PRODUCT CATALOG

ENGINE HEATERS • CONTROLS • OIL HEATERS • ACCESSORIES

HOTSTART®
ENGINE HEATING

HEATER INSTALLATION

CUSTOM PRODUCTS

Call for information on:
- **Battery Chargers**
- **Wiring Harnesses**
- **Air Intake Heaters**
- **APUs**
- **Other Specialty Products**

SECTION

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SECTION 1

PRODUCT CATALOG

Small Tank Heaters

TPS Model
Single Phase

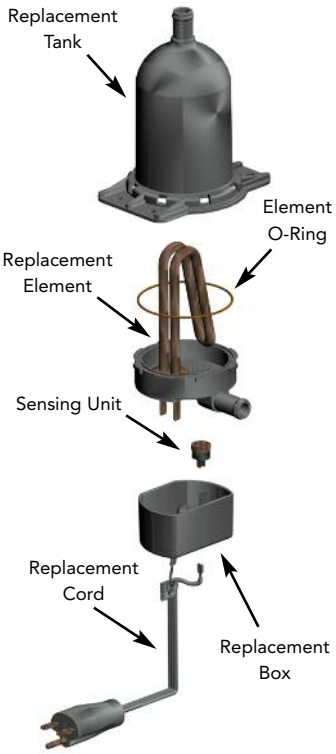
500-2000 Watts
120 & 240V

Engine Displacement	Model Number	Volts	Watts	Phase	Amps	Thermostat Range On	Thermostat Range Off
150cid 2.5L	TPS051GT8-000	120	500	1	4.2	80°F (27C)	100°F (38C)
	TPS051GT10-000	120	500	1	4.2	100°F (38C)	120°F (49C)
	TPS051GT12-000	120	500	1	4.2	120°F (49C)	140°F (60C)
	TPS052GT8-000	240	500	1	2.1	80°F (27C)	100°F (38C)
	TPS052GT10-000	240	500	1	2.1	100°F (38C)	120°F (49C)
	TPS052GT12-000	240	500	1	2.1	120°F (49C)	140°F (60C)
350cid 5.7L	TPS101GT8-000	120	1000	1	8.4	80°F (27C)	100°F (38C)
	TPS101GT10-000	120	1000	1	8.4	100°F (38C)	120°F (49C)
	TPS101GT12-000	120	1000	1	8.4	120°F (49C)	140°F (60C)
	TPS102GT8-000	240	1000	1	4.2	80°F (27C)	100°F (38C)
	TPS102GT10-000	240	1000	1	4.2	100°F (38C)	120°F (49C)
	TPS102GT12-000	240	1000	1	4.2	120°F (49C)	140°F (60C)
350 - 500cid 5.7 - 8.2L	TPS151GT8-000	120	1500	1	12.5	80°F (27C)	100°F (38C)
	TPS151GT10-000	120	1500	1	12.5	100°F (38C)	120°F (49C)
	TPS151GT12-000	120	1500	1	12.5	120°F (49C)	140°F (60C)
	TPS152GT8-000	240	1500	1	6.3	80°F (27C)	100°F (38C)
	TPS152GT10-000	240	1500	1	6.3	100°F (38C)	120°F (49C)
	TPS152GT12-000	240	1500	1	6.3	120°F (49C)	140°F (60C)
500 - 700cid 8.2 - 11.5L	TPS181GT8-000	120	1800	1	15	80°F (27C)	100°F (38C)
	TPS181GT10-000	120	1800	1	15	100°F (38C)	120°F (49C)
	TPS181GT12-000	120	1800	1	15	120°F (49C)	140°F (60C)
	TPS202GT8-000	240	2000	1	8.3	80°F (27C)	100°F (38C)
	TPS202GT10-000	240	2000	1	8.3	100°F (38C)	120°F (49C)
	TPS202GT12-000	240	2000	1	8.3	120°F (49C)	140°F (60C)

Hotstart TPS tank heaters are constructed from a durable, high-impact plastic. Every heater is assembled with a built-in thermostat and 4–foot power cord.

Replacement Parts

For TPS Model heaters



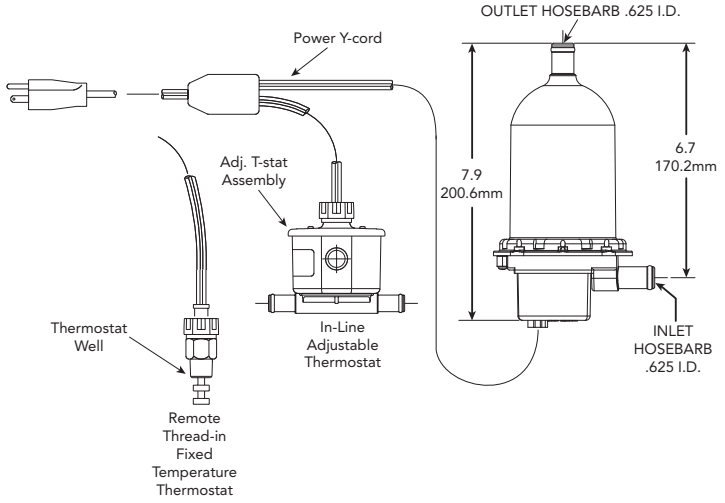
Model Number	Volts	Watts	Replacement Parts: Sensing Unit	Element	Tank	Box	Power Cord	Element O-ring
TPS051GT8-000	120	500	LSU-8	REPS051T8	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS051GT10-000	120	500	LSU-10	REPS051T10	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS051GT12-000	120	500	LSU-12	REPS051T12	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS052GT8-000	240	500	LSU-8	REPS052T8	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS052GT10-000	240	500	LSU-10	REPS052T10	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS052GT12-000	240	500	LSU-12	REPS052T12	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS101GT8-000	120	1000	LSU-8	REPS101T8	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS101GT10-000	120	1000	LSU-10	REPS101T10	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS101GT12-000	120	1000	LSU-12	REPS101T12	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS102GT8-000	240	1000	LSU-8	REPS102T8	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS102GT10-000	240	1000	LSU-10	REPS102T10	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS102GT12-000	240	1000	LSU-12	REPS102T12	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS151GT8-000	120	1500	LSU-8	REPS151T8	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS151GT10-000	120	1500	LSU-10	REPS151T10	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS151GT12-000	120	1500	LSU-12	REPS151T12	TPS-T	CPS-1	11P48UU	TPS-BOR
TPS152GT8-000	240	1500	LSU-8	REPS152T8	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS152GT10-000	240	1500	LSU-10	REPS152T10	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS152GT12-000	240	1500	LSU-12	REPS152T12	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS181GT8-000	120	1800	LSU-8	REPS181T8	TPS-T	CPS-1	12P16H48UU	TPS-BOR
TPS181GT10-000	120	1800	LSU-10	REPS181T10	TPS-T	CPS-1	12P16H48UU	TPS-BOR
TPS181GT12-000	120	1800	LSU-12	REPS181T12	TPS-T	CPS-1	12P16H48UU	TPS-BOR
TPS202GT8-000	240	2000	LSU-8	REPS202T8	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS202GT10-000	240	2000	LSU-10	REPS202T10	TPS-T	CPS-1	21P48UU	TPS-BOR
TPS202GT12-000	240	2000	LSU-12	REPS202T12	TPS-T	CPS-1	21P48UU	TPS-BOR

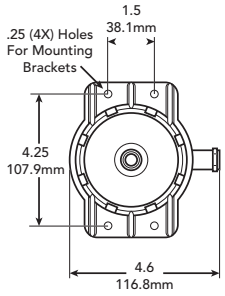
Engine Displacement	Model Number	Volts	Watts	Phase	Amps	Thermostat Range On	Thermostat Range Off
150cid 2.5L	TPS051GT12-001*	120	500	1	4.2	100°F (38C)	120°F (49C)
	TPS051GT12-A00	120	500	1	4.2	ADJUSTABLE	
	TPS052GT12-001*	240	500	1	2.1	100°F (38C)	120°F (49C)
	TPS052GT12-A00	240	500	1	2.1	ADJUSTABLE	
350cid 5.7L	TPS101GT12-001*	120	1000	1	8.4	100°F (38C)	120°F (49C)
	TPS101GT12-A00	120	1000	1	8.4	ADJUSTABLE	
	TPS102GT12-001*	240	1000	1	4.2	100°F (38C)	120°F (49C)
	TPS102GT12-A00	240	1000	1	4.2	ADJUSTABLE	
350 - 500cid 5.7 - 8.2L	TPS151GT12-001*	120	1500	1	12.5	100°F (38C)	120°F (49C)
	TPS151GT12-A00	120	1500	1	12.5	ADJUSTABLE	
	TPS152GT12-001*	240	1500	1	6.3	100°F (38C)	120°F (49C)
	TPS152GT12-A00	240	1500	1	6.3	ADJUSTABLE	
500 - 700cid 8.2 - 11.5L	TPS181GT12-001*	120	1800	1	15	100°F (38C)	120°F (49C)
	TPS181GT12-A00	120	1800	1	15	ADJUSTABLE	
	TPS202GT12-001*	240	2000	1	8.3	100°F (38C)	120°F (49C)
	TPS202GT12-A00	240	2000	1	8.3	ADJUSTABLE	

* Remote thread-in fixed temperature thermostat

ADJUSTABLE 90-130°F (32-54°C)
On differential – 20°F (-7°C)

In-line thermostat options:





Model Number	Volts	Watts	Replacement Parts: Sensing Unit	Element	Power Y-cord	Thermostat Well
TPS051GT12-001*	120	500	LSU-10	REPS051T12	TPS-YC1	TW2374-1
TPS051GT12-A00	120	500	RSU90-130	REPS051T12	#	#
TPS052GT12-001*	240	500	LSU-10	REPS052T12	TPS-YC2	TW2374-1
TPS052GT12-A00	240	500	RSU90-130	REPS052T12	#	#
TPS101GT12-001*	120	1000	LSU-10	REPS101T12	TPS-YC1	TW2374-1
TPS101GT12-A00	120	1000	RSU90-130	REPS101T12	#	#
TPS102GT12-001*	240	1000	LSU-10	REPS102T12	TPS-YC2	TW2374-1
TPS102GT12-A00	240	1000	RSU90-130	REPS102T12	#	#
TPS151GT12-001*	120	1500	LSU-10	REPS151T12	TPS-YC1	TW2374-1
TPS151GT12-A00	120	1500	RSU90-130	REPS151T12	#	#
TPS152GT12-001*	240	1500	LSU-10	REPS152T12	TPS-YC2	TW2374-1
TPS152GT12-A00	240	1500	RSU90-130	REPS152T12	#	#
TPS181GT12-001*	120	1800	LSU-10	REPS181T12	12P16H54S54X10UU	TW2374-1
TPS181GT12-A00	120	1800	RSU90-130	REPS181T12	#	#
TPS202GT12-001*	240	2000	LSU-10	REPS202T12	TPS-YC2	TW2374-1
TPS202GT12-A00	240	2000	RSU90-130	REPS202T12	#	#

* Remote thread-in fixed temperature thermostat

Call Factory

Small Tank Heaters

TPS Series w/in-line adjustable and remote thread-in fixed thermostat

Single Phase

Replacement Parts

For TPS Model heaters w/in-line adjustable and remote thread-in fixed thermostat Single Phase

Common replacement parts for all TPS Model heaters:
— Tank
— Box
— Element O-ring

See table on p. 4

Industrial Tank Heaters

CB, CL Series
Conduit Connection
Weathertight
Single Phase

1500-5000 Watts

CB Model without thermostat

CB Model assembled with thermostat

CL Model without thermostat

CL Model assembled with thermostat

Engine Displacement	Model Number without Thermostat	Model Number with Thermostat see chart 1	Volts	Watts	Phase	Amps	Fig.* No.
350 - 500cid **5.7 - 8.2L**	CB115100-000 CB115800-000 CB115200-000 CB115700-000 CB115300-000 CB115400-000	CB1151XX-200 CB1158XX-200 CB1152XX-200 CB1157XX-200 CB1153XX-200 CB1154XX-200	120 208 240 277 380 480	1500 1500 1500 1500 1500 1500	1 1 1 1 1 1	12.5 7.2 6.3 5.4 3.9 3.1	1 1 1 1 1 1
500 - 600cid **8.2 - 9.8L**	CB120100-000 CB120800-000 CB120200-000 CB120300-000 CB120400-000	CB1201XX-200 CB1208XX-200 CB1202XX-200 CB1203XX-200 CB1204XX-200	120 208 240 380 480	2000 2000 2000 2000 2000	1 1 1 1 1	16.7 9.6 8.3 5.3 4.2	1 1 1 1 1
600 - 800cid **9.8 - 13.1L**	CB125100-000 CB125800-000 CB125200-000 CB125700-000 CB125300-000 CB125400-000	CB1251XX-200 CB1258XX-200 CB1252XX-200 CB1257XX-200 CB1253XX-200 CB1254XX-200	120 208 240 277 380 480	2500 2500 2500 2500 2500 2500	1 1 1 1 1 1	20.8 12.0 10.4 9.0 6.6 5.2	1 1 1 1 1 1
800 - 1000cid **13.1 - 16.4L**	CL130100-100 CL130800-100 CL130200-100 CL130700-100 CL130300-100 CL130400-100	CL1301XX-200 CL1308XX-200 CL1302XX-200 CL1307XX-200 CL1303XX-200 CL1304XX-200	120 208 240 277 380 480	3000 3000 3000 3000 3000 3000	1 1 1 1 1 1	25.0 14.4 12.5 10.8 7.9 6.3	3 3 3 3 3 3
1000 - 1350cid **16.4 - 22.1L**	CL140800-100 CL140200-100 CL140700-100 CL140300-100 CL140400-100	CL1408XX-200 CL1402XX-200 CL1407XX-200 CL1403XX-200 CL1404XX-200	208 240 277 380 480	4000 4000 4000 4000 4000	1 1 1 1 1	19.2 16.7 14.4 10.5 8.3	3 3 3 3 3
1350 - 1650cid **22.1 - 27.0L**	CL150800-100 CL150200-100 CL150700-100 CL150300-100 CL150400-100	CL1508XX-200 CL1502XX-200 CL1507XX-200 CL1503XX-200 CL1504XX-200	208 240 277 380 480	5000 5000 5000 5000 5000	1 1 1 1 1	24.0 20.8 18.1 13.2 10.4	3 3 3 3 3

*Figure Number refers to technical drawings of heaters located on page 12.

ADAPTER FITTINGS

For the use of .75" or 1" ID heater hose, hose barb adapters are available. See below.

Part Number	Description
HB-1	1" NPT to 1" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.
HB-3/4	1" NPT to .75" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.

CHART 1 - HEATERS WITH THERMOSTATS

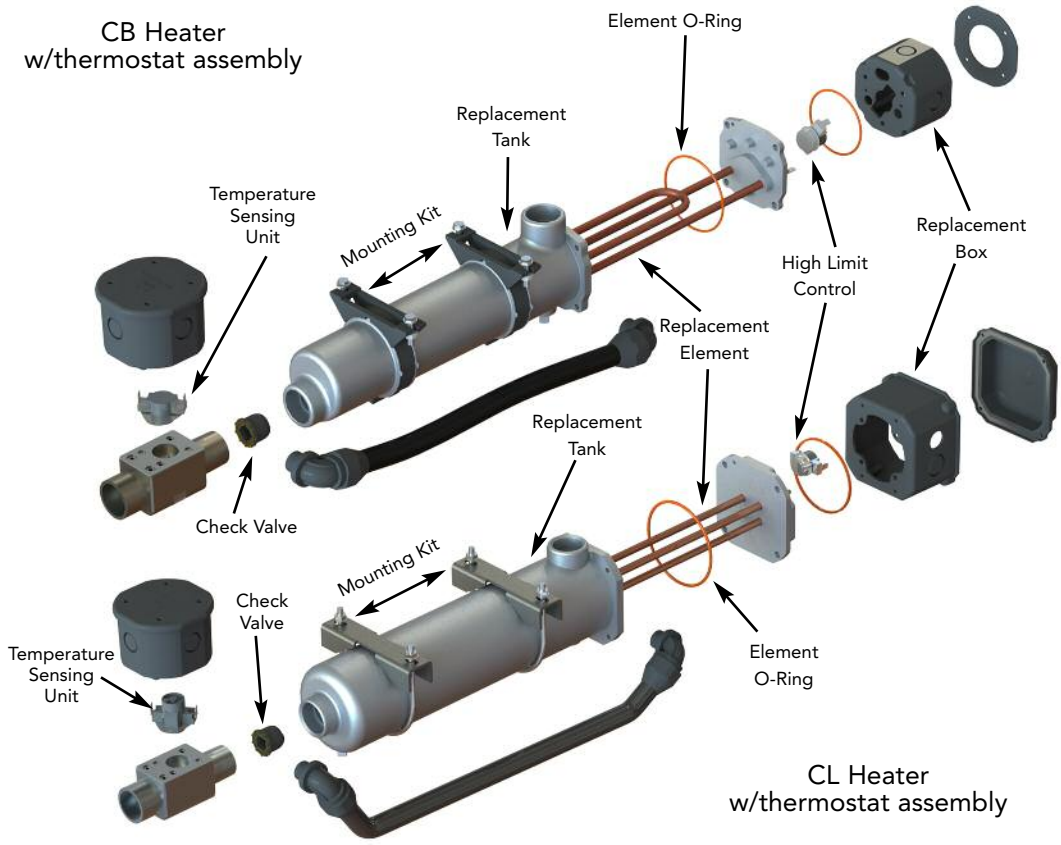
To specify temperature range of thermostat, insert numerical code from chart in place of the **XX** in model number.

Example:

Desired Temperature Range 100° - 120°F
Model Number: CB1151**XX**-200
Order as: CB1151**10**-200

Temperature Range ON	Temperature Range OFF	Numerical Code
80°F (27C)	100°F (38C)	08
100°F (38C)	120°F (49C)	10
120°F (49C)	140°F (60C)	12
Adjustable 90° - 130°F (32° - 54°C)		A3

Model Number without Thermostat	Model Number with Thermostat see chart 2	Replacement Parts				
		Element	Tank	Box	Element O-ring	Mounting Kit
CB115100-000	CB1151XX-200	RECB1151	RTB	RTBCB	TMM-OR	RTMMB
CB115800-000	CB1158XX-200	RECB1158	RTB	RTBCB	TMM-OR	RTMMB
CB115200-000	CB1152XX-200	RECB1152	RTB	RTBCB	TMM-OR	RTMMB
CB115700-000	CB1157XX-200	RECB1157	RTB	RTBCB	TMM-OR	RTMMB
CB115300-000	CB1153XX-200	RECB1153	RTB	RTBCB	TMM-OR	RTMMB
CB115400-000	CB1154XX-200	RECB1154	RTB	RTBCB	TMM-OR	RTMMB
CB120100-000	CB1201XX-200	RECB1201	RTB	RTBCB	TMM-OR	RTMMB
CB120800-000	CB1208XX-200	RECB1208	RTB	RTBCB	TMM-OR	RTMMB
CB120200-000	CB1202XX-200	RECB1202	RTB	RTBCB	TMM-OR	RTMMB
CB120300-000	CB1203XX-200	RECB1203	RTB	RTBCB	TMM-OR	RTMMB
CB120400-000	CB1204XX-200	RECB1204	RTB	RTBCB	TMM-OR	RTMMB
CB125100-000	CB1251XX-200	RECB1251	RTB	RTBCB	TMM-OR	RTMMB
CB125800-000	CB1258XX-200	RECB1258	RTB	RTBCB	TMM-OR	RTMMB
CB125200-000	CB1252XX-200	RECB1252	RTB	RTBCB	TMM-OR	RTMMB
CB125700-000	CB1257XX-200	RECB1257	RTB	RTBCB	TMM-OR	RTMMB
CB125300-000	CB1253XX-200	RECB1253	RTB	RTBCB	TMM-OR	RTMMB
CB125400-000	CB1254XX-200	RECB1254	RTB	RTBCB	TMM-OR	RTMMB
CL130100-100	CL1301XX-200	RECL1301-100	RTL	RTBCL-100	TML-OR	FK7
CL130800-100	CL1308XX-200	RECL1308-100	RTL	RTBCL-100	TML-OR	FK7
CL130200-100	CL1302XX-200	RECL1302-100	RTL	RTBCL-100	TML-OR	FK7
CL130700-100	CL1307XX-200	RECL1307-100	RTL	RTBCL-100	TML-OR	FK7
CL130300-100	CL1303XX-200	RECL1303-100	RTL	RTBCL-100	TML-OR	FK7
CL130400-100	CL1304XX-200	RECL1304-100	RTL	RTBCL-100	TML-OR	FK7
CL140800-100	CL1408XX-200	RECL1408-100	RTL	RTBCL-100	TML-OR	FK7
CL140200-100	CL1402XX-200	RECL1402-100	RTL	RTBCL-100	TML-OR	FK7
CL140700-100	CL1407XX-200	RECL1407-100	RTL	RTBCL-100	TML-OR	FK7
CL140300-100	CL1403XX-200	RECL1403-100	RTL	RTBCL-100	TML-OR	FK7
CL140400-100	CL1404XX-200	RECL1404-100	RTL	RTBCL-100	TML-OR	FK7
CL150800-100	CL1508XX-200	RECL1508-100	RTL	RTBCL-100	TML-OR	FK7
CL150200-100	CL1502XX-200	RECL1502-100	RTL	RTBCL-100	TML-OR	FK7
CL150700-100	CL1507XX-200	RECL1507-100	RTL	RTBCL-100	TML-OR	FK7
CL150300-100	CL1503XX-200	RECL1503-100	RTL	RTBCL-100	TML-OR	FK7
CL150400-100	CL1504XX-200	RECL1504-100	RTL	RTBCL-100	TML-OR	FK7



Replacement Parts

For tank-style heaters CB, CL Series

Common Replacement Parts
available on all listed heaters

High Limit Control	Check Valve
HLC-165	RV-M

CHART 2

Heaters with Thermostats

Temperature Range		Sensing Unit
ON	OFF	
80°F (27C)	100°F (38C)	FSU8
100°F (38C)	120°F (49C)	FSU10
120°F (49C)	140°F (60C)	FSU12
Adjustable 90° - 130°F (32°C - 54°C)		FSU90-130

Example:

Model Number: CB1151**10**-200
T-Stat Replacement: FSU10

Industrial Tank Heaters

SB, SL Series
With power cord
Weathertight
Single Phase

1500-4000 Watts

SB Models include high limit thermostats and carry CSA C/US approval

SB Model with power cord no thermostat

SB Model with thermostat and power cord

SL Model with power cord no thermostat

SL Model with thermostat and power cord

Engine Displacement	Model Number without Thermostat	Model Number with Thermostat see chart 1	Volts	Watts	Phase	Amps	Fig.* No.
350 - 500cid 5.7 - 8.2L	SB115100-000	SB1151XX-200	120	1500	1	12.5	2
	SB115800-000	SB1158XX-200	208	1500	1	7.2	2
	SB115200-000	SB1152XX-200	240	1500	1	6.3	2
	SB115700-000	SB1157XX-200	277	1500	1	5.4	2
500 - 600cid 8.2 - 9.8L	SB120100-000	SB1201XX-200	120	2000	1	16.7	2
	SB120800-000	SB1208XX-200	208	2000	1	9.6	2
	SB120200-000	SB1202XX-200	240	2000	1	8.3	2
600 - 800cid 9.8 - 13.1L	SB122100-000	SB1221XX-200	120	2250	1	18.8	2
	SB125800-000	SB1258XX-200	208	2500	1	12.0	2
	SB125200-000	SB1252XX-200	240	2500	1	10.4	2
	SB125700-000	SB1257XX-200	277	2500	1	9.0	2
800 - 1000cid 13.1 - 16.4L	SL130100-100	—	120	3000	1	25.0	4
	SL130800-100	SL1308XX-200	208	3000	1	14.4	4
	SL130200-100	SL1302XX-200	240	3000	1	12.5	4
	SL130700-100	SL1307XX-200	277	3000	1	10.8	4
1000 - 1350cid 16.4 - 22.1L	SL140800-100	SL1408XX-200	208	4000	1	19.2	4
	SL140200-100	SL1402XX-200	240	4000	1	16.7	4
	SL140700-100	SL1407XX-200	277	4000	1	14.4	4

*Figure Number refers to technical drawings of heaters located on page 12.
All 208v, 277v *and* 3000w/120v models come with cord only - no plug.

