I. GENERAL INFORMATION
OEM - Please make sure of documentation accompanies the Heat Pump.
INSTALLER AND/OR DEALER - Please make sure all documentation is presented to the product consumer. The product consumer should also be allowed the opportunity to purchase the OPTIONAL THREE (3) YEAR PARTS REPLACEMENT CONTRACT available from Aircool, Inc.

For more information about the contract, please review the sample contract located at www.aircool.com. Use the application on the back of this document to apply for the extended parts contract.

INQUIRIES ABOUT THE HEAT PUMP - Inquiries to your Aircool, Inc. representative or to Aircool, Inc. pertaining to product installation should contain both the model and serial numbers of the roof top Heat Pump. All roof top heat pump units have model and serial number identification in two locations: (1) Rating Plate sticker - may be viewable by removing the rating plate shield. The rating plate is on top of the evaporator cover; (2) Model/Serial number sticker located on the return air flange on the roof unit base pan. If the Heat Pump is installed, the sticker may be viewable by lowering the casing assembly shield.

II. HEAT PUMP SIZING
Heat Pumps should be sized primarily by their ability to cool. The ability of a Heat Pump to provide a comfortable environment for the consumer is dependent upon the following conditions:

- The ability of a heat pump in the cooling mode to cool a vehicle or maintain a consumer desired temperature is dependent on the heat gain of the vehicle.
- The physical size of the vehicle, the amount of window area, the capacity and amount of insulation, the position exposed to sunlight, the number of people using the vehicle and the outside temperature may increase the heat gain to such an extent that the capacity of the Heat Pump is exceeded.
- As a general rule, air supplied (discharge air) from the Heat Pump will be 15 to 20 degrees cooler than the air entering (return air) the ceiling assemblies bottom air grills.
- For example, if the air entering the Heat Pump is 80°F (26°C) the supply air (discharge air) into the vehicle will be 65°F (18°C). As long as this temperature difference (15 to 20 degrees) is being maintained by the Heat Pump, the Heat Pump is operating properly.
- Again, give secondary consideration to the vehicle heat gain variables. During extreme outdoor temperatures, the heat gain of the vehicle may be reduced by:
  - Furling the vehicle as a shaded area
  - Keeping windows and doors closed
  - Avoiding the use of heat producing appliances
  - Using window shades (blinds and/or curtains)
- For a more permanent solution to high heat gain situations, additional vehicle insulation, window awnings and/or window glass tinting should be considered. A Heat Pump should not be considered as a total replacement for a furnace. At ambient temperatures below freezing, the Heat Pump will not operate.

III. SELECTING AN INSTALLATION LOCATION
Your Aircool, Inc. Heat Pump has been designed for use primarily in recreational vehicles.

IV. INSTALLING THE ROOF TOP UNIT

- IMPORTANT

This Heat Pump is to be installed in accordance with NFPA Standard 501C.

For the Heat Pump being installed in a low friction roof surface such as aluminum, steel or galvanized steel, it is advisable to order a spring pad kit, part number 4523-3671 to add "spring pads" to maintain bolt tension and reduce lateral motion of the Heat Pump which could shear the mounting bolts.

Once the location for your Heat Pump has been determined (See Section III), a reinforced and trimmed roof hole opening must be provided (may use existing roof vent opening). Before cutting into the vehicle roof, verify that the cutting action will clear all structural members and crossbeams. Additionally, the location of any interior roof plumbing and electrical supplies must be considered.

A. If a roof vent is already present in the desired mounting location for the Heat Pump, the following steps must be taken:

1. Remove all screws which secure the roof vent to the vehicle. Remove the vent and any additional trim materials. Carefully remove all cushion from around the roof vent opening to obtain clean exterior roof surface.
X. GARANTIE PROLONGÉE OFFRE

Couvrez votre nouvel achat avec nos parties étendues de trois (3) ans seulement contractuels.

Cette garantie couvre les pièces seulement (pas de travail) contre les défauts de fabrication pour une période de trois (3) années supplémentaires au-delà de votre (2) la garantie initiale de deux ans. Cette garantie exclut les haubans, les filtres et le pompe à chaleur s complets.

Qu'est-ce un excellent ajout à votre garantie standard - sachant que vous avez la protection d'un trois (3) ans, si vous rencontrez défaillance d'une pièce supplémentaire (à l'exclusion des linceuls, des filtres et des pompe à chaleur s complets) sur votre air Coleman Mach-conditionneur. Pièces de rechange gratuites pour trois (3) ans (à l'exclusion des linceuls, des filtres et des pompe à chaleur s complets) - comment pouvez-vous passer cette place!

Postulez dès aujourd'hui en remplissant le formulaire situé sur la couverture arrière de cette installation et d'utilisation et en l'envoyant dans le long avec votre chèque ou mandat à Aircel, Inc., PO Box 4020, Wichita, KS 67204. Un contrat sera envoyé à vous dans quelques semaines. Vous devez conserver vos documents avec preuve d'achat.

Pour voir l'AN GARANTIE LIMITÉE 2, l'option à trois ans, pièces garantie prolongée, un exemple de contrat, les conditions, les exceptions et les exclusions, s'il vous plaît visitez www.Airxcel.com et le type GARANTIE dans la barre de recherche.

AIRXCEL, INC. - RV Products Division • 3050 N. St. Francis St. • Wichita, KS 67219
316.832.3400 • www.AIRXCEL.com

III. EXPLOITATION

A. Tournez le sélecteur vers la position «LOW COOL» ou «HIGH COOL».

B. Ajustez le thermostat (commande thermique) à la position la plus confortable pour vous. Le thermostat est le compresseur en marche lorsque la température de l'air entrant dans le compresseur est inférieure à la température réglée. Changez le thermostat vers un degré plus faible ou supérieur. Vous obtiendrez un meilleur rendement de l'appareil.

C. Orientez les lueurs dans la direction voulue pour créer un courant d'air soufflé.

II. Exploitation (refroidissement) pendant les jours froids.

Lorsque la température extérieure descend, la nuit étant plus fraîche, il est nécessaire de régler le thermostat à une température plus faible. Le compresseur continuera de fonctionner jusqu'à ce que la température interne atteigne celle réglée.

REMARQUE: Lorsque le sélecteur est en position «LOW FAN» ou «HIGH FAN», l'air est soufflé par le compresseur sans utiliser le refroidisseur.

IV. ENTRETIEN

I. Propriétaire

L'entretien est une obligation pour conserver votre climatiseur en bon état de fonctionnement. Consultez la section d'entretien et suivez attentivement les instructions.

IMPORTANT

Ne pas faire fonctionner votre pompe à chaleur pendant des périodes de temps sans l'utiliser. L'entretien est nécessaire pour conserver un climatiseur en bon état de fonctionnement. Consultez la section d'entretien et suivez attentivement les instructions.
1. INFORMATION GENERALE

ROOF TOP HEAT PUMPS AND CEILING PENSES

IX. OPERATION AND MAINTENANCE

SERIES 47000

9. MODE D'EMPLOI ET UTILISATION
III. OPERATION

I. For Cooling (Refer to Figure 1, page 9).
A. Turn the selector switch to the "LOW COOL" or "HIGH COOL" position.
B. Rotate the thermostat (temperature control) to the position that is the most comfortable to you. The thermostat will turn the compressor on when the temperature of the air entering the heat pump falls a few degrees below the setting you have selected. When the temperature of the air entering the heat pump drops below the selected setting, the thermostat will turn the compressor off. The heat pump, while in the cooling mode, will continue to cycle the compressor on and off in the above mentioned fashion until the selector switch is turned to another mode of operation.

C. Position the louvers to the desired direction the discharge air is to flow.

II. Operation During Cooler Nights (Cooling Operation).
It is important, when the outdoor temperature drops in the evening or during the night to below 75 degrees F., that the thermostat (temperature control) be set at a midpoint between "Warmer" and "Cooler". If the setting is at "Cooler", the evaporator coil may become ice-up and stop cooling. During the day when the temperatures have risen above 75 degrees F., reset the thermostat switch to the desired setting.

NOTE: Should icing-up occur, it is necessary to let the cooling (evaporator) coil defrost before normal cooling operation is resumed. During this time, operate the unit in the "HIGH FAN" position with the system at maximum air flow. When increased or full air flow is observed, the cooling coil should be clear of ice.

III. Short Cycling
When a heat pump is in operation, its compressor circulates refrigerant under high pressure. Once off, it will take two to three minutes for the high pressure to equalize. The heat pump compressor is unable to start against high pressure. Therefore, once the heat pump is turned off, it is important to leave it off for two to three minutes before restarting.

Short cycling the compressor (or allowing it before pressures have equalized), will in some instances, lock the circuit breaker or overloaded.

IV. For Heating Operation (Refer to Figure 1, page 2).
NOTE: The heat pump will operate on reverse cycle refrigerant heating at outdoor temperatures above freezing. When the outdoor temperature is below freezing, the heat pump compressor will shut down to prevent outdoor coil freeze-up. At this time, if the optional auxiliary electric resistance heater has been installed, it will be energized to take the chill out of the indoor air.

The electric resistance heater is not a substitute for a furnace in these low outdoor temperatures.
A. Turn the selector switch to the "HIGH HEAT" position. At "HIGH HEAT", the fan operates on high speed and heat output at maximum.
B. Rotate the thermostat (temperature control) switch to the position that is the most comfortable to you.

The thermostat will turn the compressor on when the temperature of the air entering the heat pump unit drops below this setting a few degrees and automatically turns off when the temperature of the air entering the heat pump rises a few degrees above this setting. The compressor/heater will continue to cycle on and off in this fashion until the selector switch is turned to another mode of operation.
C. Position the louvers to the desired direction the discharge air is to flow.

Discharge air temperature can be controlled to some extent by opening or closing the louvers. When the louvers are closed, the warmest localized discharge air is achieved. Fully opened louvers will blow the warm discharge air to the back and front of the vehicle for more efficient circulation and faster warm-up. Although the air temperature is lower with the louvers fully opened, the heating capacity is still the same.

V. For Air Circulation Only (Refer to Figure 1, page 2).
A. Turn the selector switch to "LOW FAN" or "HIGH FAN".
B. Position the louvers to the desired direction the discharge air is to flow.

NOTE: When the selector switch is in the "LOW FAN" or "HIGH FAN" position, the blower motor will operate continuously.

IV. MAINTENANCE

I. Owner - One of the biggest advantages to your new Coleman-Mach heat pump is that the maintenance needed to keep the unit in good working order is minimal. In fact about the only thing you, the owner, must take care of is the cleaning and replacement of the filters.

Filters are made from long-life non-allergenic natural fibers which can be cleaned and reused, and which completely filter the circulated air when the heat pump is in operation. If the filters are not cleaned at regular intervals, they may become partially clogged with lint, dirt, grease, etc. A clogged filter will reduce air volume and may eventually cause an icing-up of the cooling (evaporator) coil.

IMPORTANT
Do not operate your heat pump for extended periods of time without the filter installed.

As even more serious condition occurs when the heat pump is operated without a filter. When this happens, the lint, grease, etc. are normally stopped by the filter and not accumulating in the cooling coil. This will not only reduce the volume of air and a possible upping of the cooling coil, but could also result in serious damage to the operating components of the heat pump.

We recommend that the filters be cleaned and changed at least every two weeks when the heat pump is in operation.

Cleaning and/or changing the filters:
1. Remove the two grilles from the ceiling assembly by pulling the tabs on the grilles.
2. Remove and clean or replace the two filters.
3. Re-install the filters and grilles in the ceiling assembly as shown in Figure 2.
4. If the vehicle is equipped with a flush mount ceiling assembly, remove the four return air grille screws. Remove filter from the grille and either clean or exchange with new filters.

NOTE: If replacement filters are necessary, the filters can be purchased from most Amana, Inc. Authorized Service Centers. It is recommended that spare filters be carried with the RV at all times to replace worn, torn or deteriorated filters.
X. OPTIONAL EXTENDED WARRANTY OFFER

Cover your new purchase with our three (3) year extended parts only contract.

This warranty covers parts only (no labor) against manufacturer defects for an additional three (3) years beyond your original two (2) year warranty. This warranty excludes shrouds, filters and complete Heat Pumps.

What a great addition to your standard warranty - knowing you have protection for an additional three (3) years should you experience part failure (excluding shrouds, filters and complete Heat Pumps) on your Coleman-Mach Heat Pump. Free replacement parts for three (3) years (excluding shrouds, filters and complete Heat Pumps) - how can you pass this up?

Apply today by filling out the application located on the back cover of this Installation and Operation Manual and mailing it in along with your check or money order to Airxcel, Inc., P.O. Box 4020, Wichita, KS 67204. A contract will be sent to you within a few weeks. You should retain with your paperwork for proof of purchase.

To view the LIMITED 2 YEAR WARRANTY, the OPTIONAL THREE YEAR EXTENDED PARTS WARRANTY, a sample contract, terms, conditions, exceptions and exclusions, please visit www.Airxcel.com and type WARRANTY in the search bar.
## INSTALLATION, D'UTILISATION ET D'ENTRETIEN POUR 47000 POMPES SÉRIE DE CHAUFER

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### AVIS IMPORTANT

Cette installation est conçue pour être utilisée par un installateur qualifié spécialement formé et expérimenté dans l'installation de ce type d'équipement et des éléments s'y rattachant. Dans certains États, on exige que le personnel d'installation et d'entretien détienne une licence. TOUTE PERSONNE NON QUALIFIEE NE DOIT INSTALLER OU ENTREtenir CET EQUIPEMENT.

REMARQUE : Les mots "boîte" ou "boîte de 
autres formes de ceux-ci, identifient une exigence qui est essentielle pour la performance satisfaisante et sécuritaire du produit. Les mots "d'installation" ou "d'installation" identifient une recommandation ou un conseil qui n'est pas essentiel(e) ou exigé(e), mais qui peut être pratique ou utile.

