



October 7, 2011

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DIVISION OF AIR
RESOURCE MANAGEMENT

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USPS Tracking No:

Mr. Jonathan Holtom, P.E., CPM
Office of Permitting and Compliance
Division of Air Resource Management
Department of Environmental Protection
2600 Blair Stone Road, MS 5500
Tallahassee, Florida 32399-2400

Re: Response to Request for Additional Information (RAI)
FDEP Project Nos: 1050234-018-AC/1050234-19-AV
Hines Energy Complex Title V Permit Renewal Application
Florida Power Corporation d/b/a Progress Energy Florida, Inc.
Facility ID No: 1050234
Polk County

Dear Mr. Holtom:

You will find enclosed the response to the Florida Department of Environmental Protection (FDEP) Division of Air Resource Management's (DARM) request for additional information (RAI) for the above referenced projects. The RAI dated July 19, 2011 addressed a number of different requested changes that are currently under review via concurrent processing as part of a Title V air operation permit renewal and an air construction (AC) permit application for the Florida Power Corp. d/b/a Progress Energy, Inc.'s (PEF) Hines Energy Complex (HEC). This correspondence is the result of recommendations made by DARM staff during a teleconference conducted on October 6, 2011 with Mr. Chris Bradley of the PEF's Environmental Services & Strategies (ES&S) Section and Mr. Tom Davis, P.E. of Environmental Consulting & Technology, the professional engineer of record for this project, to discuss options to facilitate and expedite issuance of the renewed Title V air operation permit and the AC permit.

Based on the discussion with Mr. Bradley and Mr. Davis, PEF requests the separation of the concurrent processing of the Title V permit renewal (DEP Project No. 1050234-019-AV) and air construction (AC) permit (DEP Project No. 1050234-018-AC). As discussed with PEF staff bifurcation of the renewal and construction permit processing is being requested in order to facilitate the issuance of the renewed Title V air operation permit and to preserve the Acid Rain portion of the operating permit for Calendar Year 2012. As a result, a Responsible Official (R.O.) Certification page is enclosed and PEF's response to the Department's RAI only addresses those items required to process the Title V renewal portion of the current permitting project. Specifically, this RAI response includes requested information associated with Item Nos. 10, 11, 12, 13, & 14 as identified in the Department's RAI dated July 19, 2011; i.e., questions regarding excess emission provisions, emergency generators, emergency fire pumps and any stationary non-nonroad engines. See Attachment 1 for PEF's response to these items.

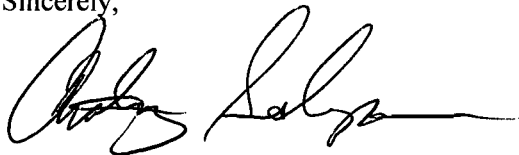
Progress Energy Florida, Inc.
Hines Energy Complex
7700 County Road 555
Bartow, FL 33830

Mr. Jonathan Holtom, P.E., CPM
Hines Energy Complex - Response
FDEP Project Nos: 1050234-018-AC/1050234-19-AV
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In addition, PEF requests the Department review the response to Item No. 6, also included in Attachment No.1, to determine if this change can be incorporated into the Title V renewal permit without being addressed in the Air Construction (AC) permitting process. If it is determined that this change will require process through an AC permit, PEF requests that this item be addressed in the current active AC permitting project; i.e., Project No. 1050234-018-AC. Furthermore, as agreed, the response to RAI items requiring the construction permitting process will be submitted at a later date. Moreover, as a result of bifurcating the processing of the AC and Title V renewal permits, PEF requests additional time to address those items contained in the RAI that the Department believes are necessary to address through the AC permitting process.

If the Department requires additional information regarding the enclosed RAI response, or PEF's request to separate the processing of the Title V air operation permit renewal and the AC permitting processes, please contact Mr. Chris Bradley by telephone via e-mail at Chris.Bradley@pgnmail.com or at (727) 820-5962.

Sincerely,

A handwritten signature in black ink, appearing to read 'Anthony Salvarezza', written over a horizontal line.

Anthony Salvarezza, Plant Manager
Hines Energy Complex

Enclosures

cc: Tom Davis, P.E., Environmental Consulting & Technology
Tommy Oneal, HE 44
Chris Bradley, PEF 903 (ES&S Files)

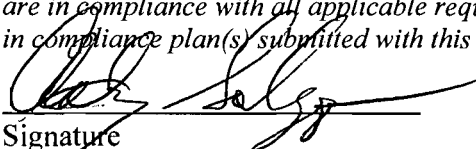
OCT 11 2011

**DIVISION OF AIR
RESOURCE MANAGEMENT**

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial, revised, or renewal Title V air operation permit or concurrent processing of an air construction permit and revised or renewal Title V air operation permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

<p>1. Application Responsible Official Name: Anthony Salvarezza, Plant Manager</p>
<p>2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):</p> <p><input checked="" type="checkbox"/> For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.</p> <p><input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively.</p> <p><input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.</p> <p><input type="checkbox"/> The designated representative at an Acid Rain source, CAIR source, or Hg Budget source.</p>
<p>3. Application Responsible Official Mailing Address...</p> <p>Organization/Firm: Florida Power Corporation dba Progress Energy Florida, Inc.</p> <p>Street Address: 7700 County Road 555</p> <p style="text-align: center;">City: Bartow State: FL Zip Code: 33830</p>
<p>4. Application Responsible Official Telephone Numbers...</p> <p>Telephone: Telephone: (863) 519-6103 ext. Fax: (863) 519-6110</p>
<p>5. Application Responsible Official E-mail Address: anthony.salvarezza@pgnmail.com</p>
<p>6. Application Responsible Official Certification:</p> <p><i>I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.</i></p> <p style="text-align: center;">  <u>10/7/11</u> Signature Date </p>

Attachment No. 1

FDEP/DARM Project Nos: 1050234-08-AC/10500234-019-AV

Response to FDEP/DARM Request for Additional Information (RAI) Dated July 19, 2011

RAI Item 3:

Comment: *Item 6, requested change to excess emissions provisions. The Department understands that the requested changes are similar to the excess emissions provisions provided in more recent permits issued for other units at the facility. However, please explain how the existing requirements have been complied with to date. Also, provide any available continuous emissions monitoring system (CEMS) data that was used to determine the proposed time periods for excess emissions data exclusion and a history of how these units have been dispatched to show how often these units operate under each of the start up, shut down and fuel switching scenarios.*

Response: The requested change was an effort to craft a more easily readable and understandable condition similar in form to the excess emission provisions for other power blocks. PEF retained the language from the current condition and reformatted it in outline form; i.e., the language in the requested change is identical to the current language found in Section III, Subsection A, Specific Condition A.7 of Title V Air Operation Permit No. 1050234-016-AV. The summary table was added for purposes of clarity for operators and other PEF personnel. Furthermore, to date PEF has complied with all existing requirements of this specific permit condition.

RAI Item 10:

Comment: *Subsection D of the current Title V permit addresses the potential operation of a relocatable diesel generator that was permitted as a separate facility under permit No. AC09-202080. Has any engine permitted under this permit ever operated at the Hines facility? If so, for what purpose? The allowable 2,970 hours established by this permit far exceed what would be expected of a normal emergency generator or fire pump. This permit also did not address the requirements of 40 CFR 63, Subpart ZZZZ or 40 CFR 60, Subpart VII. Does this section need to remain in the Title V permit?*

Response: No engine permitted under AC09-202080 has ever been operated at the Hines Energy Complex. In addition, these re-locatable generators no longer need to remain in the Title V Air Operating Permit.

RAI Item 11:

Comment: *Do any other reciprocating internal combustion engines exist at the facility? If so, please specify if any of them are subject to 40 CFR 60 Subpart III, Standards of performance for Stationary Compression Ignition (CI) Internal Combustion Engines (ICE), 40 CFR 63 Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, or 40 CFR 60 Subpart JJJJ, Standards of Performance for Stationary Spark Ignition (SI) Internal Combustion Engines.*

Response: There is only one Stationary Reciprocating Internal Combustion Engine (RICE) located at the facility. This engine is diesel-fired (i.e., compression ignition (CI)) and associated with the emergency fire pump. The exact date of manufacture is unknown; however, the fire pump was installed in 1998; therefore, it can be concluded that the year of manufactured/ordered was 1998 or earlier.