ADAPTER FITTINGS

For the use of .75" or 1" ID heater hose, hose barb adapters are available. See below.

Part Number	Description
HB-1	1" NPT to 1" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.
HB-3/4	1" NPT to .75" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.

CHART 1 - HEATERS WITH THERMOSTATS

To specify temperature range of thermostat, insert numerical code from chart in place of the **XX** in model number.

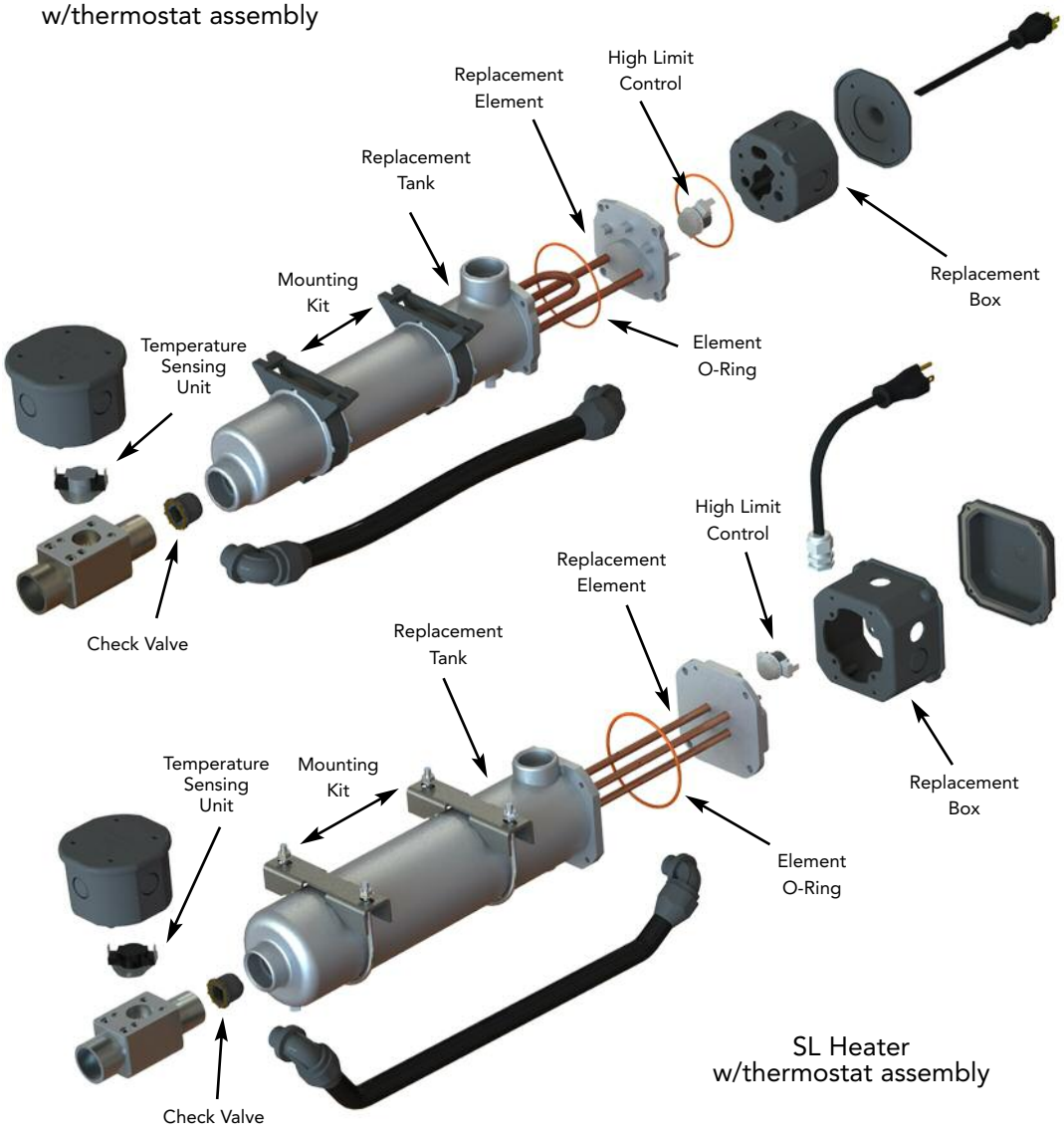
Example:

Desired Temperature Range 100° - 120°F
Model Number: SB1151**XX**-200
Order as: SB1151**10**-200

Temperature Range ON	Temperature Range OFF	Numerical Code
80°F (27C)	100°F (38C)	08
100°F (38C)	120°F (49C)	10
120°F (49C)	140°F (60C)	12
Adjustable 90° - 130°F (32° - 54°C)		A3

Model Number without Thermostat	Model Number with Thermostat see chart 2	Replacement Parts					
		Element	Tank	Box	Power Cord	Element O-ring	Mounting Kit
SB115100-000	SB1151XX-200	RESB1151	RTB	RTBSB	RHB-1-15	TMM-OR	RTMMB
SB115800-000	SB1158XX-200	RESB1158	RTB	RTBSB	RHB-WOP	TMM-OR	RTMMB
SB115200-000	SB1152XX-200	RESB1152	RTB	RTBSB	RHB-2-15	TMM-OR	RTMMB
SB115700-000	SB1157XX-200	RESB1157	RTB	RTBSB	RHB-WOP	TMM-OR	RTMMB
SB120100-000	SB1201XX-200	RESB1201	RTB	RTBSB	RHB1-20	TMM-OR	RTMMB
SB120800-000	SB1208XX-200	RESB1208	RTB	RTBSB	RHB-WOP	TMM-OR	RTMMB
SB120200-000	SB1202XX-200	RESB1202	RTB	RTBSB	RHB-2-15	TMM-OR	RTMMB
SB122100-000	SB1221XX-200	RESB1221	RTB	RTBSB	RHB-1-20	TMM-OR	RTMMB
SB125800-000	SB1258XX-200	RECB1258	RTB	RTBSB	RHB-WOP	TMM-OR	RTMMB
SB125200-000	SB1252XX-200	RECB1252	RTB	RTBSB	RHB-2-15	TMM-OR	RTMMB
SB125700-000	SB1257XX-200	RECB1257	RTB	RTBSB	RHB-WOP	TMM-OR	RTMMB
SL130100-100	—	RECL1301	RTL	RTBCL-100	N/A	TML-OR	FK7
SL130800-100	SL1308XX-200	RECL1308	RTL	RTBCL-100	RHL-WOP	TML-OR	FK7
SL130200-100	SL1302XX-200	RECL1302	RTL	RTBCL-100	RHL-2-15	TML-OR	FK7
SL130700-100	SL1307XX-200	RECL1307	RTL	RTBCL-100	RHL-WOP	TML-OR	FK7
SL140800-100	SL1408XX-200	RECL1408	RTL	RTBCL-100	RHL-WOL	TML-OR	FK7
SL140200-100	SL1402XX-200	RECL1402	RTL	RTBCL-100	RHL-2-20	TML-OR	FK7
SL140700-100	SL1407XX-200	RECL1407	RTL	RTBCL-100	RHL-WOP	TML-OR	FK7

SB Heater
w/thermostat assembly



SL Heater
w/thermostat assembly

Replacement Parts

For tank-style heaters SB, SL Series

Common Replacement Parts
available on all listed heaters

High Limit Control	Check Valve
HLC-165	RV-M

CHART 2

Heaters with Thermostats

Temperature Range		Sensing Unit
ON	OFF	
80°F (27C)	100°F (38C)	FSU8
100°F (38C)	120°F (49C)	FSU10
120°F (49C)	140°F (60C)	FSU12
Adjustable 90° - 130°F (32°C - 54°C)		FSU90-130

Example:

Model Number: SB1151**10**-200
T-Stat Replacement: FSU10

Industrial Tank Heaters

WL Series Weathertight Three Phase

1500-5000 Watts

CE

WL Model without thermostat

WL Model with thermostat

Engine Displacement	Model Number without Thermostat	Model Number with Thermostat see chart 1	Volts	Watts	Phase	Amps	Fig.* No.
600 - 800cid 9.8 - 13.1L	WL325800-000	WL3258XX-200	208	2500	3	6.9	5
	WL325200-000	WL3252XX-200	240	2500	3	6.0	5
	WL325A00-000	WL325AXX-200	400	2500	3	3.6	5
	WL325400-000	WL3254XX-200	480	2500	3	3.0	5
	WL325500-000	WL3255XX-200	575	2500	3	2.5	5
1000 - 1350cid 16.4 - 22.1L	WL340800-000	WL3408XX-200	208	4000	3	11.1	5
	WL340200-000	WL3402XX-200	240	4000	3	9.6	5
	WL340A00-000	WL340AXX-200	400	4000	3	5.8	5
	WL340400-000	WL3404XX-200	480	4000	3	4.8	5
	WL340500-000	WL3405XX-200	575	4000	3	4.0	5
1350 - 1650cid 22.1 - 27.0L	WL350800-000	WL3508XX-200	208	5000	3	13.9	5
	WL350200-000	WL3502XX-200	240	5000	3	12.0	5
	WL350A00-000	WL350AXX-200	400	5000	3	7.2	5
	WL350400-000	WL3504XX-200	480	5000	3	6.0	5
	WL350500-000	WL3505XX-200	575	5000	3	5.0	5

*Figure Number refers to technical drawings of heaters located on page 12.

ADAPTER FITTINGS

For the use of .75" or 1" ID heater hose, hose barb adapters are available. See below.

Part Number	Description
HB-1	1" NPT to 1" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.
HB-3/4	1" NPT to .75" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.

CHART 1 - HEATERS WITH THERMOSTATS

To specify temperature range of thermostat, insert numerical code from chart in place of the **XX** in model number.

Example:

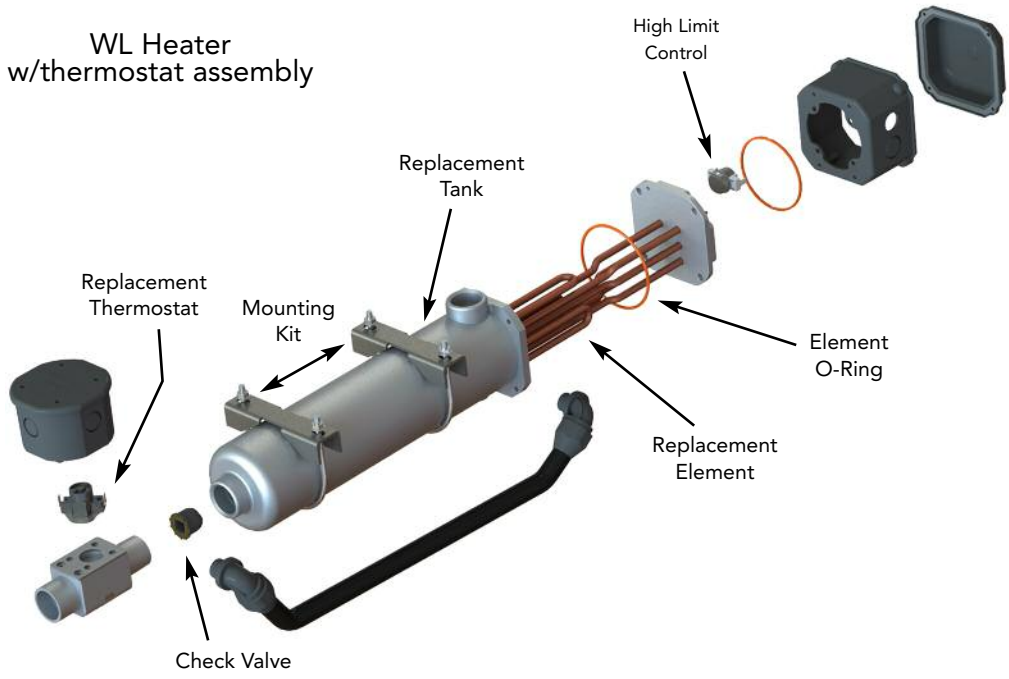
Desired Temperature Range 100° - 120°F
Model Number: WL3252**XX**-200
Order as: WL3252**10**-200

All 3 phase heaters with thermostat must use a control box

See Control Systems page 38

Temperature Range ON	Temperature Range OFF	Numerical Code
80°F (27C)	100°F (38C)	08
100°F (38C)	120°F (49C)	10
120°F (49C)	140°F (60C)	12
Adjustable 90° - 130°F (32° - 54°C)		A3

Model Number without Thermostat	Model Number with Thermostat see chart 2	Replacement Parts					
		Element	Tank	Element O-ring	High Limit Control	Mounting Kit	Check Valve
WL325800-000	WL3258XX-200	REWL3258	RTL	TML-OR	HLC-165	FK7	RV-M
WL325200-000	WL3252XX-200	REWL3252	RTL	TML-OR	HLC-165	FK7	RV-M
WL325A00-000	WL325AXX-200	REWL325A	RTL	TML-OR	HLC-165	FK7	RV-M
WL325400-000	WL3254XX-200	REWL3254	RTL	TML-OR	HLC-165	FK7	RV-M
WL325500-000	WL3255XX-200	REWL3255	RTL	TML-OR	HLC-165	FK7	RV-M
WL340800-000	WL3408XX-200	REWL3408	RTL	TML-OR	HLC-165	FK7	RV-M
WL340200-000	WL3402XX-200	REWL3402	RTL	TML-OR	HLC-165	FK7	RV-M
WL340A00-000	WL340AXX-200	REWL340A	RTL	TML-OR	HLC-165	FK7	RV-M
WL340400-000	WL3404XX-200	REWL3404	RTL	TML-OR	HLC-165	FK7	RV-M
WL340500-000	WL3405XX-200	REWL3405	RTL	TML-OR	HLC-165	FK7	RV-M
WL350800-000	WL3508XX-200	REWL3508	RTL	TML-OR	HLC-165	FK7	RV-M
WL350200-000	WL3502XX-200	REWL3502	RTL	TML-OR	HLC-165	FK7	RV-M
WL350A00-000	WL350AXX-200	REWL350A	RTL	TML-OR	HLC-165	FK7	RV-M
WL350400-000	WL3504XX-200	REWL3504	RTL	TML-OR	HLC-165	FK7	RV-M
WL350500-000	WL3505XX-200	REWL3505	RTL	TML-OR	HLC-165	FK7	RV-M



Replacement Parts

For tank-style heaters WL Series

CHART 2

Heaters with Thermostats

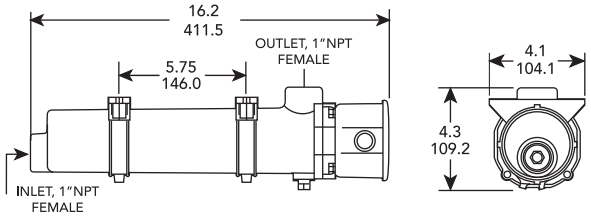
Temperature Range		Sensing Unit
ON	OFF	
80°F (27C)	100°F (38C)	FSU8
100°F (38C)	120°F (49C)	FSU10
120°F (49C)	140°F (60C)	FSU12
Adjustable 90° - 130°F (32°C - 54°C)		FSU90-130

Example:

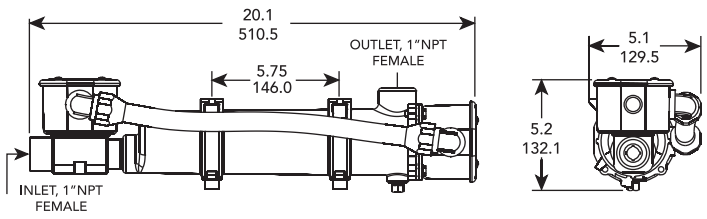
Model Number: WL3252**10**-200
T-Stat Replacement: FSU10

Dimensional Drawings

inch, millimeter

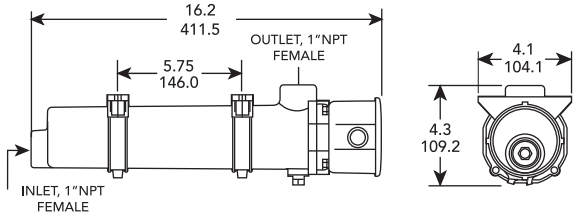


CB Style Heater without thermostat (pg. 6-7)

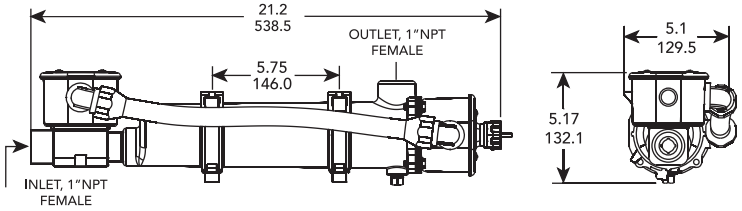


CB Style Heater with thermostat (pg. 6-7)

FIGURE 1

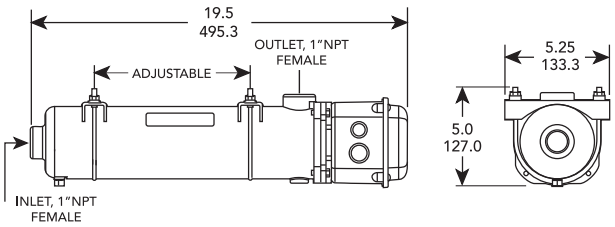


SB Style Heater without thermostat (pg. 8-9)

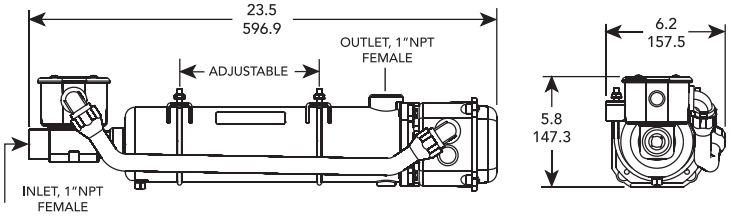


SB Style Heater with thermostat (pg. 8-9)

FIGURE 2

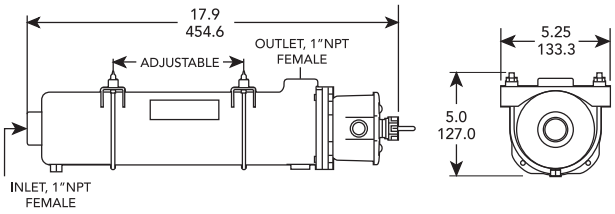


CL Style Heater without thermostat (pg. 6-7)

