

## Water & Steam Boilers – Series 2

For Gas, Light Oil, & Gas/Light Oil – Fired Burners

### Burner Specification & Data Sheet

### Power Flame Gas/Oil Burners Model WCR

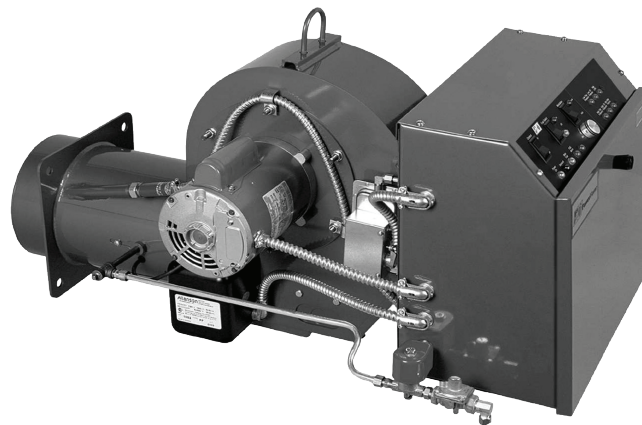
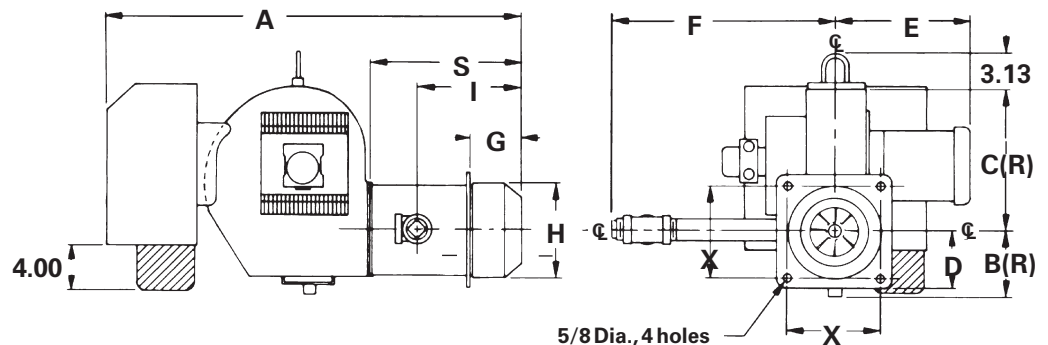


Figure 1 Model WCR



Note: Add .38 to "H" dim for size of opening in boiler front plate.

Burner Model Number	A	B(R)	C(R)	D	E	F*	G	H	I	S	X	Approximate Weight
WCR1	34.13	5.56	14.50	4.63	12.25	20.00	3.25	7.25	7.38	12.63	7.25	175-200
WCR2	39.13	6.13	14.00	5.25	14.00	20.00	4.00	8.75	8.50	13.38	8.50	220-300
WCR3	44.00	7.00	15.25	6.00	16.00	22.38	5.00	10.13	11.50	15.50	10.00	360-400
WCR4	50.00	7.31	17.69	7.00	18.50	28.00	6.00	12.13	14.25	19.13	12.00	500-550

