Table of Contents

FIRST 5 LA

750A N Alameda St, Los Angeles, CA 90012

Equipment Anchorage Calculations

PROJECT NUMBER: 19002647.00

February 26,2021

Job:	**By:**	**Job Number:**
Subject:	**Checked By:**	**Date:**

MECHANICAL EQUIPMENTS

ANCHORAGE CALCULATIONS

OSHPD

First 5 LA Building

750 N Alameda St, Los Angeles, CA 90012, USA

Latitude, Longitude: 34.055342, -118.237355

Date	11/11/2020, 12:05:49 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.981	MCE_R ground motion. (for 0.2 second period)
S_1	0.707	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.377	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.585	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.85	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	1.02	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.981	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.211	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.478	Factored deterministic acceleration value. (0.2 second)
S1RT	0.707	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.789	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.782	Factored deterministic acceleration value. (1.0 second)
PGAd	1	Factored deterministic acceleration value. (Peak Ground Acceleration)

Sheet	
By	*RA*
Job no.	*19002647.00*
Date	*2/26/2021*

PROJECT: First 5 LA

EQUIPMENT: AHU

EQUIPMENT CATEGORY: Mechanical and Electrical Components — Table 13.6-1, ASCE 7-16

EQUIPMENT TYPE: 1 — Air-side HVAC, fans, air handlers, air conditioning units, cabinet heaters, air distribution boxes, and other mechanical components constructed of sheet metal framing

HORIZONTAL SEISMIC DESIGN FORCE CALCULATION

As per CBC 2019/ ASCE 7-16

a_p =	2.5	COMP. AMP. FACTOR	*Table 13.6-1, ASCE 7-16*
R_p =	6	COMP. RESP. FACTOR	*Table 13.6-1, ASCE 7-16*
Ω =	2	OVER STRENGTH FACTOR	*Table 13.6-1, ASCE 7-16*
S_{DS} =	1.585	SHORT PERIOD SPECTRAL ACCELERATION	
I_p =	1.00	IMPORTANCE FACTOR	*Section 11.5.1 ,ASCE 7-16*
Z =	1	COMP. ATTACH. ELEV. (FT. OR LEVEL)	
H =	1	ROOF ELEV. (FT. OR LEVEL)	

$F_{ph,calc}$ =	**0.79 Wp**	$= 0.4*Ap*S_{DS}*Ip*(1+2*Z/H)W_p/R_p$	*Eqn 13.3-1, ASCE 7-16*
$F_{ph,min}$ =	**0.48 Wp**	$= 0.3S_{DS}I_pW_p$	*Eqn 13.3-3, ASCE 7-16*
$F_{ph,max}$ =	**2.54 Wp**	$= 1.6S_{DS}I_pW_p$	*Eqn 13.3-2, ASCE 7-16*

GOVERNING HORIZONTAL SEISMIC DESIGN FORCE ,*Fph*= **0.79 Wp**

SEISMIC DESIGN FORCE CONSIDERING OVERSTRENGTH FACTOR, Ω*Fph*= **1.59 Wp**

Job: First 5 LA	**By:** RA	**Job Number:** 19002647.00
Subject: Equipment Anchorage Calculations	**Checked By:**	**Date:** 02/26/2021

AHU -1 Anchorage

Equipment wt (including curb) = 9109 # + 1150# = 10250 #

Curb ht = 18" (assumed)

Equip Dim - 392" x 89" x 94" (L x W x H)

Net CG = 18" + 48" = 66"

Fph = 1.59 Wp (with omega factor)

Fph x 66" - (0.9 -0.2Sds) Wp x 89" /2 = T x 89"

1.59 x 10250# x 66" - 0.583 x 10250# x 89" /2 = T x 89"

T = 9098 lbs

Assuming for a 6" thk conc . (N wt - 2500 psi) & min edge distance from the anchor center line to pad edge to be 9"

Providing total 18 anchorage points -(7 each on longer side & 2 each on shorter side)

Tensile force / anchor = T / 7 = 9098 lbs / 7 = 1300 lbs / anchor

Shear force / anchor = 1.59 x Wp / 18 = 1.59 x 10250# / 18 = 889 lbs / anchor

Providing 1/2" KB-TZ w/ 3.25" embed was found to be working with DCR of 0.46

(see attached Hilti report below)

Company:		Page:	1
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

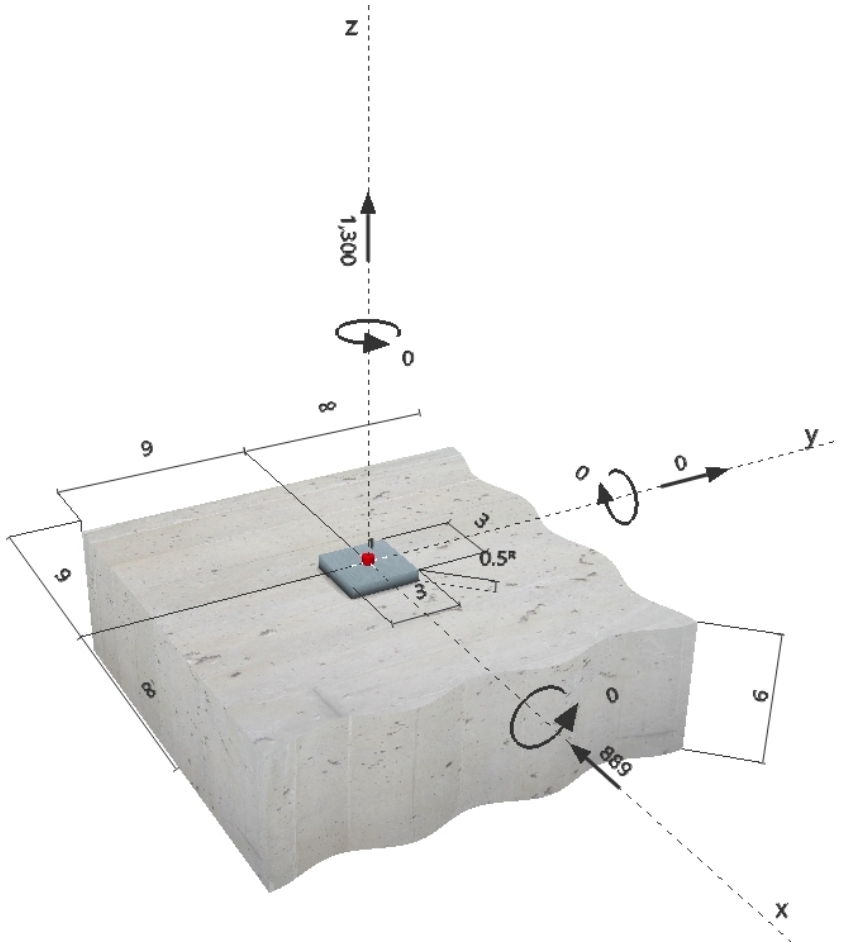
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - CS 1/2 (3 1/4)**
Effective embedment depth:	$h_{ef,act}$ = 3.250 in., h_{nom} = 3.625 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-1917
Issued I Valid:	1/1/2020 | 5/1/2021
Proof:	Design method ACI 318-14 / Mech.
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 3.000 in. x 3.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	no profile
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 6.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: >= No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	1,300	2,396	55 / -	OK
Shear	Steel Strength	889	3,572	- / 25	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.543	0.249	5/3	46	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Job: First 5 LA	**By:** RA	**Job Number:** 19002647.00
Subject: Equipment Anchorage Calculations	**Checked By:**	**Date:** 02/26/2021

AHU -2 Anchorage

Equipment wt (including curb) = 11824 # + 2024# = 13850 #

Curb ht = 18" (assumed)

Equip Dim - 395" x 114" x 94" (L x W x H)

Net CG = 18" + 60" = 78"

Fph = 1.59 Wp (with omega factor)

Fph x 78" - (0.9 -0.2Sds) Wp x 114" /2 = T x 114"

1.59 x 13850# x 78" - 0.583 x 10250# x 114" /2 = T x 114"

T = 11030 lbs

Assuming for a 6" thk conc . (N wt - 2500 psi) & min edge distance from the anchor center line to pad edge to be 9"

Providing total 18 anchorage points -(7 each on longer side & 2 each on shorter side)

Tensile force / anchor = T / 7 = 11030 lbs / 7 = 1576 lbs / anchor

Shear force / anchor = 1.59 x Wp / 18 = 1.59 x 13850# / 18 = 1223.5 lbs / anchor

Providing 1/2" KB-TZ w/ 3.25" embed was found to be working with DCR of 0.67

(see attached Hilti report below)

Company:		Page:	1
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

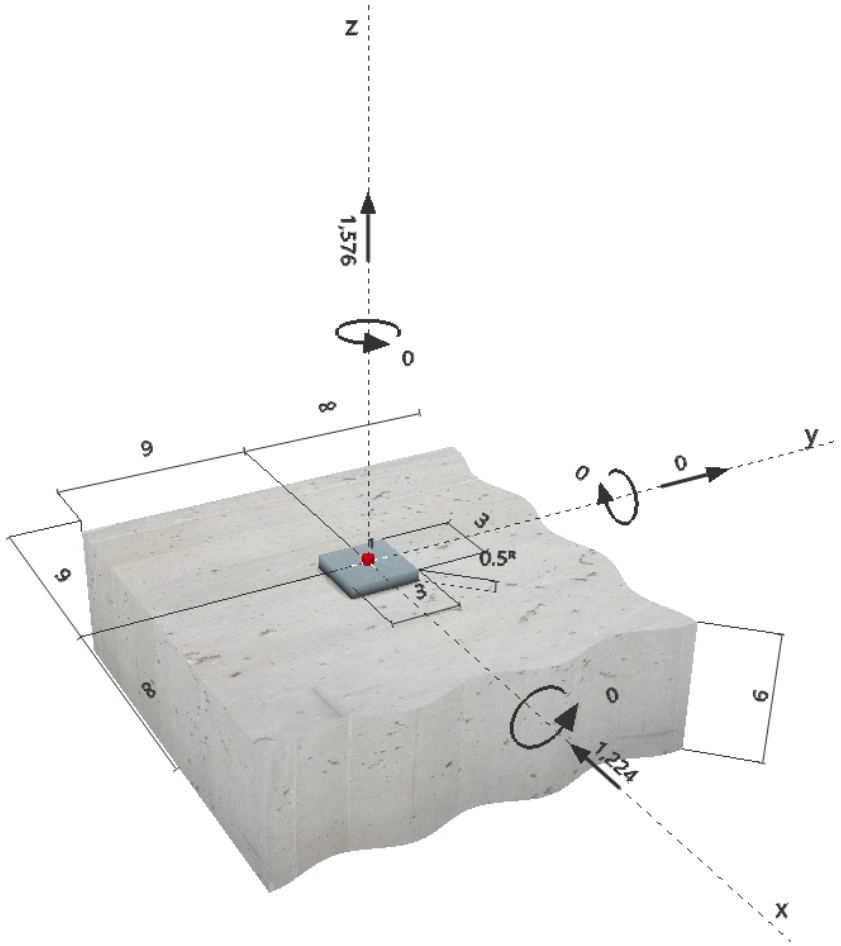
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - CS 1/2 (3 1/4)**
Effective embedment depth:	$h_{ef,act}$ = 3.250 in., h_{nom} = 3.625 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-1917
Issued I Valid:	1/1/2020 | 5/1/2021
Proof:	Design method ACI 318-14 / Mech.
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 3.000 in. x 3.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	no profile
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 6.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: >= No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	1,576	2,396	66 / -	OK
Shear	Steel Strength	1,224	3,572	- / 35	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.658	0.343	5/3	67	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Tag Data - Commercial Rooftop Air Conditioning Units (Midrange) (Qty: 3)

Item	Tag(s)	Qty	Description	Model Number
A1	50 ton	2	50 Ton Packaged Industrial Rooftop (	SXHLF5040-46CPJE9001**WU-H*K0--RW-M8--*-----*
A2	75 ton	1	75 Ton Packaged Industrial Rooftop (	SXHLF7540-56CUFE9001**WU-H*K0--RW-M8--*-----*

Product Data - Commercial Rooftop Air Conditioning Units (Midrange)

All Units

Standard Unit
DX Cooling only with extended casing
R-410A refrigerant
460 Volt-60 Hertz-3 Phase
600 rpm - Exhaust/return fan
0-100% Economizer with Traq outside air measurement & DCV
Economizer control w/ dry bulb
Grease lines
2.00" [51mm] Spring isolators
MERV 8 High efficiency throwaway filters
eDrive, Direct drive plenum (DDP) supply fan
VAV (DTC) with supply & exhaust/return VFD with bypass
Standard ambient control
cULus
Ultra low leak dampers (AMCA 511 Class 1A) with fault detection & diagnostics
High efficiency unit
0-5 volt Generic B.A.S Module
IntelliPak replacement unit with hinged access doors
BACnet communication interface module
Startup Included - Trane Service must start equipment for warranty to be honored
2nd-5th Year Replacement Compressor Warranty

Item: A1 Qty: 2 Tag(s): 50 ton

50 Ton unit
100% Exhaust - 5 hp with Statitrac building pressure control
25 hp DDP 80% width
1800 rpm

Item: A2 Qty: 1 Tag(s): 75 ton

75 Ton unit
100% Exhaust - 7.5 hp with Statitrac building pressure control
30 hp DDP 120% width
1500 rpm

Performance Data - Commercial Rooftop Air Conditioning Units (Midrange)

Tags	50 ton	75 ton
Supply airflow (cfm)	17000	22000
Exhaust/Return airflow (cfm)	13600	17600
Cooling entering DB (F)	80.00	80.00
Cooling entering WB (F)	67.00	67.00
Ambient DB (F)	95.00	95.00
Cooling leaving coil DB (F)	56.00	53.65
Cooling leaving coil WB (F)	55.24	52.85
Cooling leaving unit DB (F)	58.96	56.38
Cooling leaving unit WB (F)	56.40	53.97
Gross total capacity (MBh)	623.22	953.46
Gross sensible capacity (MBh)	457.36	665.66
Gross latent capacity (MBh)	165.86	287.80
Net total capacity (MBh)	567.86	887.15
Net sensible capacity (MBh)	402.00	599.35
Net sensible heat ratio (%)	70.79	67.56
Fan motor heat (MBh)	55.35	66.32
Evaporator face area (sq ft)	38.00	43.00
Supply duct static pressure (in H2O)	2.000	2.000
Return duct static pressure (in H2O)	1.000	1.000
Component S.P. drop (in H2O)	0.780	1.260
Total static pressure (in H2O)	3.780	4.260
Supply motor bhp (bhp)	19.95	23.51
Supply fan rpm (rpm)	1790	1490
Supply fan efficiency (%)	50.69	62.73
Exhaust static pressure (in H2O)	1.000	1.000
Exhaust motor bhp (bhp)	4.53	6.22
Exhaust fan rpm (rpm)	637	609
System power (kW)	64.14	97.59
EER @ AHRI (EER)	11.0	10.7
IEER @ AHRI (EER)	14.5	16.3
Minimum circuit ampacity (A)	135.13	198.10
Maximum overcurrent protection (A)	150.00	225.00
Minimum disconnect switch size (A)	146.00	217.00
Recommended dual element (A)	150.00	225.00
Compressor 1 count (Each)	2.00	2.00
Compressor 1 RLA (A)	20.20	37.20
Compressor 2 count (Each)	2.00	2.00
Compressor 2 RLA (A)	19.10	25.40
Supply fan motor FLA (A)	30.50	20.50
Supply motor count ( )	1	2
Supply fan count (Each)	1.00	2.00
Condenser fan FLA (A)	10.80	10.80
Exhaust fan motor FLA (A)	6.60	9.80
Other FLA (A)	1.00	2.00
R-410A refrigerant charge - circuit 1 (lb)	34.5	52.0
R-410A refrigerant charge - circuit 2 (lb)	32.5	50.5
Total installed weight (lb)	9108.6	11823.9

Mechanical Specifications - Commercial Rooftop Air Conditioning Units (Midrange)
Item: A1, A2 Qty: 3 Tag(s): 50 ton, 75 ton

General - R410A
Units shall be specifically designed for outdoor rooftop installation on a roof curb and be completely factory assembled and tested, piped, internally wired, fully charged with R-410A compressor oil and shipped in one piece. Units shall be available for direct expansion cooling only, or direct expansion cooling with natural gas, electric, hot water or steam heating. Filters, outside air system, exhaust air system, optional non-fused disconnect switches and all operating and safety controls shall be furnished factory installed. All units shall be cULus approved and factory run tested. Cooling capacity shall be rated in accordance with AHRI Standard 360. All units shall have decals and tags to aid in service and indicate caution areas. Electrical diagrams shall be printed on long life water resistant material and shall ship attached to control panel doors.

Casing
Exterior panels shall be zinc coated galvanized steel, phosphatized and painted with a slate grey air-dry finish durable enough to withstand a minimum of 672 hours consecutive salt spray application in accordance with standard ASTM B117. Screws shall be coated with zinc-plus-zinc chromate. Heavy gauge steel hinged access panels with tiebacks to secure door in open position shall provide access to filters and heating sections. Refrigeration components, supply air fan and compressor shall be accessible through removable panels as standard. Unit control panel, filter section, and gas heating section shall be accessible through hinged access panels as standard. Optional Double Wall Construction hinged access doors shall provide access to filters, return/exhaust air, heating and supply fan section. All access doors and panels shall have neoprene gaskets. Interior surfaces or exterior casing members shall have 1/2" Tuf-Skin fiberglass insulation. Unit base shall be watertight with heavy gauge formed load bearing members, formed recess and curb overhang. Unit lifting lugs shall accept chains or cables for rigging. Lifting lugs shall also serve as unit tiedown points.

IntelliPak Replacement Unit (IRU)
The IntelliPak replacement solution shall include a condenser base pan, strengthening of the condenser section with welded reinforcement of condenser base rail, as well as welded integral supports to the condenser base. This additional strength shall allow the reuse of the existing pedestal as well as any Trane full perimeter curb and reduce installation risk and labor. Also optional with stainless steel.

Hinged Access Doors
Hinged access doors shall provide easy access to supply fan, filters, exhaust/return fan, and heating section.These access doors shall feature double wall construction with dual density insulation sandwiched between heavy gauge galvanized steel panels for strength and durability

Air-Cooled Condenser Coil - R410A
Condenser coils shall have all Aluminum Microchannel coils. All coils shall be leak tested at the factory to ensure pressure integrity. The condenser coil is pressure tested to 650psig Subcooling circuit(s) shall be provided as standard.
.

Condenser Fans and Motors
All condenser fans shall be vertical discharge, direct drive fans, statically balanced, with aluminum blades and zinc plated steel hubs. Condenser fan motors shall be three-phase motors with permanently lubricated ball bearings, built-in current and thermal overload protection and weathertight slingers over motor bearings.

Evaporator Coil - R410A
Internally enhanced copper tubing of 3/8" or 1/2" O.D. shall be mechanically bonded to heavyduty aluminum fins of configured design. All coils shall be equipped with thermal expansion valves and factory pressure and leak tested.

Compressors - R410A
The Trane Scroll compressor shall be industrial grade, direct drive 3600 RPM maximum speed scroll type. The motor shall be suction gas-cooled hermetic design. Compressor shall have centrifugal oil pump with dirt separator, oil sight glass, and oil charging valve. Compressor shall also be provided with thermostatic motor winding temperature control to protect against excessive motor temperatures resulting from over-/under-voltage or loss of charge, high and low pressure cutouts, and reset relay.

High Efficiency Unit
High efficiency unit shall meet ASHRAE 189.1-2011 and CEE Tier 2 Commercial Unitary AC and HP Specification for utility rebate requirements.

Phase Monitor
Shall protect 3-phase equipment from phase loss, phase reversal, and low voltage. Any fault condition shall produce a Failure Indicator LED, and send the unit into an emergency stop condition. cULus approved. (Standard on 20-75T units)

Supply Fan
Supply fan motors shall be either open drip-proof or enclosed fan cooled. All supply fans shall be dynamically balanced in factory. Supply fan shall be test run in unit and shall reach rated rpm. All 60 Hz supply fan motors meet the Energy Independence Security Act of 2007 (EISA). All 50 Hz supply fan motors meet the U.S. Energy Policy Act of 1992 (EPACT).

Direct-Drive Plenum Supply Fan
Supply fan shall be [one] [two] single width, single inlet 9-blade plenum fan. Fan blades shall be aluminum backward-inclined airfoil. Plenum fans shall be direct-driven. Entire assembly shall be completely isolated from unit and fan board by 2" deflection spring isolation. Multiple fan widths shall be available to optimize efficiency. Fan shall not require routine maintenance such as fan bearing lubrication, belt tensioning and replacement, sheave alignment, and setscrew torque checks.

Variable Frequency Drive
Unit shall include factory-installed and tested variable frequency drive[s] (VFD) to provide motor speed modulation. The VFD shall receive a 0-10VDC speed signal from the unit controller. The drive will respond to the signal by accelerating or decelerating to maintain the controlling set point (duct static, space pressure, etc). VFD shall also include the following features:

1. Designed, constructed, and tested in accordance with NEMA ICS, NFPA, and IEC standards and housed in a plastic IP20 enclosure.
2. DC link reactors on both the positive and negative rails of the DC bus equal to 3% impedance to minimize power line harmonics.
3. Full rated output current continuously - 110% of rated current for 60 seconds and 160% of rated current for up to 0.5 second while starting.
4. Isolation between the Drive's power circuitry and control circuitry to ensure operator safety and to protect connected electronic control equipment
   from damage caused by voltage spikes, current surges, and ground loop currents.

5. Audible noise reduction through automatic adjustment of the carrier frequency and frequency avoidance.

6. Rated at 40C with a standard operating range of -10 to 50C (14 to 124F) ambient temperatures and 0 to 95% relative humidity

7. Self-diagnostics and motor protections such as: cULus listed overload, phase loss, and internal thermal overload.

8. Off/Stop and Auto/Start selector switches to start and stop the AC Drive and determine the speed reference.

a. On units with bypass, an AC Drive/Off/Bypass hand selector switch shall be provided in the unit control box

b. In DRIVE mode speed reference shall be provided by a 0-10 VDC analog input

9. A keypad interface which shall be programmable by language and feature multiple lines for easy reading.

10. Controlled and/or accessible points such as AC Drive Start/Stop, speed reference, and fault diagnostics.

11. Meter points such as motor power in HP, motor power in kW, motor kW-hr, motor current, motor voltage, hours run, DC link voltage, thermal load
   on motor, Thermal load on AC Drive and Heatsink temperature.

12. Troubleshooting features such as:

a. AC Drive memory storage of the last 10 faults and related operational data

b. Four simultaneous displays: frequency or speed, run time, output amps and output power

c. Keypad which shall display: Reference Signal Value, Output Frequency in Hz or percent, Output Amps, Motor HP, Motor kW, kW

13. Coated circuit boards for protection against corrosive environments

14. Field readable BACnet points to allow for communication of stauts, setpoints and diagnostics to the BAS.

Bypass control
Shall provide full nominal airflow in the event of drive failure.

Extended Grease Lines
Lines shall be provided to allow greasing of supply and exhaust/return fan bearings through he filter access door.

Two-inch Spring Isolators
Supply and Exhaust/Return fan (if applicable) assemblies shall be isolated with two-inch nominal deflection to reduce transmission of vibrations

Modulating 100 Percent Exhaust Fan with Statitrac Control
Two, double-inlet, forward-curved fans shall be mounted on a common shaft with fixed sheave drive. All fans shall be dynamically balanced and tested in factory before being installed in unit. Exhaust fan shall be test run as part of unit final run test. Unit shall reach rated rpm before fan shaft passes through first critical speed. Fan shaft shall be mounted on two grease lubricated ball bearings designed for 200,000-hour average life. Optional extended grease lines shall be provided to allow greasing of bearings from unit filter section. Fan motor and assembly shall be mounted on common base to allow consistent belt tension with no relative motion between fan and motor shafts. Entire assembly shall be completely isolated from unit and fan board by double deflection, rubber in shear isolators or spring isolation on motor sizes larger than five hp. For both CV and VAV rooftops, the 100 percent modulating exhaust discharge dampers (or VFD) shall be modulated in response to building pressure. A differential pressure control system, (Statitrac), shall use a differential pressure transducer to compare indoor building pressure to outdoor ambient atmospheric pressure. The FC exhaust fan shall be turned on when required to lower building static pressure setpoint. The (Statitrac) control system shall then modulate the discharge dampers (or VFD) to control the building pressure to within the adjustable, specified dead band that shall be adjustable at the Human Interface Panel. All 60 Hz exhaust fan motors meet the Energy Independence Security Act of 2007 (EISA).

0-100 percent modulating economizer
Operated through the primary temperature controls to automatically utilize OA for "free" cooling. Automatically modulated return and OA dampers shall maintain proper temperature in the conditioned space. Economizer shall be equipped with an automatic lockout when the outdoor high ambient temperature is too high for proper cooling. Minimum position control shall be standard and adjustable at the Human Interface Panel or with a remote potentiometer or through the building management system. A spring return motor shall ensure closure of OA dampers during unit shutdown or power interruption. Mechanical cooling shall be available to aid the economizer mode at any ambient. Low leak economizer dampers shall be standard with a leakage rate of 2.5 percent of nominal airflow (400 CFM/ton) at 1" wg. static pressure.

Economizer Control with Dry Bulb
An outdoor temperature sensor shall be included for comparing the outdoor dry bulb temperature to a locally adjustable temperature setpoint. The setpoint shall be programmed at the human interface, or remote human interface, to determine if outdoor air temperature is suitable for economizer operation.

Ultra-Low Leak Damper
Economizer return and fresh air dampers shall be provided with horizontal airfoil blades and spring-return actuators. The economizer shall have a functional life of 60,000 opening and closing cycles. Dampers shall be AMCA 511 Class 1A certified with a maximum leakage rate of 3 CFM/sqft at 1.0 inWC pressure differential thus exceeding requirements of ASHRAE 90.1-2013, California Title 24-2013, and IECC-2012. Fault Detection and Diagnostic (FDD) control will also be provided with Ultra Low Leak Economizers. FDD control monitors the commanded position of the economizer compared to the feedback position of the damper. If the damper position is outside +/- 10% of the commanded position, a diagnostic is generated.

Ultra-Low Leak motorized exhaust dampers will be provided when the Ultra-Low Leak Economizer is ordered with an exhaust/return option that includes motorized dampers. Ultra Low Leak motorized exhaust dampers will be AMCA 511

Class 1A certified with a maximum leakage rate of 3 CFM/sq-ft at 1.0 inWC pressure differential. This exceeds the most stringent requirements of ASHRAE 90.1 and IECC (4 CFM/sq-ft at 1.0 inWC pressure differential).