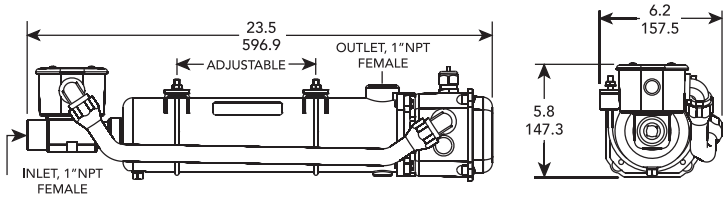


CL Style Heater with thermostat (pg. 6-7)

FIGURE 3

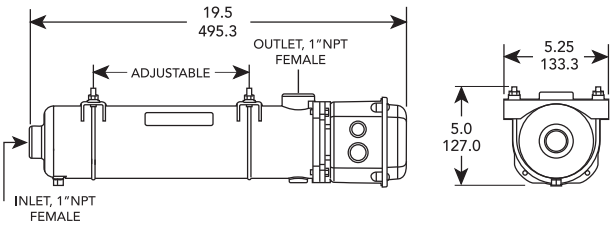


SL Style Heater without thermostat (pg. 8-9)

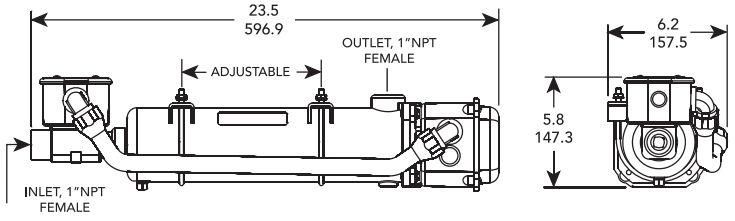


SL Style Heater with thermostat (pg. 8-9)

FIGURE 4



WL Style Heater without thermostat (pg. 10-11)



WL Style Heater with thermostat (pg. 10-11)

FIGURE 5

SECTION 2

PRODUCT CATALOG

Industrial Tank Heaters

EE Series
Hazardous Location
Single Phase

1500-5000 Watts

EE Model without thermostat

EE Model assembled with thermostat

Engine Displacement	Model Number without Thermostat	Fig.* No.	Model Number with Thermostat see chart 1	Fig.* No.	Volt	Watt	Phase	Amp
500cid or less **8.2L or less**	EE115100-000	1	EE1151XX-000	2	120	1500	1	12.5
	EE115800-000	1	EE1158XX-000	2	208	1500	1	7.2
	EE115200-000	1	EE1152XX-000	2	240	1500	1	6.3
	EE115700-000	1	EE1157XX-000	2	277	1500	1	5.4
	EE115300-000	1	EE1153XX-000	2	380	1500	1	3.9
	EE115400-000	1	EE1154XX-000	2	480	1500	1	3.1
	EE115500-000	1	EE1155XX-000	2	575	1500	1	2.6
500 - 600cid **8.2 - 9.8L**	EE120100-000	1	EE1201XX-000	2	120	2000	1	16.7
	EE120800-000	1	EE1208XX-000	2	208	2000	1	9.6
	EE120200-000	1	EE1202XX-000	2	240	2000	1	8.3
	EE120300-000	1	EE1203XX-000	2	380	2000	1	5.3
	EE120400-000	1	EE1204XX-000	2	480	2000	1	4.2
	EE120500-000	1	EE1205XX-000	2	575	2000	1	3.5
600 - 800cid **9.8 - 13.1L**	EE125100-000	1	EE1251XX-000	2	120	2500	1	20.8
	EE125800-000	1	EE1258XX-000	2	208	2500	1	12.0
	EE125200-000	1	EE1252XX-000	2	240	2500	1	10.4
	EE125700-000	1	EE1257XX-000	2	277	2500	1	9.2
	EE125300-000	1	EE1253XX-000	2	380	2500	1	6.6
	EE125400-000	1	EE1254XX-000	2	480	2500	1	5.2
	EE125500-000	1	EE1255XX-000	2	575	2500	1	4.3
800 - 1000cid **13.1 - 16.4L**	EE130100-000	1	EE1301XX-000	2	120	3000	1	25.0
	EE130800-000	1	EE1308XX-000	2	208	3000	1	14.4
	EE130200-000	1	EE1302XX-000	2	240	3000	1	12.5
	EE130700-000	1	EE1307XX-000	2	277	3000	1	10.8
	EE130300-000	1	EE1303XX-000	2	380	3000	1	7.9
	EE130400-000	1	EE1304XX-000	2	480	3000	1	6.3
	EE130500-000	1	EE1305XX-000	2	575	3000	1	5.2
1000 - 1350cid **16.4 - 22.1L**	EE140800-000	1	EE1408XX-000	2	208	4000	1	19.2
	EE140200-000	1	EE1402XX-000	2	240	4000	1	16.7
	EE140700-000	1	EE1407XX-000	2	277	4000	1	14.4
	EE140300-000	1	EE1403XX-000	2	380	4000	1	10.5
	EE140400-000	1	EE1404XX-000	2	480	4000	1	8.3
	EE140500-000	1	EE1405XX-000	2	575	4000	1	7.0
1350 - 1650cid **22.1 - 27.0L**	EE150800-000	1	EE1508XX-000	2	208	5000	1	24.0
	EE150200-000	1	EE1502XX-000	2	240	5000	1	20.8
	EE150700-000	1	EE1507XX-000	2	277	5000	1	18.1
	EE150300-000	1	EE1503XX-000	2	380	5000	1	13.2
	EE150400-000	1	EE1504XX-000	2	480	5000	1	10.4
	EE150500-000	1	EE1505XX-000	2	575	5000	1	8.7

*Figure Number refers to technical drawings of heaters located on page 18.

ADAPTER FITTINGS

For the use of .75" or 1" ID heater hose, hose barb adapters are available. See below.

Part Number	Description
HB-1	1" NPT to 1" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.
HB-3/4	1" NPT to .75" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.

CHART 1 - HEATERS WITH THERMOSTATS

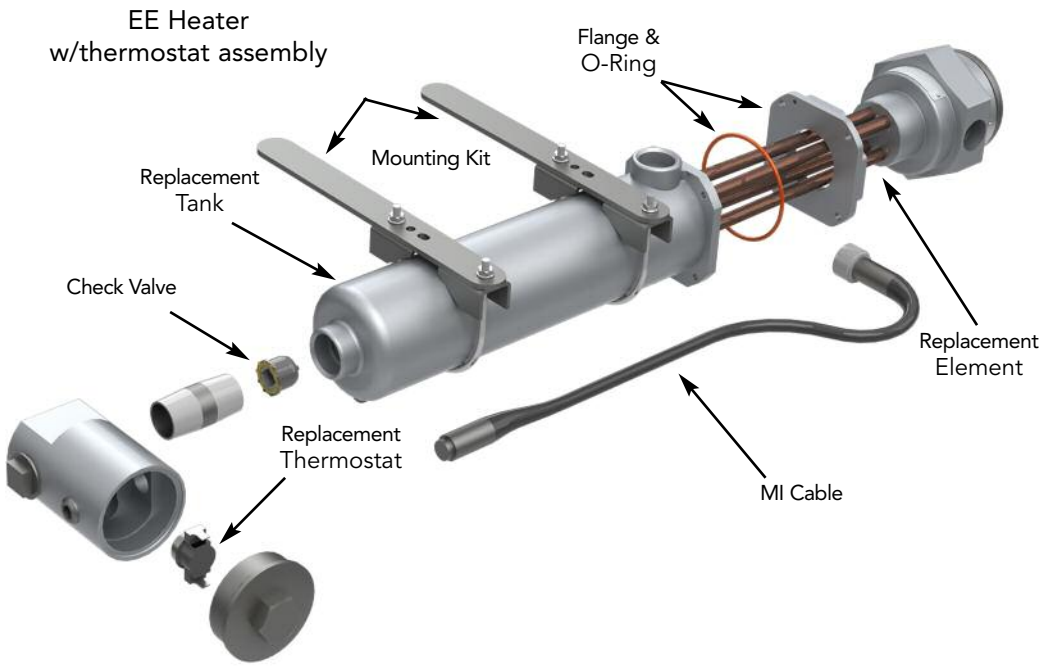
To specify temperature range of thermostat, insert numerical code from chart in place of the **XX** in model number.

Example:

Desired Temperature Range 100° - 120°F
Model Number: EE1302**XX**-200
Order as: EE1302**10**-200

3Ø heaters and heaters over 480v must use a control box See Control Systems page 38	Temperature Range ON	Temperature Range OFF	Numerical Code
	80°F (27C)	100°F (38C)	08
	100°F (38C)	120°F (49C)	10
	120°F (49C)	140°F (60C)	12

Model Number w/o Thermostat	Model Number w/ Thermostat see chart 2	Replacement Parts						
		Element	MI Cable	Tank	Flange	Flange O-ring	Mounting Kit	Check Valve
EE115100-000	EE1151XX-000	REEE1151	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE115800-000	EE1158XX-000	REEE1158	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE115200-000	EE1152XX-000	REEE1152	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE115700-000	EE1157XX-000	REEE1157	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE115300-000	EE1153XX-000	E01531E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE115400-000	EE1154XX-000	E01541E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE115500-000	EE1155XX-000	E01551E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE120100-000	EE1201XX-000	REEE1201	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE120800-000	EE1208XX-000	REEE1208	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE120200-000	EE1202XX-000	REEE1202	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE120300-000	EE1203XX-000	E02031E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE120400-000	EE1204XX-000	E02041E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE120500-000	EE1205XX-000	E02051E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125100-000	EE1251XX-000	REEE1251	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125800-000	EE1258XX-000	REEE1258	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125200-000	EE1252XX-000	REEE1252	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125700-000	EE1257XX-000	REEE1257	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125300-000	EE1253XX-000	E02531E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125400-000	EE1254XX-000	E02541E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE125500-000	EE1255XX-000	E02551E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130100-000	EE1301XX-000	REEE1301	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130800-000	EE1308XX-000	REEE1308	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130200-000	EE1302XX-000	REEE1302	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130700-000	EE1307XX-000	REEE1307	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130300-000	EE1303XX-000	E03031E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130400-000	EE1304XX-000	E03041E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE130500-000	EE1305XX-000	E03051E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE140800-000	EE1408XX-000	REEE1408	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE140200-000	EE1402XX-000	REEE1402	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE140700-000	EE1407XX-000	REEE1407	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE140300-000	EE1403XX-000	E04031E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE140400-000	EE1404XX-000	E04041E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE140500-000	EE1405XX-000	E04051E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE150800-000	EE1508XX-000	E05081E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE150200-000	EE1502XX-000	E05021E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE150700-000	EE1507XX-000	E05071E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE150300-000	EE1503XX-000	E05031E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE150400-000	EE1504XX-000	E05041E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M
EE150500-000	EE1505XX-000	E05051E-C0NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK7	RV-M



Replacement Parts

For tank-style heaters EE Series

CHART 2

Heaters with Thermostats

Temperature Range		Sensing Unit
ON	OFF	
80°F (27C)	100°F (38C)	RSU8
100°F (38C)	120°F (49C)	RSU10
120°F (49C)	140°F (60C)	RSU12

Example:

Model Number: EE1302**10**-000
T-Stat Replacement: RSU10

Industrial Tank Heaters

EE Series Hazardous Location Three Phase

1500-5000 Watts

EE Model without thermostat

EE Model assembled with thermostat

Engine Displacement	Model Number without Thermostat	Fig.* No.	Model Number with Thermostat see chart 1	Fig.* No.	Volt	Watts	Phase	Amp
500cid or less	EE315800-000	1	EE3158XX-000	2	208	1500	3	4.2
	EE315200-000	1	EE3152XX-000	2	240	1500	3	3.6
8.2L or less	EE315400-000	1	EE3154XX-000	2	480	1500	3	1.8
500 - 600cid	EE320800-000	1	EE3208XX-000	2	208	2000	3	5.6
	EE320200-000	1	EE3202XX-000	2	240	2000	3	4.8
	EE320300-000	1	EE3203XX-000	2	380	2000	3	3.0
8.2 - 9.8L	EE320400-000	1	EE3204XX-000	2	480	2000	3	2.4
	EE320500-000	1	EE3205XX-000	2	575	2000	3	2.0
600 - 800cid	EE325800-000	1	EE3258XX-000	2	208	2500	3	6.9
	EE325200-000	1	EE3252XX-000	2	240	2500	3	6.0
	EE325300-000	1	EE3253XX-000	2	380	2500	3	3.8
9.8 - 13.1L	EE325400-000	1	EE3254XX-000	2	480	2500	3	3.0
	EE325500-000	1	EE3255XX-000	2	575	2500	3	2.5
800 - 1000cid	EE330800-000	1	EE3308XX-000	2	208	3000	3	8.3
	EE330200-000	1	EE3302XX-000	2	240	3000	3	7.2
	EE330300-000	1	EE3303XX-000	2	380	3000	3	4.6
13.1 - 16.4L	EE330400-000	1	EE3304XX-000	2	480	3000	3	3.6
	EE330500-000	1	EE3305XX-000	2	575	3000	3	3.0
1000 - 1350cid	EE340800-000	1	EE3408XX-000	2	208	4000	3	11.1
	EE340200-000	1	EE3402XX-000	2	240	4000	3	9.6
	EE340300-000	1	EE3403XX-000	2	380	4000	3	6.1
16.4 - 22.1L	EE340400-000	1	EE3404XX-000	2	480	4000	3	4.8
	EE340500-000	1	EE3405XX-000	2	575	4000	3	4.0
1350 - 1650cid	EE350800-000	1	EE3508XX-000	2	208	5000	3	13.9
	EE350200-000	1	EE3502XX-000	2	240	5000	3	12.0
	EE350300-000	1	EE3503XX-000	2	380	5000	3	7.6
22.1 - 27.0L	EE350400-000	1	EE3504XX-000	2	480	5000	3	6.0
	EE350500-000	1	EE3505XX-000	2	575	5000	3	5.0

*Figure Number refers to technical drawings of heaters located on page 18.

ADAPTER FITTINGS

For the use of .75" or 1" ID heater hose, hose barb adapters are available. See below.

Part Number	Description
HB-1	1" NPT to 1" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.
HB-3/4	1" NPT to .75" hose barb adapter. Installs in 1" NPT female inlet or outlet of the heater.

CHART 1 - HEATERS WITH THERMOSTATS

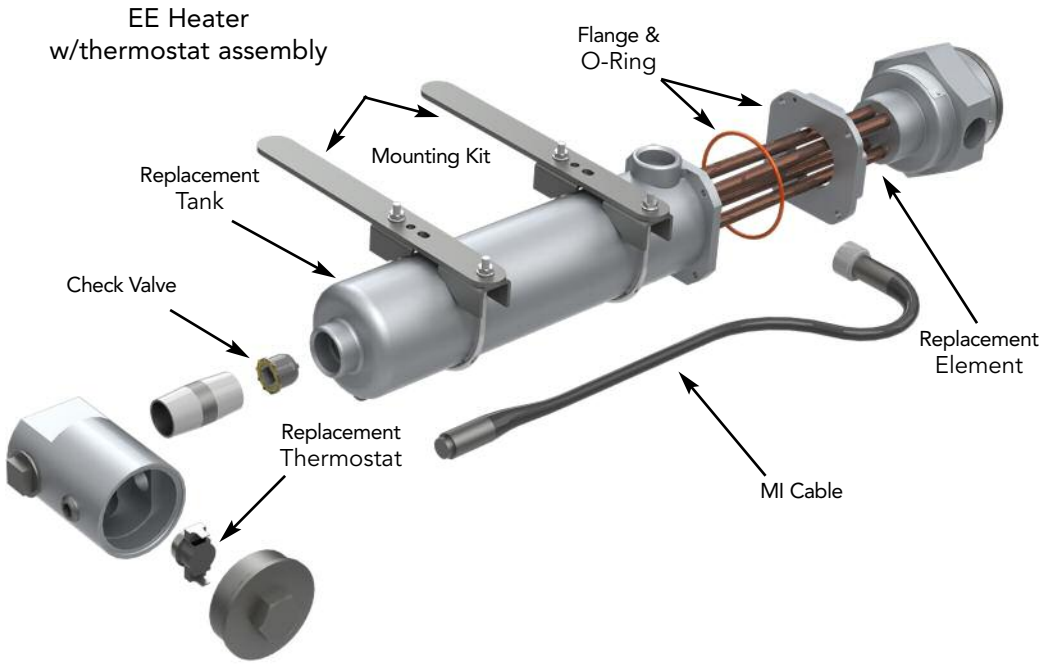
To specify temperature range of thermostat, insert numerical code from chart in place of the **XX** in model number.

Example:

Desired Temperature Range 100° - 120°F
Model Number: EE1302**XX**-200
Order as: EE1302**10**-200

3Ø heaters and heaters over 480v must use a control box	Temperature Range ON	Temperature Range OFF	Numerical Code
See Control Systems page 38	80°F (27C)	100°F (38C)	08
	100°F (38C)	120°F (49C)	10
	120°F (49C)	140°F (60C)	12

Model Number w/o Thermostat	Model Number w/ Thermostat see chart 2	Replacement Parts						
		Element	MI Cable	Tank	Flange	Flange O-ring	Mount Kit	Check Valve
EE315800-000	EE3158XX-000	E01583E-15NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE315200-000	EE3152XX-000	E01523E-15NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE315400-000	EE3154XX-000	E01543E-15NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE320800-000	EE3208XX-000	E02083E-25NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE320200-000	EE3202XX-000	E02023E-25NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE320300-000	EE3203XX-000	E02033E-25NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE320400-000	EE3204XX-000	E02043E-25NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE320500-000	EE3205XX-000	E02053E-25NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE325800-000	EE3258XX-000	E02583E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE325200-000	EE3252XX-000	E02523E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE325300-000	EE3253XX-000	E02533E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE325400-000	EE3254XX-000	E02543E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE325500-000	EE3255XX-000	E02553E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE330800-000	EE3308XX-000	E03083E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE330200-000	EE3302XX-000	E03023E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE330300-000	EE3303XX-000	E03033E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE330400-000	EE3304XX-000	E03043E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE330500-000	EE3305XX-000	E03053E-30NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE340800-000	EE3408XX-000	E04083E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE340200-000	EE3402XX-000	E04023E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE340300-000	EE3403XX-000	E04033E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE340400-000	EE3404XX-000	E04043E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE340500-000	EE3405XX-000	E04053E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE350800-000	EE3508XX-000	E05083E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE350200-000	EE3502XX-000	E05023E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE350300-000	EE3503XX-000	E05033E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE350400-000	EE3504XX-000	E05043E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M
EE350500-000	EE3505XX-000	E05053E-50NA-00	PRP104202-024	RTL	RF-L	TML-OR	FK6	RV-M



Replacement Parts

For tank-style heaters EE Series

CHART 2

Heaters with Thermostats

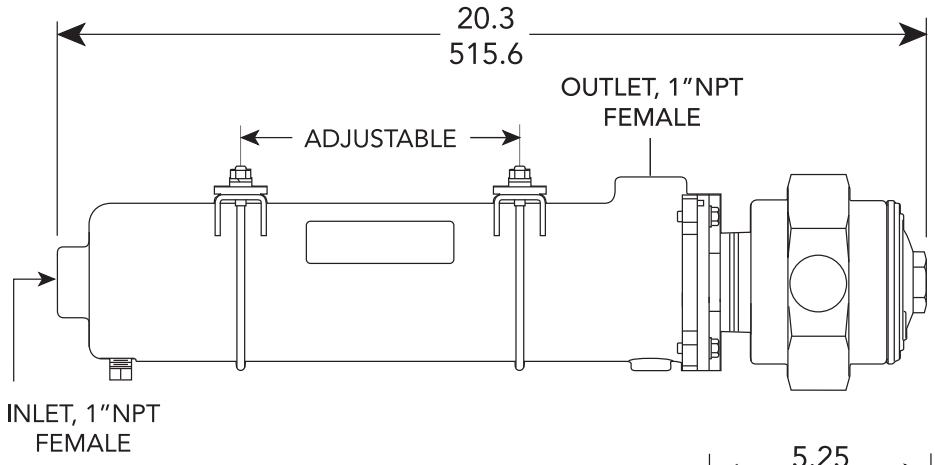
Temperature Range		Sensing Unit
ON	OFF	
80°F (27C)	100°F (38C)	RSU8
100°F (38C)	120°F (49C)	RSU10
120°F (49C)	140°F (60C)	RSU12

Example:

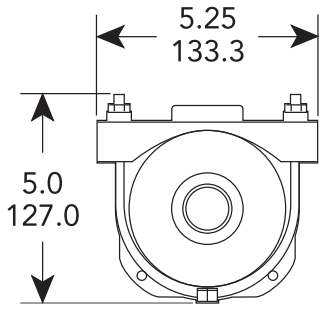
Model Number: EE330**2**10-000
T-Stat Replacement: FSU10

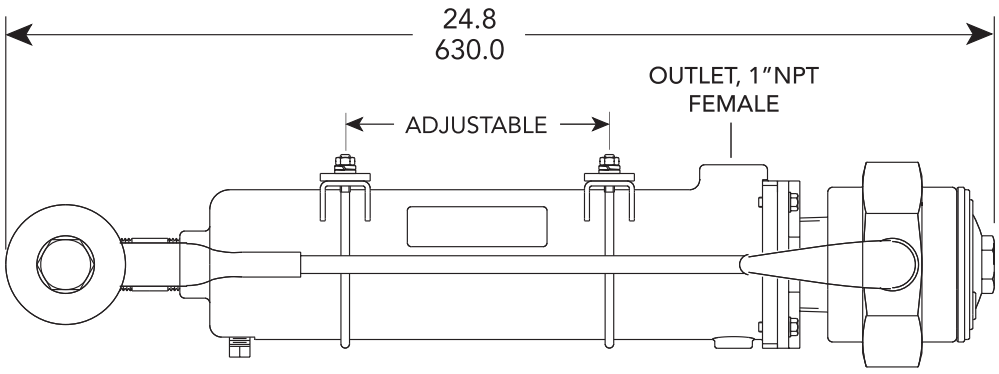
Dimensional Drawings

inch, millimeter

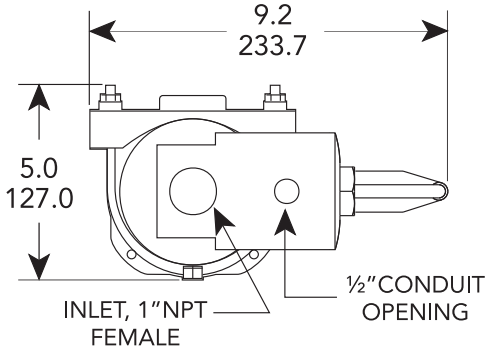


EE heater without thermostat (pg. 14 and 16)





EE heater with thermostat (pg. 14 and 16)



Part Number Matrix for Tank-style Heaters

Typical 11-digit part number

Enclosure Type	Tank	Phase	Watts	Volts	Thermostat	Options
C	B	1	15	1	XX	—000

Part Numbering System

Each letter or number in the HOTSTART tank-style heater part number represents a piece of information to accurately provide you with the description and composition of your HOTSTART heater.

