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Inspections Division
Approved with Conditions
Date: 04/20/17


# *AIRTEMP INC.*

***MECHANICAL CONTRACTORS***
***20 THOMAS DRIVE***
***WESTBROOK, MAINE 04092***
***207-774-2300***
***207-874-2383 FAX***

***A COMFORT SYSTEMS USA COMPANY***
***QUALITY PEOPLE – BUILDING SOLUTIONS***


## ***RE-SUBMITTAL***

**JOB: INFINITY FEDERAL CREDIT UNION**
**DATE: 2/1/17**
**LOCATION: 29 BAXTER BOULEVARD, PORTLAND ME**
**MECHANICAL CONTRACTOR: AIRTEMP INC.**
**ENGINEER: BENNETT ENGINEERING**
**AIRTEMP JOB NUMBER: 598**
*****

BRIGGS
EQUIPMENT SALES, INC.

16 NorthBrook Drive / PO Box
Gray, ME (
207-657-7123 www.briggsac

CITY OF PORTLAND, MAINE
RESURGAM
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Date: 04/20/17

# REVISED SUBMITTAL DATA

**Project:** Inifinity Credit Union

**Mechanical Engineer:** Bennett Engineering

**Mechanical Contractor:** Airtemp

**Date:** January 30, 2017

**Product:** Rooftop Units

**Specification Section:** 230000

**Revision:** 01

| Tag | Qty | Model / Description | Manufacturer |
|---|---|---|---|
| HVAC-1 | 1 | LGH048 / 4 Ton RTU | Lennox |
| HVAC-2 | 1 | LGH060 / 5 Ton RTU | Lennox |
| | | | |
| | | | |

REV-01
Increased heat on HVAC-2

**Includes:**
- Humiditrol Hot Gas Reheat
- Dual Enthalpy Economizers
- 2-Stage SS Heat Exchangers
- Disconnect Switches and GFI Outlets
- 2 Sets of MERV 8 Filters
- 14" Tall Flat Roof Curbs
- CS8500 Programmable T-Stats w/ Built-in RH Sensors

**Prepared by:**
Ann Marie Juliano
ajuliano@briggsac.com
207-657-7123 ext. 202

# Lennox Industries Inc. - Product Submittal

**System ID:** HVAC-1
**Package Model:** LGH048H4E **Description:** PKGGE/4TON/CONFIGURABLE

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Date: 04/20/17

## HEATING PERFORMANCE

| | | | |
|---|---|---|---|
| Unit Type | Packaged Gas Electric | Gas Supply Connection | 0.50 (in.) |
| H/E LowInput | 53000 (Btuh) | H/E Heat Rise | 40.6 (°F) |
| H/E LowOutput | 43000 (Btuh) | AFUE/ ThermalEff | 81 |
| H/E HighInput | 70000 (Btuh) | Number of Heating Stages | 2 |
| H/E HighOutput | 57000 (Btuh) | Minimum Gas Supply Pressure | 7 (in.WC) |
| System HeatOutput | 57000 (Btuh) | | |

## COOLING PERFORMANCE

| | | | |
|---|---|---|---|
| Refrigerant | R-410A | Number Compressors | 1 |
| ARI EER | 12.8 | Number of Cooling Stages | 2 |
| ARI SEER | 17.6 | Condensate Drain Size | 1.00 (in.) |
| ARI Total Power | 3800 (W) | Cooling OutdoorDB | 95.0 (°F) |
| ARI GrossTotalCool | 50100 (Btuh) | Cooling CondenserDB | 95.0 (°F) |
| ARI NetTotalCool | 49000 (Btuh) | Cooling MixedDB | 76.6 (°F) |
| Coil GrossTotalCool | 44849 (Btuh) | Cooling MixedWB | 62.3 (°F) |
| Unit NetTotalCool | 43061 (Btuh) | Coil DischargeDB | 50.6 (°F) |
| Coil GrossSensCool | 35921 (Btuh) | Coil DischargeWB | 49.6 (°F) |
| Unit NetSensCool | 34133 (Btuh) | Unit DischargeDB | 51.9 (°F) |
| Tube/Fin Humiditrol Refrig. Charge | 12 LBS. 7 OZ. | Unit DischargeWB | 50.2 (°F) |
| | | Coil MoistureRemoval | 8.4 (lb/hr) |
| | | System MoistRemoval | 8.4 (lb/hr) |

## HUMIDITROL PERFORMANCE

| | | | |
|---|---|---|---|
| Humid-1st CoilDischDB | 70.7 (°F) | Humiditrol OutdoorDB | 95.0 (°F) |
| Humid-1st CoilDischWB | 58.0 (°F) | Humiditrol MixedDB | 76.6 (°F) |
| Humid-All CoilDischDB | 70.7 (°F) | Humiditrol MixedWB | 62.3 (°F) |
| Humid-All CoilDischWB | 58.0 (°F) | Humid-1st MoistRemoval | 7.9 (lb/hr) |
| | | Humid-All MoistRemoval | 7.9 (lb/hr) |

## SUPPLY FAN PERFORMANCE

| | | | |
|---|---|---|---|
| Supply AirFlow | 1300 (cfm) | TotalStaticPress | 1.19 (in.WC) |
| Outdoor AirFlow | 130 (cfm) | Wet Coil Static Press | 0.09 (in.WC) |
| ExtStaticPress Supply | 1.00 (in.WC) | Added Filter Static Press | 0.04 (in.WC) |
| SupplyFan Req'dPower | 0.75 (hp) | Humiditrol Static Press | 0.02 (in.WC) |
| SupplyFan NomPower | 0.75 (hp) | Economizer Static Press | 0.04 (in.WC) |
| Supply Fan Type | MSAV Direct Drive | Air Filter Qty | 4 |
| SupplyDriveReq'd RPM | 1219 (rpm) | Air Filter Length | 16.0 (in.) |
| Motor Torque Pct | 80 | Air Filter Width | 20.0 (in.) |
| | | Air Filter Thickness | 2.0 (in.) |

