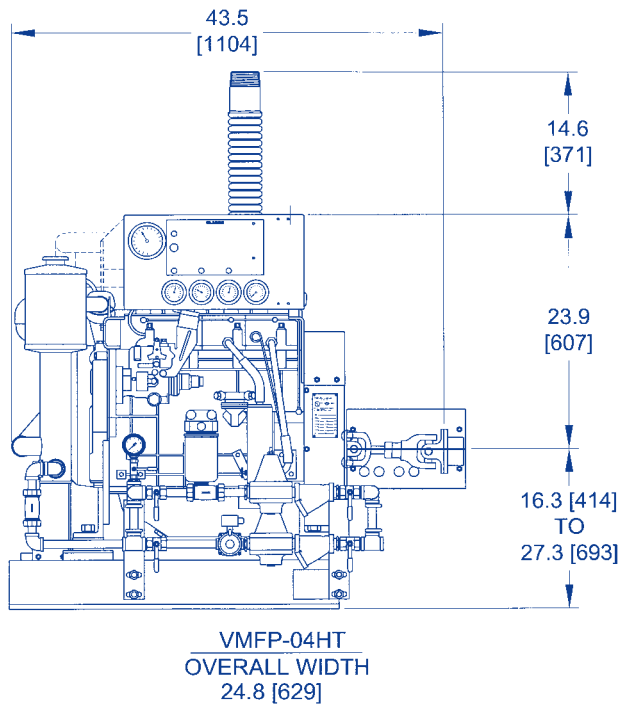


CLARKE FIRE PUMP DRIVERS



MODELS

VMFP-04HN VMFP-04HT VMFP-06HT
VMFP-T6HT VMFP-L6HR VMFP-T6HR

APPROVED RATINGS (BHP)/(kw) FM-UL*

VMFP MODEL	OPERATING SPEED (RPM)			
	2800	3000	3300	3600
04HN	55	56	56	60
	41	42	42	45
04HT	80	83	86	87
	60	62	64	65
06HT	104	115	120	115
	78	86	90	86
T6HT	135	140	143	145
	101	104	107	108
L6HR	155	160	163	165
	116	119	122	123
T6HR	160	175	180	185
	119	131	134	138

ENGINE EQUIPMENT

- Air Cleaner** — (S) Direct Mounted, Washable, For Indoor Service Only
- Alternator** — (S) 12V-DC, 42 Ampere, with Belt Guard
- Exhaust Protection** — (S) Blankets For Manifolds & Turbo
- Exhaust Flex Connection** — (S) SS Flex, NPT End
- Flywheel** — (S) Includes Integral Cover
- Flywheel Power Take Off** — (S) Drive Shaft System, 04HN, 04HT - SC41; 06HT, T6HT, L6HR, T6HR - SC55
- Fuel Connections** — (S) Fire Resistant Flexible Supply & Return Lines
- Fuel Injection System** — (S) Bosch Direct Injection
- Fuel Filter** — (S) With Water Drain
- Engine Heater** — (S) 115 V- AC, 850 Watts (O) 230 V- AC, 850 Watts
- Governor** — (S) Constant Speed, Mechanical
- Heat Exchanger** — (S) Tube & Shell Type, Rated 60 PSI w/NPTF Connections
- Instrument Panel** — (S) English & Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure, Two (2) Voltmeters
- Junction Box** — (S) Integral With Instrument Panel. For DC Wiring Interconnection To Engine Controller
- Lube Oil Cooler** — (S) Engine Water Cooled, Plate Type
- Lube Oil Filter** — (S) Full Flow w/By-Pass Valve
- Lube Oil Pump** — (S) Gear Driven, Rotor Type
- Manual Start Controls** — (S) On Instrument Panel With Control Position Warning Light
- Mounts** — (S) Adjustable Height With Resilient Pad
- Overspeed Control** — (S) Electronic w/Reset & Test on Instrument Panel
- Raw Water Solenoid Operation** — (S) Automatic With Emergency Local Control
- Run-Stop Control** — (S) On Instrument Panel With Control Panel Position Warning Light
- Starters** — (S) Two (2) 12V-DC Motors
- Throttle Control** — (S) Tamper Proof
- Water Pump** — (S) Dual Belt Driven, Centrifugal Type

