# Allied HVAC Distributors

## Technical Service Reference Guide

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RUUD

"Rely on Us"


October 2014

CUSTOMER SERVICE IS OUR PASSION

*The intent of this booklet is to guide our customers on how to best utilize the resources of our Technical Support resources. Please don't hesitate to contact us with any questions you might have regarding the services we offer.*

# Table of Contents



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# Supporting Documents



**Training Course Cancellation Policy:** We encourage people to sign up online for courses and to do so early to insure a seat is reserved in their name. Please note that we reserve the right to cancel a course at least one week in advance when attendance is below our minimum, which changes based on subject matter and length of class.

**Training Course No Shows:** There are significant costs incurred to produce a training course, including printing, travel, lodging, meals, snacks and drinks. Please note that no shows, those who sign up for courses, but don't show up or cancel within 24 hours of the scheduled start time are billed the full tuition. All handouts will be provided to the TM for delivery to the contractor as time permits.

# Technical Service Calls

One of the primary job functions for a technical service manager (TSM) is to assist our customers in solving problems over the phone. To maximize that effort we attempt to record all incoming technical support calls. The records we keep are then used to identify trends in service or warranty, allowing us to be proactive in reporting back to RUUD's technical support department. It also helps technicians obtain more accurate support if they call back with follow up information days or weeks later because we keep accurate records on what direction was provided at the time of the original call.

So prior to making the call and as a way to increase the likelihood the TSM can help resolve your issue please have the following information at the ready:

- Technician contact information such as first/last name, company name, company phone and cell phone
- Model and Serial # (both indoor and outdoor if split system)
- Date Installed and date failed
- Description of the problem, including as many specifics as possible
- Temperatures, pressures and all operational data that may assist the TSM in finding the resolution

In fact, to better serve you we recommend having a diagnostic or start up sheet completed **prior** to making the call. We have sheets for residential and/or commercial A/C and heat pumps, ground source heat pumps, mini split systems and gas furnaces. These sheets are available to download from our available forms page. To insure you have the means to complete these sheets please see Appendix G for the list of tools we suggest be on every service van. These tools are vital to insuring a professional start up, commissioning or troubleshooting effort. Please don't hesitate to contact us if you have questions on what tools are needed to obtain the data for these sheets.

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# TSM Jobsite Visits

Jobsite visits are another valuable service provided by a TSM, with the goal to always resolve issues as efficiently as possible. In order to meet our phone support goals, site visits must be scheduled with as much advance notice as can be provided and we ask that you keep in mind only the TSM or the Director of Technical Service can schedule a site visit. A service technician with all the tools needed to perform the work must be present for any site visit. If the site visit will not involve troubleshooting a system another contractor representative, such as a principle or manager, may be present instead of a service technician. However there must always be a contractor present when a TSM visits a site. NO EXCEPTIONS to this rule are permitted under any circumstances.

Site visits can only be made if the TSM has received, in advance, a completed datasheet. The reason behind this requirement is that it is a well proven fact that our TSM can resolve most service and troubleshooting issues from their desks when provided the proper information. The data found on our start up or diagnostic sheets help him get to the core of the problem quickly. By requesting and reviewing this information before considering a site visit he can often spot the problem and provide suggested resolutions without having to leave the office. This information is also required by the factory when we contact them for additional support. An urgent call because a service technician has been to the site 5 times is not as effective as if we are called to assist after the first or second visit. Even if a site visit is not required at that time we can log the information then have it available as reference data at a later time if more action is required.

Please help us support you in the most proactive way possible by following the steps below to arrange a site visit:

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- Provide the TSM with the completed data sheet using fax or email. After entering the data into our call log, reviewing and discussing it with the technician, the TSM may provide suggestions on how to resolve the issue. If the suggested resolutions do not resolve the problem a site visit can then be scheduled.
- The TSM will schedule the visit at a time most convenient with the system owner and the contractor, with the only limiting factor being the need to insure our minimum phone coverage is met.
- The TSM will meet the contractor at the jobsite at the designated date and time. The TSM provides supervisory assistance onsite and also records all the data. The technician must have the tools required to complete all anticipated troubleshooting tasks. These tasks may include, but are not limited to, the ability to recover the system charge into a clean empty cylinder, weighing the charge that was removed, evacuating the system to 500 microns and weighing in the correct, calculated charge. For details on the tools we recommend every service van have (or have access to), please see appendix G.
- After the site visit the TSM will forward, via email or fax, a report to the contractor detailing the suspected cause, resolution and follow up recommendations. All jobsite notes and reports are then entered into our call log.

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# DOA Policy

The intent of the Allied HVAC Distributors DOA (Dead On Arrival) policy is to insure consumers and contractors are not forced to accept one of the few units that may come from the factory with a problem that can either not be repaired, or due to concerns for long term reliability, a repair is not an option. *This policy is limited to contractors who participate in our marketing programs and who also attend the product training courses.* Please see your TM to discuss eligibility.

The acronym DOA means dead on arrival so the failure must occur within 30 days of the unit start up to qualify for this program. Failures that occur beyond the first 30 days would be covered by either the factory CCE program or the unit's standard warranty. Please contact your territory manager or your local TSM to verify coverage. The program guidelines are as follows:

- *Authorization for any unit being returned under this policy must be obtained in advance from a regional vice president, branch/operations manager or technical service manager.*
- The policy only applies to residential condensing units, furnaces and residential packaged units.
- To qualify the failure must be a non-repairable refrigeration leak, a shorted, open or non-repairable compressor or a defective, non-repairable heat exchanger.
- To begin the process call our TSM on call to report a unit being DOA. Provide model/serial of the unit along with the reason for failure.
    - The reason for failure must be specific. "Compressor will not start" or "The unit has a leak" will not be considered specific enough to qualify.
- The TSM will log the information and then provide you with a SR# for future reference. The words "DOA SR#" should then be written on the unit being returned to insure proper tracking.
    - Units received without an SR# for tracking cannot be accepted by our warehouse staff or truck drivers.
- A completed residential start up/data sheet must be provided on the replacement unit. This insures the new unit is operating within acceptable parameters.
    - **Note:** Credit for either the unit or the unit and labor (if applicable) are not issued until the completed startup/data sheet has been received by the TSM responsible for the branch where the unit was purchased. This information is then scanned and attached to the service request (SR) in our call log for future reference.

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# Technical Training

One of the universal truths about the HVAC industry is that it is constantly evolving and improving. So to keep pace with the introduction of new products and technologies it is absolutely essential for contractors and technicians to evolve and improve as well. Allied takes pride in offering our customers the widest range of technical training opportunities in the industry. Our jobs and lives are typically very busy so making time for training can be a challenge. A contractor will sometimes say "What if I train that technician and he leaves the company?" We'll always counter by suggesting they ask a different question: "What if I don't train that technician and he stays?". Listed below is a list of our current training options:

### Traditional Classroom Training

F2F or Face to Face training has existed since the dawn of time and continues to be the method of choice for a large contingent of contractors and technicians. Last year we developed and introduced a five part series called "C.A.T." or Callback Avoidance Training. It was very successful and continues as a popular offering for both seasoned and new technicians. We offer a wide range of scheduled training courses in both spring and fall. However please keep in mind that posted courses are added and changed on a very regular basis so we encourage you to visit our webpage often.

### Anytime Learning Network

We understand how difficult it can be to juggle work, home, training and still find a way to enjoy some leisure time. Our ALN offers almost 40 full length training courses that take anywhere from 15 to 25 hours to complete. These courses are used by colleges and universities across the country in a wide range of content such as HVACR Fundamental, Electrical Theory (both AC & DC), Oil Heat, Gas Heat, Heat Pumps, Indoor Air Quality, Troubleshooting, etc.. The courses are rated as beginning, intermediate and advanced.

### Self-Paced Training Modules

Through our partnership with Hardi we offer a full range of printed training materials for those learners who prefer self paced home study courses over F2F or online. Many of these courses are designed non-technical personnel such as office, accounting or warehouse staff whose productivity and efficiency can be improved with a better understanding of the HVAC industry. The courses come in a wide range of topics that include comfort heating, comfort cooling, controls, materials handling, etc.

### Personalized Training Sessions

Whether in response to new hires, when considering a new product line or to simply get up to speed on how to wire a particular system, Allied is there to help. Our TSM can come to your place of business at a time most convenient to your schedule to present whatever material you request.

### Webinars – Live and Pre-Recorded

Webinars are fast becoming a training tool of choice for many organizations. They can be arranged quickly, require no special travel and very little cost. Yet live webinars, typically less than 1 hour in length, allow learners to interact with the presenter in a way that video cannot, while pre-recorded webinars give potential learners the chance to review material they may not otherwise have access to. If you have a need or idea for a webinar, please don't hesitate to ask as we can arrange the webinar of your choice as soon as time permits.

# Frequently Asked Questions (F.A.Q's)

The following are a list of common questions often posed to the technical service managers. We hope you find them useful and would encourage you contact your local TSM with any additional questions you might have. We will add to this list from time to time so please be sure to visit our View Available Forms page often to obtain the most recent version of this document.

**I would like to call the factory directly for technical support. Why will Allied not provide a number to call?** As the local RUUD distributor it's both our responsibility and our desire to support the products we sell. Even if a contractor were to reach out to the factory they will always be redirected back to the local distributor.

**I have a consumer who is demanding to speak with the factory. Will Allied provide them a contact number?** For the same reasons as mentioned above we do not provide the factory technical support number to consumers. Consumers who try contacting the factory directly will always be redirected back to us as the local distributor. We sell only to licensed contractors who then sell those products to consumers. If a consumer has an issue they should first speak to the installing contractor. However we will always do our best to help resolve issues between a consumer and a contractor and we always try to answer consumer questions.

**I have a design or quality issue that I feel should be brought to the factory's attention. How can I get this accomplished?** Provide your TSM with as much detail as you can, including pictures whenever possible. He will create a report which is then submitted to the factory. The RUUD factory has assured us all such reports will be reviewed and answered. We will then forward that answer to you. This insures your voice is heard and we strongly encourage our contractors to take advantage of this process.

**How do I determine if the control board or ECM motor is the problem?** Verify you have high voltage to the motor and then connect a Tech Mate to the motor. Contact your TSM to obtain this valuable tool.

**How do I check a X13 motor to verify if it's not working properly?** Verify you have high voltage constant to the motor and then check to see if you have 24v on one of the terminals 1-5.

**I have a split system application with 128 feet of refrigerant piping. What size line set do I need and what would the refrigerant charge be?** You can use the installation instructions along with the long line set application guidelines and our refrigerant line sizing spreadsheet. They can be downloaded from our forms webpage.

**I have a gas furnace with a variable speed blower. The cfm light on the board tells me it's delivering 1200 cfm. How can I be sure it is in fact moving 1200 cfm?** You can apply the sensible heat formula to quickly and easily determine actual CFM while on the jobsite: *CFM=BTUH/(1.08 X TD)*

# Residential Commissioning Sheet

Cond. Model #_____ Serial #_____

Evap. Model #_____ Serial #_____

AH/Furn. Model #_____ Serial #_____

Elec. Heat Model #_____ Serial #_____

Owner_____ Phone #_____ Start Up Date_____

Owner Address_____

Installing Contractor_____ Start Up Mechanic_____

- ☐ Check and verify model numbers to insure proper match up
- ☐ Install field accessories as required (Follow accessory installation instructions)
- ☐ If installing a TXV, carefully tighten connections and install/insulate sensing bulb
- ☐ Prior to energizing the system, inspect all factory electrical connections (tighten as needed) and verify field wiring, including accessories.
- ☐ Verify thermostat parameters have been set to jobsite requirements
- ☐ Inspect and set pin selections on air handler, furnace and condensing unit (if applicable)
- ☐ Install primary and secondary drains as per I/O and local codes
- ☐ Install line set, purging with Nitrogen while brazing (Leak check refrigeration system)
- ☐ Evacuate to below 500 microns *(Must stay below 500 microns for at least 15 minutes)*
- ☐ Calculate and weigh in refrigerant charge (Refer to application data sheet)
- ☐ *Furnaces:* Leak check all gas line connections, then verify a complete and solid ground exists
- ☐ *Furnaces:* If converting to LP verify the correct kit has been used and installed.
- ☐ *Furnaces:* Measure inlet gas pressure_____ Measure manifold gas pressure_____
- ☐ *All Heating Systems:* Measured Temperature Rise_____ (Adjust airflow as needed)
- ☐ *Refrigeration Systems:* Verify airflow, operate for 15 minutes, then measure/record performance. *If heat pump, operate in both heating and cooling modes*
- ☐ Perform all other start up procedures outlined in the installation instructions and complete the data fields on page 2 of this document
- ☐ Balance system airflow to each room to insure proper distribution
- ☐ Provide owner with information packet, explaining thermostat and system operation

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Air Conditioning & Heat Pump Systems

# Start-Up Information Sheet

**Record the data below as a permanent record the unit is performing as expected on start up.**

LL: Pressure_____ Temperature_____ Saturated Temperature_____ Subcooling_____ OD Db Temp_____

SL: Pressure_____ Temperature_____ Saturated Temperature____ Superheat_____ Discharge Temp____
***Measured after 15 minutes of run time***

Compressor: Type_____ Running Volts_____ Amps (1st Stage)_____ Amps (2nd Stage)_____

Low Voltage: R____ Y1_____ Y2_____ G_____ B____ W1_____ W2_____
***Measured from Common***

Suction Line Size___ Liquid Line Size___ Vertical Rise____ ft. Total Length_____ ft. # of Els___
Is there underground pipe (Y/N)_____ Length underground_____ft. Refrigerant added ____ozs
***If line size verification is required, provide configuration drawings. Refrigerant added is for system match and line length beyond 15'***

Return Air: db Temp_____ wb_____ Supply Air: db_____ wb_____ ΔT_____
***Values must be taken as close to the coil as possible. Wb temps must be recorded to the nearest tenth of a degree***

Return Air Static Pressure_____ Supply Air Static Pressure_____ Total Static_____
***Taken downstream of filter for return and upstream of coil for supply (unless a single piece air handler)***

CFM_____ Calculation Method: Temp Rise_____ Velometer_____ ECM Board Settings_____

ECM Jumper Settings: Cool_____ Adjust____ Heat_____ Delay_____ Hum_____ HP_____

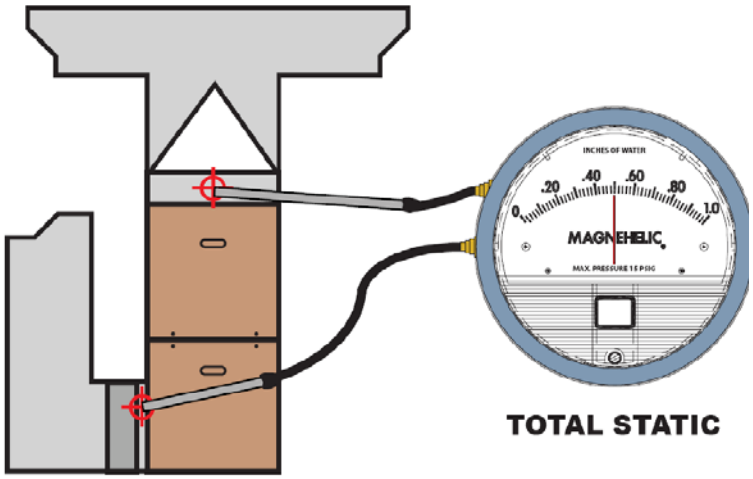
Other Air Handler, Defrost Control or Furnace Jumper Settings:_____

Comments_____

_____

_____

**Total Static Measurement**



# HEAT PUMP JOBSITE INFORMATION SHEET

## OWNER:

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____ Phone: _____

Contact: _____

## SERVICING CONTRACTOR:

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____ Phone: _____

Contact: _____

## DATE REQUESTED: _____

## REQUESTOR:

_____

## DISTRIBUTOR:

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____

Phone: _____

Contact: _____

## EQUIPMENT DATA:

OUTDOOR UNIT

Model #: _____ Serial #: _____ Date Installed: _____

EVAPORATOR

Model #: _____ Serial #: _____ Date Installed: _____

AIR HANDLER

Model #: _____ Serial #: _____ Date Installed: _____

FURNACE

Model #: _____ Serial #: _____ Date Installed: _____

## PROBLEM SUMMARY:

_____

_____

_____

## CORRECTIVE ACTIONS TAKEN:

_____

_____

_____

## ADDITIONAL INFORMATION:

_____

_____

_____

## ACCESSORIES? (CHECK THOSE INSTALLED):

- ❑ Low Ambient Kit
- ❑ Compressor Time Delay
- ❑ Mild Weather Kit
- ❑ Crankcase Heater
- ❑ Hard Start Kit
- ❑ Filter-Drier
- ❑ Compressor Sound Enclosure
- ❑ Oil Separator
- ❑ High Pressure Cutout
- ❑ Low Pressure Cutout
- ❑ Discharge Line Muffler
- ❑ Hot Water Recovery
- ❑ Heat Pump Monitor
- ❑ Hot Gas Bypass
- ❑ Pump Down Kit
- ❑ Accumulator
- ❑ Fossil Fuel Kit:

type: _____

- ❑ Other:

_____

# HEAT PUMP JOBSITE INFORMATION SHEET

**REMEMBER:**

1. Circle Metering device used.
2. Circle Yes or No at drier locations.
3. Circle Service Ports used.
4. Sat. Temp. is pressure converted to Temp.

