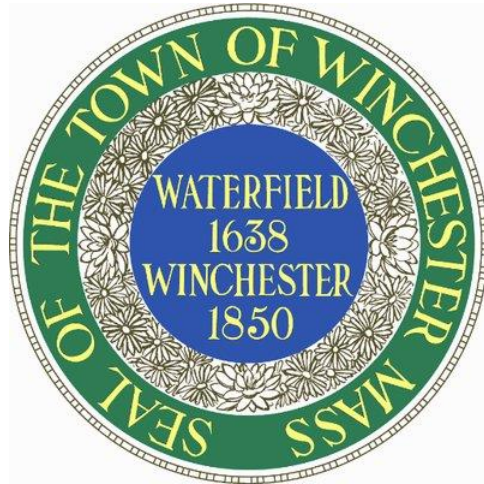




**HORIZON
SOLUTIONS**

Town of Winchester

Energy Efficiency Measures



Prepared by
HORIZON Solutions LLC
7/13/2022

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Disclaimer

This report is not for general use and is the intellectual property of Horizon Energy Services LLC. All savings estimates and rebates must be considered estimated until reviewed and approved by the utility.

Data and assumptions used to generate this estimate and proposal were supplied by customer. All reasonable attempts to validate the information gathered have been made, and conservative estimates of data and system capacities have been made using assessment and design criteria established by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, and Association of Energy Engineers.

For any questions regarding this report, please contact Mike Sciaraffa, Director of Engineering for Horizon Energy Services LLC, MSciaraffa@HorizonSolutions.com. Any additional use of this report is prohibited unless permission is given in writing from Horizon Energy Services LLC.

Executive Summary

Horizon Solutions is pleased to present the Town of Winchester, a summary of Energy Efficiency Measures (EEMs) recommended for the Winchester Recreational Center and the Parkhurst School.

Below is a brief summary of individual buildings' EEMs. Costs for each EEM, utility incentive, utility savings and simple paybacks are listed in the table below. Please note, all incentives must be considered estimates until approved by the appropriate local utility. Fair and reasonable estimations were made for incentive dollars; \$0.25 per kilowatt hour saved annually, and \$1.50 per therm saved annually for custom incentive projects, and prescriptive incentives where applicable.

Financial Summary of Proposed Efficiency Measures

<i>Town of Winchester</i>										
<i>Location</i>	<i>EEM</i>	<i>Project Cost</i>	<i>kWh Saved</i>	<i>Therms Saved</i>	<i>Electric Rebate</i>	<i>Gas Rebate</i>	<i>Cost to Customer</i>	<i>Annual Savings</i>	<i>Years to Pay Back</i>	<i>ROI</i>
Parkhurst School	Gymnasium Heat Pump Installation	\$ 95,202	-	2,807	\$ 30,000	\$ -	\$ 65,202	\$ 4,210	15.5	6.5%
Recreational Center	Heat Pump - Domestic HW	\$ 98,380	-	2,091	\$ 30,000	\$ -	\$ 68,380	\$ 3,136	21.8	4.5%
Totals		\$ 193,582	-	4,898	\$ 60,000	\$ -	\$133,582	\$ 7,346	18.2	5.5%

Note: Annual dollar savings are based on \$0.18/kWh and \$1.50/therm Utility cost. Rebates are considered estimates until approved by the corresponding utility.

For heat pump incentive approvals, space air sealing and insulation may be required.

Parkhurst School – Gymnasium Heat Pump Installation

Existing Condition

The Parkhurst Gymnasium is approximately 51' x 60' multi use space with perimeter baseboard heating controlled via local pneumatic thermostat and valves.

Proposed Condition

Horizon Solutions is proposing the installation of ductless split system heat pumps for the gymnasium. This will allow for cooling and heating of the multi-function space, while alleviating a large heat load from the central boiler plant.

Scope of Work for Heat Pump Installation:

- Furnish all labor and materials necessary to install four (4) zone LG RED ductless heat pump systems in the gym area that will supply A/C and will be the primary source of heat. The system will consist of four (4) 3-ton condensers (Model# LMU36HHV) and four (4) wall mounted cassettes (Model # LS363HLVS) will be installed in the lab. Each cassette will have integral condensate pump. Insulated flex lines will run between the cassettes and the condensers. The condenser will be attached to the exterior wall on the parking lot side of the gym. Where these lines are exposed on the exterior of the building, they will be covered with brown PVC trim. Four opens in the exterior and one interior wall openings are required. All interior wall openings will be sealed with fire-stop.
- Heads will be installed on the CMU walls between windows on the parking lot side of the building
- Each system is stand alone and will be controlled by a separate infra-red remote
- Wiring for the new system will be pulled from the existing electrical panel
- Start-up and testing

For heat pump incentive approvals, space air sealing and insulation may be required.

