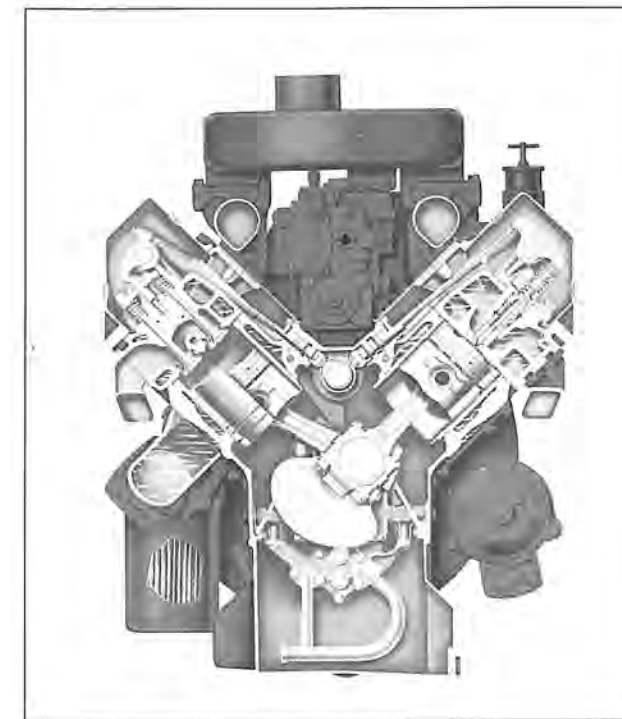
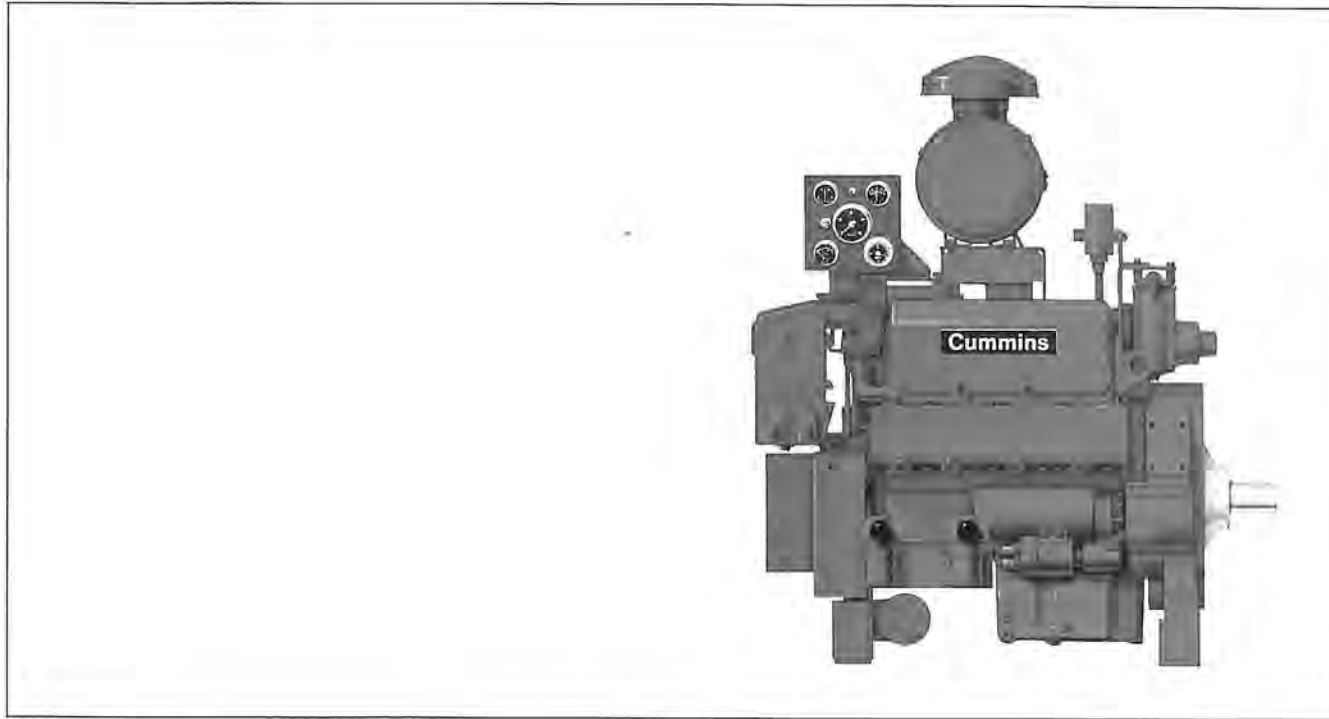


Cummins Diesel

V-378-F1



Specifications

	Metric
Number of Cylinders	6
Bore and Stroke	117 x 95mm
Piston Displacement	6.2 l
Operating Cycles	4
Crankcase Oil Cap.	14 l
Engine Coolant Cap.	28 l
Net Weight with Std. Accessories, Dry	756 kg

Specific ratings are shown on rear page.