\* Required for installation of standard control components



# Burner specifications and settings

**Table 1** Burner data

Boiler Model Number	Burner Input		Positive Pressure In Firebox In. W.C.	Standard Burner Model Designation			Standard Combustion Control			Standard Control System			Burner Motor 3450 Rpm			Standard Motor Voltage
	No. 2 Oil Gph	Gas Mbh		Gas	Light Oil	Gas/Light Oil	Gas	Light Oil	Gas/Light Oil	Gas	Light Oil	Gas/Light Oil	Gas	Light Oil	Gas/Light Oil	
488R	6.9	996	0.80	WCR1-G-12	WCR1-OS	WCR1-GO-12	RM7897A	R7184P	RM7897C	OO	FALFS	OO/FALFS	½	½	½	120/60/1
488	7.0	1,010	0.80	WCR1-G-12	WCR1-OS	WCR1-GO-12	RM7897A	R7184P	RM7897C	OO	FALFS	OO/FALFS	½	½	½	120/60/1
588	9.4	1,356	0.58	WCR1-G-12	WCR1-OS	WCR1-GO-12	RM7897A	R7184P	RM7897C	OO	FALFS	OO/FALFS	½	½	½	120/60/1
688	11.8	1,701	0.46	WCR2-G-15	WCR2-OAS	WCR2-GO-15	RM7897A	R7184P	RM7897C	LHO	LHO	LHO/LHO	½	¾	¾	120/60/1
788	14.2	2,046	0.47	WCR2-G-15	WCR2-OAS	WCR2-GO-15	RM7897A	R7184P	RM7897C	LHO	LHO	LHO/LHO	½	¾	¾	120/60/1
888	16.6	2,382	0.49	WCR2-G-20A	WCR2-OBS	WCR2-GO-20A	RM7897A	R7184P	RM7897C	LHO	LHO	LHO/LHO	¾	1	1	240/60/1
988R	17.2	2,482	0.50	WCR2-G-20B	WCR2-OBS	WCR2-GO-20B	RM7897A	R7184P	RM7897C	LHO	LHO	LHO/LHO	1	1	1	240/60/1
988	18.8	2,737	0.50	WCR2-G-20B	WCR2-OBS	WCR2-GO-20B	RM7897C	R7184P	RM7897C	LHO	LHO	LHO/LHO	1	1½	1½	240/60/1
1088R	20.0	2,887	0.52	WCR2-G-20B	WCR2-OBS	WCR2-GO-20B	RM7897C	RM7897A	RM7897C	LHO	LHO	LHO/LHO	1	1½	1½	240/60/1
1088	21.5	3,082	0.73	WCR3-G-20	WCR3-O	WCR3-GO-20	RM7897C	RM7897A	RM7897C	LHO	LHO	LHO/LHO	1½	2	2	240/60/1
1188	23.5	3,428	0.53	WCR3-G-20	WCR3-O	WCR3-GO-20	RM7897C	RM7897A	RM7897C	LHO	LHO	LHO/LHO	1½	2	2	3-Phase*
1288	26.0	3,773	0.48	WCR3-G-20	WCR3-O	WCR3-GO-20	RM7897C	RM7897A	RM7897C	LHO	LHO	LHO/LHO	1½	2	2	3-Phase*
1388	28.5	4,119	0.56	WCR3-G-25	WCR3-O	WCR3-GO-25	RM7897C	RM7840L	RM7840L	LHO	LHO	LHO/LHO	1½	2	2	3-Phase*
1488	31.0	4,464	0.58	WCR3-G-25B	WCR3-OB	WCR3-GO-25B	RM7840L	RM7840L	RM7840L	LHO	LHO	LHO/LHO	3	3	3	3-Phase*
1588	33.0	4,809	0.59	WCR3-G-25B	WCR3-OB	WCR3-GO-25B	RM7840L	RM7840L	RM7840L	LHO	LHO	LHO/LHO	3	3	3	3-Phase*
1688R	34.5	4,979	0.80	WCR3-G-25B	WCR3-OB	WCR3-GO-25B	RM7840L	RM7840L	RM7840L	LHO	LHO	LHO/LHO	3	3	3	3-Phase*
1688	35.5	5,155	0.80	WCR3-G-25B	WCR3-OB	WCR3-GO-25B	RM7840L	RM7840L	RM7840L	LHO	LHO	LHO/LHO	3	3	3	3-Phase*
1788	38.0	5,494	0.62	WCR4-G-25	WCR4-OA	WCR4-GO-25	RM7840L	RM7840L	RM7840L	LHO	LHO	LHO/LHO	3	5	5	3-Phase*
1888	40.5	5,845	0.69	WCR4-G-25	WCR4-OA	WCR4-GO-25	RM7840L	RM7840L	RM7840L	LHO	LHO	LHO/LHO	3	5	5	3-Phase*

\* 208/60/3, 240/60/3, 480/60/3 burner motor voltage must be specified.

