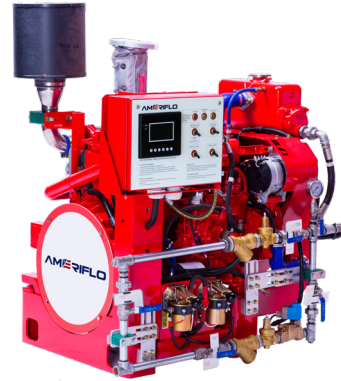


## FM - APPROVED RATINGS BHP & KW

<b>ENGINE MODEL:</b>	AF4-102B
<b>EMISSIONS:</b>	TIER 0
<b>DATE:</b>	09/01/2020
<b>DRAWING NUMBER:</b>	AF4-102B.00
<b>PERFORMANCE CURVE NUMBER:</b>	C04105F
<b>RATED POWER:</b>	95 BHP @ 2950 RPM 71 KW @ 2950 RPM
<b>REFERENCE NUMBER:</b>	14DS001E
<b>VERSION:</b>	A



## GENERAL ENGINE DATA

TYPE:	4 CYCLE; INLINE; WATER COOLED	
NUMBER OF CYLINDERS:	4	
ASPIRATION:	TURBOCHARGED	
BORE & STROKE - IN [MM]:	4.02 x 4.65 [102 x 118]	
CYLINDER LINER TYPE:	<input type="checkbox"/> WET <input checked="" type="checkbox"/> DRY	
DISPLACEMENT - IN <sup>3</sup> [L]:	236 [3.86]	
COMPRESSION RATIO:	17:01	
FIRING ORDER:	1 - 3 - 4 - 2	
COMBUSTION SYSTEM:	DIRECT INJECTION	
ROTATION (AS VIEWED FROM FRONT OF ENGINE):	CCW	
VALVES PER CYLINDER:	INTAKE: 1 EXHAUST: 1	
VALVE LASH (COLD ENGINE):	INTAKE - IN [MM]:	0.016 [0.40]
	EXHAUST - IN [MM]:	0.016 [0.40]
IGNITION TYPE:	COMPRESSION (DIESEL)	
CHARGE AIR COOLING TYPE:	N/A	
WEIGHT (FUEL PUMP CONFIGURATION) - LBS [KG]:	1190 [540]	
DIMENSIONS (L x W x H) - IN [MM]:	47 x 35 x 50 [1205 x 890 x 1275]	
FLYWHEEL / FLYWHEEL HOUSING DIMENSIONS:	11.50 / SAE #3	
TORQUE @ RATED RPM - LB-FT [N-M]:	169 [230]	

## 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]:	≤ 1004 [540] @ 2950 RPM
EXHAUST GAS FLOW @ MAXIMUM OUTPUT - LBS/HR [KG/HR]:	1488 [675] @ 2950 RPM
MAXIMUM ALLOWABLE BACK PRESSURE - PSI [KPA]:	1.45 [10]
MINIMUM EXHAUST PIPE DIAMETER - IN [MM]:	3.0 [80]

**AIR INTAKE SYSTEM**

AIR CLEANER TYPE:	DRY TYPE, DISPOSABLE
AIR FLOW - CFM [M <sup>3</sup> /HR]:	323 [550]
AIR INLET RESTRICTION - PSI [KPA]:	≤ 0.87 [6]

**LUBRICATION SYSTEM**

OIL CAPACITY (ENGINE ONLY) - QTS [L]:	12.6 [12]
MAXIMUM SUMP OIL TEMPERATURE - °F [°C]:	176 ~ 248 [80 ~ 120]
NORMAL OPERATING OIL PRESSURE RANGE - PSI [BAR]:	> 36.3 ~ 87.0 [2.5 ~ 6.0]
OIL PRESSURE @ IDLE - PSI [BAR]:	> 14.5 [1.00]

**COOLING SYSTEM**

COOLANT CAPACITY (ENGINE & HEAT EXCHANGER) - QTS [L]:	19.0 [18]	
THERMOSTAT RANGE:	START OPEN - °F [°C]:	169 [76]
	FULL OPEN - °F [°C]:	187 [86]
COOLANT PRESSURE MAXIMUM - PSI [BAR]:	13 [0.9]	
RAW WATER PRESSURE RANGE @ HEAT EXCHANGER - PSI [BAR]:	72.5 [5]	
ENGINE NORMAL OPERATING COOLANT TEMPERATURE - °F [°C]:	169 ~ 203 [79 ~ 95]	
ENGINE COOLANT FLOW @ FULL SPEED - GPM [M <sup>3</sup> /HR]:	47.1 [10.7]	
MINIMUM RAW WATER FLOW @ ENGINE SPEED (RPM)	2200	2950
RAW WATER TEMPERATURES TO 60.8°F [16°C] - GPM [M <sup>3</sup> /HR]:	19.8 [4.5]	19.8 [4.5]
RAW WATER TEMPERATURES TO 100.4°F [38°C] - GPM [M <sup>3</sup> /HR]:	24.3 [5.3]	24.3 [5.3]
RAW WATER INTAKE PIPE SIZE:	RAW WATER INLET - IN:	0.75 NPT
	RAW WATER OUTLET - IN:	1.00 NPT