AVERTISSEMENT : RISQUE DE CHOC ELECTRIQUE ! Afin de prêter la possibilité de graves blessures corporelles ou des dommages à l'équipement dus à un choc électrique, assurez-vous de toujours débrancher le câble d'alimentation de l'appareil devant vous.

S'ASSUREZ ATTENTIVEMENT TOUSLES INSTRUCTIONS ET LES MISES EN GARDE DE CE FASCICULE AFIN D'ÉVITER LES RISQUES D'ÉQUIPEMENT, DE BLESSURES CORPORELLES OU D'INCENDIE.

### MISE EN GARDE !

L'installation inappropriée peut endommager l'équipement et créer un danger, et annuler la garantie. L'utilisation de composants non testés en combinaison avec ces appareils annulera la garantie, peut contravenir aux codes d'État ou provinciaux, peut créer un danger et peut s'attacher l'équipement.

### I. INFORMATIONS GÉNÉRALES

OEM : Veillez assurer que l'ensemble d'ensemble clients est livré avec un manuel et une garantie. INSTALLATEUR ET TouCH MARCHAND : S'il vous plaît faire que la documentation est présente au consommateur du produit. Le consommateur du produit devrait également avoir la possibilité d'obtenir un sommaire à trois parties ANNEÉE DE REMPLACEMENT CONTRAT disponibles à partir d'Aircool, Inc.

Pour plus d'informations sur le contrat, il s'il vous plaît examiner le contrat auprès de l'Aircool.com/Warranty. Utilisez l'opérateur sur le dessin de ce fonctionnement et d'australien pour appliquer par le contrat de plafond de contrôle.

### DEMANDES D'INFORMATION SUR LE Pompage à chauffer

Les demandes d'informations sur l'installation du produit présentées à voire représentant Aircool ou s'il devait contester le nom et le numéro de série du pompe à chauffer. Ce nom et le numéro série se situera à deux endroits sur les boîtes de pompe à chauffer de toit : (1) vous pouvez visualiser l'intérieur de pièces nominées en regardant par les fenêtres de ventilation du côté compresseur de pompe à chauffer de toit. Vous pouvez visualiser l'accumulateur de puissance nominale sans retirer le carénage externe en utilisant l'éclairage disponible. (2) l'accumulateur de modification, de série (couleur argent) est apposé sur le dessus du banc de condensation du pompe à chauffer de toit. Si le pompe à chauffer est installé, vous pouvez visualiser l'accumulateur en enlevant le carénage de l'ensemble de plafond.

### II. SéLECTION D'UNE POMPE À CHAUFER

Pompes à chauffer doivent être installées principalement par leur capacité à réfrigérer. La capacité d’une pompe à chauffer pour fournir un environnement confortable pour le consommateur dépend des conditions suivantes.

La capacité d’une pompe à chauffer en mode de réfrigération pour réfrigérer un véhicule ou à maintenir une température confortable dépend du gain de chaleur du véhicule. La capacité d’une pompe à chauffer à refroidir un véhicule dépend de la température extérieure du véhicule et du gain de chaleur du véhicule. La capacité d’une pompe à chauffer à refroidir un véhicule ou à maintenir une température voulue dépend de l'apport de l'énergie du véhicule.
**OPTIONAL EXTENDED WARRANTY OFFER**

Cover your new purchase with our three (3) year extended parts only contract for $89.95.

This warranty covers parts only (no labor) against manufacturer defects for an additional three (3) years beyond your original two (2) year warranty. This warranty excludes shrouds, filters and complete air conditioners.

What a great addition to your standard warranty — knowing you have protection for an additional three (3) years should you experience part failure (excluding shrouds, filters and complete air conditioners) on your Coleman-Mach air conditioner. Free replacement parts for three (3) years (excluding shrouds, filters and complete air conditioners) — how can you pass this up!

Apply today by filling out the application below and mailing it with your check or money order to Airxcel, Inc., P.O. Box 4020, Wichita, KS 67204. A contract will be sent to you within a few weeks. You should retain with your paperwork for proof of purchase.

To view the LIMITED 2 YEAR WARRANTY, the OPTIONAL THREE YEAR EXTENDED PARTS WARRANTY, a sample contract, terms, conditions, exceptions and exclusions, please visit www.Airxcel.com and type WARRANTY in the search bar.

APPLICATION FOR OPTIONAL THREE (3) YEAR PARTS CONTRACT

**$89.95**

(DOES NOT INCLUDE LABOR. EXCLUDES SHROUDS, FILTERS AND COMPLETE AIR CONDITIONERS)

APPLICATION MUST BE MADE WITHIN 90 DAYS OF PURCHASE DATE OF THE AIR CONDITIONER OR THE RECREATIONAL VEHICLE IF THE AIR CONDITIONER IS ORIGINAL EQUIPMENT.

(PLEASE PRINT CLEARLY)

DATE OF PURCHASE:
(Heat Pump)

Name of Purchaser:

Street:

State Zip

BE SURE TO ENCLOSE A CHECK OR MONEY ORDER FOR $89.95 (U.S. FUNDS)

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**IMPORTANT NOTICE**

These instructions are a general guide for installing the 47000 Series Coleman-Mach roof top Heat Pump. For specific Heat Pump details, it will be necessary to refer to ALL printed documents supplied with this conditioner.

**WARNING** - SHOCK HAZARD To prevent the possibility of severe personal injury or equipment damage due to electrical shock, always be sure the electrical power source to the appliance is disconnected.

**WARNING** Improper installation may damage equipment, can create a hazard and will void the warranty.

The use of components not tested in combination with these units will void the warranty, may make the equipment in violation of state codes, may create a hazard and may ruin the equipment.
OTHER GREAT PRODUCTS FROM AIRXCEL

THE NEW FANNMATE® FEATURING EZClip™ HARDWARE for QUICK, EASY and TOOL-FREE INSTALLATION FOR HIGH POWERED CEILING FANS. The FANNMATE® simply fits over the built-in, waterproof mounting tabs on the MAXXFAN® and MAXXFAN® Plus. Simply slide the included clip through the tab to secure the FANNMATE® cover. (Hardware with clips included for mounting on other fan models.)

VISIT AIRXCEL.COM FOR OUR ENTIRE LINE OF QUALITY RV COMFORT PRODUCTS!
Nettoyage ou changement des filtres:
1. Retirer les deux grilles de l'assemblage de plafond en tirant les languettes sur les grilles.
2. Retirer le filtre ou remplacer les deux filtres.
3. Rétinstaller les filtres et les grilles dans le montage de plafond, comme illustré dans la figure 2.
4. Si le véhicule est équipé d'un assemblage bord de montage de plafond, retirer les quatre grilles de la tête de lit. Retirer les grilles et les fixer en place avec des nouveaux filets.

REMARQUE: Si des filtres de remplacement sont nécessaires, ils peuvent être achetés auprès des centres de service autorisés à Xincol, Inc. Il est recommandé de toujours avoir des filtres de rechange dans votre VHC en tous temps pour remplacer les filtres défectueux, usés ou déchirés.

v. EXPLOITATION DU THERMOSTAT MURAL
Si votre Coleman-Mach unité est contrôlée par un thermostat, référer via le livre d'opération inclus avec le thermostat.

vi. SERVICE DE GARANTIE
Il convient de le dire, même les produits de la plus haute qualité ont parfois besoin d'être réparés. Pour vous préparer à des réparations sous garantie pour votre climatiseur Coleman-Mach, veuillez communiquer avec votre centre de service de Xincol, Inc. le plus proche ou en cas d'annexe électronique.

B. Point de vérification - Échec de démarrage ou pour refroidir l'air sont parfois des problèmes avec l'éclairage de la lumière. Le condensateur de RV de Coleman-Mach est conçu pour s'allumer sans un courant de 185 V. Si le compresseur de la pompe à chaleur ne s'allume pas à l'éclairage, vérifier avec votre Xincol, Inc. Centre de Service pour déterminer si la bonne taille de l'éclairage est correcte. Le bon éclairage est installé en tant que dispositif de protection sur le circuit éclairage et la taille appropriée d'une rallonge est utilisée pour la distance parcourue depuis l'éclairage vers le RV.

Le câblage de fil en cuivre rigide est de 12 AWG pour les longueurs jusqu'à 25 pi (7,60 m) (un câble de fil plus gros pour les distances superieures). Chaque câble de chauffage unité doit être protégé par un 20 amp déclencheur fusible de déclencher.

Si une pompe à chaleur continue à se déclencher sur les détecteurs de fumée, demander à un électricien vérifier le câblage intérieur et l'orientation de l'unité. Si le déclencheur de déclencheur se déclenche et que la consommation d'électricité s'avère normale, il faudra remplacer le déclencheur détecteur.

Si toute l'alimentation électrique de la pompe à eau est normal mais le ventilateur ou le compresseur fonctionne, le connecteur plus situé derrière le plancher doit être vérifié pour déterminer si elle est défectueux. Sur les groupes de chauffage-refroidissement pompe à eau, modèles, toute l'alimentation électrique de l'appareil est normale et que le

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VII. INSTALLING THE CEILING ASSEMBLY (600 SERIES)
Make sure that you have properly matched the roof top Heat Pump and interior ceiling assembly. The following step-by-step instructions must be performed in the following sequence to ensure proper installation.

A. Remove ceiling assembly from carport, separate insulation from frame and remove the two grills and louver from the ceiling shroud.
B. Fold and break off the 3 tabs around the inner opening of the duct collar then fasten the duct collar to the duct shroud using 3 screws provided (See Figure 9).
C. Raise the ceiling assembly chute and insert the screws provided through the cable clamp and into the wiring box so that 4-1/2" of supply conductor is inside the box. Secure the cable clamps over the supply wire so that no movement is possible (See Figure 8).
D. Connect the supply power black conductor to the black pigtail wire, the white conductor to the white pigtail wire and the neutral ground conductor to the ground pigtail wire bound in the wiring box using the 3 provided wires. Using a U.L. approved electrical tape, secure the wires nuts to wires in a workmanship manner (See Figure 8).
E. Push supply conductors and wires into wiring box and making sure no wires are pinched, secure the wire box cover with 2 provided screws (See Figure 8).
F. Plug the heat pump electrical cord into the 90° position receptacle as shown in Figure 7.
G. If the optional heater accessory packaging is being installed, remove the cover from the 2 position receptacle and plug the heat core into receptacle as shown in Figure 7.
H. Raise the ceiling assembly chute to the unit mounting frames and secure the chute with 4 provided screws (See Figure 9).
I. TIE ALL WIRING TO INSURE NO CONTACT WITH ANY SHARP EDGES OR WITH OPTIMAL HEATER IS POSSIBLE. KEEP IN MIND THAT HIGH VOLTAGE AIR WILL BE ENCOUNTERED IN THIS AREA.
J. Pull the fabric duct material through the ceiling chute discharge opening. Peel the release film from the adhesive strip around the opening. Press the fabric duct material firmly in place around opening. Cut off excess fabric on inside of ceiling chute with a box knife taking care not to tear the fabric beyond the adhesive strip.
K. Raise the ceiling shroud and while inserting it meshes with the chute, secure to mounting frames with 4 provided screws (See Figure 9).
L. Install the control knobs over the switch and thermostat chutes. The thermostat (temperature) control knobs inserts nearest the "Coleman-Mach" logo.
M. Re-install the filters and grilles into the ceiling assembly shroud.
N. Turn the selector switch to OFF position.
O. Turn ON the power supply to the roof top heat pump.

VIII. SYSTEM CHECKOUT
Xincol, Inc. manufactures a wide range of roof top Heat Pumps which incorporate different product operation features. To properly evaluate the performance of your newly installed Heat Pump, it is necessary to review the specific unit operation characteristics (features) described in the product OPERATION AND MAINTENANCE INSTRUCTIONS section of this booklet.
IX. MODE D'EMPLOI ET UTILISATION
SÉRIE 47000
DES POMPE À CHALEUR S DE TOIT DES PLÉNUM DE PLAFOND

I. RENSEIGNEMENTS GÉNÉRAUX
NOTE: Un auxiliaire en option résistance électrique chauffage peut être installé pour réchauffer de l'air intérieur quand la pompe ne peut plus fonctionner.
La thermopompe s'étendra dans les conditions qui causeraient un déblocage par congélation de l'échangeur extérieur, en général près des températures de congélation.
Cette thermopompe de toit est conçue pour s'alimenter d'une source monophasée de 115 V c.a. et de 50 Hz. Un technicien qualifié doit vérifier que la pompe à chaleur reçoit l'alimentation adéquate.

Au mode refroidissement, la baisse de température de l'air à l'entrée à la sortie sera de 15 à 70 degrés F (-6.7 à -21.1 degrés C). Au mode chauffage, la hausse de température de l'entrée à la sortie atteindra de 25 à 40 degrés F (-1.1 à 4.4 degrés C), à moins que la température extérieure n'oblige suffisamment pour activer l'interrupteur anti-brouillard. Dans ce cas, la température n'atteindra de 10 à 20 degrés F (-12.2 à -6.7 degrés C). Tout écart à ces normes justifie un examen de l'appareil, à la recherche de toiles à air sales ou d'un échangeur extérieur encrassé. Le fait de stationner le véhicule à l'ombre, de garder les fenêtres et les portières fermées et d'éviter l'utilisation d'appareils thermogénés dans la vénérable côter à réduire le gain de chaleur. Si possible, considérez l'ajout d'isolant et de vitres teintées (surtout dans les fourgonnettes non isolées).

R410A tout pompes à chaleur

Circuit de blocage du contacteur haute pression
Pompes à chaleur utilisant la R410A réfrigérant utiliser une usine installée interrupteur haute pression circuit de sécurité. Dans l'éventualité d'une anomalie (une défaillance du moteur de ventilateur, un serpenting de condensation salé, des filtres encrassés), le contacteur haute pression empêche le compresseur de rester en marche. Quand le contacteur haute pression est débranché, ce circuit de sûreté bloque le compresseur, ce qui empêche ce dernier de réfrigerer ou de fonctionner jusqu'à ce que l'alimentation de 115 V c.a. soit coupée puis rétablie de façon à réinitialiser le circuit de sûreté du contacteur haute pression. Si le blocage du contacteur haute pression se déclenche à maintes reprises, vous devez faire réparer l'appareil par un technicien compétent.

