# Commercial HVAC Optimization

# *Program Participation Guide*

April 3, 2017

Version 5.1

# Change Record

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# 1. Legal Notices

**NOTICE OF PARTICIPATION**: Contractor and Customer participation in this program is entirely voluntary. You agree, by participating, to abide by the program requirements and standards. You understand that all customers and contractors who participate in this program are also PG&E customers and may be contacted by PG&E, its agents (including Honeywell Smart Energy), or employees regarding customer participation in this program. You agree to indemnify PG&E, its Agents and Employees, and Honeywell Smart Energy against all loss, damage, expense, fees, costs and liability arising from either customer or contractor participation in this program. Contractor, Customer or PG&E may cancel participation in this program at any time.

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# 2. Introduction

The goal of this guide is to serve as a reference for the participating Commercial HVAC Service contractor and customer regarding activities to be performed under the Commercial HVAC Optimization Program ("HVAC Optimization Program"). This guide is a complement to the information provided in the Contractor Participation Agreement, Customer Incentive Application, Contractor Incentive Application, Service Agreement Addendum, and other technical training materials.

The target audience for this document is the customer, contractor, contractor employees, and subcontractors who will perform work related to the program. In the table of contents for this guide, Contractor and Customer specific materials are identified separately to help each user access pertinent information quickly.

# 3. Program Overview

The PG&E Commercial HVAC Quality Maintenance Program (HVAC Optimization) is designed to support the State of California Long Term Strategic Plan. Launched in mid-2011, this comprehensive program is designed to optimize the performance of major energy-using components of commercial heating, ventilation, and air conditioning (HVAC) equipment. Equipment efficiencies are improved by applying diagnostic methods and the detailed HVAC inspection and maintenance tasks of American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air Conditioning (ASHRAE)/Air Conditioning Contractors of America (ACCA) Standard 180 (Standard 180).

The innovative diagnostic methods and technologies used by the Program set it apart from tune-ups and other HVAC maintenance efforts. Program measures include thorough unit inspection and repairs that go above and beyond routine HVAC unit maintenance. The Standard 180 based methods allow contractors to comprehensively evaluate a commercial customers' HVAC system. Service will improve equipment efficiency, maximize energy savings, increase reliability and comfort, extend the useful life of equipment and reduce emergency comfort calls.

The Program is driven by the HVAC Optimization Agreement Addendum between the customer and HVAC service contractor. The program incorporates training, marketing and incentives to help

contractors and customers understand the value of Standard 180 maintenance and participate in the program.

**Examples of Energy Efficiency Services:**

- Thermostat schedule and set point programming to improve efficiency without sacrificing comfort.
- Install programmable thermostat and programming, if needed.
- Repair and control adjustment of the outside air economizer components, if needed.
- Diagnosis and optimization of the refrigerant charge.
- Installation of optional efficiency measures such as Demand Controlled Ventilation (DCV) and Enhanced Ventilation Control (EVC) for economized units.

**Customer Benefits:**

- Energy and operating cost savings.
- Improved indoor air quality.
- Improved thermal comfort.
- Fewer emergency service calls.
- Increased equipment life.
- Environmental benefits associated with reduced energy use and refrigerant emissions.
- Customer incentives designed to help offset maintenance agreement costs.
- Contractor incentives to help reduce the cost of some repairs associated with participation.

**Contractor Benefits**

- Increased customer understanding of services performed.
- Comprehensive data collection for all work performed and equipment serviced for each customer.
- Contractor Incentives to help offset repair costs.
- Customer incentives to encourage customer participation in the program.
- Scheduling software to facilitate on-time performance of services and identify repairs to customer.
- Utility based customer referrals and program website listing of contractor.

## 3.1. *Program Options*

- Silver Tier HVAC Optimization – Customer may enroll for a single year at the same incentives eligible for the first year of the HVAC Optimization Gold program. Designed to help offer introduction to maintenance services, with the ability to upgrade to HVAC Optimization Gold after the first year. Contractor incentives for Silver Tier are the same as HVAC Optimization Gold Tier.

- Gold Tier HVAC Optimization – This is the core program and includes three years' of service with a minimum of 12 inspections, performed quarterly. Tasks and required responses are defined in an inspection questionnaire. Customer is notified of repairs required to meet the base energy efficiency requirements of the equipment; and the system is maintained to that base level for three years. Goal of this program is to both save energy and change the customer perception that "run to fail" maintenance is more cost effective than Standard 180 maintenance over time. Program is also attempting to reach out to customers that do not maintain equipment to show the value of predictive maintenance.

- EVC – Enhanced Ventilation Control is an energy efficiency upgrade available in the other two programs. EVC is also offered as a stand-alone program to help controls contractors add value to customers, where they maintain the building management systems but do not perform HVAC maintenance. Program goal is to provide energy efficiency upgrades to existing equipment within the scope of a contractor's license classification.

## 3.2. *Program Contact Info*

Visit the Program websites:

http://www.pgehvacoptimization.com or

http://www.pge.com/rethinkhvac

Contact the Program Implementer, Honeywell Smart Energy (HON):

E-mail: pgehvacoptimization@honeywell.com

## 3.3. *3 Year HVAC Optimization Service Map*

The Service Map shown below identifies the minimum required services to participate in the program. Many factors contribute to maintenance requirements and your conditions may require additional or less frequent service. The PG&E program sets a minimum starting point and does not allow reducing inspections below those shown on the Service Map below.

**HVAC QM Agreement Service Map** – Based on Standard 180
*PG&E Commercial HVAC Optimization Program*

Honeywell

| Inventory & Assessment | EE Baseline & Q1 TASKS | Year 1 Q2 | Year 1 Q3 | Year 1 Q4 | Year 2 Q1 | Year 2 Q2 | Year 2 Q3 | Year 2 Q4 | Year 3 Q1 | Year 3 Q2 | Year 3 Q3 | Year 3 Q4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Unit Name | ✓ Visual Inspection of Equipment | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2. Unit Locations | ✓ Filters/Housing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3. Unit Type | ✓ Blower Compartment Systems | ② | ✓ | ② | ✓ | ② | ✓ | ② | ✓ | ② | ✓ | ② |
| 4. Unit Mfg. | ✓ Control System | ② | ✓ | ② | ✓ | ② | ✓ | ② | ✓ | ② | ✓ | ② |
| 5. Unit Model # | ✓ Variable Frequency Drive | ② | ✓ | ② | ✓ | ② | ✓ | ② | ✓ | ② | ✓ | ② |
| 6. Unit Serial # | ✓ Evap / Condensor Coils | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 7. Unit Mfg. Year | ✓ Equipment Enclosure | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 8. Unit Tonnage | ✓ Ductwork / Piping / Plenums | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 9. # of Stages [circuits] | ✓ Drain Pan / P-Trap / Moisture | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 10. Refrigerant Type | ✓ Refrigeration System Test | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 11. Economizer [Y/N] | ✓ Control Box / Wiring | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 12. VF Drive [Y/N] | ✓ Bearings | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 13. # of Compressors | ✓ Gas Heat | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 14. PG&E Sticker # | ✓ Thermostat | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 15. AirCare Plus [Y/N] | ✓ Economizer | ② | ② | ② | ✓ | ② | ② | ② | ✓ | ② | ② | ② |
| 16. Voltage | ✓ Repairs List | C | C | C | C | C | C | C | C | C | C | C |
| | **Conditional / As Required** | | | | | | | | | | | |
| | C Test & Repair Econ. Component | | | | | | | | | | | |
| | C Replace Economizer Controller | | | | | | | | | | | |
| | C Adjust Economizer Controller | | | | | | | | | | | |
| | C Replace Thermostat | | | | | | | | | | | |
| | C Install DCV (Optional) | | | | | | | | | | | |
| | C Install EVC (Optional) | | | | | | | | | | | |

✓ = Inspection and maintenance as required to maintain Standard 180
C = Conditional as required corrections to achieve Standard 180
② Visually inspect for faults and repair as necessary to maintain Standard 180
All tasks above contain several activities to meet Standard 180 requirements

# 4. Determining Program Eligibility

Prior to performing work under the program both the contractor and the customer will need to verify that the site and the equipment on that site meet program requirements. All work performed on sites or equipment determined to be ineligible for incentives will be paid for by contractor or customer without the benefit of program incentives. How the customer and contractor determine site eligibility is identified below.

## 4.1. *Customer Location Eligibility*

A Customer is defined as the purchaser of the HVAC Optimization Service Agreement. The service must be performed for units on a building that:

- ✓ Is equipped with an active electric meter and
- ✓ Receives service from PG&E.
- ✓ Has not had units treated by AirCare+ within the last 5 years.

Prior to enrolling a customer, verify the customer electric account status by obtaining the Customer's Electric Service Agreement (SAID) Number (which can be found in the details section of the customer bill statement, as shown below). Otherwise, provide, at minimum, the site address and customer name to HON for enrollment eligibility check.

## 4.2. *HVAC Equipment Eligibility Criteria*

The table below lists eligible and ineligible units. Only the items specified in the list below are eligible for participation. If you have questions about eligibility for units not specifically identified below, contact HON before enrolling the customer. **The contractor is responsible for verifying equipment eligibility.**

| Eligible Units | Ineligible Units |
|---|---|
| ✓ Air-cooled packaged DX, constant speed mini-split, VAV and Heat Pump rooftop units or split systems that are 3 tons or greater. Wall mount Ductless Systems over 3 tons. "Gas Pack" and Electric Package Units typically qualify, check with HON for atypical systems. | • Chilled/hot water fed units<br>• Water source or ground source heat pump systems<br>• Variable speed compressor units<br>• Size less than 3 tons<br>• Units that have received incentives under PG&E's AirCare Plus Program are not eligible for a period of 5 years from date of payment of incentives.<br>• Systems still under warranty or within 1 year of installation.<br>• Liebert or Chiller systems specifically designed for Data Centers, etc. Typically do not qualify. |

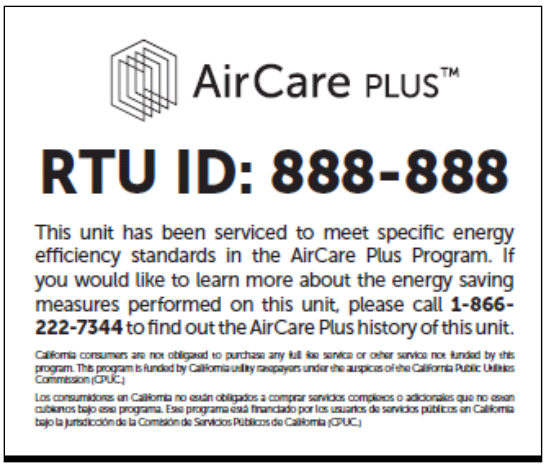
## 4.3. *Previous EE Program Disqualifiers*

Units that have participated in PG&E's AirCare Plus Program will have identification stickers on the Thermostat and on the unit panel. These provide clear evidence that Contractors can use to inquire further as to the unit's eligibility in the Program. HVAC Optimization program

implementer, HON, can check a database to verify past participation and when eligibility is reinstated.

The AirCare Plus Program's thermostat sticker is pictured here:

The AirCare Plus Program's unit panel sticker is pictured below:




**Eligibility is based on both customer and unit eligibility. A customer may have participated in a disqualifying program prior, but many of their units may not have been enrolled. The program will verify what units are eligible on sites where the customer has been determined to have participated in a disqualifying program.**

# 5. Customer Participation Requirements

Standard 180 stresses the involvement of customers in the maintenance of their equipment. The goal is to help customers understand the value of maintenance and, more specifically, the value of Standard 180 maintenance over other maintenance options. The program provides significant reporting, including a Standard 180 maintenance plan that covers all the basics required to fully inform the customer of the status of their equipment, to make recommendations as to when maintenance should be performed, and specifically what work should be done. It also covers some detail on the expected energy savings that can be achieved from the services that are performed, as well as a detailed list of repairs that were required to bring units to "baseline," the programs description of a unit that has been properly serviced to begin program participation. Customers are expected, with the help of the contractor, to do the following:

- Discuss their maintenance options with the contractor, including their goals with regards to savings and maintenance.
- Monitor their progress using the programs' portal.
- Discuss any questions they have regarding service with their contractor and engage the contractor to make recommendations that benefit the customer.
- Notify the program of any issues related to their maintenance if they are unable to resolve the issue with their contractor.
- Annually discuss the maintenance and the revised maintenance plan to ensure they are still achieving the goals they set with the contractor during the first year.
- Potentially discuss new goals and additional offerings that could achieve better savings, indoor air quality, comfort, or additional maintenance goals for the customer.
- Meet all requirements covered by the Customers Incentive Application signed by the participating customer and participating contractor.
- Sign all program paperwork authorizing participation in the program

## 5.1. *Customer Enrollment Criteria*

- Customer must be a PG&E customer with a Service Account Identification Number (SAID). The SAID may be found on top/right hand side of the customer bill.
- Customer must not have participated in another disqualifying program such as Aircare+ within the last 5 years from the time the last payment was made to the customer.
- Customer must be responsible for maintaining the equipment at the enrolled address. Customers who have property managers or other entities responsible for handling maintenance for their HVAC systems may be enrolled by those entities and all incentives for enrollment will go to the party responsible for HVAC maintenance.
- Any customer may be excluded from participation based on notification from PG&E or HON to the enrolling contractor. As a market transformation program, continued participation in energy efficiency programs without change in customer behavior is a reason to exclude a customer from participation in similar programs. As a reference, neither PG&E nor HON has excluded a customer for this program; but we reserve the right to do so.

