KUHN Mechanical Inc.

HVAC and Plumbing Submittals

City of Wichita Re use pump station project 468-851 12

MKEC ENGINEERING CONSULTANTS, INC.
411 N. WEBB RD. WICHITA, KS 67206

☐ Reviewed ☐ Incomplete
☑ Reviewed as Noted ☐ Revise and Resubmit
☐ Not Reviewed ☐ Rejected

Reviewed for conformance with the design concept of the Project and compliance with the information given in the Contract documents. Contractor is responsible for: dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of work of all other trades.

BY M.S.S. DATE 07-19-16

NOTE:
EF-1 & EF-2 ELECTRICAL INFORMATION TO BE COORDINATED WITH ELECTRICAL CONTRACTOR. CONTRACT DOCUMENTS SPECIFIED 480/1Ø MOTORS FOR FANS AND 3Ø IS PROVIDED IN THIS SUBMITTAL AND IS APPROVED BY ENGINEER.

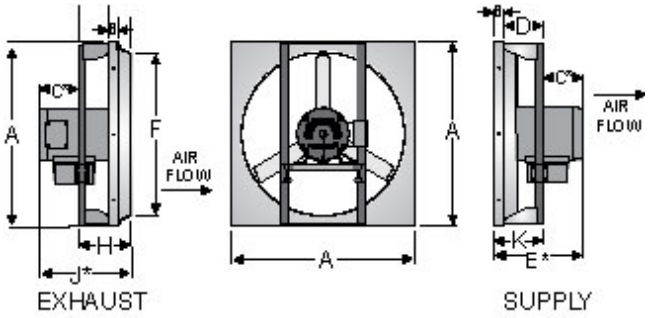
S&P USA

Qty:	1
Tag:	EF-1
Project:	Re use water pump station

DFE20-1

Sidewall Propeller Fan-Direct Drive Exhaust

STANDARD FEATURES:
Direct Drive for Low Maintenance • Statically and Dynamically Balanced Propeller • 5 Year Fan and 1 Year Motor Warranty • Motors Rated for Continuous Duty • Heavy Gauge Welded Galvanized Construction • Integral Deep Spun Inlet • All Welded Support Structure •



Depth of Venturi = G
Depth of Support Structure (Exhaust) = L
*Varies with motor selected

Performance

Fan RPM	Flow (CFM)	SP (in W.G.)	Power (HP)	SE	ME	FPM (TS)	FPM (OV)
1725	5341	.285	1.066	22%	1.19	9032	2449

Altitude (Feet): n/a Temperature (Fahrenheit): n/a Density (Lb/Ft3): .075

Motor Information: (Wired for 460V)

HP	RPM	Volts/PH/Hz	Enclosure	Efficiency	Mounted
1	1725	208V-230V/460V/3PH/60HZ	OPEN DRIP PROOF	STANDARD	YES

DBA	SONE
73.8	24

SEE COMMENTS ON COVER PAGE.

Submittal Notes:

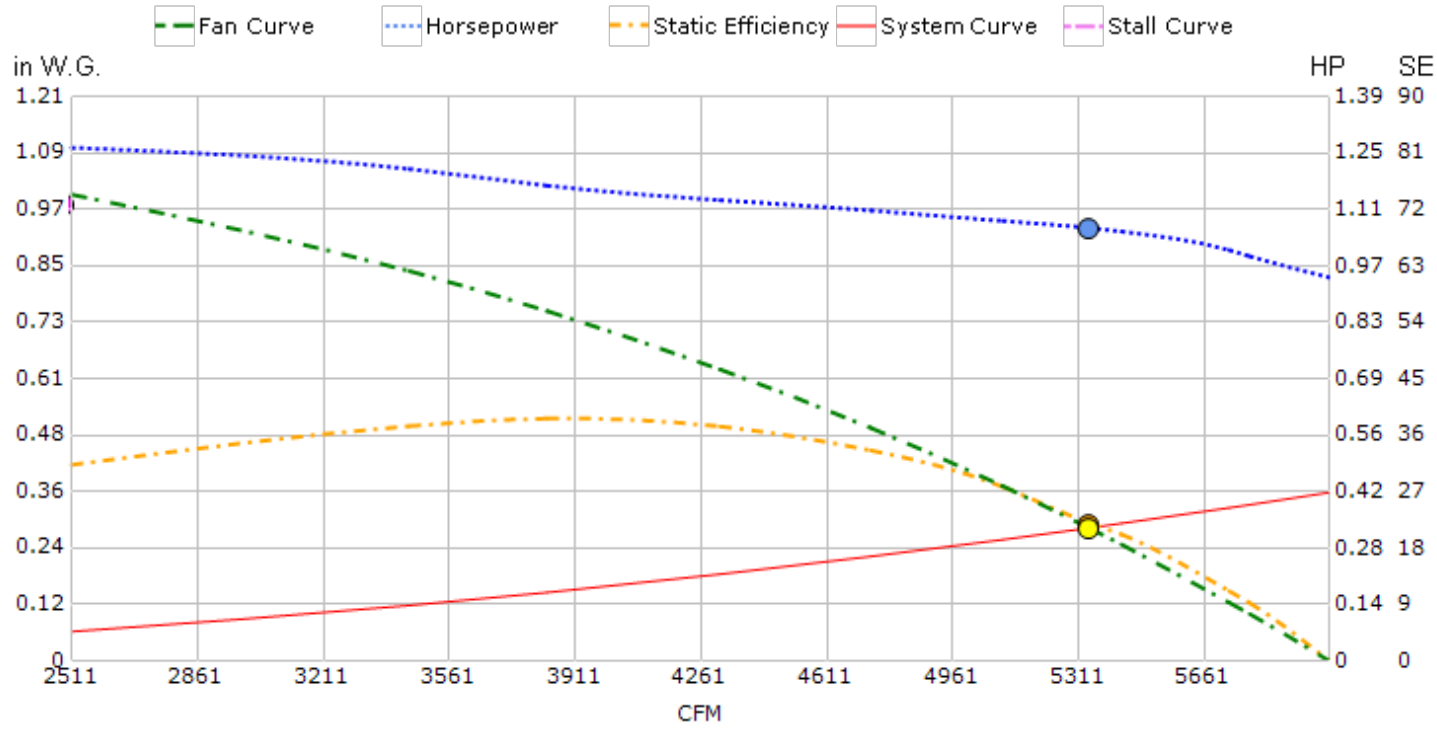
Dimensions (Inches)											
A	24	B	1	C	7	D	6	E	12
F	20.5	G	2	H	8	I		J	15
K	7	L	5	M		N		O	
P		Q		R		S		T	
U		V		W		X		Y	

Note: Accessories may effect dimensions shown.

Avg. Shipping Weight (Lbs)*: 50
*Includes fan, motor, and packaging.

Accessories:

NEMA1 3PH 240-480V 2HP MAX SW/ASSY • MOUNT & WIRE DISCONNECT FOR DF • DFE/DFS 20" BLADE ASSY 1 HP 1750 RPM (5/8) • ASSY WALL HOUSING PCK-DPR-GRD EXH DF1820HD • LABEL UL/CUL 705 LISTED POWER VENT (709J) • RAINHOOD EXHAUST 18-20" •



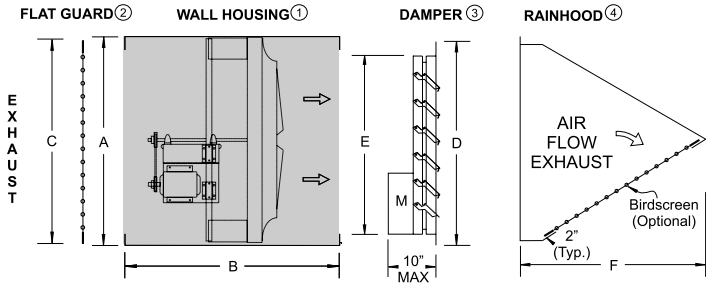
ASSEMBLED WALL HOUSING PACK

SIDEWALL PROPELLER FANS - BELT OR DIRECT DRIVE

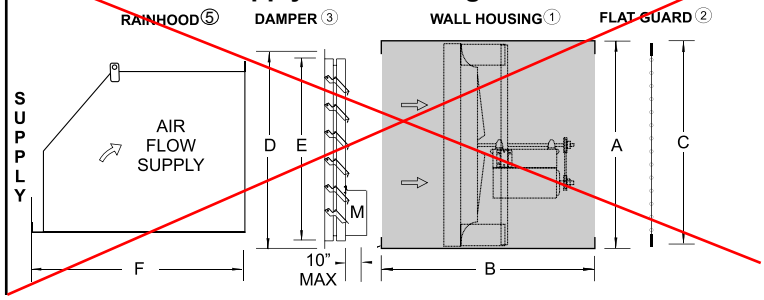
MODELS LCE/LCS, L2E/L2S, L3E/L3S, DDE/DDS, DFE/DDS - EXHAUST & SUPPLY

This heavy-gauge, all galvanized G-90 steel housing provides a simple solution to installing a fan and all required accessories in a rough wall opening. It can be used in exhaust or supply applications. Depending on space and maintenance requirements, the wall housing maybe installed inward or outwards of the building. All housings ship with the fan, shutter and guard assembled to lessen jobsite installation costs. ***Rainhoods (not included in packs) are required for all supply applications, and motorized shutters are strongly recommended.***

Exhaust Wall Housing Pack



Supply Wall Housing Pack



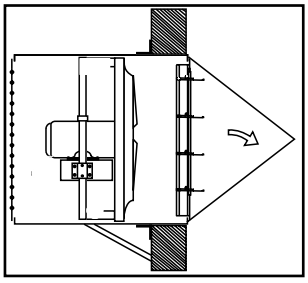
Fan Size	A (S.Q.) O.D.	Wall Housing ①	Minimum Wall Opening	Flat Guard ②	Damper ③		Exhaust Optional Rainhood 45 Deg. ④		Supply Required Rainhood 90 Deg. ⑤
		B Length	Square	C (SQ.)	D (O.D.)	E	F		F
10/12	17	26	17 1/2	16	14 1/2	12	Exh/Sup	16 1/4	-
14/16	21	26	21 1/2	20	18 1/2	16		20 1/4	-
18	25	26	25 1/2	24	22 1/2	20		24 1/4	-
DF20	25	26	25 1/2	24	22 1/2	20	24 1/4		27 3/4
LC20	25	44	25 1/2	24	22 1/2	20	24 1/4		27 3/4
24	31	44	31 1/2	30	28 1/2	26	28 1/2		38 1/2
30	37	44	37 1/2	36	34 1/2	32	34 1/2		44 1/2
36	43	44	43 1/2	42	40 1/2	38	40 1/2		49
42	49	44	49 1/2	48	46 1/2	44	46 1/2		56 1/2
48	55	44	55 1/2	54	52 1/2	50	49 1/2		62 1/2
54	61	44	61 1/2	60	58 1/2	56	58 1/2		73
60	67	44	67 1/2	66	64 1/2	62	64 1/2		73
72	81	44	81 1/2	80	78 1/2	76	73		73

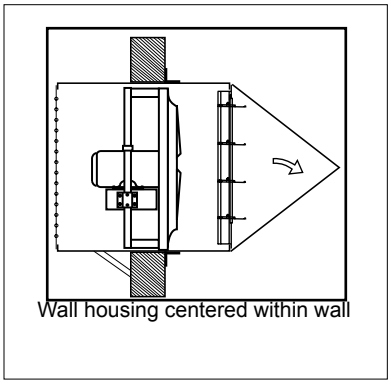
NOTES:
(1) Dimensions include fastener heads (approx 5/8" extra).
(2) Housing ship assembled with fan unless ordered K.D.
(3) Standard material is G90 galvanized. Aluminum optional
(4) Angle mounting flanges ship loose and are an option.
(5) CAUTION: Housing position when mounted may require additional support.
(6) Data applies to exhaust and supply fan models unless shown otherwise.

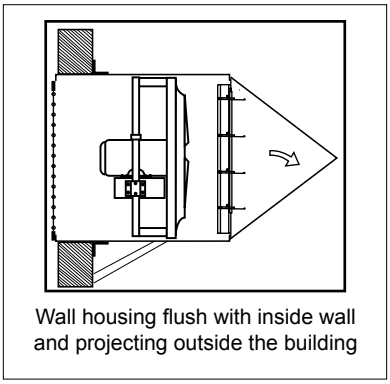
CAUTION: When wall housing extends outside the building, field caulking and/or flashing of seams and unused prepunched mounting holes is required.

