure.
Example: 0.5 in w.c. = 16,000 CFM.

ACCESSORIES

Model	Description
A-321	Safety relief valve
A-448	3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
A-135	Rubber gasket for panel mounting
A-401	Plastic carry case
A-310A	3-way vent valves. In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

A-310A

Job: DAYTON CHILDRENS AMBULATORY
EQ NUMBER: 21580

[ELECTRICAL DRAWING AND DATA SUBMITTAL]

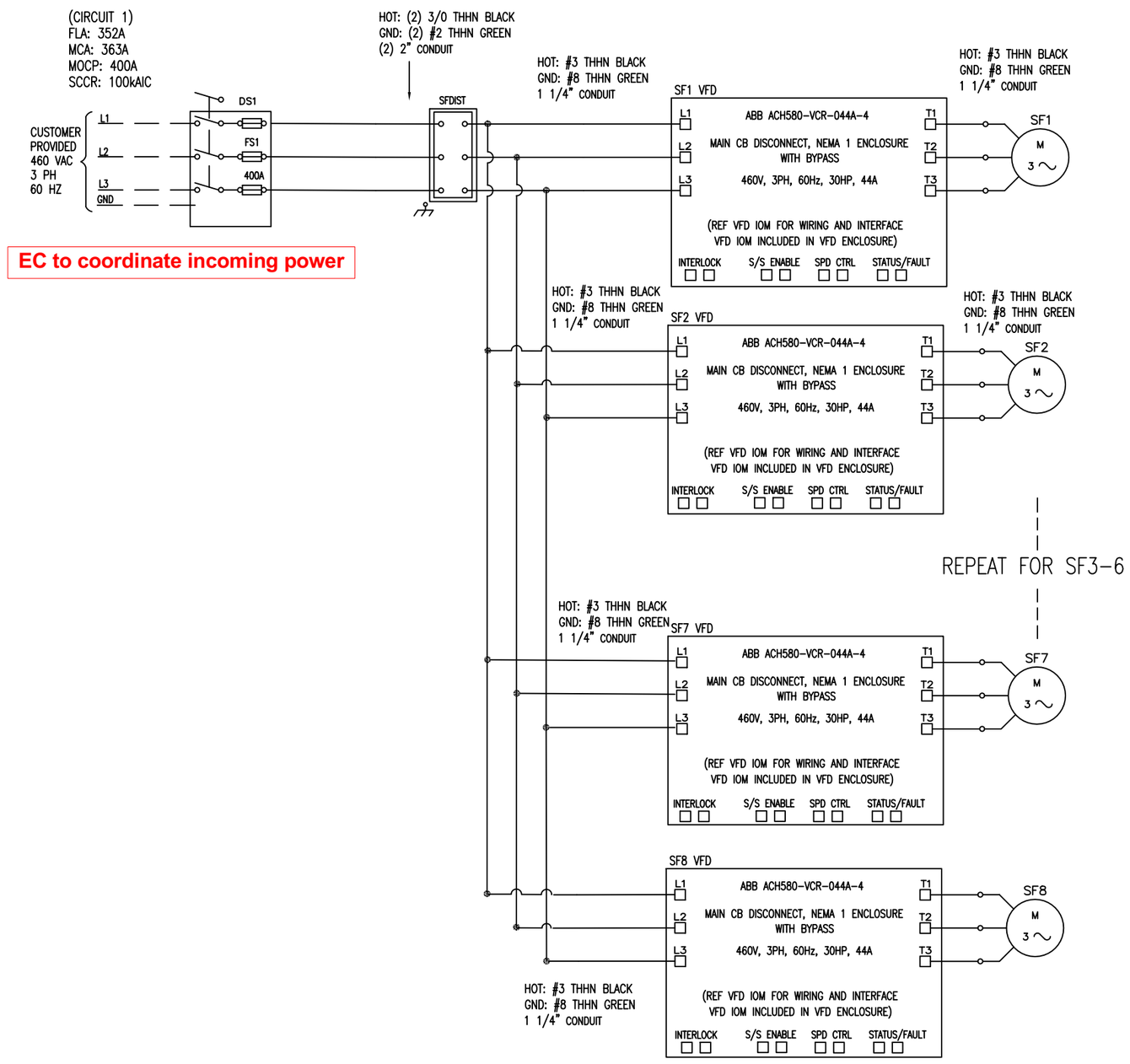
REV0 - ORIGINAL SUBMITTAL - SENT 8/10/2021
REV1 - REVISED SUBMITTAL - SENT 8/19/2021

CLARIFICATIONS:

1. Trane Factory to provide, mount and wire components only as shown and noted in the following Electrical Submittal drawings (VFDs to Motors, Lights, & Receptacle to Load Center).
2. Controls and Sensors are in Field by Others (Controls Contractor)
3. Do not run directly piping above electrical panels per NEC.

Trane 9900 Aire Circle, Fort Smith, AR 72916 Phone: (479) 648-7438 Fax: (479) 648-7499

REPLACES	AUTOCAD	21580-ELEC-AHU-63,64	REV B
REVISION DATE	TRANE CUSTOM THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE CUSTOM	DAYTON CHILDRENS AMBULATORY	
DRAWN BY EML		TAG: AHU-63 & AHU-64 ELECTRICAL DIAGRAM	
DATE 8/16/2021	SIMILAR TO	SHEET 1 of 3	



EC to coordinate incoming power

LEGEND

DEVICE DESIGNATION	DESCRIPTION	MODEL NUMBER / MFGR. / VENDOR
DS1	SQUARE D FUSED DISC., 600V, 400A, NEMA1	H365
FS1 (3)	FERRAZ-SHAWMUT FUSES, 600V, 400A, W/REJECTION KIT	TRS400R / RFK03H
SFDIST	SQUARE D POWER DISTRIBUTION BLOCK W/COVER, 600V, 3P	LBA365208/ LB53
SFDIST ENCL	HOFFMAN NEMA1 ENCLOSURE	ASE18X18X6NK
SFVFD1-8 (8)	ABB ACH580 460V 30HP 44A NEMA1 W/BYPASS	ABBACH580-VCR-044A-4

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C(77°F) AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF AND AFTER A NORMAL SHUTDOWN HAS OCCURED.
2. SOLID LINES INDICATE FACTORY WIRING. DASHED LINES INDICATE FIELD WIRING. PHANTOM LINES INDICATE OPTIONAL FEATURES.
3. CONDUIT TO BE EMT AND FMC, 1/2" MINIMUM, COMPRESSION CONNECTORS AND FITTINGS.
4. WIRING FROM DS1 TO SFDIST IS A PARALLEL RUN.

⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
HAZARDOUS VOLTAGE!	TENSION DANGEREUSE!	¡VOLTAJE PELIGROSO!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE. FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.	COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS. NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.	DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR. EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION	ATTENTION	PRECAUCIÓN
USE COPPER CONDUCTORS ONLY!	N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!	¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.	LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.	LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.	L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.	SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

REPLACES	AUTOCAD	21580-ELEC-AHU-63,64	REV B
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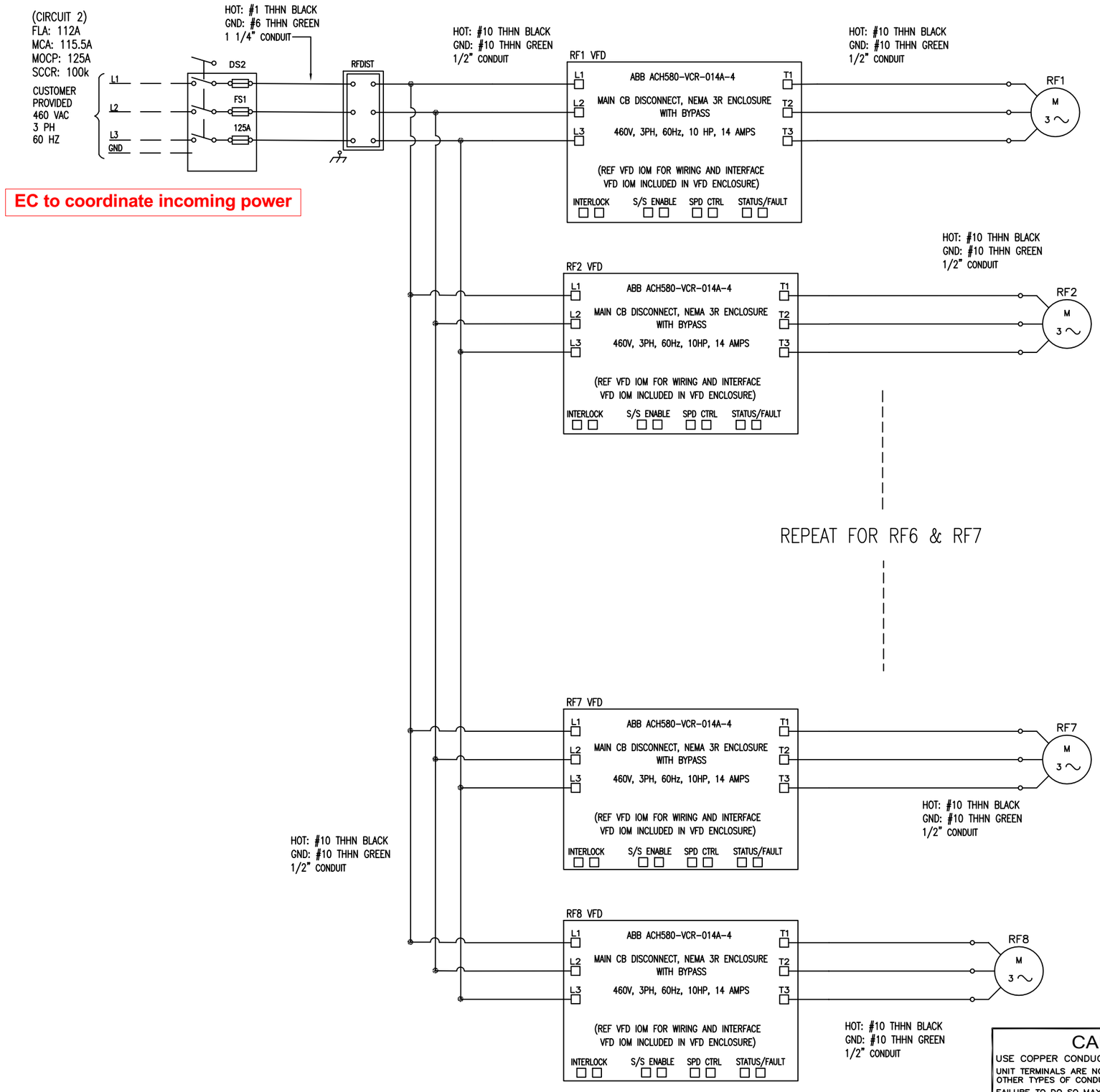
DRAWN BY EML		TAG: AHU-63 & AHU-64 ELECTRICAL DIAGRAM	
DATE 8/16/2021	SIMILAR TO	SHEET 2 of 3	



LEGEND

DEVICE DESIGNATION	DESCRIPTION	MODEL NUMBER / MFGR. / VENDOR
DS2	SQUARE D FUSED DISC., 600V, 200A, NEMA1	H364
FS2 (3)	FERRAZ-SHAWMUT FUSES, 600V, 125A, W/REJECTION KIT	TRS125R / RFK03H
RFDIST	SQUARE D POWER DISTRIBUTION BLOCK W/COVER, 600V, 3P	LBA364108 / LB43
RFDIST ENCL	HOFFMAN NEMA1 ENCLOSURE	ASE18X18X6NK
RFVFD1-8 (8)	ABB ACH580 460V 10HP 14A NEMA1 W/BYPASS	ABBACH580-VCR-014A-4

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C(77°F) AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF AND AFTER A NORMAL SHUTDOWN HAS OCCURED.
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3. CONDUIT TO BE EMT AND FMC, 1/2" MINIMUM, COMPRESSION CONNECTORS AND FITTINGS.
4. WIRING FROM DS1 TO SFDIST IS A PARALLEL RUN.

⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
HAZARDOUS VOLTAGE!	TENSION DANGEREUSE!	¡VOLTAJE PELIGROSO!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.	COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.	DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.	NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.	EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

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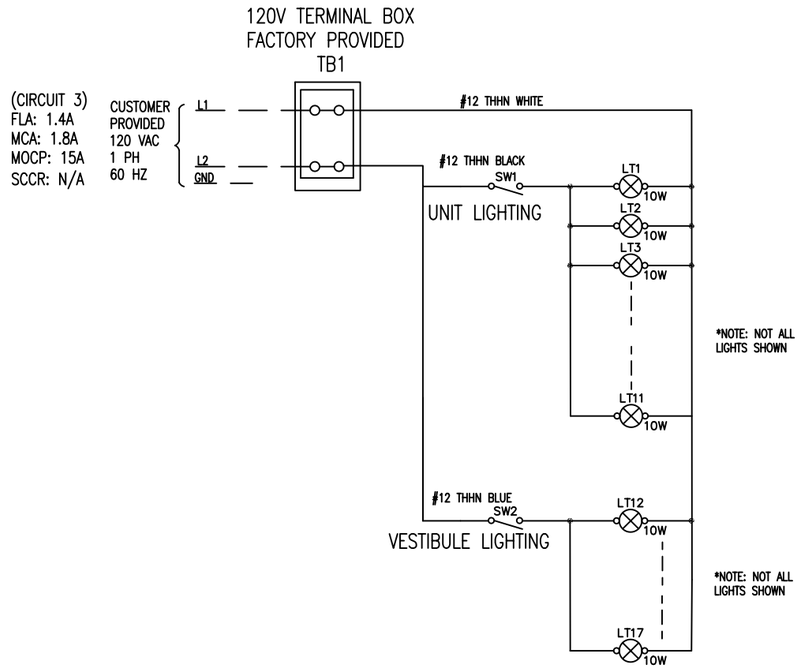
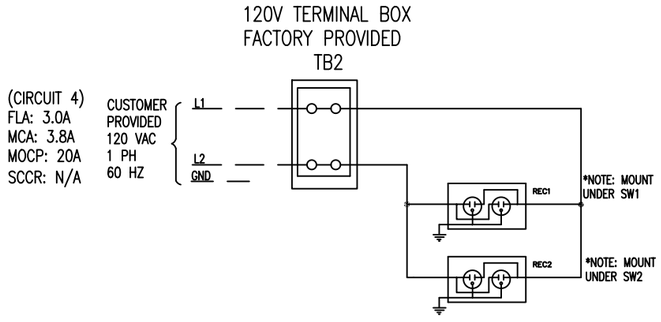
FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.	L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.	SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.



Provide 120 V load center from previous submittal with single 120 V power from EC. Provide (2) spare 15 A circuits in load center for field installed controls and NPBI. Revise for record submittal.



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DATE: 8/16/2021	SIMILAR TO	SHEET 1 of 3

LEGEND

DEVICE DESIGNATION	DESCRIPTION	MODEL NUMBER / MFGR. / VENDOR
REC1-2	LEVITON 20A WEATHER-RESISTANT GFCI RECEPTACLE	002-W7899-00W
SW1-2	TORK LIGHT SWITCH TIMER, 0-60 MINUTES W/HOLD	C560MH
LT1-17	RAB VAPORPROOF FIXTURE	VX100DG
LT1-17 BULB	CREE 10W LED BULBS - 60W EQUIVALENT	A19-60W-P1-27K-E26-U1

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C(77°F) AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF AND AFTER A NORMAL SHUTDOWN HAS OCCURED.
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3. CONDUIT TO BE EMT AND FMC, 1/2" MINIMUM, COMPRESSION CONNECTORS AND FITTINGS.
4. WIRING FROM DS1 TO SFDIST IS A PARALLEL RUN.

⚠ WARNING

HAZARDOUS VOLTAGE!

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FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ ADVERTENCIA

¡VOLTAJE PELIGROSO!

DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.

EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!

LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.

L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.

PRECAUCIÓN

¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!

LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.

SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.

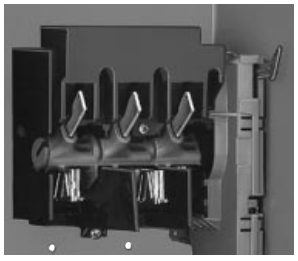
Series E

Series F

Operating Mechanism
Series E

Operating Mechanism
Series F

Mechanical Lugs



Visible Blades

DESCRIPTION

Visible blade heavy duty safety switches are designed for application where maximum performance and continuity of service are required. All heavy duty safety switches feature a quick-make, quick-break operating mechanism, a dual cover interlock and a color-coded indicator handle. They are suitable for use as service equipment when equipped with a field or factory installed neutral assembly or equipment grounding kit, unless a 600Y/347 V or 480Y/277 V, 1000 A or greater, solidly grounded WYE system is used, per NEC 215-10. Heavy duty safety switches are UL Listed (except as noted), File E2875 and 154828, and meet or exceed the NEMA Standard KS1. NEMA Type 12, 12K and stainless steel switches through 200 A are UL Marine Listed for use on vessels over 65 feet long. For UL Listed short circuit withstand ratings, see Digest 171, page 3-6.

CONFIGURATION

- Four fusible, switched poles without insulated, groundable solid neutral.
- Six fusible, switched poles without insulated, groundable solid neutral.
- Four or six not fusible, switched poles without insulated, groundable solid neutral.
- Three fusible, switched poles without insulated groundable solid neutral interlocked to Appleton; Crouse-Hinds or HUBBELLOCK® receptacle.
- Three not fusible, switched poles without insulated groundable solid neutral interlocked to Appleton, Crouse-Hinds or HUBBELLOCK receptacle.

CONSTRUCTION

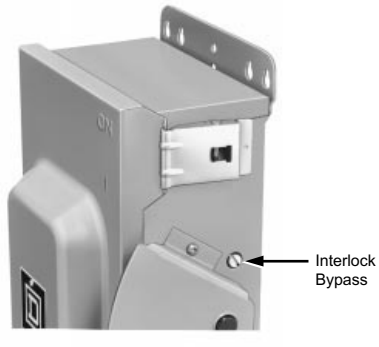
- Visible blades for positive blade position indication.
- Optional viewing window allows visual verification of blade position without opening door. Not available on all devices, contact Square D sales offices.
- Red and black handle indication for switch position.
- Series F handle, mechanism, and lockplate are field replaceable.
- Series F Type 3R devices have side opening covers.
- Highly visible embossed ON-OFF marking.
- Quick-make, quick-break, spring-driven operating mechanism.
- Front removable mechanical lugs. Refer to page 31 for further lug data.
  - — Standard lugs accommodate aluminum or copper cable termination on NEMA Type 1, 3R, or 4X fiberglass enclosure.
  - — Standard lugs accommodate copper only cable termination on NEMA Type 12, 12K or 4, 4X, 5 stainless steel.

NEMA Type 1

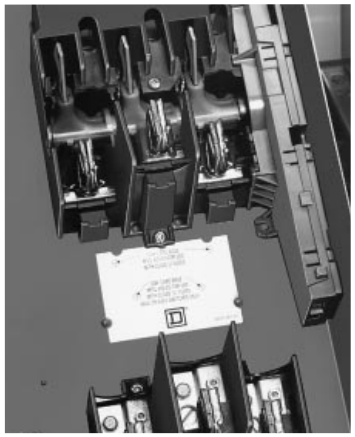
NEMA Type 3R

NEMA Type 4, 4X and 5
Stainless Steel

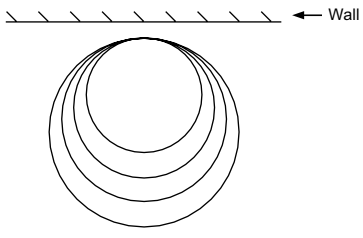
NEMA Type 12



Fuse Pullers

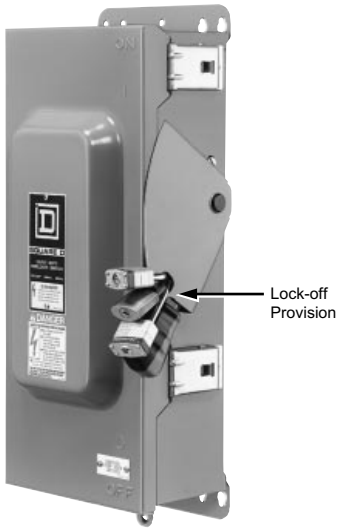


Class J Fuse Provisions
Alternate mounting holes make for easy conversion to Class J fuses.



Tangential Knockouts

- Dual cover interlock keeps the cover shut when switch is ON. When the cover is open, it interlocks the switch OFF, unless the interlock is bypassed.
- Factory-installed fuse pullers on 30–100 A NEMA Type 4, 4X, and 5 stainless steel and NEMA Type 12 or 12K switches. Field installable on 30–100 A NEMA Type 1 and NEMA Type 3R switches.
- Class J fuse provisions on 30 A–600 A, 600 V switches and 100–600 A, 240 V switches. 600 A devices require a mounting kit (catalog number H600J).
- 30–600 A switches are shipped with standard Class H fuse spacing. These switches will accept Class R fuses also. A field installable rejection kit is available which, when installed, rejects all but Class R fuses. See pages 26 through 30 for Class R fuse kits.
- Multiple padlock provision in OFF position.
- Lock-on provisions factory or field modification.
- Tangential combination knockouts lessen the need for conduit offset bends.



