



TCH250 and TCH150

Manufactured by Thawzall, LLC

104 Donovan Drive

P O Box 158

Alexandria, MN 56308, USA

T 320.759.1588

24/7 Tech Support 888.757.3545

F 320.759.1583

www.thawzall.com

E-mail: thawzall@thawzall.com

Table of Contents

| | |
|---|-------------|
| Cover Page | Page 1 |
| Table of Contents | Page 3 |
| Registration Sheet | Page 5 |
| Maintenance Record | Page 7 |
| Company General Information, History | Page 9—10 |
| Frequently Asked Questions | Page 11-12 |
| Important Safety Recommendations and Warnings | Page 13—18 |
| HeatZone™ Series Product Enhancements | Page 18—21 |
| TCH150 Specifications and Performance | Page 23 |
| TCH250 Specifications and Performance | Page 24 |
| Ground Thawing Setup Charts | Page 25—28 |
| Altitude Adjustments, Hose fill capacity, Connector Maintenance | Page 29 |
| General Maintenance Chart | Page 30 |
| Beckett Burner/GeniSys Controller Features | Page 31– 34 |
| TCH250 Wiring Schematics | Page 35—39 |
| MSDS HTF | Page 41—42 |
| MSDS AquaStast | Page 43—45 |
| Tech. Service Bulletin—Hydronic System Leak Check | Page 47—48 |
| Tech. Service Bulletin—High Altitude Operation | Page 49—50 |
| Technical Service Bulletin—Heat Transfer Fluid Check | Page 51—53 |
| Technical Service Bulletin—Preventive Maintenance Procedures | Page 55—57 |
| Technical Service Bulletin—Coupler Replacement Kit | Page 59—60 |
| Thawzall Limited Warranty | Page 61 –62 |
| How to File a Warranty Claim | Page 63 |
| Warranty Claim Form | Page 65 |



Operators Manual

For model:

TCH 250/TCH150

Please record the following information from your new Thawzall for future reference. This information is required for all warranty claims.

Purchase date: ____/____/____ Generator make: _____

Machine model: _____ Generator KW: _____

Machine serial number: _____ Generator Serial #: _____

Serial number located on trailer pull tube.

Thawzall, LLC

Manufactured by Thawzall, LLC

P. O. Box 158

104 Donovan Drive

Alexandria, MN 56308

Phone 320.759.1588

Fax: 320.759.1583

Tech Support 888.757.3545

Website: www.Thawzall.com

E-Mail: Thawzall@Thawzall.com

*Older Models similar are H150, H250 and H250SL.



Maintenance Record for _____ - _____ Season

See Recommended Maintenance sheet for frequency details

DISCONNECTS

| | <u>DATE</u> | <u>DATE</u> | <u>DATE</u> | <u>DATE</u> |
|--|-------------|-------------|-------------|-------------|
| Clean and lubricate—Minimum twice per season | _____ | _____ | _____ | _____ |

HOSE REEL

| | | | | |
|--|-------|-------|-------|-------|
| Grease all Zerts—Minimum of twice per season | _____ | _____ | _____ | _____ |
| Check all Allen screws at gear shaft—As needed | _____ | _____ | _____ | _____ |
| Check Allen screws at bearing keepers—Minimum twice per season | _____ | _____ | _____ | _____ |

BOILER

| | | | | |
|------------------------------------|-------|-------|-------|-------|
| Clean stack—As needed | _____ | _____ | _____ | _____ |
| Clean flute—As needed | _____ | _____ | _____ | _____ |
| Clean baffles—As needed | _____ | _____ | _____ | _____ |
| Clean combustion chamber—As needed | _____ | _____ | _____ | _____ |

BECKETT BURNER/GENISYS CONTROL

| | | | | |
|---------------------------------------|-------|-------|-------|-------|
| Set air band—As needed | _____ | _____ | _____ | _____ |
| Check nozzle—As needed | _____ | _____ | _____ | _____ |
| Replace flange gasket—As needed | _____ | _____ | _____ | _____ |
| Replace fuel filter—As needed | _____ | _____ | _____ | _____ |
| Check combustion head—As needed | _____ | _____ | _____ | _____ |
| Lubricate motor—As needed | _____ | _____ | _____ | _____ |
| Check gap on ignition probe—As needed | _____ | _____ | _____ | _____ |
| Lubricate circulator—As needed | _____ | _____ | _____ | _____ |

PRESSURE RELIEF

| | | | | |
|--|-------|-------|-------|-------|
| Inspect to ensure working properly—As needed | _____ | _____ | _____ | _____ |
|--|-------|-------|-------|-------|

MISCELLANEOUS

| | | | | |
|---|-------|-------|-------|-------|
| Check pH level of heat transfer fluid—As needed | _____ | _____ | _____ | _____ |
|---|-------|-------|-------|-------|



COMPANY GENERAL INFORMATION

Mission Statement

It is the mission for Thawzall to continue to derive quality and innovate while securing a larger market share and become the brand of choice recognized by all major rental companies and their contractor and oil field service customers, for providing the most fuel efficient rental-store friendly glycol and flameless heaters.

VISION STATEMENT

Thawzall's vision is fairly simple. As a team, we want to provide the very best equipment to our valued customers. Our relationships within our team and with our customers are faith based and predicated on honesty, trust, fidelity and respect. Balance sheet growth and employee personal growth are tandem precepts Thawzall intertwines as it prepares for the future. At the end of the day, Thawzall wants a better world for its customers and its employees.

History of Thawzall, LLC

The idea of a portable hydronic heating system was conceived and named Thawzall in an Alexandria Minnesota workshop in 1996 by a Norwegian plumber who had a contractor friend who was behind schedule on a construction site when the winter freeze-up caught him off guard.

History of Thawzall, LLC, cont.

The plumber, Jerome Jakobson, developed his version of a portable hydronic heat system using a low pressure closed loop system. The first of hundreds of machines to come was produced that first winter. Because Jakobson felt that he had a better idea than a competing model, he applied for and received patent #5,964,402 for his portable hydronic heater in 1999. This patented system uses a manifold fluid distribution system that features quick disconnects and multiple heat zones.

Jakobson, an avid hunter and fisherman, decided to sell his company, known then as T.H.E. Machine Company, to a group of five local investors from the Alexandria Minnesota area—in order to pursue his passions. On July 1, 2007, the company was formed with new ownership and management and became known as Thawzall, LLC.

The new management team is committed to listening to its customers for their ideas regarding product innovation and simplicity. By listening carefully to our customers, we are confident that in the next generation, Thawzall heat units will exceed our customers' expectations and set new standards for **quality and innovation** in the industry for portable hydronic and flameless heater technology.

All Thawzall employees are committed to excellence in manufacture and customer satisfaction. We take great pride with every machine we build!

Thank you for investing in a Thawzall portable heater!

David Reller—General Manager

Steve Knisley—Sales

Neil Beilke—Technical Service Manager

Jeremy Guhlke—Operations Manager

Helen Berner—Purchasing and Inventory Manager

Karen Weis—Office Manager

FREQUENTLY ASKED QUESTIONS

Q: What can I do with a Thawzall Hydronic heater?

A: 1) Remove ground frost, 2) Prevent ground frost, 3) Use as a temporary heat source, 4) Cold weather concreting

Q: How does it work?

A: TCH 250/150 utilizes a top draft, high efficiency oil fired furnace which heats water/propylene glycol (HTF) and distributes the HTF through the patented multi-zone manifold system thru a series of 600 foot. industrial hydronic hoses in a low pressure closed loop system. Thawzall uses an automatic tempering valve to cover the various temperatures needed for Thaw, Cure and Heat modes. Under no circumstances, will the furnace ever need to be adjusted down as the electronic tempering valve can adjust the temperature delivery needed for the specific applications.

Q: How long does it take to remove frost?

A: Up to 12 inches of frost can be removed in a 24 hour period depending on layout of hose, insulation used, ambient outside temperature and soil conditions.

PERFORMANCE

THAW AND CURE performance in the field is affected by a wide range of factors which include:

- Soil type
- Moisture content in the soil
- Hose spacing
- Thermal rating of the covering construction blankets
- Outside ambient temperatures

HEAT performance in interior work spaces is also affected by several factors which include:

- Outside ambient temperature
- Heat loss
- Volume of space to be heated and type of heat exchanger used

FAQ, Continued

Q: Can Thawzall operate at high altitudes?

A: Yes, but operation at high altitudes may require adjustments—see **High Altitude** section.

Q: What kind of vehicle do I need to tow a Thawzall?

A: A minimum of 3/4 ton truck with a brake controller. Please see **Specifications** section.

Q: What type of fuel does the Thawzall use?

A: #1 fuel oil is preferred and if not available, then winter blend with anti-gelling additives.

Q: What type of power is required to operate the Thawzall?

A: 120 volt ac, 20 amps. The burner may not fire with less than 112 volts!

Q: How long can I expect a tank of fuel to last?

A: Depending on ambient temperature, work zone insulation and soil conditions, the average fuel consumption is roughly 1 GPH without the generator and with the generator is about 1.6 GPH.

IMPORTANT SAFETY RECOMMENDATIONS AND WARNINGS

OUTSIDE SAFETY FEATURES

Your Thawzall is equipped with DOT Certified outside LED lights, reflectors, safety-chains and electronic.

Break-away brakes.

Make use of these features:

Before towing the trailer, be sure that all the lighting is connected and working

Connect the safety chains to the towing vehicle

Connect the small cable from the break-away switch to the towing vehicle

Close the fuel valve at the bottom of the fuel tank on your Thawzall

PARKING YOUR THAWZALL

Avoid unexpected movement of your Thawzall:

Avoid parking on hills

Use blocks or wheel chucks to prevent movement

Always use the jack to support the hitch

TOWING YOUR THAWZALL

Tow safely:

A $\frac{3}{4}$ ton truck with a brake controller is recommended for towing the TCH 250/150.

Thawzall axles, wheels and tires are rated to travel at legal posted speeds on the highway

Connect safety-chains, lights and brake cable to towing vehicle

Thawzall trailers are equipped with electronic break-away brakes in case the trailer should become disconnected from the towing vehicle. Trailer brakes will apply automatically

Failure to connect trailer in a safe manner could result in a serious accident or death

Always verify that the hitch ball size on the towing vehicle matches the size of the coupler on the Thawzall trailer

GENERAL OPERATING INSTRUCTIONS

Do not operate your Thawzall without instruction and understanding the startup and shut down procedures thoroughly—If you do not understand these instructions, call Thawzall Technical Support—888.757.3545

GENERAL OPERATING INSTRUCTIONS, cont.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or the safety and affect the life of the machine.