First Digit - [ENCLOSURE TYPE] — 1 letter

TYPE: S
Single phase only
Maximum volts and watts: 277v, 4000w
Standard heater cord in cover — watertight

TYPE: C
Single phase only
Maximum volts and watts: 575v, 5000w
Conduit connection — watertight

TYPE: W
Three phase only
Maximum volts and watts: 575v, 5000w
Conduit connection — watertight

TYPE: E
Single or three phase
Maximum volts and watts: 575v, 5000w
Hazardous location enclosure — Class I, Group D

Second Digit - [TANKS] — 1 letter

B — Medium: 1500w - 2500w, single phase
E — Large: 1500w - 5000w, single or three phase, Hazardous Location only
L — Large: 3000w - 5000w, single or three phase

Third Digit - [PHASE] — "1" or "3"

1 — Single Phase **3** — Three Phase

Fourth & Fifth Digits - [WATTS] — 2 numbers

15 — 1500w **22** — 2250w **30** — 3000w **50** — 5000w
20 — 2000w **25** — 2500w **40** — 4000w

Sixth Digit - [VOLTS] — 1 number

1 — 120v **3** — 380v **4** — 480v **7** — 277v
2 — 240v **A** — 400v **5** — 575v **8** — 208v

Seventh & Eighth Digits - [THERMOSTAT] — 2 numbers

08 — ON at 80°F (27C), OFF at 100°F (38C)
10 — ON at 100°F (38C), OFF at 120°F (49C)
12 — ON at 120°F (49C), OFF at 140°F (60C)
A3 — Adjustable - 90°F (32C) to 130°F (54C)

XX - Must specify thermostat range **00** - No thermostat

Ninth, Tenth & Eleventh Digits - [OPTIONS] — 3 numbers

—100 — Medium: 1500w - 2500w, single phase
—200 — Large: 1500w - 5000w, single or three phase, Hazardous Location only
—220 — Large: 3000w - 5000w, single or three phase

Installation Instructions for Tank-style Heaters

The HOTSTART engine heater operates on the principle of a thermosiphon. As coolant flows into the heater intake opening, it is warmed by the element and begins to rise. The heated coolant exits through the heater outlet opening creating continuous circulation. The heater thermostat senses the temperature of the coolant and cycles the heater on and off.

For "V" engines larger than eight cylinders or over 1000 CID (15L), HOTSTART recommends using a HOTflow™ heater. Please refer to pages 22-24 to specify the proper size heater.

Prior to heater installation, inspect the coolant supply. Contaminated coolant will limit heater performance and cause premature element failure. Check your engine manufacturer's recommendations for the proper coolant. Only de-ionized or distilled water and a low-silicate antifreeze should be used and not exceed a 60% antifreeze to 40% water ratio. The use of hard water or water softened with salts is one of the most common causes of failure to the heating element. A cooling system containing anti-leak additive will also result in element failure.

MOUNTING

Mount the heater in a horizontal position with the outlet neck pointed up. Position the heater outlet directly under the engine port to which coolant returns. Proper positioning of the heater will eliminate horizontal sections or dips in the outlet hose which restricts circulation.

Using supplied hardware, mount heater to the engine frame or skid. (See Figure 2). The heater must be mounted below the lowest level of the engine water jacket to ensure a good gravity flow of coolant to the heater.

DO NOT mount the heater to the engine. Engine vibration can damage the heater and void the warranty.

PLUMBING

Heater Outlet: Install the hose between the outlet of the heater and the coolant return port on the engine. The hose must be routed to ensure a continuous rise from the heater to the engine (See Figure 3).

Heater Inlet: Connect hose from the inlet of the heater to where the coolant will be pulled out of the engine. There must be no high spots in the routing of the hose (See Figure 3).

DO NOT route outlet hose above engine block connection, or loop or kink hoses. This will cause air locks in the hose and block circulation of the coolant by the heater.

Follow the engine manufacturer's specifications for coolant. Refill the cooling system with the outlet hose disconnected to eliminate air pockets in the heater. Start engine and allow it to run until the engine thermostat opens. This will help purge the air out of the heater and plumbing. Once the engine has reached operating temperature, shut off and inspect for leaks and check coolant level. Top off the coolant if necessary.

WIRING

1 PHASE up to 480VAC:

Single phase heaters rated up to 480V may be powered directly without the use of a control relay or contactor.

OVER 480VAC or 3 PHASE:

If the power to the heater is greater than 480V or is 3 phase, the heater thermostats must be used in a control circuit with a contactor for switching the main power to the heating elements. Contact HOTSTART for recommended control boxes.

On standby and automatic start engines, heaters should be de-energized upon engine start-up. The engine heater should not operate during engine operation. See pages 37, 38, and 39 or consult HOTSTART for recommendations on your specific applications.

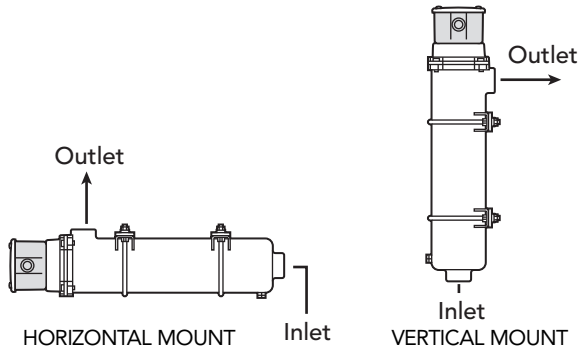


FIGURE 1

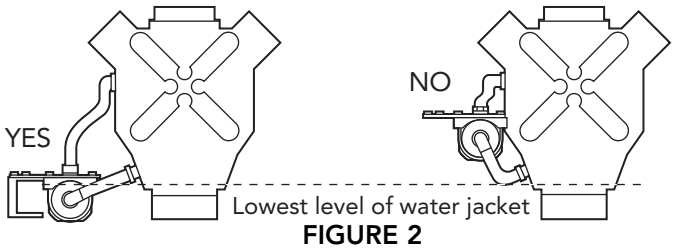


FIGURE 2

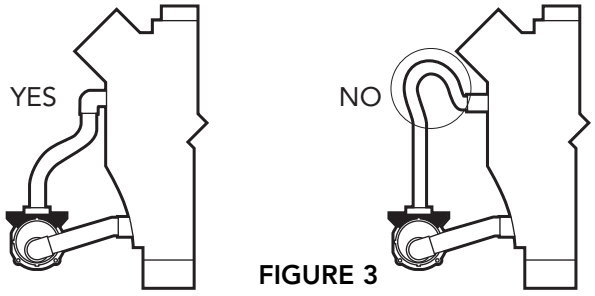


FIGURE 3

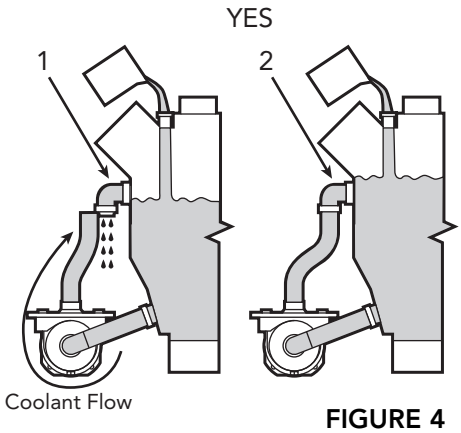
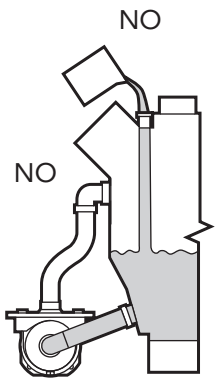


FIGURE 4



To ensure the heater has been installed correctly, the coolant temperature going into the engine should be well below 200°F (93°C). A heater outlet temperature higher than 200°F or an inlet hose that is hotter than the outlet hose indicates limited or no circulation. High outlet temperatures result in decreased heater/hose life and poor engine heating. If equipped with a control thermostat – the heater should cycle on and off a maximum of 4 times per hour.

SECTION 3

PRODUCT CATALOG

HOTflow™ Heaters

CSM Series
Single & Three Phase

3000-12000

HOTSTART's HOTflow™ heating system (CSM Series) is a complete coolant preheater with thermostat, pump and all required controls. Forced circulation of the coolant delivers uniform heating throughout the entire engine, extends element life and offers a significant reduction in electrical consumption.

The HOTflow™ CSM operates automatically by supplying a 24 Vold DC signal to the provided contacts.

Engine Displacement	Model Number	Volts	kW	Ø	Hz	Amps	Thermostat Range On	Thermostat Range Off	Style
1000 - 2000cid 15 - 30L	CSM10301-000	120	3	1	60	27.0	100°F (38C)	120°F (49C)	A
	CSM10308-000	208	3	1	60	16.4	100°F (38C)	120°F (49C)	A
	CSM1030C-000	220	3	1	50	15.6	100°F (38C)	120°F (49C)	A
	CSM10302-000	240	3	1	60	14.5	100°F (38C)	120°F (49C)	A
2000 - 3000cid 25 - 50L	CSM10608-000	208	6	1	60	30.8	100°F (38C)	120°F (49C)	A
	CSM1060C-000	220	6	1	50	29.3	100°F (38C)	120°F (49C)	A
	CSM10602-000	240	6	1	60	27.0	100°F (38C)	120°F (49C)	A
	CSM10604-000	480	6	1	60	14.5	100°F (38C)	120°F (49C)	B
	CSM30603-000	380	6	3	50	11.1	100°F (38C)	120°F (49C)	B
	CSM30604-000	480	6	3	60	9.2	100°F (38C)	120°F (49C)	B
	CSM30605-000	575	6	3	60	6.0	100°F (38C)	120°F (49C)	B
3000 - 4500cid 50 - 75L	CSM10908-000	208	9	1	60	45.3	100°F (38C)	120°F (49C)	A
	CSM1090C-000	220	9	1	50	42.9	100°F (38C)	120°F (49C)	A
	CSM10902-000	240	9	1	60	39.5	100°F (38C)	120°F (49C)	A
	CSM10904-000	480	9	1	60	20.8	100°F (38C)	120°F (49C)	B
	CSM30903-000	380	9	3	50	15.7	100°F (38C)	120°F (49C)	B
	CSM30904-000	480	9	3	60	12.8	100°F (38C)	120°F (49C)	B
4500 - 6000cid 75 - 100L	CSM11208-000	208	12	1	60	59.7	100°F (38C)	120°F (49C)	B
	CSM1120C-000	220	12	1	50	56.5	100°F (38C)	120°F (49C)	B
	CSM11202-000	240	12	1	60	52.0	100°F (38C)	120°F (49C)	B
	CSM11204-000	480	12	1	60	27.0	100°F (38C)	120°F (49C)	B
	CSM31203-000	380	12	3	50	20.3	100°F (38C)	120°F (49C)	B
	CSM31204-000	480	12	3	60	16.5	100°F (38C)	120°F (49C)	B

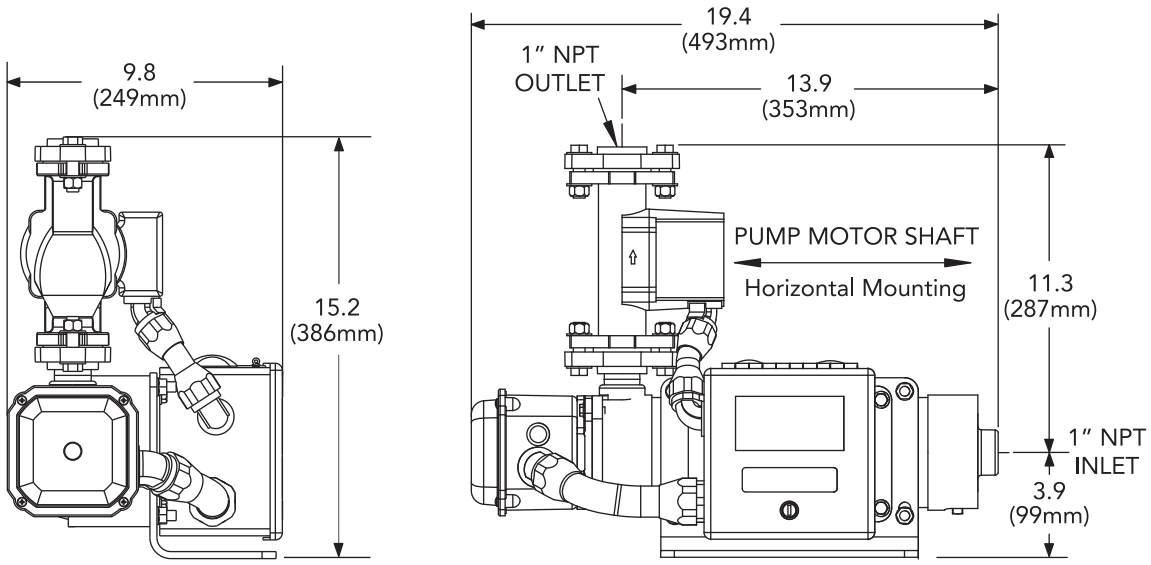
Other voltages available. Consult the factory.

Meets requirements for installation on any UL 2200 listed generator

Dimensional Drawings

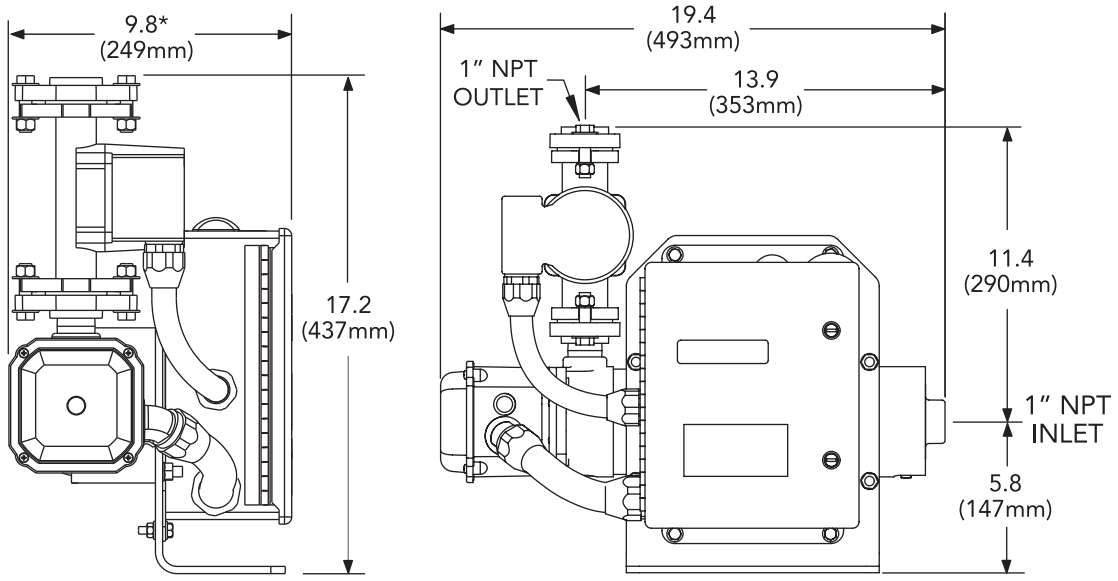
inch, millimeter

Style A



Shipping Weight: 37lbs. (16.8kg)

Style B



Shipping Weight: 54lbs. (24.5kg)

* For CE compliant models, overall depth measures 10.8" (274mm)

HOTflow™ Heaters

CTM™ Series Single Phase

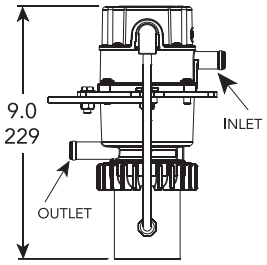
1000-2500 Watts

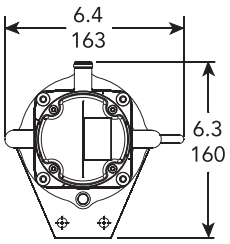
CE

Suffix Descriptions		
Suffix	**Description**	**Industry Approvals**
A00	3m cord, no plug	
E00	Schuko plug Laing pump	CE compliant
N00	NEMA plug Laing pump	

HOTSTART's HOTflow™ heating system (CTM Series) is a complete coolant preheater. It features an integrated pump that combines the benefits of forced circulation with a compact design that can mount to a variety of small engine applications. Forced circulation of the coolant delivers uniform heating throughout the entire engine, extends element life and offers a significant reduction in electrical consumption.

Engine Displacement	120V	240V N. American power cord	240V Euro power cord	Watts	Amps 120/240V	Thermostat Range
0 - 500cid **0 - 8L**	CTM10110-A00	CTM10210-N00 CTM10210-A00	CTM10210-E00	1000	8.8/4.4	**On** 100°F (38C) **Off** 120°F (49C)
500 - 750cid **8 - 12L**	CTM15110-A00	CTM15210-N00 CTM15210-A00	CTM15210-E00	1500	13.0/6.5	**On** 100°F (38C) **Off** 120°F (49C)
750 - 1200cid **12 - 20L**	CTM25110-A00	CTM25210-N00 CTM25210-A00	CTM25210-E00	2500	21.3/10.7	**On** 100°F (38C) **Off** 120°F (49C)





Isolation Mounting Kit (optional)

CTM-IMK

SECTION 4

PRODUCT CATALOG

Oil Heaters

To specify temperature range of thermostat, insert code from chart in place of the **XX** in model number.

Example:

Desired Temp. Range 80° - 100°F
Model Number: OW2121**XX**-000
Order as: OW2121**08**-000

Temperature Range ON	Temperature Range OFF	Code
60°F (15C)	80°F (27C)	06
80°F (27C)	100°F (38C)	08
100°F (38C)	120°F (49C)	10

See p.33 for remote thermostat assembly part numbers

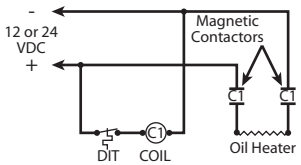
Oil Capacity	Weathertight Heater Only	Weathertight With Thermostat	Class 1, Group D Haz. Locations Heater Only	Volts	Watts	Amps	Watts/Sq Inch
3/8" N.P.T. THREAD WITH A 2 1/8" PROBE LENGTH							
2 qts (2L) or Less	OW005100-000 OW005200-000	— —	— —	120 240	50 50	.4 .2	20.0 20.0
1/2" N.P.T. THREAD WITH A 4" PROBE LENGTH							
2 - 6 qts 2 - 5.7L	OW212100-000 OW212200-000	OW2121XX-000 OW2122XX-000	OE212100-000 OE212200-000	120 240	125 125	1.0 .5	24.6 24.6
3/4" N.P.T. THREAD WITH A 5" PROBE LENGTH							
1 - 5 gal 3.8 - 19L	OW415100-000 OW415200-000	OW4151XX-000 OW4152XX-000	OE415100-000 OE415200-000	120 240	150 150	1.3 .6	14.6 14.6
5 - 15 gal 19 - 57L	OW430100-000 OW430800-000 OW430200-000	OW4301XX-000 OW4308XX-000 OW4302XX-000	OE430100-000 OE430800-000 OE430200-000	120 208 240	300 300 300	2.6 1.1 1.2	29.3 29.3 29.3
1" N.P.T. THREAD WITH A 5 1/4" PROBE LENGTH							
1 - 5 gal 3.8 - 19L	OW615100-000 OW615200-000	OW6151XX-000 OW6152XX-000	OE615100-000 OE615200-000	120 240	150 150	1.3 .6	10.7 10.7
5 - 15 gal 19 - 57L	OW630100-000 OW630800-000 OW630200-000 — — —	OW6301XX-000 OW6308XX-000 OW6302XX-000 — — —	OE630100-000 OE630800-000 OE630200-000 OE630700-000 OE630300-000 OE630400-000	120 208 240 277 380 480	300 300 300 300 300 300	2.6 1.6 1.2 1.1 1.0 .6	21.4 21.4 21.4 21.4 21.4 21.4
15 - 30 gal 57 - 113L	OW650100-000 OW650800-000 OW650200-000 OW650700-000 — — —	OW6501XX-000 OW6508XX-000 OW6502XX-000 OW6507XX-000 — — —	OE650100-000 OE650800-000 OE650200-000 OE650700-000 OE650300-000 OE650400-000 OE650500-000	120 208 240 277 380 480 575	500 500 500 500 500 500 500	4.1 2.4 2.0 1.8 1.3 1.0 0.8	35.7 35.7 35.7 35.7 35.7 35.7 35.7

NOTES: Weathertight models are furnished with a 4 ft. oil and heat resistant power cord - no plug. Class 1, Group D heaters are furnished with 18" of lead wire for connection to the power leads in an approved splice box.