ENCLOSURES

- NEMA Type 1 general purpose, indoor.
- NEMA Type 3R rainproof, outdoor.
- NEMA Type 4, 4X, 5 indoor or outdoor, watertight, dusttight, and corrosion-resistant (Type 304 stainless steel).
- NEMA Type 4X indoor or outdoor, watertight, dusttight, and corrosion-resistant (fiberglass reinforced polyester enclosures).
- NEMA Type 7 and NEMA Type 9 hazardous locations:
  - — Class I, Groups C and D.
  - — Class II, Groups E, F and G.
  - — Class III.
- NEMA Type 12, 12K indoor, dusttight, and dripproof.
  NEMA Type 12 has no knockouts (suitable for outdoor use).
  NEMA Type 12K provided with knockouts.
- NEMA Type 3, 3R, 4, 4X, and 12 indoor or outdoor watertight, dusttight, and corrosion-resistant epoxy powder coated cast aluminum.

100 A Heavy Duty Ratings, Series E and F

Catalog Number	Series	120 Vac		240 Vac				480 Vac				600 Vac				Vdc▲			240 Vac		480 Vac		600 Vac	
		Std.	Max.	Std.		Max.		Std.		Max.		Std.		Max.		Max. hp Ratings			Std.	Max.	Std.	Max.	Std.	Max.
		1ϕ	1ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	125	250	600	2ϕ	2ϕ	2ϕ	2ϕ	2ϕ	2ϕ
H223DS	E2	. . .	. . .	7½	. . .	15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H223AWK	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H223A	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H223N	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H223NRB	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H323DS	E2	. . .	. . .	. . .	15	. . .	30	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H323A	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H323AWK	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H323N	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H323NRB	F5	. . .	. . .	7½▲	15■	15▲	30■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	20●	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363	F5	. . .	. . .	. . .	. . .	. . .	. . .	10▲	25■	30▲	60■	. . .	30	. . .	75	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363RB	F5	. . .	. . .	. . .	. . .	. . .	. . .	10▲	25■	30▲	60■	. . .	30	. . .	75	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	25	. . .	60	. . .	30	. . .	75	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363A	F5	. . .	. . .	. . .	. . .	. . .	. . .	10▲	25■	30▲	60■	. . .	30	. . .	75	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363AWK	F5	. . .	. . .	. . .	. . .	. . .	. . .	10▲	25■	30▲	60■	. . .	30	. . .	75	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363N	F5	. . .	. . .	. . .	. . .	. . .	. . .	10▲	25■	30▲	60■	. . .	30	. . .	75	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H363NRB	F5	. . .	. . .	. . .	. . .	. . .	. . .	10▲	25■	30▲	60■	. . .	30	. . .	75	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H463	F5	. . .	. . .	. . .	15	. . .	30	. . .	25	. . .	60	. . .	30	. . .	75	. . .	20●	30	15	30	25	50	30	50
H463DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	25	50	30	75
H463AWK	F5	. . .	. . .	. . .	15	. . .	30	. . .	25	. . .	60	. . .	30	. . .	75	. . .	20●	30	15	30	25	50	30	50
H663DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H663AWK	F5	. . .	. . .	. . .	15	. . .	30	. . .	25	. . .	60	. . .	30	. . .	75	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU363	F5	. . .	7½	. . .	. . .	20▲	40■✱	. . .	. . .	40▲	75✱†	. . .	. . .	40▲	75✱	7½	20	50	. . .	. . .	. . .	. . .	. . .	. . .
HU363RB	F5	. . .	7½	. . .	. . .	20▲	40■✱	. . .	. . .	40▲	75✱†	. . .	. . .	40▲	75✱	7½	20	50	. . .	. . .	. . .	. . .	. . .	. . .
HU363DS	E1	. . .	10▲	. . .	. . .	15▲	40‡	. . .	. . .	30▲	75	. . .	. . .	40▲	75‡	10	20	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU363A	F5	. . .	7½	. . .	. . .	20▲	40■✱	. . .	. . .	40▲	75✱†	. . .	. . .	40▲	75✱	7½	20	50	. . .	. . .	. . .	. . .	. . .	. . .
HU363AWK	F5	. . .	7½	. . .	. . .	20▲	40■✱	. . .	. . .	40▲	75✱†	. . .	. . .	40▲	75✱	7½	20	50	. . .	. . .	. . .	. . .	. . .	. . .
HU463	F5	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	75	. . .	. . .	. . .	75	. . .	20	30	. . .	30	. . .	50	. . .	50
HU463DS	E2	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	75	. . .	. . .	. . .	75	. . .	20	30	. . .	30	. . .	50	. . .	50
HU463AWK	F5	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	75	. . .	. . .	. . .	75	. . .	20	30	. . .	30	. . .	50	. . .	50
HU663DS	E1	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	75	. . .	. . .	. . .	75	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU663AWK	F5	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	75	. . .	. . .	. . .	75	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

■ For corner grounded delta only, install neutral and use switching poles for ungrounded conductors.
▲ Use both outer switching poles.
● Standard hp rating.
▼ 15 hp maximum on a corner grounded delta system.
★ 30 hp maximum on a corner grounded delta system.
✱ Use 75C No. 4 Cu or No. 2 Al conductors.
† 60 hp maximum on corner grounded delta.
‡ Use 75C No. 1 copper conductor only.

200 A Heavy Duty Ratings, Series E

Catalog Number	Series	120 Vac		240 Vac				480 Vac				600 Vac				Vdc▲			240 Vac		480 Vac		600 Vac	
		Std.	Max.	Std.		Max.		Std.		Max.		Std.		Max.		Max. hp Ratings			Std.	Max.	Std.	Max.	Std.	Max.
		1ϕ	1ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	125	250	600	2ϕ	2ϕ	2ϕ	2ϕ	2ϕ	2ϕ
H224DS	E1	. . .	. . .	15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H224A	E1	. . .	. . .	15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H224AWK	E1	. . .	. . .	15	. . .	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H224N	E1	. . .	. . .	15▲■	25	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H224NRB	E1	. . .	. . .	. . .	25	15▲■	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H324DS	E1	. . .	. . .	. . .	25	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H324A	E2	. . .	. . .	. . .	25	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H324AWK	E1	. . .	. . .	. . .	25	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H324N	E1	. . .	. . .	. . .	25	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H324NRB	E1	. . .	. . .	. . .	25	. . .	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H364	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364RB	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364A	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364AWK	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364N	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364NRB	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364A	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H364AWK	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	125	. . .	60	. . .	150	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .
H464	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	50	50	50
H464DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	50	50	50
H464AWK	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	50	50	50
H664DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H664RWK	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU364	E1	. . .	. . .	. . .	. . .	. . .	60	. . .	. . .	. . .	125	. . .	. . .	. . .	150	. . .	40	50	. . .	. . .	. . .	. . .	. . .	. . .
HU364RB	E1	. . .	. . .	. . .	. . .	. . .	60	. . .	. . .	. . .	125	. . .	. . .	. . .	150	. . .	40	50	. . .	. . .	. . .	. . .	. . .	. . .
HU364DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	125	. . .	. . .	. . .	150	. . .	40	50	. . .	. . .	. . .	. . .	. . .	. . .
HU364A	E1	. . .	. . .	. . .	. . .	. . .	60	. . .	. . .	. . .	125	. . .	. . .	. . .	150	. . .	40	50	. . .	. . .	. . .	. . .	. . .	. . .
HU364AWK	E1	. . .	. . .	. . .	. . .	. . .	60	. . .	. . .	. . .	125	. . .	. . .	. . .	150	. . .	40	50	. . .	. . .	. . .	. . .	. . .	. . .
HU464	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	50	. . .	50
HU464DS	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	50	. . .	50
HU464AWK	E1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	50	. . .	50
HU664DS	E1	. . .	. . .	. . .	. . .	. . .	75	. . .	. . .	. . .	150	. . .	. . .	. . .	150	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU664RWK	E1	. . .	. . .	. . .	. . .	. . .	75	. . .	. . .	. . .	150	. . .	. . .	. . .	150	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

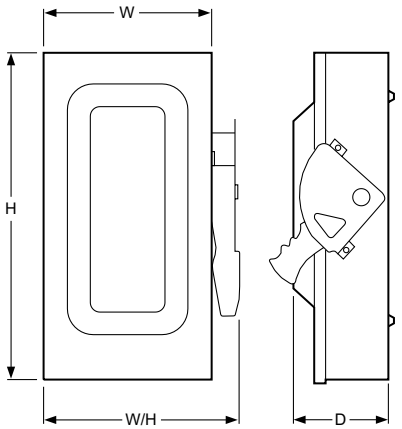
■ For corner grounded delta only, install neutral and use switching poles for ungrounded conductors.
▲ Use both outer switching poles.

400 A Heavy Duty Ratings, Series E

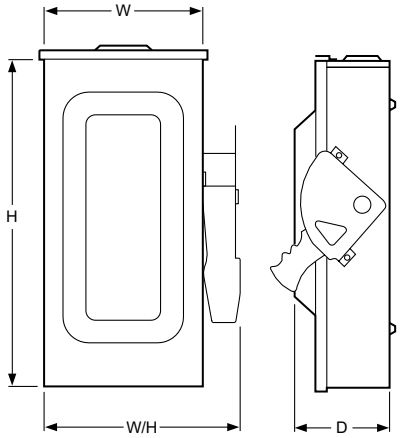
Catalog Number	Series	120 Vac		240 Vac				480 Vac				600 Vac				Vdc			240 Vac		480 Vac		600 Vac	
		Std.	Max.	Std.		Max.		Std.		Max.		Std.		Max.		Max. hp Ratings			Std.	Max.	Std.	Max.	Std.	Max.
		1ϕ	1ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	1ϕ	3ϕ	125	250	600	2ϕ	2ϕ	2ϕ	2ϕ	2ϕ	2ϕ
H225	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225R	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225DS	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225AWK	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225N	E2	. . .	. . .	. . .	5o■	. . .	125■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225NR	E2	. . .	. . .	. . .	50■	. . .	125■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225NDS	E2	. . .	. . .	. . .	50■	. . .	125■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H225NAWK	E2	. . .	. . .	. . .	50■	. . .	125■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325R	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325DS	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325AWK	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325N	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325NR	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325NDS	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H325NAWK	E2	. . .	. . .	. . .	50	. . .	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H265	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100■	. . .	250■	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H265R	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100■	. . .	250■	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H265DS	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100■	. . .	250■	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H265AWK	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100■	. . .	250■	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100	. . .	250	. . .	125	. . .	350	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365R	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100	. . .	250	. . .	125	. . .	350	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365DS	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100	. . .	250	. . .	125	. . .	350	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365AWK	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100	. . .	250	. . .	125	. . .	350	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365N	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100	. . .	250	. . .	125	. . .	350	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365NR	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100	. . .	250	. . .	125	. . .	350	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365NDS	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H365NAWK	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H465▲	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
H465AWK▲	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU265	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU265R	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU265DS	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU265AWK	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU365	E2	. . .	. . .	. . .	. . .	. . .	125	. . .	. . .	. . .	250	. . .	. . .	. . .	350	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU365R	E2	. . .	. . .	. . .	. . .	. . .	125	. . .	. . .	. . .	250	. . .	. . .	. . .	350	. . .	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU365DS	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU365AWK	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU465▲	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
HU465AWK▲	E2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

■ For corner grounded only, install neutral and use switching poles for ungrounded conductors.

▲ Not suitable for use as service equipment.



Typical NEMA Type 1



Typical NEMA Type 3R

Catalog Number	Series	Approximate Dimensions							
		H		W		W/H		D	
		IN	mm	IN	mm	IN	mm	IN	mm
H364	E2	27.38	695	12.88	327	14.38	365	7.50	191
H364N	E1	27.38	695	16.25	413	17.38	441	7.50	191
H364NRB	E1	27.50	699	16.13	410	18.00	457	7.75	197
H364RB	E1	27.38	695	13.13	334	14.75	375	7.75	197
H365, N	E2	50.25	1276	27.63	702	27.63	702	10.13	257
H365R, NR	E2	50.31	1278	27.88	708	27.88	708	10.13	257
H366, N	E2	50.25	1276	27.63	702	27.63	702	10.13	257
H366NR, R	E2	50.31	1278	27.88	708	27.88	708	10.13	257
H367, N	E4	69.13	1756	36.62	930	36.62	930	17.75	451
H367NR, R	E4	69.13	1756	36.62	930	36.62	930	17.75	451
H368, N	E4	69.13	1756	36.62	930	36.62	930	17.75	451
H368NR, R	E4	69.13	1756	36.62	930	36.62	930	17.75	451
H461	F5	20.50	521	14.75	375	16.13	410	6.85	174
H462	F5	20.50	521	14.75	375	16.13	410	6.85	174
H463	F5	20.50	521	14.75	375	16.13	410	6.85	174
H464	E1	27.38	695	16.25	413	17.38	441	7.50	191
H465	E2	50.25	1276	33.88	861	33.88	861	10.13	257
H466	E2	50.25	1276	33.88	861	33.88	861	10.13	257
HU265	E2	50.25	1276	27.63	702	27.63	702	10.13	257
HU265R	E2	50.31	1278	27.88	708	27.88	708	10.13	257
HU266	E2	50.25	1276	27.63	702	27.63	702	10.13	257
HU266R	E2	50.31	1278	27.88	708	27.88	708	10.13	257
HU267	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU267R	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU268	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU268R	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU361	F1	14.60	371	6.51	165	7.55	192	4.87	127
HU361RB	F1	14.88	378	6.63	168	7.55	192	4.87	124
HU362	F5	17.50	445	9.00	229	10.50	267	6.38	162
HU362RB	F5	17.50	445	9.00	229	10.50	267	6.38	162
HU362WH	F5	18.19	462	9.00	229	10.50	267	6.81	173
HU363	F5	21.25	540	8.50	216	10.50	267	6.38	162
HU363RB	F5	21.25	540	8.50	216	10.50	267	6.38	162
HU364	E1	27.38	695	12.88	327	14.38	365	7.50	191
HU364RB	E1	27.38	695	13.13	334	14.75	375	7.75	197
HU365	E2	50.25	1276	27.63	702	27.63	702	10.13	257
HU365R	E2	50.31	1278	27.88	708	27.88	708	10.13	257
HU366	E2	50.25	1276	27.63	702	27.63	702	10.13	257
HU366R	E2	50.31	1278	27.88	708	27.88	708	10.13	257
HU367	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU367R	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU368	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU368R	E4	69.13	1756	36.62	930	36.62	930	17.75	451
HU461	F5	20.50	521	14.75	375	16.13	410	6.85	174
HU462	F5	20.50	521	14.75	375	16.13	410	6.85	174
HU463	F5	20.50	521	14.75	375	16.13	410	6.85	174
HU464	E1	27.38	695	16.25	413	17.38	441	7.50	191
HU465	E2	50.25	1276	33.88	861	33.88	861	10.13	257
HU466	E2	50.25	1276	33.88	861	33.88	861	10.13	257

THE INDUSTRY'S MOST POPULAR FUSE FOR MOTOR CIRCUIT PROTECTION.

Tri-onic® SmartSpot® fuses now provide a visual open fuse indicator. With advanced material technology added to the existing product the TR and TRS current limiting time delay fuses are engineered for overcurrent protection of motors and transformers, service entrance equipment, feeder and branch circuits. Tri-onic proven time delay characteristic safely handles harmless starting currents and inrush currents associated with today's motors and transformers.

Features/Benefits

- **Solid State SmartSpot Indicator**
- **Time delay** for motor start-ups and transformer inrush currents without nuisance opening
- **Current limiting** for low peak let-thru current
- **Rejection-style design** prevents replacement errors (when used with recommended fuse blocks)
- **Easy-to-read label** for quick recognition and replacement
- **Metal-embossed date and catalog number** for traceability and lasting identification
- **Fiberglass body** provides dimensional stability in harsh industrial settings
- **High-grade** silica filler ensures fast arc quenching and high current limitation

HIGHLIGHTS:

- Time Delay
- Current Limiting
- AC & DC Rated

APPLICATIONS:

- Motor Circuits
- Mains
- Feeders
- Branch Circuits
- Transformers
- Service Entrance Equipment
- General-purpose Protection

Ratings

- **TR**
  AC: 1/10 to 600A 250VAC, 200kA I.R.
- **DC:** 1/10 to 2 8/10A & 35 to 400A, 250VDC, 20kA I.R.; 3 to 30A & 450 to 600A, 160VDC, 20kA I.R.
- **TRS**
  AC: 1/10 to 600A 600VAC, 200kA I.R.
- **DC:** 1/10 to 12A, 600VDC, 20kA I.R.; 15 to 60A, 300VDC, 20kA I.R. 70 to 600A, 600VDC, 100kA I.R.

Approvals

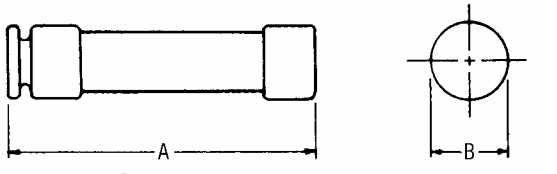
- UL Listed to Standard 248-12 File E2137
- CSA Certified to Standard C22.2 No. 248.12
- DC Listed to UL Standard 248 TRS only

TIME DELAY/CLASS RK5 FUSES

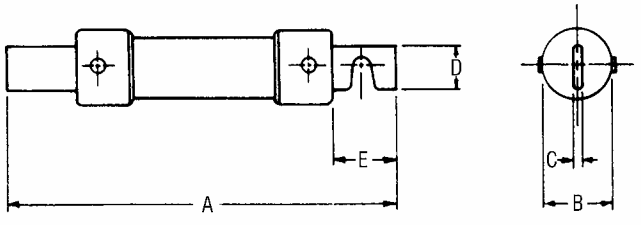
Standard Fuse Ampere Ratings, Catalog Numbers

Ampere Rating	Catalog Number 250V	Catalog Number 600V	Ampere Rating	Catalog Number 250V	Catalog Number 600V	Ampere Rating	Catalog Number 250V	Catalog Number 600V
1/10	TR1/10R	TRS1/10R	3-1/2	TR3-1/2R	TRS3-1/2R	50	TR50R	TRS50R
15/100	TR15/100R	TRS15/100R	4	TR4R	TRS4R	60	TR60R	TRS60R
2/10	TR2/10R	TRS2/10R	4-1/2	TR4-1/2R	TRS4-1/2R	70	TR70R	TRS70R
3/10	TR3/10R	TRS3/10R	5	TR5R	TRS5R	75	TR75R	TRS75R
4/10	TR4/10R	TRS4/10R	5-6/10	TR5-6/10R	TRS5-6/10R	80	TR80R	TRS80R
1/2	TR1/2R	TRS1/2R	6	TR6R	TRS6R	90	TR90R	TRS90R
6/10	TR6/10R	TRS6/10R	6-1/4	TR6-1/4R	TRS6-1/4R	100	TR100R	TRS100R
8/10	TR8/10R	TRS8/10R	7	TR7R	TRS7R	110	TR110R	TRS110R
1	TR1R	TRS1R	8	TR8R	TRS8R	125	TR125R	TRS125R
1-1/8	TR1-1/8R	TRS1-1/8R	9	TR9R	TRS9R	150	TR150R	TRS150R
1-1/4	TR1-1/4R	TRS1-1/4R	10	TR10R	TRS10R	175	TR175R	TRS175R
1-4/10	TR1-4/10R	TRS1-4/10R	12	TR12R	TRS12R	200	TR200R	TRS200R
1-6/10	TR1-6/10R	TRS1-6/10R	15	TR15R	TRS15R	225	TR225R	TRS225R
1-8/10	TR1-8/10R	TRS1-8/10R	17-1/2	TR17-1/2R	TRS17-1/2R	250	TR250R	TRS250R
2	TR2R	TRS2R	20	TR20R	TRS20R	300	TR300R	TRS300R
2-1/4	TR2-1/4R	TRS2-1/4R	25	TR25R	TRS25R	350	TR350R	TRS350R
2-1/2	TR2-1/2R	TRS2-1/2R	30	TR30R	TRS30R	400	TR400R	TRS400R
2-8/10	TR2-8/10R	TRS2-8/10R	35	TR35R	TRS35R	450	TR450R	TRS450R
3	TR3R	TRS3R	40	TR40R	TRS40R	500	TR500R	TRS500R
3-2/10	TR3-2/10R	TRS3-2/10R	45	TR45R	TRS45R	600	TR600R	TRS600R

Note: Indicator not available (1/10 - 7) amps.



