INFRARED HEATER

VAL6

OWN THE SUN

SALES GUIDE

3rd Edition

VAL6 Manufacturer Info.

1914 - Shizuoka-seiki Co. Ltd. is established in 1914

1974 - The first VAL6 Heater was manufactured

"For over 30 years, VAL6 Heater is the Number 1 portable infrared heater in Japan."

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EPX

KBE5S

KBE5L

HG125NA

Daystar

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SALES MANUAL

Presenting Key Factors

WHAT IS BTU? · WHAT IS HEAT? HOW DO YOU MEASURE HEAT?

BTU

BTU expresses the amount of the thermal energy required to raise one pound of water one degree Fahrenheit

SURPRISING TRUTH ABOUT BTU RATING IN THE HEATER INDUSTRY

Rated BTU is basically derived from fuel consumption of the heater rather than its actual ability to heat.
Therefore, high BTU rating does not warrant high heat output!!

UNDERSTANDING HEAT OUTPUT

Fuel to energy conversion ratio.
What precent of the consumed fuel is perfectly combusted?
Smoke, smell or eye irritation are typical signs of incomplete combustion which leads to lower fuel to energy combustion ratio.

APPLICATION EFFICIENCY (Actual heat transfer)

How much of the heat generated actually is received by the object which is to be heated.

Moving air, wind chill or rise of heated air affects application efficiency.
VAL6' s near perfect combustion combined with high heat transfer makes new formula for the heater selection.

VAL6 experiences ZERO HEAT TRANSFER LOSS due to humidity, misty conditions, high winds or high wind chill factor, unlike any forced air heaters.

- ***Lowest possible rated BTU*** (Fuel consumption)

+ *Highest possible Heat output* (Actual heat recieved)

= *THE BEST BUY!*

Huge Fuel Savings!

Over $1,650 Fuel Cost Savings within a Season (4 Months)!

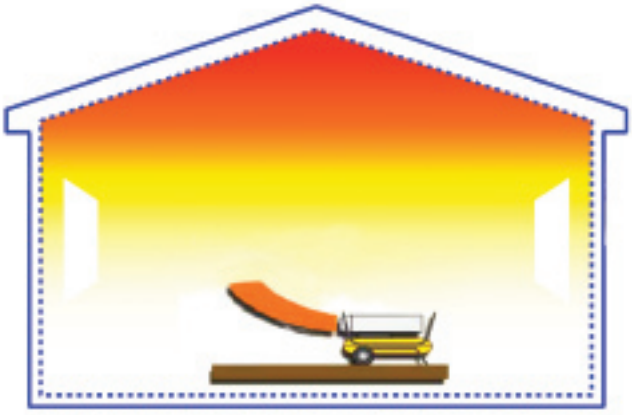
VAL6 Infrared Heater
111,000 BTU rated

with VAL6

Amount of Diesel fuel required per hour 0.85 gal

Heating Cost for 1 month
based on $2.00/gal, 8 hours/day

$272.00



Conventional Forced Air Heater
300,000 BTU rated

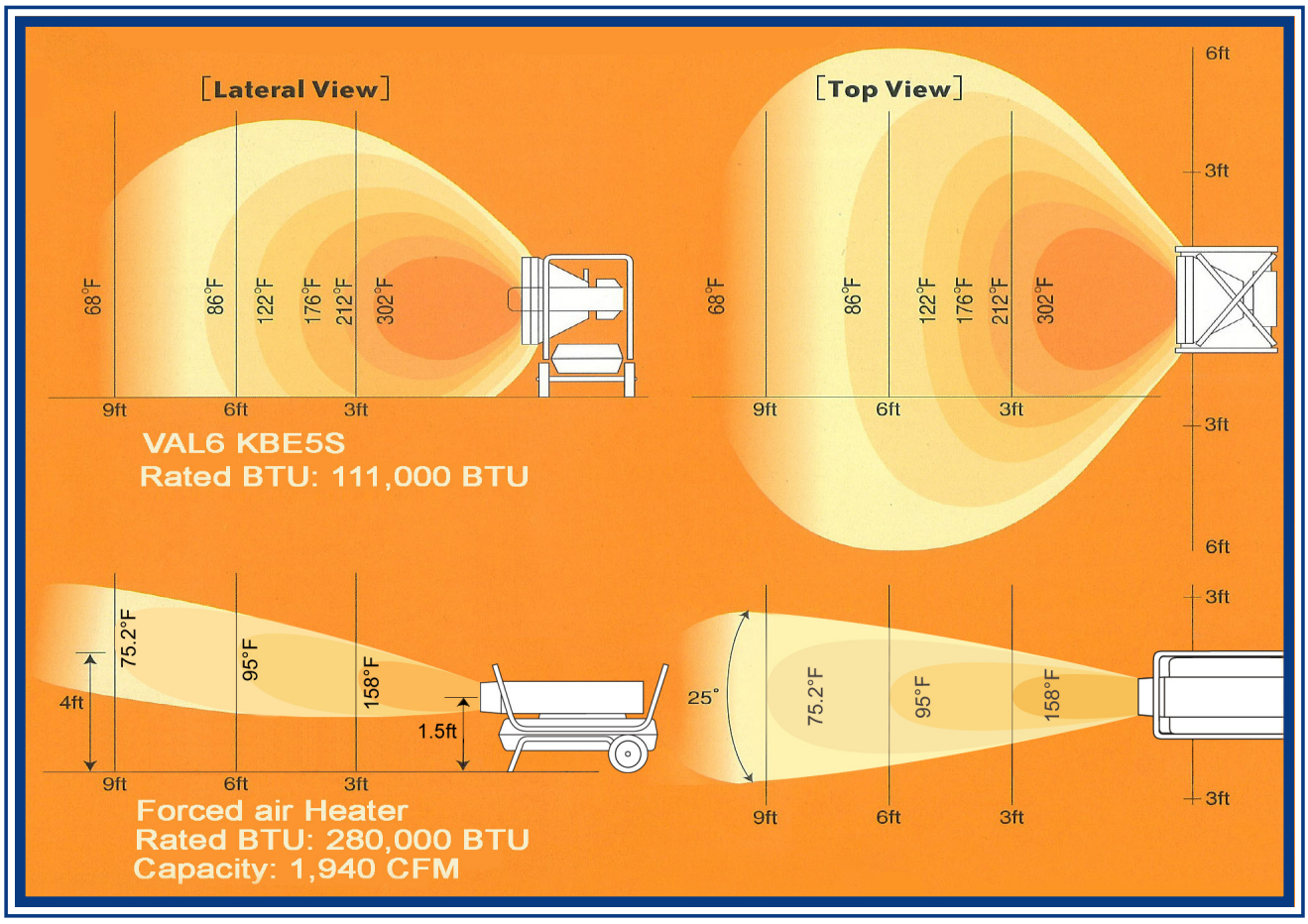
with Forced Air

Amount of Diesel fuel required per hour 2.14 gal

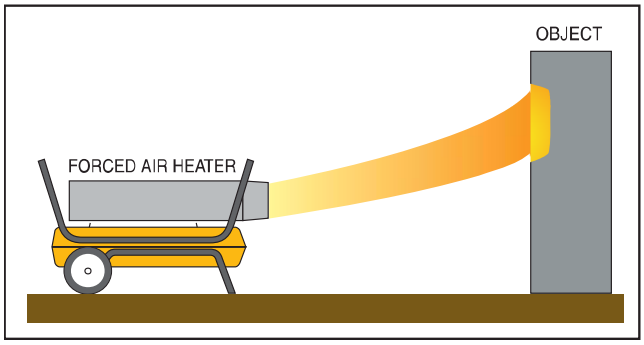
Heating Cost for 1 month
based on $2.00/gal, 8 hours/day

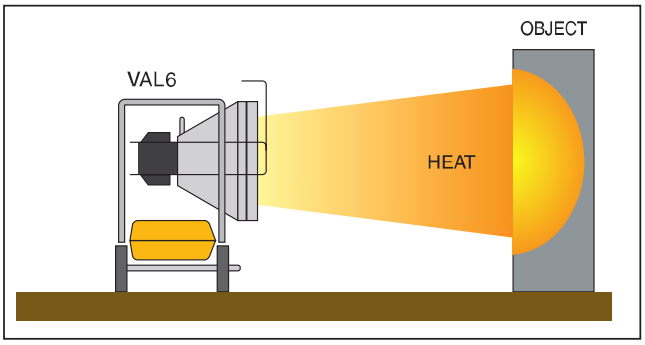
$685.00

Comparison Chart with a Forced Air Heater



VAL6 KBE5S can efficiently heat up to three times the area compared to conventional space heaters with 1/3 the fuel usage





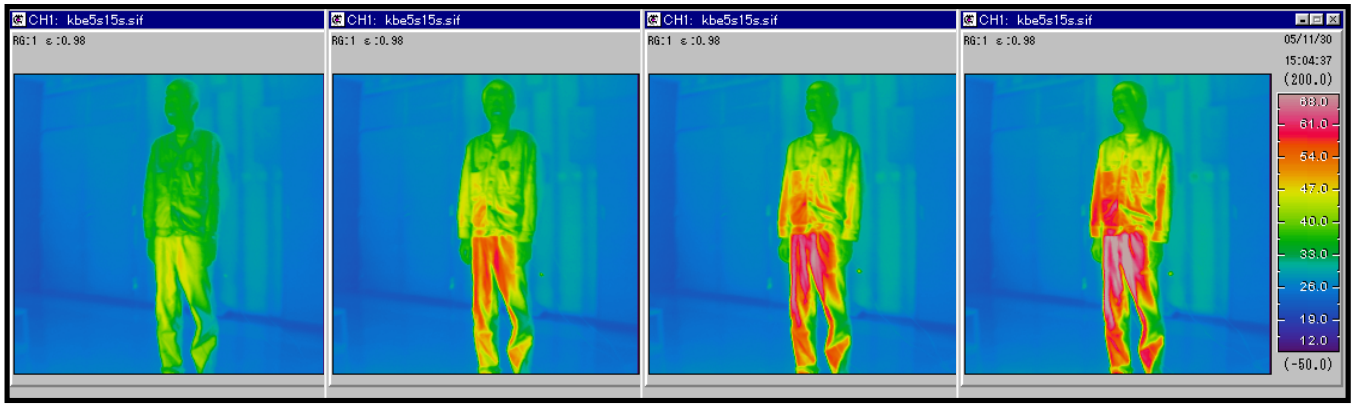
VAL6 Radiant Series are not affected at all under these conditions:

EXTREME HUMIDITY · OUTDOORS OR MISTY
HIGH WINDS · HIGH WIND CHILL FACTOR

NATURE OF VAL6 RADIANT SERIES VAL6 KBE5S vs. FORCED - AIR HEATER WITH CROSS WIND

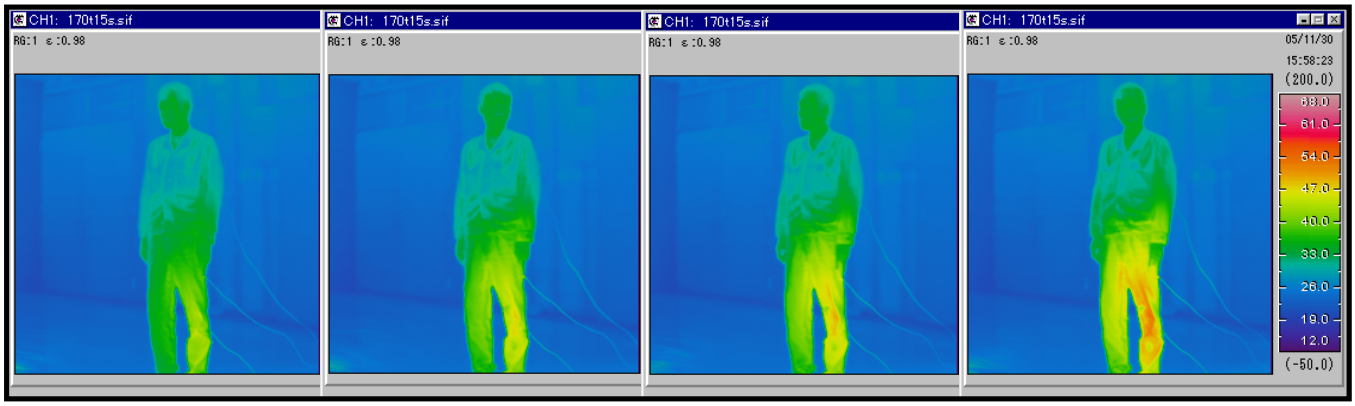
Cold winds affect the heating efficiency of conventional forced air heaters.

VAL6 KBE5S



40 sec. 60 sec. 80 sec. 100 sec.

FORCED - AIR HEATER



40 sec. 60 sec. 80 sec. 100 sec.

Cross wind - 6.7 ft/sec.
Distance to object - 5ft

COMFORTABLE ENVIRONMENT

One of the main purposes of using a heater is not only raising air temperature but creating a comfortable (working) environment.

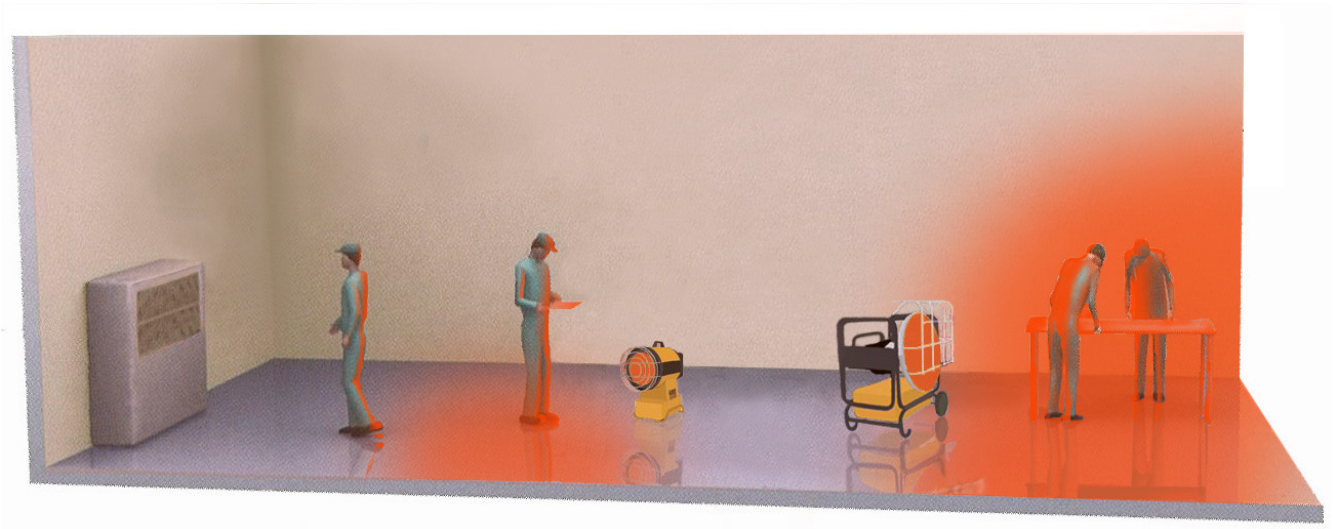
3 senses are good detectors for finding out comfort level

EYES	Irritation from smoke or dust
EARS	Noise level leading to disturbance
NOSE	Unpleasant odor and unhealthy exhaust

Modern detectors used on VAL6 for carbon monoxide exhaust measured just 1 to 2 parts per million for diesel fuel #2.

CPSC(Consumer Product Safety Commission) suggests a National Indoor Air Quality Guideline of 15 ppm for an average of 8hours and not to exceed 25 ppm for an average of an hour.

VAL6 RADIANT SERIES ARE VERY EFFICIENT INDOORS!



VAL6 Infrared heater:

Puts heat precisely when and where you need it. Once objects absorb infrared heat, they begin to re radiate this heat into their surroundings to help heat larger area.

Convection Heater:

Without exception, the area recieving the most heat is always the ceiling. This heater would not be able to warm people or objects that are close to the floor effectively or economically.

WHAT MAKES VAL6 HEATERS A CUT ABOVE THE REST?

Chamber

An optimally designed chamber creates a near perfect fuel/air mixture enabling temperature to reach 1800˚ F.

Insulator

A one piece constructed ceramic wool insulator produces a higher rate of heat retention.

Radiation Disk

Heat absorbed by the radiation disk can reach 1500˚F to radiate sun-like heat. The unique construction of the VAL6's radiation disk emits heat rays to wider areas.

Perfect Atomization System

Highly efficient air/fuel mixing is achieved in the well insulated and high capacity chamber which is different from ordinary systems which pass massive air thr$_o$ugh a small main chamber. VAL6's perfect atomization system enables stable and perfect air/fuel mixture to produce very high heat output.

ULTIMATE FORCED AIR HEATER
HOT GUN HG125NA

Ultimate forced air heater with VAL6 technology

Hot Gun uses the same VAL6 burner technology which gives similar performance as other VAL6 heaters.

- ✓ Semi-enclosed chamber to burn fuel efficiently unlike ordinary forced air heaters
- ✓ Fuel Miser / Only 0.85 Gallons per hour fuel consumption
- ✓ 2 independent fans:
  one for combustion and other for carrying out hot air for efficient burning process
- ✓ Very quiet operation: Low rpm fan yet high CFM. Specially angled fins for optimized flow of air and quiet operation.

- ✓ Operation time is 16 hours
- ✓ Low carbon monoxide emission

WITH

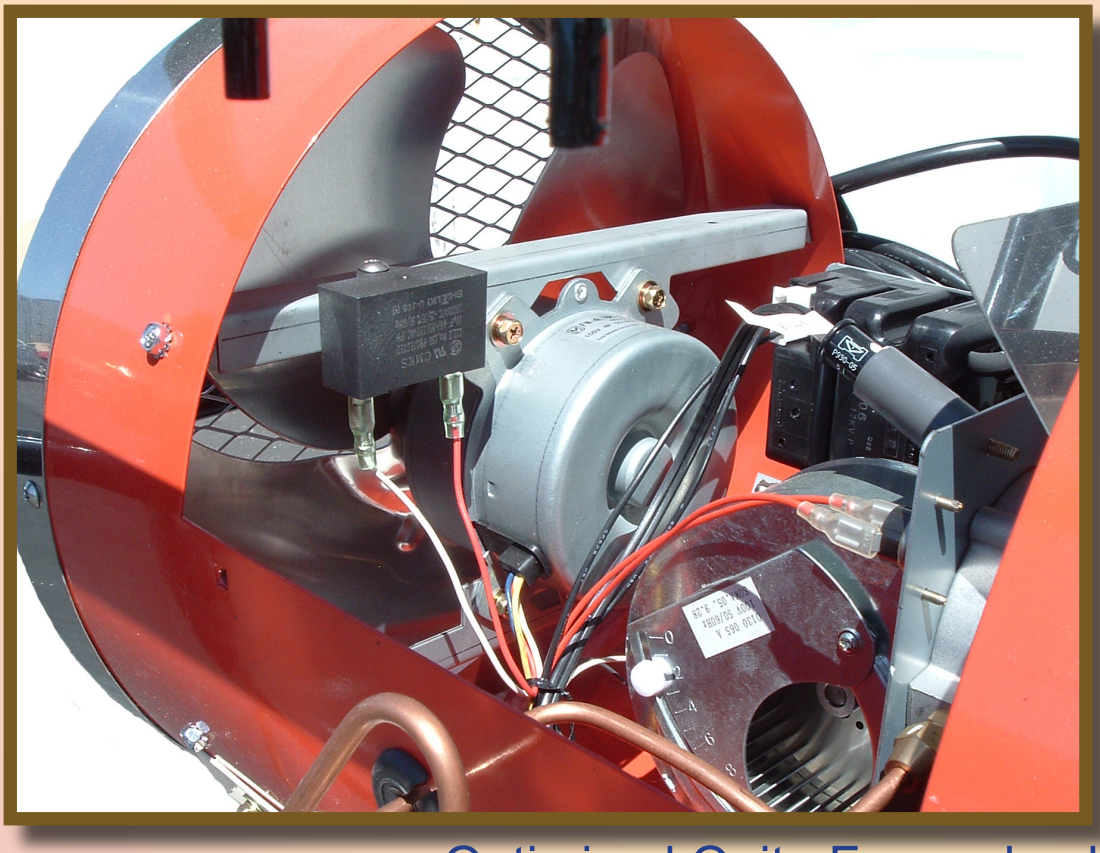
Ability to heat a larger space quickly

&

Quiet Operation creating comfortable work environment.

