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## INSTALLATION INSTRUCTIONS

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Original Issue Date: **5/95**

Model: **200-2000 kW**

Market: **Industrial**

Subject: **Double-Wall Subbase Fuel Tanks/Day Tanks**

Double-wall subbase fuel tanks provide fuel storage immediately beneath the generator set where the engine fuel transfer pump easily draws fuel for starting and running. The subbase fuel tank also provides a convenient location to connect fuel injector return lines.

There are two types of double-wall subbase fuel tanks: secondary containment and closed-top diked. Double-wall fuel tanks are UL listed and have all vent fittings necessary to meet NFPA requirements.

### Secondary Containment Double-Wall Subbase Fuel Tank

Diesel generator sets use an above-ground rectangular secondary containment fuel tank as a subbase fuel tank. The purpose of the outer tank is to contain liquids if a leak or rupture of the inner tank occurs. The inner tank is sealed inside the outer tank except for the necessary vents. The UL-listed secondary containment fuel tank has emergency relief vent fittings on the inner and outer tanks. The secondary containment subbase fuel tank allows for direct mounting of the generator set.

### Closed-Top Diked Double-Wall Subbase Fuel Tank

The purpose of an integral steel dike is to contain fuel from an inner tank leak or rupture. The protected top of the diked tank prevents precipitation, debris, and/or other elements from entering the diked area. The top incorporates a vent negating the need for emergency venting of the secondary containment tank (outer tank). The UL listed, closed-top diked subbase fuel tank allows for direct mounting of the generator set.

### Double-Wall Subbase Fuel Tank with Day Tank Option

For double-wall subbase day tank use, add float switch and transfer pump. Transfer pump specifications:

- D Capable of lifting fuel a maximum of 17 ft. (5.2 m)
- D 120-volt AC single phase
- D Pump, 2 gpm (7.57 L/min) 200-1250 kW  
4 gpm (15.14 L/min) 1500-2000 kW
- D Motor-driven, 1/3 HP

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#### ⚠ WARNING



**Accidental starting.  
Can cause severe injury or death.**

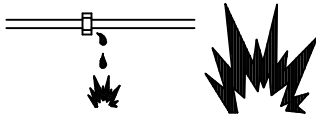
Disconnect battery cables before working on generator set. (Remove negative (-) lead first when disconnecting battery. Reconnect negative (-) lead last when reconnecting battery.)

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**Disabling generator set. Accidental starting can cause severe injury or death.** Before working on the generator set or connected equipment, disable the generator set as follows:

- 1) Turn the generator set master switch to OFF position.
- 2) Disconnect power to battery charger.
- 3) Remove battery cables (remove negative (-) lead first). Reconnect negative (-) lead last when reconnecting battery. Follow these precautions to prevent starting of generator set by an automatic transfer switch or remote start/stop switch.

**⚠ WARNING**



**Explosive fuel vapors.  
Can cause severe injury or death.**

Use extreme care when handling, storing, and using fuels.

**Fuel system. Explosive fuel vapors can cause severe injury or death.** All fuels are highly explosive in a vapor state. Use extreme care when handling and storing fuels. Store fuel in a well-ventilated area away from spark-producing equipment and out of the reach of children. Never add fuel to the tank while the engine is running because spilled fuel may ignite on contact with hot parts or from spark. Do not smoke or permit flame or spark to occur near sources of spilled fuel or fuel vapors. Keep fuel lines and connections tight and in good condition. Do not replace flexible fuel lines with rigid lines. Use flexible sections to avoid breakage caused by vibration. Do not operate generator set in the presence of fuel leaks, fuel accumulation, or sparks. Repair systems before resuming generator set operation.

**Fuel tanks. Explosive fuel vapors can cause severe injury or death.** Gasoline and other volatile fuels stored in day tanks or subbase fuel tanks can cause an explosion. Store only diesel fuel in tanks.

<b>⚠ WARNING</b>	
A warning icon showing a stick figure being struck by a large, rotating rotor.	A warning icon showing a hand reaching towards a hot engine or exhaust system, with wavy lines representing heat.
<b>Hazardous voltage. Moving rotor. Can cause severe injury or death.</b>	
Operate generator set only with all guards and electrical enclosures in place.	

**Grounding generator set. Hazardous voltage can cause severe injury or death.** Electrocutation is possible whenever electricity is present. Open main circuit breakers of all power sources before servicing equipment. Configure the installation to electrically ground the generator set and electrical circuits when in use. Never contact electrical leads or appliances when standing in water or on wet ground, as the chance of electrocution increases under such conditions.

**Servicing day tank. Hazardous voltage can cause severe injury or death.** Service day tank Electrical Control Module (ECM) as prescribed in equipment manual. Disconnect power to day tank before servicing. Press the day tank ECM OFF pushbutton to disconnect power. Be aware that line voltage is still present within the ECM when the POWER ON light is lit. Be sure that generator set and day tank are electrically grounded. Do not operate day tank when standing in water or on wet ground as the chance of electrocution increases under such conditions.

<b>⚠ WARNING</b>
A warning icon showing a person lifting a heavy object (represented by a box) using their back instead of their legs, with a red 'X' over the back.
<b>Unbalanced weight. Improper lift can cause severe injury or death and/or equipment damage.</b>
Do not use lifting eyes. Lift generator set using lifting bars inserted through skid lifting holes.

<b>⚠ WARNING</b>
A warning icon showing a hand reaching towards a hot engine or exhaust system, with wavy lines representing heat.
<b>Hot engine and exhaust system. Can cause severe injury or death.</b>
Do not work on generator set until it is allowed to cool.

**Servicing exhaust system. Hot parts can cause severe injury or death.** Do not touch hot engine parts. An engine becomes hot while running and exhaust system components become extremely hot.

## Fuel Tank Kit/Part Numbers

Fuel Tank Capacity Gallons (L)	Closed-Top Diked Fuel Tanks				Secondary Containment Fuel Tanks			
	Std. Fuel Tank Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank w/Day Tank Option Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank w/Day Tank Option Kit No.	Fuel Tank Part No. (included in kit)
<b>200 kW</b>								
150 (568)	224414 224414-SD	224413 224413	224416 224416-SD	224415 224415	224557 224557-SD	224556 224556	224559 224559-SD	224558 224558
275 (1041)	224418 224418-SD	224417 224417			224561 224561-SD	224560 224560		
400 (1514)	224420 224420-SD	224419 224419			224563 224563-SD	224562 224562		
773 (2926)	228972 228972-SD	228804 228804			228973 228973-SD	228805 228805		
966 (3656)	228974 228974-SD	228806 228806			228975 228975-SD	228807 228807		
1160 (4391)	228976 228976-SD	228808 228808			228977 228977-SD	228809 228809		
<b>230-300 kW</b>								
200 (757)	224422 224422-SD	224421 224421	224424 224424-SD	224423 224423	224565 224565-SD	224564 224564	224567 224567-SD	224566 224566
400 (1514)	224426 224426-SD	224425 224425			224569 224569-SD	224568 224568		
600 (2271)	224428 224428-SD	224427 224427			224571 224571-SD	224570 224570		
1157 (4379)	228978 228978-SD	228810 228810			228979 228979-SD	228811 228811		
1446 (5473)	228980 228980-SD	228812 228812			228981 228981-SD	228813 228813		
1736 (6571)	228982 228982-SD	228814 228814			228983 228983-SD	228815 228815		
<b>350-400 kW</b>								
300 (1135)	224430 224430-SD	224429 224429	224432 224432-SD	224628 224628	224573 225573-SD	224572 224572	224575 224575-SD	224574 224574
540 (2044)	224434 224434-SD	224433 224433			224577 224577-SD	224576 224576		
800 (3028)	224436 224436-SD	224435 224435			224579 224579-SD	224578 224578		
1594 (6033)	228984 228984-SD	228816 228816			228985 228985-SD	228817 228817		
1992 (7539)	228986 228986-SD	228818 228818			228987 228987-SD	228819 228819		
2391 (9050)	228988 228988-SD	228820 228820			228989 228989-SD	228821 228821		
<b>450 kW</b>								
300 (1135)	228990 228990-SD	228824 228824	327868 327868-SD	228822 228822	228991 228991-SD	228825 228825	327869 327869-SD	228823 228823
450 (1703)	228992 228992-SD	228826 228826			228993 228993-SD	228827 228827		
600 (2271)	228994 228994-SD	228828 228828			228995 228995-SD	228829 228829		

