

DIESEL DRIVEN PUMPUNIT HK400-CAT3126/C7



VAN HECK BV

P.O. Box 14 8390 AA Noordwolde Holland
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n=800 ø525 45° turned out	projection 	drawn 	checked PB	approved	file 3	project no.	drawing no. 281105-01	rev. A
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PUMPUNIT HK400

PUMP

General

The HK pump is a single-stage mixed-flow centrifugal pump for lifting large quantities of water to medium heads.

The pump is suitable for heavily contaminated and unpurified water.

The pump types HK are not self-priming, but by using the Van Heck priming system and non-return valve, the pump will be made self-priming.

Type : HK-400
Capacity : see performance curve 281105-01
Connections : suction 600 mm stc705 / discharge 400 mm stc515

Pump Casing

A solid circular casing with a tangential discharge nozzle Ø 400 mm, which can be turned 360 degrees in discrete steps.

The pump casing is supported by a cast iron bearing block with 4 integrally casted feet.

Shaft Seal

Sealing is by means of gland packing with grease lubrication.

A stainless steel sleeve in the seal area protects the shaft.

Materials

Pump casing : cast-iron GG20
Bearing block : cast-iron GG20
Shaft : steel (st 50)
Shaft sleeve : stainless steel
Impeller : cast-iron GG20

GEARBOX

To reduce the engine speed of 1,950 rpm to the pump speed of 800 rpm, a gearbox is mounted directly to the bearing block of the pump. This gearbox, type TW-400-G, designed by Van Heck, is sufficient to cope with an input of 140 kW at 1,950/800 rpm ($i = 2,44$).