Traq (Outside Air Measurement)
Traq shall include Ventilation Control Module (VCM). The VCM shall be linked to the Intellipak UCM to control the minimum fresh air entering the unit. Using a velocity pressure sensing ring, the VCM monitors and controls the quantity of fresh air entering the unit. This allows it to control to the minimum outside airflow setpoint. An optional temperature sensor can be connected to the VCM which enables it to control a field installed fresh air preheater; and an optional carbon dioxide sensor can be connected to the VCM to control the carbon dioxide reset. Option is cULus approved.

Demand Control Ventilation
Provide demand control ventilation (DCV) system fully integrated with unit economizer. Controller shall minimize fresh air intake during periods of low occupancy based on parts per million space CO2 in response to a customer defined parts per million CO2 setpoint. CO2 setpoint, and minimum DCV fresh air damper position shall be programmable at the human interface, or building management system
Note: CO2 sensor used with Demand Control Ventilation must be powered from an external power source or separate 24 VAC transformer.

Unit Controller
DDC microprocessor controls shall be provided to control all unit functions. The control system shall be suitable to control CV or VAV applications. The controls shall be factory-installed and mounted in the main control panel. All factory-installed controls shall be fully commissioned (run tested) at the factory. The unit shall have a Human Interface Panel with a 16 key keypad, a 2 line X 40 character clear English display as standard to provide the operator with full adjustment and display of control data functions. The unit controls shall be used as a stand-alone controller, or as part of a building management system involving multiple units.

1
The unit shall be equipped with a complete microprocessor control system. This system shall consist of temperature and pressure (thermistor and transducer) sensors, printed circuit boards (modules), and a unit mounted HumanInterface Panel. Modules (boards) shall be individually replaceable for ease of service. All microprocessors, boards and sensors shall be factory mounted, wired and tested. The microprocessor boards shall be stand-alone DDC controls not dependent on communications with an on-site PC or a Building Management Network. The microprocessors shall be equipped with on-board diagnostics, indicating that all hardware, software and interconnecting wiring are in proper operating condition. The modules (boards) shall be protected to prevent RFI and voltage transients from affecting the board's circuits. All field wiring shall be terminated at separate, clearly marked terminal strip. Direct field wiring to the I/O boards is not acceptable. The microprocessor's memory shall be non-volatile EEPROM type requiring no battery or capacitive backup, while maintaining all data.

2
Zone sensors shall be available in several combinations with selectable features depending on sensor.

3
The Human Interface Panel's keypad display character format shall be 40 characters x 2 lines. The character font shall be 5 x 7 dot matrix plus cursor. The display shall be Supertwist Liquid Crystal Display (LCD) with blue characters on a ray/green background which provides high visibility and ease of interface. The display format shall be in clear English. Two or three digit coded displays are not acceptable.

4
The keypad shall be equipped with 16 individual touch-sensitive membrane key switches. The switches shall be divided into four separate sections and be password protected from change by unauthorized personnel. The six main menus shall be STATUS, SETPOINTS, DIAGNOSTICS, SETUP, CONFIGURATION and SERVICE MODE.

BACnet Communication Interface Module
Option shall provide control and monitoring of the rooftop by Tracer SC or a 3rd party building management system utilizing BACnet protocol.

Unit Interrupt Rating (Standard Short Circuit Current Rating-SCCR)
A 5,000 Amp rating shall be applied to the unit enclosure using a non-fused circuit breaker for disconnect switch purposes. Fan motors, compressors, and electric heat circuits shall be provided with protective devices that will provide the unit rated level of fault protection. The unit shall be marked with approved cULus markings and will adhere to cULus

regulations.

Equipment manufactured by Trane that includes required start-up and sold in North America will not be warranted by Trane unless Trane or its authorized independent Trane commercial sales office performs the startup on the equipment.

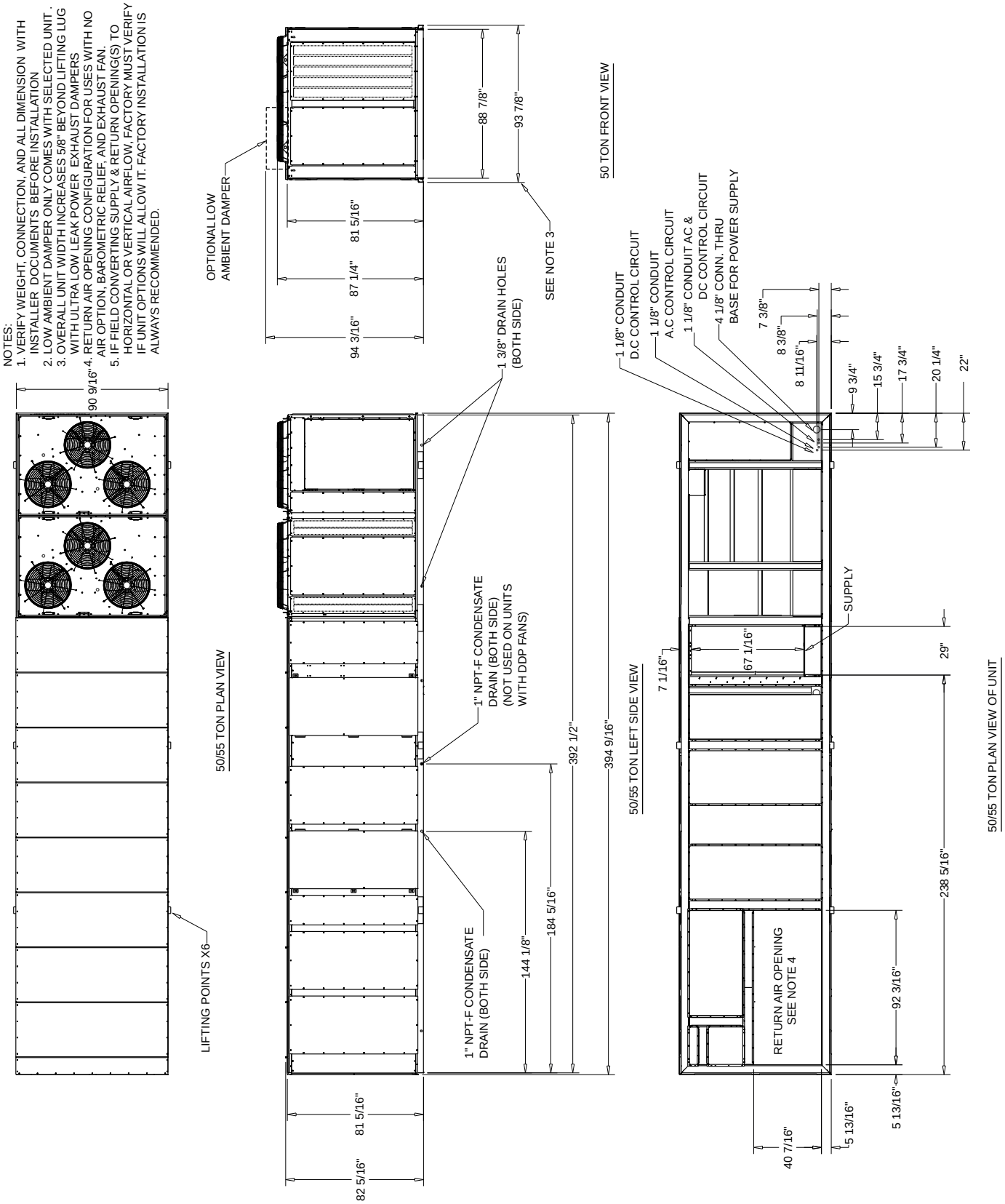
Certified AHRI Performance

Packaged Rooftop units cooling, heating capacities and efficiencies are rated within the scope of the Air-Conditioning, Heating & Refrigeration Institute (AHRI) Certification Program and display the AHRI Certified® mark as a visual confirmation of conformance to the certification sections of AHRI Standard 340-360 (I-P) and ANSIZ21.47 and 10 CFR Part 431 pertaining to Commercial Warm Air Furnaces. The applications in this catalog specifically excluded from the AHRI certification program are:

-Ventilation modes
-Heat Recovery.
-Units larger than nominal 63 tons in Cooling
-Evaporative Condensers

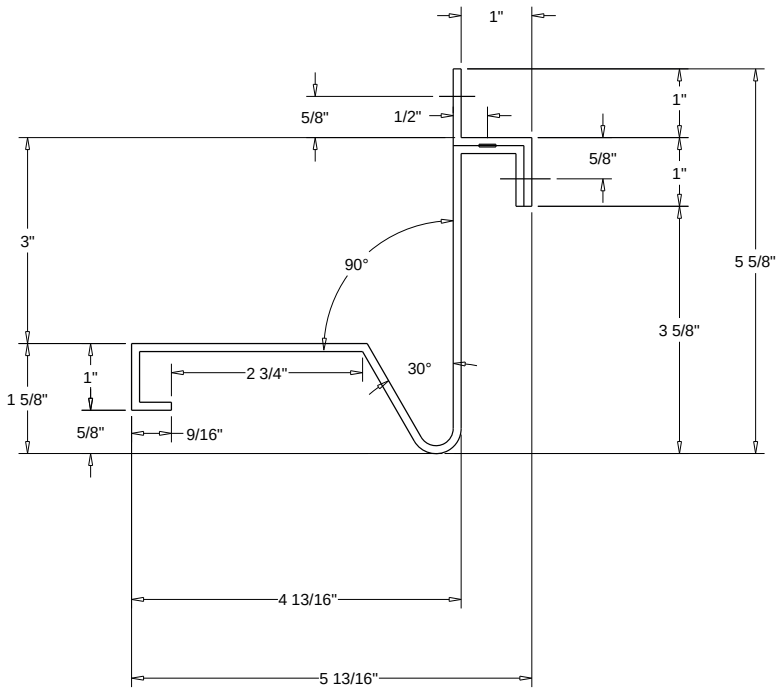
Unit Dimensions - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A1 Qty: 2 Tag(s): 50 ton

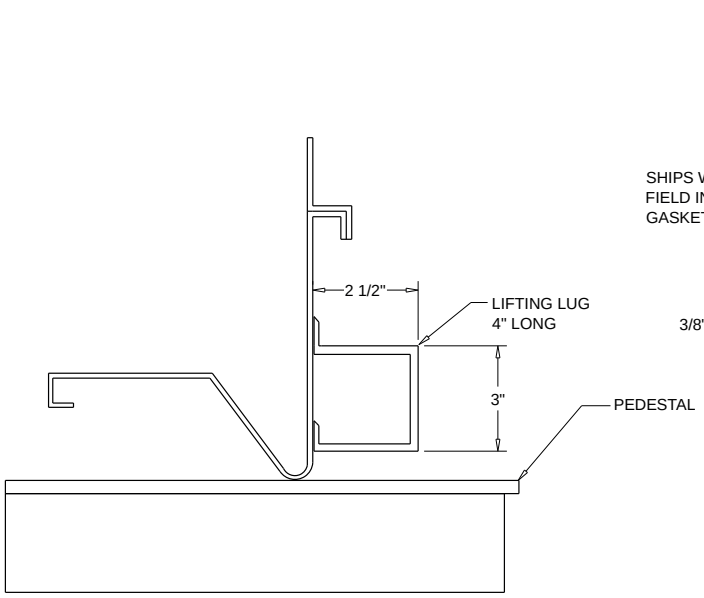


Unit Dimensions - Commercial Rooftop Air Conditioning Units (Midrange)

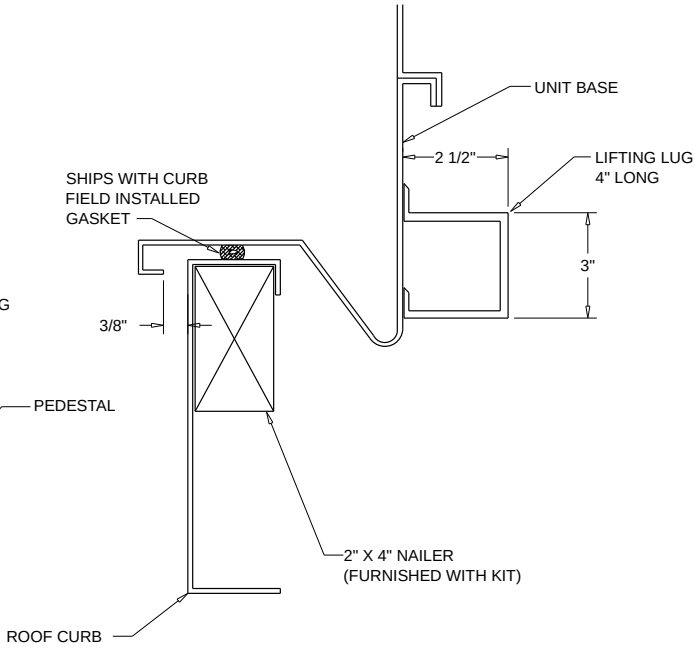
Item: A1, A2 Qty: 3 Tag(s): 50 ton, 75 ton



TYPICAL PEDESTAL AND BASE
DIMENSION DRAWING



TYPICAL PEDESTAL AND BASE PAN DETAIL
DETAIL



TYPICAL ROOF CURB AND BASE PAN DETAIL
DETAIL

Unit Dimensions - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A1 Qty: 2 Tag(s): 50 ton

ELECTRICAL / GENERAL DATA

TONS

Model (Tonnage):	SXHLF50 (50Ton)
Unit Operating Voltage Range:	414-506
Unit Primary Voltage:	460
Unit Hertz:	60
Unit Phase:	3
EER:	11.0 EER
IEER:	14.5 EER

GAS HEATING - PERFORMANCE

Heating Input:	
Heating Output:	
Capacity Steps:	
HEATING - GENERAL DATA	
Gas inlet pressure: (in w.c.)	
Gas Pipe Connection Size:	

COMPRESSOR

Compressor 1 Count:	2.00 Each
Compressor 1 RLA:	20.20 A
Compressor 2 Count:	2.00 Each
Compressor 2 RLA:	19.10 A
Compressor 3 Count:	Value not available
Compressor 3 RLA:	Value not available

ELECTRIC HEATER

Electric Heater Kw:	
Electric Heater Full Load Amps:	

SUPPLY FAN MOTOR

Number of Fans:	1.00 Each
Number of Motors:	1
Total Horsepower:	25 hp DDP 80% width
Supply Fan Motor Full Load Amps:	30.50 A
Supply Fan Efficiency:	50.69 %

EXHAUST / RETURN FAN MOTOR SECTION

Number:	Value not available
Horsepower (Each):	100% Exhaust - 5 hp with Statitrac building pressure control
Exhaust/Return Fan Motor FLA:	6.60 A

CONDENSER FAN MOTOR

Number:	6
Horsepower (each):	1.0
Condenser Fan Motor Full Load Amps (Total):	10.8

FILTERS - TYPE

Type:	
Furnished:	YES
Number:	20
Recommended Size:	20"x25"x 2"
PREFILTERS	
Furnished:	
Number:	
Recommended Size:	

EVAPORATIVE CONDENSER (7)

Pump Horsepower:	N/A
Pump Full Load Amps:	N/A
Sump Heater Full Load Amps:	N/A
Sump Heater kW:	N/A

REFRIGERANT TYPE (6)

Charge Type:	R-410A
Factory Charge (Circuit #1):	34.5 lb
Factory Charge (Circuit #2):	32.5 lb

FINAL FILTERS - TYPE

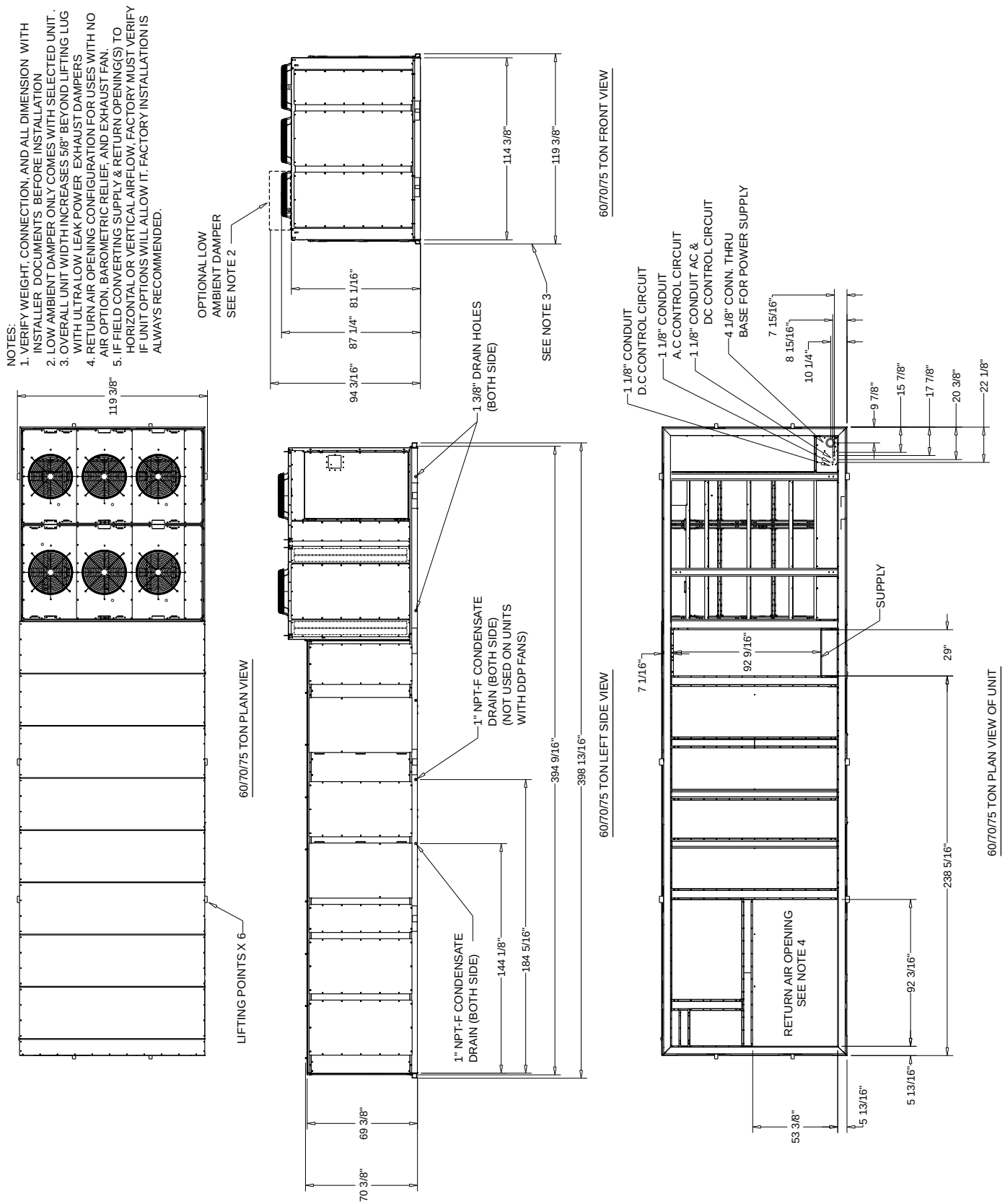
Type:	
Furnished:	
Number:	
Recommended Size:	
PREFILTERS	
Furnished:	
Number:	
Recommended Size:	

Notes:

1. LOAD 1=Current of the largest motor (compressor or fan motor); LOAD 2=Sum of the currents of all remaining motors; LOAD 3 =Current of electric heaters LOAD 4 =Control Power Transformer (20-40 and 24-48 ton units add 3 FL amps for wire sizing formula, 50-75 and 59 - 89 ton units add 6 FL amps)
2. For Electric Heat MCA, MOP, RDE values, calculate for both cooling and heating modes. (When determining LOADS, the compressors do not operate when the unit is in heating mode) (On 70-89 ton single source units, heating Load 4 = 12 amps on 200,230 volt units and 9 amps on 460,575 volt units)
3. If selected Max Over Cur is less than the Min CIr Amp, then select the lowest maximum fuse size which is equal to or larger than the Min Cir Amp, provided the selected fuse size does not exceed 800 amps.
4. If the selected Recommended Dual Element fuse size is greater than the selected Max Over Cur Protection value, then select the Recommended Dual Element fuse size value to equal the Max Over Protection value.
5. Compressor KW at AHRI rating conditions of 80/67 -95
6. Refrigerant charge is an approx. value. For a more precise value, see unit nameplate and service instructions.
7. Sump Heater is an optional feature.
8. Total Horsepower is the combined Horsepower for the Supply Fan Motors.

Unit Dimensions - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A2 Qty: 1 Tag(s): 75 ton



Unit Dimensions - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A2 Qty: 1 Tag(s): 75 ton

ELECTRICAL / GENERAL DATA

TONS

Model (Tonnage):	SXHLF75 (75Ton)
Unit Operating Voltage Range:	414-506
Unit Primary Voltage:	460
Unit Hertz:	60
Unit Phase:	3
EER:	10.7 EER
IEER:	16.3 EER

GAS HEATING - PERFORMANCE

Heating Input:	
Heating Output:	
Capacity Steps:	
HEATING - GENERAL DATA	
Gas inlet pressure: (in w.c.)	
Gas Pipe Connection Size:	

COMPRESSOR

Compressor 1 Count:	2.00 Each
Compressor 1 RLA:	37.20 A
Compressor 2 Count:	2.00 Each
Compressor 2 RLA:	25.40 A
Compressor 3 Count:	Value not available
Compressor 3 RLA:	Value not available

ELECTRIC HEATER

Electric Heater Kw:	
Electric Heater Full Load Amps:	

SUPPLY FAN MOTOR

Number of Fans:	2.00 Each
Number of Motors:	2
Total Horsepower: (8)	30 hp DDP 120% width
Supply Fan Motor Full Load Amps:	20.50 A
Supply Fan Efficiency:	62.73 %

EXHAUST / RETURN FAN MOTOR SECTION

Number:	Value not available
Horsepower (Each):	100% Exhaust - 7.5 hp with Statitrac building pressure control
Exhaust/Return Fan Motor FLA:	9.80 A

CONDENSER FAN MOTOR

Number:	6
Horsepower (each):	1.0
Condenser Fan Motor Full Load Amps (Total):	10.8

FILTERS - TYPE

Type:	
Furnished:	YES
Number:	35
Recommended Size:	16" x20" x2"
PREFILTERS	
Furnished:	
Number:	
Recommended Size:	

EVAPORATIVE CONDENSER (7)

Pump Horsepower:	N/A
Pump Full Load Amps:	N/A
Sump Heater Full Load Amps:	N/A
Sump Heater kW:	N/A

REFRIGERANT TYPE (6)

Charge Type:	R-410A
Factory Charge (Circuit #1):	52.0 lb
Factory Charge (Circuit #2):	50.5 lb

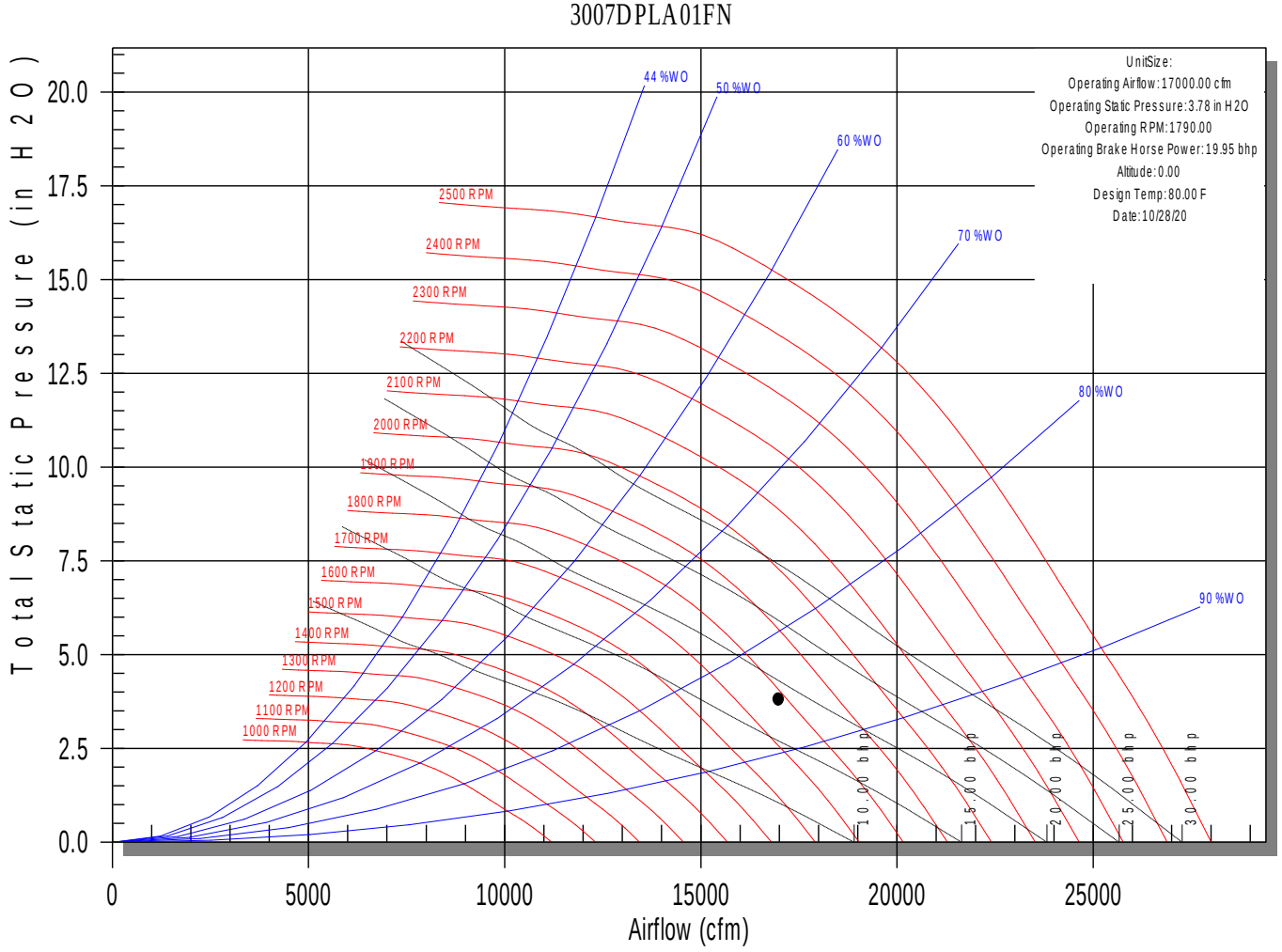
FINAL FILTERS - TYPE

Type:	
Furnished:	
Number:	
Recommended Size:	
PREFILTERS	
Furnished:	
Number:	
Recommended Size:	

