404J-E22TA (IR)

400 Series

55 kW Gross @ 2800 rpm
50 kW Gross @ 2800 rpm
45 kW Gross @ 2800 rpm

IOPU

Basic technical data

Number of cylinders	4
Cylinder arrangement	Inline
Cycle	Four stroke
Induction system	Turbocharged, aftercooled
Compression ratio	17.3:1
Bore	84 mm
Stroke	100 mm
Displacement	2.22 litres
Direction of rotation (viewed from flywheel)	Anticlockwise
Firing order (cylinder 1 furthest from flywheel)	1-3-4-2
Lifting point location (as defined when looking from flywheel end)	Front left, rear right
Mobile use g-load limitations	Refer to design G-load limits

Weight of IOPU

Dry (estimated)	327 kg
Wet (estimated)	344 kg

Overall dimensions of IOPU

Height	985 mm
Length	992 mm
Length (including fuel cooler)	992 mm
Width	602 mm

Centre of gravity of IOPU

Wet, forward from rear of block	195 mm
Wet, above centre line of block	65 mm
Wet, offset to right hand side of crankshaft centre line	-5 mm

Moments of inertia (mk^2)

Engine rotational components (excluding flywheel)	0.10 kgm^2

Operation

Speed variation at constant load	± 5 rpm
All ratings certified to within	±5%
Maximum Intermittent Ratings	C-Tier

Emissions capability

Emissions certification	EU Stage V, US EPA/CARB Tier 4 Final, Japan 2014
Aftertreatment type	DOC+DPF
Aftertreatment configuration[1]	Engine mounted

Notes:

- Perkins maintains ISO9001:2000 certified quality management systems for engine test facilities to assure accurate calibration of test equipment
- All data based on operation to ISO 3046/1:2002 standard reference conditions
- For engines operating at increased ambient temperate and/or altitude conditions suitable adjustments must be made
- All data is subject to a tolerance of ±5%, power delivery tolerance is stated separately
- Performance data quoted will be influenced by installation parameters which must be verified at sign off
- Unless stated otherwise, key parameters are provided for Full Load Rated Speed (FLRS), for other values please refer to the ESM
- Please refer to the relevant Operation and Maintenance Manual (OMM) for engine servicing details including coolant, fuel, oil and Diesel Exhaust Fluid (DEF) requirements where applicable
- For additional product information please refer to the relevant ESM, A&I Manual or contact Perkins Applications Engineering

Footnotes:

1. Alternative options are available for aftertreatment configuration.

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

General installation, Rating T5076

Designation	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
Gross engine power output	kW	45.2	49.6	52.4	54.1	55.0	55.0
Gross BMEP	kPa	1529.0	1492.0	1418.0	1331.0	1241.0	1063.0
Nett engine power (with puller fan and alternator at no load)	m/s	44.9	48.6	50.7	51.7	51.9	50.5
Nett engine power (with pusher fan and alternator at no load)	kW	44.2	47.8	49.8	50.7	50.8	49.2
Air mass flow (wet)	kg/min	3.3	3.8	3.9	4.4	4.7	5.0
Exhaust gas temperature at manifold outlet	°C	456.0	474.0	487.0	491.0	501.0	510.0
Exhaust gas flow rate volume (wet) at tailpipe	m^3/min	6.4	7.9	8.7	9.8	10.7	12.2
Exhaust gas mass flow (wet)	kg/min	3.4	3.8	4.0	4.4	4.6	5.0

General installation, Rating T6184

Designation	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
Gross engine power output	kW	42.2	46.4	49.8	50.0	50.0	50.0
Gross BMEP	kPa	1428.0	1395.0	1348.0	1230.0	1128.0	967.0
Nett engine power (with puller fan and alternator at no load)	m/s	41.9	45.4	48.1	47.6	46.9	45.5
Nett engine power (with pusher fan and alternator at no load)	kW	41.2	44.6	47.2	46.6	45.8	44.2
Air mass flow (wet)	kg/min	3.1	3.6	3.8	4.1	4.2	5.0
Exhaust gas temperature at manifold outlet	°C	397.6	412.4	428.9	409.5	415.6	436.5
Exhaust gas flow rate volume (wet) at tailpipe	m^3/min	6.1	7.1	7.8	8.0	8.4	10.1
Exhaust gas mass flow (wet)	kg/min	3.3	3.7	4.0	4.2	4.4	5.2

General installation, Rating T6182

Designation	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
Gross engine power output	kW	39.4	43.4	45.0	45.0	45.0	45.0
Gross BMEP	kPa	1333.0	1305.0	1218.0	1107.0	1015.0	870.0
Nett engine power (with puller fan and alternator at no load)	m/s	39.1	42.4	43.3	42.6	41.9	40.5
Nett engine power (with pusher fan and alternator at no load)	kW	38.4	41.6	42.4	41.6	40.8	39.2
Air mass flow (wet)	kg/min	2.8	3.2	3.4	3.7	4.0	4.7
Exhaust gas temperature at manifold outlet	°C	402.6	404.0	399.3	392.4	393.5	400.7
Exhaust gas flow rate volume (wet) at tailpipe	m^3/min	5.5	6.3	6.8	7.1	7.7	9.1
Exhaust gas mass flow (wet)	kg/min	2.9	3.3	3.6	3.8	4.2	4.8

Reference conditions for technical data

Air temperature ... 25°C
Barometric pressure ... 102.0 kPa
Relative humidity ... 32%
Fuel temperature (inlet pump) ... 40°C

Air inlet restriction at maximum power (nominal) (T5076) ... -5 kPa
Air inlet restriction at maximum power (nominal) (T6184) ... -4.8 kPa
Air inlet restriction at maximum power (nominal) (T6182) ... -4.6 kPa
Exhaust back pressure at maximum power (nominal) ... 8 kPa

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Energy balance[2] - T5067

Designation	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
Energy in fuel	kWt	128.0	142.9	151.6	162.9	171.7	182.3
Energy in power output (gross)	kW	45.2	49.6	52.4	54.1	55.0	55.0
Energy to puller fan and battery charging alternator	kWm	0.3	1.0	1.7	2.4	3.1	4.5
Energy to pusher fan and battery charging alternator	kWm	1.0	1.8	2.6	3.4	4.2	5.8
Energy to exhaust[3]	kWm	44.7	52.8	55.2	62.3	66.8	73.1
Energy to charge air	kWt	5.5	6.2	6.3	7.1	7.6	8.5
Energy to coolant radiator	kWt	26.0	27.4	31.0	31.6	33.5	36.6
Energy to radiation (atmosphere)[4]	kWt	6.7	7.4	7.9	8.5	8.9	9.4

Energy balance[2] - T6184

Designation	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
Energy in fuel	kWt	117.6	133.0	145.5	148.8	154.9	171.7
Energy in power output (gross)	kW	42.2	46.4	49.8	50.0	50.0	50.0
Energy to puller fan and battery charging alternator	kWm	0.3	1.0	1.7	2.4	3.1	4.5
Energy to pusher fan and battery charging alternator	kWm	1.0	1.8	2.6	3.4	4.2	5.8
Energy to exhaust[3]	kWm	40.3	47.1	52.1	54.0	56.7	69.7
Energy to charge air	kWt	5.1	5.8	6.1	6.4	6.7	8.2
Energy to coolant radiator	kWt	24.4	27.0	30.2	31.1	33.2	34.4
Energy to radiation (atmosphere)[4]	kWt	6.1	6.9	7.6	7.7	8.0	8.8

Energy balance[2] - T6182

Designation	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
Energy in fuel	kWt	109.1	122.4	130.3	135.2	142.2	155.8
Energy in power output (gross)	kW	39.4	43.4	45.0	45.0	45.0	45.0
Energy to puller fan and battery charging alternator	kWm	0.3	1.0	1.7	2.4	3.1	4.5
Energy to pusher fan and battery charging alternator	kWm	1.0	1.8	2.6	3.4	4.2	5.8
Energy to exhaust[3]	kWm	35.9	41.2	44.7	47.3	51.7	61.6
Energy to charge air	kWt	4.2	5.0	5.3	5.6	6.0	7.2
Energy to coolant radiator	kWt	24.5	26.9	28.7	30.3	31.7	33.9
Energy to radiation (atmosphere)[4]	kWt	5.7	6.4	6.8	7.0	7.3	7.9

Footnotes:

2. Data included in the energy balance table should not be used for combined heat and power (CHP) purposes.
3. Not to be utilised for heat recovery, does include energy input from combustion air.
4. Includes heat rejected to fuel via return to tank flow.

