



Heat Thaw Cure Dry

Operators Manual

Water Heater Module
2100-DG Series

P.S. 1133-
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Warranty Policies & Claim Procedures

DRYAIR Inc. (referred to within as DRYAIR) warrants its new, unused equipment to be free of defects in material and workmanship at the time of delivery to the first retail purchaser.

Warranty Policies

Basic warranty policy

- DRYAIR will repair or replace, at its option, without charge, any defective part of the equipment for a period of twelve (12) months from delivery to the first retail purchaser, F.O.B St. Brieux, SK., Canada or Bowling Green, Ohio.
- Mileage is not covered. Any parts that are covered by an extended warranty published by DRYAIR are an exception to the Basic Warranty policy and are to be warranted as per the details of the Extended Warranty Policy.
- Labor is covered as per DRYAIR flat labor rate.
- The Warranty Policy, terms and conditions, may change from time to time without prior notice.
- Warranty terms and conditions are transferable in the event of the sale to a second owner.
- Replacement parts will be warranted for 90 days from the repair date. Bill of sale must accompany the warranty claim.

Extended warranty policy

Water heater heat exchanger

- An extended warranty is available on the heat exchanger unit of the water heater assembly. The available warranty for a part, under the extended warranty policy, is prorated by 20% per year.
- (Shipment date is the date to be used for the commencement of the warranty period).
- Coverage schedule
 - Year 1 - 100%
 - Year 2 - 80%
 - Year 3 - 60%
 - Year 4 - 40%
 - Year 5 - 20%

Exceptions to the warranty policies

- Under no circumstance shall the owner be entitled to recover costs for incidental, special or consequential damages such as, but not limited to: loss of profit or revenue, other commercial losses, inconvenience and/or replacement equipment rental cost.
- Maintenance, repair or service items not related to warrantable defects.
- Loss or damage during shipping.
- Failure resulting from lack of or improper maintenance.
- Damage caused by operator abuse, negligence or improper operation.
- Damage resulting from improper voltage supply.
- Damage from improper installation. Installation done by other than the manufacturer.
- Non-defective items replaced at the request of the customer.
- Damage due to accidents.
- Damage resulting from improper fuel supply (i.e. pressure or contamination).
- Damage resulting from cracked or broken lines occurring during transport.
- Damage resulting from use of inadequate or improper fluids (i.e.. glycol or oil).

Owners obligations

- It is the responsibility of the owner, at the owner's expense, to transport the equipment to the service facility of an authorized DRYAIR distributor/dealer or alternately to reimburse the distributor/dealer, for any traveling expenses incurred in fulfilling this warranty.
- The terms of this Warranty Policy are subject to provincial and state legislation. DRYAIR reserves the right to make modifications in accordance with provincial and state legislation without prior notice or obligation.
- It is the responsibility of the owner to read, understand and implement the maintenance, safety and operational guidelines as laid out in the Operation and Maintenance Guide.
- All parts to be tagged with warranty claim number and shipped prepaid to DRYAIR within 30 days.

Manufacturer obligations

- DRYAIR reserves the right to continually improve and/or change the product's parts or specifications at any time without notice or obligation.
- The terms of this Warranty Policy are subject to provincial and state legislation. DRYAIR reserves the right to make modifications in accordance with provincial and state legislation without prior notice or obligation.

Warranty Claim Procedure

- All warranty credits must be processed with the DRYAIR Warranty Claim Form.
- All warranty parts, unless otherwise specified, are to be returned to DRYAIR Inc. along with a completed Warranty Claim Form.

Note: Prior to returning warranty parts, please call for an authorization number and shipping instructions from the Warranty department in Canada.

- Location of Warranty Depots

USA	Canada
DRYAIR Inc	DRYAIR Inc.
1095 N. Main Street	606 Highway Drive
Bowling Green, OH	Box 126
43402	St. Brieux, SK
Ph. 1 (866) 354-8546	S0K 3V0
	Ph. 1 (888) 750-1700

- Each warranty claim should only refer to one Serial or Production Schedule numbered unit.
- Warranty parts are to be tagged with warranty claim number.
- When claiming for warranty labour, the allowable warranty labour rate will be \$45.00/hour. The factory reserves the right to adjust the number of hours claimed where deemed necessary.
- The factory may at times specify allowable labour for certain warranty procedures.
- Mileage and travel time, to and from the customer are not eligible for warranty credit.
- Freight charges for warranty parts are not eligible for warranty credit.
- Labour flat rates for component changes
 - Electrical components - .5 hour
 - Plumbing components - 1 hour
 - Electric motor changes - 1 hour

Note: Other labour charges will be at the discretion of DRYAIR.

Safety Concerns

General Safety Guidelines

- Make certain that the operator reads and understands all the information in this manual.
- All unauthorized people must be kept away from the equipment when in operation.
- Maintain instructional and safety decals. Replace damaged decals.
- All guards must be in place when the equipment is in operation.

Water Heater Module

CAUTION! The water heater is a heating appliance.

- When dealing with any heating appliance, observe all posted warnings and cautions.
- Keep children and pets away from all piping and fuel accessories.
- The water heater housing panels must be kept closed when the system is operating. This prevents drafts from affecting water heater operation.

Heat Transfer Fluid

Follow the following precautions and measures when working with “heat transfer fluid” (“DOWFROST* HTF” & “BOSS CHILL PG”).

Fluid handling precautions

- Ventilation Good general ventilation should be sufficient for most conditions.
- Respiratory protection . No respiratory protection should be needed.
- Skin protection For brief contact, no precautions other than clean body-covering clothing should be needed.
..... Use impervious gloves when prolonged or frequently repeated contact should occur.
- Eye Protection Use safety glasses.

First aid measures

- Eyes Flush eyes with plenty of water.
- Skin Wash off in flowing water or shower.
- Ingestion Induce vomiting if large amounts are ingested.
..... Consult medical personnel.
- Inhalation Remove to fresh air if effects occur.
..... Consult a physician.
- Note to physician No specific antidote.
..... Supportive care.
..... Treatment based on judgment of the physician in response to reactions of the patient.

For complete “heat transfer fluid” information, refer to the Material Safety Data Sheets for “Dowfrost HTF” & “Boss Chill PG” on the following page.

Material Safety Data Sheet - Boss Chill PG

BOSS CHILL PG MSDS

Canadian Centre for Occupational Health and Safety

Issue: 2001-4 (November, 2001)

MATERIAL SAFETY DATA

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME:..... PROPYLENE GLYCOL INDUSTRIAL
PRODUCT CODE: 70511
EFFECTIVE DATE: 05/23/03 DATE PRINTED 10/09/03 MSD: 000248
COMPANY IDENTIFICATION: The Dow Chemical Company, Midland, MI 48674
EMERGENCY TELEPHONE NUMBER:.. 24-HOUR EMERGENCY PHONE NUMBER 989-636-4400
..... Customer Information Center: 800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

Propylene glycol CAS# 000057-55-6 99%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Colorless, odorless liquid. Toxic fumes released in fire situations.
POTENTIAL HEALTH EFFECTS: (See Section 11 for toxicological data.)
EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely. Mists may cause eye irritation.
SKIN: Prolonged contact is essentially nonirritating to skin. A single prolonged skin exposure is not likely to result in the material being absorbed through skin in harmful amounts. Repeated exposures may cause flaking and softening of skin. May be absorbed in potentially harmful amounts when applied in large quantities to severe burns (second or third degree) over large areas of the body as part of a cream or other topical application. Absorption under such circumstances can elevate serum osmolality and may result in osmotic shock.
INGESTION: Single dose oral toxicity is considered to be extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations.
INHALATION: At room temperature, vapors are minimal due physical properties. Mists may cause irritation of upper respiratory tract.
SYSTEMATIC: (OTHER TARGET ORGAN) EFFECTS: Repeated excessive ingestion may cause central nervous system effects.
CANCER INFORMATION: Did not cause cancer in long-term animal studies.
TERATOLOGY (BIRTH DEFECTS): Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus.
REPRODUCTIVE EFFECTS: In animal studies, has been shown not to interfere with reproduction.

4. FIRST AID

EYE: Flush eyes with plenty of water.
SKIN: Wash off in flowing water or shower.
INGESTION: No adverse effects anticipated by this route of exposure incidental to proper industrial handling.
INHALATION: Remove to fresh air if effects occur. Consult a physician
NOTE TO PHYSICIAN: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES

FLASH POINT: 218°F, 103°C
METHOD USED: PMCC
FLAMMABLE LIMITS LFT: 2.6%
LFL: 2.6%
UFL: 12.5%
HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to: aldehydes, carbon monoxide.
OTHER FLAMMABILITY INFORMATION: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
EXTINGUISHING MEDIA: Water fog or fine spray, carbon dioxide, dry chemical, foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream. Will spread fire.
MEDIA TO BE AVOIDED: Do not use direct water stream.
FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire.
PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure, self-contained breathing apparatus (SCBA) and protective fire-fighting clothing (including fire-fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURE (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Isolate area.

PROTECT THE ENVIRONMENT: Contain liquid to prevent contamination of soil, surface water or ground water.

CLEANUP: For small spills, clean up with absorbent material. Collect material in suitable and properly labeled open containers. For large spills, dike and pump into suitable and properly labeled containers.

7. HANDLING AND STORAGE

HANDLING: Product handled hot may require additional ventilation or local exhaust. Product on surfaces can cause slippery conditions.

STORAGE: Keep containers tightly closed when not in use. Store in stainless steel, aluminum, Plaste 3066 lined containers or 316 stainless steel. Store below 121°C, 250° F.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below exposure guidelines.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use safety glasses. Safety glasses should be sufficient for most operations; however, for misty operations wear chemical goggles.

SKIN PROTECTION: For brief contact, no precautions other than clean body-covering clothing should be needed. Use impervious gloves when prolonged or frequently repeated contact could occur.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiration protection is required for certain operations, use an approved air-purifying respirator. In misty atmospheres, use an approved mist respirator.

EXPOSURE GUIDELINE(S): Propylene glycol: AIHA WEEL is 50 ppm total, 10 mg/m³ aerosol only.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless liquid
ODOR: Odorless
VAPOR PRESSURE: 0.08 mmHg @ 20°C, 68°F
VAPOR DENSITY: 2.62
BOILING POINT: 370°F, 188°C
SOLUBILITY IN WATER: Complete
SPECIFIC GRAVITY: 1.038 @ 20/20°C, 68°F

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.

CONDITIONS TO AVOID: Avoid temperatures above 121°C/250°F. Product can decompose at elevated temperatures.

INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS: When available oxygen is limited, as in a fire or heated to very high temperatures by hot wire or plate, carbon monoxide and other hazardous compounds such as aldehydes might be generated,

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in section 1)

SKIN: the LD₅₀ for skin absorption in rabbits is greater than 10,000 mg/kg.

INGESTION: The oral LD₅₀ for Female rats is about 20,000-34,000mg/kg.

MUTAGENICITY (EFFECTS ON GENETIC MATERIAL): Results of in vitro (test tube) mutagenicity tests have been negative. Results of mutagenicity tests in animals have been negative.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT AND PARTITIONING: Based largely or completely on information for similar material(s), i.e. propylene glycol. Bioconcentration potential is low (BCF less than 100 or Log Pow less than 3). Log octanol/water partition coefficient (log Pow) is -0.92. Henry's Law Constant (H) is 1.2E-8 atm.m³/mole.

DEGRADATION AND PERSISTENCE: Based largely or completely on information for similar material(s), i.e. propylene glycol. Biodegradation under aerobic static laboratory conditions is high (BOD₂₀ or BOD₂₈/ThOD greater than 40%). Biodegradation is expected to be achieved in a secondary waste-water treatment plant. 5-Day biochemical oxygen demand (BOD₅) is 1.16 p/p. 20-Day biochemical oxygen demand (BOD₂₀) is 1.45 p/p. Theoretical oxygen demand (ThOD) is calculated to be 1.68 p/p. Inhibitory concentration (IC₅₀) in OECD Activated Sludge Respiration Inhibition Test (OECD Test No. 209) is greater than 1gm/L. Degradation is expected in the atmospheric environment within minutes to hours.

ECOTOXICITY: Based largely or completely on information for similar material(s), i.e. propylene glycol. Material is practically non-toxic to aquatic organisms on an acute basis (LC₅₀ greater than 100 mg/L in most sensitive species).

Acute LC₅₀ for fathead minnow (*Pimephales promelas*) is 46500-54900 mg/L.

Acute LC₅₀ for guppy (*Poecilia reticulata*) is greater than 10000 mg/L.

Acute LC₅₀ for water flea *Daphnia magna* is 4850-34400 mg/L.

Acute LC₅₀ for rainbow trout (*Oncorhynchus mykiss*) is 44 ml/L (about 44000 mg/L).

13. DISPOSAL CONSIDERATION (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESS OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information on Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or waste water treatment system.

As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Centre at 800-258-2436 or 989-832-1556 for further details.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORT:

This product is not regulated by D.O.T. when shipped domestically by land

CANADIAN TDG INFORMATION:

For TDG regulatory information, if required, consult transportation regulations, product shipping papers, or your Dow representative.

15. REGULATORY INFORMATION (Not meant to be all-inclusive—selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specified information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATION

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories: Not to have met any hazard category.