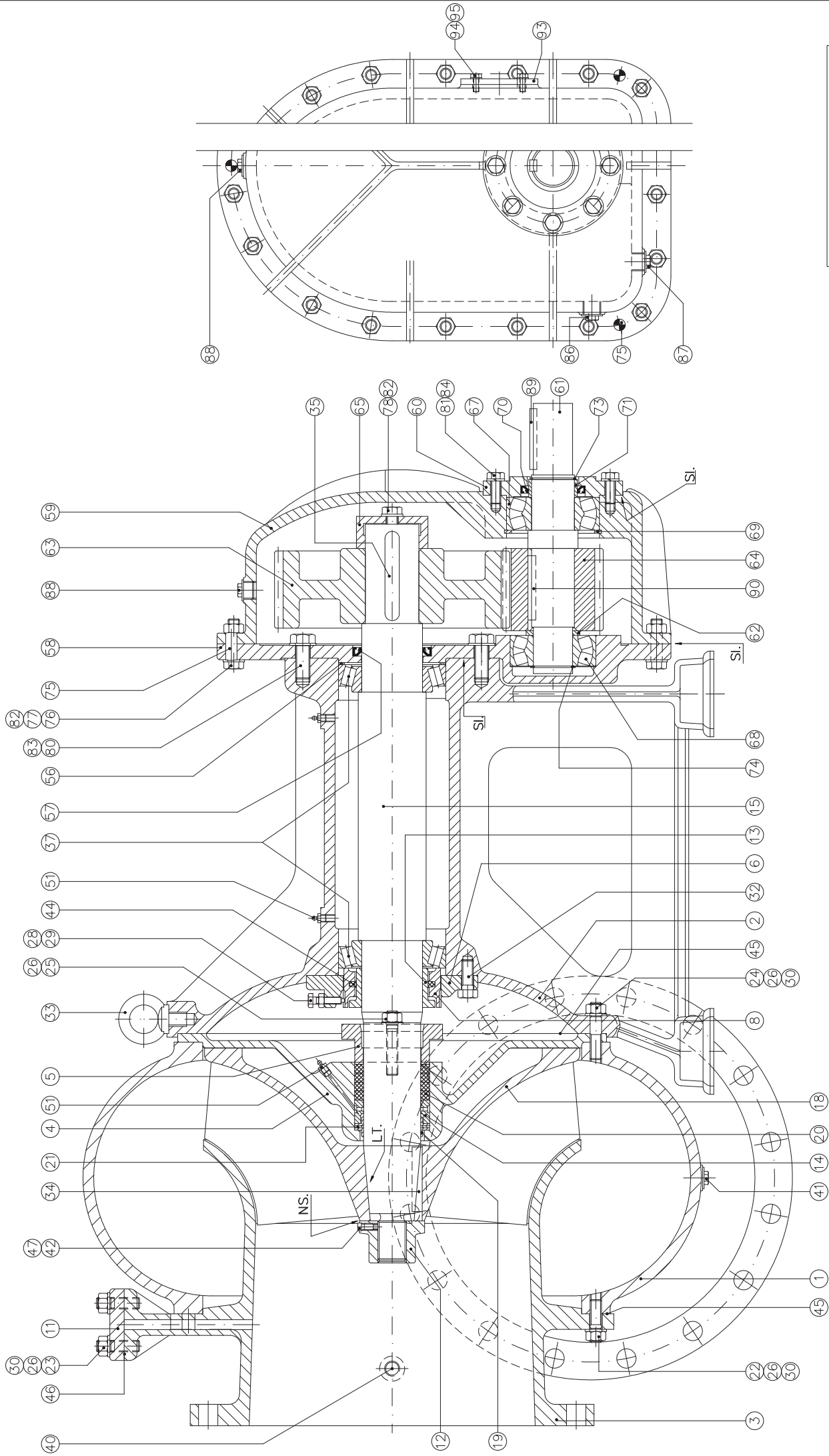
PRIMING SYSTEM

The Van Heck priming system consists of a vacuumpan, which is mounted at the suction nozzle of the pump and a continuously driven air-cooled, oil lubricated vacuum pump.

In combination with a non-return valve on the discharge flange, the pump becomes self-priming.

Make	:	Demag Wittig
Type	:	SL 15-1 VR
Capacity	:	110 m ³ /hr
Vacuum	:	100 mbar (90%)

The vacuum pump is cooled by a radial fan mounted on the rotor shaft and is provided with an automatic lubrication oil pump. Finally the vacuum system is provided with an oil separator and an exhaust to reduce the noise.



SI: Afdichten met siliconepakking
 NS: Monteren met Neverseize multigrade
 LT: Vastzetten met Loctite

OPM.: - Speling tussen waaier (POS.18) en zuigmond (POS.03) afstellen op 0.3mm met vuring 56.
 - Axiale lagerspeling met stelring 8 afstellen op 0.2 ~ 0.3mm.
 - Uitlijning tandwielen controleren met pruisisch blauw.

STUKLIJST ZIE TEK. 170697-17 EN 170697-18	
SAMENSTELLING	
HK 400/TW 400 C	
	P.O. Box 14 8390 AA Noordwolda, Holland Tel. +31 (0)86 - 431739 Telek. +31 (0)86 - 431768
scale 1:2.5	projection
drawn AB	checked 1
approved 	project no. 170697-01
drawing no. 170697-01	rev. 0