RAI Item 12:

Comment: *For each emergency generator, please provide the following information:*

- a. *What type of fuel does the engine use?*

- b. *What is the HP (1 HP = 0.7456 KW) of the stationary engine?*
- c. *Is the engine a temporary replacement unit located at a stationary source for less than 1 year and has been properly certified as meeting the standards that would be applicable to such engine under the appropriate non-road engine provisions?*
- d. *Is the engine a new, existing, or reconstructed engine?*
- e. *Do you have a Manufacturer's Certification for the engine?*
- f. *Does the engine meet any of the following conditions;*
 - i. *The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and*
 - ii. *It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act.*
- g. *When did you commence construction (date the engine is ordered by the owner or operator) or reconstruction on your stationary engine?*
- h. *What is the date of manufacture of the engine?*
- i. *What is the engine displacement (number of cylinders and liters per cylinder)*
- j. *Does the engine use an oxidation catalyst?*
- k. *Does the engine have a CEMS (continuous emissions monitoring system)?*
- l. *Does the engine have NSCR (non-selective catalytic reduction)?*
- m. *Does the engine use a CPMS (continuous parameter monitoring system)?*
- n. *What are the total hours of operation per year for engine?*
- o. *How many of the total hours during an emergency situation?*
- p. *How many of the total hours are part of the demand response program?*
- q. *Is the engine used for peak shaving, to generate income for a facility to supply power to an electrical grid, or supply power as a part of a financial arrangement with another entity?*
- r. *What type of engine do you have? (ex. CI, SI, 4SLB, 2SLB)*

Response: The facility has an arrangement with a local equipment rental company to retain a trailer-mounted, compression-ignition emergency generator in its local inventory from June 1st through November 30th; i.e., Florida's hurricane season. As a result of this rental agreement, Progress Energy Florida, Inc. is not an owner by could be defined as an operator. In the event there is the threat of a hurricane striking Florida within 48 hours, the emergency generator will be transported to the Hines site. If, as a result of a hurricane, all four (4) Power Blocks are required to be shutdown, the generator will provide electrical power to operate the facility's administration building. In addition to other administrative functions the administration building contains the CT control room. When the threat of the hurricane is no longer present threat and the administration building is being supplied power from the Power Block or back-fed from the grid, the emergency generator is returned to the equipment rental company's inventory until such time Florida is again threatened with a hurricane.

The emergency generator clearly meets the definition for Nonroad Engine found in 40 CFR 1068.30. In one category of Nonroad Engine; i.e., (1)(iii), a nonroad engine is defined as "by itself or in or on a piece of equipment, it is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicative of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform."

Furthermore, according to the 40 CFR Part 60, Subpart IIII – NSPS for CI RICE; specifically 60.4200(a) states that “the provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in paragraphs (a)(1) through (4) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.”

In addition, 40 CFR 60.4219 defines a *stationary internal combustion engine* as “any internal combustion engine, except combustion turbines, that converts heat energy into mechanical work and is not mobile. Stationary ICE differ from mobile ICE in that a stationary internal combustion engine is not a nonroad engine as defined at 40 CFR 1068.30 (excluding paragraph (2)(ii) of that definition), and is not used to propel a motor vehicle, aircraft, or a vehicle used solely for competition. Stationary ICE include reciprocating ICE, rotary ICE, and other ICE, except combustion turbines.”

By extension, per 40 CFR Part 63, Subpart ZZZZ NESHAP for RICE; specifically 63.6585 states this rule is applicable to stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand. In addition, 63.6585(a) defines stationary RICE as any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is *not* mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a nonroad engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition. Again, it has been determined that the emergency generator meets the definition of a nonroad engines as defined in 40 CFR 1069.30.

RAI Item 13:

Comment: *For each fire pump engine, please provide the following information:*

- a. *Is the Fire Pump a temporary replacement unit located at a stationary source for less than 1 year and has been properly certified as meeting the standards that would be applicable to such engine under the appropriate non-road engine provisions?*
- b. *What is the HP (1 HP; 0.7456 KW) of the stationary Fire Pump?*
- c. *When did you commence construction (date the Fire Pump was ordered by the owner or operator) or reconstruction on your stationary Fire Pump?*
- d. *What is the date of manufacture of the Fire Pump?*
- e. *What is the Fire Pump's displacement (number of cylinders and liters per cylinder)?*

Response: The specification for the compression-ignition (CI) engine-driven fire pump can be found in Attachment 2. In summary, specific information includes –

- a. *Is the Fire Pump a temporary replacement unit located at a stationary source for less than 1 year and has been properly certified as meeting the standards that would be applicable to such engine under the appropriate non-road engine provisions?*
The stationary fire pump is stationary and permanently located at the facility.
- b. *What is the HP (1 HP; 0.7456 KW) of the stationary Fire Pump?*
The size of the stationary fire pump is 310 BHP.
- c. *When did you commence construction (date the Fire Pump was ordered by the owner or operator) or reconstruction on your stationary Fire Pump?*
The stationary fire pump was installed at the site in approximately 1998.

d. *What is the date of manufacture of the Fire Pump?*

The date of manufacture is unknown; however the fire pump was installed in 1998; therefore, the date of manufacture year is 1998 or earlier.

e. *What is the Fire Pump's displacement (number of cylinders and liters per cylinder)?*

The total displacement of the stationary fire pump is 9.05 liters. There are six (6) cylinders with a displacement of 1.51 liters/cylinder.

RAI Item 14:

Comment: *Please evaluate the recent Federally-issued Cross State Air Permitting Rule and provide a statement of how the units that are currently subject to the Clean Air Interstate Rule will be affected.*

Response: Progress Energy Florida, Inc. is currently working on determining the impact of this final rule on all generation facilities, including the Hines Energy Complex. Although the analysis continues, it is unknown at this time how the Cross-State Air Pollution Rule (CSAPR) will affect the Hines units, which are currently subject to the Clean Air Interstate Rule (CAIR).

Attachment No. 1 - Continued
Project Nos: 1050234-08-AC/10500234-019-AV
Response to RAI dated July 19, 2011
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ATTACHMENT 1

**HINES ENERGY COMPLEX
REQUESTED CHANGES TO CURRENT TITLE V PERMIT**

ATTACHMENT 2

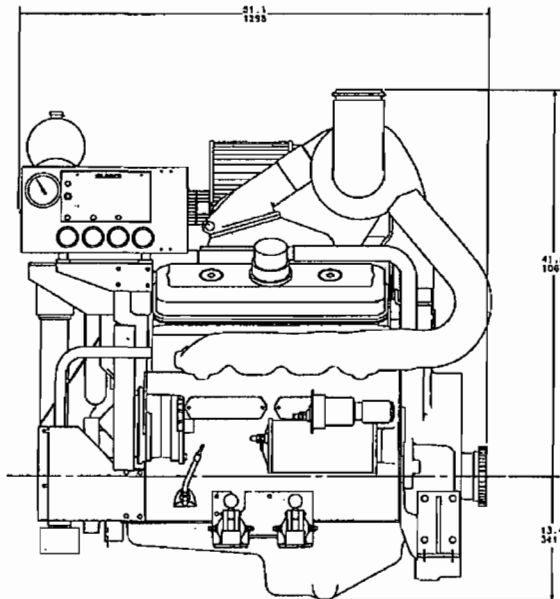
Performance Specifications

Clarke DDFP-L6FA Diesel Fire Pump

Progress Energy Florida, Inc.

Hines Energy Complex

CLARKE FIRE PUMP DRIVERS



PDFP-08FA
OVERALL WIDTH
41.02 (1041.86)

MODELS

DDFP-L6FA DDFP-T6FA
DDFP-06FA DDFP-06FH
DDFP-L8FA DDFP-08FA
DDFP-08FH

APPROVED RATINGS BHP/kw FM-UL-ULC*

MODEL	SPEED (RPM)			
	1470	1760	2100	2350
DDFP-L6FA	218 163	265 200	305 227	310 231
DDFP-T6FA	254 189	302 225	341 254	348 259
DDFP-06FA	315 235	368 275	412 307	443 331
DDFP-06FH	350 260	425 316	460 343	465 346
DDFP-L8FA	380 283	460 343	500 373	515 384
DDFP-08FA	420 313	509 380	552 412	570 425
DDFP-08FH	468 349	575 429	669 499	708 528

*Engines are rated at standard SAE conditions of 29.61 in. (7521 mm) Hg barometer and 77°F (25°C) inlet air temperature [approximates 300 ft. (91.4 m) above sea level] by the testing laboratory (see SAE Standard J 1349).