Notes:

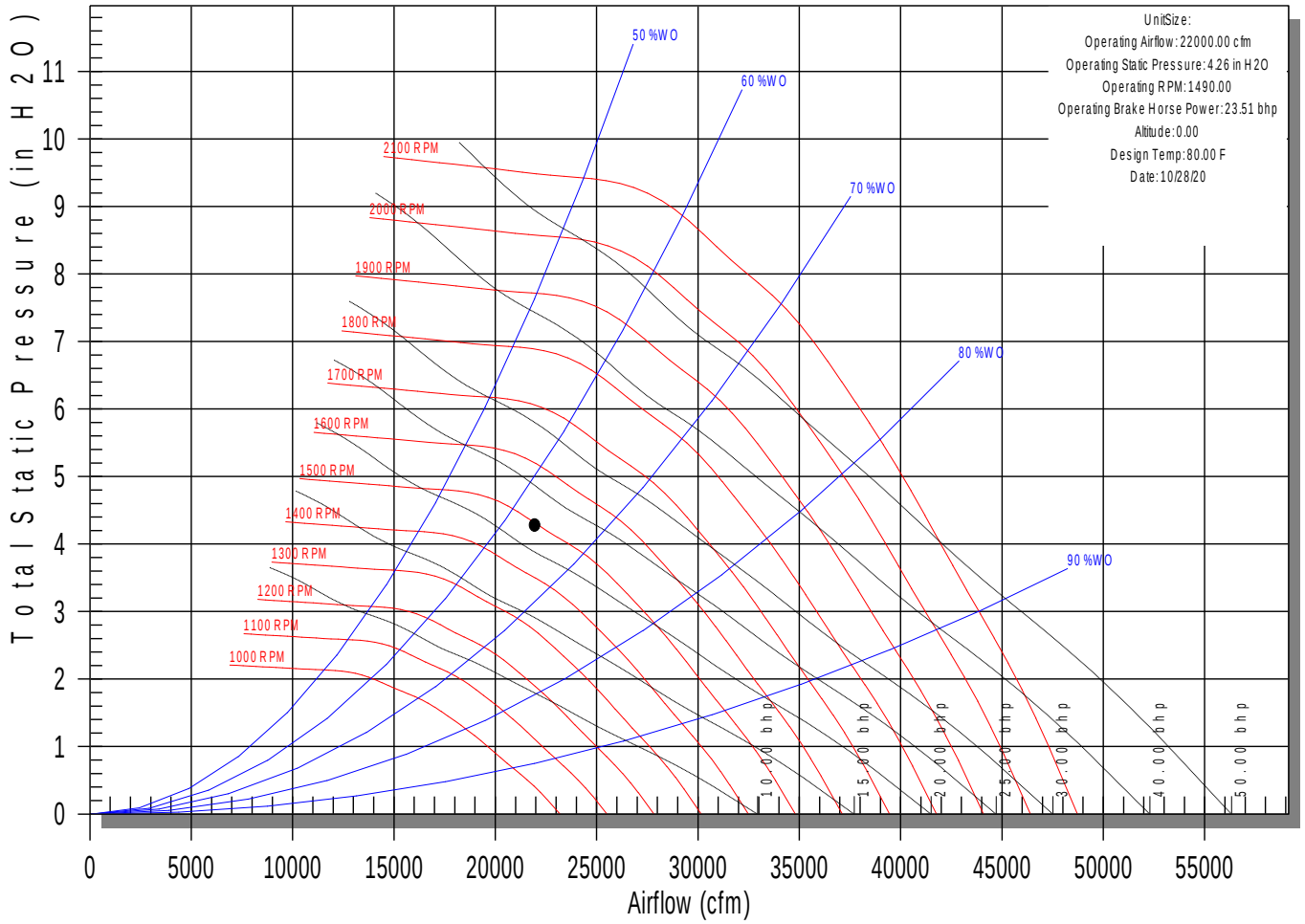
1. LOAD 1=Current of the largest motor (compressor or fan motor); LOAD 2=Sum of the currents of all remaining motors; LOAD 3 =Current of electric heaters LOAD 4 =Control Power Transformer (20-40 and 24-48 ton units add 3 FL amps for wire sizing formula, 50-75 and 59 - 89 ton units add 6 FL amps)
2. For Electric Heat MCA, MOP, RDE values, calculate for both cooling and heating modes. (When determining LOADS, the compressors do not operate when the unit is in heating mode) (On 70-89 ton single source units, heating Load 4 = 12 amps on 200,230 volt units and 9 amps on 460,575 volt units)
3. If selected Max Over Cur is less than the Min CIr Amp, then select the lowest maximum fuse size which is equal to or larger than the Min Cir Amp, provided the selected fuse size does not exceed 800 amps.
4. If the selected Recommended Dual Element fuse size is greater than the selected Max Over Cur Protection value, then select the Recommended Dual Element fuse size value to equal the Max Over Protection value.
5. Compressor KW at AHRI rating conditions of 80/67 -95
6. Refrigerant charge is an approx. value. For a more precise value, see unit nameplate and service instructions.
7. Sump Heater is an optional feature.
8. Total Horsepower is the combined Horsepower for the Supply Fan Motors.

Fan Curve - Commercial Rooftop Air Conditioning Units (Midrange)
Item: A1 Qty: 2 Tag(s): 50 ton



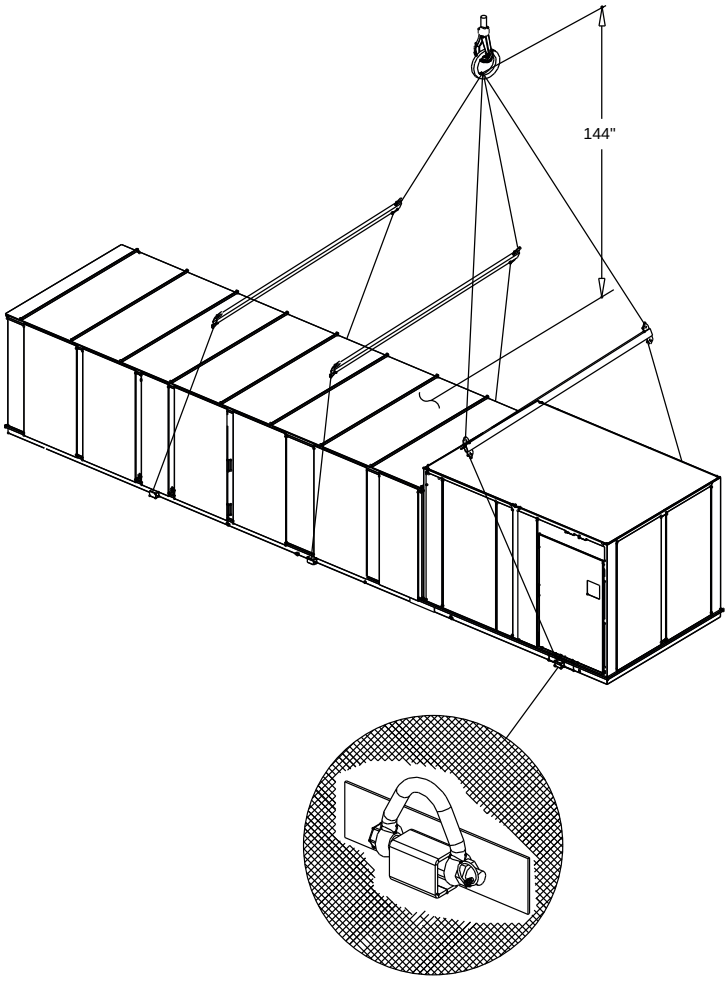
Fan Curve - Commercial Rooftop Air Conditioning Units (Midrange)
Item: A2 Qty: 1 Tag(s): 75 ton

2-2710DPLA01FN

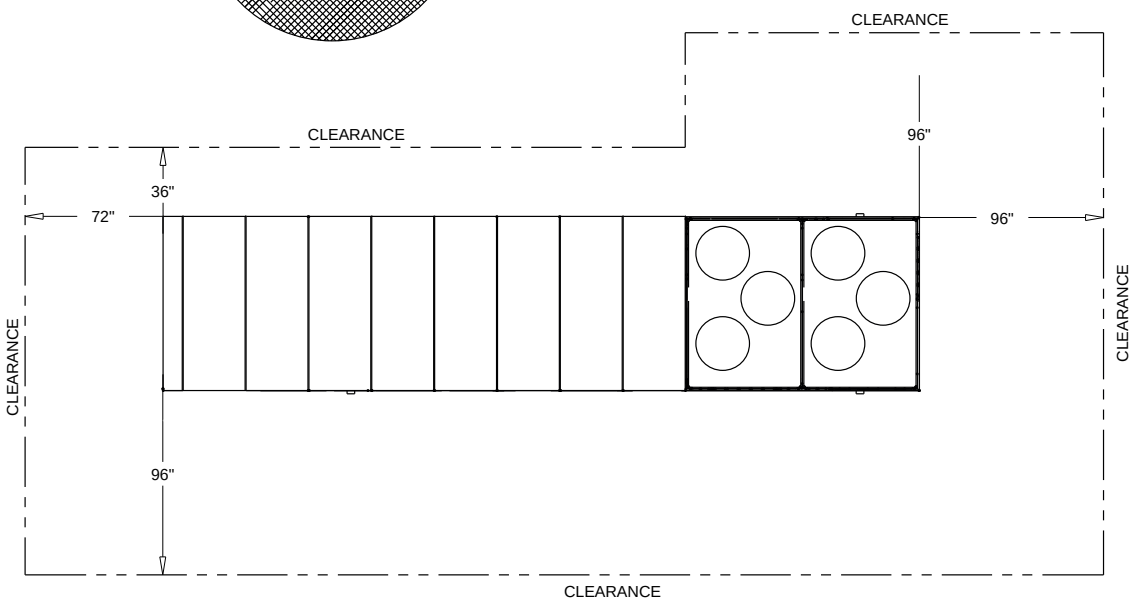


Weight, Clearance & Rigging Diagram - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A1 Qty: 2 Tag(s): 50 ton



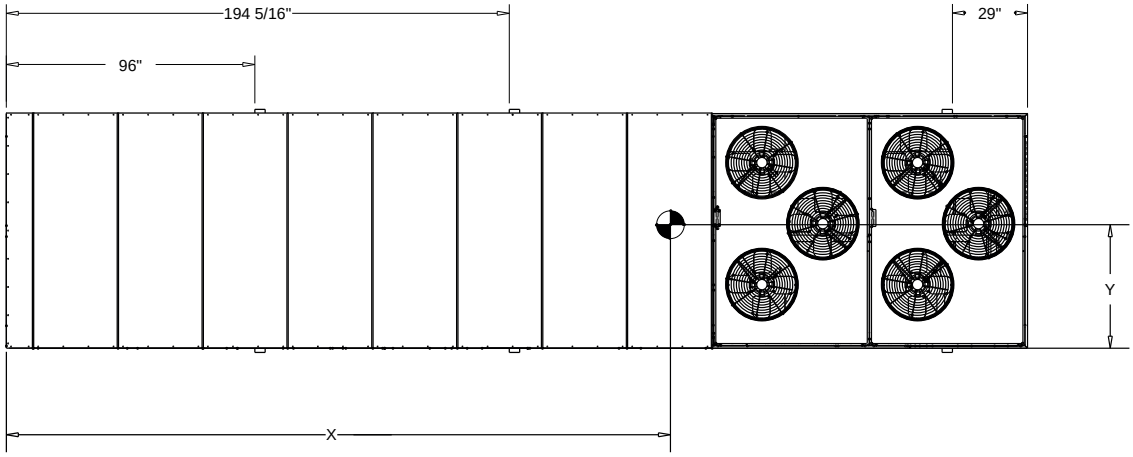
Note:
When 2 or more units are to be placed side by side, the distance between the units should be increased to 150% of the recommended single unit clearance. The units should also be staggered to reduce span deflection & assure proper diffusion of exhaust air.

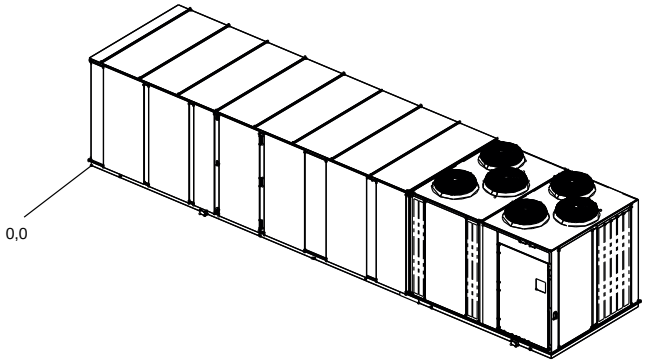


RIGGING AND CLEARANCE
AIR COOLED DRAWING

Weight, Clearance & Rigging Diagram - Commercial Rooftop Air Conditioning Units (Midrange)

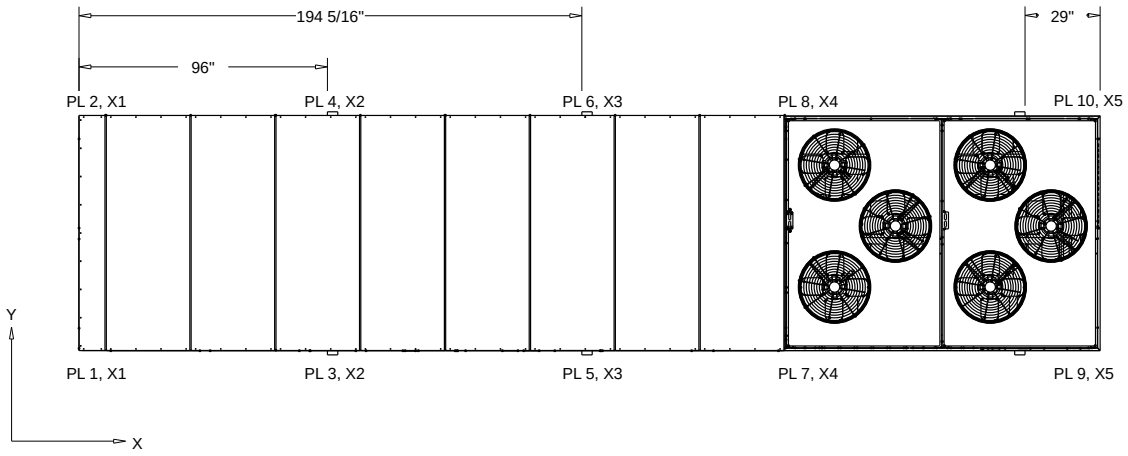
Item: A1 Qty: 2 Tag(s): 50 ton





Center of Gravity X:	17.43 ft	Point load X location 1:	4.000 in
Center of Gravity Y:	4.01 ft	Point load X location 2:	101.000 in
		Point load X location 3:	187.000 in
Point Load 1:	628.6 lb	Point load X location 4:	274.000 in
Point Load 2:	744.8 lb	Point load X location 5:	370.000 in
Point Load 3:	747.3 lb	Point load X location 6:	N/A
Point Load 4:	863.5 lb	Point load X location 7:	N/A
Point Load 5:	852.5 lb	Point load X location 8:	N/A
Point Load 6:	968.7 lb	Point load X location 9:	N/A
Point Load 7:	959.0 lb	Point load X location 10:	N/A
Point Load 8:	1075.2 lb	Point load Y location 1:	4.000 in
Point Load 9:	1076.5 lb	Point load Y location 2:	87.000 in
Point Load 10:	1192.6 lb		
Total Weight:	9108.6 lb		
Added Weight 1. Double wall : (3)	N/A		

Notes:
1. The actual weight is stamped on the unit nameplate.
2. The weight shown represents the typical unit operating weight for the configuration selected. Estimated at +/- 10% of the nameplate weight. .
3. Add weight to the total unit weight.
4. Design Special weights are not displayed. Any weight added through COD (Custom Order Design) will not be accounted in the +/- 10% estimate
5. When 2 or more units are to be placed side by side, the distance between the units should be increased to 150% of the recommended single unit clearance. The units should also be staggered to reduce span deflection & assure proper diffusion of exhaust air.

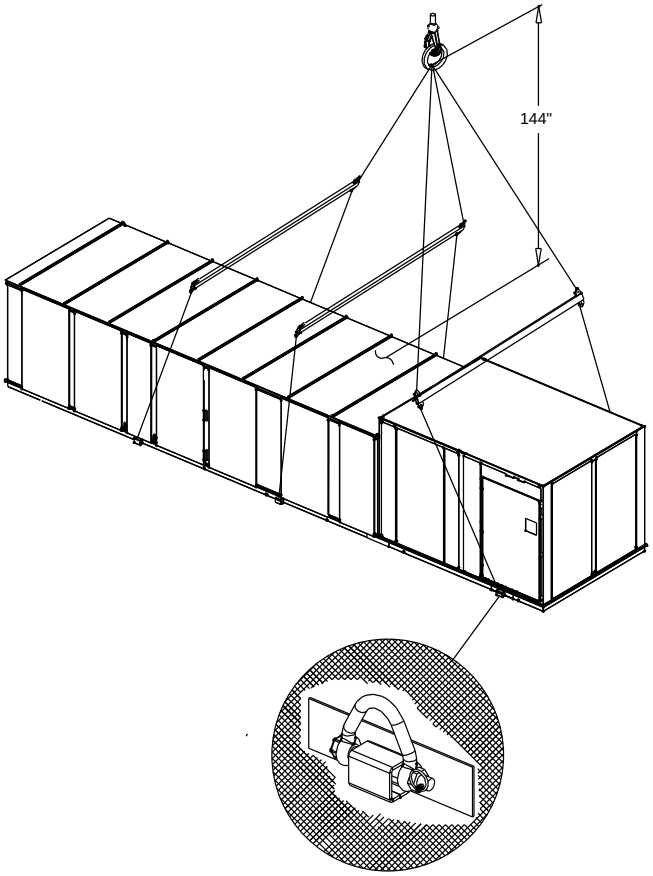


CENTER OF GRAVITY AND INSTALL WEIGHT X-Y POINTS

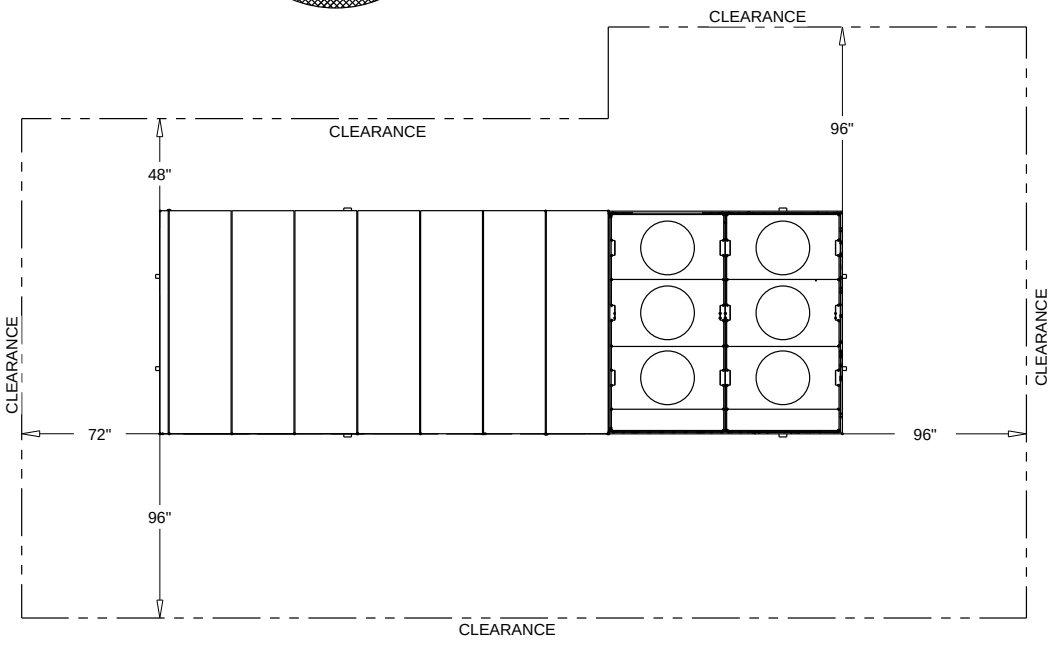
AIR COOLED DRAWING

Weight, Clearance & Rigging Diagram - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A2 Qty: 1 Tag(s): 75 ton



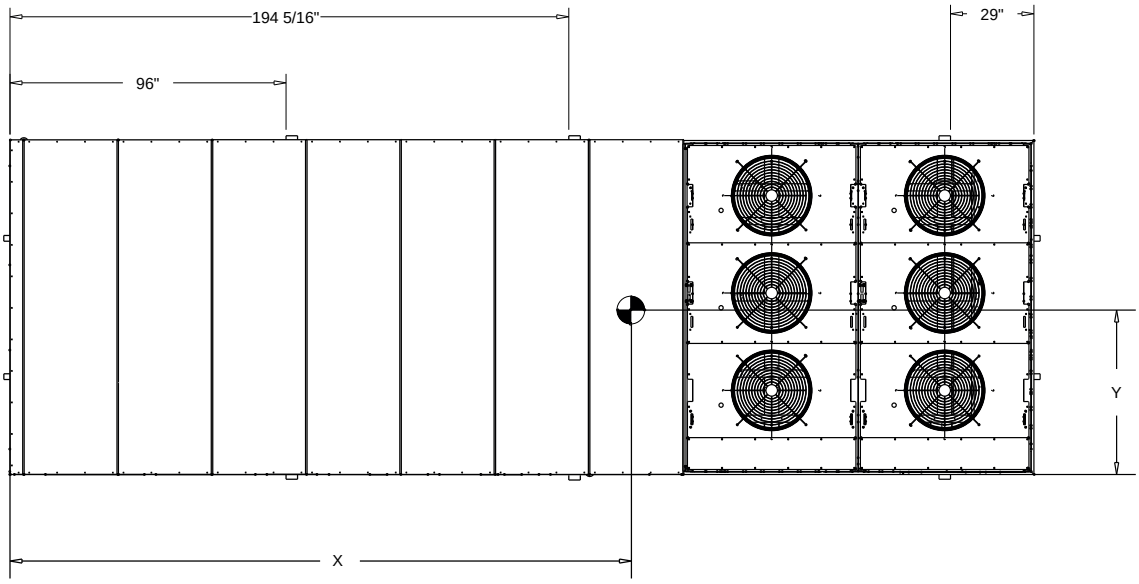
Note:
When 2 or more units are to be placed side by side, the distance between the units should be increased to 150% of the recommended single unit clearance. The units should also be staggered to reduce span deflection & assure proper diffusion of exhaust air.

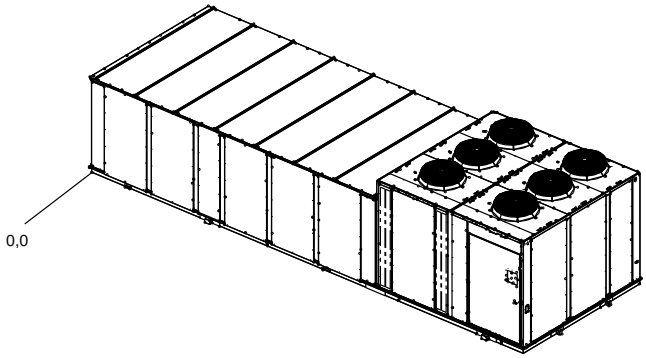


RIGGING AND CLEARANCE
AIR COOLED DRAWING

Weight, Clearance & Rigging Diagram - Commercial Rooftop Air Conditioning Units (Midrange)

Item: A2 Qty: 1 Tag(s): 75 ton

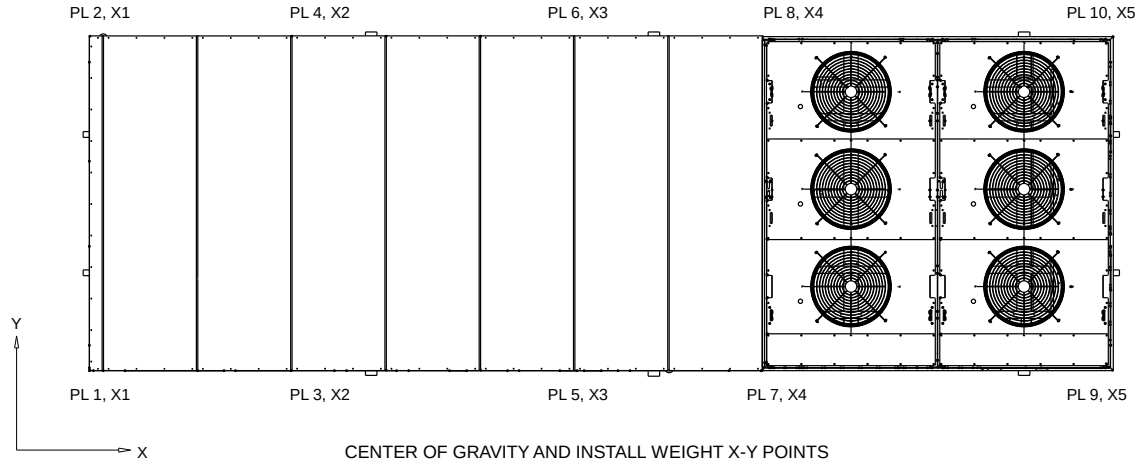




Center of Gravity X:	17.72 ft	Point load X location 1:	4.000 in
Center of Gravity Y:	4.98 ft	Point load X location 2:	101.000 in
		Point load X location 3:	187.000 in
Point Load 1:	805.4 lb	Point load X location 4:	274.000 in
Point Load 2:	884.7 lb	Point load X location 5:	370.000 in
Point Load 3:	984.0 lb	Point load X location 6:	N/A
Point Load 4:	1063.3 lb	Point load X location 7:	N/A
Point Load 5:	1142.4 lb	Point load X location 8:	N/A
Point Load 6:	1221.7 lb	Point load X location 9:	N/A
Point Load 7:	1302.6 lb	Point load X location 10:	N/A
Point Load 8:	1381.9 lb	Point load Y location 1:	4.000 in
Point Load 9:	1479.3 lb	Point load Y location 2:	112.000 in
Point Load 10:	1558.7 lb		
Total Weight:	11823.9 lb		

Added Weight
1. Double wall : (3) N/A

Notes:
1. The actual weight is stamped on the unit nameplate.
2. The weight shown represents the typical unit operating weight for the configuration selected. Estimated at +/- 10% of the nameplate weight. .
3. Add weight to the total unit weight.
4. Design Special weights are not displayed. Any weight added through COD (Custom Order Design) will not be accounted in the +/- 10% estimate
5. When 2 or more units are to be placed side by side, the distance between the units should be increased to 150% of the recommended single unit clearance. The units should also be staggered to reduce span deflection & assure proper diffusion of exhaust air.



