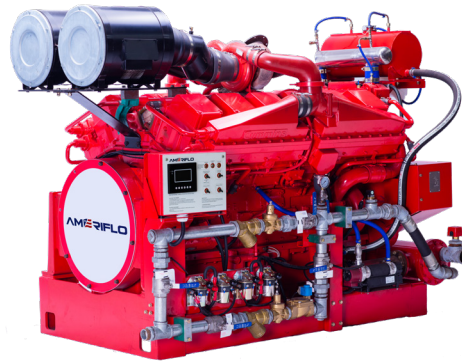


FM - APPROVED RATINGS BHP & KW

ENGINE MODEL:	AF12-159
EMISSIONS:	TIER 0
DATE:	09/01/2020
DRAWING NUMBER:	AF12-159B.00
PERFORMANCE CURVE NUMBER:	C12159B
RATED POWER:	1080 BHP @ 1760 RPM 805 KW @ 1760 RPM
REFERENCE NUMBER:	14DS001E
VERSION:	A


GENERAL ENGINE DATA

TYPE:	4 CYCLE; V-TYPE; WATER COOLED	
NUMBER OF CYLINDERS:	12	
ASPIRATION:	TURBOCHARGED + WATER COOLED	
BORE & STROKE - IN [MM]:	6.26 x 6.26 [159 x 159]	
CYLINDER LINER TYPE:	<input checked="" type="checkbox"/> WET <input type="checkbox"/> DRY	
DISPLACEMENT - IN ³ [L]:	2319 [38]	
COMPRESSION RATIO:	14.5:01	
FIRING ORDER:	1R-6L-5R-2L-3R-4L-6R-1L-2R-5L-4R-3L	
COMBUSTION SYSTEM:	DIRECT INJECTION	
ROTATION (AS VIEWED FROM FRONT OF ENGINE):	CCW	
VALVES PER CYLINDER:	INTAKE: 2 EXHAUST: 2	
VALVE LASH (COLD ENGINE):	INTAKE - IN [MM]:	0.014 [0.36]
	EXHAUST - IN [MM]:	0.028 [0.69]
IGNITION TYPE:	COMPRESSION (DIESEL)	
CHARGE AIR COOLING TYPE:	RAW WATER	
WEIGHT (FUEL PUMP CONFIGURATION) - LBS [KG]:	10086 [4575]	
DIMENSIONS (L x W x H) - IN [MM]:	100 x 69 x 69 [2550 x 1745 x 1756]	
FLYWHEEL / FLYWHEEL HOUSING DIMENSIONS:	18.00 / SAE #0	
TORQUE @ RATED RPM - LB-FT [N-M]:	10086 [4575]	

ENGINE PERFORMANCE DATA

ESTIMATED FREE FIELD SOUND PRESSURE LEVEL AT 3 FEET [1 METER] WITH FULL-LOAD GOVERNED SPEED (INCLUDES NOISE FROM EXHAUST, COOLING SYSTEM AND DRIVEN COMPONENTS)	dBa	≤ 108
ALL DATA IS BASED ON ENGINE OPERATING WITH FUEL SYSTEM, LUBRICATING OIL PUMP, AIR CLEANER AND ALTERNATOR. DOES NOT INCLUDE AIR COMPRESSOR, FAN & OPTIONAL EQUIPMENT. DATA IS BASED ON SAE STANDARD J1349 CONDITIONS AT 300 FEET [91.4 METERS] ALTITUDE, 29.61 INCHES [752 MILLIMETERS] HG DRY BAROMETER AND 77°F [25°C] INTAKE AIR TEMPERATURE USING #0 DIESEL FUEL FOLLOWING THE GB 252-2011 STANDARD.		
ALTITUDE ABOVE WHICH OUTPUT SHOULD BE DERATED:	FEET [METER]	300 [91]
DERATE PER 1,000 FEET [305 METERS] ABOVE ALTITUDE LIMIT:	3%	
TEMPERATURE ABOVE WHICH OUTPUT SHOULD BE DERATED:	°F [°C]	77 [25]
DERATE PER 10°F [5.6°C] ABOVE TEMPERATURE LIMIT:	1%	

● ALL DATA CERTIFIED WITHIN ±5%.