## Fuel Tank Kit/Part Numbers (continued)

Fuel Tank Capacity Gallons (L)	Closed-Top Diked Fuel Tanks				Secondary Containment Fuel Tanks			
	Std. Fuel Tank Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank w/Day Tank Option Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank w/Day Tank Option Kit No.	Fuel Tank Part No. (included in kit)
<b>500/600 kW</b>								
400 (1514)	226234 226234-SD	228840 228840	327872 327872-SD	228838 228838	226235 226235-SD	228841 228841	327873 327873-SD	228839 228839
600 (2271)	226236 226236-SD	228842 228842			226237 226237-SD	228843 228843		
800 (3028)	226238 226238-SD	228844 228844			226239 226239-SD	228845 228845		
400 (1514)	226242 226242-SD	228848 228848	327874 327874-SD	228846 228846	226243 226243-SD	228849 228849	327875 327875-SD	228847 228847
600 (2271)	226244 226244-SD	228850 228850			226245 226245-SD	228851 228851		
800 (3028)	327800 327800-SD	228852 228852			327801 327801-SD	228853 228853		
<b>750 kW</b>								
550 (2081)	327804 327804-SD	228856 228856	327876 327876-SD	228854 228854	327805 327805-SD	228857 228857	327877 327877-SD	228855 228855
800 (3028)	327806 327806-SD	228858 228858			327807 327807-SD	228859 228859		
1000 (3785)	327808 327808-SD	228860 228860			327809 327809-SD	228861 228861		
<b>800 kW</b>								
550 (2081)	327812 327812-SD	228864 228864	327878 327878-SD	228862 228862	327813 327813-SD	228865 228865	327879 327879-SD	228863 228863
800 (3028)	327814 327814-SD	228866 228866			327815 327815-SD	228867 228867		
1000 (3785)	327816 327816-SD	228868 228868			327817 327817-SD	228869 228869		
<b>900/1000 kW (7M Alt.)</b>								
600 (2271)	327820 327820-SD	228872 228872	327880 327880-SD	228870 228870	327821 327821-SD	228873 228873	327881 327881-SD	228871 228871
1200 (4542)	327822 327822-SD	228874 228874			327823 327823-SD	228875 228875		
1800 (6813)	327824 327824-SD	228876 228876			327825 327825-SD	228877 228877		
<b>900/1000 kW (5M Alt.)</b>								
600 (2271)	327828 327828-SD	228880 228880	327882 327882-SD	228878 228878	327829 327829-SD	228881 228881	327883 327883-SD	228879 228879
1200 (4542)	327830 327830-SD	228882 228882			327831 327831-SD	228883 228883		
1800 (6813)	327832 327832-SD	228884 228884			327833 327833-SD	228885 228885		
<b>1200/1250 kW</b>								
900 (3406)	327836 327836-SD	228888 228888	327884 327884-SD	228886 228886	327837 327837-SD	228889 228889	327885 327885-SD	228887 228887
1200 (4542)	327838 327838-SD	228890 228890			327839 327839-SD	228891 228891		
1600 (6056)	327840 327840-SD	228892 228892			327841 327841-SD	228893 228893		
900 (3406)	327844 327844-SD	228896 228896	327886 327886-SD	228894 228894	327845 327845-SD	228897 228897	327887 327887-SD	228895 228895
1200 (4542)	327846 327846-SD	228898 228898			327847 327847-SD	228899 228899		
1600 (6056)	327848 327848-SD	228900 228900			327849 327849-SD	228901 228901		

## Fuel Tank Kit/Part Numbers (continued)

Fuel Tank Capacity Gallons (L)	Closed-Top Diked Fuel Tanks				Secondary Containment Fuel Tanks			
	Std. Fuel Tank Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank w/Day Tank Option Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank Kit No.	Fuel Tank Part No. (included in kit)	Std. Fuel Tank w/Day Tank Option Kit No.	Fuel Tank Part No. (included in kit)
<b>1500/1600 kW</b>								
1000 (3785)	327852 327852-SD	228904 228904	327888 327888-SD	228902 228902	327853 327853-SD	228905 228905	327889 327889-SD	228903 228903
1500 (5677)	327854 327854-SD	228906 228906			327855 327855-SD	228907 228907		
1900 (7191)	327856 327856-SD	228908 228908			327857 327857-SD	228909 228909		
<b>2000 kW</b>								
1300 (4920)	327860 327860-SD	228912 228912	327890 327890-SD	228910 228910	327861 327861-SD	228913 228913	327891 327891-SD	228911 228911
1900 (7191)	327862 327862-SD	228914 228914			327863 327863-SD	228915 228915		
2500 (9462)	327864 327864-SD	228916 228916			327865 327865-SD	228917 228917		