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Cooling system

Cooling pack

Overall weight (wet) . . . . . 56.9 kg
Overall cooling pack face area . . . . . 0.36 m^2
Width . . . . . 552 mm
Height . . . . . 650 mm

Radiator

Radiator face area . . . . . 0.19 m^2
Core material . . . . . Aluminium
Number of rows. 1
Fins per inch 12.7
Width of matrix . . . . . 378 mm
Height of matrix. . . . . 510 mm
Pressure cap setting . . . . . 90 kPa

Charge cooler

Charge cooler face area. . . . . 0.07 m^2
Core material . . . . . Aluminium
Number of rows. 1
Fins per inch 10.16
Width of matrix . . . . . 145 mm
Height of matrix. . . . . 450 mm

Fan

	Unit	MD042	MD043
Fan type	-	Mechanical, fixed	Mechanical, fixed
Configuration	-	Pusher	Puller
Diameter (tip to tip)	mm	460	
Number of blades	-	7	
Material	-	Composite	

Coolant

IOPU coolant capacity (with radiator) . . . . . 8.2 litres
Engine coolant capacity (without radiator. . . . . 4.5 litres
Maximum top tank temperature 112ºC
Coolant temperature rise across engine 12.5ºC
Thermostat operation range (closed to fully open) . . . . 82/95 (+/- 3)ºC
Recommended coolant . . . . . Perkins ELC 50:50 Premix
Coolant shutdown switch setting . . . . . 116˚C

Specifications - T5076

Specifications	Units	Engine speed (rpm)		
		1500	2000	2800
Charge air cooler restriction at full load (maximum)	kPa	5.2	6.9	11.1
Compressor outlet temperature at standard 25ºC test condition	ºC	137.3	140	151.2
Compressor outlet pressure (gauge) at standard 25ºC test condition	kPa	120.4	129	134.8
Charge air cooler outlet temperature at standard 25ºC test condition (maximum)	ºC	38.0	43.3	50.2

Specifications - T6184

Specifications	Units	Engine speed (rpm)		
		1500	2000	2800
Charge air cooler restriction at full load (maximum)	kPa	4.6	6.6	11.1
Compressor outlet temperature at standard 25ºC test condition	ºC	126.8	138.9	148.7
Compressor outlet pressure (gauge) at standard 25ºC test condition	kPa	107.3	129.0	133.1
Charge air cooler outlet temperature at standard 25ºC test condition (maximum)	ºC	36.3	43.2	50.3

Specifications - T6182

Specifications	Units	Engine speed (rpm)		
		1500	2000	2800
Charge air cooler restriction at full load (maximum)	kPa	4.1	5.4	9.6
Compressor outlet temperature at standard 25ºC test condition	ºC	118.2	138.6	144.8
Compressor outlet pressure (gauge) at standard 25ºC test condition	kPa	95.5	125.1	132
Charge air cooler outlet temperature at standard 25ºC test condition (maximum)	ºC	37.7	46.3	52.0

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

Duct allowance

MD042 Pusher fan

Duct allowance[5] (Pa)		Units	Engine speed (rpm)					
			1200	1400	1600	1800	2000	2200
0	Ambient clearance[6]	°C	55	55	55	55	55	55
	Resultant minimum fan airflow	m^3/sec	1.94	2.06	2.31	2.56	3.06	3.56
60	Ambient clearance[6]	°C	48	48	48	-	-	-
	Resultant minimum fan airflow	m^3/sec	1.89	2.02	2.27	-	-	-
120	Ambient clearance[6]	°C	-	-	-	48	48	48
	Resultant minimum fan airflow	m^3/sec	-	-	-	2.35	2.9	3.48

MD043 Puller fan

Duct allowance[5] (Pa)		Units	Engine speed (rpm)					
			1200	1400	1600	1800	2000	2200
0	Ambient clearance[6]	°C	55	55	55	55	55	55
	Resultant minimum fan airflow	m^3/sec	1.82	1.94	2.18	2.42	2.9	3.39
60	Ambient clearance[6]	°C	48	48	48	-	-	-
	Resultant minimum fan airflow	m^3/sec	1.65	1.76	1.98	-	-	-
120	Ambient clearance[6]	°C	-	-	-	48	48	48
	Resultant minimum fan airflow	m^3/sec	-	-	-	1.96	2.45	2.93

Fuel system

Fuel injection pump.. ... . .Common rail
Fuel injector type... .. .. Electronic
Filtration media size ... . Primary 10, Secondary 4 µm
Priming pump type .. .. Solenoid pump
Fuel lift pump type. .. .. Electric
Primary filter... .. ..Off engine
Lift pump. .. ..Off engine
Secondary filter. ... .Engine mounted
Maximum fuel supply restriction at lift Pump Inlet... .. ..-11 kPa
Maximum fuel return restriction at low idle .. .. 20 kPa
Maximum fuel return flow rate ... . 72 litres/hr
Maximum low-pressure system fuel flow rate.. .. .. 138 litres/hr
Maximum pressure measured at main filter inlet ... . 70 kPa
Maximum fuel temperature at lift Pump Inlet ... .70ºC
Maximum fuel filter service interval[7].. .. ..500 Hours
Governor type .. .. Electronic

Fuel specification

Recommended fuel conformity EN950
Maximum sulphur in fuel limit. ... .<15ppm

Footnotes:

5. Maximum additional cooling airflow restriction.
6. Ambient clearance allows for 5 ºC rise above ambient temperature at fan.
7. Operating with fuels that do not meet the recommendations in the OMM can reduce fuel filter service life.

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

Fuel consumption[8] - T5076

Fuel consumption[8]	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
100% load	g/kWh	208	212	217	221	227	237
75% load	g/kWh	204	207	212	220	229	251
50% load	g/kWh	210	215	224	234	246	280
25% load	g/kWh	252	251	270	270	293	353

Fuel consumption[8] - T6184

Fuel consumption[8]	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
100% load	g/kWh	205	209	214	217	225	237
75% load	g/kWh	205	208	213	225	235	253
50% load	g/kWh	211	216	225	240	254	281
25% load	g/kWh	256	257	272	284	304	354

Fuel consumption[8] - T6182

Fuel consumption[8]	Units	Engine speed (rpm)					
		1600	1800	2000	2200	2400	2800
100% load	g/kWh	205	208	211	217	225	237
75% load	g/kWh	205	209	216	225	235	253
50% load	g/kWh	213	217	228	240	254	281
25% load	g/kWh	260	264	278	284	304	354

Lubricating system

Capacity

Total system capacity ... 8.5 litres
Maximum sump capacity (maximum dipstick mark) ... 8.2 litres
Minimum sump capacity (minimum dipstick mark) ... 6.9 litres

Oil temperatures

Maximum oil temperature (continuous operation) ... 125°C
Maximum oil temperature (intermittent operation) ... 135°C

Lubricating oil

Relief valve opening pressure ... 284 (+/-58) kPa
Minimum oil pressure ... 150 kPa
Sump drain plug tapping size or hose connection size ... M16*1.5
Oil pump drive method ... Gear
Oil flow at rated speed ... 20.4 litres/min
Oil consumption at full load rated speed ... 0.09% of fuel
Oil grade ... NALSTD CK-4

Maximum engine operating angles

Front up, front down ... 35°
Right side up, right side down ... 35°

Induction system - T5076

Maximum air intake restriction (clean filter) ... 5 kPa
Maximum air intake restriction (dirty filter) ... 7.5 kPa
Air filter option ... TD001
Air filter type ... Standard

Induction system - T6184

Maximum air intake restriction (clean filter) ... 4.8 kPa
Maximum air intake restriction (dirty filter) ... 6.9 kPa
Air filter option ... TD001
Air filter type ... Standard

Induction system - T6182

Maximum air intake restriction (clean filter) ... 4.6 kPa
Maximum air intake restriction (dirty filter) ... 6.7 kPa
Air filter option ... TD001
Air filter type ... Standard

Exhaust system

Exhaust outlet diameter ... 47 mm
Minimum back pressure at DPF Outlet ... 0 kPa
Maximum back pressure at DPF Outlet ... 3 kPa

Footnotes:

8. For conversion to litres/hr use the following formula with the correct fuel density: $\frac{\text{SFC (kg/kWh)}}{\text{Fuel density (kg/litre)}} \times \text{Power (kW)} = \text{Fuel Consumption (litres/hr)}$

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

Electrical system

Alternator	Unit	Option Code ND003
Alternator output voltage	Volts	12
Alternator output current	Amps	85

Starter	Unit	Option Code ED001
Starter motor input voltage	Volts	12
Starter motor power draw	kW	2
Number of teeth on flywheel ring gear	DD002	126
	DD03	126
Number of teeth on starter pinion	-	9
Minimum average cranking speed	rpm	100
Starter solenoid -Maximum pull-in current at - 20°C	Amps	50
Starter solenoid -Maximum hold-in current at - 20°C	Amps	15

Engine mounting

Maximum static bending moment at rear face of block.. .. .. ±1332Nm

Maximum dynamic bending moment at rear face of block.. .. .. Refer to g load limits

Maximum design G loading capability

X .. .. 4 g

Y .. .. 4 g

Z .. .. 6 g

Aftertreatment system

Maximum skin temperature for aftertreatment .. .. .400°C

Typical maximum temperature, aftertreatment out. .. .. .486°C

Aftertreatment outlet maximum static bending moment .. ... .0.24 Nm

Typical service life of DPF ... . 8000 hrs

Cold start recommendations[9]

Standard fitted starting aid .. .. glow plugs

Minimum starting temperature	Engine oil grade	Minimum battery cold cranking amps with glow plugs (12 volts)
°C		CCA
0	0W-40, 5W-40, 10W-30, 15W-40	740
-5	-	-
-10	0W-40, 5W-40, 10W-30, 15W-40	740
-15	-	-
-20	0W-40, 5W-40	780
-25	-	-
Maximum battery cold cranking amps (CCA)	-	800

Footnotes:

9. Cold cranking amps as per SAEJ537.

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

Noise data - Pusher Fan MD042

Noise data of the IOPU, this excludes exhaust outlet noise except where specifically stated, measured in a semi-anechoic environment. Measurements taken in accordance with ISO 6798:1995.