**HEATER SYSTEM**

WATTAGE - W:	2000
VOLTAGE (AC) - V:	220

**DC ELECTRICAL SYSTEM**

NORMAL SYSTEM VOLTAGE - V:	24
STARTER MOTOR - HP [KW]:	6.0 [4.5]
RECOMMENDED MINIMUM BATTERY SIZE - AH:	150
COLD CRANKING AMPS @ 0°F (-18°C):	900
CHARGING ALTERNATOR OUTPUT - AMPS:	35

① ALL DATA CERTIFIED WITHIN ±5%.

**FUEL SYSTEM**

INJECTION PUMP:	INLINE, PLUNGER TYPE
INJECTION PUMP ADVANCE ANGLE - °:	11
MINIMUM SUPPLY LINE SIZE - IN [MM]:	0.394 [10]
MINIMUM RETURN LINE SIZE - IN [MM]:	0.394 [10]
FUEL MANAGEMENT CONTROL:	MECHANICAL
IDLE SPEED - RPM:	800
GOVERNED SPEED RATE - %:	< 10

① ALL DATA CERTIFIED WITHIN ±5%.



**ENGINE MATERIALS & CONSTRUCTION**

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

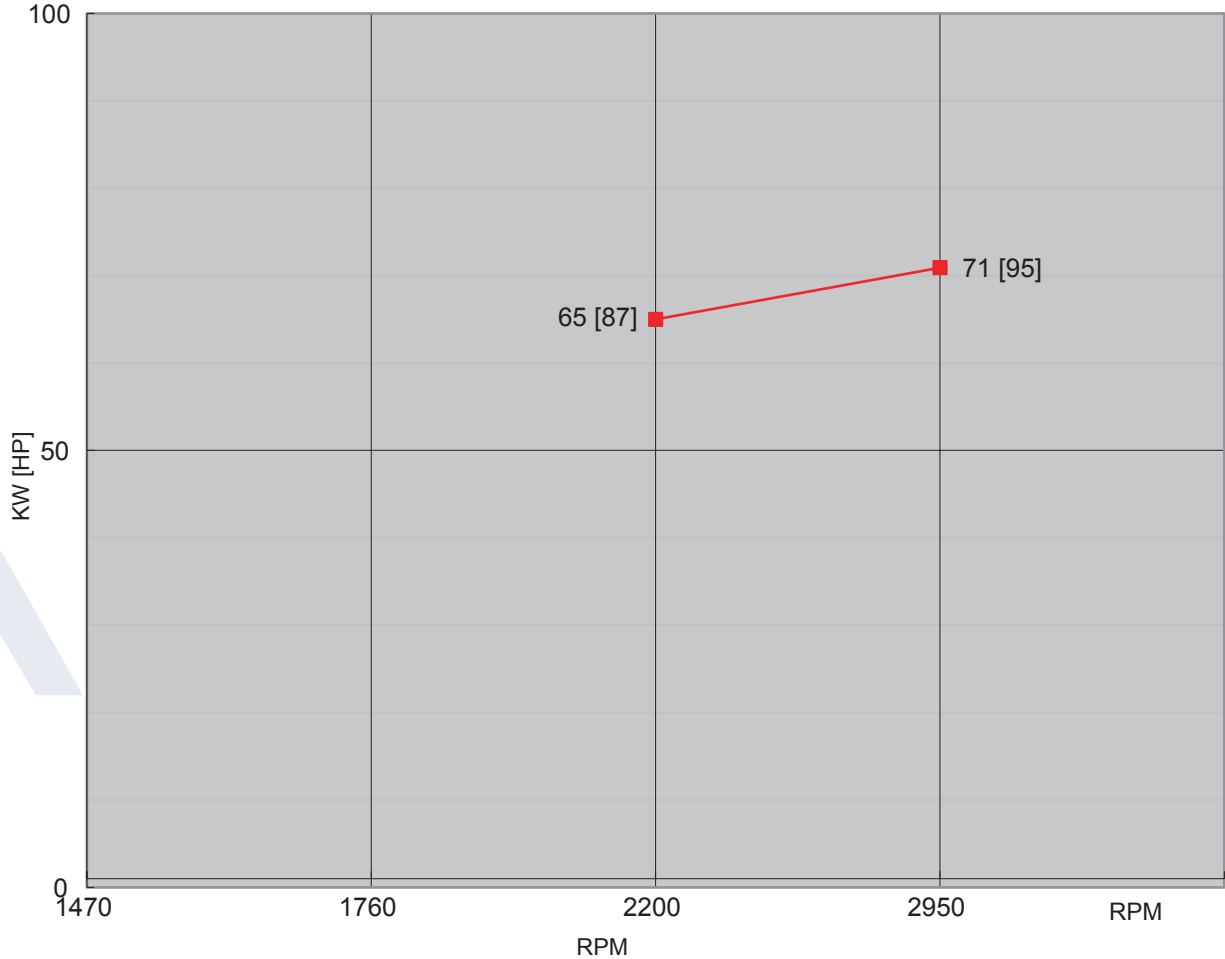
**SPARE PARTS LIST**

PART DESCRIPTION	PART NUMBER	REMARKS
AFTERCOOLER	N/A	N/A
HEAT EXCHANGER	AH300	MAX. WORKING PRESSURE 72.5 PSI [5 BAR]
ALTERNATOR	JFWZ29-109	28 V / 35 A
STARTING SYSTEM	QDJ2516A-P	24 V / 4.5 KW
TURBOCHARGER	JP60A	N/A
FUEL PUMP WITH SPEED CONTROLLER	4AW	N/A
FUEL INJECTORS	1112020-A02-TX1A	0.26 MM
CONTROLLER	AF.ENG.AB-ETS-R-B	N/A