# Specifications

<b>Closed-Top Diked (CTD) and Secondary Containment (SC) Fuel Tank Specifications</b>						
<b>Fuel Tank Capacity Gallons (L)</b>	<b>Emergency Relief Vent Size in. (mm)</b>	<b>Tank Length in. (mm)</b>	<b>Tank Width in. (mm)</b>	<b>Tank Height in. (mm)</b>	<b>CTD Approx. Empty Fuel Tank Weight lbs. (kg)</b>	<b>SC Approx. Empty Fuel Tank Weight lbs. (kg)</b>
<b>200 kW</b>						
150 (568)	3 (76.2)	120.0 (3048.0)	50.0 (1270.0)	12.5 (318.0)	1180 (535)	1059 (480)
275 (1041)	3 (76.2)	120.0 (3048.0)	50.0 (1270.0)	18.0 (457.0)	1450 (658)	1305 (592)
400 (1514)	3 (76.2)	120.0 (3048.0)	50.0 (1270.0)	30.0 (762.0)	1775 (805)	1657 (752)
773 (2926)	5 (127.0)	157.0 (3987.8)	50.0 (1270.0)	36.0 (914.4)	2575(1168)	2378(1079)
966 (3656)	5 (127.0)	140.0 (3556.0)	77.0 (1955.8)	32.0 (812.8)	2949(1338)	2667(1210)
1160 (4391)	5 (127.0)	146.0 (3708.4)	77.0 (1955.8)	36.0 (914.4)	3244(1471)	2945(1336)
<b>230-300 kW</b>						
200 (757)	3 (76.2)	108.0 (2743.2)	50.0 (1270.0)	18.0 (457.0)	1254 (569)	1151 (522)
400 (1514)	3 (76.2)	126.0 (3200.4)	50.0 (1270.0)	24.0 (610.0)	1730 (785)	1577 (715)
600 (2271)	3 (76.2)	126.0 (3200.4)	50.0 (1270.0)	36.0 (914.0)	2164 (982)	2015 (914)
1157 (4379)	5 (127.0)	146.0 (3708.4)	77.0 (1955.8)	36.0 (914.0)	3244(1471)	2945(1336)
1446 (5473)	5 (127.0)	174.0 (4419.6)	77.0 (1955.8)	36.0 (914.0)	3747(1700)	3372(1530)
1736 (6571)	6 (152.4)	204.0 (5181.6)	77.0 (1955.8)	36.0 (914.0)	4278(1941)	3824(1735)
<b>350/400 kW</b>						
300 (1136)	3 (76.2)	114.0 (2895.6)	50.0 (1270.0)	24.0 (610.0)	1520 (689)	1407 (638)
540 (2044)	3 (76.2)	132.0 (3352.8)	50.0 (1270.0)	30.0 (762.0)	2030 (921)	1868 (847)
800 (3028)	4 (101.6)	132.0 (3352.8)	70.0 (1778.0)	30.0 (762.0)	2578(1169)	2331(1057)
1594 (6033)	6 (152.4)	180.0 (4572.0)	82.0 (2082.8)	36.0 (914.0)	4021(1824)	3604(1634)
1992 (7540)	6 (152.4)	216.0 (5486.4)	82.0 (2082.8)	36.0 (914.0)	4695(2130)	4174(1893)
2391 (9050)	6 (152.4)	206.0 (5232.4)	102.0 (2590.8)	36.0 (914.0)	5287(2398)	4660(2114)
<b>450 kW</b>						
300 (1136)	4 (101.6)	110.5 (2806.7)	50.5 (1282.7)	20.0 (508.0)	1483 (673)	1341 (608)
450 (1703)	4 (101.6)	110.5 (2806.7)	50.5 (1282.7)	30.0 (762.0)	1816 (824)	1816 (824)
600 (2271)	4 (101.6)	115.5 (2933.7)	50.5 (1282.7)	36.0 (914.4)	2085 (946)	2085 (946)
<b>500/600 kW</b>						
400 (1514)	4 (101.6)	117.5 (2984.5)	50.0 (1270.0)	25.0 (635.0)	1733 (786)	1585 (719)
600 (2271)	4 (101.6)	117.5 (2984.5)	50.0 (1270.0)	25.0 (635.0)	2115 (959)	1965 (891)
800 (3028)	5 (127.0)	117.5 (2984.5)	63.0 (1600.0)	36.0 (914.4)	2472(1121)	2267(1028)
400 (1514)	4 (101.6)	124.0 (3149.6)	50.0 (1270.0)	23.0 (584.2)	1753 (795)	1589 (721)
600 (2271)	4 (101.6)	124.0 (3149.6)	50.0 (1270.0)	23.0 (584.2)	2158 (979)	2001 (998)
800 (3028)	5 (127.0)	124.0 (3149.6)	63.0 (1600.0)	35.0 (889.0)	2516(1141)	2304(1045)

## Specifications (continued)

Closed-Top Diked (CTD) and Secondary Containment (SC) Fuel Tank Specifications						
Fuel Tank Capacity Gallons (L)	Emergency Relief Vent Size in. (mm)	Tank Length in. (mm)	Tank Width in. (mm)	Tank Height in. (mm)	CTD Approx. Empty Fuel Tank Weight lbs. (kg)	SC Approx. Empty Fuel Tank Weight lbs. (kg)
<b>750 kW</b>						
550 (2082)	5 (127.0)	136.6 (3469.6)	68.0 (1727.2)	21.0 (533.4)	2473(1122)	2218(1006)
800 (3028)	5 (127.0)	136.6 (3469.6)	68.0 (1727.2)	29.0 (736.6)	2886(1309)	2626(1191)
1000 (3785)	5 (127.0)	136.6 (3469.6)	68.0 (1727.2)	36.0 (914.4)	3233(1466)	2974(1349)
<b>800 kW</b>						
550 (2082)	4 (101.6)	137.1 (3482.3)	74.1 (1881.6)	19.0 (482.6)	2547(1155)	2258(1024)
800 (3028)	5 (127.0)	137.1 (3482.3)	74.1 (1881.6)	26.0 (660.4)	2931(1321)	2634(1195)
1000 (3785)	5 (127.0)	137.1 (3482.3)	74.1 (1881.6)	32.0 (812.8)	3240(1470)	2944(1335)
<b>900/1000 kW (7M Alt.)</b>						
600 (2271)	5 (127.0)	195.9 (4975.9)	88.0 (2235.2)	14.0 (355.6)	3385(1535)	2927(1328)
1200 (4542)	5 (127.0)	195.9 (4975.9)	88.0 (2235.2)	26.0 (660.4)	4274(1926)	3789(1719)
1800 (6813)	6 (152.4)	195.9 (4975.9)	88.0 (2235.2)	34.0 (863.6)	4820(2186)	4362(1979)
<b>900/1000 kW (5M Alt.)</b>						
600 (2271)	5 (127.0)	195.9 (4975.9)	88.0 (2235.2)	14.0 (355.6)	3385(1535)	2927(1328)
1200 (4542)	5 (127.0)	195.9 (4975.9)	88.0 (2235.2)	26.0 (660.4)	4247(1926)	3789(1719)
1800 (6813)	6 (152.4)	195.9 (4975.9)	88.0 (2235.2)	34.0 (863.6)	4820(2186)	4362(1979)
<b>1200/1250 kW</b>						
900 (3406)	5 (127.0)	213.4 (5420.4)	87.9 (2486.7)	18.0 (457.2)	3994(1812)	3482(1579)
1200 (4542)	5 (127.0)	213.4 (5420.4)	87.9 (2486.7)	24.0 (609.6)	4403(1997)	3909(1773)
1600 (6056)	6 (152.4)	213.4 (5420.4)	87.9 (2486.7)	30.0 (762.0)	4938(2240)	4416(2003)
900 (3406)	5 (127.0)	219.2 (5568.9)	87.9 (2486.7)	18.0 (457.2)	4049(1837)	3537(1604)
1200 (4542)	5 (127.0)	219.2 (5568.9)	87.9 (2486.7)	22.0 (558.8)	4436(2012)	3893(1766)
1600 (6056)	6 (152.4)	219.2 (5568.9)	87.9 (2486.7)	29.0 (736.6)	4967(2253)	4430(2009)
<b>1500/1600 kW</b>						
1000 (3785)	5 (127.0)	243.6 (6187.9)	87.9 (2232.7)	18.0 (457.2)	4395(1993)	3822(1734)
1500 (5677)	6 (152.4)	243.6 (6187.9)	87.9 (2232.7)	25.0 (635.0)	5021(2278)	4429(2009)
1900 (7191)	6 (152.4)	243.6 (6187.9)	87.9 (2232.7)	31.0 (787.4)	5515(2502)	4923(2233)
<b>2000 kW</b>						
1300 (4920)	6 (152.4)	272.0 (6908.8)	108.9 (2763.5)	16.0 (406.4)	5740(2604)	4880(2214)
1900 (7191)	6 (152.4)	272.0 (6908.8)	108.9 (2763.5)	22.0 (558.8)	6341(2876)	5473(2483)
2500 (9462)	6 (152.4)	272.0 (6908.8)	108.9 (2763.5)	28.0 (711.2)	6950(2876)	6074(2755)

# Standard Features

The following features are standard on all subbase fuel tanks.