INTERNAL MECHANISM OF HOT GUN IS VERY SIMILAR TO VAL6 HEATER

HG125NA

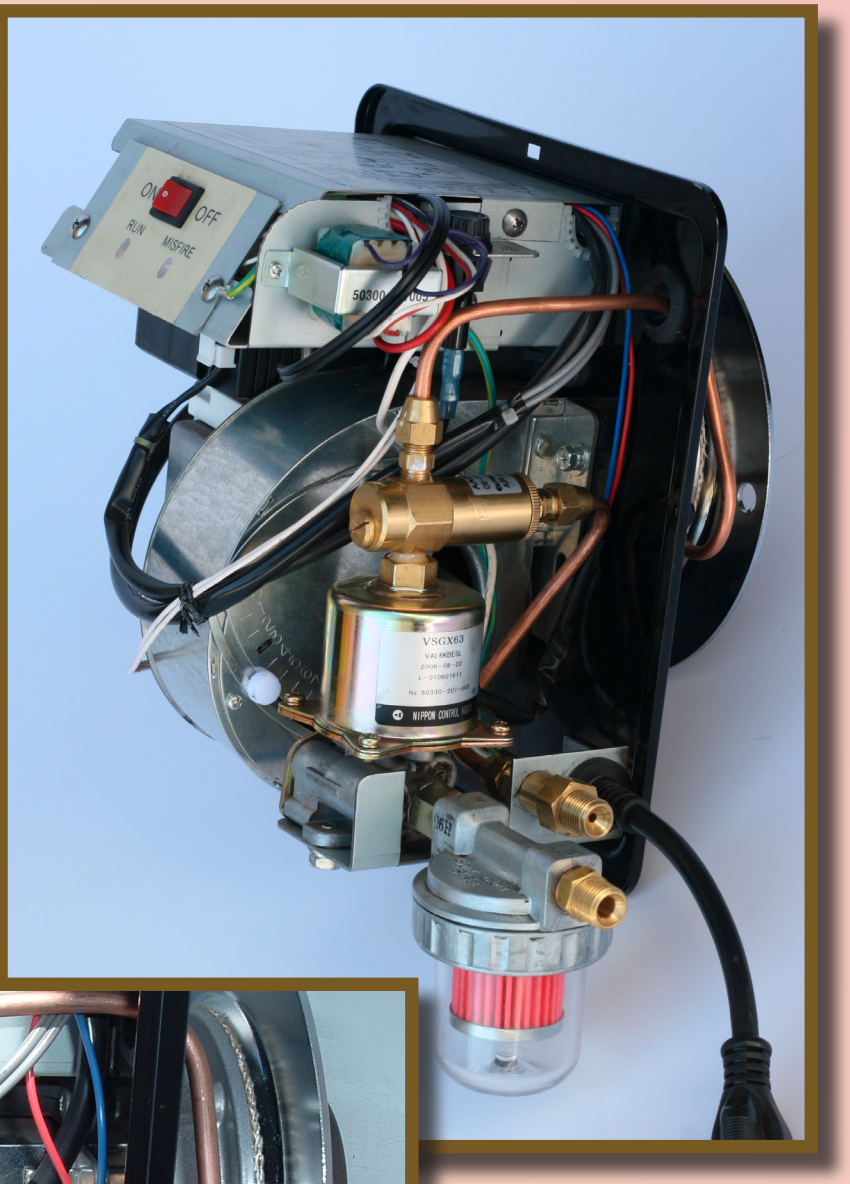


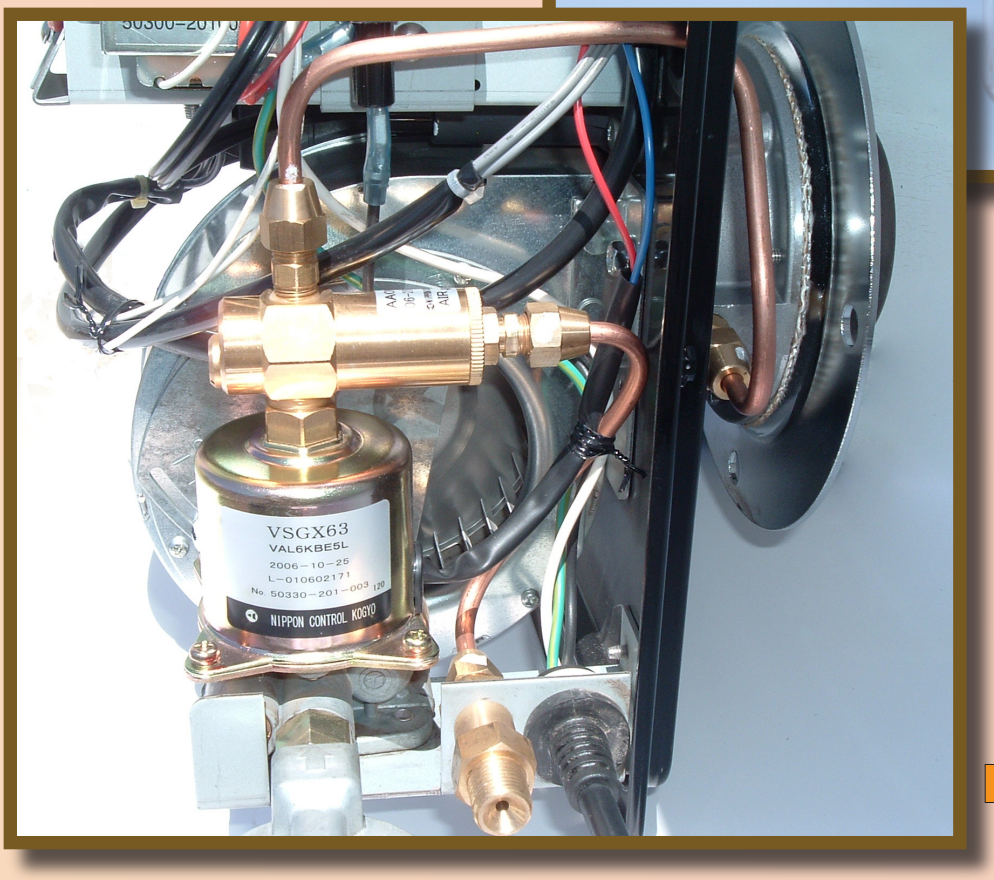
Optimized Quite Fan on back of Hot Gun

Comparison:

VAL6 KBE5S/L Internal Mechanism

Very Similar to Hot Gun 125NA





KBE5S

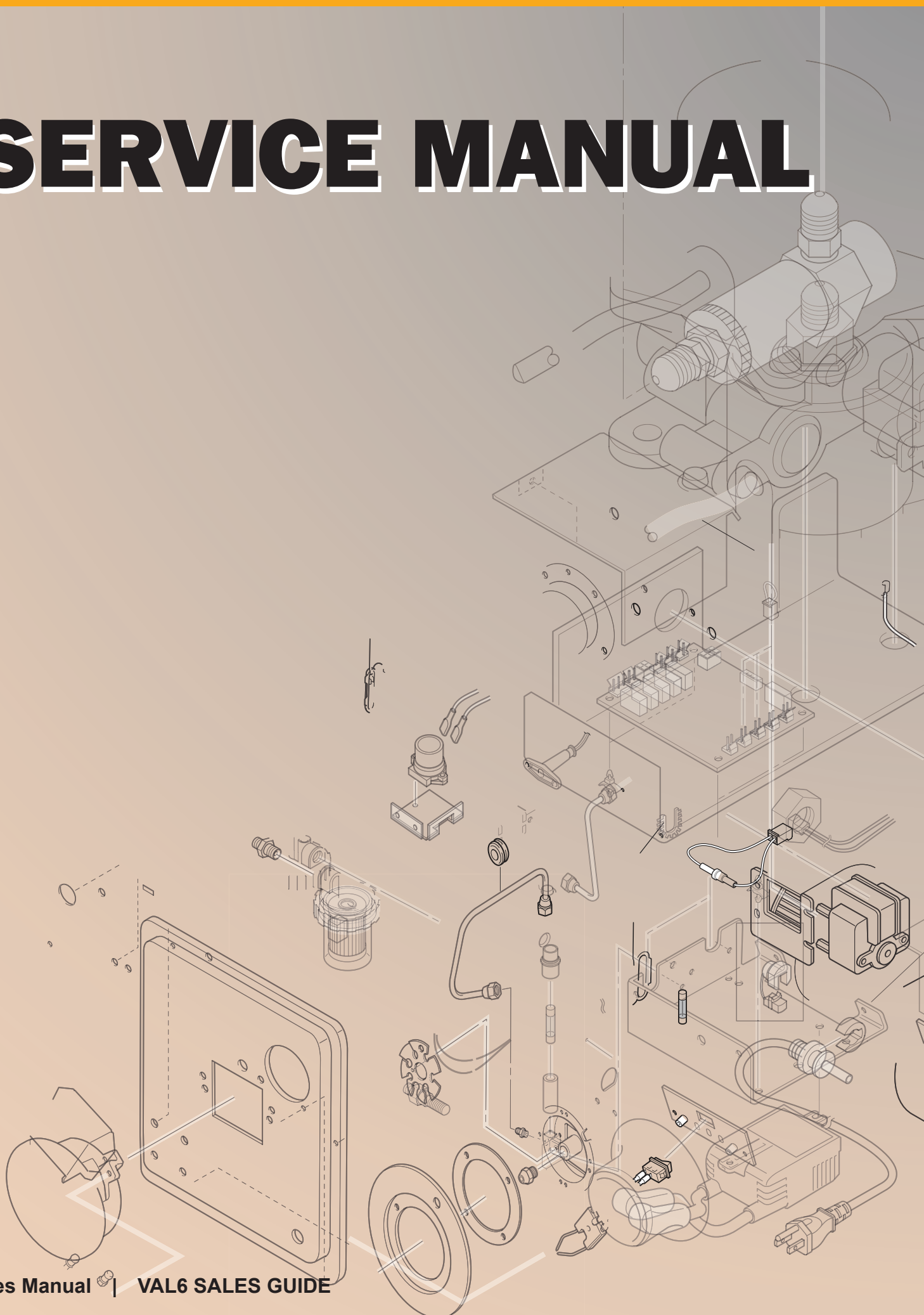
VAL6 RADIANT SERIES
Sales / Rental Applications

- Construction
  - Drywall
  - Masonry
  - Painting
  - Plumbing
- Mining and Oil Services
- Automotive, Bus and Truck Industries
- Sports Industry, Arenas and Tent Heating
- Highway maintenance and Snow Removal
- Aircraft/Airport Maintenance Thawing
- Military and Government
- Metal Fabrication
- Fire and Rescue
- Farming
- Dairy Industry

SUMMARY

- VAL6 is the most efficient heater per BTU on the market today.
- VAL6 is very effective even under conditions of snow, wind or rain.
- VAL6's effectiveness in heating objects in target area eliminates heat loss to ambient air.
- VAL6's directional infrared penetrates into objects which re-radiate heat resulting in quicker drying times and better overall heat retention.
- VAL6's penetrating infrared rays heat people quicker and more efficiently, resulting in a longer lasting, more comfortable heating effect (Unlike conventional heaters which only heat the air.)
- VAL6's infrared heat creates a comfortable environment. VAL6 emits no smell or smoke while operating and has low noise levels and virtually undetectable carbon monoxide emissions.
- VAL6 costs much less to operate because it uses far less fuel than conventional heaters.

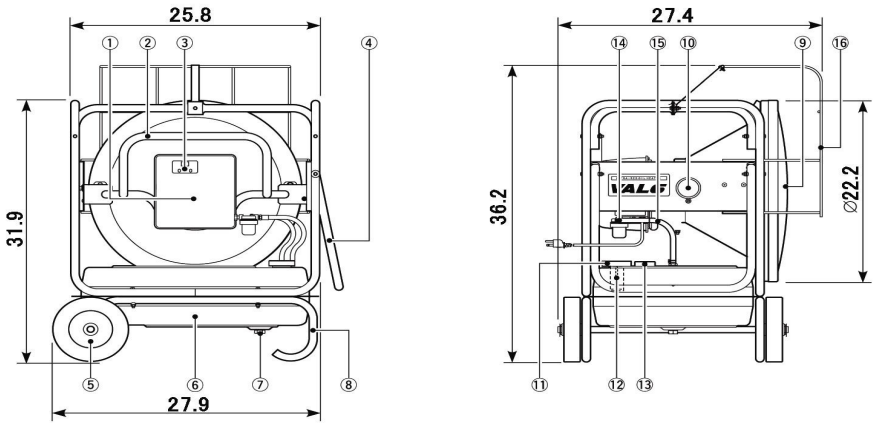
SERVICE MANUAL



1 Specifications

Type	VAL6 KBE5S/KBE5L
Heat Output	111,000BTU/h
Fuel	Kerosene, Diesel
Tank Capacity	9 gallons/15.1gallons
Fuel Consumption	0.85gallon/h
Power Source	120V, 60Hz single phase
Power Consumption	100W
Ignition System	High Intensity Discharge
External Dimentions (L/W/H)	KBE5S 36.1/25.8/27.3 (inches)
	KBE5L 40.2/28.0/27.4 (inches)
Safety Device	Photocell Flame Monitor
Overload Check Device	3A Fuse
Dry Weight	83.8lbs/92.7lbs

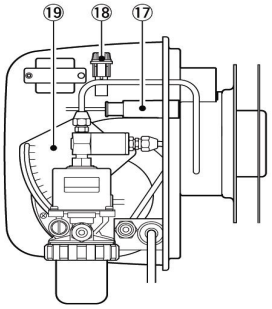
2 Names of Components



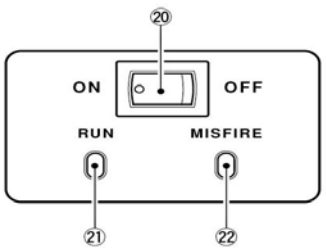
① Burner Cover
② Burner Handle
③ Switch Section
④ Transport Handle
⑤ Wheel
⑥ Fuel Tank
⑦ Drain Bolt
⑧ Tank Legs
⑨ Radiation Disk
⑩ Knob Bolt

⑪ Fuel Cap
⑫ Tank Inlet Filter
⑬ Fuel Gauge
⑭ Fuel Filter
⑮ Fuel Suction and Return Hoses
⑯ Protector
⑰ Flame Monitor (Flame Eye)
⑱ Fuse
⑲ Fan Motor

◆ Burner Section



◆ Switch Section

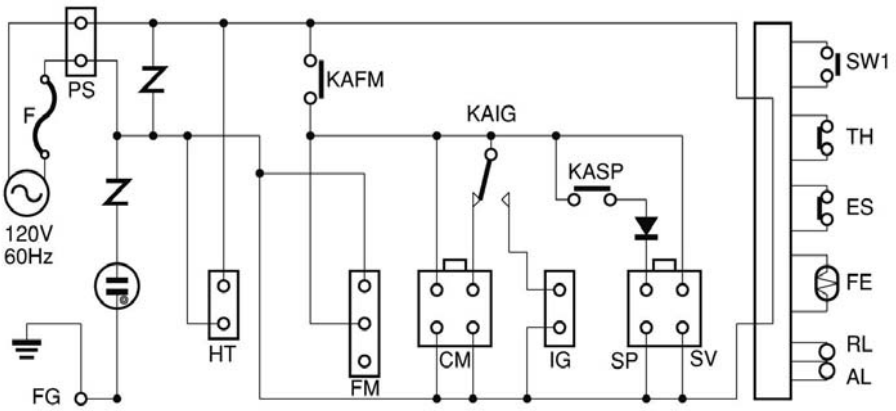


⑳ **Operating Switch**
This ignites or extinguishes the flame.

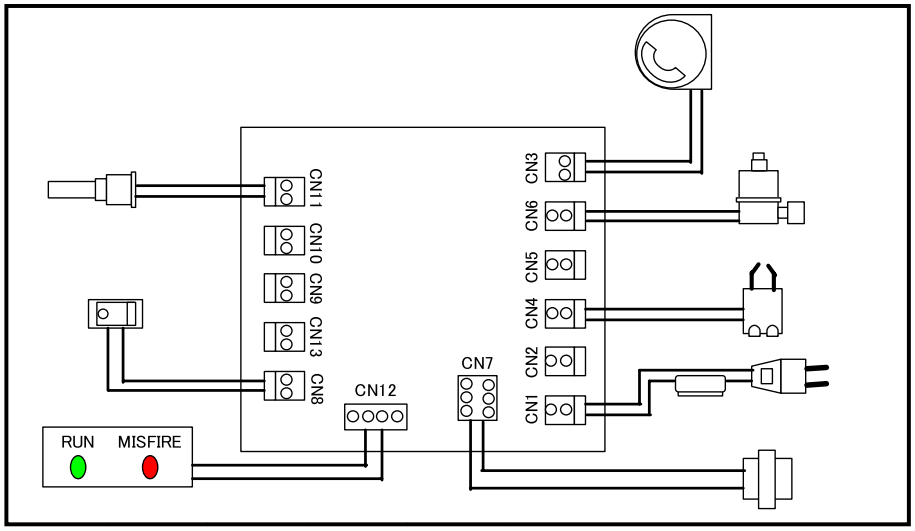
㉑ **Operating Lamp**
This is lit while (the heater is)operating and flashes while (the heater is) cooling down.

㉒ **Misfire Lamp**
This flashes when the flame is extinguished.

3 Wiring Diagram of Burner Control

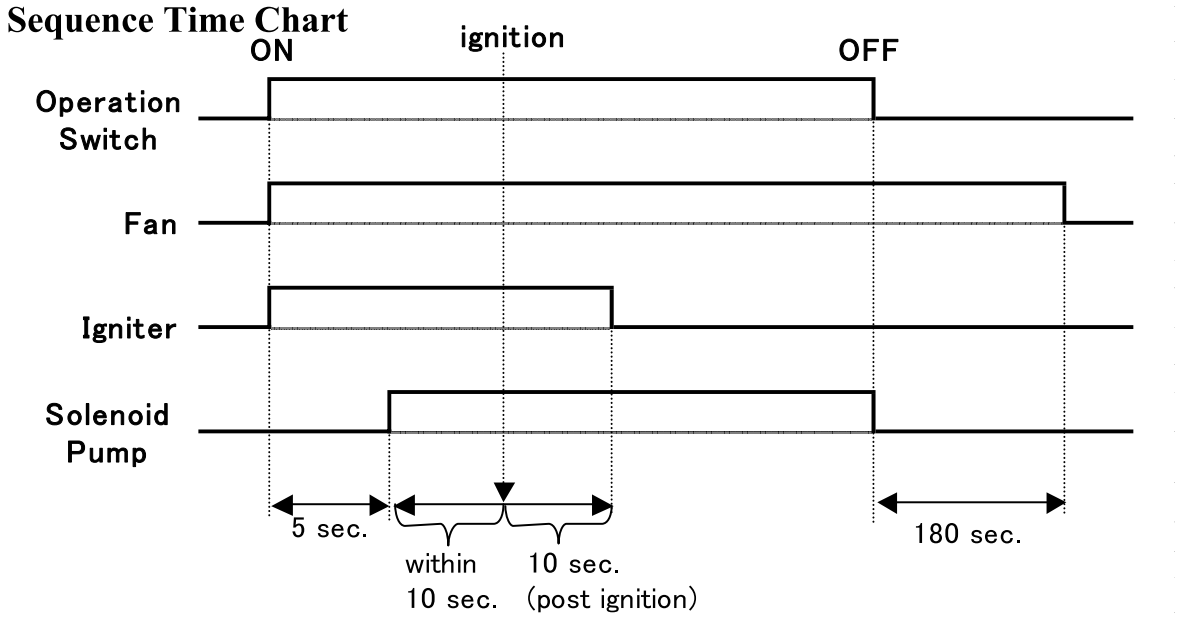


PS : Power Source
SW1 : Operating Switch
TH : Thermostat (Short)
FE : Flame Monitor
FG : Frame Ground
HT : Pre Heater
FM : Fan Motor
CM : (Open)
IG : Igniter
SP : Solenoid Pump
SV : (Open)
RL : Running Lamp
AL : Misfire Lamp
KA : Control Relay
F : Line Fuse
Z : Surge Absorber
ES : Emergency (Short)



Connector No.	
CN1	Power Source
CN2	–
CN3	Fan Motor
CN4	Ignition Transformer
CN5	–
CN6	Solenoid Pump
CN7	Transformer
CN8	Operating Switch
CN9	Thermostat (Short)
CN10	–
CN11	Flame Monitor
CN12	Running Lamp, Misfire Lamp
CN13	–

Sequence Time Chart



VAL6 KBE5S Troubleshooting

	Fault Condition		page
1	**The heater does not start**	The lamp does not light on	22
		Misfire lamp is lit	
2	**The heater does not ignite**	Fuel pump does not operate at all	23
		No fuel or a little fuel is pumped up	
		Ignition coils does not spark.	
		Sequence of operation is normal, but it doesn't ignite	
3	**Misfire within 25 seconds after ignition**	Misfire lamp is lit	24
4	**Combustion stop during the operation**	Misfire lamp is lit	24
5	**Smell of unburned fuel**		25
6	**Smokes**		25
7	**Combustion is not stable**		
8	**Fuel leaks**		
9	**Fuse blows out**	When the heater is plugged in	26
		When the switch is turned on	
		5 seconds after turning on the heater	
10	**Restore the fuel flow (ignition)**		34

13 VAL6 KBE5S Troubleshooting

Note: If the problem(s) is electrical, disconnect all terminal connectors on the circuit board and reconnect one at a time. Make sure all contact points are securely connected

Fault Condition		Possible Cause	How to check	Remedy	Ref.
1. The lamp does not light.		Heater power cable is not receiving electricity	Plug in another power tool and see if it works	Plug into a working outlet	
		Blown fuse		Replace fuse	Picture 8 Picture 9
		Defective transformer	Measure voltage at output side of transformer connector (CN 7) and if it reads 0 Standard: about AC15V (purple-purple)	Replace transformer	
		Defective operation switch	Take operation switch connector (CN 8) out, then check lead with multimeter: if not conducting Standard: Conducting (0Ω) when turned on switch	Replace operation switch	
		Defective circuit board	Measure voltage at input side of transformer connector (CN 7) and if it reads 0V Standard: AC120V (white-red)	Replace circuit board	
	Run lamp is lit.	Loose terminals on circuit board	Check by wiggling the terminals	Firmly connect terminals on circuit board	Picture 6
	Misfire lamp is lit.	Flame monitor sensor malfunctions or direct sun hits flame monitor	Unplug flame monitor connector (CN 11), repositioning of the heater, then turn on switch, if it starts…	Move disk away from direct sunlight or bright light source.	
		Defective circuit board	Do above test and if it fails to start	Replace circuit board	

Fault Condition		Possible Cause	How to check	Remedy	Ref.
2. The heater does not ignite.	**Fuel pump does not work.**	Defective fuel pump	Measure voltage at output side of fuel pump connector on circuit board: must read 60-96V if not	Replace fuel pump	
Please refer to the section: How to Restore Fuel Flow		Defective circuit board	If multimeter reads 0V: Standard: AC60~96V (red-blue)	Replace circuit board	
	No fuel or a little fuel is pumped up.	Fuel line is clogged		• Clean fuel lines • Clean and flush the tank with kerosene, alcohol or acetone	
		Filter is clogged	Check condition of filter	• Replace filter • Clean and rinse the tank with kerosene, alcohol or acetone	
		Nozzle is clogged	Please refer to the section: How to restore Fuel Flow	• Replace nozzle • Clean and rinse the tank with kerosene, alcohol or acetone	
		Loose fittings on fuel lines		Tighten all fittings	
		Fuel pump is clogged, or damaged	Please refer to the section: How to restore Fuel Flow	Replace fuel pump	Picture 4
	Ignition coils do not spark.	Defective ignition coils	Measure voltage at ignition coils connector (CN4) on circuit board: if it reads 120V	Replace ignition coils	
		Defective circuit board	Standard:AC120V (black-black)	Replace circuit board	
	Sequence of operation is normal, but it doesn't ignite	Electrode is out of alignment	Measure the alignment of electrode	Replace electrode	
		Inadequate amount of air	Check gate opening of fan motor	Adjust gate opening. Normal scale: 3	