## ELECTRICAL

| | | | |
|---|---|---|---|
| Voltage | 208V 3Ph | SupplyFan FLA | 6.1 (amp) |
| Frequency | 60 (Hz) | CondensingUnit FLA | 4.1 (amp) |
| System MCA | 28.0 (amp) | Cooling FLA Total | 23.7 (amp) |
| System MOCP | 40 (amp) | Unit Oper Range-Nom Voltage | +/- 10% |
| Compressors RLA | 13.5 (amp) | | |

## DIMENSIONS

| | | | |
|---|---|---|---|
| Cabinet Width | 47.0 (in.) | Downflow Supply Length | 20.0 (in.) |
| Cabinet Length | 85.3 (in.) | Downflow Supply Width | 18.0 (in.) |
| Cabinet Height | 38.9 (in.) | Downflow Return Length | 29.0 (in.) |
| Total Weight | 826 (lb) | Downflow Return Width | 11.0 (in.) |

## SOUND

| | |
|---|---|
| Outdoor Sound Rating | 75 (db) |

# Lennox Industries Inc. - Product Submittal

**System ID:** HVAC-1
**Package Model:** LGH048H4E **Description:** PKGGE/4TON/CONFIGURABLE

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 04/20/17

## SYSTEM FEATURES

| | |
|---|---|
| Durable Outdoor Enamel Paint Finish | Crankcase Heater Test |
| Scroll Compressor | Timed Off Control |
| Pre-charged Refrigeration System | AGA-CGA Certified |
| Expansion Valves | Units will operate cooling down to 0 degrees F (-17.7 degrees C) without additional controls. |
| High Capacity Driers | Redundant Comb. Gas Control Valve |
| Auto reset high & low pressure switch with strike 3 lockout feature in Prodigy unit controller | Electronic Flame Sensor |
| Totally Enclosed Fan Motor | Direct Spark Ignition |
| PVC Coated Fan Guard | Separate Compressor and Controls Compartment |
| Fan and Limit Controls | Advanced controls with Prodigy Control System |
| Factory Test Operated | Limited compressor warranty of 5 years |
| Bonded for Grounding | Limited warranty on Prodigy Unit Controller of 3 years |
| Internal Pressure Relief Valve | Limited warranty on all other components of 1 year |
| Overload Protection | See Limited Warranty Certificate included with unit for details |

## INCLUDED SYSTEM OPTIONS - FACTORY INSTALLED

STAINLESS STEEL HEAT
STANDARD CAP
BAROMETRIC RELIEF DAMPERS
2 IN MERV8 FILTER
DISCONNECT - WEATHERPROOF
2 IN MERV8 REPL FILTER
GFCI - FACTORY INSTALLED/NON-POWERED
DUAL ENTHALPY ECONOMIZER
HUMIDITROL
MULTI-STAGE AIR VOLUME
HINGED ACCESS DOORS
TUBE AND FIN COIL SYSTEM
LOW NOX

## INCLUDED SYSTEM OPTIONS - FIELD INSTALLED

| | | |
|---|---|---|
| 11F51 | 1 | C1CURB71A-1 DNFLOW HYBRID CURB 14" |
| 14X55 | 1 | COMFORTSENSE 8500 RH NON ZONING |
| 17M50 | 1 | C0SNSR31AE1- SENSOR KIT, REMOTE HUMIDITY |
| 54W20 | 4 | 100929-05 FILTER - MERV 8 16 X 20 X 2 |
| 47W37 | 1 | C0SNZN73AE2- SENSOR, 10K ZONE |

# Lennox Industries Inc. - Product Submittal

**System ID:** HVAC-1
**Package Model:** LGH048H4E **Description:** PKGGE/4TON/CONFIGURABLE

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Inspections Division
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Date: 04/20/17

## DIMENSIONS - INCHES (MM)

| CORNER WEIGHTS | | | | | | | | | CENTER OF GRAVITY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model No. | AA | | BB | | CC | | DD | | EE | | FF | |
| | lbs. | kg | lbs. | kg | lbs. | kg | lbs. | kg | in. | mm | in. | mm |
| LGH036 Base Unit | 98 | 45 | 119 | 54 | 192 | 87 | 158 | 72 | 38.5 | 978 | 18 | 457 |
| LGH036 Max. Unit | 137 | 62 | 155 | 70 | 250 | 113 | 221 | 100 | 40 | 1016 | 18 | 457 |
| LGH048 Base Unit | 104 | 47 | 126 | 57 | 202 | 92 | 167 | 76 | 38.5 | 978 | 18 | 457 |
| LGH048 Max. Unit | 145 | 66 | 164 | 74 | 264 | 120 | 233 | 106 | 40 | 1016 | 18 | 457 |
| LGH060 Base Unit | 118 | 54 | 144 | 65 | 232 | 105 | 191 | 87 | 38.5 | 978 | 18 | 457 |
| LGH060 Max. Unit | 164 | 75 | 186 | 84 | 299 | 136 | 264 | 120 | 40 | 1016 | 18 | 457 |
| LGH072 Base Unit | 132 | 60 | 160 | 73 | 258 | 117 | 212 | 96 | 38.5 | 978 | 18 | 457 |
| LGH072 Max. Unit | 173 | 78 | 195 | 89 | 314 | 143 | 278 | 126 | 40 | 1016 | 18 | 457 |
| LGH074 Base Unit | 132 | 60 | 160 | 73 | 258 | 117 | 212 | 96 | 38.5 | 978 | 18 | 457 |
| LGH074 Max. Unit | 173 | 78 | 195 | 89 | 314 | 143 | 278 | 126 | 40 | 1016 | 18 | 457 |

Base Unit - The unit with NO INTERNAL OPTIONS.
Max. Unit - The unit with ALL INTERNAL OPTIONS Installed. (Economizer, Standard Static Power Exhaust Fans, Controls, etc.). Does not include accessories external to unit or high static power exhaust.