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

REGULATORY INFORMATION:

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>LIST</u>
1, 2-PROPANEDIOL	00057-55-6	PA1

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD:

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

CANADIAN REGULATIONS

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) classification for this product is: This product is not a "Controlled Product" under WHMIS.

16. OTHER INFORMATION

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	0
Flammability	1
Reactivity	0

MSDS STATUS: Revised Section 16.

* or ® Indicates a Trademark of The Dow Chemical Company

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult The Dow Chemical Company For Further Information.

Material Safety Data Sheet - Dowfrost*

DOWFROST* HEAT TRANSFER FLUID MSDS

Canadian Centre for Occupational Health and Safety

Issue: 05/09/2002

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MATERIAL SAFETY DATA

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME:..... DOWFROST* HEAT TRANSFER FLUID
MSDS#:..... 1376
EFFECTIVE DATE:..... 05/09/2002
COMPANY IDENTIFICATION:..... The Dow Chemical Company
..... Midland, MI 48674
EMERGENCY TELEPHONE NUMBER:.. 24-HOUR EMERGENCY TELEPHONE NUMBER: (989)636-4400
..... Customer Information Number: 1-800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

Propylene glycol	CAS# 000057-55-6	> 99%
Demineralized water	CAS# 007732-18-5	< 5%
Dipotassium hydrogen phosphate	CAS#007758-11-4	< 5%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:..... Colorless, liquid, mild odor. No significant hazards for emergency response are known.
POTENTIAL HEALTH EFFECTS..... (See Section 11 for toxicological information and additional information about potential health effects.)

EFFECTS OF SINGLE ACUTE OVEREXPOSURE

INHALATION:..... At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat).
EYE CONTACT:..... May cause slight temporary eye irritation. Corneal injury is unlikely.
SKIN CONTACT:..... Prolonged contact is essentially nonirritating to skin. Repeated contact may cause flaking and softening of skin.
SKIN ABSORPTION:..... Prolonged skin contact is unlikely to result in absorption of harmful amounts.
SWALLOWING:..... Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts

POTENTIAL ENVIRONMENTAL EFFECTS (See Section 12 for Ecological Information)

4. FIRST AID

INHALATION:..... Move person to fresh air; if effects occur, consult a physician.
EYE:..... Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effect occur, consult a physician, preferably an ophthalmologist.
SKIN:..... Wash skin with plenty of water
INGESTION:..... No emergency medical treatment necessary.
NOTE TO PHYSICIAN:..... No specific antidote. Treatment of exposure should be directed at the control of symptoms and the condition of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES (Refer to section 9, PHYSICAL AND CHEMICAL PROPERTIES)

EXTINGUISHING MEDIA: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

FIRE FIGHTING PROCEDURES: Keep people away. Isolate fire area and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from a protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire-fighting clothing (including fire-fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Liquid mist of this product can burn. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

6. ACCIDENTAL RELEASE MEASURE

SMALL SPILLS: Absorb with materials such as: cat litter, sawdust, vermiculite, Zorb-all. Collect in suitable and properly labeled containers.

LARGE SPILLS: Dike area to contain spill. Recover spilled material if possible. See Section 13, Disposal Considerations for additional information.

PERSONAL PRECAUTIONS: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

ENVIRONMENTAL PRECAUTIONS: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. HANDLING AND STORAGE

HANDLING

GENERAL HANDLING: See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

VENTILATION: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

OTHER PRECAUTIONS: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

STORAGE: 121°C (250° F). Do not store in: galvanized steel.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE LIMITS

<u>COMPONENT</u>	<u>EXPOSURE LIMITS</u>	<u>SKIN FORM</u>
Propylene glycol	10mg/m3 TWA8 AIHA WEEL 50 ppm TWA8 AIHA WEEL	Aerosol Total Particulate fume

In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled.

PERSONAL PROTECTION

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline.

PROTECTION: When respiratory protection is required for certain operations, use an approved air-purifying respirator. In dusty or misty atmospheres, use an approved particulate respirator.

EYE PROTECTION: Use safety glasses.

OTHER PROTECTIVE EQUIPMENT: No precautions other than body-covering clothing should be needed. Use gloves chemically resistant to this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
APPEARANCE: Colorless
ODOR: Mild
FLASH POINT - Closed Cup: 102°C 216°F Tag closed cup ASTM D 56 (Propylene glycol)
FLAMMABLE LIMITS IN AIR: Lower 2.6%(V) 100°C (Propylene glycol)
..... Upper 12.5%(V) 130°C (Propylene glycol)
AUTOIGNITION TEMP: 416°C 780°F
VAPOR PRESSURE: 0.7 mmHg @ 20°C, 68°F
BOILING POINT (760 mmHg): 162°C 323°F
VAPOR DENSITY (air=1): 2.6
SPECIFIC GRAVITY (H2O=1):1.05 20°C/20°C
FREEZING POINT: <=-51°C <=-60°F
MELTING POINT: *Not applicable (for liquids)*
SOLUBILITY IN WATER (by weight): 100% 20°C
pH: 9-11 (5% solution in water)
EVAPORATION RATE (Butyl Acetate=1): 0.07
PERCENT VOLATILES: 98 Wt%

10. STABILITY AND REACTIVITY

STABILITY/INSTABILITY: Thermally stable at recommended temperatures and pressures.

CONDITIONS TO AVOID: Product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems

INCOMPATIBLE MATERIALS: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

THERMAL DECOMPOSITION: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Alcohols. Ethers.

HAZARDOUS POLYMERIZATION: Will not occur

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Peroral: Rat; female; LD50 = 20300 mg/kg

Percutaneous: Based on information for a similar material:

Rabbit; LD50 = > 10000 mg/kg

DEVELOPMENT TOXICITY: Contains component(s) which did not cause birth defects or any fetal effects in lab animals., The component(s) is/are:;

REPRODUCTIVE TOXICITY: Contains component(s) which did not interfere with reproduction in animal studies., Contains component(s) which did not interfere with fertility in animal studies., The component(s) is/are:; Propylene glycol.

CHRONIC TOXICITY AND CARCINOGENICITY: Similar formulations did not cause cancer in laboratory animals.

GENETIC TOXICOLOGY:

In Vitro: In Vitro mutagenicity studies were negative.

In Vivo: Mutagenicity studies in animals were negative for component(s) tested

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS: In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE: Based largely or completely on information for: Propylene glycol. Material is readily biodegradable.

Passes OECD test(s) for ready biodegradability. Degradation is expected in the atmospheric environment within minutes to hours.

ECOTOXICITY: Based largely or completely on information for: Propylene glycol. Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 . 100mg/L in most sensitive species tested).

FURTHER INFORMATION: Based largely or completely on information for: Propylene glycol. Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is very high (Koc between 0 and 50).

13. DISPOSAL CONSIDERATION (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESS OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information on Ingredients). FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destructive device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Centre at 1-800-258-2436 or 0-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. TRANSPORT INFORMATION

NON-BULK Proper Shipping Name: NOT REGULATED

BULK Proper Shipping Name: NOT REGULATED

The information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transportation organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION (Not meant to be all-inclusive—selected regulations represented)

FEDERAL/NATIONAL

OSHS Hazard Communication Standard

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right To Know Act) Section 313
To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right To Know Act) Section 302
To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right To Know Act) Section 311 & 312

Delayed (Chronic) Health Hazard: NO

Fire Hazard: NO

Immediate (Acute) Health Hazard: NO

Reactive Hazard: NO

Sudden Release of pressure Hazard: NO

Toxic Substance Control Act (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

European Inventory of Existing Commercial Chemical Substances (EINECS)

The components of this product are on the EINECS inventory or are exempt from EINECS inventory requirements.

STATE/LOCAL

Pennsylvania (Worker and Community Right To Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

<u>COMPONENT</u>	<u>CAS#</u>	<u>AMOUNT</u>
Propylene glycol	57-55-6	96.0000 %

Pennsylvania (Worker and Community Right To Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects of other reproductive harm, at levels which would require a warning under the statute.

California SCAQMD Rule 443.1 (South Coast Air Quality Management District Rule 443.1, Labeling of Material Containing Organic Solvents).

VOC: Vapor pressure 0.66 mmHg @ 20°C
1002 g/l VOC
1030 g/l less water and less exempted solvents

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

16. OTHER INFORMATION

ADDITIONAL INFORMATION

Additional information on this and other Dow products may be obtained by visiting our web page at www.dow.com.

Additional information on this product may be obtained by calling Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada)

HAZARD RATING SYSTEM

NFPA rating for this product are: H - 0 F - 0 R - 0

The ratings are part of a specific hazard communication program and should be disregarded where individuals are not trained in the use of this hazard rating system. You should be familiar with the hazard communication programs applicable to your workplace.

RECOMMENDED USES AND RESTRICTIONS

Intended as a heat transfer fluid for closed-loop systems.

Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's Stated use, please contact Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada) for more information.

REVISION

Version: 4.1
Revision: 05/09/2002

Most recent revision(s) are noted by the bold, double bars in the left-hand margin throughout this document.

LEGEND

Bacteria/NA	Non Acclimated Bacteria
F	Fire
H	Health
IHG	Industrial Hygiene Guidelines
N/A	Not available
NFPA	National Fire Protection Association
O	Oxidizer
R	Reactivity
TS	Trade secret
VOL/VOL	Volume/Volume
W	Water reactive
W/W	Weight/Weight

NOTICE: Dow urges each customer or recipient of this MSDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this MSDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given., Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that its activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of Dow, it is the buyer's/user's duty to determine the condition necessary for the safe use of this product., Due to the proliferation of sources for information such as manufacturer-specific MSDSs, Dow is not and cannot be responsible for MSDSs obtained from any source other than Dow. If you have obtained a Dow MSDS from a non-Dow source or if you are not sure that a Dow MSDS is current, please contact Dow for the most current version.

Setup

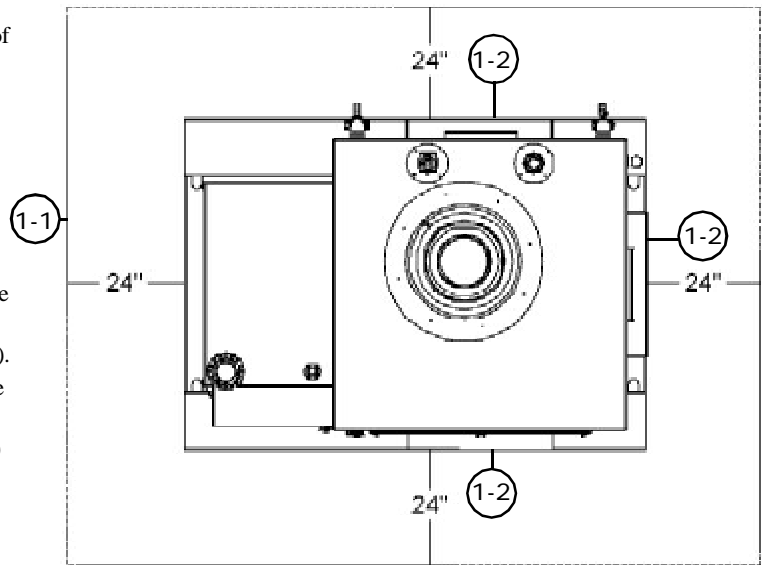
The positioning of all the system components on the site will be influenced by a number of factors. Please read all of the “Setup” section before beginning.

Be sure to observe all local electrical codes and fire regulations when positioning the trailer.

Required safety clearances

The “water heater module” is a heating appliance, therefore safe heat and exhaust clearances must be observed.

- Maintain 24” of clearance on all sides of the unit (1-1).
- Maintain 36” of clearance (2-1) on all sides of the flue pipe and chimney cap
- Confirm that the water heater module air intakes (1-2) on three sides of the water heater module, are free of any obstructions.

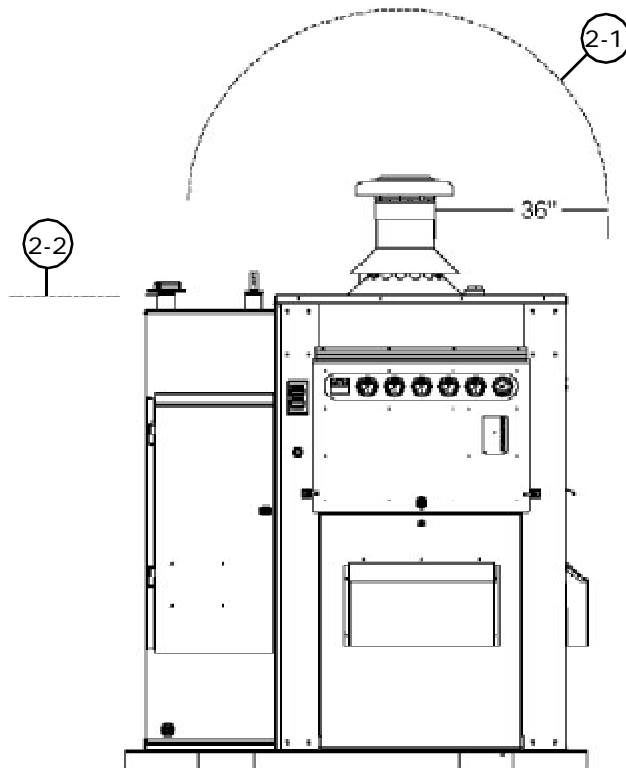


1 - water heater module - top view

Elevation concerns

Do not place any “portable heat exchangers” higher than the top level (2-2) of the heat transfer fluid fill tank . If this is not observed, the following can occur:

- Insufficient fluid in the system
Fluid will drain back to the heat transfer fill tank from the over-elevated fluid lines when the pump is shut off. The heat transfer fill tank will show adequate fluid but, when the pump is started, extra fluid will be required to recharge the over-elevated fluid lines and portable heat exchangers and the system will then have insufficient fluid in the reservoir.
- Fluid overflow
If fluid is added to maintain proper fluid levels while the pump is running, overflow at the fill tank will occur when the pump is shut off. This would occur because of drain back from the over-elevated fluid lines.