A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft (305 m) altitude above 300 ft. (91.4 m).

A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F (5.6°C) above 77°F (25°C) ambient temperature.

STANDARD EQUIPMENT

Air Cleaner — Direct Mounted, Washable, For Indoor Service Only
Alternator — Integral Regulator, 24V-DC, 40 Ampere, with Belt Guard
Cooling Water Control — Automatic At Local Control Panel
Exhaust Blankets — For Manifolds & Turbo Charger
Flywheel Housing — SAE #1
Fuel Check Valve — Per NFPA-20
Fuel Pump — Gear Driven, Gear Type
Fuel Filters — Primary & Secondary
Engine Heater — 230 Voltage (AC), 2500 Watts With Thermostat
Governor — Mechanical 10%
Heat Exchanger — NPTF Connections, Tube & Shell Type, Rated 60 PSI
Instrument Panel — English & Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure, Voltmeter (2)

Junction Box — Integral With Instrument Panel. For Customer Wiring (DC) To Match NFPA Controller
Lube Oil Cooler — Engine Water Cooled, Plate Type
Lube Oil Filter — Full Flow W/By-Pass Valve
Lube Pump — Gear Driven, Gear Type
Manual Start Controls — Per NFPA-20
Power Take Off — Includes Engine Half of Falk T10 Coupling
Run-Stop Control — On Instrument Panel With Control Position Warning Light.
Overspeed Control — Electronic w/Reset
Starter 24 VDC — High Torque, Prewired To Manual Contactors
Throttle Control — Tamper Proof
Water Pump — Gear Driven, Centrifugal Type



LISTED
513Y



meets
NFPA-20
Requirements



approved
1333



listed
C448A

SPECIFICATIONS

	DDFP-L6FA DDFP-T6FA DDFP-06FA	DDFP-06FH	DDFP-L8FA DDFP-08FA	DDFP-08FH
DDC Engine Series.....	V-92	V-92	V-92	V-92
No. Cylinders	6	6	8	8
Aspiration	TA	TA	TA	TA
Rotation**	CW STD. CCW AVAILABLE			
Displacement (cu. in.)*.....	552	552	736	736
Net Wt. (lbs.)	2217	2217	2560	2605
Bore (in.)	4.84	4.84	4.84	4.84
Stroke (in.)	5.0	5.0	5.0	5.0
Compression Ratio	17:1	15:1	17:1	15:1
Installation Drawing	D-433	D-433	D-433	D-433

DDC - DETROIT DIESEL CORP.
TA - TURBOCHARGED AND AFTERCOOLED
CW - CLOCKWISE

*V-92 UNITS ARE 2 STROKE CYCLE
**VIEW FROM FRONT

DESIGN FEATURES

- Direct Mounted Drive Coupling Hub
- Direct Attachment Of Driveshaft Available
- 24 Volt DC Starting System
- Low Watt Density Coolant Heater
- Compact Size
- High Horsepower To Weight Ratio
- Jacket Water Cooled Aftercooler
- Direct Injection
- Individual Cylinder Fuel Injectors
- Roller Camshaft Lifters
- By-Pass Type Blower
- Replaceable Cylinder Liners
- Crosshead Pistons To Eliminate Side Load Wear

CERTIFIED POWER AT ANY SPEED

Although specific FM-UL Certified BHP ratings are shown at four (4) specific speeds, these Clarke engines can be applied to fire pumps at any intermediate speed between 1470 to 2350 RPM. To determine the applicable intermediate certified power, make a linear interpolation of the Clarke FM-UL certified power curve. Contact Clarke or your Pump OEM representative to obtain details.



CLARKE

DETROIT DIESEL-ALLISON



3133 EAST KEMPER ROAD
CINCINNATI, OH 45241

☎ 513-771-2200 FAX 513-771-0520



DDFP-L6FA
INSTALLATION &
OPERATION DATA

Basic Engine Description

Engine Manufacturer
 Ignition Type
 Number of Cylinders
 Bore and Stroke - in. (mm)
 Displacement - in.³ (L)
 Compression Ratio
 Valves per Cylinder
 Intake
 Exhaust
 Combustion System
 Engine Type
 Aspiration
 Firing Order (CW Rotation)
 Turbocharger
 Charge Air Cooling Type
 Blower Type
 Blower Drive Ratio
 Rotation (Viewed from Front)
 Clockwise
 Counter-Clockwise
 Engine Crankcase Vent System
 Dimensions and Weight
 Length - in. (mm) (From Drive Flange)
 Width - in. (mm)
 Height - in. (mm) (Above Crankshaft Center Line)
 Weight, Dry - lb. (kg)
 Wet - lb. (kg)
 Installation Drawing

All Speeds

Detroit Diesel Corp.
 Compression (Diesel)
 6
 4.84 x 5.00 (123 x 127)
 552 (9.1)
 17:1
 None
 4
 Direct Injection
 63.5° VEE - 2 Cycle
 Turbocharged
 1R-1L-3R-3L-2R-2L
 1.23 A/R
 Jacket Water
 Roots By-Pass
 1.95:1
 Standard
 Optional
 Open
 45.35 (1152)
 40.34 (1025)
 43.75 (1111)
 2217 (1005)
 2325 (1055)
 D-433

Cooling System

	1470	1760	1900	2100	2350
Heat Exchanger Minimum Flow					
60°F Raw H ₂ O - gal./min. (L/min.)	9 (34)	13 (49)	15 (57)	17 (64)	18 (68)
95°F Raw H ₂ O - gal./min. (L/min.)	14 (53)	17 (64)	19 (72)	23 (87)	25 (95)
Engine H ₂ O Heat - Btu/sec. (kw/sec.)	90 (1.6)	138 (2.4)	154 (2.7)	157 (2.8)	175 (3.1)
Engine Radiated Heat - Btu/sec. (kw/sec.)			42 (0.7)		
Thermostat, Start to Open - °F (°C)			177 (81)		
Fully Open - °F (°C)			197 (92)		
Engine Coolant Capacity - qt. (L)			43 (41)		
Coolant Pressure Cap - lb./in. ² (kPa)			9 (62)		
Maximum Engine H ₂ O Temperature - °F (°C)			200 (93)		
Minimum Engine H ₂ O Temperature - °F (°C)			160 (71)		
Heat Exchanger Maximum Raw H ₂ O Inlet Pressure - lb./in. ² (kPa)					60 (414)

Electric System - DC

System Voltage (Nominal)
 Battery Capacity for Ambients Above 32°F - CCA @ 0°F
 Voltage (Nominal)
 Qty. per Battery Bank
 SAE size per J537
 Battery Cable Circuit*, Max Resistance - ohm
 Battery Cable Minimum Size
 0-225 in. Circuit* Length
 225-300 in. Circuit* Length
 301-380 in. Circuit* Length
 Charging Alternator Output - Amp
 Starter Cranking Amps - @ 40° F

All Speeds

24
 900
 12
 2
 8D-900
 0.002
 No. 00
 No. 000
 No. 0000
 40
 595

*Positive and Negative Cables Combined Length

(Continued)

NOTE: This Engine Is Intended For Indoor Installation Or In A Weatherproof Enclosure.