TOP VIEW (Base)

END VIEW

SIDE VIEW

BACK VIEW

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## ACCESSORY DIMENSIONS - INCHES (MM)

OUTDOOR AIR HOOD DETAIL FOR OPTIONAL ECONOMIZER AND BAROMETRIC RELIEF DAMPERS
(Down-Flow Applications)

SIDE VIEW

OUTDOOR AIR HOOD FOR ECONOMIZER
(Furnished)

BAROMETRIC RELIEF HOOD FOR ECONOMIZER
(Furnished)

| Model No. | A | | B | | C | |
|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm |
| 036, 048 | 19-1/4 | 489 | 13 | 330 | 11-3/4 | 298 |
| 060, 072 | 23-1/4 | 591 | 17 | 432 | 15-3/4 | 400 |

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**HYBRID ROOF CURBS - DOUBLE DUCT OPENING**

**TYPICAL FLASHING DETAIL FOR ROOF CURB**

**DETAIL ROOF CURB**

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## UNIT CLEARANCES - INCHES (MM)

| [1] Unit Clearance | A | | B | | C | | D | | Top Clearance |
|---|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | in. | mm | |
| Service Clearance | 48 | 1219 | 36 | 914 | 36 | 934 | 36 | 914 | Unobstructed |
| Clearance to Combustibles | 36 | 914 | 1 | 25 | 1 | 25 | 1 | 25 | |
| Minimum Operation Clearance | 36 | 914 | 36 | 914 | 36 | 914 | 36 | 914 | |

NOTE - Entire perimeter of unit base requires support when elevated above the mounting surface.
[1] **Service Clearance** - Required for removal of serviceable parts.
**Clearance to Combustibles** - Required clearance to combustible material.
**Minimum Operation Clearance** - Required clearance for proper unit operation.

# Lennox Industries Inc. - Product Submittal

**System ID:** HVAC-2
**Package Model:** LGH060H4E **Description:** PKGGE/5TON/CONFIGURABLE

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Date: 04/20/17

## HEATING PERFORMANCE

| | | | |
|---|---|---|---|
| Unit Type | Packaged Gas Electric | Gas Supply Connection | 0.50 (in.) |
| H/E HighInput | 108000 (Btuh) | H/E Heat Rise | 44.8 (°F) |
| H/E HighOutput | 87000 (Btuh) | AFUE/ ThermalEff | 81 |
| System HeatOutput | 87000 (Btuh) | Number of Heating Stages | 1 |
| | | Gas Supply Pressure | 7 (in.WC) |

## COOLING PERFORMANCE

| | | | |
|---|---|---|---|
| Refrigerant | R-410A | Number Compressors | 1 |
| ARI EER | 12.7 | Number of Cooling Stages | 2 |
| ARI SEER | 17.1 | Condensate Drain Size | 1.00 (in.) |
| ARI Total Power | 4700 (W) | Cooling OutdoorDB | 95.0 (°F) |
| ARI GrossTotalCool | 61600 (Btuh) | Cooling CondenserDB | 95.0 (°F) |
| ARI NetTotalCool | 60000 (Btuh) | Cooling MixedDB | 77.3 (°F) |
| Coil GrossTotalCool | 59250 (Btuh) | Cooling MixedWB | 64.0 (°F) |
| Unit NetTotalCool | 56867 (Btuh) | Coil DischargeDB | 53.1 (°F) |
| Coil GrossSensCool | 46122 (Btuh) | Coil DischargeWB | 52.4 (°F) |
| Unit NetSensCool | 43739 (Btuh) | Unit DischargeDB | 54.4 (°F) |
| Tube/Fin Humiditrol Refrigerant Charge | 17 LBS. 8 OZ. | Unit DischargeWB | 52.9 (°F) |
| | | Coil MoistureRemoval | 12.4 (lb/hr) |
| | | System MoistRemoval | 12.4 (lb/hr) |

## HUMIDITROL PERFORMANCE

| | | | |
|---|---|---|---|
| Humid-1st CoilDischDB | 74.8 (°F) | Humiditrol OutdoorDB | 95.0 (°F) |
| Humid-1st CoilDischWB | 60.7 (°F) | Humiditrol MixedDB | 77.3 (°F) |
| Humid-All CoilDischDB | 74.8 (°F) | Humiditrol MixedWB | 64.0 (°F) |
| Humid-All CoilDischWB | 60.7 (°F) | Humid-1st MoistRemoval | 12.9 (lb/hr) |
| | | Humid-All MoistRemoval | 12.9 (lb/hr) |

## SUPPLY FAN PERFORMANCE

| | | | |
|---|---|---|---|
| Supply AirFlow | 1800 (cfm) | TotalStaticPress | 1.23 (in.WC) |
| Outdoor AirFlow | 255 (cfm) | Wet Coil Static Press | 0.08 (in.WC) |
| ExtStaticPress Supply | 1.00 (in.WC) | Gas H/E Static Press | 0.03 (in.WC) |
| SupplyFan Req'dPower | 1.00 (hp) | Added Filter Static Press | 0.05 (in.WC) |
| SupplyFan NomPower | 1.00 (hp) | Humiditrol Static Press | 0.02 (in.WC) |
| Supply Fan Type | MSAV Direct Drive | Economizer Static Press | 0.05 (in.WC) |
| SupplyDriveReq'd RPM | 889 (rpm) | Air Filter Qty | 4 |
| Motor Torque Pct | 61 | Air Filter Length | 20.0 (in.) |
| | | Air Filter Width | 20.0 (in.) |
| | | Air Filter Thickness | 2.0 (in.) |

## ELECTRICAL

| | | | |
|---|---|---|---|
| Voltage | 208V 3Ph | SupplyFan FLA | 7.4 (amp) |
| Frequency | 60 (Hz) | CondensingUnit FLA | 4.1 (amp) |
| System MCA | 33.0 (amp) | Cooling FLA Total | 29.1 (amp) |
| System MOCP | 45 (amp) | Unit Oper Range-Nom Voltage | +/- 10% |
| Compressors RLA | 17.6 (amp) | | |

## DIMENSIONS

| | | | |
|---|---|---|---|
| Cabinet Width | 47.0 (in.) | Downflow Supply Length | 20.0 (in.) |
| Cabinet Length | 85.3 (in.) | Downflow Supply Width | 18.0 (in.) |
| Cabinet Height | 46.9 (in.) | Downflow Return Length | 29.0 (in.) |
| Total Weight | 924 (lb) | Downflow Return Width | 11.0 (in.) |