0-60A



61-600A

Dimensions

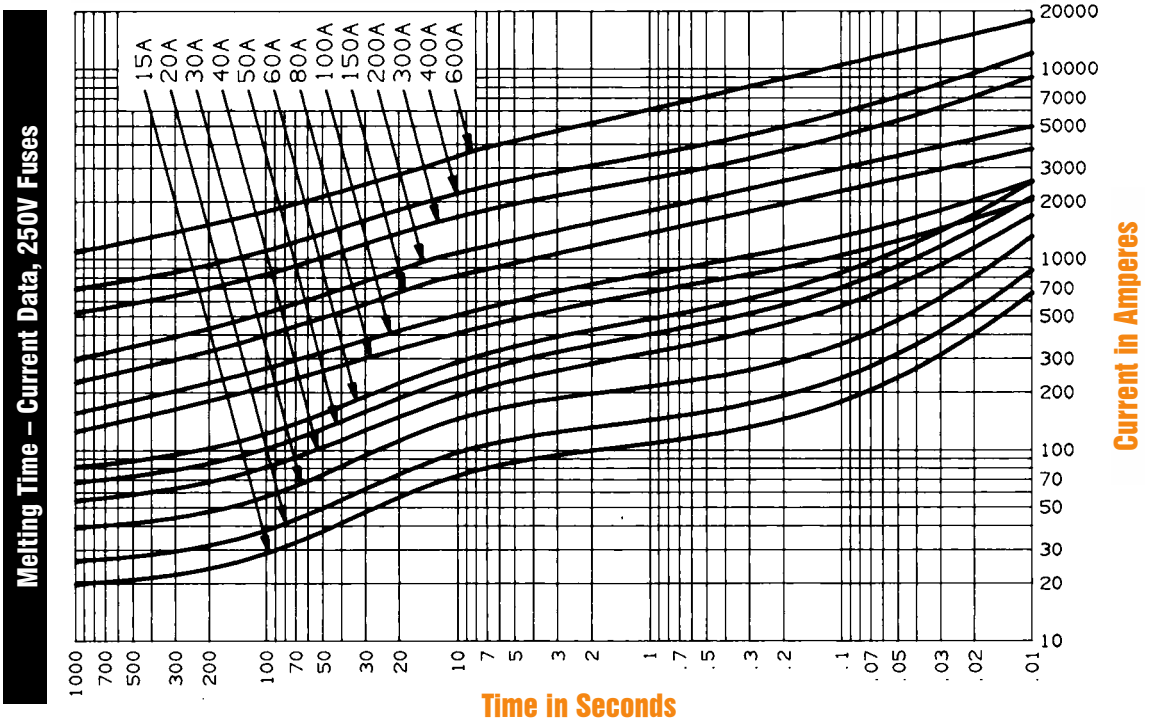
AMPERE RATING	A In.	A mm	B In.	B mm	C In.	C mm	D In.	D mm	E In.	E mm
250V-TR FUSES										
0-30	2	51	9/16	14	-	-	-	-	-	-
31-60	3	76	13/16	21	-	-	-	-	-	-
61-100	5-7/8	149	1-1/16	27	1/8	3	3/4	19	1	25
101-200	7-1/8	181	1-9/16	40	3/16	5	1-1/8	28	1-3/8	35
201-400	8-5/8	219	2-1/16	53	1/4	6	1-5/8	41	1-7/8	48
401-600	10-3/8	264	2-9/16	66	1/4	6	2	51	2-1/4	57
600V-TRS FUSES										
0-30	5	127	13/16	21	-	-	-	-	-	-
31-60	5-1/2	139	1-1/16	27	-	-	-	-	-	-
61-100	7-7/8	200	1-5/16	34	1/8	3	3/4	19	1	25
101-200	9-5/8	244	1-13/16	46	3/16	5	1-1/8	28	1-3/8	35
201-400	11-5/8	295	2-9/16	66	1/4	6	1-5/8	41	1-7/8	48
401-600	13-3/8	340	3-1/8	80	1/4	6	2	51	2-1/4	57

Recommended Fuse Blocks With Box Connectors For Tri-onic® Class RK5 Fuses

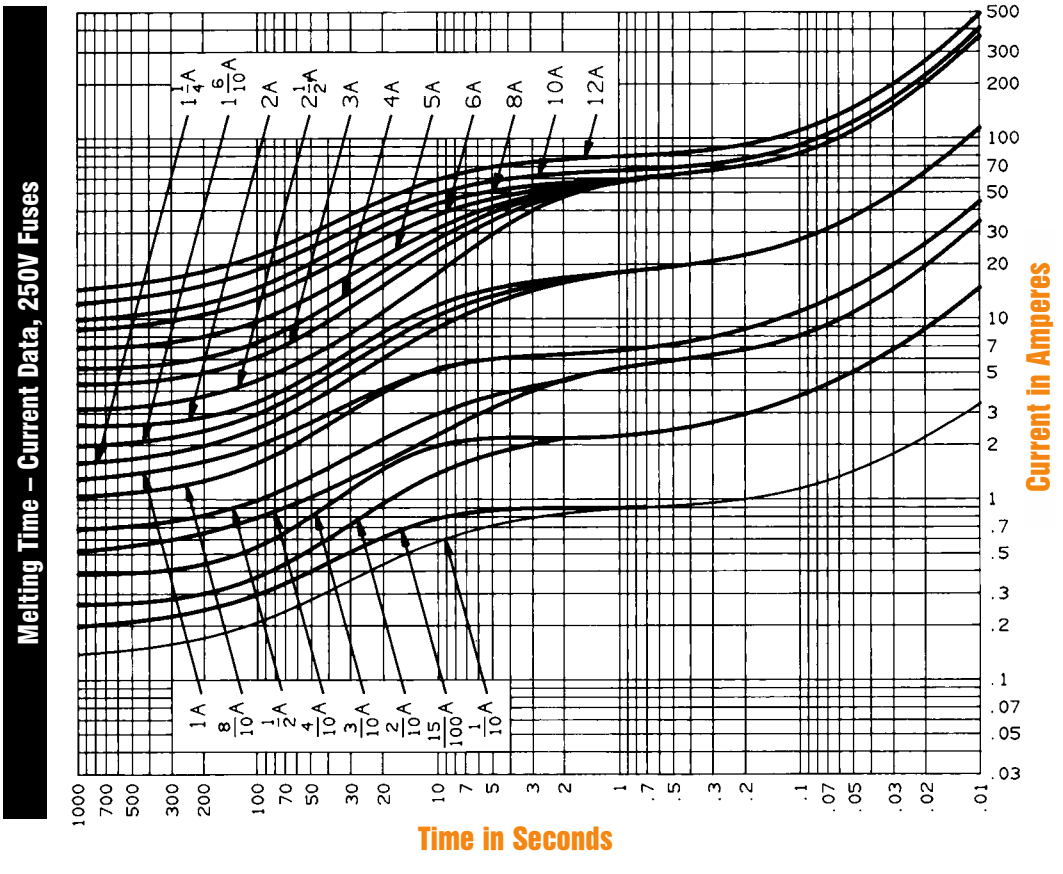
Fuse Ampere Rating	Catalog Number 250V 1 Pole	Catalog Number 250V 3 pole	Catalog Number 600V 1 pole	Catalog Number 600V 3 pole
0-30	20306R	20308R	60306R	60308R
31-60	20606R	20608R	60606R	60608R
61-100	21036R	21038R	61036R	61038R
101-200	22001R	22003R	62001R	62003R
201-400	24001R	24003R	64001R	64003R
401-600	2631R	2633R	6631R	6633R

TIME DELAY/CLASS RK5 FUSES

TR15 TO 600



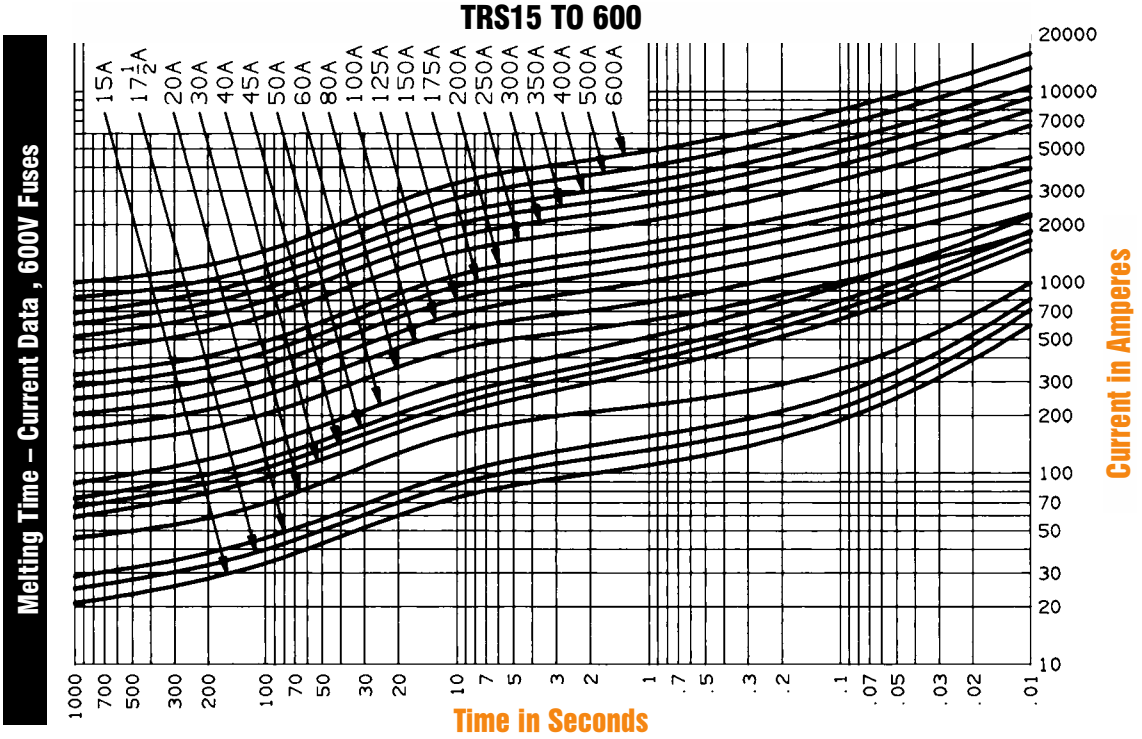
TR1/10 TO 12



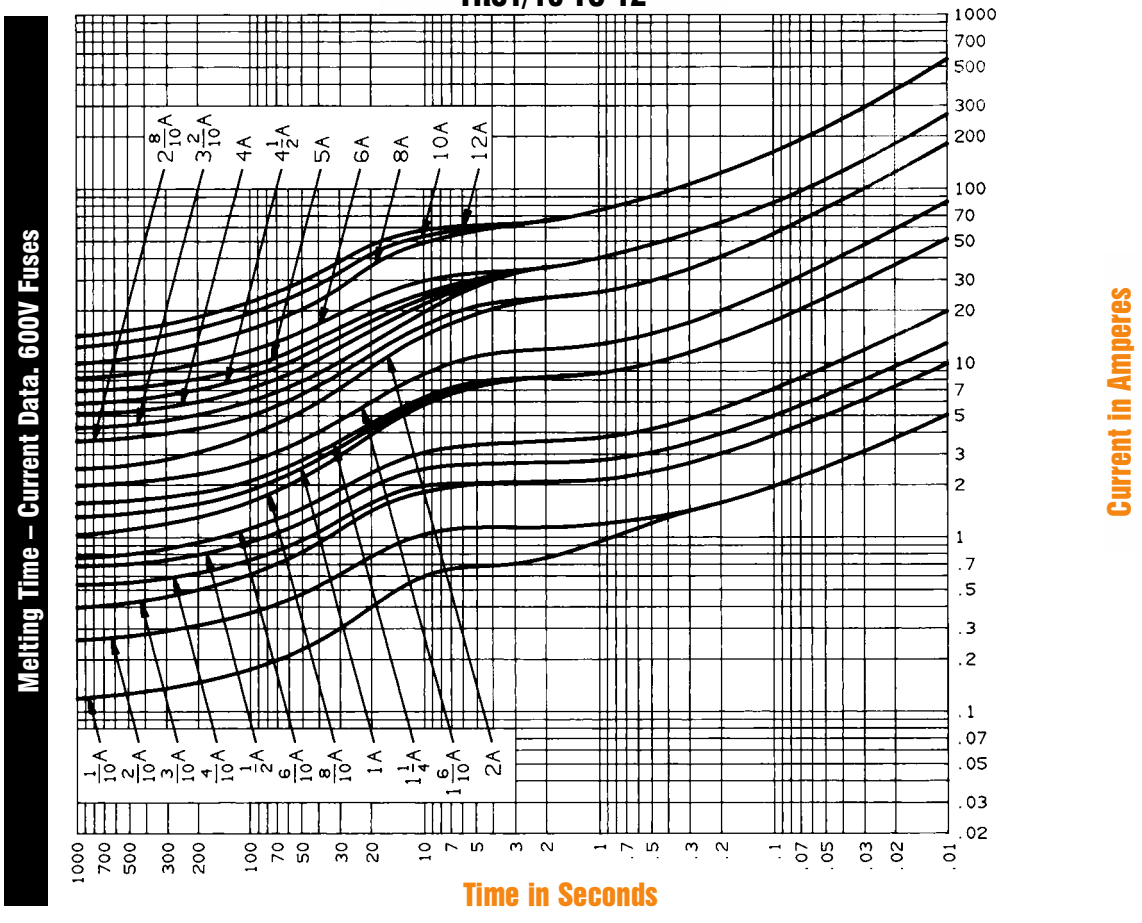
TIME DELAY/CLASS RK5 FUSES

B

TRS15 TO 600

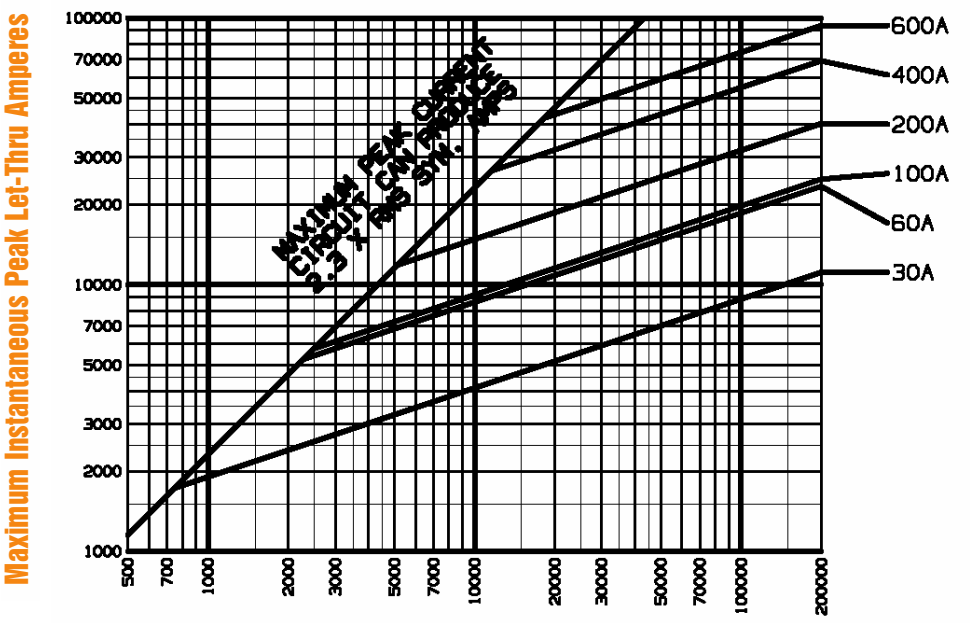


TRS1/10 TO 12

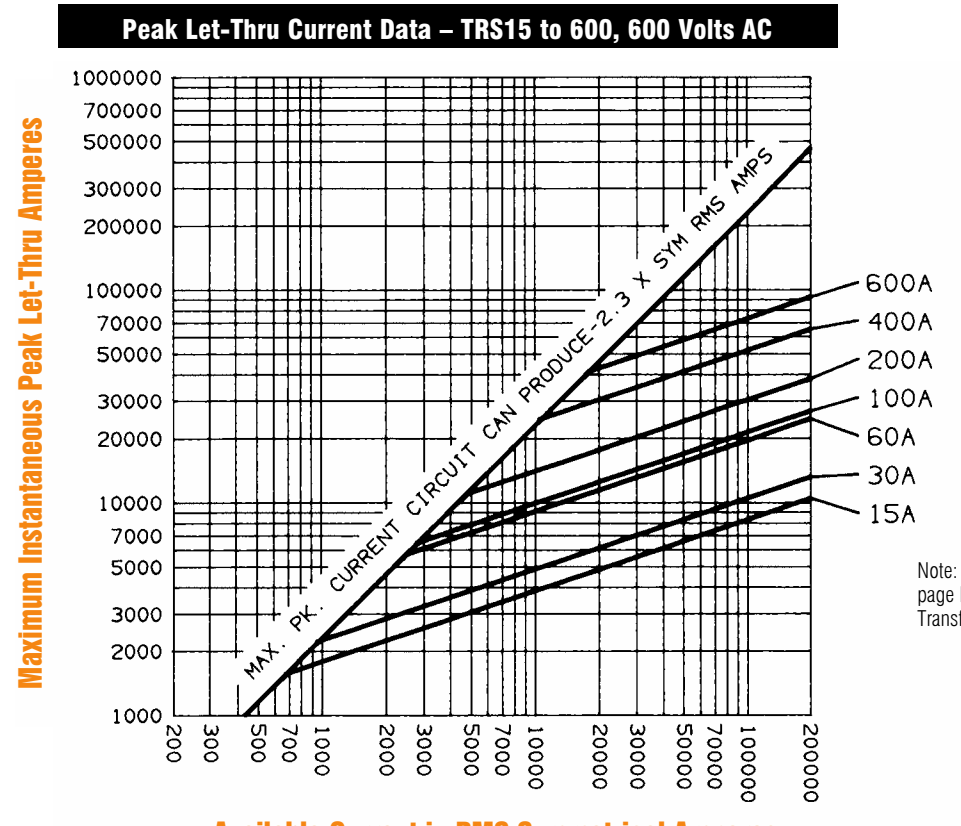


TIME DELAY/CLASS RK5 FUSES

Peak Let-Thru Current Data – TR30 to 600, 250 Volts AC



Peak Let-Thru Current Data – TRS15 to 600, 600 Volts AC



Note: See Application Information page L9 for All Motor and Transformer Tables.

Screw Cover Type 1 Pull Boxes

Application

Designed for use as a junction box and pull box in commercial and general industrial applications. Flush covers and door frames must be ordered separately for flush installations.

Features

- Unique keyhole screw slots in the cover permit removal of the cover without extracting the screws
- Available with or without knockouts. Various sizes of easily removable concentric knockouts on all four sides of standard boxes with knockouts.
- Optional flush-mounted door frame available
- Optional flush covers are designed to mount on enclosures for flush installations

Construction

- 16, 14, or 12 gauge steel or galvanized steel
- Flat, removable covers fastened with plated steel screws
- Provision for grounding
- Mounting holes on back of box

Finish

ANSI 61 gray polyester powder paint finish inside and out. Unless otherwise specified, all custom pull boxes are finished with ANSI 61 gray polyester powder paint.

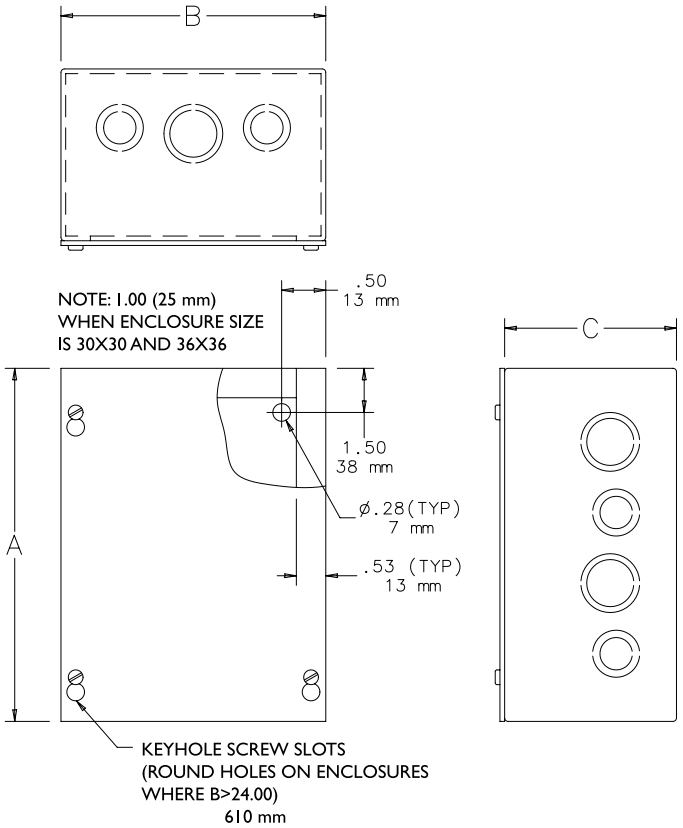
Industry Standards

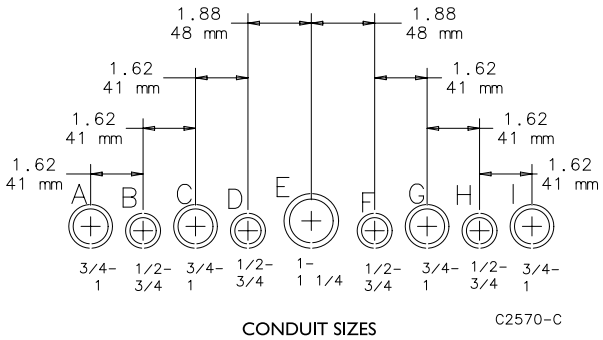
UL 50, File No. E27525, Type 1
NEMA/EEMAC Type 1
cUL CSA C22.2 No. 40, File No. E27525, Type 1
IEC 60529, IP30

Accessories

See also Accessories chapter.