(S) – Standard Equipment

(O) – Optional Equipment

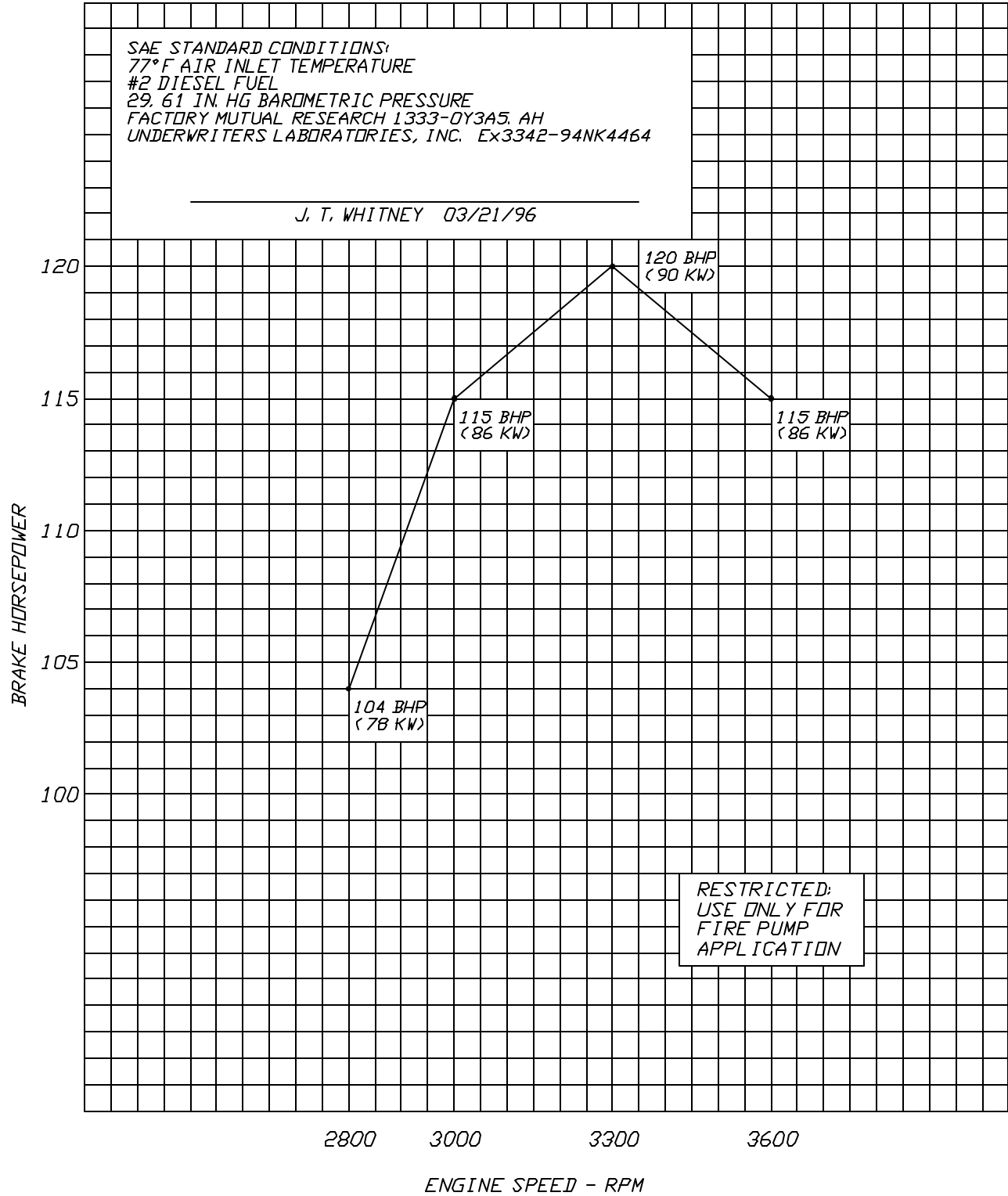


LISTED
513Y



meets
NFPA-20
Requirements





VMFP-06HT INSTALLATION & OPERATION DATA (Continued)

<u>Exhaust System</u>	<u>2800</u>	<u>3000</u>	<u>3300</u>	<u>3600</u>
Exhaust Flow - ft. ³ /min. (m ³ /min.)	696 (20)	780 (22)	900 (25)	944 (27)
Exhaust Temperature - °F (°C)	915 (491)	1010 (543)	1125 (607)	1160 (627)
Maximum Allowable Back Pressure - in. H ₂ O (kPa)		30 (7.5)		
Minimum Exhaust Pipe Dia. - in. (mm)**		4.0 (102)		
 <u>Fuel System</u>				
Fuel Consumption - gal./hr. (L/hr.)	5.8 (22)	6.5 (24)	7.2 (27)	7.6 (29)
Fuel Pressure - lb./in. ² (kPa)		4.4-5.8 (30-40)		
Minimum Line Size - Supply - in. (mm)**		0.37 Sch. 40 - Black		
Minimum Line Size - Return - in. (mm)**		0.25 Sch. 40 - Black		
Maximum Allowable Fuel Pump Suction				
With Clean Filter - in. H ₂ O (mH ₂ O)		39.4 (1.0)		
Maximum Allowable Head on Fuel Pump - ft (m)		9.8 (3.0)		
Fuel Filter Micron Size		4		
Fuel Modulator/Setting		Boost/None		
 <u>Heater System</u>				
Jacket Water Heater		Standard		
Wattage (Nominal)		850		
Voltage - AC, 1P		115 (+5%, -10%)		
Optional Voltage - AC, 1P		230 (+5%, -10%)		
Lube Oil Heater Wattage (Required When Ambient Is Below 50°F (10°C)		100		
 <u>Induction Air System</u>				
Air Cleaner Type		Indoors Service Only - Washable		
Air Intake Restriction Maximum Limit				
Dirty Air Cleaner - in. H ₂ O (kPa)	7.4 (1.8)	8.0 (2.0)	8.8 (2.2)	9.0 (2.2)
Clean Air Cleaner - in. H ₂ O (kPa)	5.4 (1.3)	6.0 (1.5)	6.8 (1.7)	7.0 (1.7)
Engine Air Flow - ft. ³ /min. (m ³ /min.)	272 (7.7)	285 (8.1)	305 (8.6)	313 (8.9)
Maximum Allowable Temperature (Air To Engine Inlet) - °F (°C)***		130 (54)		
 <u>Lubrication System</u>				
Oil Pressure - normal - lb./in. ² (kPa)		58-65 (400-450)		
In Pan Oil Temperature - °F (°C)		230-270 (110-132)		
Oil Pan Capacity - High - qt. (L)		10 (9.5)		
Low - qt. (L)		6.0 (5.7)		
Total Oil Capacity with Filter - qt. (L)		11 (10)		
 <u>Performance</u>				
BMEP - lb./in. ² (kPa)	116 (800)	120 (827)	114 (786)	100 (690)
Piston Speed - ft./min. (m/min.)	1834 (559)	1965 (599)	2162 (659)	2358 (719)
Noise - dB (A) @ 1m		C13923		
Power Curve		CDDA - H064 - 01		

