
Perkins 400D Series

Models 402D-05, 403D-07, 403D-11, 403D-15, 403D-15T, 404D-15, 403D-17, 404D-22, 404D-22T and 404D-22TA

ENGINE SPECIFICATION MANUAL

402D-05	Two cylinder naturally aspirated diesel engine for industrial, construction and agricultural applications
403D-07 403D-11 403D-15 403D-17	Three cylinder naturally aspirated diesel engines for industrial, construction and agricultural applications
403D-15T	Three cylinder turbocharged diesel engine for industrial, construction, and agricultural applications
404D-15 404D-22	Four cylinder naturally aspirated diesel engines for industrial, construction and agricultural applications
404D-22T 404D-22TA	Four cylinder turbocharged diesel engines for industrial, construction and agricultural applications

Chapters

1 General information

2 The engine range

3 Engine specification

4 Options

5 Accessories

6 Technical data

The following pages contain a detailed table of contents

Contents

1 General information

Abbreviations and codes

Abbreviations	3
Drawing standards	3
Engine type codes	3

2 The engine range

400 Series standard base list offering

402D-05 base list breakdown	6
403D-07 base list breakdown	7
403D-11 base list breakdown	8
403D-15 base list breakdown	10
403D-17 base list breakdown	12
404D-15 base list breakdown	13
404D-22 base list breakdown	14
404D-22T base list breakdown	16
404D-22TA base list breakdown	17

3 Engine specification

Option selection template

Order form for 400D Series “Industrial Custom” Engines	20
--	----

Sub application codes

Agricultural power	22
Construction power	22
Defence power	22
Gen set power	22
Industrial power	22
Material handling power	22
Refrigeration power	22
Vehicle power	22

General arrangement drawings

402D-05 - Left side view	24
402D-05 - Front view	25
402D-05 - Right side view	26
402D-05 - Rear view	27
402D-05 - Plan view	28
403D-07 - Left side view	29
403D-07 - Front view	30
403D-07 - Right side view	31
403D-07 - Rear view	32
403D-07 - Plan view	33
403D-11 - Left side view	34
403D-11 - Front view	35
403D-11 - Right side view	36
403D-11 - Rear view	37
403D-11 - Plan view	38
403D-15 - Left side view	39
403D-15 - Front view	40
403D-15 - Right side view	41
403D-15 - Rear view	42
403D-15 - Plan view	43
403D-15T - Left side view	44
403D-15T - Front view	45
403D-15T - Right side view	46
403D-15T - Rear view	47
403D-15T - Plan view	48
404D-15 - Left side view	54
404D-15 - Front view	55
404D-15 - Right side view	56
404D-15 - Rear view	57
404D-15 - Plan view	58
404D-22 - Left side view	59
404D-22 - Front view	60
404D-22 - Right side view	61
404D-22 - Rear view	62
404D-22 - Plan view	63
404D-22T/404D-22TA - Left side view	64
404D-22T/404D-22TA - Front view	65
404D-22T/404D-22TA - Right side view	66
404D-22T/404D-22TA - Rear view	67
404D-22T/404D-22TA - Plan view	68

4 Options**Engine ratings****Machine load factor**

Method 1 - to establish machine load factor	73
Method 2 - to establish machine load factor	73

Labels

AL001 - Perkins label	74
-----------------------------	----

Flywheel housing

CD001 - Backplate, 402D-05, 403D-07	75
CD001 - Backplate, 403D-11, 404D-15	76
CD001 - Backplate, 403D-15, 403D-15T	76
CD001 - Backplate, 404D-22, 404D-22T, 404D-22TA	77
CD002 - Double backplate, 403D-11	77
CD002 - Double backplate, 404D-22, 404D-22T, 404D-22TA	78
CD003 - Flywheel housing, short, SAE 5, 402D-05, 403D-07	78
CD003 - Flywheel housing, short, SAE 5, 403D-11, 404D-15	79
CD003 - Flywheel housing, short, SAE 4, 403D-15, 403D-15T	79
CD003 - Flywheel housing, short, SAE 4, 404D-22, 404D-22T, 404D-22TA	80
CD004 - Flywheel housing, long, SAE 5, 402D-05, 403D-07	80
CD004 - Flywheel housing, long, SAE 5, 403D-11, 404D-15	81
CD004 - Flywheel housing, long, SAE 4, 403D-15, 403D-15T	81
CD004 - Flywheel housing, long, SAE 4, 404D-22, 404D-22T, 404D-22TA	82

Flywheels

DD000 - Not required	83
DD001 - Flywheel, flatface, 402D-05	83
DD001 - Flywheel, flatface, 403D-07	84
DD001 - Flywheel, flatface, 403D-11	84
DD001 - Flywheel, flatface, 403D-15, 403D-15T	85
DD001 - Flywheel, flatface, 404D-15	85
DD001 - Flywheel, flatface, 404D-22, 404D-22T, 404D-22TA	86
DD002 - Flywheel, light, 402D-05	86
DD002 - Flywheel, light, SAE 6½, 403D-07	87
DD002 - Flywheel, light, SAE 6½, 403D-11	87
DD002 - Flywheel, light, SAE 7½, 403D-15, 403D-15T	88
DD002 - Flywheel, light, SAE 6½, 404D-15	88
DD002 - Flywheel, light, SAE 7½, 404D-22, 404D-22T, 404D-22TA	89
DD003 - Flywheel, heavy, 402D-05	89
DD003 - Flywheel, heavy, SAE 6½, 403D-07	90
DD003 - Flywheel, heavy, SAE 6½, 403D-11	90
DD003 - Flywheel, heavy, SAE 7½, 403D-15, 403D-15T	91
DD003 - Flywheel, heavy, SAE 6½, 404D-15	91
DD003 - Flywheel, heavy, SAE 7½, 404D-22, 404D-22T, 404D-22TA	92
DD004 - Flywheel, SAE 8 and SAE 10, 404D-22, 404D-22T, 404D-22TA	92

Flywheel mass and inertia

402D-05	93
403D-07	93
403D-11	93
403D-15, 403D-15T, 403D-17	93
404D-15	93
404D-22, 404D-22T, 404D-22TA	93

Starter motors

Starter specification	94
ED000 - Not required	94
ED001 - 12V, 2,0 kW, 403D-15, 403D-15T	95
ED001 - 12V, 2,0 kW, 403D-17	95
ED001 - 12V, 2,0 kW, 404D-22, 404D-22T, 404D-22TA	96
ED002 - 24V, 2,5 kW, 403D-15, 403D-15T, 404D-22, 404D-22T, 404D-22TA	96
ED003 - 12V, 1,4 kW, 403D-11	97
ED003 - 12V, 1,4 kW, 404D-15	97
ED005 - 12V, 0,8 kW, 402D-05, 403D-07	98
ED006 - 12V, 1,2 kW, 402D-05, 403D-07	98

Fan drive

FB001/FB002/FB003 - Fan pulley, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA	99
FB005 - Fan pulley Ø 77.8 mm, 402D-05, 403D-07, 403D-11, 404D-15	100

Sump and Dipstick

GB001 - Standard sump, short straight dipstick, 402D-05	101
GB001 - Standard sump, short straight dipstick, 403D-07	102
GB001 - Standard sump, short straight dipstick, 403D-11	102
GB001 - Standard sump, short straight dipstick, 403D-15, 403D-15T, 403D-17	103
GB001 - Standard sump, short straight dipstick, 404D-15, 404D-22, 404D-22T, 404D-22TA	104
GB002 - Standard sump, short dipstick, 402D-05	105
GB002 - Standard sump, short dipstick, 403D-07	105
GB002 - Standard sump, short dipstick, 403D-11	106
GB002 - Standard sump, short dipstick, 403D-15, 403D-15T, 403D-17,	107
GB002 - Standard sump, short dipstick, 404D-15, 404D-22, 404D-22T, 404D-22TA	108
GB003 - Standard sump, long dipstick, 402D-05	109
GB003 - Standard sump, long dipstick, 403D-07	109
GB003 - Standard sump, long dipstick, 403D-11	110
GB003 - Standard sump, long dipstick, 403D-15, 403D-15T, 403D-17	111
GB003 - Standard sump, long dipstick, 404D-15, 404D-22, 404D-22T, 404D-22TA	112

Sump eco drain valve

GC000 - No eco drain - 2 of sump plugs fitted, all models	113
GC000 - No eco drain valve - 2 of sump plugs fitted.	113
GC001 - Eco drain valve (M16), 403D-15, 403D-15T, 404D-22, 404D-22T, 404D-22TA	113

Supply with or without oil

Maximum angle of continuous operation	114
GD000 - Engine supplied without oil	114
GD001 - Engine supplied with oil	114

Lubricating oil filler

Lift pump oil filler	115
HB000 - No lift pump oil filler	115
HB003 - Lift pump oil filler, all models	115

Lubricating oil filter mount

JC000 - No pendant oil filter	116
JC001 - Oil pendant filter, 404D-22	116
JC001 - Oil pendant filter, 404D-22T, 404D-22TA	117
JC002 - Oil pendant filter 90°, 403D-11	117

Crankshaft pulleys

KB001 - Crankshaft pulley, 403D-15 403D-15T, 403D-17.. . . .	118
KB001 - Crankshaft pulley, Ø 120 mm, 404D-22, 404D-22T, 404D-22TA	119
KB003 - Crankshaft pulley, drive ratio 1.285:1, 403D-11	119
KB003 - Crankshaft pulley, drive ratio 1.285:1, 404D-15	120
KB004 - Crankshaft pulley, drive ratio 1.105:1, 403D-11	120
KB005 - Crankshaft pulley, 402D-05,	121
KB005 - Crankshaft pulley, 403D-07,	121

Front end drive - output

KD000 - Not required	122
KD001 - Additional crankshaft pulley, 402D-05, 403D-07	122
KD001 - Additional crankshaft pulley, 403D-11, 404D-15	123
KD001 - Additional crankshaft pulley, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA	124

Oil cooler

LB001 - No oil cooler fitted, 402D-05, 403D-07, 403D-11, 403D-15, 403D-15T, 404D-15, 404D-22	125
LB002 - Oil cooler fitted, 403D-15, 403D-15T	125
LB002 - Oil cooler fitted, 404D-22, 404D-22T, 404D-22TA	125

Water outlet connections

LD001 - Water outlet connection, vertical, 402D-05, 403D-07	126
LD001 - Water outlet connection, vertical, 403D-11, 404D-15	127
LD001 - Water outlet connection, vertical, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA	128
LD002 - Water outlet connection, horizontal, 403D-11	129
LD002 - Water outlet connection, horizontal, 403D-15, 403D-15T403D-17	130
LD002 - Water outlet connection, horizontal, 404D-22, 404D-22T, 404D-22TA	131
LD003 - Water outlet connection, 45°, 403D-15, 403D-15T403D-17	132
LD003 - Water outlet connection, 45°, 404D-22, 404D-22T, 404D-22TA	133

Cooling fan

Cooling fan diagram, 402D-05	135
Fan specification	135
MD003 - 390 mm puller fan, 403D-15, 403D-15T.	136
MD003 - 390 mm puller fan, 404D-22, 404D-22T, 404D-22TA	136
MD004 - 390 mm pusher fan, 403D-15, 403D-15T	137
MD004 - 390 mm pusher fan, 404D-22, 404D-22T, 404D-22TA	137
MD005 - 340 mm puller fan, 403D-15, 403D-15T, 404D-15, 403D-17	138
MD006 - 340 mm pusher fan, 403D-15, 403D-15T, 404D-15, 403D-17.. . . .	138
MD007 - 330 mm puller fan, 403D-11.	139
MD008 - 330 mm pusher fan, 403D-11	139
MD009 - 280 mm puller fan, 403D-07.	140
MD010 - 280 mm pusher fan, 403D-07	140
MD011 - 250 mm puller fan, 402D-05.	141
MD012 - 260 mm pusher fan, 402D-05	141

Fan Spacer

ME006 - Crankshaft mounted fan spacer (62 mm), 403D-11.. 143

Alternators

ND001/ND003 - 65/85 amp alternator 12V, 403D-15, 403D-15T, 403D-17, 404D-22,
404D-22T, 404D-22TA 144

ND005 - Alternator 24V, 55 amp, 403D-15, 403D-15T, 404D-22,
404D-22T, 404D-22TA 145

ND009 - Alternator 12V, 40 amp, 403D-11, 404D-15 145

ND011 - Alternator 12V, 15 amp, 403D-11 146

ND013 - Alternator 12V, 14 amp, 402D-05, 403D-07 146

Drive belt

NE000 - No belt required. 147

NE001 - V belt 147

Timing case blanks and bearing holder

QC007 - 403D-11, 404D-15 149

QC007 - 403D-15, 403D-15T, 404D-22, 404D-22T and 404D-22TA 149

Intake/exhaust manifolds (turbocharged)

SB001 - Rear intake manifold, side outlet exhaust, 403D-15T 150

SB001 - Rear intake manifold, side outlet exhaust, 404D-22T, 404D 22TA 151

SB002 - Rear intake manifold, vertical up outlet exhaust, 404D-22T, 404D 22TA.. . . . 151

SB003 - Rear intake manifold, no exhaust manifold, blanking plate fitted,
404D-22T, 404D-22TA 152

Intake manifolds (naturally aspirated)

TB001 - Intake manifold, side, 402D-05 153

TB001 - Intake manifold, side, 403D-07 154

TB001 - Intake manifold, side, 403D-11 154

TB001 - Intake manifold, side, 403D-15, 403D-17 155

TB001 - Intake manifold, side, 404D-15 155

TB001 - Intake manifold, side, 404D-22 156

TB002 - Intake manifold, vertical, 402D-05 156

TB002 - Intake manifold, vertical, 403D-07 157

TB002 - Intake manifold, vertical, 403D-11 157

TB002 - Intake manifold, vertical, 403D-15, 403D-17 158

TB002 - Intake manifold, vertical, 404D-15 158

TB002 - Intake manifold, vertical, 404D-22 159

TB003 - Intake manifold, rear, 402D-05 159

TB003 - Intake manifold, rear, 403D-07 160

TB003 - Intake manifold, rear, 403D-11 160

TB003 - Intake manifold, rear, 403D-15, 403D-17 161

TB003 - Intake manifold, rear, 404D-15 161

TB003 - Intake manifold, rear, 404D-22 162

Air filter, bracket and hose

TD001 - Air filter, bracket and hose, 403D-11 163

TD001 - Air filter, bracket and hose, 403D-15 164

TD001 - Air filter, bracket and hose, 404D-22 164

Kit offering

Kits available for 402D-05	192
Kits available for 403D-07	193
Kits available for 403D-11	194
Kits available for 403D-15, 403D-15T and 403D-17..	195
Kits available for 404D-15	196
Kits available for 404D-22, 404D-22T and 404D-22TA.	197

5 Accessories**Exhaust manifold side outlet - elbow**

UD000 - Not required	200
UD001/UD002/UD003 - Exhaust manifold elbow all models ..	200

Mounting feet loose

ZC000 - Not required	201
ZC001 - Mounting feet (loose) front and rear, 402D-05 ..	201
ZC001 - Mounting feet (loose) front and rear, 403D-07 ..	202
ZC001 - Mounting feet (loose) front and rear, 403D-11, 404D-15..	202
ZC001 - Mounting feet (loose) front and rear, 403D-15, 403D-15T ..	203
ZC001 - Mounting feet (loose) front and rear, 404D-22, 404D-22T, 404D-22TA ..	203

Oil filler extension

ZD000 - Not required	204
ZD001- 403D-07, 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T, 404D-22TA	204

Heater/starter switch (12V)

ZE000 - Not required	205
ZE001 - Heater/starter switch (12V), all models	205

Radiator assembly with mounting feet

Coolant capacities	206
ZM000 - Not required	206
ZM001/ZM002 - Radiator assembly with mounting feet, 403D-11	207
ZM001/ZM002 - Radiator assembly with mounting feet, 403D-15	207
ZM001/ZM002 - Radiator assembly with mounting feet, 404D-22	208

Deutsch connectors

ZP000 - Not required	209
ZP001/ZP002 - Deutsch connector, all models	209
ZP002/ZP004/ZP005 - Starter motor connections, all models	210
ZP003/ZP005 - Deutsch to Lucar adaptor, all models	210

Automatic shutdown

Automatic shutdown controller (12V)	211
ZR000 - Not required	211
ZR001 - Automatic shutdown controller (12V), all models	211

Literature

ZT000 - All models no literature	212
ZT001 - All models warranty leaflet required...	212

Exhaust silencer

ZU000 - Not required .....	.213
ZU001 - Exhaust silencer 402D-05, 403D-07, 403D-11, 403D-15, 403D-17, 404D-15, 404D-22 .....	.213

Low pressure fuel accessories (fuel pre-filters and hand primer)

ZV000 - No pre filter and no hand primer .....	.214
ZV001/ZV003 - Fuel pre-filter, all models .....	.214
ZV002/ZV003 - Hand primer, all models .....	.214

Cab heater connections

ZW000 - Not required .....	.215
ZW001/ZW002 - Cab heater connection, all models .....	.215

6 Technical data

Basic technical data

402D-05 .....	.218
403D-07 .....	.219
403D-11 .....	.220
403D-15 .....	.221
403D-15T .....	.222
404D-15 .....	.223
403D-17 .....	.224
404D-22 .....	.225
404D-22T .....	.226
404D-22TA .....	.227

Power curves

402D-05 @ 2800 rpm T3144 - ISO TR14396..	228
402D-05 @ 3000 rpm T3148 - ISO TR14396..	229
402D-05 @ 3600 rpm T3150 - ISO TR14396..	230
403D-07 @ 2800 rpm T3138 - ISO TR14396..	231
403D-07 @ 3000 rpm T3142 - ISO TR14396..	232
403D-07 @ 3600 rpm T3146 - ISO TR14396..	233
403D-11 @ 2200 rpm T3110 - ISO TR14396..	234
403D-11 @ 2400 rpm T3112 - ISO TR14396..	235
403D-11 derate @ 2200 rpm T3114 - ISO TR14396	236
403D-11 derate @ 2800 rpm T3116 - ISO TR14396	237
403D-11 @ 2600 rpm T3118 - ISO TR14396..	238
403D-11 derate @ 3000 rpm T3120 - ISO TR14396	239
403D-11 @ 2800 rpm T3122 - ISO TR14396..	240
403D-11 @ 3000 rpm T3124 - ISO TR14396..	241
403D-11 @ 3400 rpm T3156 - ISO TR14396..	242
403D-15 @ 2200 rpm T3090 - ISO TR14396..	243
403D-15 @ 2400 rpm T3092 - ISO TR14396..	244
403D-15 @ 2600 rpm T3094 - ISO TR14396..	245
403D-15 @ 2800 rpm T3096 - ISO TR14396..	246
403D-15 @ 3000 rpm T3098 - ISO TR14396..	247
403D-15T @ 2200 rpm T3100 - ISO TR14396	248
403D-15T @ 2400 rpm T3102 - ISO TR14396	249
403D-15T @ 2600 rpm T3104 - ISO TR14396	250
403D-15T @ 2800 rpm T3106 - ISO TR14396	251
403D-15T @ 3000 rpm T3108 - ISO TR14396	252
403D-17 @ **** rpm T3086 - ISO TR14396	253
403D-17 @ **** rpm T3086 - ISO TR14396	254
404D-15 @ 2800 rpm T3086 - ISO TR14396..	255
404D-15 @ 3000 rpm T3088 - ISO TR14396..	256
404D-22 @ 2200 rpm T3128 - ISO/TR 14396..	257
404D-22 @ 2400 rpm T3130 - ISO/TR 14396..	258
404D-22 @ 2600 rpm T3132 - ISO/TR 14396..	259
404D-22 @ 2800 rpm T3134 - ISO/TR 14396..	260
404D-22 @ 3000 rpm T3136 - ISO/TR 14396..	261
404D-22 derate @ 3000 rpm T3170 - ISO/TR 14396	262
404D-22 derate @ 2800 rpm T3172 - ISO/TR 14396	263
404D-22 derate @ 2600 rpm TBA - ISO/TR 14396	264
404D-22 balanced @ 2600 rpm T3179 - ISO/TR 14396..	265
404D-22T @ 3000 rpm T2980 - ISO/TR 14396	266
404D-22T @ 2800 rpm T3140 - ISO/TR 14396	267
404D-22T balanced @ 2600 rpm T3183 - ISO/TR 14396	268
404D-22T @ 2600 rpm T3184 - ISO/TR 14396	269
404D-22T @ 2600 rpm T3186 - ISO/TR 14396	270
404D-22TA @ 2800 rpm T3126 - ISO/TR 14396	271

Cylinder block views non-stressed block

Block and head - 402D-05 ..	272
Block and head - 403D-07 ..	273
Block and head - 403D-11 ..	273
Block and head - 403D-15T ..	274
Block and head - 404D-15 ..	274
Block and head - 404D-22T ..	275

Installation data

Cold start system	276
Equipment required for cold temperatures	276
Battery performance	277
Battery to starter lead resistance	277
Glow plugs	277

Cooling system

Coolant.....	278
Coolant capacities (engines only)	278
Radiators	278
Thermostat	278
Coolant temperature switch	278
Radiator coolant flow rates	279
Heat balance	280
404D-22TA Charge Air Cooler (CAC) Specification	282

Electrical system

Back EMF warning.....	283
-----------------------	-----

Wiring diagrams

402D-05, 403D-07 and 403D-11 (14 amp, 15 amp alternator)	283
Maximum circuit resistance	283
403D-11, 404D-15 (40 amp alternator).....	284
Maximum circuit resistance	284
403D-15, 403D-17, 403D-15T, 404D-22, 404D-22T, 404D-22TA (65/85 amp alternator)	285
Maximum circuit resistance	285
Alternator charge lamp.....	285
Auto shut down - 402D-05, 403D-07 and 403D-11 (14 amp, 15 amp alternator)	286
Auto shut down - 403D-11 and 404D-15 (40 amp alternator)	287
Auto shut down - 403D-15, 403D-17, 403D-15T, 404D-22, 404D-22T, 404D-22TA (65/85 amp).....	288

Exhaust system

Temperature, flow rate and back pressure	289
Exhaust gas flow rates	289

Fuel system

Fuel specification	291
Low pressure fuel system	291
Electrical shut-off solenoid (ESOS).....	291
Specific fuel consumption (typical).....	292
Fuel temperature and specific gravity	293
Fuel inlet temperature and specific gravity graphs	293

Induction system

Air flow requirements	294
Inlet restriction.....	294
Closed breather requirements	295

Permissible overhung loads

Maximum allowable load versus overhang, 402D-05, at front of crankshaft	303
Maximum allowable load versus overhang, 402D-05, at rear of crankshaft	304
Maximum allowable load versus overhang, 403D-07, at front of crankshaft	305
Maximum allowable load versus overhang, 403D-07, at rear of crankshaft	306
Maximum allowable load versus overhang, 403D-11 and 404D-15, at front of crankshaft	307
Maximum allowable load versus overhang, 403D-11 and 404D-15, at rear of crankshaft	308
Maximum allowable load versus overhang, 403D-15, 403D-15T, at front of crankshaft	309
Maximum allowable load versus overhang, 403D-15, 403D-15T, at rear of crankshaft .	310
Maximum allowable load versus overhang, 403D-17, 404D-22, 404D-22T and 404D-22TA, crankshaft front.	311
Maximum allowable load versus overhang, 403D-17, 404D-22, 404D-22T and 404D-22TA, crankshaft rear.	312
Maximum allowable crankshaft overhung load PED-0257-14	313
Maximum allowable crankshaft overhung load PED-0257-12	314
Maximum allowable crankshaft overhung load PED-0244-14	315
Maximum allowable crankshaft overhung load PED-0244-12	316
Maximum allowable crankshaft overhung load PED-0371-4	317
Maximum allowable crankshaft overhung load PED-0371-2	318
Maximum allowable crankshaft overhung load PED-0152-11-D	319
Maximum allowable crankshaft overhung load PED-0152-11-B	320
Maximum allowable crankshaft overhung load PED-0290-14	321
Maximum allowable crankshaft overhung load PED-0290-12	322
Power and torque available	323
Gear ratio formula	323
Torque available from drive gear (B)	324
Hydraulic pumps	325
SAE A hydraulic pump interface detail 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T and 404D-22TA.	325
SAE A-A hydraulic pump interface detail 403D-11, 404D-15	326

Mass Elastic System

Diagram - 402D-05	327
Diagram - 403D-07	328
Diagram - 403D-11	329
Diagram - 403D-15 and 403D-15T	330
Diagram - 404D-15	331
Diagram - 404D-22, 404D-22T and 404D-22TA	332

Ratings

Allowances for engine driven auxiliary equipment	334
De-rating	334

Performance curves

Fan MD011 - curve PED-0257-16 - 402D-05	335
Fan MD012 - curve PED-0257-17 - 402D-05	336
Fan MD009 - curve PED-0244-16 - 403D-07	337
Fan MD010 - curve PED-0244-17 - 403D-07	338
Fan MD007 - curve PED-0005-2 - 403D-11	339
Fan MD008 - curve PED-0005-1 - 403D-11	340
Fan MD005 - curve PED-0153 - 403D-15, 403D-15T, 403D-17 and 404D-15.	341
Fan MD006 - curve PED-0146 - 403D-15, 403D-15T, 403D-17 and 404D-15.	342
Fan MD003 - curve PED-0290-17 - 404D-22, 404D-22T and 404D-22TA	343
Fan MD004 - curve PED-0290-18 - 404D-22, 404D-22T and 404D-22TA	344

Derate curves

S8001 - Altitude and temperature	345
S8002 - Humidity	346

Important notes

Company liability	349
Installation	349

Emissions certification

MHSA Certification	350
Legislation	350
California Proposition 65	350
Warranty	350

1

General information

Introduction

The 400 Series range of 2, 3 and 4 cylinder engines have been developed to meet EPA Tier 3+ and EC Stage IIIA off highway emissions legislation, and Japanese MLIT Step 3.

The 400 Series Engine Specification Manual is an important publication enabling sales personnel and distributors to select and specify 400 Series engines for a wide variety of industrial, construction and agricultural applications.

This manual enables the user to complete an engine specification with a selection of options and accessories to suit the needs of the application.

This manual also contains a considerable amount of technical data. For more information about the installation and service of the 400 Series engines refer to:

Publication	Engine	Language	Publication number
The Perkins Installation Manual	All Perkins	English	TPD1249
Service Manual	400D Series	English	KENR6942
- Operation & Maintenance Manual	400D Series	English	SEBU8311
- Systems Operation Testing and Adjusting	400D Series	English	KENR6225
- Specifications Manual	400D Series	English	KENR6223
- Disassembly & Assembly	400D Series	English	KENR6226

Note: The photographs and general arrangement drawings that appear in this manual are of typical engines and must not be taken as an illustration of any particular engine specification.

Warning! *All build lists referenced in this publication exclude any fan guard or hot surface protection features. To the extent that it is lawfully possible, the company accepts no responsibility whatsoever for any injury, damage or death whether to property or persons, arising directly or indirectly from this exclusion.*

How to use the manual

All the information needed to specify an engine for an application can be found in chapters 2 to 6. Use the chapters as follows:

Chapter 2: The engine range

This chapter contains brief details of the power output of 400 Series engines and specification sheets for the engines. Use the data in this chapter to determine which engine is required for the application. Copies of the specification sheets are available separately so that they can be left with the customer for easy reference.

Note: If the engine operates in the ambient conditions shown on the power curve, the only allowances that must be made are for the power used by accessories such as the fan and the alternator. The amount of power used by accessories driven by the engine must be decided so that the net horsepower available at the flywheel can be found.

Chapter 3: Engine specifications

This chapter contains information that will guide the user in the process of specifying options and accessories necessary to complete a full specification. An option selection template is also included. The standard table, listing sub application codes and descriptions is shown for the whole range of applications for Perkins engines.

General arrangement drawings for 400 Series engines are shown in this chapter.

Chapter 4: Options

To complete the specification of the engine, use the information shown in chapter 4 to select the options required for the application. Only one option can be selected from each group. A selection must be made from each group, even if it is "Not required".

To assist with the process of selecting the options, see "Option selection procedure" on page 19.

This chapter is split into sections for each of the engine families.

Chapter 5: Accessories

To complete the specification of the engine, use the information shown in chapter 5 to select the accessories required for the application. Only one accessory can be selected from each group. A selection must be made from each group, even if it is "Not required".

To assist with the process of selecting the accessories, see "Option selection template" on page 20.

This chapter is split into sections for each of the engine families.

Chapter 6: Technical data

This chapter contains full technical information for the engines in the range and is intended to assist the user of the manual to create an engine specification that is compatible with the required application.

How to order an engine

On confirmation of the specification, a unique build list number will be generated; an example of a typical list number is Gx65xxxu. The build list number, along with the volume requirements, will be programmed into the build programme.

The build list number will be stamped on the engine number plate on the engine along with the engine type and serial number.

Abbreviations and codes

Abbreviations

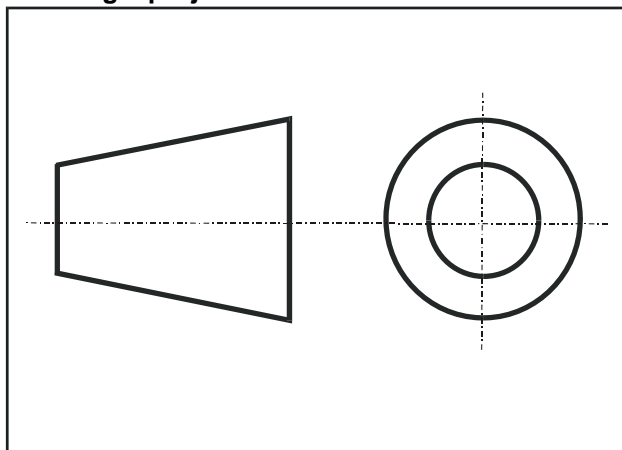
- BCD Boost Control Device
- ESOS..... Electrical shut-off solenoid
- SPES Sales project engine specification
- IDI Indirect injection
- LHS..... .Left hand side, when viewed from the flywheel end
- NORFNew Option Request Form
- DCP Design change proposal
- PTO Power take off
- RHS..... .Right Hand Side, when viewed from the flywheel end
- SPL.....Sound Pressure Level
- STD Standard
- SWL..... Sound Power Levels
- T Indirect injection turbocharged
- TA Indirect injection turbocharged/air/air after cooling

Drawing standards

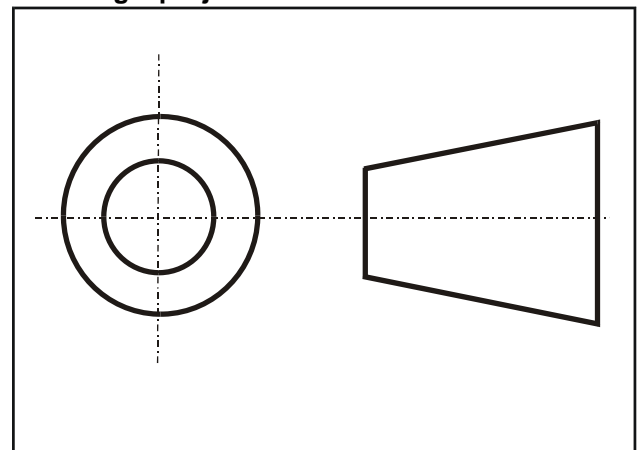
- Ø..... Diameter
- XX Rear face of cylinder block
- YY Crankshaft centre line (horizontal)
- ZZ Crankshaft centre line (vertical)

Note: All dimensions are in mm unless otherwise stated.

First angle projection



Third angle projection



Engine type codes

Engine type	Engine type codes
402D-05	GG
403D-07	GH
403D-11	GJ
403D-15	GK
403D-15T	GL

Engine type	Engine type codes
404D-15	GM
403D-17	GS
404D-22	GN
404D-22T	GP
404D-22TA	GR

This page is intentionally blank

2

The engine range

The 400 Series is a family of two, three and four cylinder water cooled diesel engines. They are among the cleanest and quietest engines in their power range. The highly efficient combustion is achieved through the indirect fuel injection system, with optimised pre-combustion swirl chambers. This same efficiency makes the 400 Series capable of exceeding all known applicable off-highway emissions standards.

These engines are suitable for most industrial, construction and agricultural applications.

Product duty - usage limitations

The rating curves published for these engines apply for only intermittent use unless specifically stated otherwise. Intermittent is defined as cyclic power and/or speed, with the minimum power utilised for no more than one hour in any two hour period, and the average load not exceeding the mechanical sign-off limit of the specification. Where an application demands, or is likely to demand, usage above this operating envelope, the applications engineer must obtain prior agreement from PSEL Product Engineering. The customer must also understand and agree to any identified durability or reliability vulnerabilities.

Note: See also, "Machine load factor" on page 72.

Gross intermittent ratings

Engine type	Maximum rating - kW (bhp) @ rpm ⁽¹⁾
402D-05	10,2 kW (13.6 bhp) at 3600
403D-07	15,3 kW (20.5 bhp) at 3600
403D-11	21,0 kW (28.2 bhp) at 3400
403D-15	25,1 kW (33.7 bhp) at 3000
403D-15T	30,0 kW (40.2 bhp) at 3000
404D-15	26,5 kW (35.5 bhp) at 3000
403D-17	26,1 kW (35.0 bhp) at 2600
404D-22	38,0 kW (51.0 bhp) at 3000
404D-22T	45,5 kW (61.0 bhp) at 3000
404D-22TA	49,2 kW (66.0 bhp) at 2800

1. Rating in kW/bhp to ISO/TR 14396 gross, ± 5%.

Note: Refer to the power curves and basic technical data (chapter 6) in order to decide which engine and rating are required for the application. If the engine is to operate in the ambient conditions shown on the power curve, the only adjustments that must be made are for the power used by the fan, the alternator and any additional equipment. Additional information for the correct specification of an engine rating is shown on page 69.

400 Series standard base list offering

The tables on the following pages give a breakdown by option code of all the C0.5 - C2.2 standard base list currently available for order. Against each build list a status is given, availability should be checked with your usual sales contact as some ratings are going through final rating development.

402D-05 base list breakdown

GG65666J		GG65624J		GG65622J		GG65610J		Build List	
Genset / ePak		Industrial		Industrial		Industrial		Industrial / IOPU / Genset	
HB30857J		HB30855J		HB30851J		HB30852J		Replaces 400C	
AA066	AA067	AA065	AA065	AA065	AA065	AA065	AA065	AA	Rating
AC012	AC012	AC012	AC012	AC012	AC012	AC012	AC012	AC	Core
AL003	AL003	AL003	AL003	AL003	AL003	AL003	AL003	AL	Labels
CD003	CD003	CD003	CD001	CD001	CD003	CD003	CD003	CD	Flywheel Housing
DD002	DD002	DD002	DD001	DD001	DD002	DD002	DD002	DD	Flywheel
ED005	ED005	ED005	ED005	ED005	ED005	ED005	ED005	ED	Starter Motor
FB005	FB005	FB005	FB005	FB005	FB005	FB005	FB005	FB	Fan Drive
GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB	Sump & Dipstick
GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC	Sump drain
GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD	Engine supplied with oil
HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB	Lubricating oil filter
JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC	Lubricating oil filter mounting options
KB004	KB004	KB004	KB004	KB004	KB004	KB004	KB004	KB	Crankshaft pulleys
KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD	Front end drive output options
LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB	Oil cooler option
LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD	Water outlet connections
MD012	MD011	MD011	MD011	MD011	MD011	MD011	MD011	MD	Cooling fan
ME000	ND013	ND013	ND013	ND013	ND013	ND013	ND013	ME	Fan spacer options
ND013	ND013	ND013	ND013	ND013	ND013	ND013	ND013	ND	Alternators
TB001	TB002	TB001	TB001	TB001	TB001	TB001	TB001	TB	Intake and exhaust manifold options
UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB	Intake manifolds (NA)
UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD	Air filter bracket and hose
YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD	Exhaust manifold (NA)
YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ	Exhaust manifold outlet elbow
ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA	Low pressure fuel system (lift pump and fuel filter)
ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC	Paint
ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD	Packaging
ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE	Electronically controlled governor (governor / control options)
ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ	Mounting feet (loose)
ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL	Oil filler extension
ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM	Heater / Starter switch
ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP	Oil pressure switch
ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR	Water temperature switch
ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT	Radiator assembly with mounting feet
ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU	Deutsch connectors
ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV	Automatic shut down kit
ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW	Literature
ZY069	ZY067	ZY065	ZY065	ZY065	ZY065	ZY065	ZY065	ZY	Exhaust silencer
ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ	Low pressure fuel accessories (fuel filter primer and hand primer)
									Cab heater connections
									Rating
									Glow signal

403D-07 base list breakdown

GH65780J Genset / ePak N/A	GH65667J Genset / ePak HD30859J	GH65623J Industrial HD30855J	GH65593J Industrial HD30858J	Build List Industrial / IOPU / Genset Replaces 400C
AA061	AA059	AA058	AA060	AA Rating
AC011	AC011	AC011	AC011	AC Core
AL003	AL003	AL003	AL003	AL Labels
CD004	CD003	CD003	CD004	CD Flywheel Housing
DD003	DD002	DD002	DD003	DD Flywheel
ED005	ED005	ED005	ED005	ED Starter Motor
FB005	FB005	FB005	FB005	FB Fan Drive
GB010	GB010	GB010	GB010	GB Sump & Dipstick
GC000	GC000	GC000	GC000	GC Sump drain
GD000	GD000	GD000	GD000	GD Engine supplied with oil
HB000	HB000	HB000	HB000	HB Lubricating oil filter
JC000	JC000	JC000	JC000	JC Lubricating oil filter mounting options
KB004	KB004	KB004	KB004	KB Crankshaft pulleys
KD000	KD000	KD000	KD000	KD Front end drive output options
LB001	LB001	LB001	LB001	LB Oil cooler option
LD001	LD001	LD001	LD001	LD Water outlet connections
MD010	MD010	MD009	MD009	MD Cooling fan
ME000	ME000	ME000	ME000	ME Fan spacer options
ND013	ND013	ND013	ND013	ND Alternators
			SB	SB Intake and exhaust manifold options
TB001	TB001	TB001	TB001	TB Intake manifolds (NA)
TD000	TD000	TD000	TD000	TD Air filter bracket and hose
UB002	UB002	UB002	UB002	UB Exhaust manifold (NA)
UD001	UD001	UD001	UD001	UD Exhaust manifold outlet elbow
			VB	VB Low pressure fuel system (lift pump and fuel filter)
YD000	YD000	YD000	YD000	YD Paint
YZ000	YZ000	YZ000	YZ000	YZ Packaging
ZA001	ZA001	ZA001	ZA001	ZA Electronically controlled governor (governor / control options)
ZC000	ZC000	ZC000	ZC000	ZC Mounting feet (loose)
ZD000	ZD000	ZD000	ZD000	ZD Oil filler extension
ZE001	ZE001	ZE001	ZE001	ZE Heater / Starter switch
ZJ002	ZJ002	ZJ002	ZJ002	ZJ Oil pressure switch
ZL001	ZL001	ZL001	ZL001	ZL Water temperature switch
ZM000	ZM000	ZM000	ZM000	ZM Radiator assembly with mounting feet
ZP002	ZP002	ZP002	ZP002	ZP Deutsch connectors
ZR000	ZR000	ZR000	ZR000	ZR Automatic shut down kit
ZT001	ZT001	ZT001	ZT001	ZT Literature
ZU000	ZU000	ZU000	ZU000	ZU Exhaust silencer
ZV002	ZV002	ZV002	ZV002	ZV Low pressure fuel accessories (fuel filter primer and hand primer)
ZW000	ZW000	ZW000	ZW000	ZW Cab heater connections
ZY061	ZY062	ZY058	ZY060	ZY Rating
ZZ001	ZZ001	ZZ001	ZZ001	ZZ Glow signal

GJ65763U		GJ65762U		GJ65761U		GJ65680U		GJ65679U		Build List	
IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	Industrial / IOPU / Genset	
AA046	AA046	AA046	AA046	AA047	AA047	AA047	AA047	AA047	AA047	Replaces 400C	
AC010	AC010	AC010	AC010	AC010	AC010	AC010	AC010	AC010	AC010	Rating	
AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	Core	
CD003	CD003	CD003	CD004	CD003	CD003	CD003	CD003	CD003	CD003	Labels	
DD002	DD002	DD002	DD003	DD002	DD002	DD002	DD002	DD002	DD002	Flywheel Housing	
										Flywheel	
FB005	FB005	FB005	FB005	FB005	FB005	FB005	FB005	FB005	FB005	Starter Motor	
GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	Fan Drive	
GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	Sump & Dipstick	
GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	Sump drain	
HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	Engine supplied with oil	
JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	Lubricating oil filter	
KB003	KB003	KB003	KB003	KB003	KB003	KB003	KB003	KB003	KB003	Lubricating oil filter mounting options	
KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	Crankshaft pulleys	
LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	Front end drive output options	
LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	Oil cooler option	
MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	Water outlet connections	
ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	Cooling fan	
ND011	ND011	ND011	ND011	ND011	ND011	ND011	ND011	ND011	ND011	Fan spacer options	
										Alternators	
TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	Intake and exhaust manifold options	
TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	Intake manifolds (NA)	
UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	Air filter bracket and hose	
UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	Exhaust manifold (NA)	
										Exhaust manifold outlet elbow	
YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	Low pressure fuel system (lift pump and fuel filter)	
YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	Paint	
ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	Packaging	
ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	Electronically controlled governor (governor / control options)	
ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	Mounting feet (loose)	
ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	Oil filler extension	
ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	Heater / Starter switch	
ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	Oil pressure switch	
ZM001	ZM002	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	Water temperature switch	
ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	Radiator assembly with mounting feet	
ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	Deutsch connectors	
ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	Automatic shut down kit	
ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	Literature	
ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	Exhaust silencer	
ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	Low pressure fuel accessories (fuel filter primer and hand primer)	
ZY046	ZY046	ZY046	ZY046	ZY046	ZY046	ZY046	ZY046	ZY046	ZY046	Cab heater connections	
ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	Rating	
										Glow signal	

403D-15 base list breakdown

GK65671U		GK65670U		GK65669U		GK65607U		GK65597U		GK65596U		GK65595U		GK65594U		GK65484U		GK65483U		Build List	
IOPU	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	HL35128U	Industrial / IOPU / Genset
AA039	AA039	AA039	AA039	AA039	AA039	AA041	AA042	AA043	AA039	AA039	AA039	AA039	AA039	AA039	AA039	AA039	AA039	AA039	AA039	AA039	Replaces 400C
AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	AC009	Rating
AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	Core
CD003	CD004	CD004	CD004	CD004	CD004	CD004	CD004	CD003	CD003	CD003	CD003	CD003	CD003	CD003	CD003	CD003	CD003	CD003	CD003	CD003	Labels
DD002	DD003	DD003	DD003	DD003	DD003	DD003	DD003	DD002	DD002	DD002	DD002	DD002	DD002	DD002	DD002	DD002	DD002	DD002	DD002	DD002	Flywheel Housing
ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	Flywheel
FB001	FB001	FB001	FB001	FB001	FB001	FB002	FB002	FB003	FB002	FB002	FB002	FB002	FB002	FB002	FB002	FB002	FB002	FB002	FB002	FB002	Starter Motor
GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	Fan Drive
GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	Sump & Dipstick
GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	Sump drain
HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	Engine supplied with oil
JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	Lubricating oil filter
KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	Lubricating oil filter mounting options
KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	Crankshaft pulleys
LB002	LB002	LB002	LB002	LB002	LB002	LB001	LB001	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	Front end drive output options
LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	Oil cooler option
MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	Water outlet connections
ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	Cooling fan
ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	Fan spacer options
TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	Alternators
TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	Intake and exhaust manifold options
UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	Intake manifolds (NA)
UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	Air filter bracket and hose
YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	Exhaust manifold (NA)
YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	Exhaust manifold outlet elbow
ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	Low pressure fuel system (lift pump and fuel filter)
ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	Paint
ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	Packaging
ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	Electronically controlled governor (governor / control options)
ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	Mounting feet (loose)
ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	Oil filler extension
ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	ZM001	Heater / Starter switch
ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	Oil pressure switch
ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	Water temperature switch
ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	Radiator assembly with mounting feet
ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	Deutsch connectors
ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	Automatic shut down kit
ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	Literature
ZY039	ZY039	ZY039	ZY039	ZY039	ZY039	ZY041	ZY042	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	ZY043	Exhaust silencer
ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	Low pressure fuel accessories (fuel filter primer and hand primer)
																					Cab heater connections
																					Rating
																					Glow signal

GK65833U		GK65683U		GK65681U		Build List	
IOPU	HL35113U	IOPU	HL35167U	IOPU	HL35111U	Industrial / IOPU / Genset	
AA039	AA040	AA040	AA040	AA040	AA040	Replaces 400C	
AC009	AC009	AC009	AC009	AC009	AC	Rating	
AL001	AL001	AL001	AL001	AL001	AL	Core	
CD003	CD003	CD003	CD003	CD003	CD	Labels	
DD002	DD002	DD002	DD002	DD002	DD	Flywheel Housing	
ED001	ED001	ED001	ED001	ED001	ED	Flywheel	
FB001	FB001	FB001	FB001	FB001	FB	Starter Motor	
GB001	GB001	GB001	GB001	GB001	GB	Fan Drive	
GC000	GC000	GC000	GC000	GC000	GC	Sump & Dipstick	
GD000	GD000	GD000	GD000	GD000	GD	Sump drain	
HB000	HB000	HB000	HB000	HB000	HB	Engine supplied with oil	
JC000	JC000	JC000	JC000	JC000	JC	Lubricating oil filter	
KB001	KB001	KB001	KB001	KB001	KB	Lubricating oil filter mounting options	
KD000	KD000	KD000	KD000	KD000	KD	Crankshaft pulleys	
LB002	LB002	LB002	LB002	LB002	LB	Front end drive output options	
LD001	LD001	LD001	LD001	LD001	LD	Oil cooler option	
MD000	MD000	MD000	MD000	MD000	MD	Water outlet connections	
ME007	ME007	ME007	ME007	ME007	ME	Cooling fan	
ND001	ND001	ND001	ND001	ND001	ND	Fan spacer options	
					ND	Alternators	
					SB	Intake and exhaust manifold options	
TB001	TB001	TB001	TB001	TB001	TB	Intake manifolds (NA)	
TD001	TD001	TD001	TD001	TD001	TD	Air filter bracket and hose	
UB002	UB002	UB002	UB002	UB002	UB	Exhaust manifold (NA)	
UD001	UD001	UD001	UD001	UD001	UD	Exhaust manifold outlet elbow	
					VB	Low pressure fuel system (lift pump and fuel filter)	
YD000	YD000	YD000	YD000	YD000	YD	Paint	
YZ000	YZ000	YZ000	YZ000	YZ000	YZ	Packaging	
ZA001	ZA001	ZA001	ZA001	ZA001	ZA	Electronically controlled governor (governor / control options)	
ZC000	ZC000	ZC000	ZC000	ZC000	ZC	Mounting feet (loose)	
ZD000	ZD000	ZD000	ZD000	ZD000	ZD	Oil filler extension	
ZE001	ZE001	ZE001	ZE001	ZE001	ZE	Heater / Starter switch	
ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ	Oil pressure switch	
ZL001	ZL001	ZL001	ZL001	ZL001	ZL	Water temperature switch	
ZM002	ZM001	ZM001	ZM002	ZM002	ZM	Radiator assembly with mounting feet	
ZP002	ZP002	ZP002	ZP002	ZP002	ZP	Deutsch connectors	
ZR000	ZR000	ZR000	ZR000	ZR000	ZR	Automatic shut down kit	
ZT001	ZT001	ZT001	ZT001	ZT001	ZT	Literature	
ZU000	ZU000	ZU000	ZU000	ZU000	ZU	Exhaust silencer	
ZV002	ZV002	ZV002	ZV002	ZV002	ZV	Low pressure fuel accessories (fuel filter primer and hand primer)	
ZW000	ZW000	ZW000	ZW000	ZW000	ZW	Cab heater connections	
ZY039	ZY040	ZY040	ZY040	ZY040	ZY	Rating	
ZZ001	ZZ001	ZZ001	ZZ001	ZZ001	ZZ	Glow signal	

403D-17 base list breakdown

GS65774J		Build List
Industrial	Industrial / IOPU / Genset	
N/A	Replaces 400C	
AA076	AA	Rating
AC021	AC	Core
AL003	AL	Labels
CD001	CD	Flywheel Housing
DD001	DD	Flywheel
ED001	ED	Starter Motor
FB001	FB	Fan Drive
GB001	GB	Sump & Dipstick
GC000	GC	Sump drain
GD000	GD	Engine supplied with oil
HB000	HB	Lubricating oil filter
JC000	JC	Lubricating oil filter mounting options
KB001	KB	Crankshaft pulleys
KD000	KD	Front end drive output options
LB001	LB	Oil cooler option
LD001	LD	Water outlet connections
MD005	MD	Cooling fan
ME001	ME	Fan spacer options
ND001	ND	Alternators
	SB	Intake and exhaust manifold options
TB001	TB	Intake manifolds (NA)
TD000	TD	Air filter bracket and hose
UB002	UB	Exhaust manifold (NA)
UD001	UD	Exhaust manifold outlet elbow
	VB	Low pressure fuel system (lift pump and fuel filter)
YD000	YD	Paint
YZ000	YZ	Packaging
ZA001	ZA	Electronically controlled governor (governor / control options)
ZC000	ZC	Mounting feet (loose)
ZD000	ZD	Oil filler extension
ZE000	ZE	Heater / Starter switch
ZJ001	ZJ	Oil pressure switch
ZL001	ZL	Water temperature switch
ZM000	ZM	Radiator assembly with mounting feet
ZP002	ZP	Deutsch connectors
ZR000	ZR	Automatic shut down kit
ZT001	ZT	Literature
ZU000	ZU	Exhaust silencer
	ZV	Low pressure fuel accessories (fuel filter primer and hand primer)
ZW000	ZW	Cab heater connections
ZY076	ZY	Rating