IOPU noise level

Average sound pressure level[11,12] (L_{pA}) at 1m (dBA)	
Full load rated speed (FLRS)	High idle
100.1	101.5

Exhaust noise level at turbocharger outlet

Exhaust sound power level[13] (L_{WA}) (dBA)	
Full Load Rated Speed	High idle
95.8	85.1

Sound distribution around IOPU - T5076

Position (reference diagram)	Sound pressure level (L_{pA}) at 1m (dBA)	
	FLRS	High idle
1	97.1	99.3
2	101.9	103.0
3	103.8	105.4
4	102.5	103.2
5	93.7	95.8
6	97.0	98.9
7	96.5	98.7
8	94.0	94.8
9	101.7	103.0

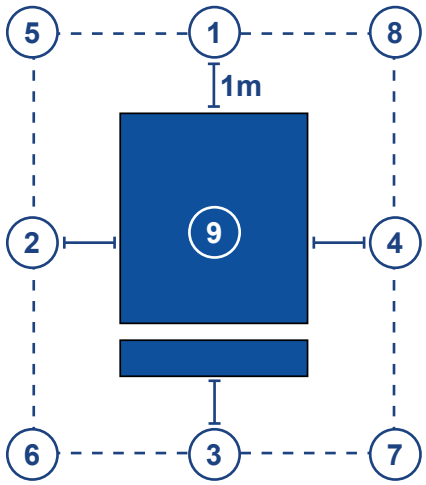
Sound distribution around IOPU - T6182

Position (reference diagram)	Sound pressure level (L_{pA}) at 1m (dBA)	
	FLRS	High idle
1	97.1	99.3
2	101.9	103.0
3	103.8	105.4
4	102.5	103.2
5	93.7	95.9
6	97.0	98.9
7	96.6	98.6
8	93.0	94.9
9	101.7	103.1

Sound distribution around IOPU - T6184

Position (reference diagram)	Sound pressure level (L_{pA}) at 1m (dBA)	
	FLRS	High idle
1	97.2	99.4
2	101.9	103.0
3	103.8	105.4
4	102.5	103.2
5	93.8	95.9
6	97.0	98.8
7	96.6	98.6
8	93.9	94.9
9	101.7	103.2

Microphone positions



Footnotes:

11. Sound pressure reference level: 20 µPa.
12. For engine, average sound pressure level to sound power conversion add 15.5 dB.
13. Sound power reference level: 1pW.

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

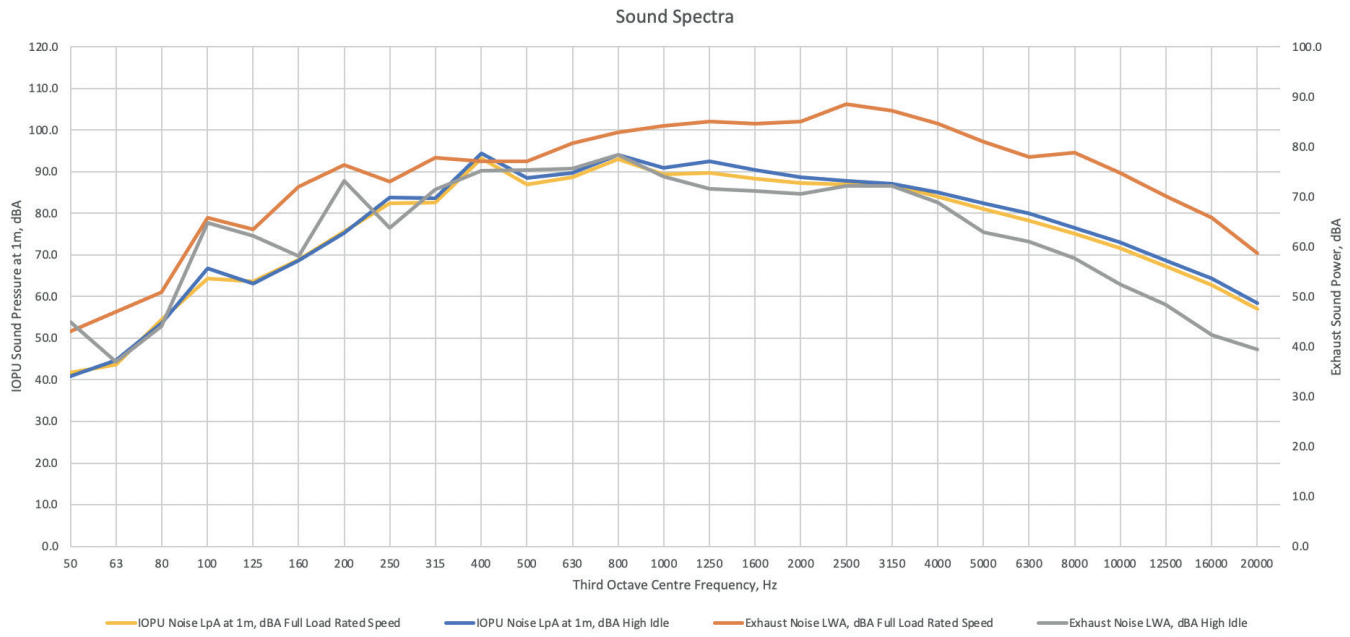
Perkins®
THE HEART OF EVERY GREAT MACHINE

Spectral data - Pusher Fan MD042 - T5076

1/3 Octave sound data for the IOPU, average of all microphones, and exhaust outlet noise level at turbocharger outlet.

	Third octave centre frequency (Hz)																										
	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8k	10k	12.5k	16k	20k
Exhaust noise L_{WA} dBA FLRS	43.1	46.9	50.8	65.8	63.5	71.9	76.3	73.0	77.8	77.1	77.1	80.7	82.9	84.2	85.0	84.6	85.0	88.5	87.2	84.5	80.9	78.0	78.8	74.8	70.0	65.8	58.7
Exhaust noise L_{WA} dBA High idle	44.9	37.0	44.1	64.7	62.2	58.1	73.1	63.8	71.4	75.2	75.3	75.6	78.4	74.1	71.6	71.2	70.5	72.1	72.1	68.8	62.8	61.0	57.6	52.4	48.5	42.3	39.3
IOPU noise L_{pA} at 1m dBA FLRS	41.8	43.7	54.4	64.4	63.6	68.8	75.7	82.4	82.6	93.2	86.9	88.6	93.1	89.3	89.7	88.3	87.3	86.8	86.9	83.9	81.0	78.3	75.1	71.7	67.2	62.7	57.1
IOPU noise L_{pA} at 1m dBA High idle	40.9	44.7	53.5	66.8	63.2	68.7	75.2	83.7	83.6	94.3	88.4	89.8	94.0	90.9	92.6	90.3	88.6	87.8	87.0	85.0	82.4	80.0	76.5	73.1	68.7	64.3	58.4

Sound spectra



Publication No. TPD2432EN-01 (12-23)

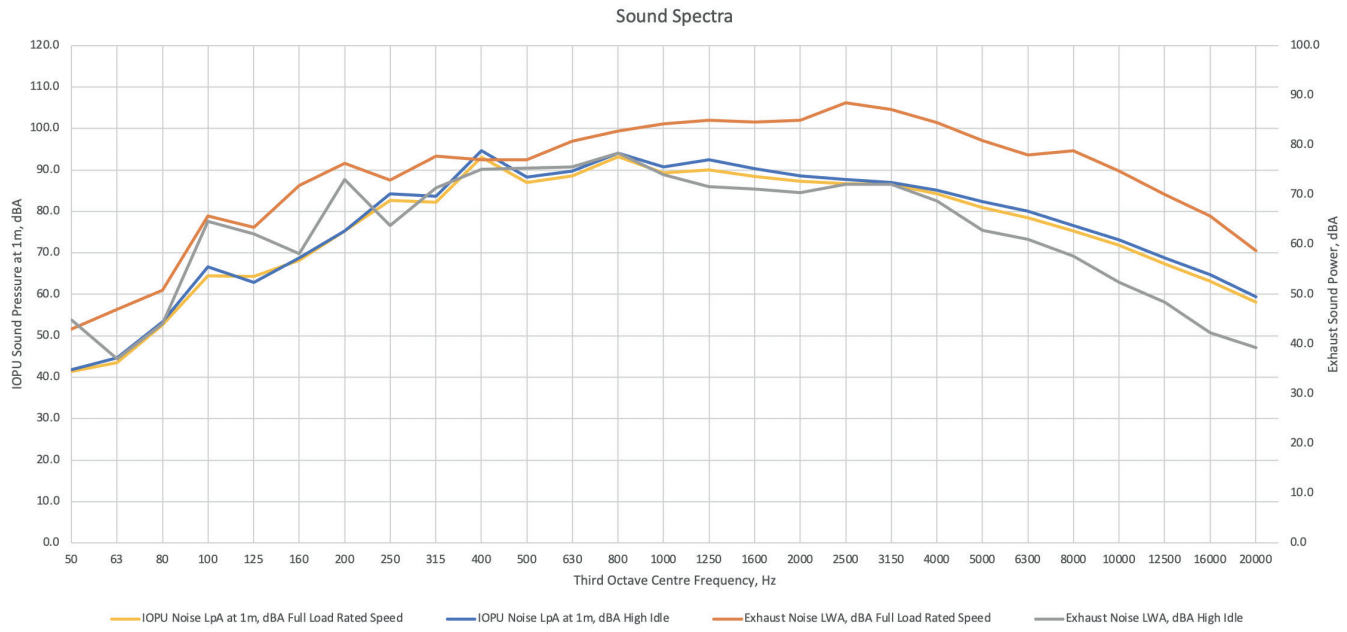
Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Spectral data - Pusher Fan MD042 - T6184

1/3 Octave sound data for the IOPU, average of all microphones, and exhaust outlet noise level at turbocharger outlet.