DDFP-L6FA INSTALLATION & OPERATION DATA (Continued)

Exhaust System	1470	1760	1900	2100	2350
Exhaust Flow - ft. ³ /min (m ³ /min.)	1037 (29)	1232 (35)	1321 (37)	1412 (40)	1463 (41)
Exhaust Temperature - °F (°C)	656 (347)	679 (359)	689 (365)	689 (365)	664 (351)
Maximum Allowable Back Pressure - in. H ₂ O (kPa)	19 (4.7)	26 (6.6)	27 (6.9)	28 (7.1)	30 (7.6)
Minimum Exhaust Pipe Dia. - in. (mm)**			Single 5.0 (127) Sch. 40		
 Fuel System					
Fuel Pressure - lb./in. ² (kPa)	58 (400)	62 (428)	63 (435)	64 (442)	65 (449)
Fuel Consumption - gal./hr. (L/hr.)	12 (45)	14 (53)	16 (61)	17 (64)	17 (64)
Fuel Return Rate - gal./hr. (L/hr.)	63 (239)	71 (269)	74 (280)	80 (303)	83 (315)
Total Fuel Flow - gal./hr. (L/hr.)	75 (284)	85 (322)	90 (341)	97 (367)	100 (379)
Minimum Line Size - Supply - in. (mm)**75 (19) Sch. 40 - Black		
Return - in. (mm)**			50 (13) Sch. 40 - Black		
Maximum Allowable Fuel Pump Suction					
Clean System - in. H ₂ O (kPa)			82 (20)		
Dirty System - in. H ₂ O (kPa)			164 (40)		
Fuel Filter Micron Size - Primary			30		
Secondary			12		
Fuel Injector/Timing			9225/1.490		
Fuel Modulator/Setting			None		
 Heater System					
Jacket Water Heater			All Speeds		
Wattage (Nominal)			Standard		
Voltage, Reconnectable - VAC, 1P			2500		
Other Voltages			120/208/240		
Lube Oil Heater			Optional		
Wattage			Optional		
			125		
 Induction Air System					
Air Cleaner Type	1470	1760	1900	2100	2350
Air Intake Restriction Maximum Limit			Indoors Service Only - Washable		
Dirty Air Cleaner - in. H ₂ O (kPa)	6.5 (1.7)	7.0 (1.8)	7.5 (1.9)	8.0 (2.0)	9.0 (2.3)
Clean Air Cleaner - in. H ₂ O (kPa)	3.3 (0.8)	4.3 (1.1)	4.9 (1.2)	5.8 (1.4)	6.5 (1.6)
Engine Air Flow - ft. ³ /min. (m ³ /min.)	760 (22)	875 (25)	926 (26)	990 (28)	1060 (30)
Maximum Allowable Temperature (Ambient Air To Engine Inlet) - °F (°C)			30 (17)		
 Lubrication System					
Oil Pressure - normal - lb./in. ² (kPa)			All Speeds		
In Pan Oil Temperature - °F (°C)			40-70 (276-433)		
Oil Pan Capacity - High - qt. (L)			190-220 (88-104)		
Low - qt. (L)			20 (19)		
Total Oil Capacity with Filters - qt. (L)			16 (15)		
			22 (21)		
 Performance					
BMEP - lb./in. ² (kPa)	1470	1760	1900	2100	2350
Piston Speed - ft./min. (m/min.)	106 (731)	108 (745)	108 (745)	104 (717)	95 (655)
Noise - dB (A) @ 1m	1225 (373)	1467 (447)	1583 (483)	1750 (533)	1958 (597)
Power Curve	95 (EST)	96 (EST)	97 (EST)	98 (EST)	98 (EST)
			CDDA - 8064 - 03		

**Based On Nominal System. Flow Analysis Must Be Done To Assure Adherence To System Limitations.
(Minimum Exhaust Pipe Diameter is based on 15 feet of pipe, one elbow, and a silencer
pressure drop no greater than one half the max. allowable back pressure.)

CAUTION

ALL PLUMBING MUST BE SUPPORTED AND/OR ISOLATED SO THAT NO WEIGHT OR STRESS IS APPLIED TO ANY ENGINE COMPONENT

ATTENTION

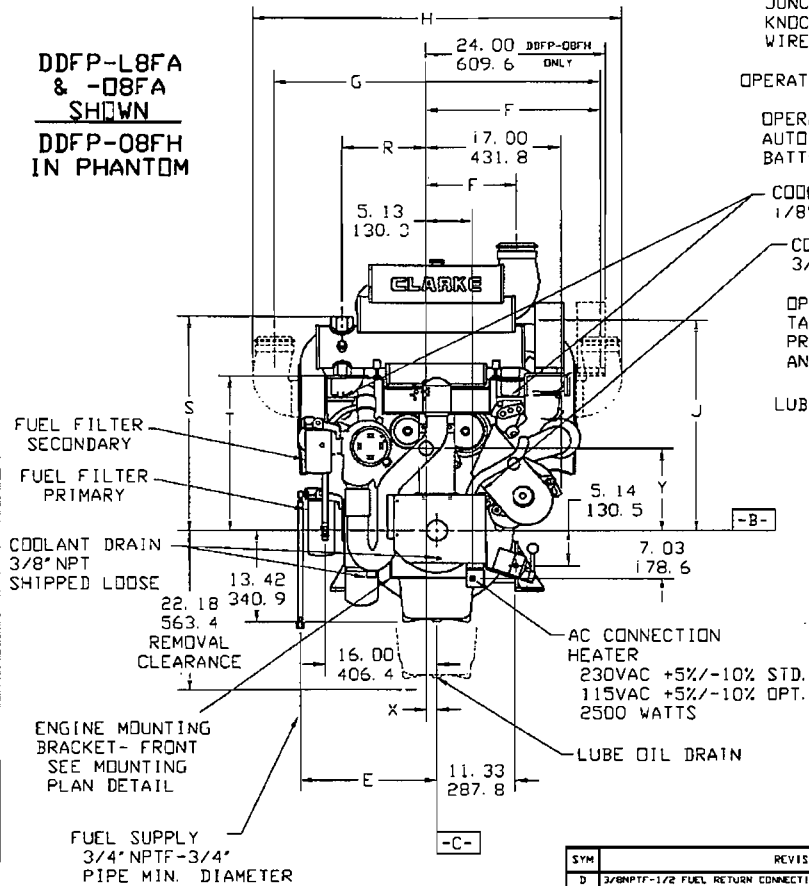
REFER TO THE SPECIFIC MODEL INSTALLATION AND OPERATION DATA FOR INSTALLATION GUIDELINES

REDUCED DRAWING

DO NOT SCALE UNKNOWN DIMENSIONS

MODEL	B	E	F	G	H	J	M	N	R	S	T	X	Y
DDFP-L6FA		18.67								28.74			11.12
DDFP-T6FA		474.2								730.0			282.5
DDFP-D6FA	11.75		11.56	-0-	41.02	43.75	29.06	42.52	15.50	29.81	25.85	-0.06	11.35
DDFP-D6FH	298.5		293.6		1041.9	1111.3	738.1	1080.0	393.7	757.2	656.6	-1.5	288.3
DDFP-L8FA		19.55										-0.05	11.12
DDFP-D8FA		496.6										-1.3	282.5
DDFP-D8FH	3.55	19.13	23.25	46.50	52.75	28.25	35.18	48.64	13.50	31.38	22.63	0.34	12.26
	90.2	485.9	590.6	1181.1	1339.9	717.6	893.6	1235.5	342.9	797.1	574.9	8.64	311.4

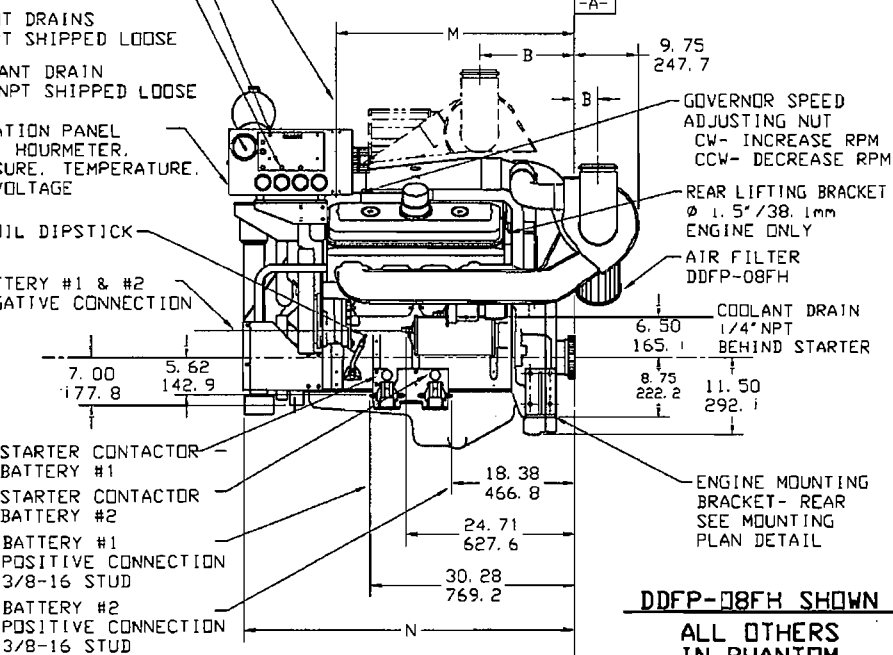
DDFP-L8FA & -D8FA SHOWN
DDFP-D8FH IN PHANTOM