Engine Performance Data

Cummins Inc

Columbus, Indiana 47202-3005
<http://www.cummins.com>

Industrial
QSC
FR92001

245 BHP (183 kW) @ 1800 RPM
870 lb-ft (1,180 N-m) @ 1400 RPM

Configuration
D413055CX03

CPL Code
8627-SC16

Revision
11-May-2007

Compression Ratio: **17.5:1**

Fuel System: **CCR**

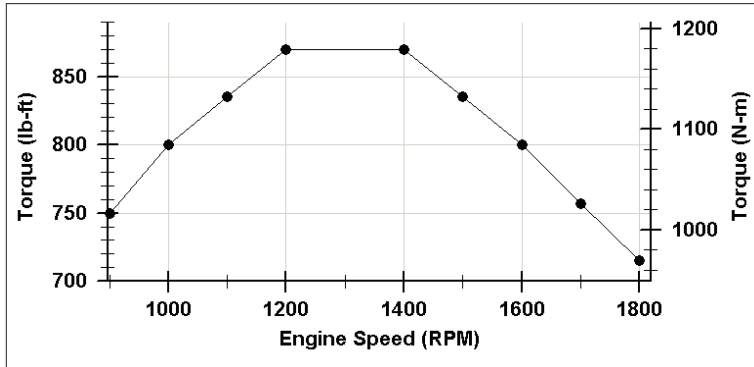
Emission Certification: **U.S. EPA Tier 3, CARB Tier 3, EU Stage IIIA**

Displacement: **506 in3 (8.3 L)**

Aspiration: **Turbocharged and Charge Air Cooled**

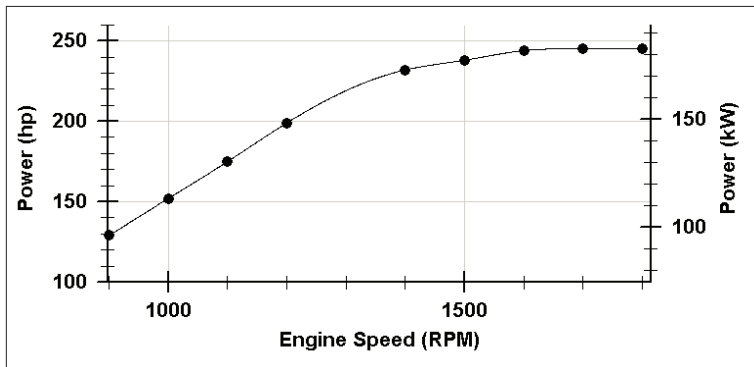
All data is based on the engine operating with fuel system, water pump, and **15 in H2O (3.73 kPa)** inlet air restriction with **6 in (152 mm)** inner diameter, and with **3 in Hg (10 kPa)** exhaust restriction with **4 in (102 mm)** inner diameter; not included are alternator, fan, optional equipment and driven components. Coolant flows and heat rejection data based on coolants as 50% ethylene glycol/50% water. All data is subject to change without notice.

Rating Type: Continuous/WMR



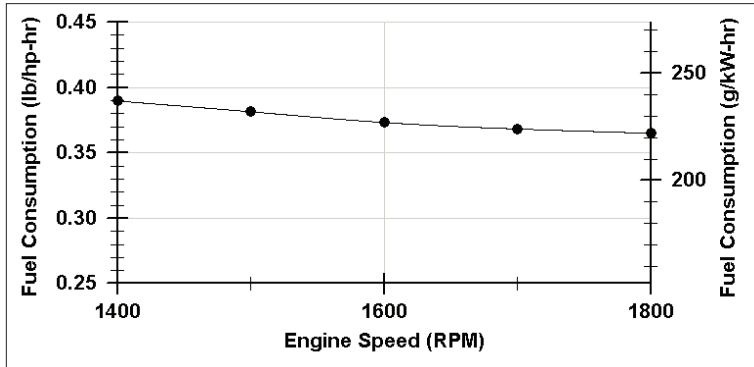
Torque Output

RPM	lb-ft	N-m
900	750	1,017
1,000	800	1,085
1,100	835	1,132
1,200	870	1,180
1,400	870	1,180
1,500	835	1,132
1,600	800	1,085
1,700	757	1,026
1,800	715	969



Power Output

RPM	hp	kW
900	129	96
1,000	152	113
1,100	175	130
1,200	199	148
1,400	232	173
1,500	238	177
1,600	244	182
1,700	245	183
1,800	245	183



Fuel Consumption

RPM	lb/hp-hr	g/kW-hr
1,400	0.39	237
1,500	0.381	232
1,600	0.373	227
1,700	0.368	224
1,800	0.365	222

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with SAE J1995 conditions of 29.61 in Hg (100 kPa) barometric pressure [300ft (91m) altitude] 77 deg F (25 deg C) inlet air temperature, and 0.30 in Hg (1kPa) water vapor pressure with No. 2 diesel fuel. The engine may be operated up to **11,000 ft (3,353 m)** altitude before electronic derate is applied.