II. PANNEAU DE COMMANDE
Si votre RV pompe à chaleur est alimenté à partir du panneau de commande situé dans le plafond, puis il y a trois commandes sur le plafond qui vous aident à contrôler la pompe à chaleur. Celles-ci sont les suivantes:

A. Le sélectionneur - Le commutateur de sélection détermine le mode de fonctionnement de la pompe à chaleur. En tournant le sélecteur, l'utilisateur peut sélectionner la fonction de l'appareil désirée. Les fonctions du dispositif varient selon les options de l'unité de toit et télésélectronique du plafond. Le figure 1 illustre l'emplacement du sélecteur et les fonctions offertes.

B. La thermostat (commande thermique) - Le thermostat fixe le réglage de température de « ON » et « OFF » auquel le compresseur va fonctionner (voir la figure 1).

C. Les louvres - Les louvres se situent aux extrémités de la coiffe du plénium et servent à diriger l'air soufflé par l'unité.

IX. OPERATION AND MAINTENANCE
INSTRUCTIONS FOR 47000 SERIES
ROOF TOP HEAT PUMPS AND CEILING PLÉNUMS

I. GENERAL INFORMATION
NOTE: An optional auxiliary electric resistance heating assembly can be installed to take the chill out of the indoor air when the heat pump can no longer operate. The heat pump will shut down at conditions which would cause outdoor coil freezing, generally near freezing temperatures.
This roof mounted heat pump is designed to operate from a 115 VAC, 60 Hz, 1 Phase power supply. A qualified technician should verify that the heat pump is receiving the proper power.

In the cooling mode, the temperature drop from inlet to supply will be 15 to 20 degrees. In the heating mode, the temperature rise from inlet to supply will be 25 to 40 degrees unless the outdoor temperature has dropped sufficiently to cause the freeze switch to activate. In that case, the rise will be only 10 to 20 degrees. Any deviations from these norms are cause to examine the system for dirty air filters or dirty outdoor coil.

Parking the vehicle in a shaded area, keeping windows and doors shut, and avoiding the use of heat producing appliances will help to reduce the heat gain. When possible, the addition of insulation and tinted glass (especially in unheated parts) should be considered.

R410A Roof Top Heat pumps
High Pressure Switch Lockout Circuit
Heat pumps using R410A refrigerant may utilize a factory-installed High Pressure Switch Safety Circuit. In the event of an abnormal condition (failure of fan motor, dirty condenser coils, dirty filters), the high pressure switch will prevent the compressor from continuing to run. Once the high pressure switch has tripped, this safety circuit will "lock out" the compressor, preventing it from trying to restart or run until the 115 VAC supply power has been turned off and then back on to reset the High Pressure Switch Safety Circuit. If repeated trips of the high pressure switch lock out occur, then you must have the unit serviced by a qualified technician.

II. CONTROL PANEL
If your RV heat pump is operated from the control panel located in the ceiling assembly, then there are three controls on the ceiling assembly that help you control the heat pump. They are as follows:

A. The Selector Switch - The selector switch determines which mode of operation the heat pump will be in. By rotating the selector switch, the operator can obtain any system function desired. System functions vary depending upon options of both the roof top unit and ceiling assembly. Figure 1 shows selector switch location and lists all available functions by model.

The "Operation" section, explains the operational characteristics of each mode of operation.

B. The Thermostat (temperature control) - The thermostat regulates the "ON" and "OFF" temperature setting at which the compressor will operate. See Figure 1.

C. Louver - The louvers are located at both ends of the ceiling assembly shroud and are used in directing the discharge air from the unit.
Figure 9

**Grille**

**Assembly**

**Shroud**

**Filter**

**Fabric**

**Uptop Unit**

**Mounting Frame**

---

**Maintenance**

1. **INDENTIFICATION**
   - Ensure the filter is clean and in place.
   - Check the shroud for any damage.
   - Inspect the assembly for wear.

2. **CLEANING MATERIAL**
   - Use a soft cloth to clean the shroud.
   - Do not use any harsh chemicals.

3. **FILTERS**
   - Replace the filter if it is dirty or damaged.
   - Ensure the filter is properly seated.

4. **ASSY**
   - Check for any loose parts.
   - Ensure all connections are secure.

---

**NOTE**

- Always follow the manufacturer's instructions for maintenance.
- Do not operate the unit if any part is damaged.
- Regular maintenance can extend the life of the unit.

---

**Technical Specifications**

- **Capacity**: 1,000 CFM
- **Power**: 250W
- **Dimensions**: 24" x 24" x 12"

---

**Installation**

- Ensure the unit is installed in a well-ventilated area.
- Allow enough space for air circulation.
- Follow the installation guide provided by the manufacturer.
VII. INSTALLATION DE L'ENSEMBLE DE PLAIFOND (SÉRIE 8620)

Confirmez que vous avez correctement apparu la pompe à chaleur de toit et l'ensemble de platfond. Vous devez exclure les instructions pas à pas dans l'avant qui suit afin d'assurer une installation appropriée.

A. Déballez l'ensemble de platfond, séparez les éléments individuellement et retirez les deux grilles et filtres du carénage de platfond.

B. Replacez et retirez les 3 languettes situées autour de l'ouverture interne du coffret de gaines, puis fixez le coffret au toit à l'aide de vis fournies (voir Figure 8).

C. Soulevez la chine de l'ensemble de platfond et installez le câblage d'alimentation à travers le serrovalé et dans la boîte de connexion de façade à une distance de 6 cm. Dans la boîte du câble de gaz. Serrez le serrovalé sur la gaine du câble d'alimentation afin d'en interdire le mouvement (voir Figure 7).

D. Raccordez le fil d'alimentation noir à la plaque de coocke, le fil d'alimentation blanc à la plaque de coocke blanche et le fil de mise à la terre à la plaque d'alimentation à la plaque de coocke verte située dans la boîte de connexion avec les 3 métaux fournies. Fixez les métaux aux fils de façon appropriée avec du ruban adhésif homologué U.L. (voir Figure 8).

E. Enfoncez les fils d'alimentation et les métaux dans la boîte de connexion en évitant de pincer les fils, fixez la boîte de connexion avec les 2 vis fournies (voir Figure 8).

V. WALL THERMOSTAT OPERATION

Si votre Coleman-Mach roof top unit is controlled by a wall thermostat, refer to the operation manual that was included with the thermostat.

VI. WARRANTY SERVICE

Let's face it. Sometimes even the best products may need service. To obtain warranty service on your Coleman-Mach heat pump, please contact your selling dealer, or you may access our web site at www.Airxcel.com for answers to the most frequently asked questions and service center locations.

Airxcel, Inc. support help may be accessed by e-mail at EWS@Airxcel.com. All written correspondence should be directed to:
AIRXCEL INC. - RV Products Division
P.O. Box 4029
Wichita, KS 67204

IMPORTANT
1. Carefully read the LIMITED 2 YEAR WARRANTY, the OPTIONAL THREE YEAR EXTENDED PARTS WARRANTY, terms contract, lemmas, exceptions and exclusions regarding your unit at www.Airxcel.com.

2. An option three year extended parts only contract is available at an additional cost of $55.00. To obtain this option, please refer to the application located on the back of this manual. Once completed, mail the application and your check or money order to the address above. Applications must be made within ninety (90) days of the original purchase.

3. Inquiries about your Coleman-Mach unit must include the model and serial numbers and the date of purchase. The model and serial numbers can be found on the L.D. label located on the unit's gas/steam return air opening at the bottom of the roof unit. This information may also be found on the unit rating plate.
The new Fanmate featuring EZClip hardware for quick, easy and tool-free installation for high powered ceiling fans. The Fanmate simply slips over the built-in, waterproof mounting tabs on the Maxxfan and Maxxtreme Plus. Simply slide the included clip through the tab to secure the Fanmate cover. (Hardware with clips included for mounting on other fan models.)

Suburban
Q Series Furnaces
Suburban Q Series furnaces are designed to be significantly quieter with increased efficiency and lower motor RPM for substantially lower sound levels.

Cooking Appliances
Give your Caravan Galley the same style and sophistication as home with Suburban's Professional Residential Style Cooking Appliances and Accessories!

Water Heaters
More options and more convenience with Suburban's durable, porcelain-lined steel tank water heaters. Fast recovery, tank capacities and features to match the requirements of almost any Caravan.

Visit Airxcel.com for our entire line of quality RV comfort products!
Pompes série de chaleur
Installation, utilisation et maintenance

**Avertissement**

Les pompes série de chaleur doivent être correctement installées et utilisées pour éviter tout risque de dommages ou de blessures. Les instructions ci-dessous doivent être respectées pour assurer une utilisation sécurisée.

**Table des matières**

1. **Installation officielle**
2. **Utilisation des pompes série de chaleur**
3. **Maintenance et entretien des pompes série de chaleur**

**Importants**

**1. Installation officielle**

- **Étapes de base**
- **Règles de sécurité**
- **Conditions d’installation**

**2. Utilisation des pompes série de chaleur**

- **Mise en route**
- **Opérations de chauffage**
- **Opérations de refroidissement**

**3. Maintenance et entretien des pompes série de chaleur**

- **Nettoyage des pompes**
- **Réglage des pompes**
- **Réparation des pompes**

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- **Éviter les liquides inflammables**
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- **Porter des gants de protection**
- **Maintenir une distance sécuritaire**
- **Respecter les consignes de sécurité**

**Informations techniques**

- **Caractéristiques techniques**
- **Spécifications de fonctionnement**
- **Garanties de garantie**
I. WARNINGS

IMPORTANT NOTICE

These instructions are for the use of qualified individuals specially trained and experienced in installation of this type equipment and related system components. Installation and service personnel are required by some states to be licensed. PERSONS NOT QUALIFIED SHALL NOT INSTALL NOR SERVICE THIS EQUIPMENT.

WARNING! SHOCK HAZARD. To prevent the possibility of severe personal injury or equipment damage due to electrical shock, always be sure the electrical power source to the appliance is disconnected.

IMPORTANT! Improper installation may damage equipment, can create a hazard and will void the warranty. The use of components not tested in accordance with these units will void the warranty. Make the equipment in violation of state codes, may create a hazard and may ruin the equipment.

NOTE: The words "Shall" or "Must" indicate a requirement which is essential to satisfactory and safe product performance. The words "Should" or "May" indicate a recommendation or advice which is not essential and not required but which may be useful or helpful.

II. PACKAGE CONTENTS

1) Wirebox Assembly
2) Duct Dividers Board - Some models do not have Dividers Boards (boards are provided bulk packed)
3) Mount Frame
4) Chilled-Assemblies Consisting of:
   1) Chilled-Assemblies Air-Plate
   2) Shroud Assembly
   3) Filters
   4) Gaskets
5) Small Parts Package Consisting of:
   1) Bolts
   2) Screws - 3/8" Length
   3) Strain Relief
   4) Mounting Nuts
   5) Wire Nuts
   6) Evaporator Freeze Sensor

III. GENERAL INFORMATION

The flush mount ceiling plenum is designed for application in systems that utilize field fabricated (CEM supplied) cold air ducting. The ducting must be routed through the ceiling cavity (between the interior ceiling and roof). Ducting specifications are given in the section labeled "Supply Ducting and Registers". This system utilizes a single, non-ducted centrally located return air opening. The return air opening is contained within the ceiling plenum. The ceiling plenum must be located directly below the roof opening used for mounting the roof top unit.

IV. CEILING PLENUM INSTALLATION REQUIREMENTS

1. The ceiling plenum must be installed under the roof opening. The ceiling plenum bolts below the roof top unit. Compression of the framed ceiling cavity between the roof top unit and the ceiling plenum is what holds both components in place.

2. Ceiling cavity depth (measured from the ceiling to the roof - maximum 8")

3. The 115 VAC service for the roof top unit must be routed into the ceiling plenum. To prevent wire pinching and to promote ease of installation, allowances must be made for routing the 115 VAC supply wiring into the front of the roof opening.

4. Thermostat wiring must be run from the wall thermostat mounting location to the wirebox low voltage terminals. To prevent wire pinching and to promote ease of installation, allowances must be made for running the low voltage wiring into the front of the opening.

5. The wirebox has a 9 pin receptacle extending from the front. This mates with the roof pin 115 volt electrical conduit. When making the connection, verify that the plugs are properly aligned and have snapped together securely.
### Terminal Function Chart

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</tr>
<tr>
<td>4</td>
<td>Heat Off</td>
<td><strong>WHITE</strong></td>
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### Installation Instructions

1. **Routing the Thermostat Wiring**: Refer to the installation manual for proper wiring connections.

2. **Connecting**: Ensure all connections are secure and tight.

3. **Check**: Test the system to ensure everything is working as expected.

4. **Final Check**: Double-check all connections and wiring before operation.

---

### Control Panel Features

- **Temperature Control**: Adjust to desired setpoint.
- **On/Off Switch**: Basic control for power.
- **Rearview Camera**: Optional for enhanced safety.
- **Wi-Fi Connectivity**: For remote access and monitoring.

---

### Diagram

- **Thermostat Probe**: Located at the center.
- **Evaporator Coil**: Positioned at the top right.
- **Control Box**: Mounted at the bottom left.

---

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### Notes

- **CMOS Protection**: Prevents damage from overvoltage.
- **Power Supply**: Typically a 12VDC power supply is used.
- **Safety Measures**: Ensure all connections are done correctly to avoid electrical hazards.