**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.)

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

VMFP-04HN; -04HT; -06HT; -T6HT; -L6HR; -T6HR ENGINE MATERIALS AND CONSTRUCTION

Air Cleaner

Type Indoor Usage Only
Oiled Fabric Pleats
Material Surgical Cotton
Aluminum Mesh

Camshaft

Material Sulphurnitridized
Steel, Case Hardened
Location In Block
Drive Gear, Helical
Type of Cam Ground

Charge Air Cooler (L6HR & T6HR 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 CU/NI, Silicone

Connecting Rod

Type H Section
Material Nickel Chrome
Molybdenum

Coolant Pump

Type Centrifugal
Drive Belt, Dual

Cooling Water Supply By-Pass

Fitting(s) Malleable Iron-Galvanized
Pipe Sch. 40 - Galvanized
Strainer(s) Two (2) - S.S. .060 Screen
Regulator(s) Two (2) - A.S.S.E. 1003
Body Bronze
Seat Stainless Steel

Crank Main Bearings

Type Precision Half Shells
Material Aluminum Silicon
Copper Backed Steel
Tunnel Supports Aluminum

Crank Rod Bearings

Type Precision Half Shell
Number 1 Pair Per Cylinder
Material Aluminum Silicon
Copper Backed Steel

Crankshaft

Material Forged Chrome
Molybdenum Steel
Type of Balance Dynamic

Cylinder Block

Type One Piece
Tunnel Bored
Material Cast Iron Alloy

Cylinder Head

Type 1 Per Cylinder
Material Aluminum

Valves

Type Poppet
Arrangement Overhead Valve
Number/Cylinder 1 Intake
..... 1 Exhaust
Operating Mechanism Mechanical Rocker Arm
Type of Lifter Large Head
Valve Spring
Number/Valve 2
Valve Seat Insert Replaceable

Fuel Pump

Type Diaphragm
Drive Cam Lobe

Heat Exchanger

Type Tube & Bundle
Materials
Tubes & Headers 80/20 CU/NI
Shell Copper
Electrode Zinc

Injection Pump

Type Rotary Distributor
Drive Gear

Liners

Type Wet Liner
Material Centrifugal Casting

Lubrication Pump

Type Lobe
Drive Gear

Mounts - Engine Isolation

Type Bonded
Material Neoprene, Steel

Piston

Type and Material Aluminum Alloy

Piston Pin


Type Full Floating

Piston Pin Bushing

Material CL010

Piston Rings

Number/Piston 3
Top Barrel Faced
Second Flat Faced, Torsional
Third Scraper

- DATUMS**
- A- - REAR FACE OF OUTPUT COUPLING
 - B- - CRANKSHAFT HORIZONTAL CENTERLINE
 - C- - ENGINE CRANKSHAFT AND PUMP SHAFT VERTICAL CENTERLINE
 - D- - PUMP SHAFT HORIZONTAL CENTERLINE
-  - CENTER OF GRAVITY OF ENGINE

CAUTION

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

BASE MUST BE FULLY GROUTED AND SECURED WITH .75(20mm) ANCHOR BOLTS AT ALL MOUNT HOLES PROVIDED

MODEL	B	E	F	H	P	R
VMFP-04HN	23.65 600.8	13.37 339.5	15.06 382.5	31.81 808.0	5.46 138.7	40.71 1034.0
VMFP-04HT	18.29 464.6	11.22 285.0	15.13 384.4	31.88 809.8		
VMFP-06HT	23.06 585.6	11.05 280.6	13.10 332.9	29.98 761.5	14.78 375.4	49.53 1258.0
VMFP-T6HT						
VMFP-L6HR	23.58 598.8	13.35 339.0	15.95 405.1	31.19 792.2	15.28 388.1	50.03 1270.8
VMFP-T6HR						

