CLARKE

FIRE PUMP ENGINES

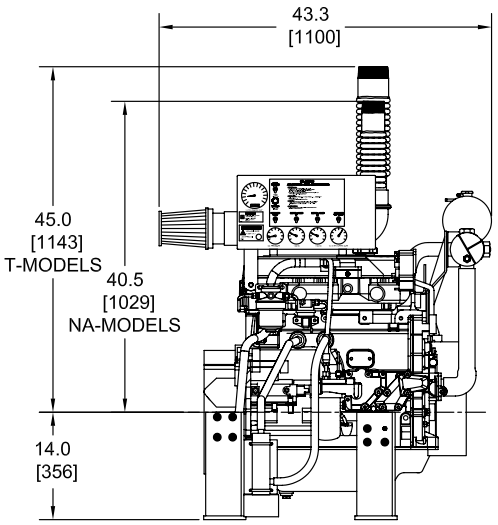
MODELS

JU4H-UF10, JU4H-UF12, JU4H-UF20, JU4H-UF22, JU4H-UF30, JU4H-UF32, JU4H-UFH8, JU4H-UFH0, JU4H-UFH2, JU4H-UF40, JU4H-UF42, JU4H-UF58, JU4H-UF50, JU4H-UF52

FM-UL-CUL APPROVED RATINGS BHP/*KW*

JU4H MODEL	RATED SPEED 1470		1760		2100		2350		2600	
UF10			41	*31*	51	*38*	55	*41*		
UF12							55	*41*	59	*44*
UF20			60	*45*	67	*50*	72	*54*		
UF22							72	*54*	75	*56*
UF30			64	*48*	79	*59*	85	*63*		
UF32							85	*63*	85	*63*
UFH8	63	*47*	73	*54*						
UFH0			73	*54*	88	*66*	98	*73*		
UFH2							98	*73*	99	*74*
UF40			94	*70*	105	*78*	106	*79*		
UF42							106	*79*	106	*79*
UF58	79	*59*	110	*82*						
UF50			110	*82*	130	*97*	127	*95*		
UF52							127	*95*	127	*95*

All engine models and ratings are USA EPA emissions compliant per NSPS (40 CFR Part 60 Sub Part IIII)



JU4H-UF50
OVERALL WIDTH
29.0
[735]

SPECIFICATIONS

ITEM	JU4H MODELS UF10/12	UF20/22	UF30/32	UFH8/H0/H2	UF40/42	UF58/50/52
Number of Cylinders	4					
Aspiration	NA		T			
Rotation*	Clockwise (CW)					
Weight - lb (kg)	910 (413)		935 (424)			
Compression Ratio	17.6:1		17.0:1			
Displacement - cu. in. (l)	275 (4.5)					
Engine Type	4 Stroke Cycle - Inline Construction					
Bore & Stroke - in. (mm)	4.19 x 5.00 (106 x 127)					
Installation Drawing	D - 534 - US		D - 545 - UK			
Wiring Diagram	C07575 (DC Engine Wiring)		C07651 (AC Heater Wiring)			
Engine Series	John Deere 4045 Series					

Abbreviations: CW – Clockwise NA – Naturally Aspirated T – Turbocharged

*Rotation viewed from Heat Exchanger / Front of engine • Engine intended for Indoor use or inside weatherproof enclosure only

† ENGINE RATINGS BASELINES

- 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.
- Note: Engines are not to be used for continuous duty. Engines are to be used only for stationary emergency standby fire pump service. According to NFPA 25 engines are to be tested 30 minutes per week at no pump flow and full pump flow once per year.

CERTIFIED POWER AT ANY SPEED

- Although FM-UL Certified BHP ratings are shown at specific speeds, Clarke engines can be applied at any intermediate speed. To determine the intermediate certified power, make a linear interpolation from the Clarke FM-UL certified power curve. Contact Clarke or your Pump OEM representative to obtain details.

c UL US

Meets NFPA 20 Requirements

FM C US APPROVED

ENGINE EQUIPMENT

EQUIPMENT	STANDARD	OPTIONAL
Air Cleaner	Direct Mounted, Washable, Indoor Service	Disposable, Drip proof, Indoor Service, Outdoor Type
Alternator	12V-DC, 42 Amps; w/Belt Guard	24V-DC, 40 Amps; w/Belt Guard
Exhaust Protection	Blankets on UF10/12, UF20/22, Metal Guards on Manifolds & Turbo on UF30/32, UFH8/H0/H2, UF40/42, UF50/52/58	
Coupling	Bare Flywheel	UL-Drive Shaft & Guard, UF10/12, UF20/22 - CDS10-SC; UF30/32, UFH8/H0/H2, UF40/42 - CDS20-SC; UF58/50/52 - CDS30-S1
Exhaust Flex Connection	SS Flex, NPT, 3" NA, SS Flex, NPT, 4" T	SS Flex, 150# Flange, 4" & 5"
Flywheel Housing	S.A.E. #3	
Flywheel Power Take Off	11.5" S.A.E. Industrial Flywheel Connection	
Fuel Connections	Fire Resistant Flexible Supply & Return Lines	
Fuel Filter	Primary Filter w/priming pump	
Fuel Injection System	Stanadyne Direct Injection	
Engine Heater	120V-AC, 1500 Watt	240V-AC, 1500 Watt
Governor, Speed	Constant Speed, Mechanical	
Heat Exchanger	Tube & Shell Type, 60 PSI w/NPTF Connections	
Instrument Panel	English & Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure & Two (2) Voltmeters	
Junction Box	Integral with Instrument Panel; For DC Wiring Interconnection to Engine Controller	
Lube Oil Cooler	Engine Water Cooled, Plate Type	
Lube Oil Filter	Full Flow w/By-Pass Valve	
Lube Oil Pump	Gear Driven, Gear Type	
Manual Start Controls	On Instrument Panel	
Overspeed Control	Electronic w/Reset & Test on Instrument Panel	
Raw Water Solenoid Operation	Automatic from Engine Controller & from Instrument Panel	
Run-Stop Control	On Instrument Panel With Control Position Warning Light	
Run Solenoid	12V-DC Energized to Run	24V-DC Energized to Run 12V-DC Energized to Stop 24V-DC Energized to Stop
Starters	Two (2) 12V-DC	Two (2) 24V-DC
Throttle Control	Adjustable Speed Control, Tamper Proof	
Water Pump	Poly-Vee Belt Drive w/Guard	