**2 in. NPT Lockable Fill Cap Kit with 2 in. (50.8 mm) Riser.** Includes 2 in. NPT diameter, 2 in. NPT riser pipe with lockable cap. This kit allows for a convenient way to fill the tank.

**Low Fuel Level Alarm Kit.** Includes float switch and wiring to microprocessor controller. Alarm annunciates when tank fuel level reaches approximately 50%.

**Normal Vent Kit with 5 in. (127 mm) Riser and Mushroom Cap.** Includes 1 1/4 in. NPT, 5 in. NPT riser pipe, and matching mushroom cap for normal vent.

## Accessories

Several accessories are available for double-wall subbase fuel tanks. Local, state, or federal codes and ordinances may require installation of one or more of the following kits. Contact local inspector or generator distributor to determine which accessories to install to comply with codes. See Figure 1 for double-wall subbase fuel tank features.

(17.2 kPa). Secondary containment tank requires two vents (inner tank and outer tank). A closed-top, diked tank requires one vent (inner tank).

## Day Tank Control Modules

**Day Tank Electronic Control Module (ECM).** Includes 1/3 HP, 110/120 vac, 50/60 Hz, single-phase motor, 2 gpm (7.57 L/min) or 4 gpm (15.14 L/min) pump depending on kW, float switch, leak alarm, electronic control module, and wiring. The ECM activates the pump when the tank fuel level reaches 50%. The ECM displays fuel level at Full, 95%, 90%, 85%, 75%, 50%, 25%, 10%, and Empty. ECM also displays high fuel, low fuel, critical low fuel, fuel in rupture basin, ECM functional, pump running, and power on. Kit requires either a 20- or 40-foot (6.1- or 12.2-m) wiring harness.

**Day Tank Relay Control Module.** Includes 1/3 HP, 110/120 vac, 50/60 Hz, single-phase motor, 2 gpm (7.57 L/min), or 4 gpm (15.14 L/min), or 7 gpm (26.50 L/min) pump depending on kW, float switch, relay control, and wiring. Use this kit with the double-wall subbase fuel tank kit having the day tank option. The motor and pump are controlled via the float switch through relays. The float switch activates the pump when the tank fuel level reaches 50%.

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### NOTE

Seal all unused fittings with steel pipe plugs. The plastic plugs in these fittings are for shipping only and are not intended for permanent use. See available pipe plug kits.

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## Alarm Kits

**Inner Tank Leak Alarm Kit.** Includes one light, one horn remote annunciator panel, leak alarm switch, and wiring. Alarm indicates a need for tank replacement when the inner tank has leaked into the outer tank. Leak alarm is standard with the electronic control module.

## Cap Kits

**Mushroom Cap Kit.** Includes one 1 1/4 in. NPT mushroom cap for use on normal vent.

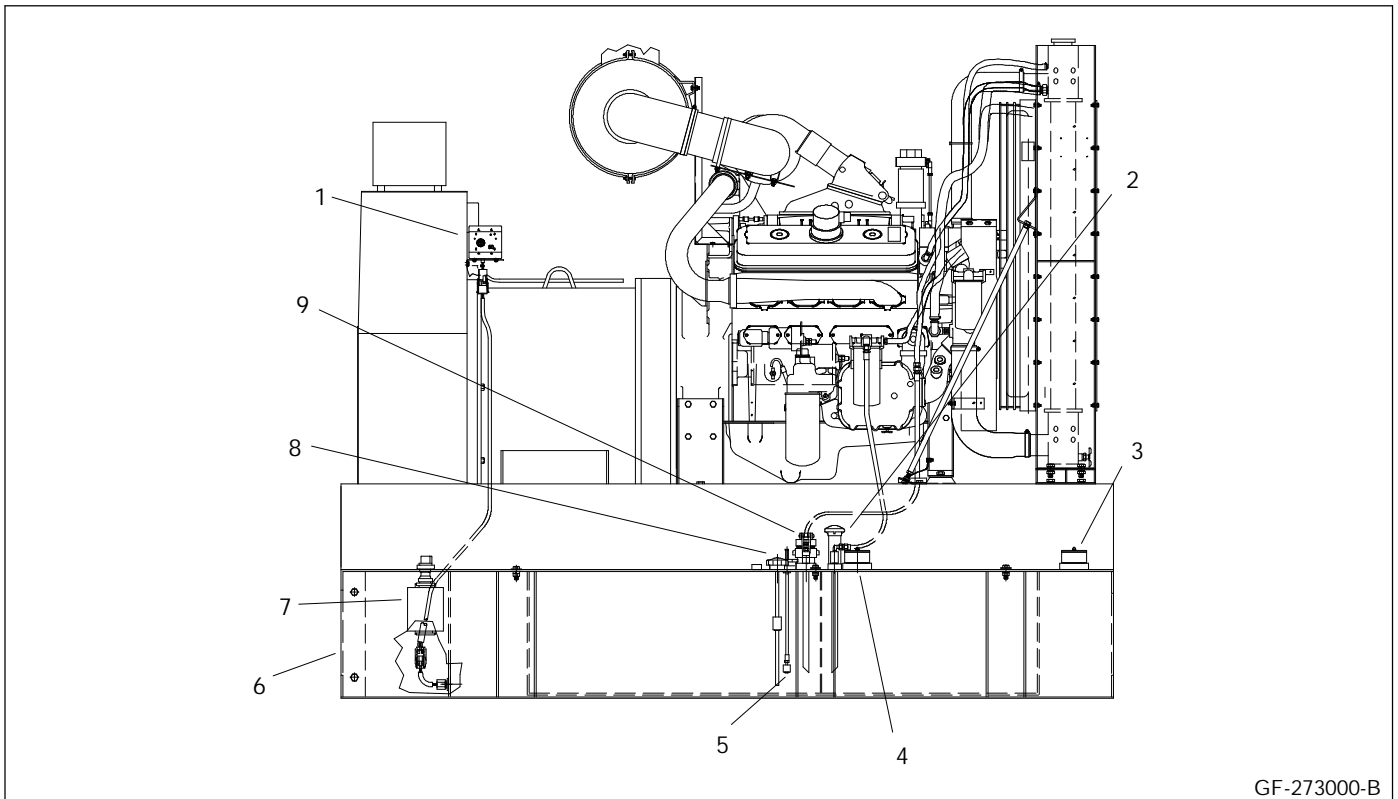
## Vent Kits

**Emergency Pressure Relief Vent Kit.** Includes one emergency pressure relief valve which opens to relieve the internal tank pressure when the pressure exceeds 1/2 psi (3.4 kPa). Relief valve is fully open at 2 1/2 psi

## Pipe Plug Kits

**Pipe Plug Kits.** Kit includes one pipe plug. Plugs sized 1/2 in. NPT through 4 in. NPT are square head, and 5 in. NPT pipe plugs are slotted bar head. NPT pipe plugs are required for fittings where optional accessories are not required.