EXHAUST SYSTEM

EXHAUST GAS TEMPERATURE @ MAXIMUM RATING (POWER) - °F [°C]:	≤ 909 [487]
EXHAUST GAS FLOW @ MAXIMUM OUTPUT - CFM [M ³ /HR]:	7183 [12204]
MAXIMUM ALLOWABLE BACK PRESSURE - PSI [KPA]:	1.31 [9]
MINIMUM EXHAUST PIPE DIAMETER - IN [MM]:	2 x 8 [200]

AIR INTAKE SYSTEM

AIR CLEANER TYPE:	DRY TYPE, DISPOSABLE
AIR FLOW - CFM [M ³ /HR]:	2683 [4558]
AIR INLET RESTRICTION - PSI [KPA]:	≤ 0.73 [5.00]

LUBRICATION SYSTEM

OIL CAPACITY (ENGINE ONLY) - QTS [L]:	143 [135]
MAXIMUM SUMP OIL TEMPERATURE - °F [°C]:	239 [115]
NORMAL OPERATING OIL PRESSURE RANGE - PSI [BAR]:	43.5 ~ 65.3 [3.0 ~ 4.5]
OIL PRESSURE @ IDLE - PSI [BAR]:	> 20.0 [1.38]

COOLING SYSTEM

COOLANT CAPACITY (ENGINE & HEAT EXCHANGER) - QTS [L]:	169 [160]	
THERMOSTAT RANGE:	START OPEN - °F [°C]:	180 [82]
	FULL OPEN - °F [°C]:	199 [93]
COOLANT PRESSURE MAXIMUM - PSI [BAR]:	13 [0.9]	
RAW WATER PRESSURE - PSI [BAR]:	72.5 [5.0]	
ENGINE NORMAL OPERATING COOLANT TEMPERATURE - °F [°C]:	180 ~ 199 [82 ~ 93]	
ENGINE COOLANT FLOW @ FULL SPEED - GPM [M ³ /HR]:	414 [94]	
MINIMUM RAW WATER FLOW @ ENGINE SPEED (RPM)	1470	1760
RAW WATER TEMPERATURES TO 60.8°F [16°C] - GPM [M ³ /HR]:	66 [15]	84 [19]
RAW WATER TEMPERATURES TO 100.4°F [38°C] - GPM [M ³ /HR]:	79 [18]	101 [23]
RAW WATER INTAKE PIPE SIZE:	RAW WATER INLET - IN:	2.00 NPT
	RAW WATER OUTLET - IN:	2.50 NPT

HEATER SYSTEM

WATTAGE - W:	2 x 4500
VOLTAGE (AC) - V:	220

DC ELECTRICAL SYSTEM

NORMAL SYSTEM VOLTAGE - V:	24
STARTER MOTOR - HP [KW]:	11.9 [8.9]
RECOMMENDED MINIMUM BATTERY SIZE - AH:	4 x 200
COLD CRANKING AMPS @ 0°F (-18°C):	1000
RESERVE CAPACITY - AMPS:	407
CHARGING ALTERNATOR OUTPUT - AMPS:	70

● ALL DATA CERTIFIED WITHIN ±5%.

FUEL SYSTEM

INJECTION PUMP:	V-TYPE, PLUNGER TYPE
INJECTION PUMP ADVANCE ANGLE - °:	4.67 ~ 4.78
MINIMUM SUPPLY LINE SIZE - IN [MM]:	0.75 [19]
MINIMUM RETURN LINE SIZE - IN [MM]:	0.63 [16]
FUEL MANAGEMENT CONTROL:	MECHANICAL
IDLE SPEED - RPM:	650
GOVERNED SPEED RATE - %:	≤ 10

① ALL DATA CERTIFIED WITHIN ±5%.