BATTERY	908DFT	12 V / 200 AH
EMERGENCY STARTERS	535-0098	24 VDC 800 A
OIL PRESSURE SENSOR	KE21103	11.6 ± 4.35 PSI [80 ± 30 KPA]
HIGH TEMPERATURE COOLANT SENSOR	KE00105	203 ± 37 °F [95 ± 3°C]
LOW COOLANT TEMPERATURE SENSOR	KE00105	104 ± 37 °F [40 ± 3°C]
HIGH TEMPERATURE RAW WATER SENSOR	204.040.15GO.1.IP65	104 ± 37 °F [40 ± 3°C]
FLOW SENSOR	WK150B	N/A
OVERSPEED SHUTDOWN DEVICE	YC-ENL-A0	N/A
SPEED SENSOR	1002121-B43-HM10	N/A
ENGINE HEATER	SH220200045	220 V / 2 KW MAX. TEMP 113°F [45°C]
	SH110200045	110 V / 2 KW MAX. TEMP 113°F [45°C]
OIL FILTERS	1012101-A02-0000	1 PIECE
FUEL FILTERS	1117101-A01-0000	1 PIECE
AIR FILTERS	ECC105004	1 PIECE
BELTS	1308032-001-DD80	1 PIECE
THERMOSTATS	1306010-001-0000Q	1 PIECE
EXHAUST BLANKET	AF4102B0602-EI	DN65
FUEL SUPPLY & RETURN LINES	AF6-110D-03.03 AF4-105-09.05	N/A

**POWER CURVE**

CURVE NUMBER:	C04102BF	DATE:	09/01/2020
DISPLACEMENT - IN <sup>3</sup> [L]:	236 [3.86]	ASPIRATION:	TURBOCHARGED
POWER STANDARD:	UL	BORE & STROKE - IN [MM]:	4.02 x 4.65 [102 x 118]
NUMBER OF CYLINDERS:	4	FUEL SYSTEM:	INLINE, MECHANICAL

● ALL DATA CERTIFIED WITHIN ±5%.