404D-15 base list breakdown

GM65621J		GM65620J		GM65619J		Build List	
Industrial	Industrial	Industrial	Industrial	Industrial	Industrial	Industrial / IOPU / Genset	
HN30865J	HN30860J	HN30861J	HN30861J	HN30861J	HN30861J	Replaces 400C	
AA029	AA028	AA028	AA028	AA028	AA	Rating	
AC007	AC007	AC007	AC007	AC007	AC	Core	
AL003	AL003	AL003	AL003	AL003	AL	Labels	
CD001	CD003	CD001	CD001	CD001	CD	Flywheel Housing	
DD001	DD002	DD001	DD001	DD001	DD	Flywheel	
ED003	ED003	ED003	ED003	ED003	ED	Starter Motor	
FB005	FB005	FB005	FB005	FB005	FB	Fan Drive	
GB001	GB001	GB001	GB001	GB001	GB	Sump & Dipstick	
GC000	GC000	GC000	GC000	GC000	GC	Sump drain	
GD000	GD000	GD000	GD000	GD000	GD	Engine supplied with oil	
HB000	HB000	HB000	HB000	HB000	HB	Lubricating oil filter	
JC000	JC000	JC000	JC000	JC000	JC	Lubricating oil filter mounting options	
KB003	KB003	KB003	KB003	KB003	KB	Crankshaft pulleys	
KD000	KD000	KD000	KD000	KD000	KD	Front end drive output options	
LB001	LB001	LB001	LB001	LB001	LB	Oil cooler option	
LD001	LD001	LD001	LD001	LD001	LD	Water outlet connections	
MD005	MD005	MD005	MD005	MD005	MD	Cooling fan	
ME001	ME001	ME001	ME001	ME001	ME	Fan spacer options	
ND009	ND009	ND009	ND009	ND009	ND	Alternators	
					SB	Intake and exhaust manifold options	
TB001	TB001	TB001	TB001	TB001	TB	Intake manifolds (NA)	
TD000	TD000	TD000	TD000	TD000	TD	Air filter bracket and hose	
UB002	UB002	UB002	UB002	UB002	UB	Exhaust manifold (NA)	
UD000	UD000	UD000	UD000	UD000	UD	Exhaust manifold outlet elbow	
					VB	Low pressure fuel system (lift pump and fuel filter)	
YD000	YD000	YD000	YD000	YD000	YD	Paint	
YZ000	YZ000	YZ000	YZ000	YZ000	YZ	Packaging	
ZA001	ZA001	ZA001	ZA001	ZA001	ZA	Electronically controlled governor (governor / control options)	
ZC000	ZC000	ZC000	ZC000	ZC000	ZC	Mounting feet (loose)	
ZD000	ZD000	ZD000	ZD000	ZD000	ZD	Oil filler extension	
ZE001	ZE001	ZE001	ZE001	ZE001	ZE	Heater / Starter switch	
ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ	Oil pressure switch	
ZL001	ZL001	ZL001	ZL001	ZL001	ZL	Water temperature switch	
ZM000	ZM000	ZM000	ZM000	ZM000	ZM	Radiator assembly with mounting feet	
ZP002	ZP002	ZP002	ZP002	ZP002	ZP	Deutsch connectors	
ZR000	ZR000	ZR000	ZR000	ZR000	ZR	Automatic shut down kit	
ZT001	ZT001	ZT001	ZT001	ZT001	ZT	Literature	
ZU000	ZU000	ZU000	ZU000	ZU000	ZU	Exhaust silencer	
ZV002	ZV002	ZV002	ZV002	ZV002	ZV	Low pressure fuel accessories (fuel filter primer and hand primer)	
ZW000	ZW000	ZW000	ZW000	ZW000	ZW	Cab heater connections	
ZY029	ZY028	ZY028	ZY028	ZY028	ZY	Rating	

404D-22 base list breakdown

GN65676U		GN65675U		GN65674U		GN65661U		GN65660U		GN65659U		GN65611U		GN65609U		GN65608U		GN65470U		GN65432U		Build List					
IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	Industrial / IOPU / Genset				
AA015	AA015	AA015	AA014	AA014	AA014	AA015	AA015	AA014	AA014	AA014	AA016	AA016	AA015	AA014	AA014	AA014	AA014	AA014	AA014	AA014	AA014	AA014	Replaces 400C				
AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	Core				
AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	Labels				
CD004	CD004	CD003	CD004	CD004	CD003	CD003	CD004	CD004	CD003	CD003	CD003	CD003	CD003	CD004	CD004	CD004	CD001	CD001	CD001	CD001	CD003	CD003	Flywheel Housing				
DD003	DD003	DD002	DD003	DD003	DD002	DD002	DD003	DD003	DD002	DD002	DD002	DD002	DD002	DD003	DD003	DD003	DD001	DD001	DD001	DD001	DD002	DD002	Flywheel				
ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	Starter Motor			
FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	Fan Drive			
GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	Sump & Dipstick			
GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	Sump drain			
GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	Engine supplied with oil			
HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	Lubricating oil filter			
JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	Lubricating oil filter mounting options			
KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	Crankshaft pulleys		
KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	Front end drive output options			
LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	LB001	Oil cooler option		
LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	Water outlet connections		
MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	MD003	Cooling fan		
ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME002	ME002	ME002	ME002	ME002	ME002	ME002	ME002	ME002	ME002	ME002	ME002	ME002	Fan spacer options		
ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	Alternators		
TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	Intake and exhaust manifold options		
TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	Intake manifolds (NA)		
UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	Air filter bracket and hose		
UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	Exhaust manifold (NA)	
VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	VD000	Exhaust manifold outlet elbow		
YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	Low pressure fuel system (lift pump and fuel filter)		
ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	Paint	
ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	Packaging		
ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	Electronically controlled governor (governor / control options)	
ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	Mounting feet (loose)	
ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	ZJ001	Oil filler extension	
ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	Heater / Starter switch	
ZM001	ZM002	ZM002	ZM001	ZM001	ZM002	ZM002	ZM001	ZM002	ZM002	ZM002	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	ZM000	Oil pressure switch	
ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	Water temperature switch	
ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	Water temperature switch	
ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	Radiator assembly with mounting feet	
ZU000	ZU001	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	Deutsch connectors	
ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	ZV002	Automatic shut down kit	
ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	Literature	
ZY015	ZY015	ZY015	ZY014	ZY014	ZY014	ZY015	ZY014	ZY014	ZY014	ZY014	ZY016	ZY015	ZY015	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	ZY014	Exhaust silencer
																											Low pressure fuel accessories (fuel filter primer and hand primer)
																											Cab heater connections
																											Rating

GN65843U		GN65842U		GN65735U		GN65734U		GN65733U		GN65732U		GN65682U		Build List	
IOPU	IOPU	IOPU	IOPU	Genset / ePak	Genset / ePak	Genset / ePak	Genset / ePak	Genset / ePak	Genset / ePak	Genset / ePak	IOPU	IOPU	IOPU	Industrial / IOPU / Genset	
HP35169U	HP35163U	HP35105U	HP35109U	HP35105U	HP35109U	HP35108U	HP35107U	HP35108U	HP35107U	HP35107U	HP35171U	HP35171U	HP35171U	Replaces 400C	
AA015	AA014	AA023	AA021	AA023	AA021	AA020	AA019	AA020	AA019	AA019	AA016	AA016	AA016	AA	Rating
AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC004	AC	Core
AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL	Labels
CD003	CD003	CD004	CD003	CD004	CD003	CD004	CD004	CD004	CD004	CD004	CD004	CD004	CD004	CD	Flywheel Housing
DD002	DD002	DD003	DD002	DD003	DD002	DD003	DD005	DD003	DD005	DD005	DD003	DD003	DD003	DD	Flywheel
ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED	Starter Motor
FB001	FB001	FB001	FB003	FB001	FB003	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB001	FB	Fan Drive
GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB	Sump & Dipstick
GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC	Sump drain
GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD	Engine supplied with oil
HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB	Lubricating oil filter
JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC	Lubricating oil filter mounting options
KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB	Crankshaft pulleys
KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD	Front end drive output options
LB002	LB002	LB001	LB002	LB001	LB002	LB001	LB001	LB001	LB001	LB001	LB002	LB002	LB002	LB	Oil cooler option
LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD	Water outlet connections
MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD	Cooling fan
ME001	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME	Fan spacer options
ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND	Alternators
TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	TB001	SB	Intake and exhaust manifold options
TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD001	TB	Intake manifolds (NA)
UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	UB002	TD	Air filter bracket and hose
UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UB	Exhaust manifold (NA)
YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	UD	Exhaust manifold outlet elbow
YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	VB	Low pressure fuel system (lift pump and fuel filter)
ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	ZA001	YD	Paint
ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	YZ	Packaging
ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZA	Electronically controlled governor (governor / control options)
ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZC	Mounting feet (loose)
ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZD	Oil filler extension
ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZE	Heater / Starter switch
ZM001	ZM001	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZM002	ZJ	Oil pressure switch
ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZP002	ZL	Water temperature switch
ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZM	Radiator assembly with mounting feet
ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZP	Deutsch connectors
ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZR	Automatic shut down kit
ZV002	ZV002	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZT	Literature
ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZU	Exhaust silencer
ZY015	ZY014	ZY023	ZY021	ZY023	ZY021	ZY020	ZY019	ZY020	ZY019	ZY019	ZY016	ZY016	ZY016	ZV	Low pressure fuel accessories (fuel filter primer and hand primer)
														ZW	Cab heater connections
														ZY	Rating

404D-22T base list breakdown

GP65809U		GP65808U		GP65807U		GP65795U		GP65433U		Build List	
IOPU	IOPU	IOPU	IOPU	IOPU	IOPU	Genset / ePak	Industrial	Industrial	Industrial / IOPU / Genset	Replaces 400C	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	HR30863U	HR30863U	AA	Rating	
AA086	AA086	AA086	AA086	AA086	AA086	AA0907	AA086	AA086	AA	Rating	
AC001	AC001	AC001	AC001	AC001	AC001	AC001	AC001	AC001	AC	Core	
AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL001	AL	Labels	
CD004	CD001	CD001	CD003	CD003	CD004	CD004	CD003	CD003	CD	Flywheel Housing	
DD003	DD001	DD001	DD002	DD002	DD003	DD003	DD002	DD002	DD	Flywheel	
ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED001	ED	Starter Motor	
FB002	FB001	FB001	FB002	FB002	FB003	FB003	FB001	FB001	FB	Fan Drive	
GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB001	GB	Sump & Dipstick	
GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC000	GC	Sump drain	
GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD000	GD	Engine supplied with oil	
HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB000	HB	Lubricating oil filter	
JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC000	JC	Lubricating oil filter mounting options	
KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB001	KB	Crankshaft pulleys	
KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD000	KD	Front end drive output options	
LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB002	LB	Oil cooler option	
LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD001	LD	Water outlet connections	
MD000	MD000	MD000	MD000	MD000	MD000	MD000	MD003	MD003	MD	Cooling fan	
ME007	ME007	ME007	ME007	ME007	ME007	ME007	ME002	ME002	ME	Fan spacer options	
ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND001	ND	Alternators	
SB002	SB002	SB002	SB002	SB002	SB002	SB002	SB001	SB001	SB	Intake and exhaust manifold options	
									TB	Intake manifolds (NA)	
TD001	TD001	TD001	TD001	TD001	TD001	TD001	TD000	TD000	TD	Air filter bracket and hose	
									UB	Exhaust manifold (NA)	
UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD001	UD	Exhaust manifold outlet elbow	
									VB	Low pressure fuel system (lift pump and fuel filter)	
YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD000	YD	Paint	
YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ000	YZ	Packaging	
ZA001	ZA001	ZA001	ZA001	ZA001	ZA005	ZA005	ZA001	ZA001	ZA	Electronically controlled governor (governor / control options)	
ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC000	ZC	Mounting feet (loose)	
ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD000	ZD	Oil filler extension	
ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE001	ZE	Heater / Starter switch	
ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ002	ZJ001	ZJ001	ZJ	Oil pressure switch	
ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL001	ZL	Water temperature switch	
ZM001	ZM001	ZM001	ZM001	ZM001	ZM002	ZM002	ZM000	ZM000	ZM	Radiator assembly with mounting feet	
ZP002	ZP002	ZP002	ZP002	ZP002	ZP007	ZP007	ZP002	ZP002	ZP	Deutsch connectors	
ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR000	ZR	Automatic shut down kit	
ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT001	ZT	Literature	
ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU000	ZU	Exhaust silencer	
ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV003	ZV002	ZV002	ZV	Low pressure fuel accessories (fuel filter primer and hand primer)	
ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW000	ZW	Cab heater connections	
ZY002	ZY002	ZY002	ZY002	ZY002	ZY007	ZY007	ZY002	ZY002	ZY	Rating	

404D-22TA base list breakdown

GR65815U	GR65812U	GR65811U	GR65810U	GR65434U	Build List
Genset / ePak	IOPU	IOPU	IOPU	Industrial	Industrial / IOPU / Genset
N/A	N/A	N/A	N/A	N/A	Replaces 400C
AA010	AA0909	AA0909	AA0909	AA0909	AA
AC001	AC001	AC001	AC001	AC001	AC
AL001	AL001	AL001	AL001	AL001	AL
CD004	CD003	CD001	CD004	CD003	CD
DD003	DD002	DD001	DD003	DD002	DD
ED001	ED001	ED001	ED001	ED001	ED
FB003	FB002	FB002	FB001	FB001	FB
GB001	GB001	GB001	GB001	GB001	GB
GC000	GC000	GC000	GC000	GC000	GC
GD000	GD000	GD000	GD000	GD000	GD
HB000	HB000	HB000	HB000	HB000	HB
JC000	JC000	JC000	JC000	JC000	JC
KB001	KB001	KB001	KB001	KB001	KB
KD000	KD000	KD000	KD000	KD000	KD
LB002	LB002	LB002	LB002	LB002	LB
LD001	LD001	LD001	LD001	LD001	LD
MD000	MD000	MD000	MD000	MD003	MD
ME007	ME001	ME001	ME007	ME002	ME
ND001	ND001	ND001	ND001	ND001	ND
SB006	SB005	SB005		SB001	SB
					TB
TD001	TD001	TD001	TD001	TD000	TD
					UB
UD001	UD001	UD001	UD001	UD001	UD
					VB
YD000	YD000	YD000	YD000	YD000	YD
YZ000	YZ000	YZ000	YZ000	YZ000	YZ
ZA005	ZA001	ZA001	ZA001	ZA001	ZA
ZC000	ZC000	ZC000	ZC000	ZC000	ZC
ZD000	ZD000	ZD000	ZD000	ZD000	ZD
ZE001	ZE001	ZE001	ZE001	ZE001	ZE
ZJ002	ZJ002	ZJ002	ZJ002	ZJ001	ZJ
ZL001	ZL001	ZL001	ZL001	ZL001	ZL
ZM002	ZM001	ZM001	ZM001	ZM000	ZM
ZP007	ZP002	ZP002	ZP002	ZP002	ZP
ZR000	ZR000	ZR000	ZR000	ZR000	ZR
ZT001	ZT001	ZT001	ZT001	ZT001	ZT
ZU000	ZU000	ZU000	ZU000	ZU000	ZU
ZV003	ZV003	ZV003	ZV003	ZV002	ZV
ZW000	ZW000	ZW000	ZW000	ZW000	ZW
ZY010	ZY009	ZY009	ZY009	ZY009	ZY
					Rating

3

Engine specification

Selection logic

An option selection template is included to assist with the process of selecting the options and accessories, see page 21. Make a copy of this form, and follow the sequence of the option groups to prepare the engine specification.

Notes:

- All engines should be specified using option codes.
- Before selecting an option, read carefully any notes relating to the option as these indicate the effect of selecting that option.
- A selection must be made for all options and accessories, even if the option is “not required”.
- If when specifying an engine an option is required that is not listed in this 400D Series Engine Specification Manual, then a NORF must be raised, complete with justification, to obtain approval.
- Record each option code that has been selected on the Custom Build engine order form provided.
- When completing the order form, the sub-application code for the specification should be included. This sub-application code provides important data for establishing market share information, but will also assist the user when searching for preferred application specifications.

The sub-application codes can be found on page 22.

Option selection procedure

Main options

A selection of one option code must be made from each of the option sections “A” through to “V”.

Put the correct codes onto the order form in the following manner.

Starter motor 12V, 2,0 kW	E	D	0	0	1
Exhaust manifold vertical outlet	U	B	0	0	2

Accessory options

A selection of one accessory code must be made from each of the accessory sections through to ZZ.

Put the correct codes onto the order form in the following manner.

Auto shut down controller	Z	R	0	0	1
Fuel pre-filter	Z	V	0	0	1

General arrangement drawings

General arrangement drawings are included in this chapter for reference purposes.

Option selection template



Order form for 400D Series "Industrial Custom" Engines

Customer Details		
Name	Customer Order No: Cust. SO No: (<i>Perkins use only</i>)	
Address	Date:	.....
	Quantity Required:	.....
	Requested Despatch Date:	.....
Special Instructions		
Notes: 1. This order form is for one or more engines of the same specification. If an alternative specification is required, please complete another order form. 2. This order form should be used in conjunction with the 400D Series Engine Specification Manual (ESM). 3. Please complete Parts A & B, noting that in Part A it is important to quote the sub-application code for which the engine(s) is / are intended to be used. A listing of the codes can be found in Chapter 3, page 22 of your ESM. 4. For option code numbers, please refer to Chapter 4 & 5 of the ESM. Your choice for each option should be entered on the form in Part B, column one. 5. Your chosen rating, includes the cost of the engine core and fuel injection equipment. Refer to your ESM. 6. The column entitled "Price" in Part B is purely for your own use as a reference. Actual pricing will be advised on your acknowledgement of order.		
Part A Base Engine Selection		
Engine Specification Codes	Type Code	Description
Sub-Application Code |__|__| Mandatory (see chapter 3, page 22 of manual for key)		

Custom build order form - 400D

Part B Options selection						
ESM Code No (complete the option / accessory code referring to your Engine Specification Manual, Chapters 4 & 5) e.g CD003			Description			Price (GBP) Excluding VAT
A	A				Rating	
A	L				Labels	
C	D				Flywheel housings	
D	D				Flywheels	
E	D				Starter motors	
F	B				Fan drive	
G	B				Sump and dipstick	
G	C				Sump eco drain valve	
G	D				Engine supplied with oil	
H	B				Lubricating oil filler	
J	C				Lubricating oil filter mount	
K	B				Crankshaft pulleys	
K	D				Front end drive - output	
L	B				Oil cooler	
L	D				Water outlet connections	
M	D				Cooling fan	
M	E				Fan spacer	
N	D				Alternators	
Q	C				Timing case blanks and bearing holder	
S	B				Intake/exhaust manifolds (turbocharged)	
T	B				Intake manifolds (naturally aspirated)	
T	D				Air filter, bracket and hose	
U	B				Exhaust manifold (naturally aspirated)	
U	D				Exhaust manifold side outlet - elbow, loose parts	
V	B				Low pressure fuel system (lift pump and filter)	
Y	D				Engine paint	
Y	Z				Engine packaging	
Accessories selection						
Z	A				Electronic controlled governor (governor/control options)	
Z	C				Mounting feet loose, supplied as loose parts	
Z	D				Oil filler extension, supplied as loose parts	
Z	E				Heater/starter switch (12V), supplied as loose parts	
Z	J				Oil pressure switch	
Z	L				Water temperature switch	
Z	M				Radiator assembly with mounting feet	
Z	P				Deutsch connectors, supplied as loose parts	
Z	R				Automatic shut down kit, supplied as loose parts	
Z	T				Literature	
Z	U				Exhaust silencer, loose parts	
Z	V				Low pressure fuel accessories (fuel pre filter and hand primer), loose parts	
Z	W				Cab heater connections, loose parts	
Z	Z				Glow signal, loose parts	

Shipping requirements (please tick one of the following)					
As in standard agree- ment	FCA (please name place)	CPT (please name place)	CIP (please name place)	Delivered your works	Ex-works
Customer signature:					

Sub application codes

Agricultural power

Application group/sub-application	Code
Agricultural others	28
Agricultural tractors fast	21
Agricultural tractors tracked	27
Agricultural tractors wheeled	20
Combine harvesters	24
Forage and specialist harvesters	22
Forestry harvesters/forwarders	85
Lawn and garden	25
Sprayers	26
Woodchippers	39

Construction power

Application group/sub-application	Code
Construction other	69
Backhoe loaders	31
Dumpers	36
Excavators	30
Graders	35
Mini excavators	41
Pavers	51
Road rollers	53
Scrapers	34
Self propelled drills	29
Skid steer loaders	38
Trenchers	37
Wheeled/tracked bulldozers	33
Wheeled/tracked shovel loaders	32

Defence power

Application group/sub-application	Code
Defence	86

Gen set power

Application group/sub-application	Code
Base load	48
Combined heat and power (CHP)	49
Ground power units	82
Lighting towers	88
Prime power	79
Standby power	80
Welders	81

Industrial power

Application group/sub-application	Code
Industrial other	42
Compressors	50
Locomotives/rail traction	75
Mining equipment	61
Petroleum (oil & gas extracting industries)	59
Pump sets	84
Snow blowers	43
Snow groomers	44
Sweepers	87

Material handling power

Application group/sub-application	Code
Material handling others	77
Access platforms	68
Aircraft baggage handler	14
Cranes	54
Fork-lift trucks	70
Rough terrain fork-lift trucks	71
Side loaders	73
Straddle carriers	76
Telescopic handlers	40
Tow tractors	72

Refrigeration power

Application group/sub-application	Code
Reefers	83

Vehicle power

Vehicles others	Code
Buses	11
Cars, taxis and derived vans	12
Trucks	10
Vans	15
Vehicles other	19

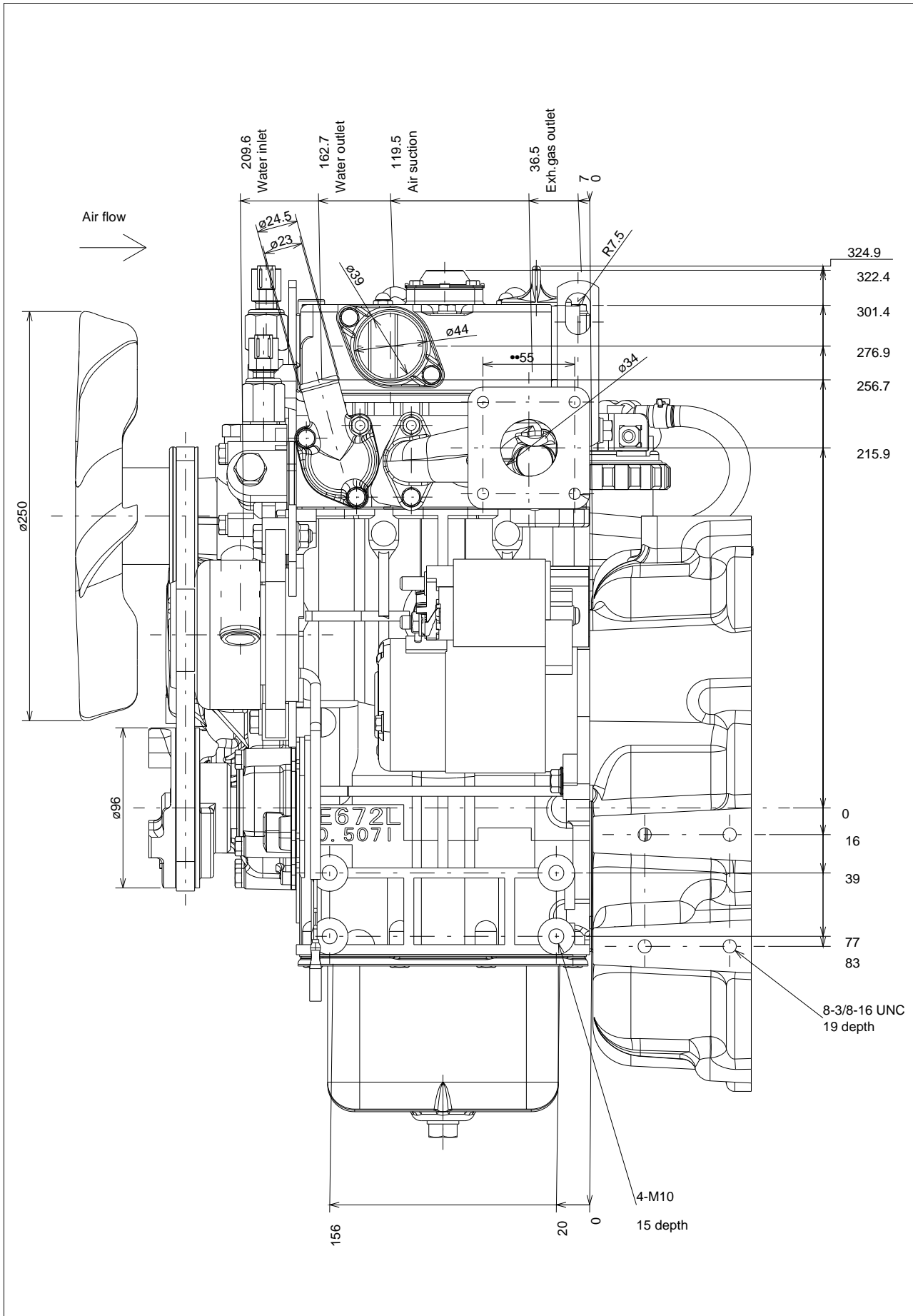
General arrangement drawings

The following pages contain the general arrangement drawings for the 400D Series engine only.

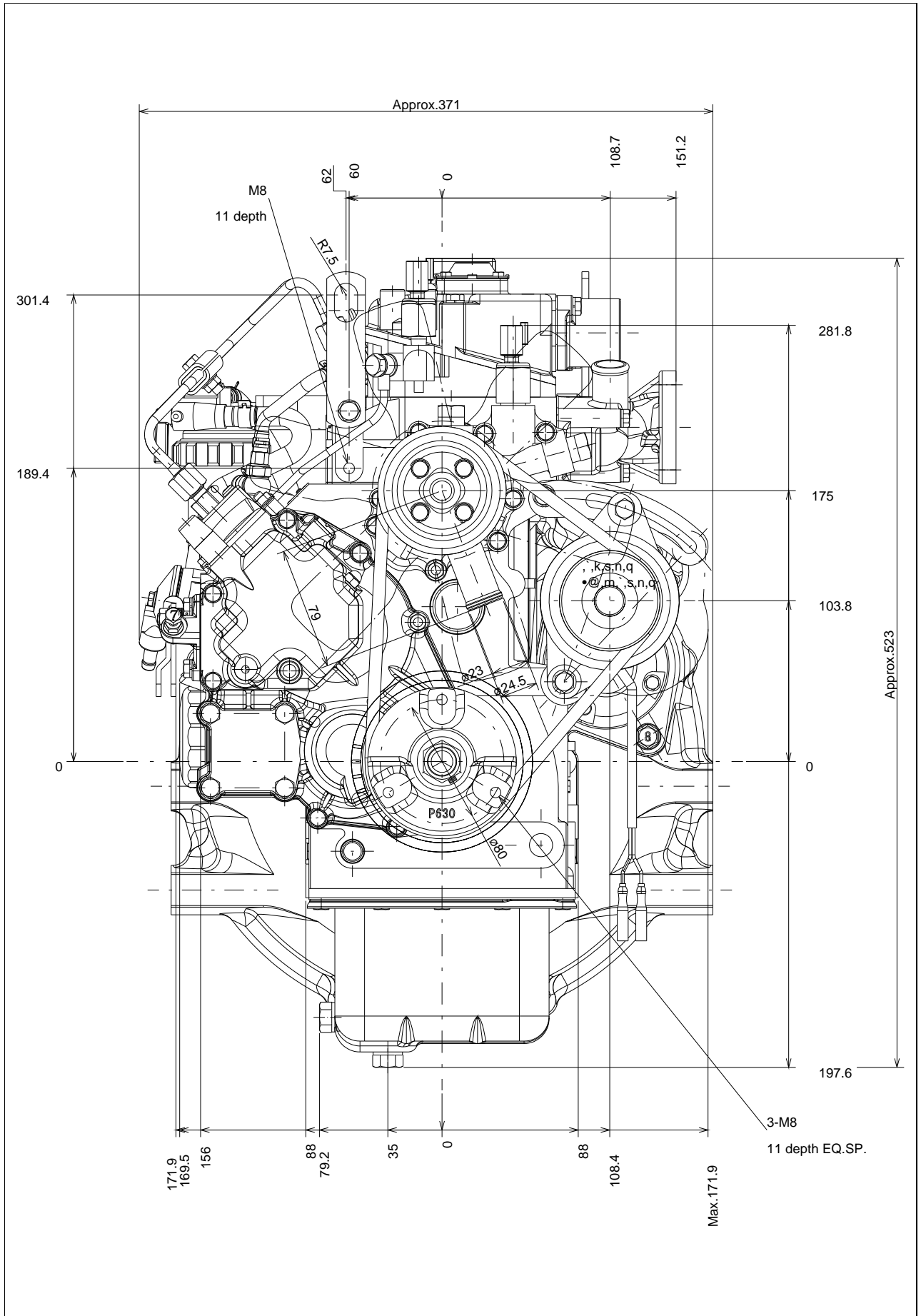
Note: In order to show a complete engine, the general arrangement drawings include the following options:

Engine type	Options
402D-05	CD003, DD002, ED005, FB005, GB001, GC000, KB005, LD001, MD011, ND013, TB001, UB002, ZA001, ZJ001, ZL001
403D-07	CD003, DD002, ED005, FB005, GB001, GC000, KB005, LD001, MD009, ND013, TB001, UB002, ZA001, ZJ001, ZL001
403D-11	CD003, DD002, ED*** , FB005, GB001, GC000, KB003, LD001, MD007, ND011, TB001, UB002, ZA001, ZJ001, ZL001
403D-15	CD003, DD002, ED001, FB001, GB001, GC000, KB001, LD001, MD005, ND001, TB001, UB002, ZA001, ZJ001, ZL001
403D-15T	CD003, DD002, ED001, FB001, GB001, GC000, KB001, LD001, MD005, ND001, SB001, UB002, ZA001, ZJ001, ZL001
403D-17	CD003, DD***, ED001, FB001, GB002, GC000, KB001, LD001, MD005, ND001, TB001, UB002, ZA001, ZJ002, ZL001
404D-15	CD003, DD002, ED003, FB005, GB001, GC000, KB003, LD001, MD005, ND009, TB001, UB002, ZA001, ZJ001, ZL001
404D-22	CD003, DD002, ED001, FB001, GB001, GC000, KB001, LD001, MD003, ND001, TB001, UB002, ZA001, ZJ001, ZL001
404D-22T 404D-22TA	CD003, DD002, ED001, FB001, GB001, GC000, KB001, LB002, LD001, MD003, ME002, ND001, SB001, ZA001, ZJ001, ZL001