MODEL NOMENCLATURE: (8 Digit Models)

JU4H-UF10

- JU — John Deere Base Engine
- 4 — 250 Series
- H — 4 Cylinders
- UF — Heat Exchanger Cooled
- 10 — Power Curve Number
- F — FM Approved
- U — UL Listed

CLARKE

CLARKE Fire Protection Products, Inc.
3133 E. Kemper Rd., Cincinnati, Ohio 45241
United States of America
Tel +1-513-771-2200 Fax +1-513-771-0726
www.clarkefire.com

CLARKE UK, Ltd.
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C13600 1.2 5/09

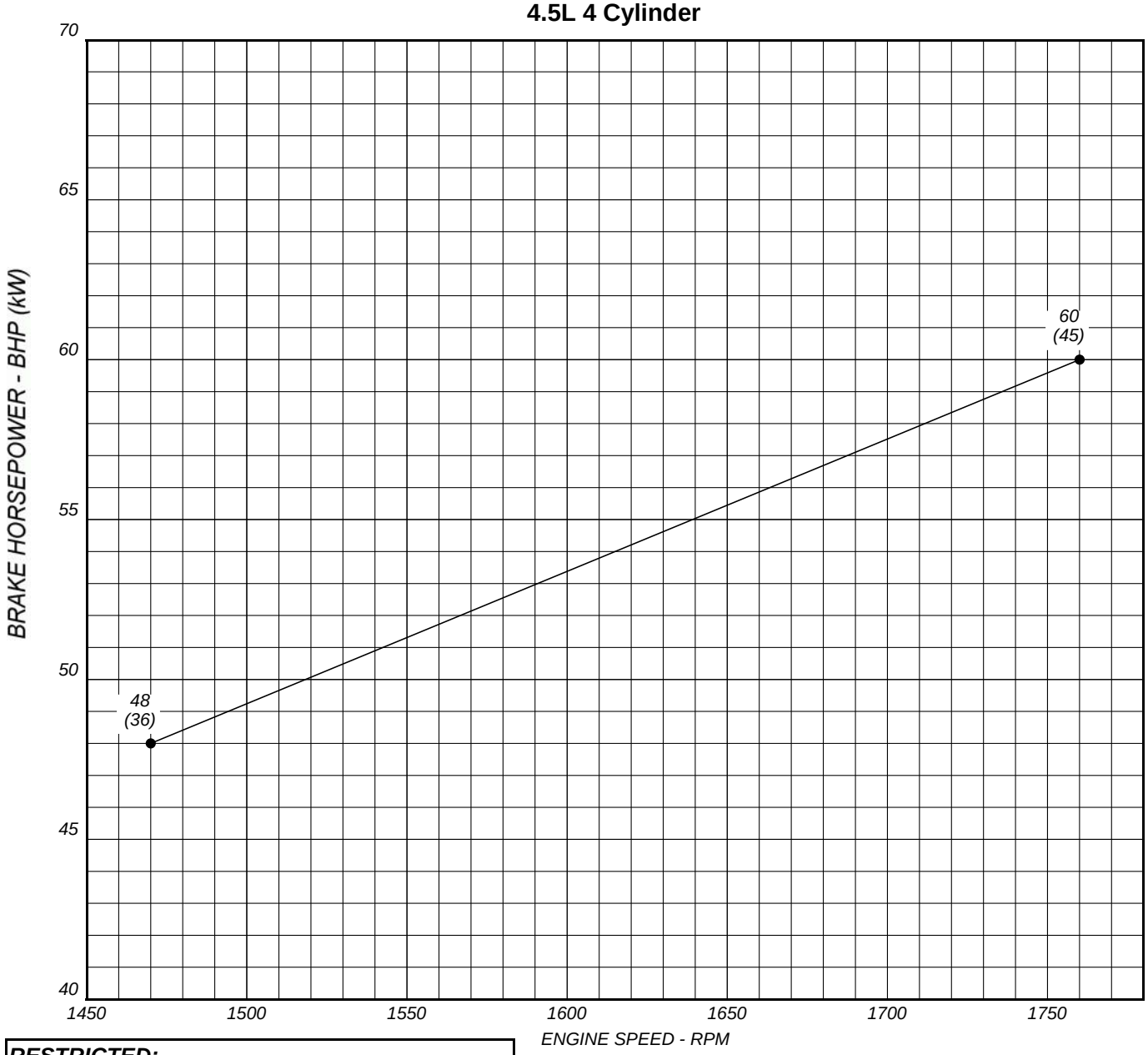
Specifications and information contained in this brochure subject to change without notice.