Use a thermostat with all lube oil heaters to protect the oil from overheating if the heater is energized while the engine is hot or running. Lube oil heaters must always be installed in the sump with the entire heater submerged below the oil level at all times. See page 33 for remote thermostat part numbers.

DC Oil Heaters 12V and 24V

When used with a thermostat control, all DC oil heaters must use a DC relay



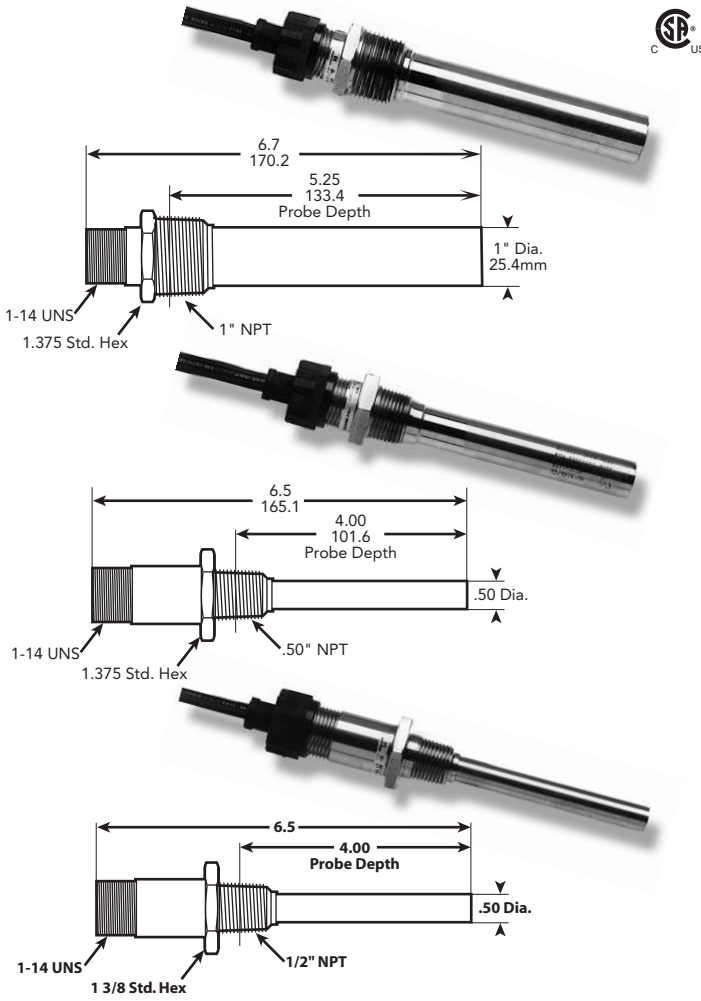
12 VOLT/24 VOLT DC CONTROL BOXES		
25 Amps Maximum	12V 24V	JBMC330DC-12V JBMC330DC-24V

Oil Capacity	Volts	Watts	.5" NPT with 4" Probe Length	.75" NPT with 4 7/8" Probe Length	1" NPT with 5 3/8" Probe Length	Amps	Watts Per Square Inch
2 Quarts or Less	12 24	75 75	OW207900-012 —	OW407900-012 OW407900-024	— —	6.3 3.1	1/2" are all 14.7 WSI 3/4" are all 7.3 WSI
2 to 6 Quarts	24	125	OW212900-024	—	—	5.2	24.6 WSI
1 to 5 Gallons	12 24	150 150	— —	OW415900-012 OW415900-024	OW615900-012 OW615900-024	12.5 6.3	3/4" are all 14.6 WSI 1" are all 10.7 WSI
5 to 15 Gallons	12 24	300 300	— —	— OW430900-024	OW630900-012 OW630900-024	25.0 12.5	3/4" are all 29.3 WSI 1" are all 21.4 WSI
15 to 30 Gallons	24	500	—	—	OW650900-024	20.8	35.7 WSI

12 Volt and 24 Volt DC oil heaters can be powered directly from the battery, but will drain the battery very rapidly unless charged by an alternator or generator.

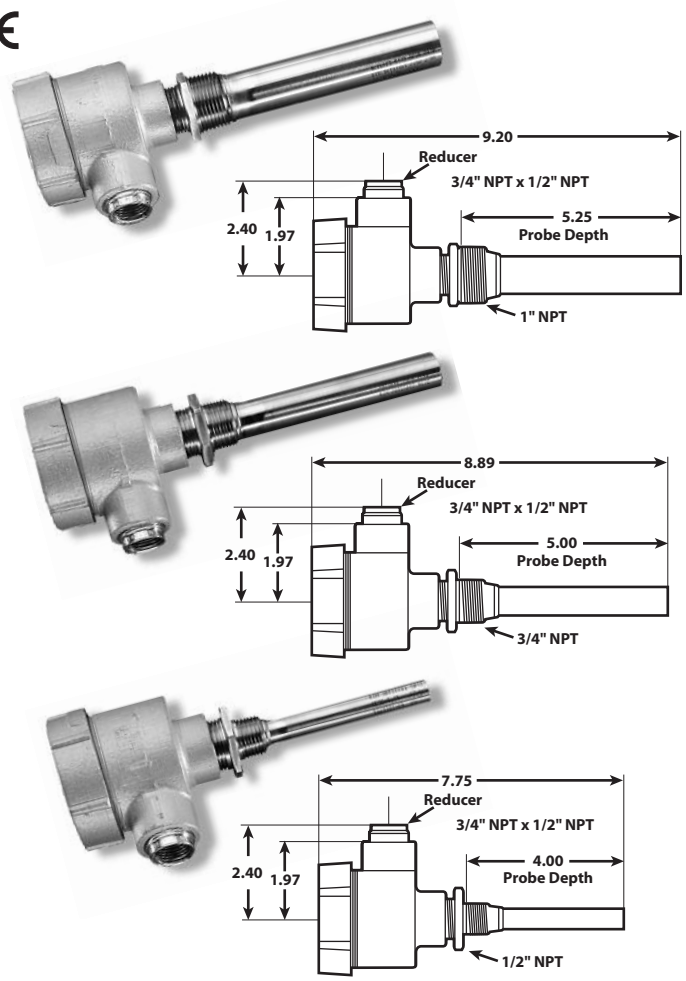
Weathertight

Heater only



Class 1, Group D

For Hazardous Locations, Heater only



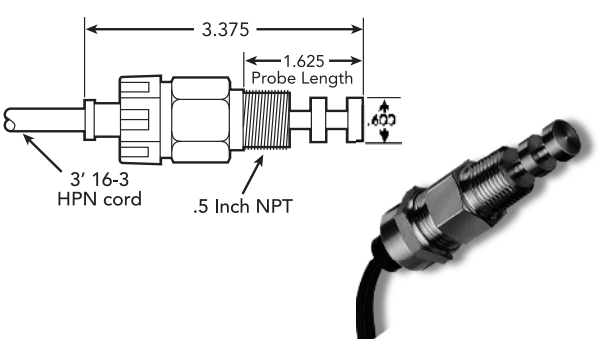
REMOTE THERMOSTATS for OIL HEATERS

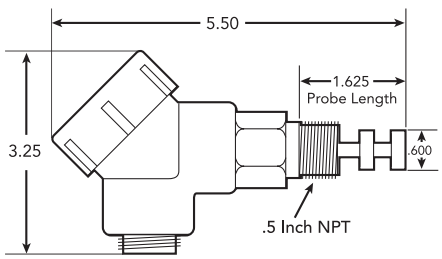
Weathertight	Class I, Group D	Temprature Range ON	Temprature Range OFF	Sensing Unit	Thread Size
DIT68	DIT68EP	60°F (16C)	80°F (26C)	LSU6	.5" NPT
DIT810	DIT810EP	80°F (26C)	100°F (37C)	LSU8	.5" NPT
DIT1012	DIT1012EP	100°F (26C)	120°F (37C)	LSU10	.5" NPT
DIT1214	DIT1214EP	120°F (26C)	140°F (37C)	LSU12	.5" NPT

Switch Capacity

120V - 15amp
208V - 10amp
240V - 10amp
277V - 10amp

12V DC } Pilot Duty Only
24V DC }





Industrial Immersion Heaters

2" Screw Plug

Available with fixed or adjustable thermostat

Models for larger capacities than shown are available. Call factory.

Oil Capacity	HIGH LIMIT THERMOSTAT CONTROL SETTING			Volts	Watts	Amps	Watts Sq. In.
	On 60°F (15C) Off 80°F (27C)	On 80°F (27C) Off 100°F (38C)	On 100°F (38C) Off 120°F (49C)				
SINGLE PHASE — 2" N.P.T. WITH A 12" PROBE LENGTH							
30 - 45 Gallons	E01011W-156A-00	E01011W-158A-00	E01011W-151A-00	120	1000	8.3	17.0
	E01081W-156A-00	E01081W-158A-00	E01081W-151A-00	208	1000	4.8	17.0
	E01021W-156A-00	E01021W-158A-00	E01021W-151A-00	240	1000	4.2	17.0
113-170L	E01071W-156A-00	E01071W-158A-00	E01071W-151A-00	277	1000	3.6	17.0
45 - 60 Gallons	E01511W-156A-00	E01511W-158A-00	E01511W-151A-00	120	1500	12.5	17.0
	E01581W-156A-00	E01581W-158A-00	E01581W-151A-00	208	1500	7.2	17.0
	E01521W-156A-00	E01521W-158A-00	E01521W-151A-00	240	1500	6.3	17.0
170-227L	E01571W-156A-00	E01571W-158A-00	E01571W-151A-00	277	1500	5.4	17.0
THREE PHASE — 2" N.P.T. WITH A 12" PROBE LENGTH							
30 - 45 Gallons	E01083W-106A-00	E01083W-108A-00	E01083W-101A-00	208	1000	2.8	11.0
	E01023W-106A-00	E01023W-108A-00	E01023W-101A-00	240	1000	2.4	11.0
113-170L	E01033W-106A-00	E01033W-108A-00	E01033W-101A-00	380	1000	1.5	11.0
45 - 60 Gallons	E01583W-156A-00	E01583W-158A-00	E01583W-151A-00	208	1500	4.2	17.0
	E01523W-156A-00	E01523W-158A-00	E01523W-151A-00	240	1500	3.6	17.0
	E01533W-156A-00	E01533W-158A-00	E01533W-151A-00	380	1500	2.3	17.0
170-227L	E01543W-156A-00	E01543W-158A-00	E01543W-151A-00	480	1500	1.8	17.0
SINGLE PHASE — 2" N.P.T. WITH A 18" PROBE LENGTH							
	E02011W-156A-00	E02011W-158A-00	E02011W-151A-00	120	2000	16.7	14.0
60 - 90 Gallons	E02081W-156A-00	E02081W-158A-00	E02081W-151A-00	208	2000	9.6	14.0
	E02021W-156A-00	E02021W-158A-00	E02021W-151A-00	240	2000	8.4	14.0
	E02071W-156A-00	E02071W-158A-00	E02071W-151A-00	277	2000	7.2	14.0
227-341L	E02031W-156A-00	E02031W-158A-00	E02031W-151A-00	380	2000	5.3	14.0
	E02041W-156A-00	E02041W-158A-00	E02041W-151A-00	480	2000	4.2	14.0
THREE PHASE — 2" N.P.T. WITH A 18" PROBE LENGTH							
60 - 90 Gallons	E02083W-156A-00	E02083W-158A-00	E02083W-151A-00	208	2000	5.6	14.0
	E02023W-156A-00	E02023W-158A-00	E02023W-151A-00	240	2000	4.8	14.0
	E02033W-156A-00	E02033W-158A-00	E02033W-151A-00	380	2000	3.0	14.0
227-341L	E02043W-156A-00	E02043W-158A-00	E02043W-151A-00	480	2000	2.4	14.0

Class I, Group D heaters with thermostat for hazardous locations also available.
Substitute the letter **"W"** in part number with the letter **"E"** to specify Class I, Group D heaters.
Industrial Immersion Heaters are also available for coolants and other process heating. Call factory.

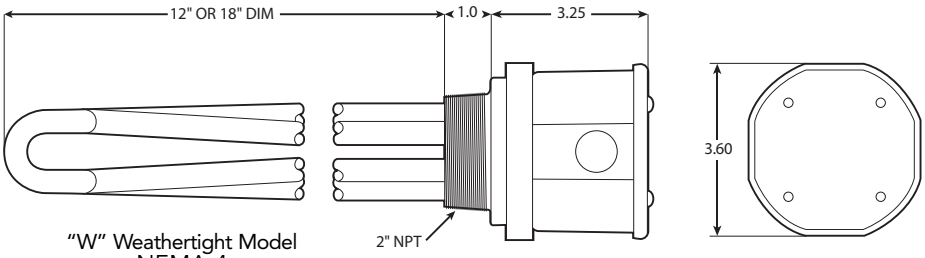
Call HOTSTART for complete model number featuring adjustable thermostat.

Industrial Immersion Heaters

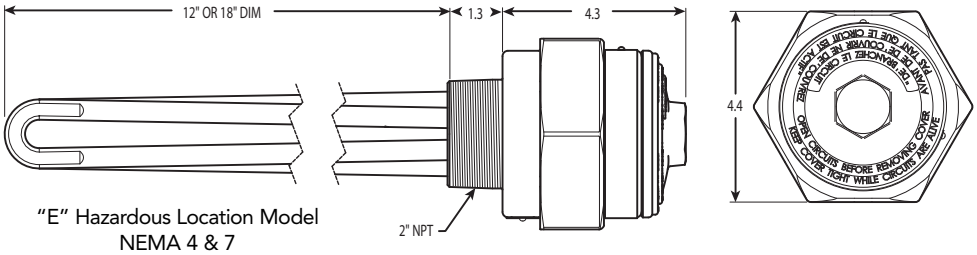
2" Screw Plug

HOTSTART immersion heaters include a fixed-setting, built-in thermostat (shown below) and are available with an adjustable thermostat (see figure on pg. 31).

Ideal for heating hydraulic reservoirs on construction equipment and the sumps of large industrial engines.



"W" Weathertight Model
NEMA 4



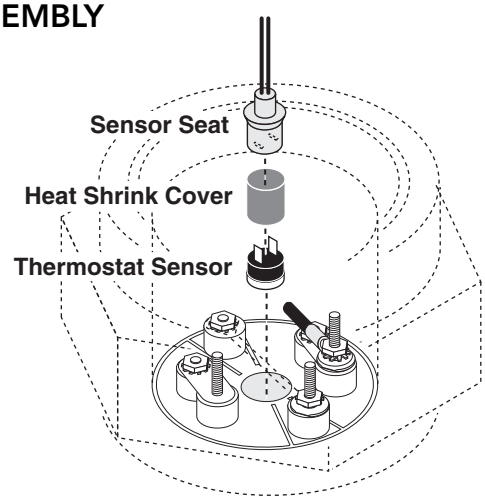
"E" Hazardous Location Model
NEMA 4 & 7

"W" Weathertight Model
NEMA 4

"E" Hazardous Location Model
NEMA 4 & 7

FIXED THERMOSTAT ASSEMBLY

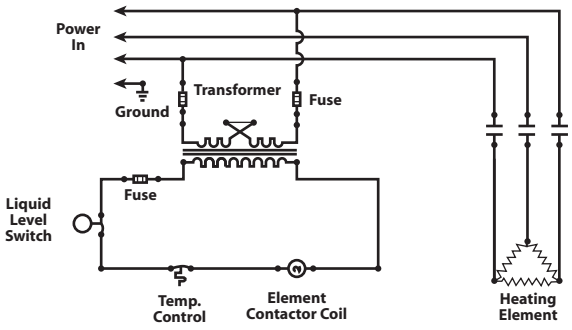
Thermostat assembly shown in "EP" housing.



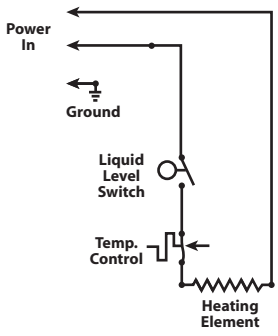
ELECTRICAL RATING		
15 Amps	at	120 VAC
10 Amps	at	240 VAC
10 Amps	at	277 VAC

TYPICAL WIRING DIAGRAMS

Three phase and single phase above 277 VAC



Single phase 277 VAC and below



NOTES:

On applications where level of fluid is subject to change, a liquid level switch mounted a minimum of 3 to 4 inches above element is recommended. **Liquid level switch is not included with heater.**

All 380 Volt and 480 Volt heaters must be used in conjunction with contactor and control transformer.

All three phase heaters must be used with a contactor. See pages 37 & 38.

Higher or lower temperature ranges are available. Consult HOTSTART.

V-Clamp Immersion Heaters

Threadless Design

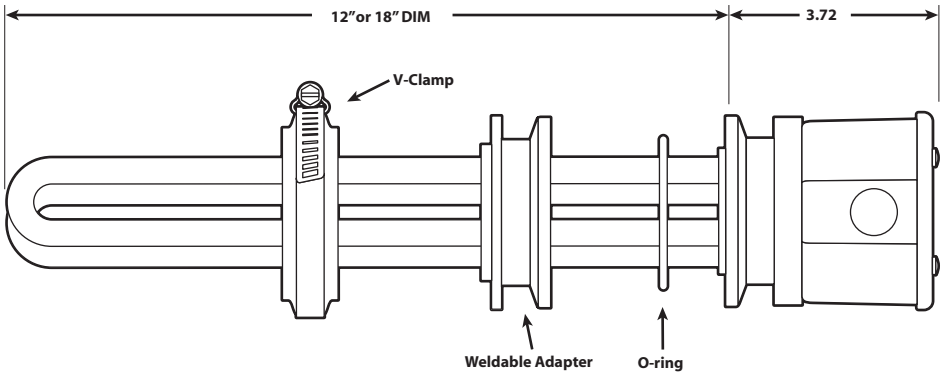
Available with fixed or adjustable thermostat

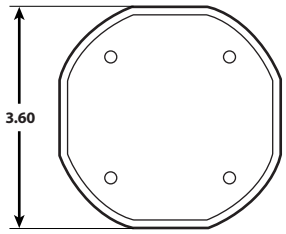
Models for larger capacities than shown are available. Call factory.

Oil Capacity	HIGH LIMIT THERMOSTAT CONTROL SETTING On 60°F (15C) Off 80°F (27C)	On 80°F (27C) Off 100°F (38C)	On 100°F (38C) Off 120°F (49C)	Volts	Watts	Amps	Watts Sq. In.
SINGLE PHASE — WITH A 12" PROBE LENGTH							
30 - 45 Gallons	E01011W-156V-00	E01011W-158V-00	E01011W-151V-00	120	1000	8.3	17.0
	E01081W-156V-00	E01081W-158V-00	E01081W-151V-00	208	1000	4.8	17.0
	E01021W-156V-00	E01021W-158V-00	E01021W-151V-00	240	1000	4.2	17.0
113-170L	E01071W-156V-00	E01071W-158V-00	E01071W-151V-00	277	1000	3.6	17.0
45 - 60 Gallons	E01511W-156V-00	E01511W-158V-00	E01511W-151V-00	120	1500	12.5	17.0
	E01581W-156V-00	E01581W-158V-00	E01581W-151V-00	208	1500	7.2	17.0
	E01521W-156V-00	E01521W-158V-00	E01521W-151V-00	240	1500	6.3	17.0
170-227L	E01571W-156V-00	E01571W-158V-00	E01571W-151V-00	277	1500	5.4	17.0
THREE PHASE — WITH A 12" PROBE LENGTH							
30 - 45 Gallons	E01083W-106V-00	E01083W-108V-00	E01083W-101V-00	208	1000	2.8	11.0
	E01023W-106V-00	E01023W-108V-00	E01023W-101V-00	240	1000	2.4	11.0
113-170L	E01033W-106V-00	E01033W-108V-00	E01033W-101V-00	380	1000	1.5	11.0
45 - 60 Gallons	E01583W-156V-00	E01583W-158V-00	E01583W-151V-00	208	1500	4.2	17.0
	E01523W-156V-00	E01523W-158V-00	E01523W-151V-00	240	1500	3.6	17.0
	E01533W-156V-00	E01533W-158V-00	E01533W-151V-00	380	1500	2.3	17.0
170-227L	E01543W-156V-00	E01543W-158V-00	E01543W-151V-00	480	1500	1.8	17.0
SINGLE PHASE — WITH A 18" PROBE LENGTH							
60 - 90 Gallons	E02011W-156V-00	E02011W-158V-00	E02011W-151V-00	120	2000	16.7	14.0
	E02081W-156V-00	E02081W-158V-00	E02081W-151V-00	208	2000	9.6	14.0
	E02021W-156V-00	E02021W-158V-00	E02021W-151V-00	240	2000	8.4	14.0
	E02071W-156V-00	E02071W-158V-00	E02071W-151V-00	277	2000	7.2	14.0
227-341L	E02031W-156V-00	E02031W-158V-00	E02031W-151V-00	380	2000	5.3	14.0
	E02041W-156V-00	E02041W-158V-00	E02041W-151V-00	480	2000	4.2	14.0
THREE PHASE — WITH A 18" PROBE LENGTH							
60 - 90 Gallons	E02083W-156V-00	E02083W-158V-00	E02083W-151V-00	208	2000	5.6	14.0
	E02023W-156V-00	E02023W-158V-00	E02023W-151V-00	240	2000	4.8	14.0
	E02033W-156V-00	E02033W-158V-00	E02033W-151V-00	380	2000	3.0	14.0
227-341L	E02043W-156V-00	E02043W-158V-00	E02043W-151V-00	480	2000	2.4	14.0

Class I, Group D heaters with thermostat for hazardous locations also available.
Substitute the letter **"W"** in part number with the letter **"E"** to specify Class I, Group D heaters.
Industrial Immersion Heaters are also available for coolants and other process heating. Call factory.