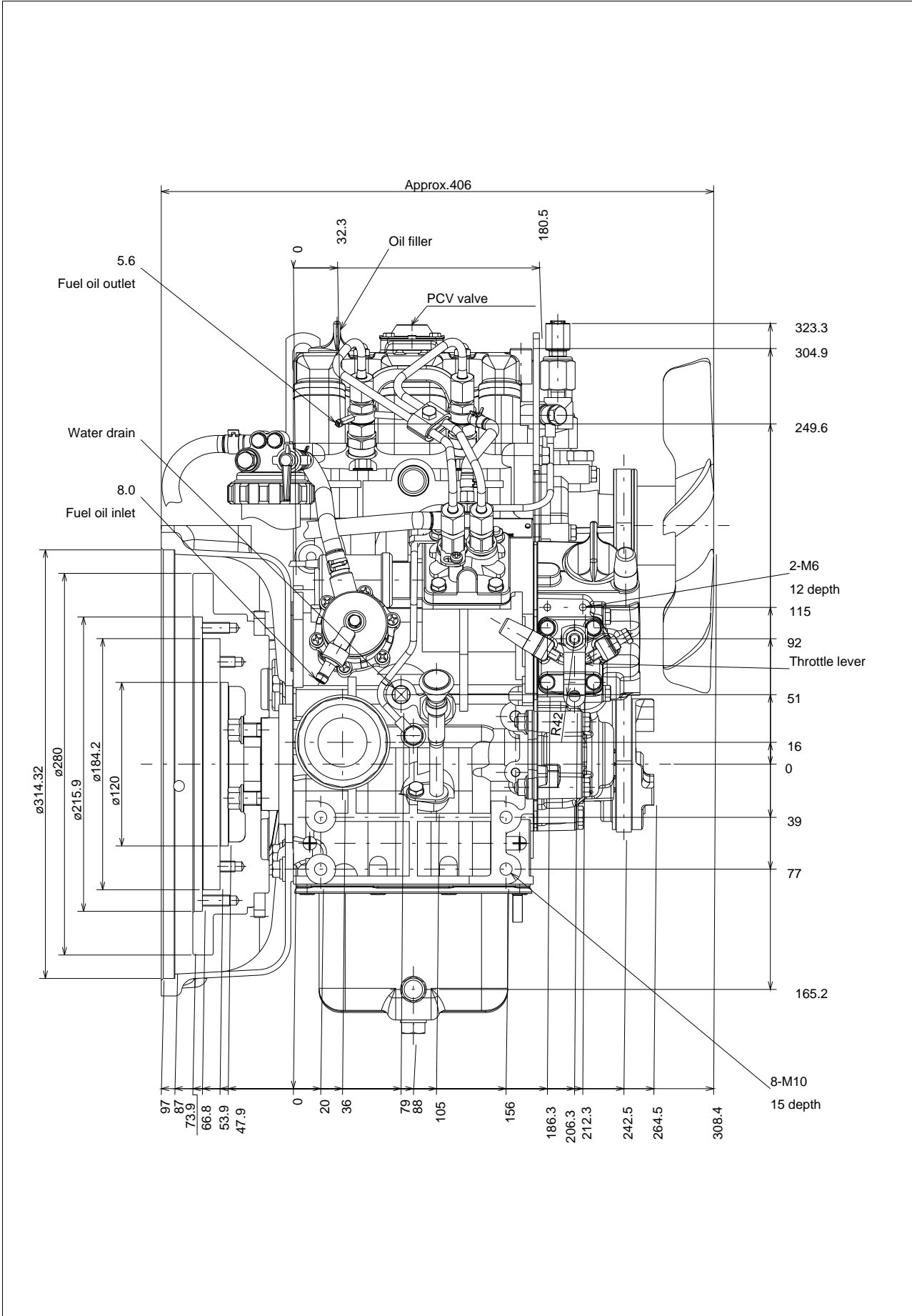
402D-05 - Left side view



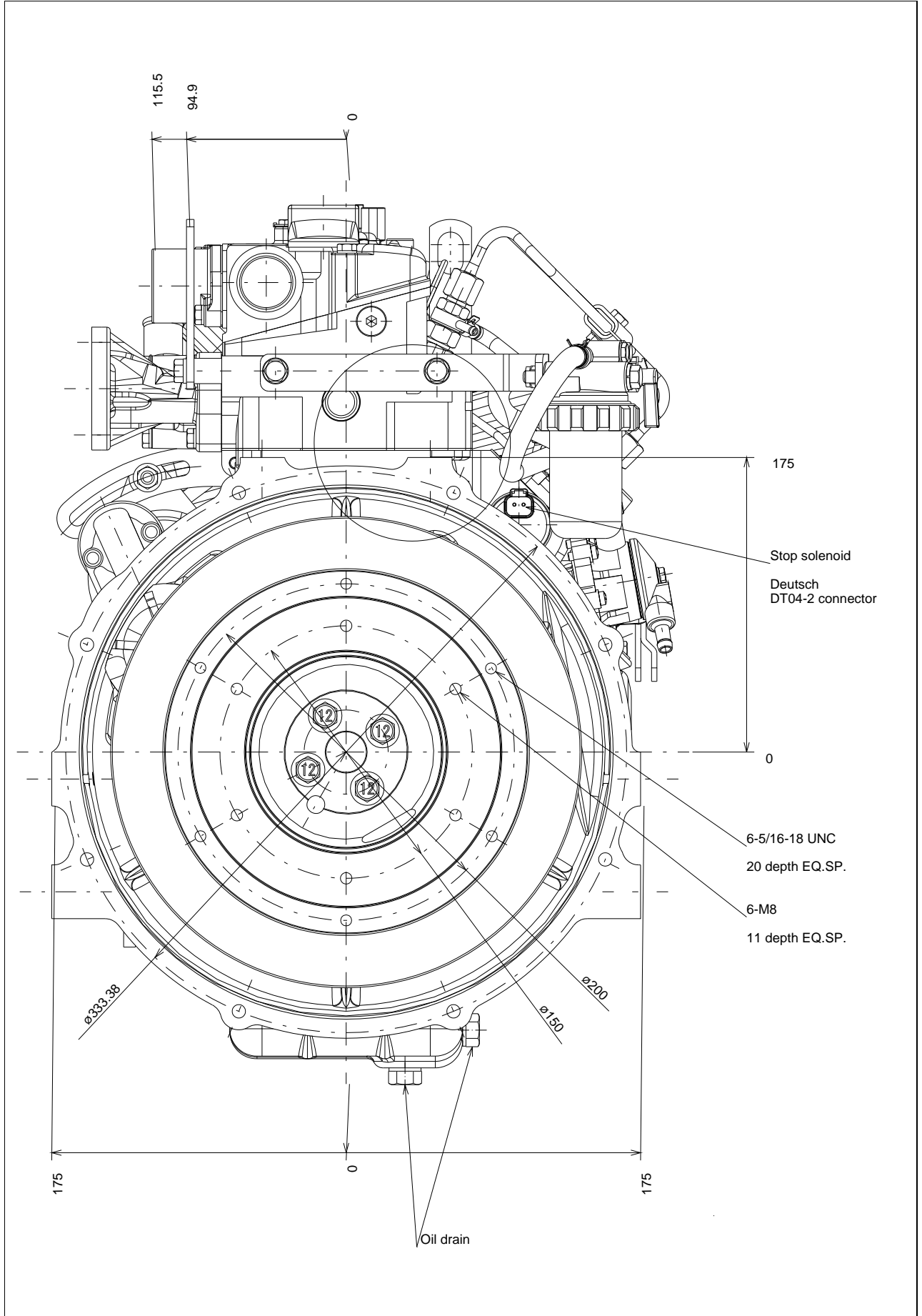
402D-05 - Front view



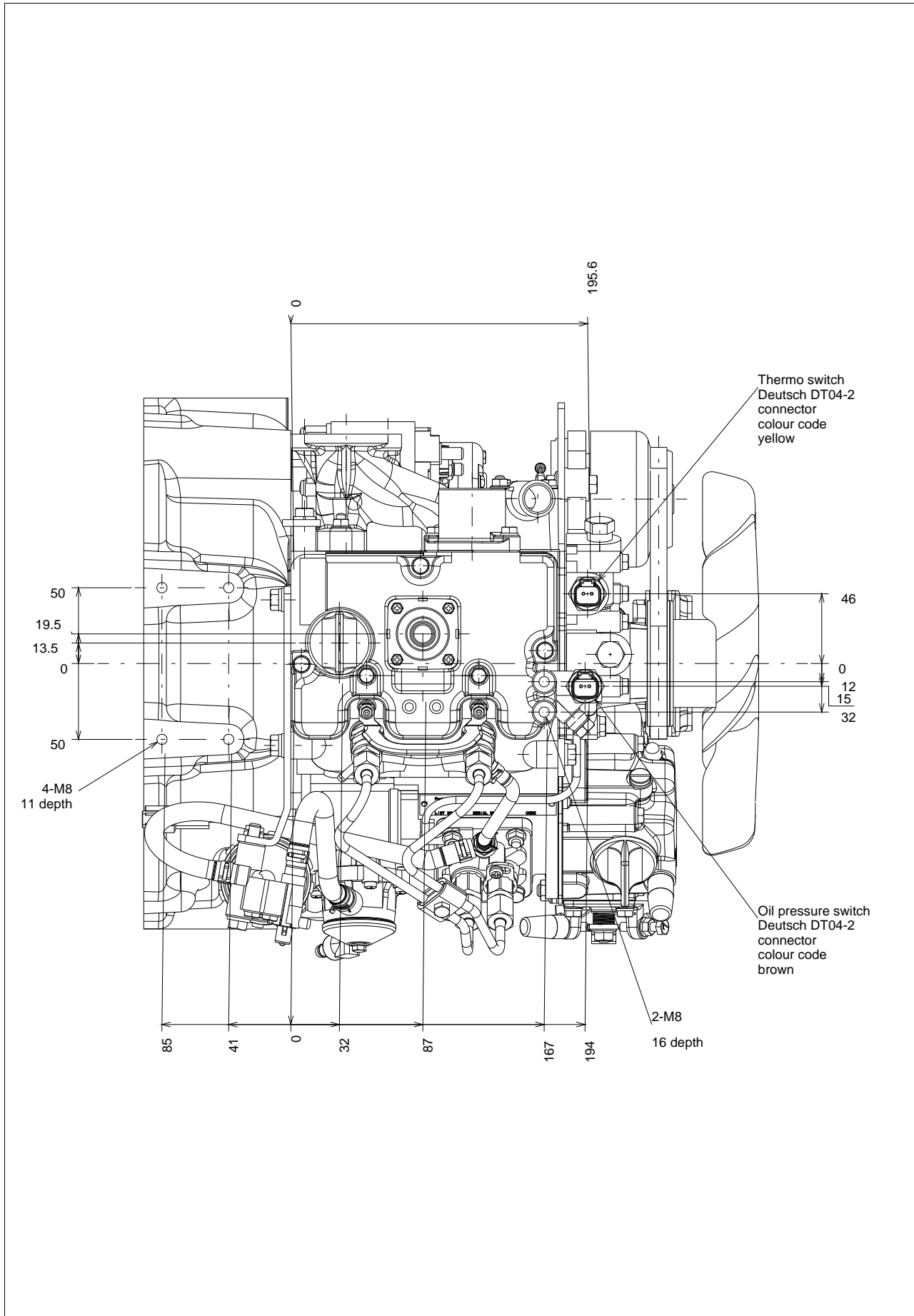
402D-05 - Right side view



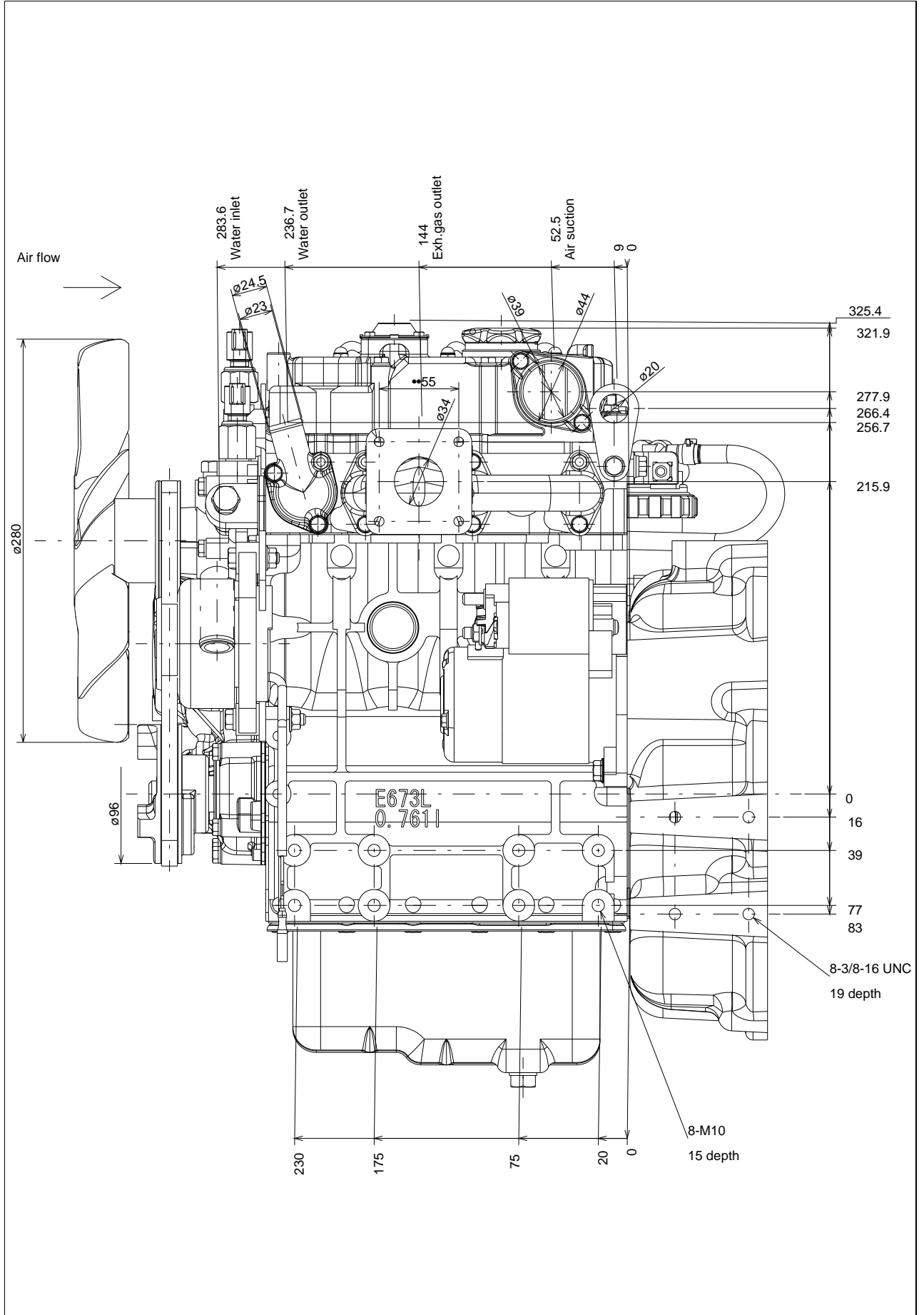
402D-05 - Rear view



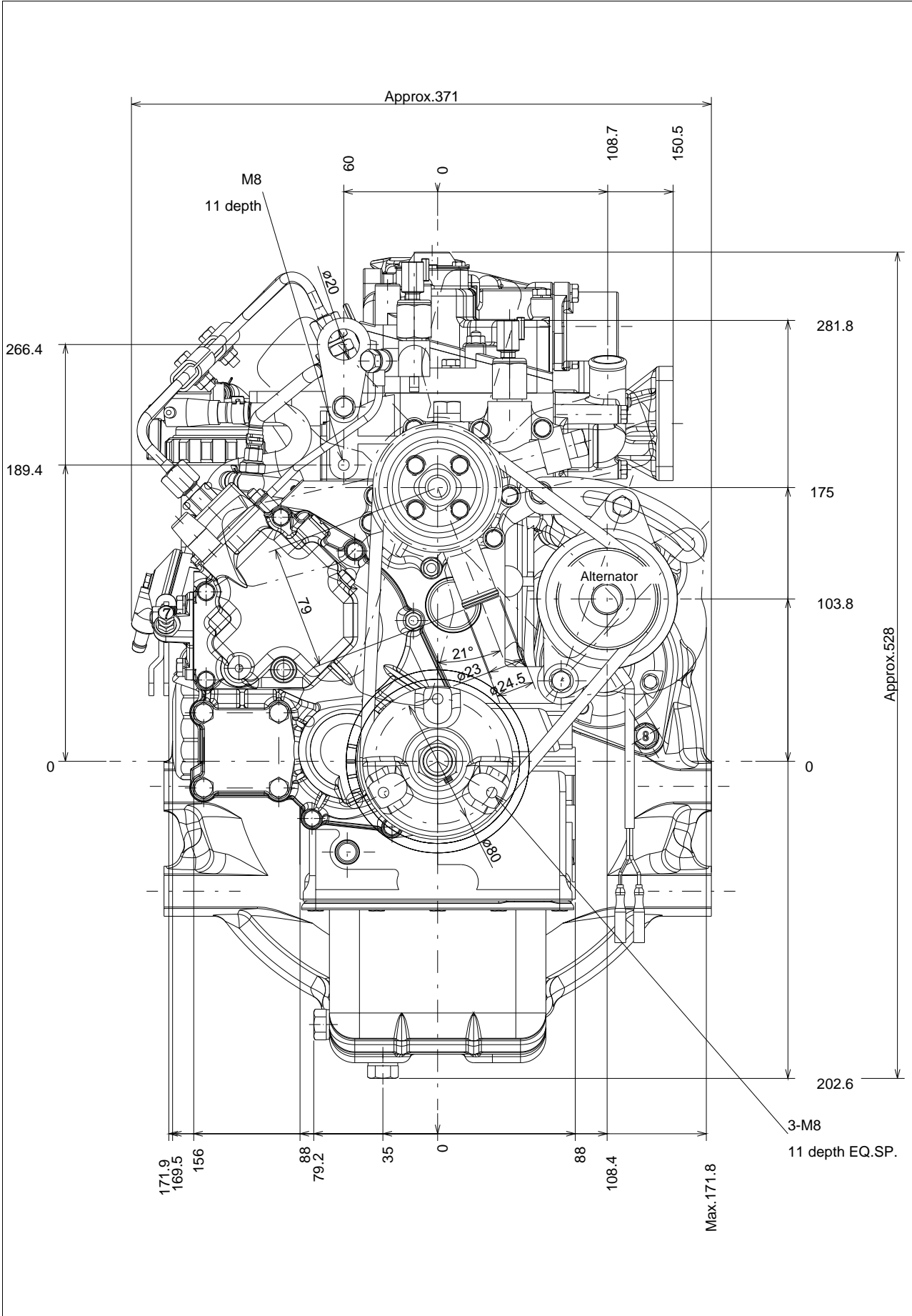
402D-05 - Plan view



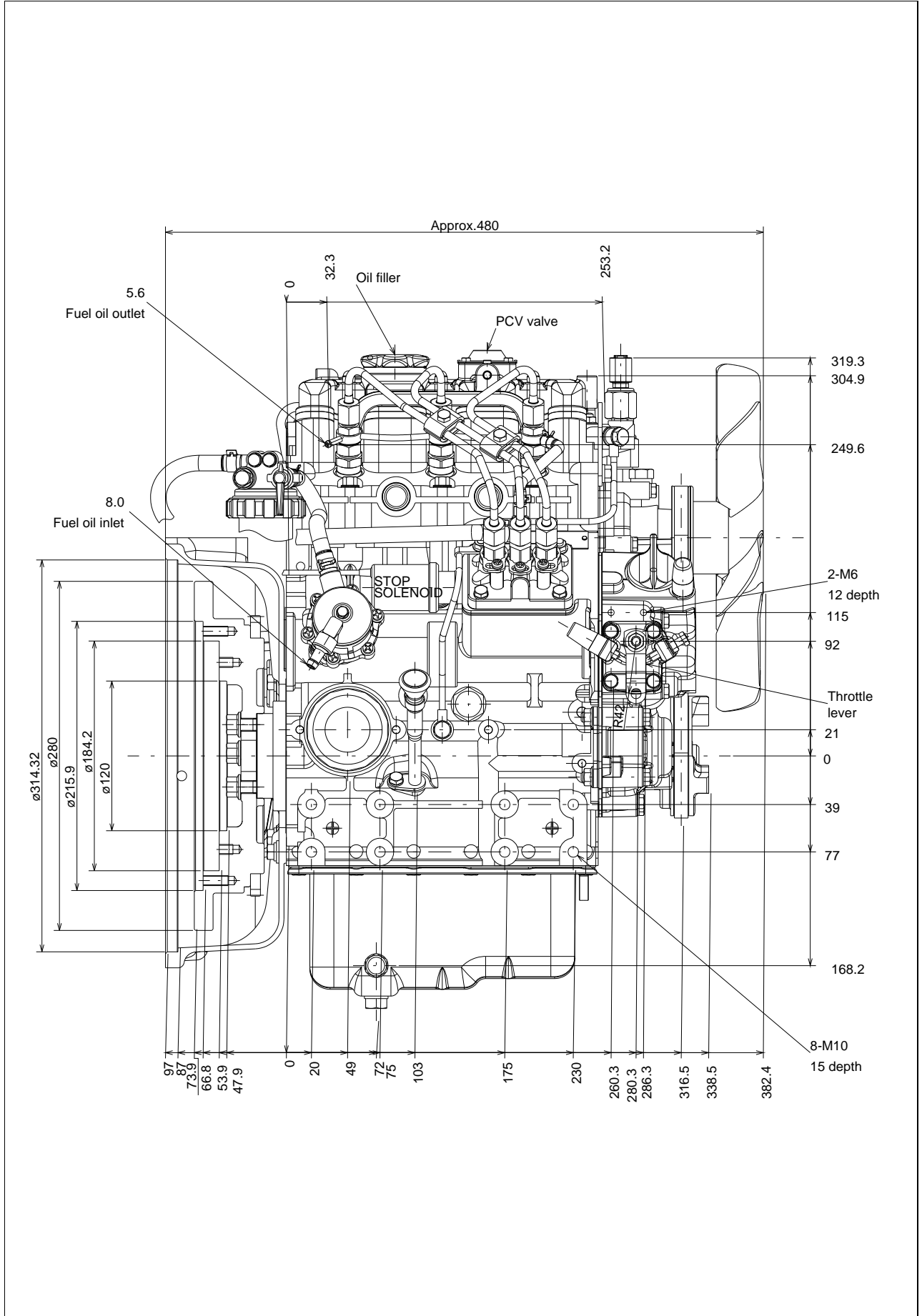
403D-07 - Left side view



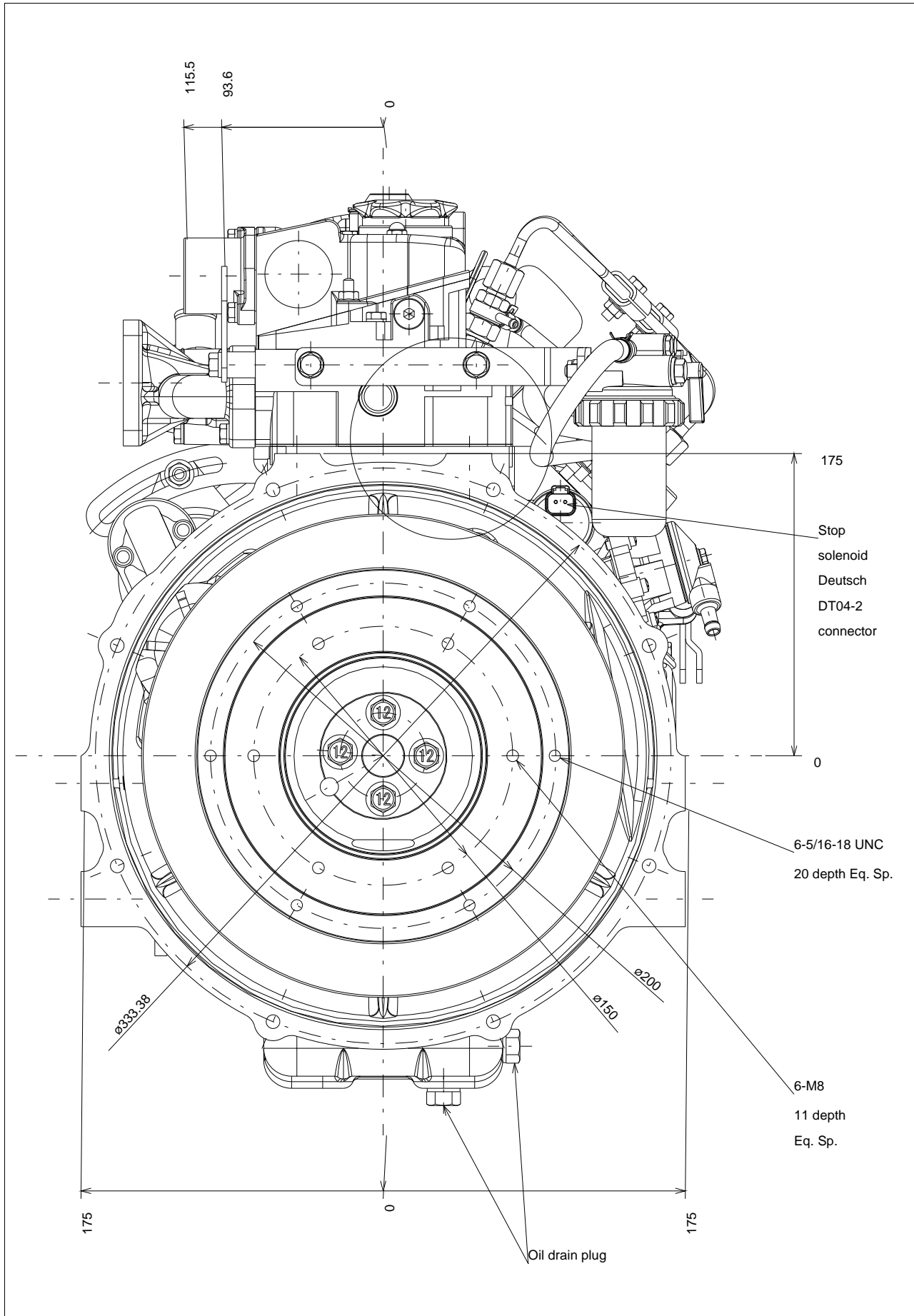
403D-07 - Front view



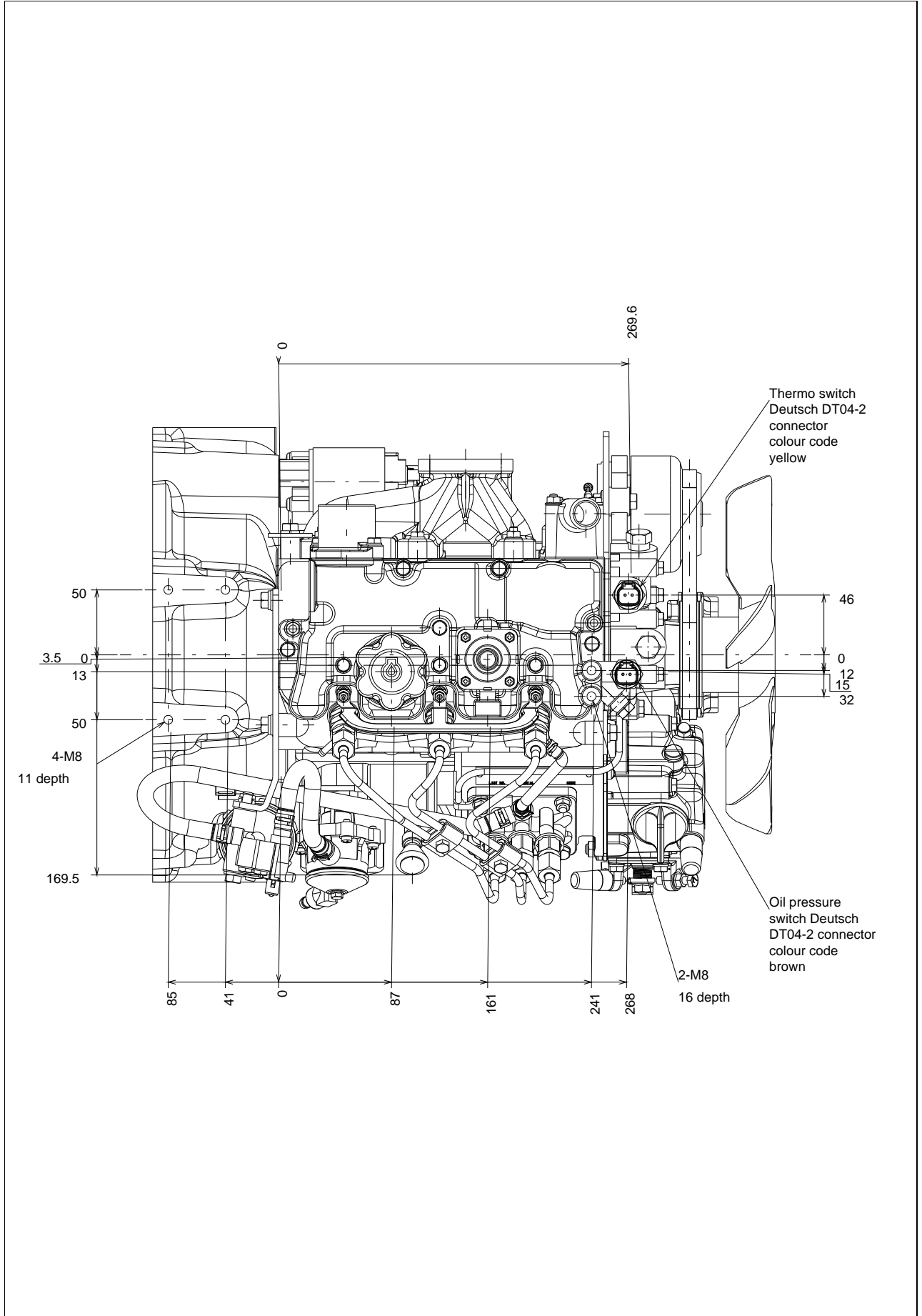
403D-07 - Right side view



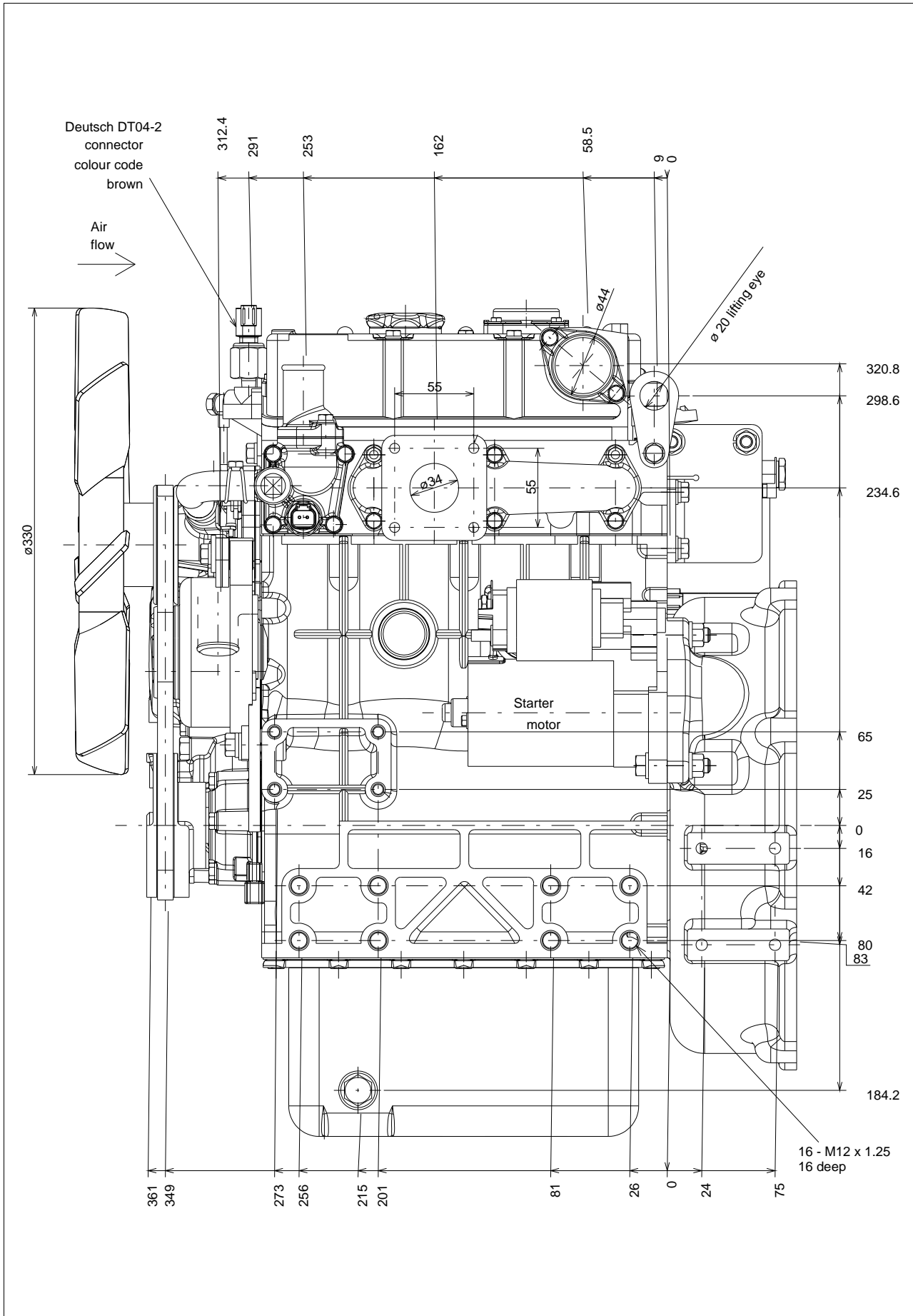
403D-07 - Rear view



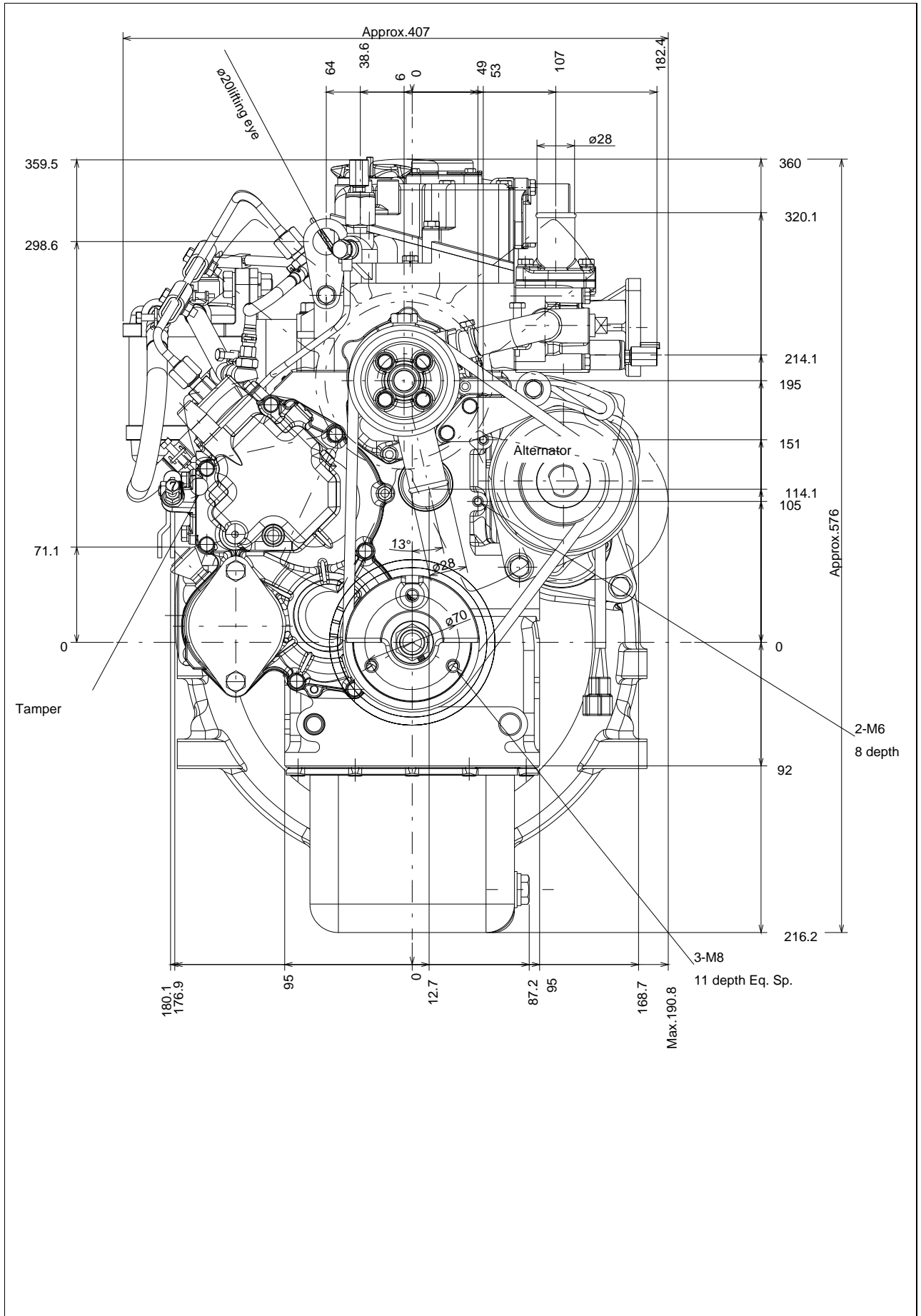
403D-07 - Plan view



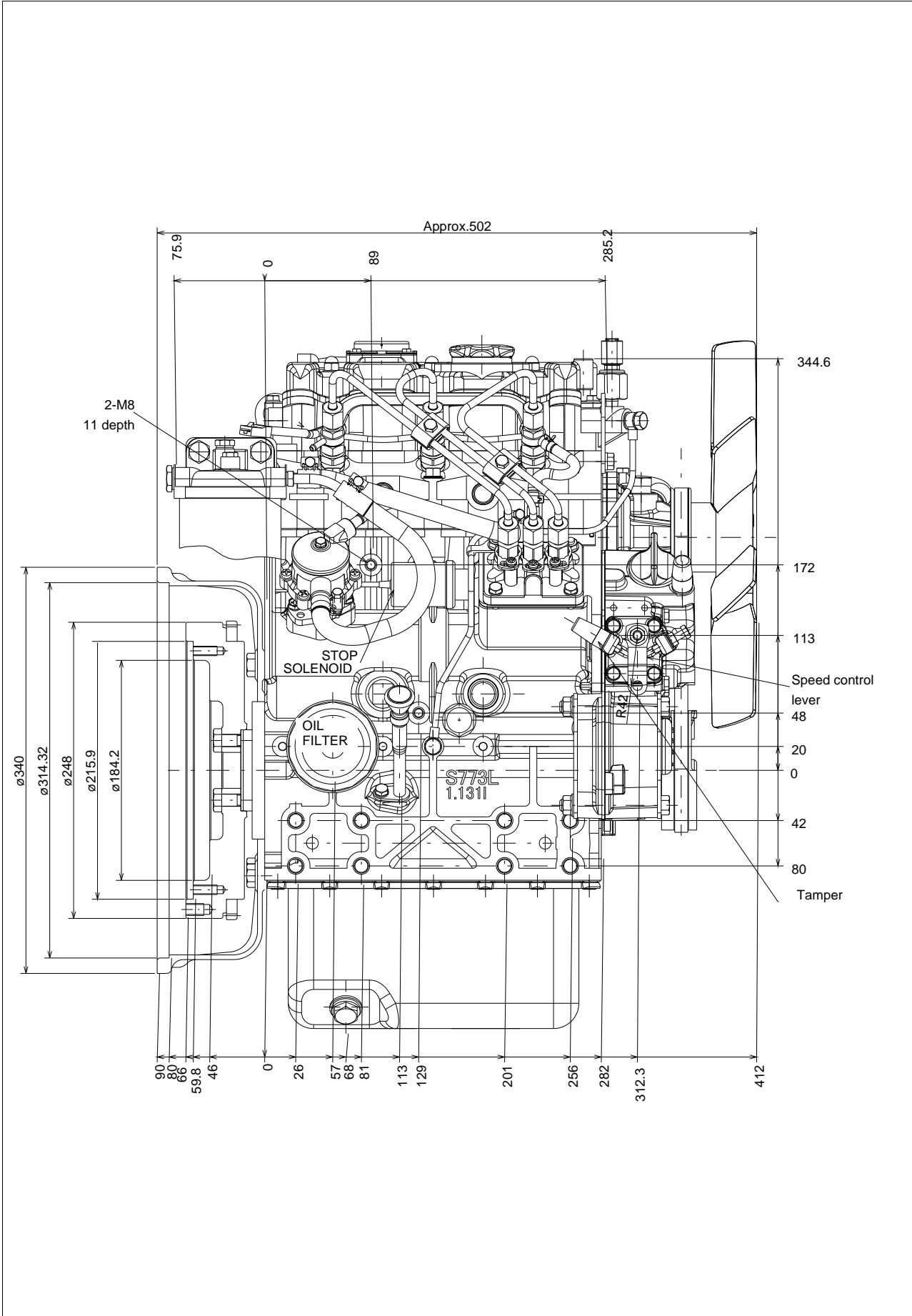
403D-11 - Left side view



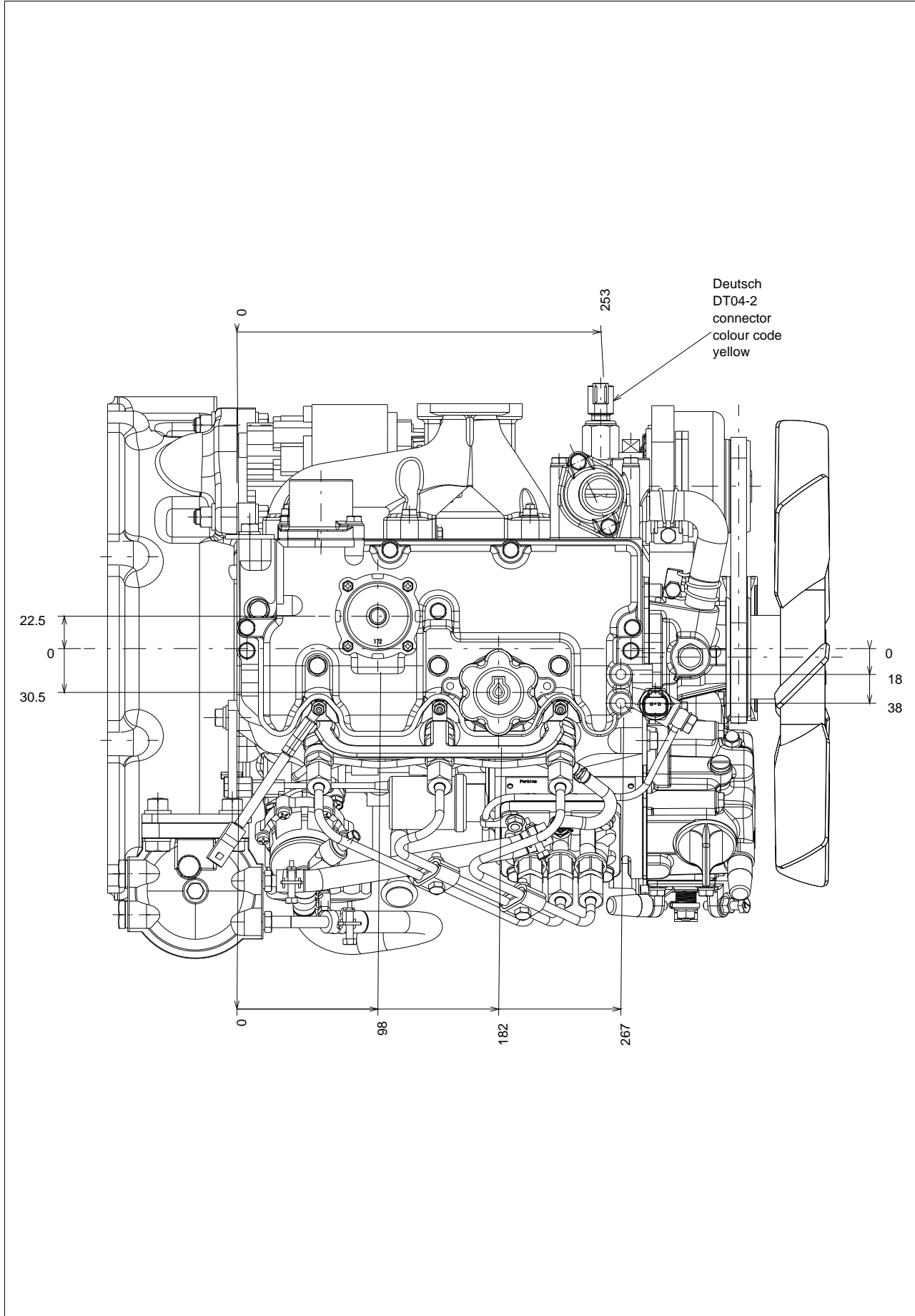
403D-11 - Front view



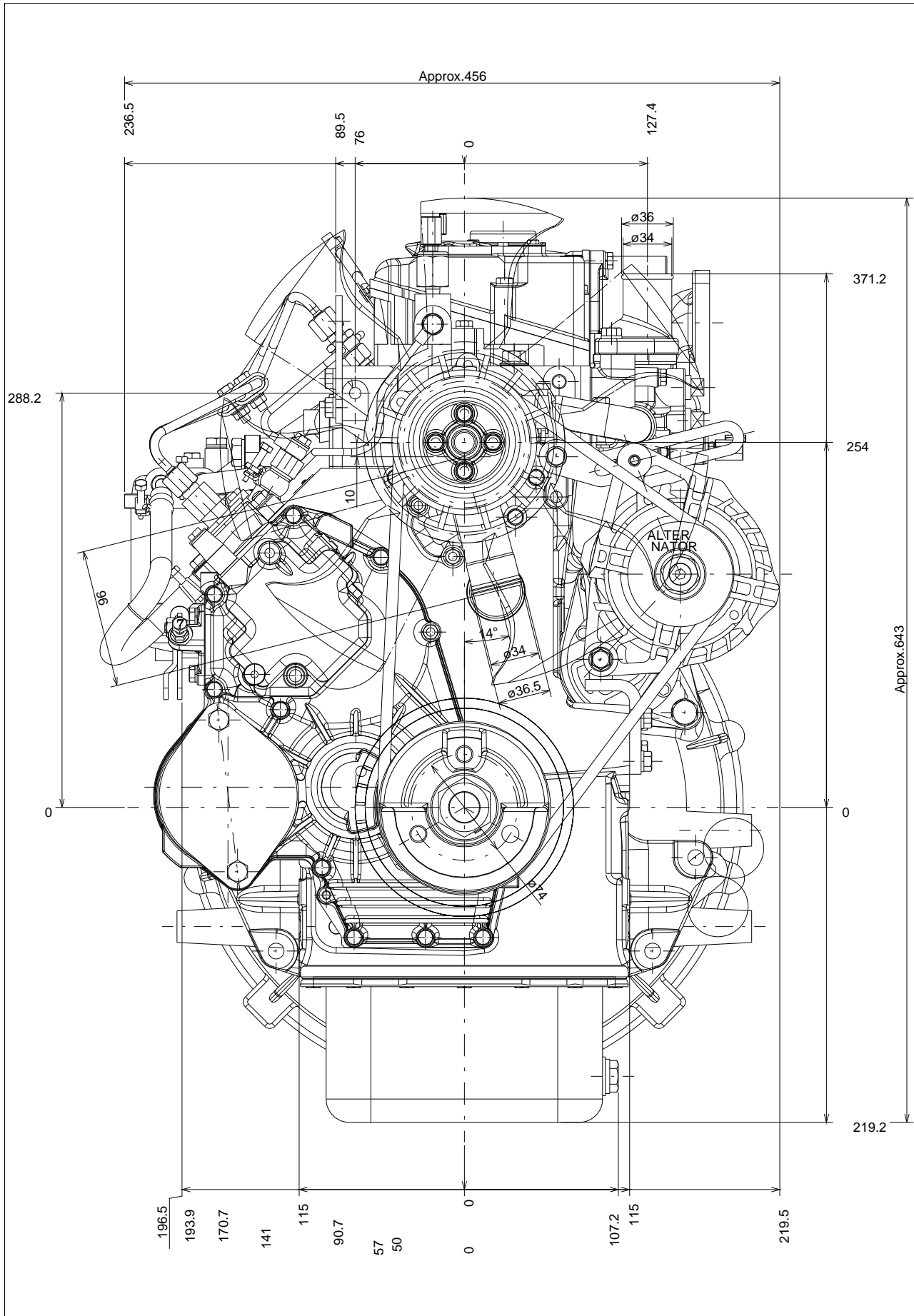
403D-11 - Right side view



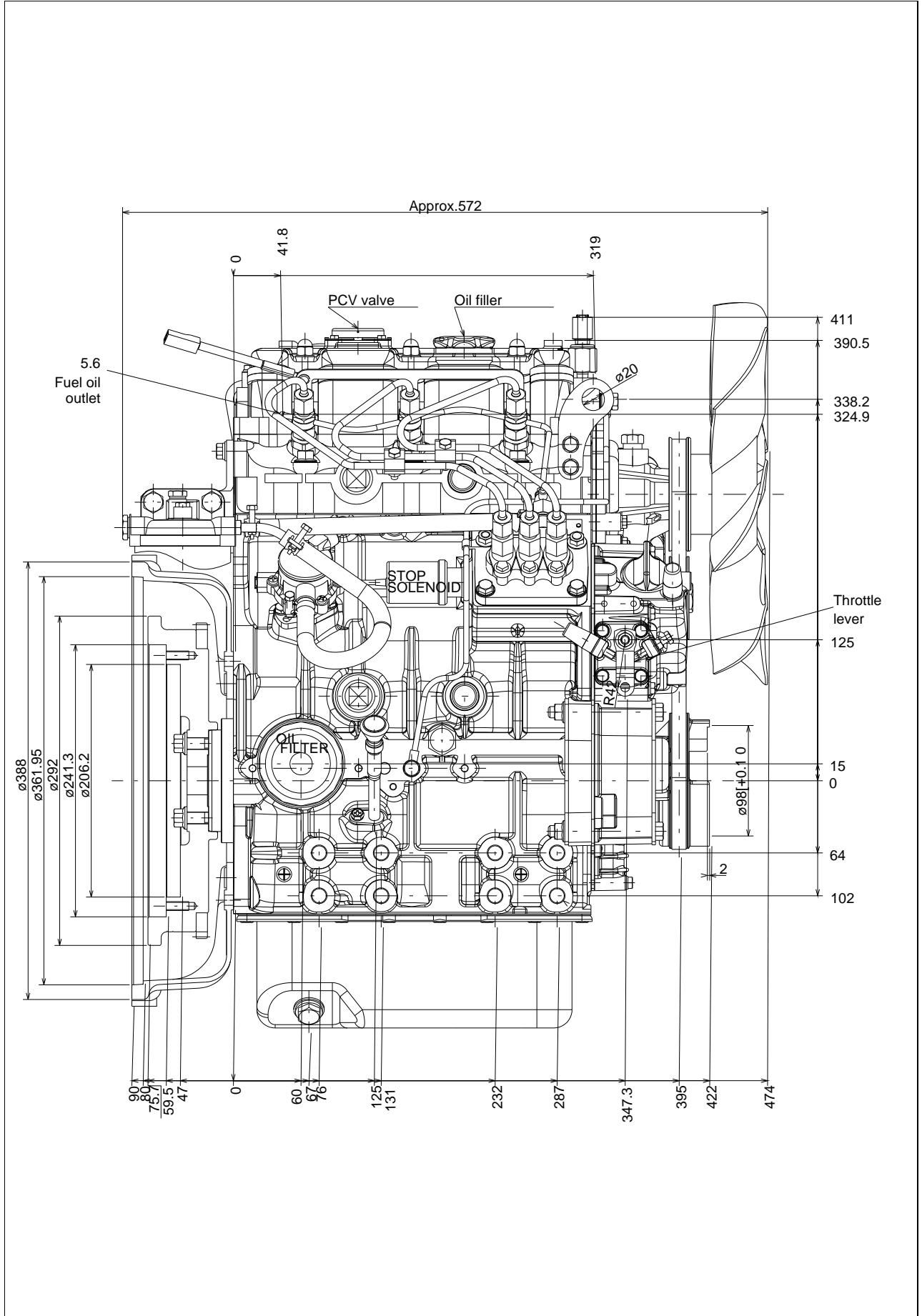
403D-11 - Plan view



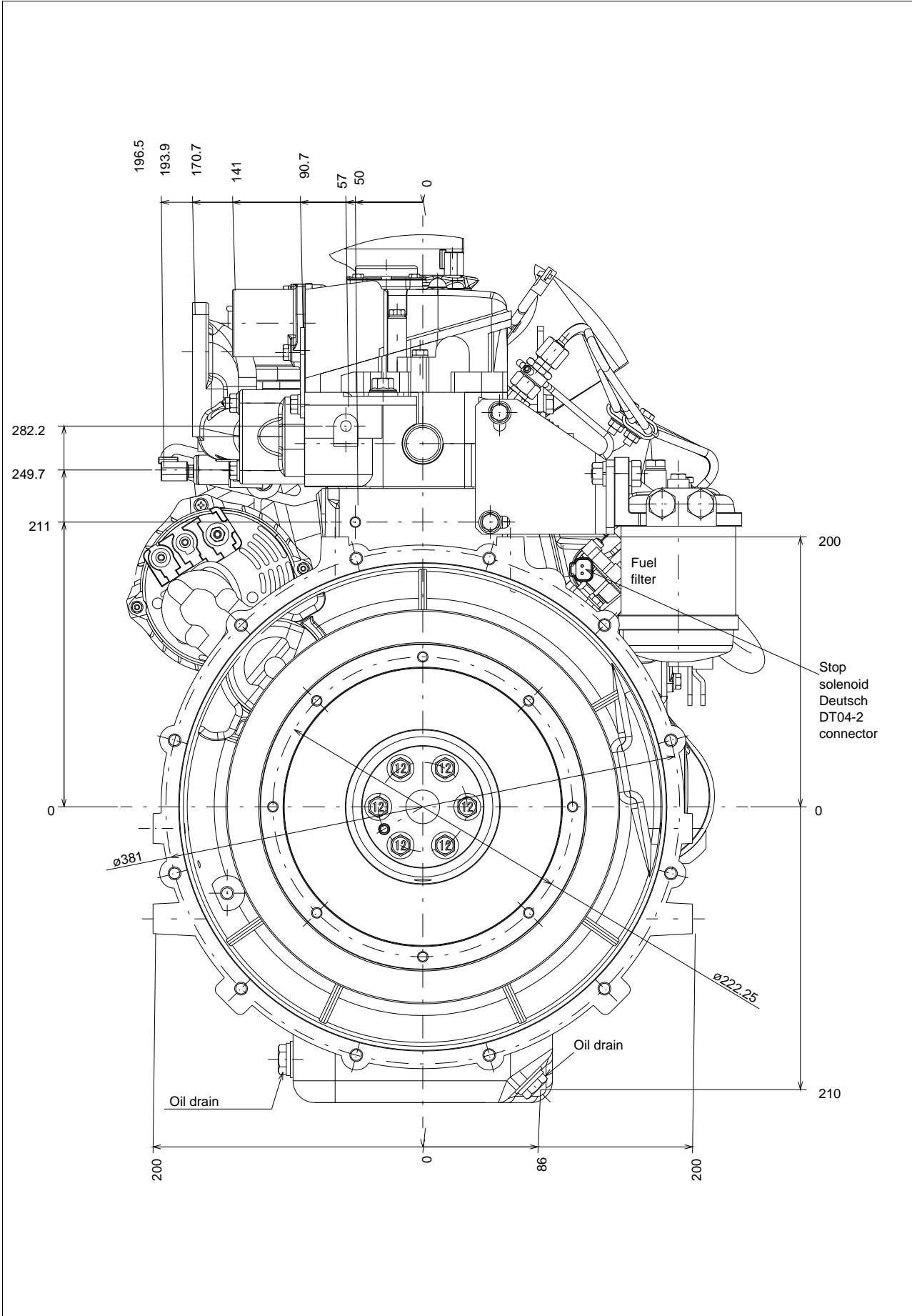
403D-15 - Front view



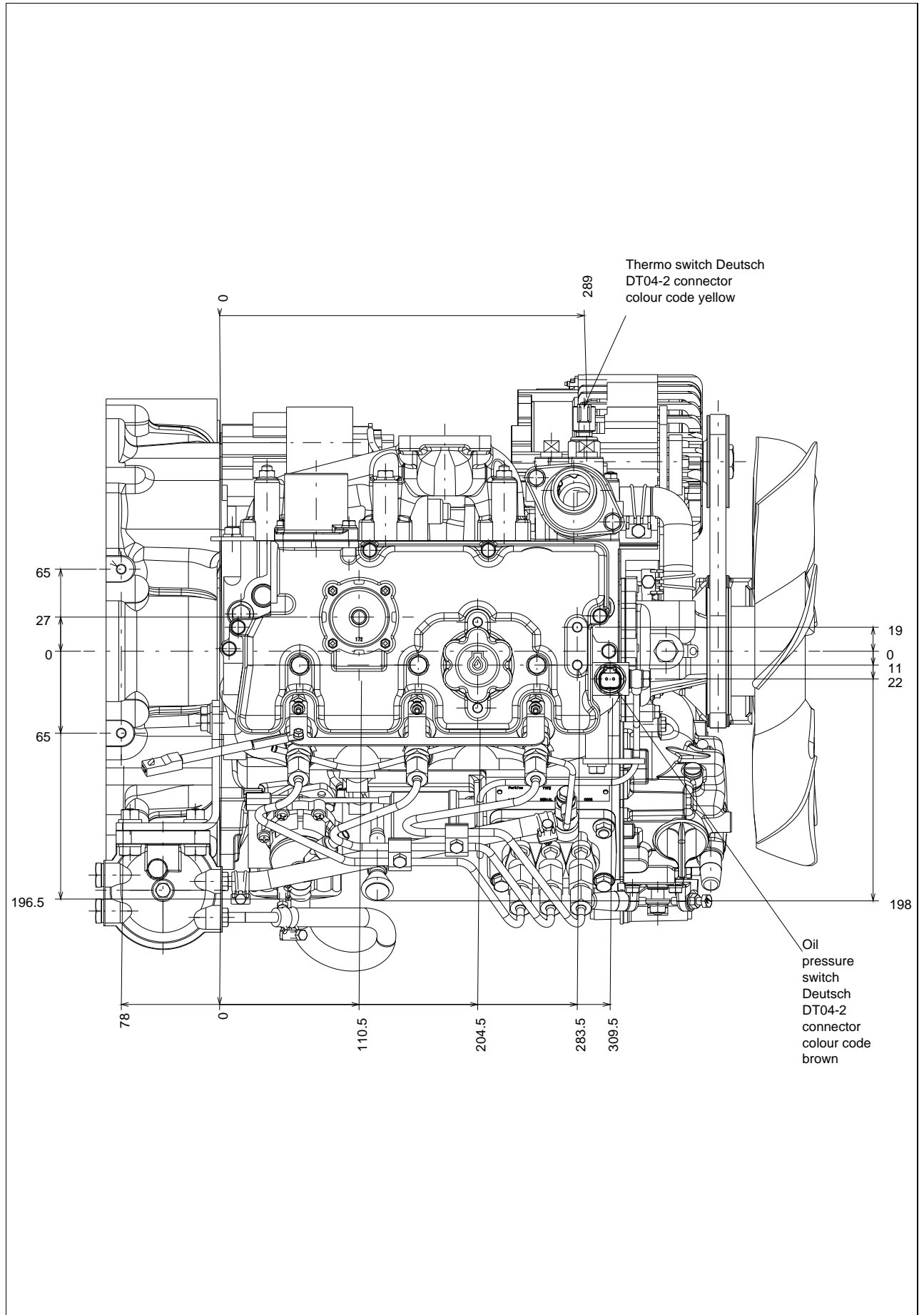
403D-15 - Right side view



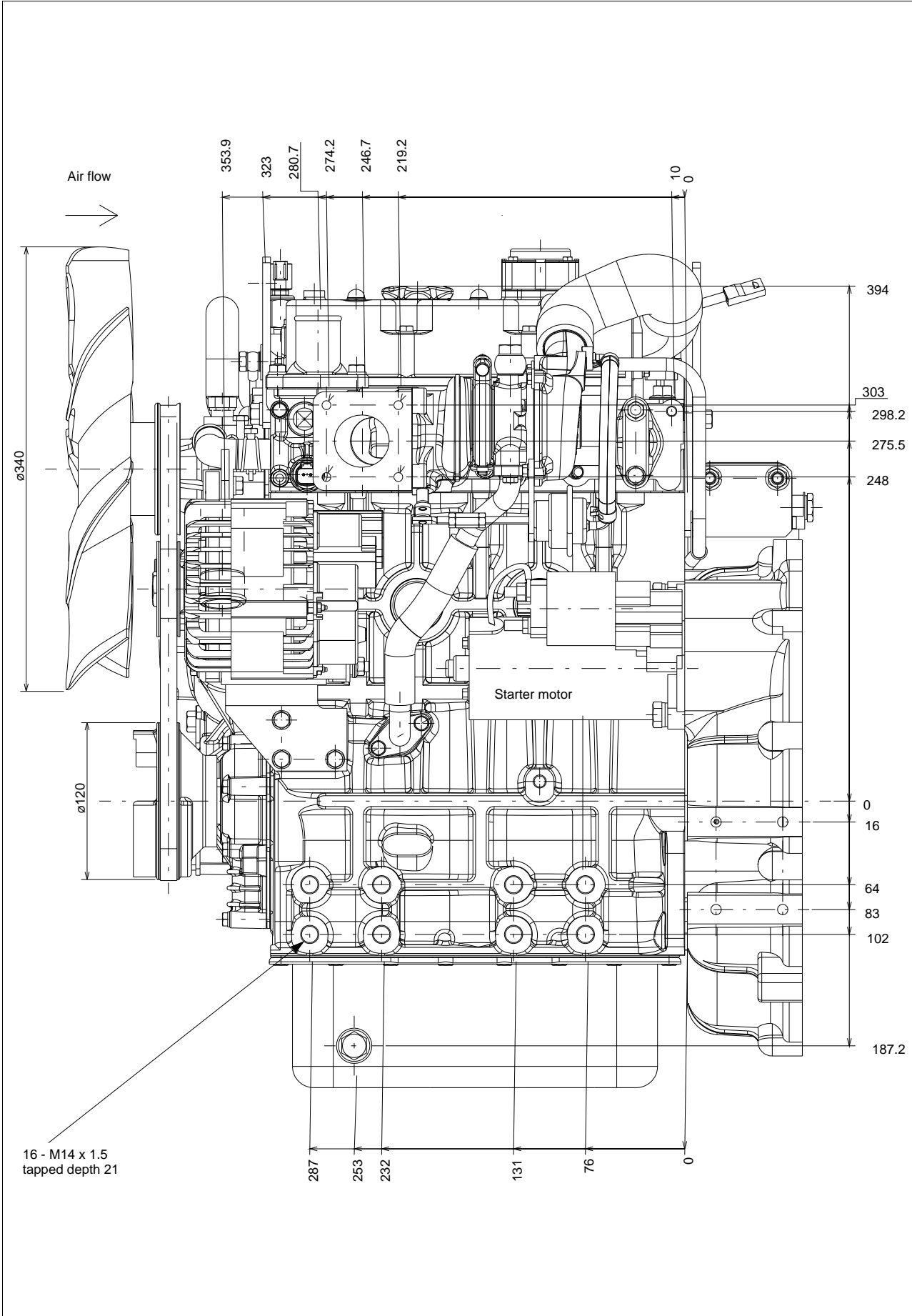
403D-15 - Rear view



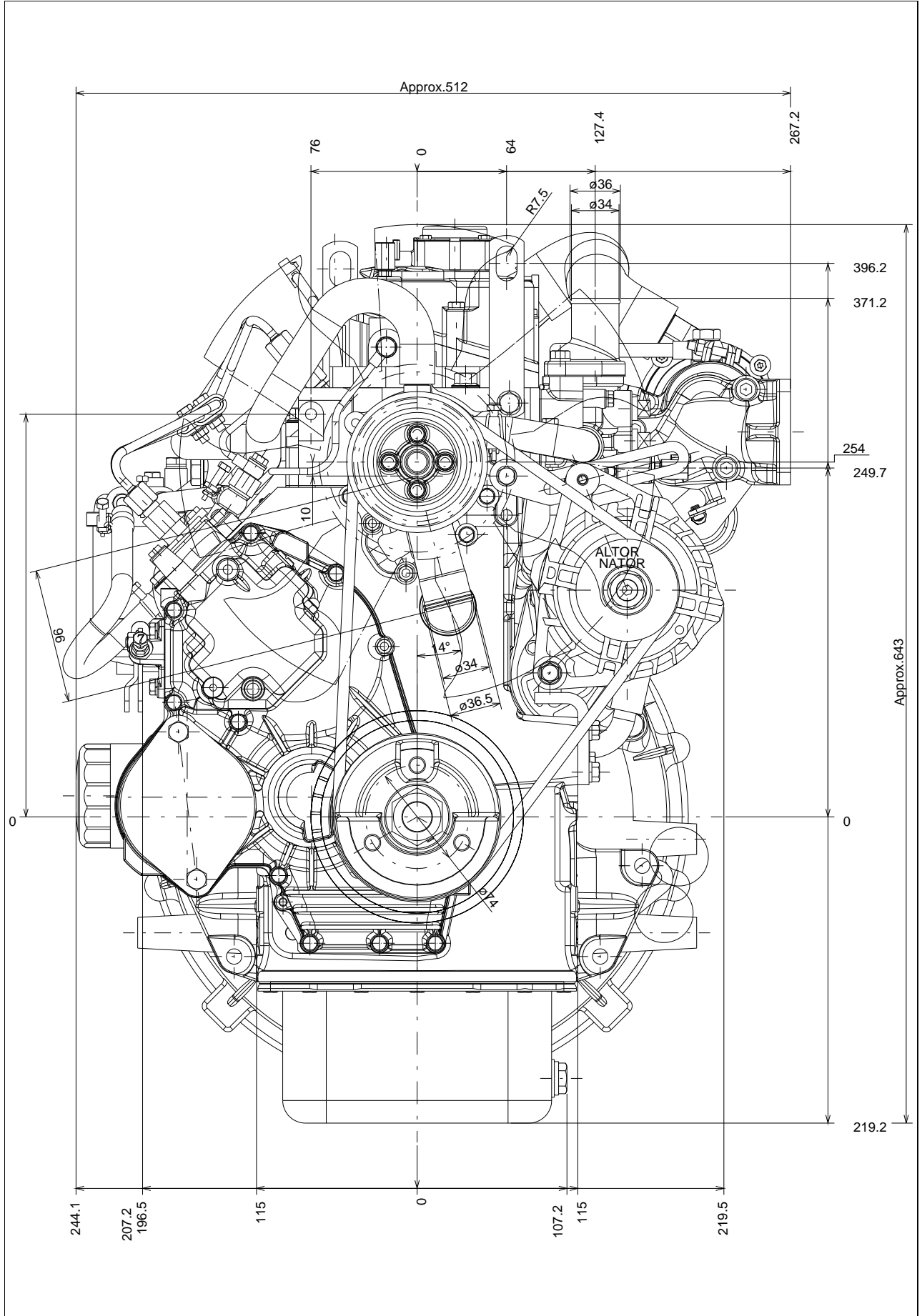
403D-15 - Plan view



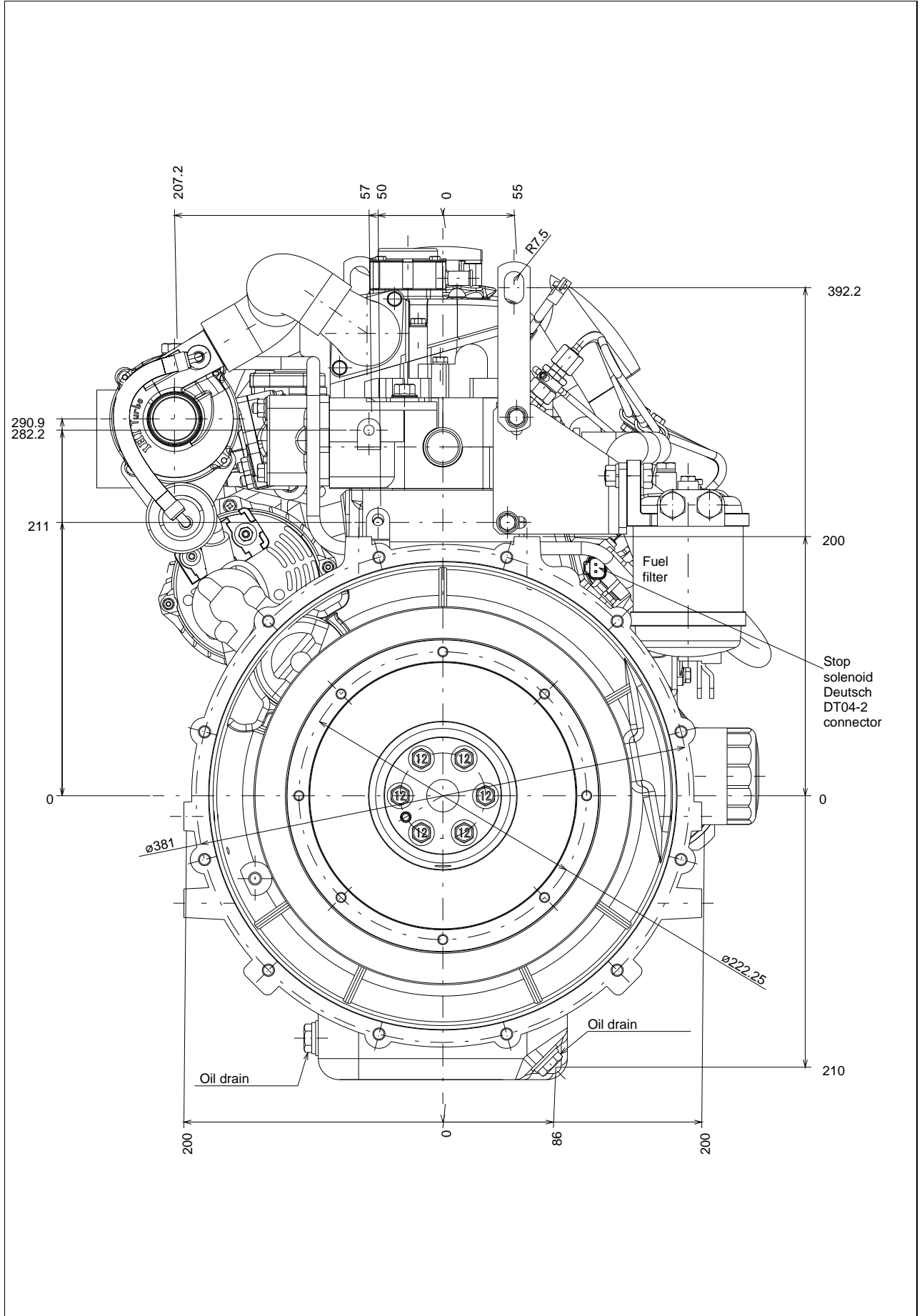
403D-15T - Left side view



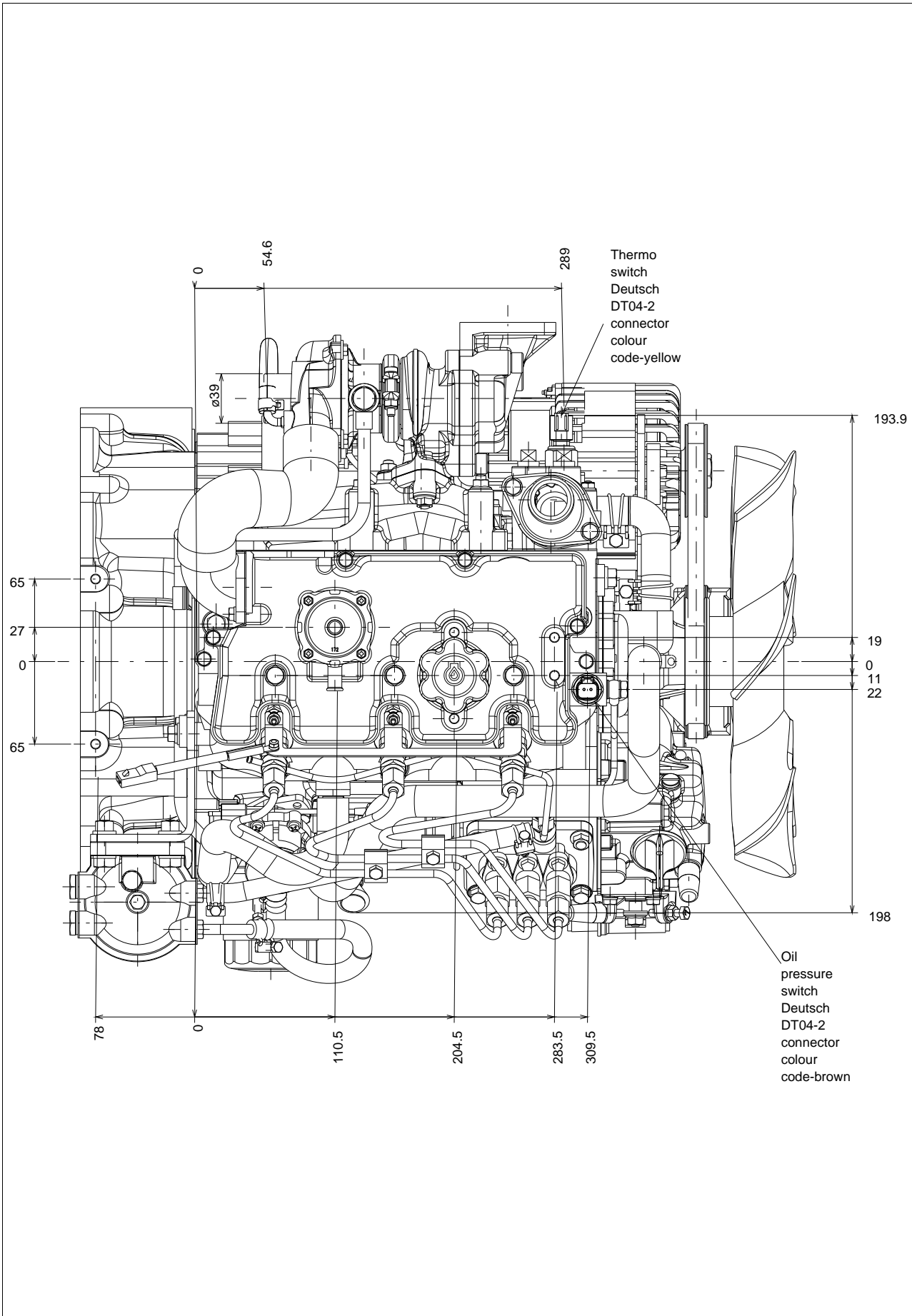
403D-15T - Front view



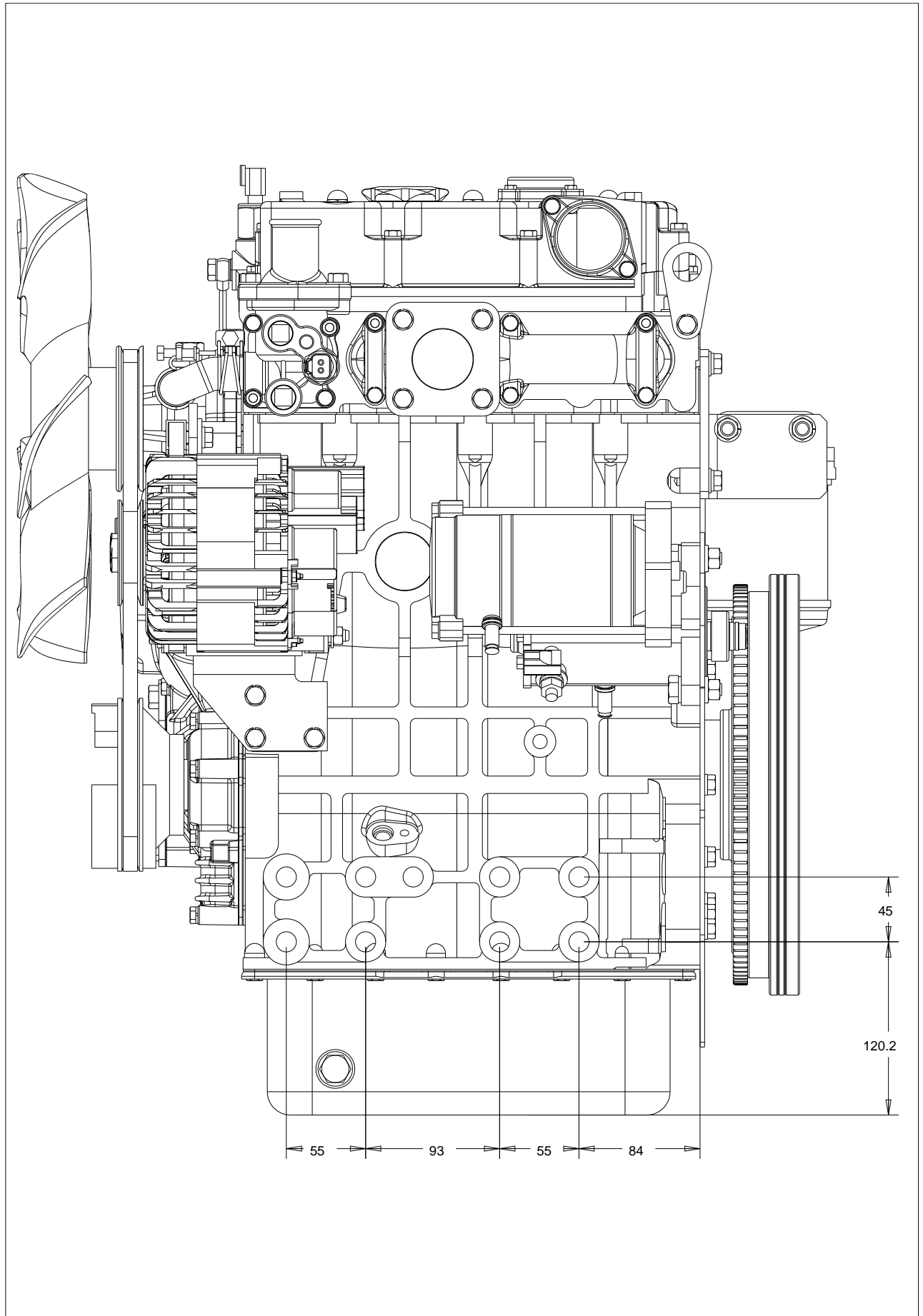
403D-15T - Rear view



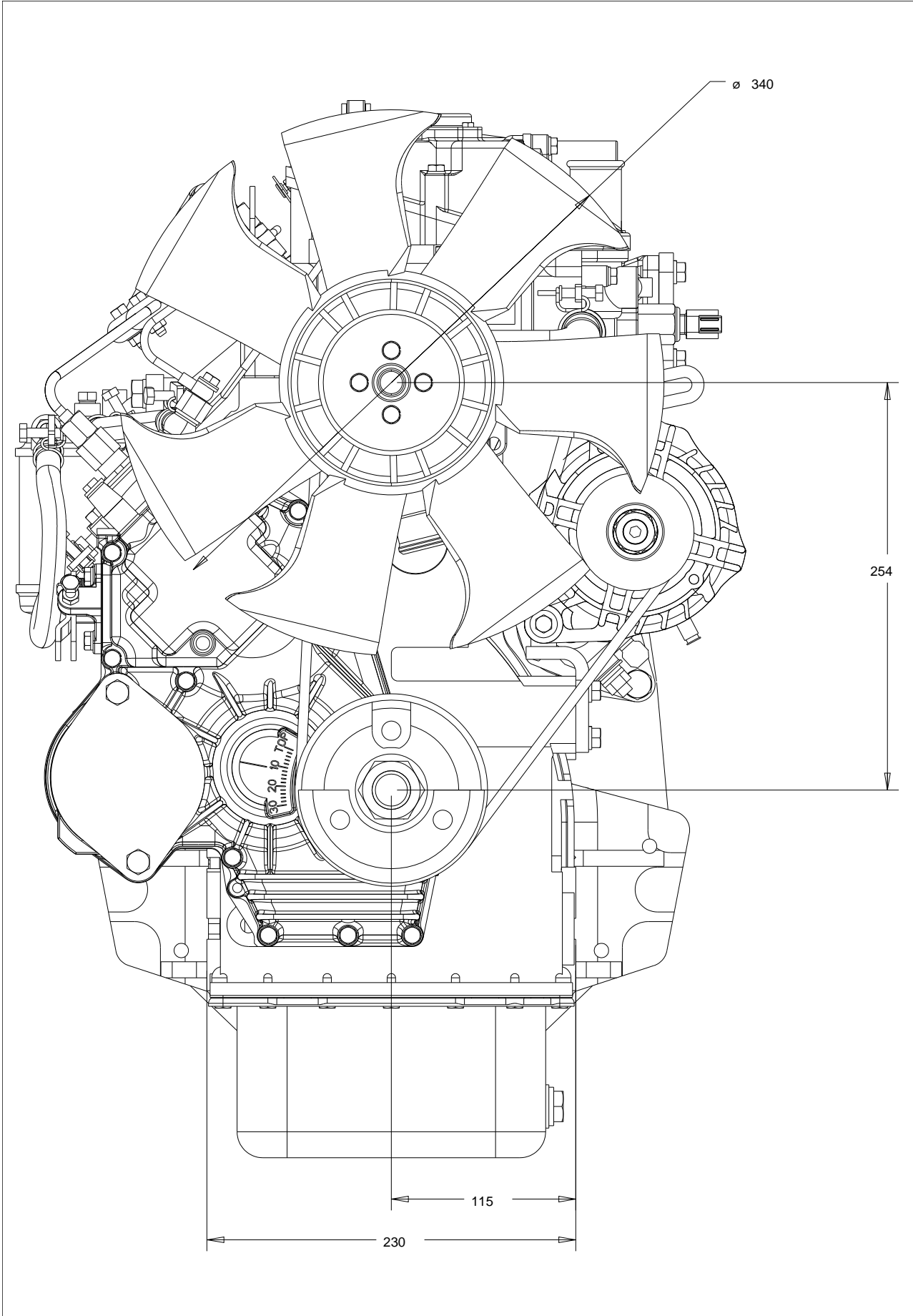
403D-15T - Plan view



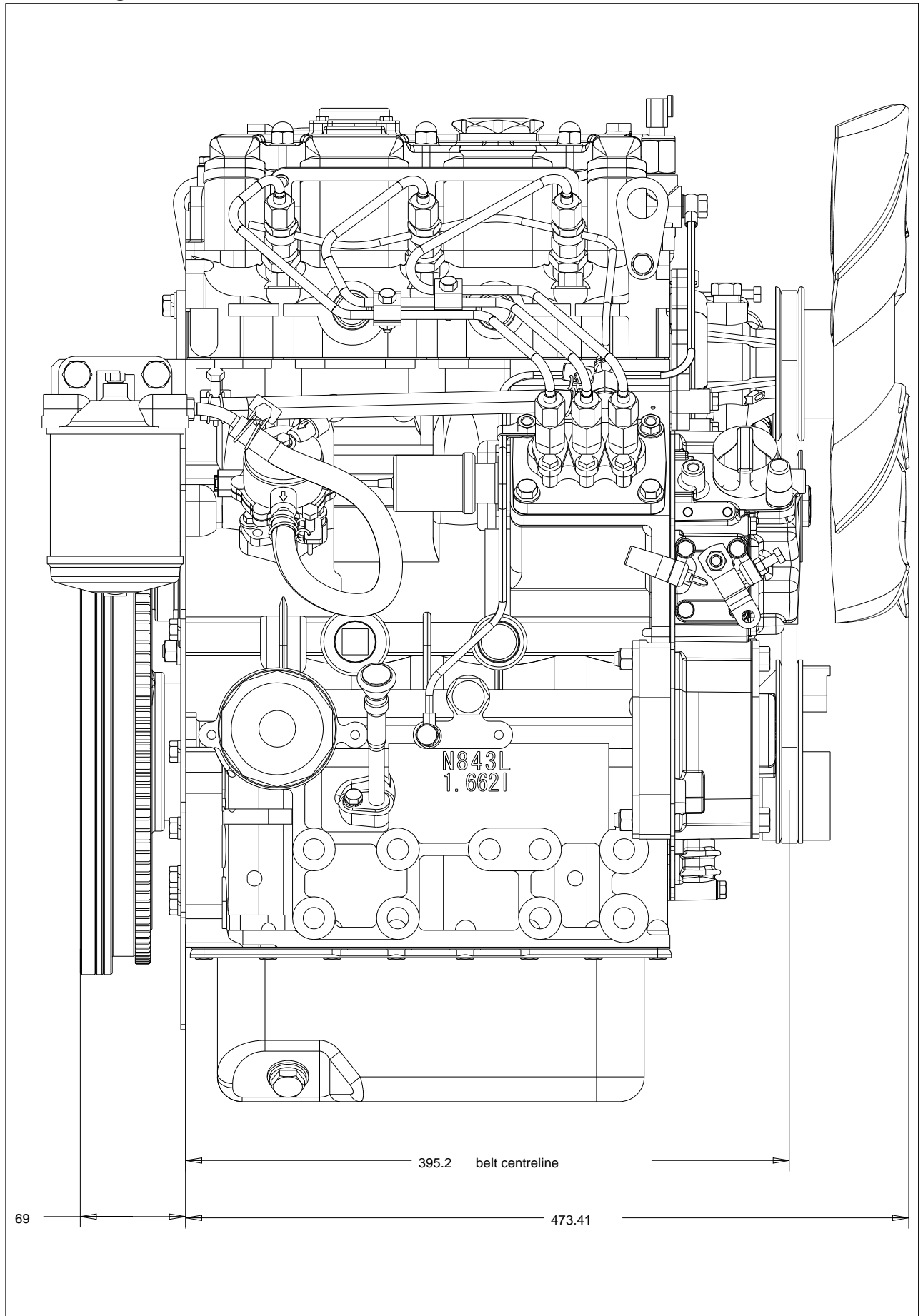
403D-17 - Left side view



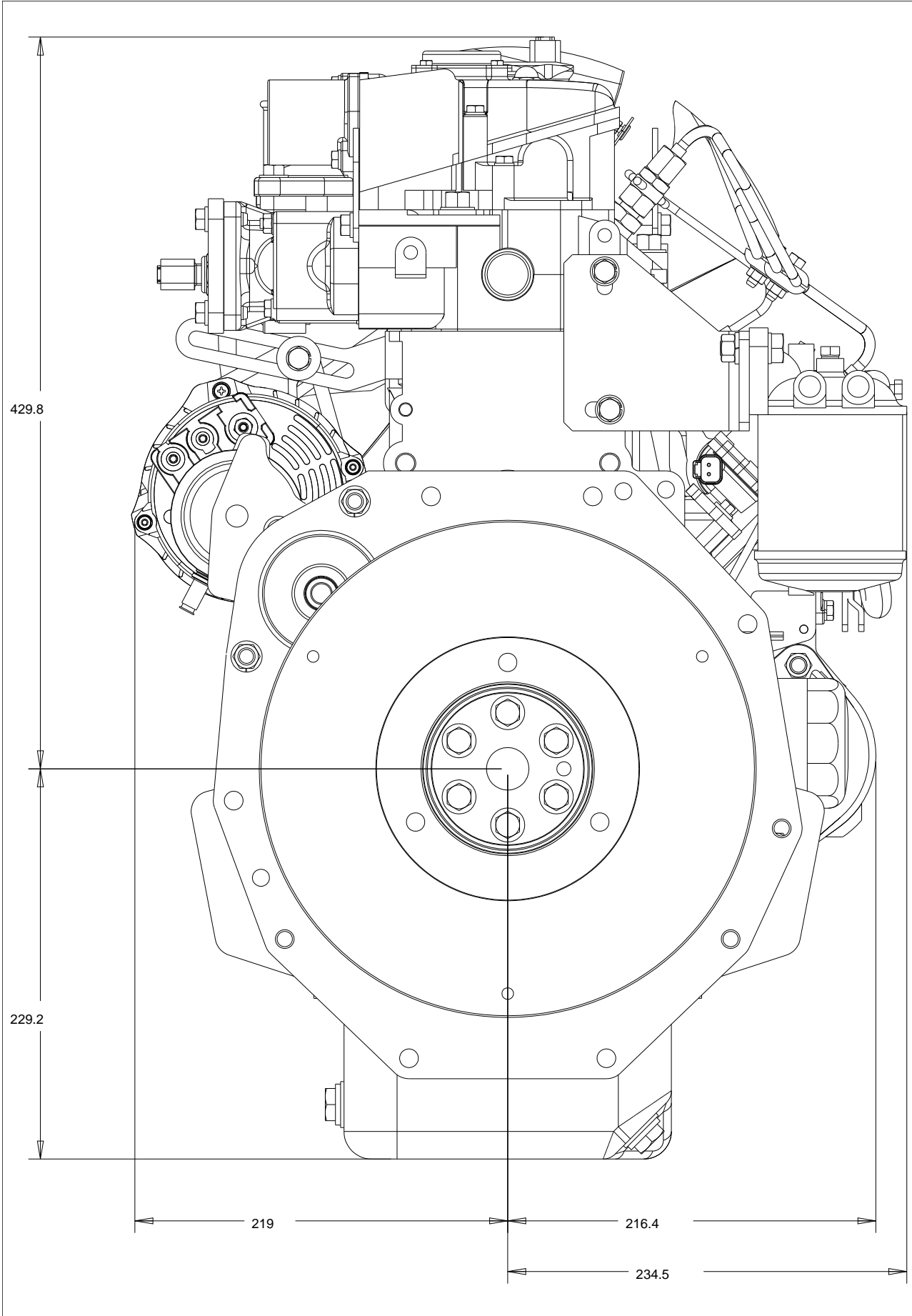
403D-17 - Front view



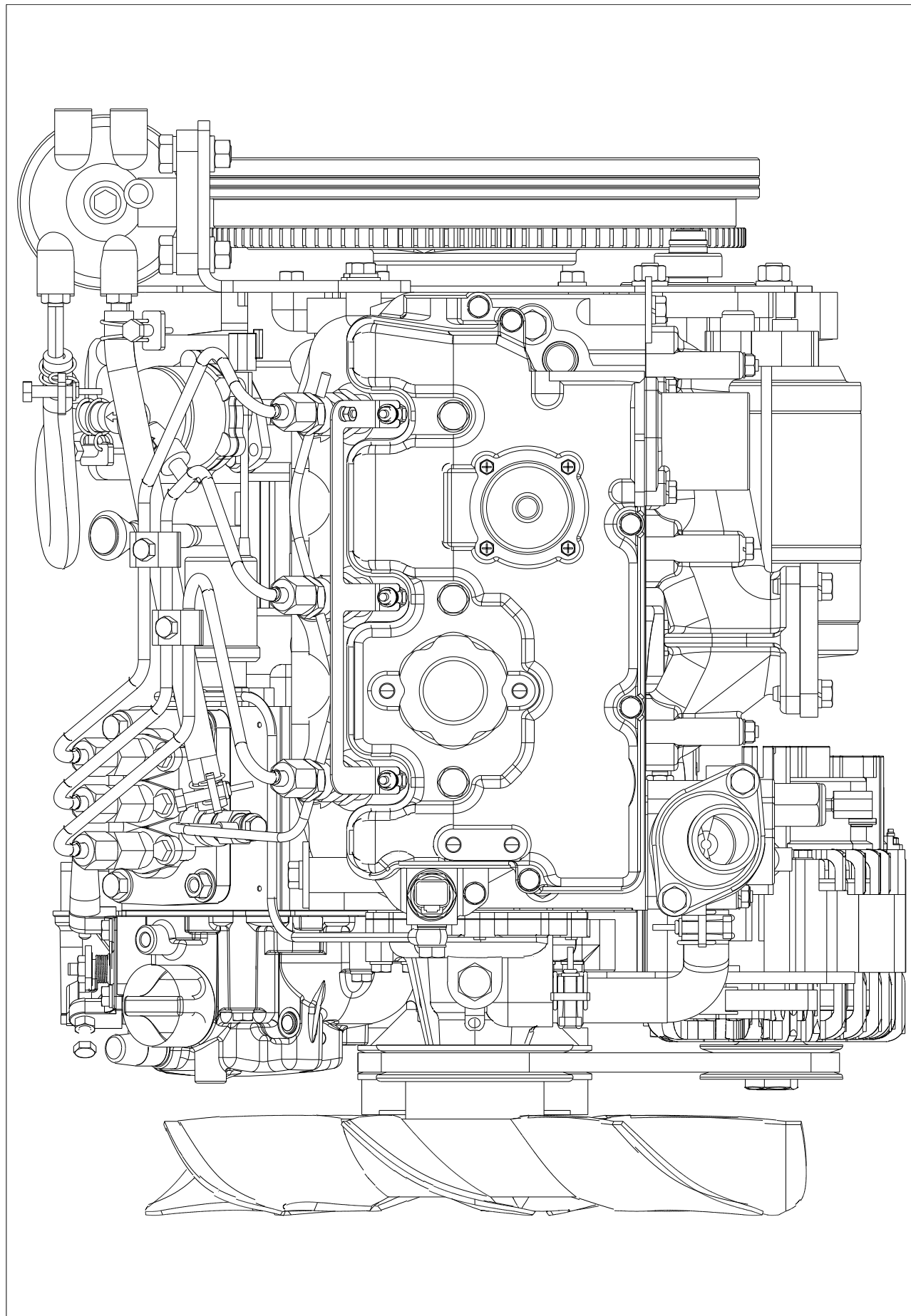
403D-17 - Right side view



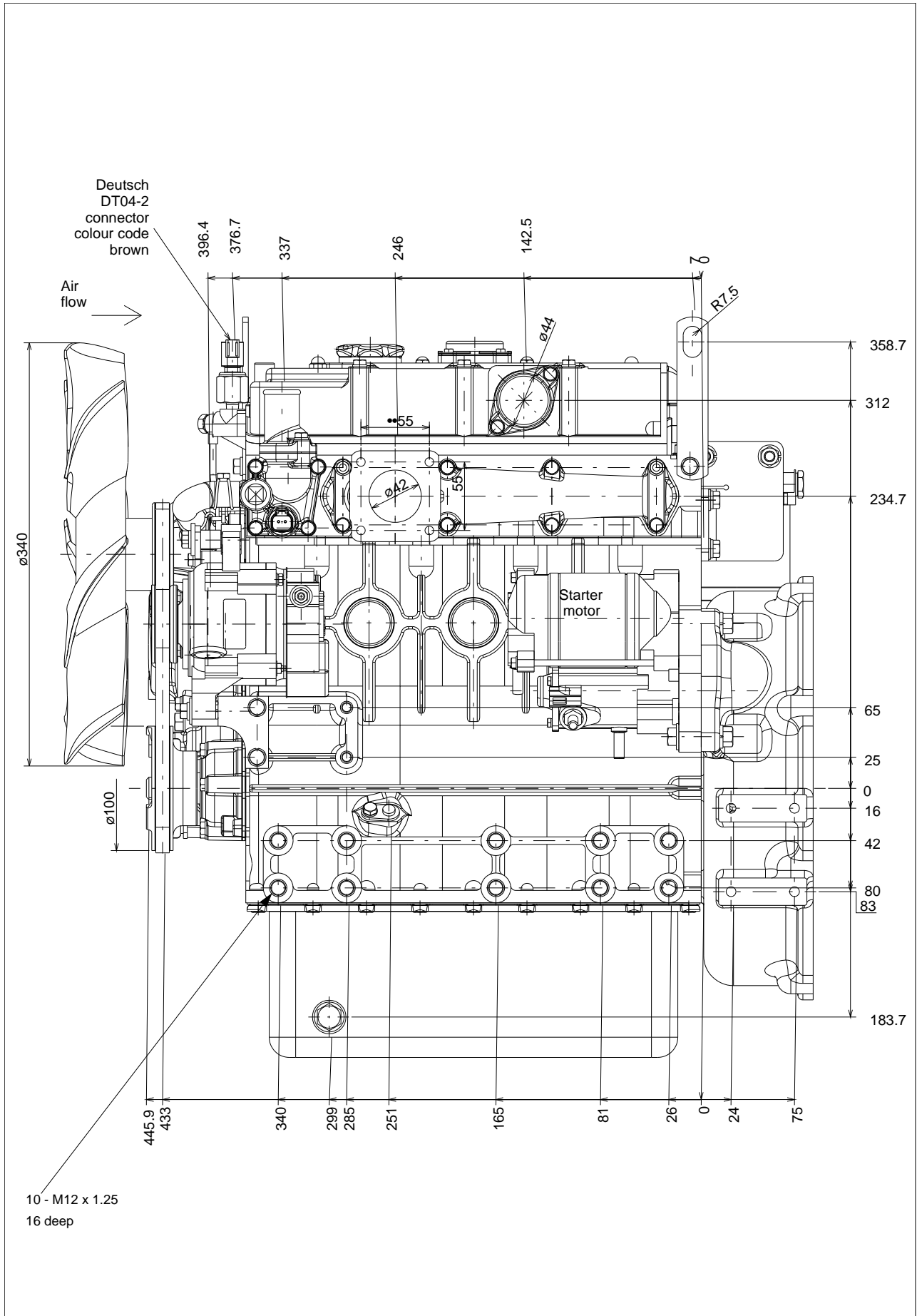
403D-17 - Rear view



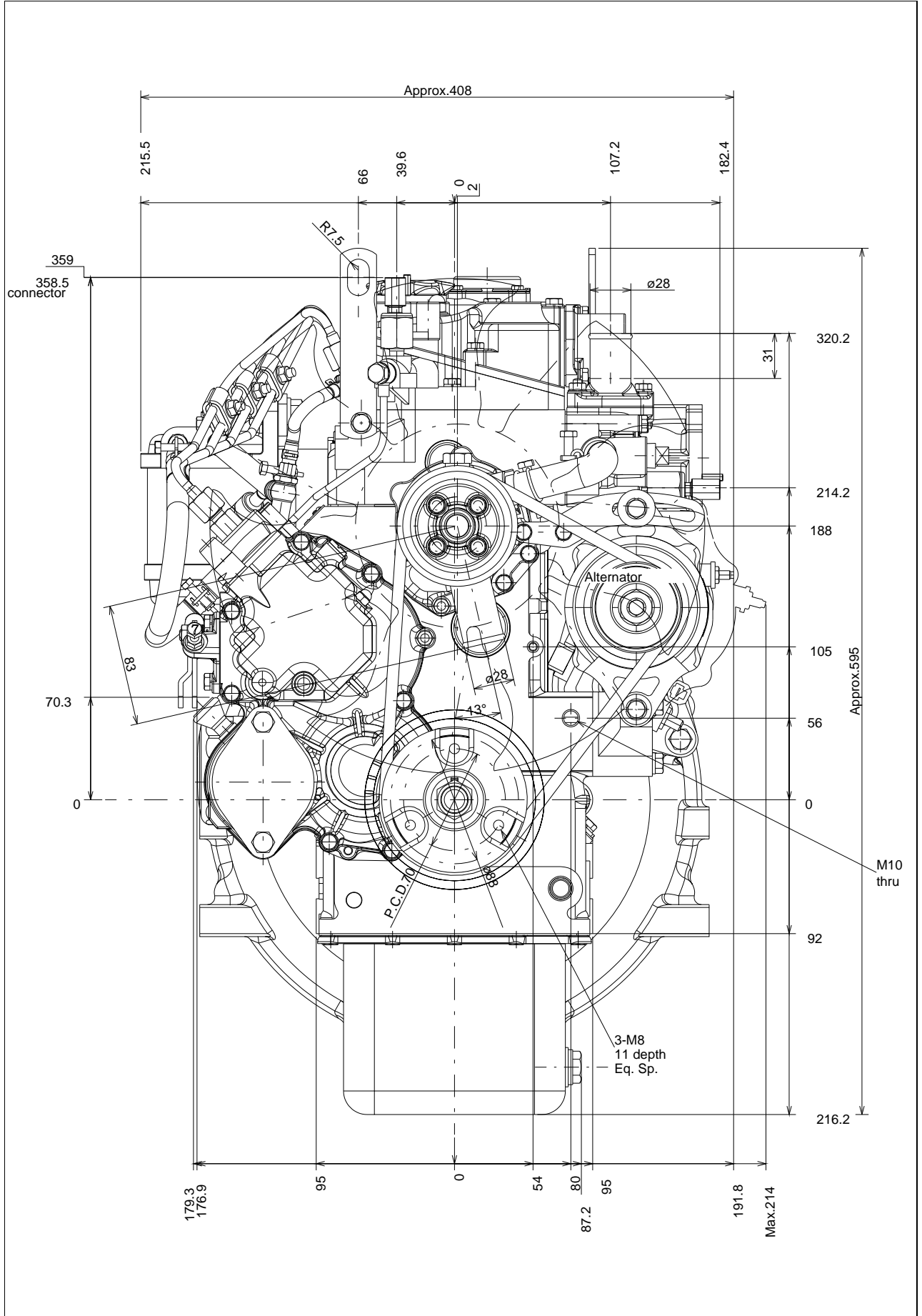
403D-17 - Plan view



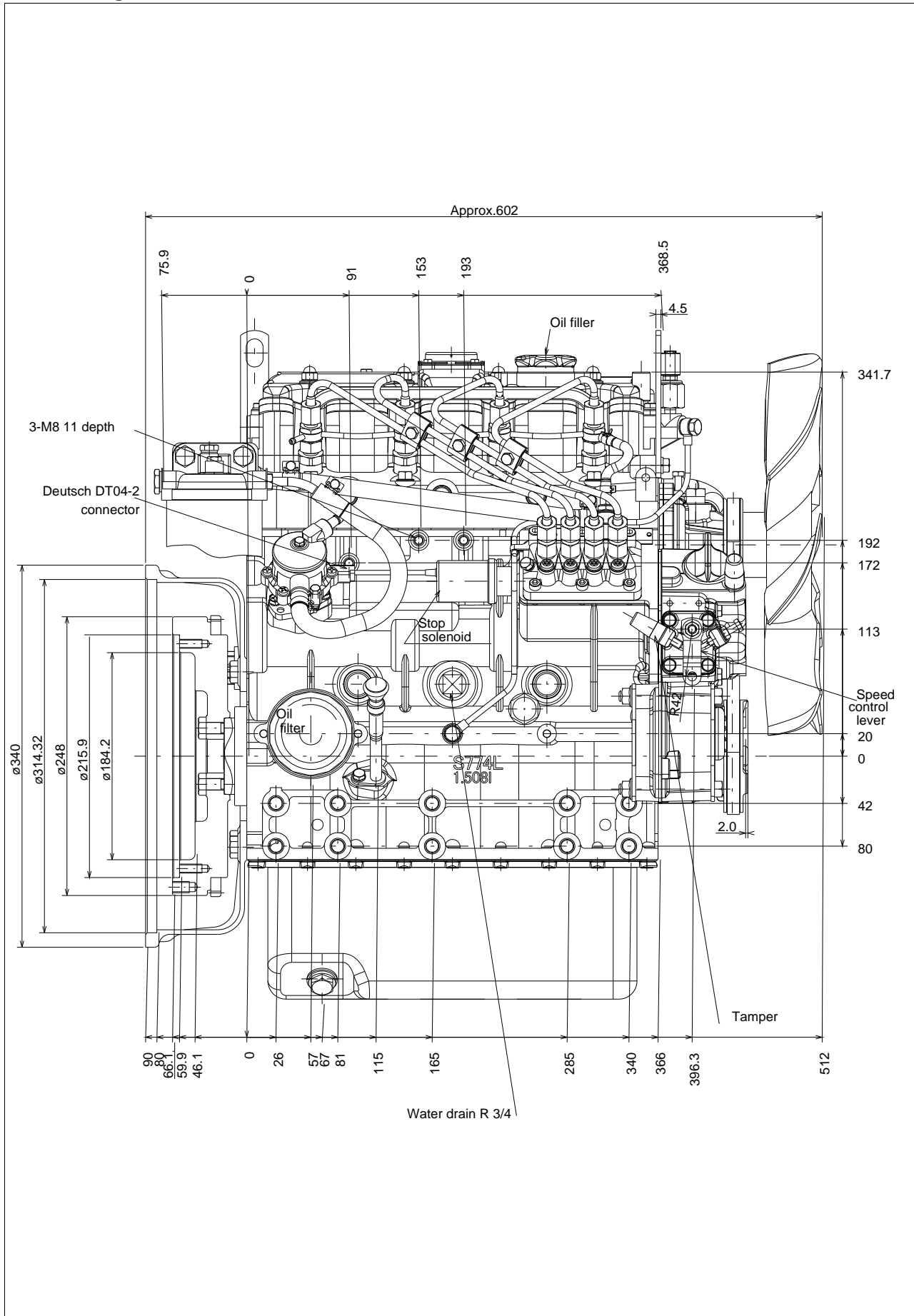
404D-15 - Left side view



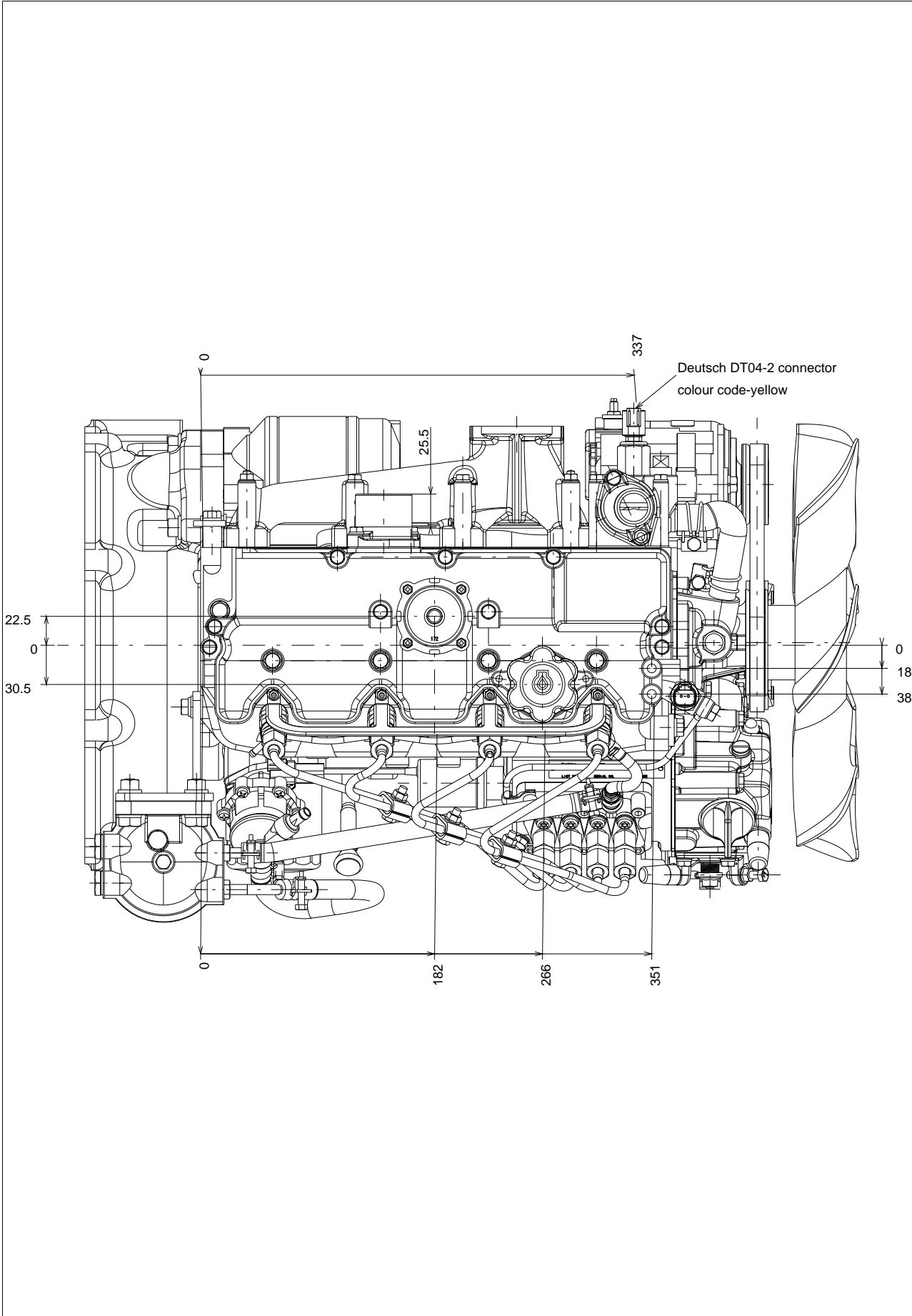
404D-15 - Front view



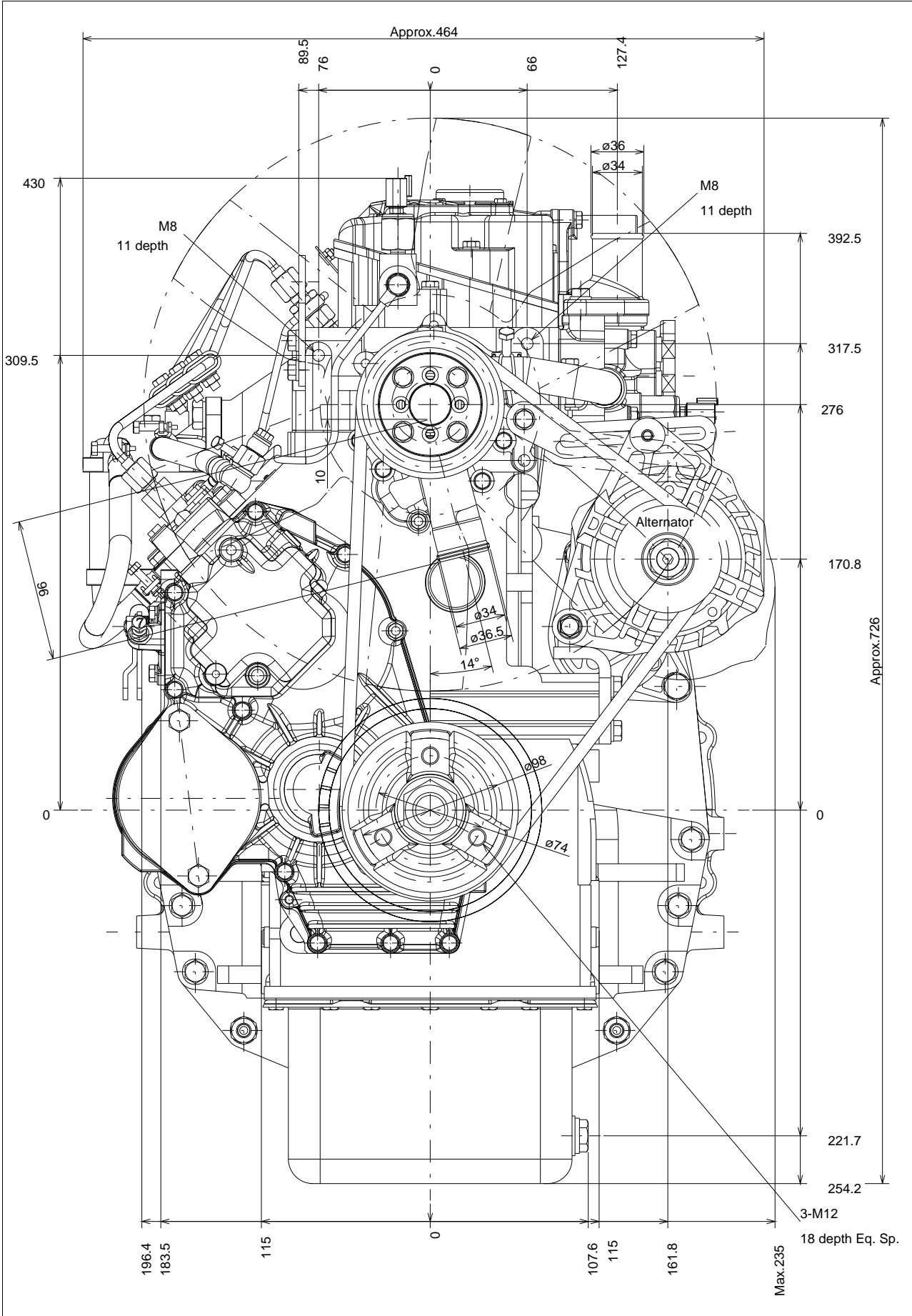
404D-15 - Right side view



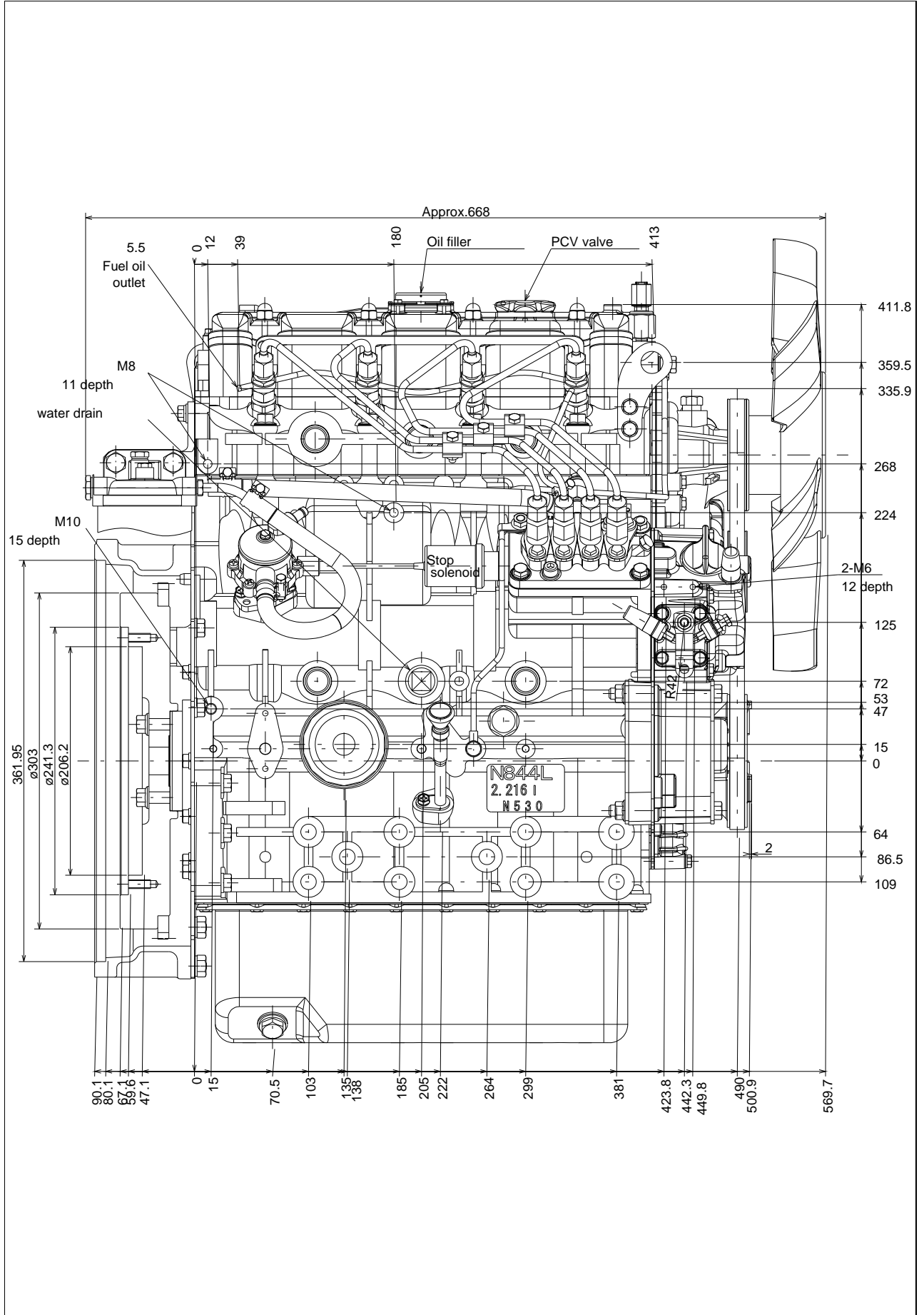
404D-15 - Plan view



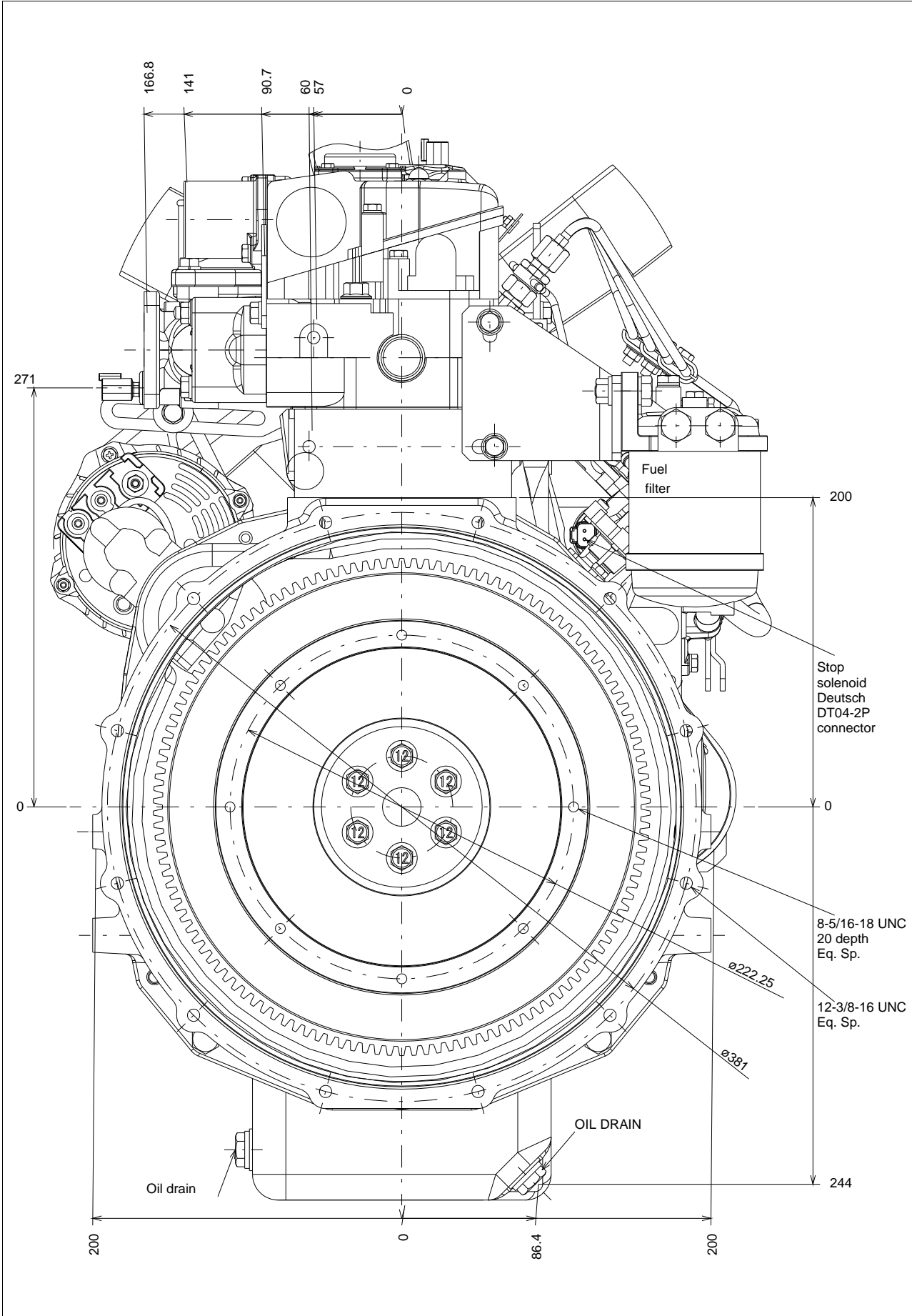
404D-22 - Front view



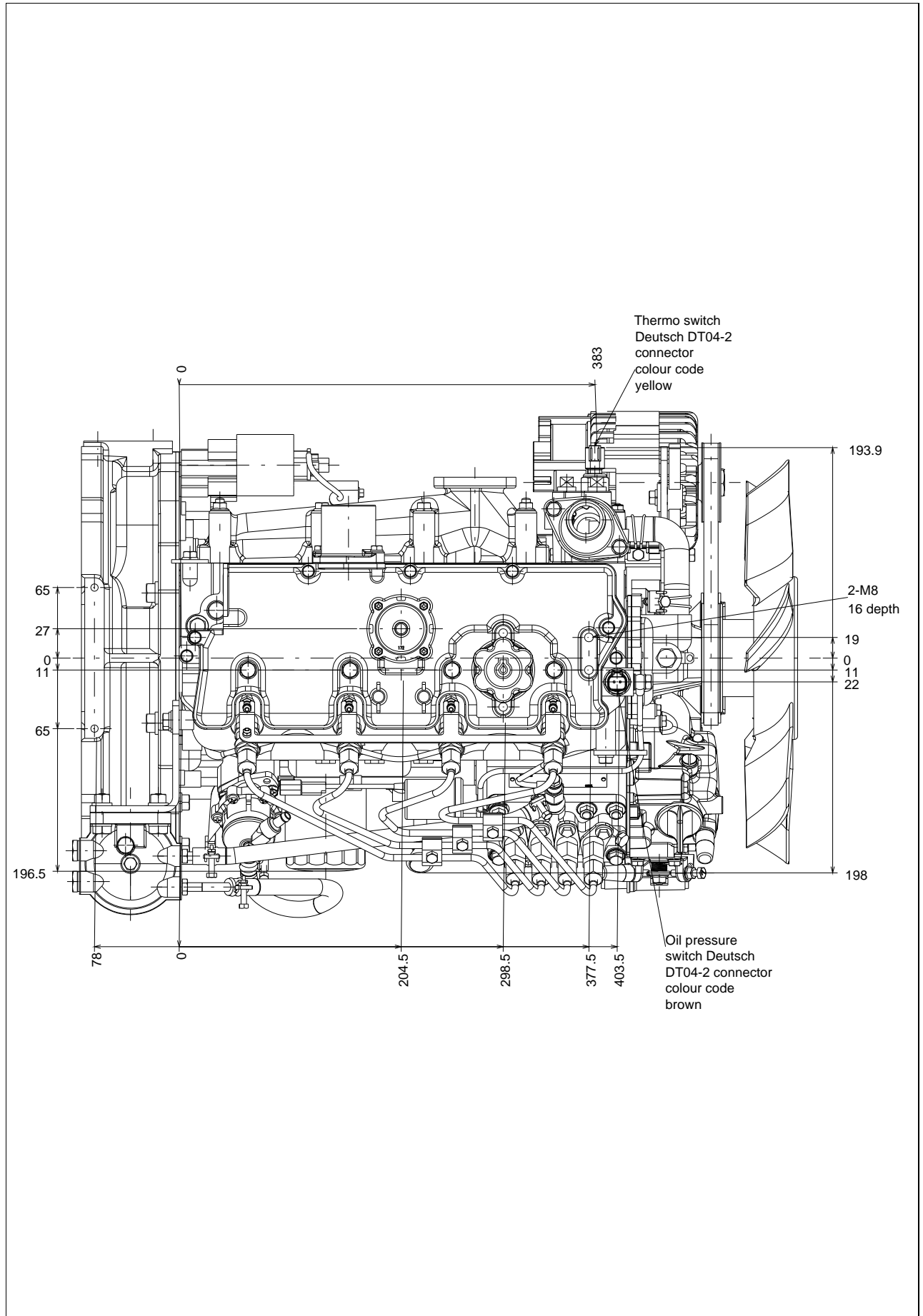
404D-22 - Right side view



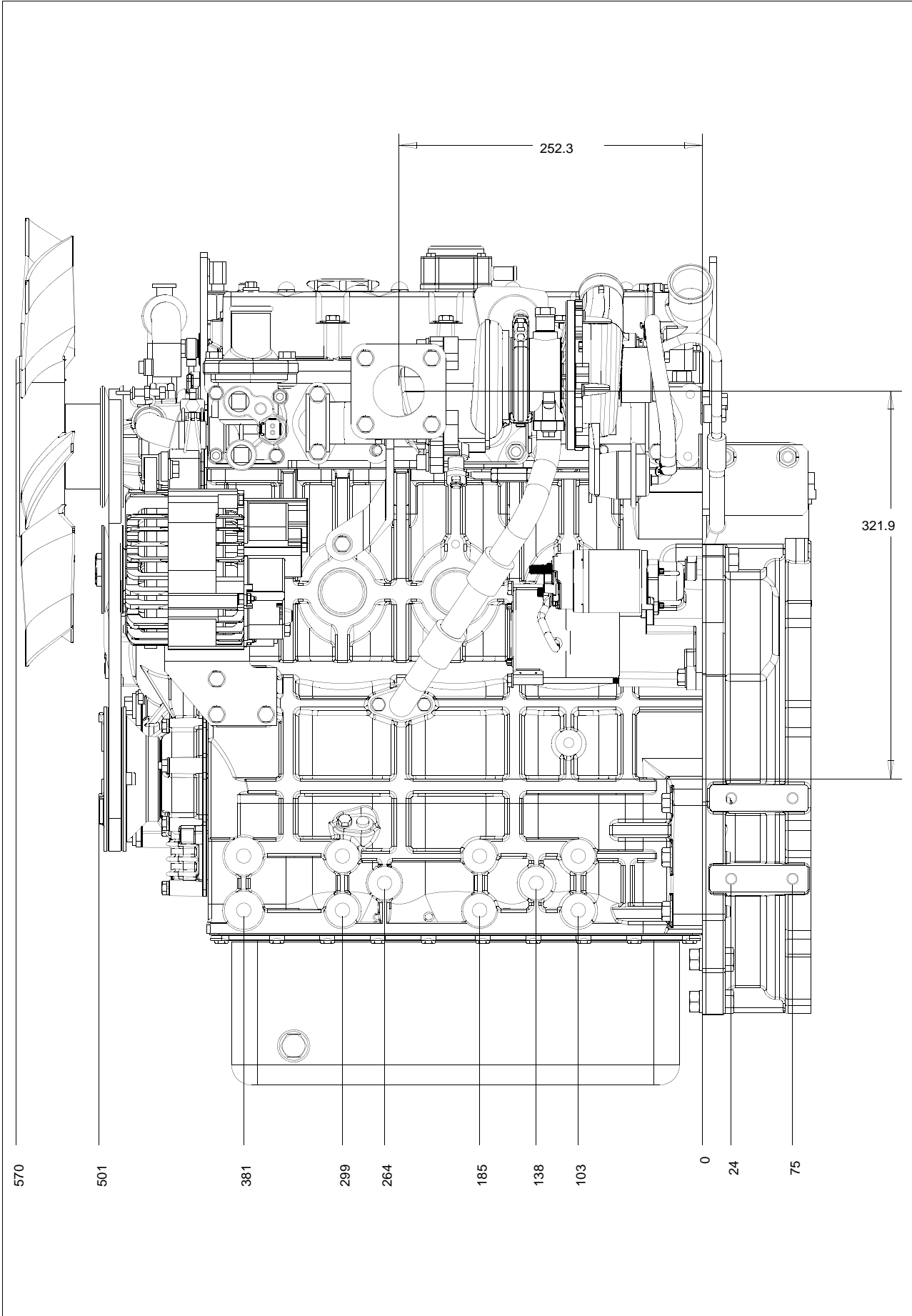
404D-22 - Rear view



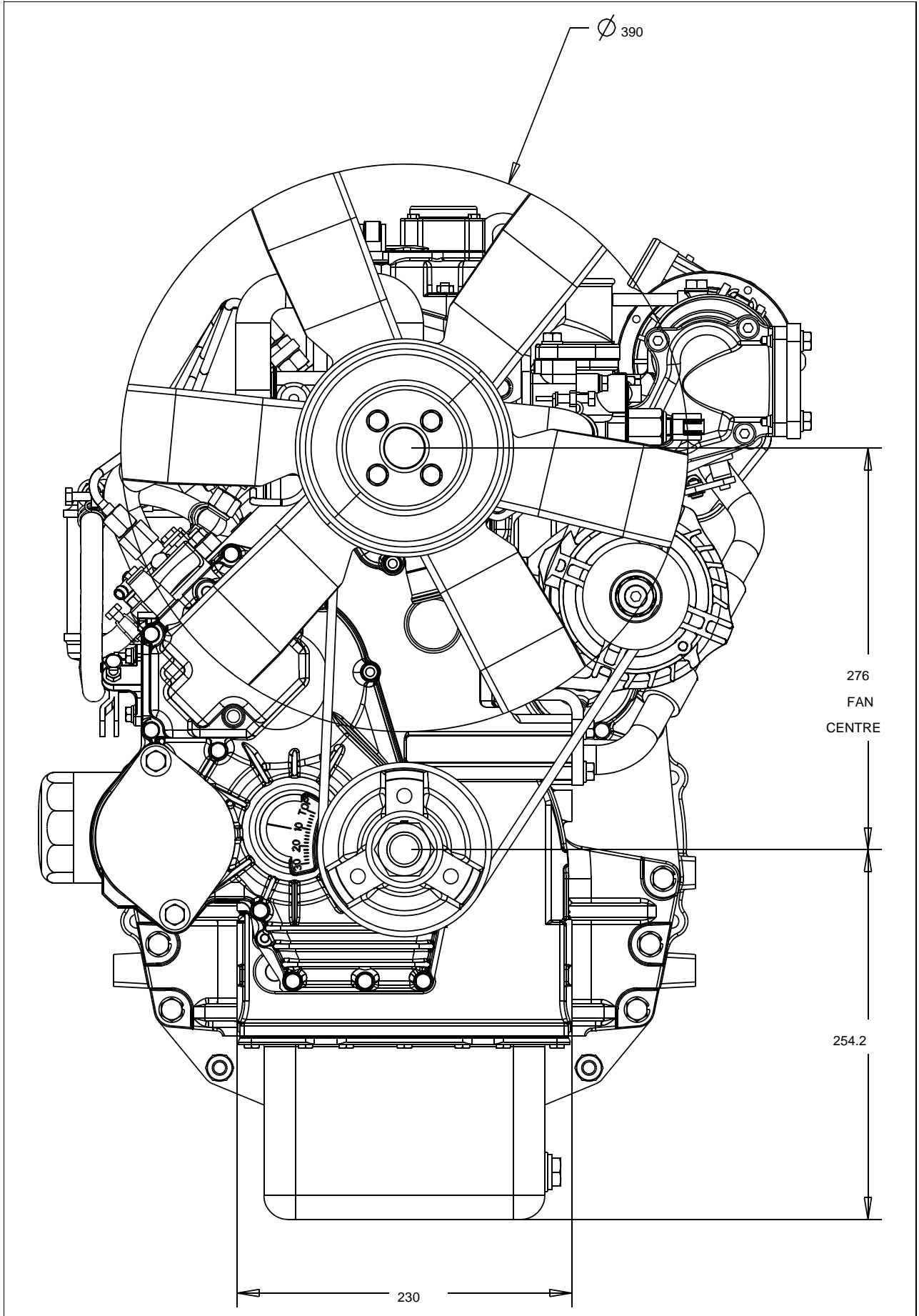
404D-22 - Plan view



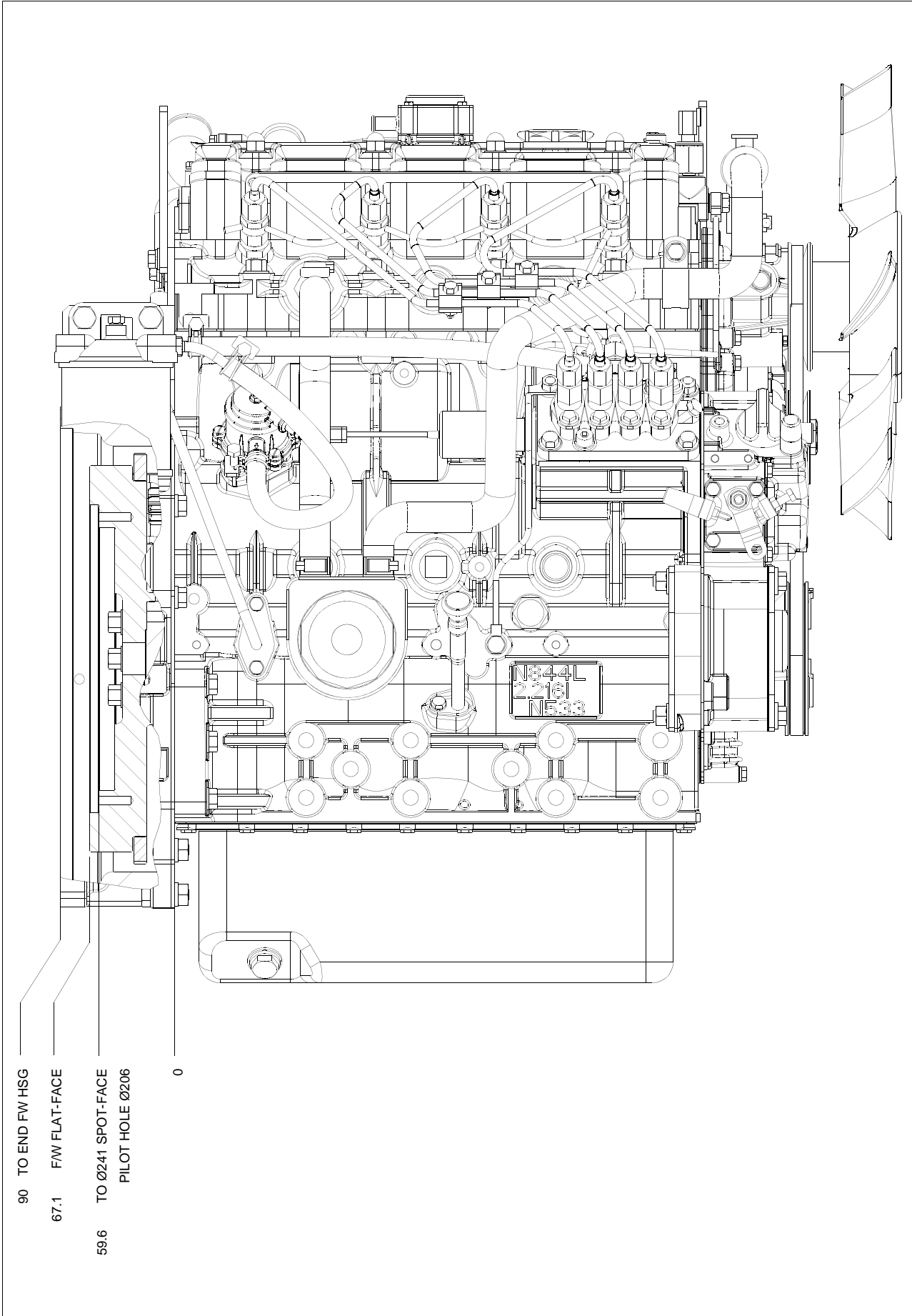
404D-22T/404D-22TA - Left side view



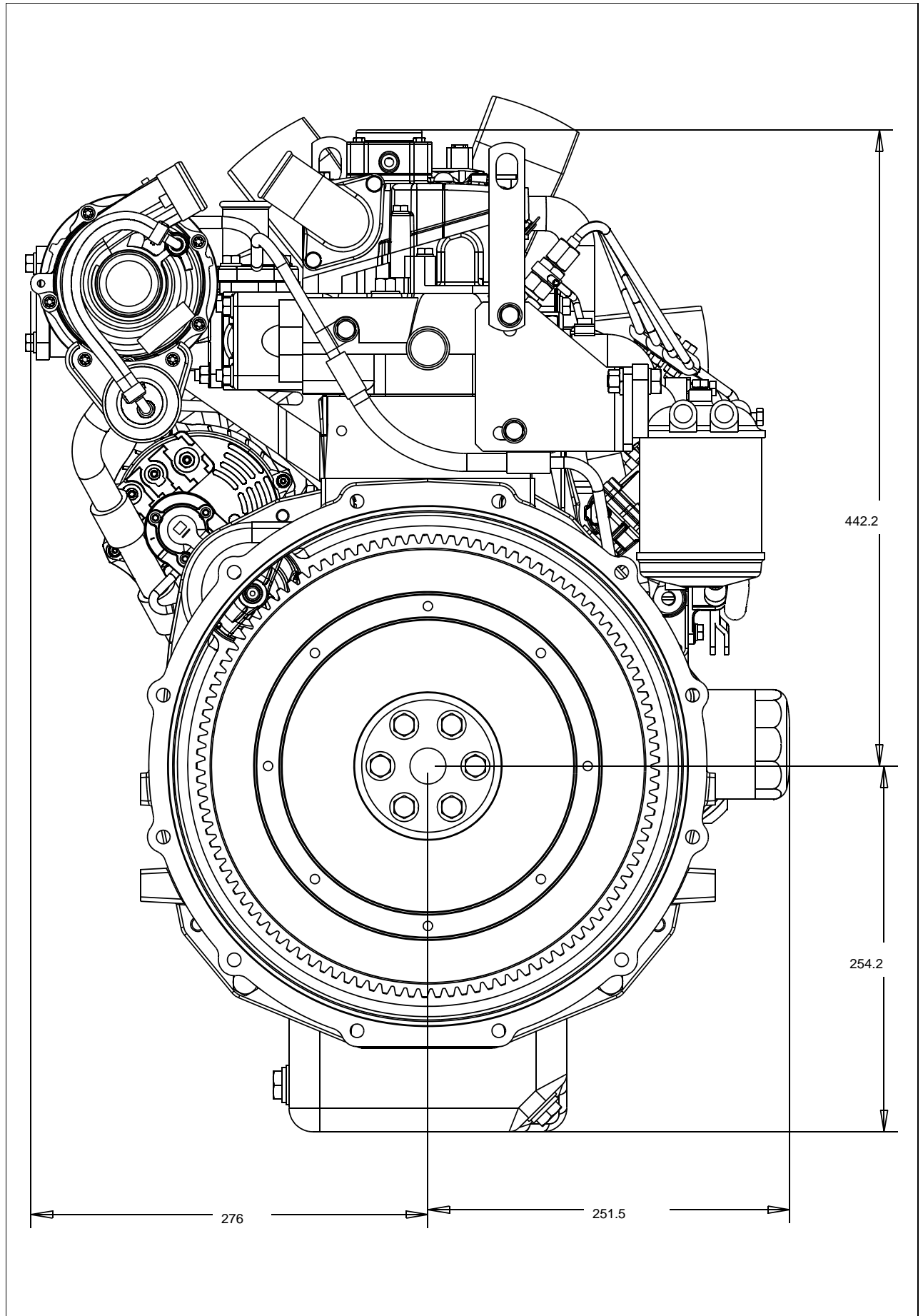
404D-22T/404D-22TA - Front view



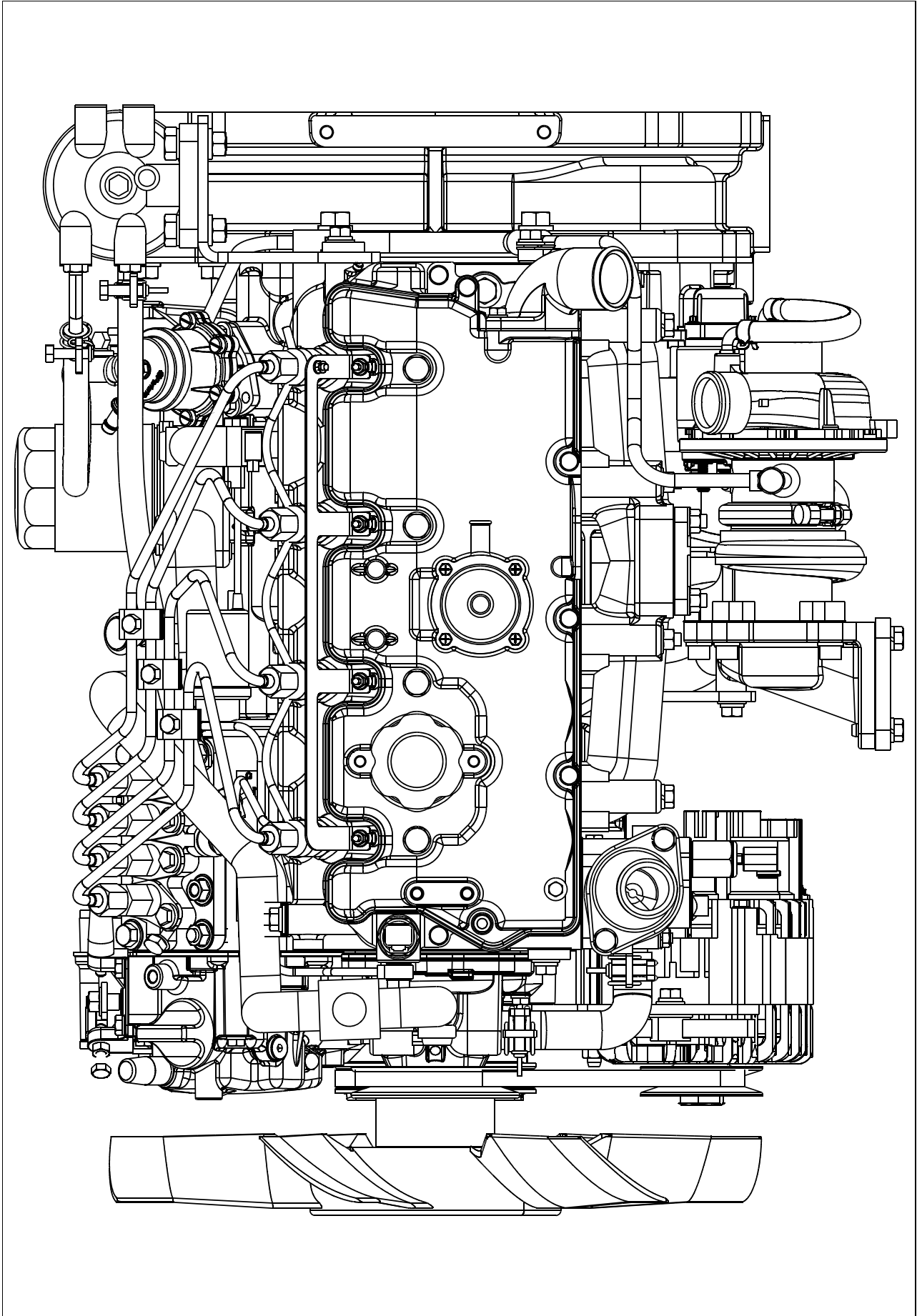
404D-22T/404D-22TA - Right side view



404D-22T/404D-22TA - Rear view



404D-22T/404D-22TA - Plan view



4

Options

Engine ratings

402D-05

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm		Maximum torque back-up %	High idle rpm	Option
T3144	8.2	11.0	2800	29.7	@ 2100	6.1%	3010	AA065
T3148	8.8	11.8	3000	29.7	@ 2400	6.1%	3240	AA066
T3150	10.2	13.7	3600	29.7	@ 2400	9.6%	3800	AA067