Wear hand protection while handling hot hoses and disconnects

HOSE REEL DANGER. Be very careful to keep hands and gloves clear from the hose reel when rewinding the hose. A glove can get caught between hoses which may cause serious bodily injury.

Close ball valves on manifold when coupling or uncoupling the hoses to avoid accidental fluid loss and spillage or possible injury from hot liquid

No loose clothing. Do not wear loose clothing that can get caught in the hose reel or on levers or latches on your Thawzall.

Do not use gasoline or kerosene to fire the furnace on your Thawzall. This may cause explosion which may result in serious injury or death. Only #1 fuel oil or a winter blend of fuel oil is recommended for the furnace.

GFI Outlet. Always plug the electrical cord from your Thawzall into a GFI protected outlet. Failure to do so could cause shock or electrocution.

Safety glasses. Always wear safety glasses when operating your Thawzall, especially when connecting and disconnecting hoses, fueling or maintaining the battery on the optional generator.

Caution and Warning decals. Carefully observe and maintain all of the caution and warning decals placed on your Thawzall machine. They are there to ensure proper operation of the Thawzall and your safety!

Never "hot-wire" any of the electrical wiring on your Thawzall or optional generator. Wiring circuits are carefully designed to provide for safe Startup and operation of the furnace, pumps and hose reel. Any alteration may cause an unsafe condition and could cause any or all components to malfunction or operate out of sequence.

Operate only OUTDOORS! Never operate and engine or furnace inside a building without proper venting of the exhaust to the outside. Carbon monoxide poisoning and asphyxiation may occur if exhaust is inhaled.

HANDLE FUEL SAFELY

Avoid fires by handling fuel with care. Both diesel fuel used in the generator and #1 fuel oil or a winter blend of fuel oil used in the furnace are extremely flammable!

Do not refuel the machine while smoking or while an open flame or sparks are near the refueling point! Do not refuel while the generator or furnace is running.

A clean machine is a safe machine. Prevent fires by keeping your Thawzall clean of accumulated trash, grease and debris. Clean up spilled fuel properly.

HANDLE CHEMICAL PRODUCTS SAFELY

Direct exposure to hazardous chemicals can cause injury. Potentially hazardous chemicals used in your Thawzall include, grease, paint and adhesives. Grease, paint and adhesives are especially toxic when heated.

Please read with care the Material Safety Data Sheets (MSDS) provided in this manual. They provide specific details on the products used in you Thawzall, physical and health hazards, safety procedures and emergency response techniques.

Check the MSDS sheets before operating your Thawzall so you will know the risks and first aid techniques in case of an accident.

Keep emergency phone numbers for doctors, ambulance service, hospital and fire department near your phone.

SAFETY INCLUDES PREVENTITIVE MAINTENANCE

Remove paint and adhesives before welding or heating.

Avoid heating near pressurized pipes and hoses, and near a fuel tank.

Dispose of waste properly. Improperly disposing of waste including HTF (Heat transfer fluid), grease, and plastics, filters and batteries, threaten the ecology of the environment.

Do not pour HTF on the ground, down a drain or into any water source. Inquire about the proper way to dispose of wastes in your area, at your recycling center.

HANDLING BATTERIES SAFELY

Battery gas can explode. Keep sparks and flames away from the battery on the generator on your Thawzall

Never place a metal object across the battery posts

Always disconnect the grounded (-) battery clamp first and re-connect it last

Battery acid is poisonous and can burn skin and eat holes in clothing and cause blindness if splashed into the eyes

Flush contaminated skin with water and baking soda. If acid is swallowed, drink water or milk and get medical attention immediately **OR CONTACT YOUR LOCAL POISON CONTROL CENTER IMMEDIATELY!**

STORING YOUR THAWZALL

To store your Thawzall for the summer months:

Park on level ground and block wheels to prevent accidental movement.

Close the fuel tank valve.

See applicable service bulletins at the back of this manual for annual maintenance items.

SAFETY FEATURES OF THE THAWZALL HEAT MACHINE

The following safety features have been built into your Thawzall Heat Machine to ensure the safest possible use of the machine and convenience that enhances your productivity.

Dripless quick connect couplers

No loss of fluid from the system

Shut-off ball valves above couplers

For maintenance, safety and zone control

14 Gallon reservoir tank

Prevents fluid spill if relief valve opens

Dual temperature heat controls on boiler

Prevents boiler from overheating (Aquastats and high limit control)—**FACTORY PRE-SET—DO NOT ADJUST!**

Electronic Mixing valve—**OPERATIONAL THRU THE CONTROL PANEL WATLOW™ CONTROL—THE ACTUAL VALVE IS PRE-SET AT FACTORY-- DO NOT ADJUST**

Hydraulically crimped hose connections

Strongest possible crimp on hoses

Covered foot control for hose reel

Prevents accidental activation of hose reel from falling objects

Interior Light for Enclosure

Provides visibility for machine operations or setup during early morning or evening hours

Gages at all vital points

Help to maintain proper operation levels

All hoses and electrical components are UL approved

Low-Water Cut-Off control

Automatically shuts down the furnace if fluid level becomes too low for safe operation

SAFETY FEATURES OF THE THAWZALL HEAT MACHINE, cont.

Trailer axles with electric brakes and breakaway stop system meet safety codes to include NHTSA, CSA, Transport Canada, UL and IBR

TCH HEATZONE™ SERIES PRODUCT ENHANCEMENTS

Performance Improvements

| | |
|---|--|
| Improved heat distribution | For faster THAW, more uniform CURE |
| Improved circulation performance | For greater head pressure and GPM flow |
| Full Strength HTF (heat transfer fluid) | For pump-ability down to—80°F |
| Simplified Configuration | Easy to operate and understand |

Quality Improvements

| | |
|--------------------------------------|--|
| Steel manifold and non-copper piping | For improved durability and reparability |
| DOT certified LED lights | For operational reliability |
| Industrial door struts | To secure door open or closed |

Control System Improvements

| | |
|---|--|
| Centralized controls | Convenience for startup and monitoring |
| Rooftop mounted message beacon | For visual assurance of proper operation |
| Digital display for individual heat zones | To monitor critical return temperatures |
| Hour Meter, voltmeter, fuel gage | To monitor hours, volts, fuel |
| Digital control for heat delivery by zone | Ideal for precise curing mode |
| Electronic mixing valve | Precise temperature delivery |

Operational Improvements

| | |
|--|-------------------------------------|
| Automatic Fuel Bleed System | no fuel line bleeding required |
| Fork Picks for ease of placement on job site | |
| Back flow check valve | to eliminate HTF fill tank overflow |
| Lockable cover over temp controls | to prevent unauthorized tampering |
| Furnace Troubleshooting guide | to reduce non-revenue service calls |

SERIES PRODUCT ENHANCEMENTS, cont.

Built-in Features for Quality

| | |
|-------------------------------------|--------------------------------------|
| Reinforced Fiber Combustion Chamber | For rugged use and durability |
| Fuel Oil Furnace | Unit is totally self-contained |
| Bell and Gosset Pumps | Quality pump, nationally available |
| Closed Loop Fluid System | No calcium buildup, ensures warranty |
| Powder Coat Finish | Attractive high quality finish |

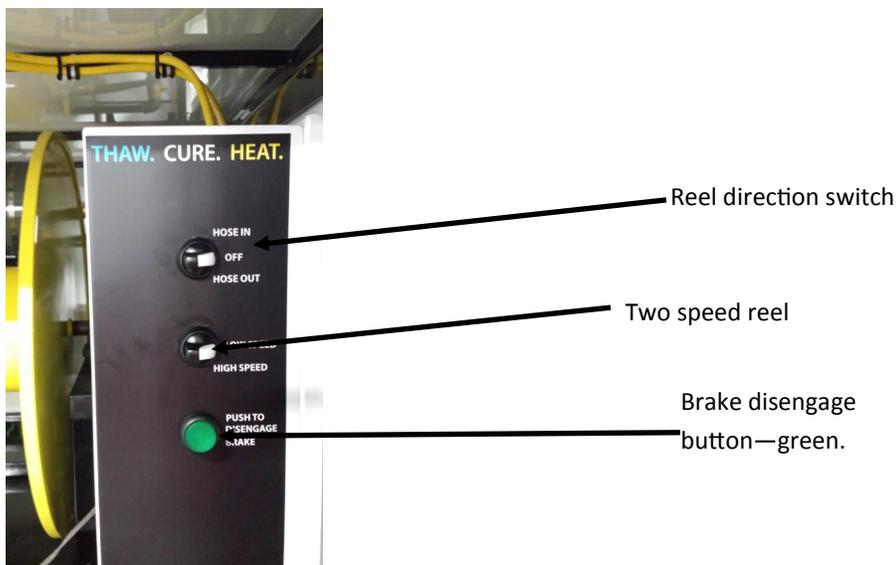
REEL OPERATION

The TCH 250/150 reel has a switch control mounted on the right hand side of the back enclosure. The reel can be powered both to take up and release hose thru the manually switch. There are two operating speeds (Low and High). The reel unit uses a brake coupler that can be released for optional free-wheeling for manual hose deployment.

BRAKE COUPLER OPERATION

The unit should always be transported with the brake engaged to prevent hose unspooling.

Note: The motor should not be run with the brake in the manual release position to avoid over-heating of friction disks.



SERIES PRODUCT ENHANCEMENTS, cont.



TCH150



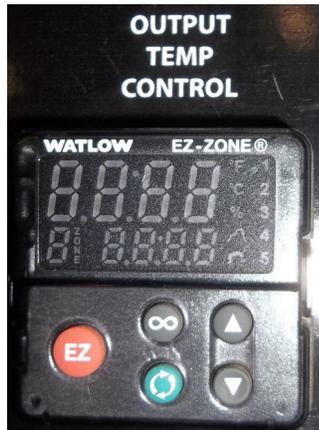
TCH250

SERIES TCH150/TCH250 CONTROL BOX , features:

1. On/Cool Down/Off switch
2. Panel Light on/off
3. Enclosure Light on/off
4. Strobe Light on/off
5. Voltmeter
6. Fuel Gage
7. Hour Meter
8. Temperature Delivery Set Switch

TCH150 has three zone return temperature displays—two displays for the individual Thaw/Cure zones and one display for the Auxiliary Zone. TCH250 has six zone temperature displays—five displays for the individual Thaw/Cure zones and one display for the Auxiliary Zone. The Auxiliary Zone display is used for monitoring temperature return for a remote manifold or heat exchanger in temporary heat situations.