GF-273000-B

- 1. Inner tank-leak alarm kit
- 2. Normal vent kit with riser and mushroom cap
- 3. Outer tank emergency pressure relief vent kit (secondary containment tank only)
- 4. Emergency pressure-relief vent kit
- 5. Low fuel level alarm kit
- 6. Removable end channel
- 7. Day tank kit
- 8. Mechanical fuel gauge (standard)
- 9. Lockable fill cap and riser kit

**Figure 1. Double-Wall Subbase Fuel Tank Options**

Kits	Part Number
<b>Alarm Kits</b>	
Inner Tank Leak Alarm	224807
<b>Vent Kits</b>	
Emergency Pressure Relief 3 in.	224679
Emergency Pressure Relief 4 in.	224680
Emergency Pressure Relief 5 in.	224681
Emergency Pressure Relief 6 in.	224686
Normal Vent	224686
<b>Pipe Plug Kits</b>	
1/2 in. (13 mm)	224666
1 in. (25 mm)	224667
2 in. (51 mm)	224668
3 in. (76 mm)	224669
4 in. (102 mm)	224670
5 in. (127 mm)	224671

**Figure 2. Accessories**

# Installation

1. Disconnect engine starting battery, negative (-) lead first.
2. Calculate the weight of the generator set and accessories (including subbase fuel tank and fuel) to determine the strength of the mounting pad construction. Use current generator set spec sheet for data.

---

## NOTE

Use the formulas below to calculate total weight (lbs.) of the tank and fuel:

Fuel weight (lbs.) = Tank capacity (gal) x 7.3 (lbs.)

Total weight of tank and fuel (lbs.) = Fuel weight + tank weight (see specifications chart)

Total weight of generator set with subbase tank (lbs.) = Total weight of tank and fuel + weight of generator set (see spec sheet)

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3. Use current generator set spec sheet and dimensional drawing to size mounting pad.

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## NOTE

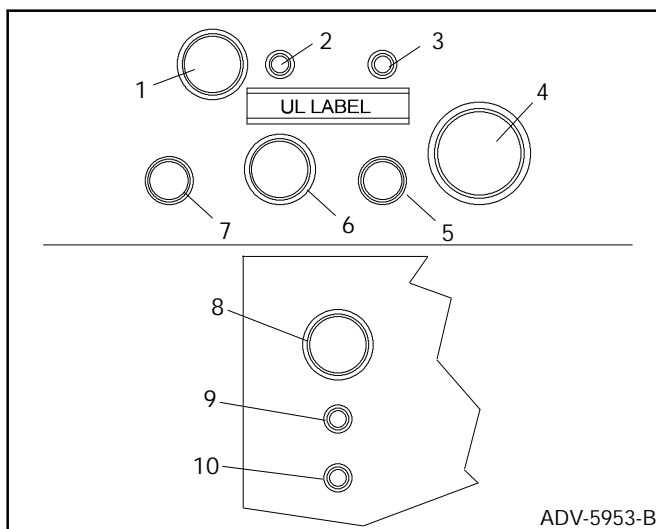
The lifting contractor determines the type and suitability of the subbase fuel tank lifting device. Lift the subbase fuel tank as one unit if shipped separately from the generator set. Use lifting eyes if equipped on subbase fuel tank; otherwise, use chains or cables to lift the subbase fuel tank. If using lifting straps, protect the strap from sharp fuel tank edges.

Lift the generator set (up to 400 kW) and subbase fuel tank together provided the fuel tank is empty and the subbase fuel tank does not extend beyond the perimeter of the generator set skid.

In all other cases, remove the mounting hardware and wiring between the the generator set and subbase fuel tank. Lift the generator set and subbase fuel tank separately. It is not necessary to drain fuel tank when lifting just the fuel tank.

---

4. **500-2000 kW:** Install spring isolation mounts to subbase fuel tank. Use installation instructions provided in the kit.
5. Attach the subbase fuel tank to the concrete using anchor bolts placed in the cement before it has set. Otherwise, install anchors later by drilling holes in the concrete.
6. Size all hoist equipment accordingly. Hoist the generator set into place and bolt it to the subbase fuel tank. Use grade 5 minimum bolts and associated hardware when mounting hardware is not supplied in the kit. Torque all hardware using a value that corresponds to the hardware size.
7. Install emergency pressure relief vents as required. Secondary containment tanks require two vents (inner tank and outer tank) and closed-top, diked tanks require one vent (inner tank).
8. Connect low fuel level switch leads 63 and N according to the illustration in Figure 4. Use a connection kit (terminal strip) for easier connection and disconnection of generator accessories.



1. 2 in. NPT low level switch
2. 1/2 in. NPT dip tube/fuel supply
3. 1/2 in. NPT dip tube/fuel return
4. Emergency vent per NFPA-30
5. 1 1/2 in. NPT for level gauge
6. 2 in. NPT raised manual fill cap with 2 in. riser
7. 1 1/4 in. NPT normal vent opening with 5 in. riser and mushroom cap
8. 2 in. NPT sensor/pump control float (day tank only)
9. 3/4 in. NPT overflow (day tank only)
10. 3/8 in. NPT tank fill (day tank only)

**Figure 3. Fuel Tank Fittings**

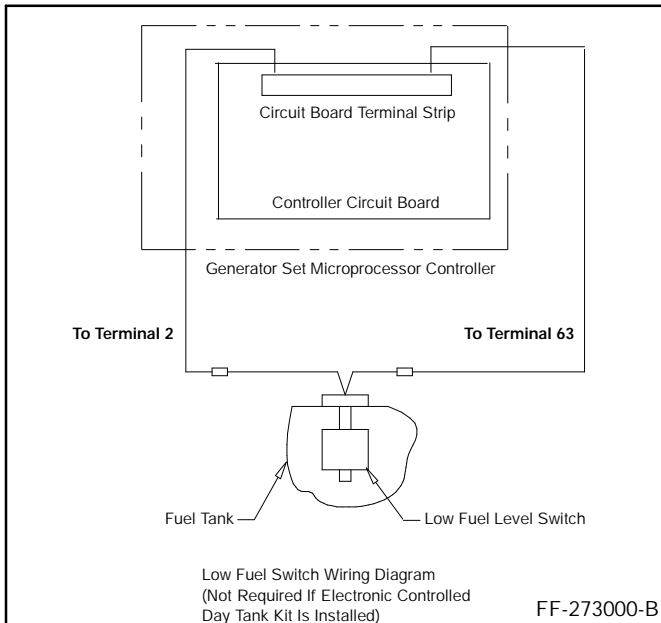


Figure 4. Low Fuel Switch Wiring Diagram

9. Install flexible fuel line kit. Refer to installation instructions provided with kit. Connect two lines, a supply and return line, between the generator set and the subbase fuel tank.
10. If subbase day tank is required, install transfer pump kit, float, and controls.

For day tank relay control module instructions proceed to step 12a. For day tank electronic control module instructions proceed to step 13. If subbase day tank is not required proceed to step 14.

**NOTE**

Controller box assembly shown at suggested mounting location only.

- a. Remove cover plate from controller box assembly. Mount controller box assembly (A-224874) to skid using two screws (X-50-3), washers (X-25-36), and nuts (X-6210-5) supplied with the controller box assembly. Do not install cover plate. See Figure 5.