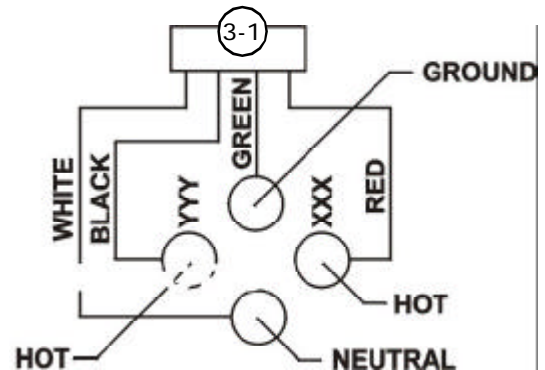
2 - water heater module - control side view

Electrical requirements & connection

When determining the “water heater module” location on site, consider setting up in close proximity to the electrical power supply.

Note: This applies mainly to systems not equipped with a dedicated generator.

- The “water heater module” main feed wiring must be adequately sized to carry the minimum ampacity shown on the water heater cabinet’s rating label. All electrical connections, connectors and wire must be CSA approved and installed according to local laws and codes.
- Before making any electrical connections, be sure that the electric power supply is off.
- The “water heater module” requires 110/220VAC power. The module is factory wired so that the only connection to be made is a 110/220VAC main feed to the circuit breakers inside the water heater cabinet.
- The main feed wiring must be adequately sized to carry the minimum ampacity shown on the water heater cabinet’s rating label.
- All electrical connections, connectors and wire must be CSA approved, and installed according to local laws and codes.
- A 4-wire hookup (3-1) is required for all systems to work properly. Warranty is void if the wiring hookup is not done correctly.



3 - water heater module

Heat transfer fluid “HTF”

CAUTION! At no time should you use automobile antifreeze in your DRYAIR system. The use of automobile antifreeze will void your DRYAIR warranty.

- The heat transfer fluid “HTF” level should show no more than 1/4 on the gauge (cold fluid) at start-up. As the “HTF” warms to operating temperature, fluid expansion will raise the level to 1/2 or 3/4 on the gauge (depending on the total volume of fluid in the circulation system).

Heat transfer fluid specifications

- DRYAIR pre-mixed “HTF” fluid is made up of 50% “Dowfrost @ HTF” or “Boss Chill PG” and 50% water*, by weight - freeze protection down to -28°F (-33°C).
- The “glycol/water mixture chart”, to the right, will provide you with more information on the proper mixture for your area.
- “Dowfrost @ HTF” or “Boss Chill PG” must be used. The pure “Dowfrost @ HTF” or “Boss Chill PG” heat transfer fluid used in the DRYAIR system is made up of a blend of 95-97% Propylene glycol, <5% Dipotassium phosphate and deionized water (see Safety Concerns section - MSDS sheets for additional information).
- Soft water with a neutral pH level (#7) must be used.

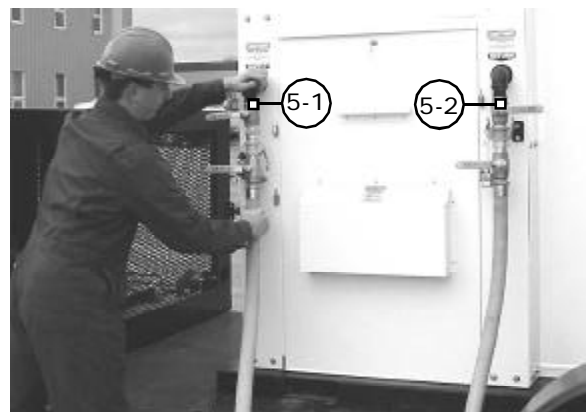
Percent Propylene Glycol		Freezing Point	
By Mass	By Volume	°F	°C
0.0	0.0	32.0	0.0
10.0	9.6	26.1	-3.2
20.0	19.4	17.9	-7.8
30.0	29.4	6.7	-14.0
40.0	39.6	-8.1	-22.3
50.0	49.9	-28.9	-33.8
60.0	60.0	-54.9	-48.3

4 - glycol/water mixture chart

CAUTION! Whenever coupling or uncoupling the kamlocks, make sure that the isolation valves are closed and the pump is turned off. Failure to do so may put you at risk of injury from eye or skin exposure to hot glycol.

Primary circulation lines

- If possible, position the primary circulation lines out of high traffic areas.
- Connect the primary circulation lines to the “supply” (5-1) and “return” (5-2) isolation valves on the water heater. Isolation valves and kamlock quick couplers are attached to both ends of the primary circulation lines to enable quick coupling. This also allows the isolation of the primary lines while retaining the heat transfer fluid “HTF” in the lines. Plus... setup and dismantling of the circulation system is much quicker.



5 - primary circulation line connected to the water heater module

Fuel/Gas

See “Burner Setup - Burner Identification” - below for burner type.

Diesel/Light Oil

- Only clean #1 or #2 diesel fuel or light heating oil is suitable for use in the system
- The “water heater module” comes equipped with its own tank, so there are no fuel line hookups required.
- The fuel system utilizes a two-pipe system to ensure efficient fuel supply to the burner.

Contact your local fuel supplier to inform them of the requirements.

Propane Gas

A supply of “Propane Vapor” should be connected to the inlet of the secondary regulator (6-1) at an approximate pressure of 12 PSI.

Provide your local Propane supplier with BTUH input requirements to ensure an adequate volume of vaporized propane even in the coldest ambient conditions.

Natural Gas

A supply of “Natural Gas” should be connected to the manual gas train supply valve (7-1) at a pressure of approximately 12-14” W.C.

Provide your local Natural Gas Utility Company with BTUH input and pressure requirements to ensure adequate volume of gas at the correct pressure range

Burner Setup

The model “2100-DG” series water heaters come with a diesel/light fuel oil supply package and a gas train. The Diesel/Light Oil Burner is installed on the heat exchanger from factory and the burner settings are depending on which model was purchased (2100-DG-0600 or 2100-DG-0900).

Burner Identification

Riello’s own identification label (8-1, 9-1, 10-1) located on the top flange of the burner’s main chassis plate and identifies if the burner is for use with “Diesel/Light Oil”, “Natural Gas” or “Propane Gas”.

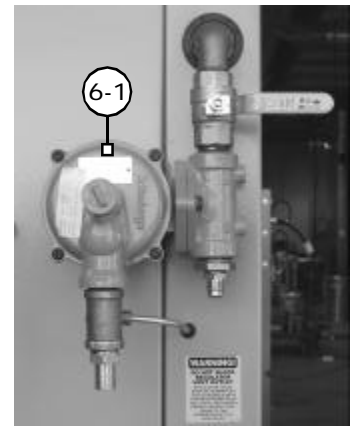
White vinyl labels are also located on both the burners main chassis plate (8-2, 9-2, 10-2) and to the top of the burner cover hood (8-3, 9-3, 10-3).

- Black lettering = diesel/light oil burner (fig. 8)
- Blue lettering = natural gas burner (fig. 10)
- Red lettering = propane gas burner (fig. 9)

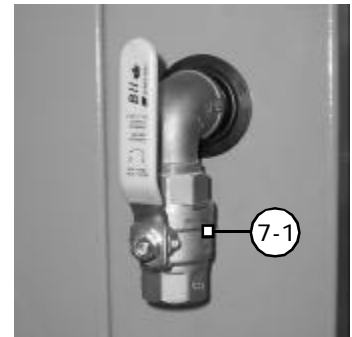
If the installed burner is the correct fuel type to be used, proceed to the applicable section below:

- See “Startup for Diesel/Light Oil Burner” in the Operation section of the Operators Manual.
- See “Startup for Propane Gas Burner” in the Operation section of the Operators Manual.
- See “Startup for Natural Gas Burner” in the Operation section of the Operators Manual.

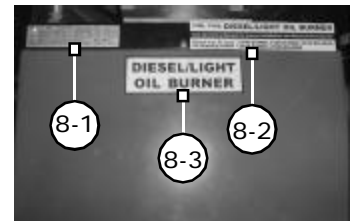
If a burner of different format is required, it **must** be obtained from your DRYAIR Inc. distributor. The existing burner must then be removed before the alternate burner can be installed. See below for alternate burner removal and installation.



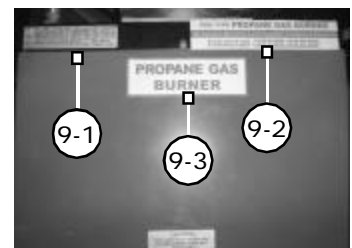
6 - propane secondary regulator



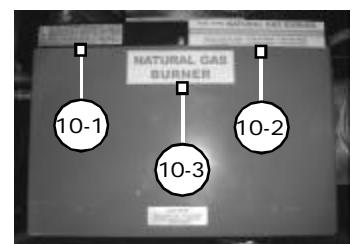
7 - natural gas manual gas train supply valve



8 - Riello I.D. label & diesel/light oil vinyl burner I.D. labels



9 - propane gas fuel type & burner type vinyl labels

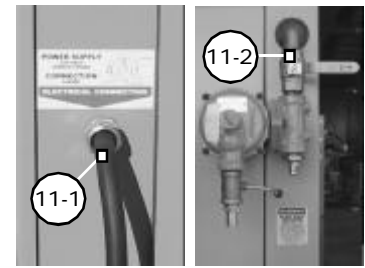


10 - natural gas fuel type & burner type vinyl labels

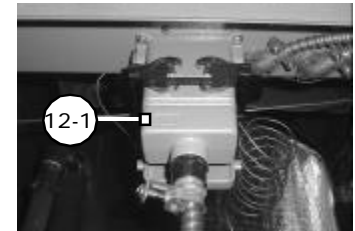
Burner Removal

To remove an existing **Diesel/Light Oil Burner**, use the following sequence:

- 1 Make certain that the power supply (11-1) to the water heater is disconnected.
- 2 Disconnect the electrical connection to the burner by unplugging the quick-disconnect multi-pin connector (12-1). This connection is on the interior of the water heater cabinet, at the base of the main control panel. A pair of Cam-lever locks will need to be disengaged to permit separation of the plug connection.
- 3 Disconnect the combustion air duct (13-1) by loosening the gear clamp-band.
- 4 Disconnect the oil supply hose (14-1) and oil return hose (14-2) by uncoupling the quick connections on the side of the burner. The loose supply and return hose ends may be coupled together and pushed aside out of the way inside the cabinet.
- 5 Remove 2 bolts (16-1) from top of burner tube bracket.
- 6 Pull burner toward you and away from the mounting bracket (16-2).
- 7 Remove the gas union plug (15-1) to accommodate the propane/natural gas burner union.



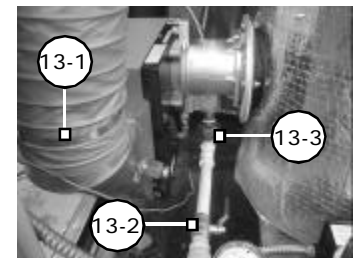
11 - power and gas supply



12 - multi-pin connector

To remove an existing **Propane Gas Burner** or **Natural Gas Burner**, use the following sequence:

- 1 Make certain that power supply (11-1) and gas supply (11-2) are shut off and disconnected from the water heater.
- 2 Disconnect the electrical connection to the burner by unplugging the quick-disconnect multi-pin connector (12-1). This connection is on the interior of the water heater cabinet, at the base of the main control panel. A pair of Cam-lever locks will need to be disengaged to permit separation of the plug connection.
- 3 Disconnect the combustion air duct (13-1) by loosening the gear clamp-band.
- 4 Close off the manual gas train valve (13-2).
- 5 Use 2 wrenches to loosen and disconnect the gas union (13-3).
- 6 Remove 2 bolts (16-1) from top of burner tube bracket.
- 7 Pull burner toward you and away from the mounting bracket (16-2).
- 8 Replace the gas union plug (15-1) to prevent a blockage or debris.