SERIES PRODUCT ENHANCEMENTS, cont.



WATLOW™ OUTPUT TEMPERATURE DELIVERY CONTROL

Press and hold the up or down arrow to select desirable temperature output (temperature range 70° F - 180° F)—The other buttons are disabled.

Normal set temperature for Thaw mode is pre-set at 180° F, 82.2° C

Ideal Cure mode set temperature is approximately 85° F, 29.4° C

Temporary Heat mode can be any set temperature that the environment can endure

MODEL TCH 150 SPECIFICATIONS AND PERFORMANCE

TCH150 PORTABLE HYDRONIC HEATER

| | | |
|--|----------------------|--|
| Fuel | | #1, #2 Diesel |
| | Fuel Capacity | 102 Gal 390 L |
| | HTF Capacity | 56 Gal 212 L |
| HTF Durability | | -80° F -62° C |
| HTF Circulation Pump | | 1-Closed Loop Centrifugal |
| Maximum BTU output | | 148,000 |
| Size: | | 161 IN. X 74 IN. X 79 IN. 409 cm X 190 cm X 2,00 cm |
| Weight: | | 3,460 LB 1,570 kg |
| Electrical service required | | 120 v, 20 amp |
| Hose (3,000 Lineal Feet, 918 Lineal Meters) | | 2 x 600 Ft. 2 x 184 m |
| Optional Generator: | | MQ 7,000 WATT DIESEL FIRED |
| Available hitch | | 2", 2 5/16", Pintle |
| Safety Codes: | | NHTSA, CSA, UL, IBR |

TCH150 PORTABLE HYDRONIC HEATER

| | | |
|-------------------------------------|-------------------------|----------------------------|
| Thaw Area | 1,200 SQ FT | 110 m² |
| With additional hose | 2,400 SQ FT | 220 m² |
| Concrete curing area | 2,400 SQ FT | 220 m² |
| With accessories | 10,800 SQ FT | 1,000 m² |
| Frost prevention | 2,400 SQ FT | 220 m² |
| With accessories | 10,800 SQ FT | 1,000 m² |
| Heat buildings | 210,000 CU FT | 5,900 m³ |
| Operating Pressure | 1 - 5 psi | 6895 Pa-34474 Pa |
| Fuel Consumption (full load) | 1.0 GPH | 4.54 LPH |
| Run Time | 4 + days | 3 + days |
| Pump Capacity | 30 GPM/1,800 GPH | 110LPM/6,800 LPH |

MODEL TCH 250 SPECIFICATIONS AND PERFORMANCE

TCH250 PORTABLE HYDRONIC HEATER

| | | |
|--|----------------------|---|
| Fuel | | #1, #2 Diesel |
| | Fuel Capacity | 160 Gal 608 L |
| | HTF Capacity | 122 Gal 464 L |
| HTF Durability | | -80° F -62° C |
| HTF Circulation Pump | | 1-Closed Loop Centrifugal |
| Maximum BTU output | | 280,000 |
| Size: | | 170 IN. X 84 IN. X 97 IN. 4,318 mm X 2,133 mm X 2,439 mm |
| Weight: | | 5,600 LB 2,522 kg |
| Electrical service required | | 120 v, 20 amp |
| Hose (3,000 Lineal Feet, 918 Lineal Meters) | | 5 x 600 Ft. 5 x 184 m |
| Optional Generator: | | MQ 7,000 WATT DIESEL FIRED |
| Available hitch | | 2", 2 5/16", Pintle |
| Safety Codes: | | NHTSA, CSA, UL, IBR |

TCH250 PORTABLE HYDRONIC HEATER

| | | |
|-------------------------------------|------------------|-----------------------|
| Thaw Area | 3,000 SQ FT | 278 m ² |
| With additional hose | 6,000 SQ FT | 550 m ² |
| Concrete curing area | 6,000 SQ FT | 550 m ² |
| With accessories | 18,000 SQ FT | 1,670 m ² |
| Frost prevention | 9,000 SQ FT | 840 m ² |
| With accessories | 27,000 SQ FT | 2,500 m ² |
| Heat buildings | 400,000 CU FT | 11,320 m ³ |
| Operating Pressure | 1 - 5 psi | 6895 Pa-34474 Pa |
| Fuel Consumption (full load) | 1.0 GPH | 4.54 LPH |
| Run Time | 3 + days | 3 + days |
| Pump Capacity | 30 GPM/1,800 GPH | 110 PM/6,800 LPH |

GROUND THAW SETUP CHARTS

| | | | | | |
|---|-----|-----|-----|-----|-----|
| TEMPERATURE: 30° F or higher / -1° C LAYERS OF BLANKETS TO USE: SINGLE (R6 insulation factor) SOIL CONDITION: Gravel or Sand (good drainage) | | | | | |
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing** | 24" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |
| **Hose spacing is measured inches on center | | | | | |
| TEMPERATURE: 30° F or higher / -1° C LAYERS OF BLANKETS TO USE: SINGLE (R6 insulation factor) SOIL CONDITION: Clay or Silt (poor to moderate drainage) | | | | | |
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing" | 16" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |
| **Hose spacing is measured inches on center | | | | | |
| TEMPERATURE: 15° F to 30° F / -9° C to -1° C LAYERS OF BLANKETS TO USE: SINGLE (R6 insulation factor) SOIL CONDITION: Gravel or Sand (good drainage) | | | | | |
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing' | 24" | 24" | 24" | 24" | 24" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |
| **Hose spacing is measured inches on center | | | | | |
| TEMPERATURE: 15° F to 30° F / -9° C to -1° C LAYERS OF BLANKETS TO USE: SINGLE (R6 insulation factor) SOIL CONDITION: Clay or Silt (poor to moderate drainage) | | | | | |
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing' | 24" | 24" | 24" | 24" | 24" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |
| **Hose spacing is measured inches on center | | | | | |

GROUND THAW SETUP CHARTS, cont.

TEMPERATURE: 0° F to 15° F / -18° C to -9° C

LAYERS OF BLANKETS TO USE: DOUBLE (R12 insulation factor) SOIL CONDITION: Gravel or Sand (good drainage)

| | | | | | |
|--------------|-----|-----|-----|-----|-----|
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing | 24" | 24" | 24" | 24" | 24" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |

"Hose spacing is measured inches on center

TEMPERATURE: 0° F to 15° F / -18° C to -9° C

LAYERS OF BLANKETS TO USE: DOUBLE (R12 insulation factor) SOIL CONDITION: Clay or Silt (poor to moderate drainage)

| | | | | | |
|----------------|-----|-----|-----|-----|-----|
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing** | 16" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |

**Hose spacing is measured inches on center

TEMPERATURE: -20° F to 0° F / -28° C to -18° C

LAYERS OF BLANKETS TO USE: DOUBLE (R12 insulation factor) SOIL CONDITION: Gravel or Sand (good drainage)

| | | | | | |
|----------------|-----|-----|-----|-----|-----|
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing** | 16" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |

"Hose spacing is measured inches on center

TEMPERATURE: -20° F to 0° F / -28° C to -18° C

LAYERS OF BLANKETS TO USE: DOUBLE (R12 insulation factor) SOIL CONDITION: Clay or Silt (poor to moderate drainage)

| | | | | | |
|---------------|-----|-----|-----|-----|-----|
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing" | 16" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |

"Hose spacing is measured inches on center

GROUND THAW SETUP CHARTS, cont.

TEMPERATURE: -20° F or lower/ -29° C or lower

LAYERS OF BLANKETS TO USE: DOUBLE (R12 insulation factor) SOIL CONDITION:

Gravel or Sand (good drainage)

| | | | | | |
|----------------|-----|-----|-----|-----|-----|
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing** | 16" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |

"Hose spacing is measured inches on center

TEMPERATURE: -20° F to lower/ -28° C or lower

LAYERS OF BLANKETS TO USE: DOUBLE (R12 insulation factor) SOIL CONDITION:

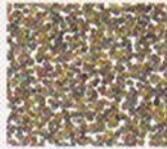
Clay or Silt (poor to moderate drainage)

| | | | | | |
|---------------|-----|-----|-----|-----|-----|
| Frost Depth | 12" | 24" | 36" | 48" | 60" |
| Hose Spacing" | 16" | 16" | 16" | 16" | 16" |
| Hours to run | 24 | 48 | 72 | 96 | 120 |

"Hose spacing is measured inches on center

THAW

When moisture freezes in the soil, it requires 143 BTU's per pound to thaw the ground. Shown are 4 types of soil and their thawing requirements:



Gravel

up to 1,001 BTU's required to melt ice



Sand

up to 2,574 BTU's required to melt ice



Clay

up to 3,146 BTU's required to melt ice



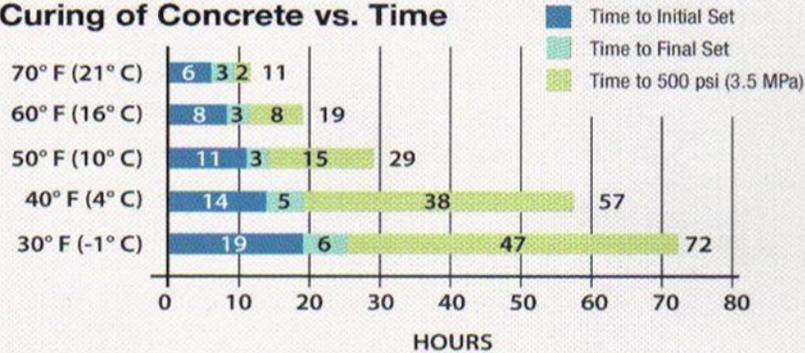
Silt

up to 7,436 BTU's required to melt ice

CURE

Concrete cures slowly due to cold temperatures. Here's how temperature affects the concrete curing process:

Curing of Concrete vs. Time



Performance

Thaw and Cure performance in the field is affected by a wide range of factors to include soil type, density of frozen ice in the soil, hose spacing, thermal rating of the covering insulating blankets, and ambient temperatures.

Heat performance in interior spaces is also affected by several factors to include outside ambient temperatures, heat loss through walls and ceiling, and the volume of the space to be heated.