ATTENTION

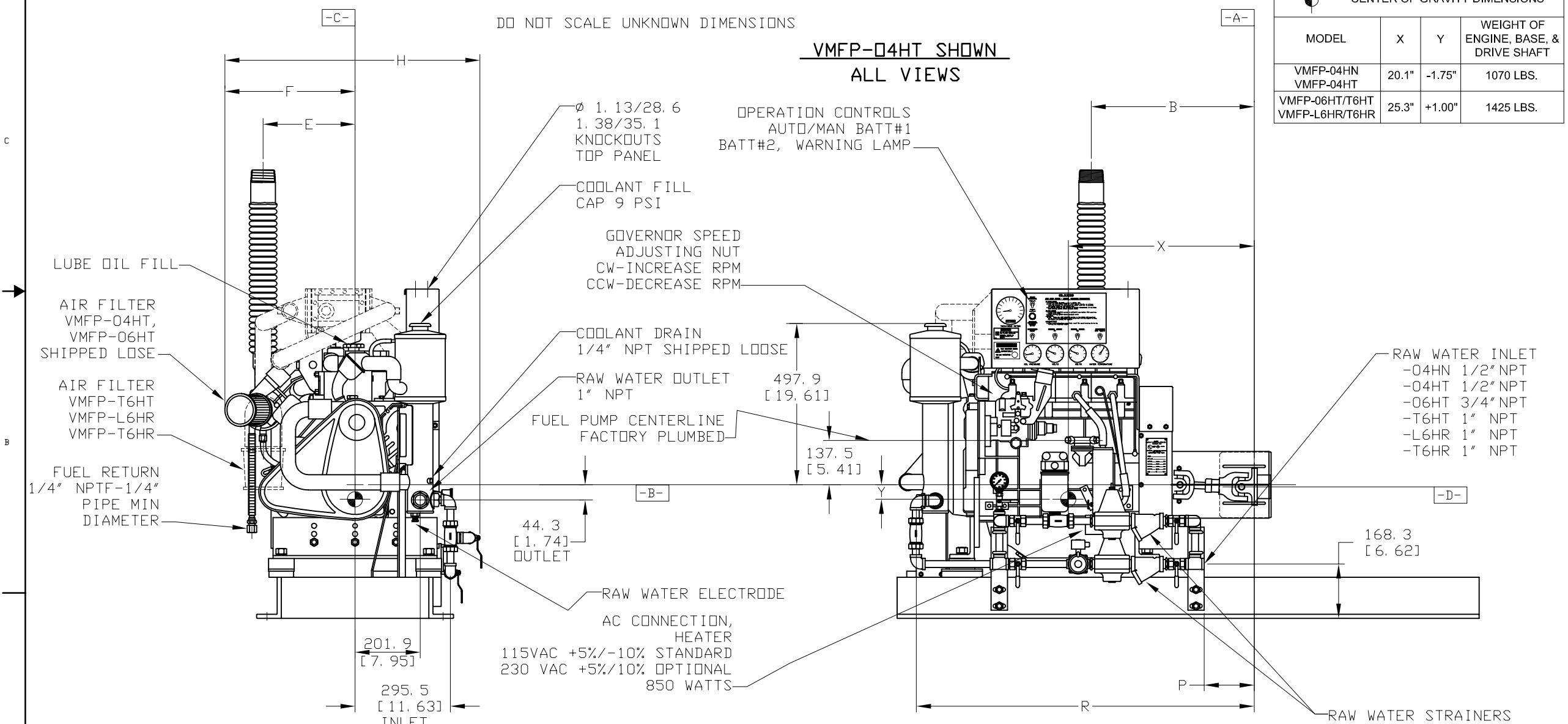
REFER TO THE SPECIFIC MODEL "INSTALLATION AND OPERATION DATA" FOR INSTALLATION GUIDELINES


THE DRIVESHAFT IS NOT DESIGNED TO OPERATE AT 0° ANGLE THE ENGINE CRANKSHAFT IS TO BE A PARALLEL OFFSET 0.2 ±0.1 INCH ABOVE THE PUMP SHAFT. THE ENGINE CRANKSHAFT MAY BE PARALLEL OFFSET FROM THE PUMP SHAFT 0.2 INCH RIGHT OR LEFT. REFER TO THE ENGINE MANUAL FOR ALIGNMENT INSTRUCTIONS.

REDUCED DRAWING

DO NOT SCALE UNKNOWN DIMENSIONS

**VMFP-04HT SHOWN
ALL VIEWS**



 - CENTER OF GRAVITY DIMENSIONS

MODEL	X	Y	WEIGHT OF ENGINE, BASE, & DRIVE SHAFT
VMFP-04HN VMFP-04HT	20.1"	-1.75"	1070 LBS.
VMFP-06HT/T6HT VMFP-L6HR/T6HR	25.3"	+1.00"	1425 LBS.