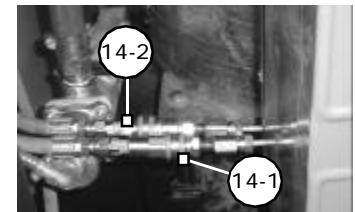


13 - air duct, manual gas valve and gas union

Burner Installation

To install an alternate **Riello model 40-F20 Diesel/Light Oil Burner**:

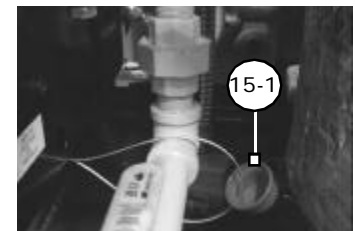
- 1 Insert burner into the mounting bracket (16-2).
- 2 Install 2 bolts (16-1) at top of burner tube bracket.
- 3 Connect the oil supply hose (14-1) and oil return hose (14-2) by coupling them to the quick connections on the side of the burner.
- 4 Make the electrical connection to the burner by plugging-in the quick-connect (12-1). The Cam-lever locks should be engaged to prevent separation of the plug connection.



14 - oil supply & oil return hose

To install an alternate **Riello model 40-G750 Propane Gas Burner** or **Natural Gas Burner**:

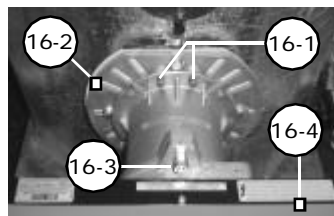
- 1 Insert burner into the mounting bracket (16-2).
- 2 Install 2 bolts (16-1) at top of burner tube bracket.
- 3 Connect gas union (13-3). Use 2 wrenches to tighten.
- 4 Open the manual gas train valve (13-2).
- 5 Remove locking nut (16-3) and swing burner chassis (16-4) away to expose the combustion head adjustment mechanism (fig. 17). Loosen Allen screw (17-1) and move the head assembly (17-2) until the rear edge of the air tube (17-3) coincides with the desired number setting (17-4).



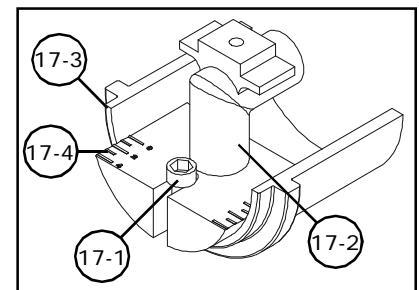
15 - oil supply & oil return hose

- Setting for model "2100-DG-0600" (natural gas or propane) should be 3.0
 - Setting for model "2100-DG-0900" (natural gas or propane) should be 4.0
- 6 Lock off the setting, swing the burner closed and replace the locking nut (16-3).

- 7 Connect combustion air duct (13-1) and tighten the gear clamp-band.
- 8 Make the electrical connection to the burner by plugging-in the quick-disconnect (12-1). The Cam-lever locks should be engaged to prevent separation of the plug connection.



16 - burner bracket, mounting bolts & locking nut

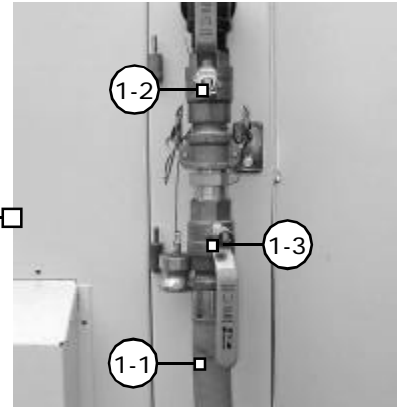
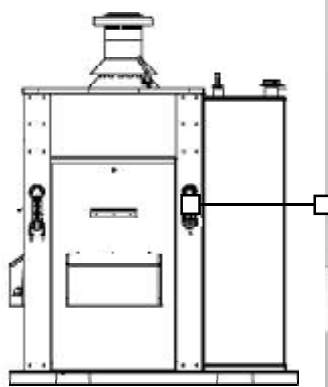


17 - burner combustion head adjustment

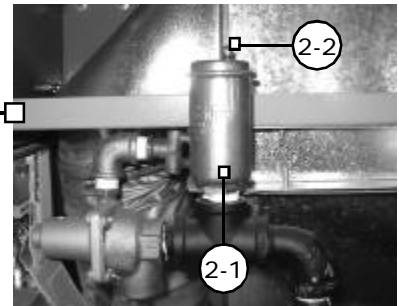
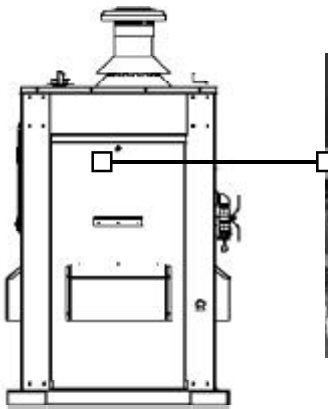
Operation

Purging air from the “HTF” circulation system

- Verify that the primary circulation lines (1-1) are connected to the “supply” and “return” isolation valves (1-2) on the “water heater module”.
- Verify that the primary circulation lines are connected to a distribution manifold.
- Complete the connection for one “heat exchanger loop” or “portable heat exchanger” This will close the circulation loop and allow circulation.
- Verify that the “supply” and “return” isolation valves (1-2) and the isolation valves (1-3) at both ends of the primary circulation lines are in the “open” position.
- The automatic air vent (2-1) valve cap (2-2) should not need adjustment. The valve cap should be opened 1 1/2 turns (counter clockwise) from fully closed to allow air escape from “HTF” system.

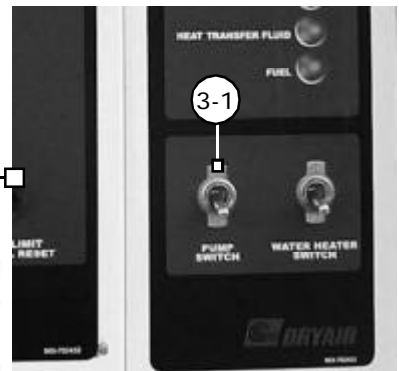
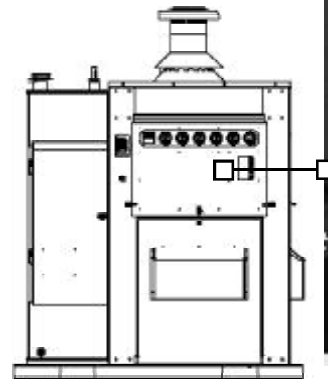


1 - “supply” & “return” isolation valve in the “open” position



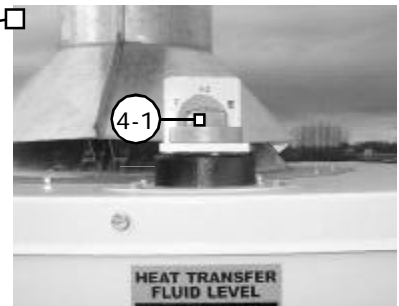
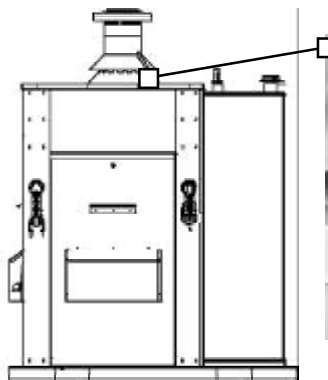
2 - automatic air vent

- Toggle the pump switch (3-1) to the “On” (up) position and run the pump. This will release the air from the system.



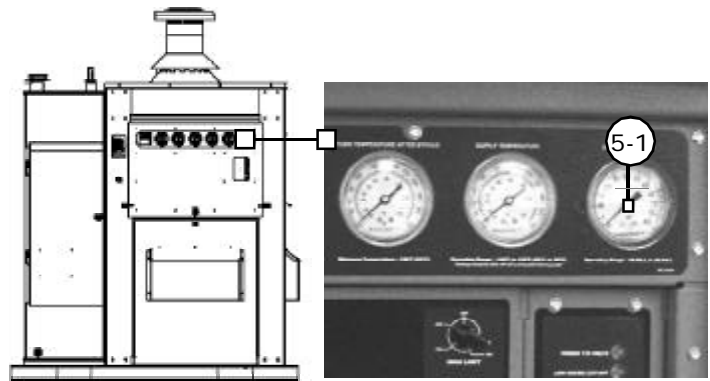
3 - pump and water heater switch

- Monitor the “heat transfer fluid level gauge” (4-1) and make sure that the heat transfer fluid level stays between 1/4 to 3/4 full at all times during this process.
- Note that there may be a certain amount of air in the system. “HTF” levels may change as air is displaced from the system. Add “HTF” fluid to maintain 1/4 to 3/4 levels.



4 - heat transfer fluid level gauge

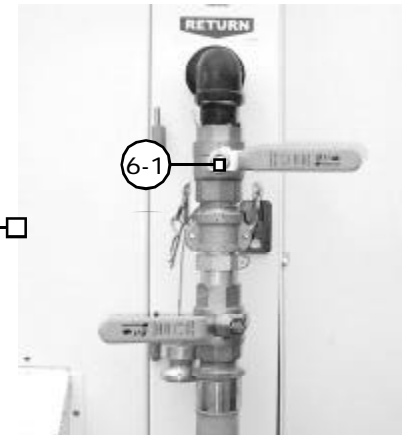
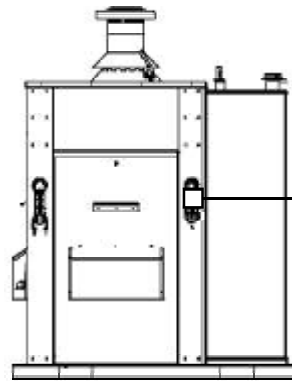
- When the air is eliminated, the “System Pressure” gauge (5-1) will hold at a steady reading of between 15 to 40 P.S.I.



5 - system pressure gauge

Before firing the system

- Verify that the power supply is correct and that the electrical hook up is as specified in “Setup”.
- Verify that the water heater is being supplied with the same fuel/gas type as indicated on the water heater data plate and the vinyl burner type labels - See “Burner Setup - Burner Identification” in the Setup section of the Operators Manual.
- Verify that the “supply” and “return” isolation valves (6-1) are closed.
- Verify that the heat transfer fluid level gauge (4-1) shows approximately 1/4 to 1/2 full.



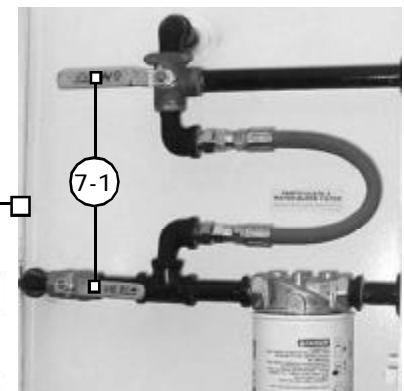
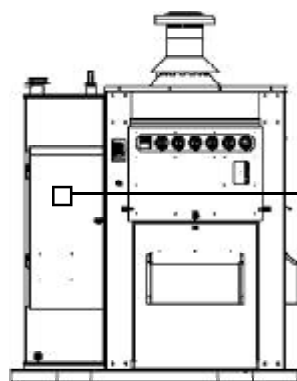
6 - “supply” & “return” isolation valve in the “closed” position

Diesel/Light Oil

- Verify that the fuel line valves (7-1) are in the positions as shown, to the right.

Propane/Natural Gas

- Verify that the manual gas train valve is in the “open” position.



7 - fuel line valves and filter

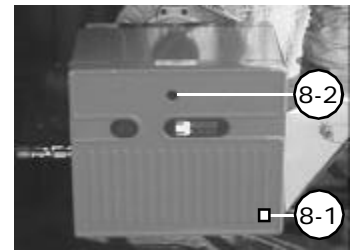
Startup for Diesel/Light Oil Burner:

NOTE: The following steps must be performed by “Qualified Personnel” only.

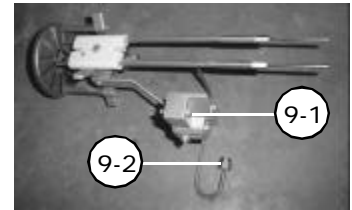
Contact your local fuel supplier to inform them of requirements. Only clean, #1 or #2 diesel fuel or light heating oil is suitable for use in this system.

1. Remove burner hood (8-1).
2. To remove the drawer assembly (figure 10):
 - Loosen screw (10-1), then unplug control box (10-2), by carefully pulling it back and then up.
 - Remove the air tube cover plate (10-3) by loosening the two retaining screws (10-4).
 - Loosen screw (9-1) and the fuel supply line connection (9-2) then slide the complete drawer assembly out of the combustion head as shown.
3. Remove the nozzle adapter (11-2) from the drawer assembly by loosening the screw (11-1).
4. Check the nozzle to ensure correct size and type. If wrong replace the nozzle with one of the correct size and type listed below. Nozzles should be replaced after 5,000 hours of service, due to gradual erosion of the orifice from high pressure flow.
 - Model “2100-DG- 0600” nozzle = 3.50 x 60°.
 - Model “2100-DG- 0900” nozzle = 5.00 x 60°.
5. Replace the nozzle adapter into the drawer assembly and re-secure the retaining screw.
6. Check position of ignition electrodes. Refer to figure 12 for correct alignment. Adjust if necessary.
7. To set the turbulator adjustment assembly (figure 13).
 - Loosen nut (13-1) and turn screw (13-2) until index marker (13-3) is aligned with the correct index number. Retighten the retaining nut.
 - Correct turbulator settings are:
 - Model “2100-DG- 0600” = 2.5.
 - Model “2100-DG- 0900” = 4.0.
8. Insert the drawer assembly back into the burner tube. Replace the control box and cover plate by reversing procedure described in “2” above.
9. Connect power supply to the water heater and establish flow of heat-transfer-fluid by turning on the circulating pump’s toggle switch (14-1), located on the control panel. Open Supply and Return isolation valves (6-1)
10. Initiate a try for ignition by turning on the operator toggle switch (14-2) located on the control panel. The burner will go through a pre-purge cycle before trying for ignition. Due to air in the fuel line, you may have to re-initiate the ignition cycle multiple times, by pressing and holding the burner reset button (8-2) for at least 10 seconds. Once all air is eliminated, the burner should light. The burner will run on low for about ten seconds before shifting to high fire.