## 5.2. *Customer Process*

- Eligibility – Determined by Program to verify PG&E customer status and no previous disqualifying program participation. **Program may not identify every disqualified customer, if previous participation is later identified to be same customer enrolling in HVAC Optimization, customer will be responsible for all services rendered by contractor.**
- Approval – Processed by Program Staff (Note, failure to identify previous participation in another program will result in Customer being responsible for all services rendered by Contractor.)

- Site Evaluation – Performed by Contractor
- Initial Agreement – Performed by Contractor and Customer
- Application Signatures – Customer authorization for program participation
- Site Service – Performed by Contractor
- Repairs Notification – Itemized list of repairs required for all units to remain eligible, performed by a Contractor. Completion of repair is required for unit to remain eligible.
- Creation of Customer Record – Performed by Contractor but accessible by Customer in program portal.
- Standard 180 Maintenance Plan – Lists all equipment, as found conditions, repairs required, inspections performed, energy efficiency tasks performed and expected savings (Deemed Savings based on an average). Recommendations for improvement of equipment. – Provided by Portal with Contractor data
- Quality Control Check – Performed on percentage of all enrolled sites. - Performed by QC Implementer (Proctor Engineering)
- Payment – Performed by PG&E using program data. Contractor has no control over incentive payments, beyond performing required work as specified by program.

# 6. Customer Program Tasks Descriptions

Program maintenance is divided into a series of tasks that are done either quarterly, semi-annually or annually, based on the units maintenance needs. Each task covers a specific portion of an HVAC system and is designed to maximize the energy efficiency and the longevity of the unit. The tasks, when done as part of a maintenance plan, provide the best combination of energy efficiency and cost to service. At any time, the program may add or remove tasks that are thought to improve the value of this program to both the contractor and the customer. The tasks are outlined below:

## 6.1. *Panels*

Refers to the visual inspection and correction of panels, fasteners and the external enclosure of an HVAC system. Maximizing airflow and prevention of loss of conditioned air is the primary purpose behind this task.

## 6.2. *Coils*

Refers to the condition and ongoing maintenance of the coils in the HVAC unit, both evaporator and condenser coils. Ensuring the highest attainable temperature transfer across the coil by cleaning and repairing the coils and verifying no leakage is present.

## 6.3. *VFD*

A motor controller used for variable speed control of the blower motor (typically), may also be used on other motors within the HVAC system. Visual inspection and verification of proper programming and automation of the controller.

## 6.4. *Ductwork/Piping*

Inspection and maintenance of the ductwork and plenums carrying air to or from the HVAC system. Proper cleaning and maintenance of the system is imperative to insure clean air quality, as well as to prevent leakage of conditioned air from the system.

## 6.5. *Filters and Housing*

Routine ongoing inspection and replacement of filters to ensure air quality, prevention of reduced airflow and identification of other problems such as moisture carryover or coil freezing within the HVAC system.

## 6.6. *Drain Pan / P-Trap*

Inspection, cleaning and evacuation of excess moisture from the HVAC system helps to prevent issues with mold or potential building damage from leaking HVAC systems.

## 6.7. *Control Box*

Inspection and repair or replacement of all items within the HVAC control box. These items include motor contactors and capacitors as well as the wiring integrity contained within.

## 6.8. *Bearings*

Inspection and maintenance of field serviceable bearings within the HVAC system. Many systems may not have field serviceable parts but for those that do, this service applies.

## 6.9. *Blower Compartment*

Inspection, maintenance and repair of the blower compartment. Ensuring proper pulley and sheave alignment as well as belt tension and cleaning of blower compartment and blower fan blades helps ensure cleaner air quality for the serviced space and prevents extra belt wear, slippage or belt failure, as well as damage to the blower motor.

## 6.10. *Gas / Heat*

Inspection, maintenance and repair of the gas system and burner components. Insuring the safe and efficient operation of the heating system component of the HVAC system.

## 6.11. *Thermostat*

Inspection, programming and potential replacement of the individual HVAC units serviced space control system. Program provides incentives to upgrade this equipment to allow for highly customizable configuration of the operation hours and functions of the HVAC system.

## 6.12. *Control System*

Inspection and verification of the HVAC systems' control functions. Ensuring the proper systems activate based on specified conditions. Prompt identification of control system failures can prevent individual failures from stressing or causing other systems to fail.

## 6.13. *Economizer*

Inspection and maintenance of the system responsible for "free cooling". Proper maintenance and setup of an economizer can result in substantial savings for the customer by using outside air to cool an occupied space during hours when the outside air can be used, instead of mechanically cooling air for the conditioned space. Program provides incentives to repair and replace components of this system.

## 6.14. *Refrigerant System Test*

Inspection and verification of the refrigeration system cooling capacity and function. Contractor will ensure the system is operating as designed within the proper charge. The testing is highly complex and the program requires significant data on this test to insure proper operation of equipment.

## 6.15. *Refrigerant System Service*

Service of refrigeration system, should the contractor find conditions that do not meet program requirements.

## 6.16. *Repairs List*

A list of all repairs required for program participation for any unit enrolled in the system. The purpose of this list is to identify the existing condition of a unit prior to its enrollment in the Program and to ensure all corrections are made to bring the unit to its most efficient operating state. The repairs list also serves to identify any issues that may develop after enrollment in the program to ensure they are quickly resolved before they can cause any additional damage. Customer has two weeks to authorize repairs indicated by contractor and an additional two weeks for those repairs to be completed. Any repairs not completed will require removal of the unit from program participation.

## 6.17. *EVC Installation (Optional)*

Enhanced Ventilation Control refers to the control of an economized HVAC system using a combination of an economizer, a C02 sensor, a VFD and a high efficiency motor. EVC systems are the most energy efficient form of a package HVAC system. The economizer, C02 sensor and VFD work in unison to provide proper airflow depending on multiple system factors such as outside temperature and C02 conditions in the space. Substantial energy efficiency can be achieved through the installation of these types of systems and the program offers incentives to help offset the cost of a portion of this work.

# 7. Inventory and Estimation of Incentives

Prior to signing an agreement with the customer, the contractor must go through multiple steps to identify information that determines the customer incentives that are available for participation in the program. The initial data gathering steps are not designed as a diagnostic service but rather as a visual identifier of available equipment for enrollment. Typically, contractors will need to be under agreement with the customer before they can spend the time required to properly inspect and diagnose equipment.

## 7.1. *Initial Inventory*

The Customer HVAC Optimization Service Agreement Incentive amount for each eligible HVAC unit is dependent on key pieces of information from the Initial Inventory. The following information is required:

- Economizer status (economized or standard unit)
- Unit tonnage
- Number of compressors on the unit
- Year of the unit's manufacture

The required fields for the Initial Inventory are clearly marked. Contractor will use an Excel form and input captured data to determine the incentives and deemed energy savings for each unit enrolled. Initially the form will only identify customer incentives; but after repairs, the form will be updated to include energy savings. Repairs and other required services impact energy savings.

Additional fields, both required and optional, for the **Final Inventory** are also accessible through the Unit Inventory section of the program portal during the final inventory. The technician will be able to further catalog the unit's characteristics by removing panels and inspecting them in order to further confirm the unit's program eligibility and support the ongoing maintenance of the unit.

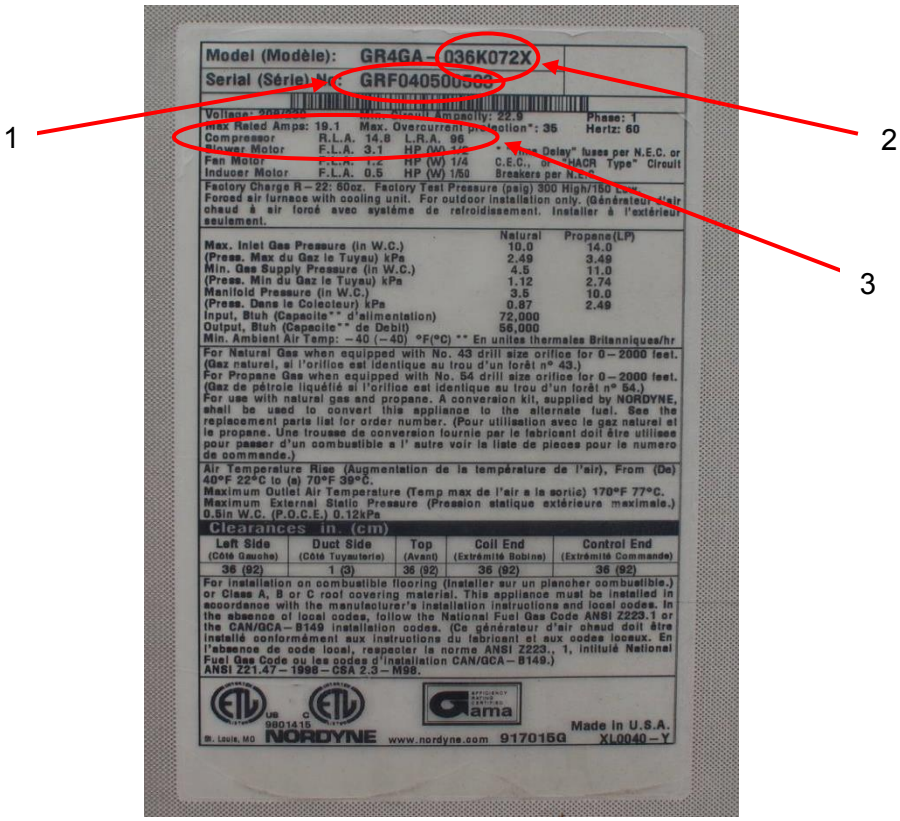
### *7.1.1. Using the HVAC Unit Nameplate*

If the nameplate is in good condition, most of the unit information required to calculate the Customer Incentive Amount (age, tonnage, number of compressors and, if present, an economizer) can be found on the nameplate. On the following page is a picture of a typical nameplate with the needed information in red circles.

1. Age – Age can be determined from the equipment serial number. Where the date of production will be embedded in the serial number will depend on the manufacturer. For the example below the first four digits represent the production year and month respectively.

2. Tonnage – Tonnage can be determined from the model number. Typically, the first three digits represent the cooling capacity in kBTU/hr. However sometimes only 2 digits are given. Tonnage can be calculated by dividing by 12. In this example the tonnage is equal to 36 kBTU/hr / 12 = 3 tons. Tonnage is almost always a whole number or half a ton (i.e. 7.5 tons). If the calculated tonnage is 5.37 tons or some other fraction of a ton you are probably not looking at the correct numbers. If the nameplate is unreadable, the tonnage can be estimated from the make and model number of the compressor(s). Contact the compressor manufacturer.
3. Number of Compressors – The number of compressors can also be found on the nameplate. Typically, the nameplate will list all components and their size. Here we see only one compressor listed and therefore this is a single stage Roof Top Unit (RTU).

   If the nameplate is unreadable, the number of compressors can be determined by opening the panel near the condenser coil.
4. Economizer – The model number may also indicate whether there is an economizer, if the unit is big enough. It may be easier to look for motorized economizer dampers. In some cases, it may be necessary to remove a panel in order to determine whether an economizer has been installed. The figures below show an economizer for a 5 ton RTU. From the picture on the left, it is not clear that an economizer has been installed. The economizer dampers will be located near the outside air intake.



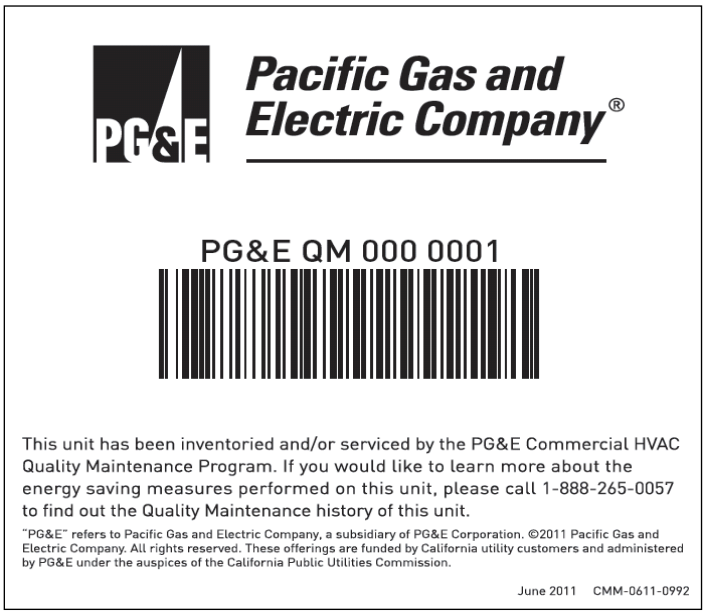

**1: Example nameplate**

**Figure 2: Example of an outside air intake (left) and economizer dampers & actuator (right) for the same small RTU.**

### *7.1.2. Unit and Thermostat Sticker*

Using the HVAC Unit Inventory Sticker Book provided by the program, the Contractor must apply the HVAC Unit Sticker next to unit nameplate and the Interior Thermostat Sticker for each corresponding unit inventoried (provided the thermostat is acceptable to the program).