JUNCTION BOX KNOCKOUT FOR CONTROL WIRE TERMINAL STRIP
OPERATION INSTRUCTIONS
OPERATION CONTROLS AUTO/MAN. BATT#1, BATT#2, WARNING LAMP
COOLANT DRAINS 1/8\"/>

DATUMS

- A- - REAR FACE OF OUTPUT COUPLING
- B- - CRANKSHAFT HORIZONTAL CENTERLINE
- C- - CRANKSHAFT VERTICAL CENTERLINE



DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

SYN	REVISION	DRWN	APVD	DATE	DESCRIPTION
D	3/4\"/>				
C	RELOCATED FUEL FILTERS, CORRECTED DIMS 'E', 'L', & 'Y'	DHP	JTW	12SEP94	
F	MODELS -L6FA, -T6FA WERE -L6VT, -T6VT	DHP	JTW	28NOV94	
G	REVISED J.V. HEATER AND ADDED NEW INSTRUMENT PANEL	DHP	DHP	28DEC95	
H	REVISED TO NEW FORMAT WITH NO OTHER CHANGES	SEN	JTW	25JAN97	
J	DIM 'A' ON PG 2 WAS 298.5mm IN ERROR	SK	KJK	18APR01	

CLARKE
DETROIT DIESEL-ALLISON
3133 EAST KENNER ROAD, CINCINNATI, OHIO 45241

INSTALLATION DRAWING
FIRE PUMP ENGINE
-L6FA, -T6FA, -D6FA, -D6FH,
-L8FA, -D8FA, L -D8FH

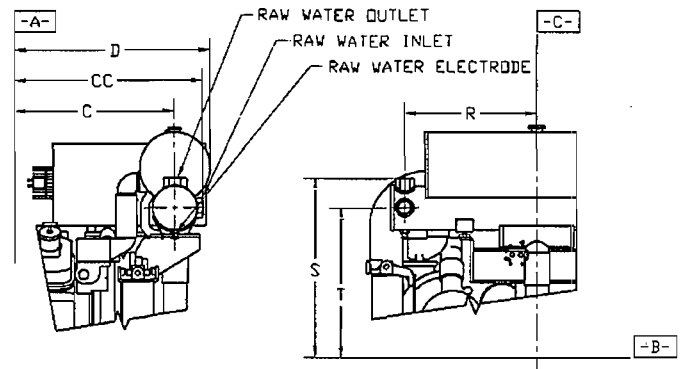
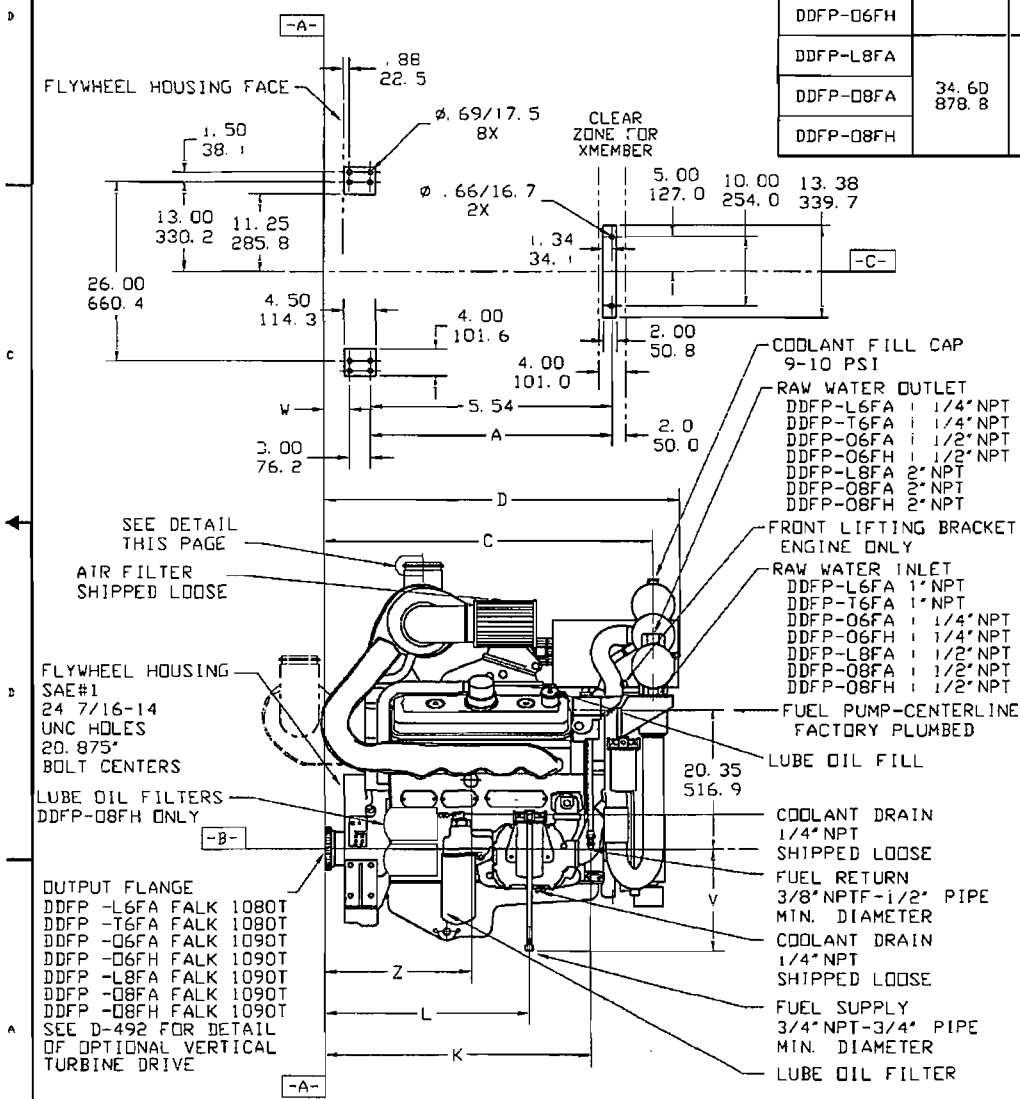
D-433

DATE: 26 JUL 90
DRAWN: JWHILLER
CHECK: JWHITNEY

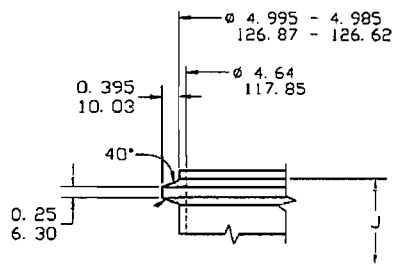
SHEET NO. 1 OF 1
DATE: 3/16
SCALE: 1/4\"/>

D-433

MODEL	A	C	CC	D	K	L	V	W	Z
DDFP-L6FA	28.84 732.5	41.08 1043.4	43.75 1111.3	45.23 1148.8	31.91 810.5	26.51 673.4	14.93 379.2	3.31 84.1	19.85 504.2
DDFP-T6FA		41.45 1052.8	44.75 1136.7	45.60 1158.2	32.28 819.9	23.65 600.7		20.31 515.9	
DDFP-O6FA		47.20 1198.9	-0-	51.10 1297.8	38.03 965.8	29.40 746.8		19.85 504.2	
DDFP-O6FH	34.60 878.8						15.77 400.6	3.68 93.6	24.03 610.5
DDFP-L8FA									22.37 568.2
DDFP-O8FA									
DDFP-O8FH									



**DDFP-L6FA, -T6FA, -O6FA, -O6FH
RAW WATER CONNECTIONS**



**TURBO EXHAUST OUTLET DETAIL
ALL MODELS 2X SCALE**

DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

**DDFP-L8FA & -O8FA SHOWN
DDFP-O8FH IN PHANTOM**

<small>THIS DRAWING AND THE INFORMATION HEREON ARE THE PROPERTY OF CLARKE DIESEL-ALLISON AND ARE TO BE USED ONLY IN CONNECTION WITH THE EQUIPMENT COVERED BY THIS DRAWING. OTHER USE IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF CLARKE DIESEL-ALLISON.</small>		DWG: JMK/LLR DATE: 26 JUL 90 EAG: JTW/HTEY DWG:	 3133 EAST KEMPER ROAD, CINCINNATI, OHIO 45241
TITLE: INSTALLATION DRAWING, FIRE PUMP ENGINE - DDFP-L6FA, -T6FA, -O6FA, -O6FH, -L8FA, -O8FA & -O8FH		SITE: R PART NO: D-433	SCALE: 3/16 SHEET: N OF SP DATE: 3/16