Printed in U.S.A.

CLARKE

Fire Protection Products, Inc.

FIRE PUMP MODEL: JU4H-UF28
Heat Exchanger
Turbocharged
4.5L 4 Cylinder



RESTRICTED:
USE ONLY FOR STAND-BY FIRE PUMP APPLICATIONS

ENGINE PERFORMANCE:
STANDARD CONDITIONS: (SAE J1349, ISO 3046)
77°F (25°C) AIR INLET TEMPERATURE
29.61 IN. (751.1MM) HG BAROMETRIC PRESSURE
#2 DIESEL FUEL (SEE C13940)

KEVIN KUNKLER 25AUG03

●——● *NAMEPLATE BHP (MAXIMUM PUMP LOAD)*

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CREATED	DATE CREATED
KTF	08/25/03

ENGINE MODEL JU4H-UF28

DRAWING NO.	REV
C13978	A

JU4H-UF28
INSTALLATION & OPERATION DATA
USA Production

Basic Engine Description

Engine Manufacturer	John Deere Co.
Ignition Type	Compression (Diesel)
Number of Cylinders	4
Bore and Stroke - in.(mm)	4.19(106) x 5.00(127)
Displacement - $in.^3$ (L)	275 (4.5)
Compression Ratio	17.0:1
Valves per cylinder - Intake	1
Exhaust	1
Combustion System	Direct Injection
Engine Type	Rotary, 4 Stroke Cycle
Aspiration	Naturally Aspirated
Firing Order (CW Rotation)	1-3-4-2
Charge Air Cooling Type	None
Rotation (Viewed from Front) - Clockwise	Standard
Counter-Clockwise	Not Available
Engine Crankcase Vent System	Open
Installation Drawing	D-538

Cooling System	**1470**	**1760**
Engine H_2O Heat -Btu/sec.(kW)	11 (12)	19 (20)
Engine Radiated Heat - Btu/sec.(kW)	10 (11)	13 (14)
Heat Exchanger Minimium Flow		
60°F (15°C) Raw H_2O - gal/min. (L/min.)	6 (23)	6 (23)
95°F (35°C) Raw H_2O - gal/min. (L/min.)	7 (27)	8 (30)
Heat Exchanger Maximum Cooling H_2O		
Inlet Pressure - bar ($lb./in.^2$) (kPa)	4 (60) (400)	
Flow - gal./min (L/min.)	40 (151)	
Thermostat, Start to Open - °F (°C)	187 (86)	
Fully Opened - °F (°C)	196 (91)	
Engine Coolant Capacity - qt. (L)	15 (14)	
Coolant Pressure Cap - $lb./in.^2$(kPa)	10 (69)	
Maximum Engine H_20 Temperature - °F (°C)	200 (93)	
Minimum Engine H_20 Temperature - °F (°C)	160 (71)	

Electric System - DC		
System Voltage (Nominal)	12	24
Battery Capacity for Ambients Above 32°F (0°C)		
Voltage (Nominal)	12	24
Qty. per Battery Bank	1	2
SAE size per J537	4D-640	4D-640
CCA @ 0°F (-18°C)	640	640
Reserve Capacity - Minutes	285	285
Battery Cable Circuit*, Max Resistance - ohm	0.0012	0.0012
Battery Cable Minimum Size		
0 -120 in. Circuit* Length	00	00
121 - 160 in. Circuit* Length	000	000
161 - 200 in. Circuit* Length	0000	0000
Charging Alternator Output - Amp	40	40
Starter Cranking Amps - @ 60°F (15°C)	380	250

**Positive and Negative Cables Combined Length*

NOTE: This engine is Intendend For Indoor Installation Or In A Weatherproof Enclosure. *(Continued)*

JU4H-UF28
INSTALLATION & OPERATION DATA (Continued)
USA Production

Exhaust System	**1470**	**1760**
Exhaust Flow - $ft.^3$/min. (m^3/min.)	348 (9.9)	379 (10.7)
Exhaust Temperature - °F (°C)	1025 (609)	1021 (549)
Maximum Allowable Back Pressure - in. H_20 (kPa)	30 (7.4)	
Minimum Exhaust Pipe Dia. - in. (mm)**	3 (76)	

Fuel System		
Fuel Consumption - gal./hr. (L/hr.)	2.5 (9.5)	3.8 (14.4)
Fuel Return - gal./hr. (L/hr)	7.4 (28.0)	7.9 (30.0)
Total Supply Fuel Flow - gal./hr (L/hr.)	9.9 (37.5)	11.7 (44.4)
Fuel Pressure - $lb./in.^2$ (kPa)	3-6 (21-41)	
Minimum Line Size - Supply - in. (mm)	.50 (12.7) Sch. 40 - Black Iron	
Minimum Line Size - Return - in. (mm)	.375 (9.5) Sch. 40 - Black Iron	
Maximum Allowable Fuel Pump Suction		
With Clean Filter - in. H_20 (mH_20)	31 (0.8)	
Maximum Allowable Fuel Head above Fuel pump, Supply or Retrun - m(ft)	1.4 (4.5)	
Fuel Filter Micron Size	8	

Heater System

Jacket Water Heater	
Wattage (Nominal)	1500
Voltage - AC, 1P	115 (+5%, -10%)
Optional Voltage - AC, 1P	230 (+5%, -10%)