**Formula For Super Heat**

_____ Vapor Line Temp.

– _____ Minus Sat Temp.

_____ Equals Super Heat

**Formula For Sub Cooling**

Sat Temp. _____

– _____ Minus Liquid Line Temp.

_____ Equals Sub Cooling

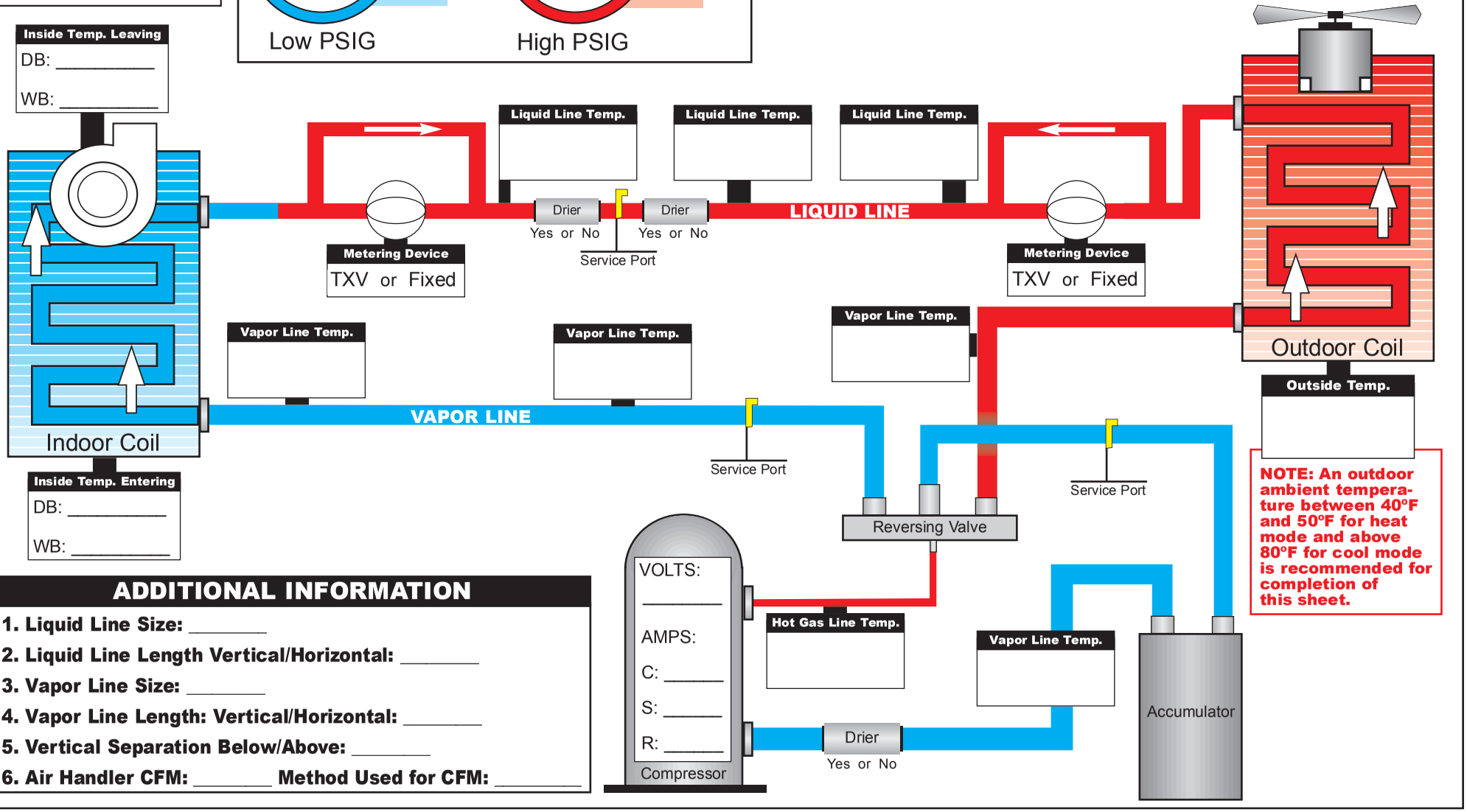
**Circle One**

Heat Mode

Cool Mode

_____ # Saturation Temp. — Low PSIG

_____ # Saturation Temp. — High PSIG




**NOTE: An outdoor ambient temperature between 40°F and 50°F for heat mode and above 80°F for cool mode is recommended for completion of this sheet.**

## ADDITIONAL INFORMATION

1. Liquid Line Size: _____
2. Liquid Line Length Vertical/Horizontal: _____
3. Vapor Line Size: _____
4. Vapor Line Length: Vertical/Horizontal: _____
5. Vertical Separation Below/Above: _____
6. Air Handler CFM: _____ Method Used for CFM: _____

# AIR CONDITIONING SYSTEM JOBSITE INFORMATION SHEET

**OWNER:**

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____ Phone: _____

Contact: _____

**SERVICING CONTRACTOR:**

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____ Phone: _____

Contact: _____

**DATE REQUESTED:** _____

**REQUESTOR:**

_____

**DISTRIBUTOR:**

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____

Phone: _____

Contact: _____

**EQUIPMENT DATA:**

OUTDOOR UNIT

Model #: _____ Serial #: _____ Date Installed: _____

EVAPORATOR

Model #: _____ Serial #: _____ Date Installed: _____

AIR HANDLER

Model #: _____ Serial #: _____ Date Installed: _____

FURNACE

Model #: _____ Serial #: _____ Date Installed: _____

**PROBLEM SUMMARY:**

_____

_____

_____

**CORRECTIVE ACTIONS TAKEN:**

_____

_____

_____

**ADDITIONAL INFORMATION:**

_____

_____

_____

**ACCESSORIES? (CHECK THOSE INSTALLED):**

- ❑ Low Ambient Kit
- ❑ Compressor Time Delay
- ❑ Mild Weather Kit
- ❑ Crankcase Heater
- ❑ Hard Start Kit
- ❑ Filter-Drier
- ❑ Compressor Sound Enclosure
- ❑ Oil Separator
- ❑ High Pressure Cutout
- ❑ Low Pressure Cutout
- ❑ Discharge Line Muffler
- ❑ Hot Water Recovery
- ❑ Hot Gas Bypass
- ❑ Pump Down Kit
- ❑ Accumulator
- ❑ Other:

_____

_____

_____

# AIR CONDITIONING JOBSITE INFORMATION SHEET

**REMEMBER:**

1. Circle Metering device used.
2. Circle Yes or No at drier locations.
3. Circle Service Ports used.
4. Sat. Temp. is pressure converted to Temp.

**Formula For Super Heat**

_____ Vapor Line Temp.

– _____ Minus Sat Temp.

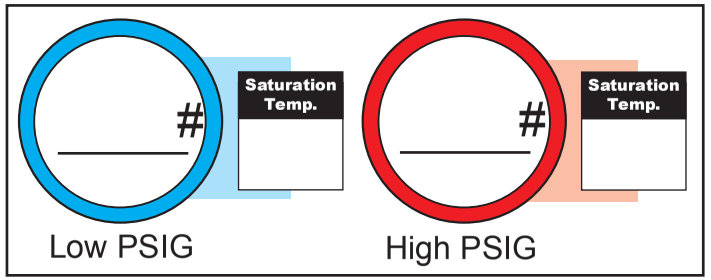
_____ Equals Super Heat

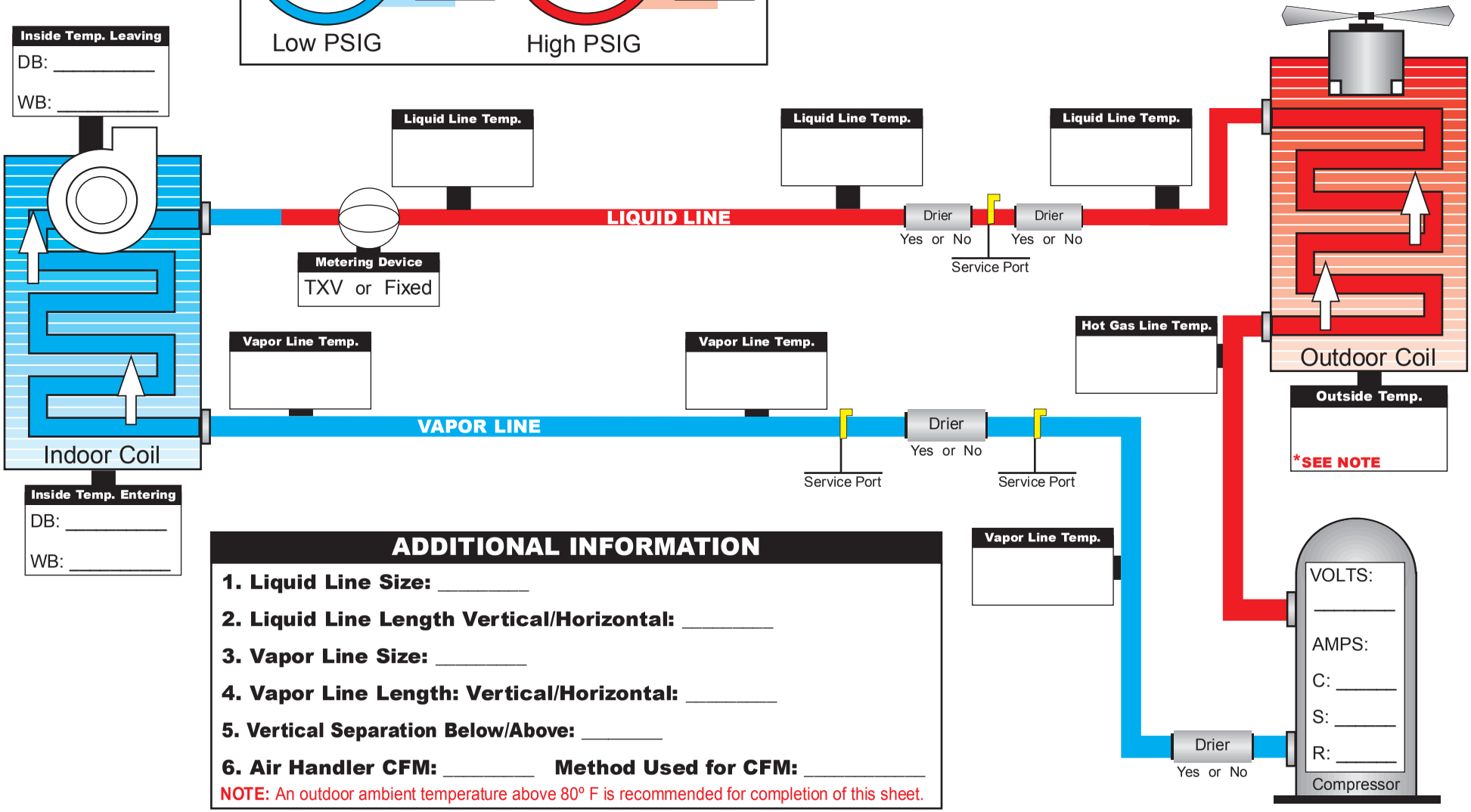
**Formula For Sub Cooling**

_____ Sat Temp.

– _____ Minus Liquid Line Temp.

_____ Equals Sub Cooling




## ADDITIONAL INFORMATION

1. **Liquid Line Size:** _____
2. **Liquid Line Length Vertical/Horizontal:** _____
3. **Vapor Line Size:** _____
4. **Vapor Line Length: Vertical/Horizontal:** _____
5. **Vertical Separation Below/Above:** _____
6. **Air Handler CFM:** _____ **Method Used for CFM:** _____

**NOTE:** An outdoor ambient temperature above 80° F is recommended for completion of this sheet.

# 80% GAS FURNACE JOBSITE INFORMATION SHEET

**OWNER**:
Name: _____
Street: _____
City: _____ Zip: _____
State/Province: _____ Phone: _____

**DATE:** _____

**PROBLEM DESCRIPTION:**
_____
_____

**SERVICING CONTRACTOR:**
Name: _____
Street: _____
City: _____ Zip: _____
State/Province: _____ Phone: _____

**DISTRIBUTOR:**
Name: _____
Street: _____
City: _____ Zip: _____
State/Province: _____
Phone: _____

**PRODUCT INFORMATION:**
Furnace Model Number: _____ **Serial #:** _____
Evaporator Model Number: _____ **Serial #:** _____
Installation Date: _____

**TEMPERATURES: (Figure 1)**
- T1-Vent Temperature = _____
- T2-Return Air = _____
- T3-Supply Air = _____
- Temperature Rise (T3-T2) = _____

**PRESSURES (Furnace Running): (Figure 1)**
- P1-Manifold = _____
- P2-Inlet Gas = _____
- P3-Vent Pressure Switch = _____
- Gas Pipe Diameter = _____
- LP or Natural Gas = _____
- Burner Orifice Size = _____

**HIGH VOLTAGE CIRCUIT READINGS: (Figure 3)**
① & ⑥ - Line Voltage _____
② & ⑥ - IBM _____
③ & ⑥ - IDM _____
④ & ⑥ - Transformer _____
① & ⑦ - L1 to Earth Ground _____
⑥ & ⑦ - Neutral to Earth Ground _____
⑤ & ⑥ - HSI Voltage during "warm-up" _____

**LOW VOLTAGE CIRCUIT READINGS: (Figure 4)**
⑧ & ⑨ - Transformer Control Voltage _____
⑩ to ⑫ - MRLC & LC ⑩ to ⑪: _____ ⑩ to ⑫: _____
⑬ & ⑭ - Vent Pressure Switch
⑮ & ⑯ - Gas Valve _____
⑰ - Flame Sensor Micro Amp _____

**VENT: (Figure 2)**
- Vent Material: Single Wall ❑ Double Wall ❑ HTPV ❑
- Common Vent Used? Yes ❑ No ❑
① Diameter = _____
② Total Length = _____
③ Term. Length = _____
④ Total Height = _____
- Power Venter Used? Yes ❑ No ❑

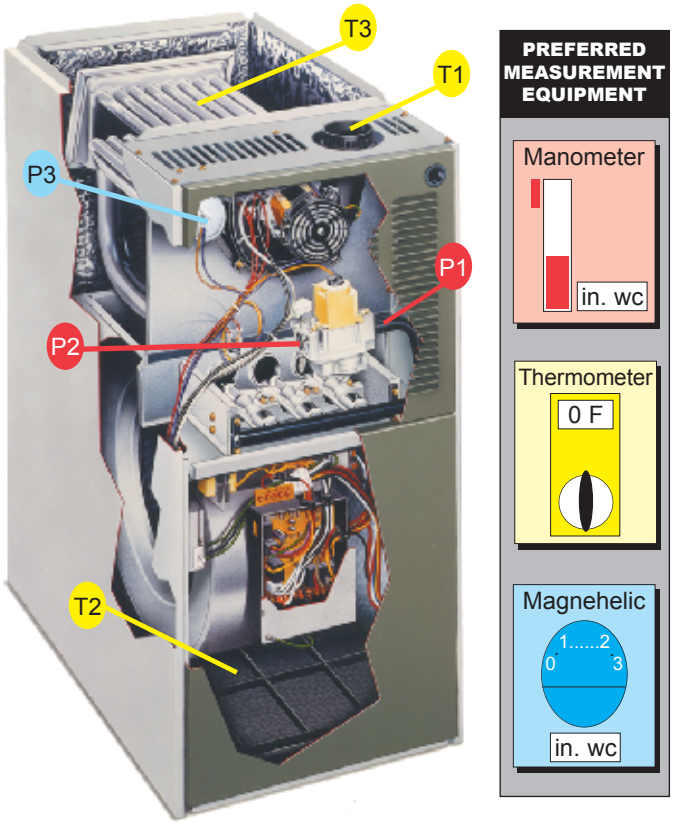
**VENT CONNECTION: (Figure 2)**

| | FURNACE | WATER HEATER |
|---|---|---|
| - Material: | Single Wall ❑ | Single Wall ❑ |
| | Double Wall ❑ | Double Wall ❑ |
| | HTPV ❑ | HTPV ❑ |
| ⑤ Diameter= | _____ | _____ |
| ⑥ Height = | _____ | _____ |