403D-07

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm		Maximum torque back-up %	High idle rpm	Option
T3138	12.2	16.4	2800	44.5	@ 2200	7.0%	3010	AA058
T3142	13.2	17.7	3000	44.5	@ 2200	6.0%	3225	AA059
T3574	9.0	12.1	2200	43.0	@ 1800	10.0%	2450	AA077
T3686	14.5	19.4	3400	46.5	@ 2400	14.2%	3650	AA080
T3146	15.3	20.5	3600	44.5	@ 2200	9.6%	3890	AA060

403D-11

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm		Maximum torque back-up %	High idle rpm	Option

403D-11(derate)

T3114	13.7	18.4	2200	62.1	@ 2000	4.4%	2415	AA049
T3116	16.8	22.6	2800	62.1	@ 2000	8.4%	3025	AA050
T3120	17.7	23.7	3000	63.4	@ 2000	33.1%		AA051

403D-11

T3110	14.7	19.7	2200	66.8	@ 1900	4.7%	2415	AA044
T3536	16.1	21.6	2400	66.9	@ 2000	4.4%	2615	AA072
T3118	17.3	23.2	2600	66.8	@ 1900	5.7%	2810	AA045
T3122	18.5	24.8	2800	66.8	@ 1900	5.9%	3025	AA046
T3124	19.7	26.4	3000	66.8	@ 1900	6.5%	3240	AA047
T3156	21.0	28.2	3400	70.2	@ 2300	19.0%	3675	AA048

403D-15, 403D-15T

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm		Maximum torque back-up %	High idle rpm	Option

403D-15

T3570	20.9	28	2200	96	@ 1800	5.8%	2415	AA036
T3092	22.3	23.9	2400	96	@ 1800	8.2%	2615	AA037
T3094	23.4	31.4	2600	96	@ 1800	11.8%	2810	AA038
T3096	24.4	32.7	2800	96	@ 1800	15.4%	3020	AA039
TBA	18.4	24.7	2100	95	@ 1800	14.7%	2310	AA101
T3570	20.9	28.0	2100	95	@ 1800	5.8%	2415	AA036
T3098	25.1	33.7	3000	96	@ 1800	20.2%	3240	AA040

403D-15T

T3100	23.1	31	2415	111.9	@ 1800	11.6%	2380	AA031
T3102	25.2	33.8	2615	111.9	@ 1800	11.6%	2600	AA032
T3104	27.3	36.6	2600	111.9	@ 1800	11.6%	2810	AA033
T3106	29.4	39.4	2800	111.4	@ 1800	11.1%	3025	AA034

T3108	30.0	40.2	3000	111.9 @ 1800	17.2%	3240	AA035
-------	------	------	------	--------------	-------	------	-------

403D-17

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm	Maximum torque back-up %	High idle rpm	Option
T3578	23.6	31.6	2600	105.0 @ 1800	11.8%	2592	AA075
T3580	26.1	35.0	2810	106.0 @ 1800	10.4%	2808	AA076

404D-15

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm	Maximum torque back-up %	High idle rpm	Option
T3086	24.6	33.0	2800	94.4 @ 1800	12.5%	2982	AA028
T3088	26.5	35.5	3000	94.4 @ 1800	11.8%	3180	AA029

404D-22, 404D-22, 404D-22

Curve	Rating kW (bhp)		Speed rpm	Maximum torque Nm @ rpm	Maximum torque back-up %	High idle rpm	Option
-------	-----------------	--	-----------	-------------------------	--------------------------	---------------	--------

404D-22 (derate)

T3538	31.4	42.1	2600	130 @ 1800	12.7%	2810	AA073
T3172	32.8	43.9	2800	130 @ 1800	16.2%	3025	AA016
T3570	36.3	48.7	2800	140 @ 1800	13.1%	3025	AA078

404D-22 (balanced)

T3179	35.4	47.5	2600	142.9 @ 1800	9.8%	2810	AA018
-------	------	------	------	--------------	------	------	-------

404D-22

T3128	31.0	41.6	2200	142.7 @ 1800	6.0%	2380	AA011
T3130	34.1	45.7	2400	142.7 @ 1800	5.2%	2590	AA012
T3132	35.7	47.9	2600	142.7 @ 1800	8.8%	2810	AA013
T3134	37.3	50.0	2800	142.7 @ 1800	12.2%	3025	AA014