Flush Covers
Flush-Mounted Door Frame
Grounding Device
Locking Window
Touch-Up Paint (ATPPY61)





CONDUIT SIZES

Knockout Pattern
(from outside of box)

PH 763 422 2211 • FX 763 422 2600 • www.hoffmanonline.com

Screw Cover Type 1 Pull Boxes

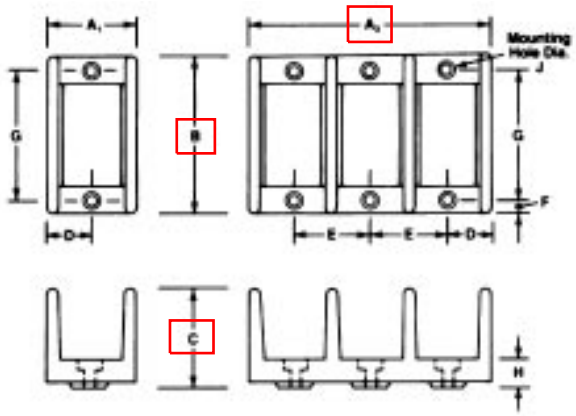
Standard Sizes Screw Cover Pull Boxes (Cont.)

Catalog Number	A x B x C in. (mm)	Style	Number of Cover Screws	Knockout Pattern along "A" Sides	Knockout Pattern along "B" Sides
ASE18X12X6	18.00 x 12.00 x 6.00 (457 x 305 x 152)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASG18X12X6	18.00 x 12.00 x 6.00 (457 x 305 x 152)	Galvanized with Knockouts	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE18X12X6NK	18.00 x 12.00 x 6.00 (457 x 305 x 152)	Painted without Knockouts	4	—	—
ASG18X12X6NK	18.00 x 12.00 x 6.00 (457 x 305 x 152)	Galvanized without Knockouts	4	—	—
ASE18X18X6	18.00 x 18.00 x 6.00 (457 x 457 x 152)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG18X18X6	18.00 x 18.00 x 6.00 (457 x 457 x 152)	Galvanized with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE18X18X6NK	18.00 x 18.00 x 6.00 (457 x 457 x 152)	Painted without Knockouts	4	—	—
ASG18X18X6NK	18.00 x 18.00 x 6.00 (457 x 457 x 152)	Galvanized without Knockouts	4	—	—
ASE24X12X6NK	24.00 x 12.00 x 6.00 (610 x 305 x 152)	Painted without Knockouts	4	—	—
ASG24X12X6NK	24.00 x 12.00 x 6.00 (610 x 305 x 152)	Galvanized without Knockouts	4	—	—
ASE24X18X6	24.00 x 18.00 x 6.00 (610 x 457 x 152)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG24X18X6	24.00 x 18.00 x 6.00 (610 x 457 x 152)	Galvanized with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X18X6NK	24.00 x 18.00 x 6.00 (610 x 457 x 152)	Painted without Knockouts	4	—	—
ASG24X18X6NK	24.00 x 18.00 x 6.00 (610 x 457 x 152)	Galvanized without Knockouts	4	—	—
ASE24X20X6NK	24.00 x 20.00 x 6.00 (610 x 508 x 152)	Painted without Knockouts	4	—	—
ASG24X20X6NK	24.00 x 20.00 x 6.00 (610 x 508 x 152)	Galvanized without Knockouts	4	—	—
ASE24X24X6	24.00 x 24.00 x 6.00 (610 x 610 x 152)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG24X24X6	24.00 x 24.00 x 6.00 (610 x 610 x 152)	Galvanized with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X24X6NK	24.00 x 24.00 x 6.00 (610 x 610 x 152)	Painted without Knockouts	4	—	—
ASG24X24X6NK	24.00 x 24.00 x 6.00 (610 x 610 x 152)	Galvanized without Knockouts	4	—	—
ASE30X24X6	30.00 x 24.00 x 6.00 (762 x 610 x 152)	Painted with Knockouts	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG30X24X6	30.00 x 24.00 x 6.00 (762 x 610 x 152)	Galvanized with Knockouts	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE30X24X6NK	30.00 x 24.00 x 6.00 (762 x 610 x 152)	Painted without Knockouts	6	—	—
ASG30X24X6NK	30.00 x 24.00 x 6.00 (762 x 610 x 152)	Galvanized without Knockouts	6	—	—
ASE30X30X6NK	30.00 x 30.00 x 6.00 (762 x 762 x 152)	Painted without Knockouts	8	—	—
ASG30X30X6NK	30.00 x 30.00 x 6.00 (762 x 762 x 152)	Galvanized without Knockouts	8	—	—
ASE36X24X6	36.00 x 24.00 x 6.00 (914 x 610 x 152)	Painted with Knockouts	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASG36X24X6	36.00 x 24.00 x 6.00 (914 x 610 x 152)	Galvanized with Knockouts	6	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE36X24X6NK	36.00 x 24.00 x 6.00 (914 x 610 x 152)	Painted without Knockouts	6	—	—
ASG36X24X6NK	36.00 x 24.00 x 6.00 (914 x 610 x 152)	Galvanized without Knockouts	6	—	—
ASE36X30X6NK	36.00 x 30.00 x 6(914 x 762 x 152)	Painted without Knockouts	8	—	—
ASE36X36X6NK	36.00 x 36.00 x 6.00 (914 x 914 x 152)	Painted without Knockouts	8	—	—
ASG36X36X6NK	36.00 x 36.00 x 6.00 (914 x 914 x 152)	Galvanized without Knockouts	8	—	—
ASE8X8X8	8.00 x 8.00 x 8.00 (203 x 203 x 203)	Painted with Knockouts	4	F-G-H-I	F-G-H-I
ASE8X8X8NK	8.00 x 8.00 x 8.00 (203 x 203 x 203)	Painted without Knockouts	4	—	—
ASG8X8X8NK	8.00 x 8.00 x 8.00 (203 x 203 x 203)	Galvanized without Knockouts	4	—	—
ASE10X10X8NK	10.00 x 10.00 x 8.00 (254 x 254 x 203)	Painted without Knockouts	4	—	—
ASG10X10X8NK	10.00 x 10.00 x 8.00 (254 x 254 x 203)	Galvanized without Knockouts	4	—	—
ASE12X10X8NK	12.00 x 10.00 x 8.00 (305 x 254 x 203)	Painted without Knockouts	4	—	—
ASE12X12X8	12.00 x 12.00 x 8.00 (305 x 305 x 203)	Painted with Knockouts	4	C-D-E-F-G	C-D-E-F-G
ASG12X12X8	12.00 x 12.00 x 8.00 (305 x 305 x 203)	Galvanized with Knockouts	4	C-D-E-F-G	C-D-E-F-G
ASE12X12X8NK	12.00 x 12.00 x 8.00 (305 x 305 x 203)	Painted without Knockouts	4	—	—
ASG12X12X8NK	12.00 x 12.00 x 8.00 (305 x 305 x 203)	Galvanized without Knockouts	4	—	—
ASE16X12X8	16.00 x 12.00 x 8.00 (406 x 305 x 203)	Painted with Knockouts	4	B-C-D-E-F-G-H	C-D-E-F-G
ASE16X12X8NK	16.00 x 12.00 x 8.00 (406 x 305 x 203)	Painted without Knockouts	4	—	—
ASE18X12X8	18.00 x 12.00 x 8.00 (457 x 305 x 203)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE18X12X8NK	18.00 x 12.00 x 8.00 (457 x 305 x 203)	Painted without Knockouts	4	—	—
ASG18X12X8NK	18.00 x 12.00 x 8.00 (457 x 305 x 203)	Galvanized without Knockouts	4	—	—
ASE18X18X8NK	18.00 x 18.00 x 8.00 (457 x 457 x 203)	Painted without Knockouts	4	—	—
ASG18X18X8NK	18.00 x 18.00 x 8.00 (457 x 457 x 203)	Galvanized without Knockouts	4	—	—
ASE24X12X8	24.00 x 12.00 x 8.00 (610 x 305 x 203)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	C-D-E-F-G
ASE24X12X8NK	24.00 x 12.00 x 8.00 (610 x 305 x 203)	Painted without Knockouts	4	—	—
ASG24X12X8NK	24.00 x 12.00 x 8.00 (610 x 305 x 203)	Galvanized without Knockouts	4	—	—
ASE24X18X8	24.00 x 18.00 x 8.00 (610 x 457 x 203)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X18X8NK	24.00 x 18.00 x 8.00 (610 x 457 x 203)	Painted without Knockouts	4	—	—
ASG24X18X8NK	24.00 x 18.00 x 8.00 (610 x 457 x 203)	Galvanized without Knockouts	4	—	—
ASE24X20X8NK	24.00 x 20.00 x 8.00 (610 x 508 x 203)	Painted without Knockouts	4	—	—
ASG24X20X8NK	24.00 x 20.00 x 8.00 (610 x 508 x 203)	Galvanized without Knockouts	4	—	—
ASE24X24X8	24.00 x 24.00 x 8.00 (610 x 610 x 203)	Painted with Knockouts	4	A-B-C-D-E-F-G-H-I	A-B-C-D-E-F-G-H-I
ASE24X24X8NK	24.00 x 24.00 x 8.00 (610 x 610 x 203)	Painted without Knockouts	4	—	—
ASG24X24X8NK	24.00 x 24.00 x 8.00 (610 x 610 x 203)	Galvanized without Knockouts	4	—	—
ASE30X24X8NK	30.00 x 24.00 x 8.00 (762 x 610 x 203)	Painted without Knockouts	6	—	—

Terminal Blocks
Power Distribution Blocks
Copper or Aluminum Wire

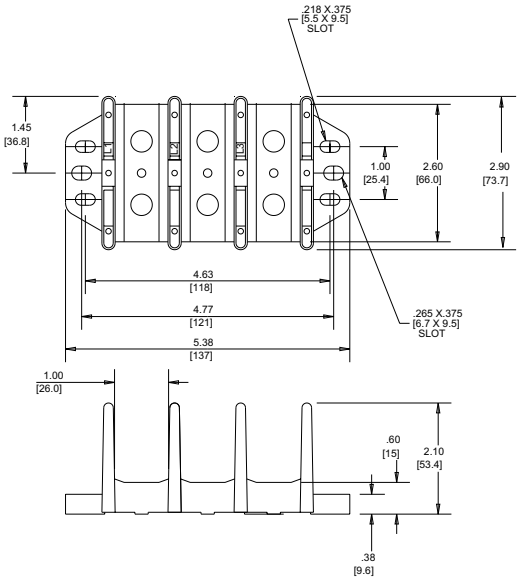
CLASS 9080	STANDARD			
				
Maximum Voltage Rating	600	600	600	600
Service Class	B & C	B & C	B & C	B & C
Amperage Rating-CU Wire	420 amp.	335 amp.	380 amp.	380 amp.
Amperage Rating-AL Wire	340 amp.	270 amp.	310 amp.	310 amp.
Wire Range Lugs suitable for use with 75° C Conductors.	MAIN (1) #4-600 MCM BRANCH (1) #4-600 MCM	MAIN (1) #6-400 MCM BRANCH (8) #14-2 AWG	MAIN (1) #4-500 MCM BRANCH (6) #14-2/0 AWG	MAIN (1) #4-500 MCM BRANCH (12) #14-2 AWG
Tightening Torque	MAIN #4-600 MCM 500 lbf-in (56.5 N-m) BRANCH #4-600 MCM 500 lbf-in (56.5 N-m)	MAIN #6-400 MCM 275 lbf-in (31.0 N-m) BRANCH #3-#2 50 lbf-in (5.6 N-m) #6-#4 45 lbf-in (5.1 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m)	MAIN #4-500 MCM 375 lbf-in (42.3 N-m) BRANCH #6-2/0 120 lbf-in (13.5 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m)	MAIN #4-500 MCM 375 lbf-in (42.3 N-m) BRANCH #3-#2 50 lbf-in (5.6 N-m) #6-#4 45 lbf-in (5.1 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m)
Lug Material	Tin Plated High Conductive AL	Tin Plated High Conductive AL	Tin Plated High Conductive AL	Tin Plated High Conductive AL
Base Material	General Purpose Phenolic	General Purpose Phenolic	General Purpose Phenolic	General Purpose Phenolic
Temperature Rating	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C
Listings	File E60616 Guide XCFR2		File LR70361	
Flammability Rating	UL94V-0	UL94V-0	UL94V-0	UL94V-0
ONE POLE BLOCKS				
Block Catalog Number	9080 LBA164101	9080 LBA164108	9080 LBA165106	9080 LBA165112
Block Dimensions (D)x(H)x(W)	3.16x4.75x2.25 in. 80.3x120.7x57.2 mm	3.16x4.75x2.25 in. 80.3x120.7x57.2 mm	3.12x5.50x3.17 in. 79.2x139.7x80.5 mm	3.12x5.50x3.17 in. 79.2x139.7x80.5 mm
TWO POLE BLOCKS				
Block Catalog Number	N/A	9080 LBA264108	9080 LBA265106	9080 LBA265112
Clear Plastic covers	N/A	9080 LB42	9080 LB52	9080 LB52
Block Dimensions (D)x(H)x(W)	N/A	3.16x4.75x4.12 in. 80.3x120.7x104.6 mm	3.12x5.50x5.88 in. 79.2x139.7x149.4 mm	3.12x5.50x5.88 in. 79.2x139.7x149.4 mm
THREE POLE BLOCKS				
Block Catalog Number	9080 LBA364101	9080 LBA364108	9080 LBA365106	9080 LBA365112
Clear Plastic covers	9080 LB43	9080 LB43	9080 LB53	9080 LB53
Block Dimensions (D)x(H)x(W)	3.16x4.75x6.00 in. 80.3x120.7x152.4 mm	3.16x4.75x6.00 in. 80.3x120.7x152.4 mm	3.12x5.50x8.54 in. 79.2x139.7x216.9 mm	3.12x5.50x8.54 in. 79.2x139.7x216.9 mm

CLASS 9080	STANDARD			
				
Maximum Voltage Rating	600	600	600	600
Service Class	B & C	B & C	B & C	B & C
Amperage Rating-CU Wire	620 amp.	760 amp.	760 amp.	760 amp.
Amperage Rating-AL Wire	500 amp.	620 amp.	620 amp.	620 amp.
Wire Range Lugs suitable for use with 75° C Conductors.	MAIN (2) #6 - 350 MCM BRANCH (2) #6 - 350 MCM	MAIN (2) #4 - 500 MCM BRANCH (2) #4 - 500 MCM	MAIN (2) #4 - 500 MCM BRANCH (8) #14 - 2/0 AWG	MAIN (2) #4 - 500 MCM BRANCH (12) #14-4 AWG
Tightening Torque	MAIN #6-350 MCM - 275 lbf-in (31.0 N-m) BRANCH #6-350 MCM - 275 lbf-in (31.0 N-m)	MAIN #4-500 MCM - 375 lbf-in (42.3 N-m) BRANCH #4-500 MCM - 375 lbf-in (42.3 N-m)	MAIN #4-500 MCM - 375 lbf-in (42.3 N-m) BRANCH #6-2/0 120 lbf-in (13.5 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m)	MAIN #4-500 MCM - 375 lbf-in (42.3 N-m) BRANCH #14-#4 35 lbf-in (4.0 N-m)
Lug Material	Tin Plated High Conductive AL	Tin Plated High Conductive AL	Tin Plated High Conductive AL	Tin Plated High Conductive AL
Base Material	General Purpose Phenolic	General Purpose Phenolic	General Purpose Phenolic	General Purpose Phenolic
Temperature Rating	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C
Listings		File E60616 Guide XCFR2		File LR70361
Flammability Rating	UL94V-0	UL94V-0	UL94V-0	UL94V-0
ONE POLE BLOCKS				
Block Catalog Number	9080 LBA165202	9080 LBA1652021	9080 LBA165208	9080 LBA165212
Block Dimensions (D)x(H)x(W)	3.12x5.50x3.17 in. 79.2x139.7x80.5 mm	3.12x5.50x3.17 in. 79.2x139.7x80.5 mm	3.12x5.50x3.17 in. 79.2x139.7x80.5 mm	3.12x5.50x3.17 in. 79.2x139.7x80.5 mm
TWO POLE BLOCKS				
Block Catalog Number	9080 LBA265202	9080 LBA2652021	9080 LBA265208	9080 LBA265212
Clear Plastic covers	9080 LB52	9080 LB52	9080 LB52	9080 LB52
Block Dimensions (D)x(H)x(W)	3.12x5.50x5.88 in. 79.2x139.7x149.4 mm	3.12x5.50x5.88 in. 79.2x139.7x149.4 mm	3.12x5.50x5.88 in. 79.2x139.7x149.4 mm	3.12x5.50x5.88 in. 79.2x139.7x149.4 mm
THREE POLE BLOCKS				
Block Catalog Number	9080 LBA365202	9080 LBA3652021	9080 LBA365208	9080 LBA365212
Clear Plastic covers	9080 LB53	9080 LB53	9080 LB53	9080 LB53
Block Dimensions (D)x(H)x(W)	3.12x5.50x8.54 in. 79.2x139.7x216.9 mm	3.12x5.50x8.54 in. 79.2x139.7x216.9 mm	3.12x5.50x8.54 in. 79.2x139.7x216.9 mm	3.12x5.50x8.54 in. 79.2x139.7x216.9 mm

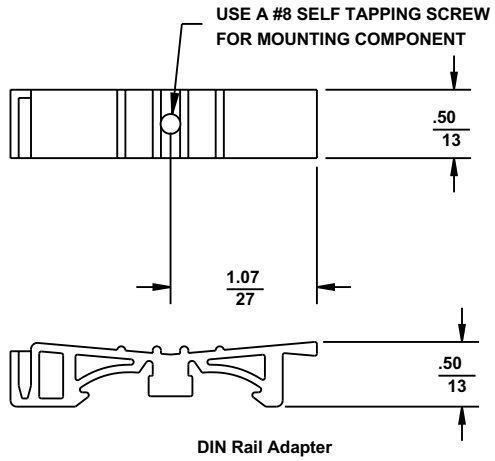


General Dimensions

1 Pole	2 Pole	3 Pole	A1	A2	A3	B	C	D	E	F	G	H	J
LBA161101 LBA161104	LBA261104	LBA161101 LBA361104	.76	1.40	2.03	2.29	1.62	.38	.64	.19	1.93	.32	.18
LBA162101 LBA162104 LBC162101	LBA262101 LBA262104	LBA362101 LBA362104 LBC362101	1.13	1.94	2.75	2.88	1.78	.56	.81	.31	2.25	.24	.205
LBA163101 LBA163104 LBA163106 LBA163206 LBC163101 LBC163106 LBC163206	LBA263101 LBA263104 LBA263106 LBA263206 LBC263106 LBC263206	LBA363101 LBA363104 LBA363106 LBA363206 LBC363101 LBC363106 LBC363206	1.94	3.47	5.00	4.00	2.61	.97	1.53	.31	3.38	.40	.203
LBA164101 LBA164108	LBA264108	LBA364101 LBA364108	2.28	4.16	6.04	4.75	2.92	1.14	1.88	.31	4.13	.51	.20
LBA165202 LBA1652021 LBA165106 LBA165112 LBA165212 LBC165208 LBC165212	LBA265202 LBA2652021 LBA265106 LBA265112 LBA265212	LBA365202 LBA3652021 LBA365106 LBA365112 LBA365212 LBC365208 LBC365212	3.17	5.88	8.54	5.50	3.12	1.58	2.69	.38	4.75	.50	.265



Dimensions for LBA362106



DIN Rail Adapter

CATALOG

ABB drives for HVAC

The next step in HVAC drives

The new ACH580 drives come with a range of advanced features, such as a new primary settings menu that makes commissioning the drives much easier and faster. Optional Bluetooth connectivity offers improved accessibility for drives in remote areas and increases safety by letting users stay out of arc flash zones.

Simple to select, install and use
All the essentials – such as chokes, EMC filters, cabling clamps, certified BACnet communication, and enclosures from UL (NEMA) Type 1 to UL (NEMA) Type 12 – are a standard part of the drive, simplifying selection, installation, and commissioning.