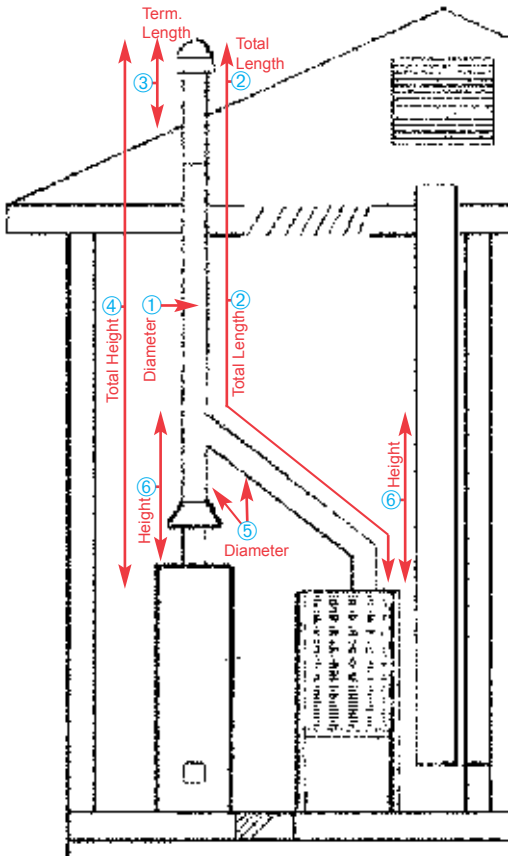
**OTHER NECESSARY DATA: (Figure 2)**
- Is return air intake sealed and terminating outside furnace area? _____
- Fault Code Number of Flashes (Fig. 1) _____
- Electronic Thermostat? Yes ❑ No ❑

**REQUESTED BY**: _____

## Figure 1

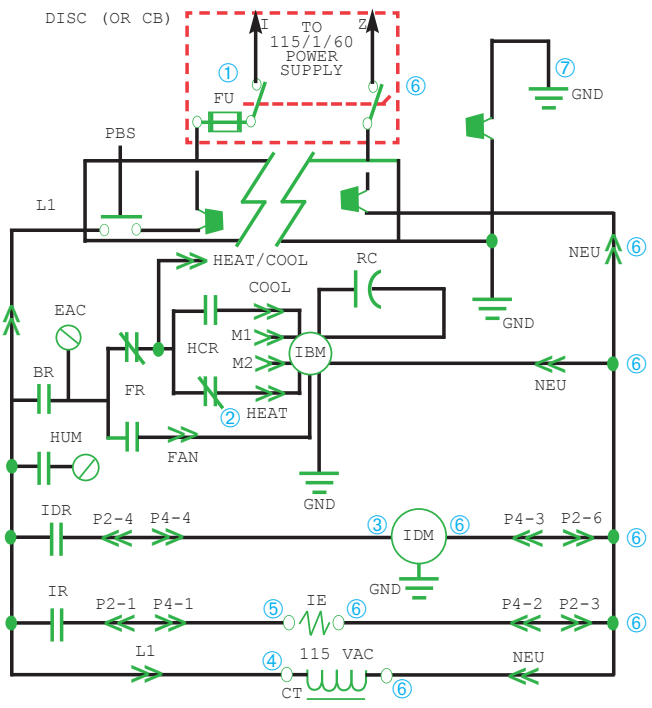



## Figure 2



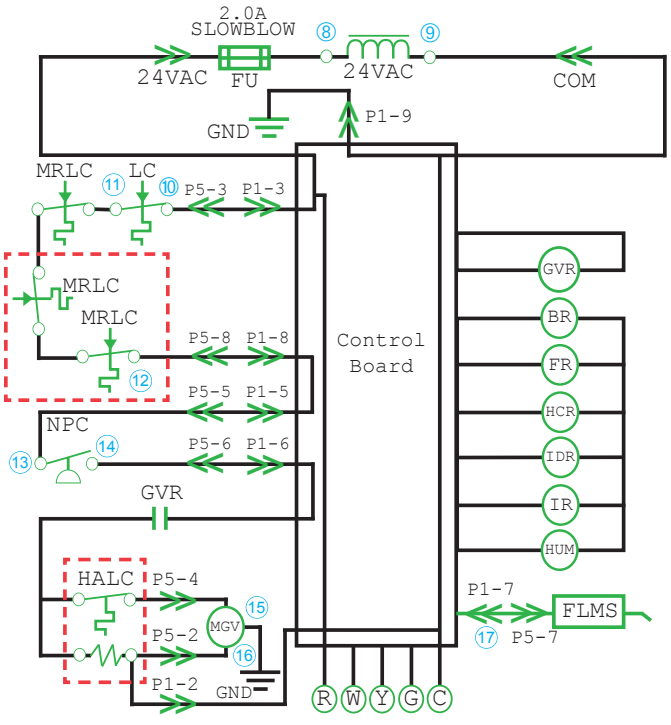

**VENTING**

## Figure 3




**HIGH VOLTAGE CIRCUIT**

## Figure 4




**LOW VOLTAGE CIRCUIT**

# 90% GAS FURNACE JOBSITE INFORMATION SHEET

**OWNER**:
Name: _____
Street: _____
City: _____ Zip: _____
State/Province: _____ Phone: _____

**DATE:** _____

**PROBLEM DESCRIPTION:**
_____
_____

**SERVICING CONTRACTOR:**
Name: _____
Street: _____
City: _____ Zip: _____
State/Province: _____ Phone: _____

**DISTRIBUTOR:**
Name: _____
Street: _____
City: _____ Zip: _____
State/Province: _____
Phone: _____

**PRODUCT INFORMATION:**
Furnace Model Number: _____
Evaporator Model Number: _____
Installation Date: _____

**Serial #:** _____
**Serial #:** _____

**TEMPERATURES: (Figure 1)**
- T1-Vent Temperature = _____
- T2-Return Air = _____
- T3-Supply Air = _____
- Temperature Rise (T3-T2) = _____
- Gas Pipe Diameter = _____
- Gas Pipe Length = _____
- LP or Natural Gas = _____
- Burner Orifice Size = _____

**PRESSURES (Furnace Running): (Figure 1)**
- P1-Manifold = _____
- P2-Inlet Gas = _____
- P3-Vent Pressure Switch = _____
- Drain Pressure Switch (for GRA/GRJ only) = _____

**EXHAUST VENT: (Figure 2)**
- Type = _____
- Diameter = _____
- Length = _____
- Number of 90's = _____
- Number of 45's = _____
- Term. Length = _____

**INTAKE VENT: (Figure 2)**
- Type = _____
- Diameter = _____
- Length = _____
- Number of 90's = _____
- Number of 45's = _____
- Term. Length = _____
- Sep. Distances = _____

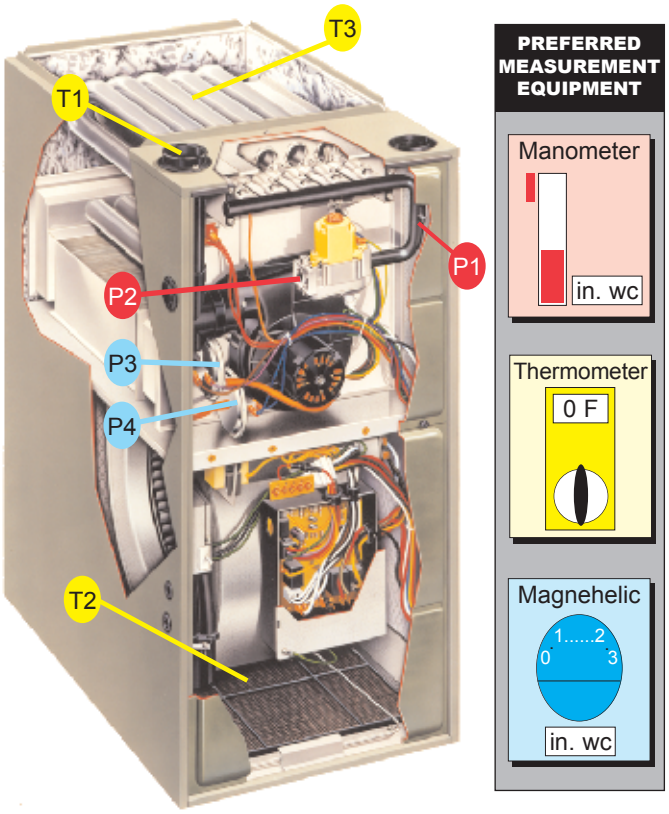
**HIGH VOLTAGE CIRCUIT READINGS: (Figure 3)**
① to ⑦ - Line Voltage _____
② to ⑦ - IBM _____
③ to ⑦ - IDM _____
④ to ⑦ - Transformer _____
⑤ to ⑦ - L1 to Neutral _____
① to ⑪ - L1 to Earth Ground _____
⑦ to ⑪ - Neutral to Earth Ground _____
⑧ - Humidifier Term. Continuity _____
⑨ - EAC to Neutral _____
⑩ - HSI Voltage during "warm-up" _____

**LOW VOLTAGE CIRCUIT READINGS: (Figure 4)**
① to ⑨ - Transformer Control Voltage _____
② - Fuse _____
③ - MRLC & LC a: _____ b: _____ c: _____
④ - Gas Valve _____
⑤ - Vent Pressure Switch _____
⑩ - Drain Pressure Switch _____
⑦ - Flame Sensor Micro Amp _____
⑧ - Heat Assisted Limit _____

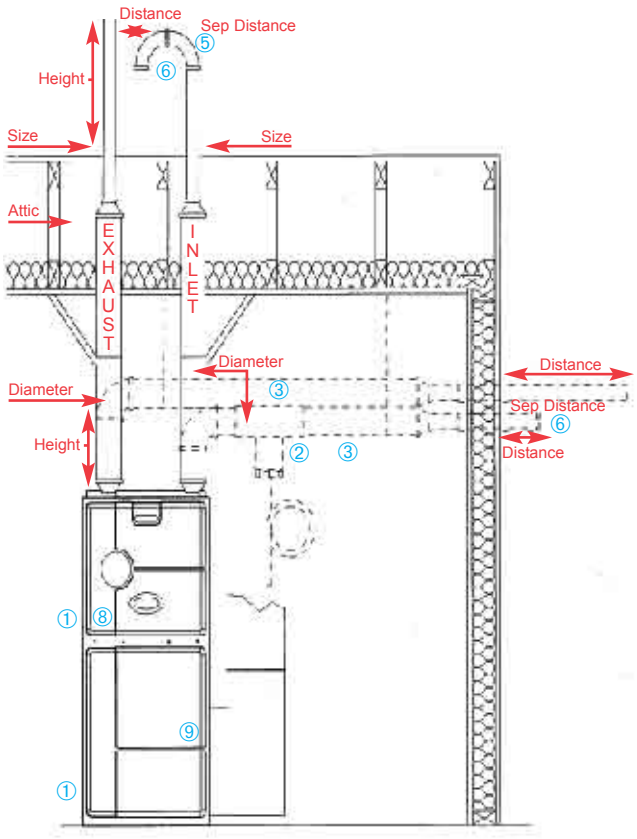
**OTHER NECESSARY DATA: (Figure 2)**
- Is return air intake sealed and terminating outside furnace area? _____
- Fault Code Number of Flashes (Fig. 1) _____
- Electronic Thermostat? Yes ❑ No ❑

**REQUESTED BY**: _____

## Figure 1

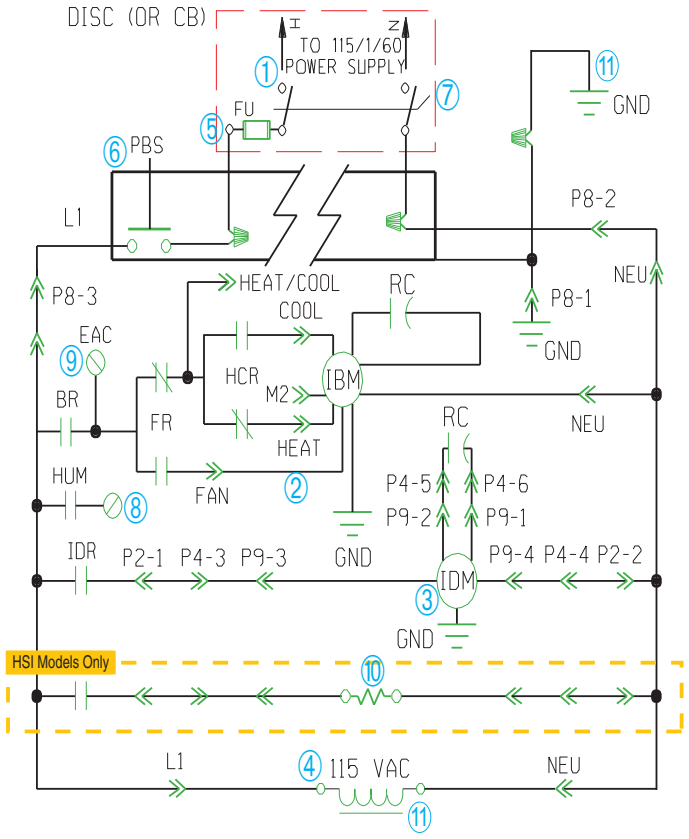



## Figure 2



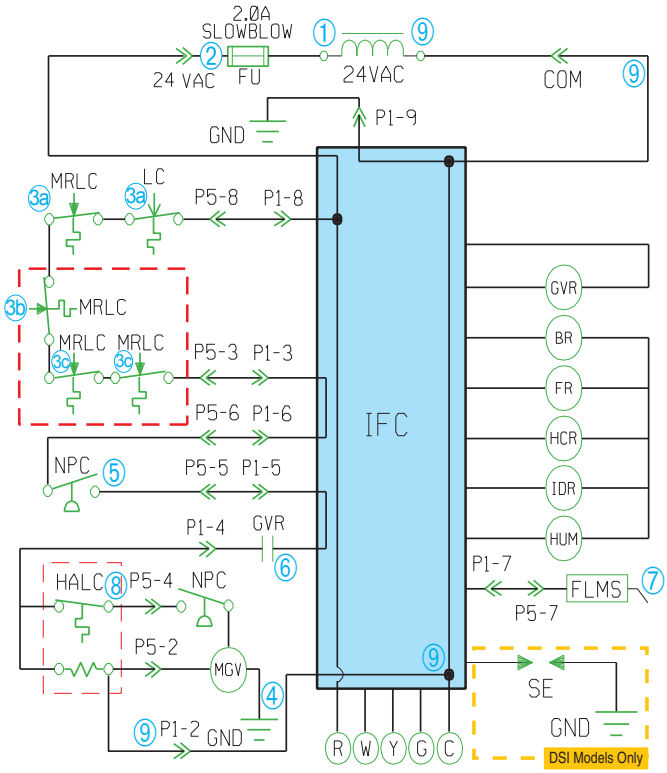

**VENTING**

## Figure 3




**HIGH VOLTAGE CIRCUIT**

## Figure 4




**LOW VOLTAGE CIRCUIT**

# OIL FURNACE JOBSITE INFORMATION SHEET

⇨ **OWNER:**

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____ Phone: _____

Contact: _____

⇨ **SERVICING CONTRACTOR:**

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____ Phone: _____

Contact: _____

⇨ **DATE REQUESTED:** _____

⇨ **REQUESTOR:**

_____

⇨ **DISTRIBUTOR:**

Name: _____

Street: _____

City: _____ Zip: _____

State/Province: _____

Phone: _____

Contact: _____

⇨ **EQUIPMENT DATA:**

FURNACE

Model #: _____ Serial #: _____ Date Installed: _____

EVAPORATOR

Model #: _____ Serial #: _____ Date Installed: _____

OUTDOOR UNIT

Model #: _____ Serial #: _____ Date Installed: _____

⇨ **PROBLEM SUMMARY:**

_____

_____

_____

⇨ **CORRECTIVE ACTIONS TAKEN:**

_____

_____

_____

⇨ **ADDITIONAL INFORMATION:**

_____

_____

_____

⇨ **ACCESSORIES? (CHECK THOSE INSTALLED):**

- ☐ Humidifier
- ☐ Electronic Air Cleaner
- ☐ Oil Line Solenoid
- ☐ Delayed Oil Valve
- ☐ Oil Line Heat Tape
- ☐ Auxiliary Oil Pump
- ☐ Fossil Fuel Kit:

  Type: _____
- ☐ Other: _____

# VENTING SYSTEM

## ⇨ VENTING INFORMATION:

**A.** Vent Connector Diameter _____

**B.** Vent Connector Length _____

**C.** Number of Elbows in Vent Connector _____

**D.** Chimney Size, (Inside) if Applicable _____

**E.** Chimney or Vent Height _____

**F.** Breech Draft Reading _____

**G.** Smoke Reading _____

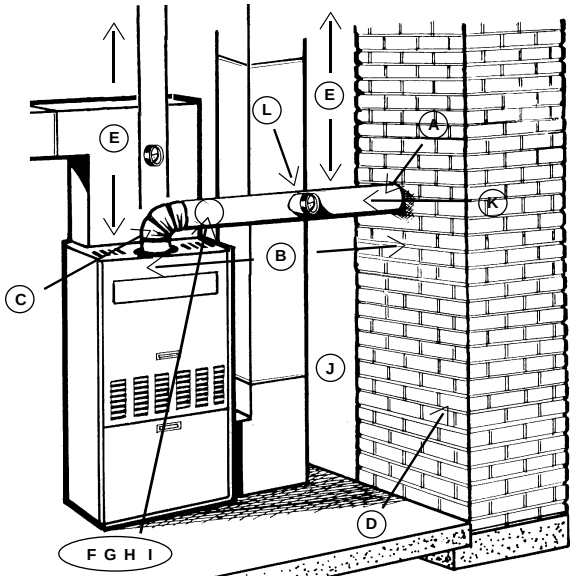
**H.** Vent Temperature _____

**I.** $CO_2$ Reading _____

**J.** Furnace Room Temperature _____

**K.** Chimney Draft _____

**L.** Barametric Damper Installed ☐ **YES** ☐ **NO**




## ⇨ TYPE OF VENTING:

☐ Chimney ☐ Other ☐ Vented with another appliance.