In general, with proper hose spacing and adequate insulation, the operator should be able to THAW about one foot of soil per day. Consult our Thawzall Technical Support personnel with questions regarding proper hose spacing. 888.757.3545

HIGH ALTITUDE ADJUSTMENTS

If your Thawzall is to be used at altitudes above 5,000 feet (1,530 meters), the burner nozzle and air intake settings must be changed to accommodate lower oxygen levels at higher altitudes. **Please see service bulletin # 501**

HOSE CAPACITY FILL CHART

| HOSE SIZE (Inside dia.) | GALLONS PER FOOT |
|----------------------------|------------------|
| 1/2 | 0.016 |
| 5/8 | 0.019 |
| 3/4 | 0.023 |
| 1.00 | 0.04 |
| 1 1/4 | 0.063 |

DISCONNECT MAINTENANCE

1. Water and dirt may get into a disconnect piece and cause it to corrode or to work improperly. It is vital that dis-connects be cleaned and lubricated at least once per season or when they get dirty. Failure to maintain discon-nects properly will void the warranty.

To clean disconnects:

- Use a mild soap and water or all-purpose cleaner like dish soap or Windex
- Use a nylon bristle brush to scrub the couplers. (Do not use a metal brush.)
- Rinse and wipe parts dry
- Allow parts to dry

To lubricate disconnects:

Use only Silicon based products that do not contain any penetrating oils like LPS or Lubrimatic. Silicone based lubricants are available at automotive parts stores or farm equipment dealerships.

Apply silicone lubricant liberally.

DO NOT USE WD-40 OR SIMILAR PRODUCTS THAT CONTAIN PENETRATING OIL.

Silicone based lubricants will displace water trapped in the disconnects and will not damage the seals inside.

For repair of the male coupler, please use the following 6 step procedure

1. Place the male coupler in a vise with the valve end up
2. Using a drift punch or other dull or flat tool, push the valve into the coupler body
3. Wedge a steel pick in between the valve and the body to hold the valve down
4. Remove the damaged O-ring and back-up ring with another pick
5. Clean the O-ring seat and install the back-up ring
6. Lubricate the O-ring seal and install it. Then release the valve by removing the pick

GENERAL MAINTENANCE CHART

| PART | MAINTENANCE FREQUENCY |
|--------------------|--|
| Fuel Filter | Replace once per year |
| Furnace | Maintenance-annually by qualified technician |
| Hose Reel | Grease all fittings twice per year |
| Hoses | Inspect for damage after each use |
| Quick- Disconnects | Clean thoroughly at least twice per year |

For further information about general maintenance items, see **Service Bulletin #503** in the service bulletin section at the back of this manual.

BECKETT BURNER GENISYS™ CONTROL

Basic Features:

Three indicator lights:

- Red reset button/lockout light
- Pump Prime
- Green flame/recycle light

Limited Reset

- Recurring lockouts without a complete heat cycle puts control in restricted (hard lockout) mode

Limited Recycle

- If flame is established and then lost, the control will recycle until the cumulative time trial for ignition budget is exhausted and will then go into hard lockout. This prevents excessive oil accumulation in the appliance

Valve on delay—15 seconds

Motor-off delay—None

Sequence of Operation

1. Standby
2. Valve-on delay
3. Trial for ignition
4. Lockout
5. Ignition carryover
6. Run
7. Recycle
8. Motor-off delay
9. Pump prime

OPERATING STATES:

STANDBY

- The burner is idle, waiting for a call for heat. When a call for heat is initiated, there is a ½ second delay while the control performs a safe start check

VALVE-ON DELAY (pre-time)

- The igniter and motor are on while the oil solenoid valve remains de-energized—typically 15 seconds. Allows the burner to establish air flow and brings the pump to full speed, helping to keep ignitions smooth and clean

TRIAL FOR IGNITION

The oil solenoid valve is energized. A flame should be established within the factory set trial for ignition time (also known as “lockout time”) 15 seconds on the GeniSys control

OPERATING STATES, cont.:

IGNITION CARRYOVER

- Once flame is established, the igniter remains on for 10 additional seconds to ensure flame stability before shutting off

RUN

- The flame is sustained until the call for heat is satisfied or safety limit shuts down burner

MOTOR-OFF DELAY (post-time)

- If applicable, the oil solenoid valve is de-energized and the motor continues to run for the preset motor-off delay time. Cools the nozzle to prevent after drip, and expels fumes and combustion
- If the cad cell detects flame in the Motor-Off Delay mode, the control goes into the standby mode. This is to prevent a failed fuel valve from keeping the flame burning

LOCKOUT—the control has shut down the burner for one of the following safety reasons:

- Trial for ignition (lockout) time expires without flame being established
- Cad cell detects flame at the end of valve-on delay
- Recycle time budget expires
- Relay check failure
- You can **NOT** reset the control by interrupting line voltage

RECYCLE

- If the flame is lost while the burner is firing, the control shuts down the burner, enters a 60 second recycle delay, and repeats the ignition sequence. The control will continue to recycle each time the flame is lost, until it reaches a preset cumulative trial for ignition time allotment. The control will then go into Hard Lockout instead of recycle. This feature prevents excessive accumulation of oil in the appliance firing chamber.

PUMP PRIME

- Enter Pump Prime mode by holding down the reset button while in the trial for ignition until the control powers down the equipment. Then depress the reset button again to enter Pump Prime mode
- The igniter and motor are on 4 minutes, and the cad cell is disregarded. This allows the technician to prime the pump without having to jumper the cad cell
- Terminate the call for heat and the control will exit the pump prime mode and resume normal operation.
- You can remove the control from the Pump Prime mode by holding the reset button for 1 second. The control will return to Standby mode.

OPERATING STATES, cont.:

DISABLE FUNCTION

- Press and hold red reset button for 1 second at any time to disable the burner
- When you release the reset button the burner will return to normal operation
- GeniSys control has limited reset
- Initial lockouts result in “soft” lockout.

Red light flashing—click the red reset button to restart

- Recurring lockouts without completing a heat cycle will result in Restricted (“hard”) lockout.

Red light on steady—hold the red reset button 15 seconds until the yellow light turns on. You can NOT reset the control by interrupting line voltage.

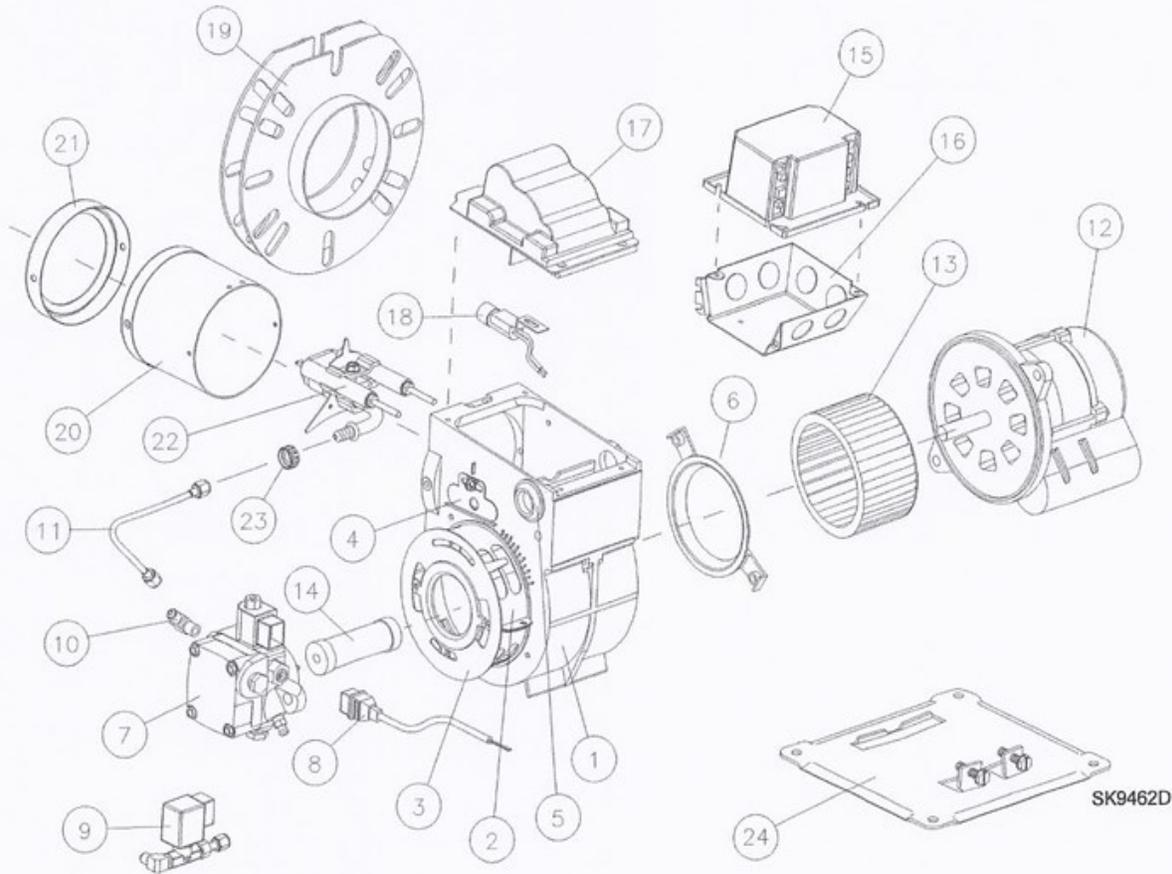
PUMP PRIME MODE

- Prepare the burner for priming
- Initiate a call for heat
- After the burner starts, press and hold the reset button until the yellow light turns on. (15 seconds)
- Release the reset button. The yellow light will turn off and the burner will start again
- At burner start up, click the reset button
- Enters 4-minute dedicated pump prime mode, with motor and igniter on, and oil valve energized. The yellow light is on when in the pump prime mode
- Terminate the call for heat and the control will exit the pump prime mode and resume normal operation

Service & maintain burner

The Air Band Assembly is pre-set to 2—The Air Shutter is pre-set to 10. **DO NOT ADJUST UNLESS ALTITUDE CONDITIONS WARRANT DIFFERENT AIR INTAKE!**