**DRAWING SUBJECT
TO CHANGE
WITHOUT NOTICE**

SYM	REVISION	ECN#	DRWN	APVD	DATE
A	ISSUED FROM ENGINEERING DRAWING REV. 5		SEN	JTW	18AUG97
B	ADDED T6HT, L6HR, T6HR MODELS		KJK	JTW	25MAR99
C	REVISED DIMENSIONS		TP	LD	14JUL99
D	ADDED "RAW WATER INLET" NOTE		CPB		03MAY00
E	"J" DIM ON SHEET 2 FOR 06HT, T6HT, L6HR/T6HR WAS 37.41, ADDED TELESCOPING GUARD & NEW RELATED DIMENSIONS, ENGINE SET HEIGHT WAS 23.29	343	MAL	KTE	22DEC03
F	ADDED CENTER OF GRAVITY DIMENSIONS	428	MAL		03MAY04

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DWN: DMPOTTER
DATE: 13MAY96
ENGR: JTWHITNEY
CHK:

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

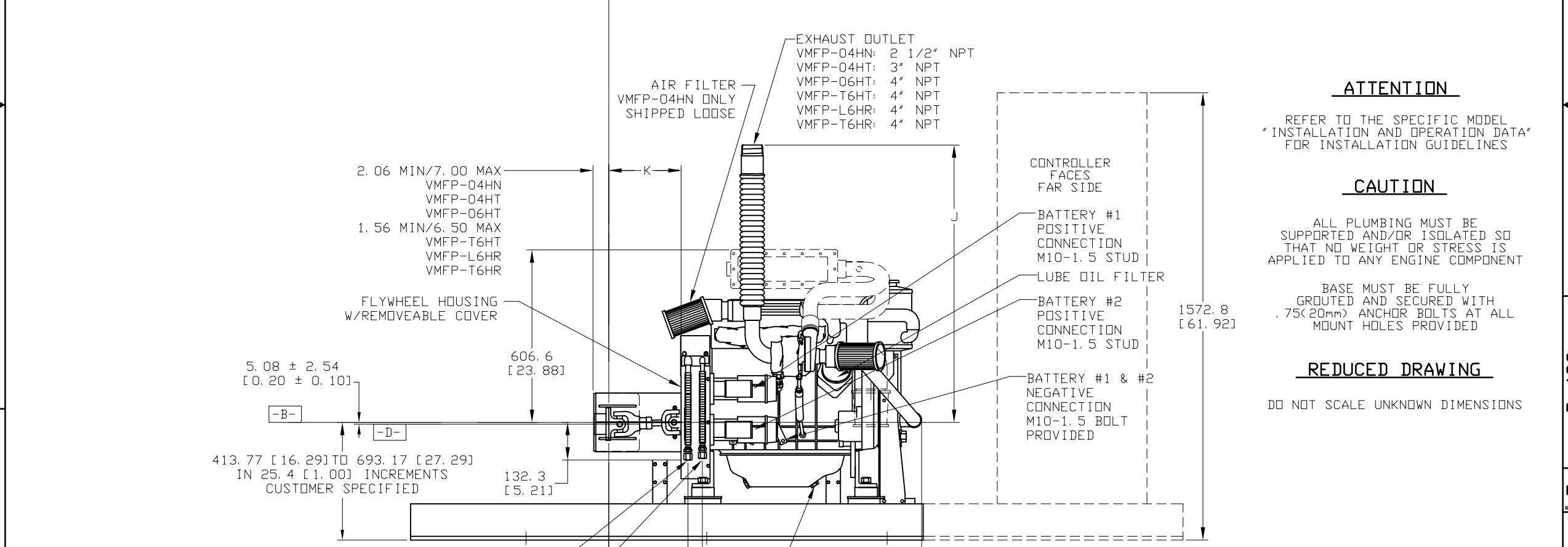
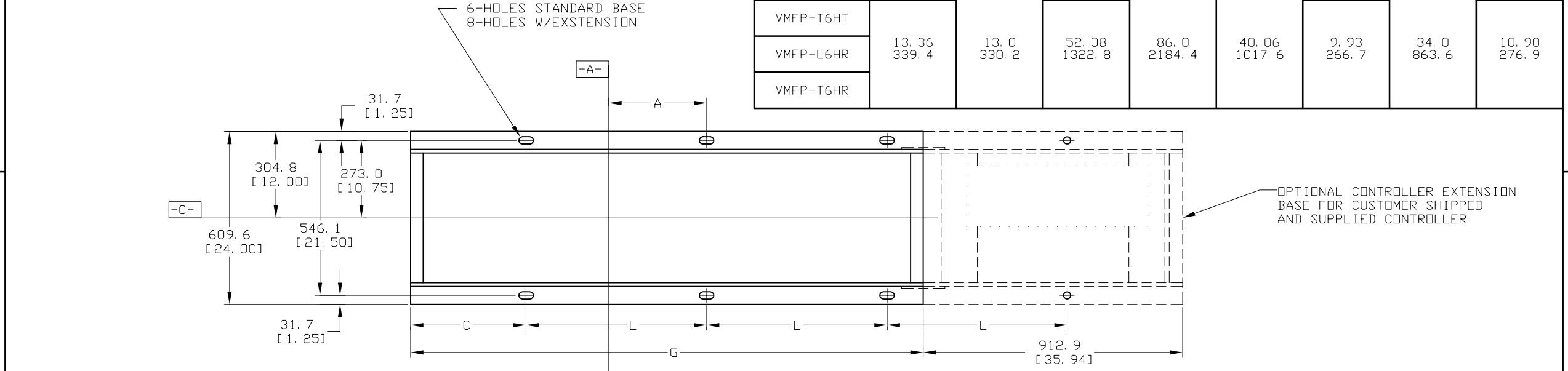
NAME: **INSTALLATION DRAWING,
FIRE PUMP ENGINE-
VMFP SERIES DRIVERS**