## Notes for Table 1 and Table 2

- Burner capacities listed for elevations up to 2,000 feet. For higher elevations, consult local Weil-McLain distributor/agent or sales office.
- Light oil ratings based on No. 2 fuel oil with heating value of 140,000 Btu per gallon.
- Gas ratings based on natural gas with heating value of 1,000 Btu per cubic foot and specific gravity of 0.60. Gas burners for other gases are available. Consult local Weil-McLain distributor/agent or sales office.
- Boiler-burner unit to be adjusted to achieve +0.10 inches W.C. pressure at the flue collar, resulting in positive pressure in firebox as listed.
- Minimum gas pressures listed are subject to variations due to job conditions. Gas burners for other gas pressures are available. Consult local Weil-McLain distributor/agent or sales office.
- Tee pressures shown are for initial start-up. Final pressure should be determined after checking actual gas flow and combustion readings.
- 120/60/1 control circuit is used for all burners.
- Control circuit transformer is available as an option.
- Motor relay or contactor will be furnished for all units, except 488R and 488.
- Airflow safety switch is standard for all gas and combination gas/light oil units.
- Burners will be completely assembled and wired (except gas train) and factory test-fired.
- Burners listed by Underwriters Laboratories, Inc., state of Connecticut, Fire Marshal state of Massachusetts, city of New York MEA, and others.
- Special controls can be provided to meet other code requirements not listed. Consult your local Weil-McLain distributor/agent or sales office.
- Electric gas pilot will be furnished as standard equipment on all gas and combination gas/light oil units.
- Direct spark ignition is standard for light oil units. Direct spark ignition is available as an option for combination gas/light oil units. Consult your local Weil-McLain distributor/agent or sales office.
- Gas Control Systems:
  - OO** On-off operation, low fire start, high fire run. Single-position air, adjustable opening gas valve.
  - LHO** On-off operation, low fire start, high fire run. 488-1388: two-position air controlled by damper arm on motorized gas valve, fixed damper pre-purge. 1488-1888: two-position air controlled by separate motor, open damper pre-purge.
  - LHL** Low-high-low-off firing conditions. 488-1388: two-position air controlled by damper arm on motorized gas valve, fixed damper pre-purge. 1488-1888: two-position air controlled by separate motor, open damper pre-purge.
  - MOD** On-off operation, with proven low fire start and full modulating firing conditions with combustion air control. Proportional motor drives fuel metering valve and combustion air damper according to the firing conditions. Fixed damper pre-purge on 488-1388, open damper pre-purge on 1488-1888.



# Burner specifications and settings *(continued)*

**Table 2** Gas train components and flame safeguards

Boiler Model Number	Pressure Drop Thru Gas Train Inches W.C.	Manifold Pressure Inches W.C.*	Gas Pressure Required At Gas Control Inlet Inches W.C.*		Initial Low Fire Damper Setting Inches		Oil Nozzle (One Per Unit)					Oil Pressures Psig			Fuel Unit Data Burner-Motor Driven 3450 Rpm		
			Min	Max	Top	Bottom	Gph @ 100 Psig	Bypass Oil System	Brand**	Type	Spray Angle	Pump Capacity Psig	High Fire Pump Pressure	Approximate Return Psig		Type	Gear Gph
														High Fire	Low Fire		
488R	2.20	2.10	4.10	14.00	7/8	7/8	4.50	No	Delavan	Solid	80°	300	295	—	100-150	B2TA-8850-4	37
488	2.20	2.10	4.30	14.00	7/8	7/8	4.50	No	Delavan	Solid	80°	300	300	—	100-150	B2TA-8850-4	37
588	1.80	2.60	4.40	14.00	1	1	5.50	No	Delavan	Solid	80°	300	300	—	100-150	B2TA-8850-4	37
688	2.70	1.70	4.40	14.00	3/8	3/8	7.00	No	Delavan	Solid	80°	300	300	183	100-150	B2TA-8851-4	43
788	2.50	2.30	4.80	14.00	3/8	3/8	8.50	No	Delavan	Solid	70°	300	300	195	100-150	B2TA-8851-4	43
888	3.90	1.20	5.10	14.00	3/8	3/8	9.50	No	Delavan	Solid	70***	300	300	210	100-150	B2GA-8852	43
988R	4.60	1.60	6.20	14.00	3/8	3/8	10.00	No	Monarch	PLP	60°	300	300	110	80-100	B2GA-8852	47
988	4.50	1.90	6.40	14.00	3/8	3/8	11.00	No	Delavan	Solid	70***	300	280	135	80-100	B2GA-8852	47
1088R	4.90	2.00	6.90	14.00	3/8	3/8	12.00	No	Monarch	PLP	60°	300	290	140	80-100	B2GA-8852	47
1088	4.00	2.30	6.30	14.00	3/8	3/8	16.00	Yes	Del. Variflo	BPS	80°	300	225	150	100-150	22R322D	105
1188	3.30	2.10	5.40	14.00	3/8	3/8 (fixed)	14.00	Yes	Del. Variflo	BPS	80°	300	295	140	50-108	22R322D	105
1288	4.10	2.50	6.50	14.00	3/8	3/8 (fixed)	16.00	Yes	Del. Variflo	BPS	80°	300	290	133	50-110	22R322D	105
1388	3.50	2.70	6.20	27.70	3/8	3/8	18.00	Yes	Del. Variflo	BPS	80°	300	244	166	60-108	22R322D	105
1488	4.70	3.60	8.20	27.70	1/4	1/4	20.00	Yes	Del. Variflo	BPS	80°	300	280	180	100-150	22R623D	105
1588	5.30	3.90	9.20	27.70	1/4	1/4	22.00	Yes	Del. Variflo	BPS	60°	300	290	165	100-150	22R623D	105
1688R	5.80	4.10	10.50	27.70	1/4	1/4	22.00	Yes	Del. Variflo	BPS	60°	300	295	175	100-150	22R623D	135
1688	6.20	4.40	10.50	27.70	1/4	1/4	22.00	Yes	Del. Variflo	BPS	60°	300	295	155	100-150	22R623D	135
1788	6.50	2.80	9.30	27.70	1/4	1/4	24.00	Yes	Hago	BPS	60°	300	300	165	100-150	22R623D	135
1888	7.10	3.20	10.30	27.70	1/4	1/4	26.00	Yes	Hago	BPS	60°	300	300	175	100-150	22R623D	135