Replacement parts



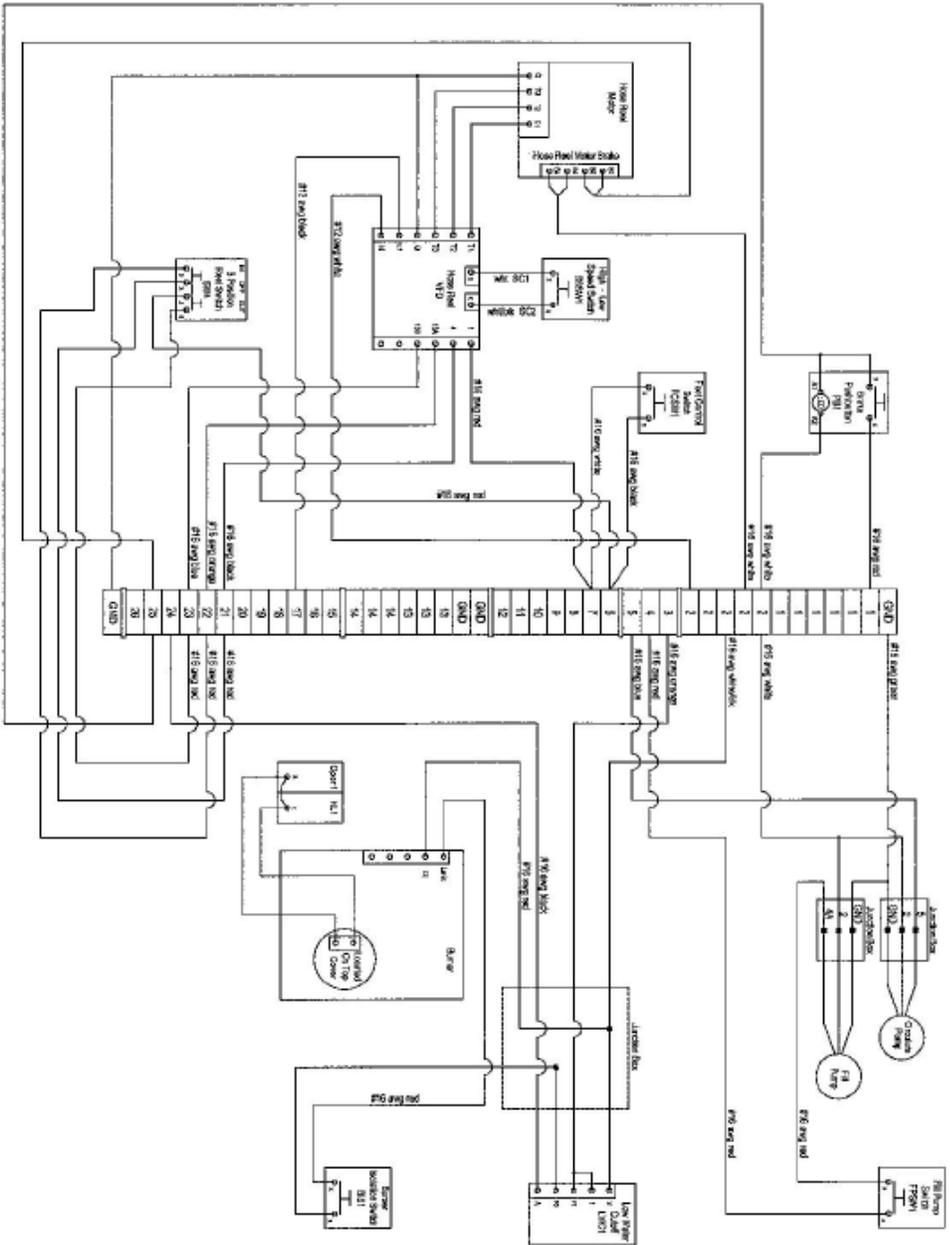
| Item | Description | Part Number |
|----------|--|-------------|
| 1 | Burner housing assembly | 5624B |
| 2 | Air band assembly – 8 slot | 5151501 |
| (Note 1) | Screw 10-24 x 1/2" | 4198 |
| | Nut 10-24 square | 4150 |
| 3 | Air shutter – 8 slot | 3494 |
| (Note 1) | Screws 10-24 x 5/16" | 4292 |
| 4 | Escutcheon plate | 3493 |
| (Note 1) | Screw 10-32 x 5/16" | 4292 |
| 5 | Hole plug | 2139 |
| (Note 1) | | |
| 6 | Air inlet bell (Note 2) | 31841 |
| (Note 1) | | |
| 7 | Pump A2VA7116 (Suntec) | 2460U |
| | A2EA6520N621L (CleanCut) | 21844U |
| | BFPH071N1161 (Danfoss) | 21391U |
| | Mounting screws 1/4-20 x 7/8" | 4189U |
| 8 | Valve cordset (for 21844 pump) | 21807U |
| | PD Timer delay cordset (for 21844 pump) | 21887U |
| 9 | Solenoid valve kit (non-delay) | 2182602U |
| | Solenoid valve kit (includes PD Timer cordset) | 2182604U |
| 10 | Pump elbow | 2256 |
| 11 | Connector tube assembly – 8" | 5394 |
| 12 | Motor - PSC | 21805U |

| Item | Description | Part Number |
|------|--|--|
| 13 | Blower wheel (use only RWB replacement) | 2459U |
| 14 | Coupling | 2454 |
| 15 | Primary Control | R7184A – interrupted ignition 7455 |
| | | R7184B – valve-on delay 7456 |
| | | R7184P – valve-on / motor-off delay 7457 |
| | | R7184P – with alarm contacts 7458 |
| 16 | Electrical box | 5770 |
| 17 | Igniter – includes gaskets | 51771U |
| 18 | Cad cell detector | 7006U |
| 19 | Flange – universal, adjustable, incl. gasket | 5432 |
| | Gasket only | 3616 |
| 20 | Air tube combination – see Table 1, page 2 | Specify |
| 21 | Heat shield kit – ceramic or fiber | Specify |
| 22 | Electrode kit F head air tubes up to 9" | 5780 |
| | F head air tubes longer than 9" | 5782 |
| 23 | Splined nut | 3666 |
| 24 | Pedestal kit | 5685 |

Note 1 These items are included in the 5624B burner housing assembly
 Note 2 Factory installed. Please do not remove from burner!

TCH 250 WIRING SCHEMATICS

Page 1 - 7



| | | | | | |
|------|----------|----|------|---------------|----------------------------------|
| DATE | REVISION | BY | DATE | THAWZALL, LLC | PROJECT |
| | | | | Abxamdi's, MN | TC150 / TC250 |
| | | | | | Hose Reel Motor / Burner Diagram |
| | | | | | 10/20/04 |

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: THAWZALL HEAT TRANSFER FLUID

VERSION 1

PG.1

PRODUCT CODE: AFPGBK

DATE 8/29/2012

CHEMICAL FAMILY: GLYCOL

SECTION I

MANUFACTURES NAME: Thawzall LLC.
ADDRESS: 104 Donovan Drive
Alexandria, MN
PHONE: (320)759-1588
EMERGENCY COC INFO TRAC #: 1-800-468-1263

SECTION II HAZARDOUS COMPONENTS

| CHEMICAL | % by wt. | CAS # | OSHA PEL | ACGIH TLV |
|----------|----------|-------|----------|-----------|
|----------|----------|-------|----------|-----------|

All Ingredients Are Non-Hazardous According To OSHA 29 Part 1910.1200 Subpart Z.

SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS

| | | | |
|------------------------|----------|------------------|--------------|
| BOILING POINT | >200° F | pH | 9 - 10 |
| FREEZING POINT | -68° F | SPECIFIC GRAVITY | 1.05 |
| VAPOR PRESSURE (mm Hg) | N/A | PERCENT VOLATILE | 36 |
| VAPOR DENSITY (AIR=1) | N/A | APPEARANCE | reddish pink |
| SOLUBILITY IN WATER | COMPLETE | ODOR | none |

EVAPORATION RATE (BUTYL ACETATE =1)

SECTION IV FIRE & EXPLOSION DATA

| | |
|---------------------|---|
| FLASH POINT | N/A |
| EXTINGUISHING MEDIA | Co2, ALCOHOL RESISTANT FOAM, DRY CHEMICAL |

SPECIAL PROCEDURES HEAT FROM FIRE CAN GENERATE FLAMMABLE VAPOR.

WHEN MIXED WITH AIR AND EXPOSED TO IGNITION SOURCE, VAPORS CAN BURN IN OPEN OR EXPLODE IF CONFINED. VAPORS CAN TRAVEL LONG DISTANCES ALONG THE GROUND BEFORE IGNITING AND FLASHING BACK TO VAPOR SOURCE. FINE SPRAYS/MISTS MAY BE COMBUSTIBLE AT TEMPERATURES BELOW NORMAL FLASH POINT. AQUEOUS SOLUTIONS CONTAINING LESS THAN 95% PROPYLENE GLYCOL BE WEIGHT HAVE NO FLASH POINT AS OBTAINED BY STANDARD TEST METHODS. HOWEVER, AQUEOUS SOLUTIONS OF PROPYLENE GLYCOL GREATER THAN 22% BY WEIGHT, IF HEATED SUFFICIENTLY, WILL PRODUCE FLAMMABLE VAPORS. ONLY AQUEOUS SOLUTIONS OF PROPYLENE GLYCOL LESS THAN 22% SHOULD BE USED IN SPRINKLER SYSTEMS OR OTHER FIRE-FIGHTING EQUIPMENT. ALWAYS DRAIN AND FLUSH SYSTEMS CONTAINING PROPYLENE GLYCOL WITH WATER BEFORE WELDING OR OTHER MAINTENANCE.

PRODUCT NAME: THAWZALL HEAT TRANSFER FLUID

VERSION 1

PG.2

PRODUCT CODE: AFPGBK

DATE 8/29/2012

CHEMICAL FAMILY: GLYCOL

SECTION V REACTIVITY DATA

STABILITY STABLE

HAZARDOUS POLYMERIZATION WILL NOT OCCUR

**INCOMPATIBILITY
(CONDITIONS TO AVOID)** HEAT, SPARKS, & OPEN FLAME, &
STRONG OXIDIZING AGENTS

**HAZARDOUS DECOMPOSITION
OR BY-PRODUCTS** CARBON MONOXIDE

SECTION VI HEALTH HAZARD DATA

ROUTES OF ENTRY SKIN-EYES-INGESTION

HEALTH HAZARDS (acute & chronic) **EYE CONTACT-** CAUSES IRRITATION AND EYE
TISSUE INJURY. **SKIN CONTACT** MAY IRRITATE AND CAUSE
DERMATITIS.

CARCINOGENICITY NOT LISTED BY OSHA, IARC, OR NTP

EMERGENCY & FIRST AID PROCEDURES:

IF CONTACT WITH EYES OR SKIN IMMEDIATELY FLUSH WITH WATER.

INGESTION: NOT EXPECTED TO PRESENT A SIGNIFICANT INGESTION HAZARD UNDER ANTICIPATED CONDITIONS OF NORMAL USE.