D-433



FIRE PUMP DRIVERS

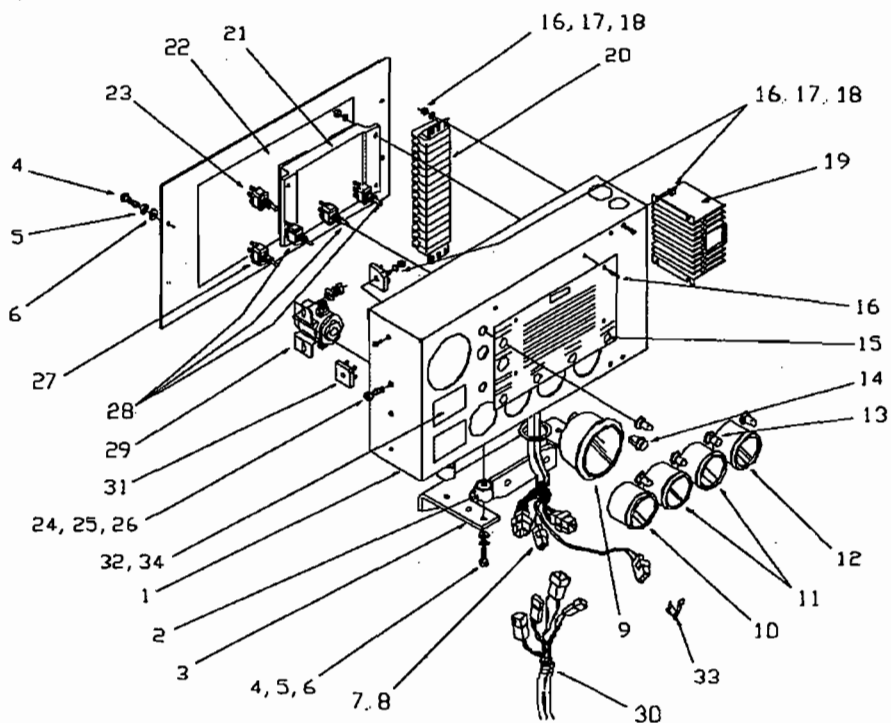
"CLARKE PARTS"

for

DJFP-L6FA, -T6FA, -06FA, -06FH, -L8FA, -08FA, & -08FH

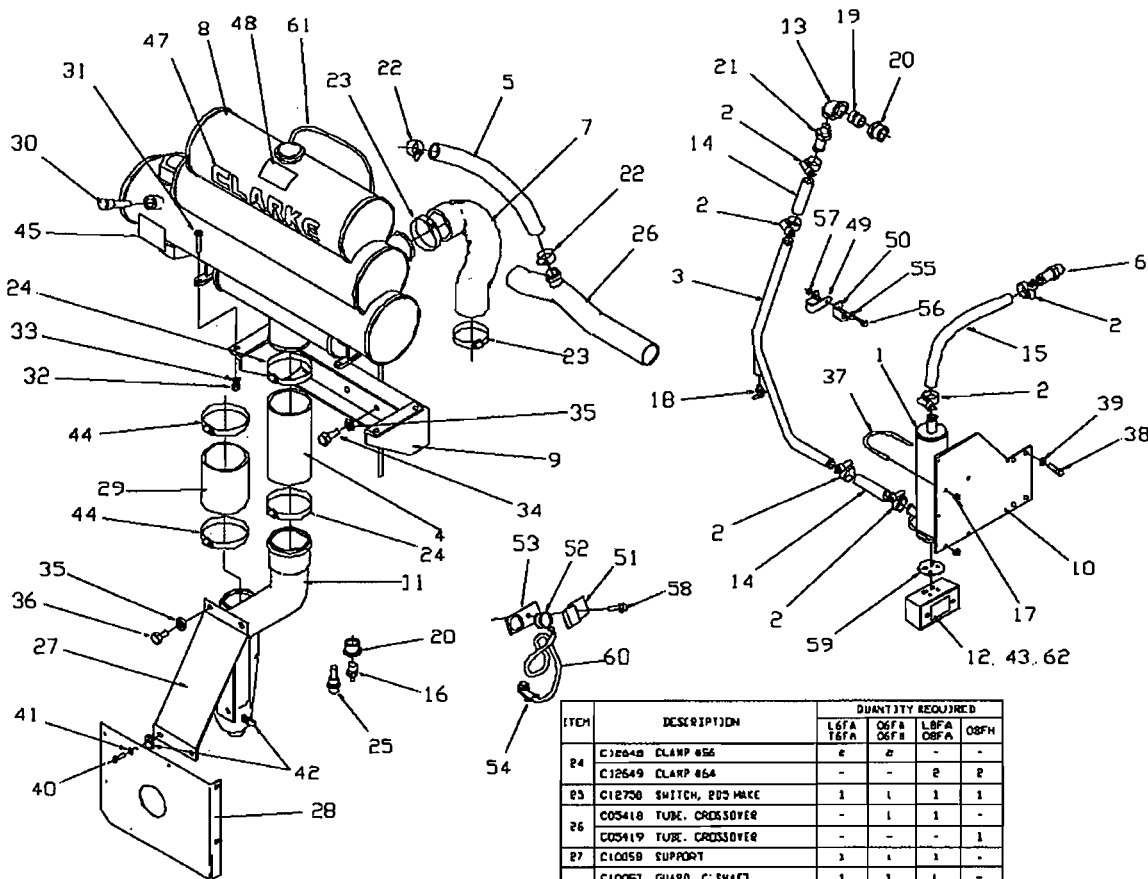
Replacement "CLARKE PARTS" can be ordered through the authorized DDC Distributor/Dealer in your area. When ordering provide your Distributor/Dealer with data from the FM/UL Nameplate and item P/N required.

A Model No _____ B Unit S/N _____
 C Manufacturing Date _____ D P/N _____



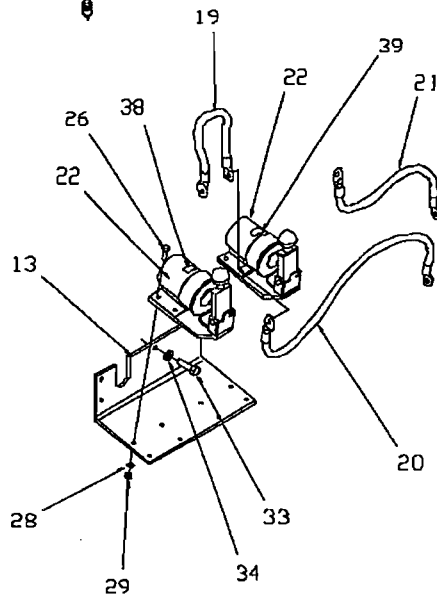
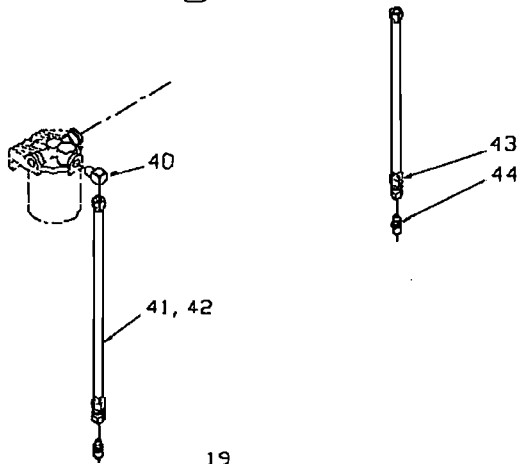
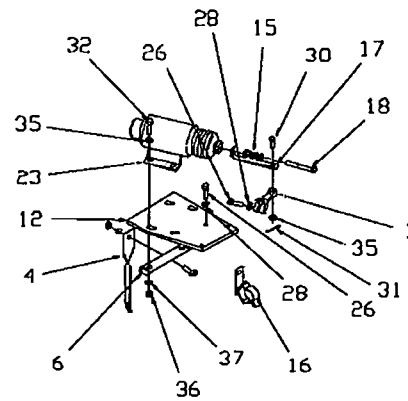
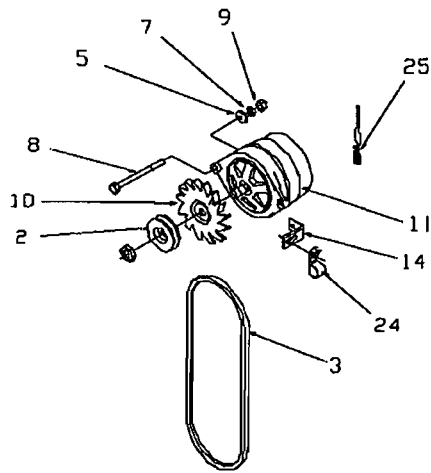
ITEM	DESCRIPTION	QTY REQ'D
--	C07662 INSTRUMENT PANEL ASSEMBLY-24VDC	1
1	C07540 INSTRUMENT PANEL w/3 SCREW COVER	1
2	C07589 MOUNT, ELASTOMER	4
3	C07640 BRACKET, HOODING	1
4	180021 BOLT, 1/4-20 X 7/8" L	4
5	120380 LOCKWASHER, 1/4	4
6	102365 FLATWASHER, 1/4	4
7	C07587 HARNESS ASSEMBLY, INSTRU PANEL	1
8	C121804 BUSHING, INSTRU PANEL	1
9	C07477 TACH w/ HOURMETER	1
10	C07475 GAUGE, PRESSURE	1
11	C07474 VOLTMETER, 24VDC	2
12	C07476 GAUGE, TEMPERATURE	1
13	C12081 BOTT. TOGGLE	5
14	C07647 LIGHT, INDICATOR	1
15	C121635 PLATE, INSTRUCTION	1
16	132776 SCREW 8-32 X 1" L	4
17	178364 LOCKWASHER, INT/EXT 100TH 8-32	4