Call HOTSTART for complete model number featuring adjustable thermostat.





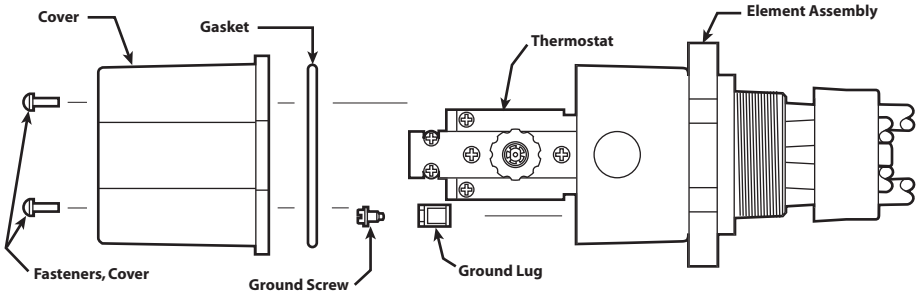
NOTE: Replacement elements supplied with **"O" Ring** only. For new installations, order kit - P/N **VC-SK**.

Kit Includes:

1 – steel weldable adapter
1 – worm-drive V-Clamp
1 – "O" Ring

ADJUSTABLE THERMOSTAT ASSEMBLY

TEMPERATURE RANGE	
OFF	70°F to 210°F
ELECTRICAL RATING	
30 Amps at 125 VAC 30 Amps at 240 VAC 30 Amps at 277 VAC 20 Amps at 480 VAC	
Nominal thermal differential is 8°F	



Call HOTSTART for complete model number featuring adjustable thermostat.

V-Clamp Immersion Heaters

Threadless Design

"W" Weathertight Model
NEMA 4

"E" Hazardous Location Model
NEMA 4 & 7

NOTES:

On applications where level of fluid is subject to change, a liquid level switch mounted a minimum of 3 to 4 inches above element is recommended. **Liquid level switch is not included with heater.**

All 380 Volt and 480 Volt heaters must be used in conjunction with contactor and control transformer.

All three phase heaters must be used with a contactor. See pages 37 & 38.

Higher or lower temperature ranges are available. Consult HOTSTART.

SECTION 5

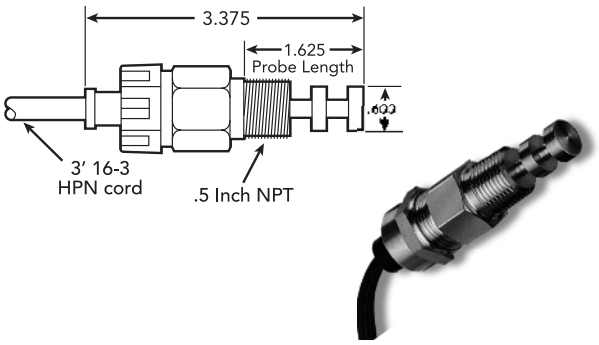
PRODUCT CATALOG

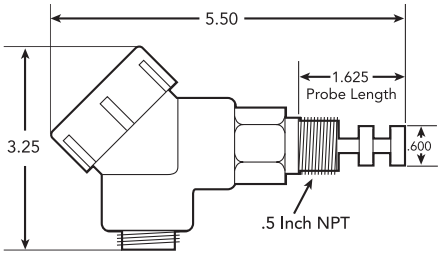
Remote thermostats for Weathertight and Class I, Group D Oil Heaters

REMOTE THERMOSTATS for OIL HEATERS

Weathertight	Class I, Group D	Temprature Range ON	Temprature Range OFF	Sensing Unit	Thread Size
DIT68	DIT68EP	60°F (16C)	80°F (26C)	LSU6	.5" NPT
DIT810	DIT810EP	80°F (26C)	100°F (37C)	LSU8	.5" NPT
DIT1012	DIT1012EP	100°F (26C)	120°F (37C)	LSU10	.5" NPT
DIT1214	DIT1214EP	120°F (26C)	140°F (37C)	LSU12	.5" NPT

Switch Capacity
120V - 15amp
208V - 10amp
240V - 10amp
277V - 10amp
12V DC
24V DC

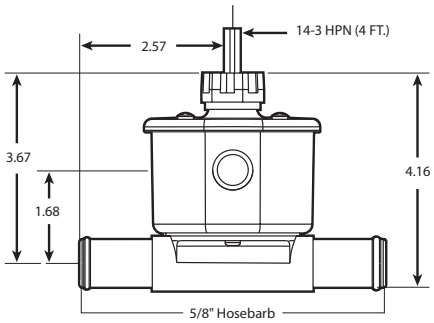


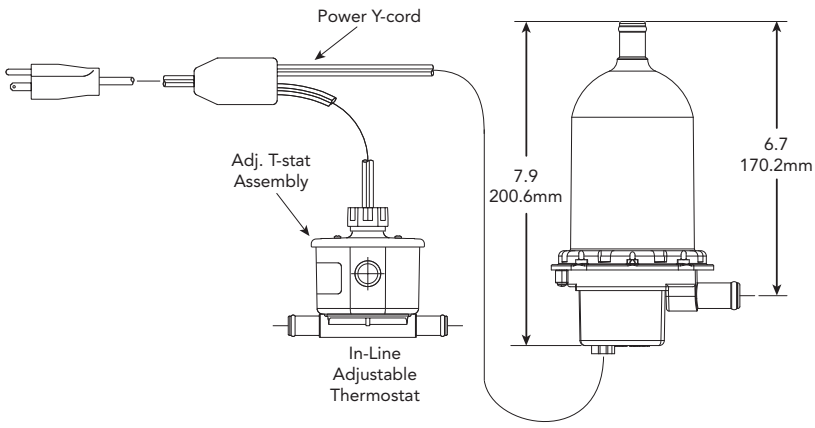


Remote adjustable thermostat for TPS tank style heater (see page 5 for heater models)

5/8" HB female x 5/8" HB male
CORD CONNECTED

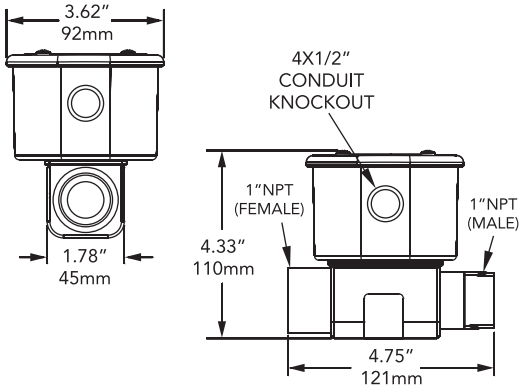
Part Number	Adjustable Range Temperature Setting	Sensing Unit
TFTA-5/8HB	Adjustable 90-130°F (32-54°C)	FSU90-130





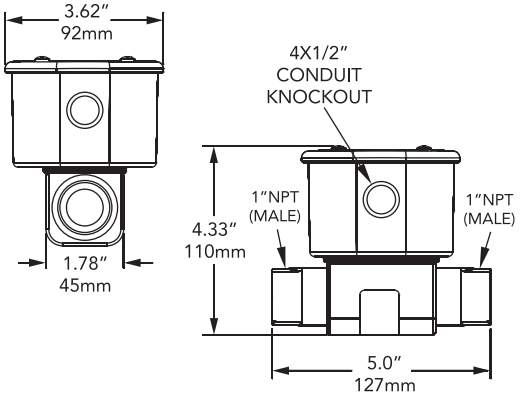
Temperature Controls

NOTE: When using a thermostat above rated capacity or on 3 phase applications, select the proper control box with transformer and contactor as shown on page 36.



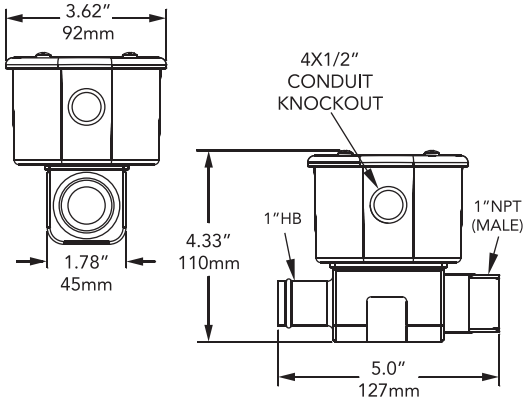
1"NPT female x 1"NPT male
CONDUIT TYPE ENCLOSURE

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFTC8-200	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFTC10-200	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFTC12-200	120°F (26C)	140°F (37C)	25amp	22amp	22amp
TFTCA-200	Adjustable 90-130°F (32-54°C)		25amp	22amp	22amp



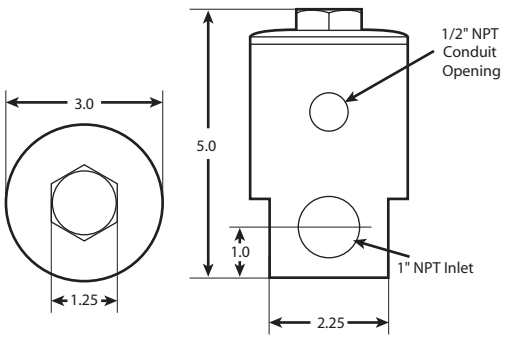
1"NPT male x 1"NPT male
CONDUIT TYPE ENCLOSURE

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFTC8-220	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFTC10-220	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFTC12-220	120°F (26C)	140°F (37C)	25amp	22amp	22amp
TFTCA-220	Adjustable 90-130°F (32-54°C)		25amp	22amp	22amp



1" hose barb x 1"NPT male
CONDUIT TYPE ENCLOSURE

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFTC8-240	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFTC10-240	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFTC12-240	120°F (26C)	140°F (37C)	25amp	22amp	22amp
TFTCA-240	Adjustable 90-130°F (32-54°C)		25amp	22amp	22amp



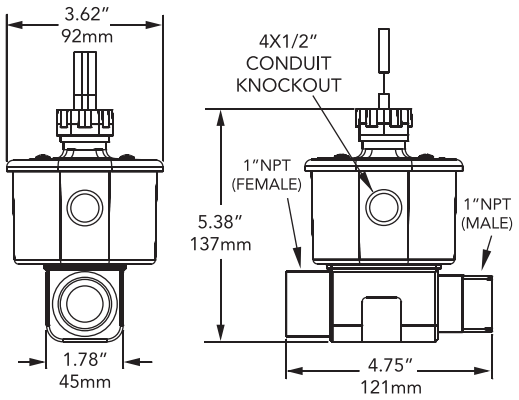
CLASS 1, GROUP D
CONDUIT TYPE ENCLOSURE

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFT8ER	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFT10ER	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFT12ER	120°F (26C)	140°F (37C)	25amp	22amp	22amp

NOTE: When using a thermostat above rated capacity or on 3 phase applications, select the proper control box with transformer and contactor as shown on pages 36.

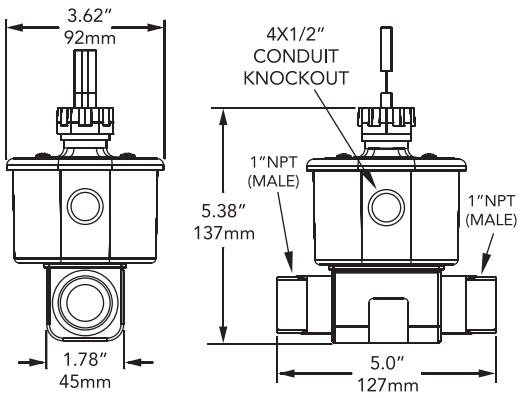
1"NPT female x 1"NPT male
CORD CONNECTED

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFT8-200	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFT10-200	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFT12-200	120°F (26C)	140°F (37C)	25amp	22amp	22amp
TFTA-200	Adjustable 90-130°F (32-54°C)		25amp	22amp	22amp



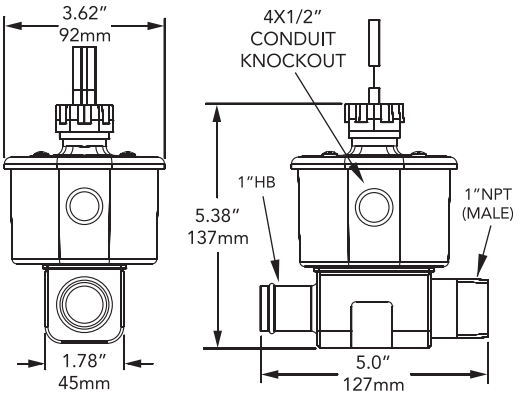
1"NPT male x 1"NPT male
CORD CONNECTED

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFT8-220	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFT10-220	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFT12-220	120°F (26C)	140°F (37C)	25amp	22amp	22amp
TFTA-220	Adjustable 90-130°F (32-54°C)		25amp	22amp	22amp



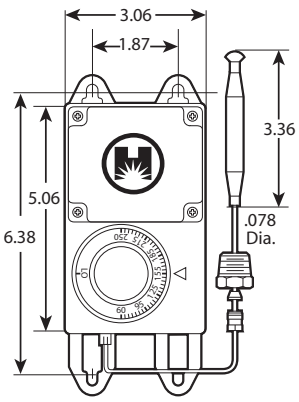
1" hose barb male x 1"NPT male
CORD CONNECTED

Part Number	Temperature Setting		Maximum Capacity Ratings		
	On	Off	120/240V	277V	480V
TFT8-240	80°F (26C)	100°F (37C)	25amp	22amp	22amp
TFT10-240	100°F (26C)	120°F (37C)	25amp	22amp	22amp
TFT12-240	120°F (26C)	140°F (37C)	25amp	22amp	22amp
TFTA-240	Adjustable 90-130°F (32-54°C)		25amp	22amp	22amp



REMOTE-ADJUSTABLE
With 60" (152cm) Capillary Probe

Part Number	Adjustable Range Temp. Setting	Maximum Capacity Ratings		
		120/240V	277V	480V
AT6525	65 - 250°F (18 - 121°C) (Open or Off Setting) Differential 7°F (-14°C) (Close or On Setting)	25amp	22amp	22amp
ATW Aluminum Well for AT6525	 .5" NPT			



CONTROL SYSTEMS

CONTROL SYSTEMS featuring AUTOMATIC SHUTDOWN DEVICES
With 24VDC Relay

Amps	Volts	1 Heater, 1 Thermostat per application	2 Heaters, 2 Thermostats per application
30A Max	120	JBC11-100	JBC21-100
30A Max	208	JBC18-100	JBC28-100
30A Max	240	JBC12-100	JBC22-100
30A Max	380	JBC13-100	JBC23-100
30A Max	480	JBC14-100	JBC24-100
30A Max	575	JBC15-100	JBC25-100

All HOTSTART heaters with thermostat, operating on three phase current (at any voltage), require the use of a control system with a 3-pole contactor. All HOTSTART heaters with thermostat, operating over 480 volt (single or three phase) require a control system to reduce the primary voltage to 120 volts for the control circuit. For increased thermostat life, use a control system on all heaters above 277 volts either single or three phase.

All control boxes can be used with either single or three phase heaters.
All control boxes are available for Class 1 Group D hazardous locations - contact factory for part number.

For heater protection and power savings, HOTSTART recommends de-energizing the heater when engine is running. Control boxes are supplied with a 24V relay to de-energize the heater upon engine start-up.

PDB-000

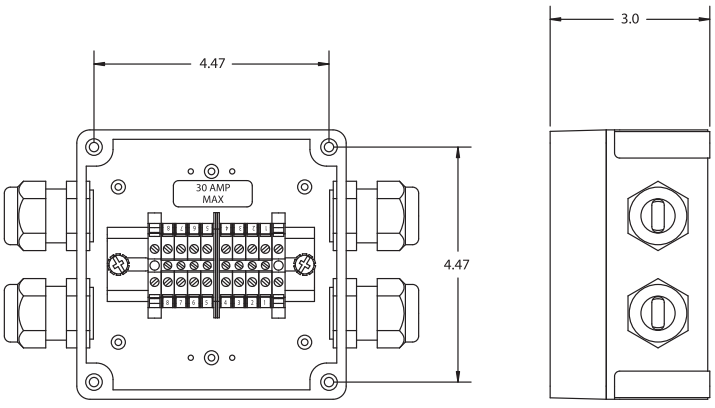
PDB-1

JUNCTION BOXES

Use to simplify wiring on equipment when a variety of heaters and controls are required. All models have ten, 25 Amp terminal blocks.

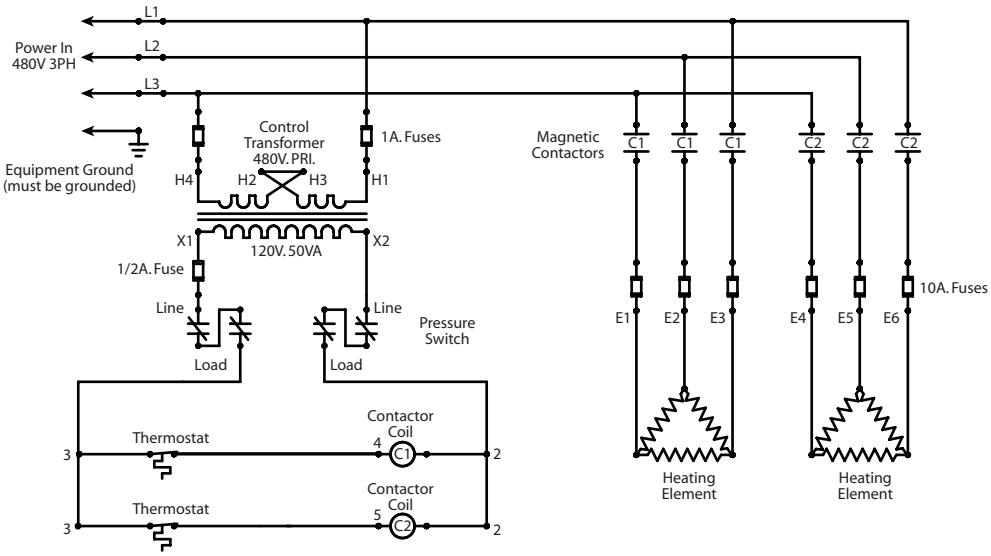
Part Number	Number of Openings
PDB-000	8*

*Box comes assembled with 4 strain relief connectors. For additional connectors, order part# PDB-1.

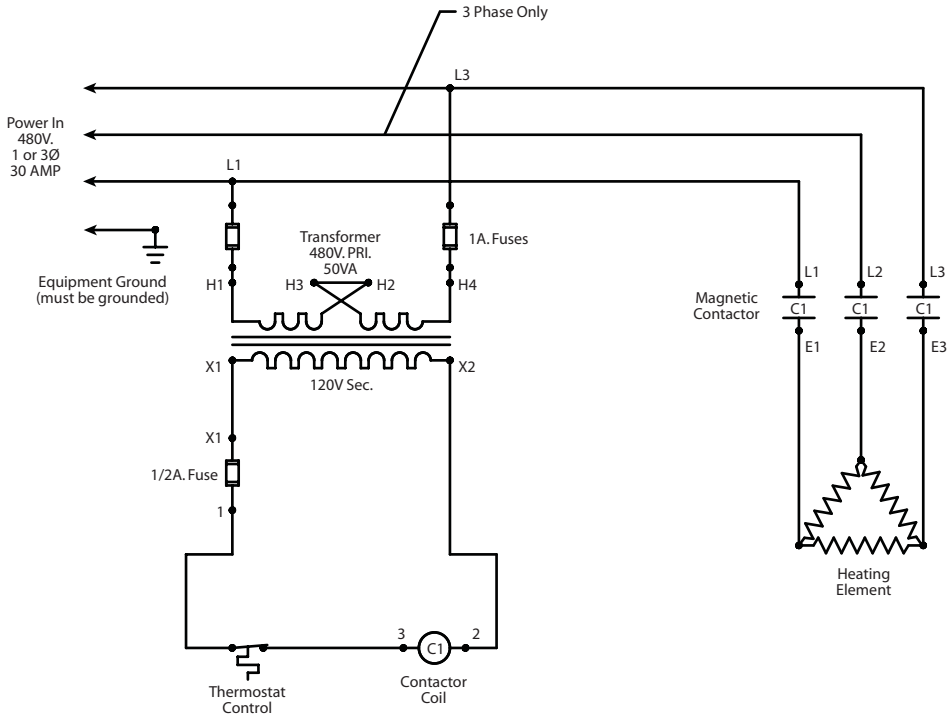


These control systems allow for quick electrical installation of all HOTSTART engine preheaters. They are designed as a time and labor saving component. They are especially useful on installations that require two coolant heaters or combinations of a coolant heater and oil heater/hydraulic heater etc.