CENTER OF GRAVITY AND INSTALL WEIGHT X-Y POINTS

AIR COOLED DRAWING

Job: First 5 LA	**By:** RA	**Job Number:** 19002647.00
Subject: Equipment Anchorage Calculations	**Checked By:**	**Date:** 02/26/2021

CU- 3 & CU -4 Anchorage

Wp = 260 lbs

Equip Dim - 37" x 13" x 54" (L x W x H)

C.G = 21.5"

Fph = 1.59 Wp (with omega factor)

Fph x 21.5" - (0.9 -0.2Sds) Wp x 14" /2 = T x 14"

1.59 x 260# x 21.5" - 0.583 x 260# x 14" /2 = T x 14"

T = 559.1 lbs

Tensile force / anchor = 559.1 / 2 = 280 lbs / anchor

Shear force / anchor = 1.59 x 260 / 4 = 103.5 lbs / anchor

Assuming for a 4" thk conc . pad & min edge distance from the anchor center line to pad edge 6"

Providing 1/2" KB-TZ w/ 2" embed was found to be working with DCR of 0.2

(see attached Hilti report below)

For CU-1 & CU-2 Anchorage , same option as of CU-3 & 4 , can be used.

(since Wp for CU-1 & 2 = 150 lbs less than 260 lbs)

Company:		Page:	1
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

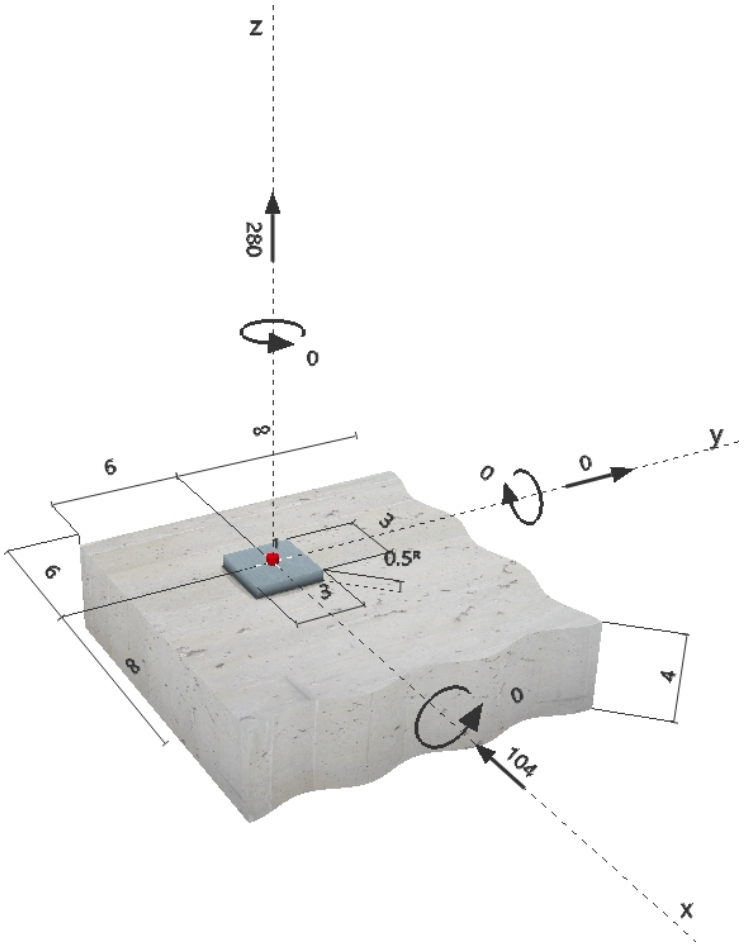
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - CS 1/2 (2)**
Effective embedment depth:	$h_{ef,act}$ = 2.000 in., h_{nom} = 2.375 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-1917
Issued I Valid:	1/1/2020 | 5/1/2021
Proof:	Design method ACI 318-14 / Mech.
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 3.000 in. x 3.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	no profile
Base material:	cracked lightweight concrete, 2500, f_c' = 2,500 psi; h = 4.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: >= No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Concrete Breakout Strength	280	811	35 / -	OK
Shear	Pryout Strength	104	1,010	- / 11	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.345	0.103	5/3	20	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Date:

PO No.:

For: ☐ File ☐ Resubmit ☐ Approval ☐ Other

Architect: GC:

Engr: Mech:

Rep:
(Company) (Project Manager)

ARUN060GSS4

Multi V™ S Heat Pump

5.0 Ton Outdoor Unit

LG Life's Good

Performance:

Cooling Mode:

Rated Capacity (Btu/h)	60,000
Power Input[1] (kW)	6

Heating Mode:

Rated Capacity (Btu/h)	64,000
Power Input[1] (kW)	5.3

Rated Capacity is based on the following conditions:

Cooling
Indoor: 80°F DB / 67°F WB
Outdoor: 95°F DB

Heating:
Indoor: 70°F DB
Outdoor: 47°F DB / 43°F WB

Electrical:

Power Supply (V/Hz/Ø)	208-230V / 60 / 1
MOP (A)	40
MCA (A)	25.4
Rated Amps (A)	
Compressor (A)	19.5
Fan (A) x Qty.	0.5 x 2

Piping:

Refrigerant Charge (lbs)	7.7
Liquid Line (in, OD)	Ø3/8 Braze
Vapor Line (in, OD)	Ø3/4 Braze

Standard Features:

- Night Quiet Operation
- Fault Detection and Diagnosis

Optional Accessories:

☐ Low Ambient Baffle Kit - ZLABGP04A (2 required)

☐ Drain Pan Heater - PQSH1200

***Installation of an optional Low Ambient Wind Baffle Kit will allow operation down to -9.9°F in cooling mode.**

Operating Range:

Cooling (°F DB)*	23 - 122
Heating (°F WB)	-13 to +61

Unit Data:

Refrigerant Type	R410A
Refrigerant Control	EEV
Max Number of Indoor Units[2]	12
Sound Pressure[3] dB(A)	57
Net Unit Weight (lbs)	260
Shipping Weight (lbs)	291
Communication Cable[4] (No x AWG)	2 x 18
Heat Exchanger Coating	GoldFin™

Compressor:

Type	Hermetically Sealed Scroll
Quantity	1
Oil / Type	PVE/FVC68D

Fan:

Type	Axial Flow Fan
Quantity	2
Motor / Drive	Brushless Digitally Controlled/Direct
Air Flow Rate (CFM)	3,885

Notes:

1. For AHRI rating, refer to the AHRI website http://www.ahridirectory.org.
2. The combination ratio must be between 50 – 130%.
3. Sound Pressure levels are tested in an anechoic chamber under ISO Standard 3745.
4. Communication cable between ODU, IDU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the ODU chassis only. Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.
5. Nominal data is rated 0 ft above sea level, with 25 ft of refrigerant line per indoor unit and a 0 ft level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95-105%.
6. Power wiring cable size must comply with the applicable local and national codes.
7. The voltage tolerance is ± 10%.

Inverter

C SA US

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

ARUN060GSS4

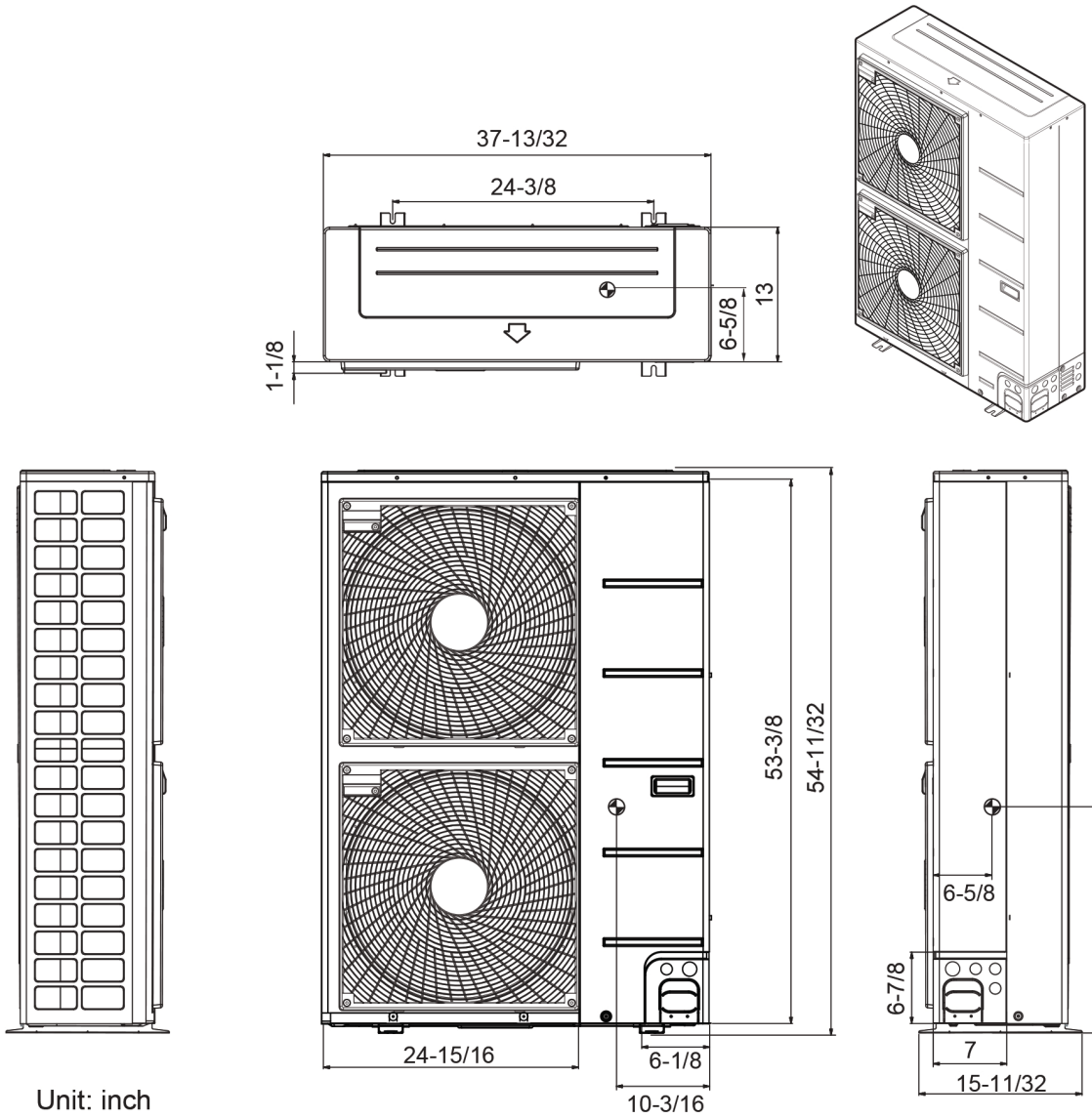
Multi V™ S Heat Pump

5.0 Ton Outdoor Unit

Tag No.: CU-3 & CU-4

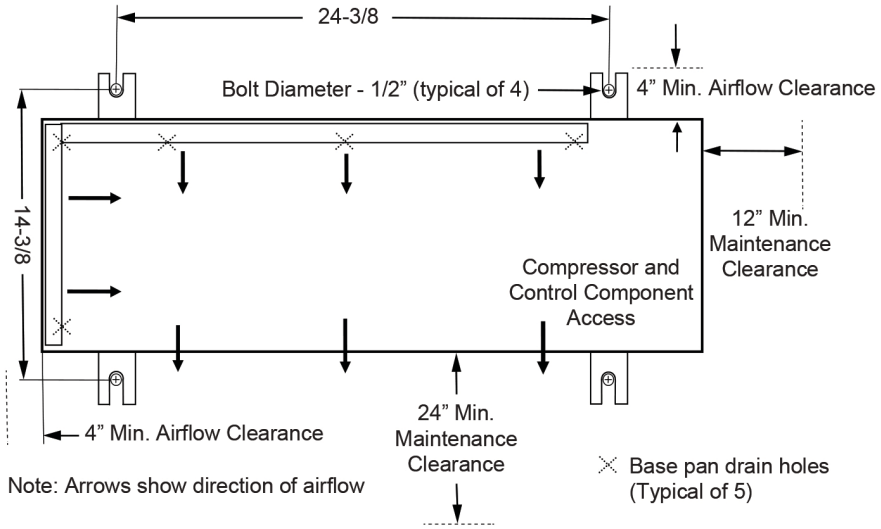
Date: _____

PO No.: _____



Unit: inch

Center of Gravity



Note: Arrows show direction of airflow

ARUN060GSS4

Multi V™ S Heat Pump

5.0 Ton Outdoor Unit

Tag No.: CU-3 & CU-4

Date:

PO No.:

AHRI Data:

AHRI Certified Reference Number	Indoor Type	AHRI Certified Ratings - Cooling Capacity (95°F)	AHRI Certified Ratings - EER (95°F)	AHRI Certified Ratings - SEER	AHRI Certified Ratings - High Heating Capacity (47°F)	AHRI Certified Ratings - Low Heating Capacity (17°F)	AHRI Certified Ratings - HSPF
10514710	Non-Ducted Indoor Units	60,000	10.00	18.90	64,000	40,000	10.90
10514711	Ducted Indoor Units	60,000	10.00	16.50	64,000	40,000	10.00
10516995	Mixed Ducted and Non-Ducted Indoor Units	60,000	10.00	17.70	64,000	40,000	10.45

Date:

For: ☐ File ☐ Resubmit ☐ Approval ☐ Other_____

PO No.:

Architect: GC:

Engr: Mech:

Rep:
(Company) (Project Manager)

LS363HLV3

Single Zone Extended Piping Wall Mount

Outdoor Unit (ODU) - LSU363HLV3, Indoor Unit (IDU) - LSN363HLV3

LG Life's Good

Performance:

Cooling:

Cooling Capacity (Min~Rated~Max) (Btu/h)	3,070~33,000~34,000
SEER	18.5
EER	10

SEER - Seasonal Energy Efficiency Ratio EER - Energy Efficiency Ratio

Heating:

Heating Capacity (Min~Rated~Max) (Btu/h)	3,070~35,200~38,900
HSPF	11
Max. Heating @ Indoor 70°F DB	
Outdoor 19°F DB / 17°F WB	35,740 (102%)
Outdoor 6°F DB / 5°F WB	30,890 (88%)
Outdoor -3°F DB / -4°F WB	26,820 (76%)

HSPF - Heating Seasonal Performance Factor

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

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

Outdoor Unit:

MOP (A)	30
MCA (A)	23
Cooling / Heating Rated Amps (A)	15.35
Compressor (A)	15.1
Fan Motor (A)	0.25

MOP - Maximum Overcurrent Protection MCA - Minimum Circuit Ampacity

Total Power Input:

Cooling Power Input (kW)	3.3
Heating Power Input (kW)	3.12

Piping:

Liquid Line (in., O.D.)	ø3/8 Flare
Vapor Line (in., O.D.)	ø5/8 Flare
Additional Refrigerant (oz./ft.)	0.38
Min. / Max. Pipe Length (ft.)[2]	9.8 / 164
Piping Length (no add'l refrig., ft.)	24.6
Max. Elevation (ft.)	98.4

Features:

- 24-Hour on/off timer
- 4-Way auto swing
- Auto changeover
- Auto restart
- Jet cool/Jet heat
- Built-in low ambient standard, down to 14°F (cooling mode)
- Condensate Sensor Connection
- Inverter (variable speed compressor)
- Smart Diagnosis
- Washable Filter
- Self-cleaning indoor coil
- Built-in base pan heater
- Built-in Wi-Fi via Smart ThinQ app

Optional Accessories:

☐ Low Ambient Wind Baffle (Cooling operation to 0°F) - ZLABGP04A
☐ Simple Remote Controller - PREMTC00U
☐ Premium Remote Controller - PREMTA000
☐ MultiSITE™ CRC1 - PREMTBVC0
☐ MultiSITE CRC1+ - PREMTBVC1
☐ MultiSITE Comm. Mgr. - PBACNBTR0A
☐ PI-485 - PMNFP14A1
☐ Dry Contact - PDRYCB100/300/400
☐ AC Smart 5 - PACS5A000
☐ ACP 5 - PACP5A000

For a complete list of available accessories, contact your LG representative.

Operating Range:

Outdoor Unit:

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

Indoor Unit:

Cooling (°F WB)	53 ~ 75
Heating (°F DB)	64 ~ 86

Electrical:

Power Supply (V/Hz/Ø)	208-230/60/1

System Data:

Refrigerant Type	R410A
Refrigerant Control	EEV
Refrigerant Charge (lbs.)	5.291
ODU Sound Pressure (Cooling / Heating) (±1 dB[A])[3]	55 / 58
IDU Sound Pressure	
Cooling (H/M/L/Sleep) (±1 dB[A])[3]	51 / 47 / 43 / 33
Heating (H/M/L) (±1 dB[A])[3]	51 / 47 / 43
ODU Net / Shipping Weight (lbs.)	147.9 / 160.3
IDU Net / Shipping Weight (lbs.)	40.8 / 48.9
Heat Exchanger Coating	GoldFin™

Fan:

ODU Type	Propeller
IDU Type	Cross Flow
Fan Speeds (Fan/Cool/Heat)	6 / 6 / 6
Quantity (ODU + IDU)	1 + 1
Motor/Drive	Brushless Digitally Controlled/Direct
ODU Max. Air Flow Rate (CFM)	2,295
IDU Air Flow	
Cooling, Max/H/M/L (CFM)	1,095 / 883 / 742 / 601
Heating, Max/H/M/L (CFM)	1,166 / 954 / 813 / 671
Dehumidification (pts./hr.)	5.49

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 3745.
4. All communication / connection (power) cable from the outdoor unit to the indoor unit is field supplied and must be a minimum of four-conductor, 14 AWG, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
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.

Inverter

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

For continual product development, LG reserves the right to change specifications without notice.

LS363HLV3

Single Zone Extended Piping Wall Mount

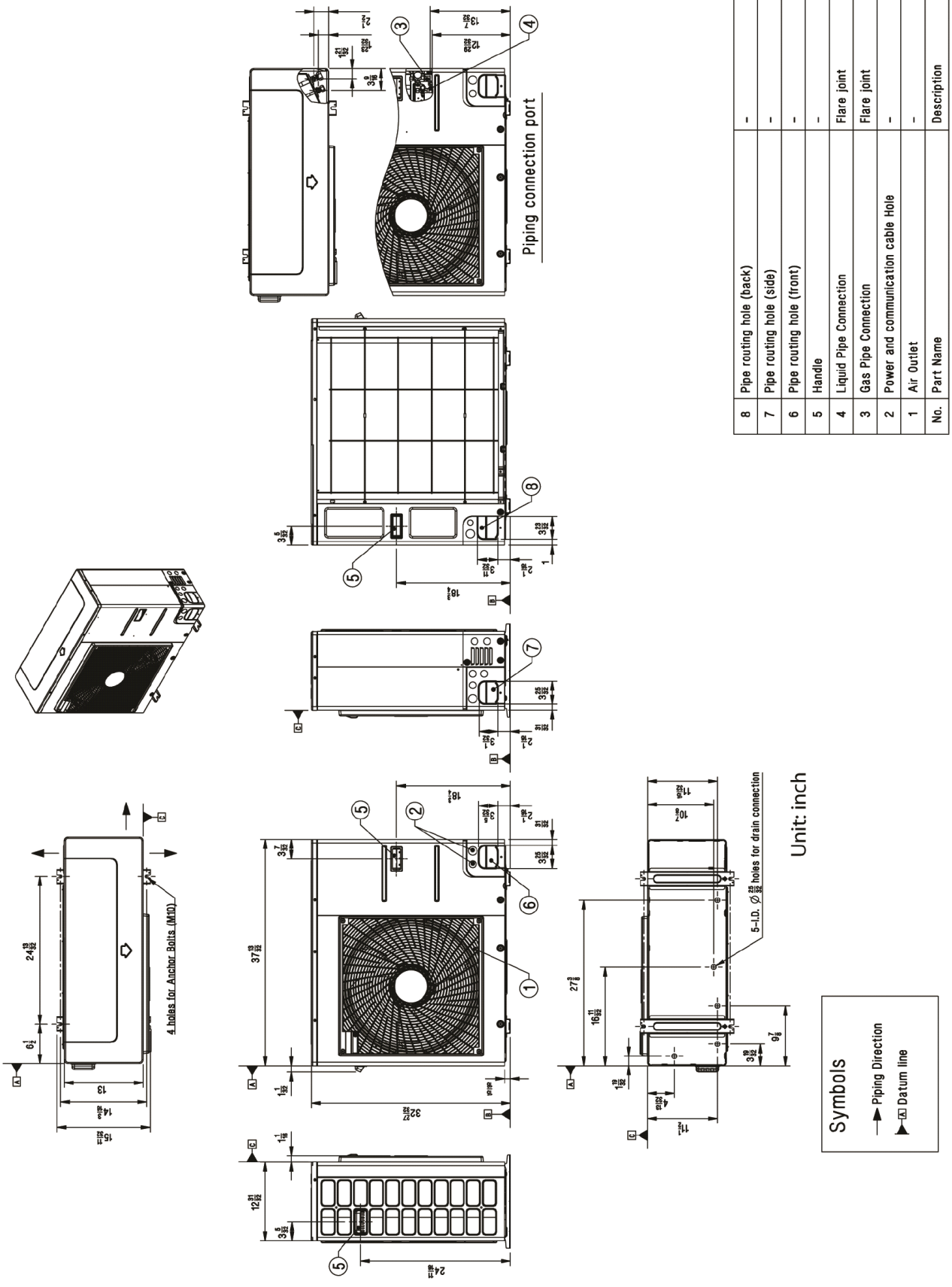
Outdoor Unit (ODU) - LSU363HLV3, Indoor Unit (IDU) - LSN363HLV3

Life's Good

Tag No.: FC-1 & CU-1; FC-2 & CU-2

Date:

PO No.:



No.	Part Name	Description
8	Pipe routing hole (back)	-
7	Pipe routing hole (side)	-
6	Pipe routing hole (front)	-
5	Handle	-
4	Liquid Pipe Connection	Flare joint
3	Gas Pipe Connection	Flare joint
2	Power and communication cable Hole	-
1	Air Outlet	-

LS363HLV3

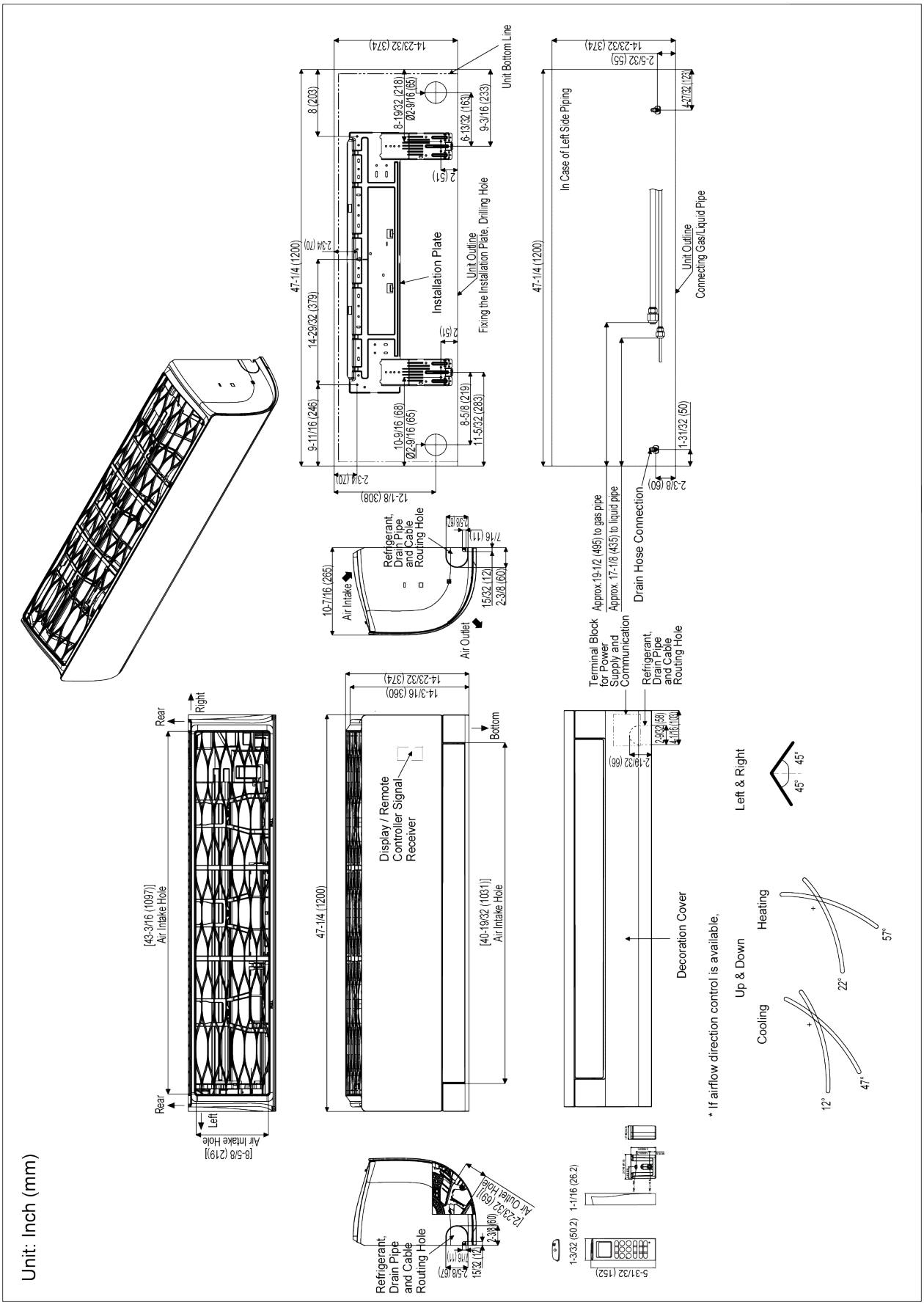
Single Zone Extended Piping Wall Mount

Outdoor Unit (ODU) - LSU363HLV3, Indoor Unit (IDU) - LSN363HLV3

Tag No.: FC-1 & CU-1; FC-2 & CU-2

Date:

PO No.:



Job: First 5 LA	**By:** RA	**Job Number:** 19002647.00
Subject: Equipment Anchorage Calculations	**Checked By:**	**Date:** 02/26/2021