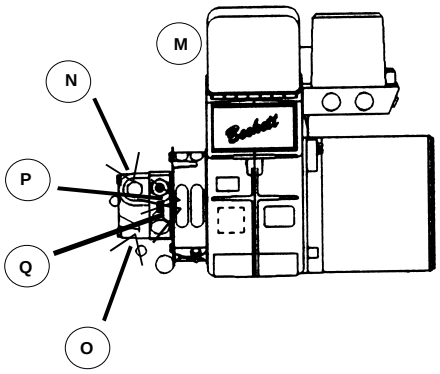
☐ Type L Vertical Describe appliance and venting: _____

☐ Sidewall Power Vent _____

# GENERAL INFORMATION

- Line Supply Voltage _____
- Control Voltage _____
- Polarity _____
- Supply Air Temperature _____
- Return Air Temperature _____
- Air Flow (CFM) _____
- Combustion Air Source _____

# BURNER INFORMATION




**M.** Overfire Draft _____

**N.** Pump Pressure _____

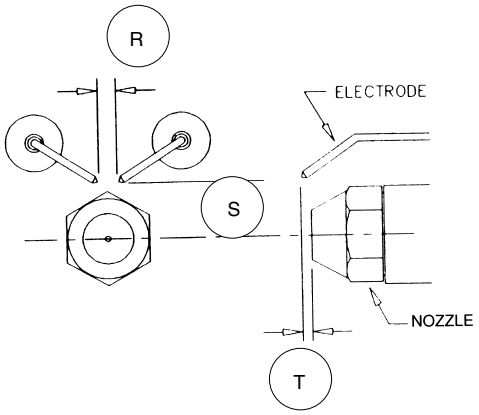
**O.** Pump Cut-off Pressure _____

**P.** Air Shutter Setting _____

**Q.** Air Band Setting _____

CAD Cell OHMS : Light _____ Dark _____

# SPARK GAP INFORMATION




**R**. Spark Gap _____ **S**. Spark Gap _____

**T.** Spark Gap _____

- Nozzle Size _____
- Date Nozzle last changed _____
- Nozzle Spray Angle / Pattern _____

# FUEL INFORMATION

- One or Two Pipe System ☐ **ONE** ☐ **TWO**
- Are Flare Fittings Used ☐ **YES** ☐ **NO**
- Pipe Size _____
- Vertical Lift _____
- Tank Location ☐ **Inside** ☐ **Outside buried** ☐ **Outside above ground**
- Date of last oil filter change _____

ALLIED
HVAC DISTRIBUTORS

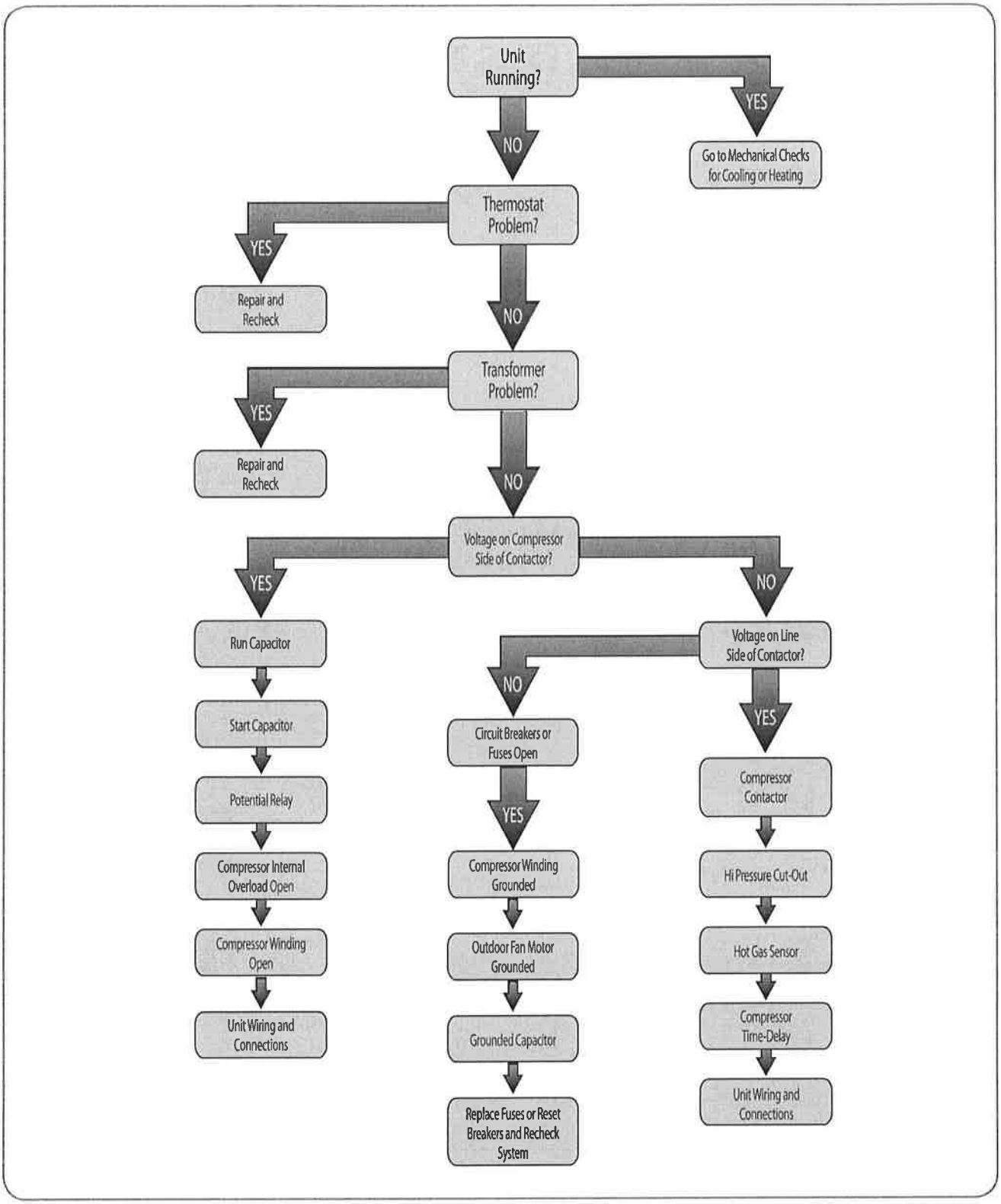
# HVAC Service Vehicle
# Suggested Tool List

This list contains the minimum tools a service technician should have in order to properly start or troubleshoot a system. Properly diagnosing any system requires well maintained, trusted tools. All tools should be inspected and calibrated on a regular basis to insure data gathered can be as accurate as possible. Please don't hesitate to contact your local Allied HVAC Distributor branch should you have any questions or if you wish to purchase any of these items.

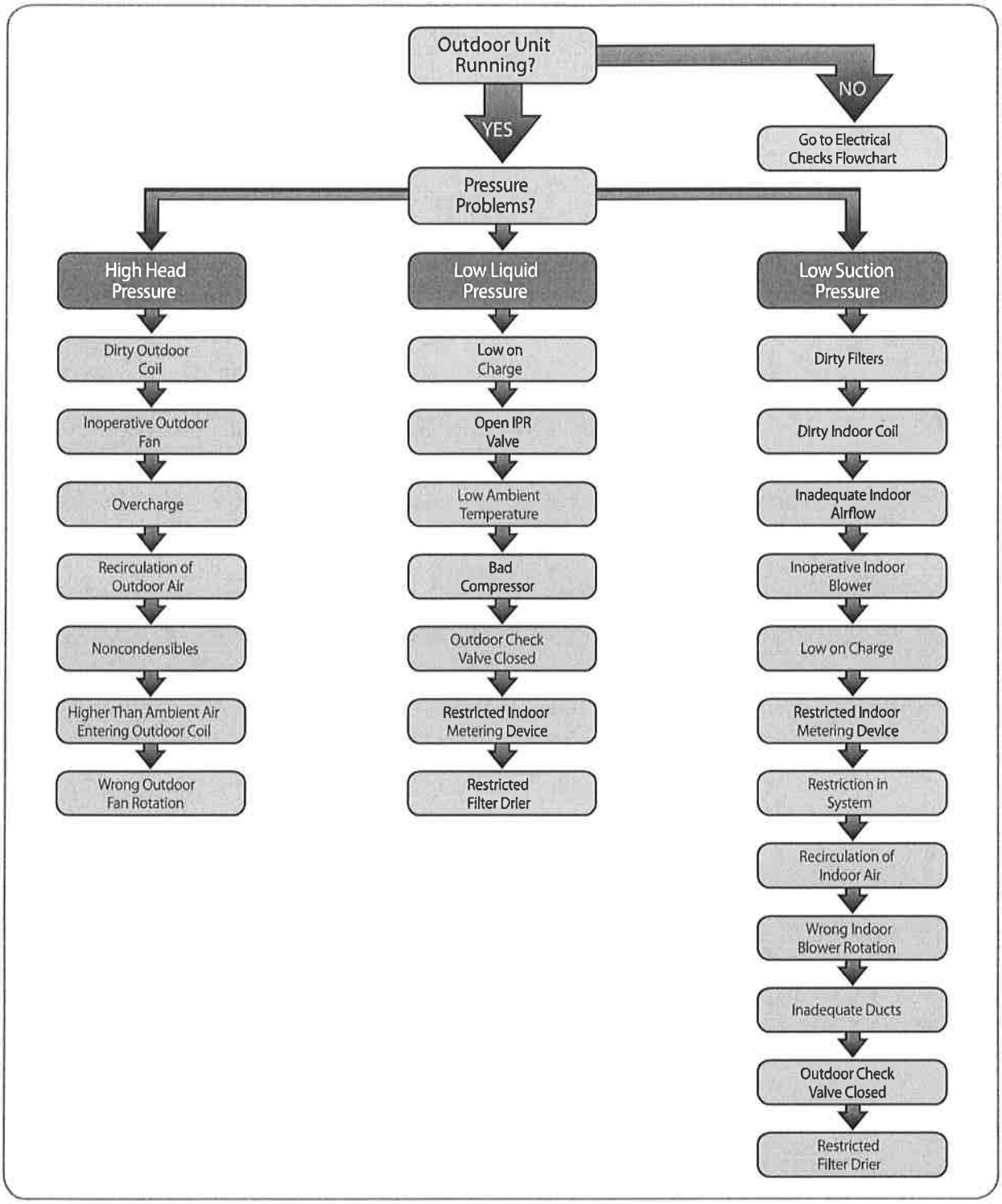
- **Vacuum Pump**
  - Clean replacement vacuum pump oil
- **Vacuum Gauge**
  - Readout in Microns
- **Refrigerant Recovery Machine**
  - Cylinders for both R-410A and R-22
- **Refrigerant Gauge Set**
  - Replacement O rings for hoses to reduce leakage
- **Refrigerant Scale**
  - Readable in lbs/ozs
- **Volt/Amp/Resistance Meter**
  - Preferably TRUE RMS
- **Temperature probes**
  - For Taking Both Wet and Dry Bulb Readings
- **Digital Psychrometer**
  - Useful For Taking Relative Humidity Readings
- **Dual Port Manometer**
  - Essential for duct static measurements and pressure switch testing
- **Resisters of Various Sizes**
  - Invaluable tools for troubleshooting /verifying control boards and equipment. Suggested sizes include 620 ohms, 1.2k ohms, 2k ohms, 3k ohms, 5k ohms, 10k ohms. These are easily obtainable from any Radio Shack and are typically sold in packs of five for about a dollar.

# DIAGNOSTICS

## Electrical Checks Flowchart

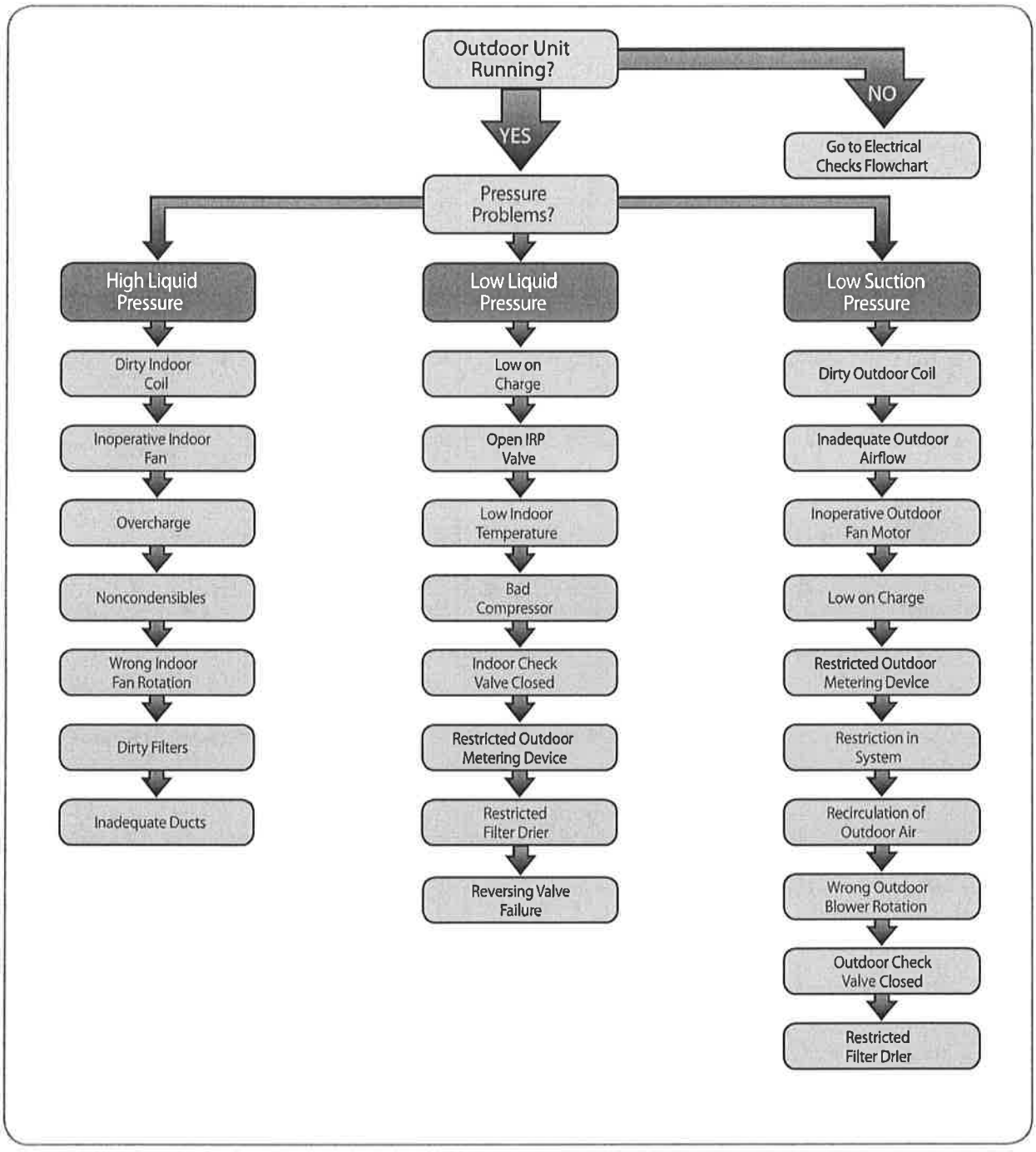


## Cooling Mechanical Checks Flowchart

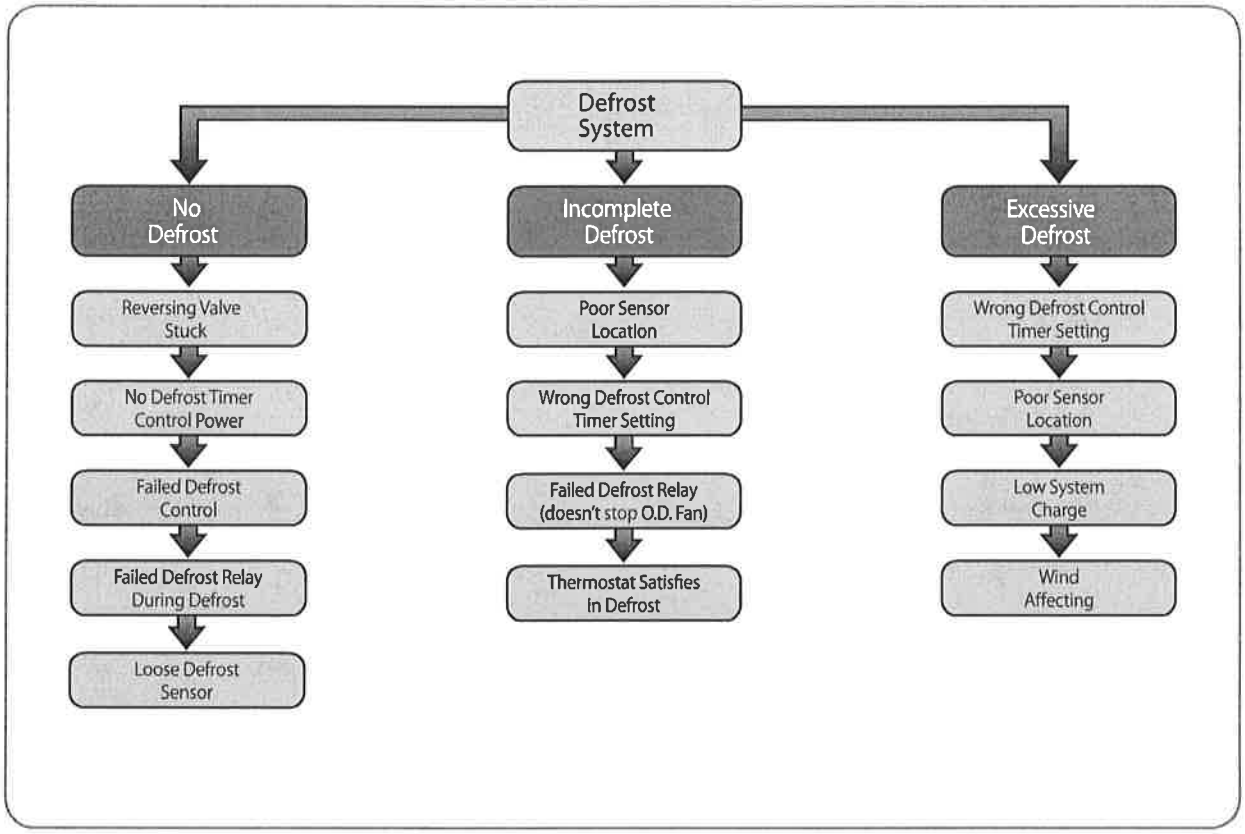


# DIAGNOSTICS

## Heating Mechanical Checks Flowchart



## Defrost Mechanical Checks Flowchart



# DIAGNOSTICS

## General Troubleshooting Chart

**⚠WARNING:** Disconnect all power to unit before servicing. Contactor may break only one side. Failure to shut off power can cause electrical shock resulting in personal injury or death.