	Third octave centre frequency (Hz)																										
	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8k	10k	12.5k	16k	20k
Exhaust noise L_{WA} dBA FLRS	43.1	46.9	50.8	65.8	63.5	71.9	76.3	73.0	77.8	77.1	77.1	80.7	82.9	84.2	85.0	84.6	85.0	88.5	87.2	84.5	80.9	78.0	78.8	74.8	70.0	65.8	58.7
Exhaust noise L_{WA} dBA High idle	44.9	37.0	44.1	64.7	62.2	58.1	73.1	63.8	71.4	75.2	75.3	75.6	78.4	74.1	71.6	71.2	70.5	72.1	72.1	68.8	62.8	61.0	57.6	52.4	48.5	42.3	39.3
IOPU noise L_{pA} at 1m dBA FLRS	41.4	43.6	52.7	64.5	64.3	68.3	75.3	82.6	82.2	93.1	87.0	88.6	93.1	89.3	90.0	88.4	87.2	86.7	86.5	84.2	81.0	78.5	75.2	71.8	67.4	63.1	58.1
IOPU noise L_{pA} at 1m dBA High idle	41.8	44.8	53.3	66.6	62.9	68.8	75.2	84.2	83.6	94.6	88.3	89.8	94.0	90.8	92.4	90.3	88.6	87.7	87.0	85.2	82.3	80.1	76.6	73.1	68.8	64.8	59.4

Sound spectra



Publication No. TPD2432EN-01 (12-23)

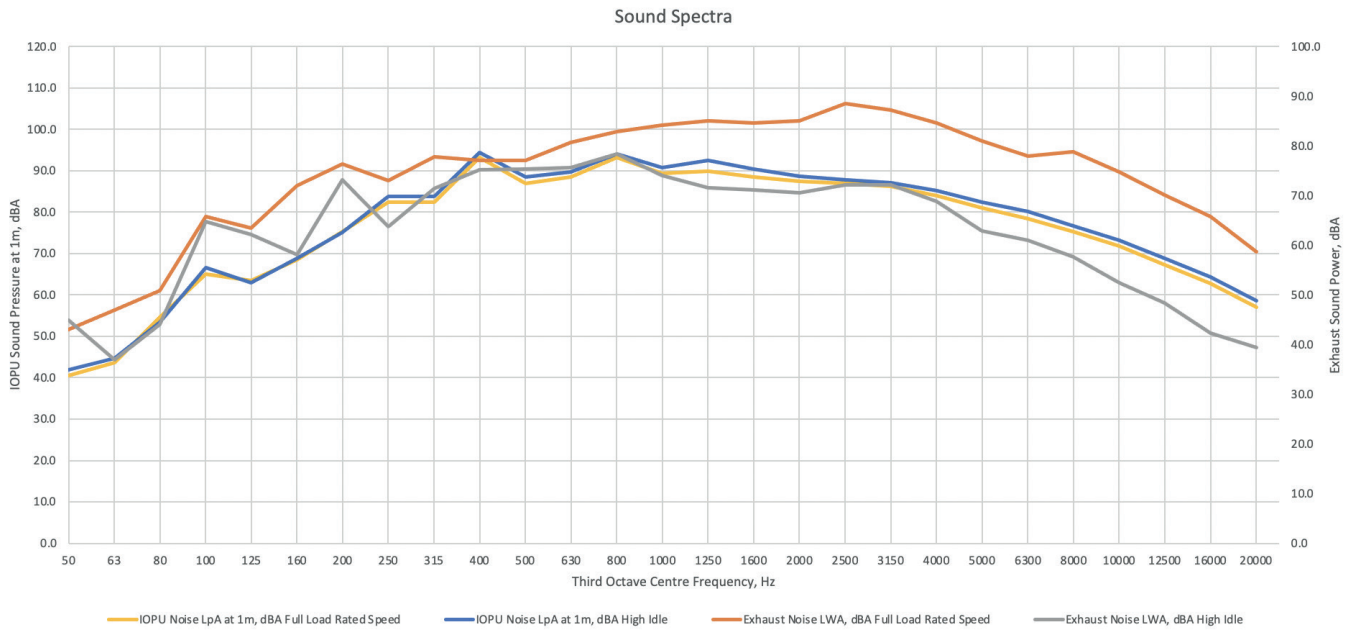
Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Spectral data - Pusher Fan MD042 - T6182

1/3 Octave sound data for the IOPU, average of all microphones, and exhaust outlet noise level at turbocharger outlet.

	Third octave centre frequency (Hz)																										
	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8k	10k	12.5k	16k	20k
Exhaust noise L_{WA} dBA FLRS	43.1	46.9	50.8	65.8	63.5	71.9	76.3	73.0	77.8	77.1	77.1	80.7	82.9	84.2	85.0	84.6	85.0	88.5	87.2	84.5	80.9	78.0	78.8	74.8	70.0	65.8	58.7
Exhaust noise L_{WA} dBA High idle	44.9	37.0	44.1	64.7	62.2	58.1	73.1	63.8	71.4	75.2	75.3	75.6	78.4	74.1	71.6	71.2	70.5	72.1	72.1	68.8	62.8	61.0	57.6	52.4	48.5	42.3	39.3
IOPU noise L_{pA} at 1m dBA FLRS	40.5	43.6	54.5	65.0	63.5	68.5	75.3	82.4	82.4	93.1	86.9	88.5	93.1	89.3	89.9	88.4	87.4	86.8	86.2	83.9	81.1	78.5	75.2	71.8	67.4	62.8	57.1
IOPU noise L_{pA} at 1m dBA High idle	41.9	44.7	53.4	66.5	63.0	68.8	75.1	83.9	83.7	94.4	88.4	89.7	94.0	90.8	92.5	90.3	88.7	87.8	87.0	85.1	82.4	80.1	76.7	73.2	68.8	64.4	58.5

Sound spectra



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

Noise data - Puller Fan MD043

Noise data of the IOPU, this excludes exhaust outlet noise except where specifically stated, measured in a semi-anechoic environment. Measurements taken in accordance with ISO 6798:1995.

IOPU noise level

Average sound pressure level[11,12] (L_{pA}) at 1m (dBA)	
Full load rated speed (FLRS)	High idle
94.5	96.5

Exhaust noise level at turbocharger outlet

Exhaust sound power level[13] (L_{WA}) (dBA)	
Full Load Rated Speed	High idle
95.8	85.1

Sound distribution around IOPU - T5076

Position (reference diagram)	Sound pressure level (L_{pA}) at 1m (dBA)	
	FLRS	High idle
1	94.1	96.8
2	97.4	99.4
3	96.4	98.6
4	97.0	98.6
5	91.5	93.8
6	91.2	93.6
7	91.6	94.2
8	88.8	91.1
9	97.1	98.8

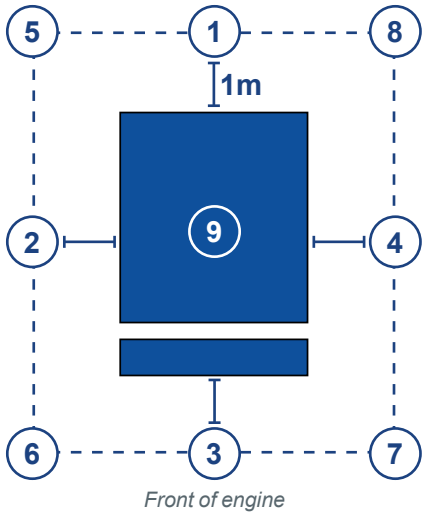
Sound distribution around IOPU - T6182

Position (reference diagram)	Sound pressure level (L_{pA}) at 1m (dBA)	
	FLRS	High idle
1	93.2	96.6
2	96.8	98.8
3	96.3	98.4
4	96.9	98.0
5	91.1	93.5
6	90.9	93.4
7	91.4	93.8
8	88.6	90.6
9	96.7	98.5

Sound distribution around IOPU - T6184

Position (reference diagram)	Sound pressure level (L_{pA}) at 1m (dBA)	
	FLRS	High idle
1	93.4	96.5
2	96.8	98.9
3	96.1	98.5
4	96.9	97.8
5	91.2	93.7
6	90.8	93.6
7	91.3	94.0
8	88.5	90.8
9	96.7	98.5

Microphone positions



Footnotes:

11. Sound pressure reference level: 20 µPa.
12. For engine, average sound pressure level to sound power conversion add 15.5 dB.
13. Sound power reference level: 1pW.

Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

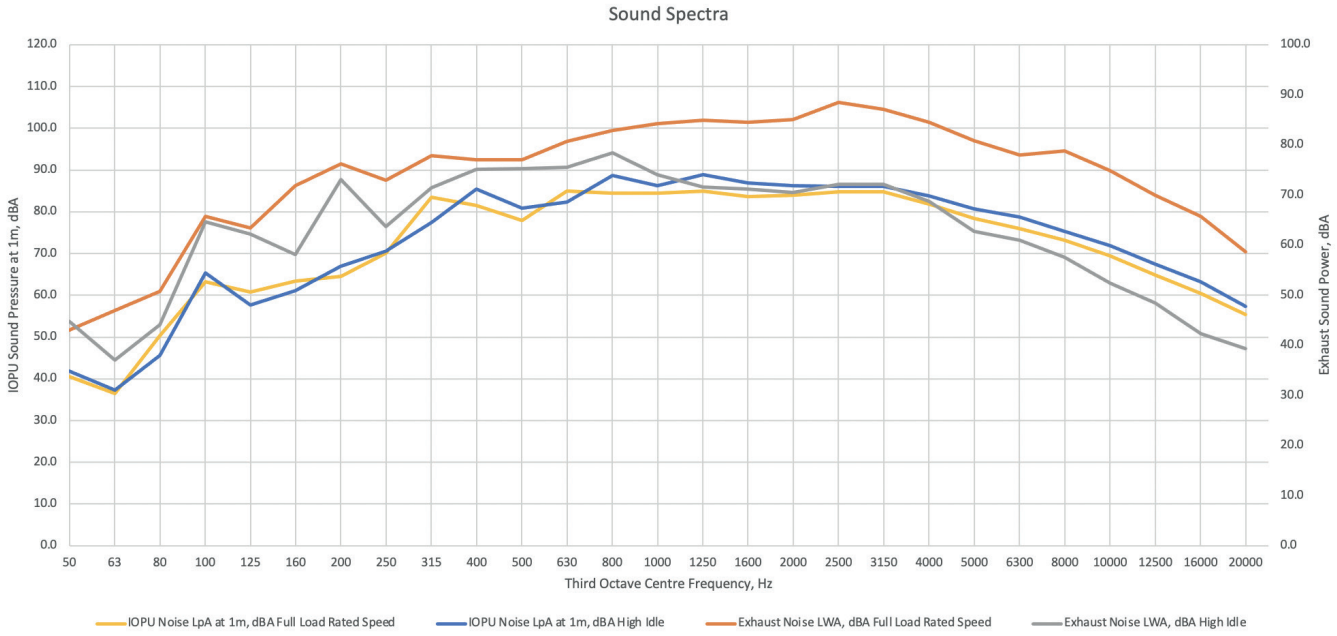
Perkins®
THE HEART OF EVERY GREAT MACHINE

Spectral data - Puller fan MD043 - T5076

1/3 Octave sound data for the IOPU, average of all microphones, and exhaust outlet noise level at turbocharger outlet.

	Third octave centre frequency (Hz)																										
	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8k	10k	12.5k	16k	20k
Exhaust noise L_{WA} dBA FLRS	43.1	46.9	50.8	65.8	63.5	71.9	76.3	73.0	77.8	77.1	77.1	80.7	82.9	84.2	85.0	84.6	85.0	88.5	87.2	84.5	80.9	78.0	78.8	74.8	70.0	65.8	58.7
Exhaust noise L_{WA} dBA High idle	44.9	37.0	44.1	64.7	62.2	58.1	73.1	63.8	71.4	75.2	75.3	75.6	78.4	74.1	71.6	71.2	70.5	72.1	72.1	68.8	62.8	61.0	57.6	52.4	48.5	42.3	39.3
IOPU noise L_{pA} at 1m dBA FLRS	40.6	36.5	50.3	63.3	60.7	63.4	64.5	70.1	83.5	81.5	78.0	85.0	84.5	84.6	84.9	83.7	84.1	84.9	84.8	81.9	78.5	76.0	73.1	69.5	65.0	60.5	55.4
IOPU noise L_{pA} at 1m dBA High idle	41.9	37.3	45.5	65.4	57.7	61.1	67.0	70.5	77.4	85.4	80.8	82.4	88.8	86.3	88.9	86.9	86.3	86.1	86.1	83.8	80.7	78.7	75.4	71.9	67.5	63.2	57.4

Sound spectra



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

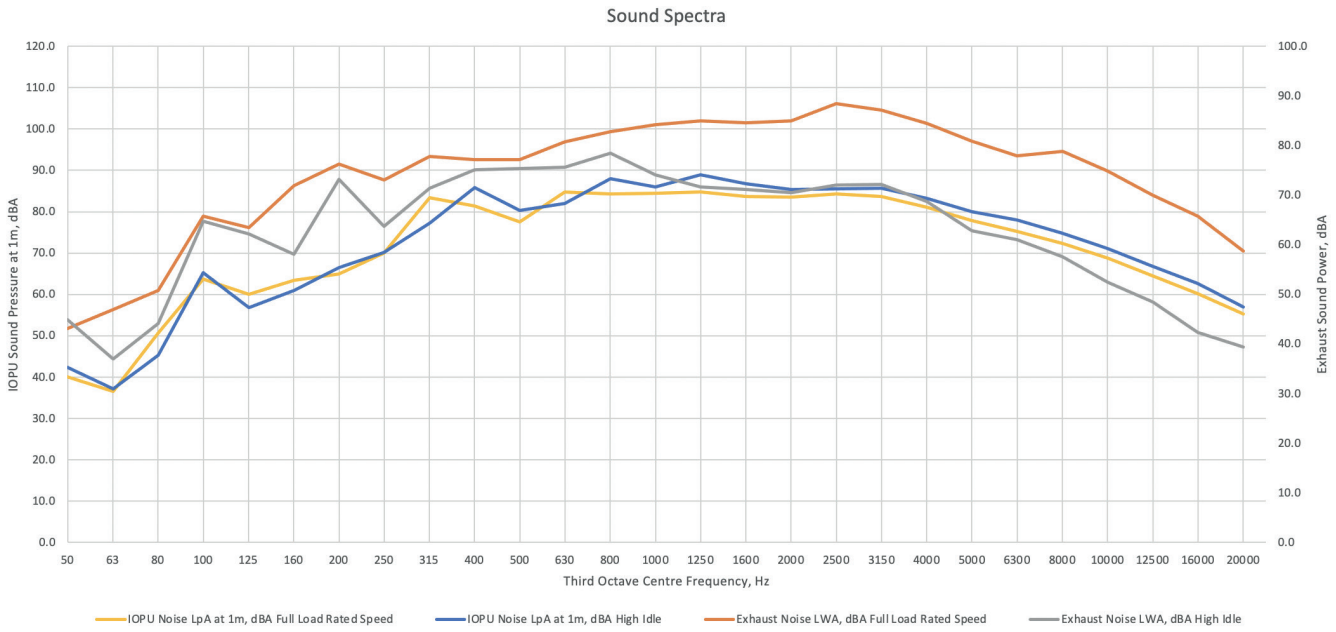
Perkins®
THE HEART OF EVERY GREAT MACHINE

Spectral data - Puller fan MD043 - T6184

1/3 Octave sound data for the IOPU, average of all microphones, and exhaust outlet noise level at turbocharger outlet.

	Third octave centre frequency (Hz)																									
	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8k	10k	12.5k	16k	20k
Exhaust noise L_{WA} dBA FLRS	43.1	46.9	50.8	65.8	63.5	71.9	76.3	73.0	77.8	77.1	77.1	80.7	82.9	84.2	85.0	84.6	85.0	88.5	87.2	84.5	80.9	78.0	78.8	74.8	70.0	65.8	58.7
Exhaust noise L_{WA} dBA High idle	44.9	37.0	44.1	64.7	62.2	58.1	73.1	63.8	71.4	75.2	75.3	75.6	78.4	74.1	71.6	71.2	70.5	72.1	72.1	68.8	62.8	61.0	57.6	52.4	48.5	42.3	39.3
IOPU noise L_{pA} at 1m dBA FLRS	40.0	36.5	50.6	63.7	60.1	63.4	64.9	70.1	83.4	81.5	77.6	84.7	84.4	84.5	84.8	83.6	83.5	84.4	83.6	81.1	77.8	75.2	72.4	68.8	64.4	60.1	55.2
IOPU noise L_{pA} at 1m dBA High idle	42.3	37.2	45.3	65.3	56.8	61.0	66.5	70.1	77.2	85.9	80.3	82.0	88.1	85.9	89.0	86.7	85.4	85.5	85.7	83.2	80.0	78.0	74.7	71.1	66.8	62.6	57.0

Sound spectra



Publication No. TPD2432EN-01 (12-23)