All control boxes on this and preceding page are NEMA 12 & 13.



To control two 480 volt heaters at maximum 30 amps on automatic start engines.



To control one 480 volt heater at maximum 30 amps on manual start engine.

Control Box Components

Model JBC14-100
With pressure switch

or

Model JBC24-100
With 24 volt relay

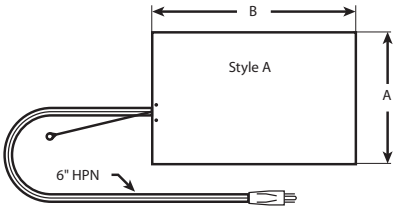
SECTION 6

PRODUCT CATALOG

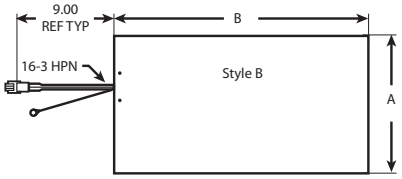
Battery Heating Pads

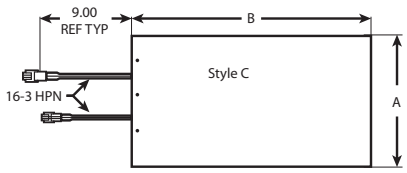
Battery heater not recommended for nickel cadmium batteries. When batteries are placed in an insulated battery box, a thermostat is recommended to sense battery box temperature to prevent overheating the battery.

Standard Pad for Single Battery

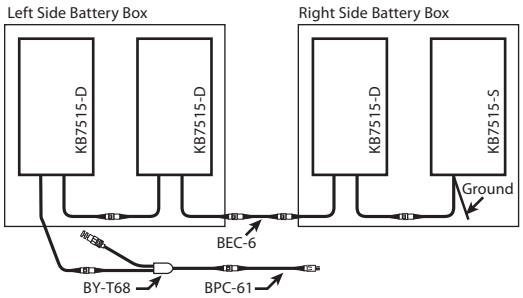


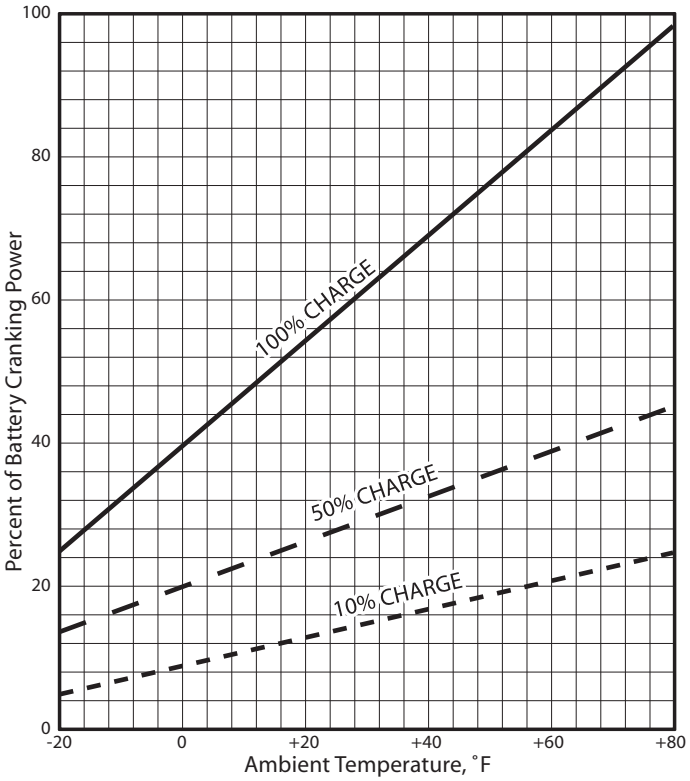
Special Pads for Multiple Batteries





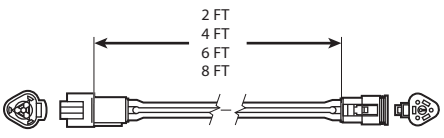
Typical Connection - 2 Batteries on Each Side of Vehicle

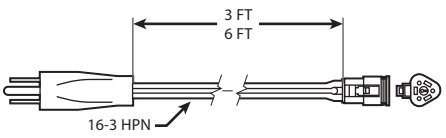


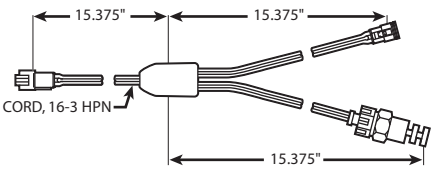


Model Number	Volts	Watts	Amps	Nominal Dimensions A	Nominal Dimensions B	Batt. Size	Style
KB5015	120	50	.42	8 1/4	13	4D	A
KB5015-S	120	50	.42	8 1/4	13	4D	B
KB5015-D	120	50	.42	8 1/4	13	4D	C
KB7515	120	75	.63	10 1/2	19 1/2	8D	A
KB7515-S	120	75	.63	10 1/2	19 1/2	8D	B
KB7515-D	120	75	.63	10 1/2	19 1/2	8D	C
KB7523	240	75	.31	10 1/2	19 1/2	8D	A
KB7523-S	240	75	.31	10 1/2	19 1/2	8D	B
KB7523-D	240	75	.31	10 1/2	19 1/2	8D	C

Accessories For Multiple Battery Heating







EXTENSION CORDS	
Model	Length
BEC-2	2′ (61cm)
BEC-4	4′ (122cm)
BEC-6	6′ (183cm)
BEC-8	8′ (244cm)

POWER SUPPLY CORDS		
Model	Length	Volts
BPC-31	3′ (91cm)	120
BPC-32	3′ (91cm)	240
BPC-61	6′ (183cm)	120
BPC-62	6′ (183cm)	240

THERMOSTAT & "Y" CORD ASSEMBLY		
Model	Temperature Control On	Temperature Control Off
BY-T68	60°F (16°C)	80°F (27°C)

Battery Thermal Wrap

BATTERY THERMAL WRAP — NO THERMOSTAT

Model Number	Volts	Watts	Length
KBW5015-000	120	50	28" (71cm)
KBW8015-000	120	80	36" (91cm)
KBW16015-000	120	160	72" (183cm)

Prolong the life of your battery with HOTSTART thermal battery wraps with or without thermostat.

- Durable, fire-retardant vinyl cover that resists oils and acids.
- All standard battery pads and battery wraps come with 6' (183cm) grounded cord and plug.
- Fast, easy installation.
- Boosts battery cranking power as much as 75%.

BATTERY THERMAL WRAP — WITH THERMOSTAT

Thermostat range: 65°F - 80°F (18°C - 27°C)

Model Number	Volts	Watts	Length
KBW5015T-000 KBW5024T-000	120 240	50 50	26" (66cm) 26" (66cm)
KBW8015T-000 KBW8024T-000	120 240	80 80	44" (112cm) 44" (112cm)
KBW10015T-000 KBW10024T-000	120 240	100 100	56" (142cm) 56" (142cm)

Thermostatically controlled battery thermal wraps provide optimum heating regardless of ambient temperature.

- At 80°F (27°C), the battery will achieve maximum cold cranking amps.
- Battery is constantly maintained at 80°F (27°C).
- Provides greater heat rise than plates or pads.
- Thermostat will eliminate battery damage caused by overheating and acid spill.

Silicone Pad Heaters

Model Number	Dimensions	Volts	Watts
AF10015 AF10024	4" x 5" (101.6 x 127.0 mm)	120 240	100 100
AF15015 AF15024	4" x 5" (101.6 x 127.0 mm)	120 240	150 150
AF25015 AF25024	5" x 6" (127.0 x 152.4 mm)	120 240	250 250
AF40015 AF40024	6" x 8" (152.4 x 203.2 mm)	120 240	400 400

Not for use on batteries

CE

Flexible, Versatile and Easy to Install.

HOTSTART adhesive pad heaters can be used on oil pans, hydraulic reservoirs, engine blocks, hydraulic cylinders and diesel fuel tanks.

- Easy peel and stick application
- Etched foil heating element for optimal heat transfer and long life
- Durable silicone/fiberglass cover resists abrasion
- Assembled with a standard 6' (183cm) HPN cord and plug (240V without plug)

Application Guidline	100 Watt	150 Watt	250 Watt	400 Watt
Engine oil pan	2 - 5 quarts 1.9 - 4.7L	5 - 8 quarts 4.7 - 7.6L	2 - 5 gallons 7.6 - 19L	5 - 8 gallons 19 - 30.3L
Diesel Tank	5 - 7 gallons 19 - 26.5L	7 - 10 gallons 26.5 - 37.9L	10 - 20 gallons 37.9 - 75.7L	20 - 30 gallons 75.7 - 113.5L
Hydraulic Tank	1 - 5 gallons	5 - 10 gallons 19 - 37.9L	10 - 20 gallons 37.9 - 75.7L	20 - 30 gallons 75.7 - 113.5L
Water Tank	up - 2 gallons	2 - 4 gallons	4 - 7 gallons	7 - 10 gallons 26.5 - 37.9L

CAUTION: Do not use pads with higher than recommended wattage for specific oil capacities.
For use on metal surfaces only.

SECTION 7

PRODUCT CATALOG

In-Block Direct Immersion Heaters

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Allis Chalmers							
670T & I 685T & I 6138LT, T & I 25000 (844 CID)	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Replaces 1" thread-in plug on the oil cooler at rear of the engine on the right side. Note that not all of the engines have this opening.			
Case/IH – Agricultural							
ALL 4 CYL 390 ALL 6 CYL 590	CUB-751FP CUB-101FP CUB-151FP	CUB-752FP CUB-102FP CUB-152FP	750 1000 1500	Inserts in any of the freeze plugs right side of engine		22mm	
ALL 6 CYL 830	CUC-151FP	CUC-152FP	1500	Inserts in the freeze plug right rear of the block		22mm	
Caterpillar							
C-10 C-12	TF121-000	TF122-000	1250	Replaces the 1" threaded plug in the oil cooler bonnet	YES	1" NPT	
C-9 Non ACERT C-15 Non ACERT C-16 Non ACERT	CATV-151	CATV-152	1500	C-9 Only: Mount in rear face of block C-15, C-16: Mount in rear oil cooler bonnet from the back end		1" NPT	
C7 ACERT 3126	FP101-001 FP151-001	FP102-001 FP152-001	1000 1500	Replace 44mm frost plug on right hand side of engine just below the turbo charger.	YES		
C7 ACERT rear port	TL101-000	TL102-000		Replace 1-1/16" plug in the rear of the block			
C9 ACERT	CATV-151	CATV-152	1500	Replace 1" NPT plug in the right rear of the engine block			
C11 ACERT C13 ACERT	TF151-008	TF152-008	1500	Replace any of the 1-5/16" plugs in rear of oil cooler on the right hand side of the engine	Check Exhaust Routing	1 5/16" STOR	
C15 ACERT w/o breaksaver	TF151-009	TF152-009	1500	Replace 1-3/16" plug in rear of the oil cooler on the right hand side of the engine			
C15 ACERT with breaksaver	TF151-008	TF152-008	1500	Replace 1-5/16" plug in the oil cooler on the righ handside of engine			
C9 2007 ACERT C13 2007 ACERT C15 2007 ACERT	TF151-012	TF152-012	1500	Replace 1-3/16" plug in the rear of the oil cooler on the right hand side of the engine			
1674	CATB-151	CATB-152	1500	Replaces the 1-1/2" thread-in plug on the right side of the engine			
1693 & D343	CATC-151	CATC-152	1500	Replaces water jacket access plate on the left side of the engine			
1693T & 1693TA	CATC-151-S	CATC-152-S	1500	Replaces water jacket access plate on the left side of the engine			
3013 1.5L 3014 2.0L	FP531-003	FP532-003	530	Replaces 40mm core plug on the front, left side of the engine			

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Caterpillar — Continued							
3024 2.22L	FP531-003	FP532-003	530	Replaces 40mm core plug on the front, left side of the engine			
3034 2.95L	FP531-001	FP532-001	530	Replaces 50mm core plug located at back of head			
3044 3.3L	PF531-001	PF532-001	530	Mounts in oval shaped opening on the right of the engine			
3046 5.0L	PF531-000	PF532-000	530	Replaces 35mm core plug located at rear of engine, left side			
3054 3.99L 3054B 4.23L	PER-751FP PER-101FP	PER-752FP PER-102FP	750 1000	Mounts in the 1-1/4" freeze plug opening on the left side of the engine			
3054C	PER-751FP	PER-752FP	750	Mounts in 1-1/4" freeze plug at left rear of engine			
3056 6.0L	PER-151FP	PER-152FP	1500	Mounts in the 1-1/2" freeze plug on the right side of the engine			
3114 3116	FP101-001 FP151-001	FP102-001 FP152-001	1000 1500	Replaces the core plug on the right side of the engine just below the turbocharger	YES	11/16"X12	
3176 10.3L through 1995	DD8L-101 CAT-12015 TF151-001	DD8L-102 CAT-12023 TF152-001	1000 1250 1500	Replaces the 3/4" plug on the right side of the engine just below the head.		1" NPT	
3176 10.3L 1996 and later	TF121-000	TF122-000	1250	Replaces the 1" threaded plug in the oil cooler bonnet	YES	11/16"X12	
3196 12.0L	TF121-000	TF122-000	1250	Replaces 1" threaded plug in oil cooler bonnet	YES	11/16"X12	
3204 all 1100 series	CATX-751 CATX-101	CATX-752 CATX-102	750 1000	Replaces the core plug on the right side of the engine just below the turbocharger		22mm	
3208 — 2 heaters with a single cord	CATX-2-751-Y	CATX-2-752-Y	1500 total	Use on industrial engines when clear access is available. Replaces any core plug - one on each side of the engine			
3208 Recommended Aftermarket Installation	JD3/4-101IN JD1-101IN JD3/4-151IN JD1-151IN	JD3/4-102IN JD1-102IN JD3/4-152IN JD1-152IN	1000 1000 1500 1500	Replaces any of the 3/4" or 1" plugs on the water transfer casting (right front of the engine). 3/4" use JD3/4 — 1" use JD1			
3304 3306	DD8L-101 CAT-12015 TF151-001	DD8L-102 CAT-12023 TF152-001	1000 1250 1500	Replaces the 3/4" plug on the left side of the engine			
3406C/E 14.6L	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Replaces 1" thread-in plug in the rear of the oil cooler bonnet on the right side of the engine		1" NPT	

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

In-Block Direct Immersion Heaters

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Caterpillar — Continued							
3406 & 3408 except 1998 ADEM 2	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Replaces 1" thread-in plug in the rear of the oil cooler bonnet on the right side of the engine		1" NPT	
3406E 1998 ADEM 2 engines only	TF151-002	TF152-002	1500	Replaces the 1" threaded plug that points downward on the top of the rear of the oil cooler bonnet	YES	1" NPT	
3406E ADEM 3 and ADEM 2000 engines	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Replaces 1" thread-in plug in the rear of the oil cooler bonnet on the right side of the engine		1" NPT	
3456 15.8L	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Replaces 1" thread-in plug in the rear of the oil cooler bonnet on the right side of the engine		1" NPT	
Chevrolet/GMC (Small Truck)							
5.7L V8 (350 CID) 6.2L V8 Diesel 6.5L V8 Diesel	FC601-501 FC601-PY2	NONE	600	Mounts in the freeze plug in the engine's block No replacement cord available			
Cummins							
6 Cylinder Engines: H, NT, NH, N Family 743 CID, 855 CID, 927 CID, "N14" 1. Cummins engines are often referred to by their horsepower rating "i.e. 350 Cummins" 2. Cummins engines are often referred to as Big Cam, Big Cam2, 3, 4, full flow cooling, etc. **All refer to engines of 855 CID Size – listed below**							
Group I							
Flat plate design	CUN-151B	CUN-152B	1500	6 bolt flat plate on the right side of the engine. May use either the forward or rear opening depending on clearance.		1" NPT	
Flat plate design when the 1/2" NPT opening is used	CUN-151BH	CUN-152BH	1500			1" NPT	
Group II							
When an external oil cooler is used..	**Note:** When a 4 bolt flat plate element design is encountered, remove the next two bolts on the casting, remove the whole casting, and replace the casting and element with either CNT-151B/CNT-152B OR CNT151B90/CNT152B90						
When connection is 1 1/2" rubber hose Engines produced Aug. 1975 thru June 1982	CNT-151B-90	CNT-152B-90	1500	6 bolt, flat plate design with an elbow that will rotate 360 degrees to connect with any hose or casting		1" NPT	
Uses an "O" ring for the 1 1/4" water tube connection Engines produced prior to August '75	CNT-151B	CNT-152B	1500	6 bolt, flat plate design with an elbow that will rotate 360 degrees to connect with any hose or casting		1" NPT	

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Cummins — Continued							
Group III							
For industrial engines with hole pattern reversed	CUN-151BREV	CUN-152BREV	1500	Six bolt flat plate on the right side of the block		1" NPT	
Group IV							
1998 and later N14 Industrial	PF151-002	PF152-002	1500	Six bolt flat plate on the right side of the block		1" NPT	
Additional Cummins Engine Models							
Cummins A 4 cyl & 6 cyl	CUA-101F	CUA-102F	1000	Inserts in any of the freeze plugs on right side of engine. Element points down.			
ISC/QSC 8.3L ISL/QSL 9.0L	DD8L-101	DD8L-102	1000	3/4" NPT threaded plug in the right rear side of engine		22mm	
L10, M11 ISM	CUL-151	CUL-152	1500	Inserts in the forward opening of the heater casting on the right rear of block		1" NPT	
QSB 3.9L, 5.9L ISB 5.9	TF751-002	TF752-002	750	3/4" NPT threaded plug in the front of the oil cooler casting		22mm	
ISM/QSM 11.0L Flat Plate Design	PF151-003	PF152-003	1500	Right rear. Replaces plate.		1" NPT	
QSX, ISX Signature 600	PF151-004	PF152-004	1500	Mounts in the oval shaped plate on the right side of the block		27mm	
4BT 3.9L	CUB-751FP CUB-101FP	CUB-752FP CUB-102FP	750 1000	Inserts in any of the freeze plugs right side of engine	Check Exhaust Routing	22mm	
6BT 5.9L	CUB-751FP CUB-101FP CUB-151FP	CUB-752FP CUB-102FP CUB-152FP	750 1000 1500	Inserts in any of the freeze plugs right side of engine	Check Exhaust Routing	22mm	
6CT 8.3L	CUC-151FP	CUC-152FP	1500	Inserts in the freeze plug right rear of the block		22mm	
Detroit Diesel							
SERIES 10 4 cylinder Phaser engines	PER-751FP PER-101FP	PER-752FP PER-102FP	750 1000	Mounts in the 1-1/4" freeze plug opening on either side of the engine			
SERIES 10 6 cylinder Phaser engines	PER-151FP	PER-152FP	1500	Mounts in the 1-1/2" freeze plug on the right side of the engine			
SERIES 30	DD8L-101	DD8L-102	1000	Mounts in the 3/4" NPT opening in the block			

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

In-Block Direct Immersion Heaters

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Detroit Diesel – continued							
SERIES 40 all versions	PER-751FP INTA-121 FR151-001	PER-752FP INTA-122 FR152-001	750 1250 1500	Mounts in the frost plug opening on the left side of the engine			
SERIES 50 SERIES 60	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Mounts in the 1" NPT opening in either water pick up pipe (up to 1991) or in the 1" NPT opening on the oil cooler housing after 1991	yes on 1991 and later	3/4" NPT	
SERIES 55	PF151-000	PF152-000	1500	Mounts in the triangle plate on the side of the block			
3-53, 4-53, 3-71, 4-71 with water cooled air compressor	DD-751-S	DD-752-S	750	Mounts in the oval shaped plate on the block. Check clearance.			
3-53, 4-53, 3-71, 4-71 without water cooled air compressor	DD-751	DD-752	750	Mounts in the oval shaped plate on the block. Check clearance.			
6-71 with water cooled air compressor	DD-151-S	DD-152-S	1500	Mounts in the oval shaped plate on the block. Check clearance.			
6-71 without water cooled air compressor	DD-151	DD-152	1500	Mounts in the oval shaped plate on the block. Check clearance.			
8.2 L V-8 Diesel	DD8L-101	DD8L-102	1000	Threads into the 3/4" NPT opening on the block			
6V-53 with water cooled air compressor	DD6V-751-S	DD6V-752-S	750	Mounts in the oval shaped plate on the block. Check clearance.			
6V-53 without water cooled air compressor	DD6V-751	DD6V-752	750	Mounts in the oval shaped plate on the block. Check clearance.			
6V71 & 8V71 Alternate location	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Threads into 1" NPT plug in the front face of the block			
6V-71 & 8V-71 6V-92 & 8V-92 except GMC General models	DDV-151B	DDV-152B	1500	Mounts in the square plate on the block			
6V92 & 8V92 alternate location - threads into oil cooler.	DD8L-101	DD8L-102	1000	Threads into the 3/4" NPT opening in the oil cooler housing.Note - not all engines have this opening			
Deutz							
BF4L913 BF6L913 F3L912 F3L913 F6L913 1011 SERIES oil cooled engines	OLT221515 plus A22M48M (adapter)	n/a	150	Use adapter kit to mount the 22MM heater in the 48MM opening		22MM or 48MM	

