

HydroTherm®



KN SERIES

Cast Iron Condensing Boilers
Models KN-6, KN-10, KN-16,
KN-20, KN-26 and KN-30

Boiler Manual

Installation and Operation

Instructions

Also read and follow:
KN Control Manual



MEA #444-05-E

MASS Plumbers
#G1-06-04-28

WARNING This manual is intended only for use by a qualified heating installer/technician. Read and follow this manual, all supplements and related instructional information provided with the boiler. Install, start and service the boiler only in the sequence and methods given in these instructions. Failure to do so can result in severe personal injury, death or substantial property damage.

WARNING **Do not use the boiler during construction.** Construction dust and particulate, particularly drywall dust, will cause contamination of the burner, resulting in possible severe personal injury, death or substantial property damage. The boiler can only be operated with a dust-free air supply. Follow the instruction manual procedures to duct air to the boiler air intake. If the boiler has been contaminated by operation with contaminated air, follow the instruction manual guidelines to clean, repair or replace the boiler if necessary.

CAUTION Affix these instructions near to the boiler/water heater. Instruct the building owner to retain the instructions for future use by a qualified service technician, and to follow all guidelines in the User's Information Manual.

CHECKING, ADJUSTMENT & OPERATION

Spark Gap

The gap has to be measured and adjusted with the igniter removed from the boiler. Observe the trial for ignition to confirm that the spark is strong and continuous. If not, allow the electrodes to cool. Check and adjust the spark gap as shown in Figure 19. Electrode tips should face slightly downward.

Figure 19 - Spark Gap

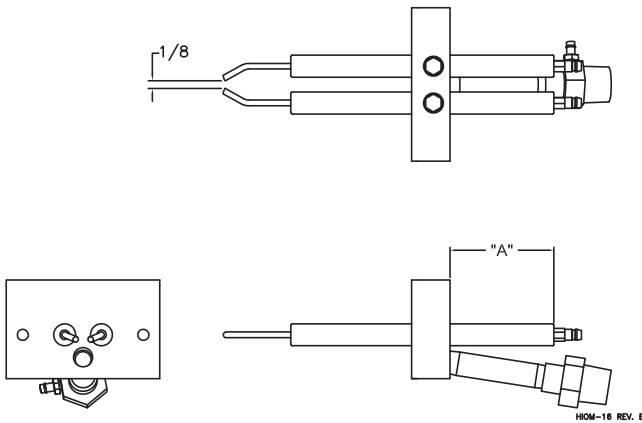


Table 10

Recommended Electrode Insertion Depth	
Model	DIM "A"
KN-30	1 1/2"
KN-26	1 1/2"
KN-20	1 1/2"
KN-16	1 7/8"
KN-10	1 7/8"
KN-6	1 7/8"

Pilot Adjustment

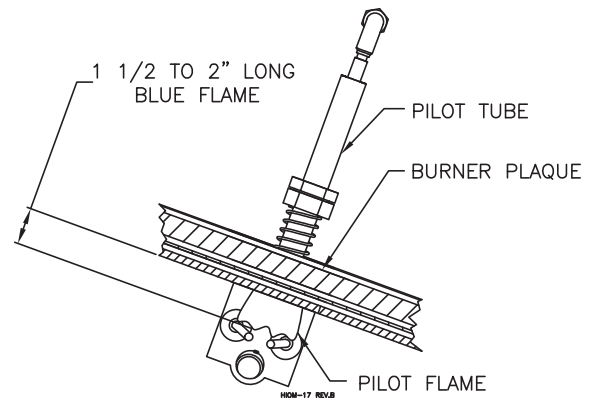
Verify the pilot pressure has been set within a range of 2.5 in.- 3.5 in WC. To check the pilot pressure close the manual main shut-off valve and the pilot gas shut-off valve, (Figure 15). Remove the 1/8 in pipe plug from the pilot tee and connect a manometer having a minimum range of 6 in, 154 mm WC to it. Open the pilot gas shut-off valve. With the unit powered generate a call for heat. When the prepurge is complete the ignition/pilot trial will begin. At this point put the Honeywell 7895C test switch in the test position. The control will hold in the ignition/pilot sequence allowing you to check the pressure.

To adjust the pilot the following steps must be taken:

1. Remove the pilot gas pressure regulator cap.
2. Turn the pressure regulator adjustment screw clockwise to increase the pressure and counterclockwise to decrease it.
3. Replace the pressure regulator adjustment screw cap.