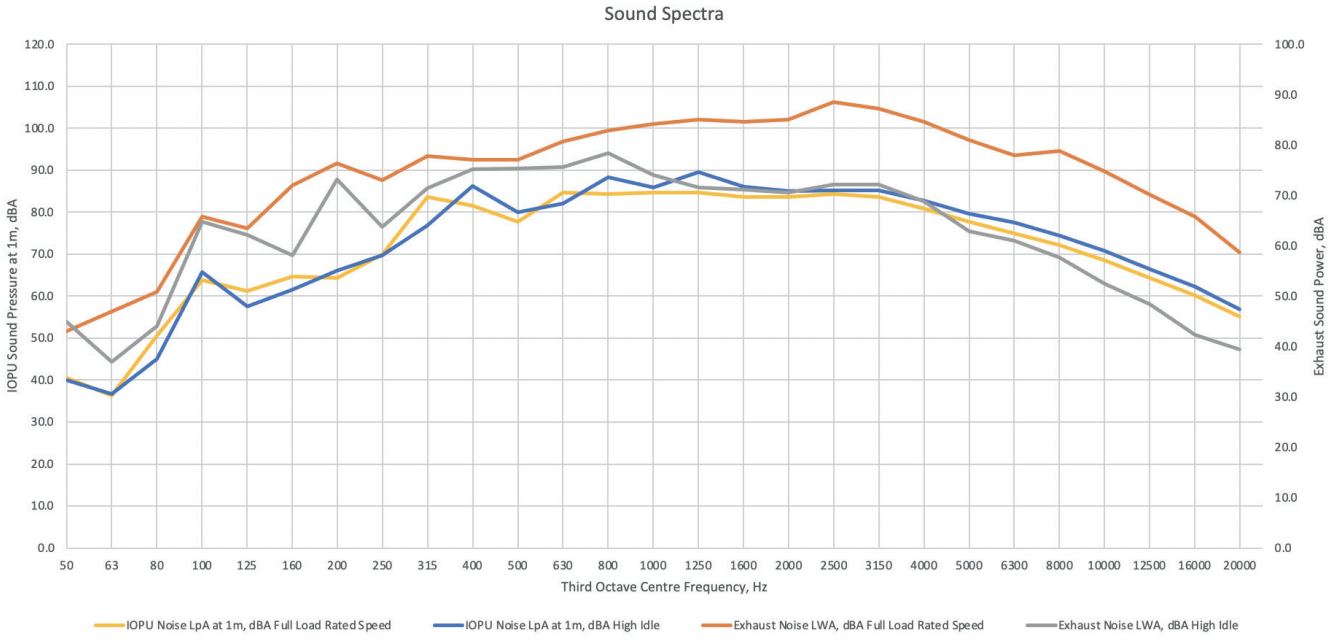
Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Spectral data - Puller fan MD043 - T6182

1/3 Octave sound data for the IOPU, average of all microphones, and exhaust outlet noise level at turbocharger outlet.

	Third octave centre frequency (Hz)																									
	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8k	10k	12.5k	16k	20k
Exhaust noise L_{WA} dBA FLRS	43.1	46.9	50.8	65.8	63.5	71.9	76.3	73.0	77.8	77.1	77.1	80.7	82.9	84.2	85.0	84.6	85.0	88.5	87.2	84.5	80.9	78.0	78.8	74.8	70.0	65.8	58.7
Exhaust noise L_{WA} dBA High idle	44.9	37.0	44.1	64.7	62.2	58.1	73.1	63.8	71.4	75.2	75.3	75.6	78.4	74.1	71.6	71.2	70.5	72.1	72.1	68.8	62.8	61.0	57.6	52.4	48.5	42.3	39.3
IOPU noise L_{pA} at 1m dBA FLRS	40.6	36.3	50.6	63.8	61.2	64.6	64.4	69.9	83.6	81.6	77.6	84.7	84.4	84.7	84.7	83.7	83.6	84.4	83.6	80.9	77.7	75.0	72.1	68.5	64.3	60.2	55.2
IOPU noise L_{pA} at 1m dBA High idle	40.0	36.8	45.0	65.7	57.5	61.5	66.1	69.8	76.8	86.2	80.0	82.0	88.3	85.9	89.6	86.1	85.0	85.2	85.1	82.8	79.6	77.5	74.3	70.7	66.5	62.2	56.8