Fault Condition		Possible Cause	How to check	Remedy	Ref.
3. Misfires within 25 seconds after ignition.	**Misfire lamp is lit.**	Loose flame monitor	Remove plastic cover, and check if the flame monitor is in	Firmly connect the monitor	
		Dirty flame monitor lens	Take flame monitor out, and check condition of its lens	Clean the sensor with soft cloth	
			Remove burner, and check draft tube and vane	Clean draft tube and whirl vane	Picture 8
			Check the air inlet opening	Open at scale: 3	
		Loose connection of flame monitor	Plug flame monitor connector (CN 11) in again, then turn on	Plug connector (CN 11) firmly	
		Defective flame monitor	Unplug flame monitor connector (CN 11), then check transition of resistance by changing quantity of light into flame monitor	Replace flame monitor	
4. Misfires during operation.	**Misfire lamp is lit.**	Air leak	Check all fuel fittings	Tighten all fittings	
		Insufficient amount of pumping fuel because vacuum forms in tank	Check if air intake of fuel gauge is clogged with dust	Clean air intake of fuel gauge	Picture 10
		Lack of light detected by flame monitor	Take flame monitor out, then check the lens	Wipe lens of flame monitor with soft cloth	
			Remove burner, then check draft tube and vane	Clean draft tube and whirl vane	Picture 7
		Defective flame monitor	Unplug flame monitor connector (CN 11), then check the movement of resistance by changing quantity of light into flame monitor	Replace flame monitor if no change	
		Nozzle clogged	Please refer to the section: How to restore Fuel Flow	Replace nozzle	

Fault Condition	Possible Cause	How to check	Remedy	Ref.
5. Smell of unburned fuel.	Too much air getting into the combustion chamber	Check gate opening of combustion air inlet	Adjust gate opening. Normal scale: 3	
	Leaky fuel line, tank		Inspect possible area and correct the problem	
	Cross thread of the nozzle		Take out and retighten the nozzle	
	Wrong orifice on the nozzle	Check makers stamp of the nozzle Mark: 0.85USgal/h 60°H	Replace with a correct nozzle	
6. Smokes.	Insufficient air	Check opening and fan	Adjust the opening to #3 and if necessary, clean the fan.	
	Fan turns at low speed (Power source voltage is insufficient)	Measure voltage at power source connector Standard: AC120V	Check voltage	
	Nozzle clogged	Please refer to the section: How to restore Fuel Flow	Replace nozzle	
	Wrong orifice on the nozzle	Check makers stamp of the nozzle Mark: 0.85USgal/h 60°H	Replace with a correct nozzle	
7. Combustion is not stable.	Air leak	Check all fuel fittings	Tighten all fittings	
8. Fuel leaks.	Refer to #5. section			
	Defective gasket	Remove drain bolt after removing fuel from tank, and check the gasket	Replace drain gasket	
	Too much fuel in the tank	Check the fuel level	Drain excess fuel	

Fault Condition		Possible Cause	How to check	Remedy	Ref.
9. Fuse blows out	**When the plug is put into the outlet.**	Defective transformer	Disconnect transformer connector (CN 7), then measure coil resistance values of two leads	If either lead shows 0Ω, the transformer is defective:replace	
			Standard: about 350Ω (white-red) Standard: about 9Ω (purple-purple)		
			• Without using a multimeter		
			Disconnect transformer connector (CN 7) , then put plug into AC outlet	If the fuse is intact, the transformer is defective:replace	
	When the switch is turned on.	Defective fan	Disconnect fan connector (CN 3), then measure resistance between terminals	If value reads 0, replace the fan	
			• Without using a multimeter		
			Unplug fan connector (CN 3), and then start operation	If the fuse is intact, replace the fan	
		Defective ignition coils	Disconnect ignition coils connector(CN 4) from circuit board, then measure resistance between terminals	If the value shows 0Ω, the ignition coils is defective:replace	
			• Without using a multimeter		
			Disconnect the connector (CN 4) from ignition coils, and then turn on	If fuse is intact, ignition coils is defective	
	About 5 seconds after turning on	Defective pump	Disconnect fuel pump connector (CN 6), then measure resistance between terminals	If the value shows 0Ω, the pump is defective:replace	
			• Without using a multimeter		
			Disconnect fuel pump connector (CN 6), then turn on	If fuse is intact, pump is defective	

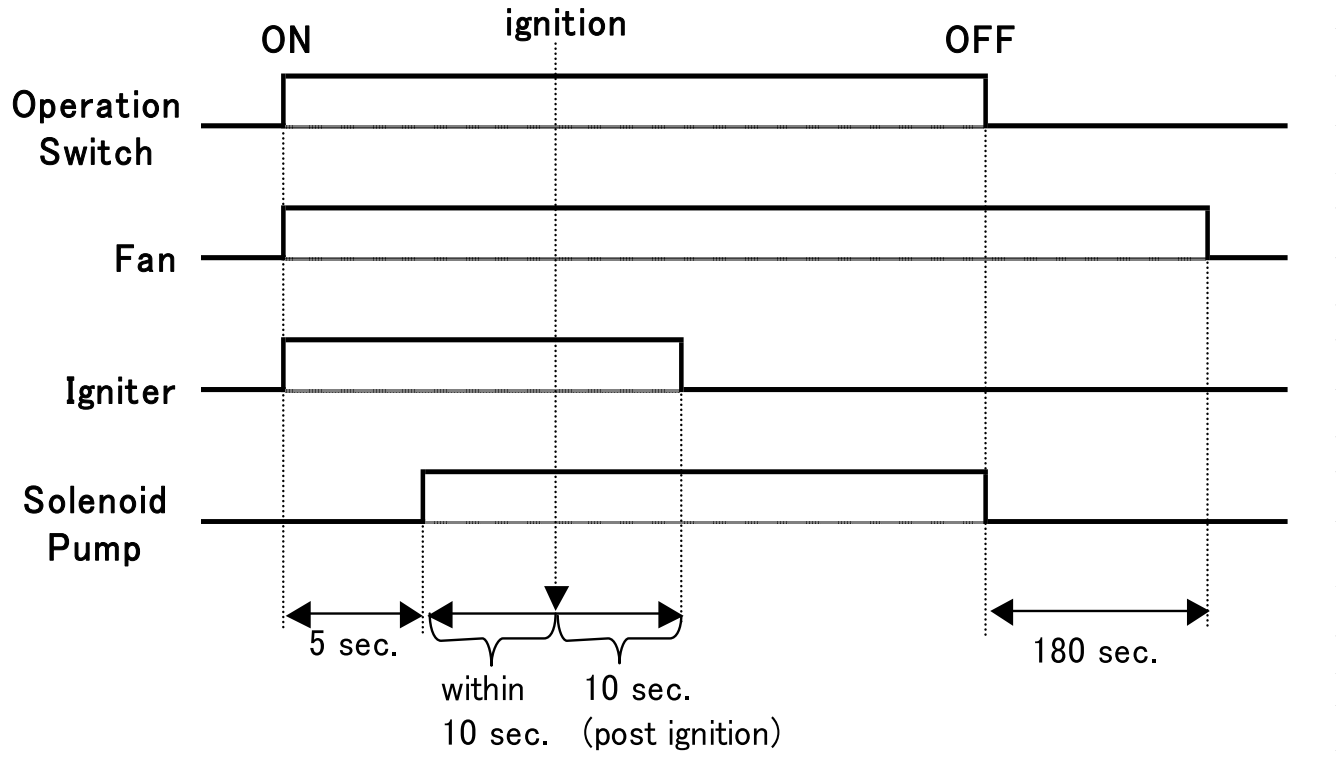
Chart 1 Standard resistance of functional parts

Parts	Connector No	Lead	Condition	Resistance	Remarks
Operation Switch	CN8	Yellow-Yellow	on	0Ω	
			off	∞Ω	
Photo Cell	CN11	Black—Black	dark	over 2MΩ	
			light	under 10KΩ	
Transformer	CN7	Red-White	input	about 350Ω	
		Purple-Purple	output	about 9Ω	
Ignition Coils	CN4	Black—Black	input	-	
			output	about 4.5KΩ	
Fuel Pump	CN6	Red-Blue	-	about 130Ω	
Fan motor	CN3	Gray-Gray	-	about 10Ω	gate: Normal scale 3 (60Hz) *

Chart 2 Input & Output of Circuit Board

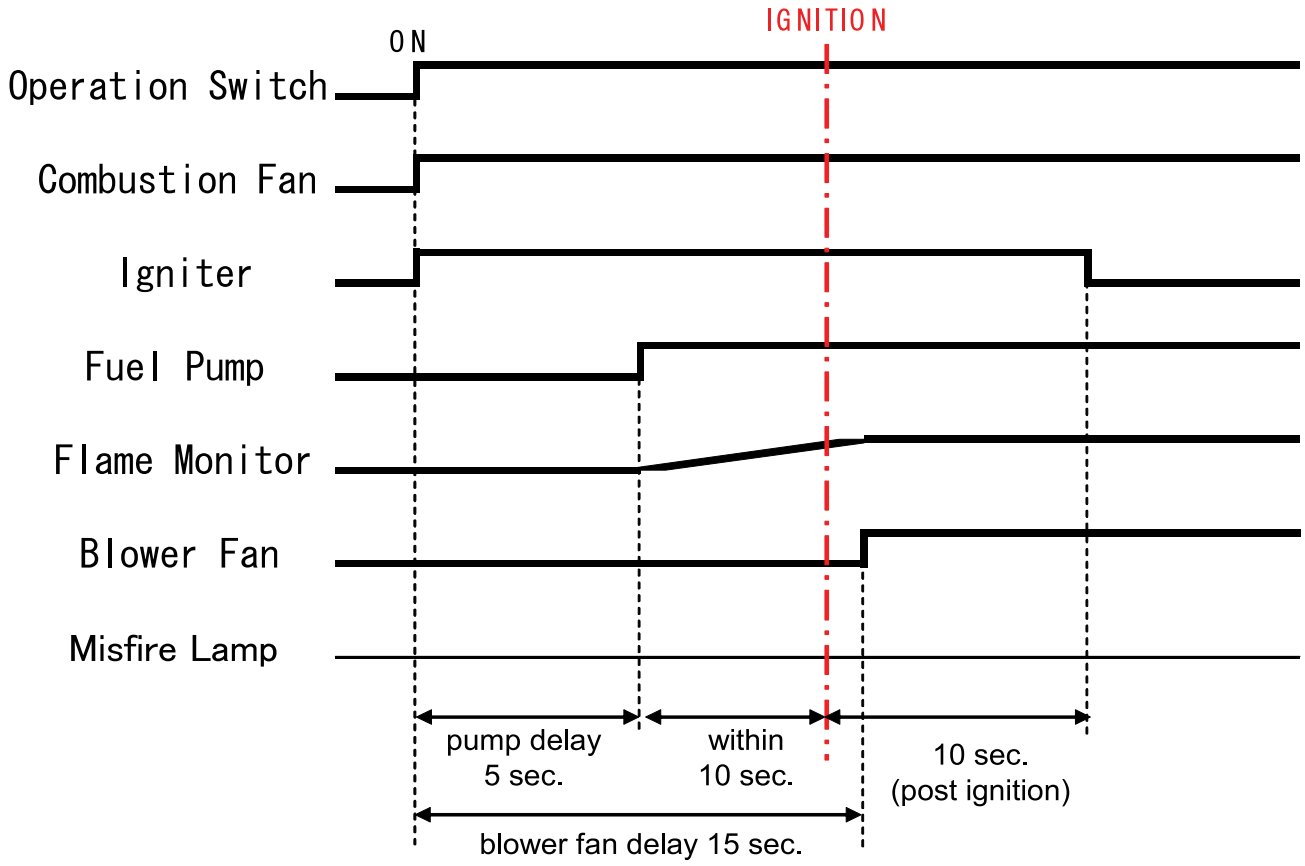
Parts	Connector No	Lead	Condition	Voltage
Power code	CN1	Black-White	-	AC 120V (±10%)
Transformer	CN7	Red-White	input	AC 120V (±10%)
		Purple-Purple	output	about AC 15V
Ignition coils	CN4	Black-Black	input	AC 120V (±10%)
Fuel Pump	CN6	Red-Blue	-	AC 60~96V
Fan motor	CN3	Gray-Gray	60Hz	AC 120V (±10%)
			50Hz	-

Time Sequence of KBE5S, KBE5L, and Hot Gun 125NA



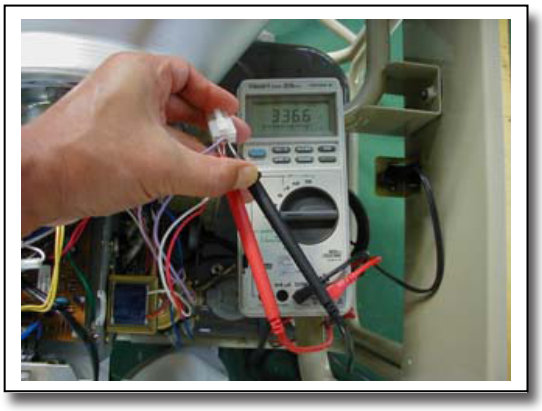
Time Sequence of Daystar

《Normal Start Sequence 》



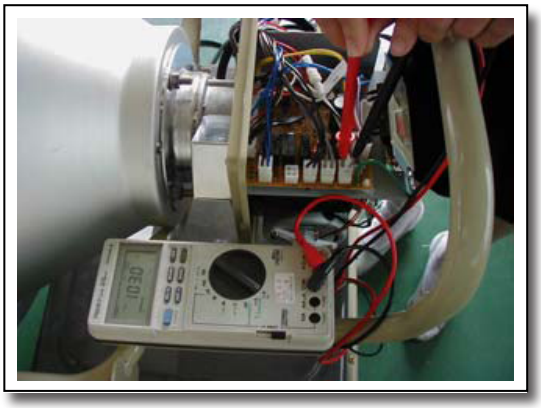
Picture 1 How to measure the resistance

① Pull out a connector which you will measure from the burner
② Turn on the resistor and set resistor range
③ Insert the lead head of resistor to connector [lead wire side] and measure the resistance



Picture 2 How to measure the voltage

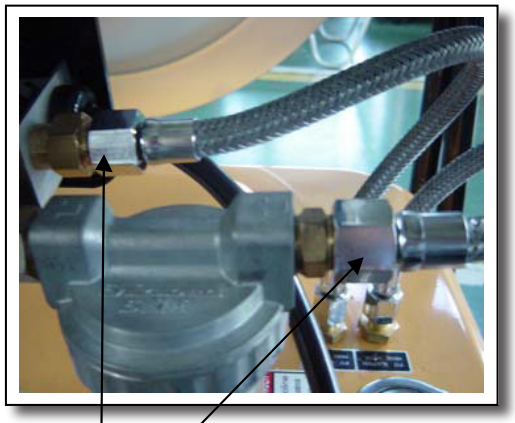
① Turn on the heater
② Turn on the resistor and set AC voltage range
③ Insert the lead head of resistor to connector and measure the resistance



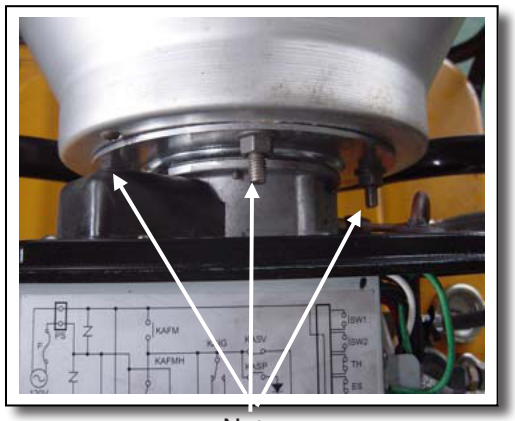
Picture 3 Removing the burner

screw

Unscrew two screws and remove the burner cover



Unscrew two silver nuts with holding gold nuts and remove two fuel hoses



Nut

Unscrew three nuts and remove the burner

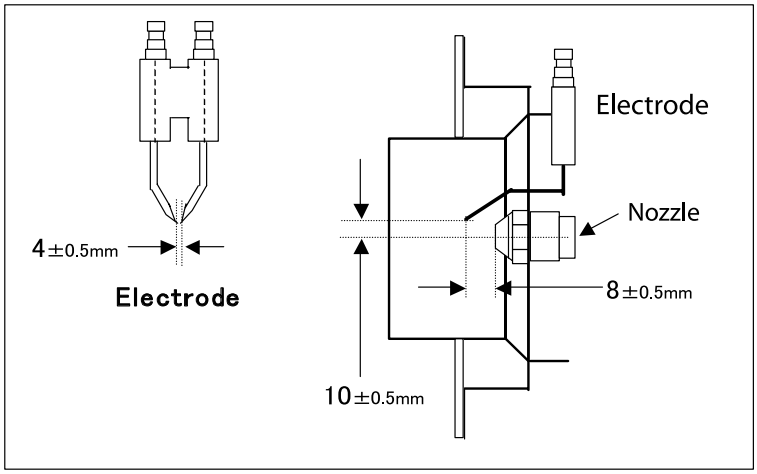
Picture 4 Inspection of the fuel pump

Loosen the brass nut, then
check whether fuel comes out
(The switch must be turned
ON)
If fuel is not flowing a minmum of 2" review
the " How to restore the fuel flow" on page 33.

Standard pressure 99 psi (±4)

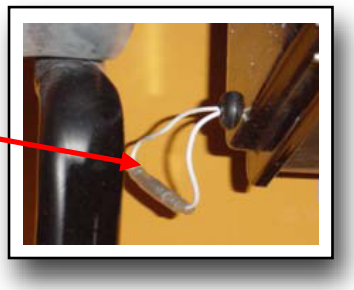
Picture 5 Position of the electrode

Manufacturer does not recommend to adjust the electrode gap since they are too sensitive to align correctly

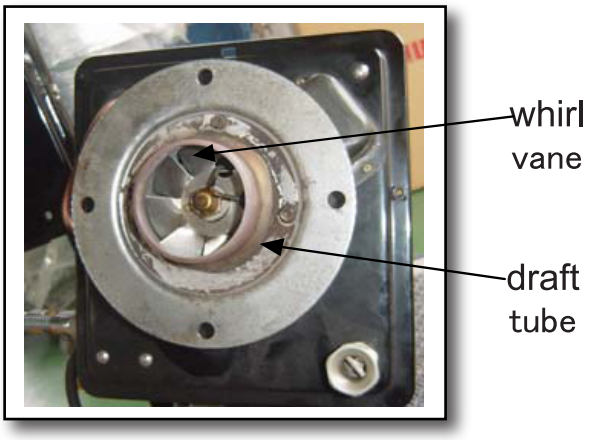


Picture 6 Inspection of the terminals for control device

Check whether the terminals
for control device are connected firmly



Picture 7 Inspection of draft tube and fan



Clean in and out as needed

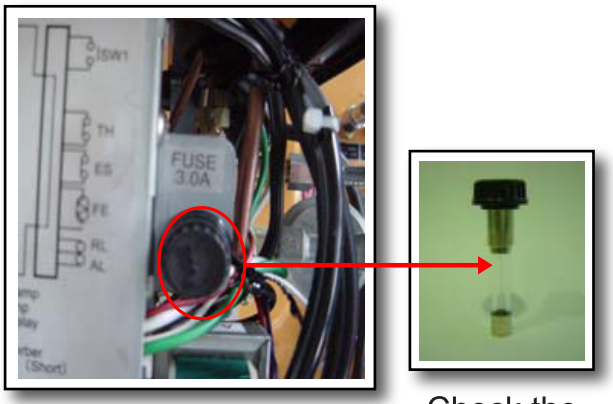
Picture 8 Inspection of fuse 1

Object Serial Number : 01S, 01R, 01Q-030000

Open the fuse box and check the fuse

Picture 9 Inspection of fuse 2

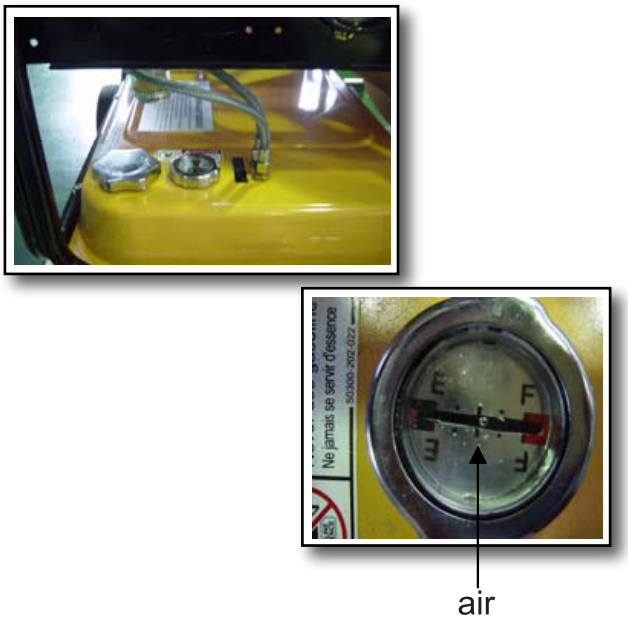
Object Serial Number :01Q-040000, 01P, 01N



Remove a screw cap and take out the fuse

Check the fuse

Picture 10 Clean up fuel gauge

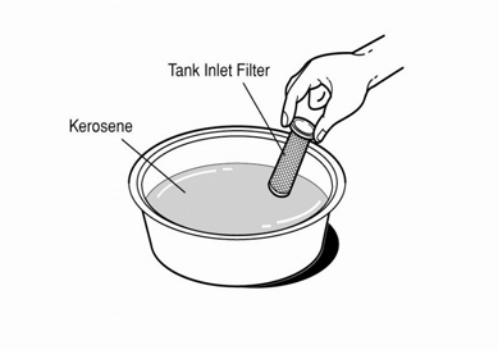


air

If air intake of fuel gauge is clogged, clean it

Preventive Maintenance

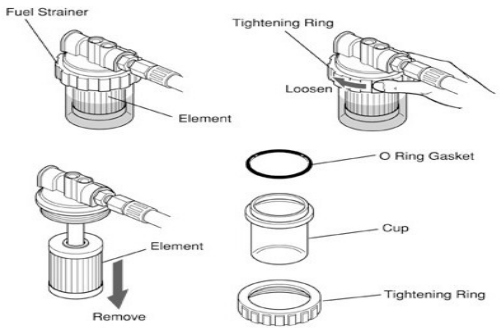
Inspection of the tank inlet filter



1. Remove the fuel cap and check inlet filter
2. If the inlet filter is dirty, clean it with fuel
3. Place the inlet filter back and tighten the fuel cap

Inspection of the filter and drainage of water from the fuel tank

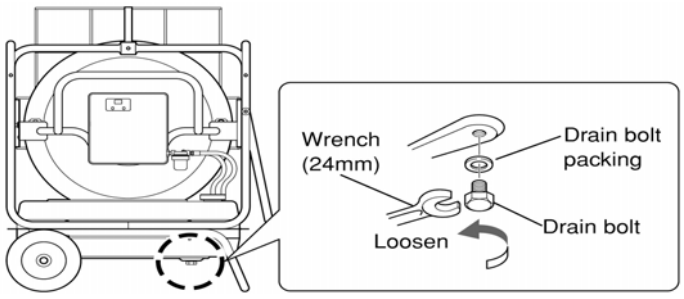
Checking the filter element



1. If the filter element is dirty, replace with a new one
2. If dirt or water is found in the cup, clean the cup thoroughly and proceed to next section

Flush the fuel tank

1. Drain contaminated fuel from the bottom of the fuel tank by removing the drain bolt
2. Place the drain bolt back and pour some clean kerosene or alcohol into the fuel tank
3. Shake and tilt the heater to clean as much inside the tank as possible
4. Remove the drain bolt again to drain the dirty fuel
   If algae like substances are found in the tank, a new tank will be needed
5. Put the drain bolt back and tighten firmly



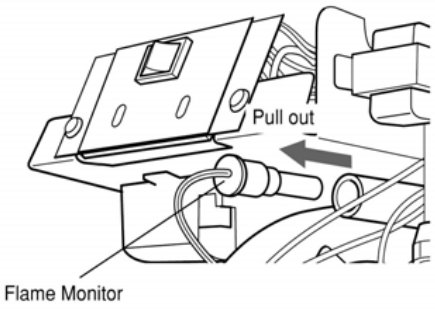
Inspection and cleaning of the flame monitor

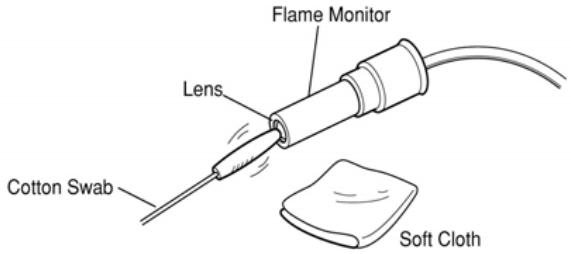
Note - When removing the flame monitor, hold it from the plastic head NOT from the cord.