\* Gas pressure shown are for standard gas train arrangement      \*\* Primary manufacturer. For alternate nozzles, contact Power-Flame  
 \*\*\* 70° spray angle standard, 60° or 80° approved and available upon request

Standard Gas Control Components And Sizes In Inches									
Boiler Model Number	Manual Hand Valve	Low Gas Pressure Switch	Gas Pressure Regulator	Combination Gas Valve And Regulator	Motorized Operating Gas Valve	Motorized Operating Gas Valve (With Proof Of Closure)	Safety Gas Valve	Manual Checking Gas Valve	High Gas Pressure Switch
488R-488	1 1/4	Optional	Optional	1 1/4	Optional	Optional	1 1/4	1 1/4	Optional
588	1 1/4	Optional	Optional	1 1/4	Optional	Optional	1 1/4	1 1/4	Optional
688	1 1/4	Optional	Optional	1 1/4	1 1/4	Optional	*	1 1/4	Optional
788	1 1/2	Optional	Optional	1 1/2	1 1/2	Optional	*	1 1/2	Optional
888	2	Optional	Optional	1 1/2	1 1/2	Optional	*	1 1/2	Optional
988R	2	Optional	2	—	1 1/2	Optional	1 1/2	1 1/2	Optional
988-1088R	2	Standard	2	—	2	Optional	1 1/2	1 1/2	Standard
1088	2	Standard	2	—	2	Optional	2	2	Standard
1188-1588	2	Standard	2	—	2	Optional	2	2	Standard
1688R-1888	2	Standard	2	—	—	2	2	2	Standard

\* Combination operating gas valve and regulator also serves as safety gas valve.

17. Light Oil Control Systems:

- FALFS** On-off operation, fixed air, reduced fuel low fire start, high fire run. Single-position air, two-position oil.
- OO** On-off operation, low fire start, high fire run. Single-position air, single-position oil.
- LHO** On-off operation, low fire start, high fire run. Two-position air, two-position oil. Fixed damper pre-purge on 488-1288, open damper pre-purge on 1388-1888.
- LHL** Low-high-low-off firing conditions. Two-position air, two-position oil. Fixed damper pre-purge on 488-1288. Open damper pre-purge on 1388-1888.
- MOD** On-off operation, with proven low fire start and full modulating firing conditions. Proportional motor drives fuel metering valve and combustion air damper according to the firing conditions. Fixed damper pre-purge on 488-1088R, open damper pre-purge on 1088-1888.

18. Gas/Light Oil Control Systems:

- OO/FALFS** Combines gas and light oil characteristics listed above.
- OO/OO** Combines gas and light oil characteristics listed above.
- LHO/LHO** Combines gas and light oil characteristics listed above. Open damper pre-purge on 1388-1888.
- LHL/LHL** Combines gas and light oil characteristics listed above. Open damper pre-purge on 1388-1888.
- MOD/MOD** Combines gas and light oil characteristics listed above. Open damper pre-purge on 1388-1888.