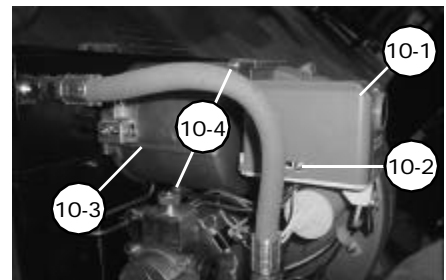
Note: *If the diesel/light oil burner fails to ignite after several attempts, there may be air in the fuel system. To purge the air from the fuel system - see “Operation - Purge air from diesel/light oil fuel system” section of the operators manual.*



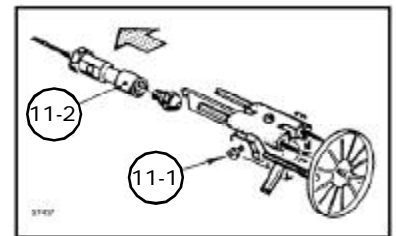
8 - burner hood & reset button



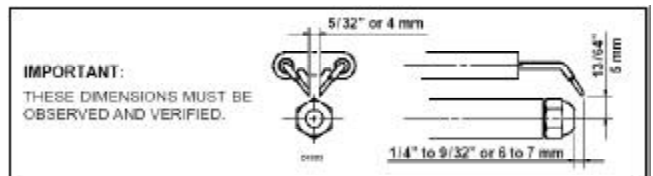
9 - combustion head



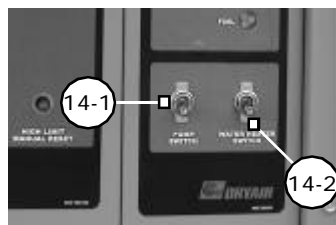
10 - drawer assembly on burner



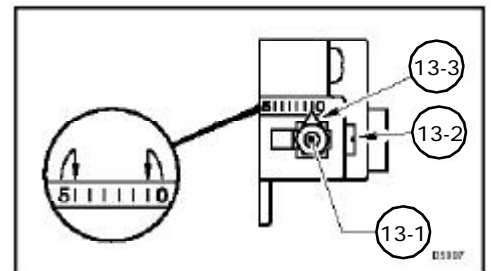
11 - nozzle adapter (fig. D7437-Riello Manual)



12 - ignition electrodes (fig. D6003-Riello Manual)



14 - circulating toggle switch



13 - turbulator adjustment (fig. D5997-Riello Manual)

11. To set the burner's air shutter (figure 17) and fuel pressure, refer to figure 17.

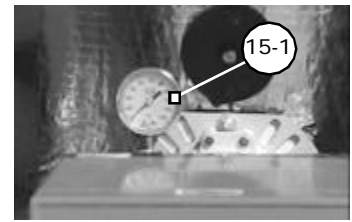
- While the burner is firing on LOW, loosen retaining nut (17-2) and turn the adjusting screw (17-3) until the top of the air shutter (17-10) is correctly positioned. Hold adjusting screw in position and secure by tightening the retaining nut. Preliminary settings for low fire are:
 - Model "2100-DG-0600" = 3.0
 - Model "2100-DG-0900" = 5.5

Fuel pressure for low fire is factory set to 100 PSI for all models.

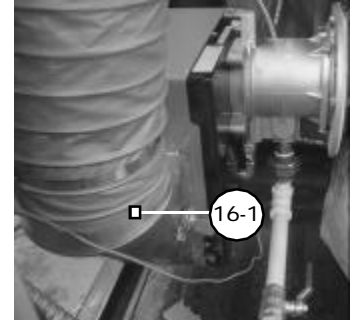
- While the burner is firing on HIGH, set fuel pressure by turning the pressure regulator adjustment screw (17-9). Fuel pressure gauge (15-1) is provided to monitor this adjustment. Fuel pressure settings for high fire are:
 - Model "2100-DG-0600" = 160 psi
 - Model "2100-DG-0900" = 145 psi
- While the burner is firing on HIGH, loosen retaining nut (17-7) and turn the bolt (17-8) in a counterclockwise direction until about $\frac{3}{4}$ " of thread is visible. Position the air shutter (17-10) so the top of the air shutter is aligned with the proper index line. Hold the shutter in this position and turn the adjusting bolt clockwise until a resistance is met. Preliminary air shutter settings for high fire are:
 - Model "2100-DG-0600" = 4.0
 - Model "2100-DG-0900" = 7.5
- NOTE: This step is essential for clean, efficient combustion.

Using a good quality Smoke Spot Tester and Flue Gas Analyzer, take flue gas sample readings at the test port in the flue pipe above the cabinet. Fine tune the readings by adjusting the burner's air shutter (17-10), to achieve acceptable efficiency and emission levels. Final readings must be taken with the burner cover in place and the combustion air duct (16-1) connected. Acceptable levels are.

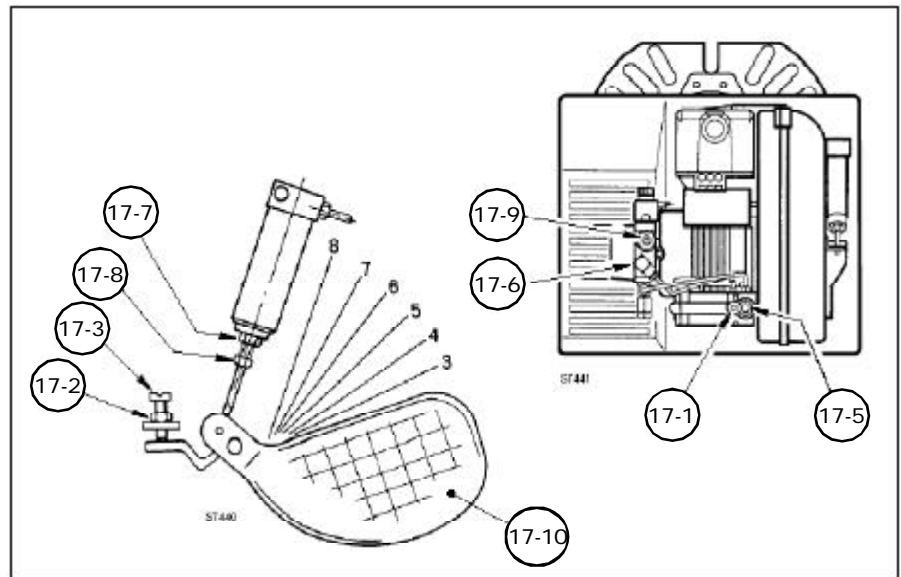
- Maximum CO₂ = 13%.
- Smoke Spot Reading = 0
- Maximum Flue Gas Temp. = 600F.
- Maximum CO Level = 50 PPM
- Minimum Efficiency = 80%.



15 - manifold gas pressure gauge



16 - combustion air duct & burner



17 - air shutter (fig. S7440 & S7441-Riello Manual)

Gas Connection and Startup for Propane Burner:

NOTE: The following steps must be performed by “Qualified Personnel” only. All permit processes and codes must be followed as administered by the local authority having jurisdiction.

Provide your local propane supplier with BTUH input requirements to ensure an adequate volume of vaporized propane even in the coldest ambient conditions.

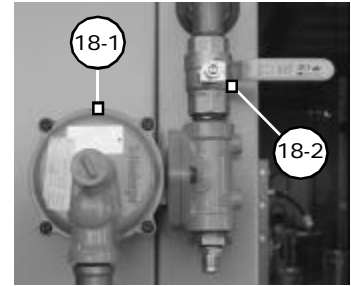
1. If the water heater was already equipped for propane, it should have a secondary regulator (18-1) installed on the outside of the cabinet as indicated. If the propane burner was purchased as an alternate, the secondary regulator (18-1) will be shipped loose with the burner and **must be installed** now. Use only CGA/AGA approved thread sealant when making gas piping connections. The manual gas train supply valve (18-2) should be closed.
2. A supply of “Propane Vapor” should be connected to the inlet of the secondary regulator (18-1) at a pressure of approximately 12 PSI. Turn on the gas at the supply tank, and soap test all piping joints to ensure no leaks are present. Bleed air from the supply line as far as the regulator. Allow 5 minutes for purged gas to dissipate from the area.
3. Remove burner hood (19-1) and set the burner’s air shutter (21-1) at a preliminary setting of:
 - Model “2100-DG-0600” = 3.0
 - Model “2100-DG-0900” = 5.5
4. CSD-1 code gas trains have a low-gas pressure switch (20-2) and a high gas-pressure switch (20-3). Settings for the various models are:
 - Model “2100-DG-0600” Low = 1.5" W.C. and High = 2.0" W.C.
 - Model “2100-DG-0900” Low = 4.2" W.C. and High = 4.8" W.C.
5. Open the manual gas train supply valve (18-2) and adjust the secondary regulator (18-1) until a static reading of 11" W.C. is achieved at the gas supply pressure gauge (23-1).
6. Connect power supply to the water heater and establish flow of heat-transfer-fluid by turning on the circulating pump’s toggle switch (22-1), located on the control panel. Open Supply & Return isolation valves (6-1).
7. Initiate a try for ignition by turning on the operator toggle switch (22-2) located on the control panel. The burner will go through a pre-purge cycle before trying for ignition. Due to air in the gas train, you may have to re-initiate the ignition cycle multiple times, by pressing and holding the burner reset button (19-2) for at least 10 seconds. Once all air is eliminated, the burner should light.
8. Set the preliminary manifold gas pressure, while the burner is firing, by adjusting the main gas train pressure regulator (20-1) to achieve a reading of.
 - Model “2100-DG-0600” = 1.80" W.C.
 - Model “2100-DG-0900” = 4.60" W.C.

Pressure adjustment can be monitored by observing the manifold gas pressure gauge (23-2). The pressure should hold steady.

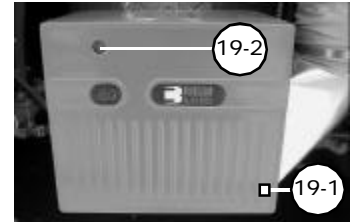
NOTE: These pressure settings are given as a starting reference only! Current ambient temperature, wind conditions and atmospheric pressure will all have an effect on actual gas input. The only way to verify actual gas input is to meter the flow of gas to the unit while it is firing. Gas pressure adjustments can then be made to more accurately fine-tune the gas input.

9. Soap test gas union (24-2) to be certain there are no leaks present.
10. Using a good quality Flue Gas Analyzer, take flue gas sample readings at the test port in the flue pipe above the cabinet. Fine tune the readings by adjusting the burner’s air shutter (21-1), to achieve acceptable efficiency and emission levels. Final readings must be taken with the burner cover in place and the combustion air duct (24-3) connected. Acceptable levels are.

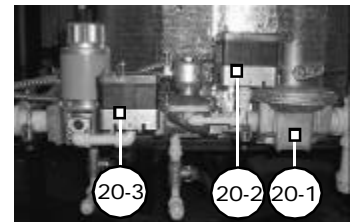
- Maximum CO₂ = 12%.
- Maximum Flue Gas Temp. = 600F.
- Maximum CO Level = 50 PPM
- Minimum Efficiency = 80%.



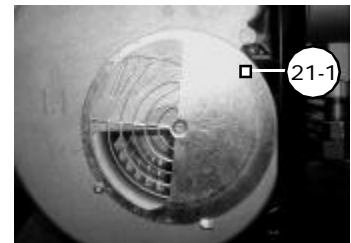
18 - secondary regulator & manual gas train supply valve



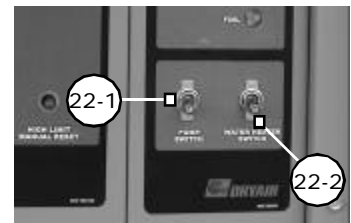
19 - burner hood & reset button



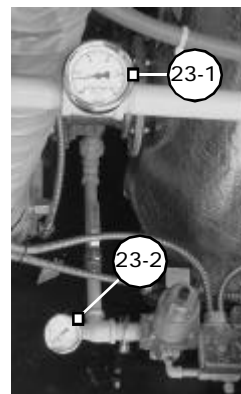
20 - main gas train pressure regulator high & low gas pressure switch



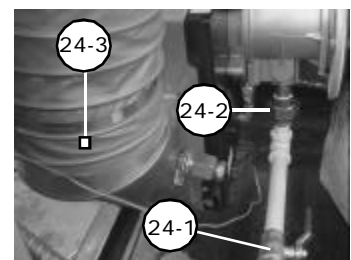
21 - burner air shutter



22 - circulating toggle switch



22 - supply & manifold gas pressure gauge



24 - air duct, manual gas valve and gas union

Gas Connection and Startup for Natural Gas Burner

NOTE: This sequence must be performed by “Qualified Personnel” only. All permit processes and codes must be followed as administered by the local authority having jurisdiction.