Place the unit sticker on the unit panel next to the data plate:



Place the thermostat sticker on the HVAC unit corresponding thermostat, ***unless it needs replacement (on BMS/EMS Systems apply all stickers for all controlled units on the control box cover):***

Interior Thermostat Sticker
Small sticker with the matching HVAC Unit number is to be placed on the corresponding thermostat control unit inside the building.

If the sticker is lost or missing then one can be made with the correct number with a label maker or it can be written on the Thermostat with a permanent marker.

# 8. Incentive Summary

Successful participation in the PG&E Commercial HVAC Optimization Program will result in multiple incentive payments to program participants, including both Contractors and Customers. The Contractor Incentive Application and Customer Incentive Application are dependent on the data captured at the Initial Inventory: number of eligible units, their respective age, equipment tonnage, number of compressors, and presence of an economizer. Incentives are paid after the approval of the Customer Incentive Application and the unit is brought to program baseline.

## 8.1. *Customer Incentives (Silver and Gold Tier)*

- 45% of the total Customer HVAC Optimization Service Agreement Incentive will be paid when the Customer Service Agreement has been approved by HON and the unit has been brought to program baseline (Gold Tier). One year agreements (Silver Tier) will be paid at 25% of incentives at baseline and 20% of incentives at end of year 1.
- 35% of total Customer incentives will be paid at end of year 2 (Gold Tier).
- 20% of total Customer Incentives will be paid at end of year 3 (Gold Tier).
- The amount of the Contractor Energy Efficiency (EE) Tasks' Incentive is determined by the EE tasks needed when servicing the unit to bring it to program baseline. It is paid to the contractor when the required tasks on each unit are completed and approved.
- The Contractor EE Tasks Incentive of $50 per Qualified Unit is paid to the contractor, when the customer site information has been entered into the Program Portal and the units have all been brought to baseline.
- All incentives above can be estimated using the program Incentive Calculator.
- PG&E reserves the right to modify or alter incentives for the program at any time. The program will make every effort to notify contractors as far in advance as possible for any incentive or program changes.

## 8.2. *Customer Incentive Description, Purpose and Requirements*

The incentive processing procedure is triggered, as outlined in the table below. All incentives are per qualifying unit.

| Incentive Name | Incentive Amount | Purpose | HON Required Documentation (in addition to general conditions) |
|---|---|---|---|
| **Customer QM 180 Service Agreement Incentive** | Up to $3,836 per unit at 25 Ton Unit<br><br>45% at baseline<br>35% EOY2<br>20% EOY3<br>OR<br><br>(25% at baseline<br>20% at EOY1) | • Decrease customer's additional cost to upgrade to a CQM 180 Service Agreement.<br><br>• Gold Tier (Keep the program Service Agreement in place and units maintained by Contractor for up to 3 years<br><br>• Silver Tier (1Yr Agreement) will only trigger year 1 incentives unless upgraded. | • Unit Inventory (within web-based software application)<br>• Signed QM 180 Service Agreement<br>• Signed QM Addendum<br>• Maintenance Plan (within web-based software application)<br>• Program Incentive Calculator<br>• Customer Incentive Application<br>• Contractor Incentive Application<br>• Unit brought to baseline |

## 8.3. *Contractor Incentive Chart*

| | | | |
|---|---|---|---|
| **Contractor QM 180 Service Agreement Incentive** | $50 | • Offset Contractors' overhead costs related to QM 180 Service Agreement sale and unit inventory. | • Data Entry in Program Portal<br>• Unit brought to baseline |
| **Contractor EE Tasks Incentive** | Up to $5,375 per unit with EVC at 25 Ton Unit | • Offset some Contractors' cost for completion of a specific set of tasks required to bring the unit to minimum performance level. Maximum incentive would require optional services approved by customer (i.e. EVC Installation). | • Contractor Incentive Application<br>• EE Tasks Incentive Calculator<br>• Invoice or work order for parts installed at site<br>• Final inventory data and completed inspection report (using web-based software application)<br>• QC Inspection Pass |

## 8.4. *List of Energy Efficiency Tasks (EE) Eligible for Contractor Incentives*

Note that all contractor incentives are paid one time, when bringing units to "baseline". The incentives are not designed to cover all costs associated with the repair, but to act as an incentive to reduce the cost to the contractor and customer. All work done after the initial baseline inspection is not incentivized to the contractor; only the customer receives ongoing incentives to remain in the program. See table below for one-time contractor incentives:

| EE Tasks Eligible for Incentives | Qualified Unit Size | | | |
|---|---|---|---|---|
| | 3-5.9 Tons | 6-12.5 Tons | Over 12.5 Tons | $/Qty |
| Replace Economizer Component | $140* | $200* | $300* | $/RTU |
| Replace Economizer Controller | $210 | $300 | $450 | $/RTU |
| Adjust Economizer Controller | $70 | $100 | $150 | $/RTU |
| Adjust Programmable Thermostat | $18 | $25 | $38 | $/RTU |
| Replace and Set up Programmable Thermostat | $140 | $200 | $300 | $/RTU |
| Install Enhanced Ventilation Control (EVC) – Economizer controller, CO2 sensor, VFD on existing Motor | $155 | $155 | $155 | $/Ton** |
| Install Enhanced Ventilation Control (EVC) – Economizer controller, CO2 sensor, VFD and NEMA Premium Motor | $190 | $190 | $190 | $/Ton** |
| Install Enhanced Ventilation Control – Economizer controller, CO2 sensor, VFD and Permanent Magnet AC Motor | $194 | $194 | $194 | $/Ton** |

***Program only pays for one repair of failed economizer components excluding controller.***
***** Incentive Capped at 25 Tons***

## 8.5. *Sample List of Services Ineligible for Incentives*

If you have any questions about eligibility, please contact HON.

- Coil Cleaning
- Compressor failure/replacement
- TXV failure/replacement
- Blower wheel replacement
- Condenser fan replacement
- Condenser fan motor failure/replacement
- Pulley replacement (drive and driven)
- Repair /replace condensate line, drain pain.
- Electrical disconnect failure/replacement
- Non-functioning refrigerant system
- Contactors and Capacitor replacements

# 9. Program Documentation

## 9.1. *Service Agreement and the HVAC Optimization Addendum*

Customer needs to sign a 1 or 3 year Service Agreement with Contractor. If the Agreement is less than 3 years, the Customer may re-enroll for the additional two years after the first year is completed.

- No unit will receive this incentive for more than 3 years. Incentives can be transferred to a new Service Agreement when there is a change of building ownership or a new HVAC Contractor participating in the Program, in which case the eligibility period will be prorated for the new agreement.
- Units must be operational and adequately maintained; deferred maintenance and repairs will cause forfeiture of incentives.
- Incentive amount may be adjusted as unit eligibility is re-evaluated during the Program lifecycle.
- Any unit not treated within 15 days of notification of failure will be made ineligible. An ineligible unit will lose all pending incentives in the program. The purpose of the short repair window is to ensure items needing repair do not cause other equipment failures and to keep energy efficiency at an optimum state as long as possible.

The HVAC Optimization Addendum is an attachment to the Service Agreement.

Purpose:

- Connect the Contractor Service Agreement to the Program.
- Apply ACCA 180 Standards to the Contractor Service Agreement.
- Require that units are maintained under the agreement for a 1- 3 year period.
- Allow HON and PG&E to verify that there is a Program Maintenance Agreement in place.

## 9.2. *Maintenance Plan*

The Maintenance Plan is defined between the Contractor and Customer and will meet the Standard 180 maintenance requirements.

Purpose:

- Improve Energy Efficiency
- Improve Indoor Air Quality
- Improve Thermal Comfort
- Inform how often a customer will expect their contractor to check in on units for maintenance.
- Identify the specific tasks that will be performed during maintenance of a unit.
- Detail when and why the customer wants to be contacted about the status of their HVAC units

- Specify the condition indicators that prompt treatments or repairs to each HVAC unit
- Specify all repairs completed by the contractor for each enrolled unit
- Identify the deemed energy savings that can be achieved by each treatment to the unit.
- Provide an opportunity for customer to set goals and annually update those goals with the servicing contractor.

The Maintenance Plan development is facilitated by using the program portal, it is available as a report at any time.

*The Contractor may print the final version of the Maintenance Plan from the program portal and provide a copy to the Customer or the customer may access the report from the program portal.*

## 9.3. *Customer Incentive Application*

The Customer Incentive Application can be downloaded from:

www.pgehvacoptimization.com

### *9.3.1. Multiple buildings under one Service Agreement*

The Contractor must verify whether the units that will be covered in the Service Agreement are in multiple buildings, in multiple building types (identified in the Customer Incentive Application form), or under more than one electric or gas service ID (see section 6.2.1). If enrolling multiple buildings from one customer, the contractor will need to fill out the "Multiple Site SAID Form", which can be found at: www.pgehvacoptimization.com

The Multi-Site form may not be altered in any way. The fields and formatting must be unchanged or the form will not upload to the program portal correctly. **Please, if you copy and paste data into this form, select text only as the paste function. If you do not know how to do this contact your Contractor Liaison for instructions.**

Example:

| Multi – Site Form | | | | | |
|---|---|---|---|---|---|
| | **Account Name** | **Service Address** | **Electric SA_ID** | **Building Type from App. STEP 5** | **No. of Units** |
| 1 | Apex | 123 Market Street | 123456 | Office: Large | 5 |
| 2 | Apex | 846 Winton Street | 432561 | Office: Small | 1 |

## 9.4. *Contractor Incentive Application*

The Contractor Incentive Application can be downloaded from:

www.pgehvacoptimization.com

Much like the Customer Incentive Application, this document defines the request for payment for each incentivized task performed on the customers units. It is required for contractors to receive payment for work completed.

# 10. Notifications to Customer and Contractor

Each participating contractor and customer in the program will receive notifications related to the status of their enrolled equipment. The list below represents a list of the notifications available and the reason for those notifications:

| HVAC Optimization Program Notifications List | | | |
|---|---|---|---|
| **USER** | **Name** | **Reason for Notification** | **Timing for Notification** |
| **Customer** | Program Welcome | Building Equipment is at Baseline | After contractor has serviced all building units. |
| **Customer** | Incentives Notification Baseline | Building Equipment is at Baseline | Incentives have been submitted for payment. |
| **Customer** | Incentive Notification EOY 1* | Building Equipment YR1 Service Complete | 4 Inspections Completed to Program Requirements. |
| **Customer** | Incentive Notification EOY 2 | Building Equipment YR2 Service Complete | 8 Inspections Completed to Program Requirements. |
| **Customer** | Incentive Notification EOY 3 | Building Equipment YR3 Service Complete | 12 Inspections Completed to Program Requirements. |
| **Customer** | Program Completion Notice | Building Equipment YR3 Service Complete | 12 Inspections Completed to Program Requirements. |
| **Contractor** | Baseline Complete | Building Equipment is at Baseline | After contractor has serviced all building units. |
| **Contractor** | Incentives Notification Baseline | Building Equipment is at Baseline | Incentives have been submitted for payment. |
| **Contractor** | Incentive Notification EOY 1 | Building Equipment YR1 Service Complete | 4 Inspections Completed to Program Requirements. |
| **Contractor** | Incentive Notification EOY 2 | Building Equipment YR2 Service Complete | 8 Inspections Completed to Program Requirements. |
| **Contractor** | Incentive Notification EOY 3 | Building Equipment YR3 Service Complete | 12 Inspections Completed to Program Requirements. |
| **Contractor** | Program Completion Notice | Building Equipment YR3 Service Complete | 12 Inspections Completed to Program Requirements. |
| **Contractor** | Inspection Upcoming | 2 Weeks Prior to Inspection Date | Notice before Inspections are due. |
| **Contractor** | Inspection Due | On Building Due Date for Inspection | Inspections are due. |
| **Contractor** | Inspections Overdue | Inspections Past Due | 2 Weeks past due date for inspection. Units Ineligible |
| **Contractor** | Q/C Status | Building was selected for Q/C | Q/C Implementer has selected site for inspection. |
| **Contractor** | Q/C Status | Results of Q/C | After Q/C of site. |

**Customers who enroll in Gold Tier will receive Baseline and EOY1 Incentives at the same time.*

# 11. Contractor /Technician Participation Information

Ongoing participation in the program is the goal of the program. The program is designed both as a market transformation program as well as an energy efficiency program. In order to achieve market transformation, the program needs participating contractors to continually engage in Standard 180 maintenance, as well as enroll new customers in the program. The goal is to engage enough customers that a new standard will be developed where customers expect the type of maintenance provided by the HVAC Optimization program.