SIZE: R PART NO: D-482 REV: F
SCALE: 3/16 UNITS: 1/8 IN or 3 MM THIRD ANGLE PROJ. SHEET OF 1 2

USAGE: 700 INSP: N SERIES CODE: 700P

- DATUMS**
- A- - REAR FACE OF OUTPUT COUPLING
 - B- - CRANKSHAFT HORIZONTAL CENTERLINE
 - C- - ENGINE CRANKSHAFT AND PUMP SHAFT VERTICAL CENTERLINE
 - D- - PUMP SHAFT HORIZONTAL CENTERLINE

MODEL	A	C	D	G	J	K	L	N
VMFP-04HN	13.05 331.4	16.0 406.4	43.48 1104.4	71.0 1803.4	38.28 972.3	9.50 241.4	25.0 635.0	10.47 266.0
VMFP-04HT					38.50 977.9			
VMFP-06HT	12.86 326.8		51.79 1315.4					
VMFP-T6HT								
VMFP-L6HR	13.36 339.4	13.0 330.2	52.08 1322.8	86.0 2184.4	40.06 1017.6	9.93 266.7	34.0 863.6	10.90 276.9
VMFP-T6HR								



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	DATE	13MAY96										
	ENGR	JTWHITNEY										
	CHK											
USAGE	700	INSPI	N	SERIES CODE	700P	SCALE	3/16	UNITS	IN IN/MM or MM	THIRD ANGLE PROJ.	SHEET OF	2 2

DATUMS

- A- - REAR FACE OF OUTPUT COUPLING
- B- - CRANKSHAFT HORIZONTAL CENTERLINE
- C- - ENGINE CRANKSHAFT AND RIGHT ANGLE GEAR SHAFT VERTICAL CENTERLINE
- D- - RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE

CAUTION

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BASE MUST BE FULLY GROUTED AND SECURED WITH .75(20mm) ANCHOR BOLTS AT ALL MOUNT HOLES PROVIDED

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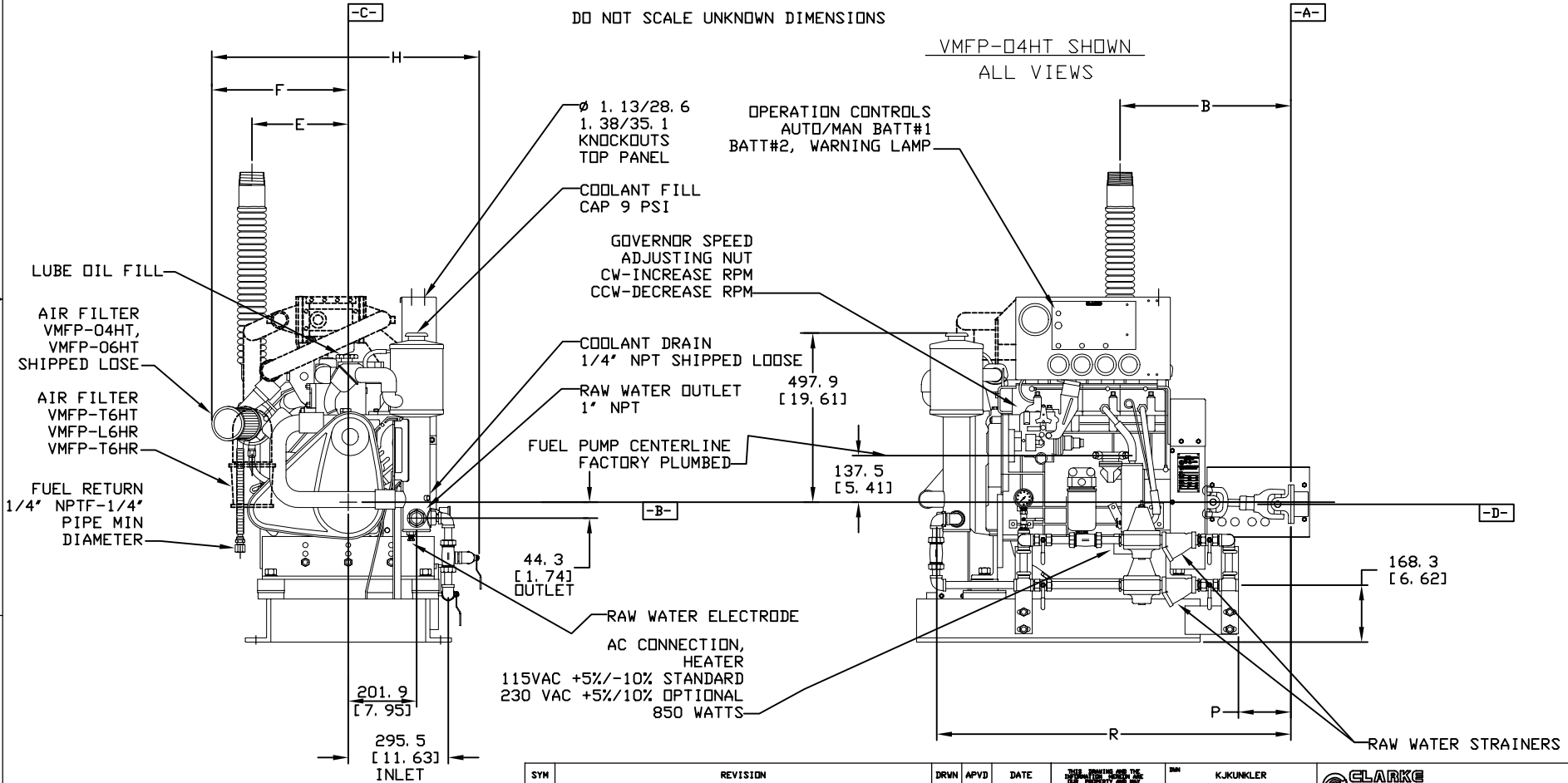
REFER TO THE SPECIFIC MODEL 'INSTALLATION AND OPERATION DATA' FOR INSTALLATION GUIDELINES