ENGINE MATERIALS & CONSTRUCTION

ENGINE		AIR INTAKE	
CAMSHAFT:		AIR CLEANER:	
TYPE	OVERHEAD	TYPE	DRIP PROOF
MATERIAL	CARBON STEEL	MATERIAL	PLEATED PAPER
LOCATION	IN BLOCK	COOLING SYSTEM	
DRIVE	SPUR GEAR	COOLANT HEAT EXCHANGER:	
CONNECTING RODS:		TYPE	TUBE & SHELL
TYPE	I-BEAM, FRACTURE	MATERIAL	
MATERIAL	FORGED STEEL	ELECTRODE	ZINC
CRANKSHAFT:		HEADERS	ALUMINUM
TYPE	GROUND	SHELL	ALUMINUM
MATERIAL	DUCTILE IRON	TUBES	COPPER
MAIN BEARINGS:		COOLANT PUMP:	
TYPE	PRECISION, HALF SHELL	TYPE	CENTRIFUGAL
MATERIAL	ALLOY STEEL	DRIVE	V-BELT
CYLINDER BLOCK:		THERMOSTAT:	
TYPE	GANTRY	TYPE	NON-BLOCKING
MATERIAL	CAST IRON	QUANTITY	1
CYLINDER HEAD:		COOLING LOOP (GALVANIZED):	
TYPE	ONE PIECE	TEES, ELBOWS, PIPE	GALVANIZED STEEL
MATERIAL	CAST IRON	BALL VALVES	BRASS
CYLINDER LINERS:		SOLENOID VALVE	BRASS
TYPE	WET LINED	PRESSURE REGULATOR	BRASS
MATERIAL	CAST IRON ALLOY	STRAINER	BRASS
PISTONS:		COOLING LOOP (316 STAINLESS STEEL):	
TYPE	TRUNK	TEES, ELBOWS, PIPE	316 STAINLESS STEEL
MATERIAL	ALUMINUM ALLOY	BALL VALVES	316 STAINLESS STEEL
PISTON PINS:		SOLENOID VALVE	316 STAINLESS STEEL
TYPE	FULL FLOATING	PRESSURE REGULATOR	316 STAINLESS STEEL
MATERIAL	ALLOY STEEL	STRAINER	316 STAINLESS STEEL
PISTON RINGS:		FUEL SYSTEM	
FIRST	DUCTILE CAST IRON	FUEL INJECTION PUMP:	
SECOND	ALLOY CAST IRON	TYPE	FULL MECHANICAL, CENTRIFUGAL
THIRD	ALLOY CAST IRON	DRIVE	GEAR DRIVEN
VALVES:		LUBRICATION SYSTEM	
TYPE	POPPET	TYPE	GEROTOR
ARRANGEMENT	OVERHEAD	DRIVE	GEAR
VALVE # PER CYLINDER	2 INTAKE, 2 EXHAUST		
OPERATING MECHANISM	MECHANICAL ROCKER ARM		
LIFTER TYPE	LARGE HEAD		