1. Remove the burner cover and pull out the flame monitor
   Check the photo receptor

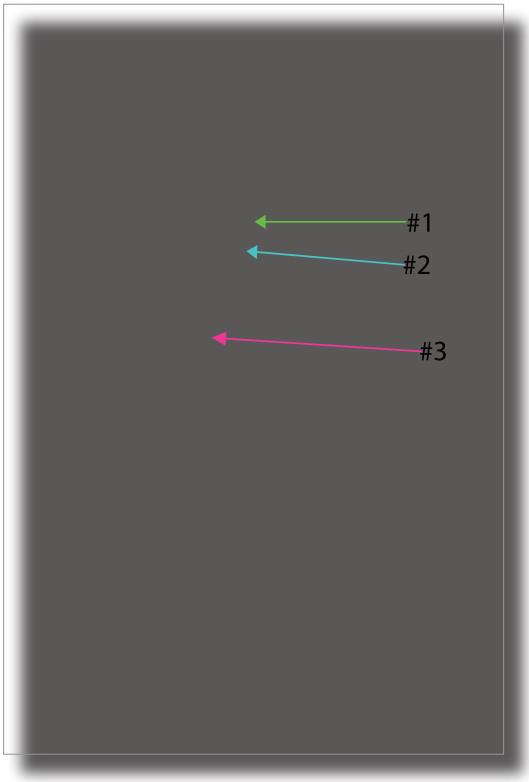
2. If the sensor is dirty, wipe the photo receptor

3. Place the sensor back into the positio n
   It will click when the flame sensor has been replaced correctly.





How to restore the fuel flow (correct firing)



If the heater produces a lot of black smoke, is difficult to fire or never ignites; please perform the following procedures before replacing the pump and /or nozzle.

1. Make sure that the pump comes on (can feel bibration and hear the vibration).
   This will not occur until after the switch has been turned on and you wail for 5 seconds.

2. Make sure that the electrode is sparking.
   You will hear this sparking and can see through the front disk right after turning on the heater.
   (take the heater to shady area for this spark check)

If the above items all check out good and the unit is still not firing, place a pan under the pump to collect fuel during the next procedures.
(If either 1 or 2 is the case, please refer to the troubleshooting)

Procedure

Unscrew the brass fitting #1 completely and push it aside, so that the fuel outlet nipple #2 can be visible.
Turn on switch and look for fuel coming out of #2.
The fuel flow must be at least 2” high.
If the required fuel height is met, only the nozzle should be replaced.

If no fuel is coming out or only a trickle, remove #3 flat head screw, and turn on the switch.
After a few tries, fuel should squirt out #3.
It should shoot out aout 12.”
If you only get a tricke, or no fuel, there may be several factors contributing to the clogging.
please contact us for further assistance.
(Toll free number is 877-VAL-VAL6)

If you have a good flow at #3, reconnect the flat head screw and turn on switch.
The fuel will flow at #2 and if it is a constant flow minimum of 2” in height, turn off switch and reconnect the fitting #1.
If there is not a sufficient fuel flow or no fuel at all, contact JTI for further evaluation.

NOTE:
Insufficient amount of the fuel at the nozzle may cause theunit not to ignite and the raw fuel that drips on the insulator will cause the black smoke when the heater does ignite.

Shizuoka Seiki Co.,Ltd.

THE MOST ADVANCED VAL6 EVER

INFRARED HEATER

VAL6

EPX

http://www.shizuoka-seiki.co.jp/eg.html

THE MOST POWERFUL, YET EFFICIENT VAL6 EVER

With the enlarged combustion chamber/disk and improved atomization, coexistence of power and economy is now possible with EPX.

Larger Radiation Disk

Compared to our regular VAL6 series, the radiation disk is 20% larger.
Because of this, the EPX is able to radiate the infrared heat to objects further and wider away.

High/Low Output Control

The EPX has a High and Low output control that enables its user to choose between a high or low out thus making it very economical.

Long Operational Time

With a 15 gallon tank, the EPX is able to operate continuously for 20 hrs with low output setting and 15 hrs with high output setting which enables it operate all night without refueling.

Variety of Safety Features

Because of the various safety features, the EPX can be used in a safer manner.

Prevention of Overheating:
To prevent malfunction, the heater has an automatic shutdown system when main body reaches temperatures above normal level.

Tip-over Protection:
Heater will automatically shut off when heater falls or receives a strong impact.

Overvoltage Detection:
To prevent malfunction of main components, heater will automatically

Built in heater for Fuel Line

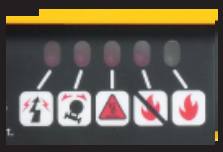
As ambient temperature decreases, viscosity increases, to counterbalance this effect, a heater is built into the fuel line to keep the fuel moving smoothly.

Built in Thermostat

Surrounding temperature can be maintained by the built in thermostat which is a standard equipment.
An external thermostat can also be connected via a connector to control temperatures that are a distant way possible.

Advanced Monitoring System

The color indication lamps are equipped in the main control panel. Not only it makes the mode of operation available but prompt troubleshooting is now possible by attaining precise information via various safety devices.

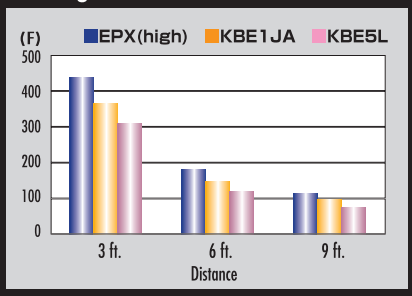


Improved Combustion Efficiency

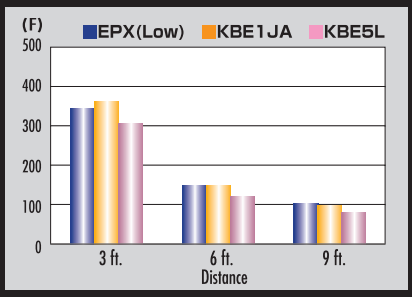
The new EPX model's combustion efficiency has been improved. When compared to KBE 1JA, the EPX can heat further and wider than the 1JA. However, even at the lower setting, the EPX is able to heat just as well with less fuel consumption.

Comparison for Temperature distribution

EPX-High



EPX-Low



shut down when it detects over voltage conditions.

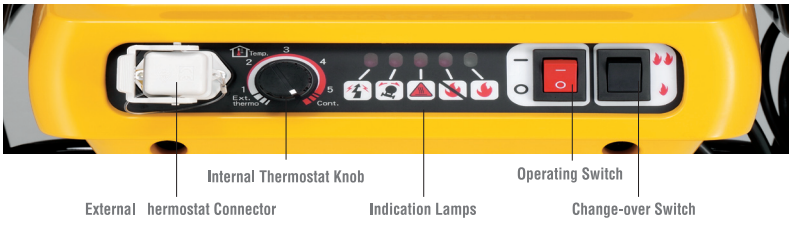
Flame Monitor:

Flame monitor will shut heater off if it detects low flame or no flame

After Power Outage:

Prevention of automatic restart when power returns after a pow outage.

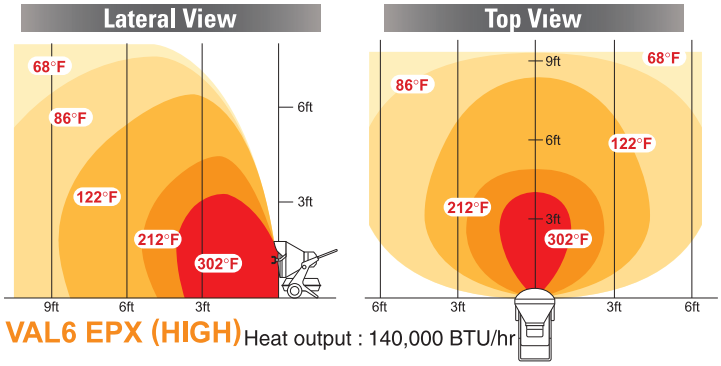
This is to prevent fire or undectable accidents when power is resto after a power outage.



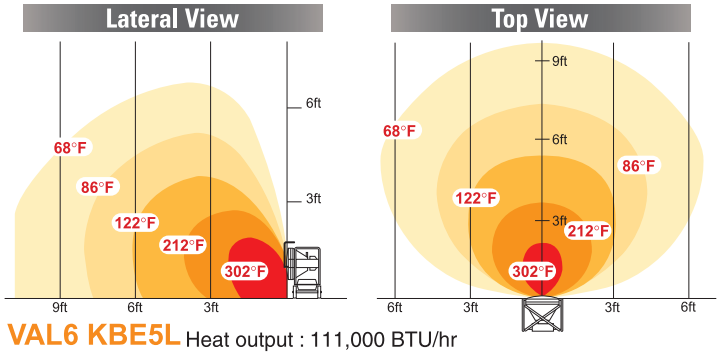
THE MOST ADVANCED VAL6 EVER

INFRARED HEATER
VAL6
EPX

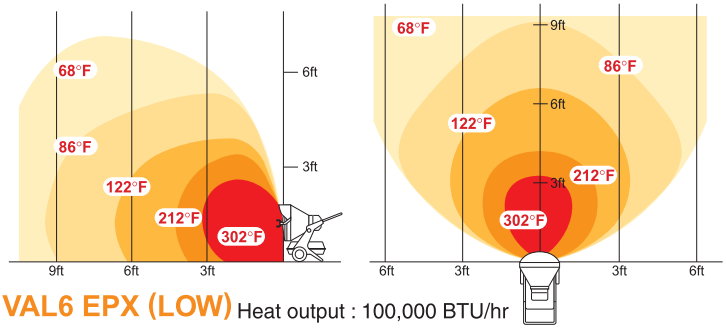
COMPARSION DIAGRAM FOR TEMPERATURE DISTRIBUTION



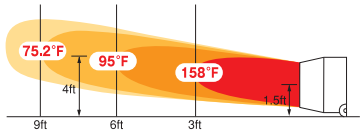
VAL6 EPX (HIGH) Heat output : 140,000 BTU/hr



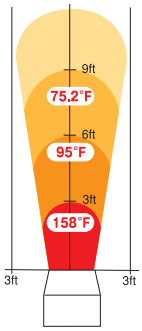
VAL6 KBE5L Heat output : 111,000 BTU/hr



VAL6 EPX (LOW) Heat output : 100,000 BTU/hr



FORCED AIR HEATER
Heat output : 280,000 BTU/hr



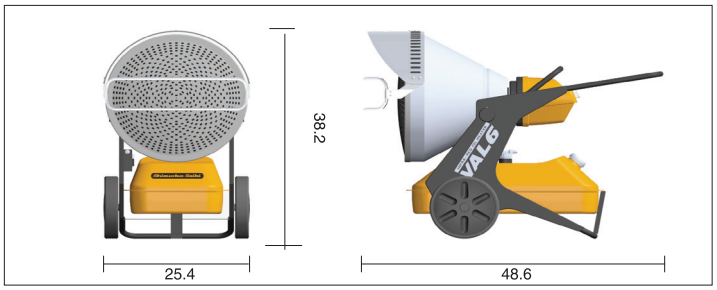
SPECIFICATIONS

Model		EPX5
Heat Output		High: 140,000 BTU/hr
		Low: 100,000 BTU/hr
Fuel Type		Diesel, Kerosene
Fuel Consumption		High: 1.02 gallon/hr
		Low: 0.75 gallon/hr
Tank Capacity		15.4 gallons
Operating Time per Full Tank		High: 15 hours
		Low: 20 hours
Power Source		120V, 60Hz
Power Consumption	in ignition	123 W
	in operation	High: 97 W
		Low: 96 W
Noise Level (in operation)		High: 67 dB (A)
		Low: 63 dB (A)
External Dimension (H×W×D)		38.2×25.4×48.6 in
Dry Weight		110 lbs
Safety Devices		Photocell flame monitor, 3A Fuse, Overheat protection, Tip-over switch, Overvoltage detector

OPTIONAL ACCESSORY

To prevent fire or damage to combustible floor surfaces, always use a "Heat Shielding Mat" when operating a VAL6 series.

Materials of Heat Shielding Mat:
Glass cloth and Aluminum film
Dimension of Heat Shielding Mat:
0.14×47.25×47.25in(H×W×D)



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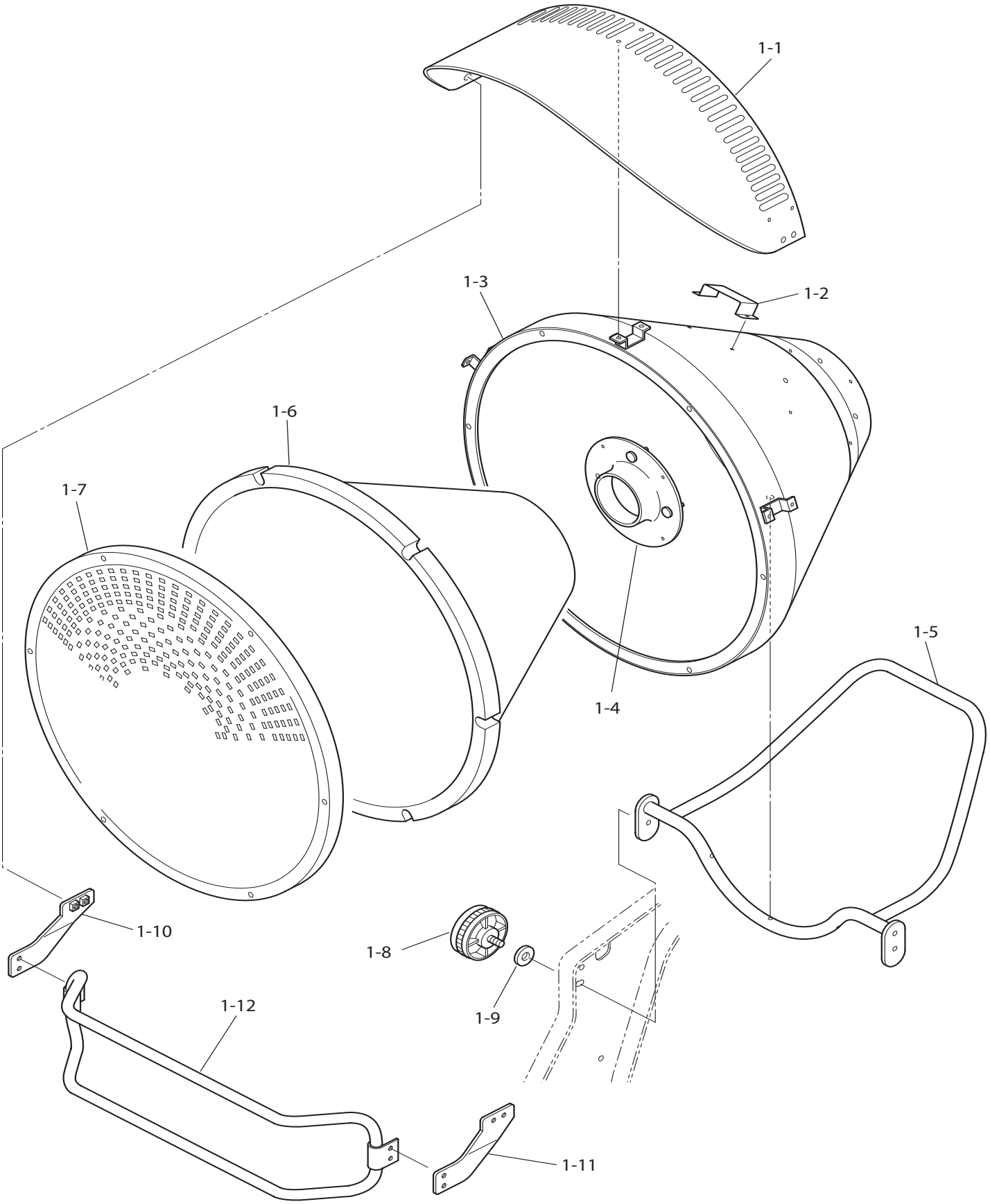
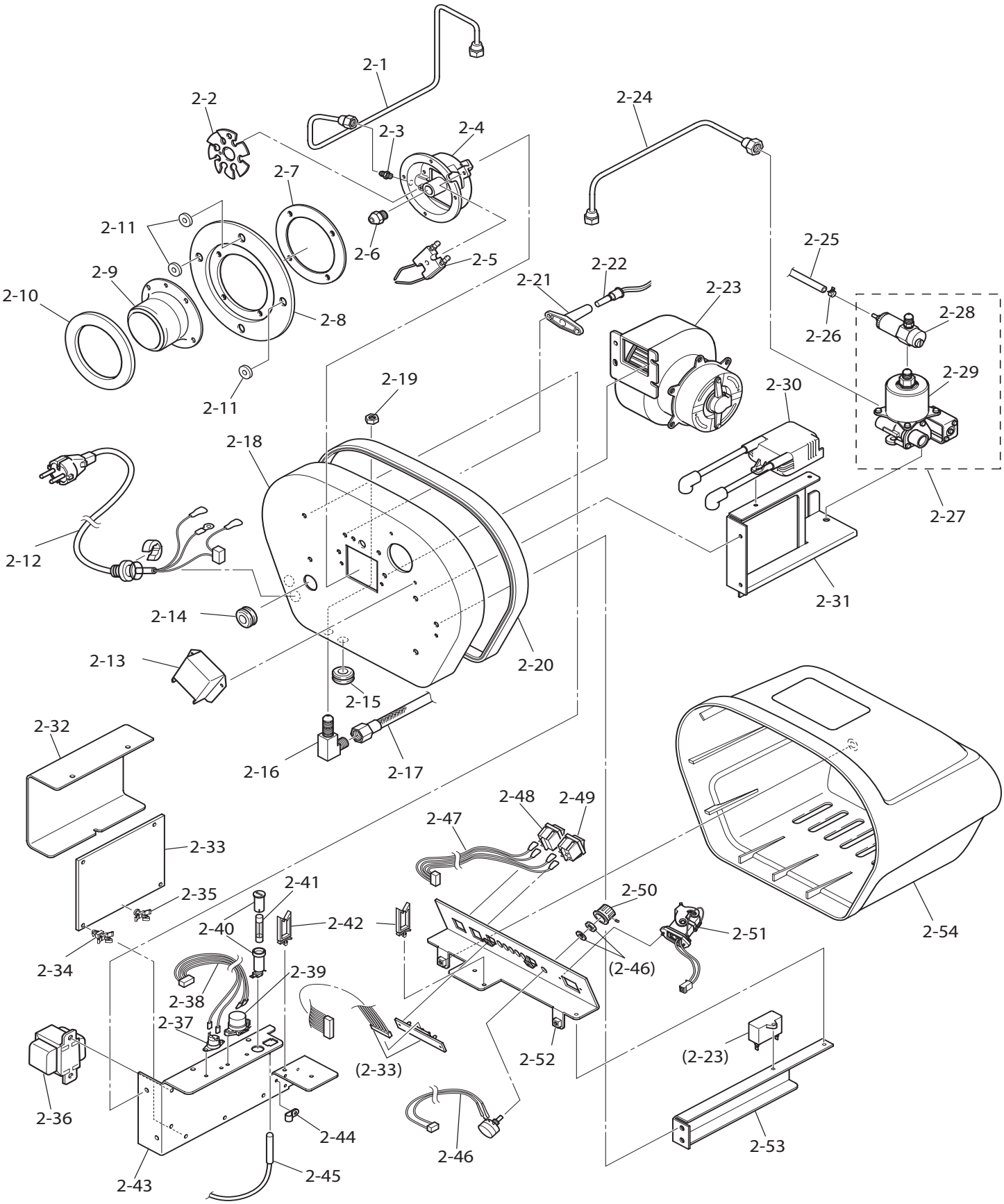
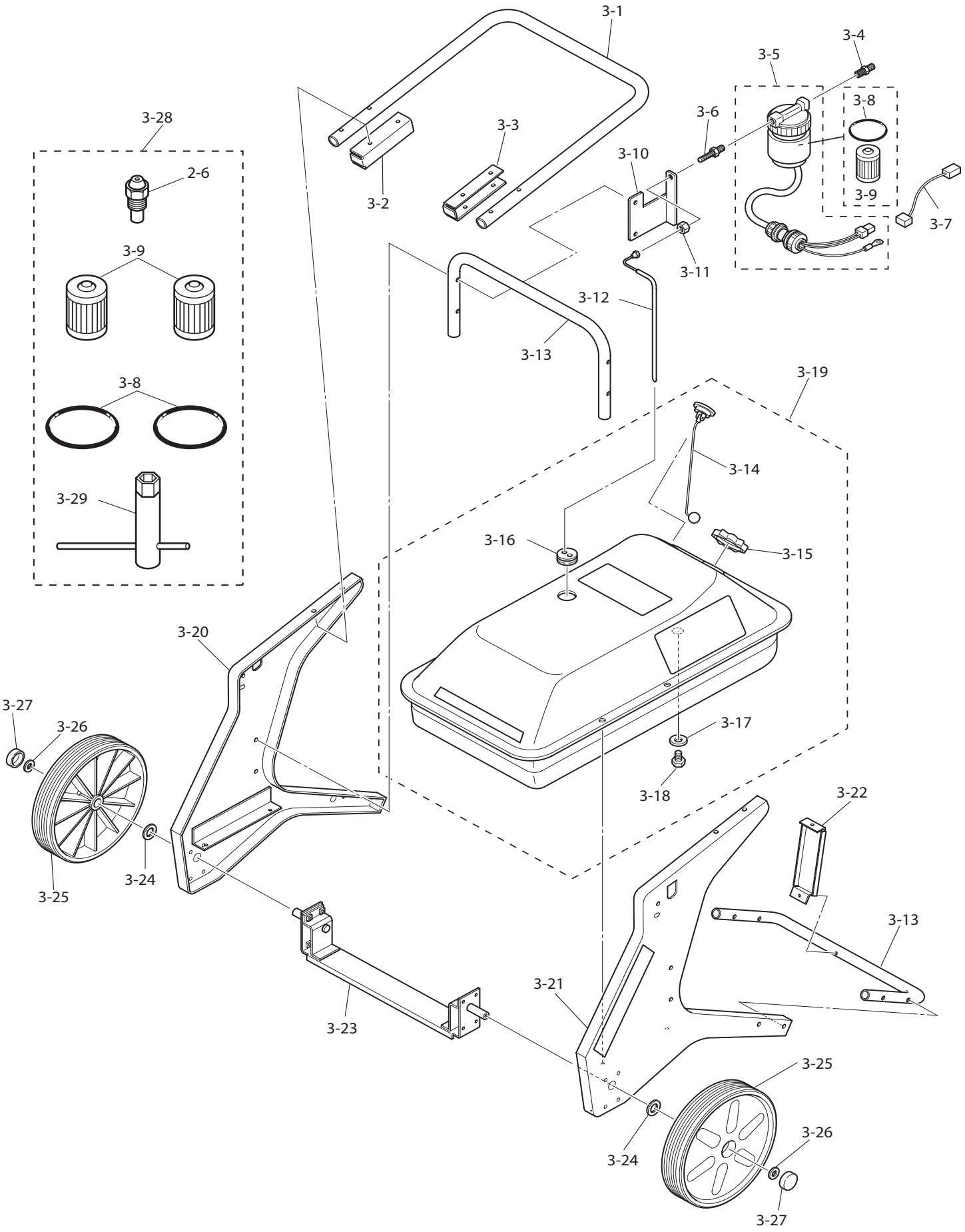