Induction Air System		
Air Cleaner Type	Indoors Service Only - Washable	
Air Intake Restriction Maximum Limit		
Dirty Air Cleaner - in. H_20 (kPa)	5 (1.2)	
Clean Air Cleaner - in. H_20 (kPa)	1 (0.2)	
Engine Air Flow - $ft.^3$/min. (m^3/min.)	127 (3.6)	140 (4.0)
Maximum Allowable Temperature (Air To Engine Inlet) - °F (°C)***	130 (54)	

Lubrication System	
Oil Pressure - normal - $lb./in.^2$ (kPa)	35-50 (241-345)
In Pan Oil Temperature - °F (°C)	220-245 (104-118)
Oil Pan Capacity - High - qt. (L)	8 (7.5)
Low - qt. (L)	7 (6.5)
Total Oil Capacity with Filter - qt. (L)	9 (8.5)

Performance		
BMEP - $lb./in.^2$ (kPa)	103 (711)	98 (677)
Piston Speed - ft./min. (m/min.)	1226 (374)	1467 (447)
Mechanical Noise - dB(A) @ 1m	C131603	
Power Curve	C131082	

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

**** Review For Power Deration If Air Entering Engine Exceeds °77F (25°C)*

C131600 rev D
ACH 06DEC06

JU4H & JU6H ENGINE MODELS
ENGINE MATERIALS AND CONSTRUCTION

Air Cleaner
Type……..…….. ..Indoor Usage Only
Oiled Fabric Pleats
Material…….……..…… Surgical Cotton
Aluminum Mesh

Air Cleaner - Optional
Type……..Canister
Material……..Pleated Paper
Housing……..Enclosed

Camshaft
Material……..Cast Iron
Chill Hardened
Location……..……..In Block
Drive……..Gear, Spur
Type of Cam……..Ground

Charge Air Cooler (JU6H-60,62,68,74,84, ADK0, AD58, ADNG, ADN0, ADQ0, ADR0, AAQ8, AARG, ADP8, ADP0, ADT0, AD88, ADR8, AD98, ADS0, ADW8, ADX8, AD98 only)
Type……Raw Water Cooled

Materials (in contact with raw water)
Tubes…… …… 90/10 CU/NI
Headers …… 36500 Muntz
Covers …… 83600 Red Brass
Plumbing …… 316 Stainless Steel/ Brass
90/10 Silicone

Coolant Pump
Type……..Centrifugal
Drive…… …… Poly Vee Belt

Coolant Thermostat
Type……..Non Blocking
Qty……..1

Connecting Rod
Type……..I-Beam Taper
Material……..Forged Steel Alloy

Crank Pin Bearings
Type……..Precision Half Shell
Number……..1 Pair Per Cylinder
Material……..Wear-Guard

Crankshaft
Material……..Forged Steel
Type of Balance……..Dynamic

Cylinder Block
Type……..One Piece with
Non-Siamese Cylinders
Material……..Annealed Gray Iron

Cylinder Head
Type…….. …… Slab 2 Valve
Material…… Annealed Gray Iron

Cylinder Liners
Type…….. …… Centrifugal Cast, Wet Liner
Material…… Alloy Iron Plateau, Honed

Valves
Type…….. ……Poppet
Arrangement…… …..Overhead Valve
Number/Cylinder……1 intake
1 exhaust
Operating Mechanism…..Mechanical Rocker Arm
Type of Lifter……..Large Head
Valve Seat Insert……Replaceable

Fuel Pump
Type……Diaphragm
Drive…… Cam Lobe

Heat Exchanger (USA)
Type……Tube & Shell
Materials
Tube& Headers……Copper
Shell……Copper
Electrode……Zinc

Heat Exchanger (UK)
Type……Tube & Bundle
Materials
Tube& Headers……Copper
Shell…… Aluminum

Injection Pump
Type……Rotary
Drive…… Gear

Lubrication Cooler
Type……Plate

Lubrication Pump
Type……Gear
Drive…… Gear

Main Bearings
Type……Precision Half Shells
Material……Steel Backed-Aluminum Lined

Piston
Type and Material…… Aluminum Alloy with Reinforced
Top Ring Groove
Cooling…… Oil Jet Spray

Piston Pin
Type……Full Floating - Offset

Piston Rings
Number/Piston……3
Top…… Keystone Barrel Faced -
Plasma Coated
Second…… Tapered Cast Iron
Third……Double Rail Type
w/Expander Spring