ITEM	DESCRIPTION	QTY REQ'D
18	120622 NUT, 8-32	14
19	C07370 ISOLATOR, BATTERY	1
20	C07592 TERMINAL STRIP, 14 POSITION	1
21	C07590 ELECTRONIC SPEED SWITCH	1
22	C13214 LABEL, EC SCHEMATIC	1
23	C07560 SWITCH, TOGGLE	1
24	132911 SCREW, 10-32 X 3/8" L	10
25	178378 LOCKWASHER, 10-32	10
26	120614 NUT, 10-32	10
27	C07538 SWITCH, TOGGLE	1
28	C07578 SWITCH, TOGGLE	3
29	C07586 SOLENOID, 24VDC	1
30	C07659 ENGINE HARNESS	1
31	C07581 BATTERY BRIDGE	2
32	C13187 LABEL, AUTO START WARNING	1
33	C07480 RESISTOR, 24VDC	2
34	C13191 LABEL, AIR FILTER	1

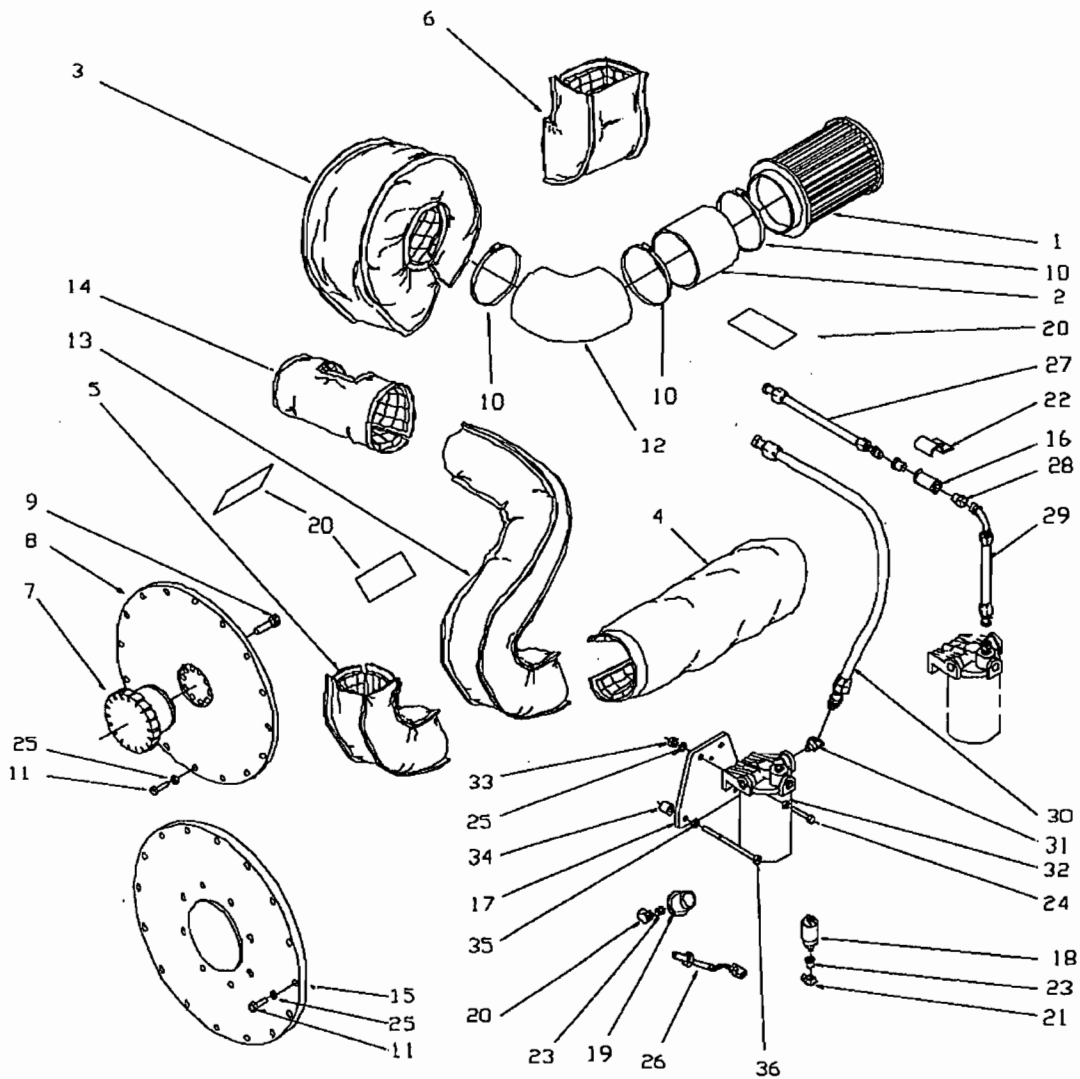


ITEM	DESCRIPTION	QUANTITY REQUIRED			
		LSFA TSFA	OSFA DSFH	LSFA DSFA	OSFA DSFH
1	C12219 J. V. MTR. 115VAC	1	1	1	1
	C12219S J. V. MTR. 230VAC	1	1	1	1
2	C121708 CLAMP	6	6	6	6
3	C03309 TUBE	1	1	1	1
4	C03037 HOSE	-	-	1	1
	C03056 HOSE	1	1	-	-
5	C03048 HOSE	-	-	1	1
6	C03153 CONNECTOR	1	1	1	1
	C03034 HOSE, STRAIGHT	2	2	-	-
	C03086 HOSE, FORMED-LEFT	-	-	-	1
	C03087 HOSE, FORMED-RIGHT	-	-	-	1
	C03084 HOSE, FORMED-LEFT	-	-	1	-
	C03085 HOSE, FORMED-RIGHT	-	-	1	-
	C03088 HEAT EXCHANGER	-	-	1	1
8	C03403 HEAT EXCHANGER	-	1	-	-
	C03424 HEAT EXCHANGER	1	-	-	-
9	C03089 BRACKET-M. E.	1	1	1	1
10	C03030 BRACKET-MTR.	1	1	1	1
	C03031 TUBE, H.P. INLET	-	-	1	-
	C03032 TUBE, H.P. INLET	-	-	-	1
	C03440 TUBE, H.P. INLET	1	1	-	-
12	C07659 JUNCTION BOX	1	1	1	1
13	C12160 ELBOW, 90°	1	1	1	1
14	C03037 HOSE	2	2	2	2
15	C03405 HOSE, SILICONE	1	1	1	1
16	C07479 SENDER, TEMPERATURE	1	1	1	1
17	C12034 NUT, W/LOCK	4	4	4	4
18	C12133 DRAINCOCK	1	1	1	1
19	C12233 NIPPLE, CLOSE	1	1	1	1
20	C12349 BUSHING	2	2	2	2
21	C03143 ADAPTER	1	1	1	1
22	C12643 CLAMP #16	-	2	2	2
23	C12646 CLAMP #40	4	4	4	4