VAL6 EPX_Combustion Section 09.03.26



VAL6 EPX_Burner Section 09.03.26



VAL6 EPX_Tank Section 09.03.26

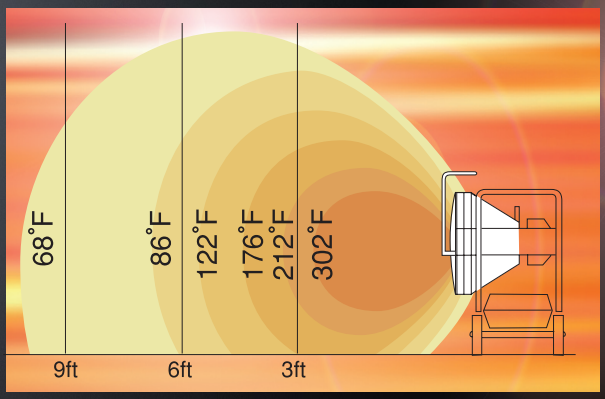
EPX PARTS LIST

Item ID	Item Description	Note
EPX-1-01	VISOR	
EPX-1-02	CAUTION LABEL PLATE	
EPX-1-03	CONICAL HOUSING ASSEMBLY	Include EPX-1-2
EPX-1-04	BURNER FITTING PIECE	
EPX-1-05	SUPPORT PIPE	
EPX-1-06	CONICAL INSULATOR	
EPX-1-07	RADIATION DISK	
EPX-1-08	KNOB BOLT	Same as KSL-T-7
EPX-1-09	WASHER	
EPX-1-10	PROTECTOR BRACKET(L)	
EPX-1-11	PROTECTOR BRACKET(R)	
EPX-1-12	PROTECTOR ASSEMBLY	
EPX-2-01	FUEL OUTLET LINE	
EPX-2-02	WHIRL VANE	
EPX-2-03	NOZZLE NIPPLE	
EPX-2-04	DIFFUSER	Same as KSL-B-8
EPX-2-05	ELECTRODE	Same as KSL-B-7A
EPX-2-06	NOZZLE	0.85G H Only
EPX-2-6A	NOZZLE	0.75G
EPX-2-07	DIFFUSER GASKET	Same as KSL-B-3
EPX-2-08	BURNER FLANGE	Same as KSL-B-2
EPX-2-09	BURNER CONE	Same as KSL-B-1
EPX-2-10	BURNER PACKING	
EPX-2-11	SPACER RING	
EPX-2-12	POWER CABLE	
EPX-2-13	ELECTRODE COVER	Same as KSL-B-6
EPX-2-14	PUMP NOZZLE GROMMET	
EPX-2-15	φ16 GROMMET	
EPX-2-16	RETURN LINE NIPPLE	
EPX-2-17	FUEL HOSE	L=450
EPX-2-18	BURNER BASE	
EPX-2-19	NIPPLE FITTING NUT	same as EPX-3-11
EPX-2-20	BASE GASKET	
EPX-2-21	FLAME MONITOR RECEPTOR	
EPX-2-22	FLAME MONITOR COMPLETE	
EPX-2-23	FAN MOTOR	
EPX-2-24	FUEL INTAKE LINE	
EPX-2-25	RETURN HOSE	
EPX-2-26	HOSE CLAMP	
EPX-2-27	FUEL PUMP WITH AIR VENT VALVE	
EPX-2-30	IGNITION TRANSFORMER	Same as KSL-B-27
EPX-2-31	PUMP TRANSFORMER BRACKET	
EPX-2-32	BURNER CONTROL COVER	
EPX-2-33	BURNER CONTROL BOARD	
EPX-2-34	CONTROL BOARD SUPPORT	Same as KSL-B-30
EPX-2-35	CONTROL BOARD SPACER	Same as NA-B-11
EPX-2-36	STEP DOWN TRANSFORMER	Same as KSL-B-24
EPX-2-37	OVERHEAT SENSOR	
EPX-2-38	OVERHEAT SENSOR CABLE	
EPX-2-39	TIP-OVER SWITCH	Same as KSL-B-44
EPX-2-40	FUSE HOLDER	Same as KSL-B-18A
EPX-2-41	FUSE	Same as KSL-B-17A
EPX-2-42	WIRE BINDING	
EPX-2-43	CONTROL BOARD CHASSIS	
EPX-2-44	NYLON CLAMP	
EPX-2-45	TEMPERATURE SENSOR	
EPX-2-46	INTERNAL THERMOSTAT CABLE	
EPX-2-47	OPERATION SWITCH CABLE	
EPX-2-48	CHANGE-OVER SWITCH	
EPX-2-49	OPERATION SWITCH	
EPX-2-60	INTERNAL THERMOSTAT KNOB	
EPX-2-61	EXTERNAL THERMOSTAT CONNECTOR	
EPX-2-62	OPERATING PANEL	
EPX-2-63	OPERATING BRACKET	
EPX-2-64	BURNER COVER	
EPX-3-01	HANDLE	
EPX-3-02	HANDLE STAY BRACKET(L)	
EPX-3-03	HANDLE STAY BRACKET(R)	
EPX-3-04	FILTER HOSE NIPPLE	Same as KSL-B-15
EPX-3-05	STRAINER HEATER	
EPX-3-06	FILTER NIPPLE	
EPX-3-07	STRAINER HEATER RELAY CABLE	
EPX-3-08	O RING	Same as KSL-B-38
EPX-3-09	FILTER ELEMENT	Same as KSL-B-14
EPX-3-10	FILTER FITTING BRACKET	
EPX-3-11	NIPPLE FITTING NUT	same as EPX-2-19
EPX-3-12	SUCTION PIPE ASSEMBLY	
EPX-3-13	SUPPORT PIPE	
EPX-3-14	FUEL GAUGE	
EPX-3-15	TANK CAP	
EPX-3-16	SUCTION RETURN PLUG	
EPX-3-17	DRAIN BOLT GASKET	Same as KSL-T-21
EPX-3-18	DRAIN BOLT	Including EPX-3-17
EPX-3-19	FUEL TANK ASSEMBLY	
EPX-3-20	SIDE PANEL(L)	
EPX-3-21	SIDE PANEL(R)	
EPX-3-22	TANK SUPPORT BRACKET	
EPX-3-23	WHEEL BEARING ASSEMBLY	
EPX-3-24	WHEEL SPACER	
EPX-3-25	WHEEL	
EPX-3-26	WHEEL WASHER	
EPX-3-27	SHAFT CAP	
EPX-3-28	REPAIR SET	
EPX-3-29	NOZZLE WRENCH	Same as KSL-B-39-2
VAL-THERMO-01	EXTERNAL THERMOSTAT INSERT	
VAL-THERMO-02	EXTERNAL THERMOSTAT COVER	

Year	2008/2009	2009/2010	2010/2011
Serial No.	H-*****	G-*****	F-*****

- Heat Output 111,000 BTU/hr
- Tank Capacity 9 gallons

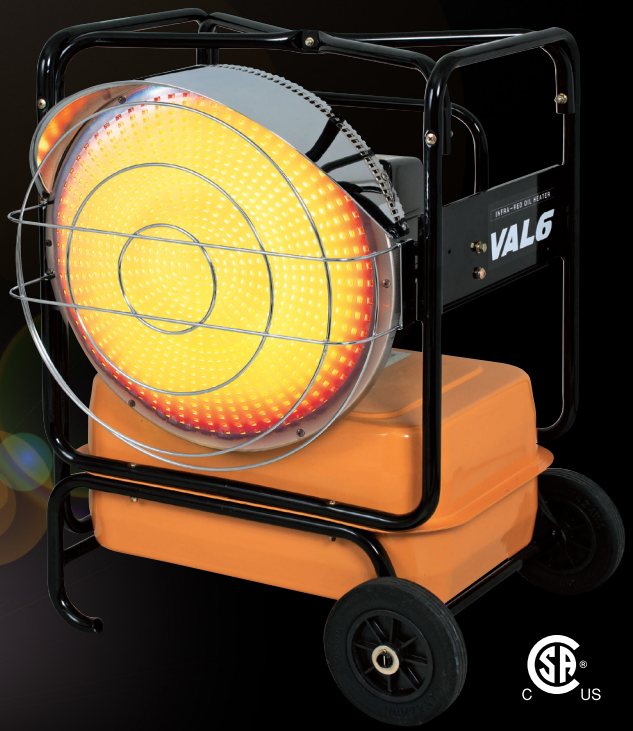
KBE5S

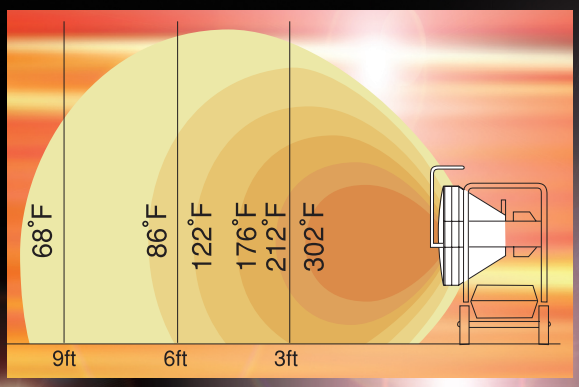


PARTS LIST

KBE5L

- Heat Output 111,000 BTU/hr
- Tank Capacity 15.1 gallons



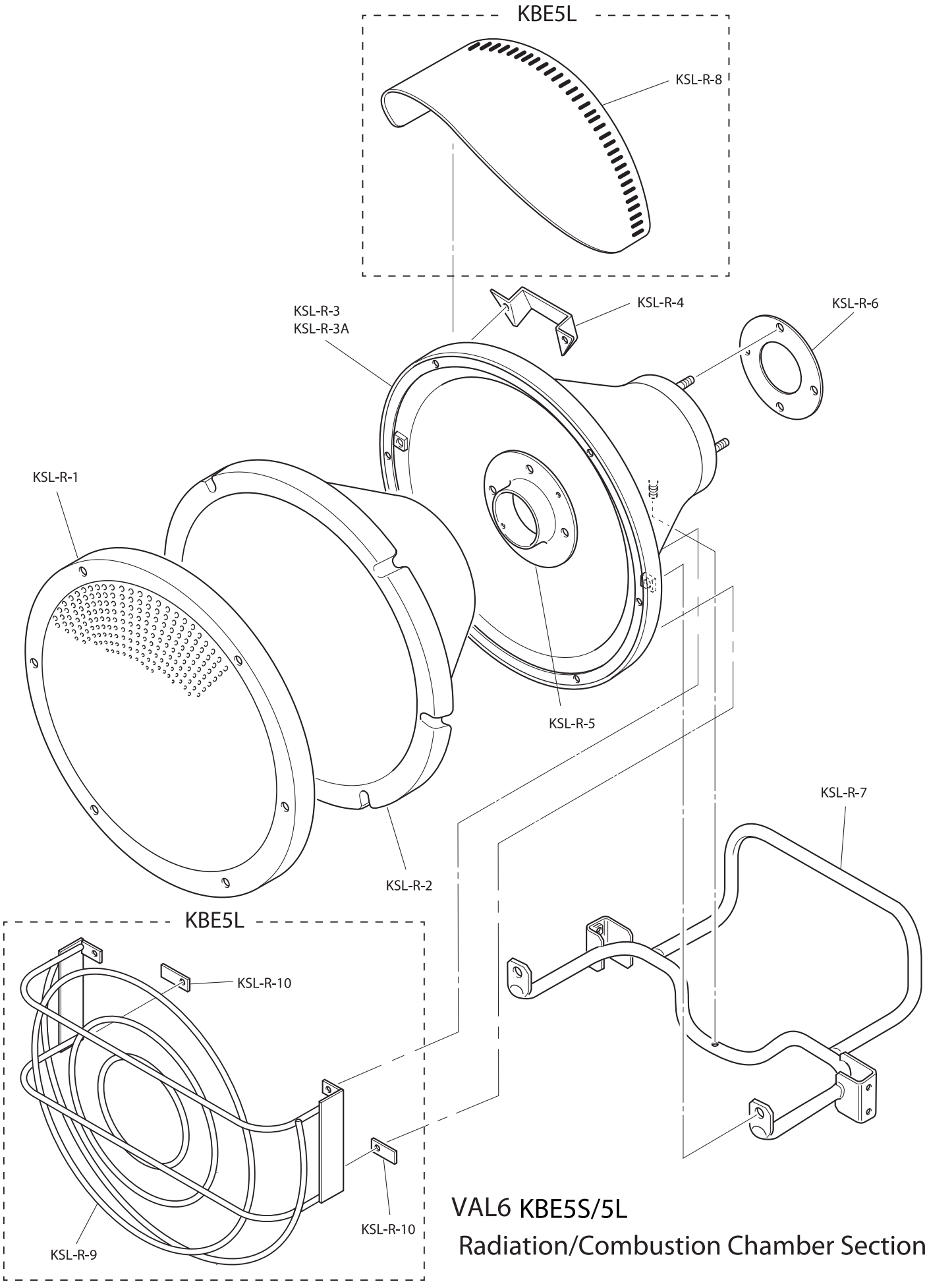


KBE5L & S PARTS LIST

Item ID	Item Description	Note
VAL-KSL-B-01	BURNER CONE	
VAL-KSL-B-02	BURNER FLANGE	
VAL-KSL-B-03	DIFFUSER GASKET	
VAL-KSL-B-04	NOZZLE	
VAL-KSL-B-05	WHIRL VANE	
VAL-KSL-B-06	ELECTRODE COVER	
VAL-KSL-B-07A	ELECTRODE	
VAL-KSL-B-08	DIFFUSER	
VAL-KSL-B-09	NOZZLE NIPPLE	
VAL-KSL-B-10A	BURNER BASE	
VAL-KSL-B-11	FLAME MONITOR COMPLETE	
VAL-KSL-B-12B	FUEL PUMP W/ AIR VENT VALVE	
VAL-KSL-B-13	FUEL FILTER COMPLETE	
VAL-KSL-B-14	FILTER ELEMENT	
VAL-KSL-B-15	FILTER NIPPLE	
VAL-KSL-B-16	PUMP BRACKET	
VAL-KSL-B-16A	PUMP BRACKET	From I
VAL-KSL-B-17A	FUSE (3A)	
VAL-KSL-B-18	FUSE HOLDER	
VAL-KSL-B-18A	FUSE HOLDER	From Q-03
VAL-KSL-B-19B	POWER CABLE	
VAL-KSL-B-20B	CABLE STOPPER	
VAL-KSL-B-21	FUEL OUTLET LINE	
VAL-KSL-B-22	PUMP NOZZLE GROMMET	
VAL-KSL-B-23	FAN MOTOR	
VAL-KSL-B-24	STEP DOWN TRANSFORMER	
VAL-KSL-B-25B	BURNER CONTROL	
VAL-KSL-B-25C	BURNER CONTROL	From J-04 KBE5S only
VAL-KSL-B-26	BURNER CONTROL COVER	
VAL-KSL-B-27	IGNITION TRANSFORMER	
VAL-KSL-B-28	BURNER CONTROL CHASSIS	
VAL-KSL-B-29	SWITCH ASSEMBLY	
VAL-KSL-B-30	CONTROL SUPPORT	
VAL-KSL-B-31	SHORT CIRCUIT CORD	
VAL-KSL-B-32	FACE PLATE	
VAL-KSL-B-32A	FACE PLATE FOR 3 LED	For KS only
VAL-KSL-B-33V	BURNER COVER	
VAL-KSL-B-34	AIR VENT VALVE	
VAL-KSL-B-35	RETURN LINE	
VAL-KSL-B-36	RETURN LINE NIPPLE	
VAL-KSL-B-37	NIPPLE FITTING NUT	
VAL-KSL-B-38A	REPAIR SET (NEW)	
VAL-KSL-B-38B	O-RING FOR FUEL BOWL	
VAL-KSL-B-38-2	NOZZLE WRENCH	
VAL-KSL-B-39	FUSE HOLDER BRACKET	
VAL-KSL-B-40	S-NIPPLE	
VAL-KSL-B-43	THERMOSTAT CABLE	
VAL-KSL-B-44	TIP OVER SWITCH	
VAL-KSL-B-45	TIP OVER SWITCH BRACKET	
VAL-KSL-B-46	TIP OVER SWITCH WIRE	

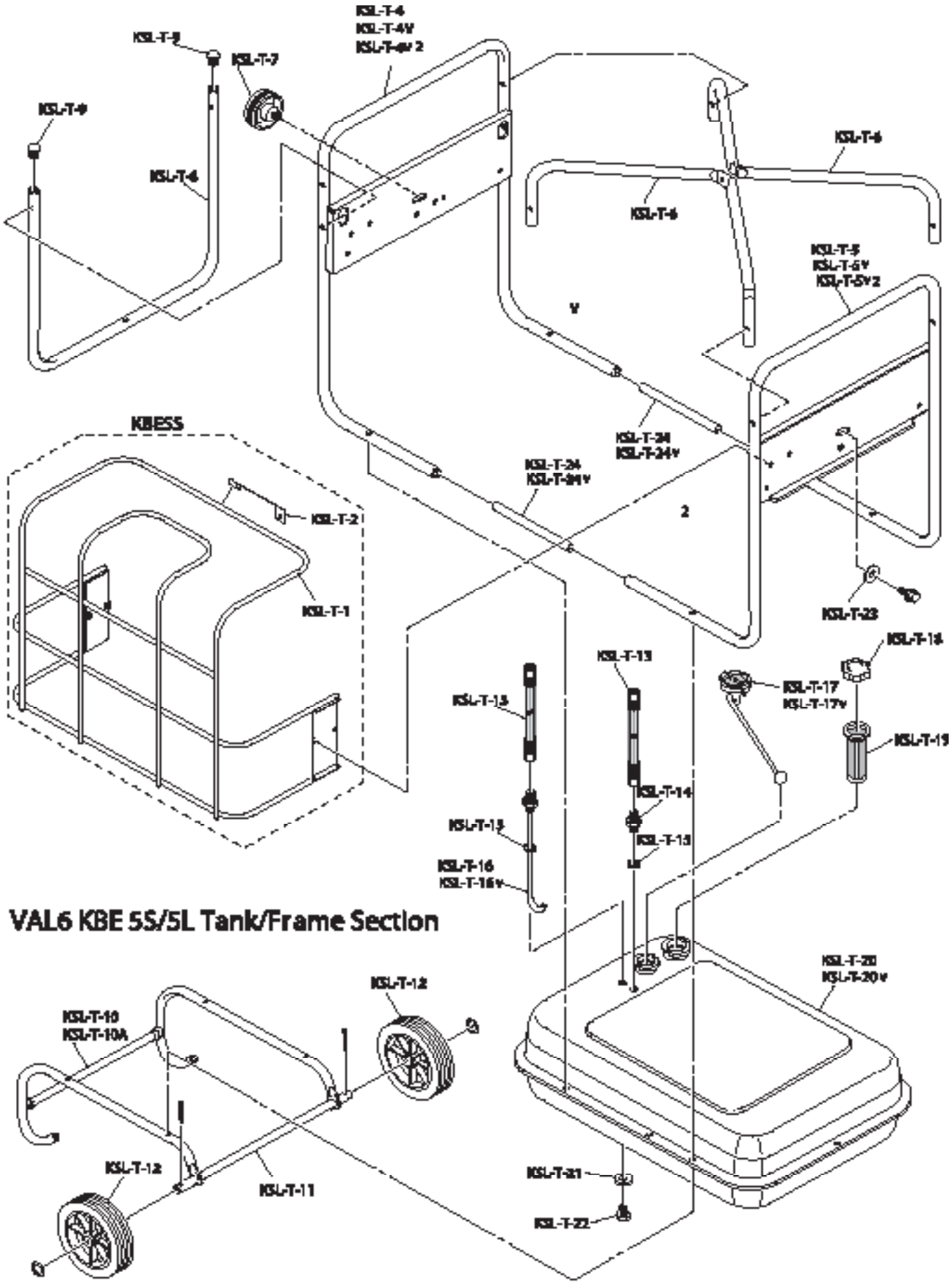
VAL-KSL-R-01	RADIATION DISK	
VAL-KSL-R-02	CONICAL INSULATOR	
VAL-KSL-R-03	CONICAL HOUSING	For KS
VAL-KSL-R-03A	CONICAL HOUSING	For KL
VAL-KSL-R-04	CAUTION LABLE PLATE	
VAL-KSL-R-05	BURNER FITTING PIECE	
VAL-KSL-R-06	BURNER GASKET	
VAL-KSL-R-07	BURNER SUPPORT	
VAL-KSL-R-08	VISOR	
VAL-KSL-R-09	PROTECTOR ASSEMBLY	
VAL-KSL-R-10	RETAINER PLATE	
VAL-KSL-R-11	VISOR FITTING PIECE	
VAL-KSL-SCREW-COVER	SCREWS FOR PLASTIC COVER	
VAL-KSL-SCREW-GUARD	SCREW FOR GUARD	
VAL-KSL-SCREW-RAD	SCREW FOR RADIATION DISK	
VAL-KSL-T-01	PROTECTOR ASSEMBLY	
VAL-KSL-T-02	PROTECTOR SUPPORT	
VAL-KSL-T-04	FRAME-R-KS	
VAL-KSL-T-04V	FRAME-R-KL	
VAL-KSL-T-04V2	FRAME-R-KL	From G-02 lot
VAL-KSL-T-05	FRAME-L-KS	
VAL-KSL-T-05V	FRAME-L-KL	
VAL-KSL-T-05V2	FRAME-L-KL	From G-02 lot
VAL-KSL-T-06	FRAME CONNECTION PIPE	
VAL-KSL-T-06V	FRAME CONNECTION PIPE-KL	
VAL-KSL-T-07	KNOB	
VAL-KSL-T-08	HANDLE	
VAL-KSL-T-08V	HANDLE-KL	
VAL-KSL-T-09	PIPE END CAP	
VAL-KSL-T-09V	PIPE END CAP	
VAL-KSL-T-10A	TANK LEG-KS	
VAL-KSL-T-10V	TANK LEG-KL	
VAL-KSL-T-11	WHEEL SHAFT	
VAL-KSL-T-12	WHEEL	
VAL-KSL-T-13	FUEL HOSE	
VAL-KSL-T-14	RETURN NIPPLE	
VAL-KSL-T-15	SUCTION GASKET	
VAL-KSL-T-16	SUCTION PIPE ASSEMBLY-KS	For KS
VAL-KSL-T-16V	SUCTION PIPE ASSEMBLY-KL	For KL
VAL-KSL-T-17	FUEL GAUGE	For KS
VAL-KSL-T-17V	FUEL GAUGE-KL	For KL
VAL-KSL-T-18	TANK CAP	
VAL-KSL-T-19	TANK INLET FILTER	Discontinued from H-01
VAL-KSL-T-20	FUEL TANK-KS	For KS
VAL-KSL-T-20V	FUEL TANK-KL	For KL
VAL-KSL-T-21	DRAIN GASKET	
VAL-KSL-T-22	DRAIN BOLT	Including T-21
VAL-KSL-T-23	GASKET	
VAL-KSL-T-24	PIPE CONNECTION-KS	
VAL-KSL-T-24V	PIPE CONNECTION-KL	
VAL-MAT	HEAT SHIELD MAT	