---

### References

- [Thermostat Installation Guide](link)
- [Control Panel Manual](link)
- [Evaporator Coil Spec](link)

---

**Note**: For detailed installation and operating instructions, please refer to the respective product manuals.
High Voltage Wiring Specifications based on Overcurrent Protection Device rated higher than the minimum required (see upper unit nameplate).

Follow all local and NEC (National Electrical Code) proper sizing of wire AWG based on Overcurrent Protection Device selected and the length of the wiring run to the air conditioner.

VIII. CEILING PLenum MOUNTING
1. Place the air conditioner over the roof opening.
2. Position the mount frame into the ceiling opening (See Figure 1).
3. Using the four bolts provided, secure the mount frame to the roof top unit. The four mounting bolts are to be applied through the back of the mount frame and into the bottom of the roof top unit (See Figure 1). Tighten each bolt until the indicators of the gasket are at final level.
4. Route the conduit into the return opening.
5. Measure the distance between the ceiling and the upper unit base pan, add 10" to this measurement and cut the duct divider to this height if necessary. ALWAYS CUT OFF THE BOTTOM EDGE (THE EDGE WITHOUT FOAM STRIP).
6. Carefully wedge this divider between the walls of the roof opening and against the upper unit basepan with the sliver side facing forward.

IX. CONNECT 115 VAC WIRING

WARNING - SHOCK HAZARD
To prevent the possibility of severe personal injury or equipment damage due to electrical shock, always be sure the electrical power is disconnected or off before beginning installation.
1. Complying with the "Danger" notice below, bring the 115 VAC supply wiring previously routed into the frame of the roof opening, through the strain relief at the electrical box and into the high voltage wiring area.

DANGER WHEN USING NON-METALLIC SHEATH SUPPLY CABLES (ROMEX, ETC.), STRIP SHEATH BACK TO EXPOSE 1/8 INCHES OF THE SUPPLY LEADS. STRIP THE INDIVIDUAL WIRE LEAD ENDS FOR WIRE CONNECTION (ABOUT 3/4" BARE WIRE). INSERT STRAIN RELIEF INTO ELECTRICAL BOX. INSERT THE SUPPLY WIRING THROUGH THE STRAIN RELIEF.

IF OTHER THAN NON-METALLIC CABLES ARE USED FOR SUPPLY CONDUCTORS, APPROPRIATE STRAIN RELIEF CONNECTORS OR CLAMPS SHOULD BE USED. IN NO CASE SHOULD CLAMPING OR PINCHING ACTION BE APPLIED TO THE INDIVIDUAL SUPPLY LEADS (NEUTRAL AND "HOT" WIRING).

2. Connect high voltage supply leads to the control box wire leads with provided wire nuts. "HOT" connects to black lead, "NEUTRAL" to white lead and "GROUND" to green lead.
3. Gently fold all wiring into the electrical box while

4. Complying with the warnings listed below, connect the 115 VAC supply wiring to its power source. Be sure all power remains until before beginning checkout procedure.

IMPORTANT
When connecting the 115V electrical conductors:
1. Make any adjustments required to relieve pinched or stressed wiring.
2. Verify that the "rigid" side of both plugs are properly aligned. Verify that the connectors have snapped together on both sides. Do not use excessive force when joining the connectors.

X. CONNECT THERMOSTAT WIRING
1. Bring the thermostat wiring previously routed into the roof opening to the low voltage terminal board extending from the front of the ceiling plenum electrical box.

These low voltage ceiling plenum designations complete the following circuits:
- B: -12 VDC for all relay coils
- Y: +12 VDC for compressor relay coil
- G: +12 VDC for fan relay coil
- S: +12 VDC for low fan relay coil
- W: +12 VDC for heat relay - found on heat ready and heat pump boxes.

XII. INSTALL OPTIONAL HEATER ASSEMBLY
1. The optional heater assembly may now be installed. Refer to Figure 5 for the 45000, 49000 and 49000 series units. Refer to Figure 6 for the 47000 series units.
2. Position the heater assembly into the return air opening as shown. For 45000, 49000 and 49000 series units, the heater bracket must be installed between the base pan and the plastic grommet on the ceiling plenum, (see Figure 4).
3. For 47000 series unit installation, the bracket assembly is to be welded to the bracket and is secured in place with screws.
4. Install the filters and return air grilles in the shroud assembly.
5. Installation is now complete.
How does the Heat Pump Thermostat Work

The RVComfort HP, the RVComfort PHP, the Coleman True Air, and the RVComfort 2C thermostats by RVProducts Inc. are all capable of running not only an Air Conditioning unit, but also an Electric Heat Pump. Frequently we receive calls from customers who do not understand the functions of the Heat Pump Thermostats. This guide is a quick run through of the information already provided in the Thermostat Operation Manual, included with each thermostat.

The Heat Pump is an electric source for heat. It will supply and maintain heat assuming the outside (ambient) temperature is above 40 degrees. This number of course can be slightly higher or lower depending on the humidity. Higher humidity can cause a heat pump to lose efficiency at a slightly higher ambient temperature, while lower humidity can cause a heat pump to lose efficiency at a lower ambient temperature.

Since no one wants to wake up to find that the outside temperature dropped below forty degrees and it is now 50 degrees inside the coach, the Heat Pump thermostats are programmed internally to recognize when the temperature drops five degrees or more from the set temperature to the actual inside room temperature. When the temperature exceeds five degrees or more between the two, the thermostat will default to the next available heat source.

The thermostat, upon sensing a temperature split of five degrees or more in the electric heat mode will bring the gas heat on to assist the electric heat. This is the first strike. A strike is created by the thermostat having to change modes (or run dual modes to sustain a temperature split). The electric heat and the gas heat will continue to run together until the thermostat reaches the set temperature and satisfies. When the electric heat comes back on, it will be in electric heat only at that point. If the temperature again drops five degrees or more from the set point, the thermostat will again bring the gas heat on to assist. This is strike two. The system will then go through the above stated procedures. If the temp should drop five degrees from set point for a third time, the thermostat will give up on the electric heat, lock the electric heat out for two hours (showing either DIFF on the display or FLASHING GAS HEAT on the display) and default to Gas heat only. You WILL NOT be able to run any Electric heat during this two hour lockout.
This is the normal operation for these thermostats. We can also cause the thermostats to lock out in a few ways. If we set the electric heat set point five degrees or more higher than the room temperature the thermostat will default the same as it would if the temperature dropped five degrees or more. If at any time the differential between the set temperature and actual temperature is five degrees or more, the thermostat will go into a strike point regardless of whether it is caused by raising the temperature too far, or the temperature falling inside the coach.

The other way the thermostat will receive a strike is if the system runs for twenty minutes and cannot reach the set temperature (satisfy). Again the thermostat senses that something is wrong with the system and defaults to the next available heat source to assist. These strikes are the same as the strikes mentioned above and any combination of three strikes will result in a two hour lockout.

Once the system comes out of lockout, it will only require 1 strike to go back into lockout. So keep in mind, if you are coming out of a two hour lockout, be careful to keep the set and room temperature within four degrees otherwise you will lock the system out again.

To summarize:

1. There is no outside ambient sensor to shut down the heat pump. The heat pump will shut down only if the system is locked out. Ambient temperature does affect the performance of the electric heat.

2. If the thermostat set point and actual room temperature are FIVE degrees or greater the system will default to the next heat source for assistance and obtain a strike. Three consecutive strikes and the electric heat will be locked out for two hours.

3. If the electric heat runs for twenty minutes and cannot satisfy and shut the compressor off, the system will also default to the next heat source for assistance and obtain a strike. Three consecutive strikes and the electric heat will be locked out for two hours.

4. Once the thermostat is locked out, it is a hard lockout. There is no reset that will bypass the lockout. Pulling the fuse will not reset the thermostat lockout.
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<td>Cautions &amp; Safety Information</td>
<td></td>
</tr>
<tr>
<td>Back Cover</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Our service technicians are available to assist you in making repairs or parts replacements from 9:00 a.m. to 5:00 p.m. Eastern Standard Time, Monday through Friday (except holidays), by calling 423-775-2134 extension 7102. E-mail address: info1@suburbanmfg.com
GENERAL SERVICE INFORMATION

Suburban DYNATRAIL furnaces installed in recreational vehicles are classified as Direct Vent Sealed Combustion Furnaces. A forced draft furnace utilizes a sealed combustion chamber which is vented to the outside atmosphere. The intake air for combustion is also taken from outdoors and is completely isolated from the room air. A motor is used to drive an impeller wheel to draw intake air into the chamber to support combustion and force the exhaust gases through the furnace chamber to the outside atmosphere. A second impeller wheel (driven by the same motor yet totally isolated from the combustion air) is used to circulate room air across the furnace chamber where it is heated. The blower then forces the hot air into the living area either through a duct system or through a front grille on the furnace cabinet on direct discharge models.

Suburban furnaces operate on 12-volt DC power which is supplied either by a 12-volt battery or a converter system. A recreational vehicle furnace that is specifically designed for “park model” trailers operates on 120 volts AC. These are designed and tested under the same standards as the 12-volt models.

Suburban forced draft combustion furnaces used in recreational vehicles are designed for use with Propane gas. Although a few recreational vehicle furnaces are approved for use with natural gas, one should never attempt to convert such a unit to natural gas unless the conversion is approved by the manufacturer of the furnace.

Gas Supply Pressure Requirements

Line Pressure:
- Minimum 11" WC*
- Maximum 14" WC

*WC - water column

Voltage Requirements

Voltage DC: 12 volt D.C.
- Minimum 10.5 volts D.C., Maximum 13.5 volts D.C.

Service Tools Required

- Manometer gauge/ U-Tube
- Volt ohm meter capable of testing above 15 amps
- Module board tester #841511
- Gas leak detector OR approved leak check liquid
- Assorted wrenches
- Assorted hand tools
- Safety glasses
### Suburban RV Furnaces

#### 12 VDC Direct Discharge

<table>
<thead>
<tr>
<th>Model</th>
<th>BTU/h</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Ignition</th>
<th>Shipping Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT-12SF</td>
<td>12,000</td>
<td>9 3/8&quot;</td>
<td>9 3/8&quot;</td>
<td>21-27 3/4&quot;</td>
<td>Electronic</td>
<td>27</td>
</tr>
<tr>
<td>DD-17DSI</td>
<td>17,000</td>
<td>12&quot;</td>
<td>10 1/2&quot;</td>
<td>22-29&quot;</td>
<td>Electronic</td>
<td>25</td>
</tr>
</tbody>
</table>

**Accessories**
- 260197: Vent Kit 2" - 4" DD Models
- 260198: Vent Kit 4" - 6" DD Models
- 260199: Vent Kit 6" - 9" DD Models

#### 12 VDC Ducted Furnaces

<table>
<thead>
<tr>
<th>Model</th>
<th>BTU/h</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Ignition</th>
<th>Shipping Weight</th>
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</thead>
<tbody>
<tr>
<td>NT-12S</td>
<td>12,000</td>
<td>9 3/8&quot;</td>
<td>9 3/8&quot;</td>
<td>22 3/4 1/2&quot;</td>
<td>Electronic</td>
<td>27</td>
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<tr>
<td>NT-16S</td>
<td>16,000</td>
<td>9 3/8&quot;</td>
<td>9 3/8&quot;</td>
<td>22 3/4 1/2&quot;</td>
<td>Electronic</td>
<td>27</td>
</tr>
<tr>
<td>NT-20S</td>
<td>19,000</td>
<td>9 3/8&quot;</td>
<td>9 3/8&quot;</td>
<td>23 3/6-20 1/8&quot;</td>
<td>Electronic</td>
<td>27</td>
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<tr>
<td>NT-24SP</td>
<td>24,000</td>
<td>12 1/2&quot;</td>
<td>12&quot;</td>
<td>23&quot;</td>
<td>Electronic</td>
<td>40</td>
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<td>NT-30SP</td>
<td>30,000</td>
<td>12 1/2&quot;</td>
<td>12&quot;</td>
<td>23&quot;</td>
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<td>NT-34SP</td>
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<td>40</td>
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<tr>
<td>NT-40</td>
<td>40,000</td>
<td>12 1/2&quot;</td>
<td>12&quot;</td>
<td>23&quot;</td>
<td>Electronic</td>
<td>42</td>
</tr>
<tr>
<td>SF-20F</td>
<td>20,000</td>
<td>7 1/2&quot;</td>
<td>17&quot;</td>
<td>20&quot;</td>
<td>Electronic</td>
<td>36</td>
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<tr>
<td>SF-25F</td>
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<td>20&quot;</td>
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<tr>
<td>SF-30F</td>
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<td>7 1/2&quot;</td>
<td>17&quot;</td>
<td>20&quot;</td>
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<td>20&quot;</td>
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<td>35</td>
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<tr>
<td>SH-33F</td>
<td>35,000</td>
<td>9 1/4&quot;</td>
<td>17&quot;</td>
<td>20&quot;</td>
<td>Electronic</td>
<td>40</td>
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<td>SH-42F</td>
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<td>42</td>
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<tr>
<td>SF-25*</td>
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<td>20&quot;</td>
<td>Electronic</td>
<td>35</td>
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<td>17&quot;</td>
<td>20&quot;</td>
<td>Electronic</td>
<td>35</td>
</tr>
<tr>
<td>SF-42*</td>
<td>42,000</td>
<td>7 1/2&quot;</td>
<td>17&quot;</td>
<td>20&quot;</td>
<td>Electronic</td>
<td>35</td>
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<td>SH-35*</td>
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<td>40</td>
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<tr>
<td>SH-42*</td>
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<td>17&quot;</td>
<td>20&quot;</td>
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<td>SHD-2542</td>
<td>25/40,000</td>
<td>8 1/4&quot;</td>
<td>17&quot;</td>
<td>20&quot;</td>
<td>Electronic</td>
<td>44</td>
</tr>
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</table>

**Accessories**
- 6258ACW: "Door, Optional Access, Colonial White, Standard SF Models"
- 6258APW: "Door, Optional Access, Polar White, Standard SF Models"
- 6257ACW: "Door, Optional Access, Colonial White, Standard SH Models"

#### 120 VAC Park Model Furnaces

<table>
<thead>
<tr>
<th>Model</th>
<th>BTU/h</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Ignition</th>
<th>Shipping Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-40</td>
<td>40,000</td>
<td>12 1/2&quot;</td>
<td>12&quot;</td>
<td>23&quot;</td>
<td>Electronic</td>
<td>46</td>
</tr>
</tbody>
</table>

**Accessories**
- 050733: Duct Cover
- 050715: Duct Collar 4"
- 051240: Duct Collar 2"
- 260152: Rain Shield
- 052164: Bottom Duct Gasket, NT-24/30/34SP, NT-40, P40
- 070853: Bottom Duct Gasket, SF Models Except SF-42, (F)
- 520099: Bottom Duct Kit W/Gasket, NT-24/30/34SP, NT-40, P40
- 520576: Bottom Duct Kit W/Gasket, SF Models Except SF-42, (F), SH35 (F)
- 520753: Bottom Duct Kit W/Gasket and Door, SF-42, (F)
- 520854: Bottom Duct Kit W/Gasket SH-42 (F) SHD-2542

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Wall Thermostats are included with All Models, except SF.
Vent Assemblies are included with all units, except DD.
INSTALLATION

There are several important aspects of the installation which will pertain to all Suburban forced draft furnaces, regardless of the model or the method in which they are installed. They are:

1. Selecting a Location
2. Venting
3. Return Air
4. Ducting

Refer to the furnace installation manual for all installation requirements.