MODEL	B	E	F	H	P	R
VMFP-04HN	600.8 23.65	339.5 13.37	382.5 15.06	808.0 31.81	138.7 5.46	1034.0 40.71
VMFP-04HT	464.6 18.29	285.0 11.22	384.4 15.13	809.8 31.88		
VMFP-06HT	585.6 23.06	280.6 11.05	332.9 13.10	761.5 29.98	375.4 14.78	1258.0 49.53
VMFP-T6HT						
VMFP-L6HR	598.8 23.58	339.0 13.35	405.1 15.95	792.2 31.19	388.1 15.28	1270.8 50.03
VMFP-T6HR						

REDUCED DRAWING

DO NOT SCALE UNKNOWN DIMENSIONS

VMFP-04HT SHOWN
ALL VIEWS



DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

SYM	REVISION	DRWN	APVD	DATE
A	ISSUED DRAWING	KJK		01NOV99

DRN	KJKUNKLER
DATE	01NOV99
ENR	JTWHITNEY
CHK	
SCALE	700
SNP	N
SERIES CODE	700P

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

INSTALLATION DRAWING,
 FIRE PUMP ENGINE-
 VMFP SERIES DRIVERS

SIZE R PART NO. D-504 REV A

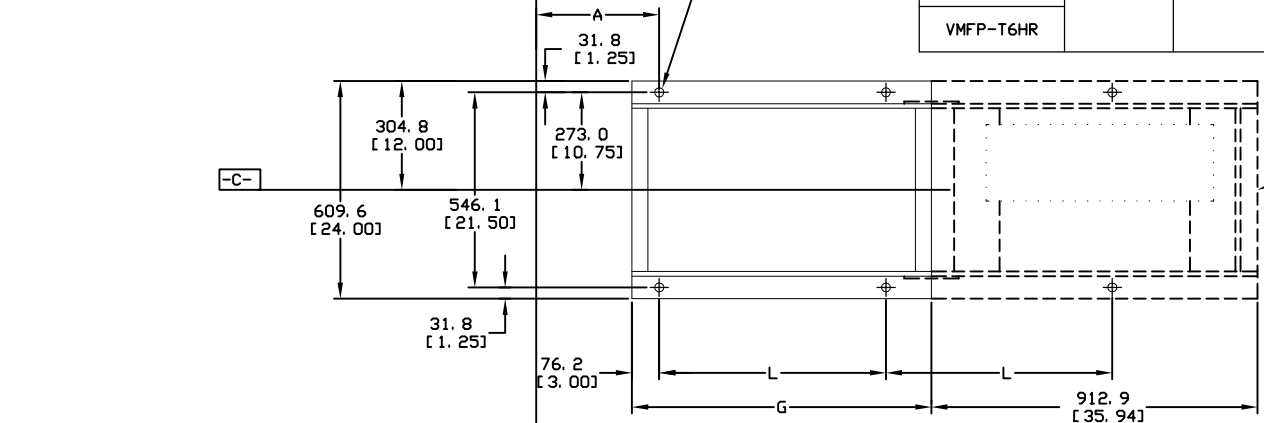
SCALE 3/16 UNITS MM/IN or IN THIS ANGLE FULL SHEET OF 1 2