Year	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Serial No.	S-[illegible]	R-[illegible]	Q-[illegible]	P-[illegible]	N-[illegible]	J-[illegible]	I-[illegible]	H-[illegible]	G-[illegible]	F-[illegible]



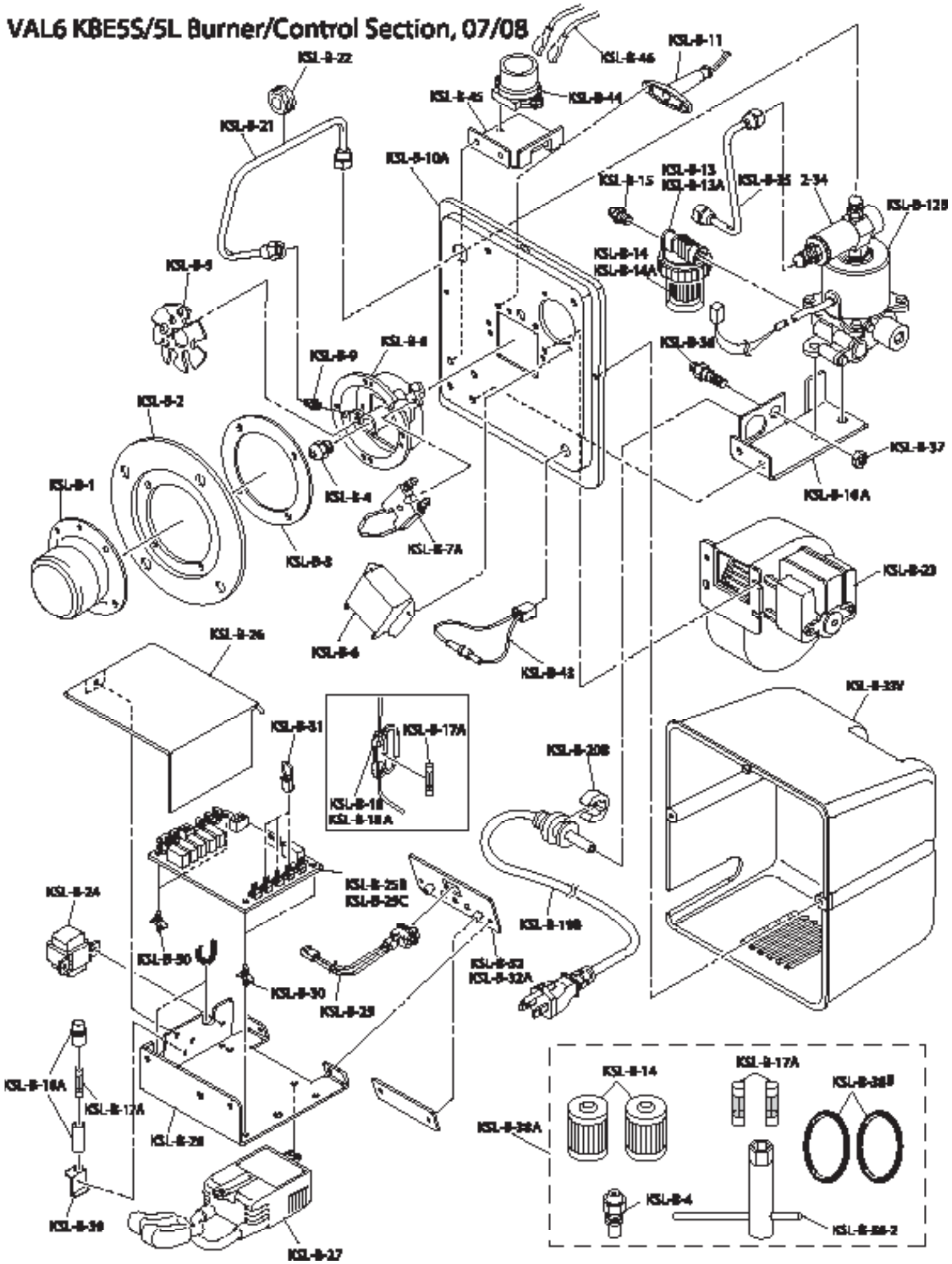
VAL6 KBE5S/5L

Radiation/Combustion Chamber Section



VAL6 KBE 5S/5L Tank/Frame Section

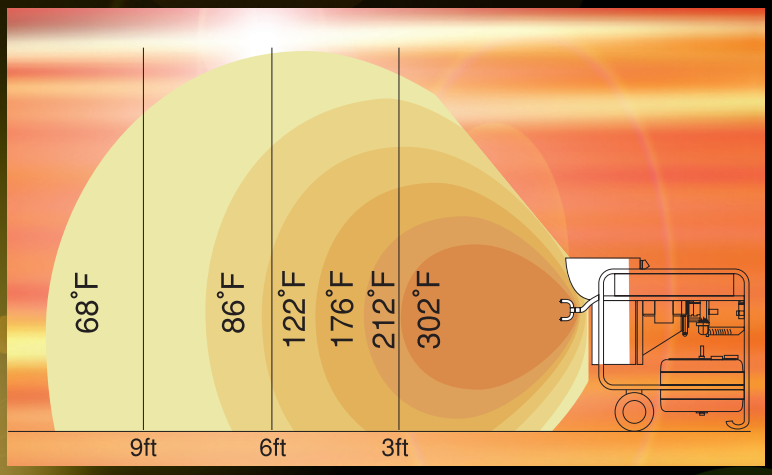
VAL6 KBE5S/5L Burner/Control Section, 07/08



Infrared Heater

KBE1JA

- Heat Output 137,600 BTU/hr
- Tank Capacity 15.1 gallons

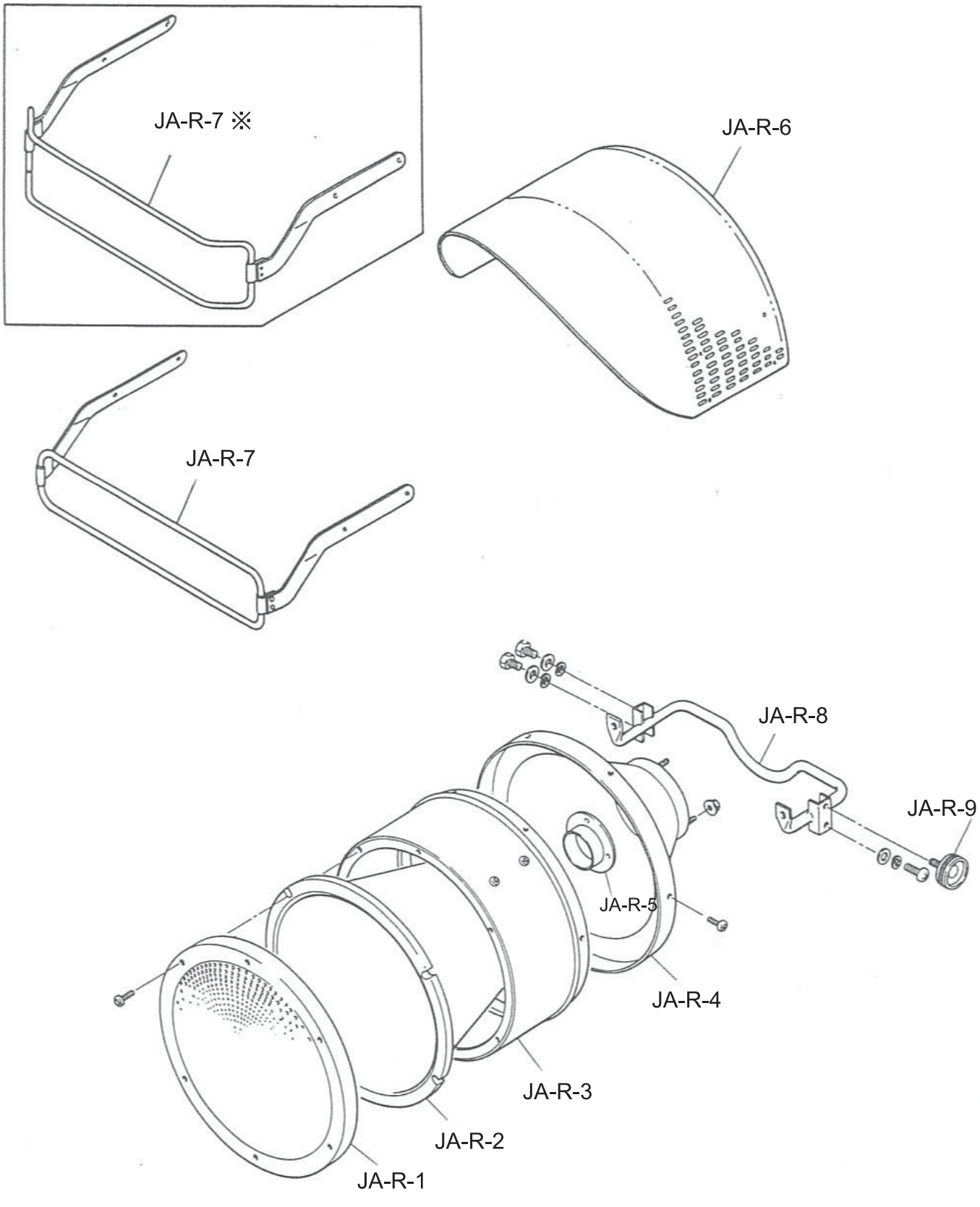


KBE1JA PARTS LIST

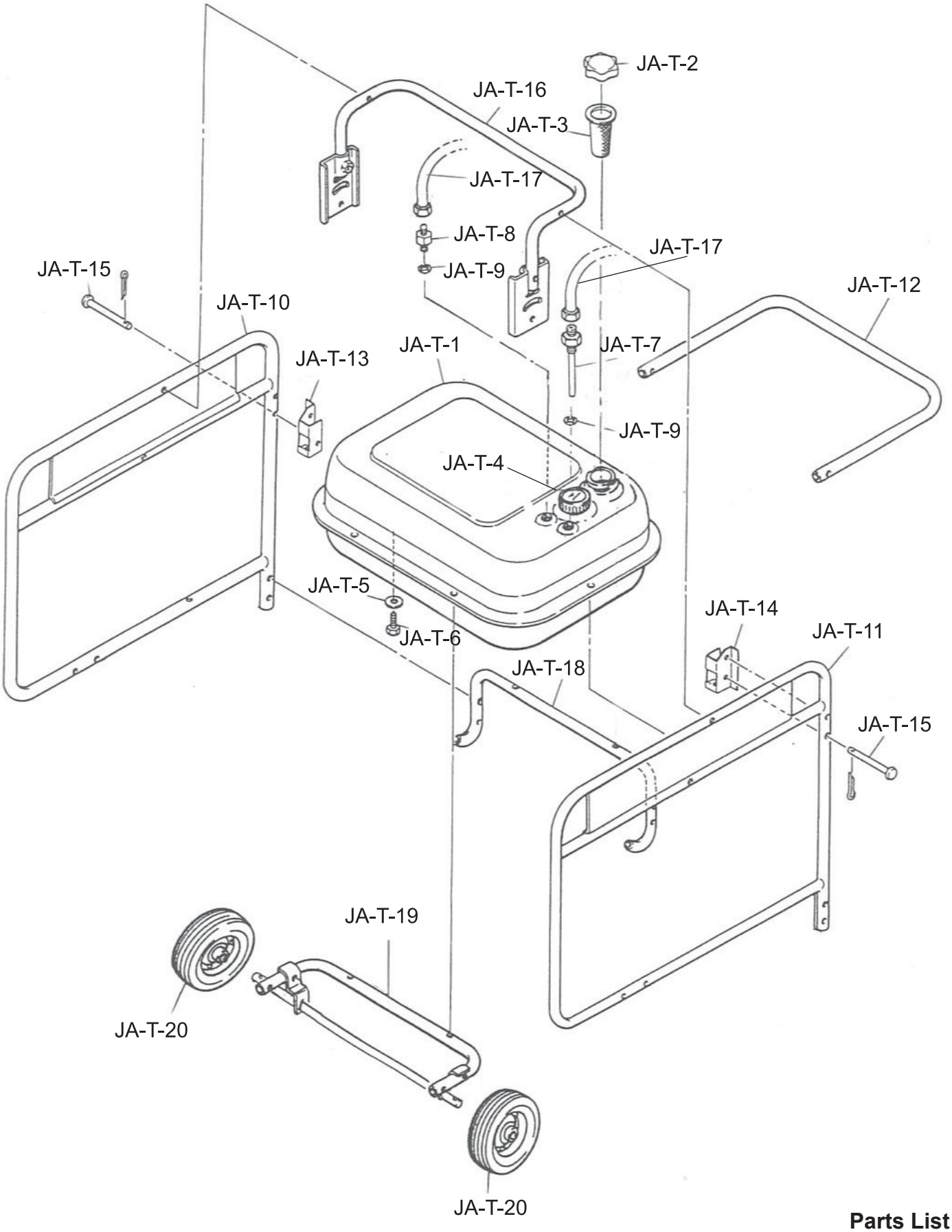
Item ID	Item Description	Note
VAL-1JA-B-01	NOZZLE	
VAL-1JA-B-02	NOZZLE HOLDER	
VAL-1JA-B-03	L TUBING	
VAL-1JA-B-04	ELECTRODE (RH)	
VAL-1JA-B-05	ELECTRODE (LH)	
VAL-1JA-B-06	ELECTRODE RETAINER	
VAL-1JA-B-07	ELECTRODE FITTING PLATE	
VAL-1JA-B-08	ELECTRODE COVER	
VAL-1JA-B-09	FUEL FILTER COMPLETE	Same as K9L-B-13
VAL-1JA-B-10	FUEL FILTER ELEMENT	Same as K9L-B-14
VAL-1JA-B-15	ELBOW NIPPLE	
VAL-1JA-B-15A	ELBOW NIPPLE	From P
VAL-1JA-B-16	FILTER NIPPLE	
VAL-1JA-B-16A	FILTER NIPPLE	From J
VAL-1JA-B-17	FUEL INTAKE TUBING	
VAL-1JA-B-18	PUMP ELBOW	
VAL-1JA-B-19	FUEL PUMP	With Air vent valve
VAL-1JA-B-22	FUEL OUTLET TUBING	
VAL-1JA-B-23	PUMP NOZZLE GROMMET	
VAL-1JA-B-25	HOUSING	
VAL-1JA-B-26	HOUSING GRIP	
VAL-1JA-B-28	HOUSING SEAL (A)	
VAL-1JA-B-30	HOUSING BRACKET (A)	
VAL-1JA-B-36	SHORT CIRCUIT JUMPER	Same as K9L-B-31
VAL-1JA-B-37B	BURNER CONTROLLER	Same as K9L-B-25B
VAL-1JA-B-38	FUSE HOLDER	
VAL-1JA-B-39	FUSE HOLDER BRACKET	
VAL-1JA-B-41	FUSE (1.6A)	
VAL-1JA-B-42	CONTROLLER CHASSIS	
VAL-1JA-B-42A	CONTROLLER CHASSIS	From I
VAL-1JA-B-43	IGNITION TRANSFORMER BRACKET	
VAL-1JA-B-45A	FACE PLATE	From I
VAL-1JA-B-46	STEP DOWN TRANSFORMER	Same as K9L-B-24
VAL-1JA-B-47	FAN MOTOR	
VAL-1JA-B-48 & 49	FLAME MONITOR COMPLETE	Same as K9L-B-11
VAL-1JA-B-51	IGNITION TRANSFORMER	
VAL-1JA-B-52	INSULATING CAP	
VAL-1JA-B-54	HOUSING END	
VAL-1JA-B-54A	HOUSING END	From J
VAL-1JA-B-55	HOUSING INNER BRACKET	
VAL-1JA-B-56	HOUSING SEAL (B)	
VAL-1JA-B-57	BURNER NECK	
VAL-1JA-B-58	BURNER CONE	
VAL-1JA-B-59	WHIRL VANE	Same as EP5D-B-03
VAL-1JA-B-69	POWER SWITCH	
VAL-1JA-B-71	POWER CABLE	
VAL-1JA-B-73B	CABLE STOPPER	
VAL-1JA-B-74	BURNER BASKET	Same as K9L-R-06
VAL-1JA-B-75	NOZZLE WRENCH	Same as K9L-B-38-2
VAL-1JA-B-77	WASHER	
VAL-1JA-B-80	RETURN TUBING	
VAL-1JA-B-81	RETURN ELBOW CONNECTOR	
VAL-1JA-B-82	RUBBER CAP	
VAL-1JA-B-83	MAINTENANCE KIT	
VAL-1JA-B-88A	O-RING FOR FUEL BOWL	Same as K9L-B-38B
VAL-1JA-B-90	NOZZLE HOLDER WASHER	
VAL-1JA-B-92	NOZZLE FILTER ASSEMBLY	Up to N
VAL-1JA-B-93	ELECTRODE NIPPLE	
VAL-1JA-B-94	NIPPLE FITTING NUT	
VAL-1JA-B-94A	NIPPLE FITTING NUT	From J
VAL-1JA-B-97	BURNER CONTROLLER COVER	
VAL-1JA-B-98	JACK	Up to N
VAL-1JA-B-99	FACE PLATE BRACKET	
VAL-1JA-R-02	CONICAL INSULATOR	
VAL-1JA-R-03	DRUM	
VAL-1JA-R-04	CONNICAL HOUSING	
VAL-1JA-R-05	VISOR	
VAL-1JA-R-07	GUARD RAIL	
VAL-1JA-T-01	FUEL TANK	
VAL-1JA-T-04	FUEL GAUGE	
VAL-THERMO-01	EXTERNAL THERMOSTAT INSERT	
VAL-THERMO-02	EXTERNAL THERMOSTAT COVER	