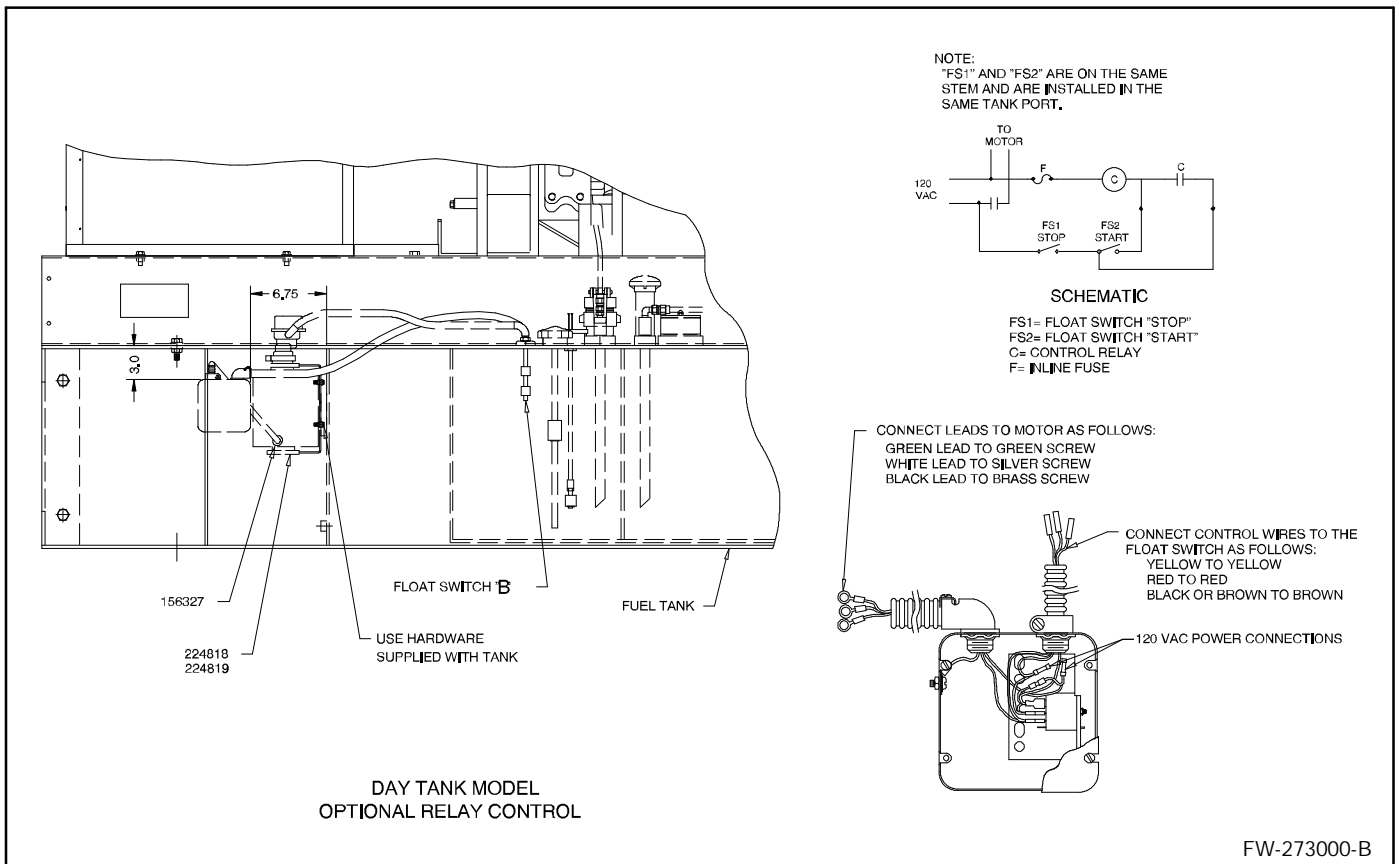


Figure 5. Relay Control Module

- b. Mount transfer pump assembly to skid using hardware supplied with the tank. See Figure 5.
- c. Remove 3/8 in. NPT pipe plug for fuel inlet connection at subbase fuel tank. See Figure 3. Pipe plug is not reused. Apply pipe sealant to male ends of 3/8 in. (9.5 mm) elbow hose connector (X-391-13) and install. Point elbow hose connector toward transfer pump assembly when final tightened.
- d. Apply pipe sealant to elbow hose connector (X-391-13) and install into transfer pump assembly outlet. Point elbow hose connector toward subbase fuel tank when final tightened.
- e. Slide hose clamps (X-426-10) over each end of flexible fuel line approximately 1 in. (25.4 mm), as required. Install fuel line to transfer pump assembly outlet and subbase tank inlet. Position hose clamps approximately 1/4 in. (6 mm) from fuel line end and tighten.
- f. Remove 2 in. NPT pipe plug for float switch (224869) installation. See Figure 3. Pipe plug is not reused. Apply pipe sealant to threads of float switch and install in subbase fuel tank.
- g. Connect float switch leads to controller as follows:
  - Yellow to Yellow
  - Red to Red
  - Black or Brown to Brown
- h. Install conduit connector (156327) to transfer pump assembly.
- i. Connect green, white, and black leads of controller box to transfer pump assembly. Remove electric motor access plate. Green lead connects to ground screw on frame. Refer to schematic on electric motor and motor wiring schematic shown in Figure 5 to make connections. Replace electric motor access plate.

---

**NOTE**

Electric motor rotation must be clockwise for transfer pump operation. Check motor schematic for correct rotation. If rotation is counterclockwise, motor operates, but transfer pump will not pump fuel.

---

- j. Make AC voltage connections to controller box assembly. Remove knockout and add conduit as necessary. Replace controller box cover.
- k. Leave circuit breaker connected to transfer pump assembly power line open until external fuel tank is filled and all piping completed.
- l. Remove 1/2 in. NPT pipe plug for tank over fill return line. See Figure 3. Install 1/2 in. NPT 90 degree elbow fitting (not provided) and fuel overflow line (not provided) back to primary tank.

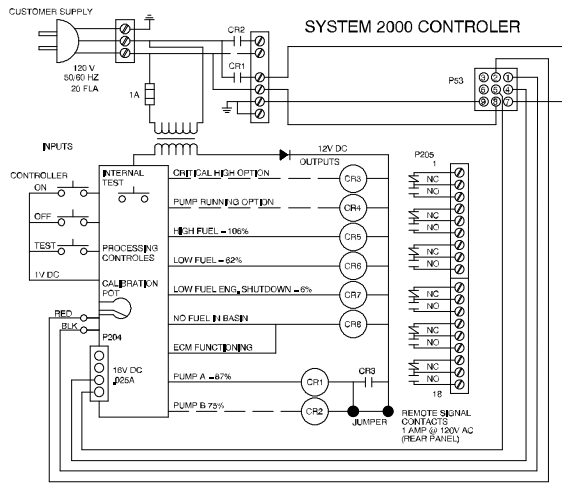
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**NOTE**

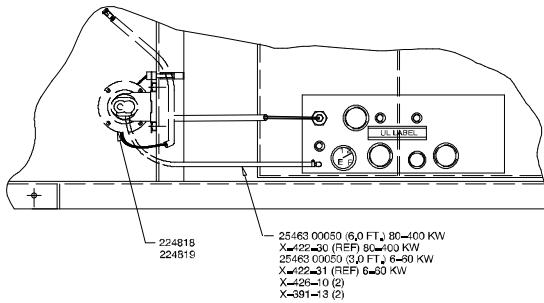
To prevent overflow from the fill cap or normal vent, locate the return line lower than the fill cap.