STATUS FOR CURVES AND DATA:

TOLERANCE: Within +/- 5 %

CHIEF ENGINEER:

Kevin R Wadell

Bold entries revised after 1-Feb-2006

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Intake Air System

Maximum allowable air temperature rise over ambient at Intake Manifold (Naturally Aspirated Engines) or Turbo Compressor inlet (Turbo-charged Engines): (This parameter impacts emissions, LAT and/or altitude capability) **30** delta deg F **16.7** delta deg C

Charge Air Cooling System

Maximum intake manifold temperature at 25 deg C (77 F) ambient **120** deg F **49** deg C
 Maximum allowable pressure drop across charge air cooler and OEM CAC piping (IMPD): **4** in-Hg **14** kPa
 Maximum Intake Manifold Temperature Differential (Ambient to IMT) (IMTD): **43** delta deg F **23.9** delta deg C
 Intake manifold temperature for Fan-ON **120** deg F **49** deg C
 Maximum coolant temperature for engine protection controls **225** deg F **107** deg C
 Maximum coolant operating temperature at engine outlet (max. top tank temp): **225** deg F **107** deg C

Exhaust System

Maximum exhaust back pressure: **3** in-Hg **10** kPa
 Recommended exhaust piping size (inner diameter): **4** in **102** mm

Lubrication System

Nominal operating oil pressure
 @ minimum low idle **10** psi **69** kPa
 @ maximum rated speed **56.3** psi **388** kPa
 Minimum engine oil pressure for engine protection devices
 @ minimum low idle **8** psi **55** kPa

Fuel System

Fuel cooling requirements (with diesel fuel)
 Maximum heat rejection to return fuel at max. coolant and inlet fuel temperature:
 @ fuel return flow rate of: **70** BTU/min **1** kW
 @ fuel return temperature prior to cooler: **165** lb/hr **75** kg/hr
250 deg F **121** deg C
 Maximum supply fuel flow: **302** lb/hr **137** kg/hr
 Maximum return fuel flow: **165** lb/hr **75** kg/hr
 Engine fuel compatibility (consult Service Bulletin #3379001 for appropriate use of other fuels) **DF1, DF2**
 Maximum fuel inlet pressure: **10** psi **70** kPa

Performance Data

Maximum low idle speed: **1,200** RPM
 Minimum low idle speed: **600** RPM
 Minimum engine speed for full load sustained operation:

	Rated Power		Maximum Power		Torque Peak	
Engine Speed	1,800 RPM				1,400 RPM	
Output Power	245 hp	183 kW			232 hp	173 kW
Torque	715 lb-ft	969 N-m			870 lb-ft	1,180 N-m
Friction Horsepower	35 hp	26 kW			23 hp	17 kW
Intake Manifold Pressure	47 in-Hg	160 kPa			51 in-Hg	173 kPa
Turbo Comp. Outlet Pressure	50 in-Hg	170 kPa			53 in-Hg	180 kPa
Turbo Comp. Outlet Temperature	325 deg F	163 deg C			347 deg F	175 deg C
Inlet Air Flow	585 ft ³ /min	276 L/s			483 ft ³ /min	228 L/s
Charge Air Flow	45 lb/min	20 kg/min			37 lb/min	17 kg/min
Exhaust Gas Flow	1,377 ft ³ /min	650 L/s			1,352 ft ³ /min	638 L/s
Exhaust Gas Temperature	907 deg F	486 deg C			1,103 deg F	595 deg C
Maximum Fuel Flow to Pump	302 lb/hr	137 kg/hr				
Heat Rejection to Coolant	5,044 BTU/min	89 kW			5,408 BTU/min	95 kW
Heat Rejection to Fuel	70 BTU/min	1 kW			70 BTU/min	1 kW
Heat Rejection to Ambient	904 BTU/min	16 kW			1,115 BTU/min	20 kW
Heat Rejection to Exhaust	9,292 BTU/min	163 kW			9,895 BTU/min	174 kW
**Steady State Smoke	0.6 Bosch				0.5 Bosch	