Location and Installation: Locate the furnace near lengthwise center of the coach. Choose a location for installation out of the way of wires, pipes, etc. which might interfere with the installation. Adhere to the minimum clearances from cabinet to combustible construction as listed in the installation manual for your specific furnace model. Secure furnace cabinet to the floor of the coach using the holes provided in the furnace cabinet.

Figure 1
VENTING

Venting - By definition of a Direct Vent Sealed Combustion Furnace, it must be vented to the outside atmosphere and also draw combustion air from outdoors. Therefore, it is imperative that the vent be unobstructed and there must be a seal between the exhaust and intake (caulking). Refer to the vent assembly installation in the manual. The vent must be straight. There can be no offsets or turns in the vent. All vent tubes which connect to the furnace exhaust and intake must overlap a minimum of 1/2" on intake, and 1 1/4" on exhaust. Check your furnace model number for vent installation procedures. Vents cannot be altered as supplied from the factory.

VENT ASSEMBLY INSTALLATION (SF and SH SERIES)
VENT ASSEMBLY INSTALLATION (SF and SH SERIES)

**SF**

- **INTAKE:** 1/2" minimum overlap
- **EXHAUST:** 1 1/4" minimum overlap

<table>
<thead>
<tr>
<th>&quot;C&quot; DIMENSION</th>
<th>EXTENSION TUBES KIT NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0&quot; TO 1 1/2&quot;</td>
<td>520767</td>
</tr>
<tr>
<td>1 1/2&quot; TO 3&quot;</td>
<td>529766</td>
</tr>
<tr>
<td>3&quot; TO 4 1/2&quot;</td>
<td>520768</td>
</tr>
<tr>
<td>4 1/2&quot; TO 7 1/2&quot;</td>
<td>529766</td>
</tr>
<tr>
<td>7 1/2&quot; TO 9&quot;</td>
<td>520661</td>
</tr>
</tbody>
</table>

NEVER INSTALL THE EXHAUST TUBE WITH LESS THAN 1 1/4" OVERLAP OR THE INTAKE TUBE WITH LESS THAN 1/2" OVERLAP

STANDARD VENT ASSEMBLY FURNISHED WITH FURNACE SPECIAL EXTENSION TUBES. IF NEEDED, MUST BE ORDERED SEPARATELY. EXTENSION KITS COME WITH COMPLETE INSTALLATION INSTRUCTIONS

**SH**

- **INTAKE:** 1/2" minimum overlap
- **EXHAUST:** 1 1/4" minimum overlap

<table>
<thead>
<tr>
<th>&quot;C&quot; DIMENSION</th>
<th>EXTENSION TUBES KIT NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0&quot; TO 1 1/2&quot;</td>
<td>520767</td>
</tr>
<tr>
<td>1 1/2&quot; TO 3&quot;</td>
<td>529766</td>
</tr>
<tr>
<td>3&quot; TO 4 1/2&quot;</td>
<td>520768</td>
</tr>
<tr>
<td>4 1/2&quot; TO 7 1/2&quot;</td>
<td>529766</td>
</tr>
<tr>
<td>7 1/2&quot; TO 9&quot;</td>
<td>520661</td>
</tr>
</tbody>
</table>

NEVER INSTALL THE EXHAUST TUBE WITH LESS THAN 1 1/4" OVERLAP OR THE INTAKE TUBE WITH LESS THAN 1/2" OVERLAP

STANDARD VENT ASSEMBLY FURNISHED WITH FURNACE SPECIAL EXTENSION TUBES. IF NEEDED, MUST BE ORDERED SEPARATELY. EXTENSION KITS COME WITH COMPLETE INSTALLATION INSTRUCTIONS
VENT ASSEMBLY INSTALLATION (SFV)

Figure 5

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Extension Tubes (per No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; To 3/8&quot;</td>
<td>1-3/16&quot; x 1-3/8&quot; with adapter</td>
</tr>
<tr>
<td>3/4&quot; To 2&quot;</td>
<td>1-3/16&quot; x 1-3/8&quot; with adapter</td>
</tr>
<tr>
<td>2&quot; To 1-1/2&quot;</td>
<td>1-3/16&quot; x 1-3/8&quot; with adapter</td>
</tr>
<tr>
<td>2-1/2&quot; To 1-1/2&quot;</td>
<td>1-3/16&quot; x 1-3/8&quot; with adapter</td>
</tr>
<tr>
<td>1-1/2&quot; To 2&quot;</td>
<td>1-3/16&quot; x 1-3/8&quot; with adapter</td>
</tr>
</tbody>
</table>

- Do not install the exhaust tube with less than 6" overlap. Do not install the intake tube with less than 1/2" overlap.

Figure 5A

Figure 8

Figure 8A

*STANDARD VENT ASSEMBLY FURNISHED WITH FURNACE. SPECIAL EXTENSION TUBES & HOSES MUST BE ORDERED SEPARATELY. EXTENSION KITS ENSURE COMPLETE INSTALLATION INSTRUCTIONS.
VENT ASSEMBLY INSTALLATION (DD SERIES)

Note: Vent cap must be installed on DD furnace when bench testing.

<table>
<thead>
<tr>
<th>PART NUM</th>
<th>VENT LENGTH</th>
<th>X DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>260197</td>
<td>5 7/8&quot;</td>
<td>22&quot; - 24 3/8&quot;</td>
</tr>
<tr>
<td>260198</td>
<td>8 3/16&quot;</td>
<td>24 3/8&quot; - 26 5/8&quot;</td>
</tr>
<tr>
<td>260199</td>
<td>10 1/2&quot;</td>
<td>26 5/8&quot; - 29&quot;</td>
</tr>
</tbody>
</table>

*NOTE: NEVER INSTALL VENT WITH LESS THAN 1 250" OVERLAP BETWEEN CHAMBER EXHAUST TUBE & VENT ASSY. EXHAUST TUBE.*

Figure 7
VENT ASSEMBLY INSTALLATION (NT SERIES)

VENT TUBE INSTALLATION NT-20S

VENT TUBE (EXHAUST) 6" X 2" O.D. VENT TUBE ASSY. (INTAKE) SEE CHART

1 1/4" MIN. OVERLAP ★ ★

MOUNTING SURFACE

1/2" MIN. OVERLAP ★ ★

PART NO. INTAKE TUBE LENGTH ONLY ★ ★ "X" DIMENSION
X05000B 2" O.D. X 3" STANDARD ★ 23 3/8" TO 25 5/8"
X052712 2" O.D. X 5" SPECIAL 25 5/8" TO 27 7/8"
X052714 2" O.D. X 7 1/4" SPECIAL 27 7/8" TO 30 1/8"

★ ★ NEVER INSTALL THE EXHAUST TUBE WITH LESS THAN 1 1/4" OVERLAP, OR THE INTAKE TUBE WITH LESS THAN 1/2" OVERLAP.

★ ★ STANDARD TUBE FURNISHED WITH FURNACE. THE SPECIAL TUBES, IF NEEDED, ARE TO BE ORDERED.

3 1/2" FROM CENTER LINE OF INTAKE TO CENTER LINE OF EXHAUST

2 1/4" FROM CENTER LINE OF INTAKE TO FLOOR

MUST BE USED ON ALL INSTALLATIONS

GASKET: PEEL OFF PROTECTIVE PAPER TO EXPOSE THE ADHESIVE SURFACE. ATTACH GASKET TO WASHER, PLACE WASHER OVER GAS FITTING. THE GASKET SHOULD SEAL AGAINST CABINET WHEN GAS FITTING IS THREADED INTO POSITION.

Figure 11
NT-20S

Figure 12
NT-24/30/34/5P
P-38S

13
VENT ASSEMBLY INSTALLATION (NT SERIES)

MAXIMUM WALL THICKNESS FOR THIS UNIT IS 2 1/4" SEE FIGURE 4 IF MORE THAN 2 1/4" WALL THICKNESS.

CAULK BEHIND VENT CAP AS SHOWN TO SEAL BETWEEN EXHAUST AND INTAKE AND TO PREVENT MOISTURE INSIDE FURNACE COMPARTMENT. APPLY CAULKING GENEROUSLY AROUND PERIMETER OF VENT CAP AND ACROSS CENTER AS SHOWN. CENTER PUTTY STRIP IS ESSENTIAL.

INTAKE TUBE 2 3/4" DIA. TWO HOLES.

ANCHOR VENT ASSEMBLY WITH THE SCREW PROVIDED. BE SURE SCREW ENGAGES FURNACE EXHAUST TUBE AND IS PULLED SECURE.

Figure 13
NT-34132026P
P-38

<table>
<thead>
<tr>
<th>EXTENSION TUBE KIT NUMBER</th>
<th>MIN./MAX. LENGTH (Extension Tube Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>520428</td>
<td>2-1/4&quot; to 3-1/8&quot;</td>
</tr>
<tr>
<td>520499</td>
<td>3-1/8&quot; to 4-7/8&quot;</td>
</tr>
<tr>
<td>620500</td>
<td>4-7/8&quot; to 7&quot;</td>
</tr>
<tr>
<td>520501</td>
<td>7&quot; to 9&quot;</td>
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</table>

Figure 14
NT-34132024SP
P-389

<table>
<thead>
<tr>
<th>EXTENSION TUBE KIT NUMBER</th>
<th>MIN./MAX. LENGTH (Extension Tube Range)</th>
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<tbody>
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<td>520594</td>
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<td>520595</td>
<td>4-7/8&quot; to 7&quot;</td>
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<td>520598</td>
<td>7&quot; to 9&quot;</td>
</tr>
</tbody>
</table>

Figure 15
NT-40
P-40
VENT ASSEMBLY INSTALLATION (NT-40 and P-40)

Figure 18
NT-40

Figure 17
P-48
RETURN AIR

Return Air - The cabinet that the furnace may be installed in will have louver or openings for the return air back to the furnace. When the furnace is installed, it is imperative that the return air louver or the furnace cabinet opening are not obstructed.

Usually, these furnaces are installed under a counter, sofa or bed in order to be out of the way. A grille or opening must be built into the cabinetry or into the base area of the sofa or bed. Return air from the living area of the trailer is drawn in through the grille and into the return air openings in the furnace cabinet. Figure 19 illustrates the return air circulation of the furnace. Note: Refer to the installation manual for the minimum return air area for your specific furnace model.

Insufficient return air will cause the furnace to overheat and cycle on limit. Another symptom of a return air problem is:

1. Furnace seems to run continuously in an effort to satisfy the thermostat.

*THE TOTAL FREE, UNOBSTRUCTED RETURN AIR OPENING TO THE FURNACE MUST NOT BE LESS THAN THE MINIMUM
DUCTING

Ducting - Suburban furnaces require that a minimum duct area be maintained throughout entire duct system including through the register. It is very important to adhere to the minimum duct area in order to keep the furnace from cycling on high limit and to assure proper operation of the sail switch (sometimes referred to as a microswitch.) NOTE: (Refer to the installation manual for the minimum ducted square inches area for each model.)

NOTE: Ducts terminating in a dead air space (like holding tank compartments or cargo areas (Toy Boxes) with no means for return air recirculation should not be counted in the required duct area. Also, ducts 2" in diameter or smaller should not be counted in the required duct area.

When installing a duct system, avoid making a lot of turns. The straighter the duct system, the less the resistance to air flow and the better the performance of the furnace.

Avoid making sharp turns in the duct system. Sharp turns will increase the static pressure in the plenum area of the furnace and could cause the furnace to cycle on limit.

The duct connections to the furnace cabinet should be tight to eliminate any heat loss which could result in overheating of the component parts on the furnace as well as a reduction in the heated air flow through the ductwork.
## INSTALLATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Models</th>
<th>Clr Front</th>
<th>Clr Top</th>
<th>Clr Btm</th>
<th>Clr Back</th>
<th>Clr Left</th>
<th>Clr Right</th>
<th>Ducts Req'd</th>
<th>Btm Duct Sq Inch</th>
<th>Top Duct Sq Inch</th>
<th>L &amp; R Side Duct Sq Inch</th>
<th>Return Air Sq inch</th>
</tr>
</thead>
<tbody>
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<td>0''</td>
<td>0''</td>
<td>0''</td>
<td>0''</td>
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<td>1''</td>
<td>0''</td>
<td>0''</td>
<td>1''</td>
<td>1''</td>
<td>2-4''</td>
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<td>n/a</td>
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<td>25''</td>
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<td>1''</td>
<td>2-4''</td>
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<td>1''</td>
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<td>2-4''</td>
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<td>0''</td>
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<td>5/8''</td>
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<td>n/a</td>
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<tr>
<td>NT-16SE</td>
<td>See *1</td>
<td>5/8''</td>
<td>0''</td>
<td>0''</td>
<td>5/8''</td>
<td>5/8''</td>
<td>n/a</td>
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<td>5/8''</td>
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<td>4-4''</td>
<td>48''</td>
<td>n/a</td>
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<td>113''</td>
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<td>1''</td>
<td>4-4''</td>
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<td>4-4''</td>
<td>48''</td>
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<td>48''</td>
<td>113''</td>
</tr>
</tbody>
</table>

*1 - Special clearances for discharge grills. Refer to Installation and Instruction Manual.
*2 - Return air should be 142" if 4 ducts are used. May be reduced to 88" if 5 ducts are used.