T3136	38.0	51.0	3000	142.7 @ 1800	17.9%	3240	AA015

404D-22T (balanced)

T3183	41.4	55.7	2600	185 @ 1800	21.6%	2820	AA087
-------	------	------	------	------------	-------	------	-------

404D-22T (derate)

T3572	36.3	48.7	2800	154 @ 1800	24.4%	3025	AA091
-------	------	------	------	------------	-------	------	-------

404D-22T

T3186	40.0	53.4	2600	189 @ 1800	29.4%	2810	AA080
T3184	43.0	57.7	2600	189 @ 1800	19.5%	2810	AA089
T3140	44.7	60.0	2800	189.1 @ 1800	24.1%	3025	AA086
T2980	45.5	61.0	3000	189.1 @ 1800	30.6%	3240	AA083

404D-22TA

T3126	49.3	66.1	2800	208.4 @ 1800	24.0%	3025	AA090
-------	------	------	------	--------------	-------	------	-------

Caution: *The idle speed, maximum speed or maximum fuel settings must not be changed by the operator. If they are, the engine and/or transmission may be damaged. If it is necessary to change any of these settings, this must be done by a Perkins distributor who has the necessary specialist equipment required for this purpose. The warranty of an engine will be affected if the seals for the setting screws on the timing case have been broken by persons not authorised by Perkins.*

Notes:

- All ratings to ISO/TR 14396 \pm 5%.
- High idle tolerance \pm 10 rpm (bare engine).
- Minimum low idle speed 800 rpm \pm 25 rpm.
- The engine ratings listed in the tables above, conform to USA Tier 3+ and EC stage IIIA emissions and Japanese MLIT Step 3 legislation for off-road applications.
- All engines will be built to the rated speeds specified for that rating. Subsequently the rated speed of those engines must not be adjusted.
- The naturally aspirated engine will run correctly up to an altitude of 600 m (2000 ft). If the engine is to operate at an altitude above this, an increase in smoke may be seen. This is normal for a naturally aspirated engine.
- Turbocharged engines have been developed to operate up to an altitude of 3000 m (9842 ft). Contact Perkins Applications Department if the engine is to operate above this height.
- All ratings to \pm 5% tolerance.
- For power curves see chapter 6, page 228.
- Some of the above ratings are being developed, please discuss availability with your Perkins sales representative or access the Perkins Intranet and view product world.

Labels

Engine type	Description	Option
All models	Perkins labels ⁽¹⁾	AL001

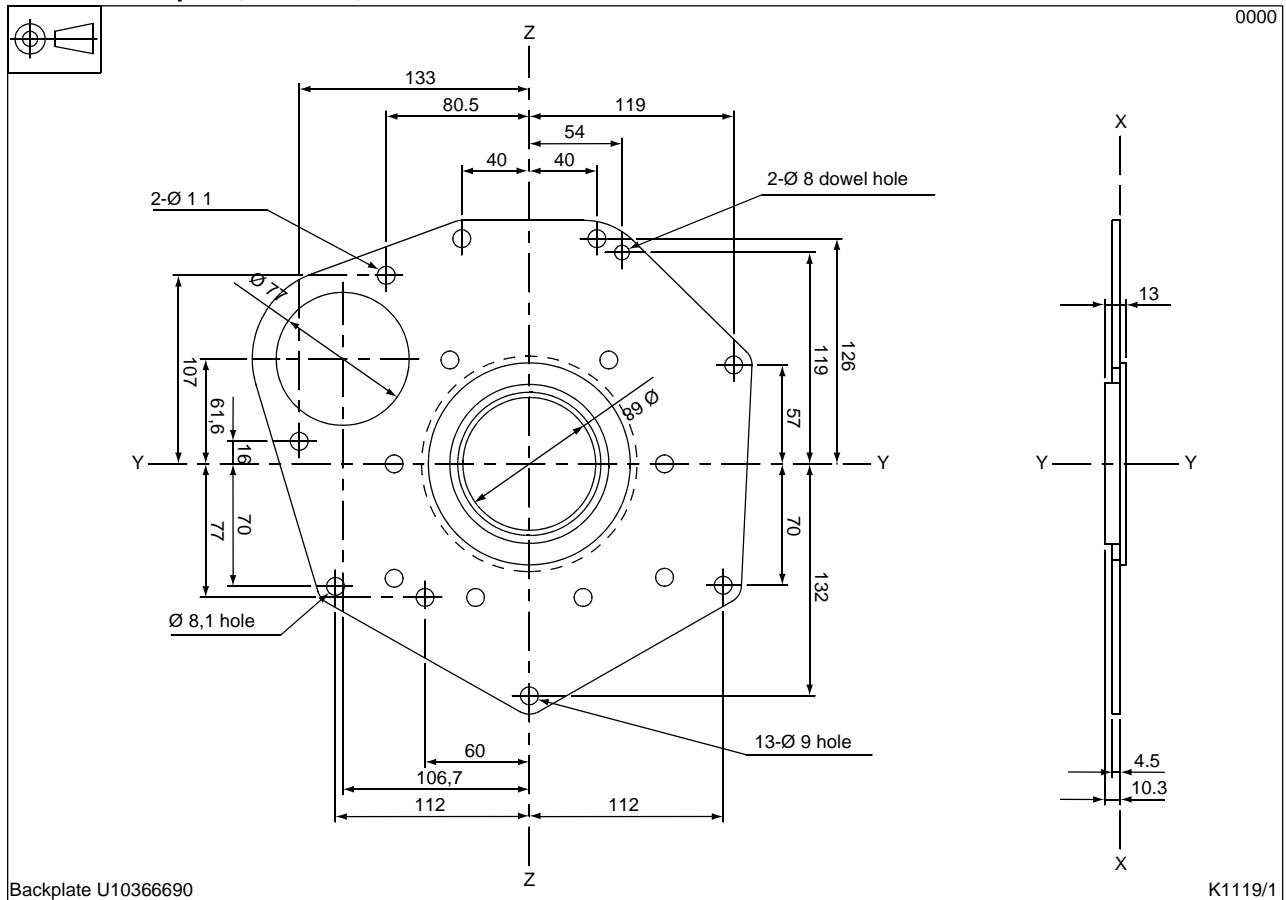
1. Includes serial plate.

AL001 - Perkins label

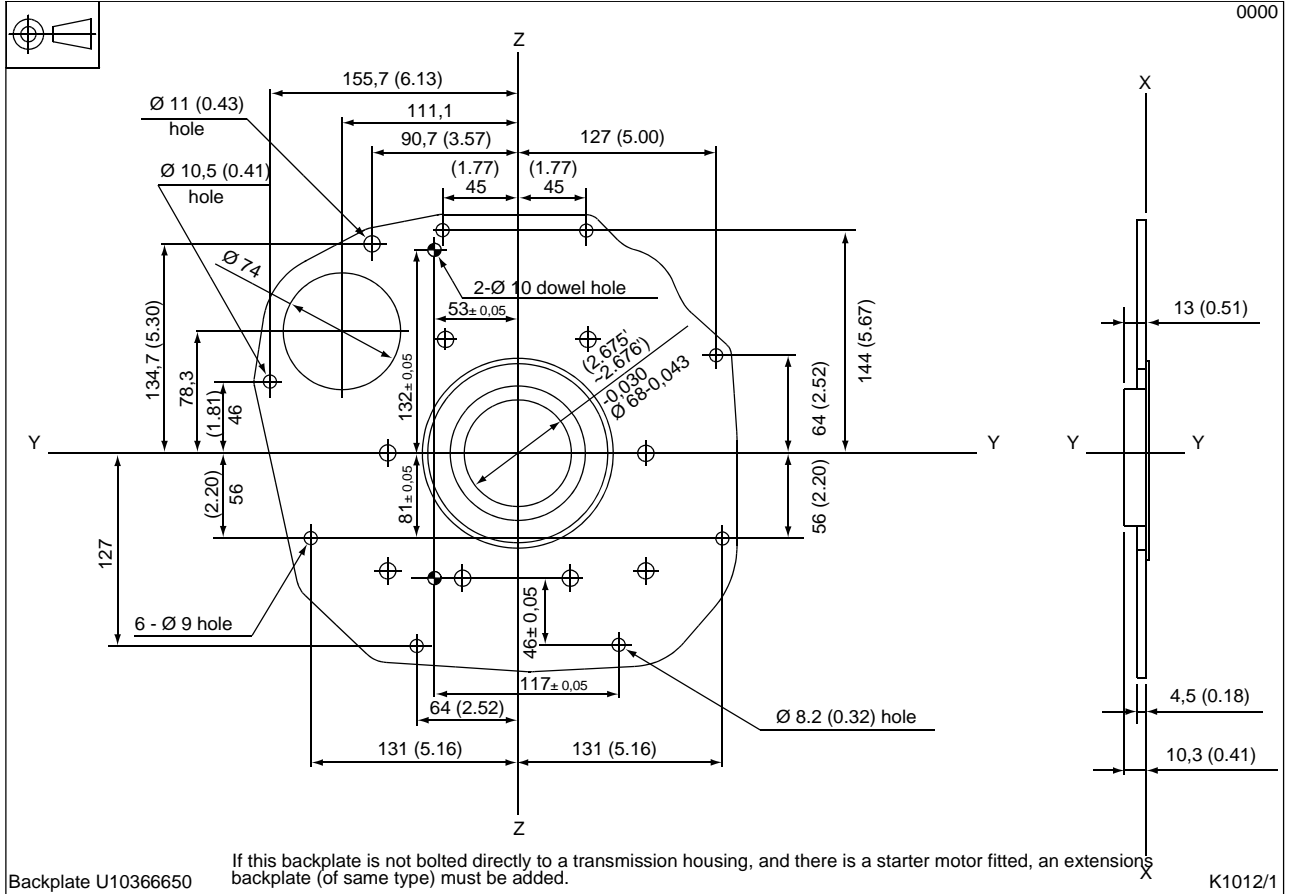
Flywheel housing

Engine type	Description	Option
All models	Backplate	CD001
403D-11 404D-22 404D-22T 404D-22TA	Double backplate	CD002
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Flywheel housing (short) SAE 4	CD003
402D-05 403D-07 403D-11 404D-15	Flywheel housing (short) SAE 5	CD003
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Flywheel housing (long) SAE 4	CD004
402D-05 403D-07 403D-11 404D-15	Flywheel housing (long) SAE 5	CD004