SECTION VII PRECAUTIONS FOR SAFE HANDLING & USE

SPILL OR LEAK PROCEDURES: DIKE AREA, RECOVER AND DISPOSE IN ACCORDANCE
TO REGULATORY REQUIREMENTS.

WASTE DISPOSAL METHOD: ACCORDING TO LOCAL, STATE, & FEDERAL LAWS.

SPECIAL PRECAUTIONS: HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL
HYGIENE AND SAFETY PRECAUTIONS.

SECTION VIII CONTROL MEASURES

RESPIRATORY PROTECTION (specify): NONE NEEDED

VENTILATION: LOCAL EXHAUST

PROTECTIVE EQUIPMENT: USE IMPERVIOUS GLOVES TO PREVENT SKIN
CONTACT. USE GOGGLES IF CONTACT IS LIKELY **DISCLAIMER**

THE INFORMATION HEREIN HAS BEEN FROM SOURCES BELIEVED TO BE ACCURATE, RELIABLE AND UP TO DATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, WE CANNOT GIVE ANY GUARANTEES REGARDING INFORMATION FROM OTHER SOURCES AND EXPRESSLY DO NOT MAKE ANY WARRANTIES NOR ASSUME ANY LIABILITY FROM ITS USE OR MISUSE.

MATERIAL SAFETY DATA SHEET

Section 1. Product And Company Identification

Product Name: Heat Conductive Compound MSDS ID: DS9021 Synonyms MS1699

Product Use: Heat conductive material used to enhance contact and heat transfer in temperature sensor applications. Manufacturer: Honeywell Inc., 1985 Douglas Drive North, Minneapolis, MN 55422.

Date Released: October 8, 1999

NFPA Ratings: Health 0; Flammability 1; Reactivity 0; Personal Protection B

Section 2. Composition, Information on Ingredients

| Ingredient | I | CAS Number | Percent | PEL | TVL |
|--|---|------------|---------|-----|------------------------|
| #2 Lithium Complex Grease (70%): | | | | | |
| Mineral Oil | | 64742-65-0 | 35-50 | | 5 mg/m ³ |
| Mineral Oil | | 64742-62-7 | 20-25 | | 5 mg/m ³ |
| Lithium Hydrostearate/Sebacate Complex | | 68815-49-6 | 4-9 | | — |
| Zinc Alkyldithiophosphate | | 68649-42-3 | 0-2 | | — |
| Aluminum Paste (30%): | | | | | |
| Aluminum, as Al | | 7429-90-5 | 20-25 | | 15 mg/m ³ |
| Aliphatic Petroleum Distillates | | 8052-41-3 | 10-15 | | 2900 mg/m ³ |
| Stearic Acid | | 57-11-4 | 1-2 | | — |
| Aromatic Petroleum Distillates | | 64742-95-6 | 1-2 | | 5 mg/m ³ |

Additional Information: Part No. 120650 (0.5 oz. tube); Part No 107408 (4 oz. can); Part No 197007 (5 gallon container). May also contain minute amounts of lithium and molybdenum lubricant compounds

Section 3. Hazard Identification

Acute Health Effects:

Skin: Excessive contact may cause skin irritation and dermatitis.

Eye: Direct contact with eye will cause irritation. **Inhalation:** No adverse effects are expected.

Ingestion: Ingestion of product may cause nausea, vomiting and diarrhea.

Chronic Health Effects:

Existing skin rash or dermatitis may be aggravated by repeated contact.

OSHA Hazard Classifications: None.

Carcinogenicity: Not considered to be a carcinogen by either OSHA, NIP, 1ARC, or ACGIFI. **Target Organs:** None known

Section 4. First Aid Measures

Eye Contact: Flush eyes with water for 15 minutes. Remove any contact lenses and continue to flush. Obtain medical attention if irritation develops and persists.

Skin Contact: Remove excess with cloth or paper. Wash thoroughly with mild soap and water. Obtain medical attention if irritation develops and persists.

Ingestion: Contact physician or local poison control center *immediately*.

Inhalation: Remove patient to fresh air and obtain medical attention if symptoms develop.

Section 5. Fire Fighting Measures

Material Flash Point: > 383°F (195°C). Will burn if exposed to flame.

Extinguishing Media: Carbon dioxide, dry chemical or foam.

Special Fire Fighting Procedures: None

Explosion Hazards: None. Aluminum powder can react with water to release flammable hydrogen gas. In the form of this product, this reaction is not expected.

Section 6. Accidental Release Measures

Scrape up and dispose of as solid waste in accordance with state and federal regulations

Section 7. Handling and Storage

Store in dry place. Keep container closed when not in use.

Section 8. Exposure Controls and Personal Protection.

Ventilation: No special ventilation is required when working with this product.

Respiratory Protection: None required.

Eye Protection: Not normally required. However, use chemical safety goggles or face shield if potential for eye contact exists, especially if material is heated

Hand/Clothing Protection: Not normally required. Protective gloves and clothing are recommended, as material is difficult to remove from skin and clothing.

Other Protective Equipment: None required

Section 9. Physically and Chemical Properties

Appearance/Odor: Aluminum Color, Semi-solid material, pleasant odor. Soluble in Water: Negligible. Specific Gravity: 0.86

Section 10. Stability and Reactivity

Stability: Stable. Reactivity: Hazardous polymerization will not occur. Incompatibilities: Strong oxidizing agents and halogens. Hazardous Decomposition Products: Carbon Dioxide, Carbon Monoxide

Section 11. Toxicology Information

No date available

Section 12. Ecological Information

Chemical Fate Information: Hydrocarbon components will biodegrade in soil; relatively persistent in water

Section 13. Disposal Consideration

Dispose of as a solid waste in accordance with Local, State and Federal regulations.

Section 14. Transportation Information

DOT Classification: Not classified as hazardous.

Section 15. Regulatory Information

SARA Title III Supplier Notification: Include in Section 311/312 inventory reports if amounts exceed 10,000 pounds. Aluminum compounds are subject to the reporting requirements under Section 313 of Emergency Planning and community Right-To-Know Act of 1986 (40 CFR 372). Ingredients listed in TSCA Inventory.

Section 16. Other Information

This information is furnished without warranty, expressed or implied, except that is accurate to the best of our knowledge.

Prepared by: PROSAR, 1295 Bandana Boulevard, Suite 335, St Paul, MN 55108 (651-917-6100).



HYDRONIC SYSTEM LEAK CHECK

Attention: All Service Managers and Service Technicians servicing Thawzall equipment

Subject: Hydronic system leak check for hose installed on Thawzall equipment

Date Effective: June 1, 2008

For Models: TCH250, H250SL, H150

Purpose: A system leak test procedure that will enable service employees to quickly find, inspect and repair system leakage and/or damaged hose on Thawzall equipment.



Photo 1



Photo 2



Photo 3

Photo 1: Attach jumper hose.

1. Turn boiler on and circulating pump—let system operate for 10 minutes
2. Visually inspect connections (photos 2, 3 and 4 looking for leaks
3. If any leaks are located, snugly re-tighten the union without over tightening.
4. Continue to operate the system while looking for additional leaks .
5. If no other leaks are spotted proceed to 6 on next page.



HYDRONIC SYSTEM LEAK CHECK, Continued from page 1



Photo 4

6. Deploy all hoses from reel and connect each to the supply and return
7. Follow each loop from supply to return to determine if there are any leaks
8. If leaks are located at Faster™ connectors, use Thawzal Coupler Repair Kit (call 888.757.3545)
9. If hose leaks are found, use Thawzall Hose Repair Kit (call 888.757.3545)
10. After all leaks are detected, the system may need HTF added to ensure proper system psi and to avoid a “low water shut-off” situation

THAWZALL, LLC

104 Donovan Drive

Alexandria, MN 56308

O 320.759.1588

F 320.759.1583

T 888.757.3545

FOR ALL THAWZALL TECHNICAL QUESTIONS CALL TECHNICAL SUPPORT 888.757.3545



HIGH ALTITUDE OPERATION

Attention: All Service Managers and Service Technicians

Subject: Selection of burner nozzle and air intake setting for operation above 5,000 ft.

Date Effective: June 1, 2008 and August 2013

Models Affected: H150, TCH150, H250SL, TCH250, 2M, 6A, 12F, 12HU

Purpose: To re-rate the burner nozzle and air intake setting based on altitude above sea level

Other Pertinent Information: All models affected are shipped with nozzle numbered 1.75 and air intake is set a 2

If your Thawzall is to be used at altitudes above 5,000 feet above sea level, the burner nozzle and air intake setting must be changed to accommodate lower oxygen levels at higher altitudes. Use the table at the top of back page to find the nozzle size and air intake settings for your altitude.

To change the burner nozzle:

- Turn power off
- Referring to the burner diagram on the back page, locate oil line and disconnect the nut from the top end of the line
- Open the hinged cover by loosening two clips to access the nozzle assembly
- Loosen and remove the splined nut from the outside end of the nozzle assembly. Do not loosen es-cutcheon Plate #4. Nozzle assembly will fall free.
- Turn and remove burner nozzle unit #24.
- With 5/8 and 3/4 open ended wrenches, loosen and replace the nozzle at front end of the assembly with one of the proper size, being careful not to bend the two electrodes.

THAWZALL, LLC

104 Donovan Drive

Alexandria, MN 56308 O 320.759.1588

USA F 320.759.1583

**FOR ALL TECHNICAL QUESTIONS, PLEASE CALL THAWZALL
TECHNICAL SUPPORT 888.757.3545**

HIGH ALTITUDE OPERATION Continued from page 1

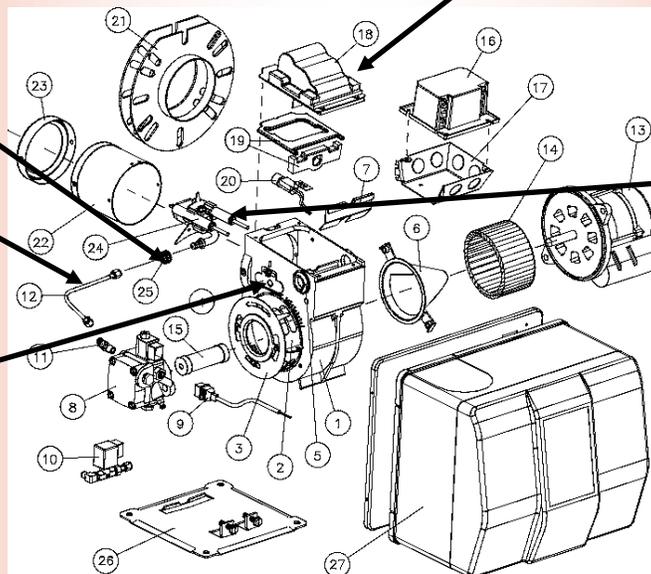
| ELEVATION ABOVE SEA LEVEL | NOZZLE SIZE COMBUSTION HEAD | AIR INTAKE SETTING |
|---------------------------|-----------------------------|--------------------|
| 2,000—5,000 FT. | 1.75 F-22 | 2 |
| 5,000—7,5000 FT. | 1.5 F-22 | 3.6 |
| 6,000—10,000 FT. | 1.5 F-22 | 5.2 |
| 10,000—12,000 FT. | 1.35 F-6 | 5.8 |

Nozzle and air intake changes affect burner BTU output only slightly at 1.48% for every 1,000 FT. above sea level.