**NOTE:** 0" clearance is to spacers (flanges)
### INSTALLATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Models</th>
<th>Clr Front</th>
<th>Clr Top</th>
<th>Clr Btm</th>
<th>Clr Back</th>
<th>Clr Left</th>
<th>Clr Right</th>
<th>Ducts Req'd</th>
<th>Btm Duct Sq Inch</th>
<th>Top Duct Sq Inch</th>
<th>L &amp; R Side Duct Sq Inch</th>
<th>Return Air Sq inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-20/20F</td>
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<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>2-4&quot;</td>
<td>56&quot;</td>
<td>56&quot;</td>
<td>25&quot;</td>
<td>55&quot;</td>
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<td>SF-25/25F</td>
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<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>3-4&quot;</td>
<td>56&quot;</td>
<td>56&quot;</td>
<td>36&quot;</td>
<td>55&quot;</td>
</tr>
<tr>
<td>SF-30/30F</td>
<td>1&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>3-4&quot;</td>
<td>56&quot;</td>
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<td>55&quot;</td>
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<tr>
<td>SF-35/35F</td>
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<td>0&quot;</td>
<td>0&quot;</td>
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<td>56&quot;</td>
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<td>48&quot;</td>
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<td>1&quot;</td>
<td>0&quot;</td>
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<td>4-4&quot;</td>
<td>72&quot; SEE *3</td>
<td>56&quot;</td>
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<td>SEE *2</td>
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<tr>
<td>SH-35</td>
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<td>0&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>4-4&quot;</td>
<td>56&quot;</td>
<td>56&quot;</td>
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<td>55&quot;</td>
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<tr>
<td>SH-42</td>
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<td>0&quot;</td>
<td>0&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>4-4&quot;</td>
<td>72&quot; SEE *3</td>
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<td>48&quot;</td>
<td>See *2</td>
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<tr>
<td>SHD-2542</td>
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<td>0&quot;</td>
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<td>4-4&quot;</td>
<td>72&quot; SEE *3</td>
<td>56&quot;</td>
<td>48&quot;</td>
<td>SEE *2</td>
</tr>
</tbody>
</table>

**NOTE:** 6" clearance is to spacers (flanges)

*1 - Special clearance for discharge grills. Refer to Installation and Instruction Manual.

*2 - Return air should be 14" if 4 ducts are used. May be reduced to 8" if 5 ducts used.

*3 - Bottom duct required. SF-42 uses kit # 020803, SH-42 and SHD-2542 uses kit #020864.
# INSTALLATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Models</th>
<th>Clr Front</th>
<th>Clr Top</th>
<th>Clr Btm</th>
<th>Clr Back</th>
<th>Clr Left</th>
<th>Clr Right</th>
<th>Ducts Req'd</th>
<th>Blm Duct Sq Inch</th>
<th>Top Duct Sq Inch</th>
<th>L &amp; R Side Duct Sq Inch</th>
<th>Return Air Sq inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFV-20/20F</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
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<td>52&quot;</td>
<td>SEE *4</td>
<td>SEE *4</td>
<td>55&quot;</td>
</tr>
<tr>
<td>SFV-25/25F</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>0&quot;</td>
<td>0&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>SEE *4</td>
<td>52&quot;</td>
<td>SEE *4</td>
<td>SEE *4</td>
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<tr>
<td>SFV-30/30F</td>
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<td>SEE *4</td>
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<td>52&quot;</td>
<td>SEE *4</td>
<td>SEE *4</td>
<td>55&quot;</td>
</tr>
<tr>
<td>SFV-42/42F</td>
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<td>2&quot;</td>
<td>0&quot;</td>
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<td>1&quot;</td>
<td>1&quot;</td>
<td>SEE *4</td>
<td>52&quot;</td>
<td>SEE *4</td>
<td>SEE *4</td>
<td>142&quot;</td>
</tr>
</tbody>
</table>

**NOTE:**
- 1" clearance to be spacer (flanges)
- 2 stake air should be 142" if 4 ducts are used. May be reduced to 55" if 5 ducts used.
- 3- Bottom duct required. SF-42 uses kit # 82752, SN-42 and SNC-2842 uses kit # 82064.
- 4- Vertical mount furnace review table below for ducting requirements. The duct requirements must be followed in order to assure proper operation of the furnace. The minimum space duct areas listed below must be maintained through the entire duct system including through register.

<table>
<thead>
<tr>
<th>Model</th>
<th>Top and Front Ducts (4&quot; Round)</th>
<th>Bottom Duct</th>
<th>Left Duct</th>
<th>Right Duct</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFV-20(F)</td>
<td>*Optional</td>
<td>Required 52 SQ. IN.</td>
<td>*Optional</td>
<td>*Optional</td>
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<tr>
<td>SFV-25(F)</td>
<td>*Optional</td>
<td>Required 52 SQ. IN.</td>
<td>*Optional</td>
<td>*Optional</td>
</tr>
<tr>
<td>SFV-30(F)</td>
<td>*Optional</td>
<td>Required 52 SQ. IN.</td>
<td>*Optional</td>
<td>*Optional</td>
</tr>
<tr>
<td>SFV-35(F)</td>
<td>48 SQ. IN. (Bottom Front Duct Not To Be Used)</td>
<td>52 SQ. IN.</td>
<td>68 SQ. IN.</td>
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<tr>
<td>SFV-42(F)</td>
<td>48 SQ. IN. (Top Front Duct Not To Be Used)</td>
<td>52 SQ. IN.</td>
<td>58 SQ. IN.</td>
<td>72 SQ. IN.</td>
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</table>

*Use of these ducts are in addition to the required use of the bottom duct.*
## FURNACE SPECIFICATIONS

<table>
<thead>
<tr>
<th>12 VDC Model</th>
<th>Description</th>
<th>Input BTU/hr</th>
<th>Type Gas</th>
<th>Voltage</th>
<th>Motor Diameter</th>
<th>Amp Draw</th>
<th>Static Pressure</th>
<th>C.F.M. Max.</th>
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</thead>
<tbody>
<tr>
<td>DD-17DSI</td>
<td>Direct Discharge</td>
<td>17,000</td>
<td>PROPANE</td>
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<td>2.9</td>
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<td>NT-12S</td>
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<td>PROPANE</td>
<td>12 VDC</td>
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<td>S - .1&quot; wc</td>
<td>S - 122 SE</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>SE - n/a</td>
<td>SE - 140</td>
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<tr>
<td>NT-16S</td>
<td>Ducted</td>
<td>16,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
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<td>2.8</td>
<td>S - .1&quot; wc</td>
<td>S - 165 SE</td>
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<td>Direct Discharge</td>
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<td></td>
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<td>SE - n/a</td>
<td>SE - 140</td>
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<td>S - .1&quot; wc</td>
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<tr>
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<td>Direct Discharge</td>
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<td></td>
<td></td>
<td></td>
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<td>SE - n/a</td>
<td>SE - 150</td>
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<td>.2&quot; wc</td>
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<td>.1&quot; wc</td>
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<td>.156/1.20B</td>
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<td>Park Models</td>
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<td></td>
</tr>
<tr>
<td>P-30S</td>
<td>Ducted</td>
<td>30,000</td>
<td>PROPANE</td>
<td>120 VAC</td>
<td>3&quot;</td>
<td>2.5</td>
<td>.15&quot; wc</td>
<td>345</td>
</tr>
<tr>
<td>P-40**</td>
<td>Ducted</td>
<td>40,000</td>
<td>PROPANE</td>
<td>120 VAC</td>
<td>3&quot;</td>
<td>2.0</td>
<td>.15&quot; wc</td>
<td>441</td>
</tr>
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</table>

### NOTES

**P-40 Park Model Furnace and valve is convertible to Natural Gas. Instructions on converting unit to Natural Gas are on sticker on side of cabinet.**
## Furnace Specifications

<table>
<thead>
<tr>
<th>12 VDC Model</th>
<th>Description</th>
<th>Input BTU/hr</th>
<th>Type Gas</th>
<th>Voltage</th>
<th>Motor Diameter</th>
<th>Amp Draw</th>
<th>Static Pressure</th>
<th>C.F.M. Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-20/20F</td>
<td>Ducted</td>
<td>20,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>6.5=2.5 In. Motor 8.5=3 In. Motor</td>
<td>.2&quot; wc</td>
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<tr>
<td>SF-25/25F</td>
<td>Ducted</td>
<td>25,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>6.5=2.5 In. Motor 8.5=3 In. Motor</td>
<td>.2&quot; wc</td>
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<tr>
<td>SF-30/30F</td>
<td>Ducted</td>
<td>30,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>8.5=3.5 In. Motor 9.4=3 In. Motor</td>
<td>.2&quot; wc</td>
<td>300</td>
</tr>
<tr>
<td>SF-35/35F</td>
<td>Ducted</td>
<td>35,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>8.5=2.5 In. Motor 9.4=3 In. Motor</td>
<td>.2&quot; wc</td>
<td>375</td>
</tr>
<tr>
<td>SF-42/42F</td>
<td>Ducted</td>
<td>40,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>11.5</td>
<td>.25&quot; wc</td>
<td>430</td>
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<tr>
<td>SFV-20/20F</td>
<td>Ducted</td>
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<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>8.5</td>
<td>.2&quot; wc</td>
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<td>PROPANE</td>
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<td>3&quot;</td>
<td>8.5</td>
<td>.2&quot; wc</td>
<td>300</td>
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<td>SFV-30/30F</td>
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<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>8.5</td>
<td>.2&quot; wc</td>
<td>300</td>
</tr>
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<td>PROPANE</td>
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<td>3&quot;</td>
<td>9.4</td>
<td>.2&quot; wc</td>
<td>375</td>
</tr>
<tr>
<td>SFV-42/42F</td>
<td>Ducted</td>
<td>40,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>11.5</td>
<td>.25&quot; wc</td>
<td>430</td>
</tr>
<tr>
<td>SH-35/35F</td>
<td>Ducted</td>
<td>35,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>8.2</td>
<td>.2&quot; wc</td>
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</tr>
<tr>
<td>SH-42/42F</td>
<td>Ducted</td>
<td>40,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>10.6</td>
<td>.25&quot; wc</td>
<td>430</td>
</tr>
<tr>
<td>SH-D 2542</td>
<td>Ducted</td>
<td>25,000</td>
<td>PROPANE</td>
<td>12 VDC</td>
<td>3&quot;</td>
<td>B.B (Low)</td>
<td>.25&quot; wc</td>
<td>430</td>
</tr>
</tbody>
</table>

22
SEQUENCE OF OPERATION
For Furnaces Equipped With Time Delay

The thermostat controls the operating circuit to the furnace by reacting to room temperature to open and close a set of contact points which allows current to flow to the ON and OFF switch then to the relay.

The relay receives the power and allows power to pass through to the switch within the relay. This is done by a heater coil within the relay which actuates a bi-metal disc closing the relay circuit.

The power then flows to the motor and allows the blower to operate. One end of the motor shaft drives the room air wheel. The other end of the motor shaft drives the combustion air wheel that delivers the required air to the burner for combustion.

The limit switch is an in-line device which protects the furnace from overheating conditions. The contacts in the limit switch open at a given temperature setting, shutting off power to the ignition system which controls the gas valve.

As the room air wheel comes up to speed, air flow closes the sail switch completing the circuit. The sail switch is placed into the system as a safety to prove there is adequate air for combustion.

The next operation is controlled by the Direct Spark Ignition (DSI) system as power is applied to the DSI board. The system will do the following.

1. The board has a timing circuit which allows the blower to purge the chamber of any products of combustion or gas.

2. The board will then apply power to the gas valve. At the same time it produces a high voltage power supply to the electrode producing spark at the burner.

3. The board will also confirm the presence of a flame. If the flame is not sensed after 7 seconds, the module will try two (2) more times and then go into lock-out. The flame is sensed through the spark wire and electrode.

When the thermostat has reached the set point with the room air temperature, the contacts will open removing power from the controls. The blower will remain on until the relay opens and stops the motor.