## 11.1. *Contractor Enrollment Criteria*

PG&E and HON are marketing this program to customers as a service with exceptional contractor support. We are attempting to differentiate highly skilled and full service contractors from those who imply they perform well but typically provide "less than advertised" service. The program is highly visible to customers and, as such, requires prompt and standardized responses to customer issues. The enrollment criteria we have outlined is only the first step in achieving the aforementioned goals.

- California C-20 License (Silver or Gold Tier or DCV/EVC) or C-10 License (DCV/EVC Install Only)
- Minimum of 5 Years in business under current license. RME or RMO number changes okay.
- Minimum of two dedicated service technicians, both must be CQM trained.
- DNB financial score of 70+ but will review based on total years in business.
- No outstanding license issues related to customer complaints or CSLB investigations.
- Must have offices or service vehicles within 100 miles of customer's location.
- Journeyman Technicians must have a minimum of 5 years of service experience related to maintaining HVAC equipment or environmental control systems.
- Journeyman Technicians must have a Universal EPA certification for handling refrigerant.
- Apprentices must have completed an HVAC trade and technical course or be currently enrolled in a federal or state recognized (California) apprenticeship program.
- All technicians must pass a background check (performed by contractor). Contractor must affirm yearly that technicians have passed a background check.
- Direct customer references will be reviewed by PG&E and HON for any contractor who may not meet one or more of the enrollment criteria. We will validate all references with customers.
- PG&E and HON reserve the right to deny participation of any contractor or technician in this program based on customer complaints, prior poor participation in PG&E programs, or concern for contractors/technicians ability to meet program requirements or objectives.

## 11.2. *Technician Enrollment Criteria*

All participating technicians are required to be either a Journeyman with 5+ years of service experience or apprentices (monitored by a qualifying technician) currently enrolled in or having completed a federal or state (state of California) apprenticeship training program. As the direct driver of work performed under the program, each technicians' performance is individually monitored. Failure to perform work, continuously, to the program standard will result in disqualifying the technician from performing work under the program. The following are requirements of the technicians participating in this program. PG&E and HON reserve the right to modify any of these requirements at any time, without prior written notification to the contractor or technician.

- Technician with a minimum 5 years of service experience on HVAC equipment. Installation or "Tin Work" does not count as service experience. (Requirements for monitoring technician, not apprentice)
- Technician must pass the HVAC Optimization training with a score of 80% or higher.
- Technician must be EPA Universal Certified for handling refrigerant.
- Technician must pass a background check before entering program participation.
- Technician must own, or have access to, all program required tools.
- Technician must have taken all OSHA required safety classes for performing work in HVAC maintenance.

### *11.2.1. Technician Eligibility and Background Checks*

- Ensure all Technicians participating in the Program meet the Program's Technician Eligibility Criteria, as specified in the CPA and this guide.
- Keep an updated list of enrolled employees in the Program and identify those who are performing HVAC Optimization tasks and/or performing sales and operational work.
- Ensure that contractor employees who perform work at customer sites are in compliance with the background check throughout the contractor's participation in the PG&E HVAC Optimization Program and shall submit a Background Investigation Policy Compliance Certificate, located in the Appendix C, by January 31 of each calendar year.
- Keep at least 2 program approved technicians enrolled in the Program at all times.

## 11.3. *Contractor Program Status Information*

To maintain active status in the program and be listed as a participating contractor on the website and on direct marketing materials the following conditions must be met:

- Current C-20/C10 (C-10 for DCV/EVC ONLY) license with up to date bonding and insurance. (Individual coverage amounts etc. are covered in the CPA.).
- Meet all requirements outlined in the Contractors Participation Agreement, the Quality Maintenance Addendum, the Customer Incentive Application and the Contractor Incentive Application.

- Maintain license in good standing with the Contractors State License Board (CSLB).
- Have at least two participating technicians in HVAC Optimization at all times.
- Enroll no less than 25 units per quarter.
- Maintain a pass rate of 80% of all serviced units each year. Dropping below 80% pass rate will subject contractor to additional monitoring and potential program disqualification.
- Have no more than two customer complaints per year. Every legitimate* customer complaint must be resolved to Customer, PG&E and HON satisfaction within two weeks of initial complaint. NOTE: Legitimate*, refers to customer complaints regarding, quality, safety, program requirements, or contractual obligations based on agreement with customer, etc. Legitimate* does not apply to free service, refusal to pay for previous service or any situation where the expectation of the customer would drive service without payment for additional work. "Additional work" is clarified as any work not specified by the program maintenance requirements. Repairs are an example of additional work not covered by maintenance.
- Create and monitor all sites data using the program portal and keep all sites current.
- Complete and submit for processing all program paperwork for customers and contractor.
- The program reserves the right to disqualify participation in the program for any item believed to create a negative representation of the program, not just the items listed above. Negative representation of any aspect of the program to customers or other contractors may result in disqualification from the program.
- Program participation is voluntary at any time customer or contractor may withdraw from the program.

## 11.4. *Contractor Participation Status*

The status of the Contractor will be determined by HON and PG&E and will affect the payment of incentives to the Contractor.

| Status | Description |
|---|---|
| ***Provisional*** | *All participating Contractors/Technicians during their first three enrollments for program participation. Contractors/Technicians who have been placed on Monitored Status may be moved back to this stage if the program determines a need to review their participation.* |
| ***Full*** | *Contractors/Technicians that have successfully completed at least three jobs, met program guidelines and provided quality services.* |

| Status | Description |
|---|---|
| ***Monitored*** | *Contractors/Technicians who have been found to be in violation of program guidelines (e.g. failure to comply with eligibility and background checks), ethical standards, or have failed inspections. Incentives will not be paid until HON determines that the problem has been resolved.* |
| ***Hold*** | *Contractors/Technicians will be placed on Hold if it is determined their participation in the program needs to be reviewed. Review may result in either movement to Provisional, Monitored, or Disqualified status.* |
| ***Disqualified*** | *Contractors/Technicians removed from program either by their own request or as a result of failure to meet program requirements.* |

## 11.5. *Contractor Process*

- Eligibility – Determined by Program Staff to ensure Contractor meets Program Requirements
- Enrollment of Contractor – Performed by Program Staff
- Approval (by PG&E) – Approval by PG&E Program Manager
- Technician Training (1 day) – Conducted by Q/C Supervisor for Program; may be on first enrolled site or at a location provided by Program, at program discretion.
- Sales and Operations Training (1 day) – Conducted by Sales Manager for Program and by Contractor Liaison (Operations Training)
- Eligibility Check of First Customer (and all future customers) – Performed by Program
- Enrollment of First Customer – Contractor Staff
- Creation of Site Information in Portal – Contractor Staff
- Service of Site - Contractor Staff
- Creation of Service Data in Portal – Contractor Staff
- Submission of all program paperwork – Contractor Staff
- Q/C of First Site - Q/C Implementer (Proctor Engineering)
- Payment – Performed by Program Staff

## 11.6. *Technician Participation Requirements*

Each participating technician is critical to the overall performance of the program. Technicians perform the direct work under the program and drive both customer and contractor satisfaction

for participation in the program. Below is a detailed list of participation requirements for technicians, this may be modified at any time by PG&E or HON without prior written notification.

- Technicians own all reports in their name, any failures related to any work under the technicians name will be recorded against the technician. Multiple failures will result in retraining requirements and potential disqualification from participation in the program.
- Technicians must score 80% or higher on the HVAC Optimization training exam.
- Technicians must maintain a pass rate of 80% or higher on all service inspections based on a quarterly review of inspections.
- Technicians must meet all requirements outlined in this guide as well as the Technician Technical Manual provided during training.
- Technicians who drop below an 80% pass rate on inspections, who fail three consecutive inspections or who have more than two customer complaints, will be required to retrain for program participation. Any technical failure within six months of retraining will result in the disqualification of that technician from program participation for one year.
- Three consecutive inspection failures is determined by either:
    A. Failing three different tasks on the same unit or same roof.
    B. Failing the same task on three different customers.
    C. Failing any task, after notification of failure, three different times.
- The program reserves the right to disqualify technician participation in the program for any item believed to create a negative representation of the program or anything that puts the program, the customer or the technician at risk. Safety violations would be an example of customer or technician risk.

## 11.7. *Contractor Conduct and Public Relations (PG&E Requirements)*

1. An adult (18 and over) must be present when Contractor is in the Customer's facility. If an adult is initially present at a Customer's facility but leaves after Contractor has begun Work, Contractor shall stop Work immediately and vacate the facility.

2. Contractor shall respect the rights of the general public and PG&E Customers, at all times. Contractor shall strive, at all times, to be courteous to all PG&E Customers affected by the Work performed under this program, as well as all members of the general public. The Contractor shall ensure that the conduct of its employees is of a professional manner, and shall not allow its employees to smoke, play radios, use profanity, use abusive language, or display gestures which could be interpreted by the PG&E Customer of the general public as offensive or obscene.

3. Conflicts between the general public and PG&E Customers and the Contractor will not be tolerated. If, in the opinion of the PG&E Program Manager, the behavior of the Contractor or its employees is determined to be unsatisfactory or unfit, Contractor or Contractor's Representative shall remove immediately said employee from performing any Work under

this program. It is understood that this provision in no way requires the Contractor to terminate the employment of any employee replaced under the terms of this section. Nor, by the terms of this section, does PG&E expressly or implicitly endorse or approve the termination of employment with the Contractor of any employee replaced under the terms of this section.

4. Due to the ongoing business relationship between PG&E and its Customers, Contractor shall perform all Work in a timely, conscientious and businesslike fashion with a minimum of delays and disputes.

5. Cleaning Up: With respect to its operation, Contractor shall maintain all worksites and related structures, equipment, and facilities in a clean, orderly condition during progress of the Work, and clean up debris to the reasonable satisfaction of PG&E and Customer. Any unused or leftover materials, garbage and debris shall be promptly removed from Customer's site by Contractor and disposed of at Contractor's expense.

## 11.8. *Customer Issues Resolution Process*

Customers and contractors can notify the program of any concerns via email at pgehvacoptimization@honeywell.com. If the complaint relates to program delivery issues in the field, the Contractor must take the following steps:

- Notify HON immediately. HON will gather information and address the issue within 24 hours (during normal business hours M-F 8AM – 5PM).
- Resolve all reasonable Customer complaints within 5 business days after notification by Customer.
- Consult with the HON Program Manager as needed to identify an initial resolution plan within 5 business days.

### *11.8.1. Complaint Resolution Disposition*

- In the event that a solution cannot be solved within 5 business days, the HON Program Manager will notify the PG&E Program Manager and, concurrently, will determine the appropriate steps required for dispute resolution.
- A Customer complaint is considered resolved when Contractor has decided on a reasonable course of action, that action has been communicated to HON, and Customer and Contractor are in agreement about the course of action.
- HON Program Manager will involve PG&E managers if there is any concern that the issue could negatively reflect on PG&E's reputation.
- Neither the implementer (HON) or PG&E can alter the conditions an agreement between the contractor and customer. The program can only determine the agreement does not meet program requirements and disqualify program participation for that reason. It is expected that all parties thoroughly review the agreement details before signing. Agreements that do not meet program requirements can cause disqualification from program participation at any time.