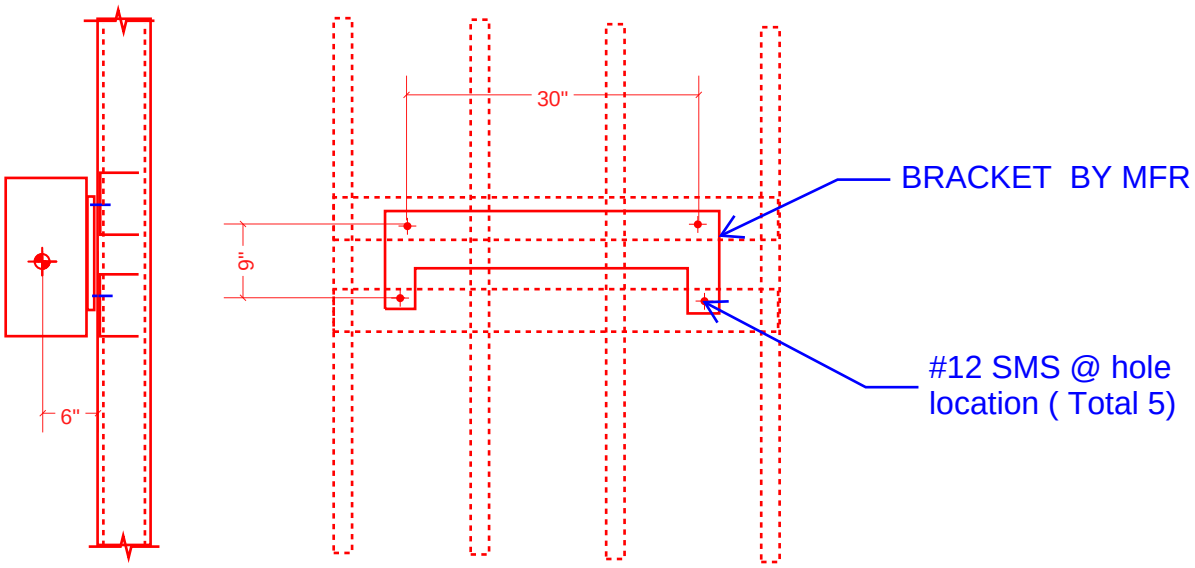
Fan Coil Anchorage

Wall mounted @ bracket provided my MFR to (E) Metal stud wall

Considering the critical Fan coil (FC-1 & 2)

Wp = 45 lbs

Equip Dim - 47" x 10.5 x 14.5" (L x W x H)



Fph = 0.79 Wp

Case 1

Tensile force acting on the screw = (0.7 x 0.79 x 45# / 4) + ((1 + 0.14 x 1.585) 45 x 6" /9) /2

= 6.25 + 18.2 = 24.5 lbs / screw(ASD)

Shear force = (1 + 0.14 Sds) Wp /5 screws =(1 + 0.14 x 1.585) 45 # / 4 = 13.75 lbs / screw (ASD)

Case 2

Tensile force = (0.7 x 0.79 x 45# x 6" / 30")/2 + ((1 + 0.14 x 1.585) 45 x 6" /9) /2

= 20.7 lbs / screw

Shear force =sqrt { (0.7 x 0.79 x 45# / 4)^2 + ((1 + 0.14 x 1.585) 45 # / 4$^{)2}$}= 15.1 lbs

Job:	By:	Job Number:
Subject:	Checked By:	Date:

Net tensile force = 24.5 + (0.3 x 20.7) = 31 lbs

Net shear force = 13.75 + (0.3 x 15.1) = 18.3 lbs

Providing 4 - #12 SMS @ Bracket mounting hole locations

Conservatively assuming (20 GA & fy =33)

DCR = (31/ 95) + (18.3 / 188) = 0.43 <1.0

Therefore O.K

Thickness (Mils)	Design Thickness	Fy Yield (ksi)	Fu Tensile (ksi)	#12 Screw (Pss= 2330 lbs, Pts = 2325 lbs) 0.216" dia, 0.340" Head		
				Shear	Pull-Out	Pull-Over
18	0.0188	33	33	55	38	105
27	0.0283	33	33	102	57	159
30	0.0312	33	33	118	63	175
33	0.0346	33	45	188	95	265
43	0.0451	33	45	280	124	345
54	0.0566	33	45	394	156	433
68	0.0713	33	45	557	196	545
97	0.1017	33	45	777	280	775
118	0.1242	33	45	777	342	775

Date:

PO No.:

For: ☐ File ☐ Resubmit ☐ Approval ☐ Other_____

Architect: GC:

Engr: Mech:

Rep:
(Company) (Project Manager)

ARNU243SKA4

Multi V™ Standard Wall Mounted Unit

24,200 Btu/h Indoor Unit

LG Life's Good

Performance:

Total Cooling Capacity (Btu/h)[1]	24,200
Heating Capacity (Btu/h)[1]	25,600
Max Power Input (W)[2]	53
L / M / H Power Input at Factory Default (W)	16 / 26 / 39

Rated capacity is certified under AHRI Standard 1230. Ratings are subject to change without notice. Current certified ratings are available at www.ahridirectory.org.

Electrical:

Power Supply (V/Hz/Ø)	208-230/60/1
Rated Amps	0.52

Piping:

Refrigerant	
Liquid Line (in., O.D.)	3/8 Flare
Vapor Line (in., O.D.)	5/8 Flare
Condensate	
Condensate Line (in., I.D.)	5/8
Factory Installed Pump	No

Controls Features:

- Auto changeover (Heat Recovery only)
- Auto operation
- Auto restart
- Dual thermistor control
- Dual setpoint control
- Multiple auxillary heater applications
- Timer (on/off)
- Weekly schedule
- Auto direction/ swing (up/down)
- Fan speed control
- Jet cool (fast cooling)
- Filter life display
- Child lock
- Group control
- Hot start
- Self diagnostics
- External on/off control
- Wi-Fi compatible
- Auto Fan
- Leak Detection

Optional Accessories:

☐ Wireless Remote Controller - PQWRHQ0FDB
☐ MultiSITE™ CRC1 Controller - PREMTBVC0
☐ MultiSITE™ CRC1+ Controller - PREMTBVC1
☐ Simple Remote Controller - PREMTC00U
☐ Premium Remote Controller - PREMTA000
☐ Remote Temperature Button Sensor - ZRTBS01
☐ Simple Dry Contact (1 contact, 24 VAC external power) - PDRYCB100
☐ Dry Contact for Third Party Thermostat - PDRYCB320
☐ Dry Contact for Economizer - PDRYCB400
☐ Auxillary Heater Kit - PRARS1

Unit Data:

Refrigerant Type	R410A
Refrigerant Control	EEV
Sound Pressure dB(A) (H/M/L)[3]	46 / 41 / 34
Primary Filter Type	Washable
Unit Net Weight (lbs.)	26.9
Unit Shipping Weight (lbs.)	35.3

Fan:

Type	Cross Flow
Quantity	1
Motor/Drive	Brushless Digitally Controlled/Direct
Motor Quantity	1
Air Flow Rate H/M/L (CFM)	537 / 449 /371

Notes:

1. See Engineering Manual for sensible and latent capacities.
2. Max. power input is rated at maximum setting value.
3. Sound Pressure levels are tested in an anechoic chamber under ISO Standard 3745.
4. All communication cable to be minimum 18 AWG, 2-conductor, twisted, stranded, shielded and must comply with applicable local and national codes. Ensure the communication cable is properly grounded at the main outdoor unit only. Do not ground the outdoor unit to indoor units / heat recovery units communication cable at any other point. Wiring must comply with all applicable local and national codes.
5. Power wiring is field provided and must comply with the applicable local and national codes.
6. This unit comes with a dry nitrogen charge.
7. All capacities are net with a combination ratio between 95 – 105%.
8. Must follow installation instructions in the applicable LG installation manual.

C US

For a complete list of available accessories, contact your LG representative.
For continual product development, LG reserves the right to change specifications without notice.

ARNU243SKA4

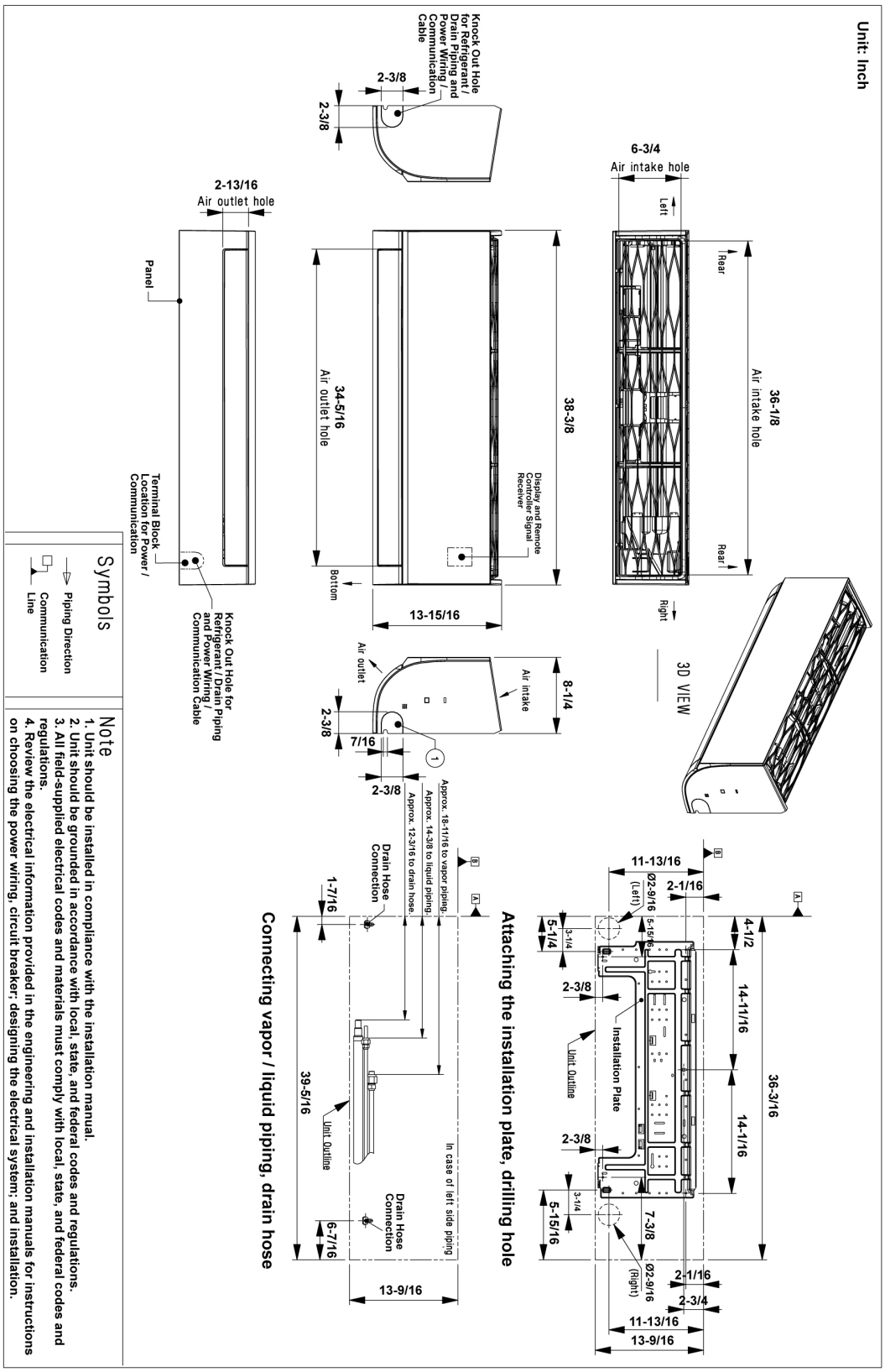
Multi V™ Standard Wall Mounted Unit

24,200 Btu/h Indoor Unit

Tag No.: FC-3B & FC-4B

Date: _____

PO No.: _____



Symbols

Piping Direction

Communication Line

Note

1. Unit should be installed in compliance with the installation manual.
2. Unit should be grounded in accordance with local, state, and federal codes and regulations.
3. All field-supplied electrical codes and materials must comply with local, state, and federal codes and regulations.
4. Review the electrical information provided in the engineering and installation manuals for instructions on choosing the power wiring, circuit breaker; designing the electrical system; and installation.

Date:

PO No.:

For: ☐ File ☐ Resubmit ☐ Approval ☐ Other_____

Architect: GC:

Engr: Mech:

Rep:
(Company) (Project Manager)

ARNU363SVA4

Multi V™ Standard Wall Mounted Unit

35,500 Btu/h Indoor Unit

LG Life's Good

Performance:

Total Cooling Capacity (Btu/h)[1]	35,500
Heating Capacity (Btu/h)[1]	37,000
Max Power Input (W)[2]	104
L / M / H Power Input at Factory Default (W)	36 / 51 / 85

Rated capacity is certified under AHRI Standard 1230. Ratings are subject to change without notice. Current certified ratings are available at www.ahridirectory.org.

Electrical:

Power Supply (V/Hz/Ø)	208-230/60/1
Rated Amps	0.81

Piping:

Refrigerant	
Liquid Line (in., O.D.)	3/8 Flare
Vapor Line (in., O.D.)	5/8 Flare
Condensate	
Condensate Line (in., I.D.)	5/8
Factory Installed Pump	No

Controls Features:

- Auto changeover (Heat Recovery only)
- Auto operation
- Auto restart
- Dual thermistor control
- Dual setpoint control
- Multiple auxillary heater applications
- Timer (on/off)
- Weekly schedule
- Auto direction/ swing (up/down)
- Fan speed control
- Jet cool (fast cooling)
- Filter life display
- Child lock
- Group control
- Hot start
- Self diagnostics
- External on/off control
- Wi-Fi compatible
- Auto Fan
- Leak Detection

Optional Accessories:

☐ Wireless Remote Controller - PQWRHQ0FDB
☐ MultiSITE™ CRC1 Controller - PREMTBVC0
☐ MultiSITE™ CRC1+ Controller - PREMTBVC1
☐ Simple Remote Controller - PREMTC00U
☐ Premium Remote Controller - PREMTA000
☐ Remote Temperature Button Sensor - ZRTBS01
☐ Simple Dry Contact (1 contact, 24 VAC external power) - PDRYCB100
☐ Dry Contact for Third Party Thermostat - PDRYCB320
☐ Dry Contact for Economizer - PDRYCB400
☐ Auxillary Heater Kit - PRARS1

Unit Data:

Refrigerant Type	R410A
Refrigerant Control	EEV
Sound Pressure dB(A) (H/M/L)[3]	52 / 47 / 43
Primary Filter Type	Washable
Unit Net Weight (lbs.)	37
Unit Shipping Weight (lbs.)	48

Fan:

Type	Cross Flow
Quantity	1
Motor/Drive	Brushless Digitally Controlled/Direct
Motor Quantity	1
Air Flow Rate H/M/L (CFM)	918 / 812 / 671

Notes:

1. See Engineering Manual for sensible and latent capacities.
2. Max. power input is rated at maximum setting value.
3. Sound Pressure levels are tested in an anechoic chamber under ISO Standard 3745.
4. All communication cable to be minimum 18 AWG, 2-conductor, twisted, stranded, shielded and must comply with applicable local and national codes. Ensure the communication cable is properly grounded at the main outdoor unit only. Do not ground the outdoor unit to indoor units / heat recovery units communication cable at any other point. Wiring must comply with all applicable local and national codes.
5. Power wiring is field provided and must comply with the applicable local and national codes.
6. This unit comes with a dry nitrogen charge.
7. All capacities are net with a combination ratio between 95 – 105%.
8. Must follow installation instructions in the applicable LG installation manual.

C US

For a complete list of available accessories, contact your LG representative.
For continual product development, LG reserves the right to change specifications without notice.

ARNU363SVA4

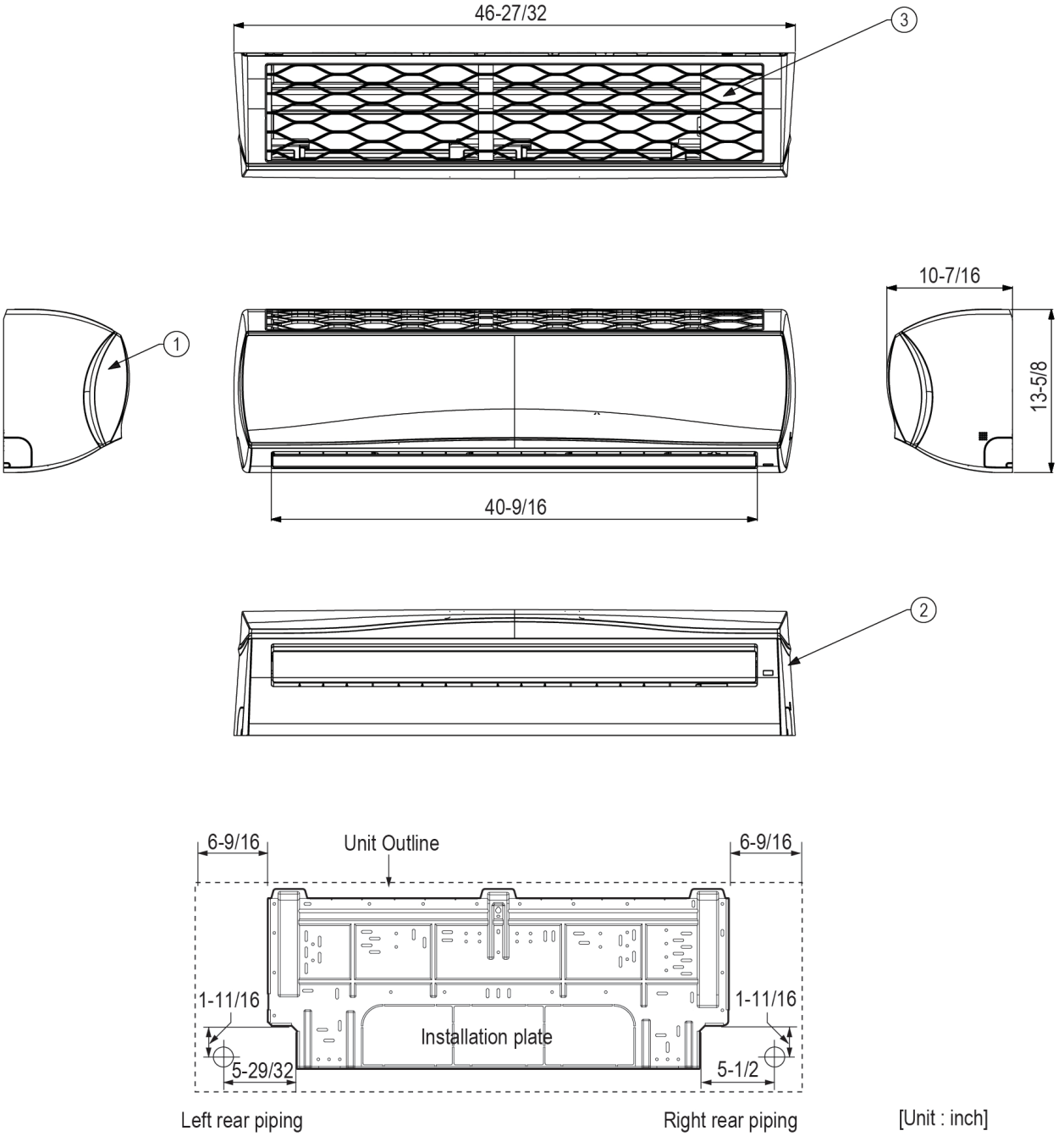
Multi V™ Standard Wall Mounted Unit

35,500 Btu/h Indoor Unit

Tag No.: FC-3A & FC-4A

Date: _____

PO No.: _____



Note:

1. Unit must be installed in compliance with the installation manual.
2. Unit must be grounded in accordance with the local regulations or applicable national codes.

Item No.	Part Name	Remark
1	Front Panel	
2	Display & Signal Receiver	
3	Air Suction Grille	
4	Installation Plate	

ARNU363SVA4

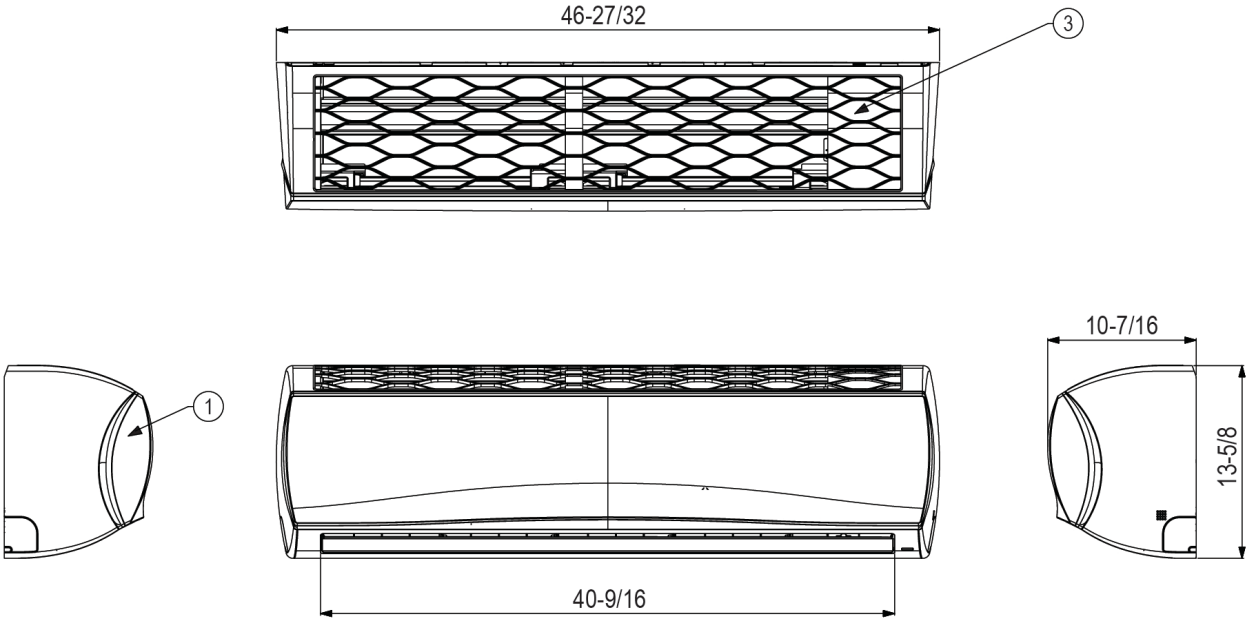
Multi V™ Standard Wall Mounted Unit

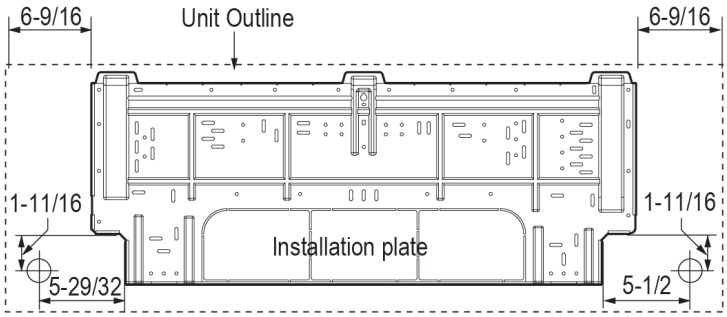
35,500 Btu/h Indoor Unit

Tag No.: FC-3A & FC-4A

Date: _____

PO No.: _____





Left rear piping

Right rear piping

[Unit : inch]

Note:

1. Unit must be installed in compliance with the installation manual.
2. Unit must be grounded in accordance with the local regulations or applicable national codes.

Item No.	Part Name	Remark
1	Front Panel	
2	Display & Signal Receiver	
3	Air Suction Grille	
4	Installation Plate	

Job:	By:	Job Number:
Subject:	Checked By:	Date:

ELECTRICAL EQUIPMENTS

ANCHORAGE CALCULATIONS

Sheet	
By	*RA*
Job no.	*19002647.00*
Date	*2/26/2021*

PROJECT: First 5 LA

EQUIPMENT: AHU

EQUIPMENT CATEGORY: Mechanical and Electrical Components — Table 13.6-1, ASCE 7-16

EQUIPMENT TYPE: 6 — Generators, batteries, inverters, motors, transformers, and other electrical components constructed of high deformability materials

HORIZONTAL SEISMIC DESIGN FORCE CALCULATION

As per CBC 2019/ ASCE 7-16

a_p =	1	COMP. AMP. FACTOR	*Table 13.6-1, ASCE 7-16*
R_p =	2.5	COMP. RESP. FACTOR	*Table 13.6-1, ASCE 7-16*
Ω =	2	OVER STRENGTH FACTOR	*Table 13.6-1, ASCE 7-16*
S_{DS} =	1.585	SHORT PERIOD SPECTRAL ACCELERATION	
I_p =	1.00	IMPORTANCE FACTOR	*Section 11.5.1 ,ASCE 7-16*
Z =	0	COMP. ATTACH. ELEV. (FT. OR LEVEL)	
H =	1	ROOF ELEV. (FT. OR LEVEL)	

$F_{ph,calc}$ =	**0.25 Wp**	$= 0.4*Ap*S_{DS}*Ip*(1+2*Z/H)W_p/R_p$		*Eqn 13.3-1, ASCE 7-16*
$F_{ph,min}$ =	**0.48 Wp**	$= 0.3S_{DS}I_pW_p$	<= GOVERNS	*Eqn 13.3-3, ASCE 7-16*
$F_{ph,max}$ =	**2.54 Wp**	$= 1.6S_{DS}I_pW_p$		*Eqn 13.3-2, ASCE 7-16*

GOVERNING HORIZONTAL SEISMIC DESIGN FORCE ,*Fph*= **0.48 Wp**

SEISMIC DESIGN FORCE CONSIDERING OVERSTRENGTH FACTOR, Ω*Fph*= **0.95 Wp**

Job:	By:	Job Number:
Subject:	Checked By:	Date:

Generator Anchorage

Equipment wt = 2000# Max.