Design Features

- Bearings:** Precision type, steel backed inserts. 4 main bearings, 3.5 in. (89mm) diameter. Connecting Rod - 2.5 in. (64mm) diameter.
- Camshaft:** Single camshaft controls all valve and injector movement. Induction hardened alloy steel with gear drive.
- Camshaft Followers:** Roller type for long cam and follower life.
- Connecting Rods:** Drop forged, 6.020 in. (153mm) center to center length. Rifle drilled for pressure lubrication of piston pin. Taper piston pin end reduces unit pressures.
- Cooler, Lubricating Oil:** Tubular type, jacket water cooled.
- Crankshaft:** High tensile strength steel forging. Bearing journals are induction hardened. Fully counterweighted.
- Cylinder Block:** Alloy cast iron with removable, wet liners.
- Cylinder Heads:** Two, one each bank. All fuel lines are drilled passages. Individual intake and exhaust porting for each cylinder.
- Fuel System:** Cummins PTR Fuel system with integral, flyball type, mechanical variable speed governor. Camshaft actuated injectors.
- Gear Train:** Heavy duty, located at rear of cylinder block.
- Lubrication:** Force feed to all bearings. Gear type pump.
- Pistons:** Aluminum, cam ground, with two compression and one oil ring.
- Piston Pins:** 1.375 in. (35mm) diameter, full floating.
- Valves:** Dual intake and exhaust each cylinder. Each valve 1.625 in. (41mm) diameter.

Big Displacement Design Features

- 1 Internal Fuel Lines:** Drilled passages in cylinder heads eliminate threaded fuel line connectors and external lines.
- 2 Large Intake and Exhaust Passages:** Minimize restriction of air and exhaust flow. Allows maximum air charge for clean burning, top economy.
- 3 Overhead Valves:** Precision machined from high strength steel. Intake and exhaust valves are of stainless steel for high temperature strength and corrosion resistance.
- 4 Open Type Combustion Chamber:** Gives most efficient combustion . . . most power from each gallon of fuel.
- 5 Replaceable Wet-type Cylinder Liners:** Dissipate heat faster. Liners are easily replaced without reboring block.
- 6 Conventional Push Rod and Rocker Lever Arrangement:** Activates valves and injectors from a single camshaft. Roller type camshaft followers are used for long life.
- 7 Cam-ground Pistons:** Assure perfect fit at operating temperatures.
- 8 Alloy Cast Iron Cylinder Block:** Follows proven design and material specifications to achieve maximum durability.
- 9 Large Volume Water Passages:** Give even flow of coolant around cylinder liners, valves, and injectors to draw excess heat from combustion chamber. Centrifugal pump circulates large volumes of water.
- 10 Connecting Rods:** Forged from high tensile strength alloy steel. I-beam section gives maximum strength. Large diameter piston pins are full-floating. Tapered piston pin end used for superior load distribution and maximum piston crown material.
- 11 Counterweighted Crankshaft:** Precision machined from high tensile strength steel forgings. Bearing journals are induction hardened for long life.

LISTED AGENCY RATINGS

- Underwriters' Laboratories:**
 - 86 HP @ 1750 RPM
 - 100 HP @ 2000 RPM
 - 111 HP @ 2200 RPM
- Factory Mutual:**
 - 86 HP @ 1750 RPM
 - 100 HP @ 2000 RPM
 - 111 HP @ 2200 RPM
- Underwriters' Laboratories of Canada:**
 - 86 HP @ 1750 RPM
 - 100 HP @ 2000 RPM
 - 111 HP @ 2200 RPM

The agency-approved horsepower ratings shown are already derated for fire pump service and available for driving the fire pump at sea level altitude (29.92 in. Hg) and 60°F. intake air temperature. The only additional deration necessary is for higher ambient temperatures and elevations as follows: 3% for each 1000 feet above sea level and 1% for each 10 degrees above 60°F. in accordance with National Fire Protection Association Pamphlet No. 20.