# 12. Contractor and Technician Training

The following table provides an overview of the training sessions offered by the Program.

| Course Title and Description | Contractor Attendees | Approx. Duration | Timing | Prerequisites |
|---|---|---|---|---|
| **Sales Training:**<br>• Overview of Standard 180-based Service Agreements; what they are and how they differ from typical Service Agreements.<br>• Value proposition for contractor and customer.<br>• Sales Cycle<br>• How to use the incentive calculators<br>• How to conduct the initial inventory.<br>• How to use the Program Portal | Management, Sales Staff, Technicians | 2 hours | Within 2 weeks of Contractor enrollment confirmation. | ✓ Approved Contractor Participation Agreement. |
| **Operations Training**<br>• Administrative requirements to qualify for incentives.<br>• Program Documentation<br>• Scheduling: expected time to complete tasks.<br>• How to use the Program Portal.<br>• Program Reports generated in the Portal. | Operational Staff / Technicians | 2 hours | Within 2 weeks of Contractor enrollment confirmation. | |
| **Technician Training**<br><br>**Stockton PG&E Energy Training Center**<br><br><u>3 hours (Classroom)</u><br>• Overview of Standard 180 and Program Requirements.<br><br><u>5 Hours (Rooftop)</u><br>• Using skills and tools required to complete the inventory, inspection, and maintenance tasks in Standard 180.<br>• Practice using the program forms. | Eligible Technicians / Any Interested Party<br><br>(Rooftop training can accommodate no more than 2 technicians per trainer.) | 1 Eight hour day | Within 2 weeks of the Contractor obtaining their first approved Customer Service Agreement. | ✓ Approved Customer Service Agreement<br>✓ Customer allows training to take place on their rooftop.<br>✓ Customer's initial inventory has been completed<br><br>✓ Technician Toolkit |

## 12.1. *Technician Training Details*

*The training location will be defined between Contractor and HON. The program prefers to use a PG&E Energy Training Center for training but contractor location and other factors may allow training to occur in another location mutually acceptable to the contractor and HON. In the event an alternate training location is used, the Contractor must be able to provide access to an eligible unit equipped with a functional economizer for the technician training, as well as a conference room where the classroom portion of the training can occur at the same location. Technicians must provide visual proof of the Universal Refrigeration Certification which will be checked on training day sign in. Technicians may not be "on-call" during training. Any interruption of the technician from the training will result in the technician needing to return to retrain at a later date.*

*Technicians who successfully complete the training and demonstrate competency in performing the work will be approved for participation in the program. Technicians who do not demonstrate proficiency with the tools for the program or do not pass the written exam will need to return at a later date to retrain. In the event that a Technician is unable to successfully complete the required training, they will not be allowed to service program enrolled equipment.*

- Contractor will be provided with a Technician Training Checklist to schedule technicians for training. The checklist must be completed and returned to HON to set a training date for technicians.
- Any technician not covered by the checklist or missing any of the required items on the checklist may attend training but they will not receive credit for the training.
- Technician must fully understand how to use all tools prior to training as HON does not provide training on using tools.
- All trained technicians must have a completed background check prior to performing work under the program. Technicians who are not listed as checked in the contractors participation agreement (CPA) should arrive at training with the required background check certification document found in the CPA and signed by the contractor or it should be sent to HON prior to the training. The background certification document can be found in the Appendices of this participation guide.

# 13. Minimum Performance Level "Baseline" Service

The minimum performance level or baseline service is the condition of the customers enrolled equipment after all services and repairs have been completed to program requirements AND that data has been entered into the program portal. Any unit that does not meet program requirements will be made ineligible for incentives under the program. The program does not require all units on any building or from any customer to be made eligible in order for the customer or building to participate. Where cost to repair exceeds value of maintenance services, it is recommended to remove the unit from participation and recommend replacement of the unit to the customer. Any measure listed as optional is not part of the baseline service and may be done at any time during customer participation in the program. Refrigeration service and Gas/Heat services should be performed during appropriate seasons and will not affect baseline of equipment.

## 13.1. *Process Overview*

The process defined below is an example. All contractors vary on how they decide to service equipment under the program. Customer input is required and many factors contribute to the service plan. When, where and how data is collected and work is performed is up to the individual contractor as long as the program requirements are met.

| Service Steps |
|---|
| **1)** Technician completes Unit Inventory and Initial service using the Field Inspection Form or the Program Portal, notes repairs and treatments required to bring unit up to Minimum Performance Level "baseline" (1.5 hours per single stage unit and more than 2.5 hours for two or more stage units has been identified as an average time for service). |
| **2)** Contractor informs customer of the cost of repairs, what is covered by the program and what is not. Contractor may have a limited time to complete service, so the customer has two weeks to approve repairs before a unit will be marked ineligible. The customer may decide not to bring some units to baseline. The contractor must update the unit eligibility status using the Program Portal and inform customer of a reduction in incentives. |
| **3)** Technicians sticker the units, applying both the large program stickers and the small t-stat sticker. Contractor completes EE Tasks and repairs approved by the Customer, to bring the units to baseline and enters the inspections in the Program Portal**.**<br>**Required Stickers:** Unit Sticker, Thermostat Sticker. |
| **4) Contractor** attaches the Contractor Incentive Application to the Program Portal. |
| **5) QC Implementer** reviews serviced site and performs quality control and passes site. |
| **6)** HON verifies and requests payment for qualifying EE Task Incentives. Upon approval, PG&E sends incentive payment to contractor within 6-8 weeks. |

## 13.1. *Field Inspection Form Example (Quarterly)*

New Quarterly Field Inspection Form

| | | | | | |
|---|---|---|---|---|---|
| Technician Name | AUTOPOPULATED DATA | Inspection Date | | | PG&E Commercial Quality Maintenance Program |
| Account Name | | Unit Name | | | Quarterly Inspection Form |
| Building Name | | Unit Sticker | | | PRINT FORM WITH NARROW MARGINS (.25") NO HEADER / NO FOOTE |
| Unit Type | Package Split HP Package HP Split | Age of Unit | | | ENTER KEY MOVES YOU DOWN TO NEXT QUESTION |
| # Comp. / Stages | | Tonnage | | | TAB KEY MOVES YOU ACROSS TO NEXT QUESTION/ANSWER |
| Economizer Y/N | | Voltage | | | |
| Does Unit Meet Standard 180 Requirements? | | Yes | | No | |
| Since unit does not meet requirements what task(s) were not at standard? | | Panels (Comment) | | | |
| | | Coils (Comment) | | | |
| | | VFD (Comment) | | | |
| | | Ductwork / Piping (Comment) | | | |
| | | Filters and Housing (Comment) | | | |
| | | Drain Pan/ P-Trap (Comment) | | | |
| | | Control Box (Comment) | | | |
| | | Bearings (Comment) | | | |
| | | Blower Compartment (Comment) | | | |
| | | Gas / Heat (Comment) | | | |
| | | Thermostat (Comment) | | | |
| | | Control System (Comment) | | | |
| | | Economizer (Comment) | | | |
| | | Refrigerant System (Comment) | | | |
| Repairs List | Itemized list of all repairs required to bring unit to Standard 180. | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Was unit repaired to meet Standard 180 Requirements? | | Yes | | No | |

*Baseline form is more extensive and has specific questions related to individual tasks to determine eligibility for incentives. The Baseline form is only used on the first inspection for the unit.

Please use the Field Inspection form to record repairs for later entry into the Program Portal (such as when no connection to the internet is available). The field inspection form matches the Program Portal task list. It is HIGHLY recommended to use direct data entry into the Program Portal wherever possible, as the field inspection form only stores data that must then be uploaded into the portal at a later date, creating additional labor costs.

# 14. Technician Maintenance Guidelines

*Contractor must discuss any repairs not fully covered by the Program with the Customer prior to bringing a unit to the Minimum Performance Level "baseline". Repairs are listed for each unit under the repairs task for that unit.* The Program Participation Guide (this document) is not the technical reference for this program. The Technician Technical Manual and Training provide detailed requirements for each task covered by the program. The descriptions below are general in nature and are only intended to provide a basic description of tasks requirements. All services should be performed to manufacturer requirements for maintenance at a minimum, with additional requirements as outlined in technical training.

## 14.1. *Coil Cleaning*

Table 5-22 for direct expansion cooling coil, heating coil and air cooled condenser coil shall be maintained in good working order, to maximize the energy efficiency of the heating and cooling system of the rooftop unit. The evaporator coil shall be cleaned with the appropriate cleaning

agent, as needed, and shall be free of dirt, dust and debris. Check for evidence of build-up, fouling or scaling on all heat exchanger surfaces and clean as needed. The evaporator and condenser coil fins shall be restored and/or straightened, as necessary. If small sections of fins are damaged, they may be ignored as long as their total area is less than 15% of the total coil surface. It is recommended to repair damaged fins for optimal coil performance.

*Check if any of the filters need to be replaced. The date (month, day and year) and the technician's initials must be written on the replacement filter* ***at each inspection.***

## 14.2. *Fan Maintenance*

The supply fan or blower shall be maintained to ensure adequate air flow. The fan blades or blower wheel shall be cleaned. All blades shall be free of deformation and attached securely. The belt should be replaced, if worn; and the tension shall be adjusted to prevent slippage and excessive wear. The motor and fan sheaves should be securely mounted and aligned to prevent wobbling. Fan should rotate in the proper direction. Finally, the motor-fan assembly should operate without excessive vibration and noise.

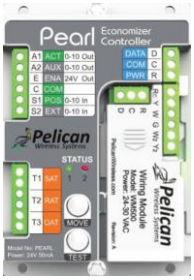
## 14.3. *Refrigerant System Test and Service*

The refrigerant system shall be tested for proper operation and charge based on manufacturer requirements. Technician should verify existing conditions and required adjustments based on the specific unit being serviced. An adjustment of refrigerant charge and inspection for cause of required adjustment, should be performed if the charge is not within ±10% of the manufacturer's specification.

## 14.4. *Selection of Economizer Controller Manufacturers:*

If there is an economizer that is not on this list below and which meets the program requirements, HON will need the make, model number and a copy of the spec sheet to verify before it can be added to this list. Catalyst is also an acceptable economizer controller for the program.

Spec sheets can be found on the equipment manufacturers' websites.




Pelican Wireless

Honeywell JADE

Belimo ZIP

## 14.5. *Economizer Functional Test and Service*

The economizer (if present) shall be tested to ensure that free cooling is provided when ambient conditions allow. The functional test must test the entire system to make sure that each component is operational. In addition, the calibration of the outside air sensor shall be checked. If necessary, small adjustments shall be made to the economizer linkages so that the maximum outside air flow can be delivered and the minimum outside air flow meets ventilation requirements.

If the economizer wiring does not currently support two stages of cooling with one dedicated to the economizer, add a multiplex device or physical wire to enable 2-stage cooling.

The motor, linkage, and dampers must be adjusted to fully open the dampers when economizing and to close the dampers to a position that allows the minimum design requirement of outside air for proper ventilation. Upon motor failure or loss of power, the motor must have a return spring that will automatically close the damper to minimum position.

When an economizer is non-functional due to inoperable dampers, linkages, or miscellaneous components, or if the economizer is not an advanced digital controller, these components shall be repaired or replaced as necessary.

### *14.5.1. Integrate Economizer Wiring*

If the economizer control does not currently support two stages of cooling, with one dedicated to the economizer, add a multiplex device or physical wire to enable 2-stage cooling, where the first stage is the economizer (outside air) and the second stage is mechanical cooling.

### *14.5.2. Replace the Economizer Damper Motor*

When a new economizer damper motor is installed, it must be appropriate to the make and manufacturer of the HVAC unit and the economizer controller and dampers. The motor, linkage, and dampers must be adjusted to fully open the dampers when economizing, and to close the dampers to a position that allows the minimum design requirement of outside air for proper ventilation. Upon motor failure or loss of power, the motor must have a return spring that will automatically close the damper to minimum position.

### *14.5.3. Replace Economizer Controller / Sensor*

When a non-functioning economizer is to be made functional, it must have the outdoor high limit sensor (dry bulb transmitter, snap disc, or a non-functional enthalpy sensor) replaced with an outside capillary style remote bulb thermostat sensor. If the enthalpy sensor is functioning, it can remain on the economizer. A nonfunctioning enthalpy control can only be replaced with a dry bulb sensor. All snap discs must be replaced with a dry bulb sensor. In addition, the economizer high limit changeover set-point controller should be set at 70º F.

### 14.5.4. Renovate Linkage

The linkage of the economizer assembly must be free moving and cleaned of any dirt or debris that could potentially interfere with operation. Linkage must be checked to ensure full operation open and closed without binding. Any binding must be either adjusted/lubricated away or the linkage must be replaced.

### 14.5.5. Airflow Economizer

The economizer portion of the unit should be sealed, as possible, to prevent outside air from passing through portions of the economizer not designed for airflow. Spacing between the economizer assembly and the unit should be properly sealed. Damper louvers that do not properly seal the damper should be replaced or repaired to allow only the amount of air designed to pass through the minimum position setting.

## 14.6. Programmable Thermostat Upgrade plus Economizer Adjustment

***Adjust Temperature Set Points and Schedule***

If existing thermostat doesn't meet requirements listed below, then replacement is required to qualify the unit for the HVAC Optimization program. The new programmable thermostat must have two terminals for cooling, Y and Y1; and it must send a separate cooling control signal for each stage of cooling, where the first stage is dedicated to the economizer.

- The new programmable thermostat must be a 7-day programmable, Title 24 compliant, commercial thermostat with a separate fan control and setback control; and be capable of controlling the supply fan continuously, during occupied mode, and intermittently with a call for heat or cool during unoccupied (setback) mode
- If there is an economizer on the HVAC unit, then the thermostat must have two-stages of cooling with the first stage dedicated to the economizer. In addition, there must be two wires — one for each stage of cooling — or there must be a multiplexer installed to allow one wire to carry two different control signals, such that the signal from the thermostat for the first stage of cooling is on a separate wire to the economizer, and the second stage cooling signal from the thermostat is on another wire, to allow the air conditioning compressor to provide additional cooling.
- Exceptions: If the HVAC system has a heat pump or if it does not have an economizer, then the contractor must install a new 7-day programmable thermostat with setback capability that meets the guidelines in the table below.
- Occupancy schedules shall be verified and programmed accurately. For EMS set points, provide printed documentation for HON, as requested.
- Supply fan mode shall be set to "Auto" during occupied periods and "Auto" or "Intermittent" during unoccupied periods. For EMS set points, provide printed documentation for HON, as requested.