DATUMS

-A- - MOUNTING FACE OF FLYWHEEL

-B- - ENGINE CRANKSHAFT HORIZONTAL CENTERLINE

-C- - ENGINE CRANKSHAFT VERTICAL CENTERLINE

- CENTER OF GRAVITY OF ENGINE

- CLOCKWISE ROTATION WHEN VIEWED FROM FRONT OF ENGINE

CAUTION

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

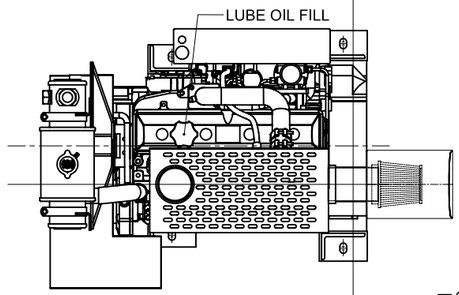
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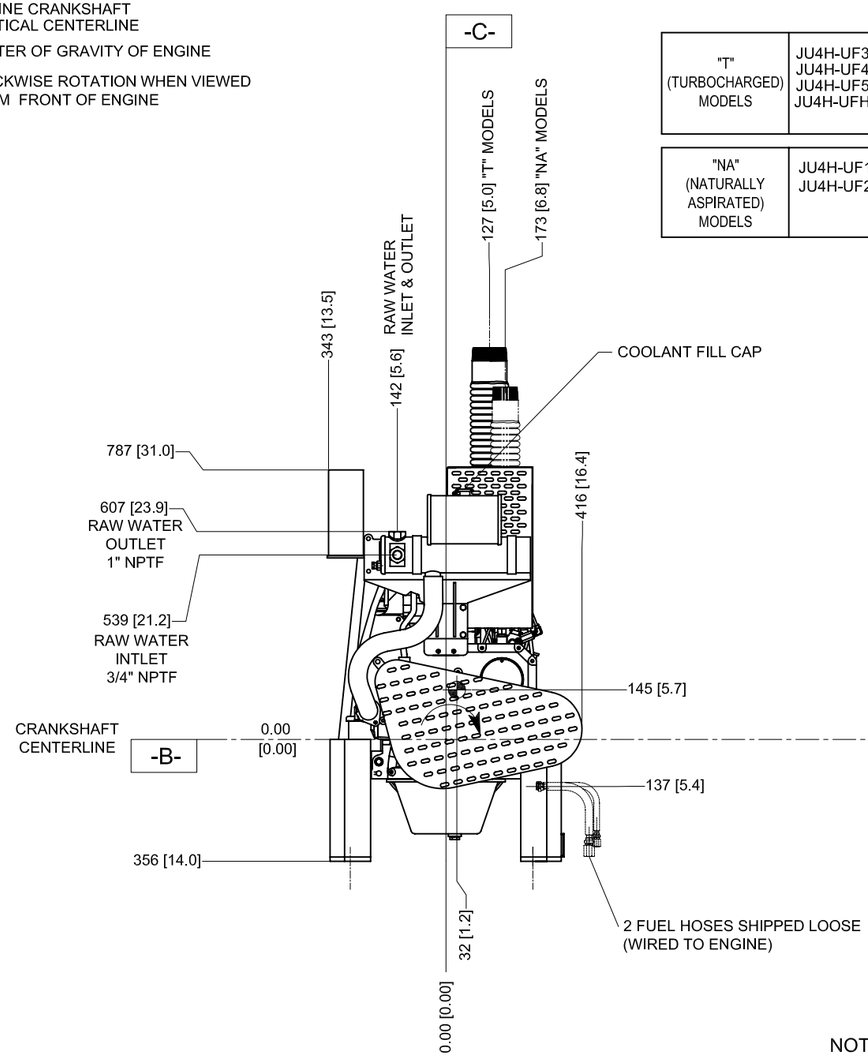
REFER TO THE SPECIFIC MODEL "INSTALLATION AND OPERATION DATA" FOR INSTALLATION GUIDELINES

"T" (TURBOCHARGED) MODELS	JU4H-UF30, JU4H-UF32, JU4H-UF34 JU4H-UF40, JU4H-UF42, JU4H-UF50 JU4H-UF52, JU4H-UF54, JU4H-UF58 JU4H-UFH0, JU4H-UFH2,JU4H-UFH8 SHOWN
"NA" (NATURALLY ASPIRATED) MODELS	JU4H-UF10, JU4H-UF12, JU4H-UF14 JU4H-UF20, JU4H-UF22, JU4H-UF24 JU4H-UFAB26 IN PHANTOM