Installation Considerations

Maximum raw water pressure must not exceed 50 PSI. Minimum acceptable raw water flow at 90°F. raw water temperature and 100°F. ambient air temperature should be at least 32 G.P.M. at the 2200 RPM listed rating.

Ventilation air required for engine combustion is 250 CFM at 2200 RPM rating. This is for engine air combustion only and does not take into consideration additional air required for normal room cooling.



Listed under Underwriters' Laboratories, Inc., reexamination service for fire protection applications.

Listed by Associated Factory Mutual Fire Insurance Companies for fire protection applications.

Listed under Underwriters' Laboratories of Canada reexamination service for fire protection applications.

Standard Equipment

Cleaner, Air: 10 in. (254mm) diameter, dry type, mounted.

Cooler, Lubricating Oil: Tubular type, jacket water cooled.

Corrosion Resistor: Mounted, checks rust and corrosion, controls acidity, and removes impurities from coolant.

Damper, Vibration: Rubber isolator.

Electrical Equipment: 24 volt negative ground system. 24 volt starting motor; 24 volt, 18 ampere alternator; voltage regulator; manually operable contacters; junction box with enclosed terminal strip.

Exchanger, Heat: Tubular type, aluminum bronze.

Filters: Lubricating oil, full flow replaceable paper element, mounted. Fuel, paper element throwaway type, mounted.

Flywheel: Machined for stub shaft mounting.

Governor: Mechanical flyball, mechanical variable speed type.

Guard, Belt and Damper Shield: Protection from alternator, accessory drive, and water pump belts and vibration damper.

Housing, Flywheel: SAE No. 2 with industrial supports.

Manifold, Exhaust: Water cooled.

Oil Pressure Switch: Provides signal to activate alarm (not included) for low oil pressure.

Overspeed Switch: Mounted, overspeed shutdown with manual reset, stop crank contacts.

Pan, Oil: Cast aluminum, rear sump type, 3 U.S. gallon (11.4 liter) capacity. Provision for oil heater.

Panel, Instrument: Mounted. Includes ammeter, circuit breaker, water temperature gauge, tachometer, lub oil pressure gauge, hourmeter.

Pump, Coolant: Belt driven, centrifugal type.

Stubshaft: Mounted on flywheel.