- The heating and cooling set points during occupied periods should be 70°F and 75°F, respectfully. The heating and cooling set points during unoccupied periods should be 60°F and 85°F, respectfully. Settings must be agreed upon, beforehand, with the owner or owner's representative, to ensure there are not special loads, equipment or uses of the conditioned space. For EMS set points, provide printed documentation to HON, as requested.

# 15. Thermostat Requirements

| Thermostat Requirements | |
|---|---|
| **1 -- No economizer, no heat pump** | **2 -- Economizer, no heat pump** |
| 1. 7-day programming capability<br>2. Heat/cool /auto changeover<br>3. Auto and On fan setting<br>4. 24 vac hardwired w/ or w/o battery<br>5. Heat/cool application<br>6. No 24-hour hold<br>7. 3-hour override acceptable | 1. 7-day programming capability<br>2. Heat/cool / auto changeover<br>3. Auto and On fan setting<br>4. 24 vac hardwired w/ or w/o battery<br>5. Two-stage cool<br>6. Heat/cool application<br>7. No 24-hour hold<br>8. 3-hour override acceptable |
| **3 -- No economizer, heat pump** | **4 -- Economizer and heat pump** |
| 1. 7-day programming capability<br>2. Heat/cool /auto changeover<br>3. Auto and On fan setting<br>4. 24 vac hardwired w/ or w/o battery<br>5. Two-stage heat<br>6. Heat/cool /heat pump application<br>7. No 24-hour hold<br>8. 3-hour override acceptable | 1. 7-day programming capability<br>2. Heat/cool /auto changeover<br>3. Auto and On fan setting<br>4. 24 vac hardwired w/ or w/o battery<br>5. Two-stage heat & two-stage cool<br>6. Heat/cool /heat pump application<br>7. No 24-hour hold<br>8. 3-hour override acceptable |

## 15.1. *Selection of Thermostat Manufacturers:*

Ensure any selected thermostat meets the requirements listed above.

Spec sheets can be found on the equipment manufacturers' websites.

Braeburn LUXPRO

# 16. Quality Assurance and Quality Control (QA/QC)

The program uses a third party Q/C Implementer (Proctor Engineering) to confirm each customer's maintenance services meet the program requirements. QC will be random based on the needs of the program, the performance of the contractor/technician and the minimum inspection requirements of the program. All QC is based upon program requirements as outlined in this manual, the Contractor Participation Agreement, the Technician Training and Standard 180 requirements.

## 16.1. *Portal QC*

The portal will contain the results of all Quality Assurance inspections. It will contain at a minimum the task that passed or failed inspection and notes on the specific failure identified. Please note that any item not identified as a failure at the time of inspection does not mean that item is eliminated from potential failure at a later date. Any inspection requiring the contractor to review and adjust the task will be noted in the portal on the dashboard. The contractor will be provided the opportunity to contest any inspection results. A contested result will be reviewed by the QC Implementer, Honeywell and PG&E. The contractor will be asked at times to make corrections and then upload a picture of those corrections to the portal. In some cases a failure may require another in person inspection by the implementer. The portal does not accept video and will only store pictures or other documents.

## 16.2. *Q/C Status Descriptions*

There are five types of Q/C status in this program:

- Q/C Pass – No corrections needed at program standard.
- Q/C Review – An issue has been found that requires the contractor to make changes to the service performed or the data in the portal.
- Contested – Contractor has reviewed an item and has determined a mistake has been made in the evaluation provided by the inspector.
- Admin Fail – An item has failed inspection that is not related to the performance of the unit. The contractor may make the correction on the next scheduled inspection of the site.
- Waived – Either a task, a unit, a building or a customer has been passed over for inspection. No action is required by the contractor / technician.

## 16.3. *Q/C Correction*

Please note the following program requirements for corrections required by QC;

- All failures will be attributed to the technician of record at the time of the failure. We will not move failures to other technicians after the Q/C is performed.
- Contractor and Technician are required to maintain an 80% pass rate for all performed inspections. Specifics on the requirements for technician and contractor are contained in the contractor and technician sections of this guide.
- The contractor has two weeks from Q/C update in portal (and email notification) to make correction and update in portal. Any item not updated in portal is considered not done.
- Any item requiring a Customer authorization for repair, in other words not maintenance but repair, the contractor has 30 days from notification to perform repair. Customer gets two weeks to make a decision and contractor has two weeks to make the repair.
- Any item not repaired will automatically move unit to ineligible and customer incentives will be updated for missing unit.
- A contested Q/C failure does not stop the clock on the available time to complete a correction. It is not expected to take more than a couple days to resolve a contested Q/C item.
- ***Customer will be notified of all Q/C failures that result in a unit being removed from the program. The customer will be told specifically why the unit was removed from participation.*** PG&E, Honeywell and Proctor Engineering are not responsible for dealing with the customer in any way related to resolving disputes about costs of repairs. We will confirm, based on program requirements whether an item is considered by the program to be a repair or a maintenance item. Repair and Maintenance are defined in this guide.

## 16.4. *Customer Notification of Q/C Results*

Customer will not be notified of any Q/C results as long as the items are brought to program requirements. The intent of this process is to insure only items that have been confirmed as

non-compliant are addressed while still providing notification to the customer should an issue arise that has the potential to disqualify units from continued participation in the program.

## 16.5. *Q/C Interaction with Customer*

Q/C will not, under any circumstances, discuss the quality of any work performed with the customer for any reason. Q/C will not discuss the appropriate value for any service or repair required or the quality of any particular part used in maintenance or repair. Should a customer request advice on any subject the Q/C implementer will refer them to the contractor. Q/C cannot stop the customer from escorting or viewing the inspector during the performance of the inspection. Customer will not be provided a copy of the Q/C inspectors report unless that task has passed the required correction date. Q/C may not contact the contractor prior to performing an inspection of the site for the program, they have the ability to contact the customer directly to schedule the visit. Should a customer refuse to allow the Q/C implementer to inspect the site the Program Implementer may choose to disqualify the entire site from participation in the program. Failure to provide access to a site at a confirmed pre-scheduled time is equivalent to refusing to allow access to the site. The terms for disqualification are outlined in the Terms and Conditions in the Customer Incentive Application.

## 16.6. *Q/C Interaction with the Contractor*

Q/C may request contractor presence prior to scheduling an inspection. Typically this request is for the benefit of the contractor or technician being inspected. Contractor and technician is not required to perform an inspection with the Q/C implementer. Contractors may request to be notified of all inspection prior to scheduling (the portal will identify sites that have been selected for inspection), but the Q/C implementer is not required to provide this notification. At times the Q/C implementer may inspect a site prior to baseline as part of PG&E data collection efforts.

## 16.7. *Q/C Dispute Resolution Process*

The following defines the steps to dispute the findings of any Q/C Inspection on any site:

1. Note the task as contested and provide the reason for contesting the inspection. Your notes will automatically be shared with the Q/C implementer.
2. Notify your contractor liaison of the Account, Building, Unit and Inspection being contested. You can use the portal hyperlink in an email to save time.
3. PG&E, Honeywell and the Q/C Implementer will review the contested task and PG&E will make the final determination as to the status of the inspection.
4. Contractor will be notified via email and the portal will be updated with the results of the review.
5. Contractor will NOT be granted additional time to perform corrections on contested inspections.

## 16.8. *Q/C Implementer Contact Information*

Dan DellOsso Program Manager

daniel.dellosso@proctoreng.com

# 17. Program on the Web

In our ongoing efforts to improve the customer and contractor experience, the Program has created a web based program portal that will store all data collected by the Program as well as inform Contractor and Customer of key metrics to facilitate their participation in the Program. The portal is based on 5 years of data collected from program participants and should make participants use much easier and more informative. The Program has two separate websites for program participation. The information website located at www.pgehvacoptimization.com and the Program Portal which can be accessed through the above website. Both websites are accessible via any web-enabled mobile device, tablet, laptop or desktop computer.

## 17.1. *Contractor Access:*

The portal application will guide Contractor personnel, step-by-step, through protocols for:

- Creating a customer account.
- Creating a customer building.
- Creating an inventory of HVAC units.
- Creating a maintenance plan for eligible units.
- Conducting inspection and maintenance tasks listed in Table 5-22 of Standard 180.
- Recording key HVAC baseline conditions that help determine eligibility for incentives and enable net energy savings to be calculated for adopted measures
- Identifying energy efficiency treatments that improve the efficiency and capacity of the units
- Recording subsequent inspection findings.
- Recording information on work completed.
- Identifying incentives earned for units enrolled and serviced.
- Outlining when services should be performed and when incentives will be received.

## 17.2. *Customer Access:*

The portal will provide the customer with important information to keep them current with the maintenance and repair of the equipment as well as the status of any incentive payments or estimated energy savings. Items available to the customer include:

- Complete list of all Buildings, Units and Inspections performed on each site.
- The maintenance plan for the enrolled buildings.

- A list of all incentives and energy savings achieved through participation.

## 17.3. *User Access*

HON will provide the Contractor access to the Program Portal upon approval for program participation as well as issue the login information for customer access.

*Contractors and Customers are responsible to immediately notifying HON via email (pgehvacoptimization@honeywell.com) for each user associated with their company that should have their existing login account terminated. The email must contain the individuals name and clear instructions to close the individual's account. The subject line of the email must include the term, "LOGIN TERMINATION REQUEST".*

## 17.4. *Program Information Website*

New users will need to change your password in the Contractor Portal before being able to access the Web Application. The following steps outline the process for logging into the Contractor Portal and changing your password for the first time.

- Once you have your User Name and Default Password, go to the PG&E Commercial Quality Maintenance Program website (http://www.pgehvacoptimization.com and select "Contractors Portal" (see image below).

# 18. Program Portal (Compass)

The program has provided for customer and contractor use of the Program Portal. The purpose of this portal is to keep all parties informed of the following:

- Enrollment status of a Customer site
- Data entry location for all program data
- Complete inventory of all buildings and equipment enrolled
- Inspection status of Customer site
- Deemed energy savings for work performed
- Status of incentive payments

The intent of the portal is to be available at any time, for use by both contractor and customer, to help answer any questions they may have about the status of enrolled equipment. A separate portal user guide is available for customers and contractors. You will find a copy of this guide on the web at http://www.pgehvacoptimization.com. Please contact your Contractor Liaison for any questions related to the guide or for additional training.

# 19. Reports for Contractors and Customers

The Program Portal will be able to generate the following reports:

- **Unit Inventory**: Lists the eligible units to be covered under the QM 180 Service Agreement, QM Addendum, and Maintenance Plan.
- **Maintenance Plan**: Provides an overview of the Maintenance Plan questions and answers as set by the customer and contractor for a specific building.
- **Inspections Overview**: Provides an overview of what inspections have been performed, over time, for all units at a building.
- **Inspections Detail**: Provides inspection findings for a unit.
- **Incentives Detail:** A report on Customer and Contractor incentives.

# 20. Frequent Asked Questions (FAQs)

Question: Do I need to read the FAQs?

Answer: Only if you want to save time and money.

## 20.1. *Sales & Operations Related FAQs:*

**Question:** When do I need to submit my paperwork (or attach the paperwork to the portal) and notify Honeywell Smart Energy (HON)?

**Answer:** You must attach your paperwork as soon as it is signed and before you begin your baseline inspections. Failure to attach your paperwork will delay processing of your incentives.

**Question:** Can the contractor claim both customer and contractor incentives?

**Answer:** It is expected that over three years, you will receive the value of the customers' incentives plus at least an additional 20% for just the maintenance agreement. Customer incentives must go to customer, but the customer may then redirect those payments to you.

**Question:** What is the 20% over the customer incentives requirement?

**Answer:** Your maintenance agreement price with the customer must be more than 20% above the total incentives available to the customer. The policy is designed to ensure the customer has some investment in the maintenance of their equipment. The program was designed as an incentive program to encourage participation, to show the value of the work performed. "Zero Dollar" contracts do not show value.

**Question:** Can I discount my services to the customer beyond the PG&E incentives?

**Answer:** You are free to price your repairs and other services as you would, regardless of program participation. You may not "discount" your service agreement for maintenance under this program below the 20% payment requirement. If your agreement with your customer does not result in the customer paying for at least 20% of the maintenance agreement, the agreement will not be approved by PG&E.

**Question:** Do repairs count towards the cost of the maintenance agreement?

**Answer:** No, repairs are not included in the maintenance agreement calculation. Under most maintenance plans, the maintenance plan is determined as a set cost based upon visual inspection of units. The repairs are done as T&M (time and material) above the cost of the maintenance plan.