CAUTION Never force the regulator adjustment screw beyond the stop limits or damage to the regulator will occur!

Figure 20 - Pilot Flame



Pilot flame UV signal

Before you check the pilot signal you need to make sure the polarity of the 120v supply to the ignition transformer is correct. To do this close the manual main shut-off valve 2 (Figure 17) and the manual pilot shut-off valve. With the unit powered generate a call for heat. The boiler will start to go through it start up sequence. During the ignition/pilot sequence observe the lights on the Honeywell 7895C. The pilot light should come on but not the flame light. If the flame light comes on along with the pilot light, interrupt the call for heat and turn off the main power. Reverse the 120v supply leads to the Honeywell 652B ignition transformer and run this test again. With this done the flame signal should be between 3vdc and 5vdc. Check the voltage on the test connections of the Honeywell 7895C's amplifier with a dc voltmeter.

Ignition Safety

To test the ignition safety shutoff device, close the manual shutoff valve 1 (Figure 17) in the gas supply line. Within 5 seconds of main burner flame extinction, the main gas valve solenoid should close. The control board will lockout and display “LOW GAS PRESSURE”. Open the manual shutoff valve in the gas supply line and reset the control board by toggling the power switch.

To confirm the input of the unit follow the instructions in the INPUT RATE section below.

Input Rate, Natural Gas

1. Turn off all other gas appliances that use the same gas meter as the boiler.
2. Call your gas supplier and ask for the heating value of the gas (Btu per cu/ft).
3. Start the boiler and let it run for 15 minutes.
4. With the boiler operation clock the time that it takes to burn 10 cu/ft of gas at full fire.
5. Insert the heating value and the time, in seconds, into the formula below.
6. $\text{Input} = 10 / \text{seconds (Btu per cu/ft)}(3600)$.
7. If the computed rate exceeds the desired input rate or 1,000,000 Btu/hr reduce the input. To do this use the maximum Btu adjustment pot located on the face of the display, Figure 18.

CAUTION Never increase the input to the boiler above that for which it is rated. Doing so can cause premature failure of the boiler!

Low Water Cutoff

Ensure that the low water cutoff device(s) function properly.

Test in accordance with the manufacturer’s instructions included with the device(s).

DIAGNOSTICS

The KN has a display that indicates the sequence of operation, Figure 18. The display will also list faults should the unit fail to operate. An explanation of each fault is listed below.

STANDBY KN: Indicates that power is being supplied to the unit and there is no call for heat.

STANDBY OPERATING LIMIT: Indicates that the operating limit if used is open.

HONEYWELL ALARM “flashing”: Indicates that there is a call for heat and the Honeywell 7895C is locked out.

STANDBY START DEMAND: Indicates that there is a call for heat and the Honeywell 7895C is not functioning or is locked out.

STANDBY WATER LIMIT: Indicates that either the high limit, low water cut off, or both are open without a call for heat.

LOCKOUT WATER LIMIT: Indicates that either the high limit, low water cut off, or both are open with a call for heat.

STANDBY GAS PRESSURE: Indicates that the low gas pressure switch or the high gas pressure switch if used is open without a call for heat.

LOCKOUT GAS PRESSURE: Indicates that the low gas pressure switch or the high gas pressure switch if used is open with a call for heat.

STANDBY FLOW SWITCH: Indicates that the water flow switch is open without a call for heat.

LOCKOUT FLOW SWITCH: Indicates that the water flow switch is open with a call for heat.

LWCO LOCKOUT: Indicates low or no water in the boiler.

MAINTENANCE

WARNING Disconnect electrical power and close the manual gas shut off valve before performing maintenance or severe personal injury may result!

CAUTION Servicing, inspection and adjustment must be done by a trained technician in accordance with all applicable local and national codes. Improper servicing or adjustment can damage the boiler!

The boiler must be inspected at least once a year and before each heating season. Make sure that the burner and ignition components are free from dust, soot, dirt, corrosion or other deposits that would impair the boiler's performance. Visually inspect the burner through the site glass.

CAUTION Improper burner servicing can result in premature burner failure voiding the warranty!

Burner Removal & Inspection

WARNING Wear a tightly fitted dust mask when servicing the burner and gently handle the burner and its gasket to prevent inhalation of airborne fibers.

NOTICE Do not attempt to remove the burner without having a burner gasket kit on hand.