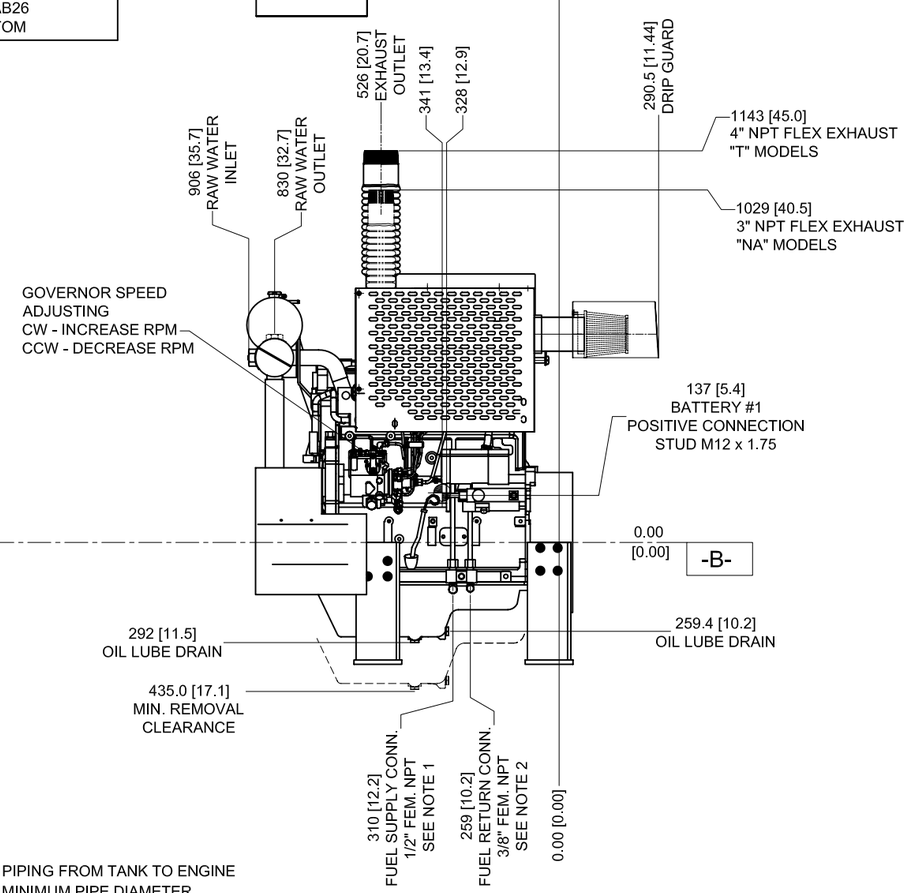
DO NOT SCALE

VIEW FROM TOP OF ENGINE





VIEW FROM FRONT OF ENGINE



VIEW FROM LEFT SIDE OF ENGINE

NOTES:
1. FUEL SUPPLY PIPING FROM TANK TO ENGINE SHOULD BE 1/2" MINIMUM PIPE DIAMETER.
2. FUEL RETURN PIPING FROM ENGINE TO TANK SHOULD BE 3/8" MINIMUM PIPE DIAMETER.

DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

REV	DESCRIPTION	ECN#	DWN	APVD	DATE
N	ISSUED ENGINEERING DRAWING	1226	MAL	KRW	23MAY08
P	ADDED ENGINE MODEL JU4H-UFAB26	1226	MAL	KRW	12SEP08
Q	CHANGED FUEL PUMP CENTERLINE	1622	KJM	KJK	12JAN09
R	ADDED DRIP GUARD	1201	MAL	KRW	08OCT08

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MACHINE TOLERANCES

DECIMAL	mm	inch
X.	±1.4	
X.X	±0.3	±0.06
X.XX	±0.3	±0.03
X.XXX	±0.025	±0.01
X.XXXX		±0.001

ANGULAR: ±0.5°

FABRICATION TOLERANCES

DECIMAL	mm	inch
X.	±3	
X.X	±1.5	±0.12
X.XX		±0.06

ANGULAR: ±1.0°

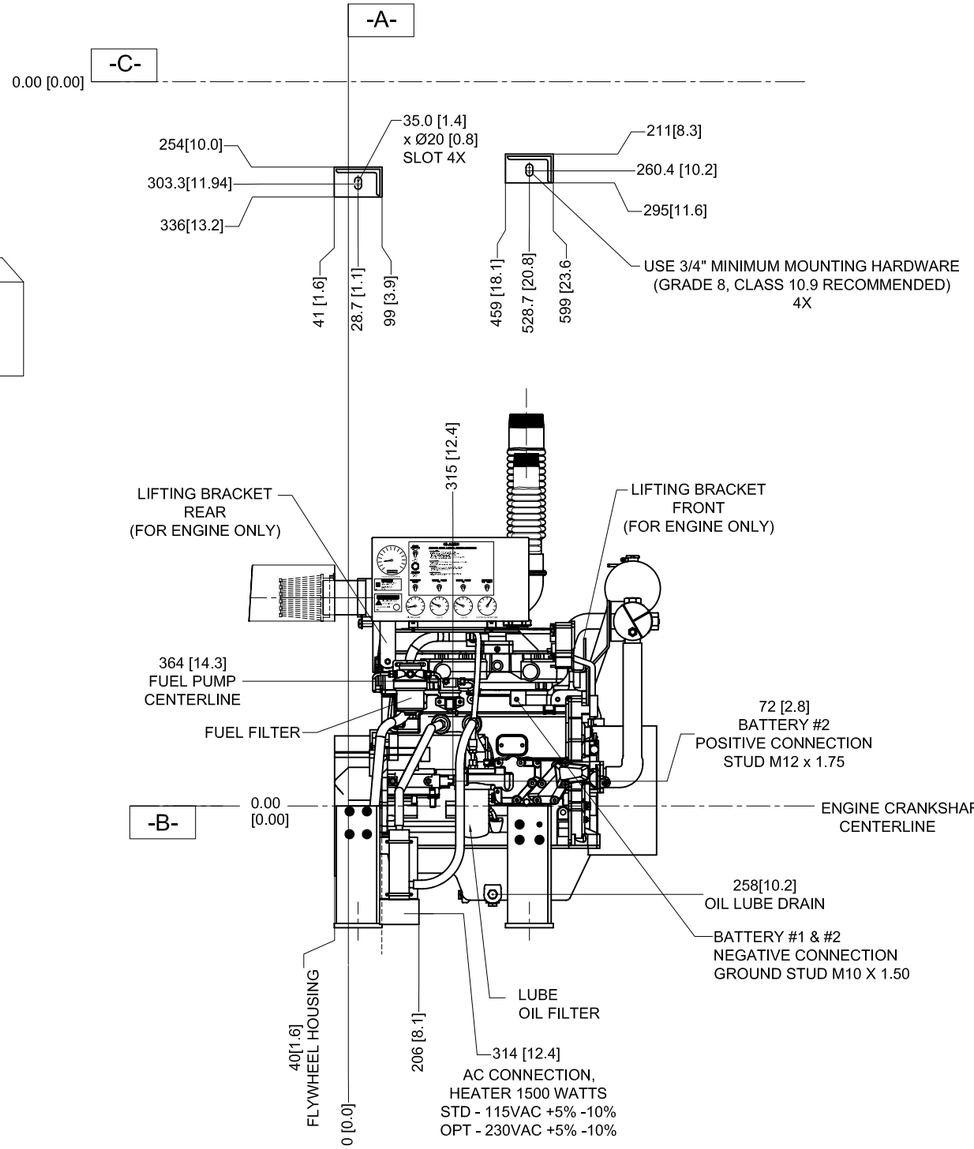
CONTROLLED DRAWING

CLARKE
Fire Protection Products, Inc.