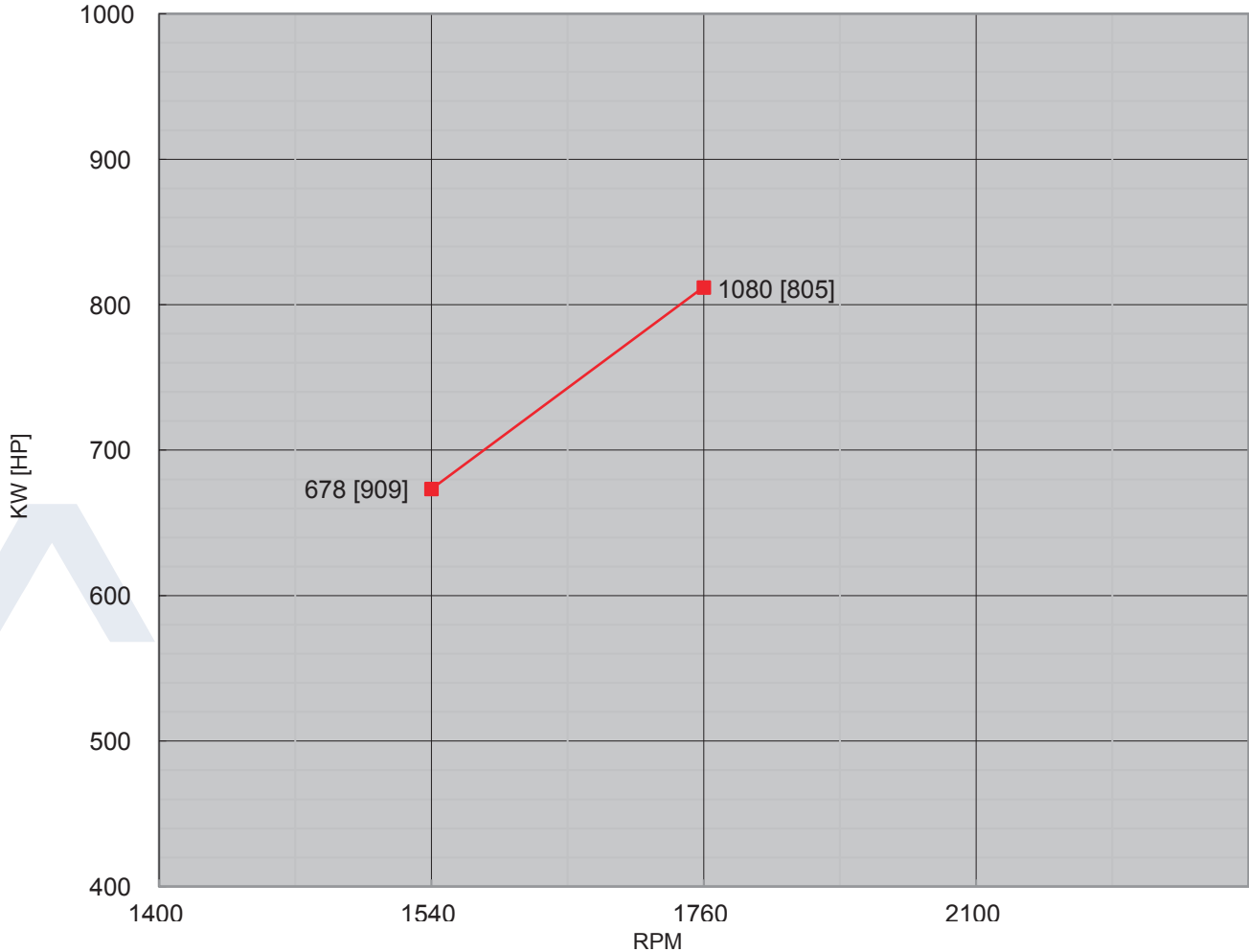
SPARE PARTS LIST

PART DESCRIPTION	QUANTITY	PART NUMBER	REMARKS
LUBRICATION SYSTEM			
OIL FILTER	4 PIECES	AF-3889310	
OIL PRESSURE SENSOR	1 PIECE	AF-21103-OPS	
FUEL SYSTEM			
FUEL FILTER	2 PIECES	AF-4095189	
INJECTION PUMP	1 PIECE	AF-5652360	
FUEL SUPPLY & RETURN HOSE	1 PIECE	AF12-159-10.01	
	1 PIECE	AF12-159-10.02	
COOLING SYSTEM			
HEAT EXCHANGER	1 PIECE	AF-K1000V-HE	
COOLING LOOP	1 SET	AF-CL2-00-CL	
HIGH COOLANT WATER TEMPERATURE SENSOR	1 PIECE	AF-KE00108	
LOW COOLANT WATER TEMPERATURE SENSOR	1 PIECE	AF-KE00108	
THERMOSTAT	4 PIECES	AF-3629305	
PREHEATER	2 PIECES	AF-FH220450065 OR AF-FH110200065	
FLOW SENSOR	1 PIECE	AF-WK150B	
CONTROL SYSTEM			
STARTER	1 PIECE	AF-3636817	
ALTERNATOR	1 PIECE	AF-3935530	
BATTERY	2 PIECES	AF-N200	
STARTER CONTACTOR	2 PIECES	AF-535-0098	
OVERSPEED SHUTDOWN	1 PIECE	AF-YC-ENL-A0	
SPEED SENSOR	1 PIECE	AF-3034572	
INSTRUMENT PANEL	1 SET	AF-ENL-AB-ETR-B(R)	
TRANSMISSION SYSTEM			
BELT	1 PIECE	AF-5413029	
STOP SOLENOID	1 PIECE	AF-3017993	
INTAKE & EXHAUST SYSTEM			
AIR FILTER	1 PIECE	AF-3630751	
TURBOCHARGER	2 PIECES	AF-HX80	

POWER CURVE

CURVE NUMBER:	C12159B	DATE:	10/12/2021
DISPLACEMENT - IN ³ [L]:	2258 [38.0]	ASPIRATION:	TURBOCHARGED + WATER COOLED
POWER STANDARD:	UL/FM	BORE & STROKE - IN [MM]:	6.26 x 6.26 [159 x 159]
NUMBER OF CYLINDERS:	12	FUEL SYSTEM:	V-TYPE, MECHANICAL

● ALL DATA CERTIFIED WITHIN ±5%.



TORQUE		
SPEED	LB-FT	N-M
RPM		
1150		
1540	3249	4406
1760	3223	4371
2100		

OUTPUT POWER		
SPEED	HP	KW
RPM		
1150		
1540	909	678
1760	1080	805
2100		

FUEL CONSUMPTION		
SPEED	LB/BHP-HR	G/KW-HR
RPM		
1150		
1540	0.337	205
1760	0.337	205
2100		

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