Provide your local Natural Gas Utility Company with BTUH input and pressure requirements, to insure an adequate volume of gas at the correct pressure range.

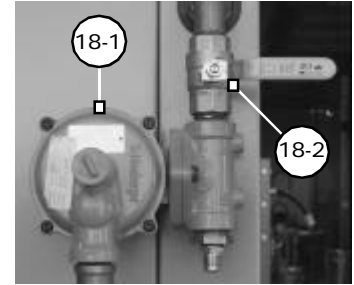
1. If the water heater was previously equipped for propane, it may have a secondary regulator (18-1) installed on the outside of the cabinet as indicated, which **must be removed** now. Close the manual gas train supply valve (18-2).
2. Natural gas supply should be connected to the manual gas train supply valve (18-2) at a pressure of approximately 12 – 14" W.C. Use only CGA/AGA approved thread sealant when making gas piping connections. Turn on the gas at the supply meter, and soap test all piping joints to ensure no leaks are present. Bleed air from the supply line as far as the manual gas train supply valve (18-2). Allow 5 minutes for purged gas to dissipate from the area.
3. Remove burner hood (19-1) and set the burner’s air shutter (21-1) at a preliminary setting of.
 - Model “2100-DG-0600” = 2.6
 - Model “2100-DG-0900” = 4.5
4. CSD-1 code gas trains have a low-gas pressure switch (20-2) and a high gas-pressure switch (20-3). Settings for the various models are.
 - Model “2100-DG-0600” Low = 1.3" W.C. and High = 2.0" W.C.
 - Model “2100-DG-0900” Low = 3.7" W.C. and High = 4.2" W.C.
5. Open the manual gas train supply valve (18-2) and adjust the metered gas supply pressure until a static reading of 12 - 14" W.C. is achieved at the gas supply pressure gauge (23-1).
6. Connect power supply to the water heater and establish flow of heat-transfer-fluid by turning on the circulating pump’s toggle switch (22-1), located on the control panel. Open Supply & Return isolation valves (6-1).
7. Initiate a try for ignition by turning on the operator toggle switch (22-2) located on the control panel. The burner will go through a pre-purge cycle before trying for ignition. Due to air in the gas train, you may have to re-initiate the ignition cycle multiple times, by pressing and holding the burner reset button (19-2) for at least 10 seconds. Once all air is eliminated, the burner should light.
8. Soap test gas union (24-2) to be certain there are no leaks present.
9. Set the preliminary manifold gas pressure, while the burner is firing, by adjusting the main gas train pressure regulator (20-1) to achieve a reading of.
 - Model “2100-DG-0600” = 1.60" W.C.
 - Model “2100-DG-0900” = 4.00" W.C.

Pressure adjustment can be monitored by observing the manifold gas pressure gauge (23-2). The pressure should hold steady.

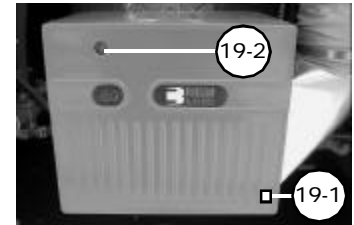
NOTE: These pressure settings are given as a starting reference only! Current ambient temperature, wind conditions and atmospheric pressure will all have an effect on actual gas input. The only way to verify actual gas input is to meter the flow of gas to the unit while it is firing. Gas pressure adjustments can then be made to more accurately fine-tune the gas input.

10. Using a good quality Flue Gas Analyzer, take flue gas sample readings at the test port in the flue pipe above the cabinet. Fine tune the readings by adjusting the burner’s air shutter (21-1), to achieve acceptable efficiency and emission levels. Final readings must be taken with the burner cover in place and the combustion air duct (24-3) connected. Acceptable levels are.

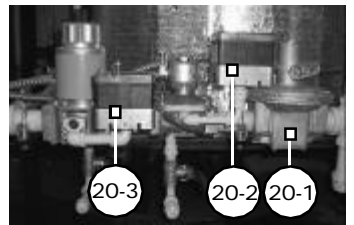
- Maximum CO₂ = 10%.
- Maximum Flue Gas Temp. = 600F.
- Maximum CO Level = 50 PPM
- Minimum Efficiency = 80%.



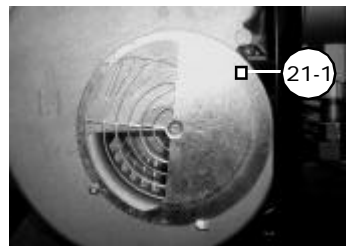
18 - secondary regulator & manual gas train supply valve



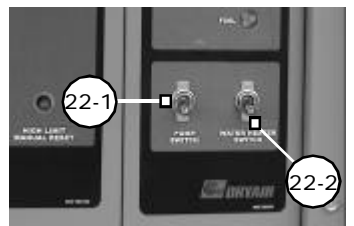
19 - burner hood & reset button



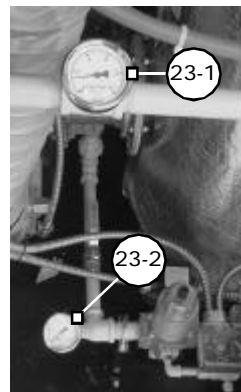
20 - main gas train pressure regulator high & low gas pressure switch



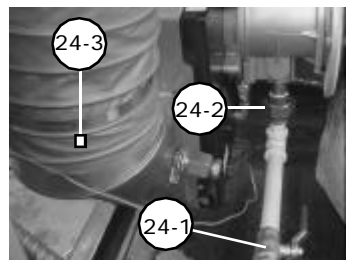
21 - burner air shutter



22 - circulating toggle switch



23 - supply & manifold gas pressure gauge



24 - air duct, manual gas valve and gas union

Cold start procedure

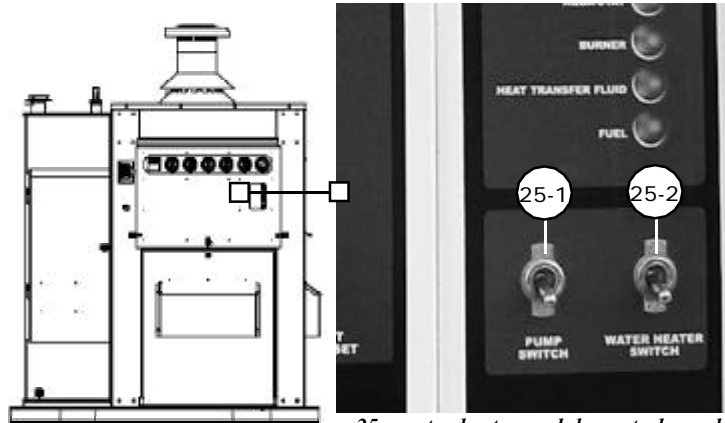
For Diesel/Light Oil Operation Only

This procedure must be completed if the ambient outdoor air temperature is lower than 50° F (10° C).

Consider initiating this process well in advance of firing the system.

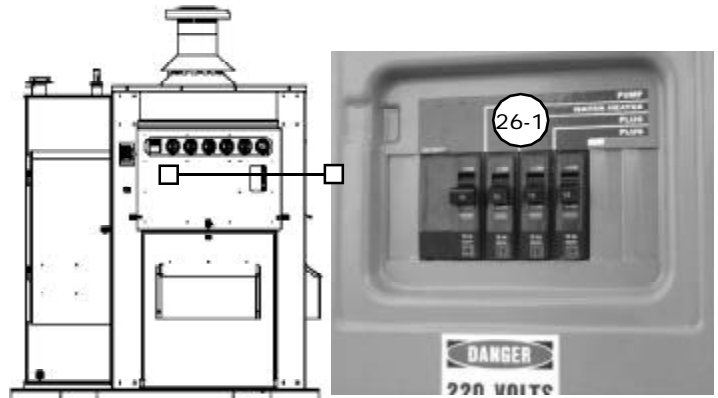
In -30F (-34C) conditions, this process could take up to 6 hours.

- The system has a built-in, 4,500 watt electric “cold start” fluid pre-heater which will heat the “heat transfer fluid” in the water heater heat exchanger.
- Confirm that the pump switch (25-1) and water heater switch (25-2) are in the “Off”(down) position.



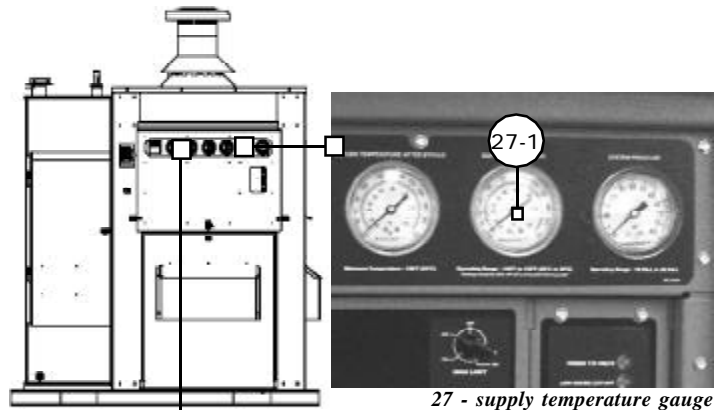
25 - water heater module control panel

- Position all four breakers (26-1) to the “on”(up) position. This will automatically energize the electric “cold start” circulation heater.



26 - water heater module breaker box

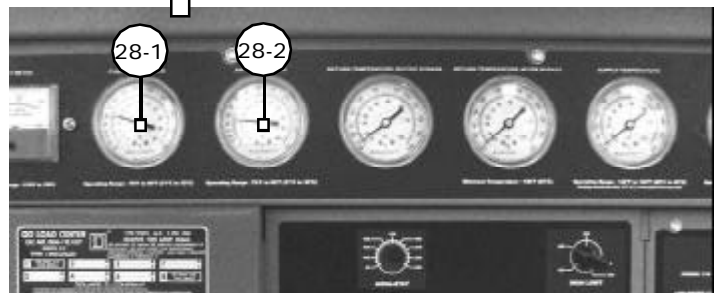
- Wait until the “supply temperature gauge” (27-1) reads between 140° F to 150° F (60° C to 65° C). The time required for the heat transfer fluid in the heat exchanger to reach this temperature will depend on the outdoor ambient air temperature.
- Toggle the pump switch (25-1) located on the control panel to the “On” (up) position. Once the pump is turned on, the “cold start” fluid pre-heater is automatically shut off.
- With the pump on and the “supply” and “return” isolation valves on the exterior of the heat module in the closed position, the “heat transfer fluid” will circulate through the heat module’s internal bypass system. This will supply warm “heat transfer fluid” to the combustion air and fuel preheat systems, which tempers combustion air and fuel for smooth burner start-up and operation.



27 - supply temperature gauge

- Continue circulating the “heat transfer fluid” within the heat module’s distribution system until the “combustion air gauge” (28-2).
- Continue circulating the “heat transfer fluid” until the “fuel temperature gauge” (28-1) read approximately 60° F to 70° F (15° C to 21° C).

The time required for the combustion air and fuel to reach this temperature will again depend on the outdoor ambient air temperature.



28 - combustion air & fuel temperature gauges

- The burner is now ready to be fired. Proceed with the “Temperate Start Procedure”

Temperate start procedure

You can proceed with this procedure when;

- 1) the ambient outdoor air temperature is above 50° F (10° C).
- 2) the “cold start procedure” has been completed.

Control settings

Low Flow Situations

Utilizing only one 80 or 200 portable heat exchanger or only one or two circulation line exchanger loops

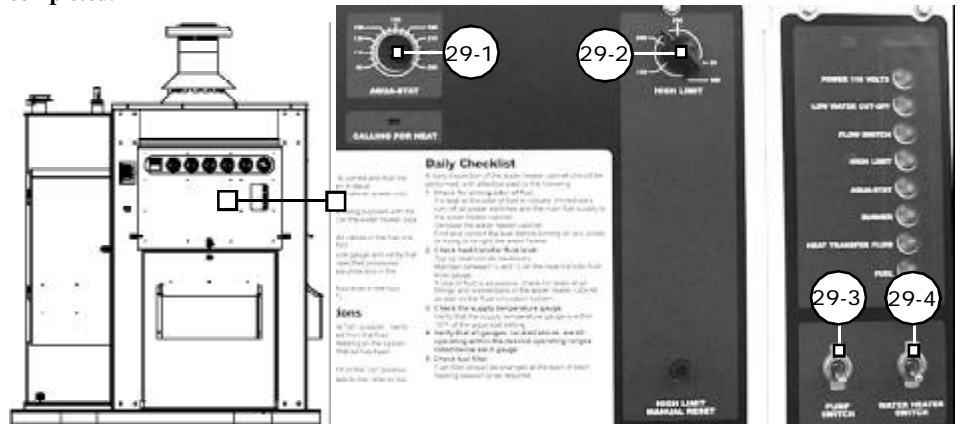
- Water heater heat exchanger temperature overrun can be expected, therefore, initially set the aquastat (29-1) at 140°F (60°C) and the high limit switch (29-2) at 200° F (93° C).