**Question:** Should I use the incentive dollars I receive to discount the cost of the maintenance agreement?

**Answer:** No, incentives are for repairs not for maintenance plan cost. Your incentives will vary depending on the final determination of repairs required. You may discount your repairs based on incentives you are eligible to receive, but do not ever include them in the price for the maintenance agreement.

**Question:** What paperwork is required to process a customer and contractor incentive application?

**Answer:** Your service agreement, the Customer Incentive Application, the Addendum (with Effective date on first page), the Contractor Incentive Application.

**Question:** Customer or another party provided me with a complete list of all units and required information to complete the Customer Incentive Application, is it okay to use this information?

**Answer:** No, contractor is incentivized to perform their own visual inspection of the units to obtain this information and contractor is responsible for the accuracy of that information. Using another party's representation will result in contractor being held liable for all mistakes.

**Question:** Customer would like some of the requirements, wording of the program documents changed, is this possible?

**Answer:** No, the program documents are identical for all contractors and customers, no exceptions will be made for either.

**Question:** I have seen an AirCare+ sticker on a site, is that site eligible for the program?

**Answer:** Possibly. If you see an AirCare+ sticker on a site, the entire site is ineligible UNTIL you receive written confirmation the site is eligible or the site will be eligible on a given date. In some cases individual units on a site may be eligible, so always verify all sites that have AirCare Plus stickers.

## 20.2. *Contractor Portal and Operations FAQs:*

**Question:** How many units can I have open and not completely treated in the Contractor Portal?

**Answer:** You may have 50 units per customer and 200 units total, open and not completely treated. You may sign agreements for any number of units but you are limited to enrolling 50 units, per customer, at a time. We are trying to ensure customer units are treated quickly and uniformly. Customers with a large number of units often result in contractors becoming overextended and delaying service. Please stagger your start dates to avoid this issue.

**Question:** How long do I have to complete all the tasks required to bring a unit to baseline?

**Answer:** The clock for the program starts as soon as you bring all of the building units to baseline. After baseline all quarterly inspections will be based off the baseline complete date. A quarterly inspection will be considered started once the first unit is completed.

**Question:** How do I know if I am done with all tasks required to bring a building to the baseline?

**Answer:** The program portal will tell you of any tasks that were either not completed or where a task answer may have been skipped.

**Question:** Can I get an extension because I was unable to complete a task on time.

**Answer:** We understand both contractor and customer issues can delay inspections. Please contact the program each time this issue occurs. We will review and provide clarifications, extensions are not guaranteed, especially if continually asked for, but we will work with both the customer and contractor.

**Question:** Do I need to answer all questions on the inspection questionnaire?

**Answer:** You are only required to answer questions that are part of the current inspection you are performing. The Baseline Inspection (First Inspection) requires you to answer all tasks except the Gas/Heat, Refrigeration System test and optional tasks. You are not required to answer questions that do not pertain to your current inspection UNLESS you have determined there is a failure and you need to make a correction. Please record all repairs made under the appropriate task.

## 20.3. *Technician Related FAQs:*

**Question:** What happens if a technician does not pass the test?

**Answer**: In the event that a Technician is unable to successfully complete the required training, they must retrain and retest with a passing score, or another technician must be used to perform work under the program.

**Question:** Do I need to complete all tasks that say suggested task?

**Answer:** No, suggested tasks are all tasks that are not listed as required. They are present in case, for some reason, you perform additional work on a site and you want credit for that work. Your operations team / service manager should indicate, on the Field Inspection Form, which tasks are required to be completed during each quarterly inspection.

**Question:** What is an optional task?

**Answer:** Optional tasks are upgrade tasks that may be done at any time during program participation. These tasks are designed to increase the efficiency of a unit that is already at baseline.

**Question:** Should I mark a task as complete when I am just waiting for a part?

**Answer:** Never close or submit an inspection that is incomplete.

**Question:** I have completed all but one task on the Baseline inspection. I need to wait until my next inspection to perform the incomplete task. Where do I enter the information when I complete the task I missed earlier?

**Answer:** Always enter the data for a missed task on the ORIGINAL inspection where that task was required to be performed. The first inspection is considered the baseline inspection, if you do not complete all tasks on this inspection like gas/heat or refrigeration system service then please do so at a later date and we will process the missed item for incentive payment later.

**Question:** Do I need to answer all questions on the inspection questionnaire?

**Answer:** You are only required to answer questions that are part of the current inspection you are performing. Please record all repairs made under the appropriate task.

**Question:** What is maintenance?

**Answer:** Maintenance is defined as any part of the equipment that can be cleaned, lubricated or adjusted to keep the performance of the equipment at optimal operating condition under the terms of the agreement. Maintenance is typically covered by the cost of the agreement between contractor and customer.

**Question:** What is a repair?

**Answer:** A repair is defined as anything that must be repaired, replaced or serviced more than the terms of the agreement. An example of a repair would be coil cleaning per program requirements at once every six months but the conditions require the coil to be cleaned more often that the agreement defined. Additional cleanings would be considered a repair not maintenance.

# 21. Appendices

## 21.1. *Appendix A - Contractor Team*

The following table describes the typical roles and functions of Contractor's employees who will play a role in the program. In many instances, multiple functions are performed by a single individual. As you can see by the extensive list below, the contractor has substantial responsibilities in providing the customer service under the Commercial HVAC Optimization Program.

| Role | Function |
|---|---|
| Management | • Understand what is required to provide maintenance service under the Program.<br>• Support the Program objectives related to raising awareness of the value of maintenance and the Program's energy efficiency measures.<br>• Help resolve Customer issues and complaints.<br>• Provide feedback and suggestions to promote continuous improvement in the Program design and delivery.<br>• Provide oversite on program progress and performance |
| Sales | • Market HVAC Optimization Service Agreements and energy efficiency measures to potential customers.<br>• Conduct the initial inventory of HVAC equipment.<br>• Educate customers on the value of quality maintenance and energy efficiency measures.<br>• Sell the service agreement using incentives, return on investment and overall advantages of HVAC Optimization Maintenance.<br>• Negotiate terms of the HVAC Optimization Service Agreement and Maintenance Plan and obtain customer signatures. |
| Technician(s) | • Conduct inspection and maintenance tasks in accordance with the ACCA/ASHRAE/ANSI 180 Standard and this Participation Guide.<br>• Enter related data into the Program Portal (Compass).<br>• Provide excellent customer service. |

| | |
|---|---|
| Operations | • Maintain files of Program documents, such as agreements, incentive applications, and invoices.<br>• Input all Portal Data and be responsible for updating Program Portal with any site changes.<br>• Submit Customer and Contractor Incentive Applications.<br>• Track incentive payments as provided by Portal.<br>• Schedule inspection and maintenance work in accordance with the frequency requirements specified in the Maintenance Plan. |

## 21.2. *Appendix B - Other Program Players*

| Honeywell Smart Energy (HON) | The firm contracted by PG&E to implement the program |
|---|---|
| Sales Staff – Contractor Liaison | • Enroll and train eligible Contractors and provide ongoing mentoring.<br>• Verify quality of work completed under the Program, based on field inspections of a random sample.<br>• Review data submitted by Contractors on inspection findings and work completed for QA/QC purposes.<br>• Work with Contractors to resolve customer issues and disputes in a timely manner, in accordance with the dispute resolution process outlined in the Contractor Participation Agreement |
| Management Staff<br>Program Manager, Program Delivery Supervisor | • Manage the incentive budget and overall Program implementation budget.<br>• Assess risks and implement mitigation measures.<br>• Meet with PG&E to discuss Program progress. |
| Administrative Staff | • Review Program documents for completeness and verify accuracy, to ensure compliance with Program requirements. Examples include Contractor eligibility documentation and incentive applications.<br>• Maintain Program files on key documents.<br>• Help prepare Program reports for PG&E. |
| Evaluation Staff<br>Quality Control Field Supervisor | • Monitor progress and quality of service based on agreed upon metrics and report findings to Program Managers.<br>• Design, implement, and analyze Customer satisfaction surveys and Contractor surveys and report findings to PG&E.<br>• Participate in and/or facilitate continuous improvement efforts with stakeholders.<br>• Assess increased Customer awareness resulting from program marketing and participation. |

| PG&E | Investor-owned Utility that is sponsoring this program under the oversight of the California Public Utilities Commission |
|---|---|
| Program Manager | • Oversee HON and other third parties contracted to support the Program.<br>• Reviews and approves Customer and Contractor incentive payments. |
| Energy Solutions and Services (ES&S) Field Representatives | • Help participating Contractors market the Program to eligible customers (owners, managers, and tenants of buildings that receive electricity from PG&E). |
| Business Customer Service Center | • Answer questions from Customers about energy savings opportunities under the Program.<br>• Refers potential sales leads to the Program Implementer (HON). |
| Energy Training Center, Stockton | • Provides Advanced Technical Training. |
| Central Inspection Program (CIP)/Proctor Engineering Group (PEG) | • Verify work completed by Technicians based on a random sample. |
| CPUC | • PG&E may recommend that CPUC commission a “market effects” evaluation to assess the impacts of the program’s market transformation activities. This would require a market characterization study to establish baseline market conditions. |

# *Appendix C - **Background Investigation Policy***

**Compliance Certificate**

The undersigned, the _____ (title/position) of _____ (Contractor) hereby certifies to PG&E and Implementer as follows:

1. Contractor has an effective background investigation policy which checks an employee's criminal history as specified in the Contractor Participation Agreement.
2. I am the person with the authority and responsibility for implementing and administering the background investigation check on each employee.
3. Each Contractor employee that may perform any work on the property of a PG&E customer, under the PG&E Commercial HVAC Optimization Program, has undergone Contractor's background investigation.
4. The results of the background investigation check indicates that the following employees have not been convicted of any misdemeanors or felonies in the past 7 years:

_____ _____

_____ _____

_____ _____

**NOTE: Contractor shall provide Implementer with an updated Compliance Certificate for all employees that may perform work on customer property on or before January 31 of each year during the Program.**

IN WITNESS WHEREOF, the undersigned has executed this Compliance Certificate on _____ _____.

_____

Signature

_____

Print Name

_____

Date

## 21.3. *Appendix D* - ***Definitions***

Air Conditioning Contractors of America (ACCA) – A non-profit association serving more than 60,000 professionals and 4,000 businesses in the HVAC community. ACCA was incorporated over 40 years ago and has state and local chapters throughout the country, including several in California. It promotes professional contracting, energy efficiency, and healthy, comfortable indoor environments.

American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) – Founded in 1894, ASHRAE is an international organization of over 51,000 persons. ASHRAE advances heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education. ASHRAE has chapters throughout the U.S. and internationally, including several in California.

American National Standards Institute (ANSI) – A Washington, DC-based, nonprofit organization that oversees the creation, promulgation, and use of voluntary consensus standards that improve productivity, increase efficiency and reduce cost. Although ANSI itself does not develop American National Standards, it provides all interested U.S. parties with a neutral venue to come together and work towards common agreements. This process is guided by the principles of consensus, due process and openness, and depends heavily upon data gathering. The Institute ensures that access to the standards process, including an appeals mechanism, is made available to anyone directly or materially affected by a standard that is under development.

ANSI/ASHRAE/ACCA Standard 180 (Standard 180): *Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems* (2012). Standard 180 defines quality maintenance for the HVAC industry and Customers.

*Baseline* – Refers to the enrolled equipment's improvement by service and repair to the minimum performance level accepted by the program.

California Long Term Energy Efficiency Strategic Plan (CLTEESP) – Approved by the CPUC in September 2008, the CLTEESP sets forth a roadmap for energy efficiency in California through the year 2020 and beyond. It articulates a long-term vision and goals for each economic sector and identifies specific near-term, mid-term and long-term strategies to assist in achieving those goals. It was developed through a collaborative process involving the CPUC's regulated utilities – Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (SoCalGas) – and over 500 individuals and organizations working together.

California Public Utilities Commission (CPUC) – Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CPUC serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy.

California State Licensing Board (CSLB) – Protects consumers by licensing and regulating California's construction industry. There are more than 310,000 licensed Contractors in the state, operating under 43 licensing classifications. CSLB educates consumers about Contractors and construction law, administers examinations to test prospective licensees, issues licenses, investigates complaints against licensed and unlicensed Contractors, issues citations, suspends or revokes licenses, and seeks administrative, criminal, and civil sanctions against violators.

Circuit (or AC Circuit or Compressor Circuit) – A circuit is defined as all compressors tied to a common suction header. To verify refrigerant charge, all compressors tied to a common suction header must be operating.

Condenser and evaporator coils – Both coils have copper tubing with aluminum fins and contain refrigerant inside. The condenser coil is very hot (100F to 130F) and dumps heat to the outside air that is pulled in by a condenser fan. The evaporator coil is very cold (45F to 60F); it cools the air delivered to the room and removes humidity.