**When operating Naturally Aspirated engines above SAE J1995 conditions, it should be noted that smoke levels will increase due to combustion inefficiencies associated with a reduction in the air to fuel mixture.

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Cranking System (Cold Starting Capability)

Unaided Cold Start:

Minimum cranking speed	130 RPM	
Minimum ambient temperature for unaided cold start	10.4 deg F	-12 deg C
Bare Engine cranking torque at minimum unaided cold start temperature:	162 lb-ft	220 N-m

Aided Cold Start:

Minimum ambient temperature with Grid Heater only	-20 deg F	-29 deg C
Minimum ambient temperature with coolant and lube heater only	-40 deg F	-40 deg C

Cold starting aids available

Intake Manifold Heater, Block Heater, Oil Pan Heater

Maximum parasitic load at 10 deg F @

Noise Emissions

Top	95.7 dBa
Right Side	95.7 dBa
Left Side	95.7 dBa
Front	95.7 dBa
Exhaust noise emissions	

Estimated Free Field Sound Pressure Level at 3.28ft (1m) and Full-Load Governed Speed
(Excludes Noise from Intake, Exhaust, Cooling System and Driven Components)

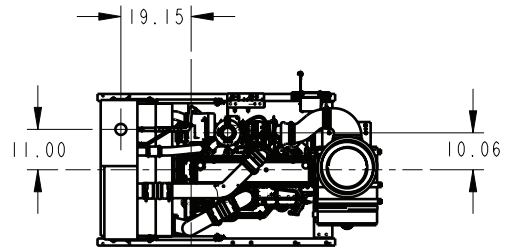
End of Report

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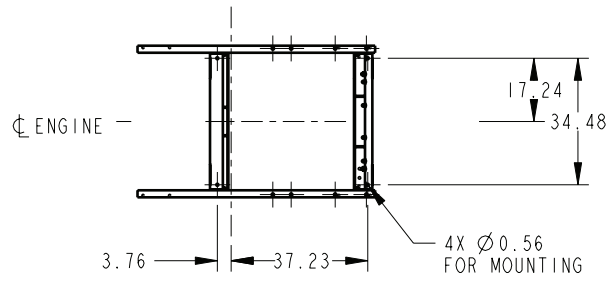