TORQUE		
SPEED	LB-FT	N-M
RPM		
1470		
1760		
2200	208	282
2950	169	230

OUTPUT POWER		
SPEED	HP	KW
RPM		
1470		
1760		
2200	87	65
2950	95	71

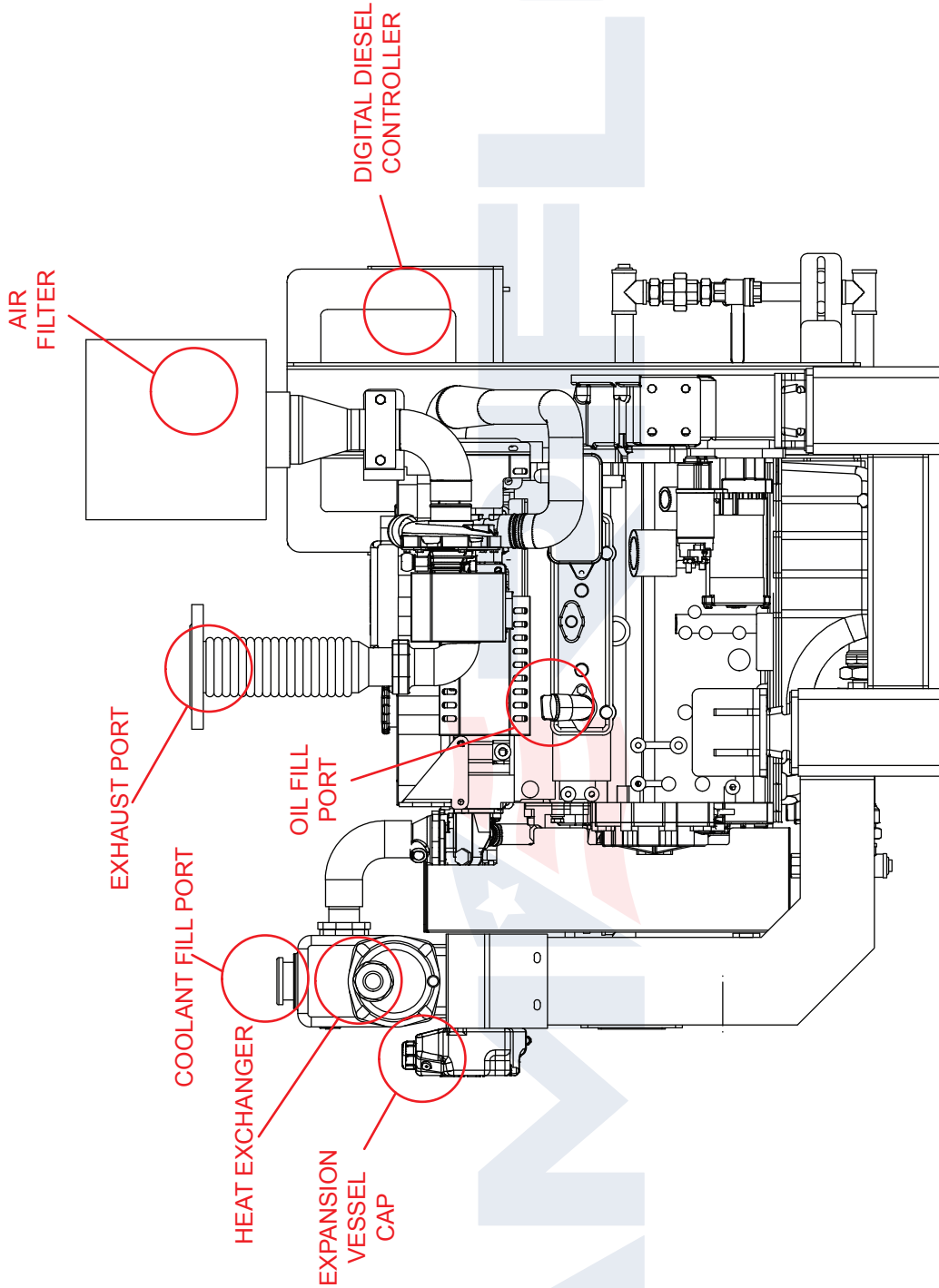
FUEL CONSUMPTION		
SPEED	LB/BHP-HR	G/KW-HR
RPM		
1470		
1760		
2200	0.452	275
2950	0.452	275

● 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 J1394 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.









**NOTES:**  
 1. ALL PLUMBING MUST BE SUPPORTED AND/OR ISOLATED SO THAT NO WEIGHT OR STRESS IS APPLIED TO ANY ENGINE COMPONENT.  
 2. REFER TO SPECIFIC MODELS' INSTALLATION, OPERATION & MAINTENANCE MANUAL FOR INSTALLATION GUIDELINES.

REV	UNITS IN/[MM]
A	
REV	

DESCRIPTION	DWN	APVD	DATE
CREATION	MJF		09/01/2020

NAME:	INSTALLATION DRAWING DIESEL FIRE PUMP DRIVER MODEL AF4-102B
DATE:	09/01/2020
CHK BY:	
DATE:	
APPROVED:	
DATE:	
PART NO.:	AF4-102B-LEFT
MATERIAL:	

PROJECTION:	PROJECT:
SCALE:	NONE
PAGE:	1
OF:	1