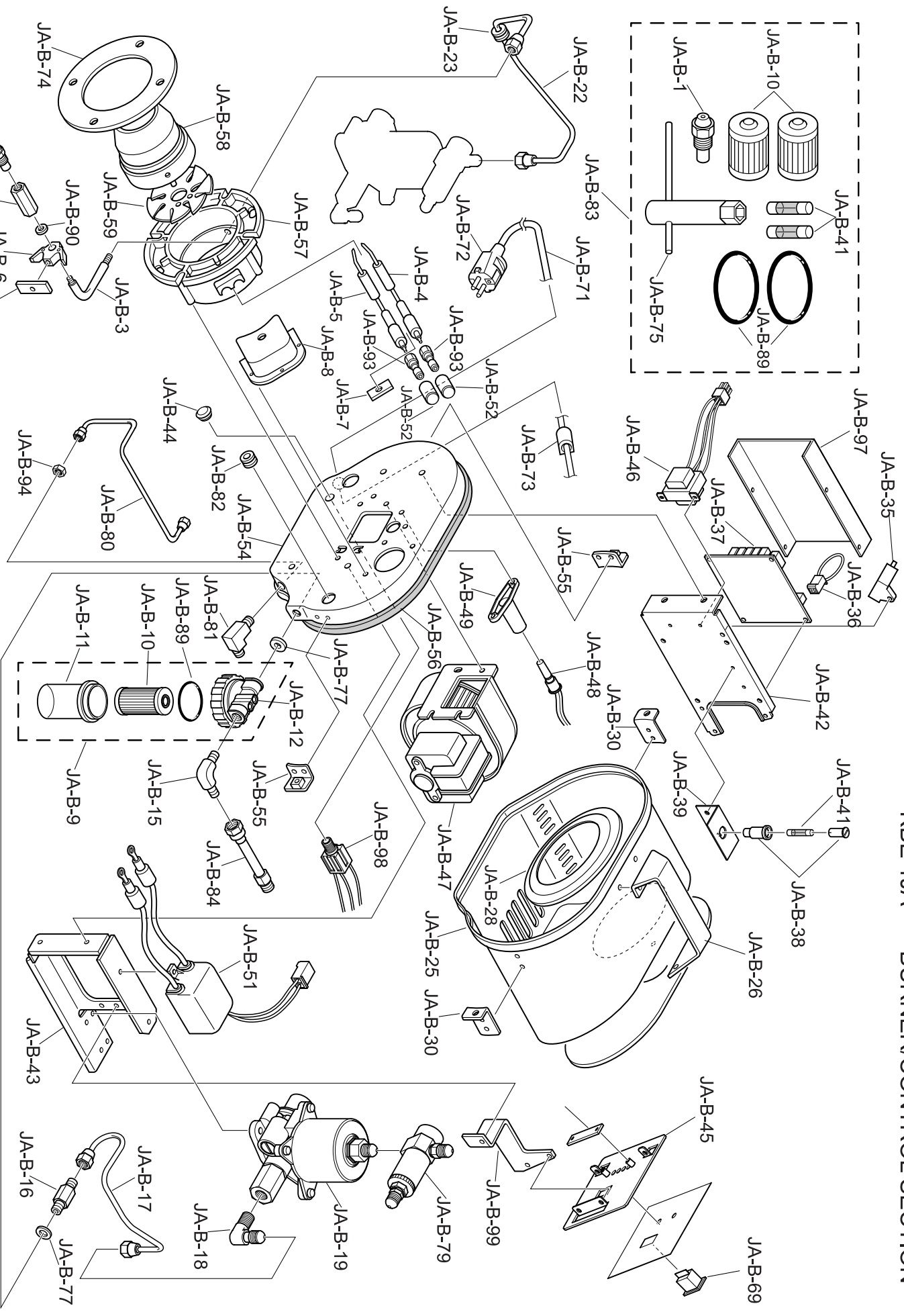
Year	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007
Serial No.	S-xxxxxxx	R-xxxxxxx	Q-xxxxxxx	P-xxxxxxx	N-xxxxxxx	J-xxxxxxx

KBE1JA RADIATION/COMBUSTION SECTION



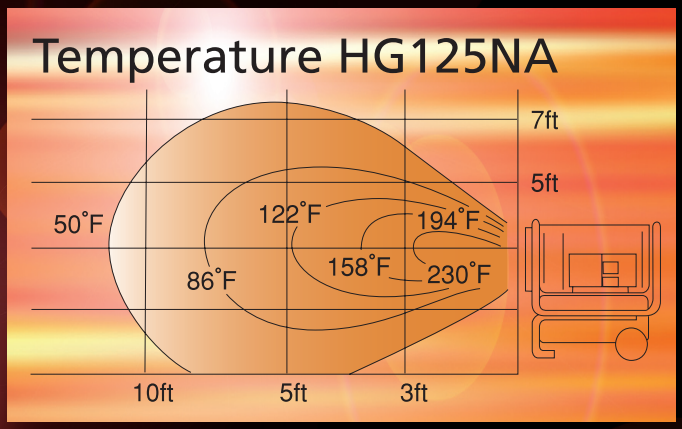
KBE1JA TANK/FRAME SECTION




KBE 1JA BURNER/CONTROL SECTION
JA-B-1
JA-B-10
JA-B-41
JA-B-75
JA-B-89
JA-B-23
JA-B-22
JA-B-74
JA-B-58
JA-B-59
JA-B-57
JA-B-83
JA-B-72
JA-B-71
JA-B-2
JA-B-90
JA-B-6
JA-B-7
JA-B-3
JA-B-4
JA-B-5
JA-B-8
JA-B-93
JA-B-52
JA-B-73
JA-B-46
JA-B-97
JA-B-35
JA-B-36
JA-B-37
JA-B-44
JA-B-94
JA-B-82
JA-B-80
JA-B-54
JA-B-55
JA-B-49
JA-B-48
JA-B-30
JA-B-42
JA-B-39
JA-B-38
JA-B-81
JA-B-89
JA-B-10
JA-B-11
JA-B-56
JA-B-77
JA-B-12
JA-B-9
JA-B-15
JA-B-55
JA-B-84
JA-B-98
JA-B-47
JA-B-28
JA-B-25
JA-B-26
JA-B-51
JA-B-43
JA-B-45
JA-B-99
JA-B-79
JA-B-19
JA-B-18
JA-B-16
JA-B-17
JA-B-77
JA-B-69

Forced Air Heater
HG125NA

- Heat Output 116,000 BTU/hr
- Tank Capacity 14.3 gallons

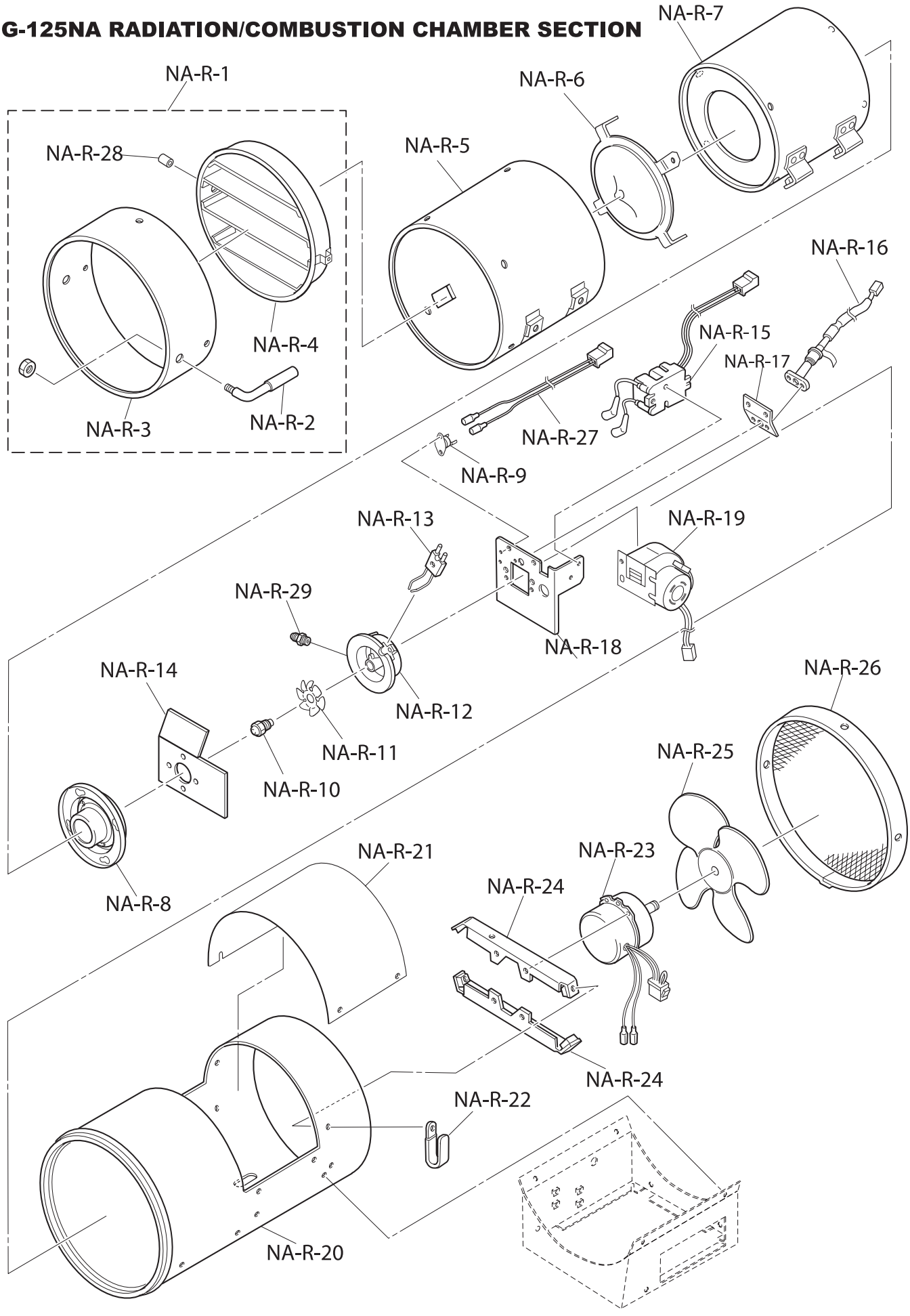


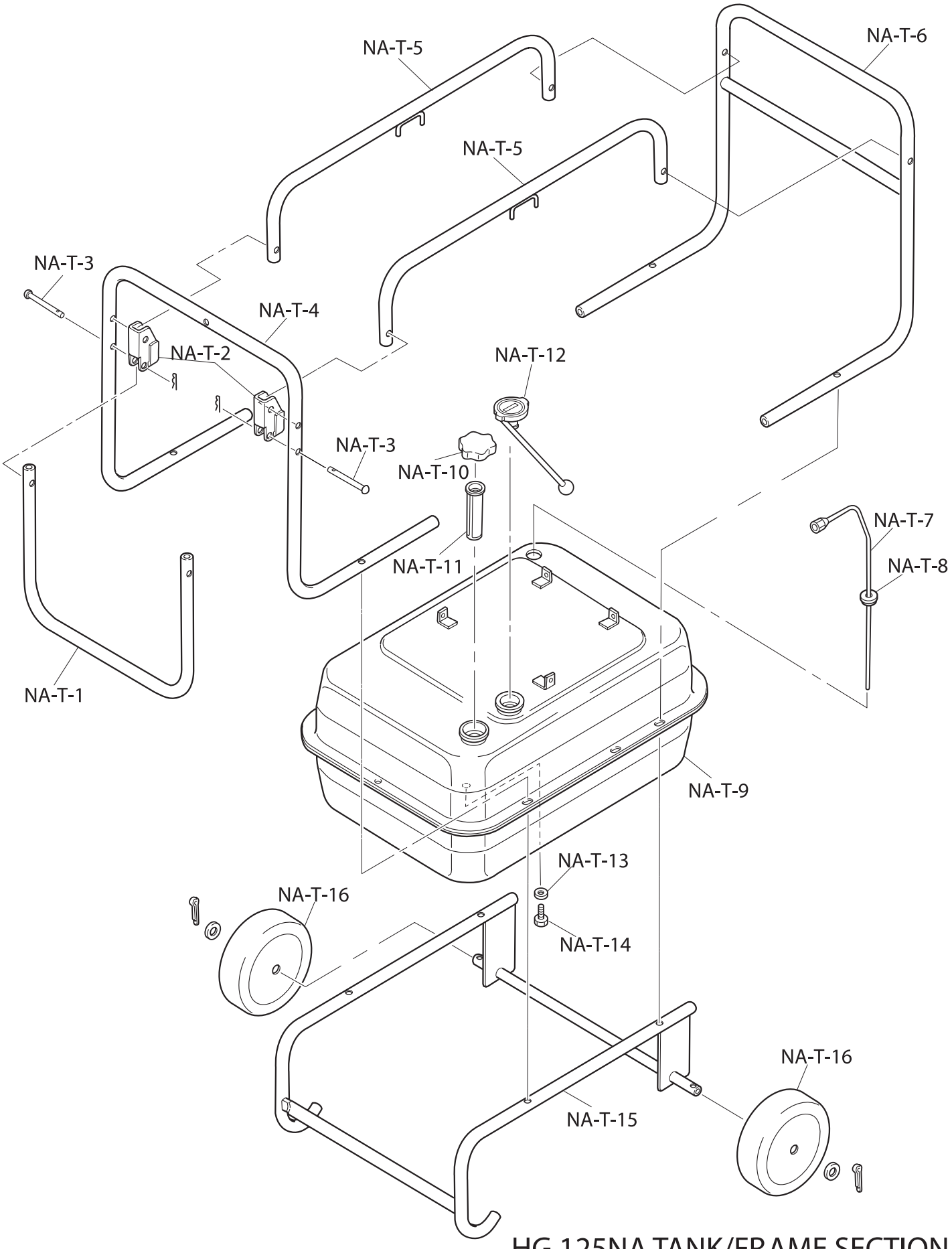
HOTGUN PARTS LIST

Item ID	Item Description	Note
VAL-NA-B-01	FUEL PUMP	
VAL-NA-B-02	PUMP BRACKET	
VAL-NA-B-03	PUMP-NOZZLE TUBING	
VAL-NA-B-04	PUMP-NOZZLE GROMMET	
VAL-NA-B-05	FUEL FILTER COMPLETE	Same as KSL-B-13
VAL-NA-B-06	FUEL FILTER ELEMENT	Same as KSL-B-14
VAL-NA-B-07	NIPPLE	
VAL-NA-B-08	CASING SUPPORT	
VAL-NA-B-09	BURNER CONTROLLER	Same as KSL-B-25B
VAL-NA-B-10	CONTROLLER BOARD SUPPORT	Same as KSL-B-30
VAL-NA-B-11	CONTROLLER BOARD SPACER	
VAL-NA-B-12	STEP DOWN TRANSFORMER	Same as KSL-B-24
VAL-NA-B-13	FACE PLATE	
VAL-NA-B-14	BURNER CONTROLLER COVER	
VAL-NA-B-15B	POWER CABLE W/PLUG	
VAL-NA-B-16	CABLE STOPPER	Same as KSL-B-20B
VAL-NA-B-17	FUSE (3A)	Same as KSL-B-17A
VAL-NA-B-18	FUSE HOLDER	Same as KSL-B-18
VAL-NA-B-18A	FUSE HOLDER	Same as KSL-B-18A, From P
VAL-NA-B-19	POWER SWITCH	
VAL-NA-B-20	THERMOSTAT CABLE	
VAL-NA-B-21	VIBRATION SENSOR HOLDER	
VAL-NA-B-22	WASHER	
VAL-NA-R-01	SPOUT UNIT ASSY	
VAL-NA-R-02	LEVER	
VAL-NA-R-03	LOUVER SUPPORT	
VAL-NA-R-04	LOUVER	
VAL-NA-R-05	HEAT ISOLATION DRUM	
VAL-NA-R-06	FLAME BARRIER	
VAL-NA-R-07	COMBUSTION CHAMBER	
VAL-NA-R-08	BURNER FLANGE	
VAL-NA-R-09	OVERHEAT SENSOR	
VAL-NA-R-10	NOZZLE (0.85 GAL/H)	Same as KSL-B-04
VAL-NA-R-11	WHIRL VANE	
VAL-NA-R-12	BURNER NECK	
VAL-NA-R-13	ELECTRODE	
VAL-NA-R-14A	INSULATION PLATE	
VAL-NA-R-15	IGNITION TRANSFORMER	
VAL-NA-R-15A	IGNITION TRANSFORMER	From I
VAL-NA-R-16	FLAME MONITOR	
VAL-NA-R-16A	FLAME MONITOR	From J
VAL-NA-R-17	FLAME MONITOR BRACEKT	
VAL-NA-R-17A	FLAME MONITOR BRACEKT	
VAL-NA-R-18	FAN MOTOR BRACEKT	
VAL-NA-R-19	COMBUSTION FAN	
VAL-NA-R-20	OUTER CASING	
VAL-NA-R-21	COVER	
VAL-NA-R-22	CABLE HANGER	
VAL-NA-R-23	BLOWER MOTOR	
VAL-NA-R-25	MAIN FAN	
VAL-NA-R-26	GUARD	
VAL-NA-R-27	OVERHEAT SENSOR CABLE	
VAL-NA-R-28	LOUVER FITTING	
VAL-NA-R-29	NOZZLE NIPPLE	
VAL-NA-T-01	HANDLE BAR	
VAL-NA-T-02	HANDLE BRACKET	
VAL-NA-T-03	HANDLE RETAINING PIN	
VAL-NA-T-04	FRONT HURDLE FRAME	
VAL-NA-T-05	BRIDGE	
VAL-NA-T-06	REAR HURDLE FRAME	
VAL-NA-T-07	SUCTION PIPE	
VAL-NA-T-08	SUCTION PIPE GASKET	
VAL-NA-T-09	FUEL TANK	
VAL-NA-T-10	TANK CAP	
VAL-NA-T-11	TANK INLET FILTER	
VAL-NA-T-12	FUEL GAUGE	
VAL-NA-T-13	DRAIN GASKET	Same as KSL-T-21
VAL-NA-T-14	DRAIN BOLT	Same as KSL-T-22 including T-21
VAL-NA-T-15	AXLE FRAME	
VAL-NA-T-16	WHEEL (Price of each)	Same as KSL-T-12

Year	2008/2009	2009/2010	2010/2011
Serial No.	H-*****	Q-*****	F-*****

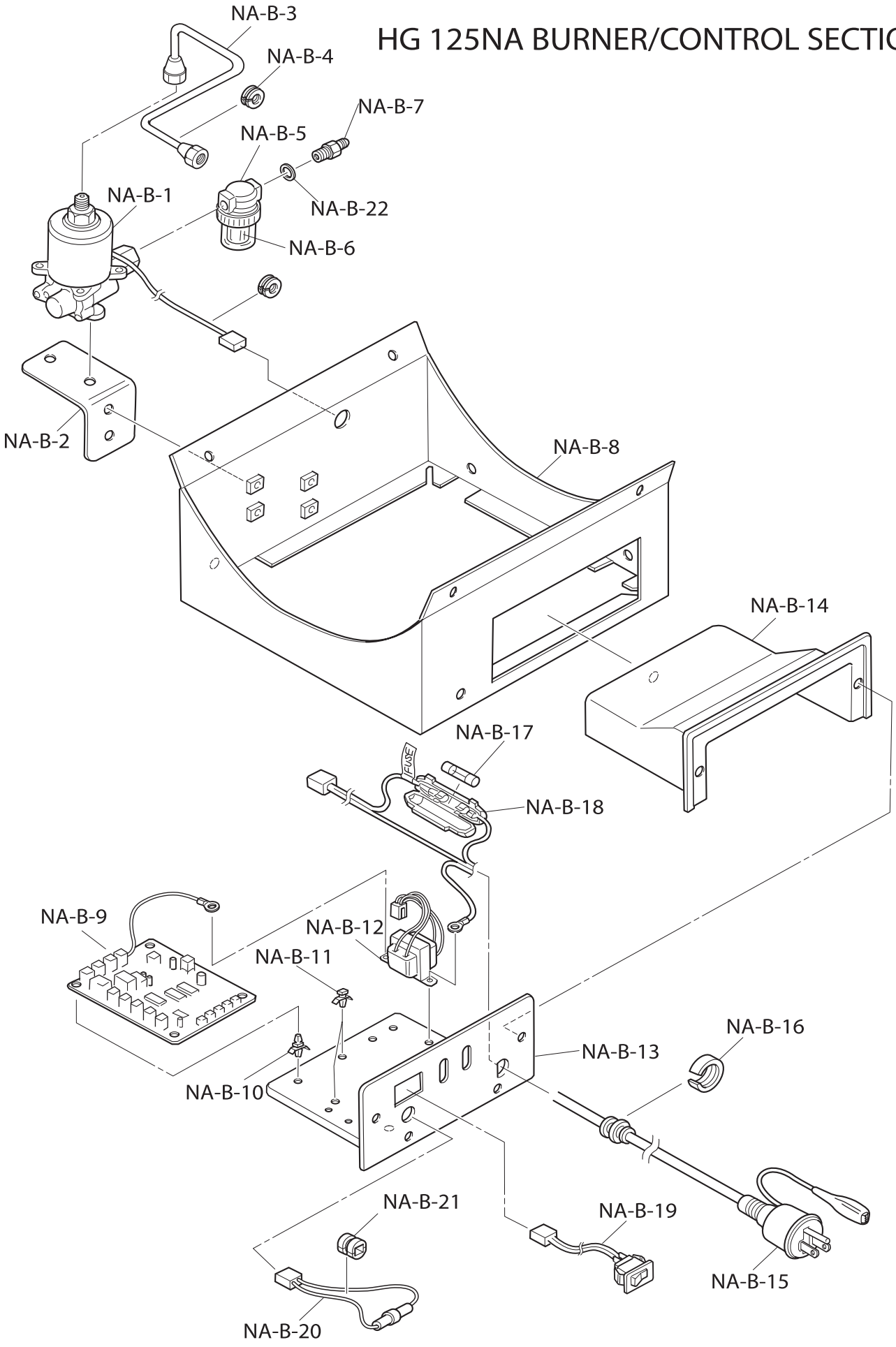
HG-125NA RADIATION/COMBUSTION CHAMBER SECTION