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Deutz – continued							
1012 — 4 & 6 cyl 1013 — 4 cyl	PF751-000	PF752-000	750	Mounts in the oval shaped plate opening on the oil cooler casting			
1013 6 cyl	PF121-001	PF122-001	1250	Mounts in the oval shaped plate opening on the oil cooler casting			
1015 6 & 8 cyl	TL151-004	TL152-004	1500	Mounts in 30MM plug in water elbow on front of the engine			
2012 — 4 & 6 cyl	PF751-002	PF752-002	750	Mounts in the oval shaped plate opening on the oil cooler casting			
Ford							
6.9L & 7.3L V-8 diesels through 1993	FC101-PY1	None	1000	Mounts in a freeze plug on the engine's block. No replacement cord available.			
7.3L V-8 diesels from 1994 on	TF751-002 DD8L-101	TF752-002 DD8L-102	750 1000	Mounts in the 3/4" NPT plug in the engine's block			
Hino							
3.8L, 5.8L, 6.0L, 6.4L, 6.7L, W04C-T, W06E, H06C-T, H07C-B	DD8L-101	DD8L-102	1000	Threads into 3/4" NPT opening in the block	YES		
Isuzu							
4BD1 6HE1 6BD1 6SA1 6BG1	TF401-501	NONE	400	Replaces 1" NPT plug in left rear of engine			
Iveco							
NEF 4cyl NEF 6 cyl	PF751-001	PF752-001	750	Mount in either front or rear opening on right side of engine block			
John Deere							
With 3/4" plug in the back of the block	JD3/4-101IN JD3/4-151IN	JD3/4-102IN JD3/4-152IN	1000 1500	3/4" NPT opening in the rear face of the block	check Exhaust routing		
With 1" plug in the back of the block	JD1-101IN JD1-151IN	JD1-102IN JD1-152IN	1000 1500	1" NPT opening in the rear face of the block			
With 1 5/8" opening on the side of the water jacket	JDS-101	JDS-102	1000	1-5/8" threaded opening on the side of the block in the water distribution channel			

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

In-Block Direct Immersion Heaters

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
John Deere – continued							
6105 (10.5L) 6125 (12.5L)	AC-101 CATV-151	AC-102 CATV-152	1000 1500	1" NPT opening in the oil cooler casting			
Komatsu							
L10 (10L) M11(11L)	CUL-151	CUL-152	1500	Inserts in the forward opening of the heater casting on the right rear of the block			
SA6D125	MA-151	MA-152	1500	Threads into the freeze plug opening in the block			
Kubota							
M, B, L Series D905 V1205 D1005 V1305 D1105 V1505 D3000B V4000B D3200B V4300B DH905 VH1205 DH1005 VH1305	TF401-501	N/A	400	Replaces 1" NPT plug in left front of engine			
Mack							
Mid liner E3 MS200 & MS250	MAM-101	MAM-102	1000	Mounts in rear face of block			
Mid liner E5 MS300	MAM-151	MAM-152	1500	Mounts in the oil cooler bonnet			
E6 engines "smooth bore" from 1981 on	MASB-151	MASB-152	1500	Mounts in the freeze plug opening. Smooth opening design.			
E6 engines threaded freeze plug opening not produced after '81 END 465, 711, EN438, 504, 707, 673, 675, 676 (1957 through 1981)	MA-151	MA-152	1500	Mounts in any threaded freeze plug opening			
E7 Engines Except E-Tech water pump mount	PF151-001	PF152-001	1500	Mounts in the plate in either the front or rear face of the block in the water jacket passage. For 2002 engine – mounts in rear face of block.			
E9, ENDT865, 866 and 1000 series V8 engines Use two heaters	DD8L-101	DD8L-102	2000 total	Threads into the 3/4" NPT opening on each side of the block			

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

In-Block Direct Immersion Heaters

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
MAN							
D2840 D2842 D2848	PF121-003	PF122-003	1250	Replace oval shaped plate in lower water pipe on right side of engine			
D2866 D2876	PF151-006	PF152-006	1500	Replace 3 bolt plate on left side of engine. May require adapter if 3 bolt opening is not available on engine. Consult customer service.			
Mercedes Benz							
MBE904 MBE906	PF101-001	PF102-001	1000	Replace frost plug in rear of engine on right side	YES		
Massey Ferguson							
3 cylinder 4 cylinder 6 cylinder	PER-751FP PER-101FP	PER-752FP PER-102FP	750 1000	Mounts in any of the 1-1/4" freeze plug openings in the engine			
Navistar/International							
V800 (796 CID)	AC-101 CATV-151	AC-102 CATV-152	1000 1500	Threads into a 1" NPT opening in the oil cooler bonnet			
INLINE 6 CYLINDER — all series — 312, 360, 414, 436, 466 & 530	PER-751FP INTA-121 FR151-001	PER-752FP INTA-122 FR152-001	750 1250 1500	Mounts in the frost plug on the left side of the engine. Fits all series of these engines.			
6.9L & 7.3L V8 diesels through 1993	FC101-PY1 or FC601-501	None	1000 600	No replacement cord available. Mounts in a freeze plug above starter			
7.3L & T444 all series	DD8L-101	DD8L-102	1000	3/4" NPT threaded opening in the block			
9.0L — V8 diesel	INT9-101F	INT9-102F	1000	Mounts in a freeze plug			
Oliver							
ALL EXCEPT 1265, 1365 & 1900	TF751-002 DD8L-101	TF752-002 DD8L-102	750 1000	Threads into a 3/4" NPT opening in the block			
Onan — See Cummins "A" Series							
Perkins							
3.152 4.236 6.354	PER-751FP PER-101FP	PER-752FP PER-102FP	750 1000	Mounts in the 1-1/4" freeze plug opening on the right side of the engine			
103.15 104.22 404.22	FP531-003	FP532-003	530	Mounts in left front freeze plug			

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

In-Block Direct Immersion Heaters

Note: In-block heaters are complete with 2-wire w/ground 6 foot HPN cord and plug. For cord replacements or "Y" thermocord energy saver, please reference page 56.

Engine Model	Part Number 120 Volts	Part Number 240 Volts	Watts	Application Information	Heat Shield Required	Oil Heater Thread Size*	Product Image
Perkins – continued							
700 Series 704.30	FP531-001	FP532-001	530	Mounts in freeze plug in rear of head			
800 Series	PF531-001	PF532-001	530	Mounts in oval shaped plate on the left front of the block			
1004 (right side)	FR751-002 FR101-000 PER-151FP	FR752-002 FR102-000 PER-152FP	750 1000 1500	Mounts in the 1-1/2" freeze plug opening on the right side of the engine			
1004 (left side)	PER-751FP PER-101FP	PER-752FP PER-102FP	750 1000	Mounts in the 1-1/4" freeze plug opening on the left side of the engine			
1006 (6 Cyl) A & B	PER-151FP	PER-152FP	1500	Mounts in the 1-1/2" freeze plug on the right side of the engine			
1103C	FR531-000	FR532-000	530	Replaces 1-1/4" freeze plug on right rear of engine. Element should point towards 1 O-clock position.			
1104 (4 Cyl) C	PER-751FP PER-101FP	PER-752FP PER-102FP	750 1000	Mounts in 1-1/4" freeze plug opening on right rear of engine with element straight up in 12 O-clock position			
Volvo							
D9	PF151-007	PF152-007	1500	Mounts in the oval shaped plate on the front, right side of the engine			
D12C Prior to Serial # 250502	PF151-005	PF152-005	1500	Mounts below turbo charger on right center of engine	YES		
D12C After Serial # 250502	PF121-002	PF122-002	1250	Mounts below turbo charger on right center of engine	YES		
TD60, TD61, TD70, TD71, TD100, TD101, VE10, TD120, TD121	VT6-101	VT6-102	1000	Mounts into threaded opening (44mm) in the front of the engine			
Yanmar							
3T72HLE 4TN82E D4T YYDXL4.41	TF401-501	N/A	400	1" NPT No replacement cord available			

NOTE: The only replacement parts for the direct immersion heaters is the power cord. Please see the power cord section on page 56 for the proper replacement cord set.

For thermostat control of in-block direct immersion heaters, see page 56. The energy saver Thermocord is available in various temperature ranges.

Supplemental heat for engines using in-block heaters can be achieved by the installation of oil pan heaters in the lube-oil. Reference pages 26 and 27 of this catalog or consult factory.

* If supplemental oil heating is desired, this column gives the correct thread size in oil pan. See NOTE on page 54.

Instructions for:
In-block direct immersion heaters
Please refer to specific instructions that accompany heater

THREADED PLUG TYPE HEATERS

A. Drain the cooling system.

B. Remove the recommended plug. (See instructions with heater)

C. Apply teflon tape to pipe threads or grease to O ring.

D. Thread heater into engine.

Please follow these steps to ensure proper operation of your HOTSTART in-block heater.

1. Align cord with pins on the heater and press the cord into the heater. Place clamp around cord & heater. DO NOT PLUG IN HEATER YET!
2. Route the cord, keeping away from hot or moving surfaces.
3. Re-fill the cooling system. Run engine until engine thermostat opens and continue running for another 20 minutes to eliminate air.
4. Stop engine and let cool. Check for leaks. Check coolant level.
5. Plug heater into power supply and test for proper operation. Block should feel warm near heater.

PLATE TYPE HEATERS

A. Drain the cooling system.

B. Remove the recommended plate. (See instructions with heater)

C. Clean the gasket area.

D. Apply gasket sealant to plate and engine surfaces.

E. Insert heater into engine. Tighten bolts.

Please follow these steps to ensure proper operation of your HOTSTART in-block heater.

1. Align cord with pins on the heater and press the cord into the heater. Place clamp around cord & heater. DO NOT PLUG IN HEATER YET!
2. Route the cord, keeping away from hot or moving surfaces.
3. Re-fill the cooling system. Run engine until engine thermostat opens and continue running for another 20 minutes to eliminate air.
4. Stop engine and let cool. Check for leaks. Check coolant level.
5. Plug heater into power supply and test for proper operation. Block should feel warm near heater.

FREEZE (CORE) PLUG TYPE HEATERS

A. Drain the cooling system.

B. Remove the recommended core plug. (See instructions with heater)

C. Clean, smooth and dry core plug opening.

D. If retaining ring style, apply a light coat of grease to the O ring and core plug opening. If press-in style, apply a light coat of high-temperature, high-strength retaining compound (Loctite 640 recommended).

E. Insert heater into engine and position properly. Push the heater into the engine by hand, then tap in using a suitable tool until flange is even with engine block.

Please follow these steps to ensure proper operation of your HOTSTART in-block heater.

1. Align cord with pins on the heater and press the cord into the heater. Place clamp around cord & heater. DO NOT PLUG IN HEATER YET!
2. Route the cord, keeping away from hot or moving surfaces.
3. Re-fill the cooling system. Run engine until engine thermostat opens and continue running for another 20 minutes to eliminate air.
4. Stop engine and let cool. Check for leaks. Check coolant level.
5. Plug heater into power supply and test for proper operation. Block should feel warm near heater.

Heat Shield

Model No.	
HS1	

Use when exhaust manifold or turbo come close to heater termination.

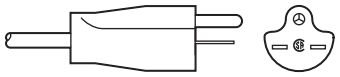
NOTE: When ordering in-block heater **and** thermocord, place suffix **–WOC** (which stands for **without cord**) after the heater model number to save cost as the standard 6 foot heater cord is replaced by the thermocord harness.

For use with In-Block Direct Immersion heaters

Cord Length	Plug Style	120 Volt	240 Volt
6′	1	IM6-1IN	IM6-2IN
11′	1	IM11-1IN	IM11-2IN
16′	1	IM16-1IN	IM16-2IN

STYLE 1

15 amp
120 Volts

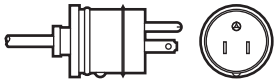


15 amp
240 Volts

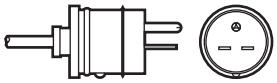
Fits most competitor's applications.

Cord Length	Plug Style	120 Volt	240 Volt
6′	2	11PR72T	21PR72T
11′	2	11PR132T	21PR132T
16′	2	11PR192T	21PR192T

STYLE 2



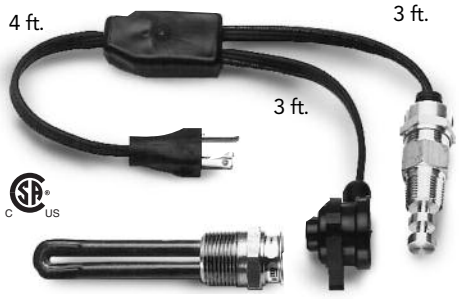
15 amp
120 Volts
Fits into flush mount housing



15 amp
240 Volts

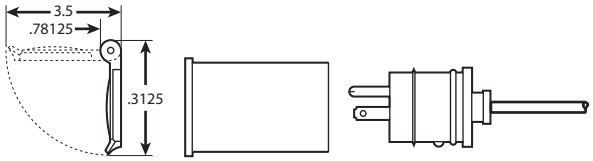
Thermocord for In-Block Direct Immersion heaters

Part No.	Volts	Thread Size	Temp Range
A-2822-ØB	120	1/2"	100-120
A-2822-ØC	120	1/2"	120-140
A-2822-ØH	240	1/2"	100-120
A-2822-ØI	240	1/2"	120-140
A-2822-ØM	120	1/2"	80-100
A-2822-ØP	240	1/2"	80-100

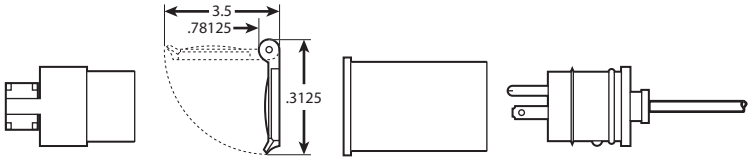


Heater shown for illustration purposes only.

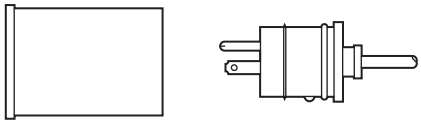
Flush mount kits for In-Block Direct Immersion heaters					
Model Number 120 Volt	Model Number 240 Volt	Cord Length	Plug Style		
IM6-1IN-FM	IM6-2IN-FM	6′	2	Kits include: 11PR- style cord (shown on page 56), recessed male receptacle and hinged flip cover	
IM11-1IN-FM	IM11-2IN-FM	11′	2		
IM16-1IN-FM	IM16-2IN-FM	16′	2		

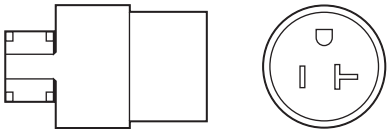


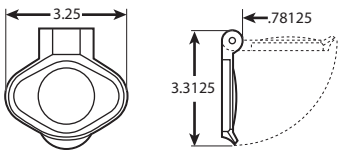
Flush mount kits for tank heaters					
Model Number	Volts	Amps	For Heater with Wattage of:		
FM15120	120	15	500 to 1800	Kits include: Recessed male receptacle with 6′ cord (no female connectors), hinged flip cover and female connector	
FM15240	240	15	500 to 3000		
FM20120	120	20	2000 to 2250		

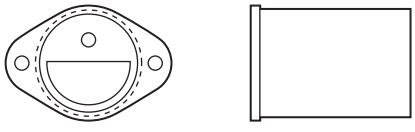


Other Accessories

Recessed Male Receptacle – with 6 ft. cord (no female connectors)			
Model Number	Volts	Amps	
RM5-15 RM6-15 RM5-2Ø RM6-2Ø	120 240 120 240	15 15 20 20	

Female Connector Only - for extension cords			
Model Number	Volts	Amps	
FM1G2ØA FM2G2ØA	120 240	15/20 15/20	

Hinged Cover Only		
Model Number	Description	
*FC-KH FC-KH-C	Black/Kim Logo Chrome/Kim Logo	
*Note: Standard with kit		

Plug Housing	
Model Number	
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Specifying an Engine Heater

1. Determine the best type of heater to be used for the application.
   - Direct Immersion or Tank Type?
   - Weathertight unit for all indoor or outdoor applications (hospital, communications building, shopping mall, pump station, off-road equipment).
   - Explosion Proof unit for Hazardous Locations (off-shore platform, oil rig, gas compression station).

2. Determine engine size.
   - Cubic inch or litre displacement.

3. Determine wattage required by using this general formula:
   - 3 watts x cubic inch displacement = watts required.
     Example: Engine is 855 C.I.D. — 855 x 3 = 2565. Requirement is 2500 watt heater.
   - This formula is a very good rule of thumb to use down to 0°F ambient temperature. This formula will generally hold engine temperature at approximately 100°F above ambient.
   - Very large engines may require a forced circulation system (see pages 16, 17 and 59).

4. Now that you have the required wattage, you need to determine:
   - Voltage available that will power the heater (120, 208, 277, 240, 380, 480).
   - Is the power source Single Phase or Three Phase?

5. For thermostat selection, determine the desired engine temperature to be maintained.
   - 100°F to 120°F applies 95% of the time. However, specifications vary with respect to the user and a higher or lower range may be required.

You now have the specifications needed to select the required engine pre-heater from the many products listed in this catalog. For other technical information and installation tips, see pages 40 and 55. If you have other questions or need additional assistance, please contact our customer service department.

Conversion Factors

Litres x 1.0567 = Quarts
Quarts x 0.94635 = Litres
Litres x 0.26417 = Gallons
Gallons x 3.7854 = Litres

Cubic Inches	Litres	Cubic Inches	Litres	Cubic Inches	Litres
150	2.46	1600	26.22	3050	49.98
200	3.28	1650	27.04	3100	50.80
250	4.10	1700	27.86	3150	51.62
300	4.92	1750	28.68	3200	52.44
350	5.74	1800	29.50	3250	53.26
400	6.55	1850	30.32	3300	54.08
450	7.37	1900	31.13	3350	54.90
500	8.19	1950	31.95	3400	55.71
550	9.01	2000	32.77	3450	56.53
600	9.83	2050	33.59	3500	57.35
650	10.65	2100	34.41	3550	58.17
700	11.47	2150	35.23	3600	58.99
750	12.29	2200	36.05	3650	59.81
800	13.11	2250	36.87	3700	60.63
850	13.93	2300	37.69	3750	61.45
900	14.75	2350	38.51	3800	62.27
950	15.57	2400	39.33	3850	63.09
1000	16.39	2450	40.15	3900	63.91
1050	17.21	2500	40.97	3950	64.73
1100	18.03	2550	41.79	4000	65.55
1150	18.84	2600	42.61	4050	66.37
1200	19.66	2650	43.42	4100	67.19
1250	20.48	2700	44.24	4150	68.00
1300	21.30	2750	45.06	4200	68.82
1350	22.12	2800	45.88	4250	69.64
1400	22.94	2850	46.70	4300	70.46
1450	23.76	2900	47.52	4350	71.28
1500	24.58	2950	48.34	4400	72.10
1550	25.40	3000	49.16	4450	72.92

Cubic Inches x 0.01639 = Liters
Liters x 61.024 = Cubic Inches

Fahrenheit	Celsius
-40° F	-40° C
-30° F	-34° C
-20° F	-29° C
-10° F	-23° C
0° F	-18° C
10° F	-12° C
20° F	- 7° C
30° F	- 1° C
40°F	4.5°C
50°F	10.0°C
60°F	15.5°C
70°F	21.0°C
80°F	26.5°C
90°F	32.0°C
100°F	37.5°C
110°F	43.5°C
120°F	49.0°C
130°F	54.5°C
140°F	60.0°C
150°F	65.5°C
160°F	71.0°C
170°F	76.5°C
180°F	82.0°C
190°F	88.0°C
200°F	93.5°C
210°F	99.0°C

F = C x 9/5 + 32
C = (F - 32) x 5/9

Customer Services

To better serve you, HOTSTART provides a customer service department to answer all your engine heating concerns, any questions regarding HOTSTART products or to take your sales order.

Customer Support Department: (509) 536-8660

Sales orders and requests for quotes can also be faxed in over our toll-free FAX line.

Toll-free FAX line: (800) 224-5550

Warranty Information

The warranty below has been drafted to comply with the Federal Law applicable to products manufactured after December 31, 1976. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

HOTSTART products are warranted against defects in workmanship and materials. No other express warranty, written or oral, applies. No person is authorized to give any other warranty or assume any liability except by written statement from an officer of HOTSTART, Inc.

The warranty extends for twelve months from date of shipment from factory or authorized distributor.

Products must be installed and maintained in accordance with HOTSTART, Inc. instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specification or other operating conditions beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

Absolutely no material can be returned to HOTSTART, Inc. without prior factory authorization.

Upon factory authorization, return the defective part or product , freight prepaid, to: HOTSTART, 5723 E. Alki, Spokane, WA 99212. Telephone (509) 534-6171; FAX (509) 534-4216.

Defective items will be repaired or replaced, at our option, at no charge. Such repair or replacements is the exclusive right of HOTSTART, Inc. HOTSTART, Inc. is not liable for labor costs incurred in removal, reinstallation, or unauthorized repair of the product or for damage of any type whatsoever including incidental or consequential damage. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the preceding limitation or exclusion may not apply to you.

HOTSTART, Inc.

HOTSTART®

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