Hinged cover

Beckett Burner with GeniSys Control



#24 Burner Nozzle

Splined Nut & Oil Line

Escutcheon Plate

EXPLODED PARTS BREAKDOWN

Technical Service Bulletin

HEAT TRANSFER FLUID CHECK

Attention: Service Managers and Service Technicians

Subject: Testing of Heat Transfer Fluid (HTF) for freeze protection

Date Effective: June 1, 2008 (rev. 8/13)

Models Affected:

TCH 250, H250SL, H150, 2M, 6A, 12HU, 12F, XH, and all new HEATZONE™ Series machines.

Purpose:

To ensure that the heat transfer fluid in the Thawzall system is concentrated enough to resist freezing in cold weather., all Thawzall model systems are now shipped with full strength (not diluted with water) Thawzall Heat Transfer Fluid. Full strength HTF provides freeze protection down to -70° F or -56° C. HTF is not automotive antifreeze.

Automotive antifreeze MUST NOT be used in your Thawzall.

Please follow this three step procedure:

Please follow this three step procedure:

Step 1

From the fluid reservoir, remove a small sample of HTF.

Test it with a refractometer according to the instructions supplied with the refractometer.



THAWZALL, LLC

104 Donovan Drive
Alexandria, MN 56308
O 320.759.1588
F 320.759.1583
T 888.757.3545
www.thawzall.com

See photo at right to identify reservoir.

Your Thawzall may have either style.



Continued on page 2...

FOR ASSISTANCE CALL THAWZALL TECHNICAL SUPPORT 888.757.3545

HEAT TRANSFER FLUID CHECK

No.00-06-08-502 rev. 8/13

...continued from Page 1

Thawzall HTF has additives that provide lower freeze protection than standard Propylene Glycol. The refractometer reading must therefore be converted to a **real protection reading** using the following chart.

| Refractometer Reading | Freeze Protection Down To | Pumpable Down To | Burst Protection Down To |
|-----------------------|---------------------------|------------------|--------------------------|
| 20 °F | 20 °F | 15 °F | 11 °F |
| 15 °F | 13 °F | 7 °F | -4 °F |
| 10 °F | 3 °F | -4 °F | <-20 °F |
| 5 °F | -3 °F | -11 °F | <-40 °F |
| 0 °F | -6 °F | -15 °F | <-60 °F |
| -6 °F | -15 °F | -26 °F | <-60 °F |
| -10 °F | -22 °F | -37 °F | <-60 °F |
| -15 °F | -27 °F | -41 °F | <-60 °F |
| -20 °F | -35 °F | -49 °F | <-80 °F |
| -42 °F | -70 °F | -80 °F | <-100 °F |

| Fahrenheit to Celsius Conversion Chart | |
|--|------|
| F° | C° |
| 20° | -7° |
| 15° | -9° |
| 10 | -12° |
| 5 | -15° |
| 0 | -18° |
| -5 | -21° |
| -10 | -23° |
| -15 | -26° |
| -20 | -29° |
| -25 | -32° |
| -30 | -34° |
| -35° | -37° |
| -40° | -40° |

Step 2

Using the chart above, locate the refractometer reading in the left column and read across to the right to find the **Freeze Protection Down To** degree reading.

This is the temperature at which the Thawzall Heat Transfer Fluid will begin to freeze. If this degree reading is at or below the coldest temperature that you can expect in your climate, no further action is necessary. If this reading is above the coldest temperature that you can expect in your climate, go to step 3.

THAWZALL, LLC

104 Donovan Drive
 Alexandria, MN 56308
 O 320.759.1588
 F 320.759.1583
 T 888.757.3545
 www.thawzall.com

The temperature readings in the third column "Pumpable Down To" indicate a temperature at which a frozen slush mixture of HTF may still be pumpable in the system. Running the circulating pump and the burner will thaw the slush and make the Thawzall usable until it is shut off again. Frozen HTF (a temperature below the "Burst Protection Down To" column will severely damage the pump and other components of your Thawzall.

Continued on page 3

FOR ASSISTANCE CALL THAWZALL TECHNICAL SUPPORT 888.757.3545

HEAT TRANSFER FLUID CHECK

...Continued from page 2

Step 3

- Completely drain the boiler of HTF. The boiler holds about 16 gallons, or 23% of the total system. The boiler can be drained with a garden hose attached to the valve on the side of the boiler housing.
- Then fill the plastic reservoir with full strength HTF (refer to the start-up procedure card that comes with your Thawzall to learn how to fill the boiler reservoir). Run the circulating pump for a few minutes to fill the boiler and mix the system.
- Un-reel all of the hoses from the hose reel and connect them to the supply and return sides of the liquid manifold at the back of the reel area so that all of the fluid can be circulated through every component of the Thawzall.



Boiler Drain valve



Rear Manifold Hose Connections

- Using a refractometer, test a sample of HTF from the boiler valve this time (not from the reservoir). Consult the table on Page 2 for the “real” protection reading in the “Freeze Protection Down To” column. If the new test is satisfactory, no further action is required.
- If the test is not satisfactory, drain the boiler again.
- Refill the reservoir again with full strength HTF and run the circulating pump again for a few minutes to fill the boiler and mix the HTF in the system
- Remember that the boiler must be filled from the reservoir each time the boiler is drained before circulating the fluid for another test.
- Test a sample again from the boiler with a refractometer and consult the chart on page 2 for a “real protection” reading in the “Freeze Protection Down To” column.
- Repeat the above procedure as often as necessary to bring the freezing temperature of the HTF in the system down to the temperature required in your climate.

Your Thawzall can now be safely put back into service.

Consult your Thawzall owners manual for other regular service procedures.

THAWZALL, LLC

104 Donovan Drive
Alexandria, MN 56308
O 320.759.1588
F 320.759.1583
T 888.757.3545
www.thawzall.com

Resource Directory

Heat Transfer Fluid (HTF) can be purchased from Thawzall in increments of one and five gallon containers and 55 gallon barrels.

Refractometer can also be purchased through Thawzall.

FOR ASSISTANCE CALL THAWZALL TECHNICAL SUPPORT 888.757.3545

Technical Service Bulletin

PREVENTIVE MAINTENANCE PROCEDURES

Attention: Service Managers and Service technicians

Subject: Preventive Maintenance

Date Effective: 8/1/2008

Thawzall Models affected: All

Purpose: A recommendation for annual checks and maintenance for all Thawzall machines

Fuel Filter Replacement:

- Replace the fuel filter annually before putting your Thawzall into service in the fall
- Shut off the fuel valve at the base of the fuel tank
- Loosen and remove the bolt at the top center of the fuel filter base and catch the cup from the bottom
- Remove the old filter from the cup. Clean the cup and install a new filter, disposing the old one properly
- Replace two O-rings, one between the cup and the filter base, and the other on the bolt. Both O-rings come with the filter in Kit 1A-30.
- Assemble the filter cup and base, tightening the bolt just snug.



Fuel Filter

Union Inspections and Leak Repair

- Inspect the unions for leaks
- Tighten all unions—Do Not over tighten!



Inspect union for leaks

Thawzall, LLC

104 Donovan Drive
Alexandria, MN 56308
O 320.759.1588
F 320.759.1583
T 888.757.3545
www.thawzall.com

Continued on page 2

FOR TECHNICAL ASSISTANCE CALL THAWZALL TECHNICAL SUPPORT 888.757.3545

PREVENTIVE MAINTENANCE

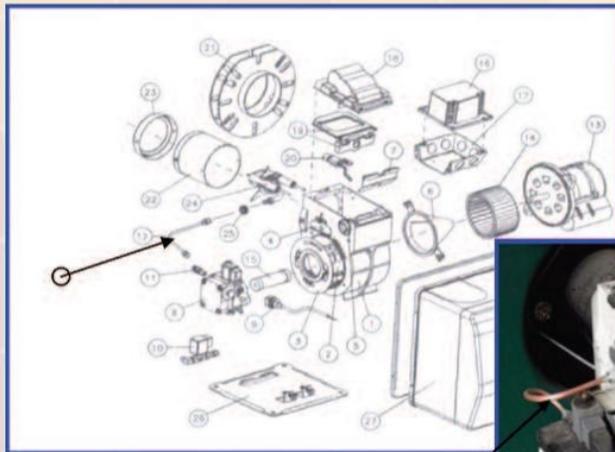
No. 00-07-20-08-503 Rev. 8/13

...Continued from page 1

Burner Nozzle Inspection

To inspect the burner nozzle:

- Turn the power off
- Referring to the burner diagram below, locate oil line #12 and disconnect the nut from the top end of the line
- Open the hinged cover #18 by loosening two clips to access the nozzle assembly.
- Do not loosen escutcheon Plate #4. The nozzle assembly will fall free.
- Inspect the nozzle for wear or damage
- To replace the nozzle, with 5/8 and 3/4 open end wrenches, loosen and replace the nozzle with a new one, being careful not to bend the two electrodes.
- Reverse the procedure for re-assembly



Beckett Burner /
GenySis Control



The copper tube on the burner is #12 in the diagram

HTF (Heat Transfer Fluid) Check

- From the fluid reservoir, using a refractometer, remove a small sample of HTF (See Service Bulletin No. 502 Rev. 8/13)
- Full strength HTF provides pumpability down to -80°F (-62°C)



Continued on page 3

FOR TECHNICAL ASSISTANCE CALL THAWZALL TECHNICAL SUPPORT 888.757.3545

...Continued from page 3

Visual Inspection of Burner, Boiler and Chimney

- Visually inspect the chimney for signs of soot or damage to the chimney and cap. Excessive soot means that the burner is not combusting cleanly and may not be properly adjusted. (see Technical Service Bulletin 00-06-01-08-501 Rev. 8/13 for proper settings)
- Open the Columbia burner inspection door and inspect the inside of the boiler with a flashlight. Note evidence of excessive sooting or any apparent cracks. If any evidence is found, call Thawzall Technical Support at 888.757.3545.