DRWN	KJMYERS
DATE	12JAN09
ENGR	KKUNKLER
MATERIAL	
SIMILAR TO	
USED ON/LAYOUT PART NO.	
UNITS	MM [INCH]
NAME	INSTALLATION DRAWING, FIRE PUMP ENGINE JU4H-UF MODELS
PART NO.	D534
REV	R
PAGE OF	1 2

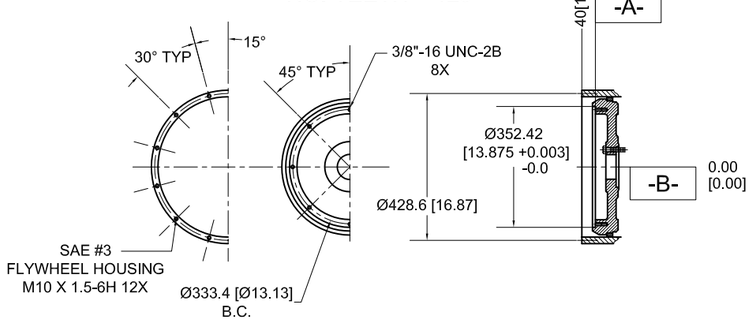
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FOR ENGINE SPECIFIC OPTIONS
SEE www.CLARKEFIRE.com



VIEW FROM RIGHT
SIDE OF ENGINE

DETAIL DATUM -A-
BARE FLYWHEEL
NO. TEETH = 129



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MACHINE TOLERANCES

DECIMAL	mm	inch
X.	±1.5	
X.X	±0.8	±0.06
X.XX	±0.3	±0.03
X.XXX	±0.025	±0.01
X.XXXX		±0.001

ANGULAR: ±0.5°

FABRICATION TOLERANCES

DECIMAL	mm	inch
X.	±3	
X.X	±1.5	±0.12
X.XX		±0.06

ANGULAR: ±1.0°

CONTROLLED DRAWING (YES / NO)

CLARKE
Fire Protection Products, Inc.

DRWN	KJMYERS
DATE	12JAN09
ENGR	KKUNKLER
MATERIAL	
NAME	INSTALLATION DRAWING, FIRE PUMP ENGINE JU4H-UF MODELS
PART NO.	D534
REV	R
SIMILAR TO	
USED ON/LAYOUT PART NO.	
UNITS	MM [INCH]
PAGE OF	2 2