DATUMS

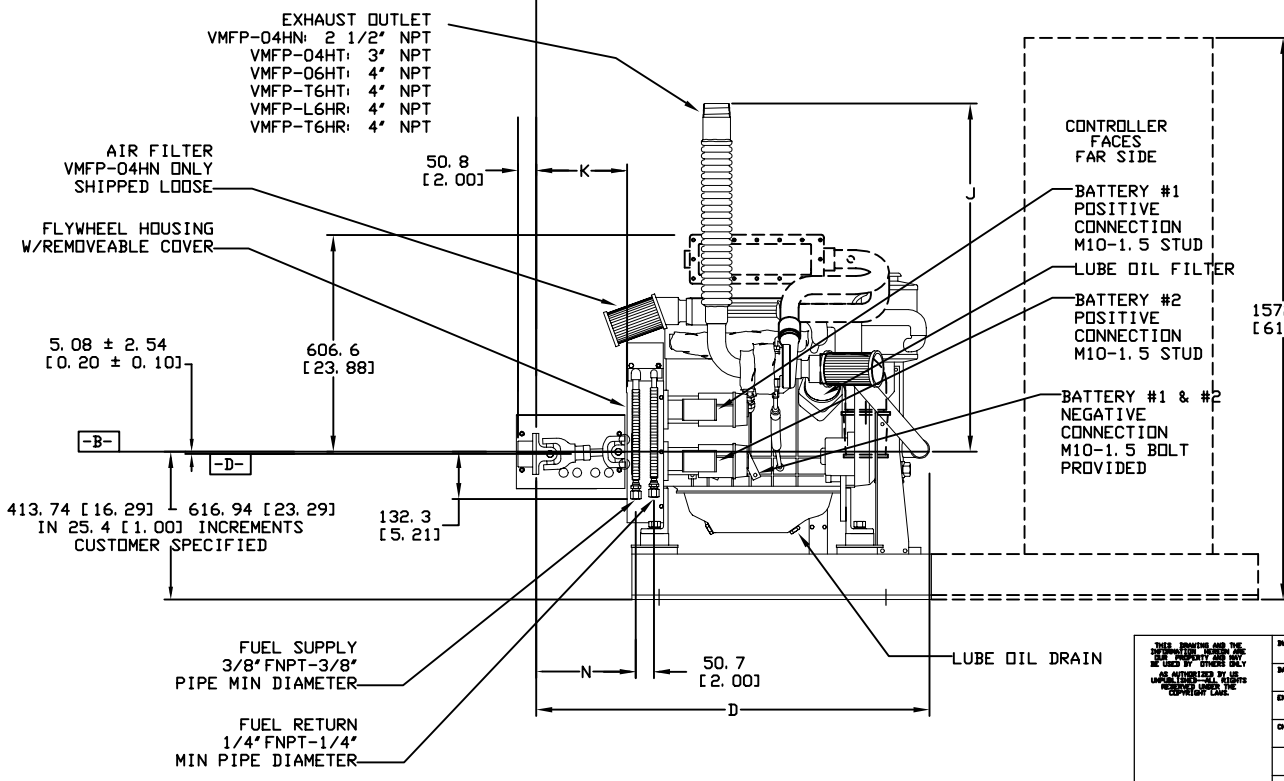
- A- - REAR FACE OF OUTPUT COUPLING
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- C- - ENGINE CRANKSHAFT AND RIGHT ANGLE GEAR SHAFT VERTICAL CENTERLINE
- D- - RIGHT ANGLE GEAR SHAFT HORIZONTAL CENTERLINE

Ø 25.4 [1.00] 6 HOLES STD BASE
8 HOLES W/EXTENSION

MODEL	A	D	G	J	K	L	N
VMFP-04HN	331.4 13.05	1104.4 43.48	838.2 33.0	972.3 38.28	241.4 9.50	635.0 25.0	266.0 10.47
VMFP-04HT				977.9 38.50			
VMFP-06HT	326.8 12.86	1315.4 51.79					
VMFP-T6HT							
VMFP-L6HR	339.4 13.36	1322.8 52.08	1066.8 42.0	950.3 37.41	266.7 9.93	863.6 34.0	276.9 10.90
VMFP-T6HR							



OPTIONAL CONTROLLER EXTENSION
BASE FOR CUSTOMER SHIPPED
AND SUPPLIED CONTROLLER



ATTENTION

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

CAUTION

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

BASE MUST BE FULLY
GROUTED AND SECURED WITH
.75(20mm) ANCHOR BOLTS AT ALL
MOUNT HOLES PROVIDED

REDUCED DRAWING

DO NOT SCALE UNKNOWN DIMENSIONS

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3133 EAST KEMPER ROAD, CINCINNATI, OHIO 45241			INSTALLATION DRAWING, FIRE PUMP ENGINE- VMFP SERIES DRIVERS	
SIZE: R PART NO: D-504 SHEET: 2 OF 2	SCALE: 3/16 UNITS: MM/IN or IN	DATE: 3/16 UNIT: MM/IN or IN	DRAWN: N SERIES CODE: 700P	CHECKED: 700 DATE: 3/16

D-504 A

VMFP-06HT

FIRE PUMP DRIVER

EMISSION DATA

To complete an application for a Permit to Operate, the following data is provided.

6 Cylinders
Four Cycle
Lean Burn
Turbocharged
Diesel Oil - Fuel
No - Energy Recovery from Exhaust
No - Emission Control Device

RPM	BHP	FUEL GAL / HR	AIR/FUEL RATIO	GM / BHP / HR					% O ₂	EXHAUST		TIMING DEGREES
				HC	NOx	CO	SO ₂	PART.		°F	CFM	
3600	115	7.6	26.5	0.12	6.57	0.99	0.80	0.19	9.6	1160	944	STD.
3300	120	7.2	27.2	0.12	6.57	0.99	0.73	0.19	10.0	1125	900	STD.
3000	115	6.5	28.2	0.12	6.57	0.99	0.68	0.19	10.2	1010	780	STD.
2800	104	5.8	30.2	0.12	6.57	0.99	0.67	0.19	11.0	915	696	STD.

For specific RPM & BHP ratings, some of the above data may have been extrapolated from the best available test data.

Sulfur Dioxide based on 0.2% sulfur content in fuel (by weight).

D706LT Base Model Engine Manufactured by VM MOTORI/DETROIT DIESEL CORP.