Safe maintenance
The packaged disconnect solution provides a main disconnect switch, further increasing safety for people working on air-handling units.

Motor control options to meet your application needs
ACH580 drives can be integrated with several types of AC motors, even high-efficiency permanent magnet (PM) and synchronous reluctance (SynRM) motors. Using these motors can reduce your energy costs even more.

Additional I/O options
Take advantage of the added flexibility and accessibility – never be without back-up I/O points at the job site again.

ACH580 drives are ideal for HVAC fans, pumps, compressors, air-handling units, and chillers. These are used in hospitals, data centers, shopping centers, tunnel ventilation, factories, office buildings, and more.

Intuitive control panel
The drive's HVAC-specific software, intuitive control panel with customizable text, and menu-driven programming simplify setup and operation of even the most complex applications. You can customize the view so that it only shows the information you need, and it automatically saves a backup of your most recent configuration so that it's always available.

Optional Bluetooth® capability
ABB's new HVAC Bluetooth control panel lets you commission the drive remotely, safely outside the arc flash boundary. The Drivetune smartphone app allows you to commission and tune the drive from a distance, giving you access to the same primary settings and other menus available on the drive's HVAC control panel.

Reliable communication
BACnet MS/TP, Modbus RTU and Johnson Controls N2 are embedded in every ACH580. In addition, a wide range of optional fieldbus adapters are available to enable connectivity with all major building automation and control systems.

Harmonic mitigation
The drive provides reduced harmonics with built-in, optimized DC choke in a small and lightweight design.

Ultra-low harmonic (ULH) drive for a clean network
The revolutionary ACH580 ultra-low harmonic drive is designed specifically for the HVAC market, minimizing the effect of harmonics on your system. This all-in-one solution is fully integrated within the ACH580 platform and leverages the same programming tools, user settings, options, and functions, while providing superior harmonic performance.

ACH580 drives offering

All ACH580 drives offer ease of use, scalability, and reliability and comes in a variety of packages. They can be equipped with an intuitive Bluetooth control panel, allowing the drive to be configured directly via the control panel or via the Drivetune app. A robust HVAC firmware package provides drive, motor, and application protection features. The drive includes BACnet MS/TP, Modbus RTU, and Johnson Controls N2. Additional protocols, such as BACnet/IP and LonWorks, are available with optional fieldbus adapters.

Wall-mounted drives, ACH580-01
ACH580-01 wall-mounted drives are available in UL (NEMA) Type 1 to UL (NEMA) Type 12 protection class with a power range up to 350 hp and offer side-by-side, flange, and horizontal mounting options. The UL (NEMA) Type 12 variants are designed for applications exposed to dust, moisture, vibration, and other harsh conditions. The ACH580-01 is a six-pulse drive that includes an optimized DC link choke for harmonic mitigation.

Ultra-low harmonic drives, ACH580-31
ACH580-31 ultra-low harmonic drives help to keep the power network clean. The ACH580 ultra-low harmonic (ULH) drive provides an unprecedented compact design that delivers unity power factor with a 3% or less THDi. By meeting the most stringent requirements of the IEEE519 recommendations, the ACH580 ULH drive reduces any risk of electrical disturbance when operating on a back-up generator.

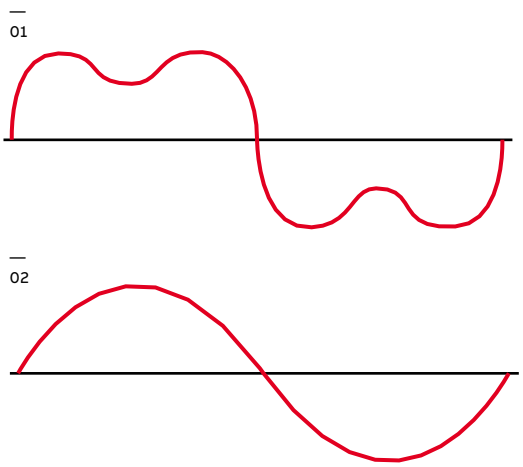
E-Clipse bypass drive, ACH580-VCR, ACH580-VDR, ACH580-BCR, ACH580-BDR
The ACH580 with ABB E-Clipse bypass has an integrated UL (NEMA) Type 1, 12 or 3R enclosure with a bypass motor starter and is available from 1 to 350 hp at 230/460/575 V. The ACH580 with ABB E-Clipse bypass provides an input disconnect switch or circuit breaker with door mounted and interlocked switch (padlockable in the OFF position), a bypass starter, electronic motor overload protection, a door mounted control panel with graphical display for local control, provisions for external control connections, and serial communications capability.

Packaged drive with disconnect means, ACH580-PCR, ACH580-PDR
The ACH580 Packaged Drive includes an ACH580 drive in a UL (NEMA) Type 1, 12 or 3R enclosure with either an input disconnect switch and fast acting fuses or an input circuit breaker. It is available from 1 to 350 hp at 230/460/575 V. The ACH580 Packaged Drive provides a door-mounted input disconnect switch (padlockable in the OFF position), electronic motor overload protection, a door mounted control panel with graphical display for local control, provisions for external control connections, and serial communications capability.

ACH580 ultra-low harmonic (ULH) drive

What are harmonics?
In an ideal case the current in an AC grid is a pure sine wave and does not contain harmonics. In reality the current deviates from this pure sine wave and contains harmonics. Harmonics are typically measured as a percentage value, called total harmonic distortion (THD).

Harmonics can cause damage to sensitive electronic equipment, interference to communication equipment, tripping of circuit breakers, blowing of fuses and capacitor failures. The effects can also include overheating of cables, light ballast, motors, overloading of transformers, generator failure and power factor capacitor damage.



01
Diode supply

02
Active supply

Complete HVAC functionality
The ACH580 ULH comes standard with an intuitive control panel used to configure, control, and monitor the drive. An optional Bluetooth control panel allows the drive to be configured via the control panel or the DriveTune app.

A robust HVAC firmware package provides drive, motor, and application protection features. Application specific features, such as accepting four separate start interlocks (safeties), along with broken belt detection, are also included. The drive includes BACnet MS/TP, Modbus RTU, and Johnson Controls N2 as standard.

Savings in total cost of ownership
Installation costs are reduce with the simple 3 wires in and 3 wires out design. Maintenance costs are lowered as compared to other harmonic mitigation solutions like passive filters, multi-pulse and active filters there are less components to maintain and stock as spares.

Using the ACH580 ULH allows your engineer to design your electrical system and backup generators to the right size and not oversizing for the harmonics in the network.

Reliability for your building
Harmonics in the network could cause problems with other electrical equipment in the same electrical network. In the worst case it might cause your sensitive electrical equipment to fail.

Harmonics can cause problems also in retrofit projects. In such projects, a transformer might not be able to meet the harmonic levels caused by non-linear loads such as standard 6-pulse drives, so there is a risk of overloading the transformer.

In addition to problems caused by harmonics, also weak network can cause troubles to your systems. Weak electrical networks that have sags in line voltage may cause motors to overheat, trip or fail.

The ACH580 ULH drive offers a reliable solution to overcome these challenges as it is able to lower the harmonic content so that sensitive equipment stay running and transformers or generators don't fail. Also the ACH580 ULH can boost output voltage so that motor always runs with nominal voltage despite the fluctuations in line voltage.

Optimized size and performance
ACH580 ULH has all the harmonic mitigation technology in the drive. With a THDi of 3% or less, there is no need for external components to install with the drive for reducing harmonics, this drive doesn't create the harmonics to fix.

ACH580 ultra-low harmonic packaged drives with disconnect
The ACH580 ultra-low harmonic (ULH) packaged drive is an ACH580 ULH variable frequency drive enclosed with either an input disconnect switch and fast acting fuses (ACH580-3PDR) or an input circuit breaker (ACH580-3PCR). The ACH580 packaged drive provides a door-mounted input disconnect operator (padlockable in the OFF position), electronic motor overload protection, a door mounted control panel with graphical display for local control, provisions for external control connections, and serial communications capability.

ACH580 ultra-low harmonic drive E-Clipse bypass
The ACH580 ultra-low harmonic (ULH) drive with ABB E-Clipse bypass is an ACH580 HVAC drive in an integrated UL (NEMA) Type 1, 12 or 3R enclosure with a bypass motor starter. The ACH580 ULH drive with ABB E-Clipse bypass provides an input disconnect switch or circuit breaker with door mounted and interlocked operator (padlockable in the OFF position), a bypass starter, electronic motor overload protection, a door mounted control panel with graphical display for local control, provisions for external control connections, and serial communications capability. Configurations with the +F267 option include a drive service switch.

Technical details and documentation
PDF, BIM, CAD Drawings and 3D models are available for planning your building.

Common characteristics of the ACH580 drives family

ACH580 series

HVAC control panel with primary settings
- Primary settings makes commissioning the drive easier than ever before
- The optional Bluetooth-enabled control panel allows easy smartphone connection and remote support capability
- Easily available USB interface for PC and tool connection
- Help button for problem-solving

HVAC communication protocols
- The most common HVAC communication protocols – BACnet MS/TP, Johnson Controls N2 and Modbus RTU – are standard
- BACnet/IP with optional fieldbus adapter

Ingress protection
- ACH580 drives are available in multiple different UL/NEMA classes. Check the details at the end of this catalog.

Suitable for various HVAC applications
- Suitable not only for variable-torque applications like fans and pumps, but also for basic constant-torque applications like compressors
- Support for induction, premanent magnet and synchronous reluctance motors

Reliability and quality
- All units are tested under full load at maximum allowed ambient temperature to verify quality
- Printed circuit boards have an extra coating to protect against humid and harsh environments

Harmonic mitigation options
- The ACH580-01 has optimized DC chokes standard for harmonic mitigation.
- Compliant with IEC/EN61000-3-12
- The ACH580-31 ultra-low harmonic drive results in harmonic current as low as 3 percent at the input terminals of the drive, meeting even the most stringent IEEE519 requirements.

Shared features of the ABB all-compatible drives portfolio

Drivetune smartphone app
- The Drivetune smartphone app together with the Bluetooth-enabled control panel allow you to set up and commission the drive remotely from a safe and comfortable location, using the same primary settings menu that is available on the control panel on the drive.

Energy efficiency calculators
- Optimize energy efficiency with features that help you to save and manage energy. You can monitor the hourly, daily cumulative, last hour, last day and last month energy consumption via kWh counters.

Diagnostic menu
- Analyze and resolve issues with the control panel's diagnostics menu. You can quickly analyze why the drive is performing as it is; running, stopped or running at the present speed.

Embedded load analyzers
- Analyze and optimize the application with the load profile log, which shows how the drive has been operating.

EMC/RFI category C2
- The EMC category C2 level design allows installation in commercial and residental buildings.

Reduced motor noise
- User-selectable switching frequencies to manage audible noise.

Integrated process control
- Reduce costs with built-in PID controllers, allowing drives to self-govern, limiting the need for external controllers.

Flexibility in programming
- Align the drive to the needs of your application and users with customized home screens and adaptive programming.

Extensive I/O capabilities
- ABB HVAC drives have an extensive number of I/O terminals in standard configuration
- Color-coded terminals and clear terminal marking significantly ease drive wiring process
- I/O status can be monitored via the I/O menu
- I/O can be forced on or off to verify the drive's programming

Same PC tools for ABB all-compatible drives
- Drive composer entry available for free at www.abb.com
- Same parameter structure makes the all-compatible platform easy to use

Connectivity
- ABB's F-series fieldbus adapters can be used throughout the all-compatible platform
- Fieldbus settings are made easy with the Primary Settings menu
- Bluetooth connectivity to apple and android devices

Technical data for the ACH580-01 and ACH580-31

Product compliance (complete list on following page)	
ACH580-01, ACH580-31	CE, UL, cUL, and EAC
Supply connection	
Input voltage (U_1)	
ACH580-xx-xxxA-2	208/240V
ACH580-xx-xxxA-4	480V
ACH580-xx-xxxA-6	600V
Input voltage tolerance	+10% / -15%
Phase	3-phase (1-phase, 240 V)
Frequency	48 to 63 Hz
Line Limitations	Max ±3% of nominal phase to phase input voltage
Power Factor (cos φ) at nominal load	
ACH580-01	0.98
ACH580-31	1.0
Efficiency at rated power	
ACH580-01	98.0%
ACH580-31	96.5%
Power Loss	Approximately 2% of rated power
Motor connection	
Supported motor control	Scalar and vector
Supported motor types	Asynchronous motor, permanent magnet motor (vector), SynRM (vector)
Voltage	3-phase, from 0 to supply voltage
Frequency	0 to 500 Hz
Short Term Overload Capacity Variable Torque	110% for 1 min/10min
Peak Overload Capacity Variable Torque	1.35 for 2 second (2 sec / 10 min)
Switching Frequency	2, 4, 8 or 12 kHz Automatic fold back in case of overload
Acceleration/ Deceleration Time	0 to 1800 s
Short Circuit Current Rating (SCCR)	100 kA with fusing

Inputs and outputs (drive)	
2 analog inputs	Selection of Current/Voltage input mode is user programmable.
Voltage reference	0 (2) to 10 V, R_{in} > 200 kΩ
Current reference	0 (4) to 20 mA, R_{in} = 100 Ω
Potentiometer reference value	10 V ±1% max. 20 mA
2 analog outputs	AO1 is user programmable for current or voltage. AO2 current
Voltage reference	0 to 10 V, R_{load}: > 100 kΩ
Current reference	0 to 20 mA, R_{load}: < 500 Ω
Applicable potentiometer	1 kΩ to 10 kΩ
Internal auxiliary voltage	24 V DC ±10%, max. 250 mA
Accuracy	+/- 1% full scale range at 25°C (77°F)
Output updating time	2 ms
6 digital inputs	12 to 24 V DC, 10 to 24 V AC, Connectivity of PTC sensors supported by a single digital input. PNP or NPN connection (5 DIs with NPN connection). Programmable
Input Updating Time	2 ms
3 relay outputs	Maximum switching voltage 250 V AC/30 V DC. Maximum continuous current 2 A rms. Programmable, Form C
Contact material	Silver Tin Oxide ($AgSnO_2$)
PTC, PT100 and PT1000	Any of the analog inputs, or digital input 6, are configurable for PTC with up to 6 sensors.
Adjustable filters on analog inputs and outputs	
All control inputs isolated from ground and power	
Operation	
Air temperature	-15 to +50 °C (5 to 122 °F). -15 to 0 °C (5 to 32 °F): No frost allowed. Output derated above +40 °C (104 °F)
Installation site altitude	0 to 4000 m (13123 ft) above sea level Output derated above 1000 m (3281 ft)
Relative humidity	5 to 95%: No condensation allowed Maximum relative humidity is 60% in the presence of corrosive gasses
Atmospheric pressure	70 to 106 kPa (10.2 to 15.4 PSI) 0.7 to 1.05 atmospheres
Vibration	Risk category IV Certified (IBC 2018)

Environmental protections	
Chemical Gasses	Class 3C2
Solid Particles	Class 3S2 No conductive dust allowed
Pollution degree (IEC/EN 61800-5-1)	Pollution degree 2
Product compliance	
Standards and directives	Low Voltage Directive 2006/95/EC EMC Directive 2004/108/EC 60721-3-3: 2002 60721-3-1:1997 Quality assurance system ISO 9001 and Environmental system ISO 14001 CE, UL, cUL, and EAC approvals Galvanic isolation according to PELV RoHS2 (Restriction of Hazardous Substances) EN 61800-5-1: 2007; IEC/EN 61000-3-12; EN61800-3: 2017 + A1: 2012 Category C2 (1st environment restricted distribution); Safe torque off (EN 61800-5-2) BACnet Testing Laboratory (BTL) Seismic (IBC, OSHPD) Plenum rated
EMC (according to EN61800-3)	ACH580-01 and ACH580-31 class C2 (1st environment restricted distribution)
Storage (in Protective Shipping Package)	
Air Temperature	-40 to +70 °C (-40 to +158 °F)
Relative Humidity	Less than 95% No condensation allowed Maximum relative humidity is 60% in the presence of corrosive gasses
Chemical Gasses	Class 1C2
Solid Particles	Class 1S2 Contact ABB regarding Class 1S3
Atmospheric pressure	70 to 106 kPa 0.7 to 1.05 atmospheres
Vibration (ISTA)	
R1…R4	In accordance with ISTA 1A
R5…R9	In accordance with ISTA 3E

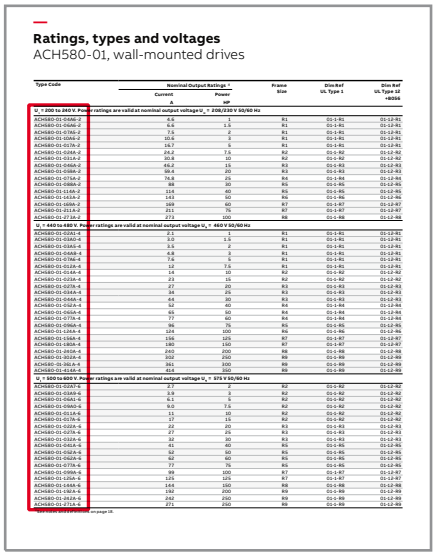
Transportation (in Protective Shipping Package)	
Air Temperature	-40° to 70°C (-40° to 158°F)
Relative Humidity	Less than 95% No condensation allowed Maximum relative humidity is 60% in the presence of corrosive gasses
Atmospheric Pressure	60 to 106 kPa (8.7 to 15.4 PSI) 0.6 to 1.05 atmospheres
Free Fall	R1: 76 cm (30 in) R2: 61 cm (24 in) R3: 46 cm (18 in) R4: 31 cm (12 in) R5: 25 cm (10 in)
Chemical Gasses	Class 2C2
Solid Particles	Class 2S2
Shock/ Drop (ISTA)	
R1…R4	In accordance with ISTA 1A
R5…R9	In accordance with ISTA 3E
Vibration (ISTA)	
R1…R4	In accordance with ISTA 1A
R5…R9	In accordance with ISTA 3E

How to select a drive

This is how you build up your own ordering code using the type designation key.

Start by identifying your supply voltage.
This tells you what rating table to use.
See pages 19-26.

Select your drive's order code from the rating table based on the nominal current rating of your motor.



Ratings, types and voltages
ACH580-01, wall-mounted drives

Type Code	Nominal Output Ratings [1] Current A	Power HP	Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B054
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60/60 Hz					
ACH580-01-04A6-2	4.6	1	R1	01-12-R1	01-12-R1
ACH580-01-06A6-2	6.6	1.5	R1	01-12-R1	01-12-R1
ACH580-01-07A5-2	7.5	2	R1	01-12-R1	01-12-R1
ACH580-01-10A6-2	10.6	3	R1	01-12-R1	01-12-R1
ACH580-01-017A-2	16.7	5	R1	01-12-R1	01-12-R1
ACH580-01-024A-2	24.2	7.5	R2	01-12-R2	01-12-R2
ACH580-01-031A-2	30.8	10	R2	01-12-R2	01-12-R2
ACH580-01-046A-2	46.2	15	R3	01-12-R3	01-12-R3
ACH580-01-059A-2	59.4	20	R3	01-12-R3	01-12-R3
ACH580-01-075A-2	74.8	25	R4	01-12-R4	01-12-R4
ACH580-01-088A-2	88	30	R5	01-12-R5	01-12-R5
ACH580-01-114A-2	114	40	R5	01-12-R5	01-12-R5
ACH580-01-143A-2	143	50	R6	01-12-R6	01-12-R6
ACH580-01-169A-2	169	60	R7	01-12-R7	01-12-R7
ACH580-01-211A-2	211	75	R7	01-12-R7	01-12-R7
ACH580-01-273A-2	273	100	R8	01-12-R8	01-12-R8
U_1 = 440 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60/60 Hz					
ACH580-01-02A1-4	2.1	1	R1	01-12-R1	01-12-R1
ACH580-01-03A3-4	3.3	1.5	R1	01-12-R1	01-12-R1
ACH580-01-04A1-4	4.1	2	R1	01-12-R1	01-12-R1
ACH580-01-05A8-4	5.8	3	R1	01-12-R1	01-12-R1
ACH580-01-07A6-4	7.6	5	R1	01-12-R1	01-12-R1
ACH580-01-012A-4	12	7.5	R1	01-12-R1	01-12-R1
ACH580-01-014A-4	14	10	R2	01-12-R2	01-12-R2
ACH580-01-023A-4	23	15	R2	01-12-R2	01-12-R2
ACH580-01-027A-4	27	20	R3	01-12-R3	01-12-R3
ACH580-01-034A-4	34	25	R3	01-12-R3	01-12-R3
ACH580-01-040A-4	40	30	R3	01-12-R3	01-12-R3
ACH580-01-052A-4	52	40	R4	01-12-R4	01-12-R4
ACH580-01-065A-4	65	50	R4	01-12-R4	01-12-R4
ACH580-01-077A-4	77	60	R4	01-12-R4	01-12-R4
ACH580-01-096A-4	96	75	R5	01-12-R5	01-12-R5
ACH580-01-124A-4	124	100	R6	01-12-R6	01-12-R6
ACH580-01-156A-4	156	125	R7	01-12-R7	01-12-R7
ACH580-01-180A-4	180	150	R7	01-12-R7	01-12-R7
ACH580-01-245A-4	245	200	R8	01-12-R8	01-12-R8
ACH580-01-302A-4	302	250	R9	01-12-R8	01-12-R8
ACH580-01-361A-4	361	300	R9	01-12-R8	01-12-R8
ACH580-01-414A-4	414	350	R9	01-12-R8	01-12-R8
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60/60 Hz					
ACH580-01-02A7-6	2.7	2	R2	01-12-R2	01-12-R2
ACH580-01-03A9-6	3.9	3	R2	01-12-R2	01-12-R2
ACH580-01-06A1-6	6.1	5	R2	01-12-R2	01-12-R2
ACH580-01-09A0-6	9.0	7.5	R2	01-12-R2	01-12-R2
ACH580-01-011A-6	11	10	R2	01-12-R2	01-12-R2
ACH580-01-017A-6	17	15	R2	01-12-R2	01-12-R2
ACH580-01-022A-6	22	20	R3	01-12-R3	01-12-R3
ACH580-01-027A-6	27	25	R3	01-12-R3	01-12-R3
ACH580-01-032A-6	32	30	R3	01-12-R3	01-12-R3
ACH580-01-041A-6	41	40	R5	01-12-R5	01-12-R5
ACH580-01-052A-6	52	50	R5	01-12-R5	01-12-R5
ACH580-01-062A-6	62	60	R6	01-12-R6	01-12-R6
ACH580-01-077A-6	77	75	R6	01-12-R6	01-12-R6
ACH580-01-099A-6	99	100	R7	01-12-R7	01-12-R7
ACH580-01-125A-6	125	125	R7	01-12-R7	01-12-R7
ACH580-01-144A-6	144	150	R8	01-12-R8	01-12-R8
ACH580-01-192A-6	192	200	R9	01-12-R9	01-12-R9
ACH580-01-242A-6	242	250	R9	01-12-R9	01-12-R9
ACH580-01-271A-6	271	250	R9	01-12-R8	01-12-R8

[1] See notes and definitions on page 18.