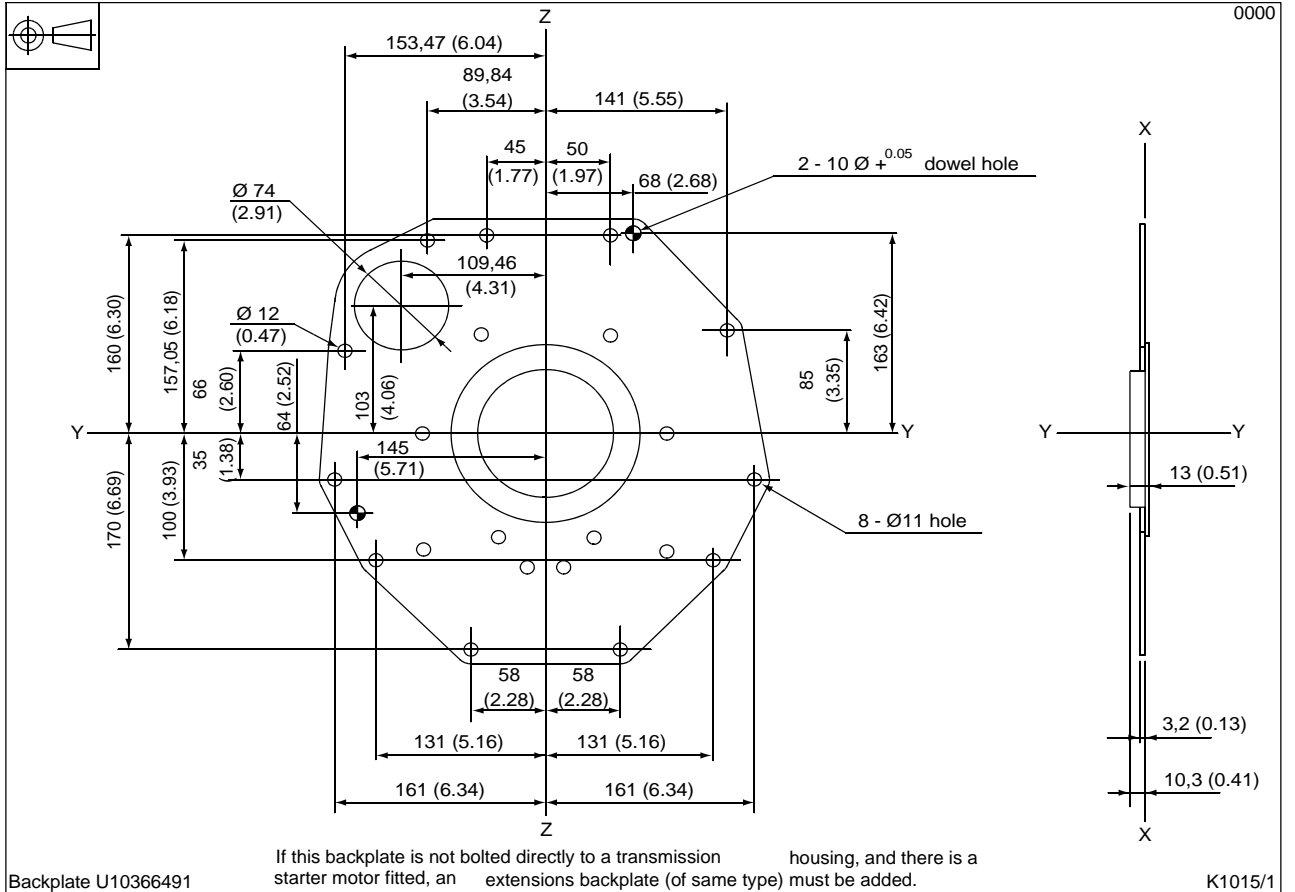
CD001 - Backplate, 402D-05, 403D-07



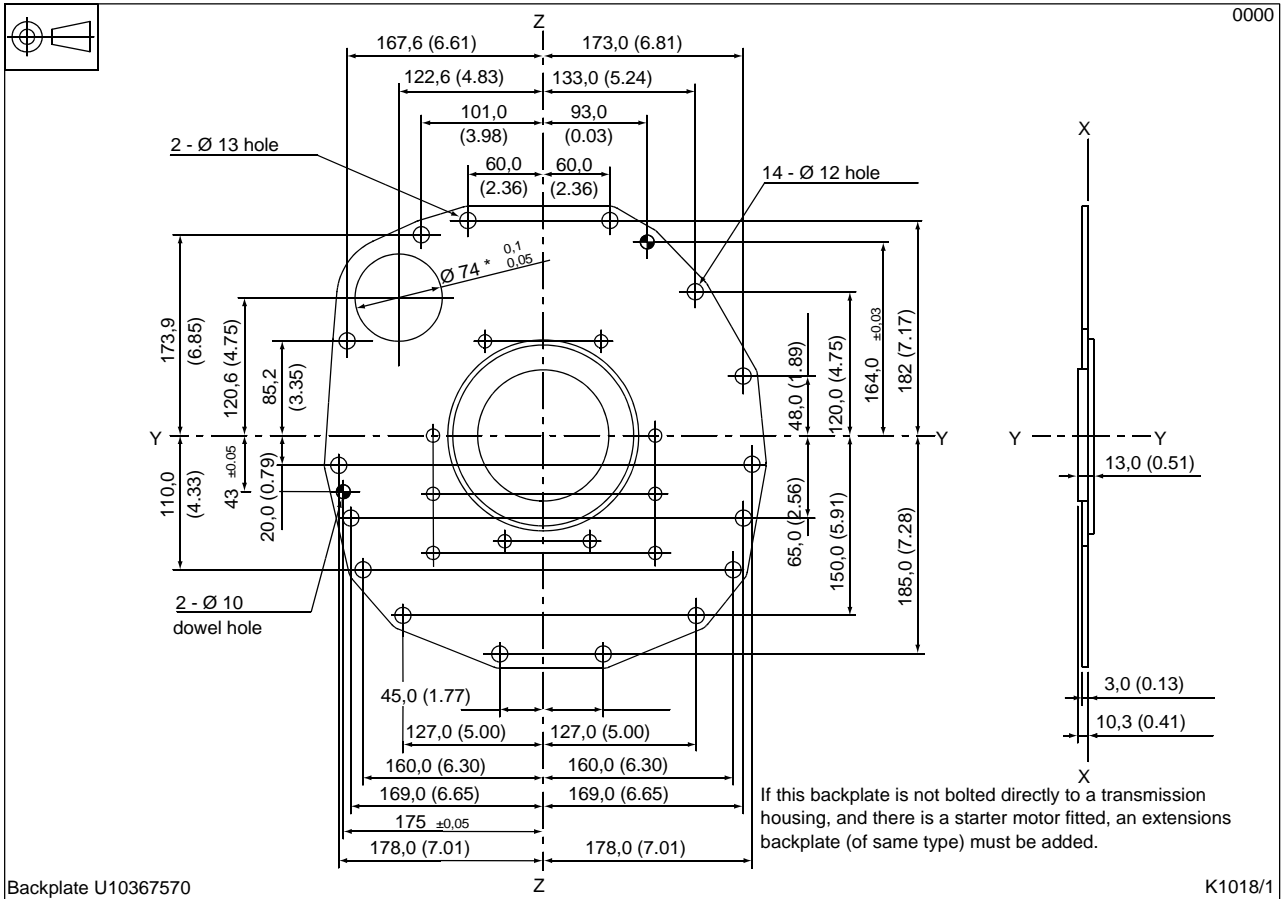
CD001 - Backplate, 403D-11, 404D-15



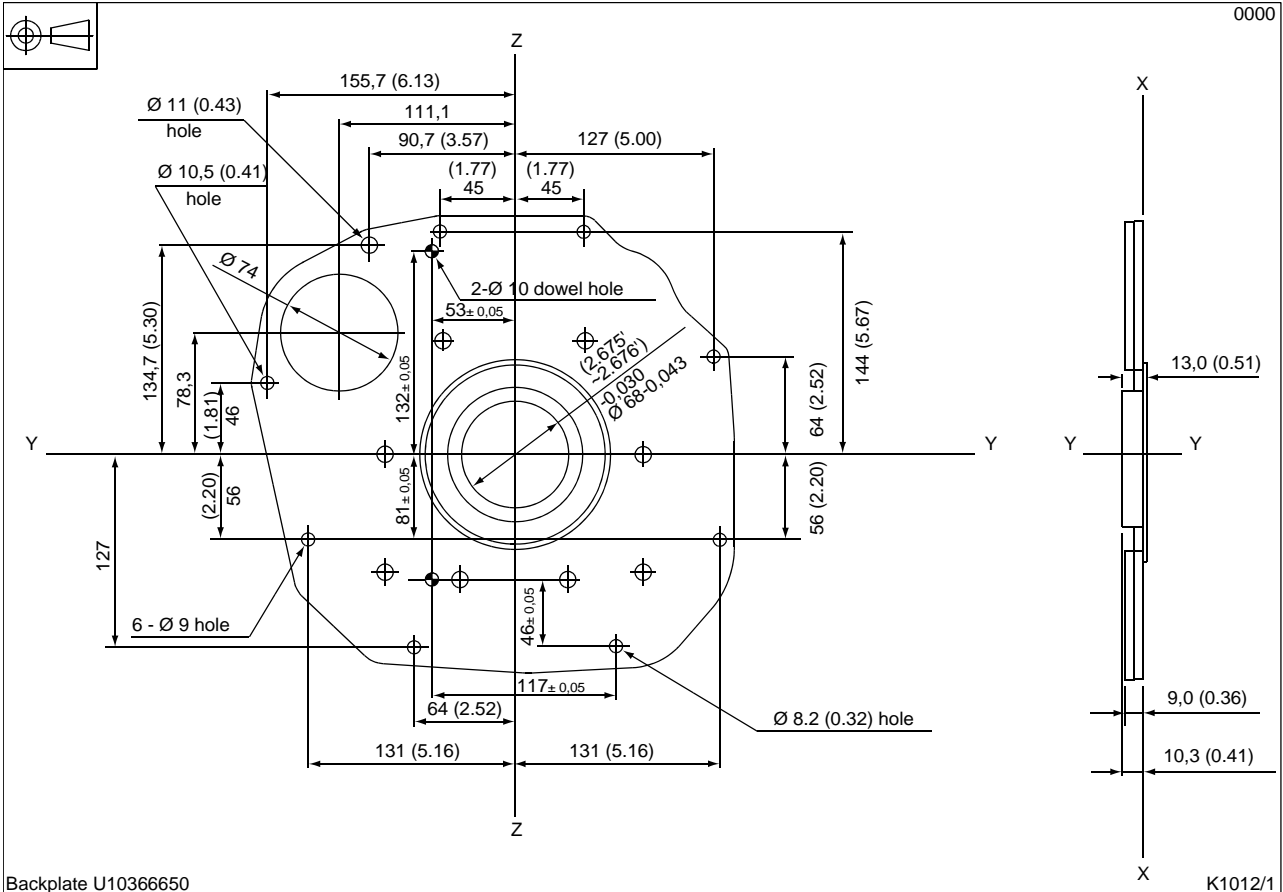
CD001 - Backplate, 403D-15, 403D-15T



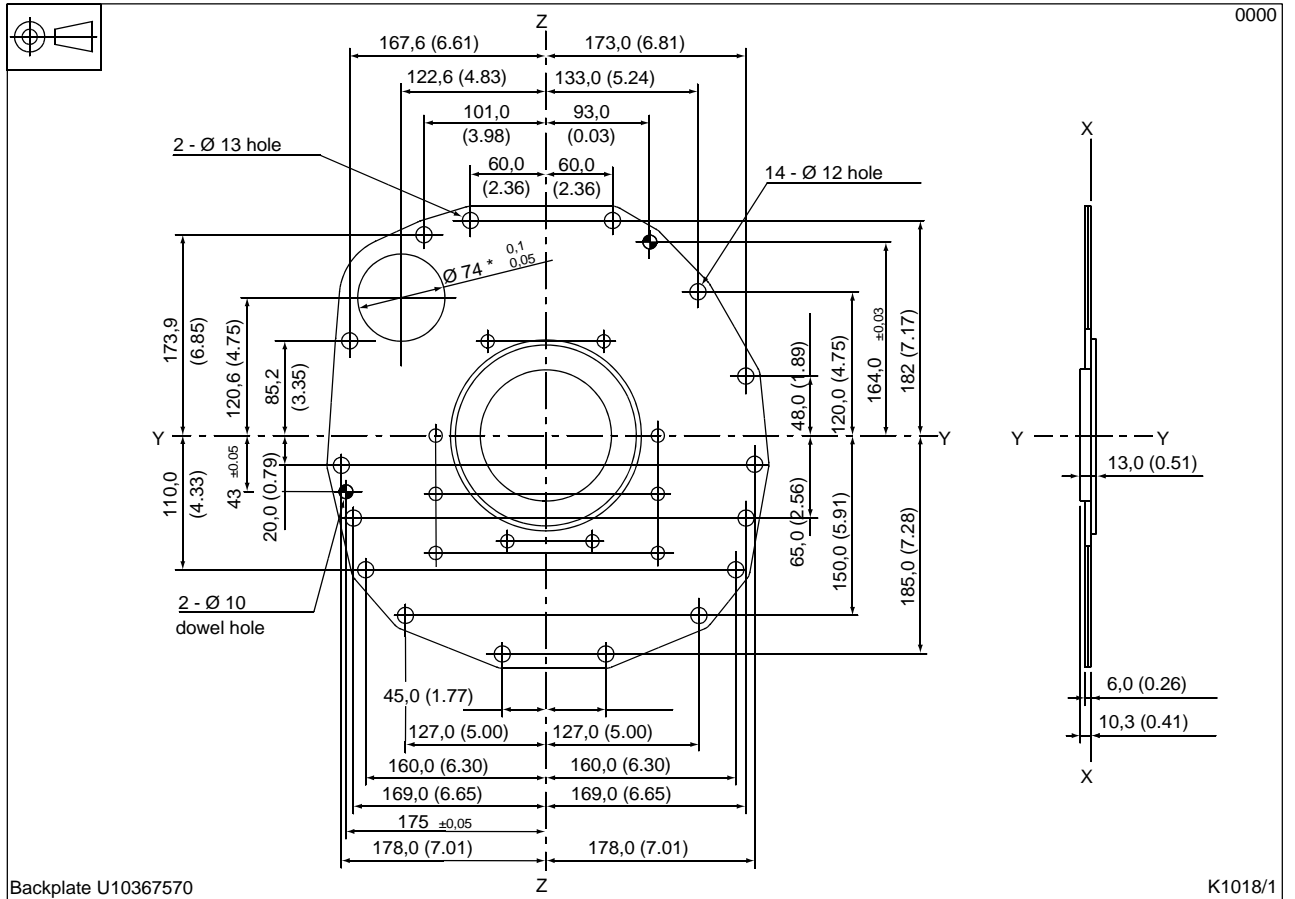
CD001 - Backplate, 404D-22, 404D-22T, 404D-22TA



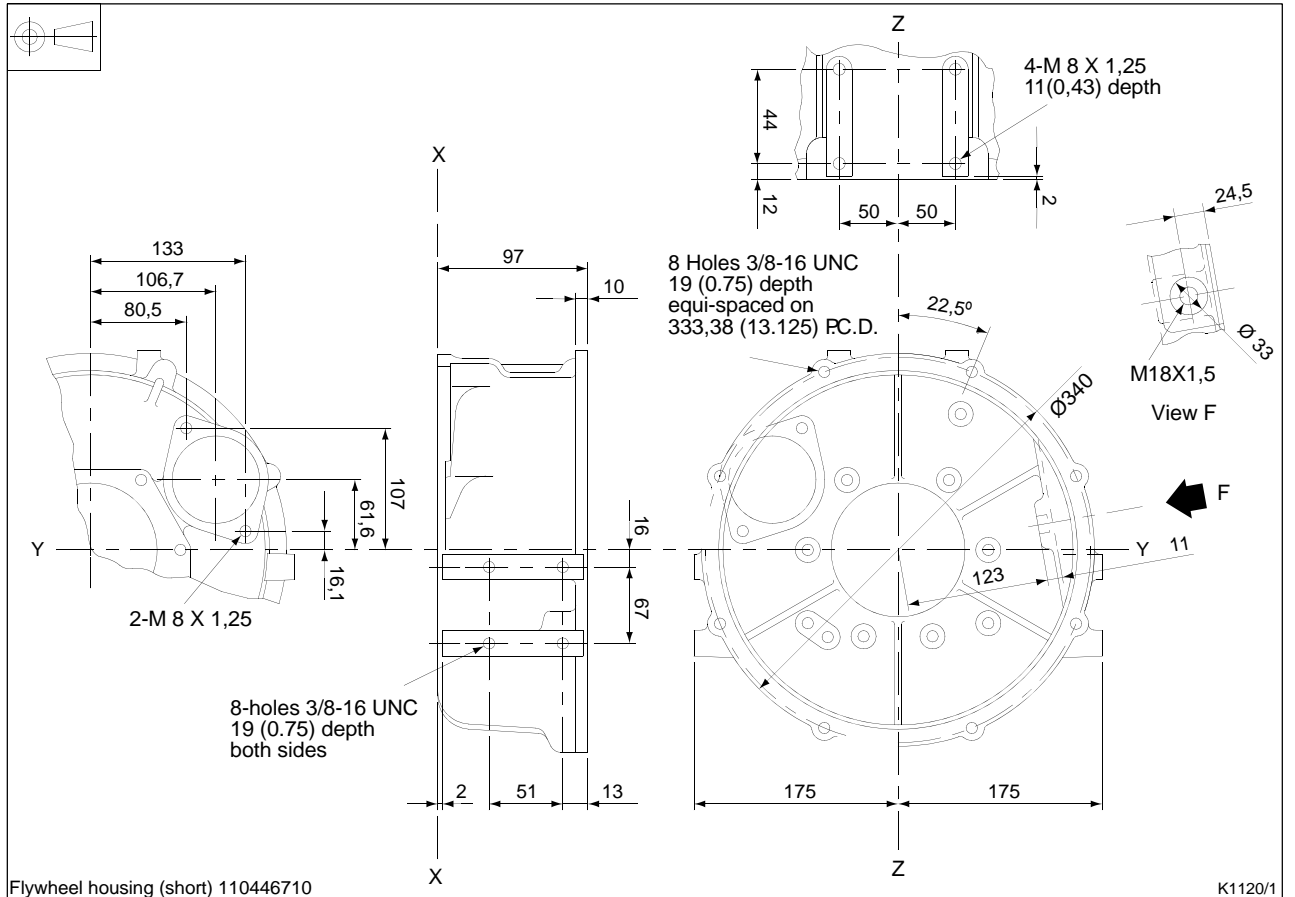
CD002 - Double backplate, 403D-11



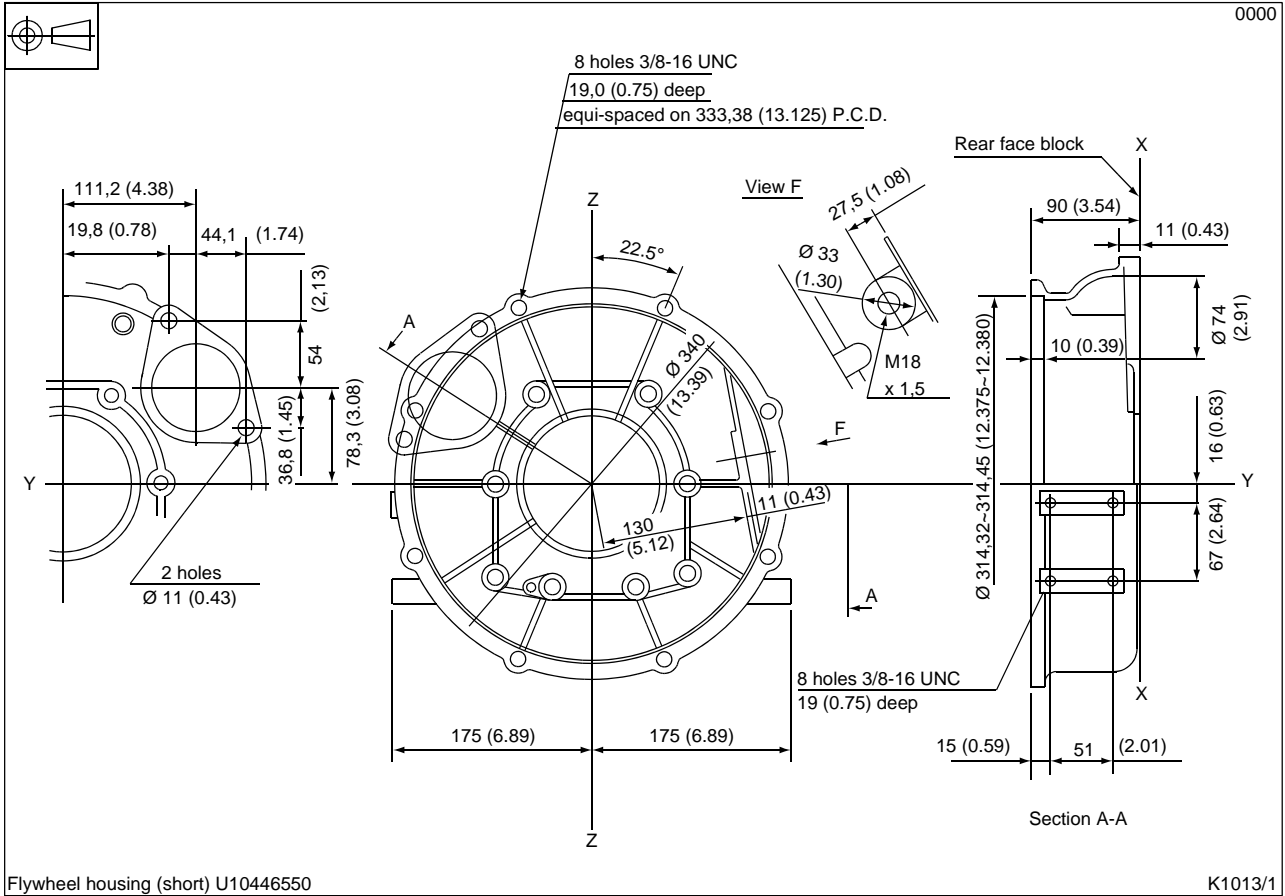
CD002 - Double backplate, 404D-22, 404D-22T, 404D-22TA



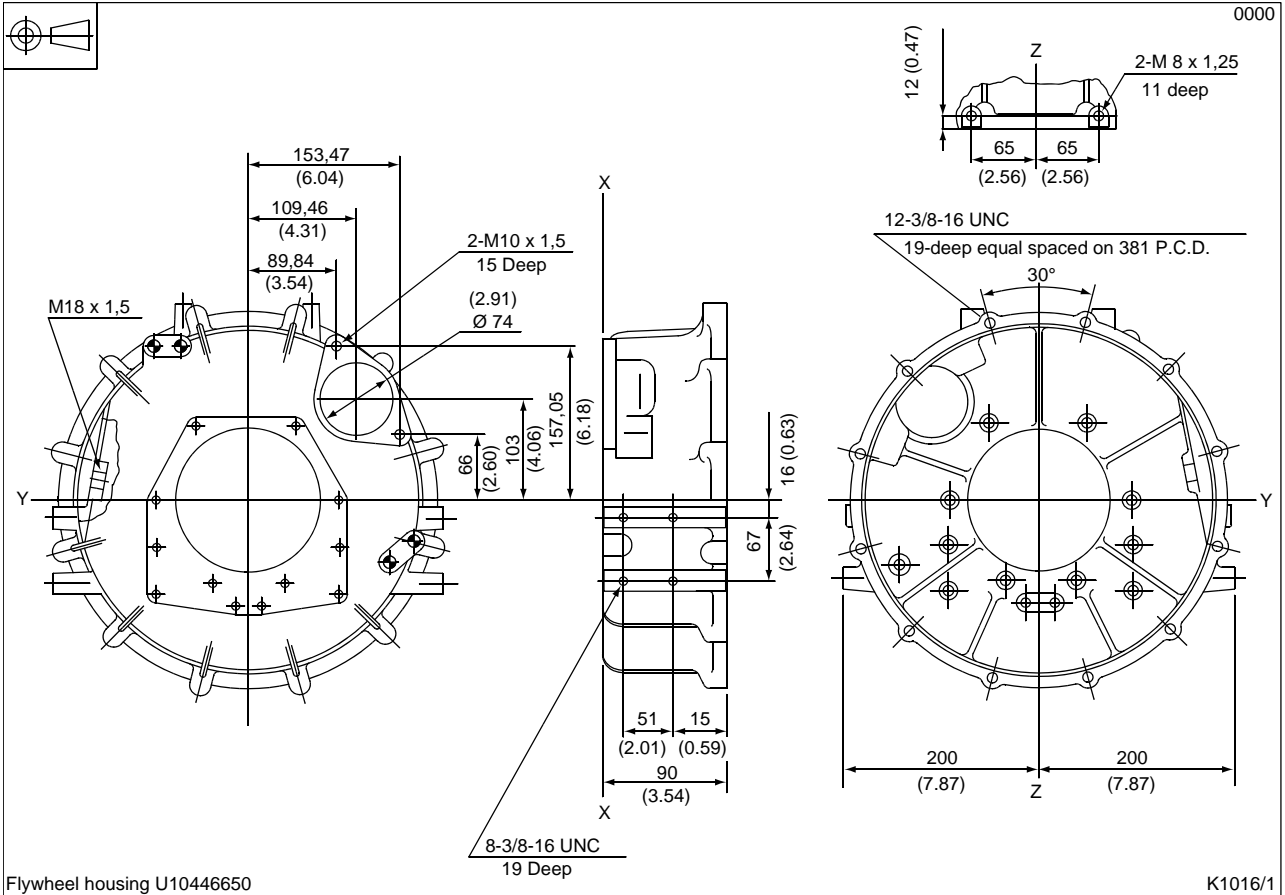
CD003 - Flywheel housing, short, SAE 5, 402D-05, 403D-07



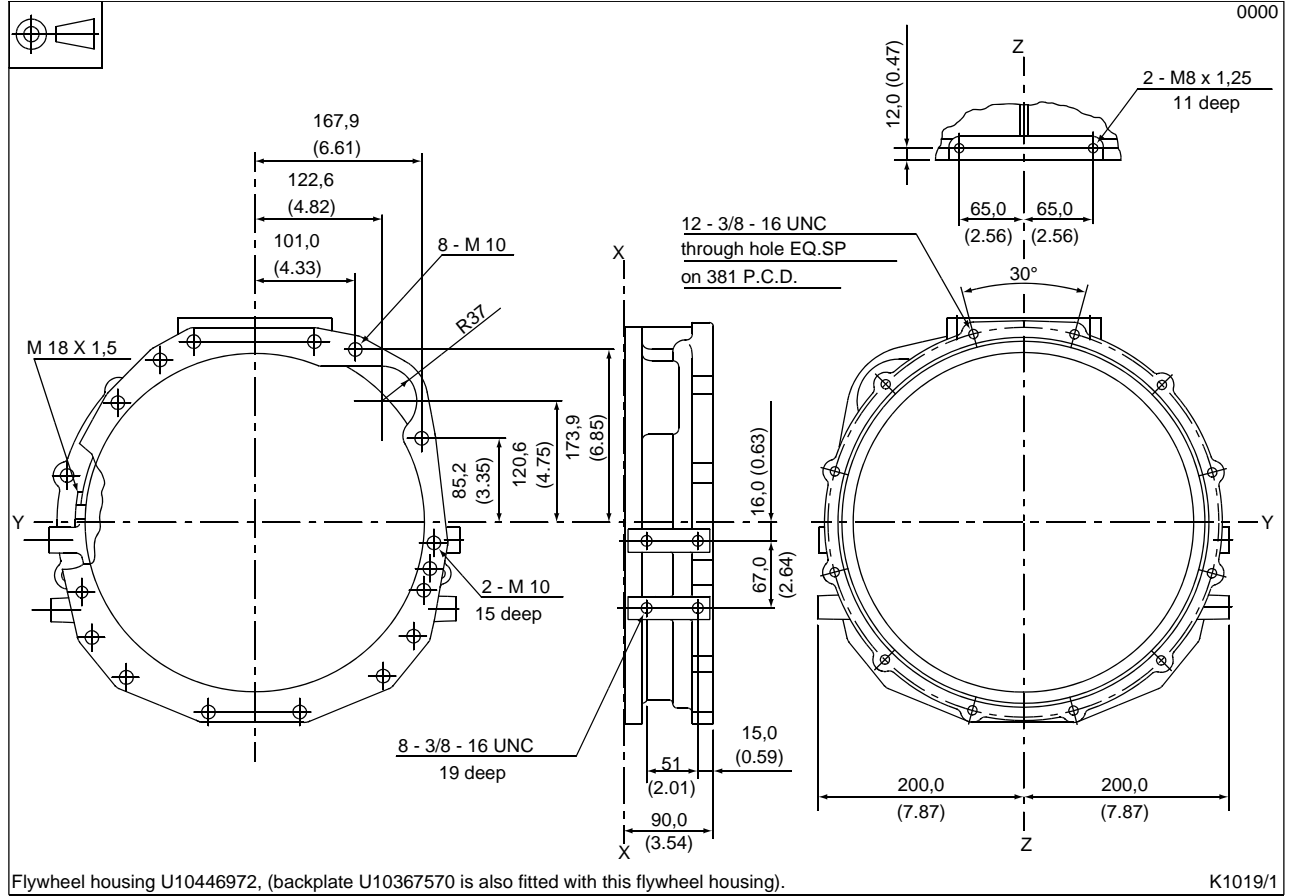
CD003 - Flywheel housing, short, SAE 5, 403D-11, 404D-15



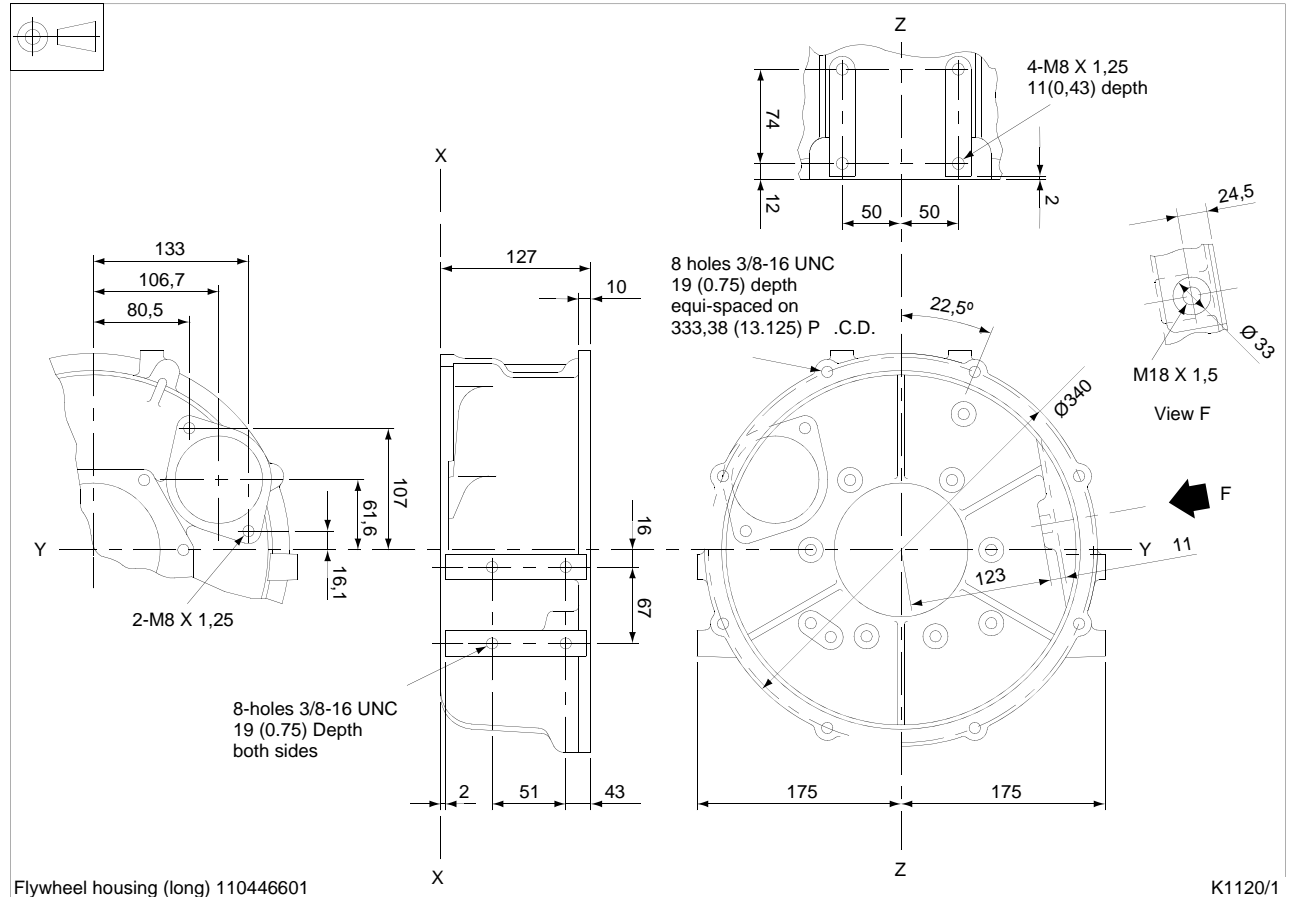
CD003 - Flywheel housing, short, SAE 4, 403D-15, 403D-15T



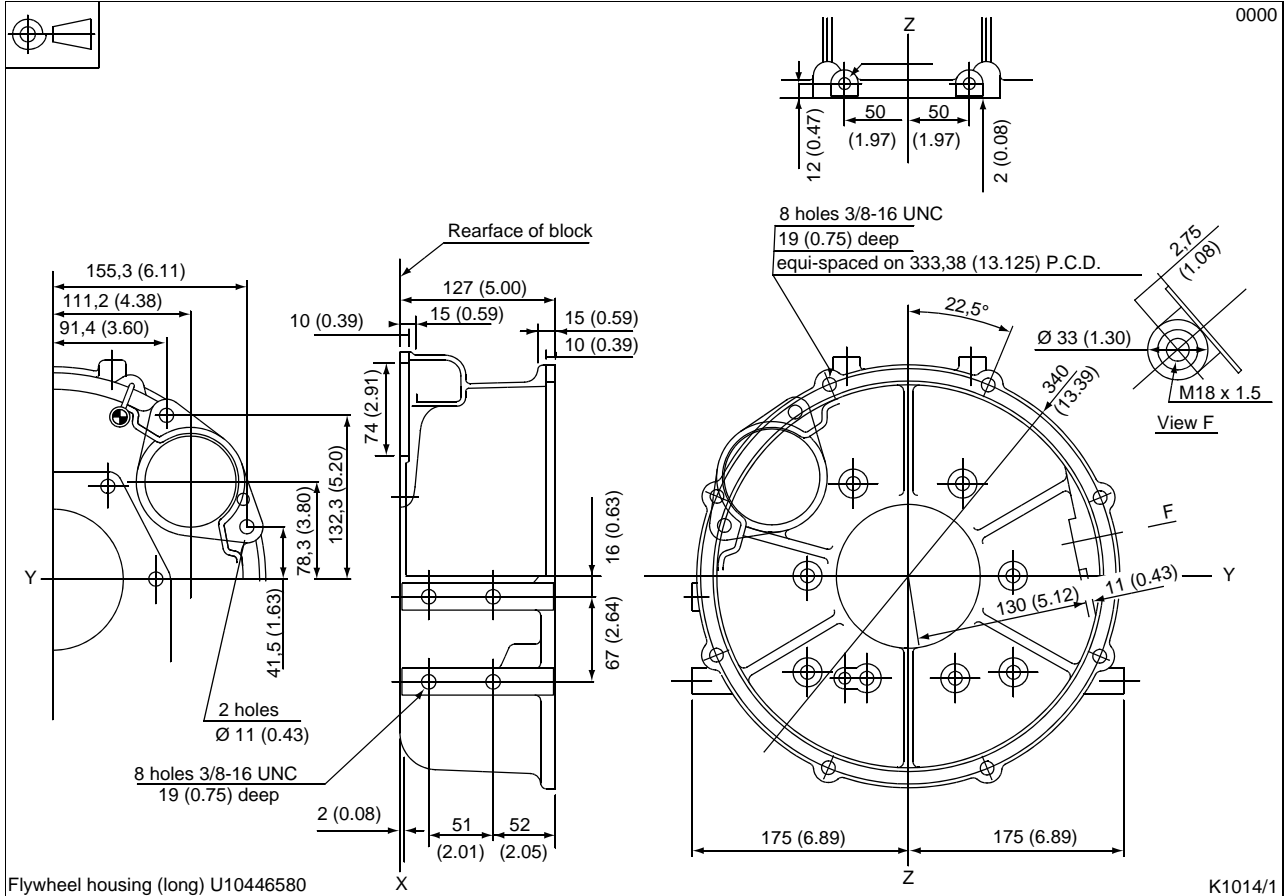
CD003 - Flywheel housing, short, SAE 4, 404D-22, 404D-22T, 404D-22TA



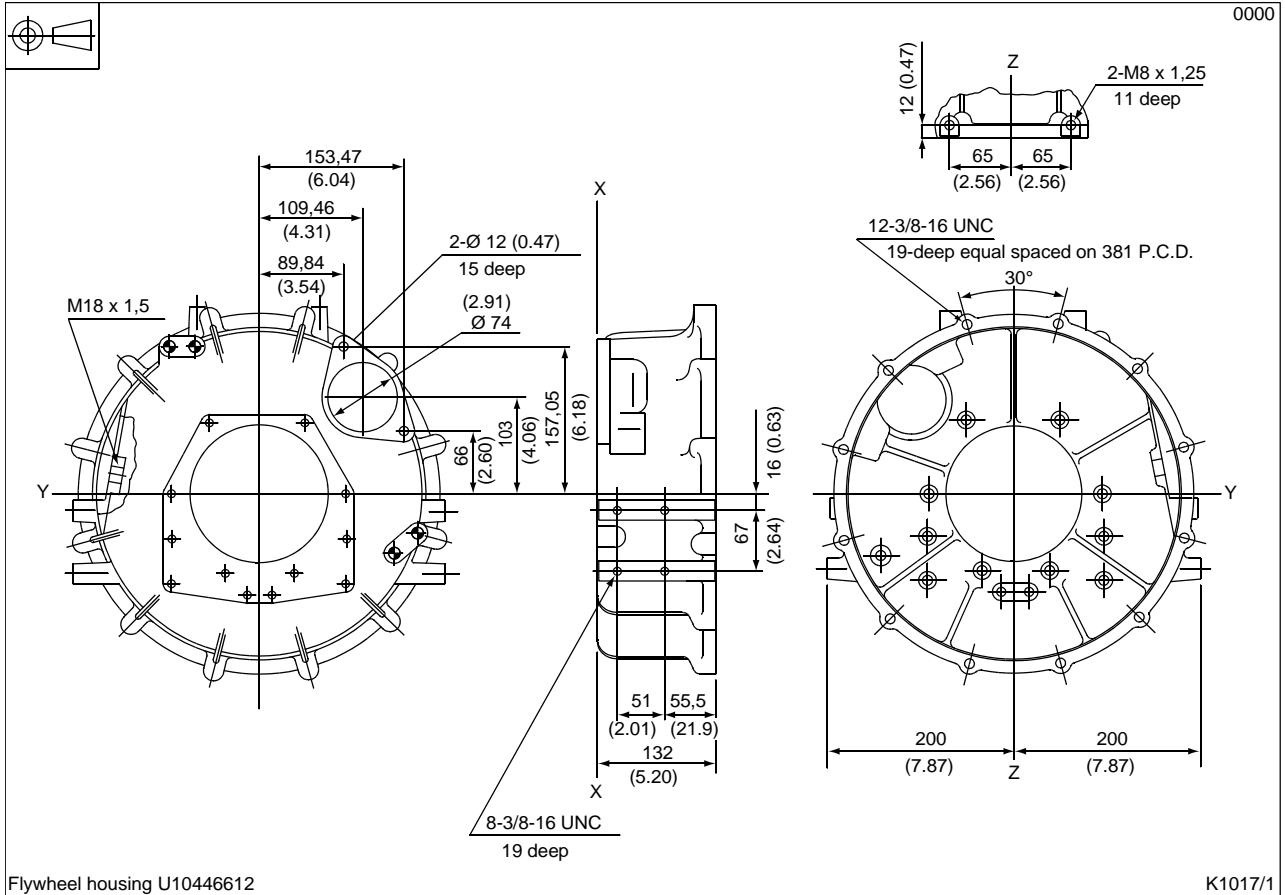
CD004 - Flywheel housing, long, SAE 5, 402D-05, 403D-07



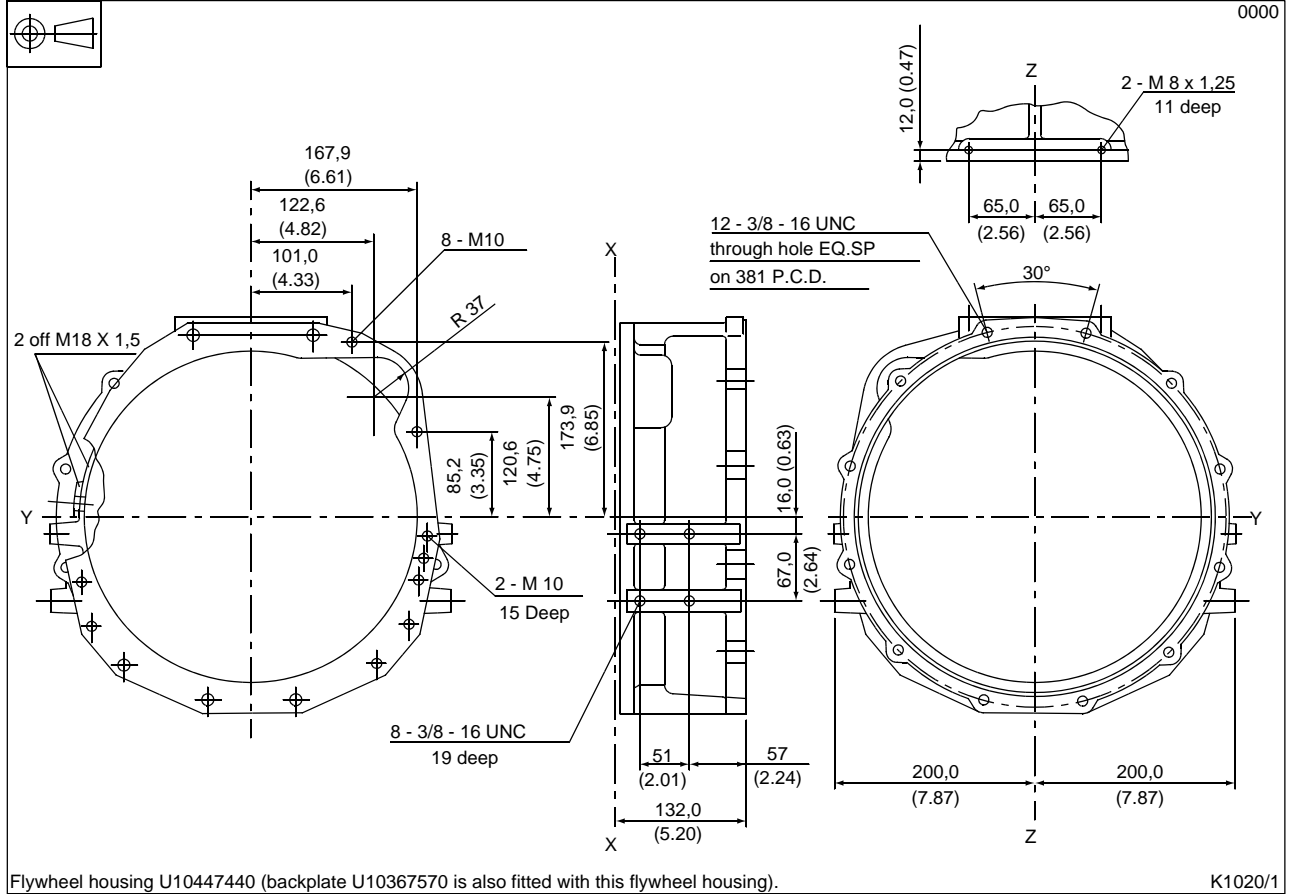
CD004 - Flywheel housing, long, SAE 5, 403D-11, 404D-15



CD004 - Flywheel housing, long, SAE 4, 403D-15, 403D-15T



CD004 - Flywheel housing, long, SAE 4, 404D-22, 404D-22T, 404D-22TA

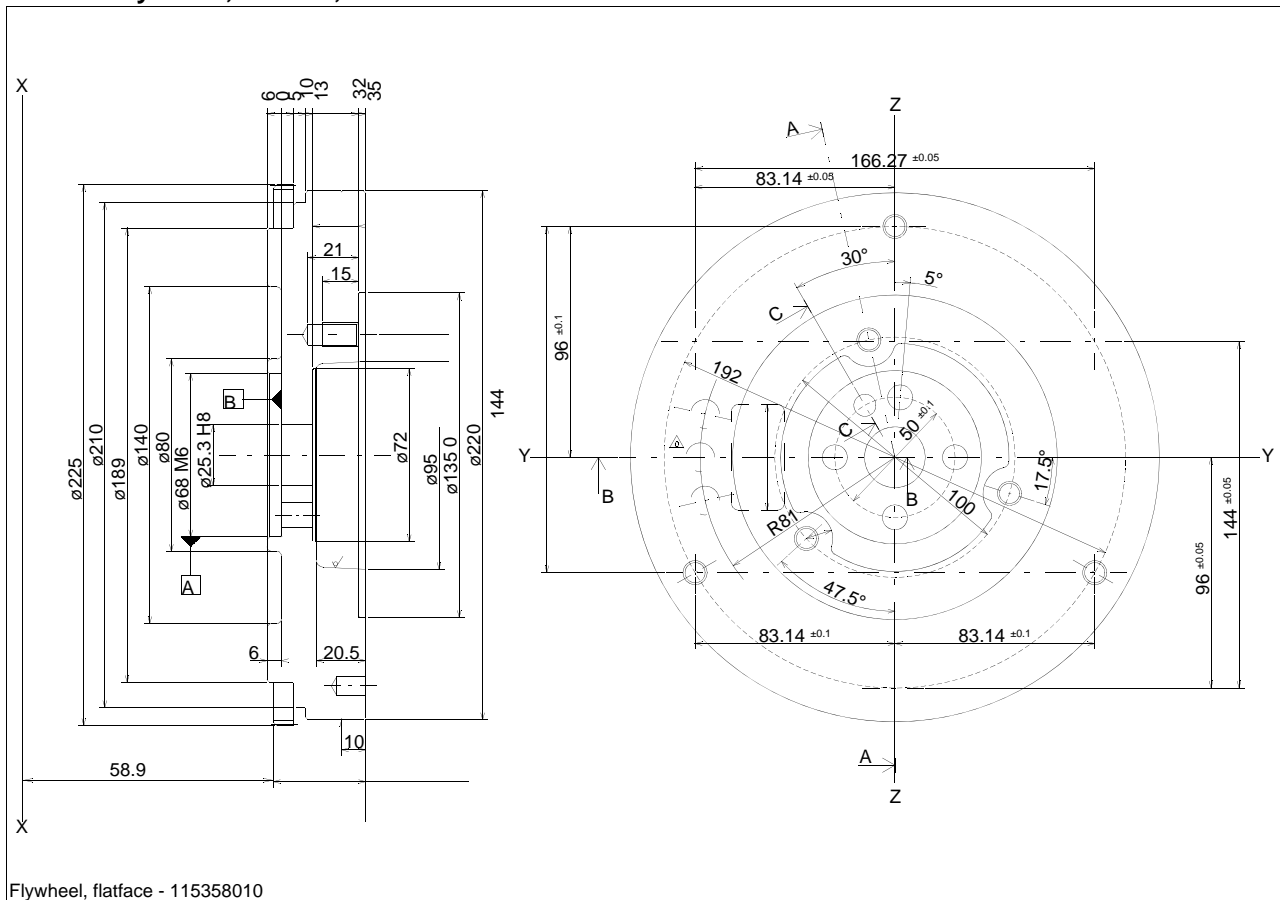


Flywheels

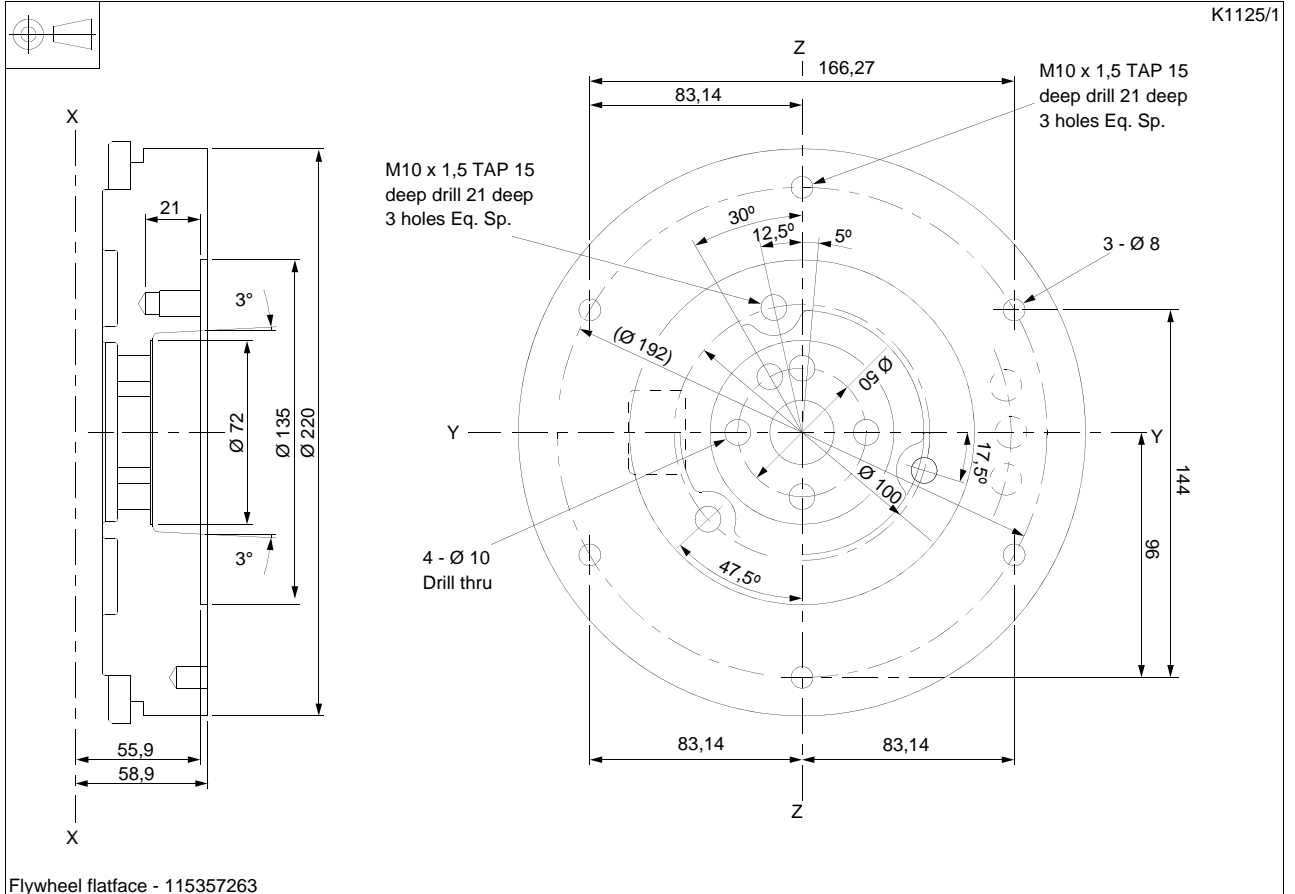
Engine type	Description	Option
All models	Not required (flywheel bolts only)	DD000
	Flywheel, flatface	DD001
402D-05 403D-07 403D-11 404D-15	Flywheel, light (SAE 6½)	DD002
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Flywheel, light (SAE 7½)	DD002
402D-05 403D-07 403D-11 404D-15	Flywheel, heavy (SAE 6½)	DD003
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Flywheel, heavy (SAE 7½)	DD003
404D-22 404D-22T 404D-22TA	Flywheel, (SAE 8/10)	DD004