Recreational Center – Gymnasium Heat Pump Installation

Existing Condition:

The Recreational Center is approximately 50' x 35' multi use space with perimeter baseboard heating controlled via local pneumatic thermostat and valves.

Proposed Condition

Horizon Solutions is proposing the installation of ductless split system heat pumps for the gymnasium. This will allow for cooling and heating of the multi-function space, while alleviating a large heat load from the central boiler plant.

Scope of Work for Heat Pump Installation:

- Furnish all labor and materials necessary to install four (4) zone LG RED ductless heat pump systems in the gym area that will supply A/C and will be the primary source of heat. The system will consist of four (4) 3-ton condensers (Model# LMU36HHV) and four (4) wall mounted cassettes (Model # LS363HLVS) will be installed in the lab. Each cassette will have integral condensate pump. Insulated flex lines will run between the cassettes and the condensers. The condenser will be attached to the exterior wall on the parking lot side of the gym. Where these lines are exposed on the exterior of the building, they will be covered with brown PVC trim. Four opens in the exterior and one interior wall openings are required. All interior wall openings will be sealed with fire-stop.
- Heads will be installed on the CMU walls between windows on the parking lot side of the building
- Each system is stand alone and will be controlled by a separate infra-red remote
- Wiring for the new system will be pulled from the existing electrical panel
- Start-up and testing
- Demo and removal of existing DX cooling condensing unit
- Existing Air Handler in Attic to remain

For heat pump incentive approvals, space air sealing and insulation may be required.

Equipment Specifications

Job Name/Location:

Tag No:

Date:

For: File Resubmit
 Approval Other

PO No.:

Architect:

GC:

Engr:

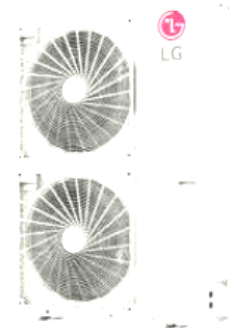
Mech:

Rep:

(Company)

(Project Manager)

LMU361HHV
Multi F MAX with LGRED® Outdoor Unit
3.0 Ton Heat Pump



Performance:

Cooling Capacity (Min.-Rated-Max., Btu/h)	10,800~36,000~47,000
Heating Capacity (Min.-Rated-Max., Btu/h)	12,420~45,000~50,000
Max. Heating Capacity at 17°F (Btu/h)	49,640
Max. Heating Capacity at 5°F (Btu/h)	45,390
Max. Heating Capacity at -4°F (Btu/h)	40,690
Max. Heating Capacity at -13°F (Btu/h)	36,360
Cooling COP @95°F (Rated)	4.25
Heating COP @47°F (Rated)	4.00

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

Electrical:

Power Supply (V/Hz/Ø) ¹	208-230V, 60, 1
MOP (A)	40
MCA (A)	32.7
Cooling Rated Amps (A)	28.4
Heating Rated Amps (A)	28.4
Compressor (A)	22.0
Fan Motor (A)	1.6 x 2
Locked Rotor Amps (A)	22

MOP - Maximum Overcurrent Protection

MCA - Minimum Circuit Ampacity

Piping:

Refrigerant Charge (lbs.)	11.46
Liquid Line Connection (in., O.D.)	Ø3/8 x 1
Vapor Line Connection (in., O.D.)	Ø3/4 x 1
Maximum Total Piping ² (ft.)	475.7
Min. / Max. ODU to IDU Piping ³ (ft.)	32.8 / 229.6
Piping Length ⁴ (no add'l refrigerant, ft.)	180.4
Maximum Elevation between ODU and IDU (ft.)	98.4
Maximum Elevation between IDU and IDU (ft.)	49.2

ODU = Outdoor Unit

IDU = Indoor Unit

Features:

- R1 Scroll (Variable Speed) Compressor
- Auto operation
- Auto restart
- Self diagnosis
- Defrost / Deicing
- Low ambient cooling down to 14°F
- Soft start
- Restart delay (three [3] minutes)
- Factory installed Drain Pan Heater

Optional Accessories:

- PI 485 PMNFP14A1
- AC Smart 5 PACS5A000
- ACP 5 PACP5A000
- MultiSITE™ Comm. Mgr. PBACNBTR0A
- Power Distribution Indicator (PDI) Premium PQNUD1541
- Mobile LGMV PLGMVW100
- Low Ambient Wind Baffle (Cooling Operation Down to -4°F) ZLABGP04A x2

Required⁵ Accessories:

- 2 Port BD Unit PMBD3620
- 3 Port BD Unit PMBD3630
- 4 Port BD Unit PMBD3640
- 4 Port BD Unit PMBD3641

Operating Range:

Cooling (°F DB)	14 to 118
Heating (°F WB)	-13 to +64

Unit Data:

Refrigerant Type	R410A
Refrigerant Control	EEV
Sound Pressure (Cool / Heat) ±1 dB(A) ⁶	53 / 55
Net / Shipping Weight (lbs.)	218 / 243
Heat Exchanger Coating	Gold Fin™
Minimum No. of Indoor Units	2
Maximum No. of Indoor Units	5

Compressor:

Type	R1 Scroll
Quantity	1
Oil / Type	FVC68D

Fan:

Type	Propeller
Quantity	2
Motor / Drive	Brushless Digitally Controlled/Direct
Max. Airflow Rate (CFM)	2,119 x 2

Notes:

- Acceptable operating voltage: 187V - 253V.
- Piping lengths are equivalent.
- 180.4 ft. of Main Piping + 49.2 ft. of Branch Piping.
- 49.2 ft. of Main Piping + 131.2 of Branch Piping.
- At least one branch distribution (BD) unit is required for system operation; a maximum of two can be installed per ODU with the use of a Y-branch accessory (PMBL5620).
- Sound pressure levels are tested in an anechoic chamber under ISO Std. 3745.
- All power / communication cable to be minimum 14 AWG from the ODU to the BD unit, and 14 AWG from the BD unit to the IDU.
- All power / communication cable to be 4-conductor, stranded, shielded or unshielded, and must comply with applicable local and national codes. If shielded, the wire must be grounded to the chassis at the ODU only.
- Power wiring size must comply with the applicable local and national codes.
- See the Engineering Manual Capacity Tables for ODU sensible and latent capacities.
- See the Engineering Manual Combination Tables for allocation of ODU rated capacity to each connected IDU when all are calling for full capacity. Allocation percentages should be applied to ODU capacity at design conditions.
- This data is rated 0 ft. above sea level, with 0 ft. level difference between ODU and IDUs, and the following refrigerant pipe lengths:
 LMU361HHV: 16.4 ft. Main + (16.4 ft. Branch x 5) = 98.4 ft.
 LMU421HHV: 16.4 ft. Main + (16.4 ft. Branch x 6) = 114.8 ft.
 LMU480HHV: 16.4 ft. Main + (16.4 ft. Branch x 8) = 147.6 ft.
 All capacities are net with a combination ratio between 95 - 105%.
- Must follow installation instructions in the applicable LG installation manual.
- See the Engineering Manual Capacity Tables for ODU capacity at design conditions.



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

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

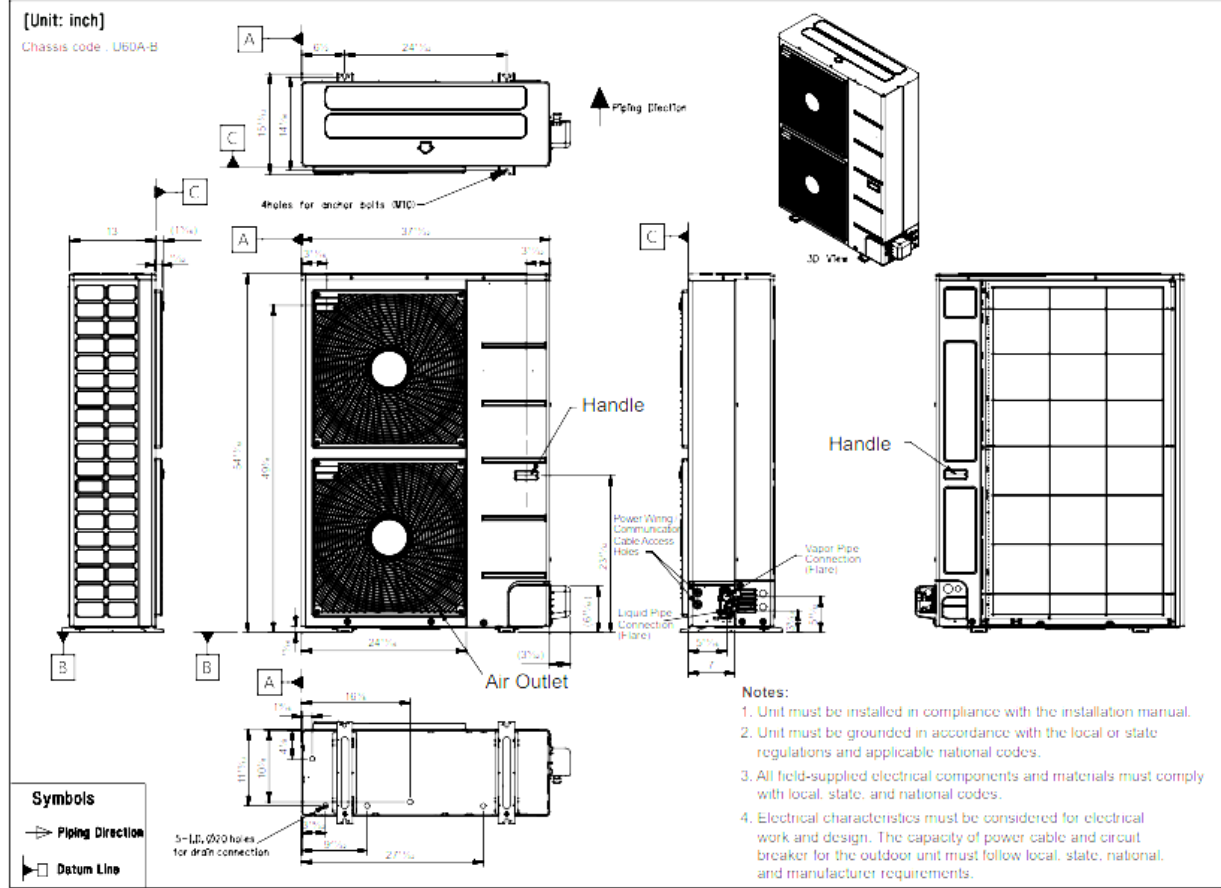
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Job Name/Location:

LMU361HHV
Multi F MAX with LGRED° Outdoor Unit
3.0 Ton Heat Pump



Tag No.: _____
Date: _____
PO No.: _____

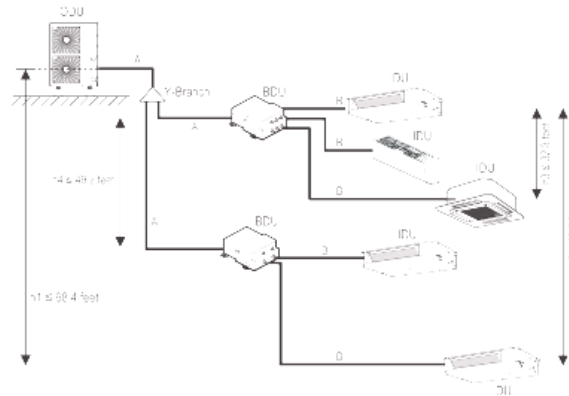


Job Name/Location: _____

LMU361HHV
Multi F MAX with LGRED® Outdoor Unit
3.0 Ton Heat Pump



Tag No.: _____
 Date: _____
 PO No.: _____

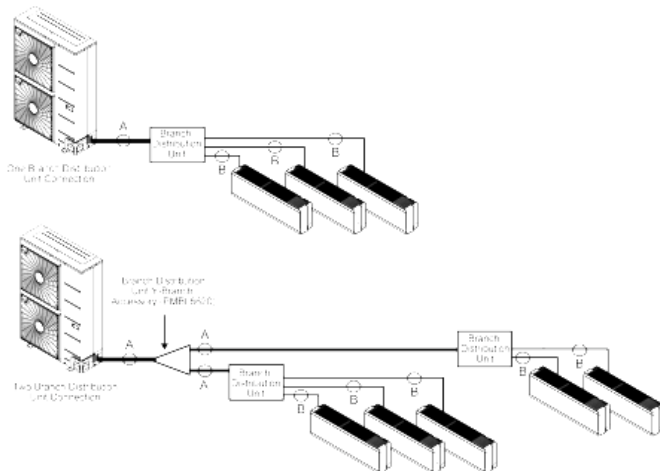


Example: LMU361HHV outdoor unit with five (5) indoor units and two (2) branch distribution units connected.
 ODU: Outdoor Unit
 IDU: Indoor Unit
 BDU: Branch Distribution Unit(s).
 A: Main Pipe.
 B: Branch Pipe (Branch Distribution Unit(s) to Indoor Unit(s)).

Multi F MAX with LGRED Outdoor Unit Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Total piping length ($\Sigma A + \Sigma B$)		≤475.7 feet
	Main pipe (Outdoor Unit to Branch Distribution Units: A)	Minimum for Each (A) Piping Segment	16.4 feet
		Maximum (ΣA)	≤180.4 feet
	Total branch piping length (ΣB)		≤295.3 feet
Elevation Differential (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit (h1)		≤98.4 feet
	Between the farthest two indoor units (h2)		≤49.2 feet
	Between branch distribution unit and farthest connected indoor unit(s) (h3)		≤32.8 feet
	Between branch distribution units (h4)		≤49.2 feet

Installing the Unit



Multi F MAX with LGRED Piping Sizes.

Piping	Main Pipe A (inch)	Branch Pipe B
Liquid	ø3/8	Depends on the size of the indoor unit piping.
Vapor	ø3/4	

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