| SYMPTOM | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| Unit will not run | • Power off or loose electrical connection | • Check for correct voltage at line voltage connections in condensing unit. |
| | • Thermostat out of calibration – set too high<br>• Defective control board | • Reset.<br>• Check control board diagnostic codes. |
| | • Blown fuses/tripped breaker<br>• Transformer defective<br>• High-pressure control open<br>• Miswiring of communications (communication light on continuously) | • Replace fuses/reset breaker.<br>• Check wiring. Replace transformer.<br>• Reset. Also see high head pressure remedy. The high-pressure control opens at 610 PSIG.<br>• Check communication wiring. |
| Outdoor fan runs, compressor doesn't | • Run or start capacitor defective<br>• Start relay defective<br>• Loose connection | • Replace.<br>• Replace.<br>• Check for correct voltage at compressor. Check and tighten all connections. |
| | • Compressor stuck, grounded or open motor winding, open internal overload.<br>• Low-voltage condition | • Wait at least 3 hours for overload to reset. If still open, replace the compressor.<br>• Add start kit components. |
| Insufficient cooling | • Improperly sized unit<br>• Improper indoor airflow<br>• Incorrect refrigerant charge<br>• Air, noncondensibles, or moisture in system | • Recalculate load.<br>• Check. Should be approximately 400 CFM per ton.<br>• Charge per procedure attached to unit service panel.<br>• Recover refrigerant. Evacuate and recharge. Add filter drier. |
| Compressor short cycles | • Incorrect voltage | • At compressor terminals, voltage must be ± 10% of nameplate marking when unit is operating. |
| | • Defective overload protector<br>• Refrigerant undercharge | • Replace. Check for correct voltage.<br>• Add refrigerant. |
| Registers sweat | • Low indoor airflow | • Increase speed of blower or reduce restriction. Replace air filter. |
| High head, low vapor pressures | • Restriction in liquid line, expansion device, or filter drier | • Remove or replace defective component. |
| | • Bad TXV | • Replace TXV. |
| High head, high or normal vapor pressure – Cooling mode | • Dirty outdoor coil<br>• Refrigerant overcharge<br>• Outdoor fan not running<br>• Air or noncondensibles in system | • Clean coil.<br>• Correct system charge.<br>• Repair or replace.<br>• Recover refrigerant. Evacuate and recharge. |
| Low head, high vapor pressures | • Bad TXV<br>• Bad compressor | • Replace TXV.<br>• Replace compressor. |
| Low vapor, cool compressor, iced indoor coil | • Low indoor airflow | • Increase speed of blower or reduce restriction. Replace air filter. |
| | • Operating below 65°F outdoors<br>• Moisture in system | • Add Low Ambient Kit.<br>• Recover refrigerant. Evacuate and recharge. Add filter drier. |
| High vapor pressure | • Excessive load<br>• Defective compressor | • Recheck load calculation.<br>• Replace. |
| Fluctuating head and vapor pressures | • TXV hunting | • Check TXV bulb clamp. Check air distribution on coil. Replace TXV. |
| | • Air or noncondensibles in system | • Recover refrigerant. Evacuate and recharge. |
| Gurgle or pulsing noise at expansion device or liquid line | • Air or noncondensibles in system | • Recover refrigerant. Evacuate and recharge. |

## Service Analyzer Charts

| COMPRESSOR OVERHEATING | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **CHECK/REMEDY** |
| High superheat (greater than 15°F [-9°C] at coil) | Low charge | Check system charge. |
| | Faulty metering device | Restricted cap tube, TEV (TXV) |
| | | Power element superheat out of adjustment internally |
| | | Foreign matter stopping flow |
| | High internal load | Hot air (attic) entering return |
| | | Heat source on; miswired or faulty control |
| | Restriction in liquid line | Drier plugged. |
| | | Line kinked. |
| | Low head pressure | Low charge |
| | | Operating in low ambient temperatures |
| | Suction or liquid line subjected to high heat source | Hot attic |
| | | Hot water line |
| Low line voltage | Loose wire connections | Check wiring. |
| | Power company problem, transformer | Have problem corrected before diagnosis continues. |
| | Undersized wire feeding unit | Correct and complete diagnosis. |
| High line voltage | Power company problem | Have problem corrected. |
| High head pressure | Overcharge | Check system charge. |
| | Dirty heat pump coil | Clean coil. |
| | Faulty or wrong size heat pump fan motor | Replace fan motor. |
| | Faulty fan blade or wrong rotation | Replace fan blade. |
| | | Replace with correct rotation motor. |
| | Recirculation of air | Correct installation. |
| | Additional heat source | Check for dryer vent near unit. |
| | | Check for recirculation from other equipment. |
| | Noncondensibles | Recover refrigerant. Evacuate and recharge system. |
| | Equipment not matched | Correct mismatch. |
| Short cycling of compressor | Faulty pressure control | Replace pressure control. |
| | Loose wiring | Check unit wiring. |
| | Thermostat | Located in supply air stream |
| | | Differential setting too close |
| | | Customer misuse |
| | TEV | Internal foreign matter |
| | | Power element failure |
| | | Valve too small |
| | | Distributor tube/tubes restricted |
| | Distributor tube | Restricted with foreign matter |
| | | Kinked |
| | | I.D. reduced from previous compressor failure |

# DIAGNOSTICS

## Service Analyzer Charts

| COMPRESSOR OVERHEATING (cont.) | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **CHECK OR REMEDIES** |
| Short cycling of compressor (cont.) | Low charge | Check system charge. |
| | Low evaporator airflow | Dirty coil |
| | | Dirty filter |
| | | Duct too small or restricted |
| | Faulty run capacitor | Replace. |
| | Faulty internal overload | Replace compressor. |
| Faulty Compressor Valves | Fast equalization/Low pressure difference | Replace compressor and examine system to locate reason. |

| ELECTRICAL | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **CHECK OR REMEDIES** |
| Voltage present on load side of compressor contactor and compressor won't run | Compressor start components | Check start capacitor. |
| | | Check potential relay. |
| | Run capacitor | Check with ohmmeter |
| | Internal overload | Allow time to reset. |
| | Compressor windings | Check for correct ohms. |
| Voltage present on line side of compressor contactor only | Thermostat | Check for control voltage to contactor coil. |
| | Compressor control circuit | High-pressure switch |
| | | Low-pressure switch |
| | | Ambient thermostat |
| | | Solid-state protection control or internal thermal sensors |
| | | Compressor timed off/on control or interlock |
| No voltage on line side of compressor contactor | Blown fuses or tripped circuit breaker | Check for short in wiring or unit. |
| | Improper wiring | Recheck wiring diagram. |
| Improper voltage | High voltage | Wrong unit |
| | | Power supply problem |
| | Low voltage | Wrong unit |
| | | Power supply problem |
| | | Wiring undersized |
| | | Loose connections |
| | Single Phasing (3 phase) | Check incoming power and fusing. |

| FLOODED STARTS | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **CHECK OR REMEDIES** |
| Liquid in the compressor shell | Faulty or missing crankcase heater | Replace crankcase heater. |
| Too much liquid in system | Incorrect piping | Check piping guidelines. |
| | Overcharge | Check and adjust charge. |

## Service Analyzer Charts

| CONTAMINATION | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **REMEDY** |
| Moisture | Poor evacuation on installation or during service | In each case, the cure is the same. Recover refrigerant. Add filter drier, evacuate, and recharge. |
| High head pressure | Noncondensibles air | |
| Unusual head and suction readings | Wrong refrigerant or mixed refrigerants | |
| Foreign matter – copper filings | Copper tubing cuttings | |
| Copper oxide | Dirty copper piping or nitrogen not used when brazing | |
| Welding scale | Nitrogen not used during brazing | |
| Soldering flux | Adding flux before seating copper partway | |
| Excess soft solder | Wrong solder material | |

| LOSS OF LUBRICATION | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **REMEDY** |
| Compressor failures | Line tubing too large | Reduce pipe size to improve oil return. |
| Low suction pressure | Low charge | Check system charge. |
| | Refrigerant leaks | Repair and recharge. |
| Cold, noisy compressor – Slugging | Dilution of oil with refrigerant | Observe piping guidelines. |
| Noisy compressor | Migration | Check crankcase heater. |
| Cold, sweating compressor | Flooding | Check system charge. |
| Low load | Reduced airflow | Dirty filter |
| | | Dirty coil |
| | | Wrong duct size |
| | | Restricted duct |
| | Thermostat setting | Advise customer. |
| Short cycling of compressor | Faulty high- or low-pressure control | Replace control. |
| | Loose wiring | Check all control wires. |
| | Thermostat | In supply air stream, out of calibration |
| | | Customer misuse |

| SLUGGING | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **REMEDY** |
| On start-up | Incorrect piping | Review pipe size guidelines. |
| TEV hunting when running | Faulty TEV | Replace TEV. |

# DIAGNOSTICS

## Service Analyzer Charts

| FLOODING | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **REMEDY** |
| Poor system control using a TEV | Loose sensing bulb | Secure the bulb and insulate. |
| | Bulb in wrong location | Relocate bulb. |
| | Wrong size TEV | Use correct replacement. |
| | Improper superheat setting (less than 5°F [-15°C]) | Replace TEV. |

| THERMOSTATIC EXPANSION VALVES | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **REMEDY** |
| High Superheat, Low Suction Pressure (superheat over 15°F [-9°C]) | Moisture freezing and blocking valve | Recover charge, install filter-drier, evacuate system, recharge. |
| | Dirt or foreign material blocking valve | Recover charge, install filter-drier, evacuate system, recharge. |
| | Low refrigerant charge | Correct the charge. |
| | Vapor bubbles in liquid line | Remove restriction in liquid line. Correct the refrigerant charge. |
| | | Remove noncondensible gases. |
| | | Size liquid line correctly. |
| | Misapplication of internally equalized valve | Use correct TEV. |
| | Plugged external equalizer line | Remove external equalizer line restriction. |
| | Undersized TEV | Replace with correct valve. |
| | Loss of charge from power head sensing bulb | Replace power head or complete TEV. |
| | Charge migration from sensing bulb to power head (Warm power head with warm, wet cloth. Does valve operate correctly now?) | Ensure TEV is warmer than sensing bulb. |
| Valve feeds too much refrigerant, with low superheat and higher than normal suction pressure | Moisture causing valve to stick open. | Recover refrigerant, replace filter-drier, evacuate system, and recharge. |
| | Dirt or foreign material causing valve to stick open | Recover refrigerant, replace filter drier, evacuate system, and recharge. |
| | TEV seat leak (a gurgling or hissing sound is heard AT THE TEV during the off cycle, if this is the cause). NOT APPLICABLE TO BLEED PORT VALVES. | Replace the TEV. |
| | Oversized TEV | Install correct TEV. |
| | Incorrect sensing bulb location | Install bulb with two mounting straps, in 2:00 or 4:00 position on suction line, with insulation. |
| | Low superheat adjustment | Replace TEV. |
| | Incorrectly installed, or restricted external equalizer line | Remove restriction, or relocate external equalizer. |

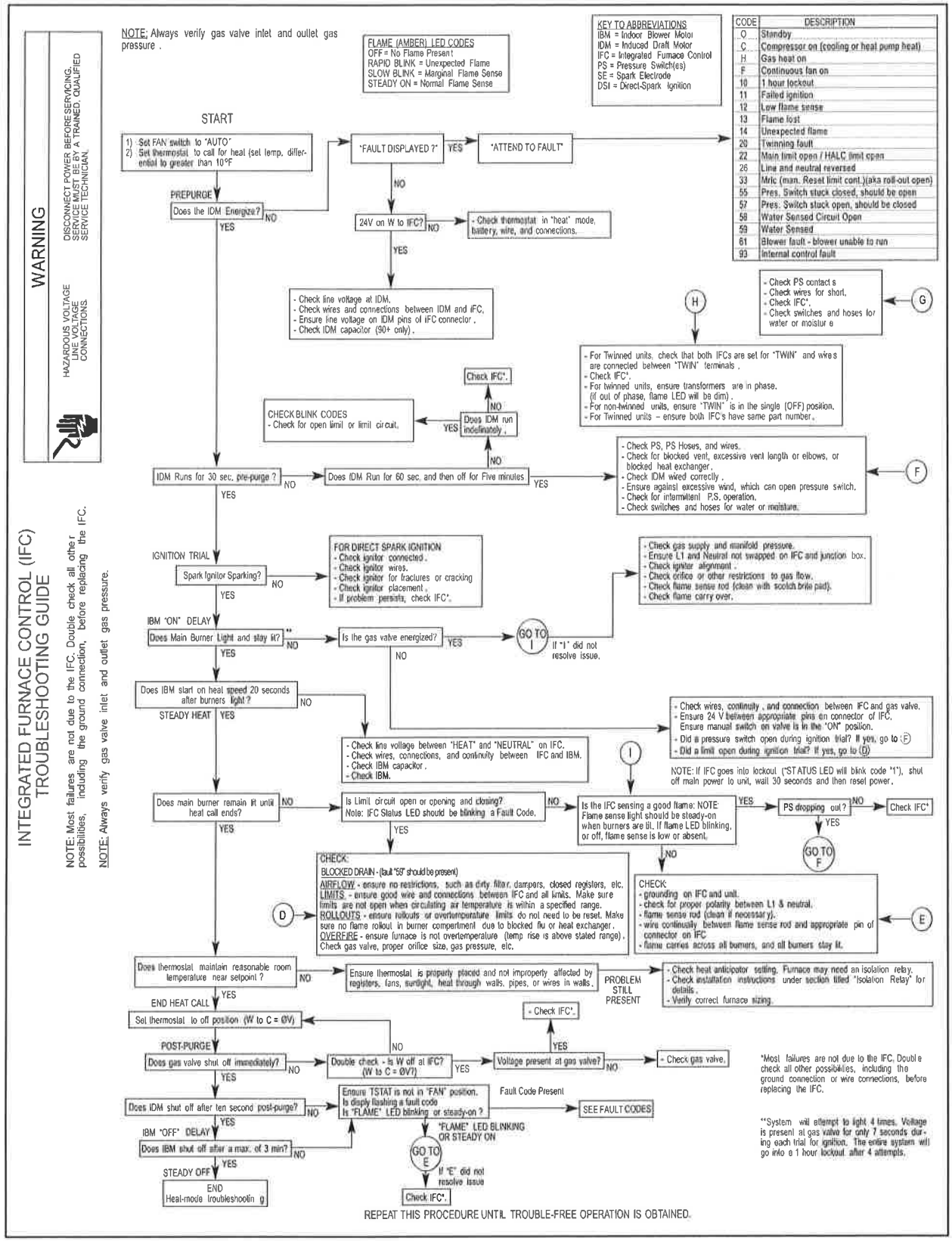
## Service Analyzer Charts

| THERMOSTATIC EXPANSION VALVES (cont.) | | |
|---|---|---|
| **SYMPTOM** | **POSSIBLE CAUSE** | **REMEDY** |
| Compressor flood back upon start-up | Refrigerant drainage from flooded evaporator | Install trap riser to the top of the evaporator coil. |
| | Inoperable crankcase heater or crankcase heater needed | Replace or add crankcase heater. |
| | Any of the causes listed under symptoms of Electrical problems on page 45 | Any of the solutions listed under solutions of Electrical problems on page 45 |
| Superheat is low to normal with low suction pressure | Unequal evaporator circuit loading | Ensure airflow is equally distributed through evaporator. |
| | | Check for blocked distributor tubes. |
| | Low load or airflow entering evaporator coil | Ensure blower is moving proper air CFM. |
| | | Remove/Correct any airflow restriction. |
| Superheat and suction pressure fluctuate (valve is hunting) | Expansion valve is oversized | Install correct TEV. |
| | Sensing bulb is affected by liquid refrigerant or refrigerant oil flowing through suction line | Relocate sensing bulb in another position around the circumference of the suction line. |
| | Unequal refrigerant flow through evaporator circuits | Ensure sensing bulb is located properly. |
| | | Check for blocked distributor tubes. |
| | Moisture freezing and partially blocking TEV | Recover refrigerant, change filter-drier, evacuate system, and recharge. |
| Valve does not regulate at all | External equalizer line not connected or line plugged | Connect equalizer line in proper location, or remove any blockage. |
| | Sensing bulb lost its operating charge | Replace TEV. |
| | Valve body damaged during soldering or by improper installation | Replace TEV. |