Note: A single line heat exchanger loop may not have enough flow to activate the system flow switch. If this occurs, consider adding another loop of hose to increase flow and activate the system.

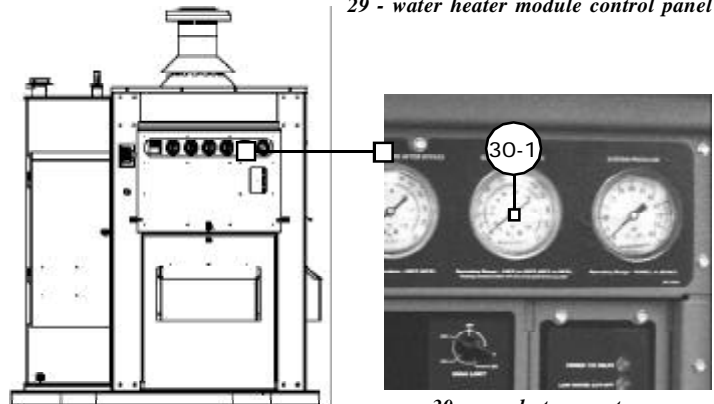
High Flow Situations

Utilizing two or more portable heat exchangers or three or more circulating line heat exchanger loops

- Set the aquastat (29-1) at 190°F (88°C) and the high limit switch (29-2) between 200°F - 210°F (93°C - 99° C).



29 - water heater module control panel

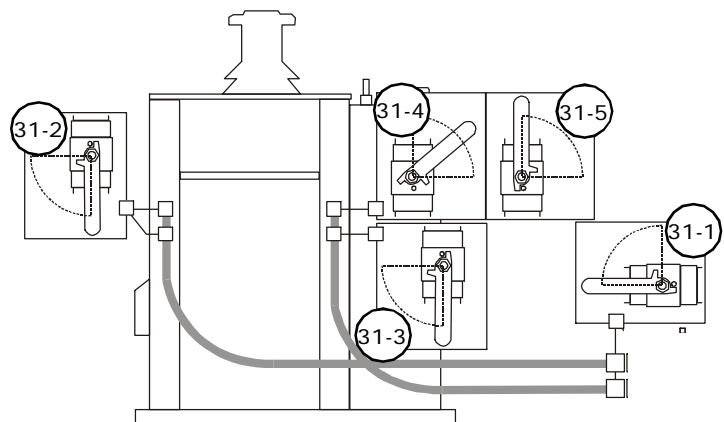


30 - supply temperature gauge

Initiate firing

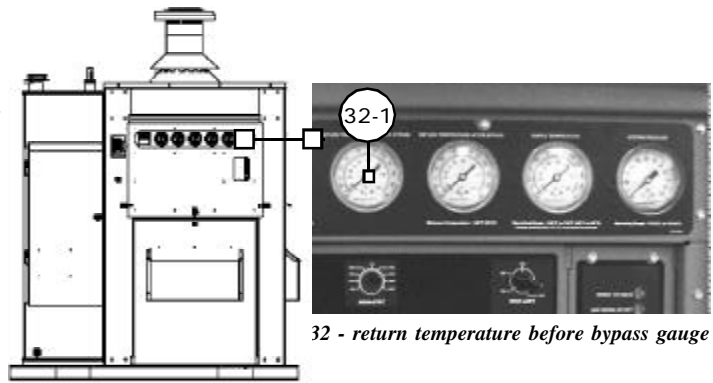
- Verify that the “Pump Switch” (29-3) is in the “On” (up) position.
- Toggle the water heater switch (29-4) to the “On” (up) position.
- The burner will proceed through its firing sequence.
- Once the burner is operating smoothly and the system pressure is steady (air has been eliminated from the system), monitor the “supply temperature” (30-1) until it is within 10° F of the aquastat temperature setting (30-1).
- Verify that only one “heat exchanger loop” or one “portable heat exchanger” is connected to the primary lines through the distribution manifold. This will close the loop and allow circulation from the “supply” side to the “return” side of the primary circulation line.
- Open fully the “supply” isolation valves (31-2).
- Open fully the “return” primary circulation line valve (31-3).
- Open the “return” isolation valve (31-4) to the “half open” position.
- The “half open” position will ensure a slow introduction of cold heat transfer fluid into the external circulation system and prevent a “cold-shock” of the system.

Note: Do not close this valve more than the 1/2 closed position. The restricted flow may prevent the firing of the water heater.



31 - circulation valve positions

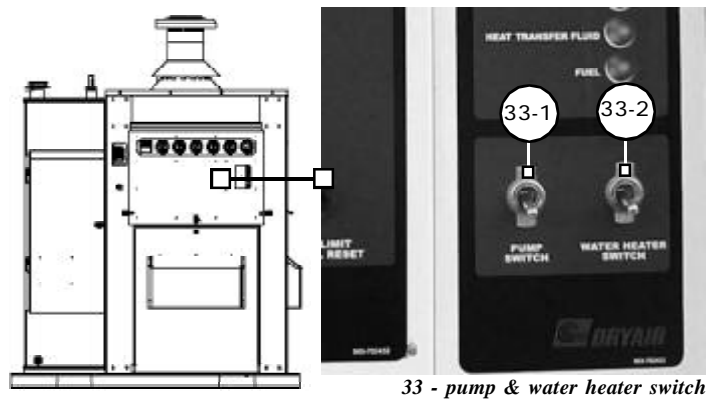
- Incrementally open the “return” isolation valve (31-5) to a fully open position.
- Monitor the “Return temperature before bypass” gauge (32-1). Before fully connecting more “heat exchanger loops” or “portable heat exchangers”, this gauge must show a noticeable rise in temperature indicating the heat transfer fluid has made the full circuit. With “heat exchanger loops”, this may take 10 minutes or more.
- Repeat the previous step until all “portable heat exchangers” or “heat exchanger loops” are connected and circulating.



Purging air from diesel/ light oil fuel system

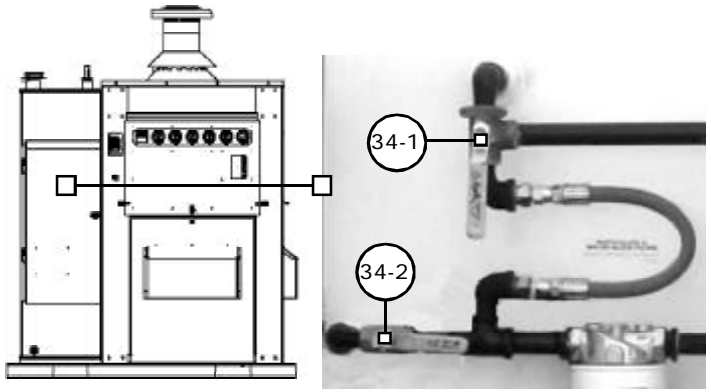
If the burner does not fire, the fuel system may have to be purged of air.

- Confirm that there is an adequate fuel supply.
- Toggle the water heater switch (33-2) to the “Off” (down) position.



33 - pump & water heater switch

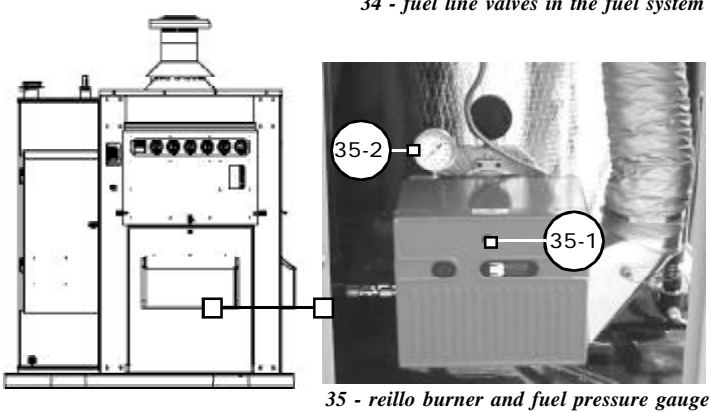
- Open all manual valves in the fuel system. Set the 3-way fuel bypass valve (34-1) for full diversion to the tank (handle straight up and down). Set valve (34-2) to the “open” position.



34 - fuel line valves in the fuel system

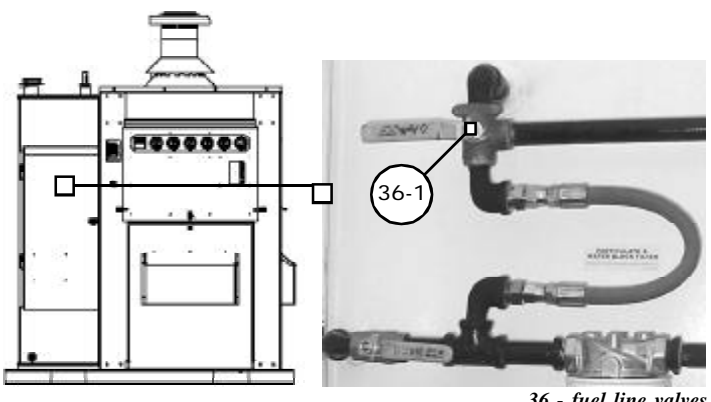
- Confirm that the pump switch (33-1) is in the “On”(up) position.
- Toggle the water heater switch (33-2) to the “On” (up) position.
- Depress the reset button (35-1) . This will activate the fuel pump & burner firing sequence.
- When the fuel system is primed, the fuel pressure gauge (35-2) will show a steady reading and the water heater should attempt to ignite.

Note: The reset process can be tried up to six times at the most. If the water heater does not fire, see the accompanying “Water Heater Module - Service Manual” or the “Reillo Burners Installation Manual” for information and/or contact Technical Support.



35 - reילו burner and fuel pressure gauge


- Once the water heater has ignited and the fuel pressure has stabilized, set the 3-way fuel bypass valve (36-1) to the two-pipe fuel system position (horizontal position)



36 - fuel line valves

Troubleshooting


- There are 6 green lights on the control panel, which indicate the status of a sequence of functions while the unit is running.
- Aquastat and burner light go off and on as the burner cycles.
- When the burner is on, all green lights should be on. With the burner on, any light which is not on should be considered burned out.
- Troubleshoot power issues at the control panel control strip. Remove control panel to expose terminal strip.



No power at outgoing side of water heater toggle switch

Check for 120 volt power between letter N and #1 on the terminal strip. If no power check the following:

- a) Check that the circuit breaker for the water heater has not been switched off.
- b) Check that the toggle switch for the water heater has not been turned off.
- c) Check for power in and out of breaker and toggle switch.
- d) Check that correct power supply has been connected to the unit. Investigate power source and be certain that the power characteristics are correct. (115/230 volt, 30 amp, single phase, 4-conductor, 0'-100' - 10 AWG, over 100' - 8 AWG)



No power at Terminal #4 on low water cutoff

Check for 120 volt power between letter N and #2 on the terminal strip. If no power check the following:

- a) Low water situation. Check fluid level in tank and add if necessary.
- b) Check fuse in low water cut off. Replace if required.



No power at flow switch

Check for 120 volt power between letter N and #3 on the terminal strip. If no power check the following:

- a) Pump not running. - Check pump breaker and toggle switch on control panel. - Check for 230 volts at pump motor. If correct power is confirmed at motor, but pump won't run, refer to "G&L Pumps, Installation, Operation & Maintenance Instructions, 11-Troubleshooting Chart" for more in-depth troubleshooting.
- b) Inadequate flow.
 - Check that all valves are open in the fluid-transfer loop. - Filter screen may be plugged. Use flush hose/valve attachment into a bucket, while pump is running, for a quick Y-strainer flush (see Y-strainer flush in Maintenance section of Operators Manual). Eventually the system may have to be drained and the filter screen removed and cleaned by hand (see Y-strainer screen in Maintenance section of Operators Manual). - Check that pressure bypass valve is open, if fluid-receiving units are closed off.
 - When performing "ground thaw" or "concrete cure" application, the use of only one "heat exchanger loop" may result in inadequate flow. Utilizing at least two "heat exchange loops" will provide adequate flow... or a short bypass loop can also be incorporated to correct this situation.
 - Air present in the circulation system. Air in the system can cause cavitation in the pump and pressure loss. Refer to "Operation, Purging air from the system" for air purging instructions.
 - Supply temperature overrun causing vaporization (steam) & pump pressure to be lost. Cavitation will occur in the "water heater heat exchanger" causing a noticeable bubbling, popping sound. Check the "overflow outlet" to confirm presence of fluid vapor. If vaporization is occurring, the "aquastat" setting is set too high. Reset the "aquastat" to a lower temperature (10°F increments) and allow cool-down. When the "heat transfer fluid" cools down, the system will regain pump pressure. Allow the burner to cycle back on and observe to ensure that the vaporization situation does not reoccur. If it does reoccur, reset the "aquastat" to a lower temperature until the problem is rectified.

Note: This situation will occur more often in a "low flow" situation (refer to Operation, Temperate Start Procedure, Control Settings).

- c) Defective flow switch. - If a) and b) check out good, the flow switch will need to be re-calibrated, or replaced.



No power at aquastat

Check for 120 volt power between letter N and #6 on terminal strip. If no power check the following:

- a) Check setting on aquastat.
- b) Check sensor and verify that it is intact in it's well.
- c) If a) and b) check out good, replace both aquastat and sensor.