## SOUND

| | |
|---|---|
| Outdoor Sound Rating | 82 (db) |

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## SYSTEM FEATURES

| | |
|---|---|
| Durable Outdoor Enamel Paint Finish | Crankcase Heater Test |
| Scroll Compressor | Timed Off Control |
| Pre-charged Refrigeration System | AGA-CGA Certified |
| Expansion Valves | Units will operate cooling down to 0 degrees F (-17.7 degrees C) without additional controls. |
| High Capacity Driers | Redundant Comb. Gas Control Valve |
| Auto reset high & low pressure switch with strike 3 lockout feature in Prodigy unit controller | Electronic Flame Sensor |
| Totally Enclosed Fan Motor | Direct Spark Ignition |
| PVC Coated Fan Guard | Separate Compressor and Controls Compartment |
| Fan and Limit Controls | Advanced controls with Prodigy Control System |
| Factory Test Operated | Limited compressor warranty of 5 years |
| Bonded for Grounding | Limited warranty on Prodigy Unit Controller of 3 years |
| Internal Pressure Relief Valve | Limited warranty on all other components of 1 year |
| Overload Protection | See Limited Warranty Certificate included with unit for details |

## INCLUDED SYSTEM OPTIONS - FACTORY INSTALLED

STANDARD CAP
BAROMETRIC RELIEF DAMPERS
2 IN MERV8 FILTER
DISCONNECT - WEATHERPROOF
2 IN MERV8 REPL FILTER
GFCI - FACTORY INSTALLED/NON-POWERED
DUAL ENTHALPY ECONOMIZER
HUMIDITROL
MULTI-STAGE AIR VOLUME
HINGED ACCESS DOORS
TUBE AND FIN COIL SYSTEM

## INCLUDED SYSTEM OPTIONS - FIELD INSTALLED

| | | |
|---|---|---|
| 11F51 | 1 | C1CURB71A-1 DNFLOW HYBRID CURB 14" |
| 14X55 | 1 | COMFORTSENSE 8500 RH NON ZONING |
| 54W21 | 4 | 100929-04 FILTER 20X20X2 - MERV 8 |

# Lennox Industries Inc. - Product Submittal

**System ID:** HVAC-2
**Package Model:** LGH060H4E **Description:** PKGGE/5TON/CONFIGURABLE

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## DIMENSIONS - INCHES (MM)

| CORNER WEIGHTS | | | | | | | | | CENTER OF GRAVITY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model No. | AA | | BB | | CC | | DD | | EE | | FF | |
| | lbs. | kg | lbs. | kg | lbs. | kg | lbs. | kg | in. | mm | in. | mm |
| LGH036 Base Unit | 98 | 45 | 119 | 54 | 192 | 87 | 158 | 72 | 38.5 | 978 | 18 | 457 |
| LGH036 Max. Unit | 137 | 62 | 155 | 70 | 250 | 113 | 221 | 100 | 40 | 1016 | 18 | 457 |
| LGH048 Base Unit | 104 | 47 | 126 | 57 | 202 | 92 | 167 | 76 | 38.5 | 978 | 18 | 457 |
| LGH048 Max. Unit | 145 | 66 | 164 | 74 | 264 | 120 | 233 | 106 | 40 | 1016 | 18 | 457 |
| LGH060 Base Unit | 118 | 54 | 144 | 65 | 232 | 105 | 191 | 87 | 38.5 | 978 | 18 | 457 |
| LGH060 Max. Unit | 164 | 75 | 186 | 84 | 299 | 136 | 264 | 120 | 40 | 1016 | 18 | 457 |
| LGH072 Base Unit | 132 | 60 | 160 | 73 | 258 | 117 | 212 | 96 | 38.5 | 978 | 18 | 457 |
| LGH072 Max. Unit | 173 | 78 | 195 | 89 | 314 | 143 | 278 | 126 | 40 | 1016 | 18 | 457 |
| LGH074 Base Unit | 132 | 60 | 160 | 73 | 258 | 117 | 212 | 96 | 38.5 | 978 | 18 | 457 |
| LGH074 Max. Unit | 173 | 78 | 195 | 89 | 314 | 143 | 278 | 126 | 40 | 1016 | 18 | 457 |

Base Unit - The unit with NO INTERNAL OPTIONS.
Max. Unit - The unit with ALL INTERNAL OPTIONS Installed. (Economizer, Standard Static Power Exhaust Fans, Controls, etc.). Does not include accessories external to unit or high static power exhaust.

TOP VIEW (Base)

END VIEW

SIDE VIEW

BACK VIEW

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## ACCESSORY DIMENSIONS - INCHES (MM)

OUTDOOR AIR HOOD DETAIL FOR OPTIONAL ECONOMIZER AND BAROMETRIC RELIEF DAMPERS
(Down-Flow Applications)

SIDE VIEW

OUTDOOR AIR HOOD FOR ECONOMIZER
(Furnished)

BAROMETRIC RELIEF HOOD FOR ECONOMIZER
(Furnished)

| Model No. | A | | B | | C | |
|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm |
| 036, 048 | 19-1/4 | 489 | 13 | 330 | 11-3/4 | 298 |
| 060, 072 | 23-1/4 | 591 | 17 | 432 | 15-3/4 | 400 |

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**HYBRID ROOF CURBS - DOUBLE DUCT OPENING**

**TYPICAL FLASHING DETAIL FOR ROOF CURB**

**DETAIL ROOF CURB**

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## UNIT CLEARANCES - INCHES (MM)

| [1] Unit Clearance | A | | B | | C | | D | | Top Clearance |
|---|---|---|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm | in. | mm | |
| Service Clearance | 48 | 1219 | 36 | 914 | 36 | 934 | 36 | 914 | Unobstructed |
| Clearance to Combustibles | 36 | 914 | 1 | 25 | 1 | 25 | 1 | 25 | |
| Minimum Operation Clearance | 36 | 914 | 36 | 914 | 36 | 914 | 36 | 914 | |

NOTE - Entire perimeter of unit base requires support when elevated above the mounting surface.
[1] **Service Clearance** - Required for removal of serviceable parts.
**Clearance to Combustibles** - Required clearance to combustible material.
**Minimum Operation Clearance** - Required clearance for proper unit operation.