# DIAGNOSTICS

| COOLING MODE<br>TROUBLESHOOTING TIPS | | | | | |
|---|---|---|---|---|---|
| SYSTEM PROBLEM | INDICATORS | | | | |
| | DISCHARGE PRESSURE | SUCTION PRESSURE | SUPERHEAT Normal: 5°–15°F [-15° – -9°C] | SUBCOOLING Normal: See Charging Chart | COMPRESSOR AMPS |
| Overcharge | High | High | Low | High | High |
| Undercharge | Low | Low | High | Low | Low |
| Liquid Restriction (Drier) | Low | Low | High | High | Low |
| Low Indoor Airflow | Low | Low | Low | Low | Low |
| Dirty Outdoor Coil | High | High | Low | Low | High |
| Low Outdoor Ambient Temperature | Low | Low | High | High | Low |
| Inefficient Compressor | Low | High | High | High | Low |
| Indoor TXV Feeler Bulb Charge Lost | Low | Low | High | High | Low |
| Poorly Insulated Indoor Sensing Bulb | High | High | Low | Low | High |

| HEATING MODE<br>TROUBLESHOOTING TIPS | | | | | |
|---|---|---|---|---|---|
| SYSTEM PROBLEM | INDICATORS | | | | |
| | DISCHARGE PRESSURE | SUCTION PRESSURE | SUPERHEAT Normal: 5°–15°F [-15° – -9°C] | SUBCOOLING Normal: See Charging Chart | COMPRESSOR AMPS |
| Overcharge | High | High | OK | High | High |
| Undercharge | Low | Low | OK or High | Low | Low |
| Liquid Restriction (Drier) | Low | Low | High | High | Low |
| Low Outdoor Airflow | Low | Low | Low | Low | Low |
| Dirty Indoor Coil | High | High | Low | Low | High |
| Low Indoor Ambient Temperature | Low | Low | OK | High | Low |
| Inefficient Compressor | Low | High | High | High | Low |
| Outdoor TXV Feeler Bulb Charge Lost | Low | Low | High | High | Low |
| Poorly Insulated Outdoor Sensing Bulb | High | High | Low | Low | High |


WARNING
DISCONNECT POWER BEFORE SERVICING. SERVICE MUST BE BY A TRAINED, QUALIFIED SERVICE TECHNICIAN.
HAZARDOUS VOLTAGE LINE VOLTAGE CONNECTIONS.
INTEGRATED FURNACE CONTROL (IFC) TROUBLESHOOTING GUIDE
NOTE: Most failures are not due to the IFC. Double check all other possibilities, including the ground connection, before replacing the IFC.
NOTE: Always verify gas valve inlet and outlet gas pressure.
NOTE: Always verify gas valve inlet and outlet gas pressure.
FLAME (AMBER) LED CODES
OFF = No Flame Present
RAPID BLINK = Unexpected Flame
SLOW BLINK = Marginal Flame Sense
STEADY ON = Normal Flame Sense
KEY TO ABBREVIATIONS
IBM = Indoor Blower Motor
IDM = Induced Draft Motor
IFC = Integrated Furnace Control
PS = Pressure Switch(es)
SE = Spark Electrode
DSI = Direct-Spark Ignition
CODE DESCRIPTION
O Standby
C Compressor on (cooling or heat pump heat)
H Gas heat on
F Continuous fan on
10 1 hour lockout
11 Failed ignition
12 Low flame sense
13 Flame lost
14 Unexpected flame
29 Twinning fault
22 Main limit open / HALC limit open
26 Line and neutral reversed
33 Mric (man. Reset limit cont.)(aka roll-out open)
55 Pres. Switch stuck closed, should be open
57 Pres. Switch stuck open, should be closed
58 Water Sensed Circuit Open
59 Water Sensed
61 Blower fault - blower unable to run
93 Internal control fault
START
1) Set FAN switch to "AUTO"
2) Set thermostat to call for heat (set temp. differential to greater than 10°F
"FAULT DISPLAYED ?" YES "ATTEND TO FAULT"
NO
PREPURGE
Does the IDM Energize? NO
YES
24V on W to IFC? NO - Check thermostat in "heat" mode, battery, wire, and connections.
YES
- Check line voltage at IDM.
- Check wires and connections between IDM and IFC.
- Ensure line voltage on IDM pins of IFC connector.
- Check IDM capacitor (90+ only).
H
- Check PS contacts
- Check wires for short.
- Check IFC*.
- Check switches and hoses for water or moisture
G
- For Twinned units, check that both IFCs are set for "TWIN" and wires are connected between "TWIN" terminals.
- Check IFC*.
- For twinned units, ensure transformers are in phase. (if out of phase, flame LED will be dim).
- For non-twinned units, ensure "TWIN" is in the single (OFF) position.
- For Twinned units – ensure both IFC's have same part number.
Check IFC*.
CHECK BLINK CODES
- Check for open limit or limit circuit.
YES Does IDM run indefinately? NO
NO
IDM Runs for 30 sec. pre-purge ? NO
YES
Does IDM Run for 60 sec. and then off for Five minutes YES
- Check PS, PS Hoses, and wires.
- Check for blocked vent, excessive vent length or elbows, or blocked heat exchanger.
- Check IDM wired correctly.
- Ensure against excessive wind, which can open pressure switch.
- Check for intermittent P.S. operation.
- Check switches and hoses for water or moisture.
F
IGNITION TRIAL
Spark Ignitor Sparking? NO
YES
FOR DIRECT SPARK IGNITION
- Check ignitor connected.
- Check ignitor wires.
- Check ignitor for fractures or cracking
- Check ignitor placement.
- If problem persists, check IFC*.
- Check gas supply and manifold pressure.
- Ensure L1 and Neutral not swapped on IFC and junction box.
- Check igniter alignment.
- Check orifice or other restrictions to gas flow.
- Check flame sense rod (clean with scotch brite pad).
- Check flame carry over.
IBM "ON" DELAY
Does Main Burner Light and stay lit? ** NO
YES
Is the gas valve energized? YES
NO
GO TO I
If "I" did not resolve issue.
Does IBM start on heat speed 20 seconds after burners light ? NO
STEADY HEAT YES
- Check wires, continuity, and connection between IFC and gas valve.
- Ensure 24 V between appropriate pins on connector of IFC.
Ensure manual switch on valve is in the "ON" position.
- Did a pressure switch open during ignition trial? If yes, go to (F)
- Did a limit open during ignition trial? If yes, go to (D)
- Check line voltage between "HEAT" and "NEUTRAL" on IFC.
- Check wires, connections, and continuity between IFC and IBM.
- Check IBM capacitor.
- Check IBM.
I
NOTE: If IFC goes into lockout ("STATUS LED will blink code "1"), shut off main power to unit, wait 30 seconds and then reset power.
Does main burner remain lit until heat call ends? NO
YES
Is Limit circuit open or opening and closing? NO
Note: IFC Status LED should be blinking a Fault Code.
YES
Is the IFC sensing a good flame: NOTE: Flame sense light should be steady-on when burners are lit. If flame LED blinking, or off, flame sense is low or absent. YES
PS dropping out? NO Check IFC*
YES
GO TO F
NO
CHECK:
BLOCKED DRAIN - (fault "58" should be present)
AIRFLOW - ensure no restrictions, such as dirty filter, dampers, closed registers, etc.
LIMITS - ensure good wire and connections between IFC and all limits. Make sure limits are not open when circulating air temperature is within a specified range.
ROLLOUTS - ensure rollouts or overtemperature limits do not need to be reset. Make sure no flame rollout in burner compartment due to blocked flu or heat exchanger.
OVERFIRE - ensure furnace is not overtemperature (temp rise is above stated range). Check gas valve, proper orifice size, gas pressure, etc.
D
CHECK:
- grounding on IFC and unit.
- check for proper polarity between L1 & neutral.
- flame sense rod (clean if necessary).
- wire continually between flame sense rod and appropriate pin of connector on IFC
- flame carries across all burners, and all burners stay lit.
E
Does thermostat maintain reasonable room temperature near setpoint ? NO
Ensure thermostat is properly placed and not improperly affected by registers, fans, sunlight, heat through walls, pipes, or wires in walls.
PROBLEM STILL PRESENT
- Check heat anticipator setting. Furnace may need an isolation relay.
- Check installation instructions under section titled "Isolation Relay" for details.
- Verify correct furnace sizing.
YES
END HEAT CALL
Set thermostat to off position (W to C = ØV)
- Check IFC*.
POST-PURGE
Does gas valve shut off immediately? NO
YES
Double check - is W off at IFC? (W to C = ØV!) YES
NO
Voltage present at gas valve? YES
NO
- Check gas valve.
Does IDM shut off after ten second post-purge? NO
YES
Ensure TSTAT is not in "FAN" position.
Is display flashing a fault code
Is "FLAME" LED blinking or steady-on ?
Fault Code Present
SEE FAULT CODES
"FLAME" LED BLINKING OR STEADY ON
IBM "OFF" DELAY
Does IBM shut off after a max. of 3 min? NO
YES
GO TO E
If "E" did not resolve issue
Check IFC*.
STEADY OFF
END
Heat-mode troubleshooting
*Most failures are not due to the IFC. Double check all other possibilities, including the ground connection or wire connections, before replacing the IFC.
**System will attempt to light 4 times. Voltage is present at gas valve for only 7 seconds during each trial for ignition. The entire system will go into a 1 hour lockout after 4 attempts.
REPEAT THIS PROCEDURE UNTIL TROUBLE-FREE OPERATION IS OBTAINED.

## Thermistor Resistance Chart

| | MODELS: ALL R410A INDOOR UNITS | | | | MODELS: ALL R410A OUTDOOR UNITS | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Room T Thermistor | Room T Thermistor w/ board | Indoor Pipe Thermistor | Indoor Pipe Thermistor w/ board | Discharge/ Compressor Thermistor | Outdoor Pipe Thermistor | Outdoor Temperature Thermistor | Heat Sink Thermistor | 2/3 Way Valve Thermistor |
| Temp °F(°C) | Ohms kΩ | Ohms kΩ | Ohms kΩ | Ohms kΩ | Ohms kΩ | Ohms kΩ | Ohms kΩ | Ohms kΩ | Ohms kΩ |
| -4(-20) | | | | | | 49.20 | 115.24 | | |
| 5(-15) | | | | | | 36.58 | 84.21 | | |
| 14(-10) | | | | | | 27.51 | 62.28 | | 312 |
| 23(-5) | | | | | | 20.91 | 46.58 | | 233 |
| 32(0) | 33.62 | 8.29 | 176.03 | 39.48 | 175.70 | 16.05 | 35.21 | 16.1 | 176 |
| 41(5) | 25.93 | - | 134.23 | - | 134.93 | 12.44 | 26.88 | 12.4 | 134 |
| 50(10) | 20.18 | 7.12 | 103.34 | 34.10 | 104.59 | 9.73 | 20.72 | 9.73 | 103 |
| 59(15) | 15.84 | - | 80.28 | - | 81.79 | 7.67 | 16.12 | 7.67 | 80.3 |
| 68(20) | 12.54 | 5.86 | 62.91 | 28.14 | 64.50 | 6.10 | 12.64 | 6.10 | 62.9 |
| 77(25) | 10.00 | 5.24 | 49.70 | 25.15 | 51.27 | 4.89 | 10.00 | - | - |
| 86(30) | 8.04 | 4.64 | 39.57 | 22.26 | 41.07 | 3.95 | 7.97 | 3.95 | 39.6 |
| 95(35) | 6.51 | - | 31.74 | - | 33.13 | 3.21 | 6.40 | - | - |
| 104(40) | 5.30 | 3.58 | 25.64 | 17.05 | 26.91 | 2.62 | 5.18 | 2.62 | 25.6 |
| 113(45) | 4.35 | - | 20.85 | - | 22.01 | 2.16 | 4.21 | - | - |
| 122(50) | 3.59 | 2.71 | 17.06 | 12.78 | 18.10 | 1.79 | 3.45 | 1.79 | 17.1 |
| 131(55) | 2.98 | - | 14.10 | - | 14.98 | 1.49 | 2.85 | - | - |
| 140(60) | 2.47 | 2.03 | 11.64 | 9.47 | 12.47 | 1.25 | 2.36 | 1.25 | 11.6 |
| 149(65) | 2.09 | | 9.69 | | 10.44 | 1.05 | 1.97 | - | - |
| 158(70) | 1.76 | | 8.12 | | 8.78 | 0.89 | 1.65 | 0.89 | 8.12 |
| 167(75) | 1.49 | | 6.83 | | 7.42 | 0.76 | 1.39 | - | - |
| 176(80) | 1.27 | | 5.78 | | 6.31 | 0.65 | 1.18 | 0.65 | 5.78 |
| 185(85) | 1.09 | | 4.91 | | 5.38 | 0.56 | 1.00 | - | - |
| 194(90) | 0.93 | | 4.19 | | 4.61 | 0.48 | 0.85 | 0.48 | 4.19 |
| 203(95) | 0.81 | | 3.59 | | 3.97 | 0.41 | 0.73 | - | - |
| 212(100) | 0.70 | | 3.09 | | 3.43 | 0.36 | 0.63 | 0.36 | 3.09 |
| 221(105) | | | | | 2.98 | | | - | |
| 230(110) | | | | | 2.59 | | | 0.27 | |
| 239(115) | | | | | 2.26 | | | - | |
| 248(120) | | | | | 1.99 | | | 0.21 | |
| 284(140) | | | | | 1.21 | | | | |
| 320(160) | | | | | 0.77 | | | | |
| 356(180) | | | | | 0.51 | | | | |

## Indoor Ceiling Cassettes

### MODELS: AUU18RCLX, AUU24RCLX, AUU36RCLX, AUU42RCLX

| Error Code | Error Contents |
|---|---|
| 01 | Indoor unit doesn't accept signal from outdoor unit |
| 02 | Room temperature sensor open |
| 03 | Room temperature sensor short-circuited |
| 04 | Indoor heat exchanger temperature sensor open |
| 05 | Indoor heat exchanger temperature sensor short circuited |
| 06 | Outdoor heat exchanger temperature sensor |
| 08 | Power source connection error |
| 09 | Float switch operated |
| 0A | Outdoor temperature sensor error |
| 0c | Discharge pipe temperature sensor |
| 11 | Model abnormal/Indoor EPROM Abnormal |
| 12 | Indoor fan abnormal |
| 13 | Outdoor unit doesn't accept the signal from indoor unit |
| 14 | Excessive outdoor pressure (permanent stop) |
| 15 | Compressor temperature sensor |
| 16 | Pressure switch error |
| 17 | IPM error |
| 18 | CT error |
| 19 | Active filter module (AFM) error |
| 1A | Compressor does not operate |
| 1b | Outdoor unit fan error |
| 1c | Communication error (inverter to multi controller) |
| 1d | 2 way valve sensor error |
| 1E | Expansion valve error |
| 1F | Connection indoor unit error |

## Outdoor Cassette & Ceiling Suspended

### MODELS: AOU18RLX, AOU24RLX, AOU36RLX, AOU42RLX

| LED | Error Contents |
|---|---|
| 1 flash | Communication error (Indoor unit to Outdoor unit) |
| 2 flash | Discharge pipe temperature sensor |
| 3 flash | Outdoor heat exchanger temperature sensor |
| 4 flash | Outdoor temperature sensor |
| 7 flash | Compressor temperature sensor |
| 8 flash | Heat sink temperature sensor |
| 9 flash | Pressure switch abnormal |
| 12 flash | IPM error |
| 13 flash | Compressor rotor position cannot detect |
| 14 flash | Compressor cannot operate/Start up error |
| 15 flash | Outdor fan abnormal (upper fan) |
| 16 flash | Outdoor fan abnormal (lower fan) |
| Lighting | No error |