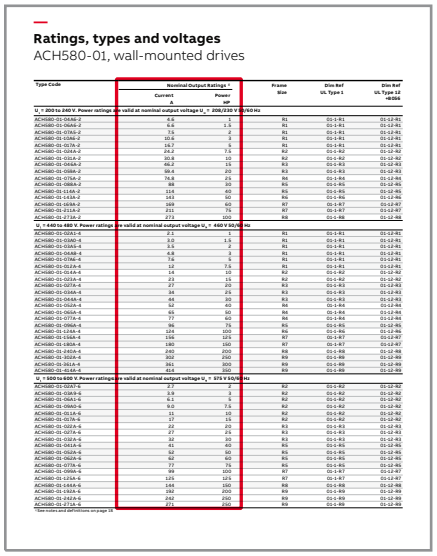
Pages 19-26

Choose your options (on page 36) and add the option codes to the drive's order code. Remember to use a "+" sign before each option code.

Type designation: ACH580 – 01 – 012A – 4 + K465

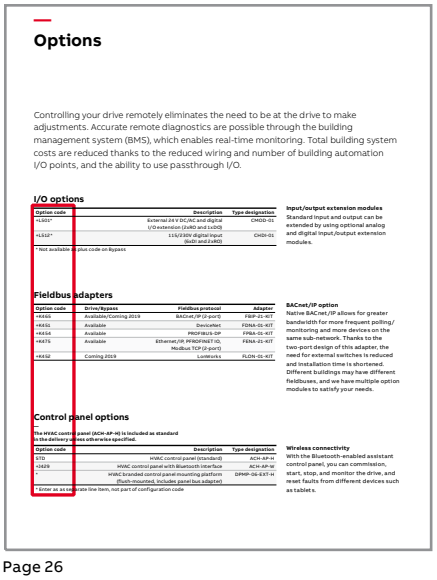
- 01 / 31 / VxR / BxR / PxR — Product series
- 012A — Types and construction
- 4 — Rating
- K465 — Voltage
- Options

Choose the power and current rating of your motor from the ratings tables on pages 19-26.



Ratings, types and voltages
ACH580-01, wall-mounted drives

Pages 19-26



Options

Controlling your drive remotely eliminates the need to be at the drive to make adjustments. Accurate remote diagnostics are possible through the building management system (BMS), which enables real-time monitoring. Total building system costs are reduced thanks to the reduced wiring and number of building automation I/O points, and the ability to use passthrough I/O.

I/O options

Option code	Description	Type designation
+L501*	External 24 V DC/AC and digital I/O extension (1xREO and 1xDIO)	CMOD-01
+L512*	115/230V digital input (6xDI and 2xRO)	CHDI-01

* Not available on plus code on Bypass

Input/output extension modules
Standard input and output can be extended by using optional analog and digital input/output extension modules.

Fieldbus adapters

Option code	Drive/Bypass	Fieldbus protocol	Adapter
+K451	Available/Coming 2019	BACnet/IP (2-port)	FBIP-21-KIT
+K452	Available	DeviceNet	FDNA-01-KIT
+K454	Available	PROFIBUS-DP	FPBA-01-KIT
+K475	Available	Ethernet/IP, PROFINET IO, Modbus TCP (2-port)	FENA-21-KIT
+K492	Coming 2019	Lonworks	FLON-01-KIT

BACnet/IP option
Native BACnet/IP allows for greater bandwidth for more frequent polling/monitoring and more devices on the same sub-network. Thanks to the two-port design of this adapter, the need for external switches is reduced and installation time is shortened. Different buildings may have different fieldbuses, and we have multiple option modules to satisfy your needs.

Control panel options

The HVAC control panel (ACH-AP-H) is included as standard in the delivery unless otherwise specified.

Option code	Description	Type designation
STD	HVAC control panel (standard)	ACH-AP-H
+J429	HVAC control panel with Bluetooth interface	ACH-AP-W
*	HVAC branded control panel mounting platform (flush-mounted, includes panel bus adapter)	DPMP-06-EXT-H

* Enter as a separate line item, not part of configuration code

Wireless connectivity
With the Bluetooth-enabled assistant control panel, you can commission, start, stop, and monitor the drive, and reset faults from different devices such as tablets.

Page 26

Note: Ratings apply at an ambient temperature of 40°C (104°F) unless otherwise noted.
To achieve the rated motor power given in the table, the rated current of the drive must be higher than or equal to the rated motor current.

Definitions:
I Continuous rms output current allowing 110% overload for 1 minute every 10 minutes.
P Typical motor power
U_N Nominal output voltage of the drive
U_1 Input voltage range

Ratings, types and voltages
ACH580-01, wall-mounted drives

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B056
	Current A	Power HP			
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz					
ACH580-01-04A6-2	4.6	1	R1	01-1-R1	01-12-R1
ACH580-01-06A6-2	6.6	1.5	R1	01-1-R1	01-12-R1
ACH580-01-07A5-2	7.5	2	R1	01-1-R1	01-12-R1
ACH580-01-10A6-2	10.6	3	R1	01-1-R1	01-12-R1
ACH580-01-017A-2	16.7	5	R1	01-1-R1	01-12-R1
ACH580-01-024A-2	24.2	7.5	R2	01-1-R2	01-12-R2
ACH580-01-031A-2	30.8	10	R2	01-1-R2	01-12-R2
ACH580-01-046A-2	46.2	15	R3	01-1-R3	01-12-R3
ACH580-01-059A-2	59.4	20	R3	01-1-R3	01-12-R3
ACH580-01-075A-2	74.8	25	R4	01-1-R4	01-12-R4
ACH580-01-088A-2	88	30	R5	01-1-R5	01-12-R5
ACH580-01-114A-2	114	40	R5	01-1-R5	01-12-R5
ACH580-01-143A-2	143	50	R6	01-1-R6	01-12-R6
ACH580-01-169A-2	169	60	R7	01-1-R7	01-12-R7
ACH580-01-211A-2	211	75	R7	01-1-R7	01-12-R7
ACH580-01-273A-2	273	100	R8	01-1-R8	01-12-R8
U_1 = 440 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz					
ACH580-01-02A1-4	2.1	1	R1	01-1-R1	01-12-R1
ACH580-01-03A0-4	3.0	1.5	R1	01-1-R1	01-12-R1
ACH580-01-03A5-4	3.5	2	R1	01-1-R1	01-12-R1
ACH580-01-04A8-4	4.8	3	R1	01-1-R1	01-12-R1
ACH580-01-07A6-4	7.6	5	R1	01-1-R1	01-12-R1
ACH580-01-012A-4	12	7.5	R1	01-1-R1	01-12-R1
ACH580-01-014A-4	14	10	R2	01-1-R2	01-12-R2
ACH580-01-023A-4	23	15	R2	01-1-R2	01-12-R2
ACH580-01-027A-4	27	20	R3	01-1-R3	01-12-R3
ACH580-01-034A-4	34	25	R3	01-1-R3	01-12-R3
ACH580-01-044A-4	44	30	R3	01-1-R3	01-12-R3
ACH580-01-052A-4	52	40	R4	01-1-R4	01-12-R4
ACH580-01-065A-4	65	50	R4	01-1-R4	01-12-R4
ACH580-01-077A-4	77	60	R4	01-1-R4	01-12-R4
ACH580-01-096A-4	96	75	R5	01-1-R5	01-12-R5
ACH580-01-124A-4	124	100	R6	01-1-R6	01-12-R6
ACH580-01-156A-4	156	125	R7	01-1-R7	01-12-R7
ACH580-01-180A-4	180	150	R7	01-1-R7	01-12-R7
ACH580-01-240A-4	240	200	R8	01-1-R8	01-12-R8
ACH580-01-302A-4	302	250	R9	01-1-R9	01-12-R9
ACH580-01-361A-4	361	300	R9	01-1-R9	01-12-R9
ACH580-01-414A-4	414	350	R9	01-1-R9	01-12-R9
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz					
ACH580-01-02A7-6	2.7	2	R2	01-1-R2	01-12-R2
ACH580-01-03A9-6	3.9	3	R2	01-1-R2	01-12-R2
ACH580-01-06A1-6	6.1	5	R2	01-1-R2	01-12-R2
ACH580-01-09A0-6	9.0	7.5	R2	01-1-R2	01-12-R2
ACH580-01-011A-6	11	10	R2	01-1-R2	01-12-R2
ACH580-01-017A-6	17	15	R2	01-1-R2	01-12-R2
ACH580-01-022A-6	22	20	R3	01-1-R3	01-12-R3
ACH580-01-027A-6	27	25	R3	01-1-R3	01-12-R3
ACH580-01-032A-6	32	30	R3	01-1-R3	01-12-R3
ACH580-01-041A-6	41	40	R5	01-1-R5	01-12-R5
ACH580-01-052A-6	52	50	R5	01-1-R5	01-12-R5
ACH580-01-062A-6	62	60	R5	01-1-R5	01-12-R5
ACH580-01-077A-6	77	75	R5	01-1-R5	01-12-R5
ACH580-01-099A-6	99	100	R7	01-1-R7	01-12-R7
ACH580-01-125A-6	125	125	R7	01-1-R7	01-12-R7
ACH580-01-144A-6	144	150	R8	01-1-R8	01-12-R8
ACH580-01-192A-6	192	200	R9	01-1-R9	01-12-R9
ACH580-01-242A-6	242	250	R9	01-1-R9	01-12-R9
ACH580-01-271A-6	271	250	R9	01-1-R9	01-12-R9

[1] See notes and definitions on page 18.

Ratings, types and voltages

ACH580-VCR, vertical E-Clipse bypass drive with circuit breaker

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type1
	Drive Current A	Package Power HP		
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz				
ACH580-VCR-04A6-2	4.6	1	R1	Vx1-1
ACH580-VCR-06A6-2	6.6	1.5	R1	Vx1-1
ACH580-VCR-07A5-2	7.5	2	R1	Vx1-1
ACH580-VCR-10A6-2	10.6	3	R1	Vx1-1
ACH580-VCR-017A-2	16.7	5	R1	Vx1-1
ACH580-VCR-024A-2	24.2	7.5	R2	Vx1-2
ACH580-VCR-031A-2	30.8	10	R2	Vx1-3
ACH580-VCR-046A-2	46.2	15	R3	Vx1-4
ACH580-VCR-059A-2	59.4	20	R3	Vx1-4
ACH580-VCR-075A-2	74.8	25	R4	Vx1-4
U_1 = 440 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz				
ACH580-VCR-02A1-4	2.1	1	R1	Vx1-1
ACH580-VCR-03A0-4	3.0	1.5	R1	Vx1-1
ACH580-VCR-03A5-4	3.5	2	R1	Vx1-1
ACH580-VCR-04A8-4	4.8	3	R1	Vx1-1
ACH580-VCR-07A6-4	7.6	5	R1	Vx1-1
ACH580-VCR-012A-4	12	7.5	R1	Vx1-1
ACH580-VCR-014A-4	14	10	R2	Vx1-2
ACH580-VCR-023A-4	23	15	R2	Vx1-2
ACH580-VCR-027A-4	27	20	R3	Vx1-3
ACH580-VCR-034A-4	34	25	R3	Vx1-3
ACH580-VCR-044A-4	44	30	R3	Vx1-3
ACH580-VCR-052A-4	52	40	R4	Vx1-4
ACH580-VCR-065A-4	65	50	R4	Vx1-4
ACH580-VCR-077A-4	77	60	R4	Vx1-4
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz				
ACH580-VCR-02A7-6	2.7	2	R2	Vx1-2
ACH580-VCR-03A9-6	3.9	3	R2	Vx1-2
ACH580-VCR-06A1-6	6.1	5	R2	Vx1-2
ACH580-VCR-09A0-6	9.0	7.5	R2	Vx1-2
ACH580-VCR-011A-6	11	10	R2	Vx1-2
ACH580-VCR-017A-6	17	15	R2	Vx1-2
ACH580-VCR-022A-6	22	20	R3	Vx1-3
ACH580-VCR-027A-6	27	25	R3	Vx1-3
ACH580-VCR-032A-6	32	30	R3	Vx1-3

[1] See notes and definitions on page 18.

Ratings, types and voltages

ACH580-VDR, vertical E-Clipse bypass drive with non-fused disconnect switch

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1
	Drive Current A	Package Power HP		
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz				
ACH580-VDR-04A6-2	4.6	1	R1	Vx1-1
ACH580-VDR-06A6-2	6.6	1.5	R1	Vx1-1
ACH580-VDR-07A5-2	7.5	2	R1	Vx1-1
ACH580-VDR-10A6-2	10.6	3	R1	Vx1-1
ACH580-VDR-017A-2	16.7	5	R1	Vx1-1
ACH580-VDR-024A-2	24.2	7.5	R2	Vx1-2
ACH580-VDR-031A-2	30.8	10	R2	Vx1-3
ACH580-VDR-046A-2	46.2	15	R3	Vx1-4
ACH580-VDR-059A-2	59.4	20	R3	Vx1-4
ACH580-VDR-075A-2	74.8	25	R4	Vx1-4
U_1 = 440 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz				
ACH580-VDR-02A1-4	2.1	1	R1	Vx1-1
ACH580-VDR-03A0-4	3.0	1.5	R1	Vx1-1
ACH580-VDR-03A5-4	3.5	2	R1	Vx1-1
ACH580-VDR-04A8-4	4.8	3	R1	Vx1-1
ACH580-VDR-07A6-4	7.6	5	R1	Vx1-1
ACH580-VDR-012A-4	12	7.5	R1	Vx1-1
ACH580-VDR-014A-4	14	10	R2	Vx1-2
ACH580-VDR-023A-4	23	15	R2	Vx1-2
ACH580-VDR-027A-4	27	20	R3	Vx1-3
ACH580-VDR-034A-4	34	25	R3	Vx1-3
ACH580-VDR-044A-4	44	30	R3	Vx1-3
ACH580-VDR-052A-4	52	40	R4	Vx1-4
ACH580-VDR-065A-4	65	50	R4	Vx1-4
ACH580-VDR-077A-4	77	60	R4	Vx1-4
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz				
ACH580-VDR-02A7-6	2.7	2	R2	Vx1-2
ACH580-VDR-03A9-6	3.9	3	R2	Vx1-2
ACH580-VDR-06A1-6	6.1	5	R2	Vx1-2
ACH580-VDR-09A0-6	9.0	7.5	R2	Vx1-2
ACH580-VDR-011A-6	11	10	R2	Vx1-2
ACH580-VDR-017A-6	17	15	R2	Vx1-2
ACH580-VDR-022A-6	22	20	R3	Vx1-3
ACH580-VDR-027A-6	27	25	R3	Vx1-3
ACH580-VDR-032A-6	32	30	R3	Vx1-3

[1] See notes and definitions on page 18.

Ratings, types and voltages

ACH580-BCR, E-Clipse bypass drive with circuit breaker

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B056	Dim Ref NEMA 3R +B058
	Drive Current A	Package Power HP				
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz						
ACH580-BCR-04A6-2	4.6	1	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-06A6-2	6.6	1.5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-07A5-2	7.5	2	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-10A6-2	10.6	3	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-017A-2	16.7	5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-024A-2	24.2	7.5	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-031A-2	30.8	10	R2	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-046A-2	46.2	15	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-059A-2	59.4	20	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-075A-2	74.8	25	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-088A-2	88.0	30	R5	Bx1-3	Bx12-3	Bx3R-3
ACH580-BCR-114A-2	114	40	R5	Bx1-3	Bx12-3	Bx3R-3
ACH580-BCR-143A-2	143	50	R6	Bx1-3	Bx12-3	Bx3R-4
ACH580-BCR-169A-2	169	60	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BCR-211A-2	211	75	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BCR-248A-2	248	100[2]	R8	Bx1-3	Bx12-3	Bx3R-5
U_1 = 440 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz						
ACH580-BCR-02A1-4	2.1	1	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-03A0-4	3.0	1.5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-03A5-4	3.5	2	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-04A8-4	4.8	3	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-07A6-4	7.6	5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-012A-4	12	7.5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-014A-4	14	10	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-023A-4	23	15	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-027A-4	27	20	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-034A-4	34	25	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-044A-4	44	30	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-052A-4	52	40	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-065A-4	65	50	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-077A-4	77	60	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-096A-4	96	75	R5	Bx1-3	Bx12-3	Bx3R-3
ACH580-BCR-124A-4	124	100	R6	Bx1-3	Bx12-3	Bx3R-4
ACH580-BCR-156A-4	156	125	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BCR-180A-4	180	150	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BCR-240A-4	240	200	R8	Bx1-3	Bx12-3	Bx3R-5
ACH580-BCR-302A-4	302	250	R9	Bx1-6	Bx12-6	Bx3R-6
ACH580-BCR-361A-4	361	300	R9	Bx1-6	Bx12-6	Bx3R-6
ACH580-BCR-414A-4	414	350	R9	Bx1-6	Bx12-6	Bx3R-6
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz						
ACH580-BCR-02A7-6	2.7	2	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-03A9-6	3.9	3	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-06A1-6	6.1	5	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-09A0-6	9.0	7.5	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-011A-6	11	10	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-017A-6	17	15	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BCR-022A-6	22	20	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-027A-6	27	25	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-032A-6	32	30	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BCR-041A-6	41	40	R5	Bx1-3	Bx12-3	-
ACH580-BCR-052A-6	52	50	R5	Bx1-3	Bx12-3	-
ACH580-BCR-062A-6	62	60	R5	Bx1-3	Bx12-3	-
ACH580-BCR-077A-6	77	75	R5	Bx1-3	Bx12-3	-
ACH580-BCR-099A-6	99	100	R7	Bx1-3	Bx12-3	-
ACH580-BCR-125A-6	125	125	R7	Bx1-3	Bx12-3	-
ACH580-BCR-144A-6	144	150	R8	Bx1-3	Bx12-3	-

[1] See notes and definitions on page 18.