No power at outgoing side of high limit switches.

Check for 120 volt power between letter N and #5 on the terminal strip. If no power check the following:

- a) Manual reset high limit reset button tripped.
- b) Check settings of switches. The automatic high limit should be set 10°F higher than the set point of the aquastat, and the manual reset high limit should be set 10°F higher than the automatic high limit switch.
- c) Determine which high limit switch is defective and replace.



No power at burner

Check for 120 volt power between letter N and #7 on the terminal strip. If power check the following:

- a) Check for 120 volt power at the burner. If power present there is a fault in the burner. See the enclosed Riello burner information to trouble shoot the burner system.

Maintenance

Daily checklist

A daily inspection of the water heater cabinet should be performed with attention paid to the following:

Check for strong odor of fuel/gas

- If a leak or the odor of fuel/gas is noticed, immediately turn off all power switches and the main fuel/gas supply to the water heater cabinet.
- Ventilate the water heater cabinet.
- Find and correct the leak before turning on any power or trying to relight the water heater.

Check heat transfer fluid “HTF” level every day

- Maintain between $\frac{1}{4}$ and $\frac{3}{4}$ on the heat transfer level gauge when fluid is hot
- Top up as necessary
- For “HTF” specifications, see “Setup, Heat Transfer Fluid “HTF”, Fluid Specifications.
- For “HTF” handling precautions, refer to the “Safety Concerns, Material Safety Data Sheet”.
- If loss of fluid is excessive, check for leaks at all fittings and connections in the water heater cabinet as well as the fluid circulation system.

Check the supply temperature gauge

- Verify that the supply temperature gauge is within 10°F of the aquastat setting.

Seasonal checklist

Fuel (water block / particulate) filter for diesel/light oil setup

- The water block/particulate filter should be changed every heating season or as required.

Hoses

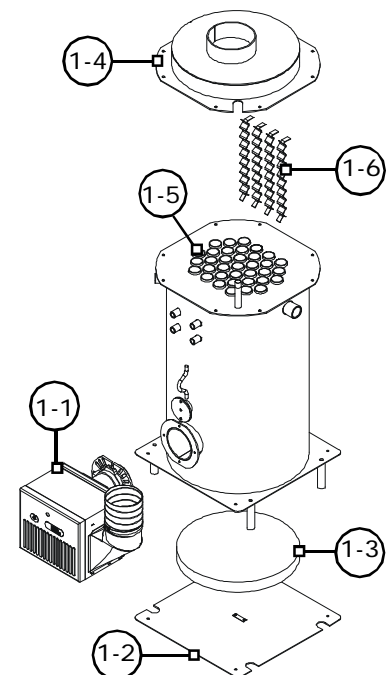
- Periodically check all hoses for damage due to aging, elevated temperatures, over-torqued hose clamps, abrasion and weathering.
- Replace damaged hoses as required.
- Seasonally check hose clamp torque and adjust accordingly.

Water heater heat exchanger

- Keep the flues in the water heater clean. Because soot is a nonconductor of heat, a dirty water heater requires more fuel to heat a structure than a clean one. Water heaters can corrode on the fireside. This results from corrosive substances in the fuel and can be difficult to control. Some fuel oils contain substances, which cause fireside corrosion. Sulphur, vanadium and sodium are among the materials that may contribute to this problem. The probability of trouble from this source depends to a large degree on the amount of sulphur in the fuel and on the care used in cleaning the fireside heating surfaces. This is particularly true when preparing a water heater for a period of idleness. Preventing this problem also depends on keeping the water heater heating surfaces dry when a water heater is out of service.
- The person responsible for water heater maintenance should be certain that the fireside surfaces of the water heaters in his care are thoroughly cleaned at the end of the firing season. He should also observe the fireside surfaces during the firing season and if signs of corrosion are discovered, a reputable consultant should be contacted.
- The flue pipe and chimney cap should be taken off once a year and thoroughly cleaned of all soot.

Heat exchanger cleaning procedure

- Remove the burner from the water heater (1-1)
- Remove the plate (1-2) from the bottom of the water heater.
- Remove the refractory board (1-3) from the water heater by reaching into the burner hole and lightly tapping the board with your hand until it drops down.
- Remove the flue collar (1-4) to expose the burner tubes (1-5).
- Remove all flue baffles (1-6).
- Clean burner tubes (1-5) with a steel round brush or a rag on a piece of rod.
- Vacuum all debris.



1 - heat exchanger breakdown

Heat transfer fluid “HTF”

- A clean, properly maintained hot water system should not be drained unless: there is possibility of freezing, the water heater has accumulated a considerable amount of sludge or dirt on the water side, or draining is necessary to permit repairs. Very little sludge should accumulate in a water heater where little make-up water is added and where an appropriate water heater water treatment is maintained at proper strength.
- The Heat transfer fluid should be tested from year to year for freeze protection and should be strong enough for your area. The heat transfer fluid should be checked with a refractometer. Check the glycol/water mixture chart (see “Setup, Heat transfer fluid HTF” for mixing ratios).
- The “pH level” of the heat transfer fluid requires an annual check to see if the pH level is neutral. The pH level should be at #7. This should be checked with a pH instrument.

See “Setup, Heat transfer fluid HTF, Heat transfer fluid specifications” for complete heat transfer fluid specifications

Burner

- For burner seasonal maintenance, see the “Service Manual”.

“Y”strainer

“Y”strainer flush

- The “Y” strainer (2-1) requires regular maintenance every time system is set up or 1000 hours of operation.
 - Remove the end plug from the end of the strainer outlet valve
 - Position a 5-gallon container at the outlet valve.
 - With the pump running, crack the strainer valve a number of times. A quick on/off action of the valve will provide the short bursts required to backwash and clean the strainer. The removal of a couple of gallons of heat transfer fluid should be adequate.

NOTE: Be certain not to run the reservoir empty, as this would allow air to enter the system.

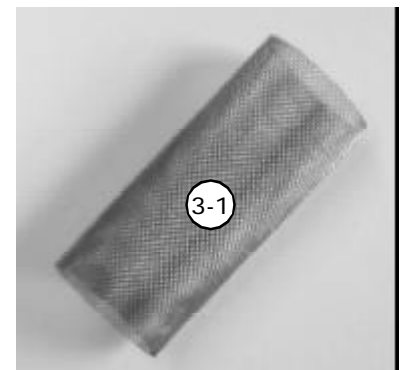
- The extracted heat transfer fluid can be reused. Before pouring the fluid back into the reservoir, the fluid must be filtered to remove impurities. Filtering the fluid through a cotton cloth or paper is adequate.

“Y”strainer screen cleaning procedure

- Clean the screen (3-1) located inside the “Y” strainer prior to every installation.
 - Remove the end plug from the end of the strainer outlet valve
 - Position a container at the outlet valve. A couple of 5 gallon containers should do.
 - With the pump “off”, drain off the “HTF” until there is no more flow.
 - Remove the top of the “Y” strainer and extract the screen (3-1)
 - The screen should be cleaned using warm water and a soft bristled brush.
 - Reassemble and ensure that all fittings are tight
 - The extracted heat transfer fluid can be reused.
 - Air will have to purged from the system. Refer to “Operation, Purging air from the “HTF” circulation system” for instructions.



2 - back washing Y-strainer



3 - Y-strainer screen

Appendum

Important Certification & Operational Information Decals

Non-pressure vessel decal

ATTENTION!

This Unit is Certified to CSA & UL Standards for use as a NON-PRESSURE VESSEL

- The unit includes an **open atmospherically vented** expansion tank.
- The expansion tank is integrally connected to the heat-exchange section of the water heater by means of a permanently open line (no valves).
- The heat exchange section connects to the inlet side of the circulating pump and therefore, only neutral atmospheric pressure is present within the heat exchange section.
- The pressure relief valve that is installed on the heat exchange section functions only as a secondary level of safety in the event that the tank vent becomes blocked.

003-703735

1 - non-pressure vessel decal

Certification & Heater Specifications



P.O. Box 126
606 Highway Drive
St. Brieux, SK
Canada
S0K 3V0



MADE IN CANADA

DRYAIR Model:	Reference:
Serial No.:	Prod. Sched.:

Main Power		Oil Burner	
Volts:	115 / 230 V	Model:	
Phase:	1	Fuel:	Diesel fuel, #2 heating oil #1 heating oil
HZ:	60 HZ	Calorific Value:	140,000 BTU / US Gal. 136,000 BTU / US Gal.
Max. Ampacity	30 A	Output:	BTUH BTUH
Control Voltage	24/115 V	Fuel Input:	US GPH
		Pump Pressure:	P.S.I.

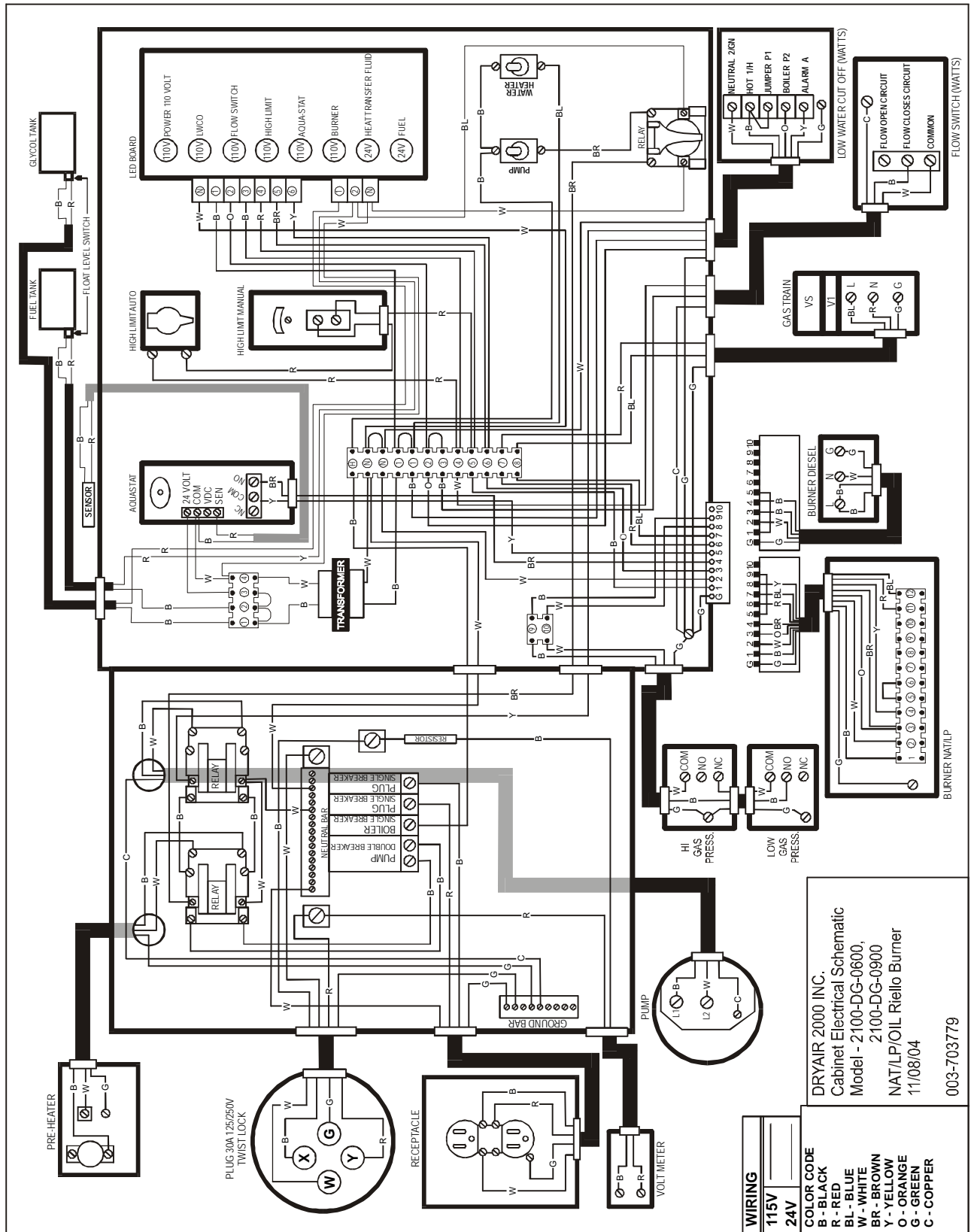
Clearances:	
Sides	36" minimum
Flue Pipe	24" minimum
Floor	0" (non-combustible)

Natural Gas Burner		Propane Gas Burner	
Model:		Model:	
Fuel:	Natural Gas	Fuel:	Propane Gas
Calorific Value:	1000 BTU/ft ³	Calorific Value:	2500 BTU/ft ³
Max. Gas Pressure:	14" W.C.	Max. Gas Pressure:	11" W.C.
Min. Gas Pressure:	12" W.C.	Min. Gas Pressure:	11" W.C.
Manifold Gas Pressure:	W.C.	Manifold Gas Pressure:	W.C.
Input Capacity:	BTUH	Input Capacity:	BTUH
Output Capacity:	BTUH	Output Capacity:	BTUH



003-703780

Electrical schematic



1 - Model 2100-DG-0600/0900 electrical schematic