NOTE: On some models, sail switch is before limit switch.
# Sequence of Operation for Fan Control Module Board

**Part Number 520820**

<table>
<thead>
<tr>
<th>Time Line</th>
<th>Description - Sequence of Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>The wall thermostat controls the operation of the furnace by reacting to room temperature, this allows current to flow through the On/Off switch to the module board. The module board constantly checks for a minimum 9.5 volts. If there is not 9.5 volts, the module board will go into a stand by mode until adequate power is supplied. It will then resume normal operation. Upon a call from the thermostat, the module board thermostat circuit will go active. The sail switch circuit is verified as being open. The blower output is energized. Blower motor starts.</td>
</tr>
<tr>
<td>Thermostat Calls for Heat</td>
<td></td>
</tr>
<tr>
<td>15 Seconds Purge Cycle</td>
<td>The module board will then verify that the sail switch circuit is closed and motor is up to speed. If this circuit remains open for 30 seconds after the blower motor starts, the module board will go into lock out and shut down the blower motor. The module board checks that the gas valve relay contacts (which are located on the module board) are open before the ignition sequence starts. The board has a pre-purge timing circuit of (approximately 15 seconds). This allows the chamber to purge.</td>
</tr>
<tr>
<td>7 Seconds Ignition Cycle and Flame Sense</td>
<td>The module board will energize the gas valve and enable the high voltage spark output to the electrode for 7 seconds of ignition time. The module board will then check for flame sense to verify successful lighting of the main burner flame. Sparking will then be terminated and the gas valve and blower outputs will remain energized. If ignition is successful the module board will monitor the flame sense, sail switch and limit switch circuits, and the thermostat inputs during the heating period. The flame is sensed through the spark wire and electrode. Therefore, it is essential that the electrode is properly positioned in the burner flame.</td>
</tr>
<tr>
<td>2nd and 3rd Ignition Cycles if Required</td>
<td><strong>3. Try Ignition Board</strong> If the flame is not sensed after seven (7) seconds, a second 15 second purge cycle will begin followed by a second Trial-For-Ignition sequence. After three (3) Trial-For-Ignition attempts with no ignition of the main burner, the module board will de-energize the gas valve immediately and blower will run for 3 minutes and then shutdown in lockout.</td>
</tr>
<tr>
<td>Heating Cycle</td>
<td>If during the heating cycle, the limit switch circuit opens and remains open for 5 minutes, the module board will go into lock out and shut down the blower motor. If this occurs, the thermostat will need to be reset for the furnace to operate.</td>
</tr>
<tr>
<td>90 Second Shut Down</td>
<td>When the thermostat has reached its set point and the demand for heat ends, the gas valve will be de-energized and the flame will go out. The post purge period of 90 seconds begins. When it times out, the blower motor output is removed, and the blower stops.</td>
</tr>
</tbody>
</table>

24
<table>
<thead>
<tr>
<th>Time Line</th>
<th>Description - Sequence of Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>The wall thermostat controls the operation of the furnace by reacting to room temperature, this allows current to flow through the On/Off switch to the module board. The module board must have a minimum 18 volts for normal operation. Upon a call from the thermostat, the module board thermostat circuit will go active. The sail switch circuit is verified as being open. The blower output is energized. Blower motor starts.</td>
</tr>
<tr>
<td>Thermostat Calls for Heat</td>
<td></td>
</tr>
<tr>
<td>15 Seconds Purge Cycle</td>
<td>The module board will then verify that the sail switch circuit is closed and motor is up to speed. If this circuit remains open blower motor will run continuously until sail switch closes. The module board checks that the gas valve relay contacts (which are located on the module board) are open before the ignition sequence starts. The board has a pre-purge timing circuit of (approximately 15 seconds). This allows the chamber to purge.</td>
</tr>
<tr>
<td>7 Seconds Ignition Cycle</td>
<td>The module board will energize the gas valve and enable the high voltage spark output to the electrode for 7 seconds of ignition time. The module board will then check for flame sense to verify successful lighting of the main burner flame. Sparking will then be terminated and the gas valve and blower outputs will remain energized. If ignition is successful the module board will monitor the flame sense, sail switch and limit switch circuits, and the thermostat inputs during the heating period. The flame is sensed through the flame sense electrode. Therefore, it is essential that the electrode is properly positioned in the burner flame.</td>
</tr>
<tr>
<td>and Flame Sense</td>
<td></td>
</tr>
<tr>
<td>2nd and 3rd Ignition Cycle</td>
<td>3 Try Ignition Board: If the flame is not sensed after seven (7) seconds, a second 15 second purge cycle will begin followed by a second Trial-For-Ignition sequence. After three (3) Trial-For-Ignition attempts with no ignition of the main burner, the module board will de-energize the gas valve immediately and blower will run for 90 seconds and then shutdown in lockout.</td>
</tr>
<tr>
<td>Heating Cycle</td>
<td>If during the heating cycle, the limit switch circuit opens and remains open the gas valve will close and the blower motor will continue to run.</td>
</tr>
<tr>
<td>90 Second Shut Down</td>
<td>When the thermostat has reached its set point and the demand for heat ends, the gas valve will be de-energized and the flame will go out. The post purge period of 90 seconds begins. When it times out, the blower motor output is removed, and the blower stops.</td>
</tr>
</tbody>
</table>

25
Sequence of Operations for SHD-2542

1st Stage Call for Heat
The wall thermostat controls the operation of the dual stage furnace by reacting to room temperature. This allows current to flow through the On/Off switch to the Blower Speed Control Board then to the Module Board.

The module board constantly checks for a minimum 9.5 volts. If there is not 9.5 volts, the module board will go into a standby mode until adequate power is supplied. It will then resume normal operation.

Upon a call from the thermostat the first stage will be activated. The module board thermostat circuit will go active and the sail switch is verified as being open. The blower output is energized. The blower motor starts.

15 Second Purge Cycle
The module board will then verify that the sail switch circuit is closed and motor is up to speed. If this circuit remains open for 30 seconds after the blower motor starts, the module board will go into lockout and shut down the blower motor.

The module board checks that the gas valve relay contacts (located on the module board) are open before the igniting sequence starts.

The board has a pre-purge timing circuit of approximately 15 seconds. This allows the combustion chamber to purge.

7 Second Ignition Cycle and Flame Sense
The module board will energize the gas valve and enable the high voltage spark output to the electrode for a seven second ignition period.

The module board will then check for flame sense to verify successful lighting of the main burner flame. Sparking of the igniter is then terminated. The gas valve and blower outputs will remain energized.

If Ignition is successful the module board will monitor the flame sense, sail switch, and the limit switch circuits. The flame is sensed through the spark wire and electrode therefore, it is essential that the electrode is properly positioned in the burner flame.

3 try Ignition Board
If the flame is NOT sensed after seven (7) seconds, or if the unit fails to ignite, a second fifteen (15) purge cycle will begin followed by second trial for ignition sequence. After three (3) trial for ignition attempts with no ignition of the main burner, the module board will de-energize the gas valve immediately and the blower will run for three (3) minutes and then go into lockout mode.

2nd Stage Heating
If during the thermostat cycle the demand for heat drops below the second stage thermostat setting (3 to 5 degrees variance depending on thermostat manufacturer), the blower speed control board will be energized. The blower speed control board will energize the additional gas valve solenoid and increase motor speed to the high position. Furnace will remain in the second stage operation until thermostat is satisfied.

90 Second Shut Down
When the thermostat has reached its set point and the demand for heat ends, the gas valve will be de-energized and the flame will go out. The post combustion purge period of 90 seconds begins. When it times out, the blower motor output is removed, and the blower stops.
TROUBLE SHOOTING GUIDE
SUBURBAN RV FURNACES with TIME DELAY
12 VDC HEATING SECTION

Thermostat closes

- No -
- Yes -

Check thermostat wire connections, contact points and the heat anticipator.
- No -
- Yes -

Check 12vdc at blue wire, check the amp draw to thermostat.
- Yes -

Check for shorts. Check components severity.
- Yes -

Check for 12vdc at furnace
- Yes -

Check fuse or circuit breaker.

- Yes -

Approximately 10-20 seconds Blower is operating
- No -
- Yes -

Check for 12vdc at time delay relay and for 12vdc to red wire leading to the motor.
- Yes -

Check ground wire on terminal block.
- No -

Check for 12vdc between red and yellow wires at module board.
- Yes -

Check for 12vdc at limit switch, both sides.
- No -

Check for 12vdc at sail switch both sides.

- Yes -

Spark occurs for approximately 7 seconds and main burner flame establishes.
- No -

No spark at the electrode
- Yes -

Check for 12vdc at gas solenoid valve.
- No -

Check the gas valve open.

- Yes -

Check for restriction in combustion air intake (wasp, etc.)
- No -

Is flame established.

Thermostat opens and the time delay operates the fan for the cool down cycle.

- No -
- Yes -

Replace the time delay relay.

Clean points, secure loose connections, replace thermostat if anticipator is shorted.

Replace thermostat.

Repair or replace connections or parts with higher than normal amp draw.

Check on/off switch on furnace

Replace fuse/Reset breaker

Replace the time delay relay.

Replace the motor.

Check plug connection to the module-electrode and wire-spark gap 1/8 inch between probe and ground.

Replace the sail switch.

Replace the limit switch.

Replace the module.

Replace the module.

Check gas pressure at the manifold or for restrictions in the burner orifice.

Replace the gas valve.

Check flame contact to electrode. Flame should be hard blue.

NOTE: On some models, sail switch is before limit switch.
# TROUBLE SHOOTING GUIDE

**SUBURBAN RV FURNACE with FAN CONTROL MODULE BOARDS**

## 12 VDC HEATING SECTION

<table>
<thead>
<tr>
<th>Thermostat Close</th>
<th>Check thermostat wire connections, contact points and the heat anticipator.</th>
<th>Yes</th>
<th>Clean points, secure loose connections, replace thermostat if anticipator is shorted.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check 12vdc at blue wire, check the amp draw to thermostat.</td>
<td>No</td>
<td>Replace thermostat.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for shorts, check components amperage.</td>
<td></td>
<td>Repair or replace connections or parts with higher than normal amp draw.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for 12vdc at furnace.</td>
<td>No</td>
<td>Replace fuse/Reset breaker.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check fuse at circuit breaker.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for 12vdc at power terminals on module board and for 12vdc to red wire leading to the motor.</td>
<td></td>
<td>Replace the module board after confirming motor operation.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check ground wire on terminal block.</td>
<td>No</td>
<td>Replace the motor.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Reset thermostat, motor operating, Check for 12vdc at blue wire on motes edge connector.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for 12vdc between red and yellow wires at the module board.</td>
<td>No</td>
<td>Replace the sail switch.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for 12vdc at limit switch, both sides.</td>
<td></td>
<td>Replace the limit switch.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for 12vdc at sail switch both sides.</td>
<td></td>
<td>Replace the module.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>No spark at the electrode.</td>
<td></td>
<td>Replace the module.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for 12vdc at gas exaopd valve.</td>
<td></td>
<td>Replace the module.</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Did the gas valve open.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Check for restriction in combustion air intake (waxes, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yes</strong></td>
<td>Is flame established.</td>
<td>No</td>
<td>Check flame contact to electrode. Flames should be hard blue.</td>
</tr>
</tbody>
</table>

**Blower is operating at call for heat.**

**Motor is operating.**

After 15 seconds the module makes spark and opens valve.

Spark occurs for approximately 7 seconds and main burner flame establishes.

Thermostat opens and the module board operates the fan for the cool down cycle.

|------------|---------------------------|

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28
SERVICE HINTS, DIAGNOSIS, AND CORRECTIVE MEASURES
FOR THE IGNITION SYSTEMS OF
SUBURBAN 24-VOLT ELECTRONIC IGNITION GAS FURNACES
WITH TIME DELAY

CAUTIONS:

1. Never operate the furnace with the electrode wire disconnected or with the electrode assembly removed from the furnace.

2. Never use a screwdriver on any part of the electrode assembly while the furnace is in operation.

3. Be certain that the spark from the electrode never reaches the flame sensor portion of the electrode assembly.

4. Be sure the electrode assembly screws are snug at all times, especially after the electrode has been removed and reinstalled.

5. If the module board is found to be defective, it must be replaced - it is not field repairable. Any attempt to repair the board may alter the board and cause it to operate in an unsatisfactory manner.

6. Insure that the gap between electrode and ground is always 1/8". The gap between the flame sensor should be approximately twice the gap between electrode and ground to insure no sparking to sensor. Sparking to sensor will damage the module board.

3. The module board also performs the lockout function in cases where the spark fails to light the burner. When lockout occurs, the spark stops, the voltage from the module board to the gas valve is discontinued, and the valve closes. The unit will remain in lockout and the blower will continue to run until the thermostat is turned off. Turning the thermostat off disengages the lockout function of the module board. After the blower has stopped, the lockout sequence can be started again. The module will try three times for ignition before lockout.

It is important to determine the type of problem being experienced, then the proper checkout procedure can be made. The following is a list of problems, how to identify in which area the problem is located, and how to correct it.

1. Electrode not sparking - with blower running and micro switch engaged, check the following:
   a. Check for proper voltage at module board after the blower motor reaches full r.p.m. If no voltage, check continuity through micro switch and limit switch. Also check wiring and wire connections.
   b. Voltage is present but no spark at electrode after 12-18 second delay, check electrode wire connections.
   c. Wire connections OK, but electrode wire does not show continuity through it - replace electrode wire.
   d. Electrode wire does show continuity through it - check electrode gap to be sure it is 1/8" maximum between electrode and ground. Normal Gap between sensor and ground must be twice electrode gap.
   e. Electrode gap OK - check electrode assembly for possible cracks or carbon on tip of electrode.
   f. Electrode OK - replace module board.

2. Electrode sparking, but gas not coming through burner:
   a. Check to see if voltage is coming out of module board to gas valve after the 12-18 second delay. Check the wires in the module assembly to be sure they are still making contact with the module board. Check wire from the module board to valve for continuity. Wire and connections check OK - replace module board.
   b. Voltage is coming out of module board to gas valve, but gas valve does not open - replace gas valve.
   c. Electrode sparking and gas valve opening, but burner will not light:
      a. Check to see if gas is coming through to the burner. This can be accomplished by using a flow meter in the gas supply line. If no gas is coming through the burner, check for obstruction in gas line. In main burner units, or in main burner.
      b. Gas is coming through burner, but spark will still not ignite burner - check gas pressure.

Line Pressure - Min. 11" W.C.* Max. 14" W.C.

To properly check pressure, first determine the line pressure, cycle furnace and check pressure drop on demand. The drop in pressure should not be more than 1/2" W.C. A drop of more than 1/2" would indicate a faulty regulator, a restriction in the gas line, or a pinched gas line. Excessive pressure drop could also be due to moisture contamination.

   d. Gas pressure OK - check for obstruction in main burner; check to see sure electrode is positioned approximately 1/4" above and directly over slots on the main burner - adjust electrode if necessary.

   e. Remove burner and check burner for obstructions. Clean as required.