Halcyon

# HIGH-SEER R410A MINI-SPLITS TROUBLESHOOTING GUIDE 2013 - 2014

FUJITSU

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*Revision 12/13*
*Part #6-26-FG2020*

# Wall Mounted

**SYSTEMS: 9CQ, 9RQ, 9R2, 9RLQ, 9RL, 9RLS, 12CQ, 12RQ, 12R2, 12RLQ, 12RL, 12RLS, 15RLQ, 15RLS, 18CL, 18RL, 18RLQ, 18RLXQ, 18RLXS, 24CL, 24CL1, 24RLQ, 24RLXQ, 24RLXS, 30RLX, 30CLX, 30CLX1, 30RLXQ, 36CLX, 36CLX1**

| Error Indication | | Wired Remote | Error | Diagnosis Method |
|---|---|---|---|---|
| Operation | Timer | | | |
| OFF | 0.5 sec 2 Times | 01 | Serial reverse transfer error at start up operation | Communication error - At Start Up, Evaporator and Condenser are not communicating.<br>*-Check wiring from panel to condenser, condenser to evaporator. Wire nuts and splices are not recommended. Check for correct voltage at panel, condenser and evaporator. Refer to the Service Instruction manual - Serial Signal troubleshooting for further details.* |
| | 0.5 sec 3 Times | 01 | Serial reverse transfer error during operation | Communication error - During operation, Evaporator and Condenser did not communicate for 10 consecutive seconds.<br>*-Check wiring from panel to condenser, condenser to evaporator. Check for correct voltage at panel, condenser and evaporator. Refer to the Service Instruction manual - Serial Signal troubleshooting for further details.* |
| | 0.5 sec 4 Times | 13 | Serial forward transfer error at start up operation | Communication error - At the start up, Evaporator and Condenser are not communicating.<br>*-Reset power. If error code reappears check wiring from panel to condenser, condenser to evaporator. Check for correct voltage at panel, condenser and evaporator. Refer to the Service Instruction manual - Serial Signal troubleshooting for further details.* |
| | 0.5 sec 5 Times | 13 | Serial forward transfer error during operation | Communication error - During operation, Evaporator and Condenser did not communicate for 10 consecutive seconds.<br>*-Reset power. If error code reappears check wiring from panel to condenser, condenser to evaporator. Check for correct voltage at panel, condenser and evaporator. Refer to the Service Instruction manual - Serial Signal troubleshooting for further details.* |
| | 0.5 sec 8 Times | 00 | Wire Remote Controller error | Communication error - Evaporator and wire remote controller are not communicating.<br>*-Check wiring between evaporator and wire remote controller.*<br>*-Check for DC 12V at evaporator connector. If voltage present replace wire remote control.* |
| 0.5 sec 2 Times | 0.5 sec 2 Times | 02 | Room temperature thermistor error | Room temperature thermistor detected an abnormal temperature.<br>*-Check thermistor for open or short. Check thermistor resistance value (Refer to "Thermister characteristics table").*<br>*-Controller PCB defective.* |
| | 0.5 sec 3 Times | 04 | Indoor heat exchanger thermistor error | Evaporator pipe thermistor detected an abnormal temperature.<br>*-Check thermistor for open or short. Check thermistor resistance value (Refer to "Thermister characteristics table").*<br>*-Controller PCB defective.* |
| 0.5 sec 3 Times | 0.5 sec 2 Times | 0C | Discharge thermistor error | Condenser discharge thermistor detected an abnormal temperature.<br>*-Check thermistor for open or short. Check thermistor resistance value (Refer to "Thermister characteristics table").*<br>*-Controller PCB defective.* |
| | 0.5 sec 3 Times | 06 | Outdoor heat exchanger thermistor error | Condenser pipe thermistor detected an abnormal temperature.<br>*-Check thermistor for open or short. Check thermistor resistance value (Refer to "Thermister characteristics table").*<br>*-Controller PCB defective.* |
| | 0.5 sec 4 Times | 0A | Outdoor temperature thermistor error | Condenser ambient thermistor detected an abnormal temperature.<br>*-Check thermistor for open or short. Check thermistor resistance value (Refer to "Thermister characteristics table").*<br>*-Controller PCB defective.* |
| | 0.5 sec 8 Times | 15 | Compressor Temperature Thermistor Error | Condenser ambient thermistor detected an abnormal temperature.<br>*-Check thermistor for open or short. Check thermistor resistance value (Refer to "Thermister characteristics table").*<br>*-Controller PCB defective.* |

# Universal Mount / Ceiling Suspended

**MODELS: ABU18RULX, ABU24RULX, ABU36RSLX**

| Operation | Timer | Swing | Error Contents |
|---|---|---|---|
| Continuous blink | Continuous blink | OFF | Indoor EEPROM abnormal |
| Continous blink | Continuous blink | Continuous blink | Outdoor EEPROM abnormal |
| 2 flashes | Continuous blink | OFF | Indoor room temperature sensor open |
| 2 flashes | Continuous blink | Continuous blink | Indoor room temperature sensor short circuited |
| 3 flashes | Continuous blink | OFF | Indoor heat exchanger temperature sensor open |
| 3 flashes | Continuous blink | Continuous blink | Indoor heat exchanger temperature sensor short circuited |
| 4 flashes | Continuous blink | OFF | Float switch operated |
| 5 flashes | Continuous blink | OFF | Communication error (serial reverse transfer error) |
| 5 flashes | Continuous blink | Continuous blink | Outdoor communication error (forward reverse transfer error) |
| 6 flashes | Continuous blink | OFF | Indoor fan abnormal |
| Continuous blink | 2 flashes | OFF | Outdoor power source connection abnormal |
| Continuous blink | 3 flashes | OFF | Outdoor heat exchanger temperature sensor open |
| Continuous blink | 3 flashes | Continuous blink | Outdoor heat exchanger temperature sensor short circuited |
| Continuous blink | 4 flashes | OFF | Outdoor temperature sensor open |
| Continuous blink | 4 flashes | Continuous blink | Outdoor temperature sensor short circuited |
| Continuous blink | 5 flashes | OFF | Outdoor discharge pipe temperature sensor or compressor temperature sensor open |
| Continuous blink | 5 flashes | Continuous blink | Outdoor discharge pipe temperature sensor or compressor temperature sensor short circuited |
| Continuous blink | 6 flashes | OFF | Outdoor high pressure abnormal |
| Continuous blink | 7 flashes | OFF | Outdoor discharge pipe temperature or compressor temperature sensor abnormal |
| Continuous blink | 8 flashes | OFF | Compressor temperature thermistor error |
| Continuous blink | 9 flashes | OFF | Pressure switch error |
| Continuous blink | 10 flashes | OFF | IPM error |
| Continuous blink | 11 flashes | OFF | CT error |
| Continuous blink | 12 flashes | OFF | Active Filter Module Error (AFM) |
| Continuous blink | 13 flashes | OFF | Compressor rotor location can not be detected (Permanent Stop) |
| Continuous blink | 14 flashes | OFF | Outdoor unit fan motor error |

# Wall Mounted

**SYSTEMS: 9CQ, 9RQ, 9R2, 9RLQ, 9RL, 9RLS, 12CQ, 12RQ, 12R2, 12RLQ, 12RL, 12RLS, 15RLQ, 15RLS, 18CL, 18RL, 18RLQ, 18RLXQ, 18RLXS, 24CL, 24CL1, 24RLQ, 24RLXQ, 24RLXS, 30RLX, 30CLX, 30CLX1, 30RLXQ, 36CLX, 36CLX1**

| Error Indication | | Wired Remote | Error | Diagnosis Method |
|---|---|---|---|---|
| Operation | Timer | | | |
| 0.5 sec 4 Times | 0.5 sec 2 Times | No Display | Forced auto switch error | Forced auto switch open (pushed in) for 30 consecutive seconds or more.<br>*-Check if forced auto switch is kept pressed.*<br>*-Controller PCB defective.* |
| | 0.5 sec 3 Times | No Display | Main Relay error | After 2 minutes 20 seconds of stopped operation, the signal from the outdoor unit is received even though the main relay is OFF.<br>*-Check if Main relay is defective.*<br>*-Controller PCB defective.* |
| | 0.5 sec 4 Times | No Display | Power supply frequency detection error | The power supply frequency can not be recognized after 4 seconds of Power ON.<br>Permanent STOP.<br>*-Controller PCB defective.* |
| | 0.5 sec 7 Times | No Display | VDD permanent STOP protection (electric air cleaner) | Electric Air Cleaner error - When the air cleanness monitor trial protection operates 4 times.<br>*-Check the front panel and ensure it is closed.*<br>*-Check IAQ micro switch for open/close operation.* |
| | 0.5 sec 8 Times | 21 | Reverse VDD (Electric air clean power supply circuit abnormal) | IAQ error code - The air clean operation signal was detected for 1 minute at the time of air clean mode was OFF.<br>*-Electric air cleaner defective.*<br>*-Controller PCB defective.* |
| 0.5 sec 5 Times | 0.5 sec 2 Times | 17 | IPM protection | Abnormal current value at the IPM is detected. Heat radiation is blocked (inlet/outlet).<br>*-Check if outdoor fan is defective (does not rotate).*<br>*-IPM/Controller PCB defective.Check Refrigeration cycle for under/over charge conditions.* |
| | 0.5 sec 3 Times | 18 | CT error | Current Transfer error - The current value during the operation after 1 minute from starting up the compressor drops to zero (0) Amps.<br>*-Check if CT wire is open. See Service Manual for schematic on each model.*<br>*-Controller PCB defective.* |
| | 0.5 sec 5 Times | 1A | Compressor location error | Compressor Detection - The compressor speed does not synchronize with the control signal. (Including start up failure of the compressor.)<br>*-Check if 2-way valve or 3-way valve are open.Check the compressor (Winding resistance value, loose lead wire).*<br>*-Check Refrigeration cycle condition.* |
| | 0.5 sec 6 Times | 1B | Outdoor fan error (DC Motor) | Condenser fan motor error - Abnormal current or fan motor lock error was detected.<br>*-Check Fan motor connector loose/defective contact. Rotate fan motor by hand to ensure it is not locked. Check DC 150-380V on fan motor between Red & Black wire. Check DC 15V between Black & White wire. Voltage not present.*<br>*-Controller PCB defective.* |
| | 0.5 sec 7 Times | 1F | Model Match Error Connected indoor unit error | Apparent model information error from EPROM (miss match). 3 continuous failure of lead test of EPROM at Power ON, Voltage drop or noise, etc.<br>*- Controller PCB defective.* |

# Multi-Zone

**MODELS: ASU9RMLQ, ASU12RMLQ, ASU18RMLQ, ARU9RML*, ARU12RML*, ARU18RML*, AUU9RML, AUU12RML, AUU18RML, AOU24RML, AOU36RML, AOU24RML1, AOU36RML1** * For these models, refer to the wired remote controller.

| ERROR CONTENTS | | INDOOR ERROR DISPLAY | | | | |
|---|---|---|---|---|---|---|
| | | OPERATION | TIMER | AIR CLEAN | COIL DRY | Wire Remote Code No. |
| Communication Error | Serial Reverse Transfer Error at Start Up | Off | 2 flashes | Off | Off | 01 |
| | Serial Reverse Transfer Error During Operation | Off | 3 flashes | Off | Off | 00 |
| | Forward Transfer Signal Error at Start Up | Off | 4 flashes | Off | Off | 13 |
| | Indoor Unit ← Remote Control - Wired Remote Control | Off | 8 flashes | Off | Off | 00 |
| Indoor Unit Temperature Error | Room temperature thermistor error | 2 flashes | 2 flashes | Off | Off | 02 or 03 |
| | Heat exchanger temperature thermistor error | 2 flashes | 3 flashes | Off | Off | 04 or 05 |
| Indoor Unit Water Drain Abnormal | Float switch tripped/pump problem | 2 flashes | 6 flashes | Off | Off | 09 |
| Outdoor Unit Temperature Error | Discharge pipe temperature thermistor error | 3 flashes | 2 flashes | Off | Off | 0C or 0d |
| | Outdoor heat exchanger temp. thermistor error | 3 flashes | 3 flashes | Off | Off | 06 or 07 |
| | Outdoor temperature thermistor error | 3 flashes | 4 flashes | Off | Off | 0A or 0b |
| | 2 way valve temperature thermistor error | 3 flashes | Off | 2 flashes | Off | 1d |
| | 3 way valve temperature thermistor error | 3 flashes | Off | 3 flashes | Off | 1E |
| | Heat sink temperaturethermistor error | 3 flashes | 7 flashes | Off | Off | 0E |
| | Compressor temperature thermistor error | 3 flashes | 8 flashes | Off | Off | 15 |
| Indoor Unit Control System Error | MANUAL AUTO button error | 4 flashes | 2 flashes | Off | Off | 20 |
| | Power supply 50HZ/60HZ detection error | 4 flashes | 4 flashes | Off | Off | 08 |
| | Electronic Air clean filter error | 4 flashes | 7 flashes | Off | Off | 21 |
| | Electronic Air cleaner Power PCB Circuit error | 4 flashes | 8 flashes | Off | Off | 22 |
| Outdoor Unit Control System Error | IPM error (Current trip error) | 5 flashes | 2 flashes | Off | Off | 17 |
| | CT error | 5 flashes | 3 flashes | Off | Off | 18 |
| | Compressor position error | 5 flashes | 5 flashes | Off | Off | 1A |
| | Outdoor fan motor error | 5 flashes | 6 flashes | Off | Off | 1b |
| | Connected indoor unit error | 5 flashes | 7 flashes | Off | Off | 1F |
| | Main CPU-sub CPU communication error | 5 flashes | 8 flashes | Off | Off | 1C |
| Indoor Unit Fan Motor Error | Indoor fan motor lock error | 6 flashes | 2 flashes | Off | Off | 12 |
| | Indoor fan motor speed error | 6 flashes | 3 flashes | Off | Off | 12 |
| Refrigerant System Error | Discharge pipe temperature error | 7 flashes | 2 flashes | Off | Off | 0F |
| | Cooling High pressure abormal rise | 7 flashes | 3 flashes | Off | Off | 14 |
| | High pressure switch error | 7 flashes | 6 flashes | Off | Off | 16 |
| Added Function Error | Active filter module (AFM) error (Second Time) | 8 flashes | 2 flashes | Off | Off | 19 |
| | Active filter module (AFM) error (First Time) | 8 flashes | 3 flashes | - | - | |
| | PFC Circuit Error | 8 flashes | 4 flashes | - | - | |
| Indoor Unit Connect Error | Indoor unit error (indoor EEPROM abnormal) | Blinking | Blinking | Blinking | Blinking | 11 |

# Multi-Zone

**MODELS: AOU18RLXFZ, AOU24RLXFZ, AOU36RLXFZ, AOU24RML, AOU36RML, AOU24RML1, AOU36RML1**

| Error Contents | LED | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Outdoor communication signal error (forward transfer) | 1 flash | OFF | OFF | OFF |
| | OFF | 1 flash | OFF | OFF |
| | OFF | OFF | 1 flash | OFF |
| | OFF | OFF | OFF | 1 flash |
| Outdoor discharge pipe temperature thermistor error | 2 flashes | OFF | OFF | OFF |
| Outdoor heat exchanger temperature thermistor error | 3 flashes | OFF | OFF | OFF |
| Outdoor temperature thermistor error | 4 flashes | OFF | OFF | OFF |
| 2 way valve temperature thermistor A error | 5 flashes | OFF | OFF | OFF |
| 2 way valve temperature thermistor B error | OFF | 5 flashes | OFF | OFF |
| 2 way valve temperature thermistor C error | OFF | OFF | 5 flashes | OFF |
| 2 way valve temperature thermistor D error | OFF | OFF | OFF | 5 flashes |
| 3 way valve temperature thermistor A error | 6 flashes | OFF | OFF | OFF |
| 3 way valve temperature thermistor B error | OFF | 6 flashes | OFF | OFF |
| 3 way valve temperature thermistor C error | OFF | OFF | 6 flashes | OFF |
| 3 way valve temperature thermistor D error | OFF | OFF | OFF | 6 flashes |
| Compressor temperature thermistor error | 7 flashes | OFF | OFF | OFF |
| Heat sink temperature thermistor error | 8 flashes | OFF | OFF | OFF |
| Pressure switch 1 error | 9 flashes | OFF | OFF | OFF |
| Pressure switch 2 error | 10 flashes | OFF | OFF | OFF |
| Connected indoor unit error | 11 flashes | OFF | OFF | OFF |
| IPM error | 12 flashes | OFF | OFF | OFF |
| Compressor rotor location can not detect (permanent stop) | 13 flashes | OFF | OFF | OFF |
| Compressor start up error (permanent stop) | 14 flashes | OFF | OFF | OFF |
| Outdoor unit fan motor error | 15 flashes | OFF | OFF | OFF |
| Main CPU sub CPU Communication error | 17 flashes | OFF | OFF | OFF |
| Discharge temperature error | 18 flashes | OFF | OFF | OFF |
| Compressor temperature error | 19 flashes | OFF | OFF | OFF |
| 4-way valve error | 20 flashes | OFF | OFF | OFF |
| Outdoor unit PCB model information error | 21 flashes | OFF | OFF | OFF |
| Active filter error, PFC circuit error | 22 flashes | OFF | OFF | OFF |