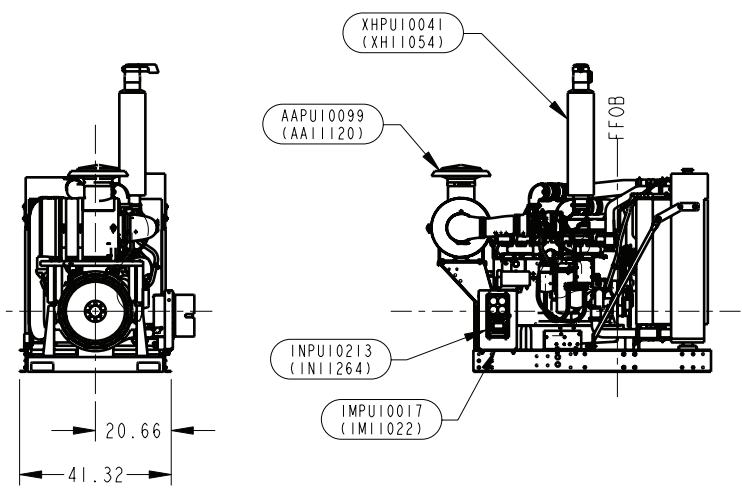
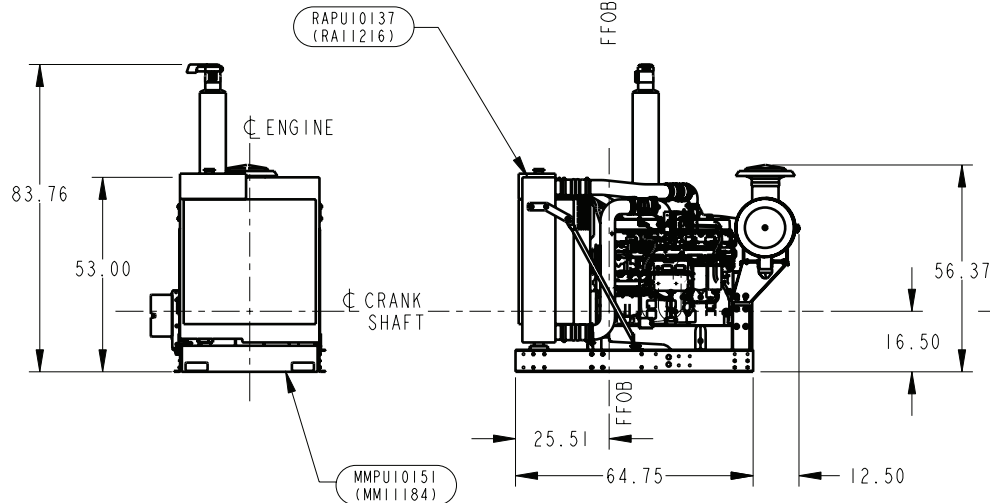
DRAWING NUMBER
60000181

REVISIONS				
REV	DATE	CHANGE	BY	ER#
0	5/25/04	PRELIMINARY	JEOP	R04049
1	5/11/05	RELEASED FOR PRODUCTION	AJM	R05178
2	4/3/07	UPDATED IN OPTION	AJM	



REAR ATTACHMENT INFORMATION:

- A.) SAE#1 FLYWHEEL HOUSING
7/16-14 UNC2B
1.14 [29.0] DEEP
12 HOLES EQUALLY SPACED
ON A Ø20.8 [530.2] B.C.
FLYWHEEL TO SUIT 15.5"
OVERCENTER CLUTCH
(SHOWN)
- B.) SAE#3 FLYWHEEL HOUSING
M10-1.5-6H
0.98 [25.0] DEEP
12 HOLES EQUALLY SPACED
ON A Ø16.87 [428.6] B.C.
FLY WHEEL TO SUIT 10" OR 11.5"
OVERCENTER CLUTCH
(NOT SHOWN)



NOTE:
DUE TO MANUFACTURING VARIANCES,
DIMENSIONS MAY VARY UP TO 0.25"

PRICE SPEC.
3622/3676/3650/3621/3669

REF. DRAWING STANDARDS: ANSI Y14.5M, ISO R1101		ALL DIMENSIONS: INCH	
CUMMINS POWER PRODUCTS		NEW HUDSON, MICHIGAN	
DRAWN BY JEO	DATE 5/25/04	DRAWING DESCRIPTION	SHEET 1 OF 1
THIS DRAWING/DATA FILE (AND THE INFORMATION SHOWN THEREON) IS CONFIDENTIAL AND PROPRIETARY AND SHALL NOT BE USED, DISCLOSED TO OTHERS, OR REPRODUCED BY ANY MEANS IN HARD COPY FORM OR IN MACHINE READABLE FILES, WITHOUT WRITTEN CONSENT OF CUMMINS POWER PRODUCTS.		QSC8.3/OSL9 TIER3	SCALE: 1/32
		OPEN POWER UNIT ASSEMBLY INSTALLATION DRAWING	DRAWING NO. 60000181