Equip Dim - 89.8" x 32.9" x 46.5" (L x W x H)

Net CG = 23"

Fph = 0.95 Wp (with omega factor)

Fph x 23" - (0.9 -0.2Sds) Wp x 30" /2 = T x 30"

0.95 x 2000# x 23" - 0.583 x 2000# x 30" /2 = T x 30"

T = 874 lbs

As per the available cut sheet attached below , 4 - mounting hole locations are provided by MFR. (2 each on each side)

Tensile force / anchor = 874 / 2 = 437 lbs

Shear force / anchor = 0.95 x2000 / 4 = 475 lbs

Providing 4 -5/8" dia Hilti - KB-TZ w/ 3.125" embed was found to be working with DCR of 0.10 (see attached Hilti report below)

Company:		Page:	1
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

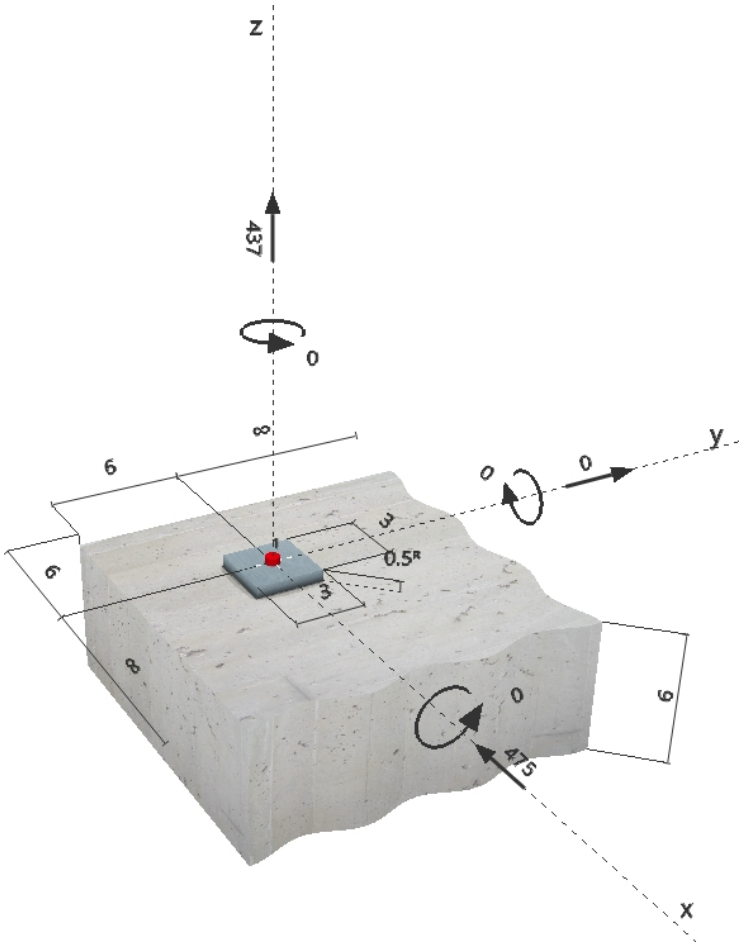
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - CS 5/8 (3 1/8)**
Effective embedment depth:	$h_{ef,act}$ = 3.125 in., h_{nom} = 3.563 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-1917
Issued I Valid:	1/1/2020 | 5/1/2021
Proof:	Design method ACI 318-14 / Mech.
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 3.000 in. x 3.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	no profile
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 6.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: >= No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:
Specifier:
Address:
Phone I Fax: |
E-Mail:

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Concrete Breakout Strength	437	2,641	17 / -	OK
Shear	Concrete edge failure in direction x-	475	3,092	- / 16	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.165	0.154	5/3	10	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

KOHLER®

Model: 60RCLA

Multi-Fuel
LPG/Natural Gas

ISO 9001 KOHLER® NATIONALLY REGISTERED

The Kohler® Advantage

- **High Quality Power**
  Kohler generators provide advanced voltage and frequency regulation along with ultra-low levels of harmonic distortion for excellent generator power quality to protect your valuable electronics.
- **Extraordinary Reliability**
  Kohler is known for extraordinary reliability and performance and backs that up with a 5-year/2000-hour limited warranty.
- **Aluminum Sound Enclosure**
  Aluminum sound enclosure is standard.
  Optional 291 kph (181 mph) wind-load-rated enclosure door kit is available for field installation.
- **Fast Response**
  Kohler's Fast-Response® X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth permanent magnet (PM)-excited alternator.
- **Quiet Operation**
  Kohler home generators provide quiet, neighborhood-friendly performance.

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The generator set accepts rated load in one step.
- A standard 5-year/2000-hour limited warranty covers all systems and components.
- Quick-ship (QS) models with selected features are available. See your Kohler distributor for details.
- RDC2 Controller
  - One digital controller manages both the generator set and transfer switch functions (with optional Model RXT ATS).
  - Designed for today's most sophisticated electronics.
  - Electronic speed control responds quickly to changing demand.
  - Digital voltage regulation protects your valuable electronics from harmonic distortion and unstable power quality.
- Engine Features
  - Powerful and reliable Kohler 6.2L liquid-cooled engine
  - Electronic engine management system.
  - Simple field conversion between natural gas and LP vapor fuels while maintaining emission certification.
- Innovative Cooling System
  - Electronically controlled fan speeds minimize generator set sound signature.
- Approved for stationary standby applications in locations served by a reliable utility source.
- Certifications
  - The 60 Hz generator set engine is certified by the Environmental Protection Agency (EPA) to conform to the New Source Performance Standard (NSPS) for stationary spark-ignited emissions.
  - UL 2200/cUL listing is available (60 Hz only).
  - CSA certification is available (60 Hz only).
  - Accepted by the Massachusetts Board of Registration of Plumbers and Gas Fitters.

Generator Set Ratings

				Standby Ratings			
				Natural Gas		LPG	
Alternator	Voltage	Ph	Hz	kW/kVA	Amps	kW/kVA	Amps
4P10X	120/208	3	60	60/75	209	60/75	209
	127/220	3	60	60/75	197	60/75	197
	120/240	3	60	60/75	181	60/75	181
	277/480	3	60	60/75	91	60/75	91
	220/380*	3	50	50/62	95	50/62	95
	230/400	3	50	50/62	90	50/62	90
	240/416*	3	50	50/62	87	50/62	87
4Q10X	120/240	1	60	58/58	242	60/60	250

* 50 Hz models are factory-connected as 230/400 volts. Field-adjustable to 220/380 or 240/416 volts by an authorized service technician.

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. *Standby Ratings:* Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. Obtain technical information bulletin TIB-101 for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Availability is subject to change without notice. Contact your local Kohler generator distributor for availability.

Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating Field
Exciter type	Brushless, Rare-Earth Permanent Magnet
Leads: quantity, type	
4P10X	12, Reconnectable
4Q10X	4, 110- 120/220- 240
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	±1.0% RMS
Unbalanced load capability	100% of Rated Standby Current
One-step load acceptance	100% of Rating
Peak motor starting kVA:	(35% dip for voltages below)
480 V, 400 V 4P10X (12 lead)	275 (60 Hz), 220 (50 Hz)
240 V, 220 V 4Q10X (4 lead)	144 (60 Hz), 132 (50 Hz)

- The unique Fast-Response® X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM)-excited alternator.
- Brushless, rotating-field alternator.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Total harmonic distortion (THD) from no load to full load with a linear load is less than 3.5%.

Application Data

Engine

Engine Specifications	60 Hz	50 Hz
Manufacturer	Kohler	
Engine: model, type	KG6208 6.2L Natural Aspiration	
Cylinder arrangement	V-8	
Rated rpm	1800	1500
Displacement, L (cu. in.)	6.2 (378)	
Bore and stroke, mm (in.)	101.6 x 95.25 (4.00 x 3.75)	
Compression ratio	10.5:1	
Max. power at rated rpm, kW (HP)	77.0 (103)	64.3 (86)
Cylinder head material	Cast Aluminum	
Piston type and material	High Silicon Aluminum	
Crankshaft material	Cast Iron	
Valve (exhaust) material	Forged Steel	
Governor type	Electronic	
Frequency regulation, no-load to full-load	Isochronous	
Frequency regulation, steady state	±1.0%	
Frequency	Fixed	
Air cleaner type	Dry	

Engine Electrical

Engine Electrical System	
Ignition system	Electronic
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	130
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	
Qty., rating for - 18°C (0°F)	One, 630
Battery voltage (DC)	12
Battery group size	24

Exhaust

Exhaust System	60 Hz	50 Hz
Exhaust manifold type	Dry	
Exhaust flow at rated kW, m^3/min. (cfm)	16.4 (580)	13.6 (480)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	649 (1200)	
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)	
Exhaust outlet size at engine hookup, mm (in.)	76 (3.0) OD	

Fuel

Fuel System	
Fuel type	LP Gas or Natural Gas
Fuel supply line inlet	1 in. NPT
Natural gas fuel supply pressure, kPa (in. H_2O)	1.2- 2.7 (5-11)
LPG vapor withdrawal fuel supply pressure, kPa (in. H_2O)	1.2- 2.7 (5-11)

Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	92 min.	—
Ethane, % by volume	4.5 max.	—
Propane, % by volume	1.0 max.	87 min.
Propene, % by volume	0.1 max.	5.0 max.
C_4 and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, MJ/m^3 (Btu/ft^3), min.	33.2 (890)	84.2 (2260)

* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	5.7 (6.0)
Oil pan capacity with filter, L (qt.)	7.1 (7.5)
Oil filter: quantity, type	1, Cartridge

Application Data

Cooling

Radiator System	60 Hz	50 Hz
Ambient temperature, °C (°F)	45 (113)	
Radiator system capacity, including engine, L (gal.)	21.3 (5.6)	
Engine jacket water flow, Lpm (gpm)	131 (34.6)	109 (28.8)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	54 (3070)	49 (2790)
Water pump type	Centrifugal	
Fan diameter, mm (in.)	qty. 3 @ 356 (14)	
Fan power requirements (powered by engine battery charging alternator)	12VDC, 18 amps each	

Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m^3/min. (scfm)†	62.2 (2200)	62.2 (2200)
Air over engine, m^3/min. (cfm)	31.1 (1100)	31.1 (1100)
Combustion air, m^3/min. (cfm)	5.5 (195)	4.6 (162)

† Air density = 1.20 kg/m^3 (0.075 lbm/ft^3)

Fuel Consumption‡		
Natural Gas, m^3/hr. (cfh) at % load	**60 Hz**	**50 Hz**
100%	28.7 (1013)	24.9 (878)
75%	21.6 (761)	18.7 (660)
50%	14.0 (493)	12.1 (427)
25%	7.0 (248)	6.1 (215)
LP Gas, m^3/hr. (cfh) at % load	**60 Hz**	**50 Hz**
100%	10.1 (357)	8.8 (309)
75%	7.2 (255)	6.3 (221)
50%	5.4 (191)	4.7 (166)
25%	3.2 (113)	2.8 (98)

‡ Nominal Fuel Rating: Natural gas, 37 MJ/m^3 (1000 Btu/ft^3)
LP Vapor, 93 MJ/m^3 (2500 Btu/ft^3)

LP vapor conversion factors:
8.58 $ft.^3$ = 1 lb.
0.535 m^3 = 1 kg.
36.39 $ft.^3$ = 1 gal.

Sound Enclosure Features

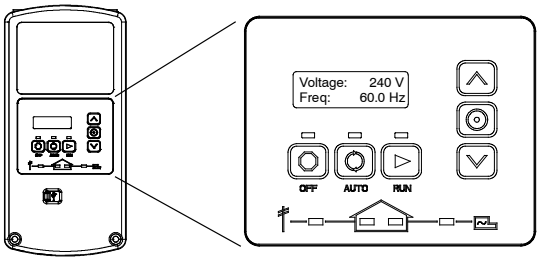
- Sound-attenuating enclosure uses acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Internally mounted critical silencer.
- Skid-mounted, aluminum construction with two removable access panels.
- Scratch- and corrosion-resistant Kohler® cashmere powder-baked finish.

Sound Data

Model 60RCLA sound levels are 57 dB(A) during weekly engine exercise and 61 dB(A) during normal operation.

All sound levels are measured at a distance of 23 ft. (7 m) from the generator set. Actual sound levels may vary based on installation parameters.

RDC2 Controller



The RDC2 controller provides integrated control for the generator set, Kohler® Model RXT transfer switch, programmable interface module (PIM), and load shed kit.

The RDC2 controller's 2-line LCD screen displays status messages and system settings that are clear and easy to read, even in direct sunlight or low light.

RDC2 Controller Features

- Membrane keypad:
  - OFF, AUTO, and RUN pushbuttons
  - Select and arrow buttons for access to system configuration and adjustment menus
- LED indicators for OFF, AUTO, and RUN modes
- LED indicators for utility power and generator set source availability and ATS position (Model RXT transfer switch required)
- LCD screen:
  - Two lines x 16 characters per line
  - Backlit display with adjustable contrast for excellent visibility in all lighting conditions
- Scrolling system status display
  - Generator set status
  - Voltage and frequency
  - Engine temperature
  - Oil pressure
  - Battery voltage
  - Engine runtime hours
- Date and time displays
- Smart engine cooldown senses engine temperature
- Digital isochronous governor to maintain steady-state speed at all loads
- Digital voltage regulation: ±1.0% RMS no-load to full-load
- Automatic start with programmed cranking cycle
- Programmable exerciser can be set to start automatically on any future day and time, and to run every week or every two weeks
- Exercise modes
  - Unloaded exercise with complete system diagnostics
  - Unloaded full-speed exercise
  - Loaded full-speed exercise (Model RXT ATS required)
- Front-access mini USB connector for SiteTech™ connection
- Integral Ethernet connector for Kohler® OnCue® Plus
- Built-in 2.5 amp battery charger
- Remote two-wire start/stop capability for optional connection of a Model RDT transfer switch

See additional controller features on the next page.

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444
KOHLERPower.com

Additional RDC2 Controller Features

- Diagnostic messages
  - Displays diagnostic messages for the engine, generator, Model RXT transfer switch, programmable interface module (PIM), and load shed kit
  - Over 70 diagnostic messages can be displayed
- Maintenance reminders
- System settings
  - System voltage, frequency, and phase
  - Voltage adjustment
  - Measurement system, English or metric
- ATS status (Model RXT ATS required)
  - Source availability
  - ATS position (normal/utility or emergency/generator)
  - Source voltage and frequency
- ATS control (Model RXT ATS required)
  - Source voltage and frequency settings
  - Engine start time delay
  - Transfer time delays
  - Fixed pickup and dropout settings
  - Voltage calibration
- Programmable Interface Module (PIM) status displays
  - Input status (active/inactive)
  - Output status (active/inactive)
- Load control menus
  - Load status
  - Test function

Generator Set Standard Features

- Aluminum sound enclosure with enclosed silencer
- Battery rack and cables
- Electronic, isochronous governor
- Engine-generator set is designed and manufactured in facilities certified to ISO:9001.
- Flexible fuel line
- Gas fuel system (includes fuel mixer, electronic secondary gas regulator, two gas solenoid valves, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral vibration isolation
- Line circuit breaker
- Oil drain extension
- OnCue® Plus Generator Management System for remote monitoring (see specification sheet G6-140)
- Operation and installation literature
- RDC2 controller with built-in battery charger
- Standard 5-year/2000-hour limited warranty

Available Options

Approvals and Listings

❑ UL 2200 Listing (60 Hz only)
❑ CSA Approval (60 Hz only)

Electrical System

❑ Battery
❑ Battery Heater

Available Options (continued)

Enclosure Option

❑ 291 kph (181 mph) wind load rated enclosure

Starting Aids §

❑ Block Heater, 120 V
❑ Block Heater, 240 V

§ Recommended for ambient temperatures below 0°C (32°F)

Controller Accessories

❑ Lockable Emergency Stop (lockout/tagout)
❑ Programmable Interface Module (PIM) (provides 2 digital inputs and 6 relay outputs)

Automatic Transfer Switches and Accessories

❑ Model RXT Automatic Transfer Switch
❑ Model RXT Automatic Transfer Switch with combined interface/load management board
❑ Model RDT Automatic Transfer Switch
❑ Load shed kit for RDT or RXT
❑ Power relay modules (use up to 4 relay modules for each load management device)
❑ Other Kohler® ATS

Miscellaneous

❑ Rated Power Factor Testing

Literature

❑ General Maintenance Literature Kit
❑ Overhaul Literature Kit
❑ Production Literature Kit

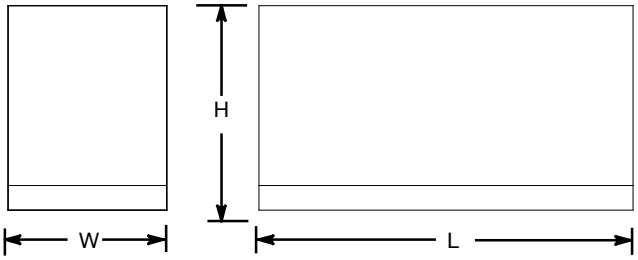
Warranty

❑ Optional Extended 5-Year/2000 Hour Comprehensive Limited Warranty

Dimensions and Weights

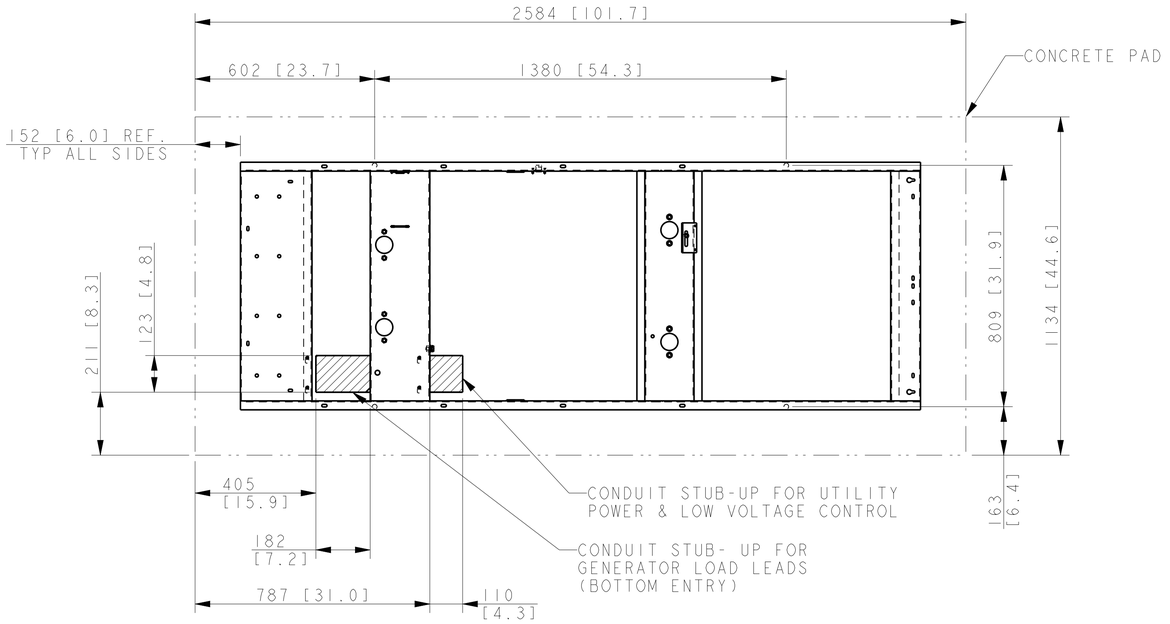
Overall Size, L x W x H, mm (in.):	2280 x 836 x 1182 (89.8 x 32.9 x 46.5)
Shipping Weight, wet, kg (lb.):	859 (1894)

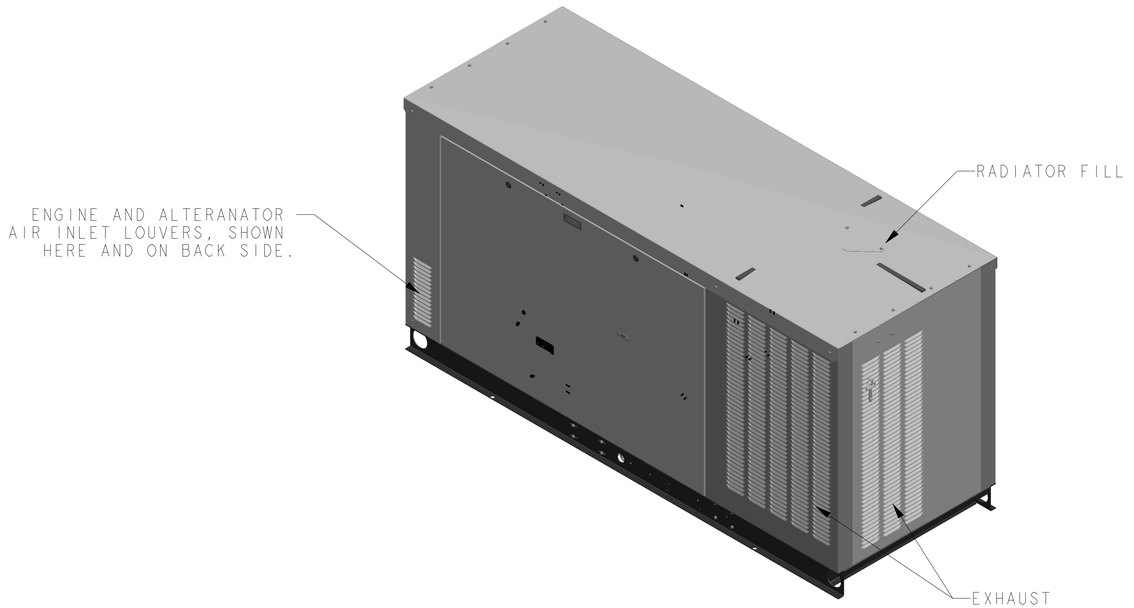
Weight includes generator set with engine fluids and 4Q10X alternator, sound enclosure, and silencer.

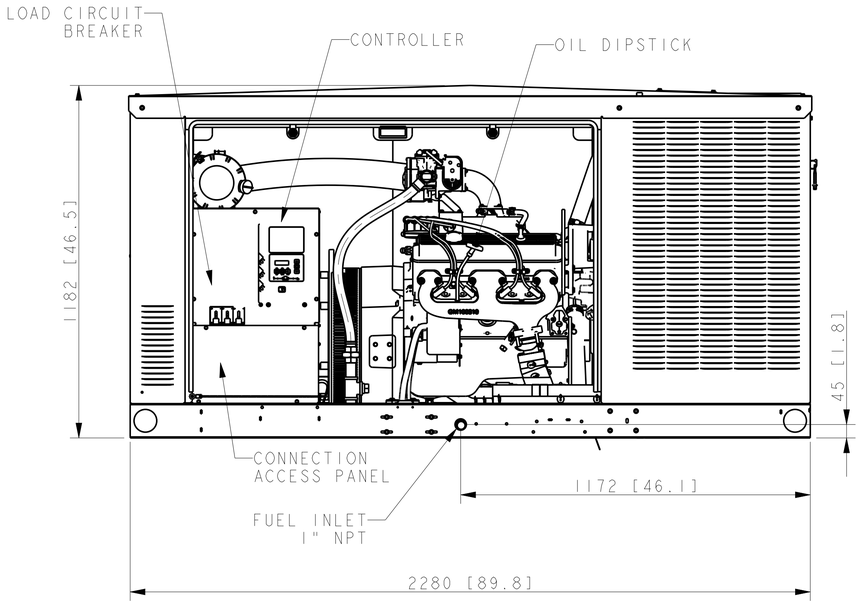


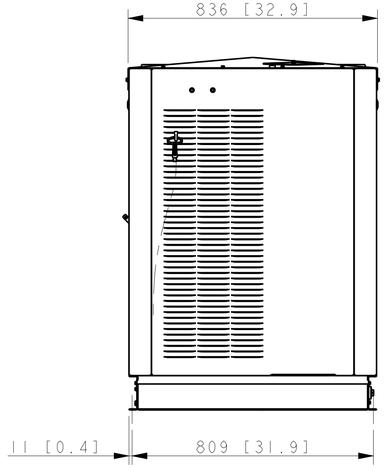
NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

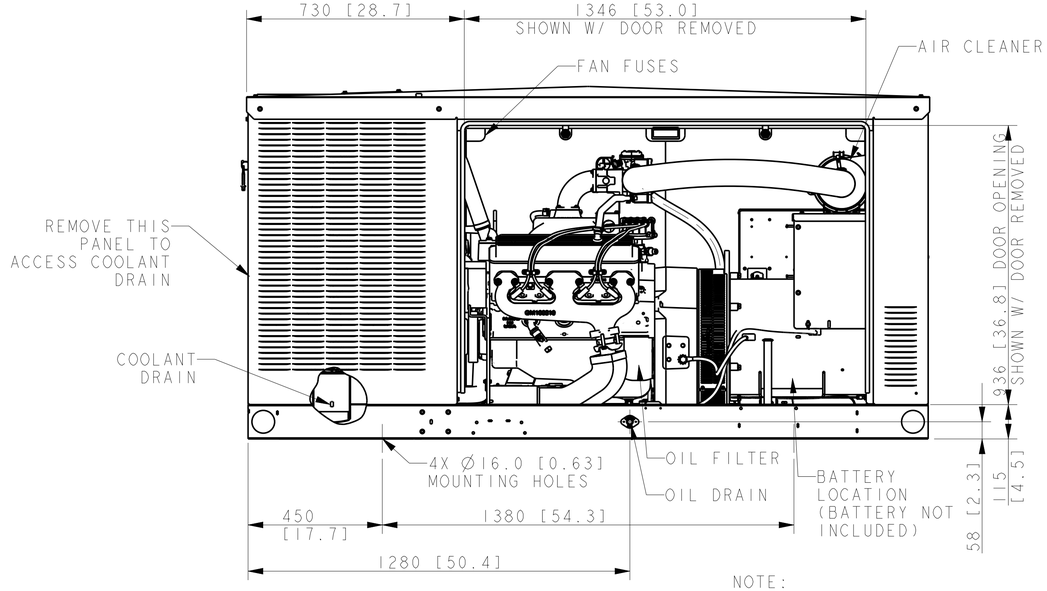
DISTRIBUTED BY:











NOTE:
DIMENSIONS IN [ ] ARE ENGLISH STANDARD EQUIVALENTS

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	8-19-17	NEW DRAWING [CT178070]	SAK

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS IN MILLIMETERS
GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SAK	8-19-17
CHECKED	DJV	8-19-17
APPROVED	KJT	8-19-17