## FEATURES AND BENEFITS

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Lennox' Energence™ packaged rooftop unit product line was created to save energy with intelligence by offering some of the highest energy efficiency ratings available with a powerful, easy to use unit controller. This makes Energence rooftop units perfect for business owners looking for an HVAC product with the lowest total cost of ownership. Energence rooftop units feature:

- **ECM Blower And Condenser Fan Motors -** Direct drive units features ECM blower and condenser fan motors to allow energy efficient MSAV™ (multi-stage air volume) operation during all operating conditions. Blower setpoints can be easily set in the field through the Prodigy Unit Controller reducing setup time.
- **Two-Stage Scroll Compressor** - All 3 to 5 ton models feature a two-stage scroll compressor which allows Energence rooftop units to deliver just the necessary amount of cooling needed to meet the space's demand. Single speed scroll compressor is furnished on 6 ton models.
- **Hinged Access Panels** - Provide quick access to components and protect panels and roof from damage during servicing.
- **Isolated Compressor Compartment** - Allows performance check during normal compressor operation without disrupting airflow.
- **Corrosion-Resistant Removable, Reversible Drain Pan** - Provides application flexibility, durability and improved serviceability.
- **Thermostatic Expansion Valves** - Provide peak cooling performance across the entire application range.
- **Humiditrol® Dehumidification System Option** - Patented system allows for independent control of temperature and humidity, providing enhanced comfort control.
- **Foil-Faced Insulation** - Insulation on all internal surfaces that have contact with airflow helps minimize airborne fibers and improve IAQ.

**Prodigy™ Control System**

Standard on every Energence rooftop unit, the new Prodigy™ unit controller is the heart of the Lennox® controls offering. The intuitive user interface makes setup, troubleshooting and service easier than ever. Each unit tracks the runtime of every major component and records the date and time when service or maintenance is performed. The unit controller intelligently operates the rooftop unit

**SmartWire™ System**

The SmartWire system simplifies field sensor or thermostat installation through advanced connectors that are keyed and color-coded to help prevent miswiring. Not only is the wire coloring scheme standardized across all models, each connection is intuitively labeled to make troubleshooting and servicing quick and easy.

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## HUMIDITROL DEHUMIDIFICATION® SYSTEM

Factory installed option designed to control humidity.

Provides dehumidification on demand using ASHRAE 90.1 recommended method for comfort conditioning humidity control.

Unit comes equipped with one row reheat coil, solenoid valve and humidity controller.

In addition to a thermostat or room sensor used for conventional operation, a humidity sensor is required and must be located in the occupied space. Remote Mounted Humidity Sensor Kit is required

for field installation.

The humidity sensor provides input to the Unit Controller which is used to control activation of the dehumidification operation.

Reheat controls are located in the compressor control section of the unit for easy access.

**Benefits**

Improves indoor air quality.

Helps prevents damage due to high humidity levels.

Improves comfort levels by reducing space humidity levels.

### OPERATION

**No Dehumidification Demand**

The unit will operate conventionally whenever there is a demand for cooling or heating and no dehumidification demand.

Free cooling is only permitted when there is no demand for dehumidification.

**Dehumidification Demand Only**

The Unit Controller is factory set at 60% relative humidity setpoint and can be adjusted at the Unit Controller or with optional Unit Controller Software.

Reheat operation will initiate on a dehumidification demand and does not require a cooling demand.

The unit will operate in the dehumidification mode until the relative humidity of the conditioned space is below the setpoint.

The reheat coil is sized to provide 68°F to 75°F supply air during reheat operation.

This reduces sensible cooling capacity and extends compressor run time to control humidity when the cooling load is low.

A solenoid valve div
from the compressor
coil.

The cooled and dehumidified air from the evaporator is reheated as it passes through the reheat coil.

The de-superheated and partially condensed refrigerant continues to the outdoor condenser coil where

condensing is completed. The unit will continue to operate in this mode until the dehumidification demand is satisfied.

See Sequence of Operation for additional information.

**Dehumidification and Cooling Demand (Thermostat/Room Sensor Application)**

**Two-stage compressor models (036, 048, 060)**

If both a dehumidification and a Y1 cooling demand occur, the system will operate in the dehumidification mode at first stage indoor air flow. If a Y2 cooling demand occurs along with a dehumidification demand, the system operates in full cooling mode at full cooling airflow until the Y2 cooling demand is satisfied. Then the system will revert to the dehumidification mode if a dehumidification mode demand is present.

**TYPICAL HUMIDITROL DEHUMIDIFICATION SCHEMATIC**

### ACCESSORIES

Humidity Sensor Kit, Remote Mounted Humidity sensor required with factory installed Humiditrol® Option or Supermarket reheat field selectable option.

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# COMFORTSENSE® 8500

## Commercial Programmable Thermostat

Bulletin No. 210787 November 2016

## PRODUCT SPECIFICATIONS

ComfortSense®

ENERGENCE® Saving Energy with Intelligence™

PRODIGY™ CONTROL SYSTEM

**4 Heat / 4 Cool Multi-Stage For Energence® Packaged Electric/ Electric and Gas/Electric Rooftop Units**

The ComfortSense® 8500 is a commercial, electronic, 7-day, multi-stage, programmable, touchscreen thermostat.

Models are available with or without $CO_2$ sensing capabilities.

All models are only used with Energence® commercial rooftop units equipped with the Prodigy® Control System.

$CO_2$ models can be used to control Lennox' premium rooftop unit Demand Control Ventilation features based on $CO_2$ setpoints and conditions stored in the Prodigy® Unit Controller ECTO parameter.

Thermostats also feature enhanced capabilities including remote temperature sensing, dehumidification and control, economizer control and custom reminders.