TYPICAL MOUNTING ARRANGEMENTS

The most common mounting arrangement (below left) leaves a clean building exterior and allows access to the fan, motor and drives from inside the building. Additional bracing angle, rod or cable (field provided) should be used in addition to the mounting angles to support the fan and wall housing assembly.


Wall housing flush with outside wall and projecting inside the building


Wall housing centered within wall


Wall housing flush with inside wall and projecting outside the building

SIDEWALL PROPELLER FAN - ACCESSORY
45 DEGREE RAINHOOD (or WEATHERHOOD)
FOR EXHAUST APPLICATIONS ONLY

6393 Powers Avenue
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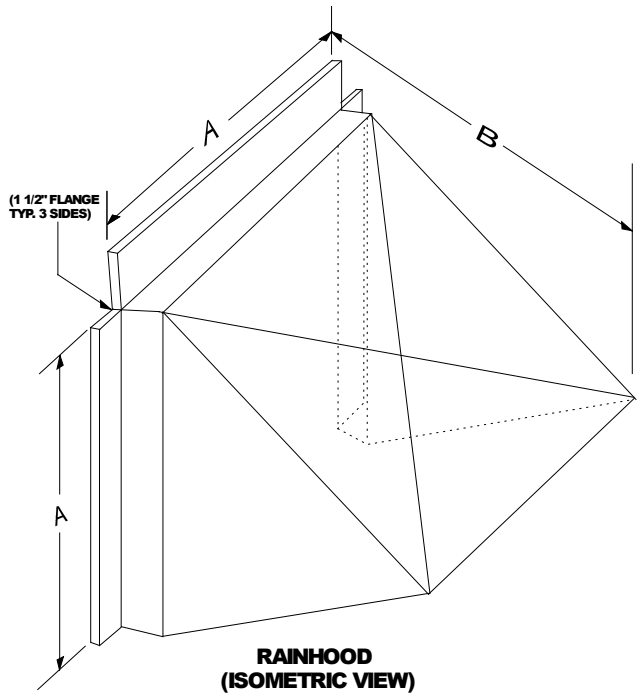
www.solerpalau-usa.com

Soler&Palau Ventilation Group



RAINHOOD (ISOMETRIC VIEW)

Rainhoods are recommended for all supply installations and wherever additional weather protection is desired. Refer to supply style rainhood for supply installations.

Rainhoods do not guarantee that water, snow, or other airborne particles will not become entrained in the airstream and enter the building through the fan.

MODEL SIZE	A	B	GAUGE (2)	AVG. WT.
10/12	14	16-1/4	18	15
14/16	18	20-1/4	18	20
18	22	24-1/4	18	25
20	22	24-1/4	18	25
24	28	28-1/2	18	30
30	34	34-1/2	18	40
36	40	40-1/2	18	50
42	46	46-1/2	18	60
48	52	49-1/2	16	70
54	58	58-1/2	16	120
60	64	64-1/2	16	175
72	78	64-1/2	16	200

1. Hoods ship in several pieces for field assembly unless specified factory assembled. Mounting holes may required field drilling.
2. Standard construction is G90 galvanized steel.
3. Hoods are sized to fit standard wall housings.
4. Rainhoods do not guarantee water will not enter through opening.
5. Sizes 48" and larger have support angles fastened to front edge.
6. Optional birdscreen is recommended to prevent critters or debris from entering the fan.

ACCESSORY ITEMS	1	2	3	4	5	ACCESSORY ITEMS	1	2	3	4	5
☐						☐					
☐						☐					
☐						☐					
☐						☐					
☐						☐					

Project: _____ Submitted: _____
Customer: _____ Approved: _____
Location: _____

L-1
Louver damper

AIR CONDITIONING PRODUCTS CO.
SHUTTERS DAMPERS LOUVERS

EXTRUDED ALUMINUM COMBINATION LOUVER / DAMPER MODEL ACL

Heavy duty Extruded Aluminum construction designed to protect the air intake and exhaust openings in the exterior walls of any building from rain and weather while still providing efficient airflow. The drainable blade design provides the best protection against water entering the opening by channeling water away from the blades and down the jambs. This eliminates water cascading from blade to blade. The adjustable rear blades allow for tight shutoff of the opening when needed.

amca WORLDWIDE CERTIFIED RATINGS
WATER PENETRATION
AIR PERFORMANCE
AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.®
www.amca.org

Standard Construction:

Frame
- 4" deep channel x .080 thick Extruded Aluminum.

Blades
- Drainable style, .080 thick Extruded Aluminum, positioned at a 45 degree angle and spaced approximately 4" centers.

Seals
- Extruded TPV.

Linkage
- On-blade type with a Thumb Screw Operator as standard.

Birdscreen
- ½" Flattened Aluminum in a removable frame mounted on the interior.

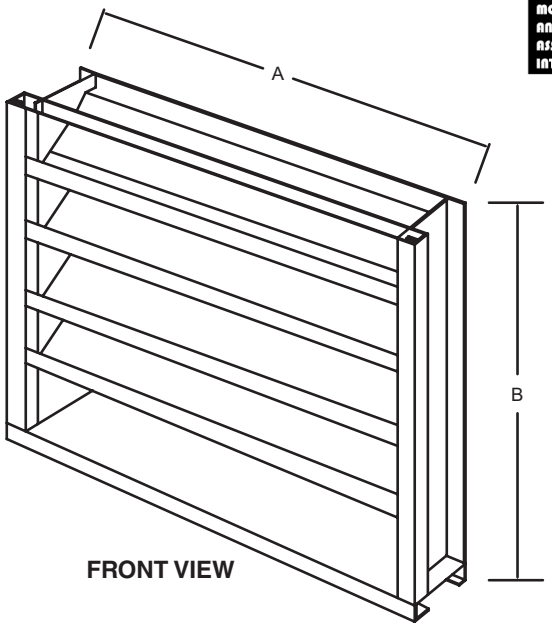
Construction
- Screwed.

Finish
- Mill.

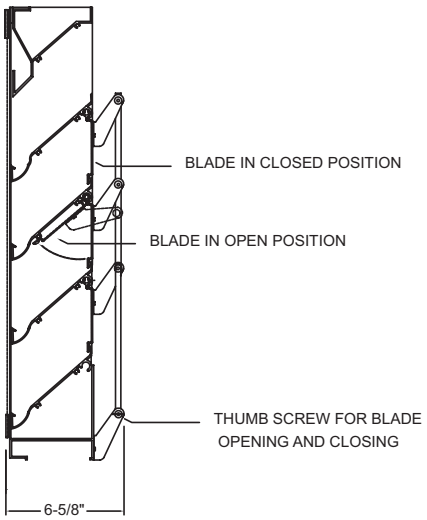
Minimum Size
- 12" W x 12" H

Maximum Single Section Size
- 60" W x 96" H

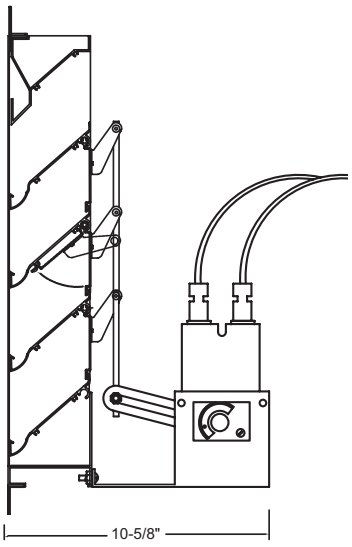
Options (at additional cost)
- Up to 48" W x 48" H, 100 to 240 VAC, 50/60 Hz Motor Pack.
- Over 48" W x 48" H, 24 to 240 VAC, 50/60 Hz Motor Pack.
- 1-½" Flange



FRONT VIEW



SIDE VIEW
(W/ STD. THUMB SCREW)



SIDE VIEW
(W/ OPTIONAL MOTOR AND FLANGED FRAME)

Note: Above "A" and "B" dimensions are undersized by ½" + or – normal tolerance of .0625".

PERFORMANCE DATA - MODEL ACL

AMCA Standard 500-L provides a method for testing and rating louvers. These tests were performed under certain sets of laboratory conditions. These performance ratings do not guarantee that other environmental conditions may actually occur. Use safety factors when selecting louver sizes based upon performance.

Free Area Chart (Sq. ft.):

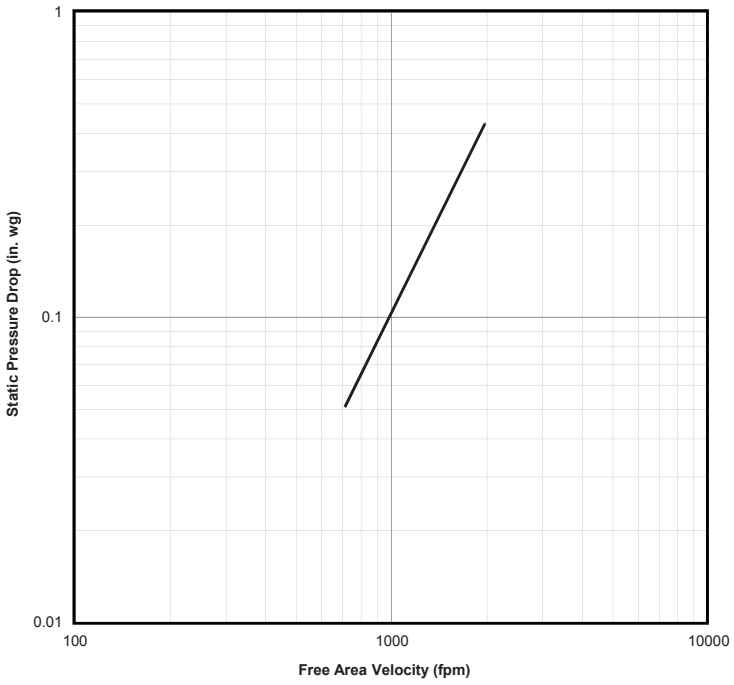
Louver Width in Inches

Louver Height in Inches	18	24	30	36	42	**48**	54	60
18	0.70	0.98	1.25	1.53	1.81	2.09	2.37	2.65
24	1.06	1.49	1.91	2.34	2.76	3.18	3.61	4.03
30	1.36	1.91	2.45	2.99	3.54	4.08	4.63	5.17
36	1.73	2.42	3.11	3.80	4.49	5.18	5.87	6.56
42	2.03	2.84	3.65	4.46	5.26	6.07	6.88	7.69
48	2.39	3.35	4.30	5.26	6.21	**7.22**	8.12	9.08
54	2.69	3.76	4.84	5.92	6.99	8.07	9.14	10.22
60	3.05	4.28	5.50	6.72	7.94	9.16	10.38	11.60
66	3.35	4.69	6.04	7.38	8.72	10.06	11.40	12.74
72	3.72	5.21	6.69	8.18	9.67	11.15	12.64	14.13
78	4.02	5.62	7.23	8.84	10.44	12.05	13.66	15.27
84	4.38	6.13	7.89	9.64	11.39	13.15	14.90	16.65
90	4.68	6.55	8.43	10.30	12.17	14.04	15.92	17.79
96	5.05	7.06	9.08	11.10	13.12	15.14	17.16	19.17

Air Conditioning Products Company certifies that the ACL 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 and Water Penetration ratings.