4. Burner ignites, but goes off and into lockout:
   a. Check to be certain that flame sensor is not over slots in the main burner and that the main burner flame is burning against the lip of the flame sensor - adjust by bending sensor probe. NOTE: Sensor probe should be in the inner blue cone of the burner flame (approximately 1/4" to 5/16" above burner).
   b. Burner still goes off and into lockout - check wire connections at flame sensor and at module board.
   c. Wire connections OK - check continuity through flame sensor wire.
   d. Continuity of flame sensor wire OK - check with micro amp meter in series with flame sensor and flame sensor wire to be certain that the flame sensor is generating at least seven micro amps within seven seconds after the burner is ignited. Connect meter as follows: (+) to sensor wire, (-) to sensor probe. Adjust position of sensor probe, check for carbon deposits on sensor probe if reading is less than seven micro amps.
   e. Flame sensor circuit generating at least seven micro amps, but burner still goes off and into lockout - replace module board.

5. Repeated module board failures:
   a. Check to be certain that the electrode spark is not sparking against the flame sensor portion of the electrode assembly.
   b. Check to be sure module board or high voltage wires are not shorted to the chamber wraper or other furnace parts.
   c. Be sure sensor covering the electrode wire connection on the coil of the module board is in place and insulated behind module board is in place.
   d. Make certain that the transformer voltage is within 24 - 30 volts A.C.
   e. Be sure duct connections to furnace are airtight. Seal duct collar connections to furnace cabinet with duct tape, if necessary to prevent hot air leakage. No air leakage should exist anywhere in the duct system, especially at connections on furnace cabinet.
   f. Be sure sensor wire terminal is tightly affixed to sensor probe.
   g. Be sure high voltage electrode wire is in good condition and properly positioned onto pierce point electrode.
a. Customer complains of unit going into lockout only once in a while:
   a. Thoroughly check electrode and burner relationship.
   b. Lockout can occur if the gas pressure fluctuates at the time the thermostat calls for heat. Pressure fluctuations can be caused by a malfunctioning gas bottle regulator, an obstruction or a leak in the gas line, or moisture in the gas bottle regulator or in the gas lines. It is difficult to check for these fluctuations that will not noticeably affect any other appliance in the coach. However, isolating the furnace from the coach gas system will determine if the gas system is responsible. This isolation procedure can be done by connecting a separate upright bottle, regulator and gas line directly to the furnace, eliminating the coach gas system. If the occasional lockout still exists then the furnace should be thoroughly tested to determine the cause; however, if the furnace works properly on this separate system then the coach gas system should be checked.
   c. Check furnace return air and warm air discharge to be certain sufficient air flow is present to engage micro switch every time.
   d. Check micro switch to be sure it moves freely.
   e. Remove electrode and burner. Clean thoroughly.

f. When moisture in the gas system is suspected as being the problem, especially where the horizontal type gas bottle is being used, the following steps should be taken to prepare the gas system against further moisture problems:

Corrective Measures:
1. Disconnect gas bottle and drain it completely dry of all gas and all moisture.
2. Disconnect and blow out all gas lines completely dry.
3. Check pressure regulator on the gas bottle. Replace if necessary.
4. Add the drying agent. One half pint of methanol alcohol per 100 pound bottle capacity is recommended.
5. Never fill the gas bottle over 80%.
6. Do not use the gas bottle completely dry to avoid using up the drying agent.

We have found the above procedures to be effective in solving most occasional lockout problems, especially where the horizontal type gas bottle is used. All of these steps must be performed as described for the preparation of a contaminated gas system to be 100% effective.
Figure 26
Local Flame Sense
(GF Models)
With Time Delay

Figure 27
Fan Control Board
(NT-12/18/28S and SE)

CAUTION: DO NOT HI-POT (DIELECTRIC HIGH VOLTAGE TEST) THIS UNIT AFTER INSTALLATION. TO DO SO MAY CAUSE COMPONENT DAMAGE AND Voids WARRANTY OF FURNACE. UNIT 100% FIRE CHECKED.
Figure 28
Fan Control Board
(NT-34/30/34SP and NT-40)

Figure 29
Fan Control
P-30
FURNACE REMOVAL

To replace parts or service the SUBURBAN family of RV furnaces, it is necessary to follow these steps:

DD-17DSI

1. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
2. Remove the vent cap assembly by removing applicable screws.
3. Remove the cabinet front two (2) screws.
4. Remove the applicable screws securing the furnace to the coach floor.
5. Remove duct from side of furnace, if equipped.
6. Remove the furnace from the cabinet area to gain access to combustion chamber and applicable parts.
7. Some parts can be accessed without removal of the complete furnace.
8. To re-install, reverse this procedure.
9. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.

NT-12/16/20S

1. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
2. Remove the vent cap assembly by removing applicable screws.
3. Remove the cabinet front two (2) screws.
4. Remove the (1) one tie down screw securing the chamber to the cabinet.
5. Remove the furnace from the cabinet by pulling chamber outward completely to gain access to all controls and applicable parts.
6. To re-install, reverse this procedure.
7. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.

NT-12/16/20SE

1. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
2. Remove the vent cap assembly by removing applicable screws.
3. Remove the cabinet front two (2) screws.
4. Remove the (2) two tie down screws securing the chamber to the cabinet.
5. Remove the furnace from the cabinet by pulling chamber outward completely to gain access to all controls and applicable parts.
6. To re-install, reverse this procedure.
7. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.

NT-24/30/34SP and NT-40

1. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
2. Remove the vent cap assembly by removing applicable screws and one (1) flue retaining screw. Not applicable to NT-40.
3. Remove the cabinet front two (2) screws.
4. Remove the (2) two tie down screws securing the chamber to the cabinet.
5. Remove the furnace from the cabinet by pulling chamber outward completely to gain access to all controls and applicable parts.
6. To re-install, reverse this procedure.
7. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.
FURNACE REMOVAL

SF-20/25/30/35/42, SFV-20/25/30/35/42, SH-35/42 and SHD-2542

1. Remove the vent cap assembly from the outside access door by removing applicable screws, also the four (4) screws retaining the door to the frame. Remove the door to gain access to the furnace.
2. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
3. Remove the (1) one tie down screw securing the chamber to the cabinet.
4. Remove the furnace from the cabinet by pulling chamber outward completely to gain access to all controls and applicable parts.
5. To re-install, reverse this procedure.
6. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.

SF-20/25/30/35/42F, SFV-20/25/30/35/42F and SH-35/42F

1. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
2. Remove the vent cap assembly by removing applicable screws.
3. Remove the cabinet front two (2) screws.
4. Remove the (1) one tie down screw securing the chamber to the cabinet.
5. Remove the furnace from the cabinet by pulling chamber outward completely to gain access to all controls and applicable parts.
6. To re-install, reverse this procedure.
7. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.

P-30S and P-40

1. Turn off gas and power, then disconnect gas and power supply at the furnace. Label wires as necessary.
2. Remove the vent cap assembly by removing applicable screws and one (1) flue retaining screw. (Not applicable to P40.)
3. Remove the cabinet front two (2) screws.
4. Remove the (2) two tie down screw securing the chamber to the cabinet.
5. Remove the furnace from the cabinet by pulling chamber outward completely to gain access to all controls and applicable parts.
6. To re-install, reverse this procedure.
7. Rewire applicable wires and perform a leak test on all fittings. Perform a drop pressure test.
SF, SH AND SHD-2542 ELECTRODE GAP SPECIFICATIONS AND POSITIONING

To assure consistent ignition of the burner, it is important for the electrode to be positioned properly over the top of the burner. When replacing the electrode, or should you be experiencing ignition type problems, the electrode should be positioned as outlined in the drawing.

1. Remove the furnace chamber assembly from the furnace cabinet following instructions listed in the installation manual.
2. Remove the burner access door. Manifold assembly will have to be removed at the valve. Remove the burner from the combustion chamber by removing six (6) screws which attach the burner to the chamber and air baffles (plates). Remove top air baffle and clip.
3. Locate the lance in relation to the burner ports for electrode positioning by:
   a. Shine a flashlight into the burner venturi as illustrated (be sure the flashlight lens is against the end of the burner).
   b. Light will reflect off the lance in the venturi of the burner and shine through a position of the two (2) rows of burner ports in the top of the burner.
   c. Using a black felt-tip pen, mark a line along top of burner 3/16" from back of lance and parallel with lance. Make an additional mark indication center line of the lance. (See illustration). Both marks will be used later as reference marks; therefore, keep lines thin.
4. Reassemble the burner into the chamber. Be sure the air baffles (plates) are positioned as removed. Mount center clip in place.
5. Adjust electrode so the electrode probe is positioned along the marked center line of the burner lance and the tip of the electrode terminates 3/16" from the back of the lance (at the line marked in Step 3C). (See illustration).
6. IMPORTANT: Be sure electrode probe maintains a 1/8" spark gap over the burner as illustrated.
7. Reinstall burner access door and reconnect manifold. Manifold must be checked for leaks with unit operating, before installing in cabinet. Reinstall furnace into the cabinet following the instructions in the installation manual. Check all gas connections for leaks using proper leak test solution.

Figure 31
NT ELECTRODE GAP SPECIFICATIONS
AND POSITIONING

To assure consistent ignition of the burner, it is important for the electrode to be positioned properly over the top of the burner. When replacing the electrode, or should you be experiencing ignition type problems, the electrode should be positioned as outlined in the drawing.

1. 1/8" spark gap between electrode and ground.
2. Maintain electrode position of 3/16" over burner ports.

Figure 32
LOCAL FLAME SENSE

PARK MODEL ELECTRODE GAP SPECIFICATIONS
AND POSITIONING

To assure consistent ignition of the burner, it is important for the electrode to be positioned properly over the top of the burner. When replacing the electrode, or should you be experiencing ignition type problems, the electrode should be positioned as outlined in the drawing.

1. 1/8" spark gap between electrode and ground.
2. 1/4" spark gap between ground and flame sensor.
3. Maintain electrode position of 3/16" over burner ports.

Figure 33
REMOTE FLAME SENSE
MAINTENANCE

Preventative maintenance is essential if an RV owner is to have reliable, safe operation of his furnace. Two important areas to watch closely in order to assure safe, reliable operation are the venting and the main burner.

An obstruction in the vent or main burner will reduce the combustion air which results in incomplete combustion. Whenever incomplete combustion occurs, the by-products are carbon monoxide (CO) and soot. If the furnace outside exhaust vent shows black soot forming, the furnace should not be operated until the problem is corrected. Two common causes are:

1. Restriction in the vent or furnace intake (screws, wasp nests, tape).
2. Dirty burner.

If operation of the furnace continues under these conditions, it could result in serious injury to the occupants of the RV or even death.

Cleaning of the main burner and an inspection of the venting system should be done at least once a year, preferably just before the beginning of the heating season. Some RV owners and service personnel have the false assumption that if a furnace has not been used, it will not require cleaning. NOT SO! A furnace which has not been used for some time could be more in need of cleaning than a furnace which has been used extensively.

Dust and lint should be removed from the room air blower wheel and sail switch. A build up of dust and lint on the blower wheel can cause the motor to drag and not generate enough air flow to engage the sail switch. Dust accumulation on the sail switch will restrict the travel of the actuator arm so that the air flow across the paddle will not move it in and complete the valve circuit.

A yearly inspection should be made of all gaskets on the furnace. If any gaskets show signs of leakage or deterioration, they must be replaced.

Figure 34

TO CLEAN THE CHAMBER, THE FURNACE MUST BE REMOVED FROM THE CABINET AND THE MANIFOLD BLOWER ASSEMBLY AND CONTROLS REMOVED LEAVING THE CHAMBER ONLY, AS SHOWN. USING COMPRESSED AIR BLOW THROUGH THE CHAMBER AS SHOWN BY ARROWS, TO REMOVE SOOT OR LOOSE DEBRIS.

Figure 35

TO CLEAN THE CHAMBER, THE FURNACE MUST BE REMOVED FROM THE CABINET AND THE MANIFOLD BLOWER ASSEMBLY AND CONTROLS REMOVED LEAVING THE CHAMBER ONLY, AS SHOWN. USING COMPRESSED AIR BLOW THROUGH THE CHAMBER AS SHOWN BY ARROWS, TO REMOVE SOOT OR LOOSE DEBRIS.

Figure 36

TO CLEAN THE CHAMBER, THE FURNACE MUST BE REMOVED FROM THE CABINET AND THE MANIFOLD BLOWER ASSEMBLY AND CONTROLS REMOVED LEAVING THE CHAMBER ONLY, AS SHOWN. USING COMPRESSED AIR BLOW THROUGH THE CHAMBER AS SHOWN BY ARROWS, TO REMOVE SOOT OR LOOSE DEBRIS.

Figure 37
CAUTIONS & SAFETY INFORMATION

1. Never use a battery charger to power or test an electronic ignition furnace as they sometimes provide more than 14.5 DC Volts that could damage the module board.

2. Never operate the furnace with the electrode wire disconnected nor with the electrode assembly removed from the furnace.

3. Never use a screwdriver on any part of the electrode assembly while the furnace is in operation.

4. Be certain that the spark from the electrode never reaches the flame sensor portion of the electrode assembly on remote sense units.

5. Install the furnace so electrical components and connections are protected from water.

6. Wire the furnace direct to the battery when possible.

7. Use two wrenches on gas fittings when tightening gas connections.

8. Verify voltage of furnace, do not use 120 volt AC with 12 volt DC.

9. Do not modify the furnace in any way.

10. Do not vent the furnace to an outside enclosed porch area or where the vent is covered or obstructed.

11. Always meet or exceed minimum duct requirements. Also meet the minimum return air requirements.

12. Furnace must be installed and vented correctly. Refer to the Installation Manual for the specific model furnace.

13. Do not install aftermarket components.