- Easy to read 4.3 in. color screen (measured diagonally).
- LCD display with backlight shows the current and set temperature, time, inside relative humidity, system status (operating mode, schedules and occupancy) and outside temperature.
- Menu-driven programming guides user through the scheduling process showing only necessary information on each screen.
- Touchscreen interaction.
- Ergonomic design.
- Scheduled occupancy control (economizer operation) for fresh air ventilation. Designed specifically for commercial applications to satisfy fresh air ventilation needs.
- Remote Indoor Temperature Sensing with up to nine averaging sensors (indoor temperature sensors must be ordered separately).
- Compressor short-cycle protection (non-adjustable).
- Built-in Relative Humidity Sensor.
- Real-time clock keeps time during power failures and automatically updates to daylight savings.
- Two user-editable Custom Reminders and a Routine System Checkup reminder.
- Two separate schedules for Work Days or Non-work Days (user selectable) with up to 4 time periods per day.
- Performance Report displays the number of hours each month the system has been operating (with Local Scheduling Function set to ON).
- Temporarily override a program schedule as by temperature.
- Holiday scheduling allows one-touch change to a pre-defined holiday schedule without having to reprogram the thermostat.

**CONTENTS**

Installer Settings ..... 5
Specifications..... 6
User Settings ..... 2

- Outside temperature display shows current outside temperature.
- Permanent memory storage of programs
- Wallplate furnished.

### WARRANTY

Two-year limited warranty.
Refer to Lennox Equipment Limited Warranty certificate for specific details.

### APPROVALS

Factory preset program settings conform to EPA ENERGY STAR® recommended setpoints.

### APPLICATIONS

Fully programmable thermostat provides precise comfort control and easy programmability.

Provides temperature control for packaged gas/ electric and electric/electric for up to 4 heat / 4 cool multi-stage systems.

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# USER SETTINGS

## HOME SCREEN

Touch blank screen to turn on the backlight.

### Temperature Settings

- Large display of current inside temperature setpoint (°F or °C)
- Heating and Cooling Setpoint Indicators on the round animated temperature band
- Current cooling setpoint temperature Button (cool-to)
- Current heating setpoint temperature Button (heat-to)

Touching the heat or cool setpoint indicators on the round temperature band, or touching the **heat-to** or **cool-to** buttons displays the heat or cool menu screens.

A tilde symbol ~ appearing under the heat-to or cool-to buttons indicates that the system is offline.

### Current Room Temperature

- Yellow bar on temperature band indicates actual room temperature

### Current Outside Temperature

- Displays current outside temperature in °F or °C

### Time/Date Display

- Displays current time and day (supports daylight savings time changes)

### Occupied/Unoccupied

- Displays Occupied or Unoccupied status

If an optional occupancy sensor is installed the thermostat will automatically change the status. NOTE - Occupancy sensor must be field provided.

### Humidity Display

- Displays current inside relative humidity above current indoor temperature

### Mode

- Displays current system operating mode below current indoor temperature (heat/cool or schedule)

### System Status Icons (left side of home screen and status screen)

Up to four status icons can be displayed at one time on the left side of the screen.

### Menu Button

Touch to display **menu** screen. See page 3.

A red circle with a number on the menu button indicates an active notification. Touch **Menu > Notifications** to view status screen.

### Heat Menu Screen (not shown)

On the Home Screen, touching the heat setpoint indicators on the round temperature band, or touching the **heat-to** button displays the heat menu screen.

- Heating setpoint display
- Heating Setpoint Indicator on the round temperature band
- Plus (+) and Minus (–) buttons
- Home button (return to Home Screen)

Touch the red heat setpoint indicator on the round temperature band, or touch the **plus** or **minus** buttons to change the heating setpoint in one degree increments.

### Cool Menu Screen (not shown)

On the Home Screen, touching the cool setpoint indicators on the round temperature band, or touching the **cool-to** button displays the cool menu screen.

- Cooling setpoint display
- Cooling Setpoint Indicator on the round temperature band
- Plus (+) and Minus (–) buttons
- Home button (return to Home Screen)

Touch the blue cool setpoint indicator on the round temperature band, or touch the **plus** or **minus** buttons to change the cooling setpoint in one degree increments.

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Inspections Division
Approved with Conditions
Date: 04/20/17

## USER SETTINGS

### MENU SCREEN

Touch each item to display the selected screen.

Touch left side of screen to return to the Home Screen.

### NOTIFICATIONS

- Displays system operating system and service reminder messages

Touch the status icon ··· on the left side of the Home Screen to view the Notifications Screen.

### PERFORMANCE REPORT SCREEN

- Displays the number of hours each month the system has been operating in heating mode (red) or cooling mode (blue) in an easy-to-read graph.

Local Scheduling Function must be set to On for Performance Reports. See page 4.

### EDIT SCHEDULE SCREEN

**Work Days**

- Select Days (mon, tue, wed, thu, fri)

Displays work days selected. Touch to edit. A checkmark indicates which work days are active.

**Non-Work Days**

- Days (sat, sun) (non-adjustable)
- Select Holidays

**Select Periods**

Time period options are the same for both Work Days, Non-Work Days and Holidays.

- Four time periods per day (1st, 2nd, 3rd, 4th)
- Default settings:
  1st period - 6:00 am
  2nd period - 6:00 pm
  3rd period - 8:00 pm
  4th period - 10:00 pm

Touch the time bar to set the start time for each period using the **set time** window.

- Cool-To, default 78°F (adjustable 48 to 90°F)
- Heat-To, default 70°F (adjustable 45 to 90°F)

Use Plus (+) and Minus (–) buttons to adjust heating and cooling settings.

- Occupancy/Unoccupied, default occupied

Touch the pencil tool in each period screen to rename the period, delete a period or cancel editing.

Use the keyboard tool to rename a schedule or time period (maximum 30 characters).

**Select Holidays**

Allows setting schedules for specific holidays (during unoccupied "Non-Work Days"). Has the same programming features as regular schedules.

- Add day

Set holiday date (d/mm/yyyy) using calendar tool.