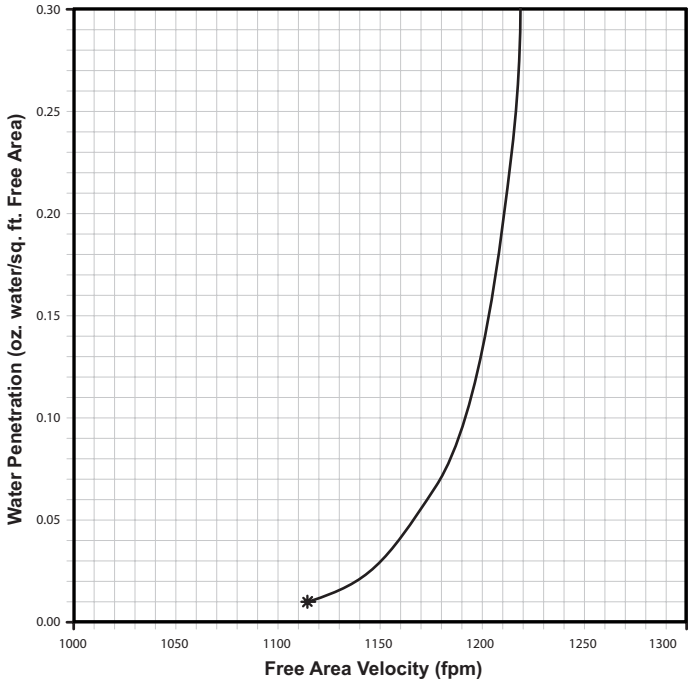
PRESSURE DROP

Standard Air - .075 lbs per cubic foot
Test size – 48″ x 48″ (Intake)
Ratings do not include the effect of a birdscreen



WATER PENETRATION

Standard Air - .075 lbs per cubic foot
Test size – 48″ x 48″ for a 15 minute duration



The beginning point of water penetration at .01 oz./sq. ft. is 1118 fpm free area velocity.

LIMITED WARRANTY

All products manufactured are warranted by Air Conditioning Products Company (ACP) to be free from original defects in workmanship for a period of one year from date of shipment, under conditions of normal use and service. ACP will replace or repair any defective parts upon return to our plant, freight prepaid. This limited warranty will, in no way, include the payment of labor charges for field replacement of defective parts, installation, repairs of adjustments, or any other work done. Back charges will not be accepted for any reason unless ACP has given prior written permission, nor will ACP be responsible for consequential damages of any character, no limited warranty expressed or implied will supersede the foregoing.

Air Conditioning Products Co.
30350 Ecorse Road • Romulus, MI 48174
acpshutters.com

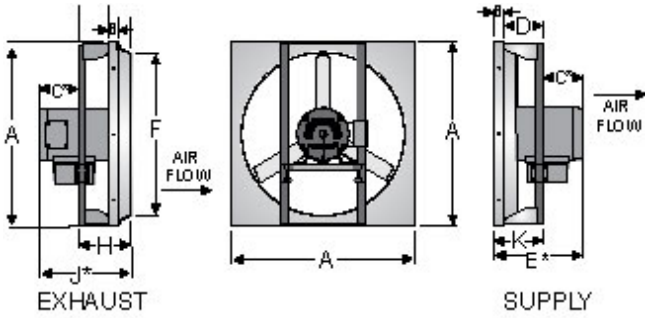
S&P USA

Qty:	1
Tag:	EF-2
Project:	Re use pump station

DFE30-1

Sidewall Propeller Fan-Direct Drive Exhaust

STANDARD FEATURES:
Direct Drive for Low Maintenance • Statically and Dynamically Balanced Propeller • 5 Year Fan and 1 Year Motor Warranty • Motors Rated for Continuous Duty • Heavy Gauge Welded Galvanized Construction • Integral Deep Spun Inlet • All Welded Support Structure •



Depth of Venturi = G
Depth of Support Structure (Exhaust) = L
*Varies with motor selected

Performance

Fan RPM	Flow (CFM)	SP (in W.G.)	Power (HP)	SE	ME	FPM (TS)	FPM (OV)
1140	7651	.299	1.123	32%	1.10	8954	1460

Altitude (Feet): n/a Temperature (Fahrenheit): n/a Density (Lb/Ft3): .075

Motor Information: (Wired for 460V)

HP	RPM	Volts/PH/Hz	Enclosure	Efficiency	Mounted
1	1140	208V-230V/460V/3PH/60HZ	OPEN DRIP PROOF	82.5%	YES

DBA	SONE
75.5	27

SEE COMMENTS ON COVER PAGE.

Submittal Notes:

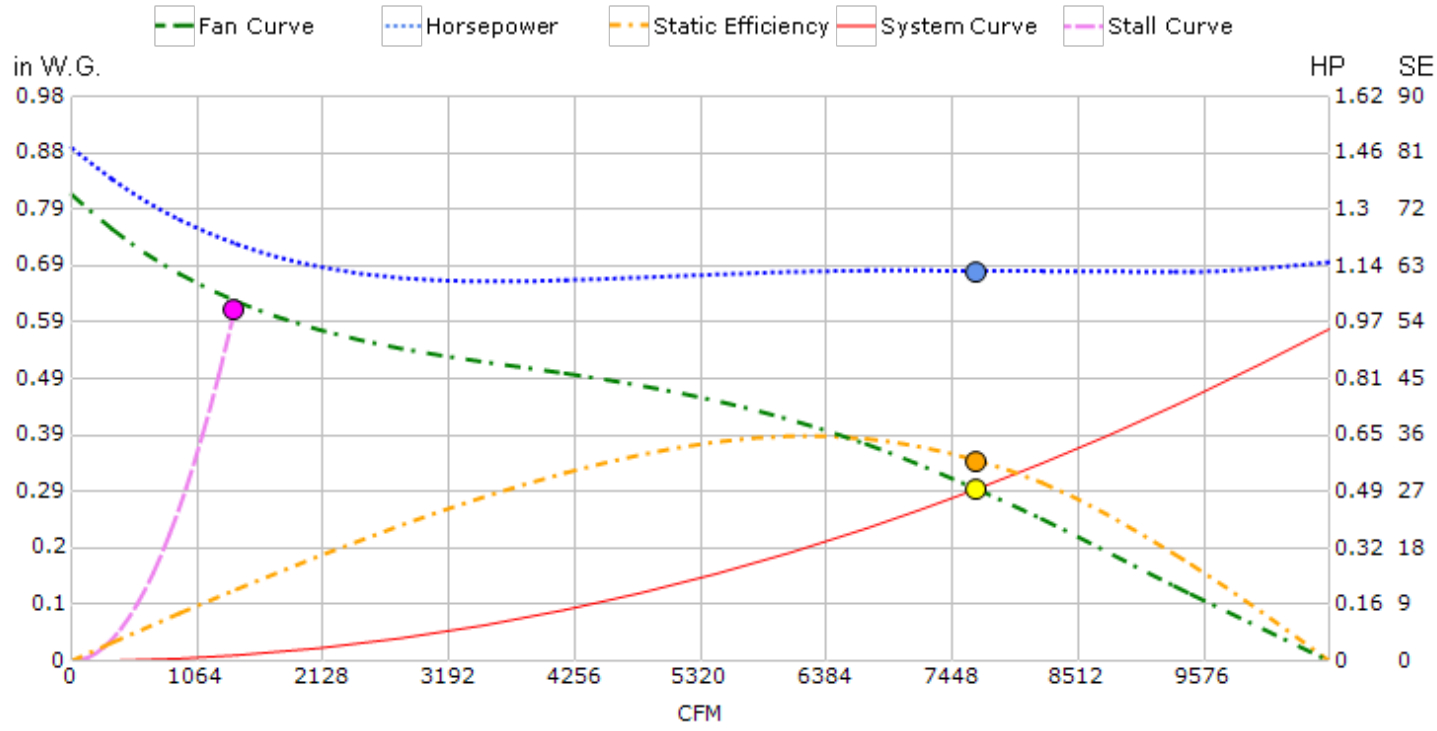
Dimensions (Inches)											
A	36	B	2	C	10	D	9	E	21		
F	31	G	3	H	10	I		J	20		
K	11	L	4	M		N		O			
P		Q		R		S		T			
U		V		W		X		Y			

Note: Accessories may effect dimensions shown.

Avg. Shipping Weight (Lbs)*: 100
*Includes fan, motor, and packaging.

Accessories:

NEMA1 3PH 240-480V 2HP MAX SW/ASSY • MOUNT & WIRE DISCONNECT FOR DF • DFE/DFS 30" BLD (W/7/8 BORE) 1 HP 1140 RPM • ASSY WALL HOUSING PCK-DAMPER-GRD MEDIUM LCE30/DDE30 • RAINHOOD EXHAUST 30" •



ASSEMBLED WALL HOUSING PACK

SIDEWALL PROPELLER FANS - BELT OR DIRECT DRIVE

MODELS LCE/LCS, L2E/L2S, L3E/L3S, DDE/DDS, DFE/DDS - EXHAUST & SUPPLY

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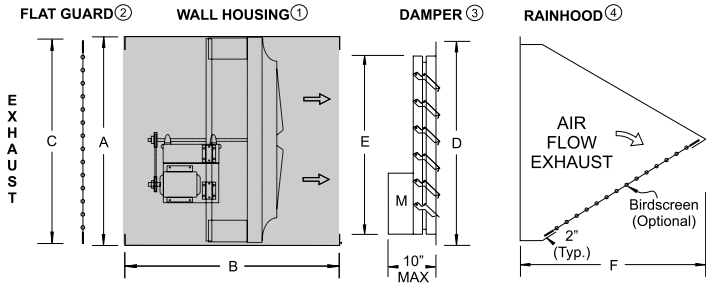
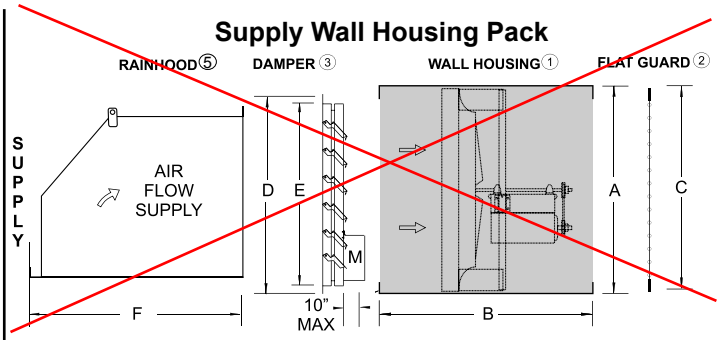
Exhaust Wall Housing Pack



Supply Wall Housing Pack



Fan Size	A (S.Q.) O.D.	Wall Housing ①	Minimum Wall Opening	Flat Guard ②	Damper ③		Exhaust Optional Rainhood 45 Deg. ④		Supply Required Rainhood 90 Deg. ⑤
		B Length	Square	C (SQ.)	D (O.D.)	E	F		F
10/12	17	26	17 1/2	16	14 1/2	12	Exh/Sup	16 1/4	-
14/16	21	26	21 1/2	20	18 1/2	16		20 1/4	-
18	25	26	25 1/2	24	22 1/2	20		24 1/4	-
DF20	25	26	25 1/2	24	22 1/2	20	24 1/4		27 3/4
LC20	25	44	25 1/2	24	22 1/2	20	24 1/4		27 3/4
24	31	44	31 1/2	30	28 1/2	26	28 1/2		38 1/2
30	37	44	37 1/2	36	34 1/2	32	34 1/2		44 1/2
36	43	44	43 1/2	42	40 1/2	38	40 1/2		49
42	49	44	49 1/2	48	46 1/2	44	46 1/2		56 1/2
48	55	44	55 1/2	54	52 1/2	50	49 1/2		62 1/2
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72	81	44	81 1/2	80	78 1/2	76	73		73

NOTES:
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(2) Housing ship assembled with fan unless ordered K.D.
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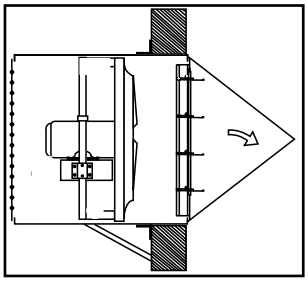
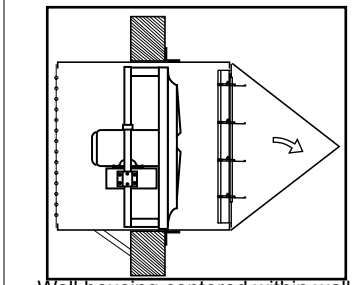
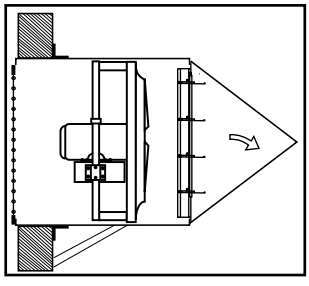


Wall housing flush with outside wall and projecting inside the building



Wall housing centered within wall



Wall housing flush with inside wall and projecting outside the building

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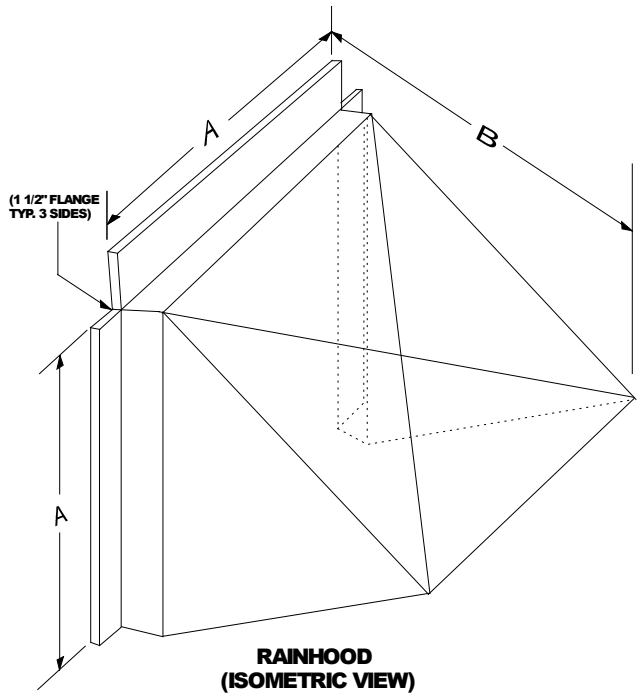
www.solerpalau-usa.com

Soler&Palau Ventilation Group



RAINHOOD (ISOMETRIC VIEW)

Rainhoods are recommended for all supply installations and wherever additional weather protection is desired. Refer to supply style rainhood for supply installations.