Heat Exchanger Cleaning

In the unlikely event that the heat exchanger becomes blocked consult the factory for the proper cleaning procedure.

Air Intake & Vent System

Thoroughly inspect the air intake and vent systems for any signs of blockage, corrosion or leakage. Immediately replace any unsound vent system piping. Inspect the air filter and replace when required.

Condensate Pan

Remove the (6) bolt base pan door from the front of the boiler. Using a hose, flush out any residual material in the base pan through the condensate drain opening. Re-install the base door. Flush the drain trap and refill with 50% water/glycol mix to prevent evaporation in the trap.

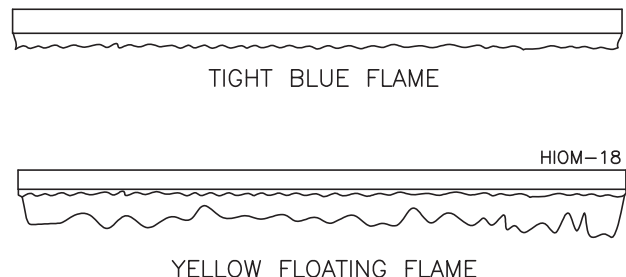
Controls

Use the BOILER OPERATION and CHECKING AND ADJUSTMENT sections of this manual for reference.

1. Check the operating controls for proper operation.
2. A float type low water cutoff device must be flushed out per the manufacturers' instructions. The probe on a probe low water cut off must be removed, cleaned and inspected at least once a year. Ensure that the low water cutoffs operate properly. If not, replace them.
3. The flow switch contacts must be open when water flow is not present.
4. The relief valve should not weep or discharge water at normal system pressure. If it does contact a qualified service technician to have it inspected. **NEVER** try to clean or repair the relief valve! If the valve fails to operate properly, have it replaced!
5. The aquastat high limit controls the maximum water temperature in the boiler. It is adjustable from **130°F, 54°C** to **215°F, 102°C**. If the water temperature reaches the set temperature before the demand for heat has been met, the aquastat high limit should shut the boiler off. The water temperature should never exceed the maximum set point of **215°F, 102°C**. The aquastat high limit cannot be repaired. If it fails to function properly replace it.
6. Visually check the pilot and main burner flames to ensure proper operation, see Figures 20 & 21.

WARNING Visual flame appearance with proper combustion will have a red and blue striped appearance at low fire and flecked areas of red with a majority of blue across the metal mesh burner at high fire. Areas of deep red indicate an infrared condition requiring a combustion adjustment to reduce CO₂ levels.

Figure 21 - Main Burner Flame



SERVICE AND REPLACEMENT PARTS LIST - KN-6, KN-10 and KN-20

Item	Description	Part #	Model Size with Item Quantities Below		
			KN-6	KN-10	KN-20
20	Burner	70-1216	1		
		70-1215		1	
		70-1214			1
	Burner Rebuild Kit	BM-1509	1		
		BM-1510		1	
BM-1511				1	
NS	Combustion Chamber	45-1269	1		
		45-1266		1	
		45-1270			1
NS	Low Chamber Gasket	59-1080	1		
		59-1065		1	
		59-1075			1
5	apter, Pilot Orifice	56-5530			1
22	Ignitor Block Assembly	70-1345	1	1	1
NS	Electrode	04-1343	2	2	2
NS	Air Orifice	25-0063	2	2	2
NS	Ignition Cable 10"	40-5403	1	1	1
NS	Ground Cable 15"	40-5404	1	1	1
23	Spark Generator Q652	26-3207	1	1	1
24	30 psi Relief Valve	22-1805	1	1	
		22-1809			1
	50 psi Relief Valve	22-1807	1	1	
		22-1810			1
	75 psi Relief Valve	22-1803	1	1	
		22-1811			1
	100 psi Relief Valve	22-1808	1	1	
		22-1812			1
25	Blower Flange Rear Gasket	59-1059	1	1	
		59-1058	1	1	
	Goose Neck Gasket	59-1076			2
26	High Limit Aquastat (Manual Reset)	02-2800	1	1	1
NS	1/2" Well	02-3413	1	1	1
27	T&P Gauge (30 & 50 psi)	20-1021	1	1	1
	T&P Gauge (75 & 100 psi)	20-1020	1	1	1
28	Low Water Cut-Off	21-2061	1	1	1
NS	Pilot Regulator	23-1014	1	1	1
NS	Pilot Gas Valve V4046C	02-1749	1	1	1
29	10K Sensor	02-4283	2	2	2
NS	2-1/2" Well	02-4285	2	2	2
34	Supply Nipple	70-1347	1	1	1
35	5" Flue Adapter	56-3347	1		
	6" Flue Adapter	56-3349		1	
	8" Flue Adapter	156-0006-01			1
	9" Flue Adapter	56-3348			1
36	Pressure Switch NS2	02-5208	3	3	3
37	Ignition Cover	70-1336	1	1	1
NS	Rating Label	42-2997	1	1	1
NS	Toggle Switch	58-1535	1	1	1