# Wall Mounted

**SYSTEMS: 9CQ, 9RQ, 9R2, 9RLQ, 9RL, 9RLS, 12CQ, 12RQ, 12R2, 12RLQ, 12RL, 12RLS, 15RLQ, 15RLS, 18CL, 18RL, 18RLQ, 18RLXQ, 18RLXS, 24CL, 24CL1, 24RLQ, 24RLXQ, 24RLXS, 30RLX, 30CLX, 30CLX1, 30RLXQ, 36CLX, 36CLX1**

| Error Indication | | Wired Remote | Error | Diagnosis Method |
|---|---|---|---|---|
| Operation | Timer | | | |
| 0.5 sec 6 Times | 0.5 sec 2 Times | No Display | Indoor fan lock error | Evaporator fan motor error - The indoor fan speed is 0 RPM after 56 seconds from starting operation.<br>*-Check if Fan motor connector loose/defective contact. Rotate fan motor by hand to ensure it is not locked.*<br>*-Controller PCB defective.* |
| | 0.5 sec 3 Times | No Display | Indoor fan speed error | Evaporator fan motor error - The indoor fan speed is 1/3 of the target frequency after 56 seconds from starting operation.<br>*-Check if Fan motor connector loose/defective contact. Rotate fan motor by hand to ensure it is not locked.*<br>*-Controller PCB defective.* |
| 0.5 sec 7 Times | 0.5 sec 2 Times | 0F | Discharge temperature error | The discharge temperature error is activated. Heat radiation is blocked.<br>*-Check for closed 2-way valve or 3-way valves. Check for leaks at line set, condenser and evaporator.*<br>*-Refrigeration cycle defective. Check for restrictions at line set, low charge.* |
| | 0.5 sec 3 Times | 24 | Excessive high pressure protection on cooling | Excessive high pressure protection on cooling mode has been activated. Heat radiation is blocked.<br>*-Check for closed 3-way valves. Check for running compressor with outdoor fan OFF.*<br>*-Check if outdoor fan is defective. Refrigeration cycle defective. Check for high pressure, over charged.* |
| | 0.5 sec 5 Times | 16 | Pressure Switch Error | If the pressure switch is open for 10 sec. when the power is turned on - Error will reset when pressure becomes normal.<br>*-Check interruption of heat radiation (Air intake/Outlet). Check outdoor fan operation (does not rotate).*<br>*-Check refrigerant cycle. Check for high pressure, over charged.* |
| 0.5 sec 7 Times | 0.5 sec 6 Times | 2b | Compressor Temp Error | When the compressor becomes hotter than 226.4°F (108°C), unit stops.<br>*-Check for closed 2/3 way valves, EEV failure, Low Change, Compressor Thermistor failure, outdoor fan failed, outdoor heat exchanger clogged.* |
| 0.5 sec 8 Times | 0.5 sec 2 Times | 19 | Active Filter Error (Permanent Stop) | Output voltage error of Active filter is detected.<br>*-Check the wiring connection (connector is loose/open. Choke coil)*<br>*-Active Filter Module/Controller PCB defective.* |
| | 0.5 sec 3 Times | 19 | Active Filter Error | Output voltage error of Active filter is detected.<br>*-Check the wiring connection (connector is loose/open. Choke coil)*<br>*-Active Filter Module/Controller PCB defective.* |
| | 0.5 sec 4 Times | 25 | PFC circuit error | Excessive voltage of DC V on PFC circuit in inverter PCB is detected.<br>*-Controller PCB defective.* |
| ALL LED's Blink Operation, Timer, Air Clean 0.1 sec ON/OFF | | 11 | Model Match Error | Apparent model infromation error from EPROM (miss match). 3 continuous failure of lead test of EPROM at Power ON, Voltage drop or noise, etc.<br>*-Controller PCB defective.* |

# Halcyon HFI Indoor UnitS, RL2 & RLS2 Indoor Units

**MODELS: ASU9RLF, ASU12RLF, ASU18RLF, ASU24RLF, ASU7RLF1, ASU9RLF1, ASU12RLF1, AUU7RLF, AUU9RLF, AUU12RLF, AUU18RLF, ARU7RLF, ARU9RLF, ARU12RLF, ARU18RLF, ARU24RLF, AGU9RLF, AGU12RLF, AGU15RLF, ASU9RL2, ASU12RL2, ASU9RLS2, ASU12RLS2, ASU15RLS2**

| Error Indication | | Economy | Wired Remote Controller | Error | Diagnosis Method |
|---|---|---|---|---|---|
| Operation | Timer | | | | |
| ● (1) | Off | Off | **N/A** | Mode Mismatch Multizone | Operation light 1sec on, 1 sec off. When 1 or more indoor units are in auto or different modes on multi-zone systems |
| ● (1) | Off | Off | **Green Light Flashing** | Defrost Mode | Operation light 7 sec on, 2 sec off. Unit in defrost normal operation |
| Off | Off | ● (3) | **N/A** | Clean filters reminder | Remove and clean filters then press and hold manual auto button on indoor unit for 2 seconds or more to reset. |
| ● (1) | ● (1) | ◊ | **11** | Serial communication error | When the indoor unit cannot receive the signal from the branch unit. When the branch unit cannot receive the signal from the indoor unit |
| ● (1) | ● (2) | ◊ | **12** | Remote controller-communication error | Wired remote controller communication error |
| ● (1) | ● (5) | ◊ | **15** | Scan error- communication error | Check operation incompletion error (normally, operation disabled) |
| ● (2) | ● (1) | ◊ | **21** | Initial setting error - Function setting | Wiring mistake |
| ● 2 | ● (2) | ◊ | **22** | Indoor unit capacity error - Function setting | Indoor unit capacity error |
| ● (2) | ● (3) | ◊ | **23** | Connection disabled (series error) - Function setting | Combination error |
| ● (2) | ● (4) | ◊ | **24** | Connection unit number error - Function setting | Connection unit number error (indoor unit).<br>Connection unit number error (branch unit) |
| ● (3) | ● (2) | ◊ | **32** | Indoor unit main PCB error | Indoor unit PCB Model information error |
| ● (3) | ● (5) | ◊ | **35** | Manual auto switch error - Indoor Unit | Manual auto switch error |
| ● (4) | ● (1) | ◊ | **41** | Room error | Inlet room temperature thermistor error |
| ● (4) | ● (2) | ◊ | **42** | Indoor unit Heat Ex. sensor error | Indoor unit Heat Ex. Middle thermistor error |
| ● (5) | ● (1) | ◊ | **51** | Indoor unit fan motor error | Main fan motor lock error<br>Main fan motor revolution speed error |
| ● (5) | ● (3) | ◊ | **53** | Water Drain error - Indoor | Drain pump error |
| ● (5) | ● (7) | ◊ | **57** | Damper error | Damper failure, limit switch, shorted wires, controller PCB failure on indoor |
| ● (5) | ● (8) | ◊ | **58** | Intake grille error | When microswitch on indoor unit is detected open, door on indoor not fully closed, microswitch failure, indoor PCB failure |
| ● (5) | ● (15) | ◊ | **5U** | Indoor unit error | Indoor unit error |
| ● (6) | ● (2) | ◊ | **62** | Outdoor unit main PCB error | Outdoor unit PCB Model information error.<br>Outdoor unit PCB microcomputer communication error |
| ● (6) | ● (3) | ◊ | **63** | Inverter PCB error - Outdoor | Inverter error |
| ● (6) | ● (4) | ◊ | **64** | Active filter error, PFC circuit error - Outdoor | Voltage error stoppage permanently. Voltage error (can restore). Over current protected operation stoppage permanently. PFC hardware error. |
| ● (6) | ● (5) | ◊ | **65** | IPM error - Outdoor | Trip terminal L error |
| ● (6) | ● (10) | ◊ | **6A** | Display panel error - Outdoor | Microcomputers communication error |
| ● (7) | ● (1) | ◊ | **71** | Discharge thermistor error - Outdoor | Discharge thermistor 1 error |
| ● (7) | ● (2) | ◊ | **72** | Compressor thermistor error - Outdoor | Compressor thermistor 1 error |
| ● (7) | ● (3) | ◊ | **73** | Outdoor unit Heat Ex. Sensor error | Outdoor unit Heat Ex. liquid thermistor error |
| ● (7) | ● (4) | ◊ | **74** | Outdoor thermistor error - Outdoor | Outdoor thermistor error |
| ● (7) | ● (5) | ◊ | **75** | Suction Gas thermistor error - Outdoor | Suction Gas thermistor error |
| ● (7) | ● (7) | ◊ | **77** | Heat sink thermistor error - Outdoor | Heat sink thermistor error |
| ● (8) | ● (2) | ◊ | **82** | Sub-cool Heat Ex. Gas thermistor error - Outdoor | Sub-cool Heat Ex. gas inlet thermistor error<br>Sub-cool Heat Ex. gas outlet thermistor error |
| ● (8) | ● (3) | ◊ | **83** | Liquid pipe thermistor error - Outdoor | Liquid pipe thermistor 1 error |
| ● (8) | ● (4) | ◊ | **84** | Current sensor error - Outdoor | Current sensor 1 error (stoppage permanently) |
| ● (8) | ● (6) | ◊ | **86** | Pressure sensor error - Outdoor | Discharge pressure sensor error. Suction pressure sensor error. High pressure switch 1 error |
| ● (9) | ● (4) | ◊ | **94** | Trip detection - Outdoor | Trip detection |
| ● (9) | ● (5) | ◊ | **95** | Compressor motor control error - Outdoor | Rotor position detection error (stoppage permanently) |
| ● (9) | ● (7) | ◊ | **97** | Outdoor unit fan motor 1 error - Outdoor | Duty error |
| ● (9) | ● (9) | ◊ | **99** | 4-way valve error - Outdoor | 4-way valve error |
| ● (10) | ● (1) | ◊ | **A1** | Discharge temperature 1 error - Refrigerant System | Discharge temperature 1 error |
| ● (10) | ● (3) | ◊ | **A3** | Compressor temperature error - Refrigerant System | Compressor temperature error |
| ● (10) | ● (5) | ◊ | **A5** | Pressure error 2 - Refrigerant System | Low pressure error |
| ● (13) | ● (5) | ◊ | **J2** | Unit flow divider error - Branch Box | •EEPROM access error<br>•Equipment type information error<br>•Serial communication error to outdoor unit<br>•Branch units serial communication error<br>•Serial communication error to indoor unit<br>•Liquid pipe thermistor error<br>•Gas pipe thermistor error<br>•Expansion valve full closure operation error<br>•Remote control communication error<br>•Branch unit error |

Display mode ● 0.5s ON / 0.5s OFF, ( ) : Number of flashing, : ◊ 0.1s ON / 0.1s OFF

# Halcyon HFI Branch Boxes

## MODEL: UTP-PU03A, UTP-PU03B

**When an error occurs, an error description displays in the LED (No. 401 ~ 405).**

| | |
|---|---|
| ● | Lit |
| ◎(n) | Flashing (number of flashing) |
| ○ | Unlit |

**Normal status**

| Green | Red | | | | Comment |
|---|---|---|---|---|---|
| LED401 | LED402 | LED403 | LED404 | LED405 | |
| ● | ○ | ○ | ○ | ○ | This box is functioning properly. |

**Error status**

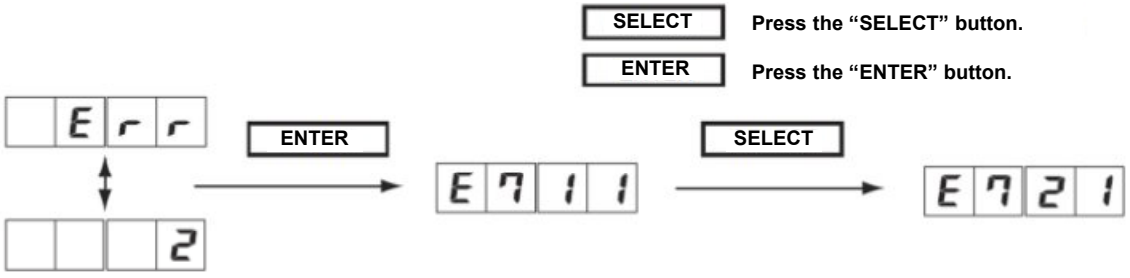
| Green | Red | | | | Error Description |
|---|---|---|---|---|---|
| LED401 | LED402 | LED403 | LED404 | LED405 | |
| ● | ● | ● | ● | ● | Connected combination error |
| ● | ● | ● | ● | ○ | Power frequency error |
| ● | ● | ● | ○ | ● | |
| Branch Box identifying display | ◎(1) | ○ | ○ | ○ | EEPROM access error |
| | ◎(2) | ○ | ○ | ○ | Model information error |
| | ◎(3) | ○ | ○ | ○ | • Serial communication error between outdoor unit and branch box<br>• Serial communication error between branch boxes |
| | ◎(4) | ○ | ○ | ○ | Serial communication error between branch boxes |
| Primary unit :◎(1) | ◎(5) | ● | ○ | ○ | Serial communication error between Indoor Unit A and branch box |
| | | ○ | ● | ○ | Serial communication error between Indoor Unit B and branch box |
| | | | ○ | ● | Serial communication error between Indoor Unit C and branch box |
| Secondary unit1 :◎(2) | ◎(6) | ● | ○ | ○ | Indoor Unit A, liquid pipe thermistor error (CN309) |
| | | ○ | ● | ○ | Indoor Unit B, liquid pipe thermistor error (CN309) |
| | | ○ | ○ | ● | Indoor Unit C, liquid pipe thermistor error (CN310) |
| | ◎(7) | ● | ○ | ○ | Indoor Unit A, gas pipe thermistor error (CN309) |
| | | ○ | ● | ○ | Indoor Unit B, gas pipe thermistor error (CN309) |
| | | ○ | ○ | ● | Indoor Unit C, gas pipe thermistor error (CN310) |
| Secondary unit2 :◎(3) | ◎(8) | ● | ○ | ○ | Indoor Unit A, EEV control error (CN305) |
| | | ○ | ● | ○ | Indoor Unit B, EEV control error (CN306) |
| | | ○ | ○ | ● | Indoor Unit C, EEV control error (CN307) |
| | ◎(9) | ○ | ○ | ○ | Remote controller communication error |

# Halcyon HFI Outdoor Unit

## MODEL: AOU48RLXFZ

• When error occurs, “Err” and “Number of error occurred” are alternately displayed in 7 seg. display.
• The latest error code can be confirmed by pressing the ENTER button.
• When error codes are displayed, all the error codes can be confirmed by pressing the SELECT button.

Example: When “Discharge thermistor error” and “Compressor thermistor error” are occurred




| CODE | | | | DESCRIPTION | CODE | | | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| E | 1 | 1 | 3 | Serial communication error | E | 7 | 5 | 1 | Suction gas thermistor error |
| E | 1 | 1 | 4 | | E | 7 | 7 | 1 | Heat sink thermistor error |
| E | 1 | 5 | 6 | Check run unfinished | E | 8 | 2 | 1 | Sub-cool heat EX gas inlet thermistor error |
| E | 2 | 1 | 2 | Number of wires and pipes error | E | 8 | 2 | 2 | Sub-cool heat EX gas outlet thermistor error |
| E | 2 | 2 | 1 | Indoor unit capacity error | E | 8 | 3 | 1 | Liquid pipe thermistor error |
| E | 2 | 4 | 2 | Number of indoor units error | E | 8 | 4 | 1 | Current sensor error |
| E | 2 | 4 | 3 | Number of Branch boxes error | E | 8 | 6 | 1 | Discharge pressure sensor error |
| E | 5 | U | 1 | Indoor unit error | E | 8 | 6 | 3 | Suction pressure sensor error |
| E | 6 | 2 | 1 | Outdoor unit model information error | E | 8 | 6 | 4 | High pressure switch error |
| E | 6 | 3 | 1 | Inverter error | E | 9 | 4 | 1 | Over current error |
| E | 6 | 4 | 1 | A.F. voltage error | E | 9 | 5 | 1 | Compressor control error |
| E | 6 | 5 | 3 | I.P.M. error | E | 9 | 7 | 3 | Outdoor unit fan motor error |
| E | 6 | A | 1 | Display P.C.B. communication error | E | 9 | 9 | 1 | 4-way valve error |
| E | 7 | 1 | 1 | Discharge thermistor error | E | A | 1 | 1 | Discharge temp. error |
| E | 7 | 2 | 1 | Compressor thermistor error | E | A | 3 | 1 | Compressor temp. error |
| E | 7 | 3 | 3 | Heat EX. liquid outlet thermistor error | E | A | 5 | 1 | Low pressure error |
| E | 7 | 4 | 1 | Outdoor thermistor error | E | J | 2 | U | Branch boxes error |