DD000 - Not required

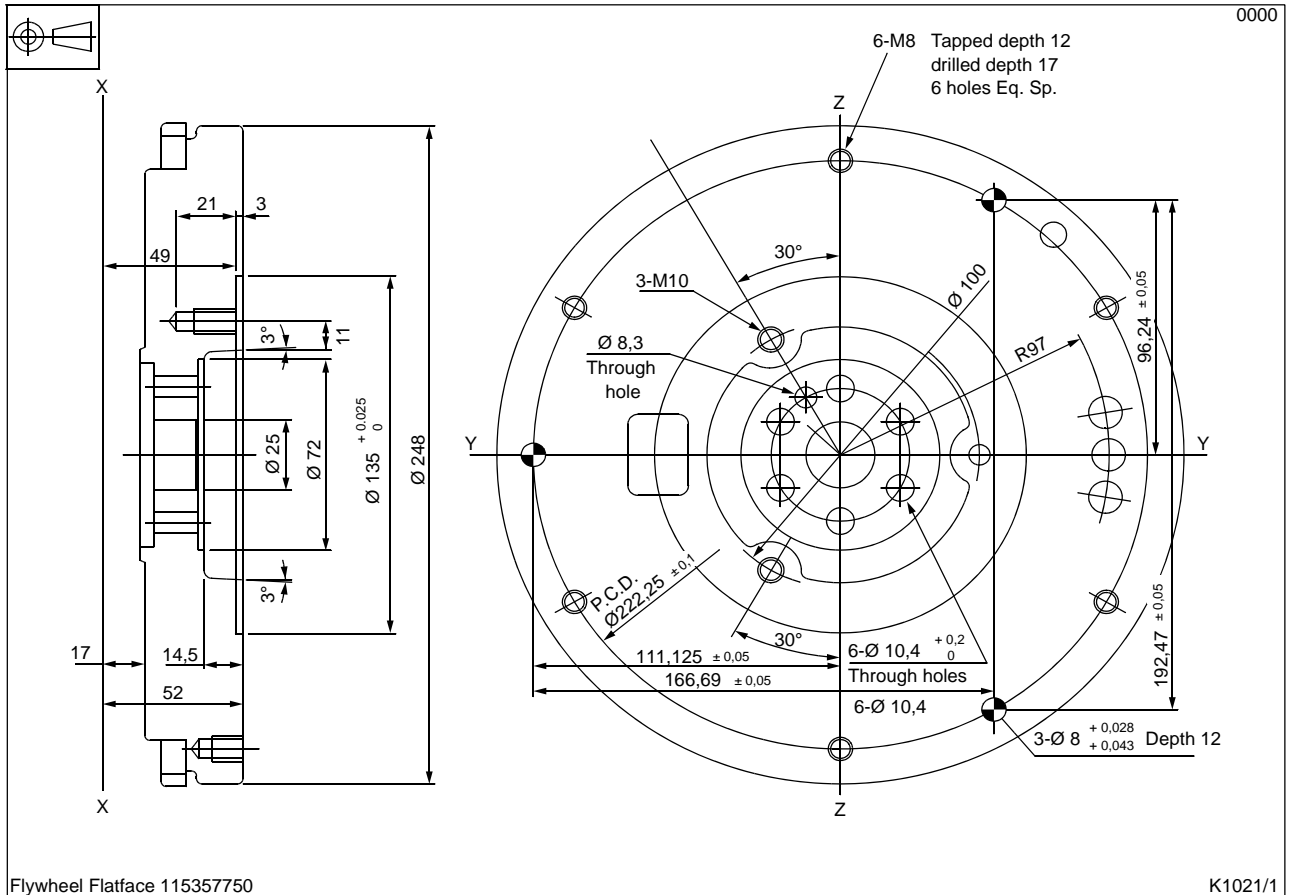
DD001 - Flywheel, flatface, 402D-05



DD001 - Flywheel, flatface, 403D-07

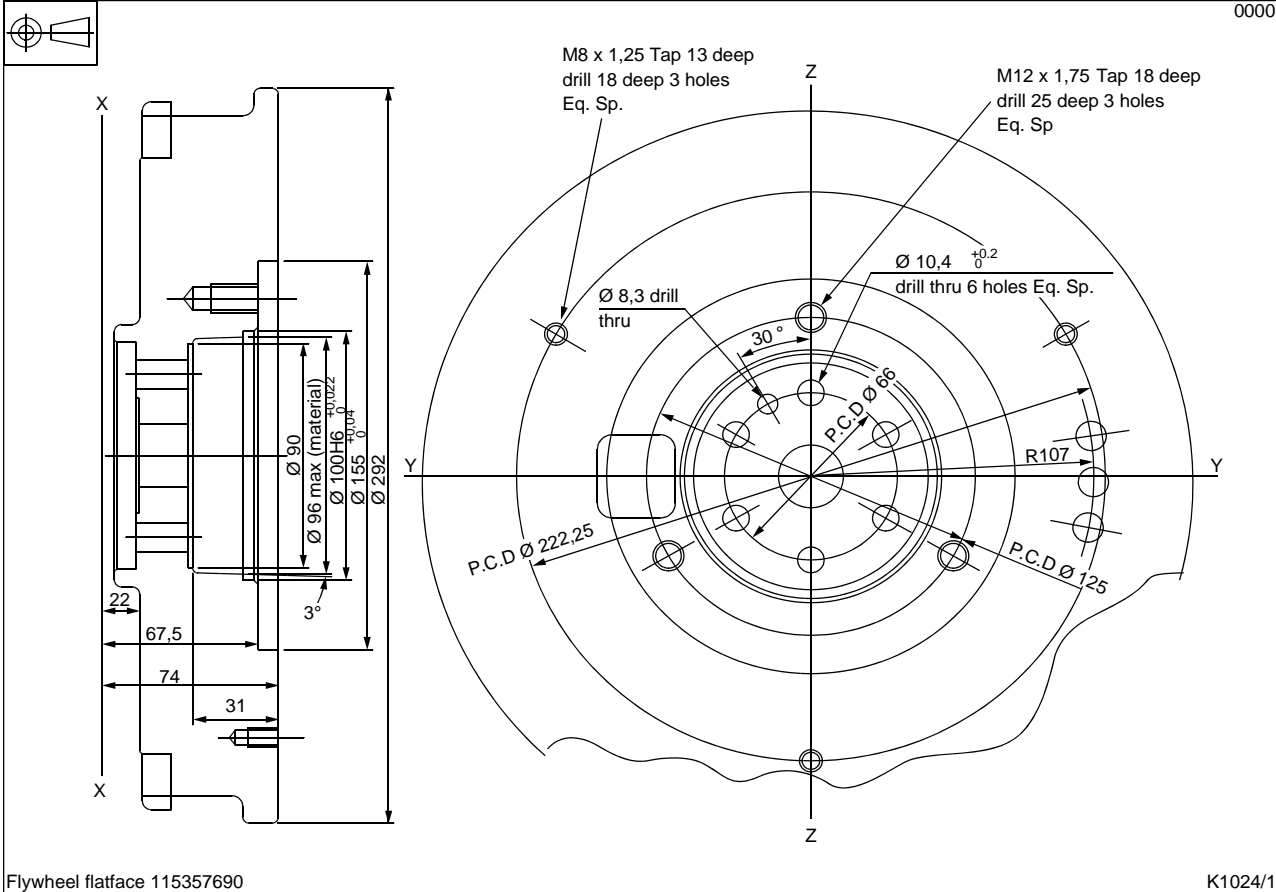


DD001 - Flywheel, flatface, 403D-11



DD001 - Flywheel, flatface, 403D-15, 403D-15T

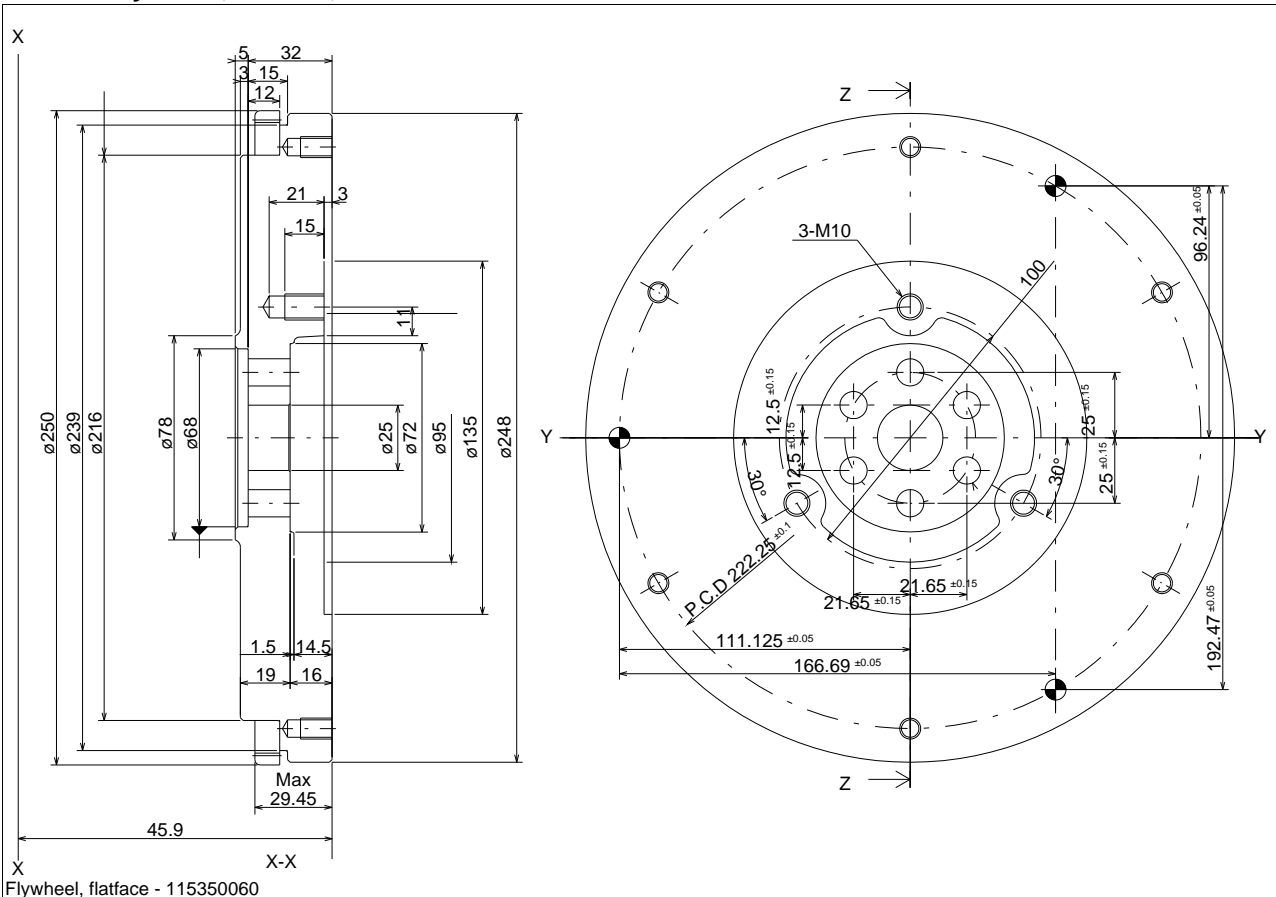
0000



Flywheel flatface 115357690

K1024/1

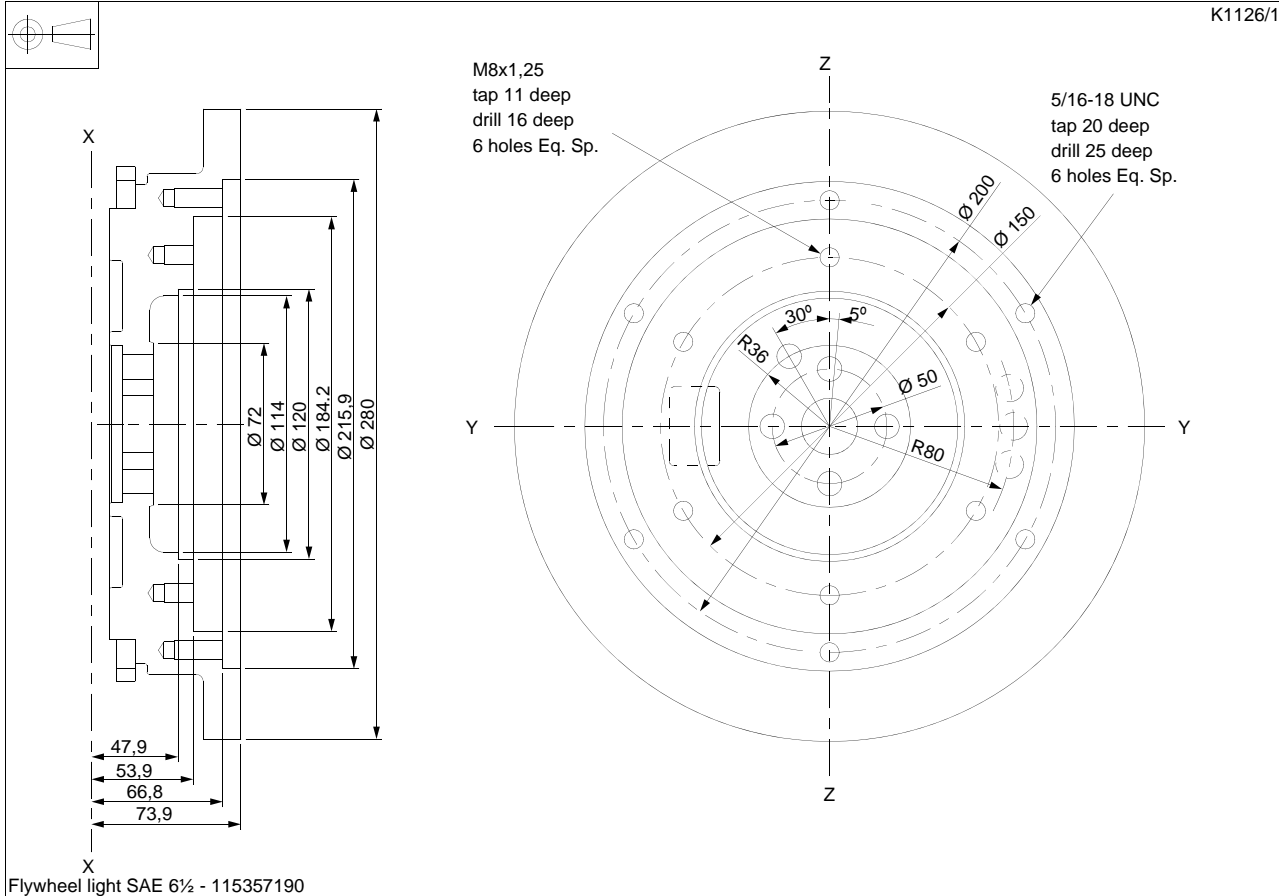
DD001 - Flywheel, flatface, 404D-15



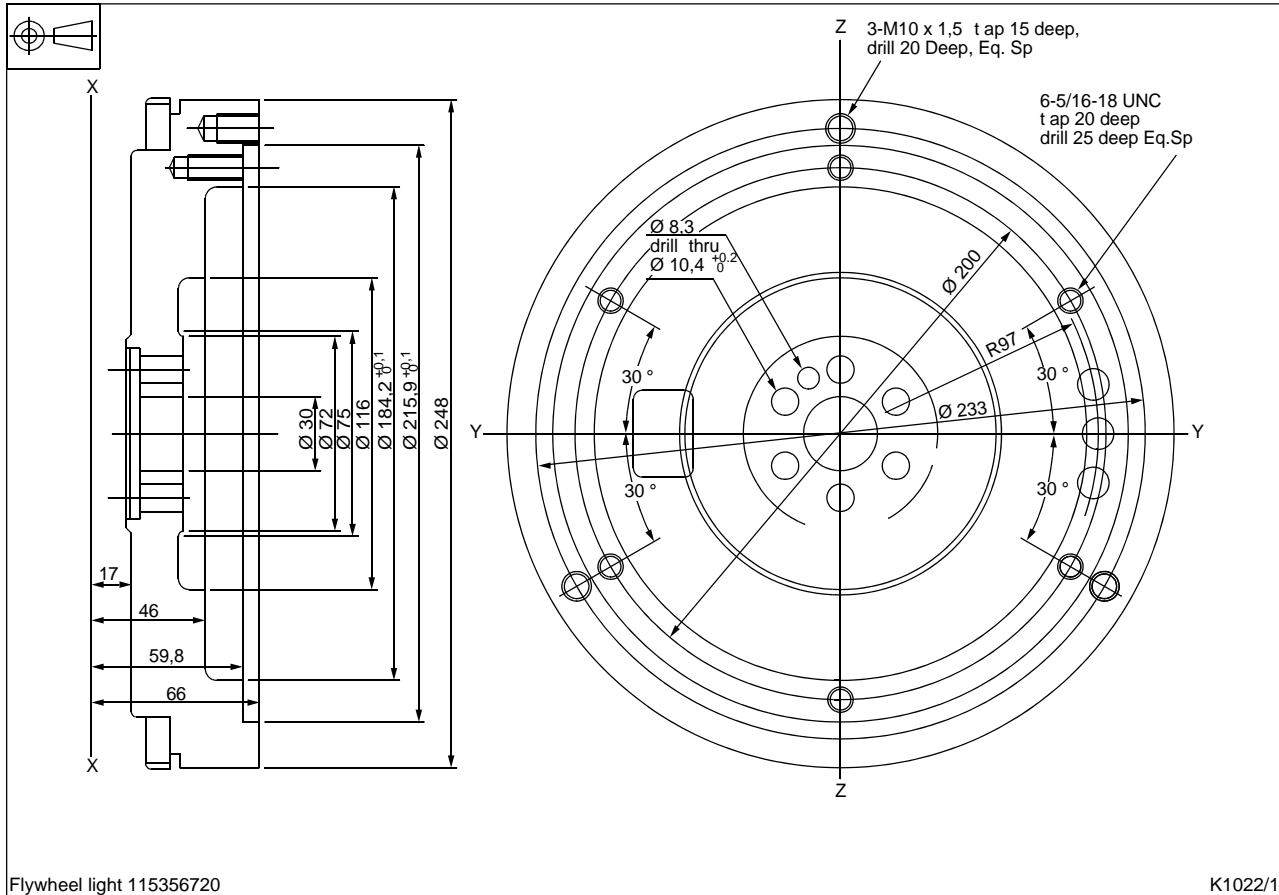
Flywheel, flatface - 115350060

DD002 - Flywheel, light, SAE 6½, 403D-07

K1126/1



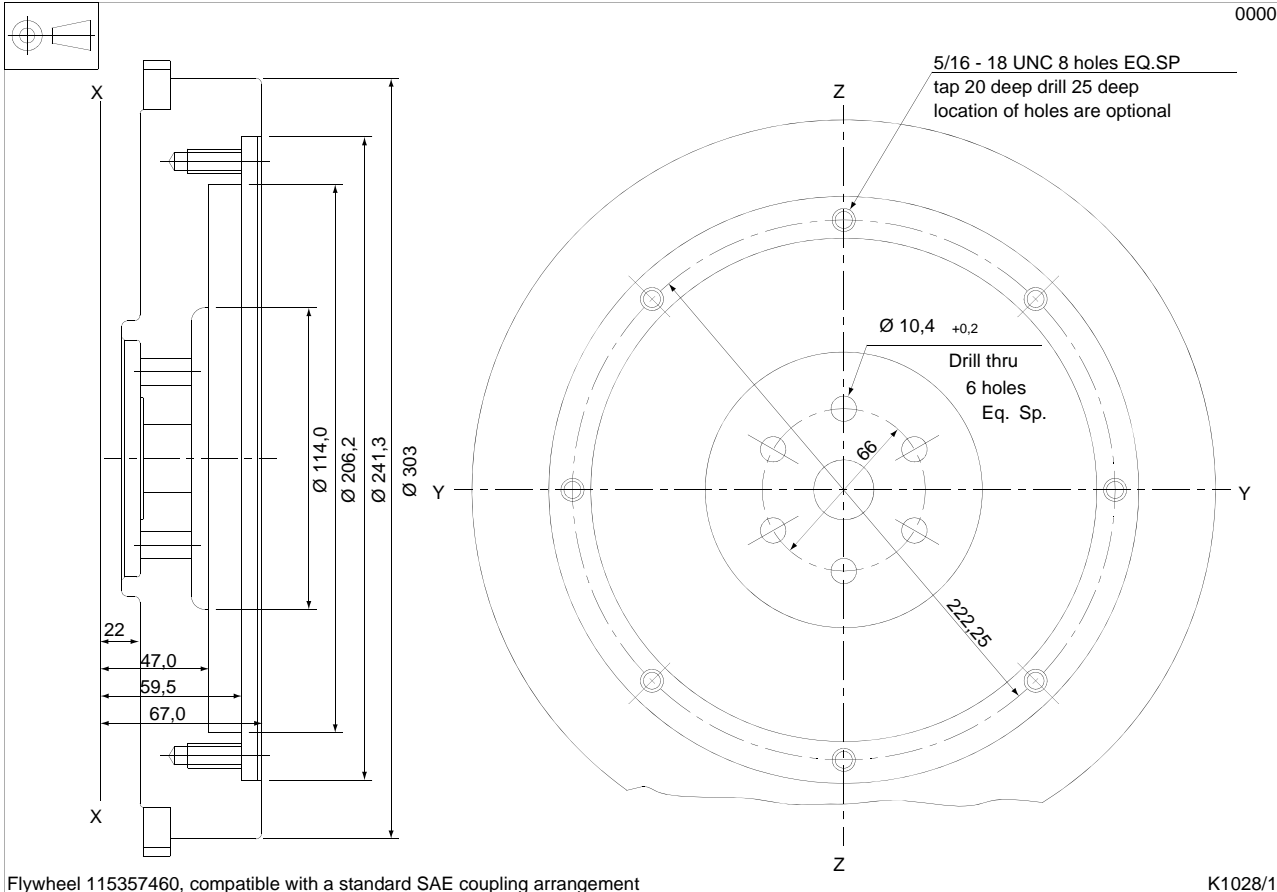
DD002 - Flywheel, light, SAE 6½, 403D-11



K1022/1

DD002 - Flywheel, light, SAE 7½, 404D-22, 404D-22T, 404D-22TA

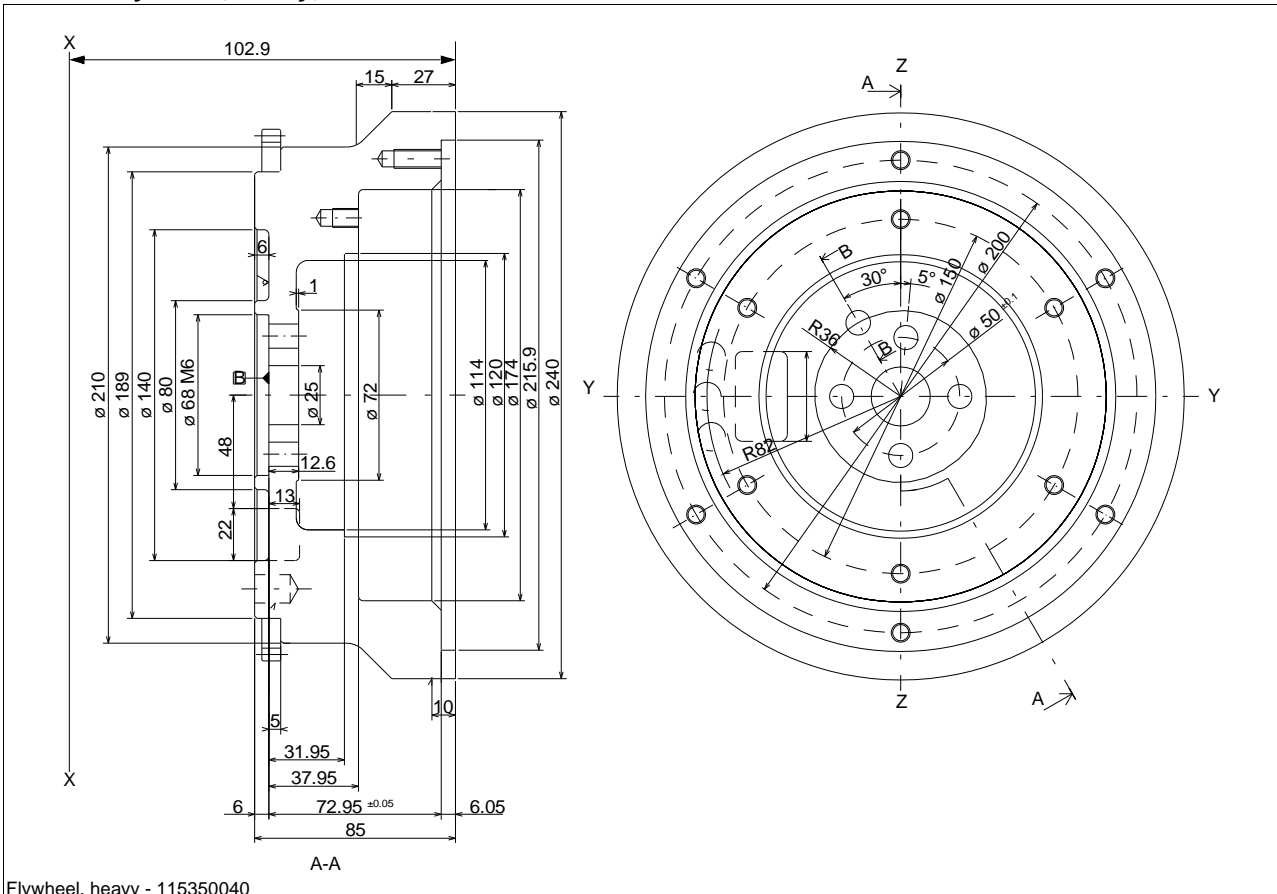
0000



Flywheel 115357460, compatible with a standard SAE coupling arrangement

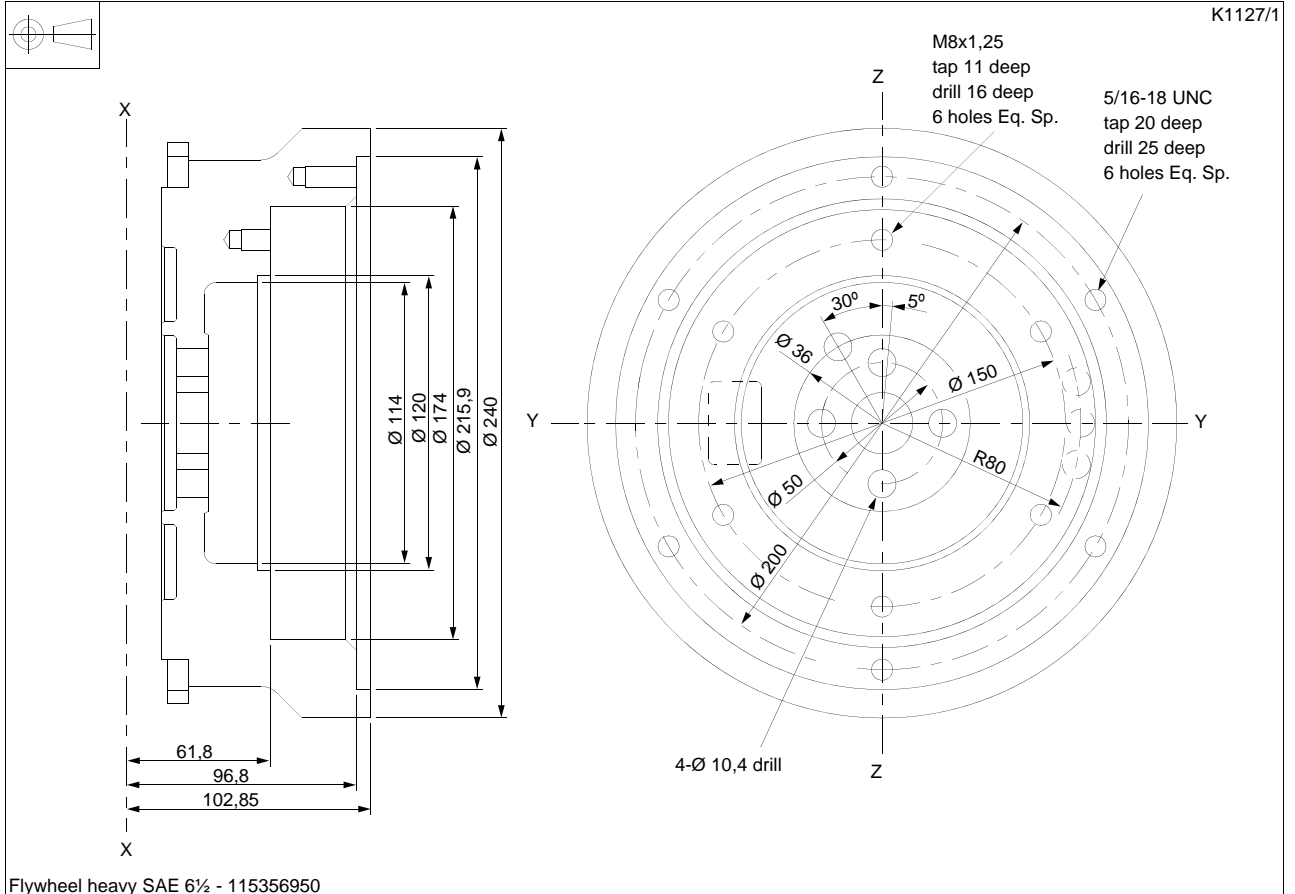
K1028/1

DD003 - Flywheel, heavy, 402D-05

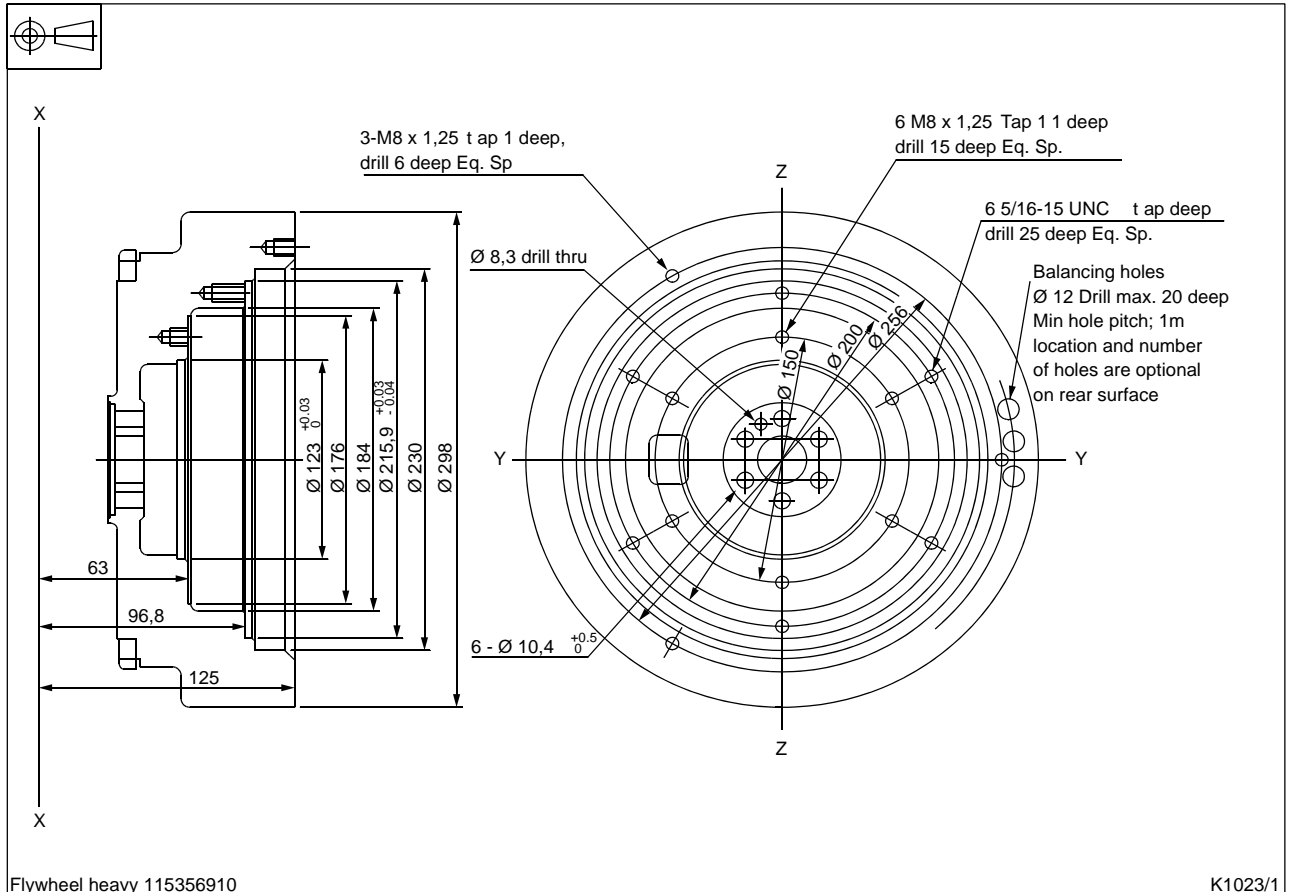


Flywheel, heavy - 115350040

DD003 - Flywheel, heavy, SAE 6½, 403D-07

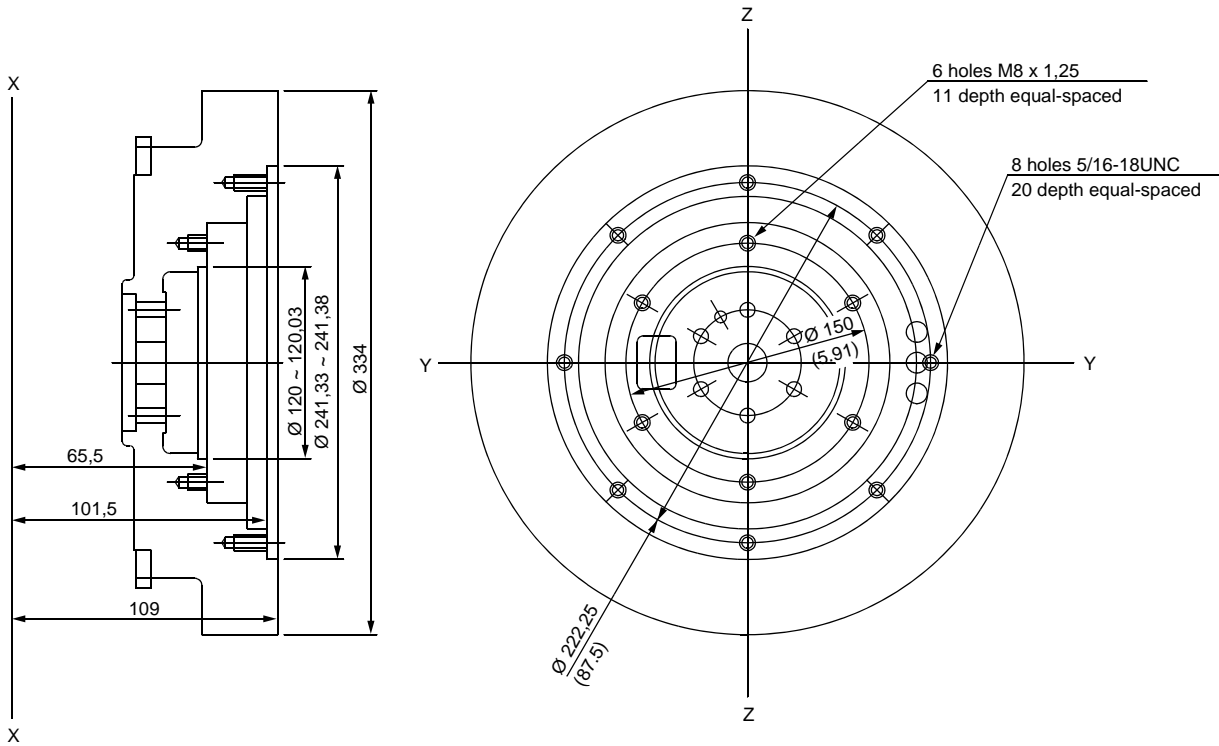


DD003 - Flywheel, heavy, SAE 6½, 403D-11



DD003 - Flywheel, heavy, SAE 7½, 403D-15, 403D-15T

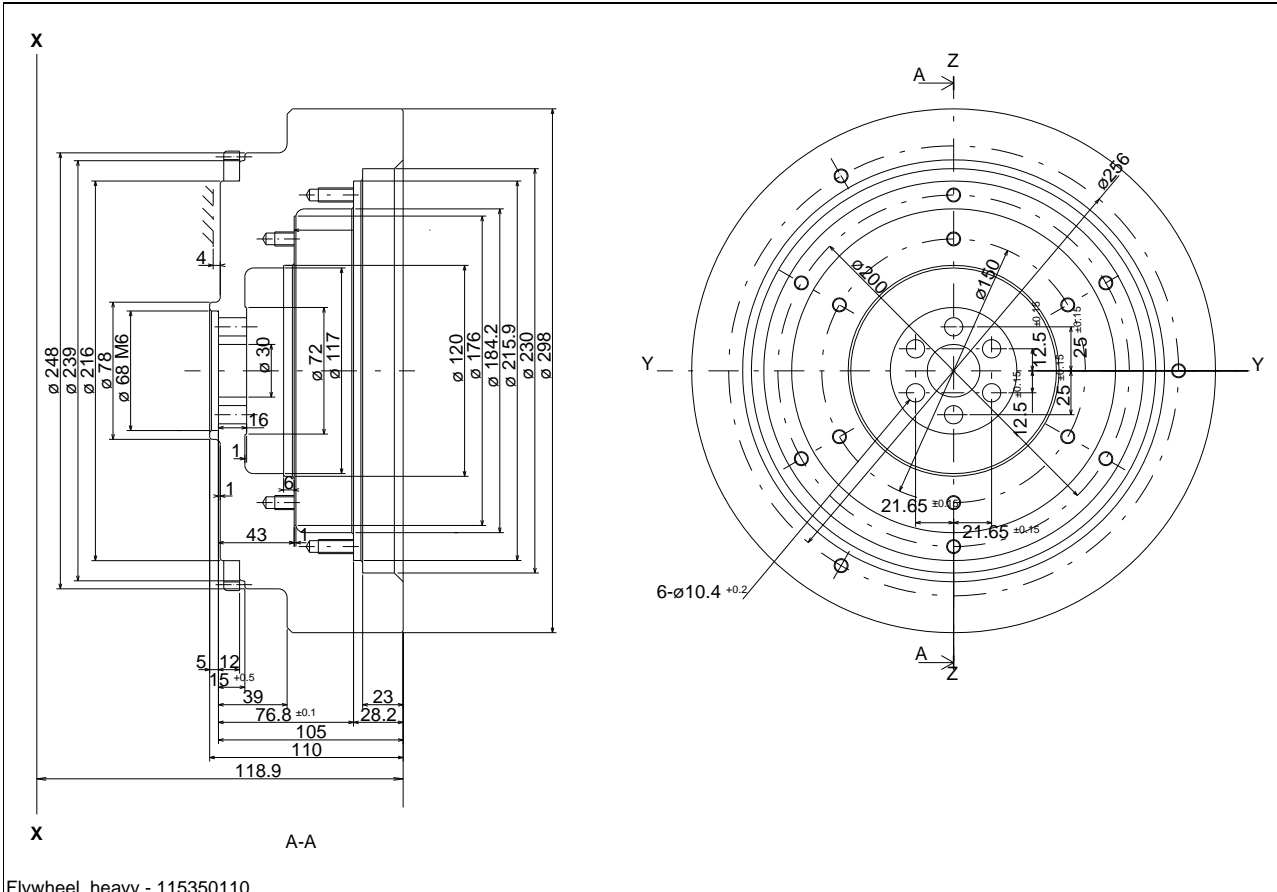
0000



Flywheel heavy 115357040

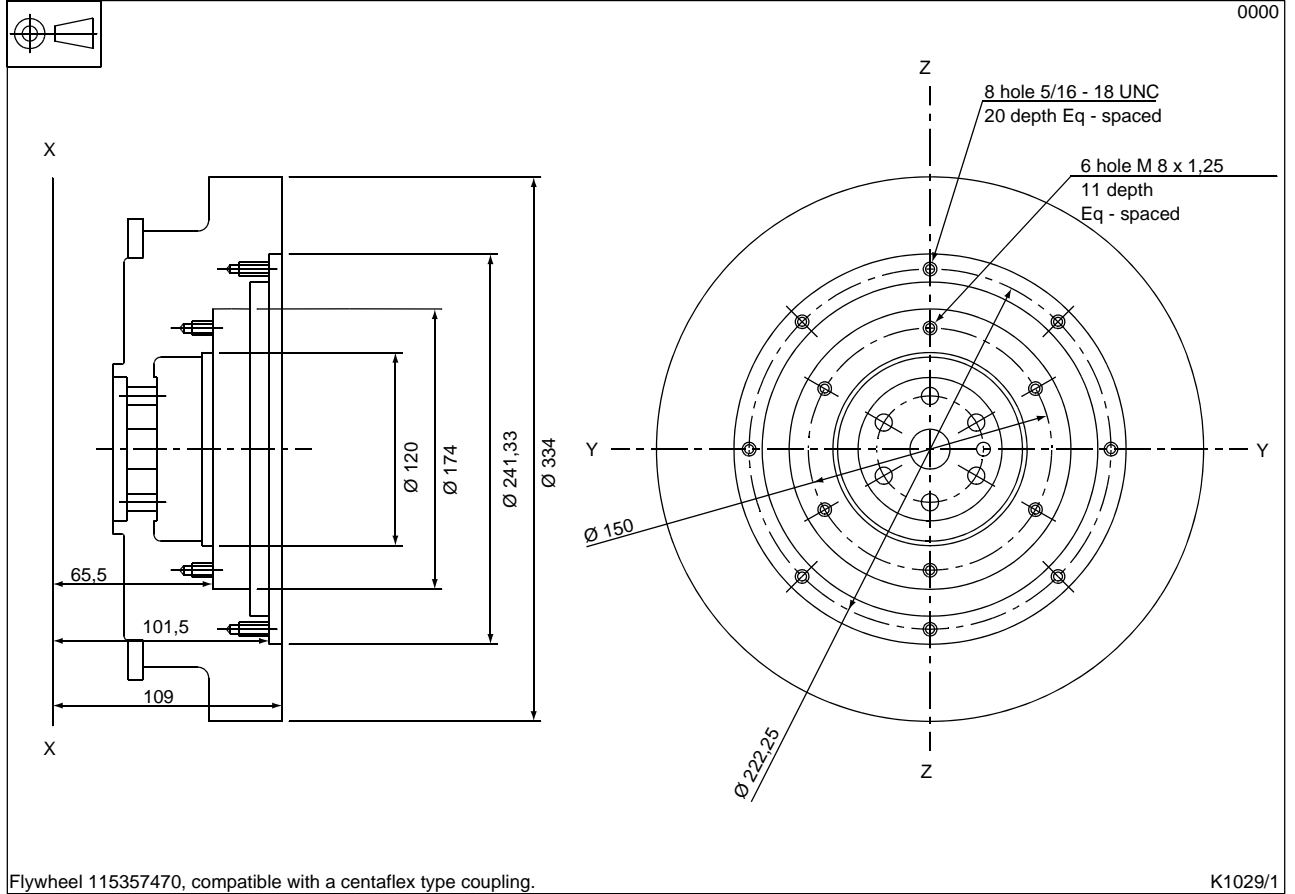
K1026/1

DD003 - Flywheel, heavy, SAE 6½, 404D-15

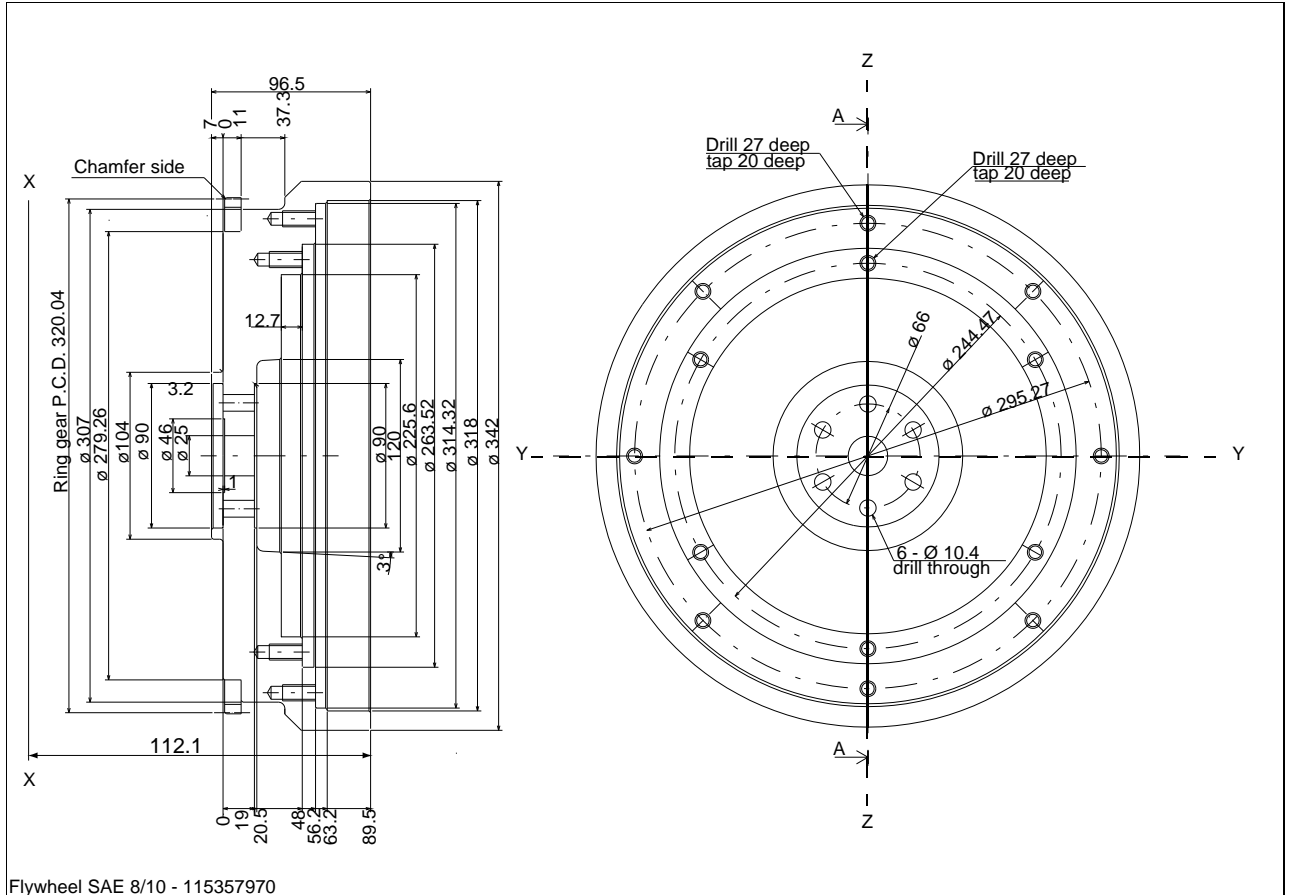


Flywheel, heavy - 115350110

DD003 - Flywheel, heavy, SAE 7½, 404D-22, 404D-22T, 404D-22TA



DD004 - Flywheel, SAE 8 and SAE 10, 404D-22, 404D-22T, 404D-22TA



Flywheel mass and inertia

Note: Mass and inertia consists of flywheel and ring gear.

402D-05

Option	Mass	Inertia GD ²	No. teeth on ring gear
DD001	8,9 kg (19.6 lb)	0,24 kg m ² (820.1 lb in ²)	88
DD002	11,1 kg (24.5 lb)	0,413 kg m ² (1411.3 lb in ²)	88
DD003	13,5 kg (29.8 lb)	0,534 kg m ² (1824.8 lb in ²)	88

403D-07

Option	Mass	Inertia GD ²	No. teeth on ring gear
DD001	9,17 kg (20.28 lb)	0,21 kg m ² (717.85 lb in ²)	88
DD002	11,1 kg (24.5 lb)	0,413 kg m ² (1411.0 lb in ²)	88
DD003	17,9 kg (39.46 lb)	0,534 kg m ² (1825.0 lb in ²)	88

403D-11

Option	Mass	Inertia GD ²	No. teeth on ring gear
DD001	9,6 kg (21.16 lb)	0,32 kg m ² (1086.6 lb in ²)	96
DD002	10,9 kg (24.03 lb)	0,39 kg m ² (1332.7 lb in ²)	96
DD003	28,1 (61.95 lb)	1,51 kg m ² (5159.9 lb in ²)	96

403D-15, 403D-15T, 403D-17

Option	Mass	Inertia GD ²	No. teeth on ring gear
DD001	20,4 kg (44.97 lb)	0,84 kg m ² (2871.4 lb in ²)	109
DD002	14,2 kg (31.42 lb)	0,63 kg m ² (2169.9 lb in ²)	109
DD003	34,2 kg (75.51 lb)	2,01 kg m ² (6868.5 lb in ²)	109

404D-15

Option	Mass	Inertia GD ²	No. teeth on ring gear
DD001	10,5 kg (23.1 lb)	0,349 kg m ² (1192.6 lb in ²)	96
DD002	11.1 kg (24.5 lb)	0,40 kg m ² (1366.9 lb in ²)	96
DD003	29.0 kg (63.9 lb)	1.51 kg m ² (5159.9 lb in ²)	96

404D-22, 404D-22T, 404D-22TA

Option	Mass	Inertia GD ²	No. teeth on ring gear
DD001	18.5 kg (61.82 lb)	1,16 kg m ² (3963.9 lb in ²)	126
DD002	18,0 kg (39.68 lb)	1,07 kg m ² (3656.3 lb in ²)	126
DD003	42,2 kg (90.03 lb)	2,55 kg m ² (8713.6 lb in ²)	126
DD004	27,5 kg (60.62 lb)	1,80 kg m ² (6151.0 lb in ²)	126

Starter motors

Engine type	Description	Option
403D-11 403D-15 403D-15T 404D-15 404D-22 404D-22T 404D-22TA	Not required	ED000
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Starter motor 12V, 2,0 kW	ED001
403D-17	Starter motor 12V, 2,0 kW	ED001
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Starter motor 24V, 2,5 kW	ED002
404D-15	Starter motor 12V, 1,4 kW	ED003
403D-11	Starter motor 12V, 1,4 kW	ED003
402D-05	Starter motor 12V, 0,8 kW	ED005
403D-07	Starter motor 12V, 1,2 kW	ED006

Starter specification

Output	Volts	Pressure angle	Pinion number of teeth
0,8 kW	12	20°	8
1,2 kW	12	20°	10
1,4 kW	12	20°	9
2,0 kW	12	20°	9
2,0 kW	12	20°	11
2,5 kW	24	20°	9

Note: When fitting a starter motor into an installation without a flywheel housing, it is recommended that an extra backplate (of the same type) is added for support.