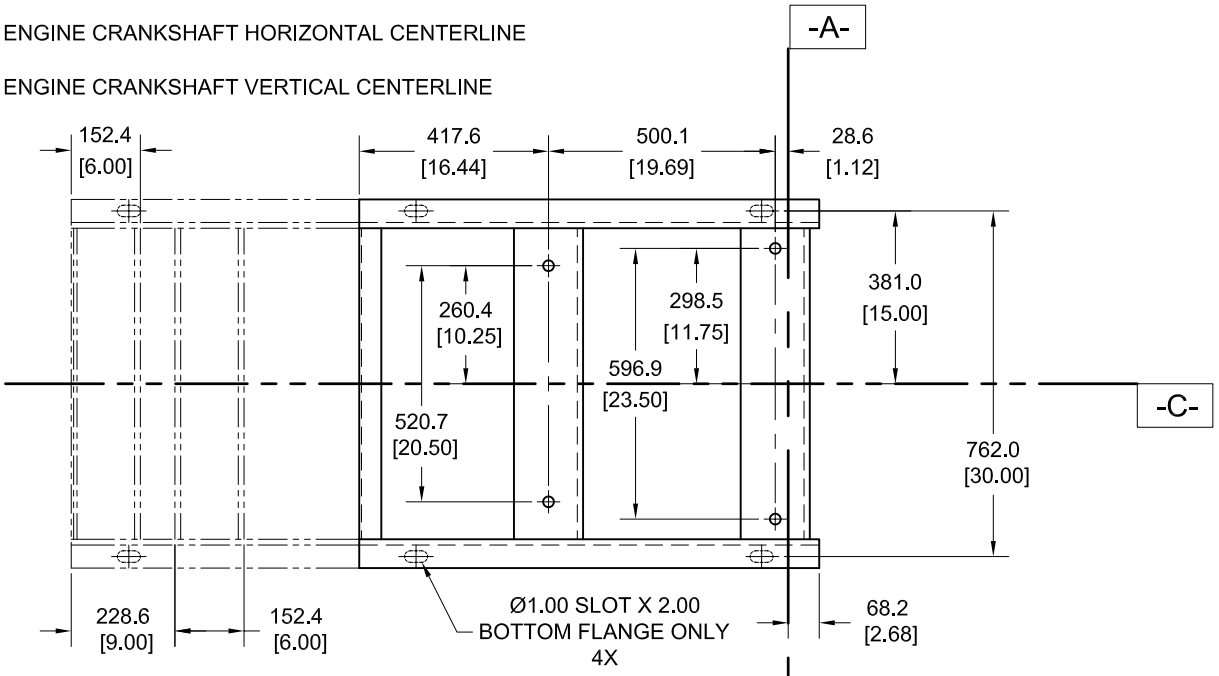
DATUMS

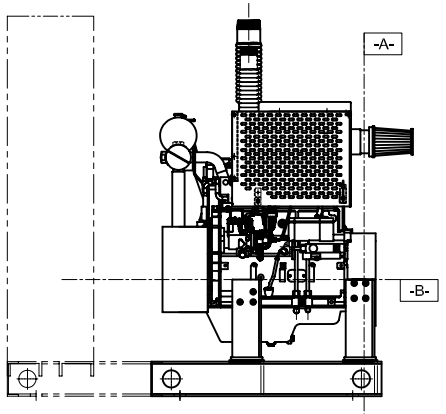
-A- - MOUNTING FACE OF FLYWHEEL

-B- - ENGINE CRANKSHAFT HORIZONTAL CENTERLINE

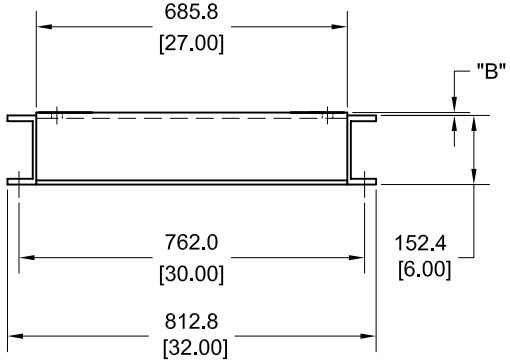
-C- - ENGINE CRANKSHAFT VERTICAL CENTERLINE

ENGINE MODEL	DRIVESHAFT	"A"	"B"
JU4H-UF10, 12, 14, 20, 22, 24, AB26	CDS10	20.25	0.25
	SC41A	20.25	0.25
JU4H-UF30, 32, 34, H8, H0, H2, 40, 42, AD4G	CDS20	20.25	0.25
JU4H-UF30, 32, 34, H8, H0, H2, 40, 42, 58, 50, 52, 54, AD4G, AD5G, ADJG, ADP0, ADR0, ADW8, AD98	SC55A	20.25	0.25
JU4H-UF58, 50, 52, 54, AD5G, ADJG, ADP0, ADR0, ADW8	CDS30	20.35	0.35
JU4H-UFAD98	CDS50	20.45	0.45





NOTE: NOT TO SCALE



ATTENTION

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

REV	DESCRIPTION	ECN#	DWN	APVD	DATE
M	REDRAWN AS OPTION PAGE	1226	RJT	KRW	23MAY08
N	DIMENSIONS FOR DIFFERENT DRIVESHATS ADDED	1695	KJM	KRW	09APR09
P	ADDED TIER 3 ENGINE MODELS	1845	KJM	KRW	01DEC09

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MACHINE TOLERANCES

DECIMAL	mm	Inch
X	±1.5	
X.X	±0.8	±0.06
X.XX	±0.3	±0.03
X.XXX	±0.025	±0.01
X.XXXX		±0.001
ANGULAR: ±0.5°		

FABRICATION TOLERANCES

DECIMAL	mm	Inch
X	±3	
X.X	±1.5	±0.12
X.XX		±0.06
ANGULAR: ±1.0°		

CONTROLLED DRAWING

CLARKE Fire Protection Products, Inc.

DRWN	RJTOLLE
DATE	14MAY08
ENGR	KWAULIGMAN
MATERIAL	
NAME	VERTICAL BASE OPTION FOR JU4H
PART NO.	D535
REV	P
SIMILAR TO	
USED ON/LAYOUT PART NO.	D534
UNITS	MM [INCH]
PAGE OF	1 1

JU4H-UF28

FIRE PUMP DRIVER

EMISSION DATA

FOR

EPA NSPS (4)

4 *Cylinders*
Four *Cycle*
Lean *Burn*
Turbocharged

500 PPM SULFUR #2 DIESEL FUEL								
RPM	BHP (1)	FUEL GAL/HR (L/HR)	GRAMS / HP- HR				EXHAUST	
			NMHC	NOx	CO	PM (2)	°F (°C)	CFM (m^3/min)
1760	60	3.8 (14.4)	0.39	5.41	0.87	0.24	1021 (549)	379 (10.7)

4045T Base Model Engine Manufactured by John Deere Co.

Notes:

1) *Engines are rated at standard conditions of 29.61in. (7521 mm) Hg barometer and 77°F (25° C) inlet air temperature. (SAE J1349)*

2) *PM is a measure of total particulate matter, including PM_{10}.*

3) *These emissions values have been determined using engine test data with 500 parts per million (PPM) Sulfur content fuel.*

4) *All engine models and ratings are USA EPA emissions compliant per NSPS (40 CFR Part 60 Sub Part IIII)*

Disclaimer

1. Stationary diesel-fueled compression ignition engines manufactured after July 1, 2006 for installations within U.S. are subject to the proposed EPA new source performance standards (the "NSPS"), Federal Code of Regulations Title 40 Chapter I, part 60.

2. The reverse side of this document shows the emissions from this model engine supplied by Clarke Fire Protection Products ("Clarke"). These emissions values are calculated based on an ISO 8178 part 4 D1 cycle weighted average of actual testing.

3. Actual test data in the field or other information established by the local air districts or the EPA that show actual emissions from an engine supplied by Clarke in excess of the NSPS limitations could indicate a violation of the NSPS and subject the owner and/or operator of the engine to penalties under federal law. Although Clarke believes that the engines supplied by Clarke comply with the NSPS based on the available data, for the foregoing reasons, Clarke cannot, and does not, guarantee that its engines will comply with the NSPS emission regulations.

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8 June 2006