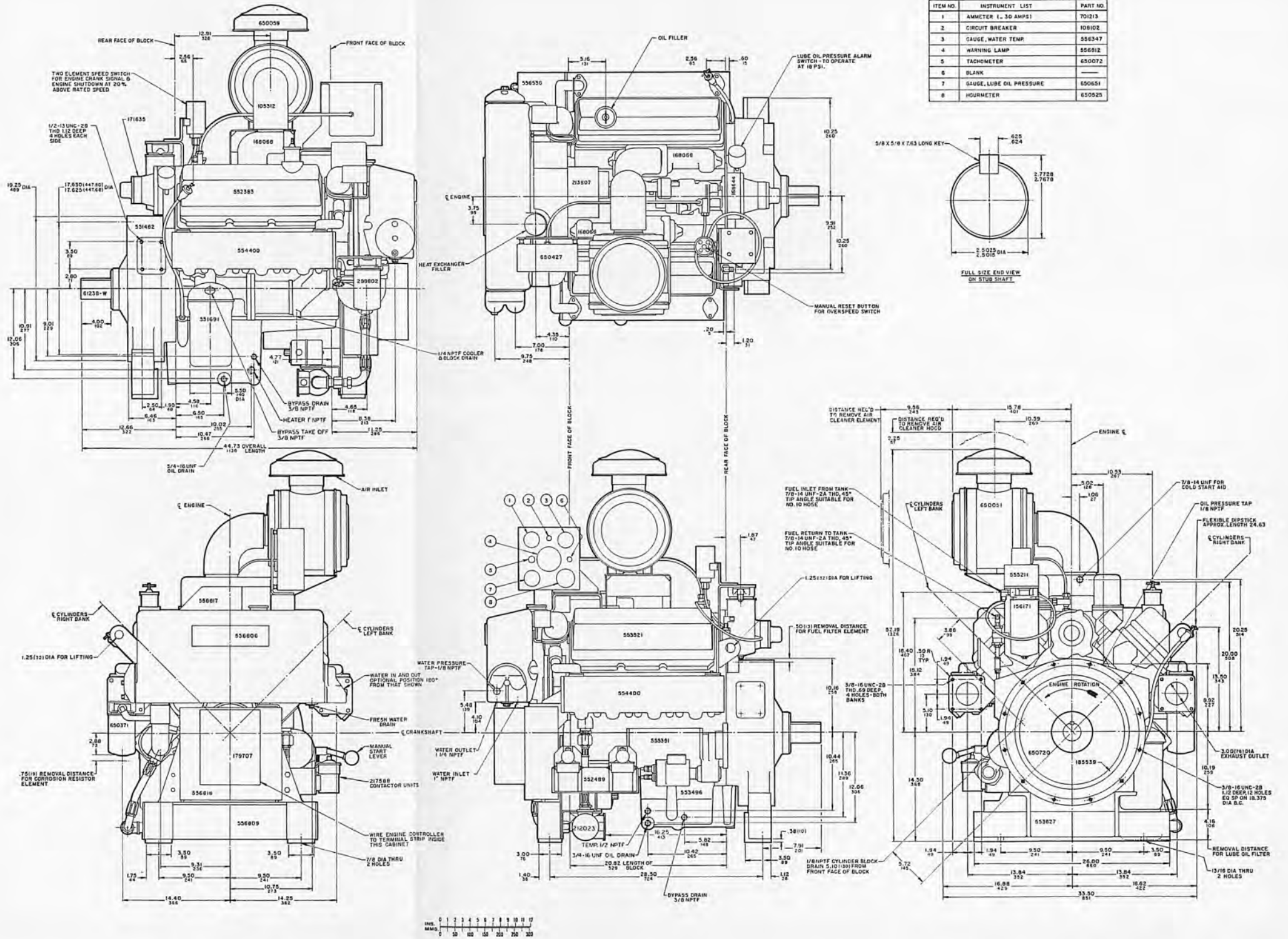
Support, Engine: Pedestal type, front and rear.

Water Jacket Heater: Mounts under oil pan. 115 volt, 2500 watt.

Water Temperature Switch: Provides signal to activate alarm (not included) for high water temperature.

Optional Equipment

Oil Heater: Mounted in pan.



V-378-F1 Engine Installation Drawing 556892

CUMMINS ENGINE COMPANY, INC.
Engine Data Sheet

Fire Pump Engine Model: V-378-F1
(for listed/approved ratings see tabulation)

Date: July, 1985

Data Sheet: DS-3605-B

General Engine Data

Type:	4 Cycle:90°Vee:6 Cylinder
Aspiration:	Natural
Bore — in. (mm)	4.625 (117)
Stroke — in. (mm)	3.75 (95)
Displacement — in. ³ (litre)	378 (6.2)
Compression Ratio:	17.0:1
Valves per Cylinder: — Intake	2
— Exhaust	2
Engine Weight & Center of Gravity (With Standard Accessories)	
Reference Installation Diagram	556892
Dry Weight — lb. (kg)	1665 (756)
Wet Weight — lb. (kg)	1763 (800)
C.G. Distance From F.F.O.B. — in. (mm)	10.7 (272)
C.G. Distance Above Crankshaft — in. (mm)	4.3 (109)
Maximum Allowable Bending Moment @ Rear Face of Block — lb.-ft. (N·m).....	1000 (1 350)

Air Induction System

Maximum Allowable Temperature Rise Between Ambient Air and Engine Air Inlet (Ambients 32°F [0°C] to 100°F [38°C]) — °F (°C)	30 (15)
Maximum Allowable Intake Restriction With a Dirty Air Filter Element — in. H ₂ O (mm H ₂ O)	20 (500)
Part Number of Standard Air Filter Element (Dry Type)	555084

Lubrication System

Oil Pressure @ Rated Speeds — PSI (kPa)	40-70 (280-480)
Oil Flow @ Maximum Rated Speeds (Nominal) — U.S. GPM (litre/s)	25 (1.6)
Oil Pan Capacity (High — Low) U.S. gal. (litre)	3-2.25 (11-8.5)
Full Flow Lube Oil Filter Capacity — U.S. gal. (litre)	3.75 (14)
Part Number of Standard Oil Pan	553496
Part Number of Standard Oil Filter Element	LF-613

Application Note: When ambient temperatures will be lower than 70°F (21°C) an oil heater is required. The recommended heater wattage for this engine is 150 down to 40°F (4°C).