**Override Schedule (not shown)**

During a scheduled time period, touching either the setpoint indicator on the temperature band or the heat-to or cool-to button on the Home Screen will initiate a temporary override. A temporary override screen is displayed and an override icon is displayed on the Home Screen. Override runs until the next scheduled time period. Touch "X" to cancel override and return to current schedule.

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Inspections Division
Approved with Conditions
Date: 04/20/17

# USER SETTINGS

## OWNER SETTINGS SCREEN

**Humidity**

- Slider to adjust humidity setting
  - Default 60% (adjustable 5 to 95% relative humidity)

**General**

- About (thermostat and service information)
  - Thermostat Information
    - Model Number
    - Serial Number
    - Hardware Revision
    - Software Revision
  - Contractor Information
    - Name
    - Address
    - Phone
    - Email
  - Website

Technician can input their contact information during technician setup using the keyboard tool (maximum 30 characters per entry).

- Screen Lock (Prevents tampering with thermostat settings, 3-digit security code)
  - Off (unlocked, no security)
  - ON (locked, prevents tampering with the thermostat)

Technician can change 3-digit security code in the Technician Settings Screen.

- Language
  - English (default)
  - Français
  - Español
  - Português
- Date & Time
  - 12 or 24 Hour setting
  - Daylight Savings - Enable or Disable (default)
  - Set Time
  - Set Date

Date and Time can be set using the **set date** screen.

**Display**

- Show Outdoor Temperature (on/off)
- Screen Options
  - Screen Brightness

Slide control allows screen brightness adjustment (20 to 100%).

  - Screen Saver options
    - Screen goes black when not in use
    - Screen brightness dims when not in use

Slide control allows screen brightness dimming adjustment (20 to 100%).

- Temperature Scale
  - Fahrenheit - °F (default)
  - Celsius - °C

# INSTALLER SETTINGS

## TECHNICIAN SETTINGS SCREEN

Technician must input 3-digit security code to access settings.

- S-Bus Address (up to 31)
- Plus (+) and Minus (–) buttons

Use Plus (+) and Minus (–) buttons to set S-Bus address. Must match setting on the Prodigy Unit Controller.

- Operation With Smart Hub (for future use)
  - On/Off, default Off)

Must be Off to operate with Prodigy Unit Controller.

- Local Scheduling Function
  - On/Off

When set to “On” thermostat controls schedules. When set to “Off” Prodigy Unit Controller controls schedules.

- Display on Home Screen (default Off)
  - $CO^2$ value ($CO_2$ model) (On/Off)
  - RTU Function State (On/Off)
  - Service Required Alert (On/Off)

Reviewed for Code Compliance
Inspections Division
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Date: 04/20/17

## INSTALLER SETTINGS

### TECHNICIAN SETTINGS SCREEN (continued)

- Contractor Information
  - Name
  - Address
  - Phone
  - Email
  - Website

Technician can input their contact information during technician setup using the keyboard tool (maximum 30 characters).

- Temperature Sensor Configuration
  - Internal Temperature Sensor (default)
  - External Temperature Sensor(s)
    - Number of External Temperature Sensor(s) (use Plus (+) and Minus (–) buttons to select 1 to 9)
    - Type of External Sensor (select 10k or 11k)

Touch to edit. A checkmark indicates which sensors are active.

- Offsets
  - Internal Temperature Sensor Offset (°F)
  - External Temperature Offset (°F)
    - 0°F (default), adjustable (–5 to 5°F).
  - Humidity Offset (%)
    - 0% (default), adjustable (–10 to 10%)
  - $CO_2$ Sensor Offset ($CO_2$ model)
    - 0% (default), adjustable –10 to +10 ppm

External Temperature Offset is only available if External Temperature Sensor(s) is configured above.

Touch the **plus** or **minus** buttons to change settings.

- Reminders
  - Custom Reminder 1
  - Custom Reminder 2
    - User defined reminders can be a custom text message (up to 20 alphanumeric characters)
    - 1 Day, 1 Week, 1 Month, 3 Month, Custom date

Touch to edit reminder title, set date and time.

  - Routine System Checkup

Touch to set date and time.

- Reset to Factory Defaults
  - Reset All Settings
  - Reset Owner Settings
  - Reset Technician Settings
  - Reset Reminders
  - Reset Schedule

An alert screen confirms reset action.

- Change Owner Pin

Technician can input a new 3-digit securit owner using the number pad screen.

- RTU Fan On/Auto User Control
  - On/Off (default On)

When set to On, RTU Fan is displayed on the Home Screen and Fan Setting Option is displayed on the Owner Settings Menu.

### Technician Status Icons (technician status screen)

Technician
(Technician Status Screen)

Legend:
- CS - Thermostat
- F.A.T. - Fresh Air Temperature
- RTU - Rooftop Unit

Touch the Technician icon ··· on the Home Screen to display the Technician Status Screen. Touch each icon for detailed information. Also see additional icons that are displayed on page 2.

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## FEATURES

### SPECIFICATIONS

**Order Numbers:**

**C0SNAJ03FF1L - 14X55**

**~~C0SNAJ22FF1L - 14X56 (With $CO_2$ Sensing)~~**

**Temperature Setting Range**

- Heating - 45 to 90°F
- Cooling - 45 to 99°F

**Humidity Settings**

- Operating range - 5 to 95% relative humidity (dehumification)
- Accuracy - ± 5%

**~~$CO_2$ Sensing ($CO_2$ Model)~~**

- ~~Operating range - 400 to 2000 ppm~~
- ~~Accuracy - ± 40 ppm~~

**Power Supply**

- 24VAC (18 to 30VAC maximum), 50/60Hz

**Clock Accuracy**

- ± 10 minutes per year

**Terminals**

- R - 24VAC
- T (qty. 2) - External Indoor Temperature Sensor
- OC (qty. 2) - Occupancy Sensor
- CM– (minus) - SysBus Communication
- CM+ (plus) - SysBus Communication
- C - Common 24VAC

**Dimensions**

- Thermostat (H x W x D) - 3-5/16 x 4-5/16 x 7/8 in. (84 x 110 x 22 mm)
- Wallplate (W x H) - 5-3/4 x 4-1/2 in. (146 x 114 mm)

**Backup**

Non-volatile memory maintains all programming in the event of a power outage.