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- m. Upon completion of relay control module installation proceed to step 12.
11. If subbase day tank with electronic control module (ECM) is required proceed to step 11a.
- a. Remove 1/2 in. NPT pipe plug for leak alarm (224863) installation. Pipe plug is not reused. Apply pipe sealant to threads of leak alarm and install in subbase fuel tank. See Figure 6 for positioning and location.

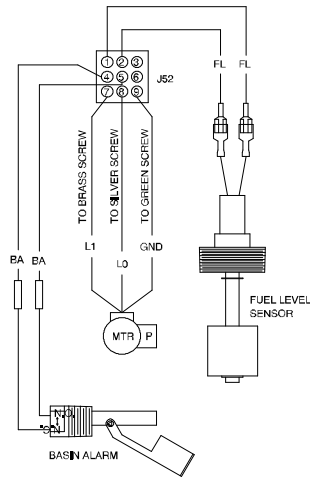


NOTE:  
 FUEL SENSOR FLOAT SHOULD BE MOVED THROUGH ITS ENTIRE RANGE OF MOTION. ADJUST CALIBRATION POT SO ELECTRONIC CONTROL MODULE READS EMPTY TO FULL OVER THIS RANGE.

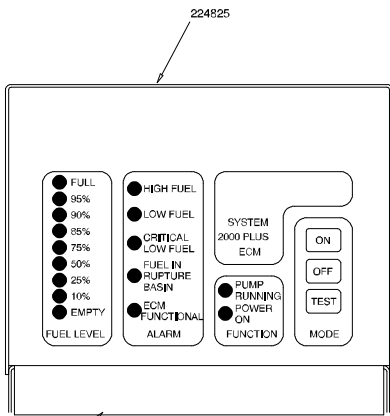


**EXTENSION HARNESS KIT**

NOTES:  
 1. RELAY IS ENERGIZED DURING NORMAL OPERATION.  
 2. THE CONTROLLER CAN BE MOUNTED UP TO 40' AWAY FROM THE TANK & GAUGE USING EXTENSION HARNESS.

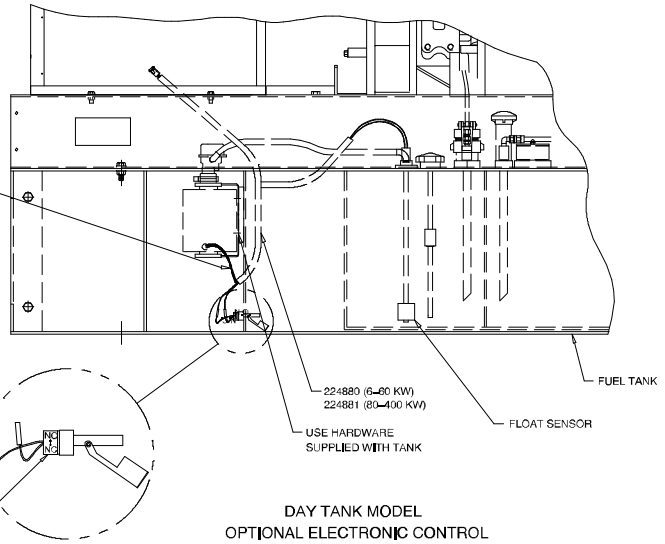
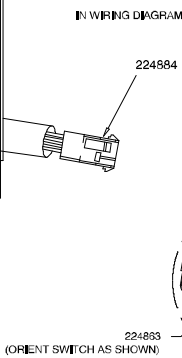


**MOTOR WIRING DIAGRAM**



REMOTE MOUNTABLE ELECTRONIC MODULAR & HARNESS FOR DAY TANK KIT

CONNECT LEADS AS SHOWN



FW-273000-A

**Figure 6. Electronic Control Module**

- b. Mount transfer pump assembly to skid using hardware supplied with tank.
  - c. Remove 3/8 in. NPT pipe plug for fuel inlet connection at subbase fuel tank. Pipe plug is not reused. Apply pipe sealant to male end of 3/8 in. (9.5 mm) elbow hose connector (X-391-13) and install. Point elbow hose connector toward transfer pump assembly when final tightened.
  - d. Apply pipe sealant to elbow hose connector (X-391-13) and install into transfer pump assembly outlet. Point elbow hose connector toward subbase fuel tank when final tightened.
  - e. Slide hose clamps (X-426-10) over each end of flexible fuel line approximately 1 in. (25 mm), as required. Install fuel line (X-422-30) to transfer pump assembly outlet and subbase tank inlet. Position hose clamps approximately 1/4 in. (6 mm) from fuel line end and tighten.
  - f. Remove 2 in. NPT pipe plug for float sensor (224815) installation. See Figure 2. Pipe plug is not reused. Apply pipe sealant to threads of float sensor and install in subbase fuel tank.
  - g. Connect fuel level sensor, leak alarm, and electric motor to appropriate wiring harness (224881) leads. See Figure 6, Motor Wiring Diagram.
  - h. Connect ECM wiring harness (224884) to appropriate ECM connections. See Figure 6. Mount ECM in desired location. Extension harness kit length may limit location of ECM.
  - i. Route wiring harness to control module. Connect mating end of extension harness to the ECM wiring harness and the day tank harness. See Figure 6.
  - j. Make AC voltage connection to control module assembly.
  - k. Leave transfer pump circuit breaker open until external fuel tank is filled and all piping completed.
  - l. Remove 1/2 in. NPT pipe plug for tank over fill return line. Install 1/2 in. NPT 90 degree elbow fitting (not provided) and fuel overflow return line (not provided) back to primary tank. See Figure 3.
- 

**NOTE**

To prevent overflow from the fill cap or normal vent, locate the return line lower than the fill cap.

---

- m. See Operation (ECM) for electronic control module operation.
- 

**NOTE**

Seal all unused fittings with steel pipe plugs. The plastic plugs in these fittings are for shipping and are not intended for permanent use. See available pipe plug kits.

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**NOTE**

Electric motor rotation must be clockwise for transfer pump operation. Check motor schematic for correct rotation. If rotation is counterclockwise, motor operates, but transfer pump will not pump fuel.

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- 12. Complete the remaining installation and start-up procedures as required by contractor/distributor.

# Operation (ECM)

## General

The electronic control module (ECM) maintains the fuel level of the day tank by controlling a pump/motor. The pump remains off at the normal fuel level and activates at 87% full. A pump running indicator LED lights when the pump activates. The motor relay is prewired to the pump/motor. Another function light on the ECM panel is the power ON. This LED lights when the power is applied to the ECM. Follow all safety precautions listed in the front of this manual.

**Servicing day tank. Hazardous voltage can cause severe injury or death.** Service day tank Electrical Control Module (ECM) as prescribed in equipment manual. Disconnect power to day tank before servicing. Press the day tank ECM OFF pushbutton to disconnect power. Be aware that line voltage is still present within the ECM when the POWER ON light is lit. Be sure that generator set and day tank are electrically grounded. Do not operate day tank when standing in water or on wet ground as the chance of electrocution increases under such conditions.

## Level Sensor

An electronic analog float gauge located below the ECM on the mounting bracket determines the day tank fuel level. Nine LEDs on the ECM indicate the day tank fuel level from full to empty. See Figure 7 for front panel layout.