ITEM	DESCRIPTION	QUANTITY REQUIRED			
		LSFA TSFA	OSFA DSFH	LSFA DSFA	OSFA DSFH
24	C12648 CLAMP #56	2	2	-	-
	C12649 CLAMP #54	-	-	2	2
25	C12708 SWITCH, 200 MAKE	1	1	1	1
26	C03418 TUBE, CROSSOVER	-	-	1	-
	C03419 TUBE, CROSSOVER	-	-	-	1
27	C10050 SUPPORT	1	1	1	-
	C10057 GUARD, C SHAFT	1	1	1	-
	C10060 GUARD, C SHAFT	-	-	-	1
29	C03056 HOSE	1	1	1	1
30	C03036 ELECTRODE	1	1	1	1
31	186622 BOLT 3/8-16 X 1 1/4	4	4	4	4
32	123221 NUT 3/8-16	4	4	4	4
33	120382 L. W. 3/8	4	4	4	4
34	181427 BOLT 1/2-13 X 1	4	4	4	4
35	120396 L. W. 1/2	6	6	6	6
36	179879 BOLT 1/2-13 X 3/4	2	2	2	2
37	C122196 U-BOLT	2	2	2	2
38	180143 BOLT 7/16-14 X 1	4	4	4	4
39	120383 L. W. 7/16	4	4	4	4
40	180003 BOLT 1/4-20 X 7/8	2	4	4	4
41	120380 L. W. 1/4	2	4	4	4
42	C121508 CLIP 1/4-20	2	4	4	4
43	C07658 J. B. COVER	1	1	1	1
44	C12648 CLAMP #56	2	2	2	2
45	C12744 CAPTION LABEL	1	1	1	1
46	C12744 WARNING LABEL	1	1	1	1
47	C13180 LABEL, LOGO	1	1	1	1
48	C13185 LABEL, PRE-MIX	1	1	1	1
49	C12661 CLAMP, RUBBERIZED	1	1	1	1
50	C03033 BRACKET, SUPPORT	1	1	1	1
51	C07650 RETAINER, THERMOSTAT	1	1	1	1
52	C07648 THERMOSTAT	1	1	1	1
53	C07649 LOCATOR, THERMOSTAT	1	1	1	1
54	C12143 AC 90° CONNECTOR	1	1	1	1
55	446220 WASHER	1	1	1	1
56	186678 BOLT	1	1	1	1
57	123221 NUT	1	1	1	1
58	B927379 BOLT	1	1	1	1
59	C03026 GASKET, JUNCTION BOX	1	1	1	1
60	C07646 SLEEVING, BRAIDED	4B	4B	4B	4B
61	C12677 TUBE, OVERFLOW	20	20	20	20
62	C13307 LABEL, HTR VOLTAGE	1	1	1	1
	C13309 LABEL, HTR VOLTAGE	1	1	1	1



ITEM	DESCRIPTION	QTY. REQ'D
1	5102863 LEVER	1
2	5103078 PULLEY	1
3	5103273 BELT	1
4	CO2293 BRACE, SUPPORT	1
5	5164294 WASHER	1
6	CO2292 BRACKET, SUPPORT	1
7	1100192 WASHER	1
8	11001730 BOLT	1
9	1101052 NUT	1
10	800594 FAN, ALTERNATOR	1
11	1101265 ALT, 40AMP/24V	1
12	CO2161 BRKT. COV.-SOLENOID	1
13	CO7469 BRKT. CONTACTOR	1
14	CO6593 BRACKET	1
15	6836128 SPRING	1
16	2040886 CLIP, HARNESS	14
17	CO2168 LINK	1
18	CO2173 BOLT, COV.-SOLENOID	1
19	CO7822 BATTERY CABLE	1
20	CO7827 BATTERY CABLE	1
21	CO7849 BATTERY CABLE	1
22	CO7142 CONTACTOR-24V	2
23	CO7481 SOLENOID-24V	1
24	C12663 CLAMP, RUBBERIZED	2
25	CO7493 WIRE ASSEMBLY	1
26	213544 BOLT 1/4-20 X 1	8
27	120385 F.W. 1/4	4
28	120380 L.W. 1/4	12
29	123179 NUT 1/4-20	8
30	103495 CLEVIS PIN	1
31	103407 COTTER PIN	1
32	180078 BOLT 5/16-18 X 7/8	5
33	179839 BOLT 3/8-16 X 1	3
34	120382 L.W. 3/8	3
35	106261 F.W. 5/16	1
36	123197 NUT 5/16-18	5
37	120214 L.W. 5/16	5
38	C12734 LABEL, SCR1	1
39	C12733 LABEL, SCR2	1
40	C121387 ELBOW, 90°	1
41	CO2270 FUEL LINE, SUPPLY	1
42	C121535 ADAPTOR, SUPPLY	1
43	CO2280 FUEL LINE, RETURN	1
44	C12697 ADAPTOR, RETURN	1



ITEM	DESCRIPTION	QUANTITY REQUIRED			
		LGFA TOPA	DGFA DSFM	LGFA DBFA	DSFM
1	C03244 AIR FILTER	1	1	1	2
2	C03250 TUBE	1	1	1	2
3	C06109 BLNKT, TURBO	1	1	1	2
4	C06450 BLNKT, MANIFOLD	-	-	2	2
5	C06466 BLNKT, MANIFOLD	2	2	-	-
6	C06451 BLNKT, R. TUBE	-	-	-	1
7	C06452 BLNKT, L. TUBE	-	-	-	1
8	C06453 BLNKT, TURBO DUT EL.	-	-	-	2
9	C08099 HUB, DRIVE	-	1	1	1
10	C08098 HUB, DRIVE	1	-	-	-
11	C08103 DRIVE DISC	1	1	1	1
12	C103231 BOLT	5	10	10	10
13	C12652 CLAMP #88	3	3	3	6
14	C12894 BOLT, GR. B 3/8-16	16	16	16	16
15	C03085 ELBOW, RUBBER	-	-	1	-
16	C03072 ELBOW, RUBBER	1	1	-	-
17	C08091 ELBOW, RUBBER	-	-	-	2
18	C06447 BLNKT, R. TUBE	1	1	1	-
19	C06448 BLNKT, L. TUBE	1	1	1	-
20	C06449 BLNKT, MTC	1	1	1	-
21	C08110 DISC 180-10/225	-	-	1	1
22	C08187 DISC 61-71-81-88-91	1	1	-	-
23	C08059 CHECK VALVE	1	1	1	1

ITEM	DESCRIPTION	QUANTITY REQUIRED			
		LGFA TOPA	DGFA DSFM	LGFA DBFA	DSFM
24	C02229 BRACKET, FUEL FILTER	1	1	1	-
25	C07643 SWITCH, 20M SPOT	1	1	1	1
26	C07478 SENSOR, PRESS GAUGE	1	1	1	1
27	C13186 LABEL, LIFT BRACKET	3	3	3	3
28	C12234 ELBOW, BRASS	-	1	1	1
29	C02230 CLAMP, HOUSING	1	1	1	1
30	C12563 BUSHING	2	2	2	2
31	434906 BOLT 3/8-16 X 1 1/2	2	2	2	2
32	120388 L.W. 3/8	10	18	18	18
33	C07485 WAG P/U ASSEMBLY	1	2	1	1
34	C12127 HOSE ASSEMBLY	1	1	1	-
35	C12128 HOSE ASSEMBLY	-	-	-	1
36	C12697 CONNECTOR, HOSE	2	2	2	2
37	C12129 HOSE ASSEMBLY	1	1	1	1
38	C12130 HOSE ASSEMBLY	1	1	1	1
39	C12717 CONNECTOR, HOSE	1	1	1	1
40	446200 F.W. 3/8	2	2	2	2
41	123221 NUT 3/8-16	2	2	2	2
42	C05758 SPACER	-	-	2	2
43	C05362 SPACER	3	3	-	-
44	120380 L.W. 3/16	3	3	3	3
45	446297 BOLT 3/16-18 X 6 1/2	3	3	3	-