Rainhoods do not guarantee that water, snow, or other airborne particles will not become entrained in the airstream and enter the building through the fan.

MODEL SIZE	A	B	GAUGE (2)	AVG. WT.
10/12	14	16-1/4	18	15
14/16	18	20-1/4	18	20
18	22	24-1/4	18	25
20	22	24-1/4	18	25
24	28	28-1/2	18	30
30	34	34-1/2	18	40
36	40	40-1/2	18	50
42	46	46-1/2	18	60
48	52	49-1/2	16	70
54	58	58-1/2	16	120
60	64	64-1/2	16	175
72	78	64-1/2	16	200

1. Hoods ship in several pieces for field assembly unless specified factory assembled. Mounting holes may required field drilling.
2. Standard construction is G90 galvanized steel.
3. Hoods are sized to fit standard wall housings.
4. Rainhoods do not guarantee water will not enter through opening.
5. Sizes 48" and larger have support angles fastened to front edge.
6. Optional birdscreen is recommended to prevent critters or debris from entering the fan.

ACCESSORY ITEMS	1	2	3	4	5	ACCESSORY ITEMS	1	2	3	4	5
☐						☐					
☐						☐					
☐						☐					
☐						☐					
☐						☐					

Project: _____ Submitted: _____
Customer: _____ Approved: _____
Location: _____

L-2
Louver damper

AIR CONDITIONING PRODUCTS CO.
SHUTTERS DAMPERS LOUVERS

EXTRUDED ALUMINUM COMBINATION LOUVER / DAMPER MODEL ACL

Heavy duty Extruded Aluminum construction designed to protect the air intake and exhaust openings in the exterior walls of any building from rain and weather while still providing efficient airflow. The drainable blade design provides the best protection against water entering the opening by channeling water away from the blades and down the jambs. This eliminates water cascading from blade to blade. The adjustable rear blades allow for tight shutoff of the opening when needed.

amca WORLDWIDE CERTIFIED RATINGS
WATER PENETRATION
AIR PERFORMANCE
AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.®
www.amca.org

Standard Construction:

Frame
- 4" deep channel x .080 thick Extruded Aluminum.

Blades
- Drainable style, .080 thick Extruded Aluminum, positioned at a 45 degree angle and spaced approximately 4" centers.

Seals
- Extruded TPV.

Linkage
- On-blade type with a Thumb Screw Operator as standard.

Birdscreen
- ½" Flattened Aluminum in a removable frame mounted on the interior.

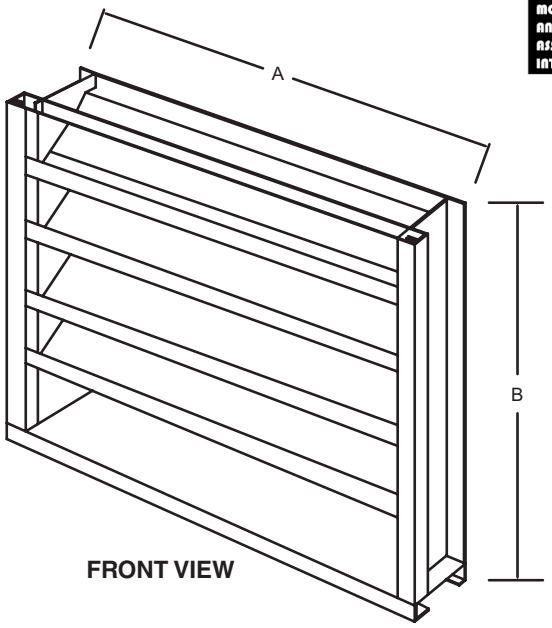
Construction
- Screwed.

Finish
- Mill.

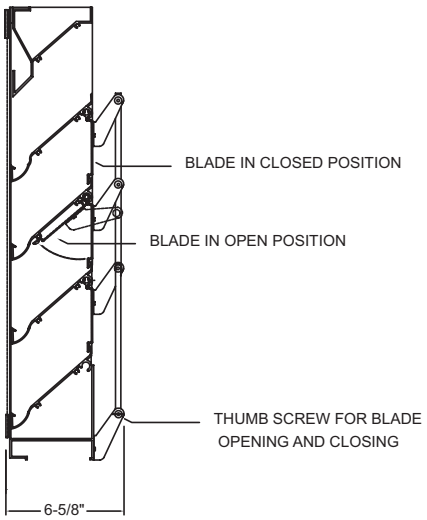
Minimum Size
- 12" W x 12" H

Maximum Single Section Size
- 60" W x 96" H

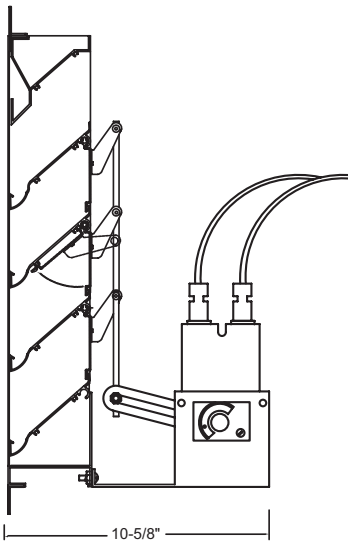
Options (at additional cost)
- Up to 48" W x 48" H, 100 to 240 VAC, 50/60 Hz Motor Pack.
- Over 48" W x 48" H, 24 to 240 VAC, 50/60 Hz Motor Pack.
- 1-½" Flange



FRONT VIEW



SIDE VIEW
(W/ STD. THUMB SCREW)



SIDE VIEW
(W/ OPTIONAL MOTOR AND FLANGED FRAME)

Note: Above "A" and "B" dimensions are undersized by ½" + or – normal tolerance of .0625".

PERFORMANCE DATA - MODEL ACL

AMCA Standard 500-L provides a method for testing and rating louvers. These tests were performed under certain sets of laboratory conditions. These performance ratings do not guarantee that other environmental conditions may actually occur. Use safety factors when selecting louver sizes based upon performance.

Free Area Chart (Sq. ft.):

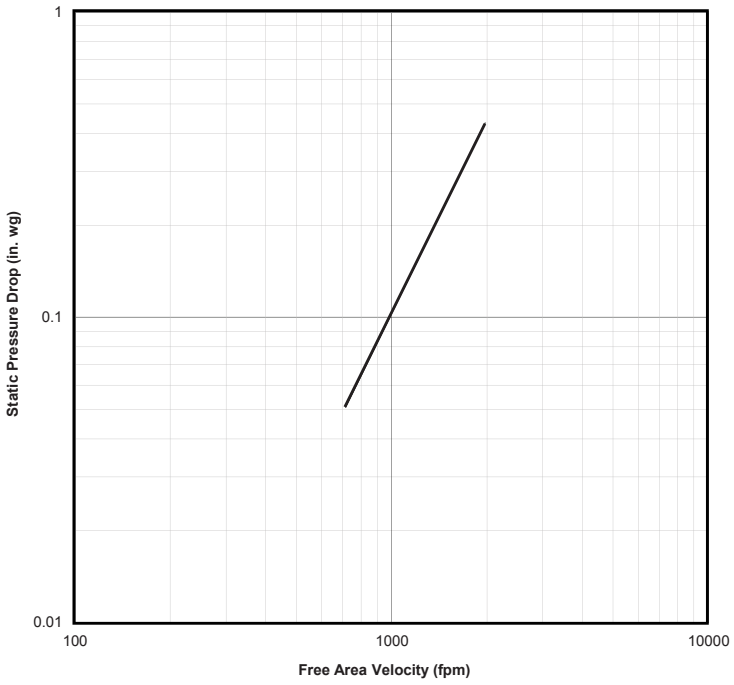
Louver Width in Inches

Louver Height in Inches	18	24	30	36	42	**48**	54	60
18	0.70	0.98	1.25	1.53	1.81	2.09	2.37	2.65
24	1.06	1.49	1.91	2.34	2.76	3.18	3.61	4.03
30	1.36	1.91	2.45	2.99	3.54	4.08	4.63	5.17
36	1.73	2.42	3.11	3.80	4.49	5.18	5.87	6.56
42	2.03	2.84	3.65	4.46	5.26	6.07	6.88	7.69
48	2.39	3.35	4.30	5.26	6.21	**7.22**	8.12	9.08
54	2.69	3.76	4.84	5.92	6.99	8.07	9.14	10.22
60	3.05	4.28	5.50	6.72	7.94	9.16	10.38	11.60
66	3.35	4.69	6.04	7.38	8.72	10.06	11.40	12.74
72	3.72	5.21	6.69	8.18	9.67	11.15	12.64	14.13
78	4.02	5.62	7.23	8.84	10.44	12.05	13.66	15.27
84	4.38	6.13	7.89	9.64	11.39	13.15	14.90	16.65
90	4.68	6.55	8.43	10.30	12.17	14.04	15.92	17.79
96	5.05	7.06	9.08	11.10	13.12	15.14	17.16	19.17

Air Conditioning Products Company certifies that the ACL 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 and Water Penetration ratings.

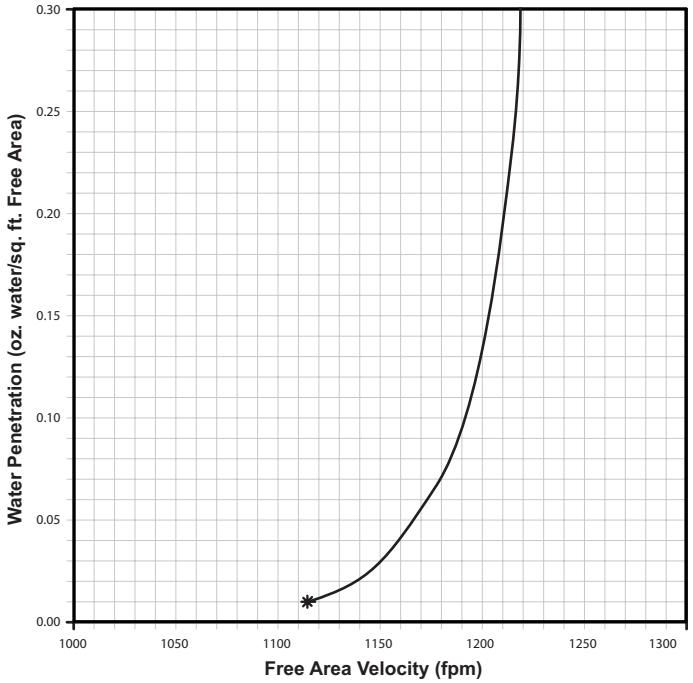
PRESSURE DROP

Standard Air - .075 lbs per cubic foot
Test size – 48″ x 48″ (Intake)
Ratings do not include the effect of a birdscreen



WATER PENETRATION

Standard Air - .075 lbs per cubic foot
Test size – 48″ x 48″ for a 15 minute duration



The beginning point of water penetration at .01 oz./sq. ft. is 1118 fpm free area velocity.