[2] 100 HP at 230 V

Ratings, types and voltages

ACH580-BDR, E-Clipse bypass drive with non-fused disconnect switch

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B056	Dim Ref NEMA 3R +B058
	Drive Current A	Package Power HP				
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz						
ACH580-BDR-04A6-2	4.6	1	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-06A6-2	6.6	1.5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-07A5-2	7.5	2	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-10A6-2	10.6	3	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-017A-2	16.7	5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-024A-2	24.2	7.5	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-031A-2	30.8	10	R2	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-046A-2	46.2	15	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-059A-2	59.4	20	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-075A-2	74.8	25	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-088A-2	88.0	30	R5	Bx1-3	Bx12-3	Bx3R-3
ACH580-BDR-114A-2	114	40	R5	Bx1-3	Bx12-3	Bx3R-3
ACH580-BDR-143A-2	143	50	R6	Bx1-3	Bx12-3	Bx3R-4
ACH580-BDR-169A-2	169	60	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BDR-211A-2	211	75	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BDR-248A-2	248	100[2]	R8	Bx1-3	Bx12-3	Bx3R-5
U_1 = 440 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz						
ACH580-BDR-02A1-4	2.1	1	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-03A0-4	3.0	1.5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-03A5-4	3.5	2	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-04A8-4	4.8	3	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-07A6-4	7.6	5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-012A-4	12	7.5	R1	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-014A-4	14	10	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-023A-4	23	15	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-027A-4	27	20	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-034A-4	34	25	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-044A-4	44	30	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-052A-4	52	40	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-065A-4	65	50	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-077A-4	77	60	R4	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-096A-4	96	75	R5	Bx1-3	Bx12-3	Bx3R-3
ACH580-BDR-124A-4	124	100	R6	Bx1-3	Bx12-3	Bx3R-4
ACH580-BDR-156A-4	156	125	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BDR-180A-4	180	150	R7	Bx1-3	Bx12-3	Bx3R-4
ACH580-BDR-240A-4	240	200	R8	Bx1-3	Bx12-3	Bx3R-5
ACH580-BDR-302A-4	302	250	R9	Bx1-6	Bx12-6	Bx3R-6
ACH580-BDR-361A-4	361	300	R9	Bx1-6	Bx12-6	Bx3R-6
ACH580-BDR-414A-4	414	350	R9	Bx1-6	Bx12-6	Bx3R-6
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz						
ACH580-BDR-02A7-6	2.7	2	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-03A9-6	3.9	3	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-06A1-6	6.1	5	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-09A0-6	9.0	7.5	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-011A-6	11	10	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-017A-6	17	15	R2	Bx1-1	Bx12-1	Bx3R-1
ACH580-BDR-022A-6	22	20	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-027A-6	27	25	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-032A-6	32	30	R3	Bx1-2	Bx12-2	Bx3R-2
ACH580-BDR-041A-6	41	40	R5	Bx1-3	Bx12-3	-
ACH580-BDR-052A-6	52	50	R5	Bx1-3	Bx12-3	-
ACH580-BDR-062A-6	62	60	R5	Bx1-3	Bx12-3	-
ACH580-BDR-077A-6	77	75	R5	Bx1-3	Bx12-3	-
ACH580-BDR-099A-6	99	100	R7	Bx1-3	Bx12-3	-
ACH580-BDR-125A-6	125	125	R7	Bx1-3	Bx12-3	-
ACH580-BDR-144A-6	144	150	R8	Bx1-3	Bx12-3	

[1] See notes and definitions on page 18.

[2] 100 HP at 230 V

Ratings, types and voltages

ACH580-PCR, packaged drive with disconnect means with circuit breaker

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B056	Dim Ref NEMA 3R +B058
	Current A	Power HP				
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz						
ACH580-PCR-04A6-2	4.6	1	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-06A6-2	6.6	1.5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-07A5-2	7.5	2	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-10A6-2	10.6	3	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-017A-2	16.7	5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-024A-2	24.2	7.5	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-031A-2	30.8	10	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-046A-2	46.2	15	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-059A-2	59.4	20	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-075A-2	74.8	25	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PCR-088A-2	88.0	30	R5	PxB1-3	PxB12-3	PxB3R-3
ACH580-PCR-114A-2	114	40	R6	PxB1-3	PxB12-3	PxB3R-3
ACH580-PCR-143A-2	143	50	R6	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-169A-2	169	60	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-211A-2	211	75	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-248A-2	248	100[2]	R8	PxB1-3	PxB12-3	PxB3R-4
U_1 = 380 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz						
ACH580-PCR-02A1-4	2.1	1	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-03A0-4	3.0	1.5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-03A5-4	3.5	2	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-04A8-4	4.8	3	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-07A6-4	7.6	5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-012A-4	12	7.5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PCR-014A-4	14	10	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-023A-4	23	15	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-027A-4	27	20	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-034A-4	34	25	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-044A-4	44	30	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-052A-4	52	40	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PCR-065A-4	65	50	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PCR-077A-4	77	60	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PCR-096A-4	96	75	R5	PxB1-3	PxB12-3	PxB3R-3
ACH580-PCR-124A-4	124	100	R6	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-156A-4	156	125	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-180A-4	180	150	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-240A-4	240	200	R8	PxB1-3	PxB12-3	PxB3R-4
ACH580-PCR-302A-4	302	250	R9	PxB1-6	PxB12-6	PxB3R-5
ACH580-PCR-361A-4	361	300	R9	PxB1-6	PxB12-6	PxB3R-5
ACH580-PCR-414A-4	414	350	R9	PxB1-6	PxB12-6	PxB3R-5
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz						
ACH580-PCR-02A7-6	2.7	2	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-03A9-6	3.9	3	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-06A1-6	6.1	5	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-09A0-6	9.0	7.5	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-011A-6	11	10	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-017A-6	17	15	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PCR-022A-6	22	20	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-027A-6	27	25	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-032A-6	32	30	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PCR-041A-6	41	40	R5	PxB1-3	PxB12-3	-
ACH580-PCR-052A-6	52	50	R5	PxB1-3	PxB12-3	-
ACH580-PCR-062A-6	62	60	R5	PxB1-3	PxB12-3	-
ACH580-PCR-077A-6	77	75	R5	PxB1-3	PxB12-3	-
ACH580-PCR-099A-6	99	100	R7	PxB1-3	PxB12-3	-
ACH580-PCR-125A-6	125	125	R7	PxB1-3	PxB12-3	-
ACH580-PCR-144A-6	144	150	R8	PxB1-3	PxB12-3	-

[1] See notes and definitions on page 18.

[2] 100 HP at 230 V

Ratings, types and voltages

ACH580-PDR, packaged drive with disconnect means with non-fused disconnect switch

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B056	Dim Ref NEMA 3R +B058
	Current A	Power HP				
U_1 = 200 to 240 V. Power ratings are valid at nominal output voltage U_N = 208/230 V 60 Hz						
ACH580-PDR-04A6-2	4.6	1	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-06A6-2	6.6	1.5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-07A5-2	7.5	2	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-10A6-2	10.6	3	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-017A-2	16.7	5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-024A-2	24.2	7.5	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-031A-2	30.8	10	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-046A-2	46.2	15	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-059A-2	59.4	20	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-075A-2	74.8	25	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PDR-088A-2	88.0	30	R5	PxB1-3	PxB12-3	PxB3R-3
ACH580-PDR-114A-2	114	40	R5	PxB1-3	PxB12-3	PxB3R-3
ACH580-PDR-143A-2	143	50	R6	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-169A-2	169	60	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-211A-2	211	75	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-248A-2	248	100[2]	R8	PxB1-3	PxB12-3	PxB3R-4
U_1 =380 to 480 V. Power ratings are valid at nominal output voltage U_N = 460 V 60 Hz						
ACH580-PDR-02A1-4	2.1	1	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-03A0-4	3.0	1.5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-03A5-4	3.5	2	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-04A8-4	4.8	3	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-07A6-4	7.6	5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-012A-4	12	7.5	R1	Px1-1	Px12-1	PxB3R-1
ACH580-PDR-014A-4	14	10	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-023A-4	23	15	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-027A-4	27	20	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-034A-4	34	25	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-044A-4	44	30	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-052A-4	52	40	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PDR-065A-4	65	50	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PDR-077A-4	77	60	R4	Px1-4	Px12-4	PxB3R-2
ACH580-PDR-096A-4	96	75	R5	PxB1-3	PxB12-3	PxB3R-3
ACH580-PDR-124A-4	124	100	R6	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-156A-4	156	125	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-180A-4	180	150	R7	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-240A-4	240	200	R8	PxB1-3	PxB12-3	PxB3R-4
ACH580-PDR-302A-4	302	250	R9	PxB1-6	PxB12-6	PxB3R-5
ACH580-PDR-361A-4	361	300	R9	PxB1-6	PxB12-6	PxB3R-5
ACH580-PDR-414A-4	414	350	R9	PxB1-6	PxB12-6	PxB3R-5
U_1 = 500 to 600 V. Power ratings are valid at nominal output voltage U_N = 575 V 60 Hz						
ACH580-PDR-02A7-6	2.7	2	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-03A9-6	3.9	3	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-06A1-6	6.1	5	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-09A0-6	9.0	7.5	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-011A-6	11	10	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-017A-6	17	15	R2	Px1-2	Px12-2	PxB3R-1
ACH580-PDR-022A-6	22	20	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-027A-6	27	25	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-032A-6	32	30	R3	Px1-3	Px12-3	PxB3R-2
ACH580-PDR-041A-6	41	40	R5	PxB1-3	PxB12-3	-
ACH580-PDR-052A-6	52	50	R5	PxB1-3	PxB12-3	-
ACH580-PDR-062A-6	62	60	R5	PxB1-3	PxB12-3	-
ACH580-PDR-077A-6	77	75	R5	PxB1-3	PxB12-3	-
ACH580-PDR-099A-6	99	100	R7	PxB1-3	PxB12-3	-
ACH580-PDR-125A-6	125	125	R7	PxB1-3	PxB12-3	-
ACH580-PDR-144A-6	144	150	R8	PxB1-3	PxB12-3	-

[1] See notes and definitions on page 18.

[2] 100 HP at 230 V

Ratings, types and voltages
ACH580-31, ultra-low harmonic drives

Type Code	Nominal Output Ratings [1]		Frame Size	Dim Ref UL Type 1	Dim Ref UL Type 12 +B056
	Current A	Power HP			
U_1 = 380 to 480 V. Power ratings are valid at nominal output voltage 460 V 60 Hz					
ACH580-31-07A6-4	7.6	5	R3	31-1-R3	31-12-R3
ACH580-31-012A-4	12	7.5	R3	31-1-R3	31-12-R3
ACH580-31-014A-4	14	10	R3	31-1-R3	31-12-R3
ACH580-31-023A-4	23	15	R3	31-1-R3	31-12-R3
ACH580-31-027A-4	27	20	R6	31-1-R6	31-12-R6
ACH580-31-034A-4	34	25	R6	31-1-R6	31-12-R6
ACH580-31-044A-4	44	30	R6	31-1-R6	31-12-R6
ACH580-31-052A-4	52	40	R6	31-1-R6	31-12-R6
ACH580-31-065A-4	65	50	R6	31-1-R6	31-12-R6
ACH580-31-077A-4	77	60	R6	31-1-R6	31-12-R6

[1] See notes and definitions on page 18.

Option compatibility
Descriptions

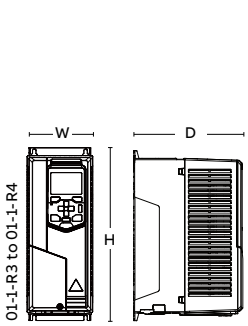
Constructions												Option	Option Code	Description
01	VCR	VDR	BCR	BDR	PCR	PDR	31	3BCR	3BDR	3PCR	3PDR			
•	•	•	•	•	•	•	•	•	•	•	•	UL (NEMA) Type 1	-	Indoor use primarily to provide a degree of protection against limited amounts of falling dirt.
•			•	•	•	•	•	•	•	•	•	UL (NEMA) Type 12	+B056	Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping non-corrosive liquids. Does not protect against contamination from salt-laden air
			•	•	•	•		•	•	•	•	UL (NEMA) Type 3R	+B058	Either indoor or outdoor use to provide a degree of protection against falling dirt, rain, sleet, and snow; and that will be undamaged by the external formation of ice on the enclosure.
			•	•	•	•		•	•	•	•	UL (NEMA) Type 3R Stainless Steel	+B058+C165	Either indoor or outdoor use to provide a degree of protection against falling dirt, rain, sleet, and snow; and that will be undamaged by the external formation of ice on the enclosure. Enclosure is made of Stainless Steel grade 304. Internal heating strips and cooling fans regulate the internal temperature of the enclosure.
			•	•	•	•		•	•	•	•	UL (NEMA) Type 4	+B057	Either indoor or outdoor use to provide a degree of protection against falling dirt, windblown dust, rain, sleet, snow, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure. Enclosure is made of powder coated galvanized steel. An air conditioner is mounted on the side of the enclosure for cooling of the VFD.
			•	•	•	•		•	•	•	•	UL (NEMA) Type 4X	+B063+C165	Either indoor or outdoor use to provide a degree of protection against falling dirt, windblown dust, rain, sleet, snow, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure. Enclosure is made of Stainless Steel grade 304. A stainless steel air conditioner made of 304 grade steel is mounted on the side of the enclosure for cooling of the VFD.
	•	•	•	•				•	•			Service Switch	+F267	Provides a means to manually disconnect power to the drive.
			•	•	•	•						Line Reactor	+E213	A line reactor provides additional line side impedance for power conditioning. In some applications the line reactor will prevent nuisance drive trips and slightly reduce overall harmonic current.
			•	•	•	•						Passive Filter	+E211	A passive harmonic filter (inductive-capacitive) style is installed and wired in series with the drive. For power factor control, the contactor drops out the tuning reactor and capacitors during light loading. This filter is designed to limit current distortion to less than 5%.
			•	•				•	•			Softstart Bypass	+G390	The Softstarter is installed in the bypass circuit ahead of the Bypass Contactor power contacts. Softstarter operation is initiated by means of a control circuit interlock contact on the Bypass Contactor. Softstarter UP-TO-SPEED and FAULT signals (contact closures) are available at the Softstarter terminal block.
					•	•						Redundant	+C170	The redundant drive control option has two drives installed into a single enclosure to act as a backup for critical applications. The control scheme automatically switches from selected Lead Drive to secondary drive upon a fault on the selected Lead Drive. Each drive equipped with Drive Fuses and electrically interlocked drive output contactors.
			•	•	•	•						MMPs	+xG405+M6xx	Control multiple motors with a single drive. Size the drive based on the combined power rating of all of the loads that will be controlled by the drive. ABB Manual Motor Protectors (MMPs) are sized based on each individual load are installed on the output of the VFD.

Adding these options may change the dimensions of the enclosure.
Contact ABB for available configuration requirements.

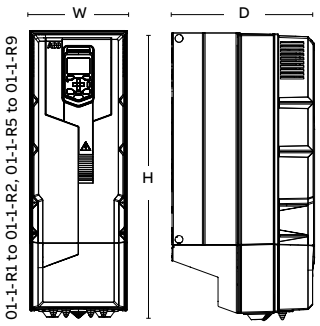
Dimensions
ACH580-01

ACH580-01, wall-mounted UL Type 1

Dim Ref	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
01-1-R1	14.69	373	4.92	125	8.78	223	10.1	4.6
01-1-R2	18.62	473	4.92	125	9.02	229	14.6	6.6
01-1-R3	19.29	490	7.99	203	9.02	229	26.0	11.8
01-1-R4	25.04	636	7.99	203	10.12	257	41.9	19.0
01-1-R5	28.82	732	7.99	203	11.61	295	62.4	28.3
01-1-R6	28.62	727	9.92	252	14.53	369	93.5	42.4
01-1-R7	34.65	880	11.18	284	14.57	370	119.1	54.0
01-1-R8	37.99	965	11.81	300	15.47	393	152.2	69.0
01-1-R9	37.60	955	14.96	380	16.46	418	213.9	97.0



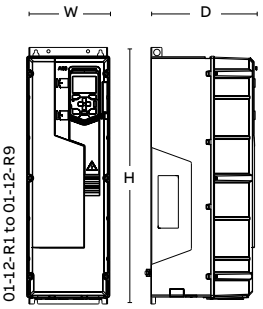
ACH580-01 with integrated conduit box (R3-R4)



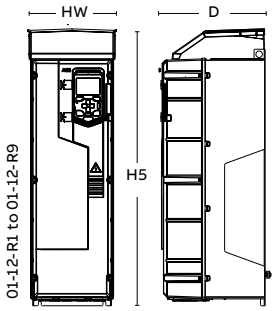
ACH580-01 with removeable conduit box (R1-R2, R5-R9)

ACH580-01, wall-mounted UL Type 12 (option +B056)

Dim Ref	Height		Height (H5)		Width (W)		Width (HW)		Depth (D)		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
01-12-R1	15.87	403	17.78	452	5.04	128	5.09	129	9.17	233	10.6	4.8
01-12-R2	19.80	503	21.49	546	5.04	128	5.10	130	9.41	239	15.0	6.8
01-12-R3	19.29	490	20.93	532	8.11	206	8.16	207	9.33	237	28.7	13.0
01-12-R4	25.04	636	27.03	686	7.99	203	8.59	218	10.43	265	44.1	20.0
01-12-R5	28.82	732	32.01	813	7.99	203	8.58	218	12.60	320	63.9	29.0
01-12-R6	28.62	727	34.81	884	9.92	252	11.46	291	14.96	380	94.8	43.0
01-12-R7	34.65	880	40.86	1038	11.18	284	13.00	330	15.00	381	123.5	56.0
01-12-R8	37.99	965	44.23	1123	11.81	300	13.80	351	17.80	452	169.8	77.0
01-12-R9	37.60	955	46.75	1188	14.96	380	16.95	431	18.78	477	227.1	103.0



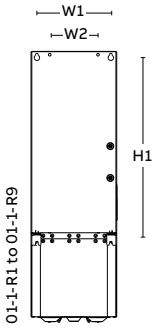
ACH580-01 without hood with integrated conduit box (R1-R9)



ACH580-01 with hood with integrated conduit box (R1-R9)

ACH580-01, mounting dimensions UL Type 1 and UL Type 12

Dim Ref	Height (H1)		Width (W1)		Width (W2)	
	(in)	(mm)	(in)	(mm)	(in)	(mm)
01-1-R1/01-12-R1	12.48	317	3.86	98	-	-
01-1-R2/01-12-R2	16.42	417	3.86	98	-	-
01-1-R3/01-12-R3	18.62	473	6.30	160	-	-
01-1-R4/01-12-R4	24.37	619	6.30	160	3.86	98
01-1-R5/01-12-R5	22.87	581	6.30	160	3.86	98
01-1-R6/01-12-R6	20.91	531	8.37	213	6.30	160
01-1-R7/01-12-R7	22.95	583	9.65	245	6.30	160
01-1-R8/01-12-R8	25.91	658	10.33	263	8.43	214
01-1-R9/01-12-R9	25.91	658	13.58	345	7.87	200



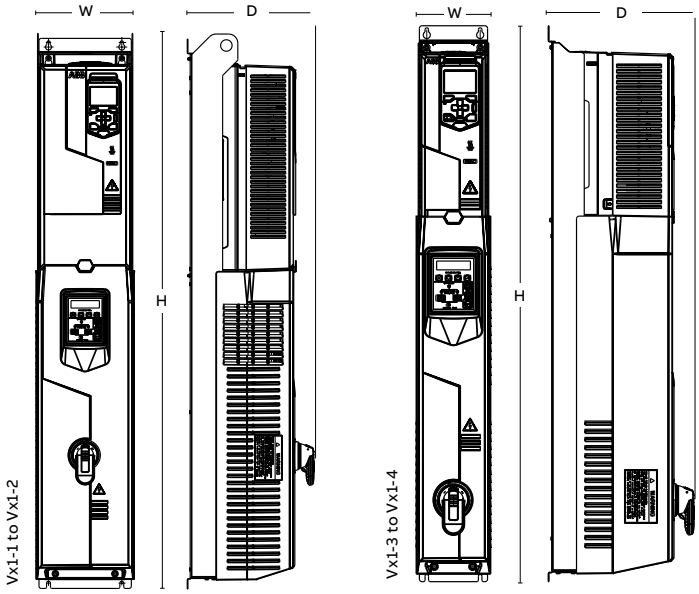
Standard configuration dimensions for reference only.

Dimensions

ACH580-VCR and ACH580-VDR

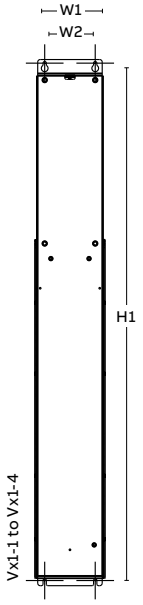
ACH580-VCR and ACH580-VDR, vertical
E-Clipse bypass drives UL Type 1

Dim Ref	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
Vx1-1	40.18	1021	5.39	137	10.55	268	30.0	13.6
Vx1-2	44.10	1120	5.39	137	10.77	274	50.7	23.0
Vx1-3	47.70	1212	8.44	214	10.90	277	59.5	27.0
Vx1-4	56.82	1443	8.44	214	12.00	305	86.0	39.0



ACH580-VCR and ACH580-VDR, vertical
E-Clipse bypass drives UL Type 1, mounting dimensions

Dim Ref	Height (H1)		Width (W1)		Width (W2)	
	(in)	(mm)	(in)	(mm)	(in)	(mm)
Vx1-1	39.51	1004	4.93	125	3.86	98
Vx1-2	43.43	1103	4.93	125	3.86	98
Vx1-3	46.47	1180	8.19	208	6.30	160
Vx1-4	55.70	1415	8.19	208	6.30	160

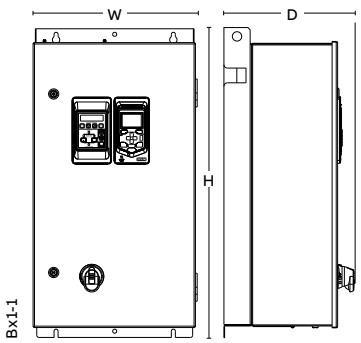


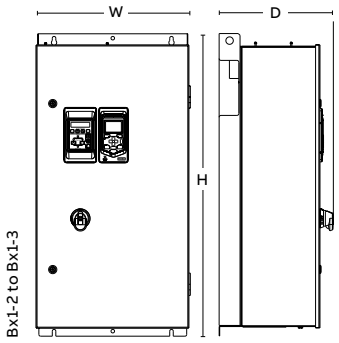
Standard configuration dimensions for reference only.