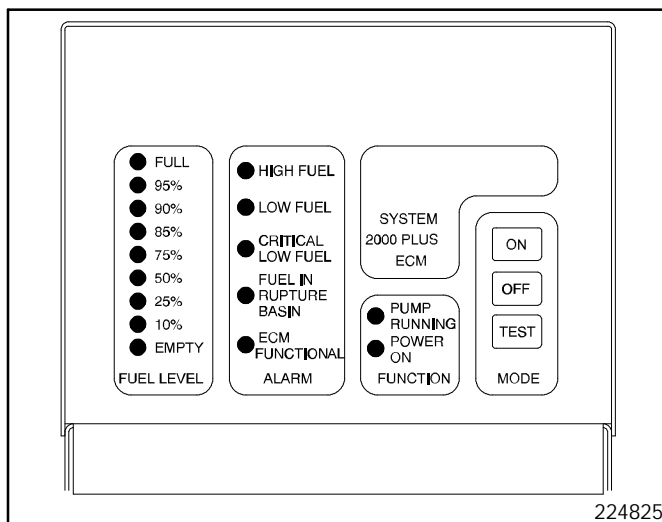


Figure 7. Front Panel Layout

## Alarms

The ECM has five standard alarm conditions. Each alarm is indicated locally by an LED and remotely by a relay. Normally open and normally closed contacts are provided on these relays for customer connections.

1. **High Fuel.** Alarm activates at 106% of normal fuel level.
2. **Low Fuel.** Alarm activates at 62% of normal fuel level. This enables reaction time to a potential problem before low fuel shutdown occurs.
3. **Critical Low Fuel (engine shutdown).** Alarm activates at 6% of normal fuel level. This enables the customer to shutdown engine/generator before fuel runs out.
4. **Fuel In Rupture Basin.** If equipped with a rupture basin float switch, the ECM monitors if fuel has leaked into the rupture basin.
5. **ECM Functional.** The ECM performs many internal checks to ensure correct operation.

## Mode

There are three modes of operation on the ECM and one internal test button.

**OFF.** Pushbutton disables the ECM for routine maintenance to the tank system without disrupting the ECM.

---

### NOTE

When ECM functional alarm relay de-energizes, it can activate a customer-installed alarm wired to this relay.

---

**ON.** Pushbutton activates the ECM after the OFF pushbutton is depressed. On any initial power-up condition, (after a power outage) the ECM automatically turns on.

**TEST.** Pushbutton tests all front panel LEDs for 3 seconds and activates pump/motor for as long as the pushbutton is depressed. All alarm relays maintain their original positions.

**INTERNAL TEST.** Pushbutton (located inside ECM) tests each LED and remote annunciation relay in sequential order (high fuel to ECM functional).

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-224414 to PA-224420</b> <b>PA-224557 to PA-224563</b> <b>PA-224414-SD to PA-224420-SD</b> <b>PA-224557-SD to PA-224563-SD</b>		
Qty.	Description	Part Number
1	Tank, double-wall subbase fuel	(See Fuel Tank Kit/Part Numbers)
1	Line, flex fuel 49 in.	274633
1	Line, flex fuel 85 in.	274736
1	Line, flex fuel 17 in.	324512
6	Washer, plain 0.812 x 1.469 x 0.134	X-25-29
6	Nut, hex 3/4-10	X-88-12
1	Union, straight	X-695-3
6	Screw, hex 3/4-10 x 2.00 in.	X-6239-3

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-224422 to PA-224428</b> <b>PA-224565 to PA-224571</b> <b>PA-224422-SD to PA-224428-SD</b> <b>PA-224565-SD to PA-224571-SD</b>		
Qty.	Description	Part Number
1	Tank, double-wall subbase fuel	(See Fuel Tank Kit/Part Numbers)
6	Washer, plain 0.812 x 1.469 x 0.134	X-25-29
6	Nut, hex 3/4-10	X-88-12
6	Screw, hex 3/4-10 x 2.00	X-6239-3

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-224430 to PA-224436</b> <b>PA-224573 to PA-224579</b> <b>PA-224430-SD to PA-224436-SD</b> <b>PA-224573-SD to PA-224579-SD</b>		
Qty.	Description	Part Number
1	Tank, double-wall subbase fuel	(See Fuel Tank Kit/Part Numbers)
4	Washer, plain 0.812 x 1.469 x 0.134	X-25-29
4	Nut, hex 3/4-10	X-88-12
4	Screw, hex 3/4-10 x 2.00	X-6239-3

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-228972 to PA-228995</b> <b>PA-228972-SD to PA-228995-SD</b>		
Qty.	Description	Part Number
1	Harness, wiring	224856
1	Tank, subbase fuel	(See Fuel Tank Kit/Part Numbers)

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-226234 to PA-226245</b> <b>PA-226234-SD to PA-226245-SD</b> <b>PA-327800, PA-327801, PA-327800-SD,</b> <b>PA-327801-SD</b>		
Qty.	Description	Part Number
1	Kit, spring mounts	PA-274640
1	Harness, wiring	224856
1	Tank, subbase fuel	(See Fuel Tank Kit/Part Numbers)

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-327804 to PA-327833</b> <b>PA-327804-SD to PA-327833-SD</b>		
Qty.	Description	Part Number
1	Kit, spring mounts	PA-292868
1	Harness, wiring	224856
1	Tank, subbase fuel	(See Fuel Tank Kit/Part Numbers)

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-327836 to PA-327857</b> <b>PA-327836-SD to PA-327857-SD</b>		
Qty.	Description	Part Number
1	Kit, spring mounts	PA-292869
1	Harness, wiring	224856
1	Tank, subbase fuel	(See Fuel Tank Kit/Part Numbers)

### Double-Wall Subbase Fuel Tank

Parts List		
<b>Kits: PA-327860 to PA-327865</b> <b>PA-327860-SD to PA-327865-SD</b>		
Qty.	Description	Part Number
1	Kit, spring mounts	PA-347688
1	Harness, wiring	224856
1	Tank, subbase fuel	(See Fuel Tank Kit/Part Numbers)



### Day Tank Relay Controller Kits

Parts List					
Kits: PA-224853, PA-224853-SD, PA-224854, PA-224854-SD, PA-224855, PA-224855-SD			Unique Parts		
Qty.	Description	Common Parts	PA-224853 PA-224853-SD	PA-224854 PA-224854-SD	PA-224855 PA-224855-SD
1	Connector, conduit elbow	156327			
1	Motor	224818			
1	Pump	224819			
1	Switch, float		279746	224869	224869
2	Washer, plain 0.219 x 0.50 x 0.049	X-25-36			
2	Connector, elbow	X-391-13			
1	Hose	X-422-30			
2	Clamp, hose	X-426-10			
2	Screw, hex 10-24 x 0,750	X-50-30			
2	Nut, 10-24 whiz	X-6210-5			

### Day Tank Electronic Controller Kits

Parts List					
Kits: PA-224811, PA-224811-SD, PA-224812, PA-224812-SD, PA-224813, PA-224813-SD			Unique Parts		
Qty.	Description	Common Parts	PA-224811 PA-224811-SD	PA-224812 PA-224812-SD	PA-224813 PA-224813-SD
1	Sensor, float		224814	224815	224816
1	Motor	224818			
1	Pump	224819			
1	Module, control	224825			
2	Switch, float	224863			
2	Harness, day tank	224881			
1	Harness, wiring	224884			
2	Connector, elbow	X-391-13			
2	Hose	X-422-30			
2	Clamp, hose	X-426-10			