Resource Directory

- Fuel Filter Kit Item No. 1A-30
- Full Synthetic 75-90 Gear Oil made by Valvoline and other oil suppliers
- HTF—Available in 1 and 5 gallon containers or 55 gallon drums from Thawzall, LLC.

Always use

Thawzall approved HTF to avoid warranty denial.

Thawzall, LLC

104 Donovan Drive
Alexandria, MN 56308
O 320.759.1588
F 320.759.1583
T 888.757.3545
www.thawzall.com

FOR TECHNICAL ASSISTANCE CALL THAWZALL TECHNICAL SUPPORT 888.757.3545

Technical Service Bulletin

COUPLER REPLACEMENT KIT for Faster Couplers

Attention: All Service Managers and Service Technicians servicing Thawzall Equipment

Subject: Coupler Replacement Kit

Date Effective: November 20, 2008 Rev. 8/13

Purpose: For repair of existing couplers using purchased Thawzall kit

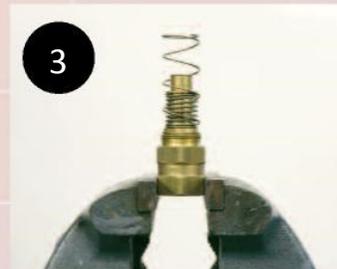
Procedure: Replace defective coupler parts using parts from the Thawzall replacement kit. Follow steps as shown below:



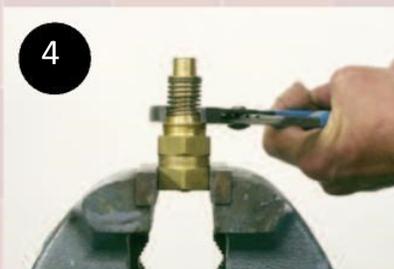
1 Place coupler in vise



2 Unscrew the body from the adaptor



3 Adaptor after body is removed



4 Unscrew the internal body from the adaptor.

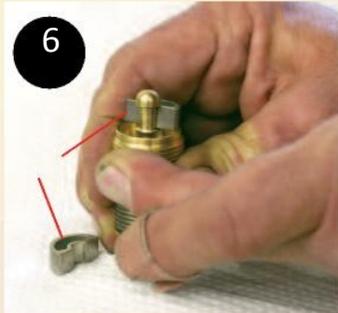


5 The initial disassembly of the coupler is now complete. Proceed to step 6 to disassemble the valve assembly.

Continued on reverse side

COUPLER REPLACEMENT KIT

for Faster Couplers, Continued from front No. 00-11-20-08-506 Rev. 8/13



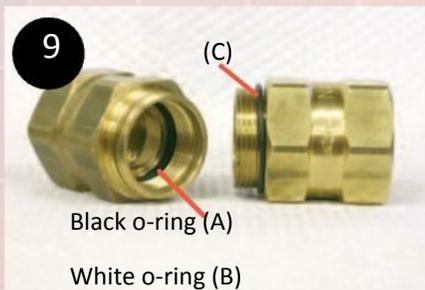
To disassemble the valve assembly, press exterior springs down to remove the "semi-guides" (A)



Pictured above are all parts from the disassembled coupler



Shown above is the complete Thawzall Re-Build Kit



Remove and replace black o-ring (A) and white o-ring (B) inside internal body. Remove and replace exterior black o-ring on adaptor (C)

10

Using parts from the re-build kit reassemble the valve group and coupler in reverse order.

Resource Directory

Thawzall Coupler Replacement Kit available from Thawzall, LLC Call 888.757.3545

Thawzall, LLC

104 Donovan Drive

Alexandria, MN 56308

O 320.759.1588

F 320.759.1583

T 888.757.3545

www.thawzall.com

FOR ALL TECHNICAL ASSISTANCE CALL TECHNICAL SUPPORT 888.757.3545



LIMITED WARRANTY

GENERAL:

THAWZALL, LLC hereby extends to the original purchaser of its THAWZALL (“Ground Defrosting, Thawing, Temporary Heat or Concrete Curing Products”) a warranty against defects in materials and workmanship for a two year time period as indicated below.

The warranty is only valid on “Ground Defrosting, Thawing, Temporary Heat or Concrete Curing Products” purchased and used in accordance with placards and instructions (e.g. Operators Manuals) provided by Thawzall, LLC. This warranty applies only to the original purchaser and is subject to the terms and conditions set forth below.

THAWZALL, LLC will repair or replace (at its discretion) a ground defrosting, thawing, temporary heat or concrete curing product (or component thereof) if it fails to conform to this warranty. In the event a ground defrosting, thawing, temporary heat or concrete curing product is to be repaired pursuant to this warranty, such repair work will be performed by THAWZALL, LLC or at its direction.

WARRANTY PERIOD:

The warranty relating to workmanship, materials and labor on THAWZALL ground defrosting, temporary heat or concrete curing products extends for two (2) years from the date of original invoice.

WARRANTY POLICY:

When claiming warranty, you must give Thawzall the VIN number of the machine and date of invoice or original invoice number of the machine or part and Thawzall will determine if the affected machine and part is within the warranty period:

To Start a claim, go to our website and complete a warranty claim and e-mail to warranty@thawzall.com

Thawzall will issue an RMA # for the defective part and provide a pre-paid freight return tag or call tag issued through UPS. **If the part(s) is not returned within 30 days from the RMA date, you will no longer be eligible for any credit towards the replacement part.**

You will need to issue a PO for the replacement part and Thawzall will invoice you for the replacement part and freight.

Once Thawzall receives the defective part we will inspect and test the part or have our vendor inspect it. If the part is determined to be defective a credit will be issued for only the part cost. ***If it is determined that the part is NOT defective, you will be charged for the time it took to inspect and test the part (Labor rate of \$100.00 per hour).***

WARRANTY PROCEDURE:

RMA – (Return Material Authorization): To ensure processing of warranty claim, a Return Merchandise Authorization (“RA”) must be obtained at the time of claim and prominently shown on correspondence and packages. To obtain warranty and an RMA, call 888.757.3545 (U.S. Central Time) or [E-mail warranty@thawzall.com](mailto:warranty@thawzall.com). Parts must be returned within 30 days of an RMA being issued to receive credit.

WARRANTY LIMITATIONS:

Thawzall Ground Defrosting, Thawing, Temporary Heat or Concrete Curing products must be installed (where applicable), operated and maintained in accordance with all instructions provided by Thawzall, LLC. Failure to follow our installation (where applicable), operating or maintenance procedures and/or use of unauthorized parts may void this warranty.

Purchasers and Users are responsible for the suitability of the products for their application.

This warranty does not apply to:

Repairs or replacements necessitated by any cause beyond the control of THAWZALL, LLC including, but not limited to, any malfunction, defect or failure caused by or resulting from unauthorized service or parts; installation (where applicable), operating or maintenance contrary to furnished instructions; local water conditions, handling, shipping or transit accidents; modifications or repair by the user; abuse; misuse; neglect; accident; incorrect power line voltage; power line surge; lightning damage; or fire, flood, or other Acts of God.

Repair or replacement in the ordinary course of expendable ground defrosting, thawing, temporary heat or concrete curing product part.

Elements and controls whose damage or failure is attributable to corrosion, scale, or dirt accumulations or to low water conditions.

Thawzall, LLC is not liable for labor and other costs incurred in removal, reinstallation, or unauthorized repair of the Ground Defrosting, Thawing, Temporary Heat or Concrete Curing product or for damages of any type whatsoever including incidental or consequential damages.

There are no warranties which extend beyond the description contained herein and specifically liability for any breach of any implied warranty of merchantability or fitness for a purpose is excluded. The duration of any warranties which may be implied by law notwithstanding the previous sentence (including the warranties of merchantability and fitness) is limited to the term of this warranty. In no event shall Thawzall, LLC be liable for special, incidental or consequential damages arising from ownership or use of any Ground Defrosting, Thawing, Temporary Heat, or Concrete Curing product, or for any delay in the performance of its obligations under this warranty due to causes beyond its control. Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of consequential damages, so the above limitations and exclusion may not apply to you. This warranty gives you specific legal rights. You may have other rights, which vary from state to state.

This warranty set forth herein is in lieu of all other expressed or implied warranties. THAWZALL, LLC does not assume or authorize any party to assume for it any other obligation or liability.

THAWZALL, LLC

104 Donovan Drive

PO Box 158

Alexandria, MN 56308 USA

TF 888.757.3545

T 320.759.1588

F 320.634.4563

Email: warranty@thawzall.com

Website: www.thawzall.com

How to File a Warranty Claim

The warranty on your Thawzall covers parts and labor for two years from the date of purchase.

In the event of a failure which is covered in the Warranty Statement on the preceding pages:

- Access the warranty claim form online at: <http://www.thawzall.com/warranty.asp?p=1.1.9>
- Or, fill out claim form on the next page; fill it out completely and send it to Thawzall via USPS Mail, Fax or E-mail
- Thawzall will determine the validity of the claim and issue a 50% credit to you for all valid claims within 5 days
- Please call 888.757.3545 or e-mail us at warranty@Thawzall.com to request a Return Material Authorization (RMA) number
- Thawzall will issue you a RMA number for the failed parts.
- To collect the balance of the credit owed, you MUST return the failed parts with the RMA form to Thawzall within 30 days
- When the failed parts are returned to Thawzall, you will receive the remaining credit.

WARRANTY CLAIM FORM



Thawzall warranties hydronic equipment for two years and flameless heaters for one year from the original invoice date.

RMA (Return Material Authorization) number is required for parts return. RMA must be clearly marked on the outside of the returned package. Parts must be returned within 30 days after RMA is issued.

THAWZALL, LLC

104 Donovan Drive

Alexandria, MN 56308 USA

O 320.759.1588

F 320.759.1583

T 888.757.3545

www.thawzall.com

| | |
|--------------|--|
| TODAY'S DATE | |
| YOUR NAME | |
| YOUR TITLE | |
| COMPANY | |
| E-MAIL | |
| PHONE | |
| FAX | |
| CELL | |

| | |
|---------------------------|--|
| MODEL NUMBER | |
| VIN NUMBER | |
| DATE OF ORIGINAL PURCHASE | |

Describe problem in detail:

How was the problem resolved?

LABOR HOURS

HOURLY LABOR RATE

IF PARTS WERE ORDERED FROM THAWZALL RECORD SALES ORDER # OR INVOICE # HERE