Cooling System

Heat Exchanger Cooled (Shell & Tube Type)	
Part Number of Tube Bundle	553747
Raw Water Working Pressure Range at Heat Exchanger — PSI (kPa)	50 (345) (Maximum)
Recommended Minimum Water Supply Pipe Size to	
Heat Exchanger (Reference Only) — in. (mm) dia.	1 (25)
Recommended Minimum Water Discharge Pipe Size From	
Heat Exchanger (Reference Only) — in. (mm) dia.	1.25 (30)
Coolant Water Capacity (Engine Side) — U.S. gal. (litre)	7.4 (28)
Standard Thermostat — Type	Modulating
— Range — °F (°C)	170-185 (77-85)
Minimum Raw Water Flow with Water	
Temperatures to 90°F (32°C) — U.S. GPM (litre/s)	32 (2.0)

Note: Minimum raw water requirement is based on water flow required to minimize tube fouling in the heat exchanger tube bundle.

A jacket water heater is mandatory on this engine. The recommended heater wattage is 1500 down to 40°F (4°C).

Exhaust System

Maximum Allowable Back Pressure Imposed by Piping & Silencer — in. Hg (mm Hg)	3 (75)
Exhaust Pipe Size Normally Acceptable — in. (mm) dia.	2.5 (65) Twin 3 (75) Single

Fuel System

Supply Line Size — in. (mm)	0.500 (15) I.D. Tube
Drain Line Size — in. (mm)	0.500 (15) I.D. Tube
Maximum Fuel Line Length Between Supply Tank & Fuel Pump — ft. (m)	40 (12)
Maximum Fuel Height Above Crankshaft — in. (mm)	80 (2 030)
Part Number of Standard Fuel Filter	156171
Part Number of Standard Fuel Filter Element	FF-105-D
Maximum Allowable Restriction to Fuel Pump With Dirty Filter — in. Hg (mm Hg)	8.0 (200)
Maximum Allowable Return Line Restriction — in. Hg (mmHg)	4 (100)

Electrical System

Battery Voltage	24	
Battery Cable Size (Maximum Cable Length Not to Exceed 10 ft. (3.0 m) AWG) ...	00	
Wiring for Automatic Starting (Negative Ground)	Standard	
Alternator (Standard) 24 Volt, Internally Regulated — Ampere		
Manually Operable Contactors	Standard	
Minimum Recommended Battery Capacity —	<u>Amp-hr.</u>	<u>°F CCA</u>
70°F (21°C) Minimum Temperature	100	450
32°F (0°C) Minimum Temperature	150	640
Reference Wiring Diagram Number	218147	

Performance Data

All data is based on the engine operating with fuel system water pump, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment and driven components. Data represents gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions of 29.61 in Hg (100 kPa) barometric pressure [300 ft. (90 m) altitude], 77°F (25°C) inlet air temperature, and 0.30 in Hg (1 kPa) water vapor pressure with No. 2 diesel fuel or a fuel corresponding to ASTM D2. All data is subject to change without notice.

Altitude Above Which Output Should be Limited — ft. (m)	500' (150m)
Correction Factor per 1000 ft. (300 m) above Altitude Limit	3%
Temperature Above Which Output Should be Limited — °F (°C)	85 (29)
Correction Factor per 10°F (11°C) Above Temperature Limit	1% (2%)

Listed/Approved Ratings BHP (kW)	Speed RPM	Ventilation Air Req'd. For Combustion CFM (litre/s)	Heat Rejection to Cooling Water BTU/min. (kW)	Heat Rejection to Ambient Air* BTU/min. (kW)	Exhaust Gas Flow CFM (litre/s)	Temp. °F (°C)	Fuel Consumption gal./hr. (litre/h)
112 (84)	2200	263 (124)	4673 (82.1)	492 (8.6)	630 (297)	865 (463)	5.7 (21.6)
101 (76)	2000	252 (119)	4515 (79.4)	449 (7.9)	588 (277)	825 (441)	5.2 (19.7)
86 (64)	1750	236 (111)	3833 (67.4)	389 (6.8)	536 (253)	785 (419)	4.5 (17.0)

*Does not include exhaust piping.

Fire Pump Engine Model: V-378-F1
 Data Sheet No.: DS-3605-B
 Date: July, 1985
 Bulletin No.: 3383349
 Rev.: 7/85