SERVICE AND REPLACEMENT PARTS LIST - KN-16, KN-26 and KN-30

Item	Description	Part #	Model Size with Item Quantities Below		
			KN-16	KN-26	KN-30
NS	Elbow, Pilot	60-4256	1	1	1
NS	Pilot Tube	10-00105-002	1		
		10-00105-001		1	1
21	Ignitor Block Assembly	70-1345	1	1	1
21a	Electrode	04-1343	1	1	1
NS	Air Orifice	25-0063	1	1	1
NS	Ignition Cable 24"	16-00004-001	1	1	1
NS	Ground Cable 15"	16-00008-001	1	1	1
22	Condensate Drain Assembly (High)	70-1390	1	1	1
	Condensate Drain Assembly (Low)	70-1338			1
23	Manual Shutoff Valve 1-1/2"	02-1578	1	1	1
24	Regulator RV12LT	23-1014	1	1	1
25	Pilot Gas Valve V4046C	02-1749	1	1	1
26	1/8 Gas Cock	23-1016	1	1	1
27	Manual Shutoff Valve 1-1/2"	02-1578	1	1	1
28	Gas Valve MBC	11-00002-001	1	1	1
28a	Low Gas Pressure Switch	02-4887	1	1	1
28b	High Gas Pressure Switch	02-4886		1	1
30	Bolt Assembly	75-00203-001	14	20	34
31	Clean Out Cover	74-00202-001	1	1	1
32	Clean Out Cover Gasket	06-00001-001	1	1	1
33	Drain Pan Weldment	74-00201-004	1		
		74-00201-002		1	
		74-00201-001			1
34	Drain Pan Filter Screen	03-00263-001	1	1	
		03-1826			1
39	Low Water Cutoff	21-2061	1	1	1
40	Toggle Switch	58-1535	2	2	2
43	Display Board	02-4278	1	1	1
44	Power Switch, Rocker	58-1536	1	1	1
45	Hidden Panel Weldment	70-1480	1	1	1
46	Front Control Panel Weldment	70-1486	1	1	1
48	Front Jacket Panel	74-00212-001	1	1	1
49	Spark Generator Q652	26-3207	1	1	1
50	Gas Support Bracket (Right)	74-00213-001	1	1	1
51	Gas Support Bracket (Left)	74-00214-001	1	1	1
52	Gas Train Shroud	74-00221-001	1	1	1
53	Front Control Panel (Door)	03-00240-001	1	1	1
54	Front Panel (Left)	74-00216-001	1	1	1
55	Front Panel (Right)	74-00215-001	1	1	1
57	HeatNet Board	40-00751-001	1	1	1
NS	Ribbon Cable	40-00259-001	1	1	1
59	50VA Transformer	26-3211	1	1	1
60	250VA Transformer	15-00001-001		1	1
61	Blower Overload Relay	15-00101-001	1	1	1
62	Contactora (2 HP)	15-00102-001	2	2	2
NS	Pump Fuse (2 HP)	48-00602-002	1	3	3
63	Flame Safeguard RM7895C	02-4012	1	1	1
NS	Purge Timer ST7800	02-4014	1	1	1
NS	UV Amplifier, R7849B	02-4015	1	1	1
64	Air Pressure Switch NS2	02-5208	1	1	1
65	Air Pressure Switch NS2	14-00305-001	1	1	1
66	Pressure Switch - HUBA	02-4881	1	1	1
	Bracket, Pressure Switch	14-00302-001	1	1	1
67	Air Pump	09-1518	1	1	1
NS	HeatNet Overlay	82-00403-001	1	1	1
NS	Front Panel Overlay	82-00405-004	1	1	1
NS	Rating Label	42-2997	1	1	1