Dimensions
ACH580-BCR and ACH580-BDR

ACH580-BCR and ACH580-BDR, E-Clipse bypass drives UL Type 1

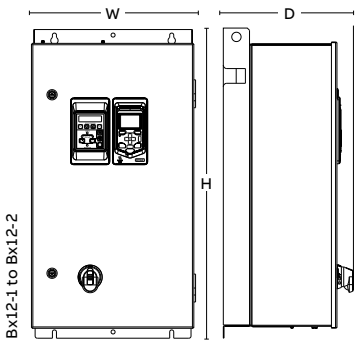
Frames	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
Bx1-1	33.16	842	17.63	447	13.90	353	84.0	38.1
Bx1-2	40.60	1030	20.70	526	15.30	388	139.0	63.0
Bx1-3	47.72	1212	28.24	717	19.04	484	448.0	203.0

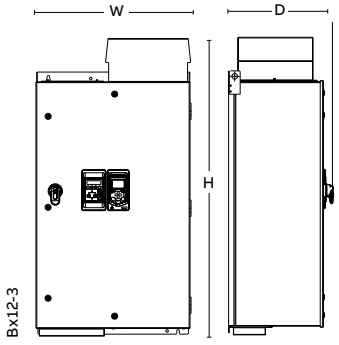




ACH580-BCR and ACH580-BDR, E-Clipse bypass drives UL Type 12

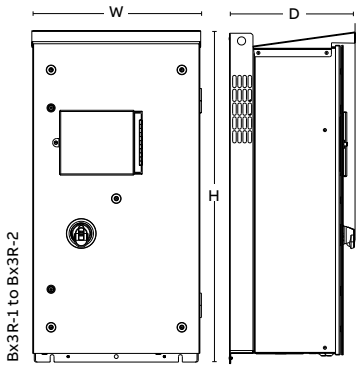
Frames	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
Bx12-1	33.16	842	17.63	448	13.90	353	84.0	38.1
Bx12-2	40.60	1030	20.70	526	15.30	388	139.0	63.0
Bx12-3	54.18	1376	28.24	717	19.04	484	448.0	203.0





ACH580-BCR and ACH580-BDR, E-Clipse bypass drives UL Type 3R

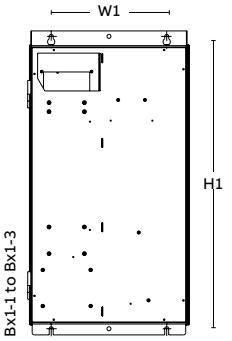
Frames	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
Bx3R-1	33.40	847	17.70	449	14.00	355	83.8	38.0
Bx3R-2	40.71	1034	20.71	526	15.43	392	193.0	88.0



Standard configuration dimensions for reference only.

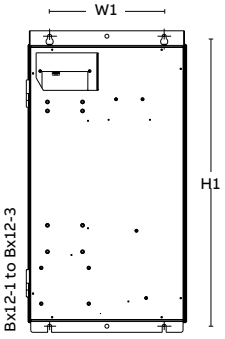
ACH580-BCR and ACH580-BDR, E-Clipse bypass drives UL Type 1, mounting dimensions

Frames	Height (H1)		Width (W1)	
	(in)	(mm)	(in)	(mm)
Bx1-1	31.89	810	12.60	320
Bx1-2	39.30	998	15.70	400
Bx1-3	46.26	1175	23.62	600



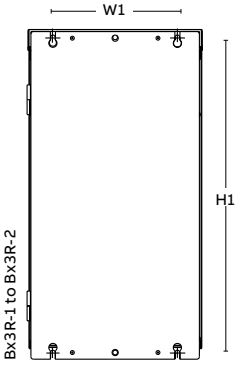
ACH580-BCR and ACH580-BDR, E-Clipse bypass drives UL Type 12, mounting dimensions

Frames	Height (H1)		Width (W1)	
	(in)	(mm)	(in)	(mm)
Bx12-1	31.89	810	12.60	320
Bx12-2	39.30	998	15.70	400
Bx12-3	46.26	1175	23.62	600



ACH580-BCR and ACH580-BDR, E-Clipse bypass drives UL Type 3R, mounting dimensions

Frames	Height (H1)		Width (W1)	
	(in)	(mm)	(in)	(mm)
Bx3R-1	31.90	810	12.60	320
Bx3R-2	39.30	998	15.70	400

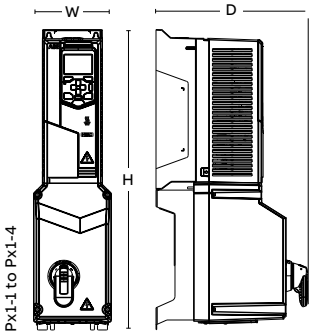


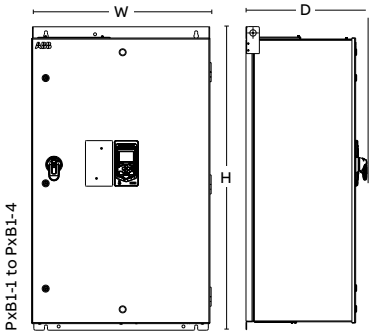
Standard configuration dimensions for reference only.

Dimensions
ACH580-PCR and ACH580-PDR

ACH580-PCR and ACH580-PDR, packaged drives with disconnect means UL Type 1

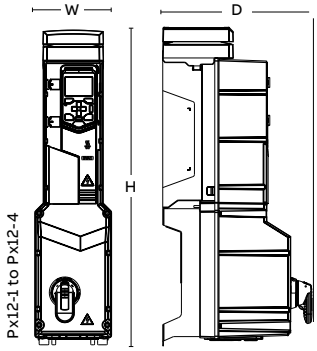
Dim Ref	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
Px1-1	24.60	625	6.34	161	12.42	316	18.1	8.2
Px1-2	28.49	725	6.34	161	12.63	321	22.0	10.0
Px1-3	34.86	885	8.39	213	13.22	336	39.0	17.7
Px1-4	40.61	1032	8.39	213	14.26	362	60.0	27.2
PxB1-1	33.16	842	17.63	448	13.90	353	77.0	35.0
PxB1-2	40.60	1030	20.71	526	15.30	388	122.0	55.3
PxB1-3	47.72	1212	28.24	717	19.04	484	359.0	163.0

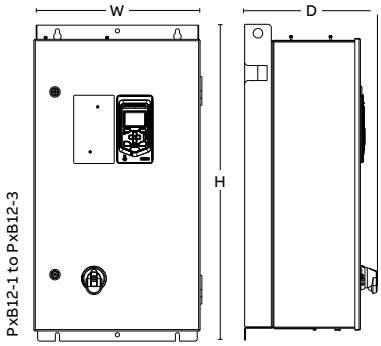


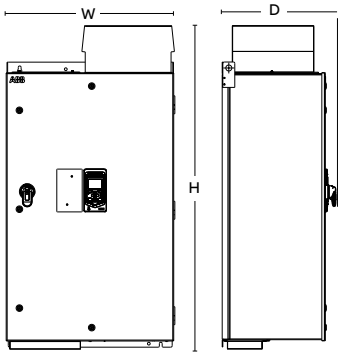


ACH580-PCR and ACH580-PDR, packaged drives with disconnect means UL Type 12

Dim Ref	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
Px12-1	26.50	673	6.50	164	12.40	316	18.1	8.2
Px12-2	30.22	768	6.50	164	12.64	321	22.0	10.0
Px12-3	36.51	927	8.39	213	13.22	336	39.0	17.7
Px12-4	42.54	1081	8.39	213	14.26	362	60.0	27.2
PxB12-1	33.16	842	17.63	448	13.90	353	77.0	35.0
PxB12-2	40.60	1030	20.70	526	15.30	388	122.0	55.3
PxB12-3	48.07	1221	28.24	717	19.04	484	359.0	163.0

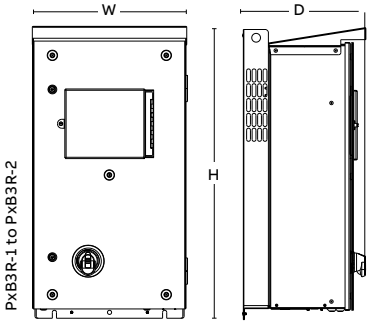






ACH580-PCR and ACH580-PDR, packaged drives with disconnect means UL Type 3R

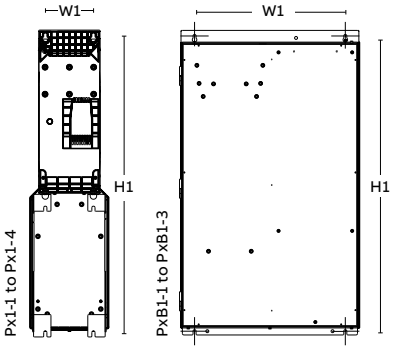
Dim Ref	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
PxB3R-1	33.35	847	17.70	449	13.98	355	77.0	35.0
PxB3R-2	40.71	1034	20.71	526	15.40	392	176.0	79.8



Standard configuration dimensions for reference only.

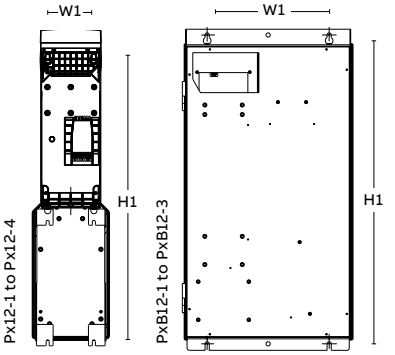
ACH580-PCR and ACH580-PDR, packaged drives with disconnect means UL Type 1, mounting dimensions

Dim Ref	Height (H1)		Width (W1)	
	(in)	(mm)	(in)	(mm)
Px1-1	12.48	317	3.86	98
Px1-2	16.42	417	3.86	98
Px1-3	18.75	476	6.30	160
Px1-4	24.49	622	6.30	160
PxB1-1	31.89	810	12.60	320
PxB1-2	39.30	998	15.70	400
PxB1-3	46.26	1175	23.62	600



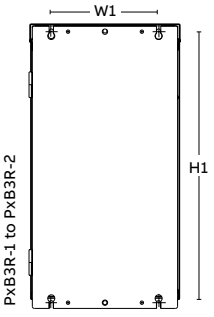
ACH580-PCR and ACH580-PDR, packaged drives with disconnect means UL Type 12, mounting dimensions

Dim Ref	Height (H1)		Width (W1)	
	(in)	(mm)	(in)	(mm)
Px12-1	12.48	317	3.86	98
Px12-2	16.42	417	3.86	98
Px12-3	18.75	476	6.30	160
Px12-4	24.49	622	6.30	160
PxB12-1	31.89	810	12.60	320
PxB12-2	39.30	998	15.70	400
PxB12-3	46.26	1175	23.62	600



ACH580-PCR and ACH580-PDR, packaged drives with disconnect means UL Type 3R, mounting dimensions

Dim Ref	Height (H1)		Width (W1)	
	(in)	(mm)	(in)	(mm)
PxB3R-1	31.90	810	12.60	320
PxB3R-2	39.30	998	15.70	400

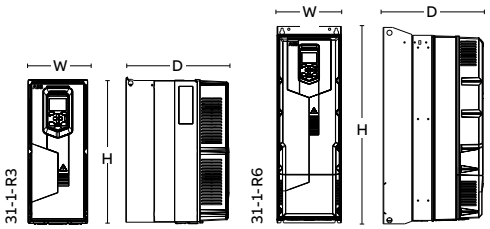


Standard configuration dimensions for reference only.

Dimensions
ACH580-31

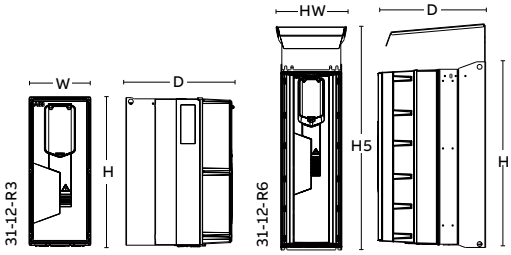
ACH580-31, ultra-low harmonic drive, UL Type 1

Dim Ref	Height		Width		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
31-1-R3	19.49	495	8.07	205	13.74	349	46.97	21.3
31-1-R6	30.35	771	9.92	252	15.44	392	134.51	61.0



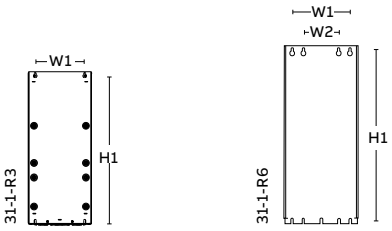
ACH580-31, ultra-low harmonic drive, UL Type 12

Dim Ref	Height		Height (H5)		Width (W)		Width (HW)		Depth		Weight	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb)	(kg)
31-12-R3	19.49	495	-	-	8.07	205	-	-	14.17	360	51.38	23.3
31-12-R6	30.35	771	36.56	929	9.92	252	11.46	291	17.65	448	138.92	63.0



ACH580-31, ultra-low harmonic drive, mounting dimensions UL Type 1 and UL Type 12

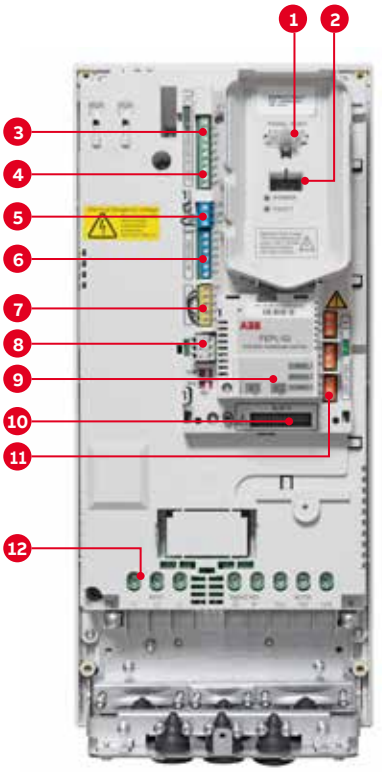
Dim Ref	Height (H1)		Width (W1)		Width (W2)	
	(in)	(mm)	(in)	(mm)	(in)	(mm)
31-1-R3/31-12-R3	18.66	474	6.30	160	-	-
31-1-R6/31-12-R6	29.65	753	8.37	212.5	6.30	160



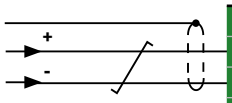
Standard configuration dimensions for reference only.

Comprehensive connectivity

Default control connections



1. Panel port (PC tools, control panel)
2. ABB drive customizer port for programming the drive without mains
3. Analog inputs (2 × AI)
4. Analog outputs (2 × AO)
5. 24 V DC output
6. Digital inputs (6 × DI)
7. Safe torque off (STO)
8. Embedded fieldbus
9. Communication options (fieldbuses)
10. Analog and digital I/O extensions
11. Relay outputs (3 × RO)
12. Mains connection



0...10 V DC speed reference signal

Terminal	Meaning	Default macro connections		
X1	**Reference voltage and analog inputs and outputs**			
1	SCR	Signal cable shield (screen)		
2	AI1	**Output frequency/speed reference:** 0 to 10 V		
3	AGND	Analog input circuit common		
4	+10 V	Reference voltage 10 V DC		
5	AI2	**Actual feedback:** 0 to 20 mA		
6	AGND	Analog input circuit common		
7	AO1	**Output frequency:** 0 to 10 V		
8	AO2	**Motor current:** 0 to 20 mA		
9	AGND	Analog output circuit common		
X2 & X3	**Aux. voltage output and programmable digital inputs**			
10	+24 V	Aux. voltage output +24 V DC, max. 250 mA		
11	DGND	Aux. voltage output common		
12	DCOM	Digital input common for all		
13	DI1	**Stop (0)/Start (1)**		
14	DI2	Not configured		
15	DI3	**Constant frequency/speed selection**		
16	DI4	**Start interlock 1 (1 = allow start)**		
17	DI5	Not configured		
18	DI6	Not configured		
X6, X7, X8	**Relay outputs**			
19	RO1C	**Damper control** 250 V AC/30 V DC 2 A	Energize damper 19 connected to 21	Damper actuator
20	RO1A			
21	RO1B			
22	RO2C	**Running** 250 V AC/30 V DC 2 A	Running 22 connected to 24	Run status
23	RO2A			
24	RO2B			
25	RO3C	**Fault (-1)** 250 V AC/30 V DC 2 A	Fault condition 25 connected to 26	Fault status
26	RO3A			
27	RO3B			
X5	**Embedded fieldbus**			
29	B+	Embedded fieldbus, EFB (EIA-485)		
30	A-			
31	DGND			
S4	TERM	Termination switch		
S5	BIAS	Bias resistors switch		
X4	**Safe torque off**			
34	OUT1	Safe torque off. Factory connection. Both circuits must be closed for the drive to start. See chapter *The Safe torque off function* in the *hardware manual* of the drive.		
35	OUT2			
36	SGND			
37	IN1			
38	IN2			
X10	**24 V AC/DC**			
40	24 V AC/DC+ in	R6-R11 only: Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected.		
41	24 V AC/DC- in			

Notes:
[1] Connected with jumpers at the factory.
[2] Only frames R6-R11 have terminals 40 and 41 for external 24 V AC/DC input.

Options

Controlling your drive remotely eliminates the need to be at the drive to make adjustments. Accurate remote diagnostics are possible through the building management system (BMS), which enables real-time monitoring. Total building system costs are reduced thanks to the reduced wiring and number of building automation I/O points, and the ability to use passthrough I/O.

I/O options

Option code	Description	Type designation
+L501*	External 24 V DC/AC and digital I/O extension (2xRO and 1xDO)	CMOD-01
+L512*	115/230V digital input (6xDI and 2xRO)	CHDI-01

* Not available as plus code on Bypass

Input/output extension modules
Standard input and output can be extended by using optional analog and digital input/output extension modules.

Fieldbus adapters

Option code	Drive/Bypass	Fieldbus protocol	Adapter
+K465	Available/Coming 2019	BACnet/IP (2-port)	FBIP-21-KIT
+K451	Available	DeviceNet	FDNA-01-KIT
+K454	Available	PROFIBUS-DP	FPBA-01-KIT
+K475	Available	Ethernet/IP, PFROFINET IO, Modbus TCP (2-port)	FENA-21-KIT
+K452	Coming 2019	LonWorks	FLON-01-KIT

BACnet/IP option
Native BACnet/IP allows for greater bandwidth for more frequent polling/monitoring and more devices on the same sub-network. Thanks to the two-port design of this adapter, the need for external switches is reduced and installation time is shortened. Different buildings may have different fieldbuses, and we have multiple option modules to satisfy your needs.

Control panel options

The HVAC control panel (ACH-AP-H) is included as standard in the delivery unless otherwise specified.

Option code	Description	Type designation
STD	HVAC control panel (standard)	ACH-AP-H
+J429	HVAC control panel with Bluetooth interface	ACH-AP-W
*	HVAC branded control panel mounting platform (flush-mounted, includes panel bus adapter)	DPMP-06-EXT-H

* Enter as as separate line item, not part of configuration code

Wireless connectivity
With the Bluetooth-enabled assistant control panel, you can commission, start, stop, and monitor the drive, and reset faults from different devices such as tablets.

LIGHTING COMPONENTS

Light Fixture:

RAB - Die Cast Aluminum Marine-Type incandescent Fixture, Clear Glass Globe, AL Guard, UL & CSA Listed, 120/277 VAC Rated		

Selection
RAB Fixture - Die Cast

Bulbs:

CREE - A19 Style - UL Listed - 120VAC - 25,000 Hour Life - 2700K	

Selection
10W - 60W Equivalent

GFCI Receptacle:
Pass & Seymour Model 7899-W, commercial specification grade, duplex, weather resistant/outdoor grade with LED indicator. White.
20A-125V@Receptacle
UL/CSA Listed

Selection	Options
20A	None

QO Load Center - 100A Panel - Plug-On Breakers
120V/1Ph/3Wire- 6 or 8 Slots - NEMA1 or NEMA3R

Selection
6-Slot N1