# Burner specifications and settings *(continued)*

**Table 3** Flame safeguards

Flame Safeguards Provided with Listed Control Systems by Code																
GAS BURNERS																
Boiler Model Number	UL				FM				CSD-1				IRI			
	OO	LHO	LHL	MOD	OO	LHO	LHL	MOD	OO	LHO	LHL	MOD	OO	LHO	LHL	MOD
488R-588	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897C	RM7897C	RM7897C	RM7840L
688-988R	—	RM7897A	RM7897A	RM7897A	—	RM7897A	RM7897A	RM7897A	—	RM7897A	RM7897A	RM7897A	—	RM7897C	RM7897C	RM7840L
988-1388	—	RM7897C	RM7897C	RM7840L	—	RM7897C	RM7897C	RM7840L	—	RM7897C	RM7897C	RM7840L	—	RM7897C	RM7897C	RM7840L
1488-1888	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L

LIGHT OIL BURNERS																
Boiler Model Number	UL				FM				CSD-1				IRI			
	FALFS	LHO	LHL	MOD	FALFS	LHO	LHL	MOD	FALFS	LHO	LHL	MOD	FALFS	LHO	LHL	MOD
488R	R7184P	R7184P	R7184P	R7184P	R7184P	R7184P	R7184P	R7184P	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7840L
488-588	R7184P	R7184P	R7184P	R7184P	R7184P	R7184P	R7184P	R7184P	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7897A	RM7840L
688-1088R	—	R7184P	R7184P	R7184P	—	R7184P	R7184P	R7184P	—	RM7897A	RM7897A	RM7897A	—	RM7897A	RM7897A	RM7840L
1088-1288	—	RM7897A	RM7897A	RM7840L	—	RM7897A	RM7897A	RM7840L	—	RM7897A	RM7897A	RM7840L	—	RM7897A	RM7897A	RM7840L
1388-1888	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L

COMBINATION GAS/OIL BURNERS																
Boiler Model Number	UL				FM				CSD-1				IRI			
	OO/FALFS	LHO	LHL	MOD	OO/FALFS	LHO	LHL	MOD	OO/FALFS	LHO	LHL	MOD	OO/FALFS	LHO	LHL	MOD
488R-588	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7897C	RM7840L
688-988R	—	RM7897C	RM7897C	RM7897C	—	RM7897C	RM7897C	RM7897C	—	RM7897C	RM7897C	RM7897C	—	RM7897C	RM7897C	RM7840L
988-1288	—	RM7897C	RM7897C	RM7840L	—	RM7897C	RM7897C	RM7840L	—	RM7897C	RM7897C	RM7840L	—	RM7897C	RM7897C	RM7840L
1388-1888	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L	—	RM7840L	RM7840L	RM7840L

## Notes for Table 3

### 1. Combustion Controls:

**R7184P**

Uses cadmium cell for flame detector to monitor oil burner flame, also furnishes intermittent ignition.

**RM7897A, RM7897C**

Uses ultraviolet electronic flame detector to monitor gas or oil burner flame and provides pre-purge programming. "A" models provide intermittent pilot; "C" models provide interrupted pilot and RUN/TEST switch. RM7897 provides same as above with post-purge.

**RM7840L, E110/EPD170**

Monitors the oil or gas burner flame, provides pre-purge and post-purge programming, provides switching necessary to allow firing rate motor to be driven to both low fire and high fire positions, prevents start-up if pre-ignition interlocks are open and has low fire start proving circuit. In the event pre-ignition interlock circuit or running interlock circuit does not "prove", system will lock out on safety. Ultraviolet sensitive electronic flame detector is standard with infrared detector available.

**RM7800L, E110/EP160**

Monitors the oil or gas burner flame with digital readout control system, provides pre-purge and post-purge programming, provides switching necessary to allow firing rate motor to be driven to both low fire and high fire position, prevents start-up if pre-ignition interlocks are open and has low fire start proving circuit. In the event pre-ignition interlock circuit or running interlock circuit does not "prove", system will lock out on safety. Ultraviolet sensitive electronic flame detector is standard with infrared detector available.



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