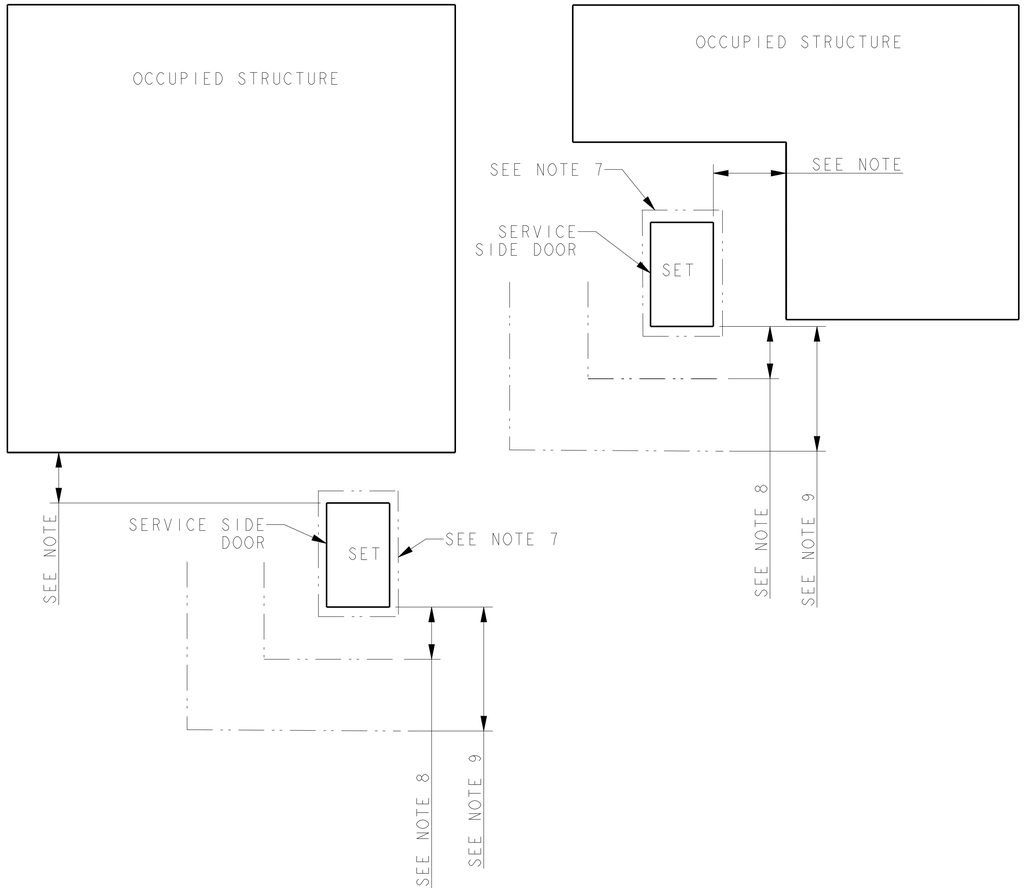
KOHLER.
KOHLER, WISCONSIN 53044

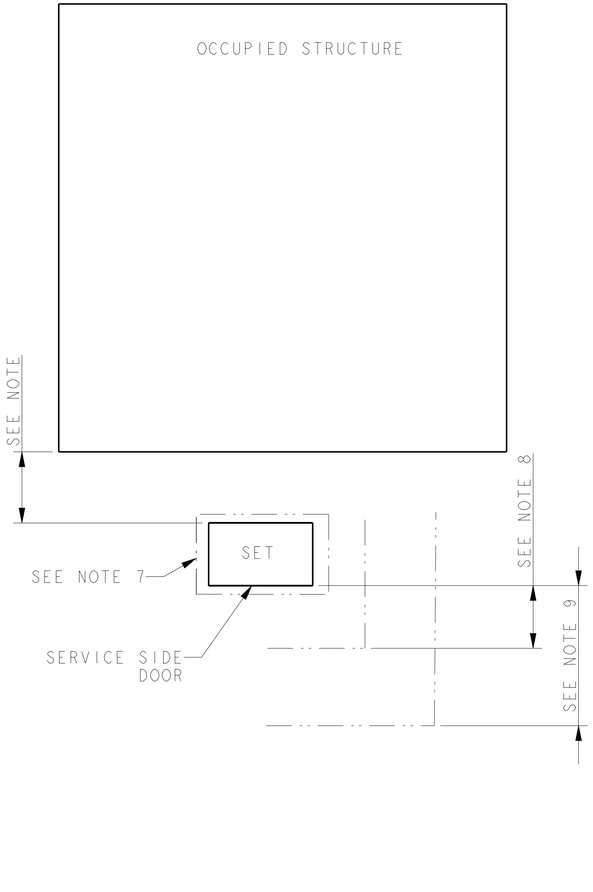
TITLE
DIMENSION PRINT, 48RCLB/60RCLA

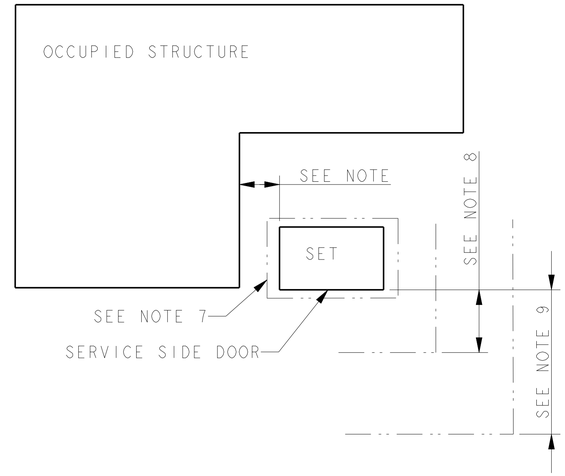
SCALE 0.40 | CAD NO. | SHEET 1 of 2

DWG NO. ADV-8954 | D

48 RCLB/ 60 RCLA







INSTALLATION GUIDELINES

1) EXHAUST IS AIMED AWAY FROM OR PARALLEL TO THE STRUCTURE.
2) EXHAUST IS NOT DIRECTED AT PLAY AREAS, PATIOS OR OTHER AREAS WHERE PEOPLE CONGREGATE.
3) THE NEAREST WINDOW, VENT, DOOR OR SIMILAR STRUCTURE OPENING IS AT LEAST 5 FEET FROM THE EXHAUST END OF THE SET.
4) SET HAS PROPER OFFSET FROM STRUCTURE.
5) WINDOWS & DOORS ON ADJACENT WALLS ARE CLOSED.
6) FURNACE AND OTHER SIMILAR INTAKES ARE AT LEAST 10 FEET FROM EXHAUST END OF SET.
7) 4" THICK CONCRETE PAD EXTENDING 6" BEYOND GENSET ON ALL SIDES.
8) WEED BARRIER & GRAVEL BED TO EXTEND 4 FT. FROM EXHAUST OUTLET. NO PLANTS, SHRUBS OR OTHER COMBUSTIBLES ALLOWED IN GRAVEL AREA.
9) SENSITIVE PLANTS, PATIO FURNITURE, ETC. ARE AT LEAST 8 FEET FROM EXHAUST END OF SET.
10) REFER TO OWNERS MANUAL FOR OTHER INSTALLATION CONSTRAINTS.

NOTE:
THE RECOMMENDED DISTANCE FROM A STRUCTURE IS DEPENDENT ON STATE AND LOCAL CODES.
NFPA 37 (STANDARDS FOR THE INSTALLATION AND USE OF STATIONARY COMBUSTION ENGINES AND GAS TURBINES) STATES THIS DISTANCE SHOULD BE AT LEAST 5 FEET FROM A COMBUSTIBLE MATERIAL.
FOR INSTALLATIONS NEAR NON-COMBUSTIBLE MATERIAL BE SURE TO LEAVE A MINIMUM DISTANCE OF 3 FEET TO ENSURE PROPER GENERATOR COOLING.

60 RCLB

REV	DATE	ON COMPOSITE DWGS, SEE PART NO. FOR REVISION LEVEL	BY
-	8-19-17	NEW DRAWING [CT178070]	SAK

DO NOT SCALE. REFERENCE THE MODEL FOR ALL UNSPECIFIED DIMENSIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS IN MILLIMETERS GENERAL TOLERANCES: N/A

THIRD ANGLE PROJECTION

APPROVALS		DATE
DRAWN	SAK	8-19-17
CHECKED	DJV	8-19-17
APPROVED	KJT	8-19-17

KOHLER.
KOHLER, WISCONSIN 53044

TITLE: DIMENSION PRINT, 48RCLB/60RCLA

SCALE 0.40 | CAD NO. | SHEET 2 of 2

DWG NO. ADV-8954 | D

Job:	By:	Job Number:
Subject:	Checked By:	Date:

ATS Anchorage

Equipment wt = 1500 Max.

Equip Dim - 90" x 38" x 60" (H x W x D)

Net CG = 45"

Fph = 0.95 Wp (with omega factor)

Fph x 45" - (0.9 -0.2Sds) Wp x 30" /2 = T x 30"

0.95 x 1500# x 45" - 0.583 x 1500# x 30" /2 = T x 30"

T = 1701 lbs

Tensile force / anchor = 1701 / 2 = 851 lbs

Shear force / anchor = 0.95 x 1500 / 4 = 357 lbs

Providing 4 -1/2" dia Hilti - KB-TZ w/ 2" embed was found to be working with DCR of 0.54

(see attached Hilti report below)

Company:		Page:	1
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

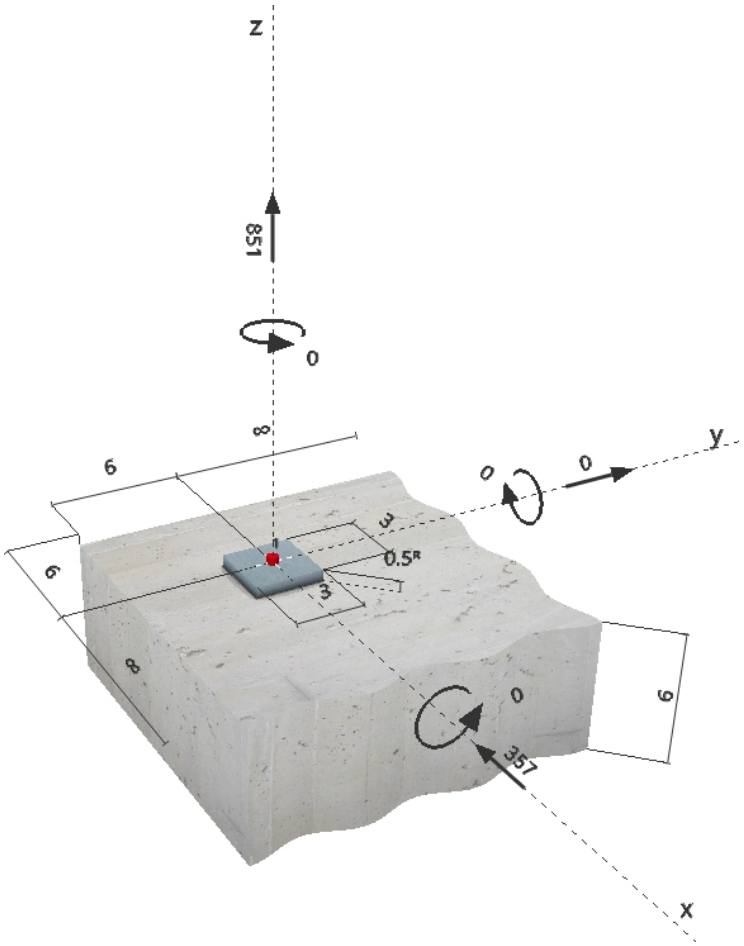
Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ - CS 1/2 (2)**
Effective embedment depth:	$h_{ef,act}$ = 2.000 in., h_{nom} = 2.375 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-1917
Issued I Valid:	1/1/2020 | 5/1/2021
Proof:	Design method ACI 318-14 / Mech.
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 3.000 in. x 3.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	no profile
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 6.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: >= No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Specifier:		Project:	
Address:		Sub-Project I Pos. No.:	
Phone I Fax:	|	Date:	2/26/2021
E-Mail:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Concrete Breakout Strength	851	1,352	63 / -	OK
Shear	Pryout Strength	357	1,683	- / 22	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.629	0.212	5/3	54	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

KOHLER®

Model KCS/KCP/KCC

Automatic Transfer Switches
Standard Any Breaker Rated

ISO 9001 KOHLER® NATIONALLY REGISTERED

Available Controllers

- Decision-Maker® MPAC 1200
- Decision-Maker® MPAC 1500

Ratings

Model	Current	Voltage, Frequency
KCS	30- 4000 amps	208- 600 VAC 50/60 Hz
KCP	150- 4000 amps	
KCC	150- 4000 amps	

Transfer Switch Standard Features

- UL 1008 listed
  file # E58962 (automatic), # E86894 (nonautomatic)
- CSA certification available
- IBC and OSHPD seismic certification available
- Available in 2, 3, or 4 pole configurations
- Electrically operated, mechanically held mechanism
- High withstand and close-on ratings
- Design suitable for emergency and standby applications on all classes of load, 100% tungsten rated through 400 amps
- Silver alloy main contacts
- Gold-flashed engine start contacts
  rated 2 amps @ 30 VDC/250 VAC
- Front-accessible contacts for easy inspection
- Front-replaceable main and arcing contacts (800- 4000 amps)
- Reliable, field-proven solenoid mechanism
- Switching mechanisms lubricated for the expected life of the transfer switch
- Internal manual operating handle
- Main shaft auxiliary position-indicating contacts
  rated 10 amps @ 32 VDC/250 VAC
- NEMA type 1, 12, 3R, 4, and 4X enclosures available
- Standard one-year limited warranty. Extended limited warranties are available.

Standard-Transition Models (KCS)

- Standard-transition operation with either automatic or non-automatic control
- Standard-transition transfer time less than 100 milliseconds (6 cycles @ 60 Hz)
- Double-throw, mechanically interlocked design (break-before-make power contacts)
- Solid, switched, or overlapping (make-before-break) neutral

Programmed-Transition Models (KCP)

- Programmed-transition operation with either automatic or non-automatic control
- Programmed-transition operation provides a center OFF position that allows residual voltages in the load circuits to decay
- Programmable OFF time
- Double-throw, mechanically interlocked design (break-before-make power contacts)
- Solid or switched neutral

Closed-Transition Models (KCC)

- Closed-transition transfer switches operate with no power interruption during transfer and retransfer between two live sources
- Source parallel times are less than 100 milliseconds (6 cycles @ 60 Hz)
- Adjustable extended transfer time relay (ensure that the setting complies with applicable codes)
- Solid or switched neutral

Available Automatic Transfer Switch Controllers

Select one of the following controllers for your automatic transfer switch.

Decision-Maker® MPAC 1200 Controller

- LCD display, 4 lines x 20 characters, backlit
- Complete programming and viewing capability at the door using the keypad and LCD display
- LED indicators: Source available, transfer switch position, service required (fault), and “not in auto”
- Programmable voltage and frequency pickup and dropout settings
- Programmable time delays
- Programmable generator exerciser
- Time-based load control
- Two programmable inputs and two programmable outputs
- Up to four I/O extension modules available
- Modbus communication standard
- RS-485 communication standard
- Ethernet communication optional

For more information about Decision-Maker® MPAC 1200 features and functions, see specification sheet G11-127.

Decision-Maker® MPAC 1500 Controller

- LCD display, 4 lines x 20 characters, backlit
- Complete programming and viewing capability at the door using the keypad and LCD display
- LED indicators: Source available, transfer switch position, service required (fault), and “not in auto”
- Programmable voltage and frequency pickup and dropout settings
- Programmable time delays
- Programmable generator exerciser
- Time-based load control
- Current-based load control (current-sensing kit required)
- Two programmable inputs and two programmable outputs
- Up to four I/O extension modules available
- Modbus communication standard
- RS-485 communication standard
- Ethernet communication standard
- Three-source system
- Prime power

For more information about Decision-Maker® MPAC 1500 features and functions, see specification sheet G11-128.

Application Data

Environmental Specifications	
Operating Temperature	- 20°C to 70°C (- 4°F to 158°F)
Storage Temperature	- 40°C to 85°C (- 40°F to 185°F)
Humidity	5% to 95% noncondensing

Input and Output Connection Specifications	
Component	**Wire Size Range**
Main board I/O terminals	#12- 24 AWG
I/O module terminals	#14- 24 AWG

Auxiliary Position Indicating Contacts (rated 10 amps @ 32 VDC/250 VAC)			
Switch Rating, Amps	**Number of Contacts Indicating Normal, Emergency**		
	KCS	**KCP**	**KCC**
30- 230	2, 2	N/A	N/A
260- 600	8, 8	—	—
150- 600	—	8, 8	7, 7
800-1200	8, 8	8, 8	7, 7
1600- 4000	8, 8	7, 7	6, 6

Extended Transfer Time Adjustable Relay (Model KCC only)	
Power	12 or 24 VDC (customer-supplied)
Connections	12- 20 AWG
Output type	Relay contacts, DPDT (2 form C)
Rating	10 amps max. resistive at 240 VAC
Note: Customer-supplied shunt trip on emergency source circuit breaker is required.	

Source Synchronization Settings (Model KCC)		
Parameter	**Default**	**Adjustment Range**
Voltage differential	5%	0- 5%
Frequency differential	0.1 Hz	0- 0.3 Hz
Phase angle	10 deg.	0- 10 deg.

Cable Sizes

Note: Cable size data is subject to change. Refer to the transfer switch dimension drawings and wiring diagrams for planning and installation.

UL-Listed Solderless Screw-Type Terminals for External Power Connections				
	Range of Wire Sizes, Copper or Aluminum ‡			
Model	**Switch Rating, Amps**	**Normal, Emergency, and Load (per phase)**	**Neutral (3-pole)**	**Ground**
KCS	30- 150	(1) #14 AWG to 4/0 AWG	(3) #14 to 4/0	(3) #6 to 3/0
	200	(1) #14 AWG to 4/0 AWG *Cu only*	(3) #14 to 4/0	(3) #6 to 3/0
	230 (208- 480 V)			
	230 (600 V)	(1) #4 AWG to 600 KCMIL or (2) 1/0 to 250 KCMIL	(3) #4 AWG to 600 KCMIL or (6) 1/0 to 250 KCMIL	(3) #4 AWG to 600 KCMIL or (6) 1/0 to 250 KCMIL
	260- 400			
KCP KCC	150- 400	(1) #4 AWG to 600 KCMIL or (2) 1/0 to 250 KCMIL	(3) #4 AWG to 600 KCMIL or (6) 1/0 to 250 KCMIL	(3) #4 AWG to 600 KCMIL or (6) 1/0 to 250 KCMIL
KCS KCP KCC	600	(2) #2 AWG to 600 KCMIL	(6) #2 AWG to 600 KCMIL	(3) #4 AWG to 600 KCMIL or (6) 1/0 to 250 KCMIL
	800- 1000	(4) 1/0 AWG to 750 KCMIL	(12) #2 AWG to 600 KCMIL	
	1200 (NEMA 3R)			
	1200 (NEMA 1)	(4) 1/0 AWG to 750 KCMIL	(16) 1/0 to 750 KCMIL	(3) #4 to 500 KCMIL
	1600- 2000 F † (NEMA 3R)	(6) 1/0 AWG to 750 KCMIL	(24) 1/0 to 750 KCMIL	(3) #4 AWG to 600 KCMIL or (6) 1/0 to 250 KCMIL
	1600- 2000	(6) 1/0 AWG to 750 KCMIL	(24) 1/0 to 750 KCMIL	(3) #4 to 500 KCMIL
	2600- 3000	(12) 1/0 AWG to 750 KCMIL	(36) 1/0 to 750 KCMIL	
	4000	(12) 1/0 AWG to 750 KCMIL	(36) 1/0 AWG to 750 KCMIL	(18) 1/0 AWG to 750 KCMIL

† F = Front connected

‡ Use 75°C minimum Cu/Al wire for power connections.

Withstand and Close-On Ratings (WCR)

Standard, Programmed, and Closed-Transition Models

Maximum current in RMS symmetrical amperes when coordinated with customer-supplied fuses or circuit breakers. All values are available symmetrical RMS amperes and tested in accordance with the withstand and close-on requirements of UL 1008. Application requirements may permit higher withstand ratings for certain size switches. Contact the factory for assistance.

Model	Switch Rating, Amps	Withstand Current Ratings in RMS Symmetrical Amperes								Short Time Ratings (sec.) ‡							
		Current-Limiting Fuses				Time-Based Rating *				480 V Max.				600 V Max.			
		480 V Max.	600 V Max.	Amps, Max.	Fuse Class	Time, sec.	240 V, Max	480 V, Max	600 V, Max	.13	.2	.3	.5	.1	.13	.3	.5
KCS	30	100kA	—	300	J	0.025	10kA	10kA	10kA	—				—			
		200kA	35kA	200	J					—				—			
		35kA	35kA	200	RK1					—				—			
	70 104 150	200kA	35kA	200	J	0.025	10kA	10kA	10kA	—				—			
	200	200kA	—	200	J	0.025	10kA	10kA	—	—				—			
	70 104 150	35kA	35kA	200	RK1	0.025	10kA	10kA	10kA	—				—			
	230 (480V)	100kA	—	300	J	0.025	10kA	10kA	—	—				—			
	230 (600V)	200kA	200kA	600	J	0.05	65kA	42kA †	35kA	7500A		—		—			
				800	L					7500A		—		—			
KCP KCC	150	200kA	200kA	600	J	0.05	65kA	42kA †	35kA	7500A		—		—			
				800	L	0.05	65kA	42kA †	35kA	7500A		—		—			
KCP	225	200kA	200kA	600	J	0.05	65kA	42kA †	35kA	7500A		—		—			
				800	L	0.05	65kA	42kA †	35kA	7500A		—		—			
KCS KCP KCC	260 400	200kA	200kA	600	J	0.05	65kA	42kA †	35kA	7500A		—		—			
				800	L	0.05	65kA	42kA †	35kA	7500A		—		—			
	600	200kA	200kA	600	J	0.05	65kA	42kA †	35kA	—		—		—			
				800	L	0.05	65kA	42kA †	35kA	—		—		—			
	800- 1200	200kA	200kA	1600	L	0.05	50kA	50kA	50kA	36kA			—	36kA			—
	1600- 2000 F	200kA	200kA	2500	L	0.05	85kA	85kA	85kA	42kA			36kA	—			
	1600- 2000 S	200kA	200kA	3000	L	0.05	100kA	100kA	100kA	42kA			36kA	42kA			—
	2600 3000	200kA	200kA	4000	L	0.05	100kA	100kA	100kA	42kA			36kA	42kA			—
	4000	200kA	200kA	5000	L	0.05	100kA	100kA	100kA	85kA	65kA			65kA			

* Applicable to breakers with instantaneous trip elements.

† Applicable to 2-pole, 3-pole, and conventional 4-pole switches only. Overlapping neutral switches have “any” breaker ratings of 35kA, 0.050 seconds at 480 V.

‡ Short time ratings are provided for applications involving breakers that utilize trip delay settings for system selective coordination.

Ratings with Specific Manufacturers' Circuit Breakers

The following charts list power switching device withstand and close-on ratings (WCR) in RMS symmetrical amperes for specific manufacturers' circuit breakers. Circuit breakers are supplied by the customer.

Model	Switch Rating, amps	WCR, amps RMS	Volts, Max.	Molded-Case Circuit Breakers		
				Manufacturer	Type or Class	Max. Size, amps
KCS	30	22,000	480	GE	THED	40
	70	150,000	240	Square D	HR	250
		125,000			HL	150
		100,000			BJ, HJ	125
		65,000			BG, HG	125
		42,000			QG, QJ	90
		25,000			HD	150
		25,000			BD	125
		22,000	480	GE	THED	90
		85,000		Square D	HL, HR	150
		50,000			BJ	125
		35,000			HG, HJ	150
					BG	125
		18,000			BD, HD	125
		25,000	600	Square D	HJ, HL, HR	150
					BJ	125
		18,000			HG	150
					BG	125
		14,000			HD	150
					BD	125
KCS	104	150,000	240	Square D	HR	250
		125,000			HL	150
		100,000			BJ, HJ	125
		65,000			BG, HG	125
		42,000			QG, QJ	125
		25,000			HD	150
					BD	125
		22,000	480	GE	THED	150
		85,000		Square D	HL, HR	150
		50,000			BJ	125
		35,000			HG, HJ	150
					BG	125
		18,000			BD, HD	125
		25,000	600	Square D	HJ, HL, HR	150
					BJ	125
		18,000			HG	150
					BG	125
		14,000			HD	150
					BD	125

Model	Switch Rating, amps	WCR, amps RMS	Volts, Max.	Molded-Case Circuit Breakers		
				Manufacturer	Type or Class	Max. Size, amps
KCS	150	150,000	240	Square D	HR	250
		125,000			HL	150
		100,000			BJ, HJ	125
		65,000			JG, JJ, JL, JR	200
					BG, HG	125
		42,000			QG, QJ	200
		25,000			HD	150
					BD	125
		22,000	480	GE	THED	150
		85,000		Square D	HL, HR	150
		50,000			BJ	125
		35,000			HG, HJ	150
					BG	125
		25,000			JG, JJ, JL	200
		18,000			BD, HD	125
		25,000	600	Square D	HJ, HL, HR	150
					BJ	125
		18,000			HG	150
					BG	125
		14,000			HD	150
					BD	125
KCS	200 230	200,000	240	Square D	JR	250
		125,000			JL	250
		100,000			JJ	250
		65,000			JG	250
		42,000			QG, QJ	225
		25,000			JD	250
		85,000	480	Square D	JL, JR	250
		30,000			JG, JJ	250
		18,000			JD	250
KCS	230	42,000	600	Eaton/ Cutler Hammer	JGU, JGX, JGH	250
					KDC	400
					LDC, CLDC	600
				GE	TBC4	400
					SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGP	600
				Square D	HJ, HL, HG	150
					KI, JJ, JL, JR, CF250L	250
					CK400H, CK400HH, CJ400L	400
					LI, MasterPact STR 28D, PK	600
				Siemens / ITE	HJD, CFD6	250
					HHJD6, HHJXD6, CJD6, SCJD6	400
					HHLD6, HHLXD6, CLD6, SCLD6, LNG, LPG, LGC*, LGU*, LGX*	600

Model	Switch Rating, amps	WCR, amps RMS	Volts, Max.	Molded-Case Circuit Breakers		
				Manufacturer	Type or Class	Max. Size, amps
KCP KCC	150 200 225 § 230 260 400 600	65,000	240	GE	THQMV	225
					SGL1, SGL4, SGL6, SGP1, SGP4, SGP6	600
				Eaton/ Cutler Hammer	LDC, CLDC, HLD, CHLD	600
				Siemens / ITE	HLD6, HLXD6	600
				Square D	QG, QJ	250
					LJ, LL, LR	600
	150 225 §	50,000	480	Eaton/ Cutler Hammer	HFDE, FDC, FDCE	225
					NHH	250
					JDC, JGU, JGX	350
					HKD, CHKD, KDC, HKDB, CHKDB, LHH	400
					HLD,CHLD, LDC, CLDC, LGH*, LGC*, LGU*, LGX*	600
					HMDLB, CHMDLB	800
				GE	SEL, SEP	150
					SFL, SFP, FEN, FEH	250
					TBC4	400
					FGN, FGH, FGL, FGP, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6. TJL4V, TJL1S- 6S, TBC6	600
					TB8	800
				Siemens / ITE	HDG, LDG	150
					HFD, HFD6, HFXD, HFXD6, HHFD6, HHFXD6, CFD6, HFG, LFG	250
					HJD, HJD6, HJXD, HJXD6, SHJD, SHJD6, HHJD6, HHJXD6, CJD6, SCJD6, HJG, LJG, LLG	400
					HLD6, HLXD6, HHLD6, HHLXD6, CLD6, SHLD6, SCLD6, HLG	600
				Square D	HJ, HL	150
					KC, KI, CF250L, NSF250	250
					CK400N, CK400NN, CK400H, CK400HH, CJ400L, NSJ400	400
					LC, DJ, DL, LI, NSJ600	600
					MasterPact STR 28D, PK, PJ, PL	800
		65,000		Square D	JJ (Current Limiting)	250
		100,000			JL (Current Limiting)	
		200,000			JR (Current Limiting)	
		42,000	600	Eaton/ Cutler Hammer	JGU, JGX, JGH	250
					KDC	400
					LDC, CLDC	600
				GE	TBC4	400
					SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGP	600
				Square D	HJ, HL, HG	150
					KI, JJ, JL, JR, CF250L	250
					CK400H, CK400HH, CJ400L	400
					LI, MasterPact STR 28D, PK	600
				Siemens/ITE	HJD, CFD6	250
					HHJD6, HHJXD6, CJD6, SCJD6	400
					HHLD6, HHLXD6, CLD6, SCLD6, LNG, LPG, LGC*, LGU*, LGX*	600

* With Digitrip 310+ LS or LSG Inst. Override set to 12X.