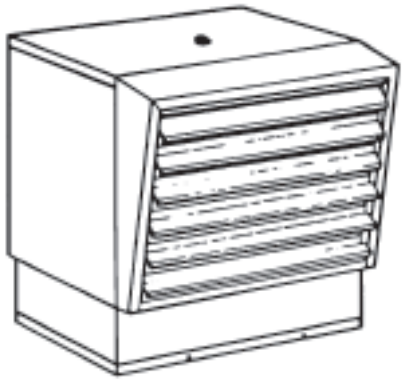
LIMITED WARRANTY

All products manufactured are warranted by Air Conditioning Products Company (ACP) to be free from original defects in workmanship for a period of one year from date of shipment, under conditions of normal use and service. ACP will replace or repair any defective parts upon return to our plant, freight prepaid. This limited warranty will, in no way, include the payment of labor charges for field replacement of defective parts, installation, repairs of adjustments, or any other work done. Back charges will not be accepted for any reason unless ACP has given prior written permission, nor will ACP be responsible for consequential damages of any character, no limited warranty expressed or implied will supersede the foregoing.

Air Conditioning Products Co.
30350 Ecorse Road • Romulus, MI 48174
acpshutters.com

EUH-1, 2
Unit Heater

Marley
Engineered Products



UH SERIES UNIT HEATERS
5KW through 30KW

c UL us
FILE #E21609

Installation & Maintenance Instructions

Dear Owner,

Congratulations! Thank you for purchasing this new heater manufactured by a division of Marley Engineered Products. You have made a wise investment selecting the highest quality product in the heating industry. Please carefully read the installation and maintenance instructions shown in this manual. You should enjoy years of efficient heating comfort with this product from Marley Engineered Products... the industry's leader in design, manufacturing, quality and service.

... The Employees of
Marley Engineered Products

⚠ WARNING ⚠

Read Carefully - This Instruction Sheet contains vital information for the proper installation, use and efficient operation of the heater. Carefully read the manual before installation, operation, or cleaning of the heater. Failure to adhere to the instructions could result in fire, electric shock, death, serious personal injury or property damage. Save these instructions and review frequently for continuing safe operation and instructing future users.

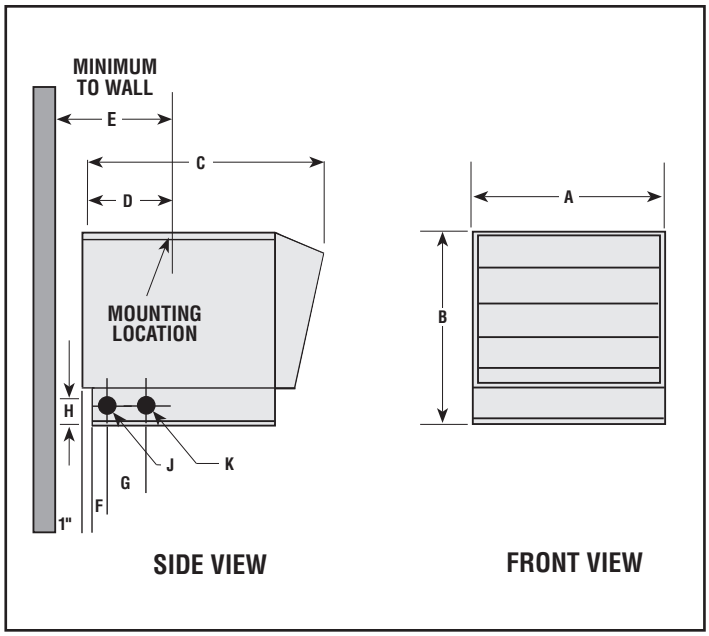
1. To prevent a possible electrical shock, disconnect all power coming to heater at main service panel before wiring or servicing.
2. All wiring must be in accordance with the National Electrical Code (Canadian Electrical Code in Canada) and all applicable local codes. The heater must be grounded as a precaution against electrical shock. Supply wiring must be copper and suitable for at least 75° C.
3. Verify the power supply and control voltages coming to the heater match the ratings printed on the heater nameplate before energizing.
4. This heater is NOT suitable for use in hazardous locations as described by the National Fire Protection Association (NFPA). this heater has hot and arcing or sparking parts inside. DO NOT use in areas where gasoline, paint or other flammable liquids are used or stored.
5. Heater must be installed so the minimum clearances shown in Specifications table are maintained.
6. Heater air flow MUST be directed parallel to or away from adjacent walls.
7. The mounting structure and anchoring hardware MUST BE capable of reliably supporting the weight of the heater plus mounting bracket if used. Refer to specifications table for heater weight.
8. To prevent a possible fire, DO NOT block air intakes or exhaust openings in any manner.DO NOT allow foreign objects to enter grille openings as this may cause electric shock, fire or damage to heater.

SAVE THESE INSTRUCTIONS

Specifications

Model No.	Wattage (KW)	Btu/Hr.	Heater Voltage	Wiring Phase	Mounting Height ft. (mm) Min.	Mounting Height ft. (mm) Max.	Air Throw ft. (mm)	Center of Heater to Wall inches (mm)	Ship Wt. lb. (kg)
UH520	5.0	17,065	208	1*	6 (1828)	8 (2486)	18 (5486)	13 (333)***	30 (13.60)
UH524			240	1*					
UH534			347	1					
UH548			480	3					
UH560			600	3					
UH720	7.5	25,598	208	1*	6 (1828)	8 (2436)	20 (6096)	13 (333)***	30 (13.60)
UH724			240	1*					
UH727			277	1					
UH734			347	1					
UH748			480	3**					
UH760			600	3					
UH1020	10.0	34,130	208	1*	6 (1828)	9 (2743)	20 (6096)	13 (333)	72 (32.66)
UH1024			240	1*					
UH1027			277	1					
UH1034			347	1					
UH1048			480	3**					
UH1060			600	3					
UH1520	15.0	51,195	208	3**	6 (1828)	10 (3048)	28 (8534)	13 (333)	78 (35.38)
UH1524			240	3**					
UH1527			277	1					
UH1534			347	1					
UH1548			480	3**					
UH1560			600	3					
UH2034	20.0	68,260	347	1	6 (1828)	11 (3352)	32 (9753)	16 (406)	78 (35.38)
UH2048			480	3**					
UH2060			600	3					
UH2548	25.0	85,325	480	3	6 (1828)	15 (4572)	34 (10360)	20 (508)	136 (61.69)
UH2560			600						
UH3048	30.0	102,390	480	3	6 (1828)	15 (4572)	38 (11582)	20 (508)	142 (64.40)
UH3060			600						

* Factory wired for 1 Phase - Field convertible to 3 Phase.
** Factory wired for 3 Phase - Field convertible to 1 Phase.
*** 48 in. (1219) for 45 deg. to vertical downward.



Dim. inches (mm)	Heater Size 5 - 7.5 KW	Heater Size 10 - 20 KW	Heater Size 25 - 30 KW
A	14 (354)	18 (457)	26 (660)
B	12 1/2 (317)	18 (457)	24 (609)
C	12 1/2 (317)	17 1/2 (444)	23 1/8 (587)
D	5 1/2 (139)	9 15/32 (240)	9 15/32 (240)
E	13 (330)	#	20 (508)
F	1 3/4 (44)	2 (51)	2 (51)
G	1 3/8 (35)	2 1/2 (63)	2 3/4 (70)
H	1 1/2 (38)	2 1/4 (57)	2 1/4 (57)
J	1/2 (12.7) 3/4 (19.7)	3/4 (19.1) 1 (25.4)	1 (25.4) 1 1/2 (38)
K	1/2 (12.7)	1 (25.4) 1 1/4 (32) 1 1/2 (38)	1 (25.4) 1 1/2 (38) 2 (50.8)
Wiring Compartment Volume	60 in^3 (968 cm^3)	105 in^3 (1720 cm^3)	288 in^3 (4720 cm^3)

13" (330 cm) for 10KW, 12.5KW, and 15KW; 16" (40.5 cm) for 20KW heaters

GENERAL INFORMATION

Automatic Fan Delay: All models incorporate an automatic fan delay. When the thermostat calls for heat, fan action is delayed momentarily until the heating element is warm. When the thermostat is satisfied, the fan continues to operate until the heating element is cool. This action prevents circulation of cold air, and avoids exposing unit to residual heat, thus providing higher comfort level and prolonged element life.

Optional Controls and Accessories: The following controls and accessories are available from your electrical distributor.

Catalog Number	Description
CWB-1	Combination wall brackets for 2.5 kw thru 15 kw units.
CWB-2	Same as above but for 20 kw thru 50 kw units
TA-1	Single pole thermostat kit 60 to 120° F temp. range for field installation in all units.
DS-30	3-pole power disconnect switch kit for field installation on unit heaters rated 30 amps or less.
DS-63	3-pole power disconnect switch kit for field installation on unit heaters 10kw and above rated at 30 to 63 amps.

012

Thermal Safety Cutout: Each unit heater is equipped with one or more thermal safety cutouts which will automatically shut off the heater in the event of overheating, and will activate the heater when the operating temperature returns to normal. If the thermal safety cutout cycles due to overheating, the cause should be determined before further operation.

LOCATION OF HEATERS

Refer to min. and max. mounting heights and clearances in Specifications table. Mounting heaters too high will require setting the louvers sharply downward to direct warm air toward the floor, thereby decreasing the distance of the air throw. Heaters should be arranged so that the discharge air stream will not be restricted by columns, machinery, etc. Heaters should be installed out of the reach of persons.

Heaters may be rotated and louvers adjusted to obtain the desired direction and distance of warm air discharge.

Where a remote thermostat is used, it should be located on an inside wall or post, out of the direct rays of the sun and internal heating sources, and away from cold drafts.

The number and capacity of heaters required should be determined by the heat loss of the structure. Small areas can be heated by one unit heater. Larger areas require multiple units. Where multiple units are required, the air discharge of each heater should support the air flow of the others to provide perimeter rotational circulation of warm air. (See Figure 1).

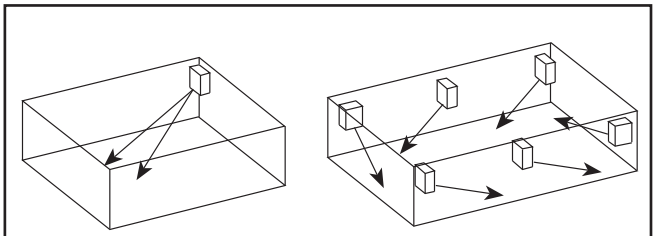


Figure 1

MOUNTING THE HEATER

10kw thru 30kw: A 1/2"-13NC threaded mounting hole is provided in the top of the heater for securing the heater to an optional mounting bracket, or other mounting structure having a minimum of 10" (254mm) clearance from the ceiling. Combination wall/ceiling, wall, and ceiling mounting kits are available from your electrical distributor. They are designed to mount the heaters on wall or ceiling, provide adequate support, insure proper clearance from walls, and permit rotation of the heater. Installation instructions are included in the kits. If one of the mounting kits is not used, the installer must provide suitable means of mounting heaters securely, allowing adequate clearance from adjacent walls and ceiling as indicated in the specifications chart.

5kw & 7.5 kw: In addition to the 1/2"-13 NC threaded mounting hole, the 5 kw & 7.5 kw heaters are supplied with a hanger bracket. The bracket may now be mounted for horizontal air discharge in the double keyhole slot which will space the top of the heater 1-7/8 inch (47 cm) from the ceiling (Figure 2), or it can be attached in the single keyhole slot for horizontal or vertical mounting.