Customer – A Customer is defined as the purchaser of the HVAC Optimization Service Agreement. The service must be performed for a building that is equipped with an active electric meter and receives service from PG&E.

Economizer (air) – A ducting system, including dampers, linkages, and an automatic control system, that allows a cooling supply fan system to supply outside air to reduce or eliminate the need for mechanical cooling [Source: Title 24].

Economizer (water) – A system by which the supply air of a cooling system is cooled directly or indirectly by evaporation of water, or other appropriate fluid, in order to reduce or eliminate the need for mechanical cooling [Source: Title 24].

Energy Efficiency (EE) Measure – An EE measure is a product or service that reduces energy use and/or increases the energy efficiency of equipment when installed/performed at the Customer's site.

Energy Efficiency Rating (EER) – The ratio of BTUs cooling per watt of power input for air conditioners, based on specified test conditions. The higher the EER number, the more efficient the equipment.

Energy Efficiency Tasks (EET) - Refers to tasks performed on Customers HVAC systems that are designed to save energy and reduce peak period energy demand

Energy Savings – The amount of energy in kilowatts (kW), kilowatt-hours (kWh) or therms that are saved by installing/adopting an energy efficiency measure.

HVAC – The heating, ventilation and air conditioning system(s) in a building used for controlling indoor air temperature and quality.

HVAC Contractor or Contractor – In the context of this Program, a Contractor is licensed by the State of California State Licensing Board (CSLB) with a C-20 license to perform HVAC work on non-residential dwellings.

HVAC Optimization Program – The program defined by this guide and other documentation, outlining the servicing of equipment according to Standard 180 (predictive maintenance) and the requirements of this guide.

Implementer (or Program Implementer) – The firm contracted by PG&E to help implement the program. For the PG&E Commercial HVAC Optimization Program, the Implementer is Honeywell Smart Energy (HON).

Incentive or Program Incentive – Funds paid by PG&E to the Customer or Contractor for Market Transformation or Energy Efficiency Measures that are completed in accordance with the requirements specified in this Program Participation Guide.

Initial Inventory – HVAC unit inventory completed for a site prior to the execution of the Service Agreement.

kW – kilowatt.

kWh – kilowatt hour.

North American Technician Excellence (NATE) – The leading non-profit certification program for Technicians in the heating, ventilation, air-conditioning, and refrigeration (HVAC/R) industry, and the only certification body supported by the entire HVAC/R industry.

Maintenance – Any item in an HVAC system that can be cleaned, adjusted or lubricated, typically as part of a maintenance plan. Maintenance is typically performed on a schedule, items that need to be cleaned, adjusted or lubricated more often than the agreed upon schedule may become repairs. Typically the maintenance schedule is adjusted annually based on the performance of a unit under the current Maintenance Plan.

Maintenance Plan – In accordance with ANSI/ASHRAE/ACCA Standard 180 Section 4.2.2, the Maintenance Plan describes the Customers' performance objectives for the HVAC system (such as acceptable temperature range), indicators of unacceptable system conditions that could lead to failure or performance degradation (by task), inspection and maintenance tasks, task frequencies, and documentation. For a given facility, the maintenance plan shall be written and developed, specifically to meet the size, design, scope and complexity of the system(s) serving that facility. The plan shall describe each required task, identify the party responsible for performing the task, specify the authorizing party, document its completion, and subsequently monitor the results. In this program, it is included in the Addendum (template provided) attached to the Service Agreement.

Market Transformation – "Long-lasting sustainable changes in the structure or functioning of a market by reducing barriers to the adoption of energy efficiency measures to the point where further publicly-funded intervention is no longer appropriate in that specific market" [source: CLTEESP].

Measurement and Verification (M&V) –The process whereby energy savings are measured, verified, and attributed to program measures after the measures have been implemented. This is typically done by a third party M&V Contractor. "Early M&V" is conducted before the end of the program, to assess the accuracy of *ex ante* savings estimates, and allow for adjustments in the program design and implementation strategy, as needed, to achieve savings targets.

Minimum Performance Level **–** Also known as Baseline. The Qualified Unit meets the baseline level of performance in accordance with ANSI/ASHRAE/ACCA Standard 180, the Maintenance Plan other required Program tasks prescribed by Contractor Manual, and the documentation provided by the Qualified Unit's manufacturer

Participating Contractor/Technician – An HVAC Contractor or Technician that has met the program's eligibility criteria, been trained and tested on program requirements, formally enrolled, and is in good standing with the program.

PG&E – Pacific Gas & Electric.

Program – In this case, the PG&E Commercial HVAC Optimization Program.

Program Manager – PG&E's designated individual(s) responsible for the management of this Program.

Program Management Metrics – A list of program-specific indicators and targets designed to help the Implementer and PG&E assess progress toward expected results. Program Management Metrics are primarily tracked by the Implementer for internal management purposes, with the exception of energy savings that are measured and verified by a 3rd party, hired by PG&E or the CPUC.

Qualifying/Qualified Site – A non-residential Customer facility/site that has not participated in PG&E's AirCare Plus program in the last three (5) years and has not participated in PG&E's HVAC Optimization Program in the last (5) years (from date of completion).

Qualified/Qualifying Units– An HVAC unit installed at the Customer site that is either: (i) a rooftop unit, or (b) a split-system unit with equal to or greater than three tons of cooling capacity. Qualified Units do not include units that are fed chilled or hot water from a chiller or boiler or those that have a heat pump or variable speed compressor.

QA/QC – Quality Assurance and Quality Control.

Refrigerant Charge – The number of pounds of refrigerant (such as R-22 or R-410) required in the HVAC unit's compressor and coils for it to operate efficiently. This number is typically specified by the manufacturer.

Repair – A repair (as defined by this program) is identified as a component of the HVAC system requiring either a repair or replacement to maintain the efficient operation of the system. Maintenance (see above) and repair are often confused in maintenance situations.

Rooftop Unit (RTU) – A unitary packaged HVAC unit located on the rooftop of a non-residential building.

Service Agreement – An HVAC maintenance contract signed between a Contractor and Customer participating in this program that complies with program requirements. It has an attached Addendum.

Service Agreement Addendum – A document attached to the Service Agreement that converts a standard maintenance agreement into one that complies with the ANSI/ASHRAE/ACCA Standard 180, and this programs requirements for maintenance.

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) – An international association of union Contractors, with over 1,800 members in 101 chapters throughout the United States, Canada, Australia and Brazil. Chapters in PG&E territory include Bay Area, Sacramento Valley, and Northern San Joaquin Valley. SMACNA produces voluntary technical standards and manuals and is accredited by the American National Standards Institute as a standards-setting organization.

Split-System Unit - An air conditioning system that comprises outdoor and indoor components: an outdoor condenser (a condenser coil, condenser fan, and air conditioning compressor) and an indoor evaporator coil (with an evaporator or supply fan).

Supply fan - The large fan system (fan, motor and drive belt) that moves the room air and outside air from the economizer damper into the evaporator coil to be cooled, before being supplied to the room.

T24 TSTAT – Title 24 compliant programmable thermostat. Section 112(c) of Title 24 states that all unitary heating and/or cooling systems, including heat pumps that are not controlled by a central energy management control system (EMCS), shall have a setback thermostat with a clock mechanism that allows the building occupant to program the temperature set points for at least four periods within 24 hours.

## 21.4. *Recommended Technician Tools*

Each Contractor will need to make sure that each of their HVAC technicians is equipped with the following items, as needed to perform the Energy Efficiency (EE) Tasks. These tools will not be provided by the Program:

- ☐ Cell phone, Wi-Fi hot spot, Bluetooth® modem or other device to ensure Internet connectivity, if needed
- ☐ Refrigerant fill and recovery tanks for R-22 and R-410a
- ☐ Small section, ~8 inches, of refrigerant pipe insulation
- ☐ Sandpaper and/or sand-cloth to clean piping area before adding measurement probes
- ☐ Multimeter that measures AC/DC voltages and resistance
- ☐ Standard safety gear, including safety goggles, hardhat, rubber gloves, etc.
- ☐ Tools for cleaning coils, including appropriate coil cleanser and pressurized water as need for the job either from a portable tank or hose
- ☐ Wire nuts and miscellaneous wire connectors
- ☐ Fin straightener
- ☐ Technician diagnostic freeze spray
- ☐ Mirror
- ☐ Button flush-style plugs (if drilling holes in the HVAC unit to measure refrigerant charge);
- ☐ Shurtape® duct foil and foam insulation tapes, UL181 compliant pressure sensitive tape
- ☐ Economizer lubricant Spray
- ☐ Standard HVAC service and hand tools, appropriate for the equipment being serviced
- ☐ Drill and Unibit® (step drill) with the ability to drill a 5/8 inch hole with hole sealing button flush-style plugs
- ☐ Sheet metal hex-head screws (Replacement fasteners)
- ☐ Screwdrivers, wrenches, ratchet and sockets, etc.
- ☐ Digital camera
- ☐ Permanent marker
- ☐ Sheet metal hex-head screws for replacement panel fasteners

## 21.4.1. Instrument Calibration Information

### Accuracy Specifications and Calibration Intervals for Instruments

Important Note: Field instruments shall include the ability to measure the following parameters to the specified accuracy, and conform to the indicated calibration interval.

| Measured Variables | Units | Accuracy Specification | Calibration Interval |
|---|---|---|---|
| Supply Air (Dry Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Return Air (Dry Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Outside Air (Dry Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Supply Air (Wet Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Return Air (Wet Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Suction Line (Dry Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Liquid Line (Dry Bulb) | F | ±1.8 | Single Point – Weekly<br>Multiple Point – Monthly |
| Suction Pressure | psig | ±1.0 | Weekly |
| Discharge Pressure | psig | ±1.0 | Weekly |
| Digital Manometer to check Gas Pressure | iwc | ±0.02 | Check zero before use |
| Condenser Amps (True RMS) | % of rdg | ±3.0 | Annually |
| Compressor Amps (True RMS) | % of rdg | ±3.0 | Annually |
| Supply Blower Motor Amps (True RMS) | % of rdg | ±3.0 | Annually |
| Charging Scale | % of rdg | ±0.5 | Annually |

## 21.4.2. Recommended Instrument List

The following instruments are recommended by the program. Contractors must provide Technicians with one instrument from each of the six categories below. If Contractor has a question about whether their instruments meet program recommendations, contact HON.

✓ **Temperature Probes**

- ☐ Fieldpiece_ ATA1 K- type Thermocouple with alligator clip
- ☐ Fieldpiece_ ATB1 K-type bead thermocouple
- ☐ Fieldpiece_ATR1 piercing type thermocouple for ventilation ducts
- ☐ Fluke 80PK-1 bead probe
- ☐ Fluke 80PK-11 Velcro K-type temperature probe
- ☐ Testo 0613 4611 Velcro pipe wrap probe
- ☐ Cooper Atkins 4011 Pipe Strap Probe – type K
- ☐ Oakton WD-08516-75 detachable probe – Radiation shielded thermocouple probe
- ☐ Transcat TC805 – Radiation shielded thermocouple probe

✓ **Temperature – Dry Bulb**

- ☐ Amprobe THWD-5 Temperature and RH Sensor
- ☐ Omegaette HH314 Temperature and RH Sensor
- ☐ Fluke 50 Series I & II Thermometer, models 50S and 50D
- ☐ Oakton Acorn Temp JKT Thermocouple Thermometer

✓ **Temperature – Wet Bulb**

- ☐ Amprobe-THWD-5 Temperature and RH Sensor
- ☐ Extech- EA20 Temperature and RH Instrument
- ☐ Testo – 605-H2 Mini Stick Temperature and RH

✓ **Pressures**

- ☐ Digi-Cool_DRSA1200_Digital System Analyzer
- ☐ Fieldpiece SMAN2 Digital System Analyzer
- ☐ Fieldpiece SMAN3 Digital System Analyzer
- ☐ Testo 550 Digital System Analyzer
- ☐ Testo 560 Digital System Analyzer

✓ **Differential Static Pressure**

- ☐ Omega HHP 2080 Series
- ☐ Testo 435 Series

✓ **Multi-Meters**

- ☐ Fieldpiece HS-35 Stick Meter
- ☐ Fieldpiece HS-36 Stick Meter
- ☐ Fluke 375 Multi-meter
- ☐ Fluke 376 Multi Meter
- ☐ Amprobe ACD-14 TRMS-FX Clamp-on Multi Meter
- ☐ Amprobe ACD-14 FX Clamp-on Multi Meter

The above is a small list of qualifying meters; the main requirements of meters are:

- At least CAT.III Safety Rated,
- At Least ±1.8°F accuracy on thermocouple,
- At Least ±3.0% accuracy for relative humidity,
- At Least Within 3% of reading accuracy measuring voltage and amps,
- At Least ±1.0 psig accuracy for low side refrigerant pressure, ±3.0 psig on high side, and
- At Least ±0.02 IWC accuracy for differential manometer.

Contact HON for the most current listing of instruments and probes that meet program requirements.