HG 125NA TANK/FRAME SECTION

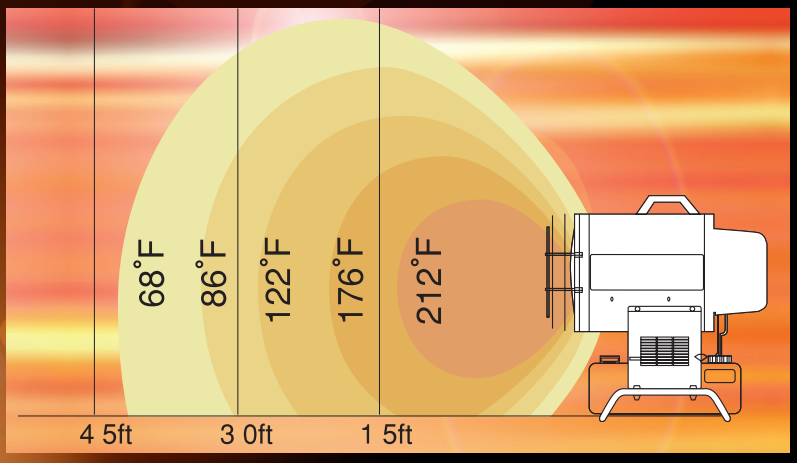
HG 125NA BURNER/CONTROL SECTION



Infrared and Forced Air Heater

Daystar

- Heat Output 51,800 BTU/hr
- Tank Capacity 2.6 gallons

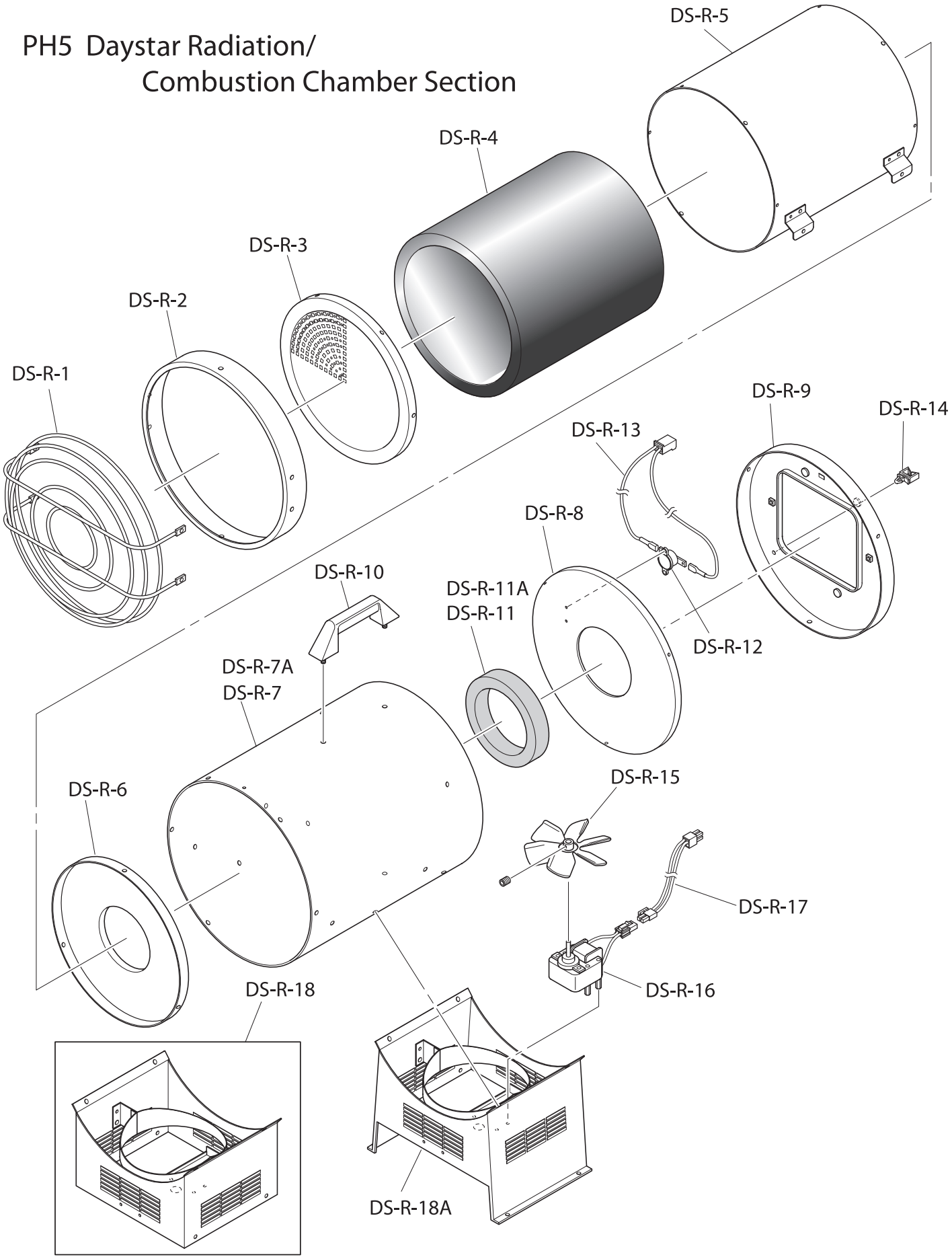


DAYSTAR PARTS LIST

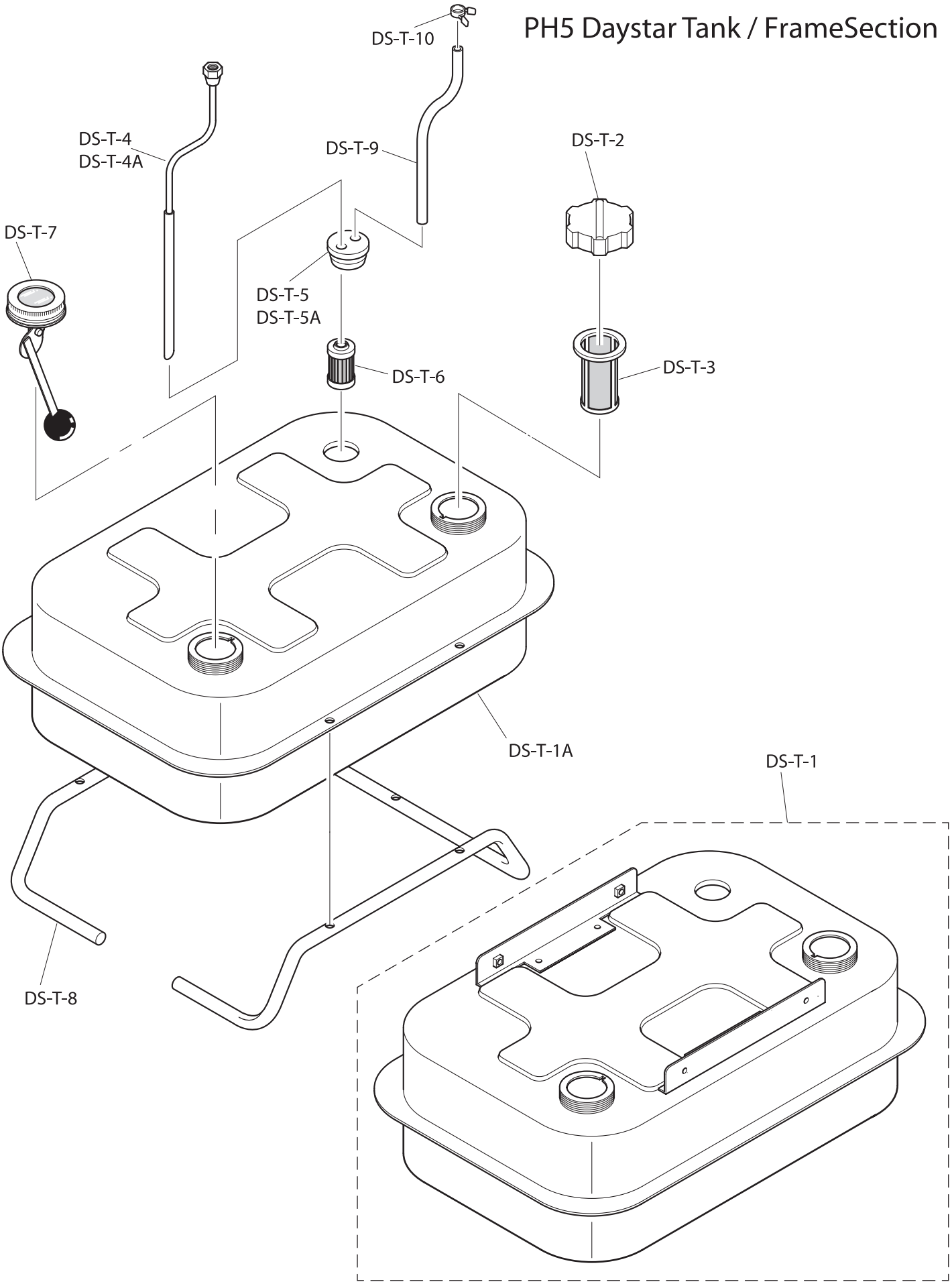
Item ID	Item Description	Note
MVL-DS-F-01	BUMPER BASE	Up to H
MVL-DS-F-01A	BUMPER BASE	Only J
MVL-DS-F-01B	BUMPER BASE	From I
MVL-DS-F-02	[illegible]	
MVL-DS-F-03	[illegible]	
MVL-DS-F-04	PUMP [illegible]	
MVL-DS-F-05	NOZZLE CLIP	Up to H
MVL-DS-F-05A	NOZZLE CLIP	From H-02
MVL-DS-F-06	[illegible] VALVE	
MVL-DS-F-06B	[illegible]	
MVL-DS-F-07	BUMPER COVER BRACKET	New from H. Use to pair with 2 DS-F-07
MVL-DS-F-08	BUMPER COVER	
MVL-DS-F-08A	BUMPER COVER	From H-02
MVL-DS-F-08B	BUMPER COVER	From F-01
MVL-DS-F-09	BUMPER BRACKET	Only for inventory left, discontinued
MVL-DS-F-09A	BUMPER BRACKET	Only for inventory left, discontinued
MVL-DS-F-09B	BUMPER BRACKET	Pair with D-05, From G-01
MVL-DS-F-09D	BUMPER BRACKET	From F-01
MVL-DS-F-11	[illegible] PLATE	
MVL-DS-F-11B	[illegible] PLATE	From H-01
MVL-DS-F-12	SWITCH ASSEMBLY	
MVL-DS-F-12A	SWITCH ASSEMBLY	From J-01 with thermostat terminal
MVL-DS-F-13	[illegible] SWITCH	Same as DS-F-11
MVL-DS-F-14	[illegible] SWITCH CABLE	
MVL-DS-F-15	STEP DOWN TRANSFORMER	Same as DS-F-01
MVL-DS-F-16	FLAME INDICTOR	Same as DS-F-11
MVL-DS-F-17	BURNER CONTROLLER	Up to P
MVL-DS-F-17A	BURNER CONTROLLER	From N-01 use replace S-17
MVL-DS-F-18	PUMP 600	Same as DS-F-17A
MVL-DS-F-18A	PUMP 600 INSTALL	From N-01
MVL-DS-F-19	CONTROL SUPPORT	Same as DS-F-03
MVL-DS-F-20	[illegible] MOTOR	
MVL-DS-F-21	IGNITION TRANSFORMER	
MVL-DS-F-21A	IGNITION TRANSFORMER	From J-01 with shorter plug wire
MVL-DS-F-22	POWER CABLE	
MVL-DS-F-23A	CABLE DIAGRAM	
MVL-DS-F-24A	FUEL PUMP	Without air vent valve unit
MVL-DS-F-24B	FUEL PUMP	From J-01 with air vent valve
MVL-DS-F-25	FUEL OUTLET LINE	
MVL-DS-F-25A	FUEL OUTLET LINE	From N-01
MVL-DS-F-25B	FUEL OUTLET LINE	From J-01
MVL-DS-F-26	[illegible]	Same as DS-F-03?
MVL-DS-F-27	RETURN LINE	
MVL-DS-F-28	PUMP ELBOW	
MVL-DS-F-29	[illegible] REPAIR KIT	
MVL-DS-R-01	[illegible] ASSEMBLY	
MVL-DS-R-02	DRUM FRONT RING	
MVL-DS-R-03	[illegible] TANK	
MVL-DS-R-04	[illegible] CLIP	
MVL-DS-R-05	[illegible] CLIP	
MVL-DS-R-06	[illegible]	
MVL-DS-R-07	[illegible]	
MVL-DS-R-08	[illegible]	
MVL-DS-R-08A	DRUM	
MVL-DS-R-09	[illegible]	
MVL-DS-R-10	DRUM BED	
MVL-DS-R-11	[illegible]	
MVL-DS-R-11A	BURNER DRAFT BRACKET	
MVL-DS-R-12	[illegible]	
MVL-DS-R-13	[illegible]	
MVL-DS-R-14	[illegible]	
MVL-DS-R-15	[illegible]	
MVL-DS-R-16	[illegible]	
MVL-DS-R-17	[illegible]	
MVL-DS-R-18	DRUM BASE	
MVL-DS-R-18A	DRUM BASE	From N-01
MVL-DS-T-01	FUEL TANK	
MVL-DS-T-01A	FUEL TANK	From N-01
MVL-DS-T-02	TANK LID	
MVL-DS-T-03	TANK INLET FILTER	
MVL-DS-T-03A	TANK INLET FILTER	From N-02
MVL-DS-T-04	SUCTION PIPE ASSEMBLY	
MVL-DS-T-04A	SUCTION PIPE ASSEMBLY	From N-02
MVL-DS-T-05	TANK RUBBER PAD	
MVL-DS-T-05A	TANK RUBBER PAD WITH RETURN	From N-02 Same as DS-T-01
MVL-DS-T-06	FILTER ELEMENT	Filter can be used for ZI
MVL-DS-T-07	FUEL GAUGE	
MVL-DS-T-08	[illegible]	From N-01
MVL-DS-T-09	RETURN LINE	From N-02
MVL-DS-T-10	HOSE CLAMP	From N-02

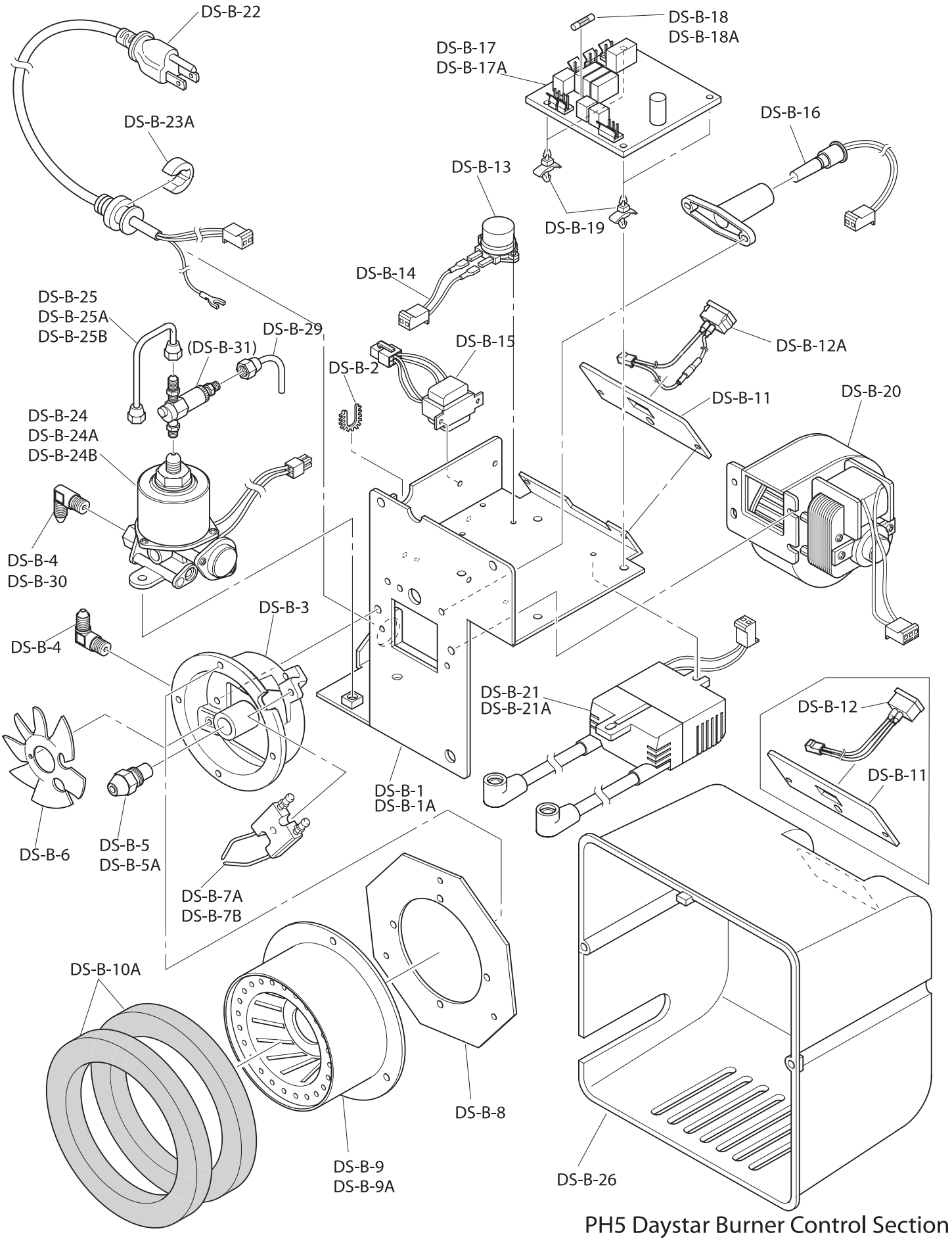
Year	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
Serial No.	S-[illegible]	R-[illegible]	Q-[illegible]	P-[illegible]	N-[illegible]	J-[illegible]	I-[illegible]	H-[illegible]	G-[illegible]

PH5 Daystar Radiation/ Combustion Chamber Section



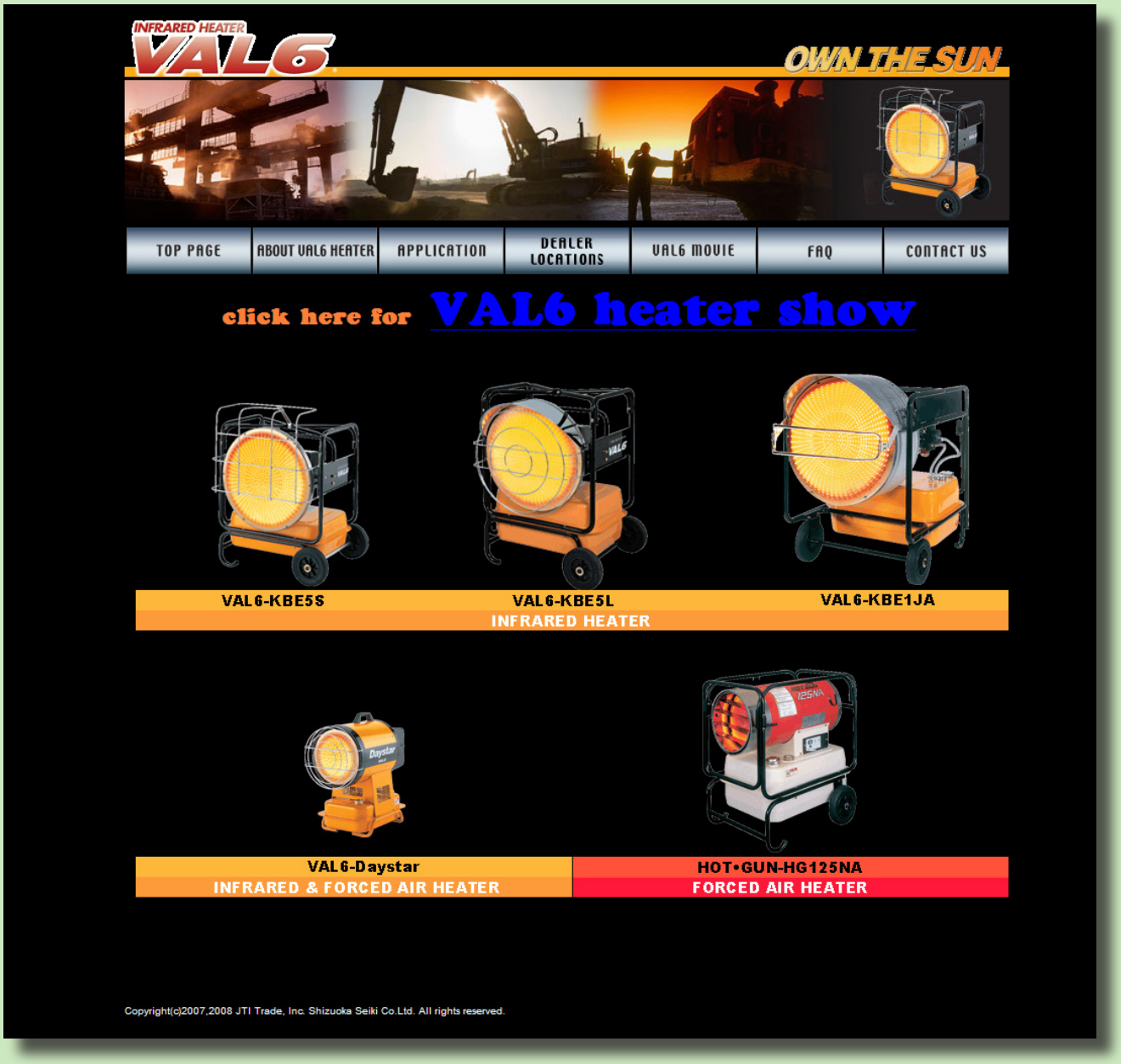
PH5 Daystar Tank / FrameSection





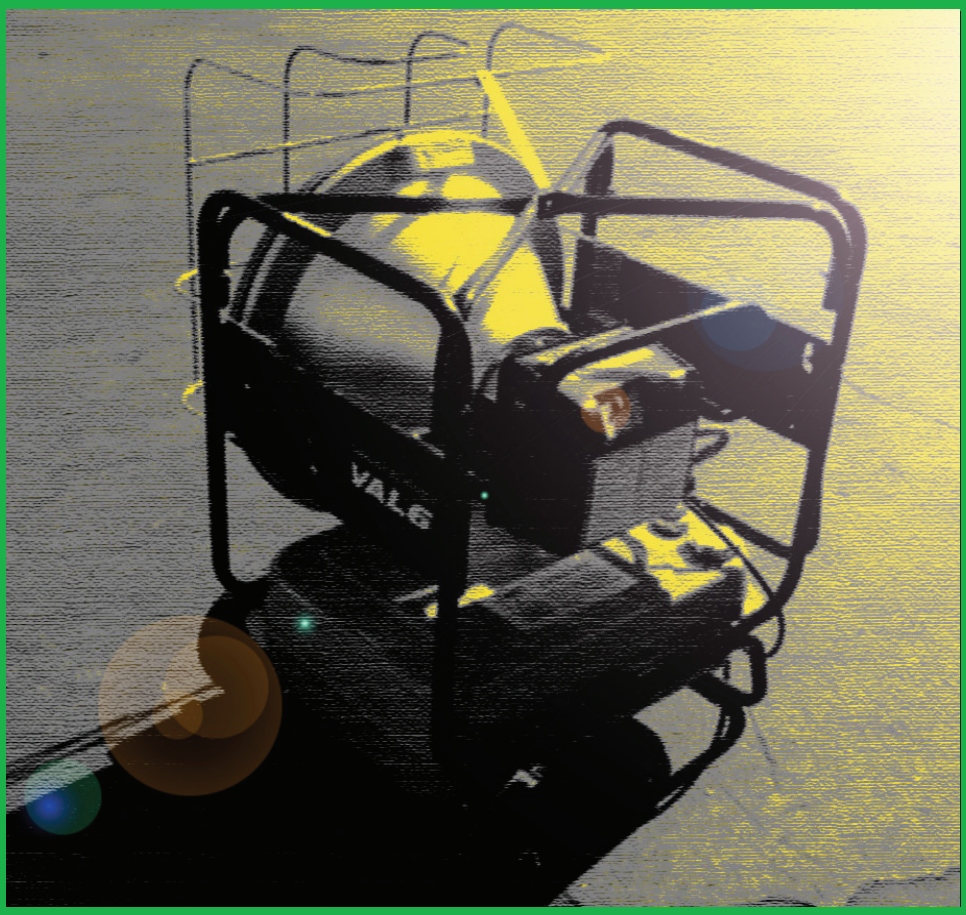
PH5 Daystar Burner Control Section

VAL6 WEB info.



- VAL6 heater specifications
- Trade show exhibits
- VAL6 promotion movie
- FAQ

For more info, See **http://www.val6.com**



INFRARED HEATER

VAL6

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