Sound spectra

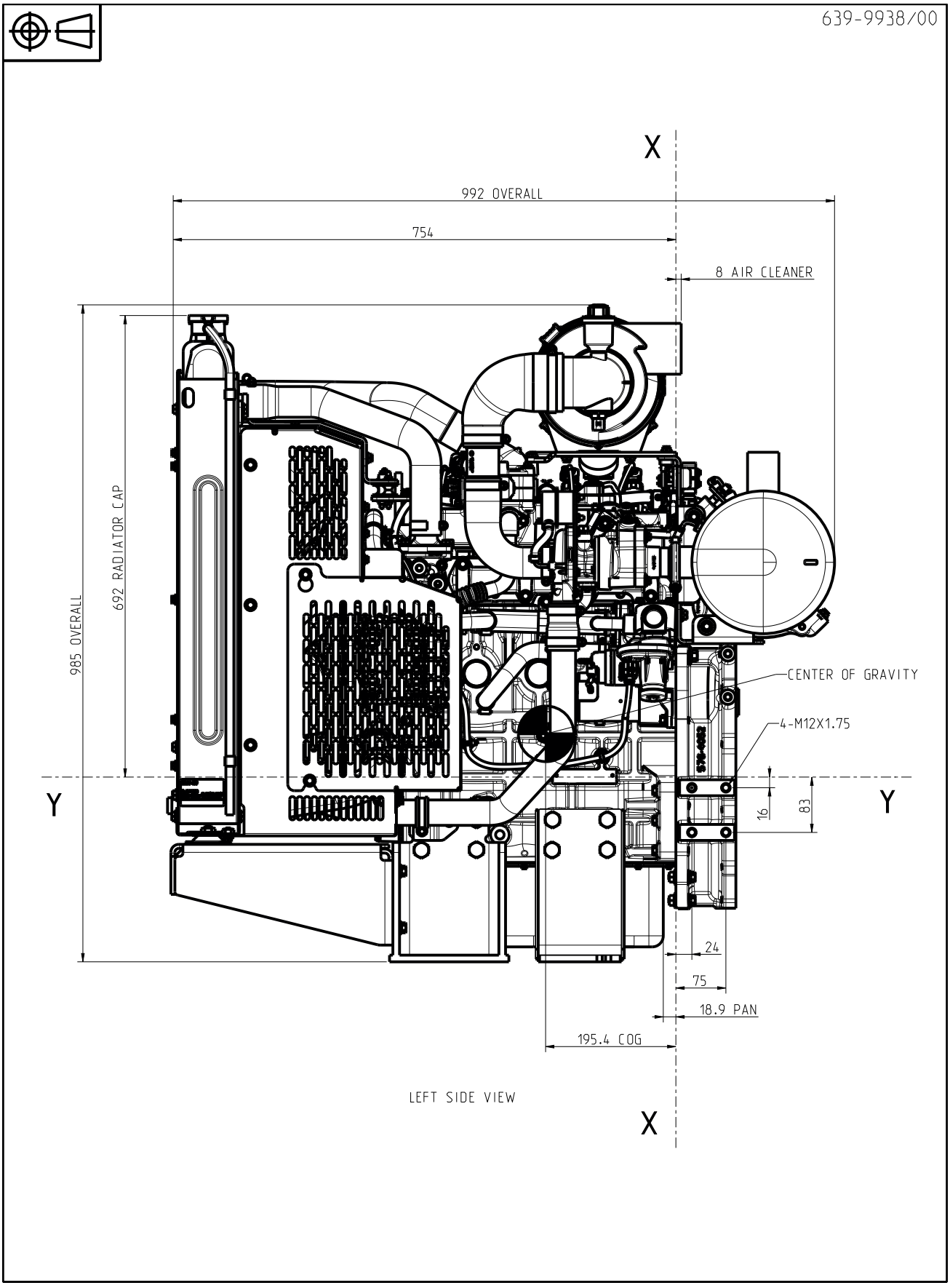


Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

Perkins®
THE HEART OF EVERY GREAT MACHINE

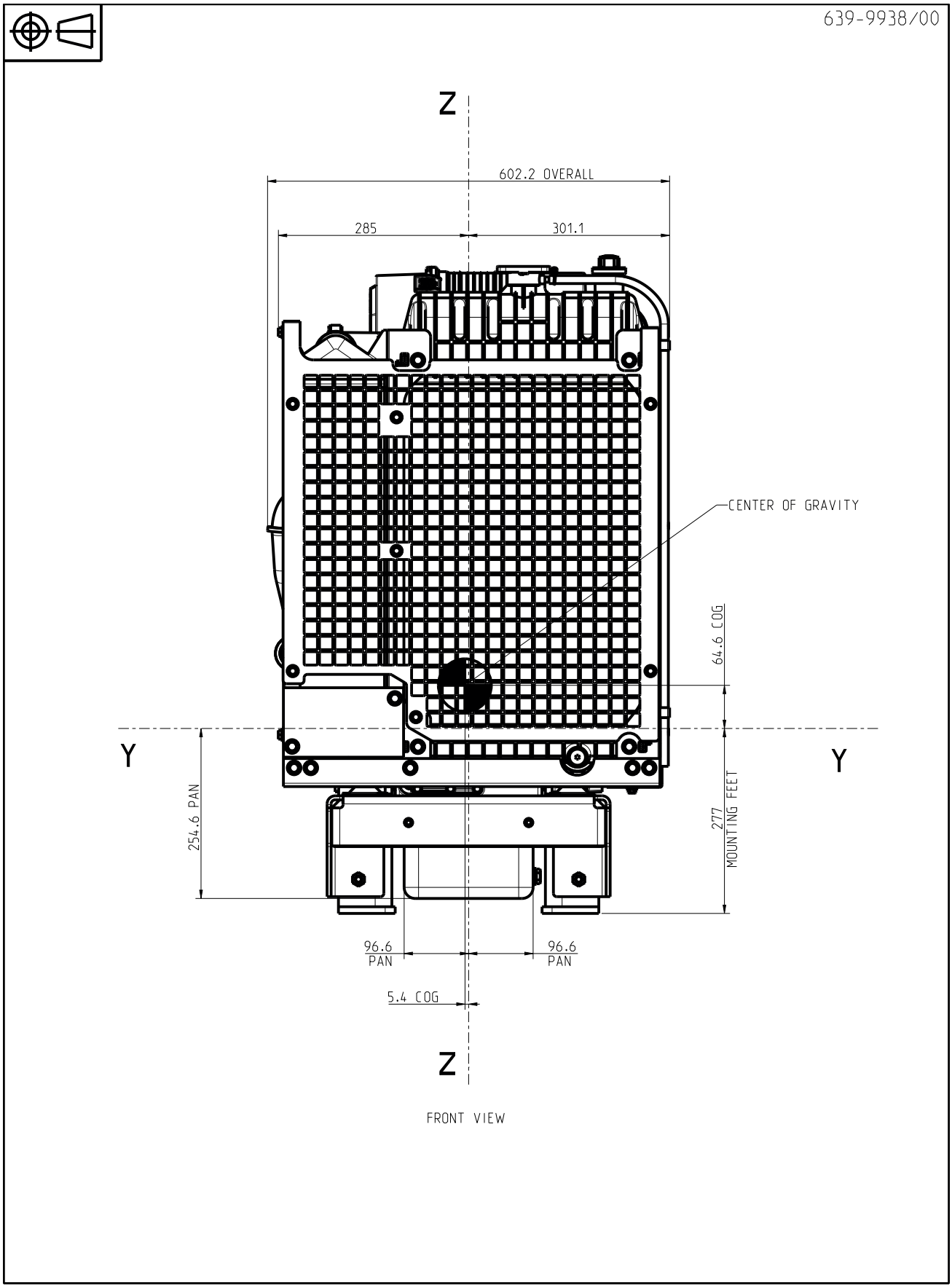
404J-E22TA - Left side view



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

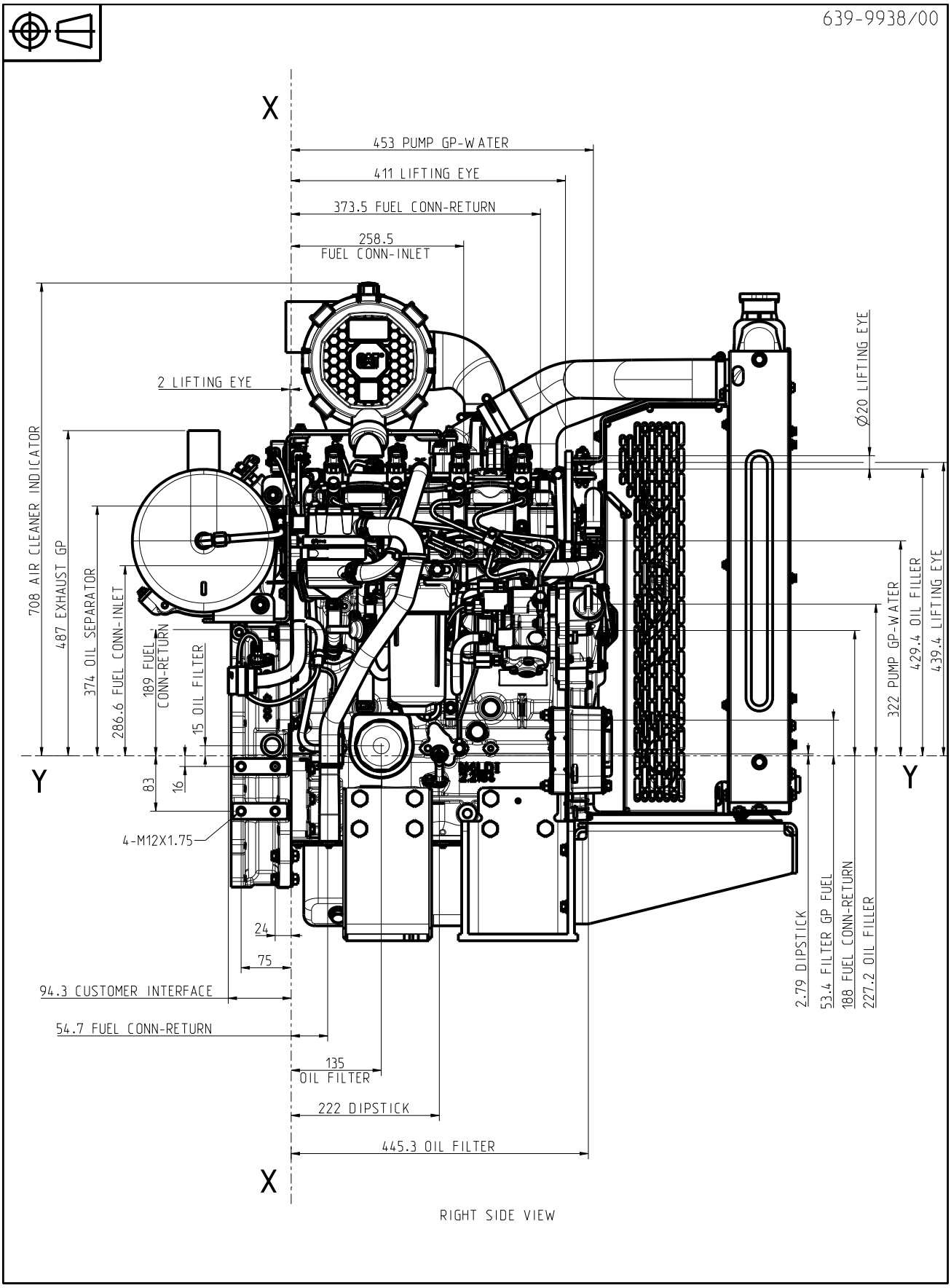
404J-E22TA - Front view



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

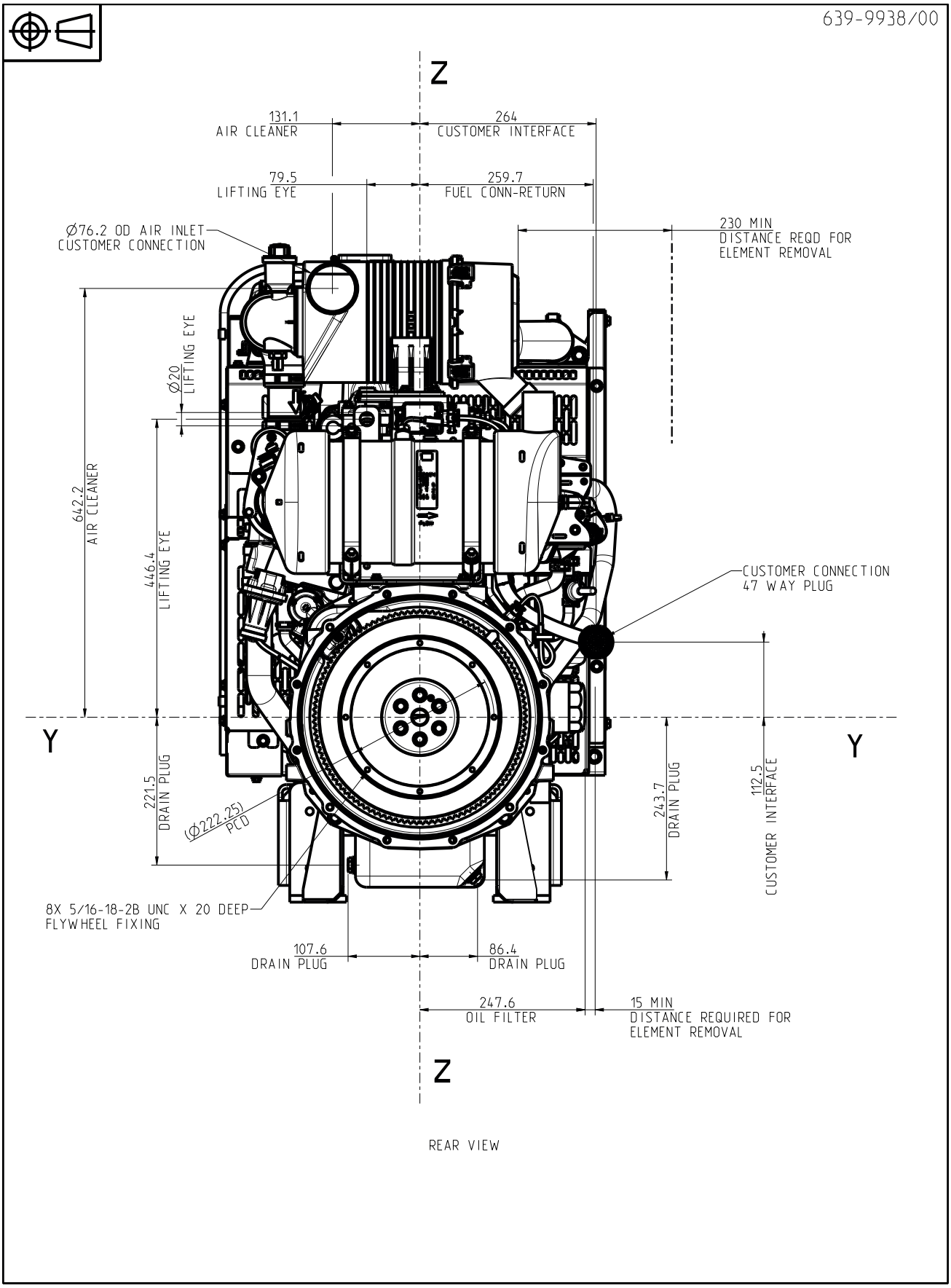
404J-E22TA - Right side view