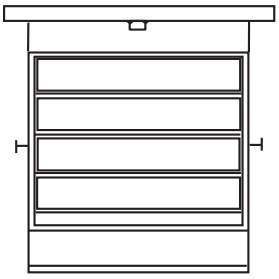


Figure 2

INTERNAL WIRING

1. Heaters drawing 48 amps or more have internal subdivided branch circuit fusing.

NOTE: A properly fused disconnect switch or suitable circuit breakers must be installed between the heater connections and power supply.

⚠ WARNING ⚠

Before proceeding further with the installation of the heater, turn off the power to the supply line for the heater at the main service box.

2. All wiring connections are made inside the control box at the bottom of the heater. To open control box, loosen screws holden the hinged cover at front (if cover is slotted) or remove screw(s) (if cover is unslotted) and open cover (Figure 3).

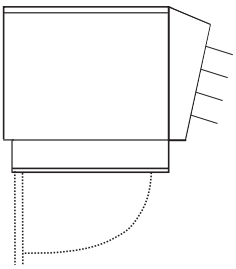


Figure 3

3. Knockouts and terminal blocks are provided for power supply connection, and connections for heater controls.

EXTERNAL WIRING

1. Supply wire size should be selected in accordance with the electrical rating shown on the heater data plate and/or wiring diagram (located on inside of control box cover), and must be suitable for 75° C.
2. Connect conduit to appropriate knockout on control box panel. If rigid conduit is used, connect to heater with sufficient length of flexible conduit so heater can be rotated as desired.
3. Connect supply leads to the heater terminals and connect any required jumpers as shown on the wiring diagram.
4. After all connection are completed, close and secure control box cover.

MAINTENANCE INSTRUCTIONS

In order to maintain the efficiency of the unit heat, it should be inspected periodically and any dirt that may have accumulated should be removed from the heating element, fan blades and motor using a soft brush or a vacuum cleaner.

5 kw & 7.5 kw Heaters: The heating element is accessible by removing the louvered bezel, front section of the heater. Loosen, but do not remove, 4 recessed head screws located to the rear of louvers (Figure 4). Grasp bezel on both sides, lift up and pull out, disengaging bezel. After servicing the unit, reverse this procedure to replace bezel.

To service the motor, remove the rear wire safety grille (Figure 5).

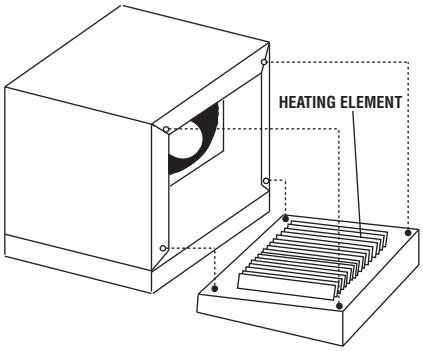


Figure 4

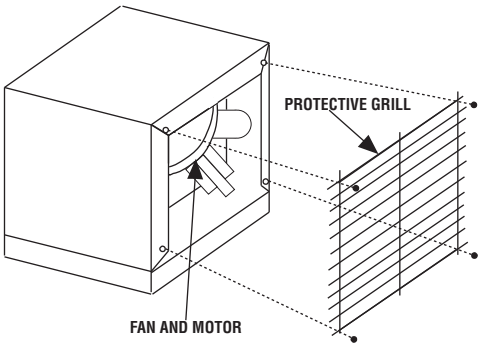


Figure 5

10 kw through 30 kw Heaters: The heating element surface and fan motor area are accessible by removing the left or right side panel of heater. To do this, open the hinged control box cover, and then remove the two screws that hold the bottom of the side panel. Lift out that end of the side panel and then pull down for removal. After servicing the unit, reverse the unit, reverse this procedure to replace the side panel.

NOTE: When a new heater is first energized, a light smoking may be noticeable. This is caused by burning off any residue oil left on the heating element during manufacturing. This condition will disappear in a few minutes after heater is put into operation.

LIMITED WARRANTY

All products manufactured by Marley Engineered Products are warranted against defects in workmanship and materials for one year from date of installation, except heating elements which are warranted against defects in workmanship and materials for ten years from date of installation. This warranty does not apply to damage from accident, misuse, or alteration; nor where the connected voltage is more than 5% above the nameplate voltage; nor to equipment improperly installed or wired or maintained in violation of the product's installation instructions. All claims for warranty work must be accompanied by proof of the date of installation.

The customer shall be responsible for all costs incurred in the removal or reinstallation of products, including labor costs, and shipping costs incurred to return products to Marley Engineered Products Service Center.Within the limitations of this warranty, inoperative units should be returned to the nearest Marley authorized service center or the Marley Engineered Products Service Center, and we will repair or replace, at our option, at no charge to you with return freight paid by Marley. It is agreed that such repair or replacement is the exclusive remedy available from Marley Engineered Products.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID EXPRESSED WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS AGREEMENT. MARLEY ENGINEERED PRODUCTS SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES ARISING WITH RESPECT TO THE PRODUCT, WHETHER BASED UPON NEGLIGENCE, TORT, STRICT LIABILITY, OR CONTRACT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For the address of your nearest authorized service center, contact Marley Engineered Products in Bennettsville, SC, at 1-800-642-4328. Merchandise returned to the factory must be accompanied by a return authorization and service identification tag, both available from Marley Engineered Products. When requesting return authorization, include all catalog numbers shown on the products.

HOW TO OBTAIN WARRANTY SERVICE AND WARRANTY PARTS PLUS GENERAL INFORMATION

1. Warranty Service or Parts **1-800-642-4328**
2. Purchase Replacement Parts **1-800-654-3545**
3. General Product Information **www.marleymep.com**

Note: When obtaining service always have the following:
1. Model number of the product
2. Date of manufacture
3. Part number or description

Marley Engineered Products

470 Beauty Spot Rd. East
Bennettsville, SC 29512 USA

ECR 38180

Part No. 5200-2237-003 03/09

DSS-1A / 1B
Ductless split system

Job Name/Location:

Date:

For: ☐ File ☐ Resubmit ☐ Approval ☐ Other

PO No.:

Architect: GC:

Engr: Mech:

Rep:

(Company) (Project Manager)

LS360HV3

Standard Single Zone Inverter

Outdoor Unit (ODU)-LSU360HV3 Indoor Unit (IDU)-LSN360HV3

LG Life's Good

Performance:

Cooling:

Capacity (Min-Rated-Max, Btu/h)	3,070-33,000-34,000
SEER	16.1
EER	8.2

SEER - Seasonal Energy Efficiency Ratio EER - Energy Efficiency Ratio

Heating:

Capacity (Min-Rated-Max, Btu/h)	3,070-35,200-38,900
HSPF	9.9

HSPF - Heating Seasonal Performance Factor

Cooling Nominal Test Conditions:
Indoor: 80°F DB/67°F WB
Outdoor: 95°F DB/75°F W

Heating Nominal Test Conditions:
Indoor: 70°F DB/60°F WB
Outdoor: 47°F DB/43°F WB

Electrical:

Power Supply (V[1]/Hz/Ø)	208-230/60/1

Outdoor Unit:

MOP (A)	25
MCA (A)	19
Cooling Rated Amps (A)	15.4
Heating Rated Amps (A)	15.4
Compressor (A)	14.6
Fan Motor (A)	0.25

MOP - Maximum Overcurrent Protection MCA - Minimum Circuit Ampacity

Total Power Input:

Cooling Power Input (kW)	4.03
Heating Power Input (kW)	3.84

Piping:

Liquid Line (in, OD)	3/8
Vapor Line (in, OD)	5/8
Additional Refrigerant (oz/ft)	0.38
Max Pipe Length (ft)[2]	98.4
Piping Length (no add'l refrigerant, ft)	24.6
Max Elevation (ft)	49.2

Controls Features:

- 24-Hour on/off timer
- Auto changeover
- Auto restart
- Auto sleep mode
- Built-in low ambient standard, down to 14°F (cooling mode)
- Chaos swing
- Condensate Sensor Connection
- Defrost control
- Energy saving
- Evaporator frost control
- Inverter (variable speed compressor)
- Jet cool/Jet heat
- Manual power switch
- 3M HAF Filter
- Self-cleaning indoor coil
- Temperature display on indoor unit
- Cooling only function

Optional Accessories:

- ☐ LG Programmable Thermostat - PREMTB10U
- ☐ Dry Contact for third party thermostat - PQDSBNGCM1
- ☐ Low Ambient Wind Baffle (Cooling operation to 0°F) - ZLABGP02A
- ☐ PI-485 - PMNFP14A1

Operating Range:

Outdoor Unit:

Cooling (°F DB)	14-118
Heating (°F WB)	-4-65

Indoor Unit:

Cooling (°F WB)	53-75
Heating (°F DB)	60-86

Unit Data:

Refrigerant Type	R410A
Refrigerant Control	EEV
Refrigerant Charge (lbs)	4.41
ODU Sound Pressure Max (±3 dB(A))[3]	55
IDU Sound Pressure (H/M/L) (±3 dB(A))[3]	49/44/39
ODU Net Weight (lbs)	128
ODU Shipping Weight (lbs)	137
IDU Net Weight (lbs)	36
IDU Shipping Weight (lbs)	42
Heat Exchanger Coating	GoldFin™

Fan:

ODU Type	Propeller
IDU Type	Cross Flow
Fan Speeds (Fan/Cooling/Heating)	4/4/4
Quantity (ODU + IDU)	1 + 1
Motor/Drive	Brushless Digitally Controlled/Direct
ODU Max Air Flow Rate (CFM)	2,119
IDU Air Flow H/M/L (CFM)	795/629/424
Dehumidification (pts/hr)	10.6

Notes:

1.Acceptable operating voltage: 187V - 253V.
2.Piping lengths are equivalent.
3.Sound Pressure levels are tested in an anechoic chamber under ISO Standard 1996.
4.All communication/power cable to be minimum 18 AWG, 4-conductor, stranded, shielded and must comply with applicable local and national code.
5.See Engineering Manual for sensible and latent capacities.
6.Power wiring cable size must comply with the applicable local and national code.
7.The indoor unit comes with a dry helium charge.
8.This data is rated 0 ft above sea level, with 24.6 ft of refrigerant line and a 0 ft level difference between outdoor and indoor units.
9.Must follow installation instructions in the applicable LG installation manual.

Intertek

Inverter

AHRI CERTIFIED™ www.ahridirectory.org
Unitary Small HP
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

015

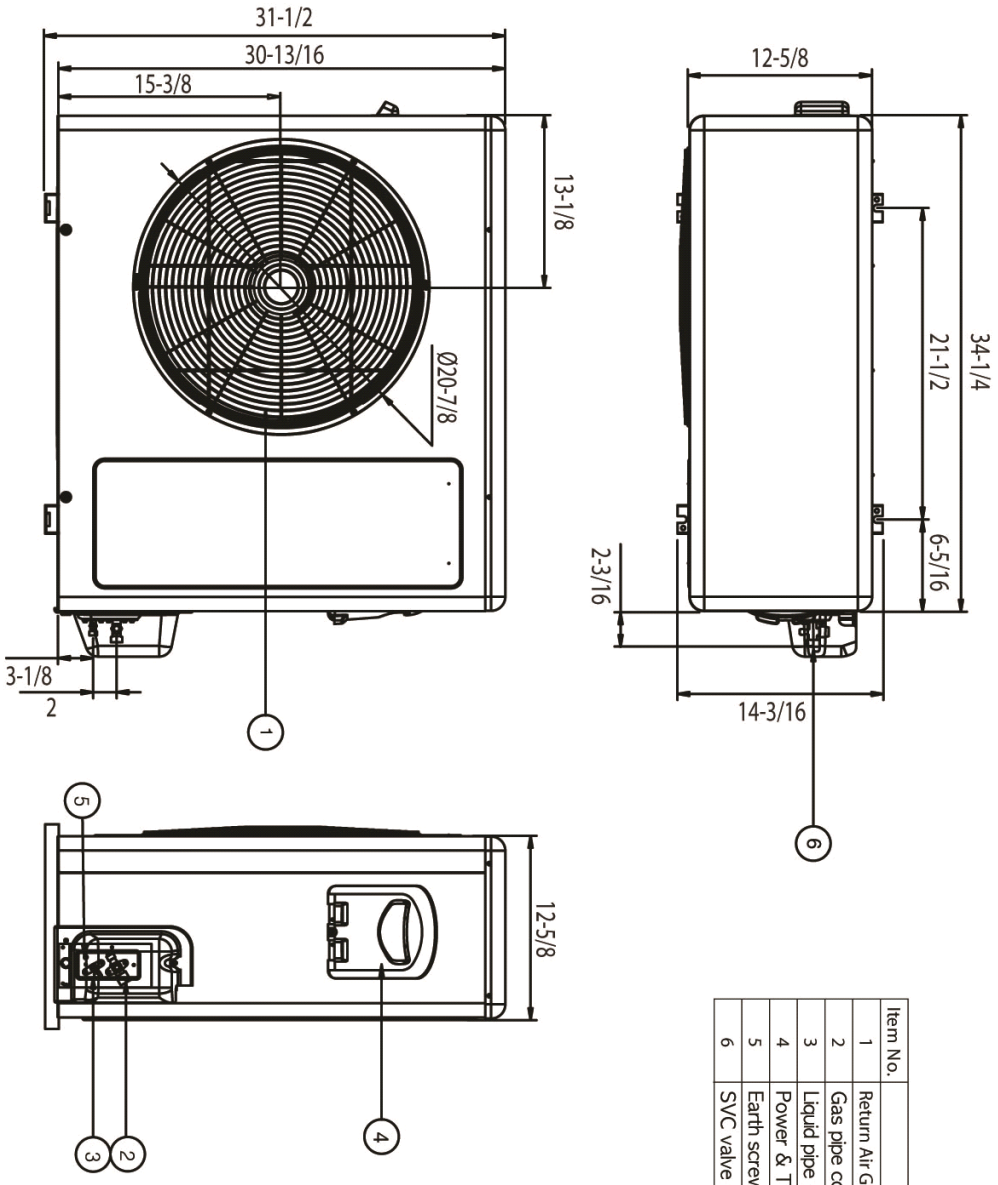
Job Name/Location:

Outdoor Unit (ODU)-LSU360HV3
Standard Single Zone Inverter

Tag #:

Date:

PO No.:



Unit: inch

Item No.	Part Name	Remarks
1	Return Air Grille	
2	Gas pipe connection	
3	Liquid pipe connection	
4	Power & Transmission connection	
5	Earth screw	
6	SVC valve cover	

Job Name/Location:

Indoor Unit (IDU)-LSN360HV3

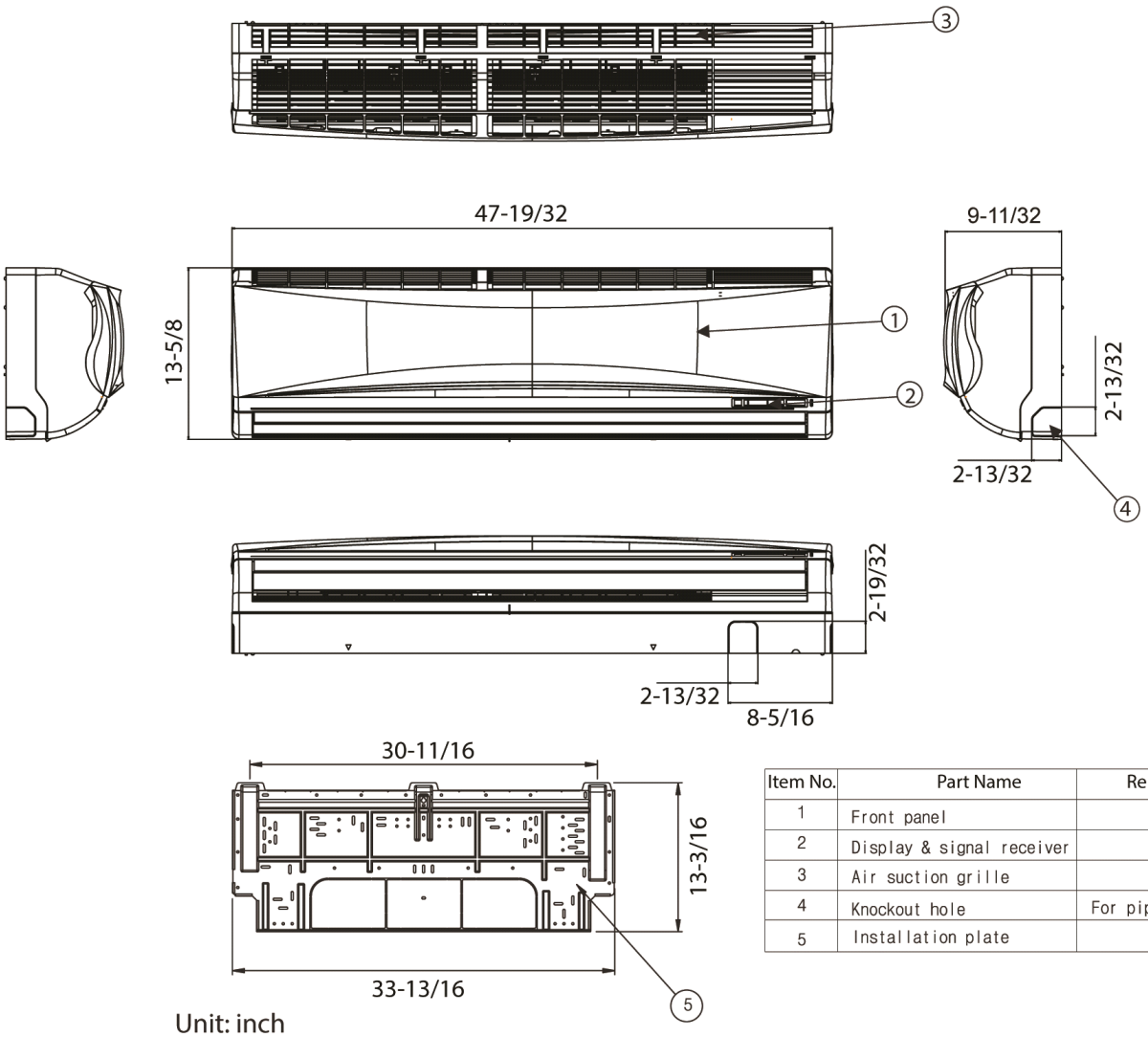
Standard Single Zone Inverter

LG Life's Good

Tag #:

Date:

PO No.:



Unit: inch

Item No.	Part Name	Remarks
1	Front panel	
2	Display & signal receiver	
3	Air suction grille	
4	Knockout hole	For pipe and cable
5	Installation plate	

STINGRAY systems
5330 East 25th Street
Indianapolis Indiana 46218
(888) 445-4142
www.tepid.com

EWS-1
EEWS

ANSI Certified
Patent Information:
tepid.com/patents

Stingray Systems S5510/S5515 Floor Mounted Emergency Shower and Eye/Face Wash

Series: S5510/S5515

The S5510/S5515 emergency combination shower and eye/face wash is a floor mounted unit that shall be manufactured of corrosion resistant materials. The manifold assembly shall be a nickel-plated brass unit with 1" NPT female connections for inlet and drain piping. It shall include a centrally located activator with universal ANSI compliant sign.

The bowl assembly shall include a First Aid Red ABS bowl (or stainless steel bowl or no bowl at all). The spray heads shall be PVC with dust caps and designed to flow at the specified flow rate. The spray heads shall be incorporated into a Quick Switch Eyewash Block that can be easily removed and serviced, allowing the supply piping to be flushed. The Quick Switch Eyewash Block (with optional integral point of use filters) shall be a single supply source eyewash to ensure symmetrical and equal flow through each spray head.

The unit shall include a First Aid Red ABS showerhead (or stainless steel showerhead) designed to give the user uniform and non-forceful flow over the entire coverage area at 20 gpm at 30psi. A stainless steel pull handle connected to the nickel-plated ball valve accomplishes activation of the shower.

The unit shall incorporate a ¼" thick base plate that is 8" in diameter and shall be secured to the floor with appropriate anchors. The piping of the unit shall be galvanized steel (or epoxy coated or stainless steel) and will serve as the drainpipe to take water away from the eye/face wash portion of the unit as well as to supply water to the showerhead portion of the unit. It shall be at the correct length to get the individual components to the correct elevations per ANSI Z358.1. The emergency combination shower and eye/face wash shall be installed level and be self-draining to hinder bacteria growth. The unit shall also be independently certified to meet the latest ANSI Z358.1 requirements.

Model Number:
- [ ] S5510 Standard Floor Mounted Combination Emergency Shower and Eye/Face Wash
- [ ] S5515 Barrier Free Floor Mounted Combination Emergency Shower and Eye/Face Wash

Pipe Finish:
- [ ] Galvanized **(GA)**
- [ ] Epoxy Coated **(EP)**
- [ ] Stainless Steel **(SS)**

Quick Switch Eyewash Element Options:
- [ ] Filter **(FLT)**
- [ ] No Filter **(NFT)**

Bowl Showerhead Material Options:
- [ ] ABS Bowl/ABS Showerhead **(AB/AB)**
- [ ] Stainless Steel Bowl/ABS Showerhead **(SS/AB)**
- [ ] No Bowl/ABS Showerhead **(NA/AB)**
- [ ] ABS Bowl/Stainless Steel Showerhead **(AB/SS)**
- [ ] Stainless Steel Bowl/Stainless Steel Showerhead **(SS/SS)**
- [ ] No Bowl/Stainless Steel Showerhead **(NA/SS)**

For a complete **TEPID** solution, this fixture shall be combined with a Stingray SV125 or SV160 emergency mixing valve.