### Optional Accessories

**Indoor Room Sensors**

Remote non-adjustable, wall mount

**C0SNZN01AE2 (10k) - 47W37**

**~~C0SNZN08AE1 (11k) - 94L61~~**

Up to nine of the same type indoor (room) sensors may be connected in parallel for averaging. Refer to installation instructions for additional details.

Uses standard two-wire thermostat wire.

Indoor (room) sensor wiring can be sized from 16 to 22 AWG depending on the application.

The maximum length of wire from the thermostat to the room sensor is 300 feet.

**Sysbus Network Thermostat Cable (Yellow)**
**(NOTE - Twisted Pair wire is required for thermostat wiring)** Wiring Not Included

# INSTALLATION INSTRUCTIONS FOR INDOOR REMOTE TEMPERATURE SENSORS — 10K OHM (47W37) AND 20K OHM (47W36)

## ⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency.

When the remote indoor sensor is installed with a commercial touch screen thermostat, use these instructions to install the sensor. Also see the touch screen instructions for more on wiring the sensor to the thermostat.

## PRE-INSTALLATION

**Cover Removal**

A snap-fit locking mechanism is used to attach the cover of the remote indoor sensor to its sub-base. To remove the cover from the sub-base:

1. Insert a thin, flat blade screwdriver into each of the two slots at the bottom of the module to release the two locking tabs (see figure 1).

**Figure 1. Cover Removal**

2. Tilt the cover out and away from the sub-base to release the two locking tabs.

**Electrical Wiring Practices**

## ⚠ CAUTION

Erratic System Operation Hazard.

Failure to follow proper wiring practices can introduce disruptive electrical interference (noise).

## ⚠ IMPORTANT

All wiring must comply with local electrical codes and ordinances, or as specified on installation wiring diagrams.

**Typical Commercial Touch Screen Thermostats**

The following items are recommended for indoor remote sensor installations:

1. Keep wiring at least one foot away from large inductive loads such as motors, line starters, lighting ballasts, and large power distribution panels.
2. Shielded cable is required in installations where these guidelines cannot be met.
3. Ground shield only to grounded controller case.
4. When connecting to all other thermostats, remote indoor sensor wiring can be sized from 16 to 22 AWG (1.31 to .34 $mm^2$) depending on the application.
5. The maximum length of wire from a thermostat or remote indoor sensor to another remote indoor sensor is 1000 feet (305 meters).
6. Twisted pair wire is recommended for wire runs longer than 100 feet (30.5 meters).

**ComfortSense 7500 Commercial Thermostat (13H15)**

1. Must keep wiring at least one foot away from large inductive loads such as motors, line starters, lighting ballasts, and large power distribution panels.
2. Only use thermostat wiring for remote indoor temperature sensors. Do not use shielded cabling.
3. Wire run should not exceed 300 feet (100m) between devices.

## INSTALLATION

Install the remote indoor sensor on an inside wall approximately 54 inches (1372 mm) from the floor (or in the specified location) to allow exposure to the average room temperature. Do not mount the remote indoor sensor on an outside wall, on a wall containing water pipes or near air ducts. Avoid locations that are exposed to discharge air from registers or radiation from lights, appliances, or the sun.

The remote indoor sensor may be installed on a wall, on a standard utility conduit box using no. 6 (3.5 mm) screws or on a 60 mm wall outlet box (see figure 2). When installing directly on a wall, use the type of screws appropriate for the wall material. See figure 3 for remote indoor sensor dimensions.

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Inspections Division
Approved with Conditions
Date: 04/20/17

**Figure 2. Installing Remote Indoor Sensor on Standard Utility Conduit Box or 60 mm Wall Outlet Box**

**Figure 3. Room Sensor Dimensions**

## WIRING

Attach the wires from the device sensor terminals to the appropriate remote indoor sensor terminals on the thermostat (see figure 5).

**⚠ CAUTION**

Improper Electrical Contact Hazard.

Screw type terminal blocks are designed to accept no more than one 16 AWG (1.31 sq. mm$^2$) conductor.

Connect multiple wires that are 16-18 AWG (1.31 to .82 mm$^2$) with a wire nut. Include a pigtail with this wire group and attach the pigtail to the individual terminal block.

Wire the terminal blocks as follows:

1. For single wires, strip 3/16" (5mm); for multi
   going into one terminal, strip 1/2 in. (13 mm) i
   from the conductor.
2. If two or more wires are being inserted into one terminal, twist the wires together before inserting.

**Figure 4. Multi-wire Installation**

***NOTE**: When two or more wires are being inserted into one terminal, be sure to twist them together. Deviation from this rule can result in improper electrical contact (see figure 4).*

3. Insert the wire in the required terminal location and tighten the screw to complete the termination.
4. Verify remote indoor sensor wiring per figure 5. Check that thermistor is in place.

**Figure 5. Room Sensor Wiring**

When all wiring is complete, attach the cover of the remote indoor sensor by pressing the cover straight down onto the sub-base until it snaps into place.

**Multiple-sensor Installations**

When using more than one sensor, maintain an equivalent resistance of 20K ohms at the thermostat (see figure 6).

**Figure 6.Sensor Wiring for Temperature Averaging**

## SENSOR SPECIFICATIONS

**Application**

To be used with Honeywell W7760C DDC Controller (29M4801) and thermostats 14W81 or 13H15.

**Temperature Sensor Operating Range**

45 to 99°F (10 to 37.2°C)

- 100959-02 (47W37) is furnished with a 10K ohm nonlinear NTC temperature sensor that follows a specific temperature resistance curve as shown in figure 7.
- 100959-03 (47W36) is furnished with a 20K ohm nonlinear NTC temperature sensor that follows a specific temperature resistance curve as shown in figure 8.

**Figure 7.10K Ohm Temperature Sensor (47W37)**

**Figure 8.20K Ohm Temperature Sensor (47W36)**

**Operating Temperature**

45 to 99°F (7.2 to 38.2°C)

**Relative Humidity**

5% to 95% non-condensing

**Dimensions**

3” W x 4.56” H x .88” D

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