§ KCP only

Model	Switch Rating, amps	WCR, amps RMS	Volts, Max.	Molded-Case Circuit Breakers		
				Manufacturer	Type or Class	Max. Size, amps
KCS KCP KCC	260	50,000	480	Eaton/ Cutler Hammer	HFDE, FDCE, HFD, FDC, LHH	225
					JDC, JGH, JGC, JGU, JGX	250
					HKD, HKDB, CHKD, CHKDB, KDC	400
					HLD,CHLD, LDC, CLDC, LGH*, LGC*, LGU*, LGX*, NHH	600
					MDL, CMDL, HMDL, CHMDL, NGS, NGH, NGC, MDLB, CMDLB, HMDLB, CHMDLB	800
				GE	SFL, SFP, FEN, FEH	250
					TBC4	400
					TBC6, TJL4V, TJL1S- 6S, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGN, FGH, FGL, FGP	600
					TBC8, TKL4V, TKH8S- 12S, TKL8S- 12S, SKH8, SKL8, SKP8, TB8	800
				Siemens / ITE	HFD6, HFXD6, HHFD6, HHFXD6, CFD6, HFG, LFG	250
					HJD6, HJXD6, SHJD6, HHJD6, HHJXD6, CJD6, SCJD6, HJG, LJG, LLG	400
					HLD6, HLXD6, SHLD6, HHLD6, HHLXD6, CLD6, SCLD6, HLG	600
					LMD, LMD6, LMXD, LMXD6, HLMD, HLMD6, HLMXD, HLMXD6, MD, MD6, MXD6, HMG, HMD6, HMXD6, SMD6, SHMD6, CMD6, SCMD6, LMG, MG	800
				Square D	KI, KC, CF250L, NSF250	250
					CK400N, CK400NN, CK400H, CK400HH, CJ400L, NSJ400	400
					LC, DJ, DL, LJ, LL, LR, LI, NSJ600	600
					CK800N, CK800NN, CK800H, CK800HH, MasterPact STR 28D, MJ, PK, PJ, PL	800
					CK1000HL	1000
					CK1200NN, CK1200HH	1200
		65,000		Square D	JJ (Current Limiting)	250
		100,000			JL (Current Limiting)	250
		200,000			JR (Current Limiting)	250
		42,000	600	Eaton/ Cutler Hammer	JGU, JGX	250
					KDC	400
					LDC, CLDC	600
				GE	TBC4	400
					TBC6, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGP	600
					TBC8, TKL4V, TKL8S- 12S, SKL8, SKP8	800
				Siemens / ITE	HJD, CFD6	250
					HHJD6, HHJXD6, CJD6, SCJD6	400
					HHLD6, HHLXD6, CLD6, SCLD6	600
					HLMD6, HLMXD6, HMXD6, SHMD6, HMD6, CMD6, SCMD6, LMG, LNG, LPG, LGC*, LGU*, LGX*	800
				Square D	KI, JL, JR, JJ, CF250L	250
					CK400H, CK400HH, CJ400L	400
					LI	600
					CK800H, CK800HH, MasterPact STR 28D, PK	800

* With Digitrip 310+ LS or LSG Inst. Override set to 12X.

Model	Switch Rating, amps	WCR, amps RMS	Volts, Max.	Molded-Case Circuit Breakers		
				Manufacturer	Type or Class	Max. Size, amps
KCS KCP KCC	400	50,000	480	Eaton/ Cutler Hammer	JGH, JGC, NHH	250
					HKD, CHKD, KDC, HKDB, CHKDB, LHH	400
					CHLD, LDC, CLDC, LGH*, LGC*, LGU*, LGX*	600
					MDL, CMDL, HMDL, CHMDL, NGS, NGH, NGC, MDLB, CMDLB, HMDLB, CHMDLB	800
					NGU	1600
				GE	TBC4	400
					TBC6, TJL4V, TJL1S- 6S, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGN, FGH, FGL, FGP	600
					TBC8, TKL4V, TKH8S- 12S, TKL8S- 12S, SKH8, SKL8, SKP8, TB8	800
				Siemens / ITE	HFD6, HFXD6, HFG, LFG	250
					HJD6, HJXD6, SHJD6, HHJD6, HHJXD6, CJD6, SCJD6, HJG, LLG, LJG	400
					HLD6, HLXD6, SHLD6, HHLD6, HHLXD6, CLD6, SCLD6, HLG	600
					LMD6, LMXD6, HLMD6, HLMXD6, MD6, MXD6, HMD6, HMXD6, SMD6, SHMD6, CMD6, SCMD6, HMG, LMG	800
				Square D	CK400N, CK400NN, CK400H, CK400HH, CJ400L, NSJ400	400
					LC, DJ, DL, LJ, LL, LR, LI, NSJ600	600
					CK800N, CK800NN, CK800H, CK800HH, MJ	800
					CK1000HH	1000
					PK, PJ, PL, MH, MasterPact STR 28D, CK1200HH	1200
		42,000	600	Eaton/ Cutler Hammer	KDC	400
					LDC, CLDC, LGC*, LGU*, LGX*	600
				GE	TBC4	400
					TBC6, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGP	600
					TBC8, TKL4V, TKL8S- 12S, SKL8, SKP8	800
				Siemens / ITE	HHJD6, HHJXD6, CJD6, SCJD6	400
					HHLD6, HHLXD6, CLD6, SCLD6	600
					HLMD6, HLMXD6, HMXD6, SHMD6, HMD6, CMD6, SCMD6, LMG	800
					LNG, LPG	1200
				Square D	CK400H, CK400HH, CJ400L	400
					LI	600
					CK800H, CK800HH	800
					MasterPact STR 28D, PK	1200

* With Digitrip 310+ LS or LSG Inst. Override set to 12X.

Model	Switch Rating, amps	WCR, amps RMS	Volts, Max.	Molded-Case Circuit Breakers		
				Manufacturer	Type or Class	Max. Size, amps
KCS KCP KCC	600	50,000	480	Eaton/ Cutler Hammer	JGH, JGC, HFG, LFG	250
					HLD, CHLD, LDC, CLDC, LGH*, LGC*, LGU*, LGX*	600
					MDL, CMDL, HMDL, CHMDL, NGS, NGH, NGC, NGU, MDLB, CMDLB, NF	800
				GE	TBC6, TJL4V, TJL1S-6S, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGN, FGH, FGL, FGP	600
					TBC8, TKL4V, TKH8S-12S, TKL8S-12S, SKH8, SKL8, SKP8, TB8	800
					SKL12, SK12P	1200
				Siemens/ITE	HLD6, HLXD6, SHLD6, HHLD6, HHLXD6, CLD6, SCLD6, HLG, LLG	600
					LMD6, LMXD6, HLMD6, HLMXD6, MD6, MXD6, HMD6, HMXD6, SMD6, SHMD6, CMD6, SCMD6, HMG, LMG	800
					HND6, HNXD6, SND6, SHND6, ND6, NXD6, HNG, LNG, CND6	1200
				Square D	LC, DJ, DL, LI, NSJ600	600
					CK800N, CK800NN, MJ	800
					MH, CK1200N, CK1200NN, CK1200H, CK1200HH, NT-H, NT-L1, NT-L, NT-LF, PK, PJ, PL	1200
					CM2000HH	2000
					CM2500HH	2500
		42,000	600	Eaton/ Cutler Hammer	JGC	250
					TBC4	400
					LDC, CLDC	600
				GE	TBC6, SGL1, SGL4, SGL6, SGP1, SGP4, SGP6, FGP	600
					TBC8, TKL4V, TKL8S-12S, SKL8, SKP8	800
					SKL12, SKP12	1200
				Siemens/ITE	HHLD6, HHLXD6, CLD6, SCLD6	600
					HLMD6, HLMXD6, HMXD6, SHMD6, HMD6, CMD6, SCMD6, LMG	800
					HND6, HNXD6, HNG, LNG, SHND6	1200
				Square D	LI	600
					CK800H, CK800HH	800
					CK1000HL	1000
					CK1200H, CK1200HH, NT-H, NT-L, NT-LF, NT-L1, MasterPact STR 28D, PK	1200
	800 1000 1200	65,000	480	Eaton/ Cutler Hammer	HLD, CHLD, LGH, LGC, LGU, LGX, LDC, CLDC	600
					HMDL, CHMDL, HMDLB, CHMDLB	800
					HND, CHND, NDC, CNDC, NF	1200
					NGH, NGC, NGU	1600
					RGH, RGC	2500
				GE	TBC6, TJL4V, SGL, SGP6	600
					TBC8, SKL8, SKP8	800
					SKL12, SKP12, TKL4V	1200
				Siemens/ITE	HLXD6, HHLXD6, HHLD6, CLD6, SHLD6, SCLD6, HLG, LLG	600
					HMXD6, HMD6, SHMD6, HMG, LMG, CMD6, SCMD6	800
					SHND6, CND6, HNXD6, HNG, LNG	1200
					HPG, LPG, HPD, HPD6, CPD6, HPXD, HPXD6, SHPD, SHPD6	1600
					HRD6, HRXD6	2000
				Square D	LI, LE LSI, LE LI, LX, LXI, LJ, LL, LR	600
					MJ, ME, MX, CK800H, CK800HH	800
					CK1000HL	1000
					NT-L1, NT-L, NT-LF, NE, NX, CK1200H, CK1200HH, PJ, PL	1200
					NW, RJ, RL	1600
					PE, PX	2500
					SES, SE, SEH (LS or LSI TRIP)	3000
					SE (LI, LSI-E, and LI-E TRIP)	4000
					MasterPact STR 28D	6300
			600	Eaton/ Cutler Hammer	Tri-Pac NB	800
					RDC	2500
				Siemens/ITE	CND	1200

* With Digitrip 310+ LS or LSG Inst. Override set to 12X.

Weights and Dimensions

Note: Always use the transfer switch dimension drawing for planning and installation. Weights and dimensions may vary for different configurations. See your local distributor for dimension drawings.

Weights and dimensions are shown for NEMA Type 1 enclosures, NEMA Type 3R enclosures and open units. See the transfer switch dimension drawings for other enclosure types.

Model	Amps	NEMA Type	Poles	Wires	Dimensions mm (in.)			Weight kg (lb.)			Dimension Drawing
					Height	Width	Depth	2-Pole	3-Pole	4-Pole	
KCS	30- 200	1, 3R	2,3,4	3, 4	791 (31)	450 (18)	314 (12.4)‡	28 (62)	30 (65)	31 (68)	ADV-8566
	230 (208- 480V)		2,3,4	3, 4	1223 (48)	560 (22)	362 (14.3)‡	52 (115)	56 (123)	59 (131)	ADV-8568
	230 (600 V) 260- 600		2,3,4	3, 4	1702 (67)	610 (24)	514 (20.2)‡	179 (395)	183 (403)	188 (414)	ADV-8570
	800		2,3,4	3, 4	1932 (76)*	864 (34)	515 (20.3)‡	220 (485)	231 (510)	238 (525)	ADV-8572
	1000		3,4	4	1932 (76)*	864 (34)	515 (20.3)‡	—	231 (510)	238 (525)	ADV-8572
	1200	1	3,4	4	2286 (90)	963 (38)	688 (27.1)	—	356 (785)	379 (835)	ADV-8574
		3R	3,4	4	2286 (90)	940 (37)	717 (28.2)	—	356 (785)	379 (835)	ADV-8575
	1600- 2000F †	1	3,4	4	2286 (90)	963 (38)	688 (27.1)	—	472 (1040)	494 (1090)	ADV-8577
		3R	3,4	4	2286 (90)	940 (37)	869 (34.2)	—	356 (785)	379 (835)	ADV-8578
	1600- 2000	1	3,4	4	2286 (90)	963 (38)	1220 (48)	—	472 (1040)	494 (1090)	ADV-8579
		3R	3,4	4	2286 (90)	940 (37)	1434 (56.4)	—	472 (1040)	494 (1090)	ADV-8580
	2600- 3000	1	3,4	4	2286 (90)	963 (38)	1524 (60)	—	649 (1430)	679 (1495)	ADV-8581
		3R	3,4	4	2286 (90)	940 (37)	1738 (68.4)	—	649 (1430)	679 (1495)	ADV-8582
	4000	1	3,4	4	2311 (91)	1524 (60)	1836 (72.3)	—	975 (2149)	1056 (2328)	ADV-8583
		3R	3,4	4	2529 (100)	1606 (63)	2310 (91)	—	1436 (3165)	1523 (3357)	
KCS	30- 200	Open Unit §	2,3,4	3, 4	787 (31)	445 (18)	296 (11.6)	8 (17)	9 (20)	11 (23)	ADV-7182
	230 (208- 480V)		2,3,4	3, 4	1219 (48)	457 (18)	330 (13.0)	17 (37)	21 (45)	24 (53)	
	230 (600V) 260- 600		2,3,4	3, 4	1422 (56)	610 (24)	362 (14.3)	31 (68)	34 (74)	36 (80)	
	800		2,3,4	3, 4	1829 (72)	864 (34)	508 (20)	68 (150)	78 (170)	90 (196)	
	1000		3,4	4	1829 (72)	864 (34)	508 (20)	—	78 (170)	90 (196)	
	1200		3,4	4	2210 (87)	965 (38)	584 (23)	—	78 (170)	90 (196)	
	1600- 2000F †		3,4	4	2210 (87)	965 (38)	635 (25)	—	190 (420)	213 (470)	
	1600- 2000		3,4	4	2286 (90)	965 (38)	1219 (48)	—	190 (420)	213 (470)	
	2600- 3000		3,4	4	2286 (90)	965 (38)	1524 (60)	—	213 (470)	243 (535)	
KCP KCC	150- 600	1, 3R	2,3,4	3, 4	1702 (67)	610 (24)	514 (20.2)‡	179 (395)	183 (403)	188 (414)	ADV-8570
	800	1, 3R	2,3,4	3, 4	1932 (76)*	864 (34)	515 (20.3)‡	220 (485)	231 (510)	238 (525)	ADV-8572
	1000	1, 3R	2,3,4	4	1932 (76)*	864 (34)	515 (20.3)‡	220 (485)	231 (510)	238 (525)	ADV-8572
	1200	1	3,4	4	2286 (90)	963 (38)	688 (27)	—	463 (1020)	485 (1070)	ADV-8574
		3R	3,4	4	2286 (90)	940 (37)	717 (28.2)	—	463 (1020)	485 (1070)	ADV-8575
	1600- 2000F †	1	3,4	4	2286 (90)	963 (38)	688 (27)	—	533 (1175)	556 (1225)	ADV-8577
		3R	3,4	4	2286 (90)	940 (37)	869 (34.2)	—	533 (1175)	556 (1225)	ADV-8578
	1600- 2000	1	3,4	4	2286 (90)	963 (38)	1220 (48)	—	533 (1175)	556 (1225)	ADV-8579
		3R	3,4	4	2286 (90)	940 (37)	1434 (56.4)	—	533 (1175)	556 (1225)	ADV-8580
	3000	1	3,4	4	2286 (90)	963 (38)	1524 (60)	—	735 (1620)	765 (1685)	ADV-8581
		3R	3,4	4	2286 (90)	940 (37)	1738 (68.4)	—	735 (1620)	765 (1685)	ADV-8582
	4000	1	3,4	4	2311 (91)	1524 (60)	1836 (72.3)	—	975 (2149)	1056 (2328)	ADV-8583
		3R	3,4	4	2528 (100)	1606 (63)	2310 (91)	—	1436 (3165)	1523 (3357)	ADV-8583
KCP	150- 600	Open Unit §	2,3,4	3, 4	1422 (56)	610 (24)	362 (14.3)	38 (84)	41 (90)	44 (96)	ADV-7182
	800		2,3,4	3, 4	1829 (72)	864 (34)	508 (20)	80 (175)	94 (205)	108 (235)	
	1000		2,3,4	4	1829 (72)	864 (34)	508 (20)	80 (175)	94 (205)	108 (235)	
	1200		2,3,4	4	2210 (87)	965 (38)	584 (23)	80 (175)	94 (205)	108 (235)	
	1600- 2000F †		3,4	4	2210 (87)	965 (38)	635 (25)	—	252 (555)	274 (605)	
	1600- 2000		3,4	4	2286 (90)	965 (38)	1219 (48)	—	252 (555)	274 (605)	
	2600- 3000		3,4	4	2286 (90)	965 (38)	1524 (60)	—	300 (660)	329 (725)	
	2600- 3000		3,4	4	2286 (90)	965 (38)	1524 (60)	—	300 (660)	329 (725)	

* Includes mounting feet
† F = Front connected
‡ On 30- 1000 amp models, the NEMA type 3R enclosures have a security cover on the controller that extends 54 mm (2.1 in.) beyond the door.
§ Dimensions shown for open units are the minimum required enclosure size. Open unit weights are shipping weights for the contactor only.

Codes and Standards

The ATS meets or exceeds the requirements of the following specifications:

- CSA C22.2 No. 178 certification available, file #LR58301
- EN61000-4-4 Fast Transient Immunity Severity Level 4
- EN61000-4-5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
- IEC Specifications for EMI/EMC Immunity:
  - CISPR 11, Radiated Emissions
  - IEC 1000-4-2, Electrostatic Discharge
  - IEC 1000-4-3, Radiated Electromagnetic Fields
  - IEC 1000-4-4, Electrical Fast Transients (Bursts)
  - IEC 1000-4-5, Surge Voltage
  - IEC 1000-4-6, Conducted RF Disturbances
  - IEC 1000-4-8, Magnetic Fields
  - IEC 1000-4-11, Voltage Dips and Interruptions
- IEC 60947-6-1, Low Voltage Switchgear and Control Gear; Multifunction Equipment; Automatic Transfer Switching Equipment
- IEEE Standard 446, IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- IEEE 472 (ANSI C37.90A) Ring Wave Test
- NEMA Standard ICS 10- 2005, Electromechanical AC Transfer Switch Equipment
- NFPA 70, National Electrical Code
- NFPA 99, Essential Electrical Systems for Health Care Facilities
- NFPA 110, Emergency and Standby Power Systems
- Seismic certification in accordance with the International Building Code is available. (Accessory kit is required for seismic certification.)
  - IBC 2000, referencing ASCE 7-98 and ICC AC-156
  - IBC 2003, referencing ASCE 7-02 and ICC AC-156
  - IBC 2006, referencing ASCE 7-05 and ICC AC-156
  - IBC 2009, referencing ASCE 7-05 and ICC AC-156
  - IBC 2012, referencing ASCE 7-10 and ICC AC-156
- California OSHPD approval is available. (Accessory kit required.)
- Underwriters Laboratories UL 1008, Standard for Automatic Transfer Switches for Use in Emergency Standby Systems file #E58962 (automatic), #E86894 (nonautomatic)

Controller Accessories

See the controller specification sheets for more information.

❑ **Accessory Modules**
- Alarm Module
- External Battery Supply Module
- Input/Output Module
- High-Power Input/Output Module

❑ **Controller Disconnect Switch**

❑ **Ethernet Communications**

❑ **Current Sensing Kit**

❑ **Line-to-Neutral Voltage Monitoring**

❑ **Padlockable User Interface Cover**

❑ **Supervised Transfer Control Switch**

Transfer Switch Accessories

Accessories are available either factory-installed or as loose kits, unless otherwise noted.

❑ CSA Certification

❑ Digital Meter

- Measure and display voltage, current, frequency, and power
- 35 programmable alarms
- LCD display, 67 x 62.5 mm (2.65 x 2.5 in.)
- Pushbutton operation
- Password- protected programming menus
- Two digital inputs
- Two digital outputs
- Two Form A relay outputs
- Serial port for optional network connections
- Data logging
- Factory- installed

❑ Export Packaging

❑ Extended Limited Warranties

- 2-year basic
- 5-year basic
- 5-year comprehensive
- 10-year major components

❑ Heater, Anti-Condensation

- Hygrostat-controlled 120 VAC strip heater (customer-supplied voltage source required)
- 100 or 250 watts (sized for enclosure)
- Protective 15 Amp circuit breaker

❑ Literature Kits

- Production literature kit (one set of literature is included with each transfer switch)
- Overhaul literature kit

❑ Load Shed Kit

- Forced transfer from Emergency to OFF for programmed-transition models
- Customer-supplied signal (contact closure) is required for the forced transfer to OFF function
- Factory-installed

❑ Neutral Assembly

- Available as loose kit for open units

❑ RSA III Remote Serial Annunciator

- Monitors the generator set
- Monitors Normal and Emergency source status and connection
- Monitors ATS common alarm
- Allows remote testing of the ATS
- For more information, see specification sheet G6- 139.

❑ Surge Protection Device (SPD)

- SPD available for the normal source supply
- Surge protection reduces transient voltages to harmless levels
- Protection modes: L-L / L-N / L-G / N-G
- Replaceable phase and neutral cartridges for service
- Frequency: 50- 60 Hz
- Operating Temperature Range: - 40 to 176°F (- 40 to 80°C)
- Remote contacts for customer-supplied status indicators:
  Contacts: 1 NO, 1 NC
  Min Load: 12VDC / 10 mA
  Max. Load: 250 VAC / 1 A
  Wire Size (max.): 16AWG
- Fuse protection: 30 amps / 600 V
- UL 1449, 3rd Edition for Type 2 applications
- IEC 61-643-1, 2nd Edition T2/11
- See additional SPD specifications below

Seismic Certification

❑ IBC Seismic Certification

- Certification depends on application and geographic location. Contact your distributor for details.
- Available for the KC model transfer switches with enclosures shown below:

ATS Size, Amps	Enclosure, NEMA Type:				
	1	3R	4	4X	12
30- 1200	●	●	●	●	●
1600- 4000	●	●			

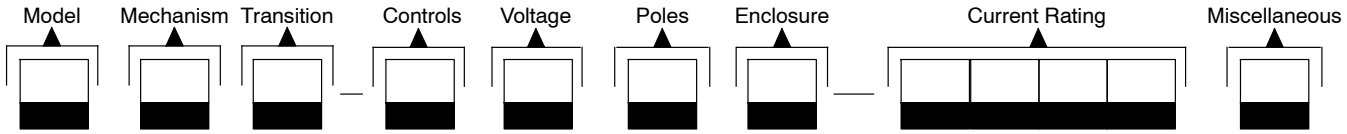
❑ California OSHPD Approval

- Available for KC model transfer switches with NEMA 1 and NEMA 3R enclosures.

SPD Specifications								
Nominal Voltage (V ±15%)	Max. Discharge Current (kA)	Phase	Poles	UL VPR 3rd Ed (L-N/N-G/L-G) (kV)	Limiting Voltage, (L-N/N-G/L-G) (kV)		Short Circuit Withstand Current (kA)	Maximum Continuous Operating Voltage (VAC)
					at 3kAmps	at 10kAmp		
240/120	40	Split	3	0.6 / 1.2 / 0.7	0.6 / 0.4 / 0.6	0.8 / 0.7 / 0.8	200	175 / 350
208/120	40	Wye	4	0.6 / 1.2 / 0.7	0.6 / 0.4 / 0.6	0.8 / 0.7 / 0.8	200	175 / 350
480/277	40	Wye	4	1.0 / 1.2 / 1.1	1.0 / 0.4 / 1.0	1.2 / 0.7 / 1.2	200	320 / 640
240/120	40	HLD	4	1.0 / 1.2 / 1.1	1.0 / 0.4 / 1.0	1.2 / 0.7 / 1.2	200	320 / 640
600/347	40	Wye	4	1.3 / 1.2 / 1.4	1.3 / 0.4 / 1.3	1.5 / 0.7 / 1.5	200	440 / 880

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444
KOHLERPower.com

Model Designation



Record the transfer switch model designation in the boxes. The transfer switch model designation defines characteristics and ratings as explained below.

Sample Model Designation: KCS-DNTA-0400S

Model

K: Kohler

Mechanism

C: Standard (Any Breaker)

Transition

S: Standard
P: Programmed
C: Closed

Controller

A: Decision-Maker® MPAC 1200, Automatic
B: Decision-Maker® MPAC 1200, Non-Automatic
D: Decision-Maker® MPAC 1500, Automatic
F: Decision-Maker® MPAC 1500, Non-Automatic

Voltage/Frequency

C: 208 Volts/60 Hz
D: 220 Volts/50 Hz
F: 240 Volts/60 Hz
G: 380 Volts/50 Hz
H: 400 Volts/50 Hz
J: 416 Volts/50 Hz
K: 440 Volts/60 Hz
M: 480 Volts/60 Hz
N: 600 Volts/60 Hz
P: 380 Volts/60 Hz
R: 220 Volts/60 Hz

Number of Poles/Wires

N: 2 Poles/3 Wires, Solid Neutral
T: 3 Poles/4 Wires, Solid Neutral
V: 4 Poles/4 Wires, Switched Neutral
W: 4 Poles/4 Wires, Overlapping Neutral

Enclosure

A: NEMA 1
B: NEMA 12
C: NEMA 3R
D: NEMA 4
F: NEMA 4X
G: Open Unit

Current, Amps

0030	0230	1200
0070	0260	1600
0104	0400	2000
0150	0600	2600
0200	0800	3000
0225	1000	4000

Connections

S: Standard
F: Front (1600 and 2000 amp only)

Note: Some selections are not available for every model. Contact your Kohler distributor for availability.

DISTRIBUTED BY:

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® Power Systems distributor for availability.