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

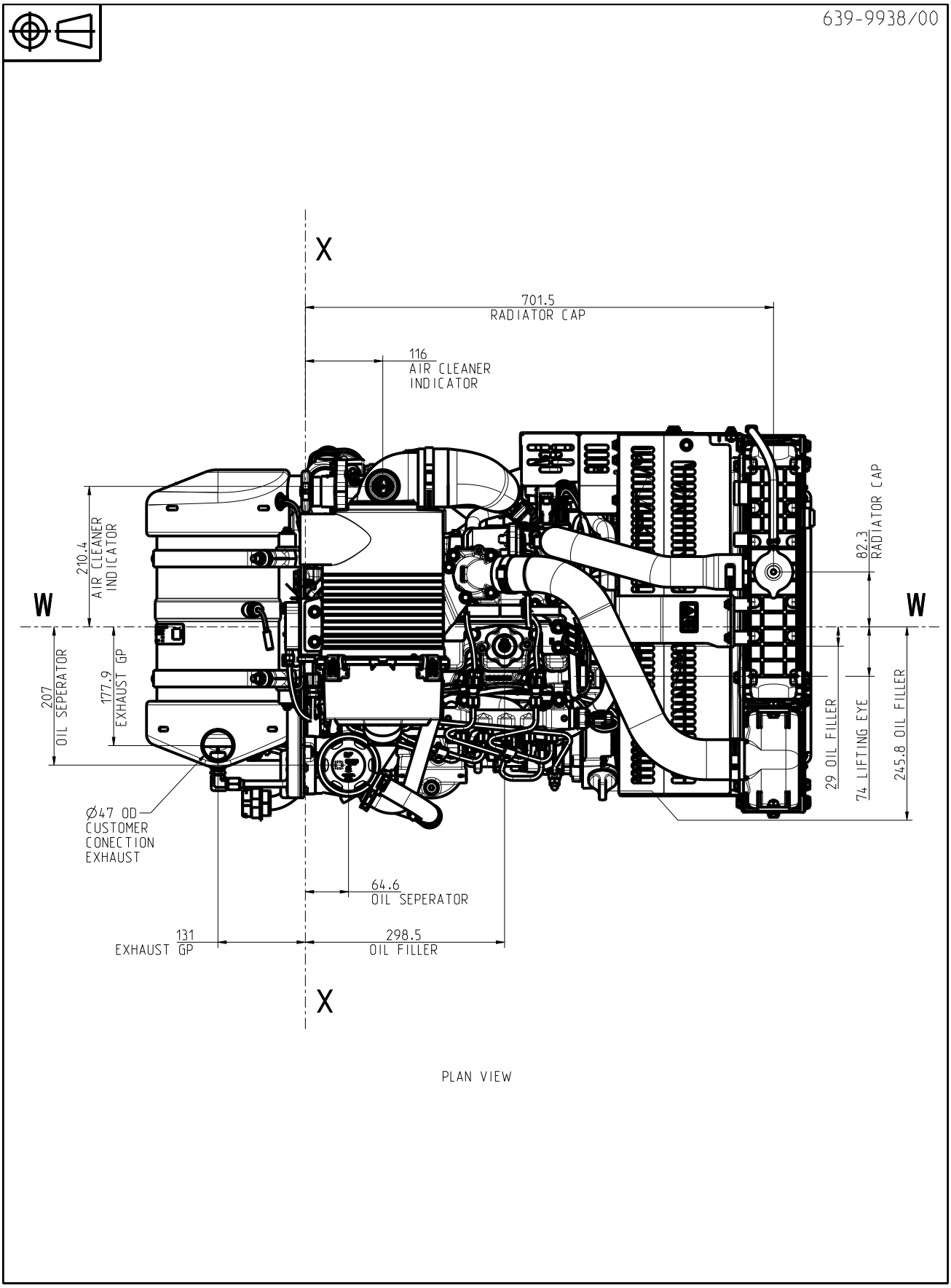
404J-E22TA - Rear view



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

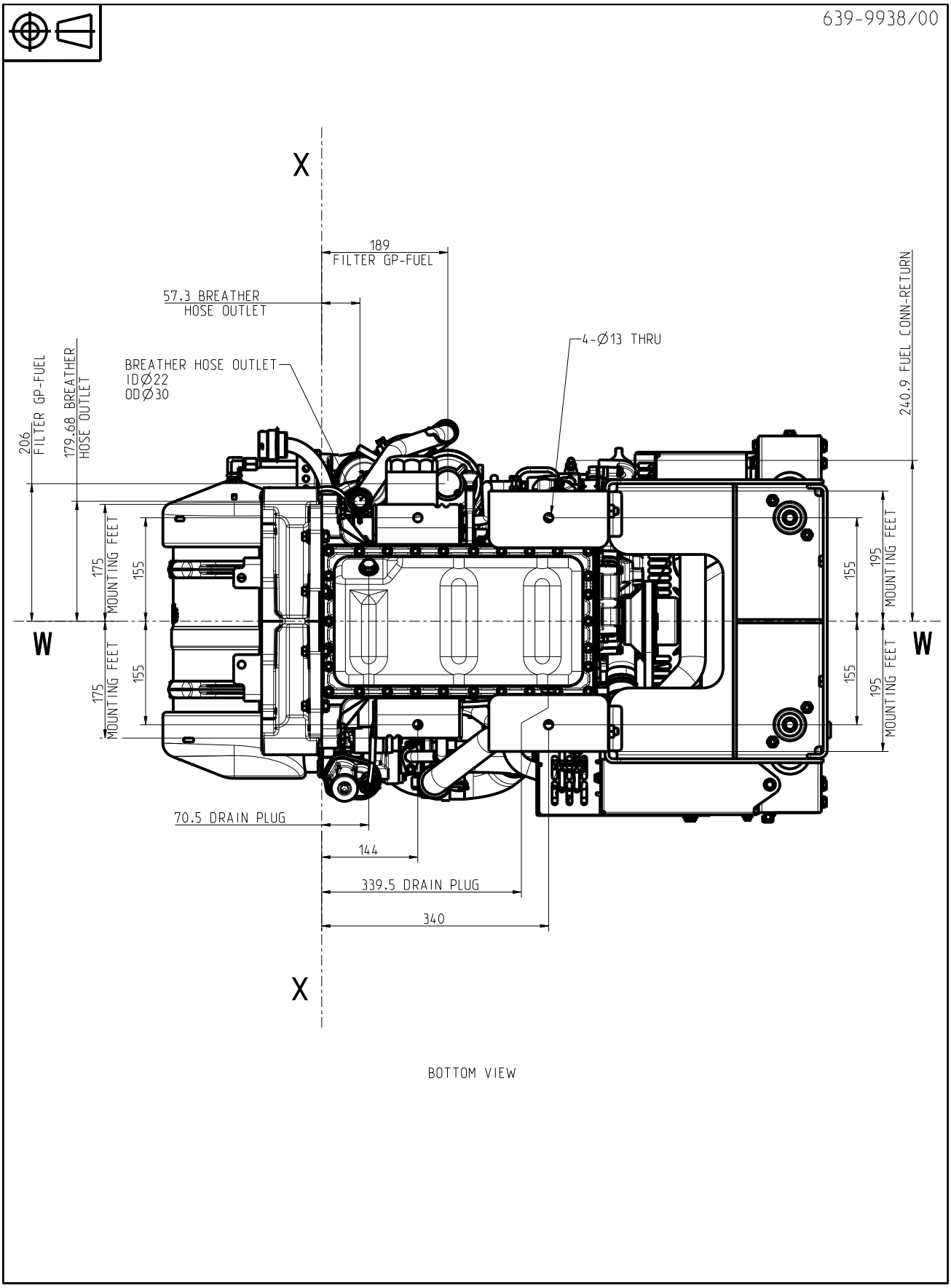
404J-E22TA - Plan view



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com

404J-E22TA - Bottom view



Publication No. TPD2432EN-01 (12-23)

Perkins Engines Company Limited
Peterborough, PE1 5FQ, United Kingdom
Tel: +44 (0)1733 583000
Fax: +44 (0)1733 582240
www.perkins.com