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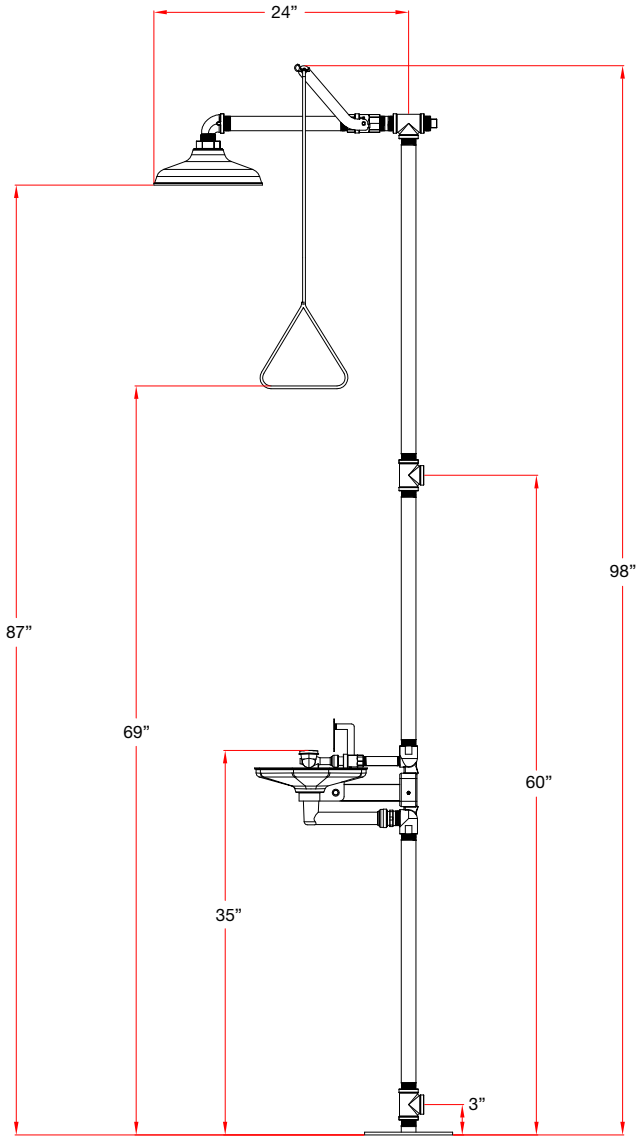
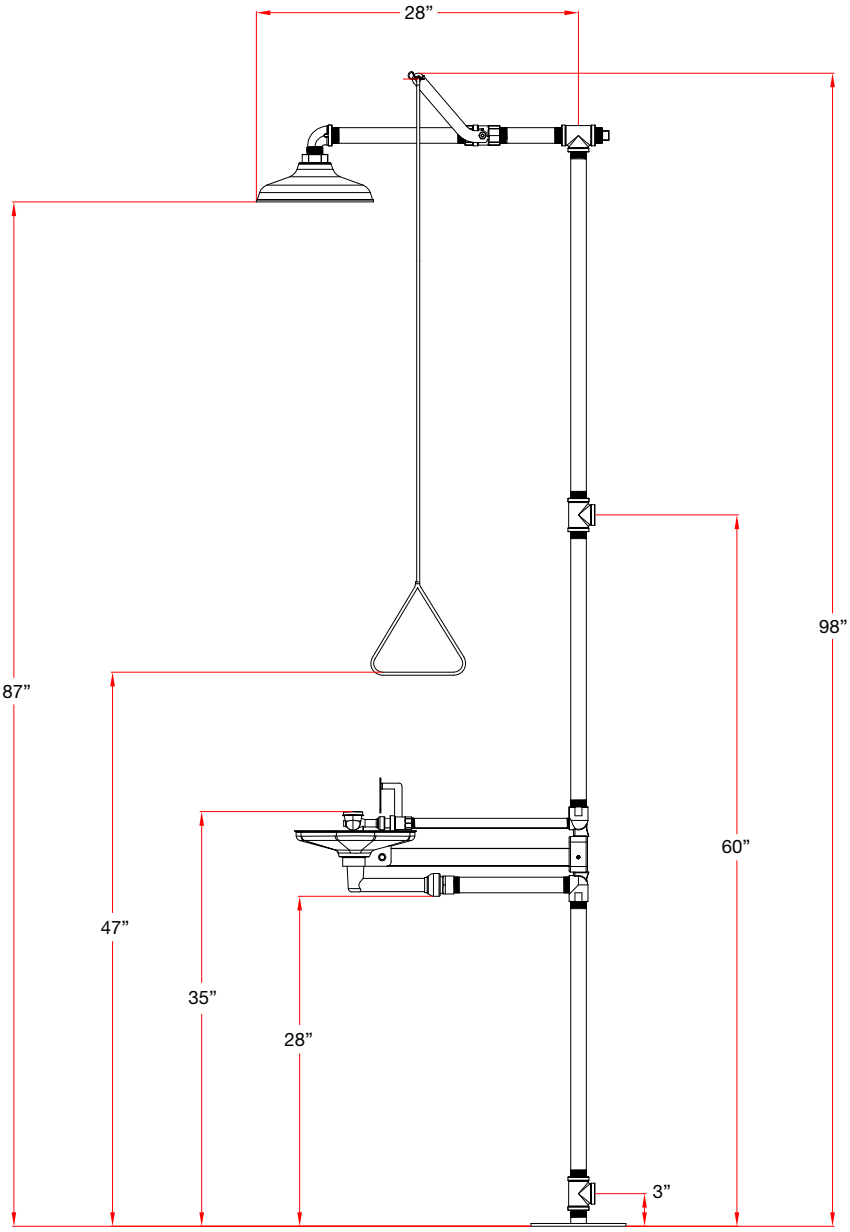


Model: S5510



Model: S5515

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EWH-1
Heater

ANSI Certified
Patent Information:
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Stingray Systems S9300 Tepid Emergency System

Model: S9300

The S9300 Tepid Emergency System shall consist of a water heater storage tank and 120V 20AMP heating element. The S9300 Tepid Emergency System shall incorporate 2 emergency mixing valves capable of controlling outlet temperature over a wide range of demand requirements. The mixing valves shall employ a liquid-filled thermostatic motor and a stainless steel sliding piston control device. The valves shall offer positive hot water shut-off in the event of cold water supply loss and full flow cold water bypass in the event of hot water supply loss or thermostatic failure. The system shall also incorporate a device capable of flattening temperature spike through the system as well as a heat trap to prevent heat migration to the cold side of the mixing valves. Unit supplied complete with pre-piped 118 gallon storage tank, 120V 20AMP heating element, patented accumulator, SV125 and SV107 Emergency Mixing Valves. Approximate weight empty = 600 lbs. The hot water tank is UL listed, heating element is CSA approved and the housing has either a Nema 1, 4 or 7 rating.

The modular design will allow for modifying the specs of eyewash without replacement of the whole unit.

This system, combined with a Stingray Emergency shower or combination shower and eye/face wash is a complete tepid solution that is ANSI Z358.1 compliant. Please select the correct fixture per the application.

Equipment Options:

Stingray Series 3000

[ ] 3010 Floor Mounted Emergency Shower
[ ] 3015 Floor Mounted Emergency Shower
[ ] 3020 Ceiling Mounterd Emergency Shower
[ ] 3025 Ceiling Mounterd Emergency Shower
[ ] 3030 Wall Mounted Emergency Shower
[ ] 3035 Wall Mounted Emergency Shower

Stingray Series 5000

[ ] 5510 Floor Mounted Combination Shower
[ ] 5515 Floor Mounted Combination Shower
[ ] 5530 Wall Mounted Combination Shower
[ ] 5535 Wall Mounted Combination Shower

Cold Water Filter:

[ ] Please Specify: _____

Heating Element Options:

[ ] Nema 1 **(N1)**
[ ] Nema 4 **(N4)**
[ ] Nema 7 **(N7)**

Please see the individual specification sheets for the fixtures for all of the options available for the selected fixture.

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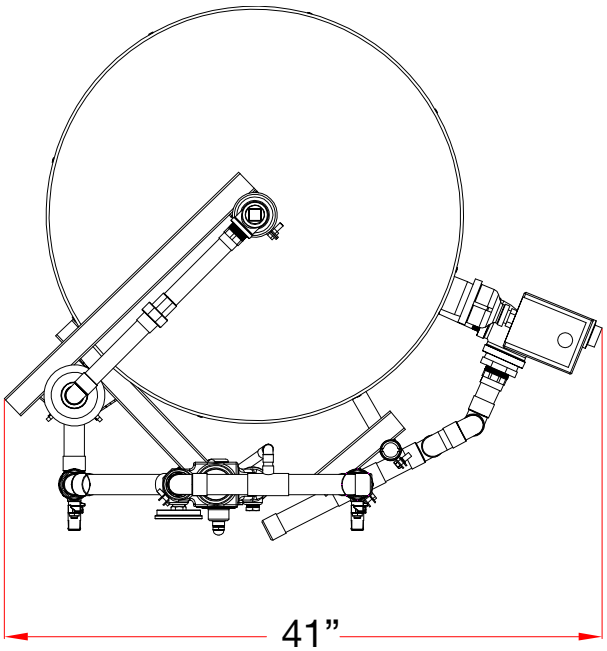
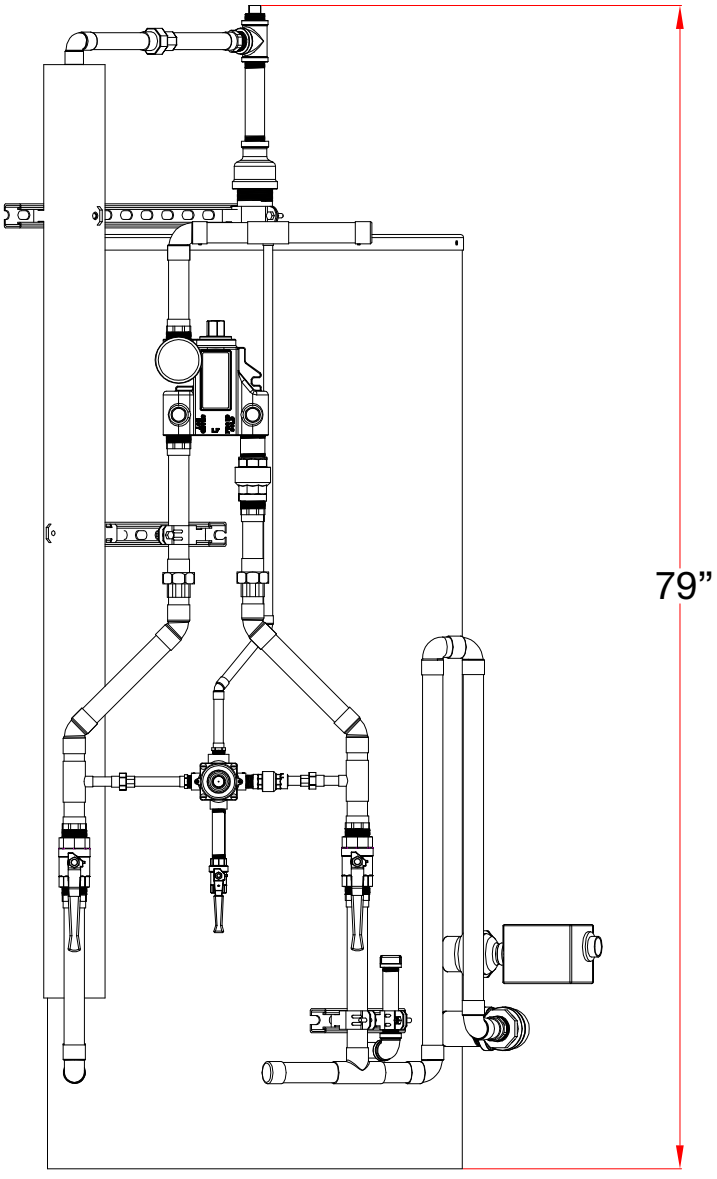
Model: S9300



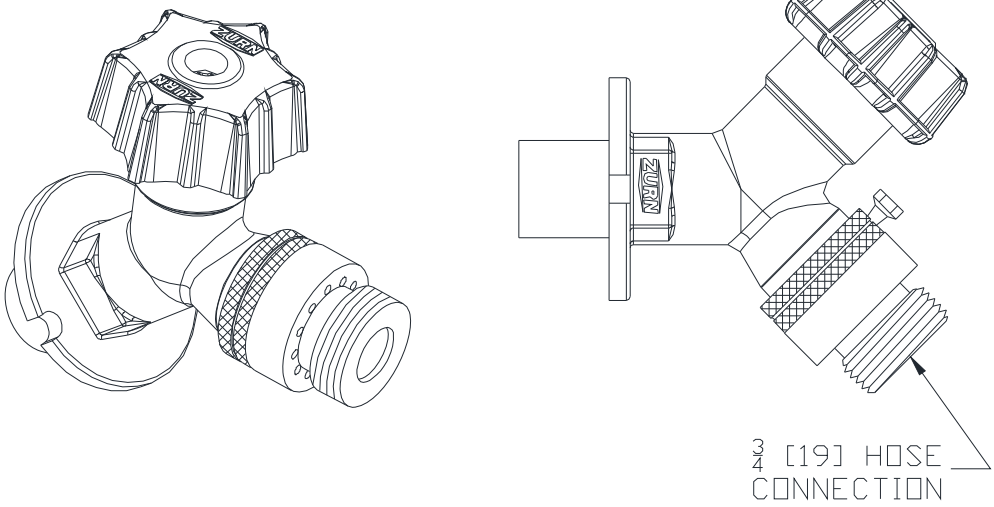


Z1341
Wall Faucet

SPECIFICATION SHEET

TAG HB-1

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



Inlet Connection	Inlet Description in Inches	Approx. Wt. Lbs. [kg]
__ -C12	1/2 [13] Solder x 3/4 [19] Solder	2 [1]
__ -C12-PX	1/2 [13] PEX	2 [1]
__ -CP12	1/2 [13] Solder x 1/2 [13] MPT	2 [1]
__ -P12	1/2 [13] FPT	2 [1]
✔ -P34	3/4 [19] FPT	2 [1]

ENGINEERING SPECIFICATION: Z1341
Exposed, anti-siphon, wall faucet for use in moderate climate installation, complete with Z1399-VB external vacuum breaker, all bronze interior components, vandal-resistant operating stem, rough bronze exterior and 3/4 [19] male hose connection (Conform to ASME B1.20.7). Furnished with choice of five different inlet connections. Provided with optional loose key handle.

OPTIONS (Check/specify appropriate options)

SUFFIXES

✔	-LF	Less Flange (-C12 and -CP12 only)
____	-PB	Polished Bronze Finish
____	-PC	Polished Chrome Finish
✔	-RC	Rough Chrome Finish
____	-RK	Hydrant Parts Repair Kit

1011
(Hose Connection Vacuum Breaker)

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
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3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
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