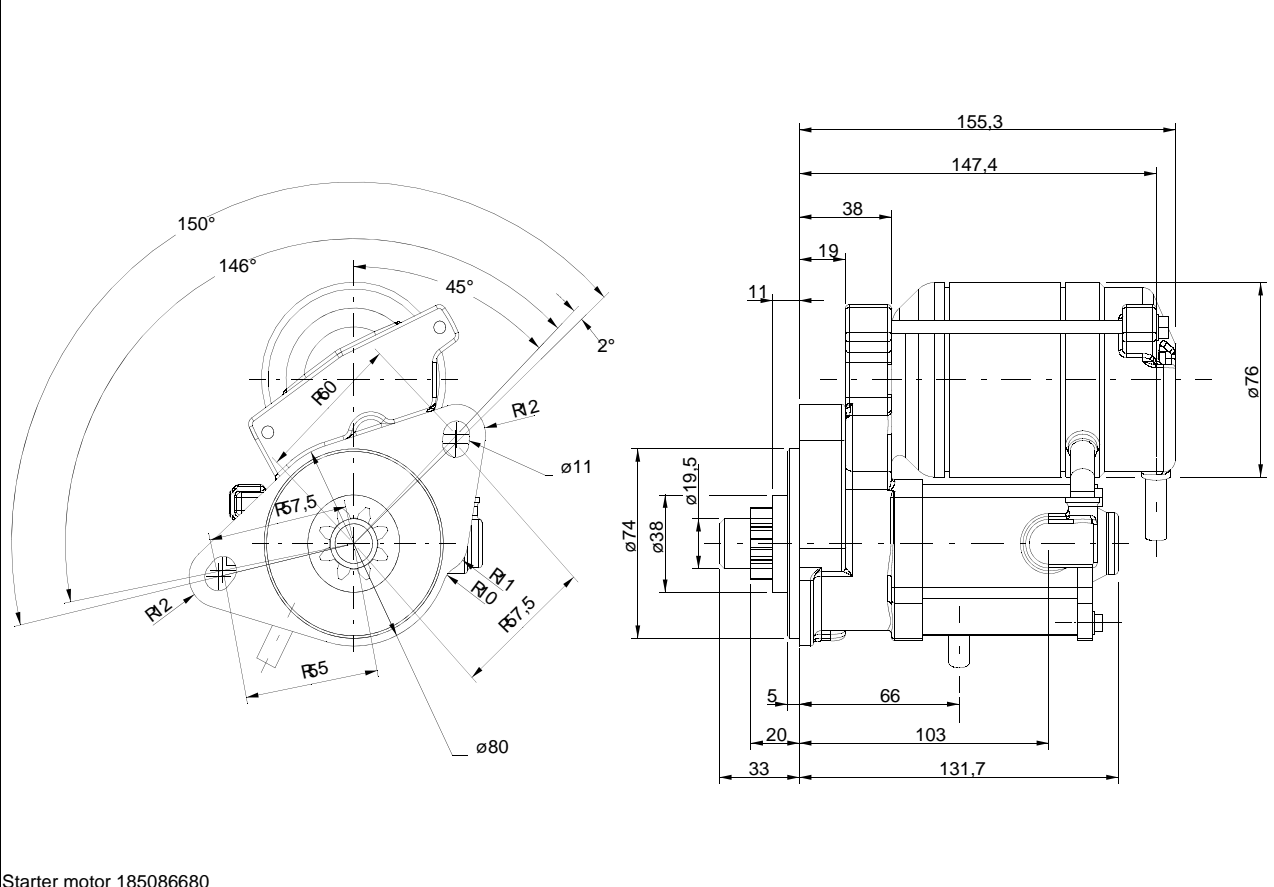
ED000 - Not required

ED003 - 12V, 1,4 kW, 403D-11



U85086711, drawing not available at time of print, drawing will be sent on request

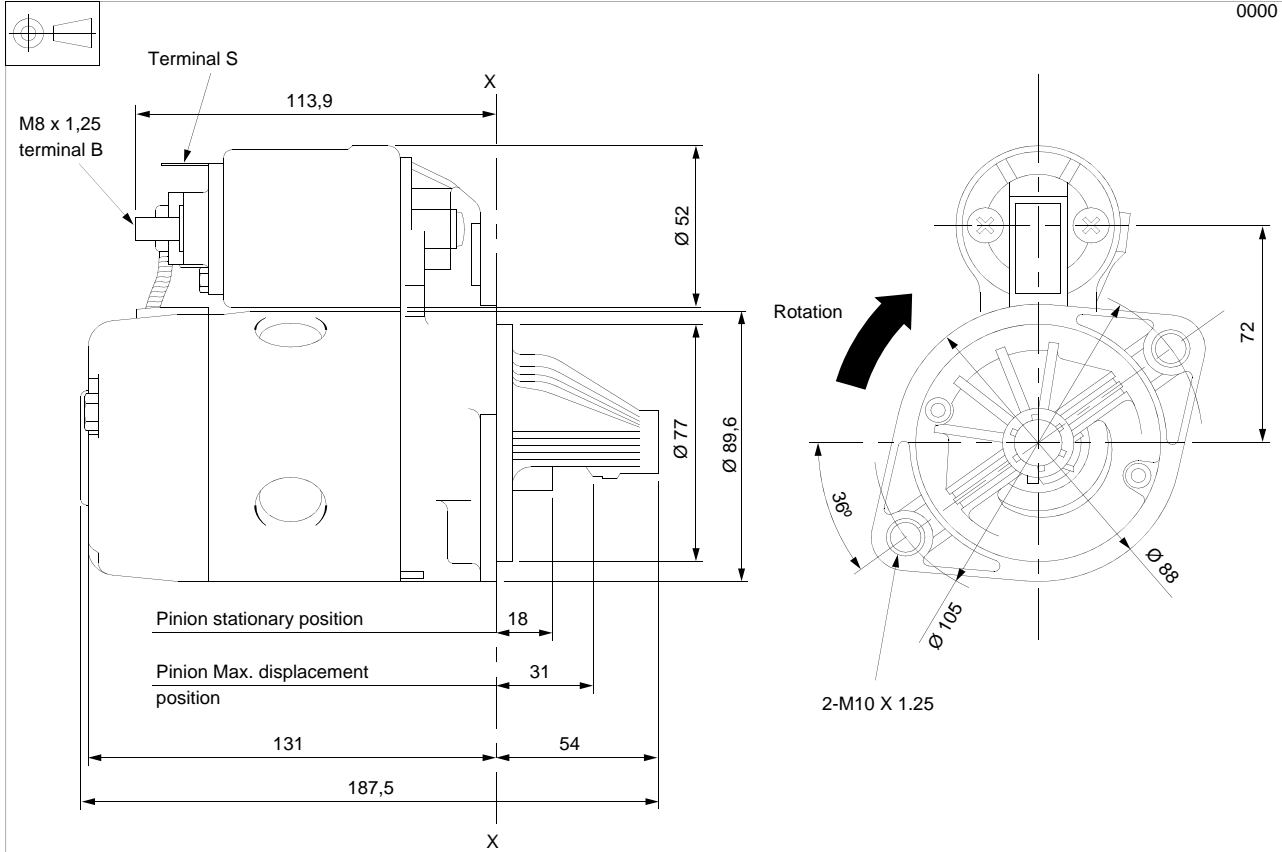
ED003 - 12V, 1,4 kW, 404D-15



Starter motor 185086680

ED005 - 12V, 0,8 kW, 402D-05, 403D-07

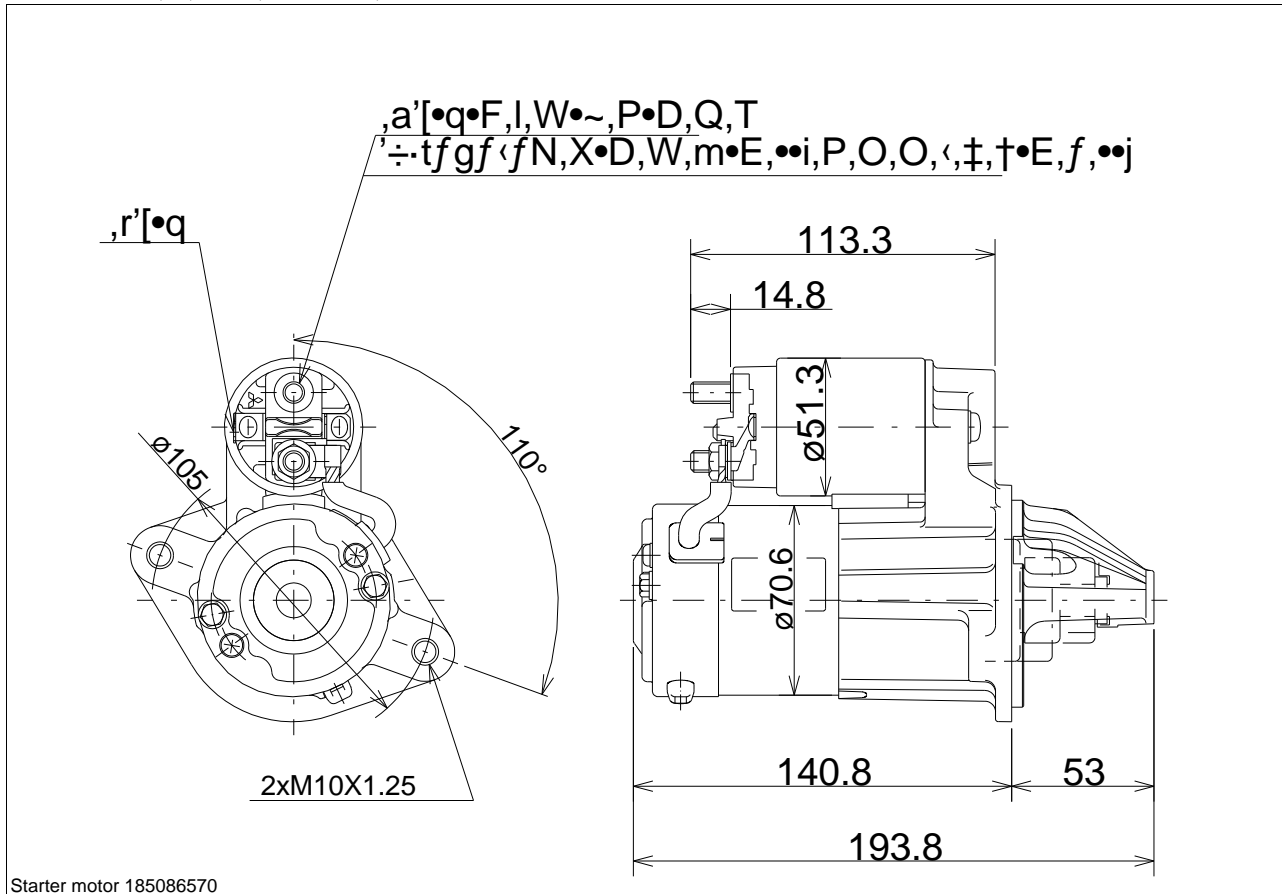
0000



Starter motor 185086540

K1131/1

ED006 - 12V, 1,2 kW, 402D-05, 403D-07

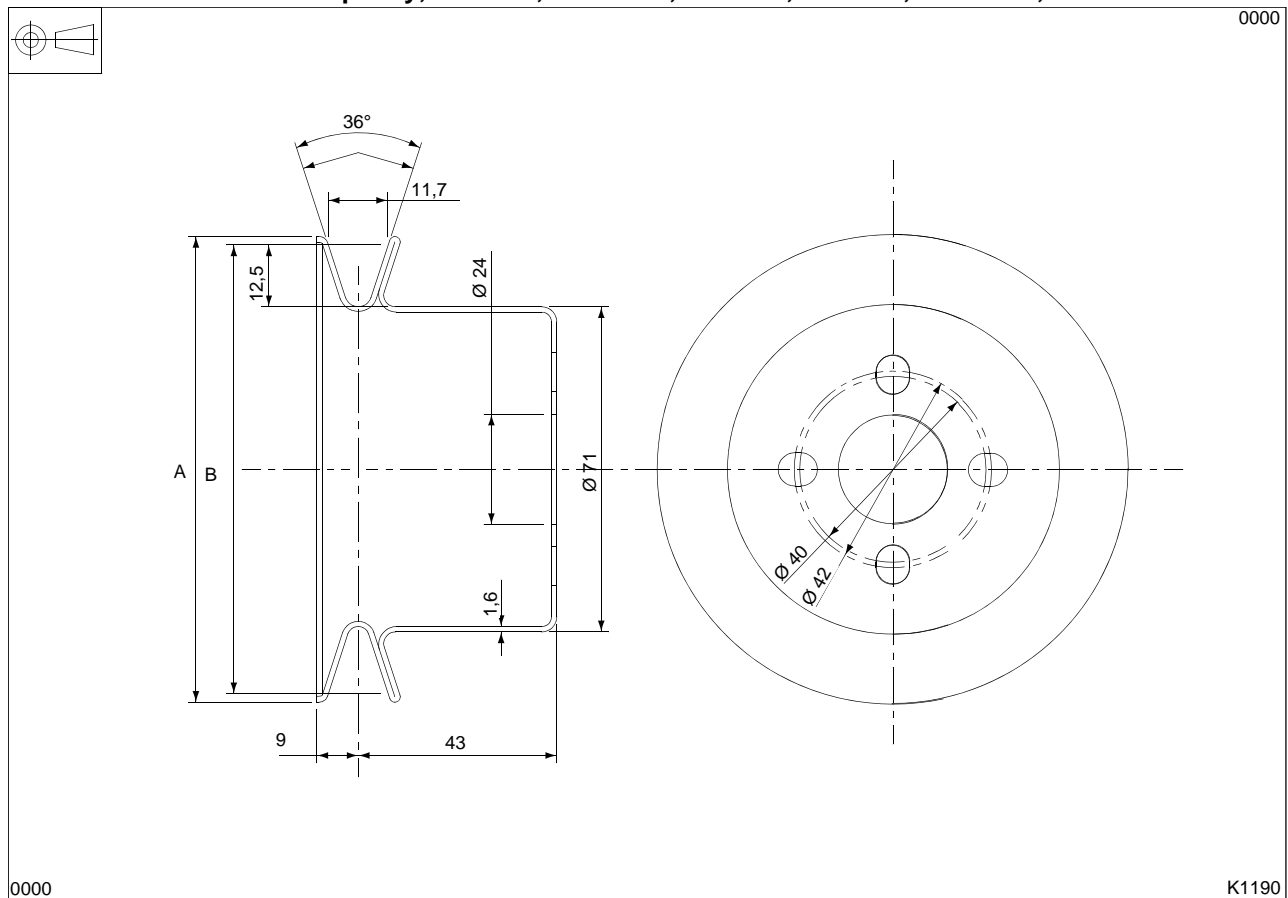


Starter motor 185086570

Fan drive

Engine type	Description	Option
403D-15	Fan pulley \varnothing 96 mm (3.8 in), drive ratio 1.25 : 1	FB001
403D-15T 403D-17	Fan pulley \varnothing 104 mm (4.1 in), drive ratio 1.15 : 1	FB002
404D-22 404D-22T 404D-22TA	Fan pulley \varnothing 109 mm (4.3 in), drive ratio 1.10 : 1	FB003
402D-05 403D-07 403D-11 404D-15	Fan pulley \varnothing 77.8 mm	FB005

FB001/FB002/FB003 - Fan pulley, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA



Engine	Dimension 'A'	Dimension 'B'	Part Number	Identification	Option
403D-15	101 mm (4.0 in)	96 mm (3.8 in)	145336620	Green ID mark	FB001
403D-15T 403D-17	109 mm (4.3 in)	104 mm (4.1 in)	145337040	Yellow ID mark	FB002
404D-22 404D-22T 404D-22TA	114 mm (4.5 in)	109 mm (4.3 in)	145337030	White ID mark	FB003

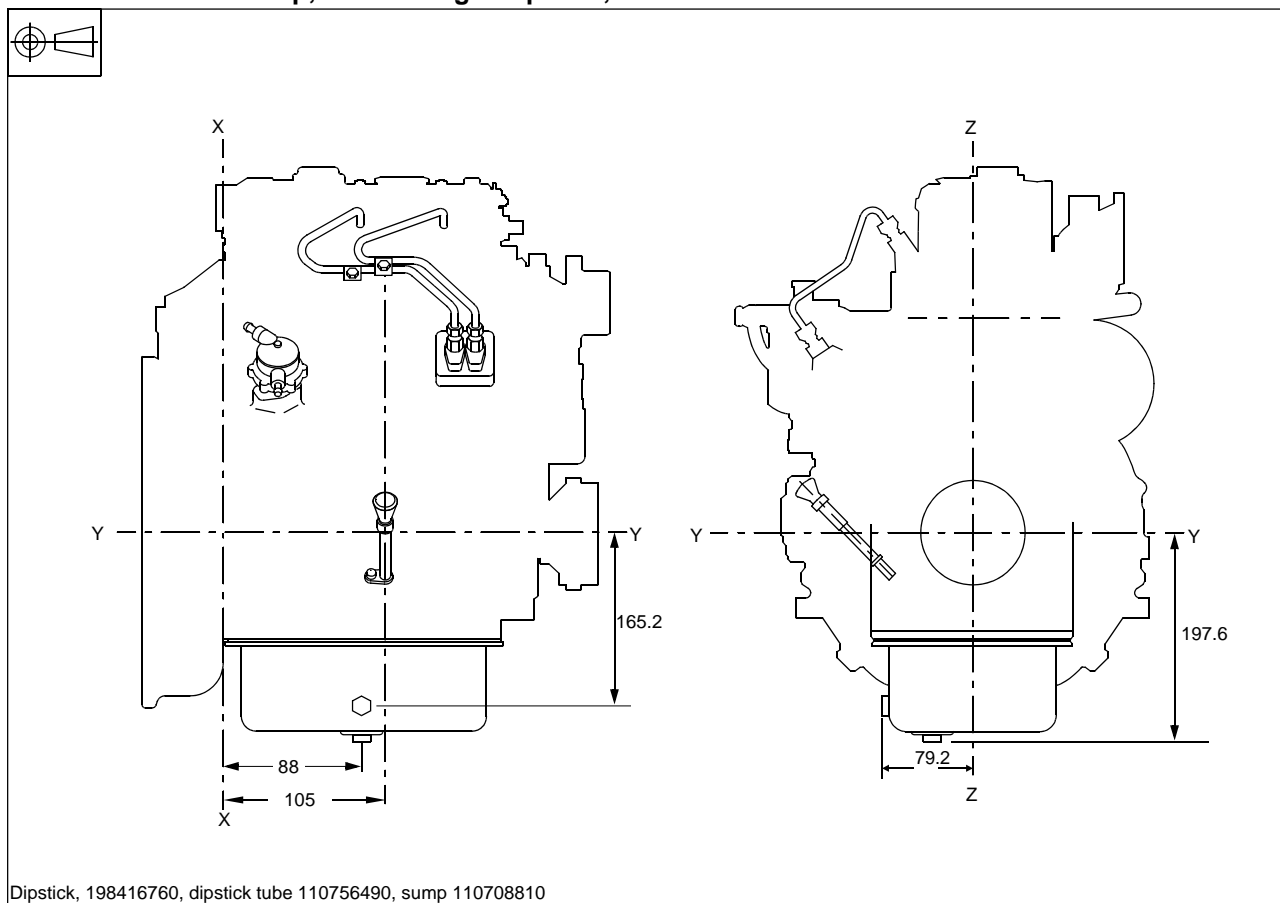
Sump and Dipstick

Engine type	Description	Option
All models	Standard sump, short straight dipstick	GB001
	Standard sump, short dipstick	GB002
	Standard sump, long dipstick	GB003

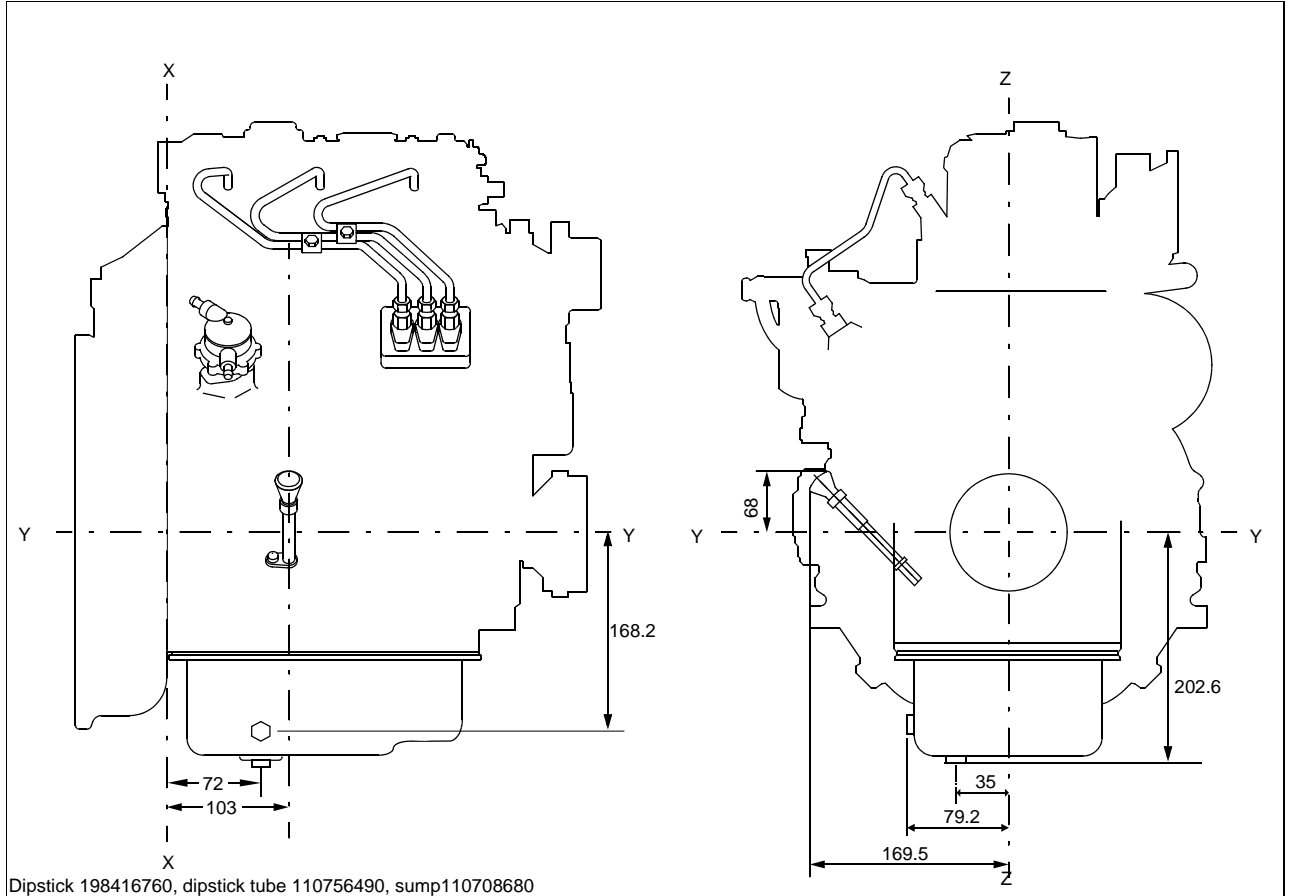
Notes:

- It is possible to reverse the sump if the drain points are required in opposite corners
- If the shallow sump options are selected this may effect the oil change period and gradability.

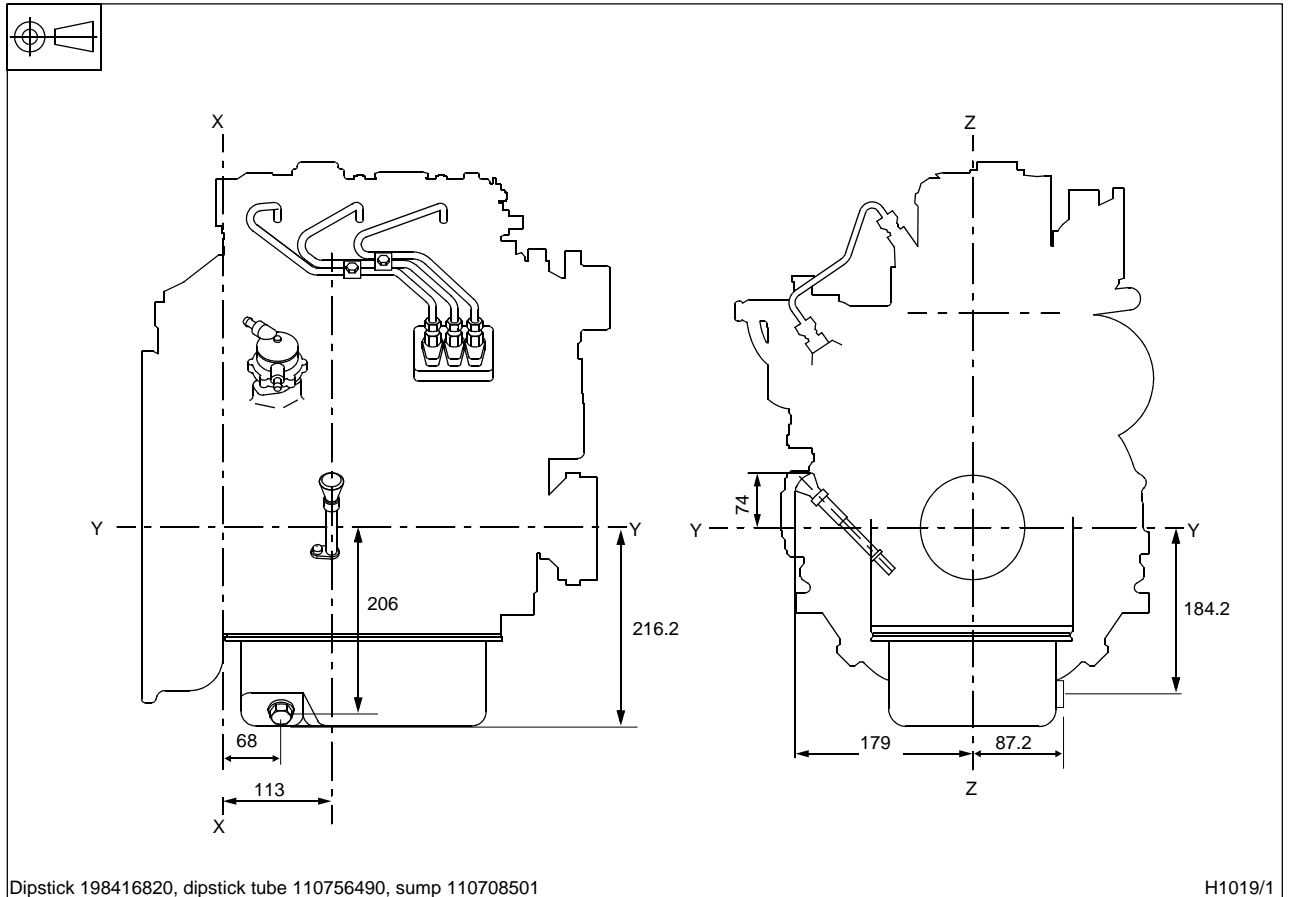
GB001 - Standard sump, short straight dipstick, 402D-05



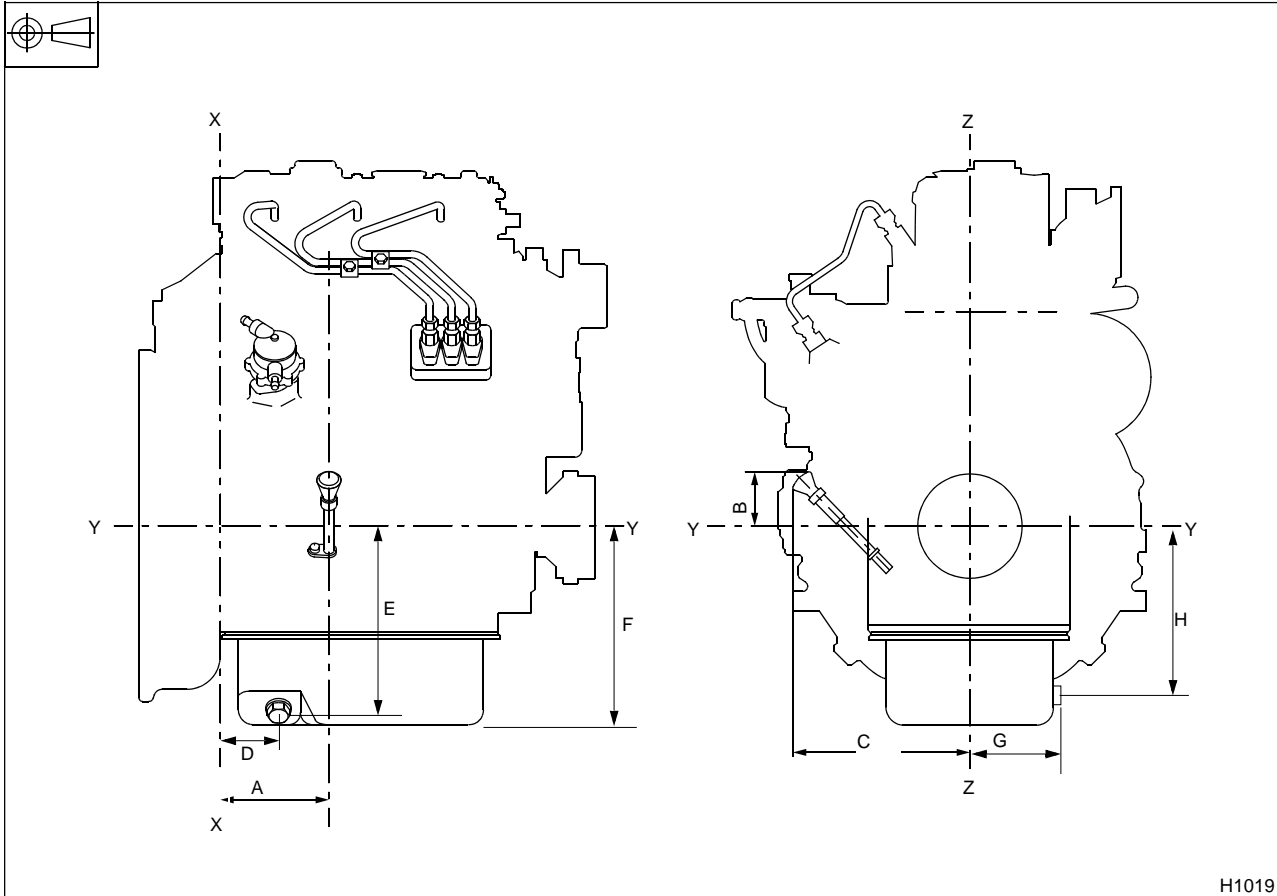
GB001 - Standard sump, short straight dipstick, 403D-07



GB001 - Standard sump, short straight dipstick, 403D-11



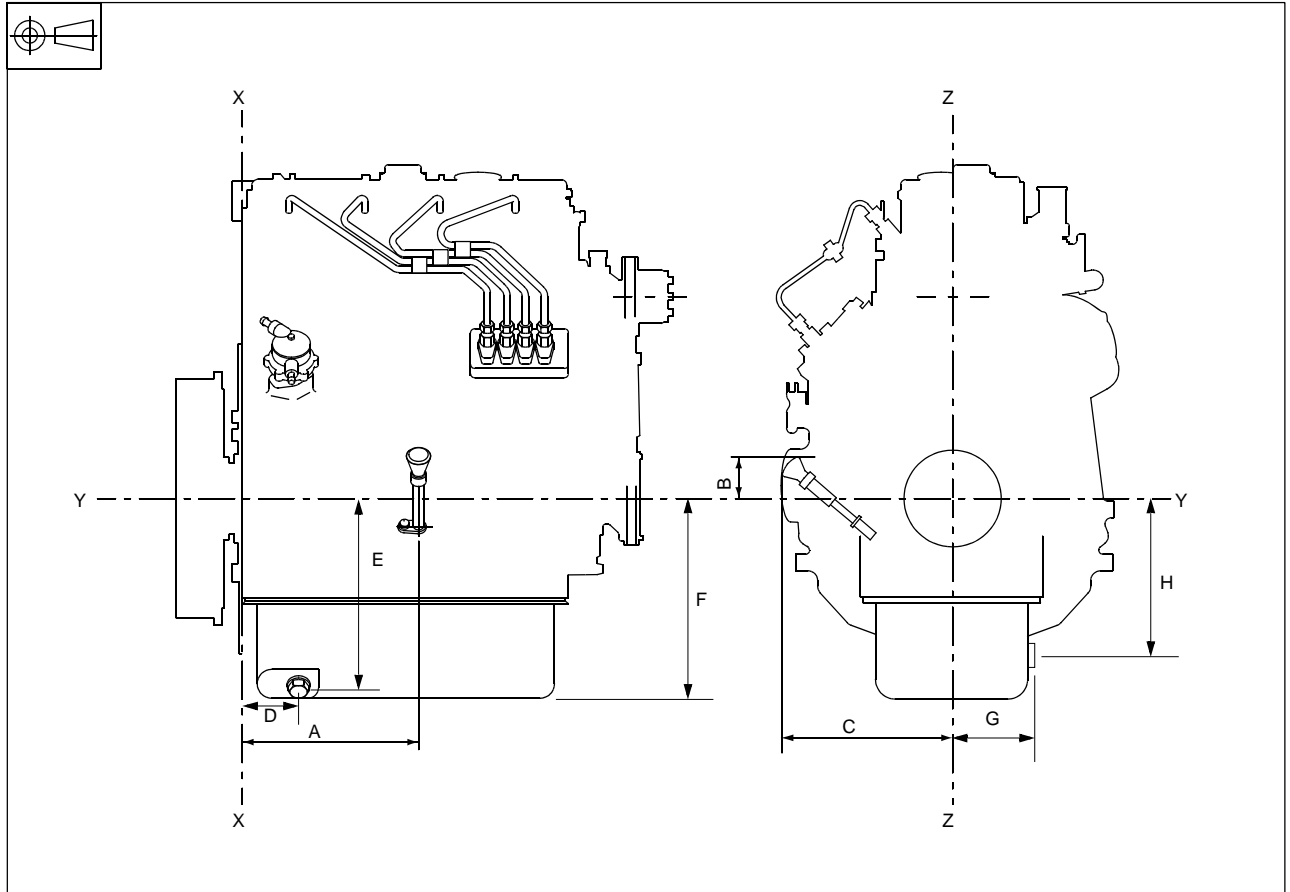
GB001 - Standard sump, short straight dipstick, 403D-15, 403D-15T, 403D-17



H1019

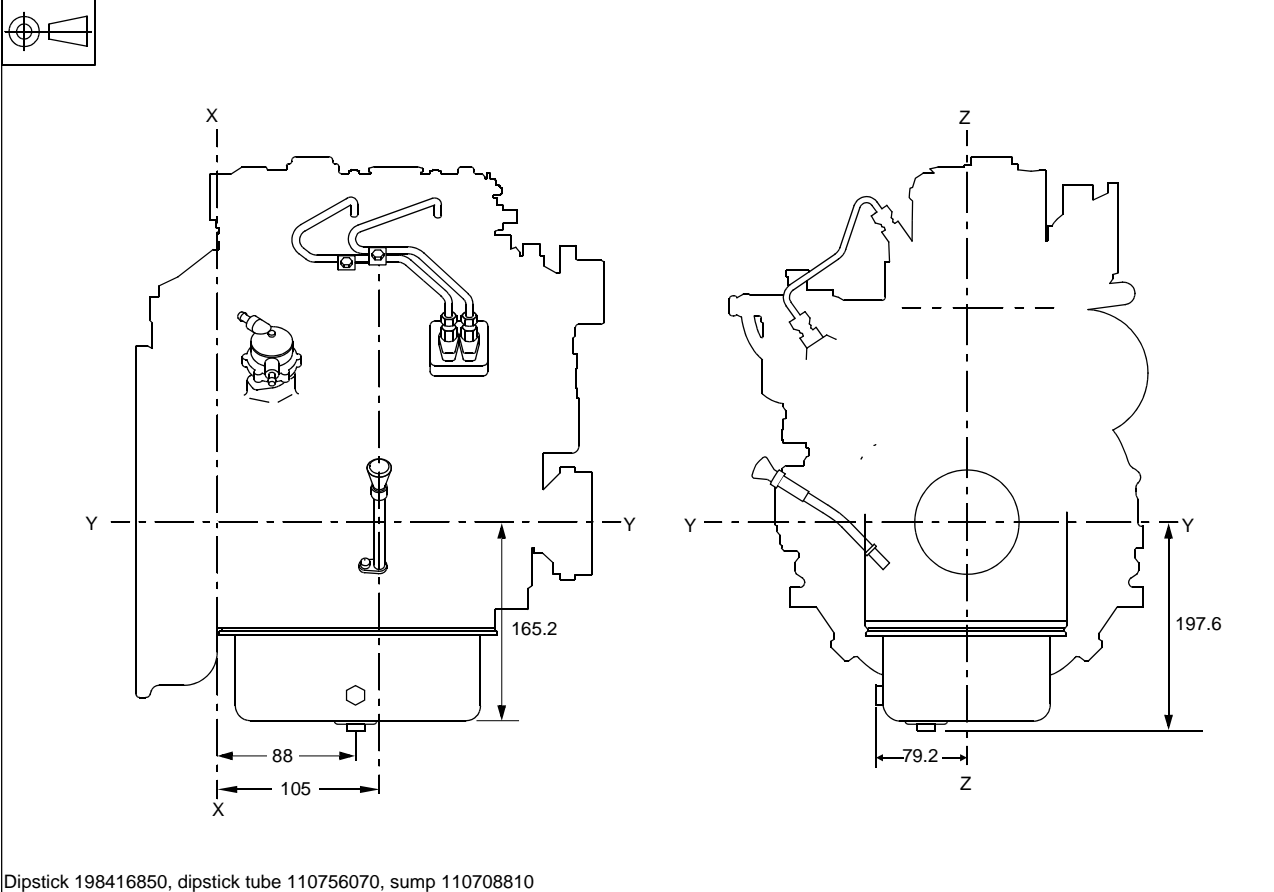
Engine	Description	Dim. A	Dim. B	Dim. C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H
403D-15 403D-15T	Dipstick TPN 467 Dipstick tube 110756490 Sump 110708461	125.0	58.0	198.0	67.0	210.0	219.2	107.2	187.2
403D-17	Dipstick 198416690 Dipstick tube 110756490 Sump 110708461	125.0	58.9	240.5	67.0	219.0	229.2	106.2	197.2

GB001 - Standard sump, short straight dipstick, 404D-15, 404D-22, 404D-22T, 404D-22TA

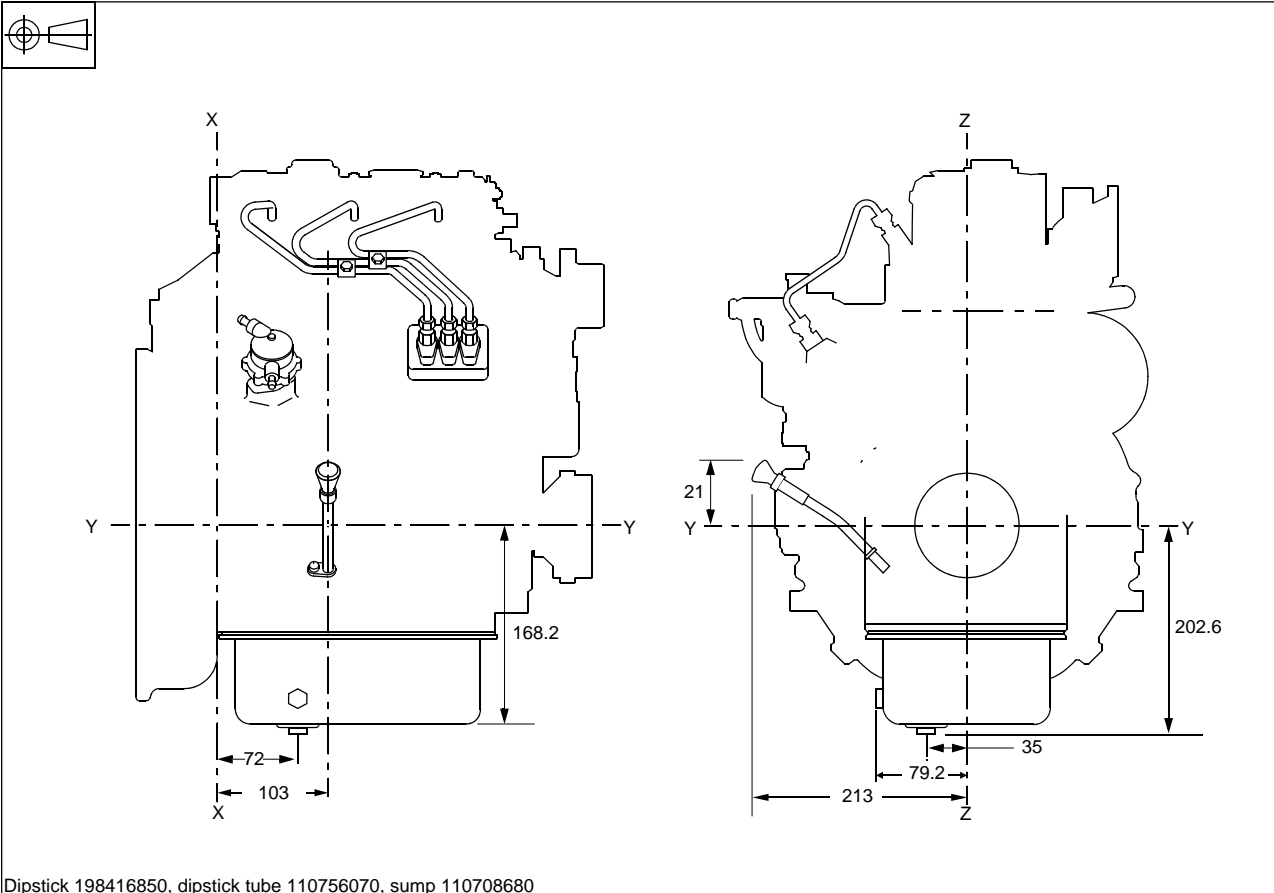


Engine	Description	Dim. A	Dim. B	Dim. C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H
404D-15	Dipstick 198416820 Dipstick tube 110756490 Sump 110700060	115.0	71.1	179.0	67.0	206.0	216.2	87.2	183.7
404D-22 404D-22T 404D-22TA	Dipstick 198416690 Dipstick tube 110756490 Sump 110708381	222.0	52.0	198.0	70.5	221.7	254.2	107.6	221.7

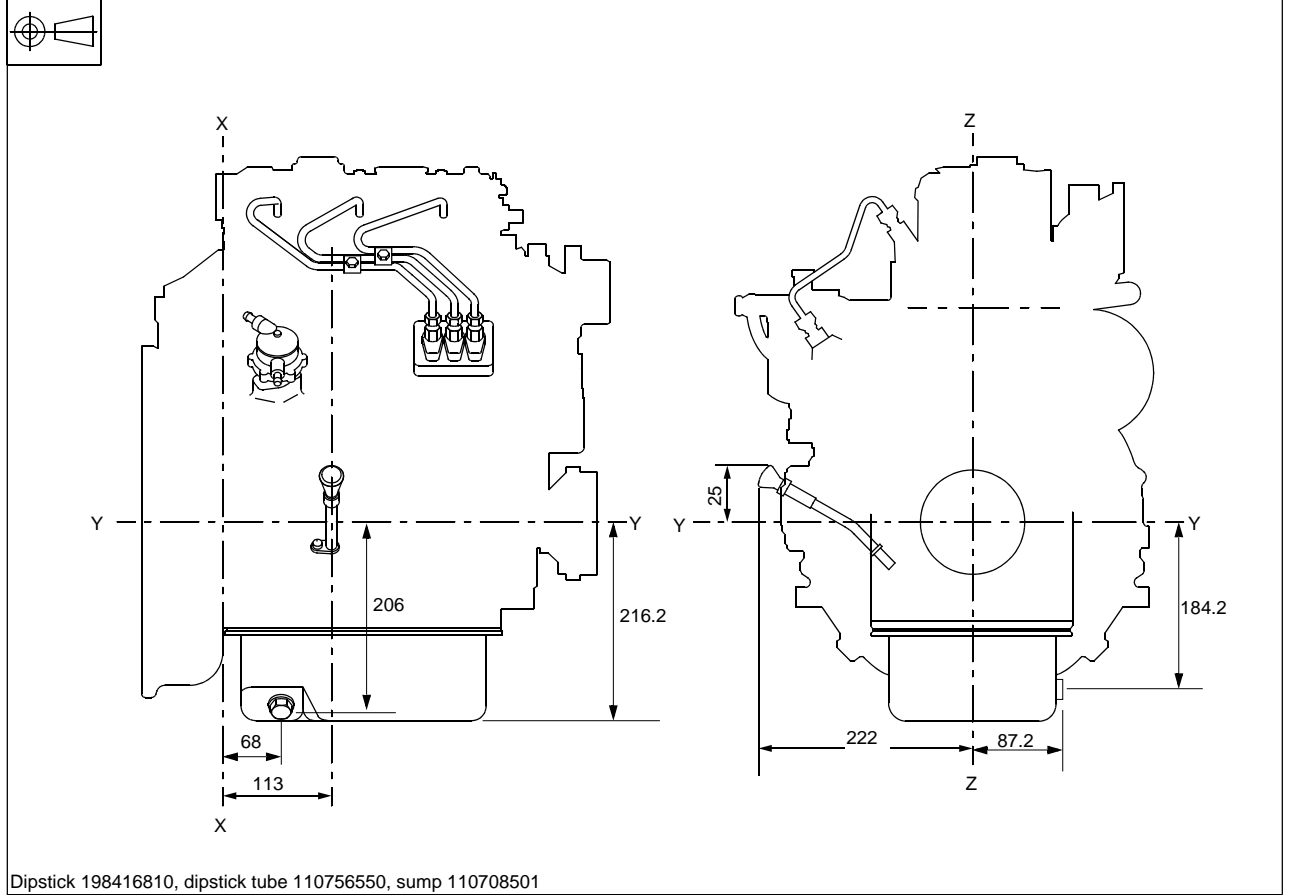
GB002 - Standard sump, short dipstick, 402D-05



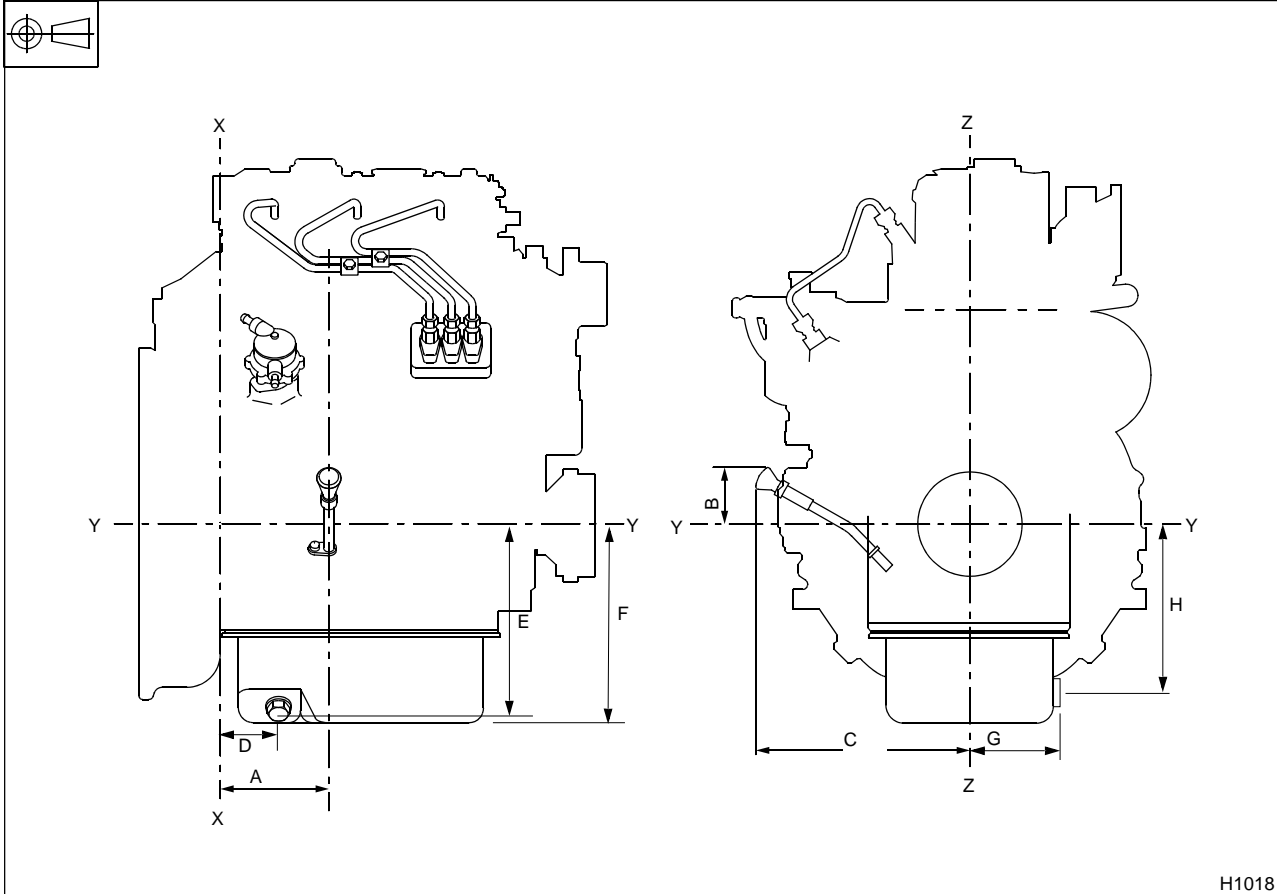
GB002 - Standard sump, short dipstick, 403D-07



GB002 - Standard sump, short dipstick, 403D-11

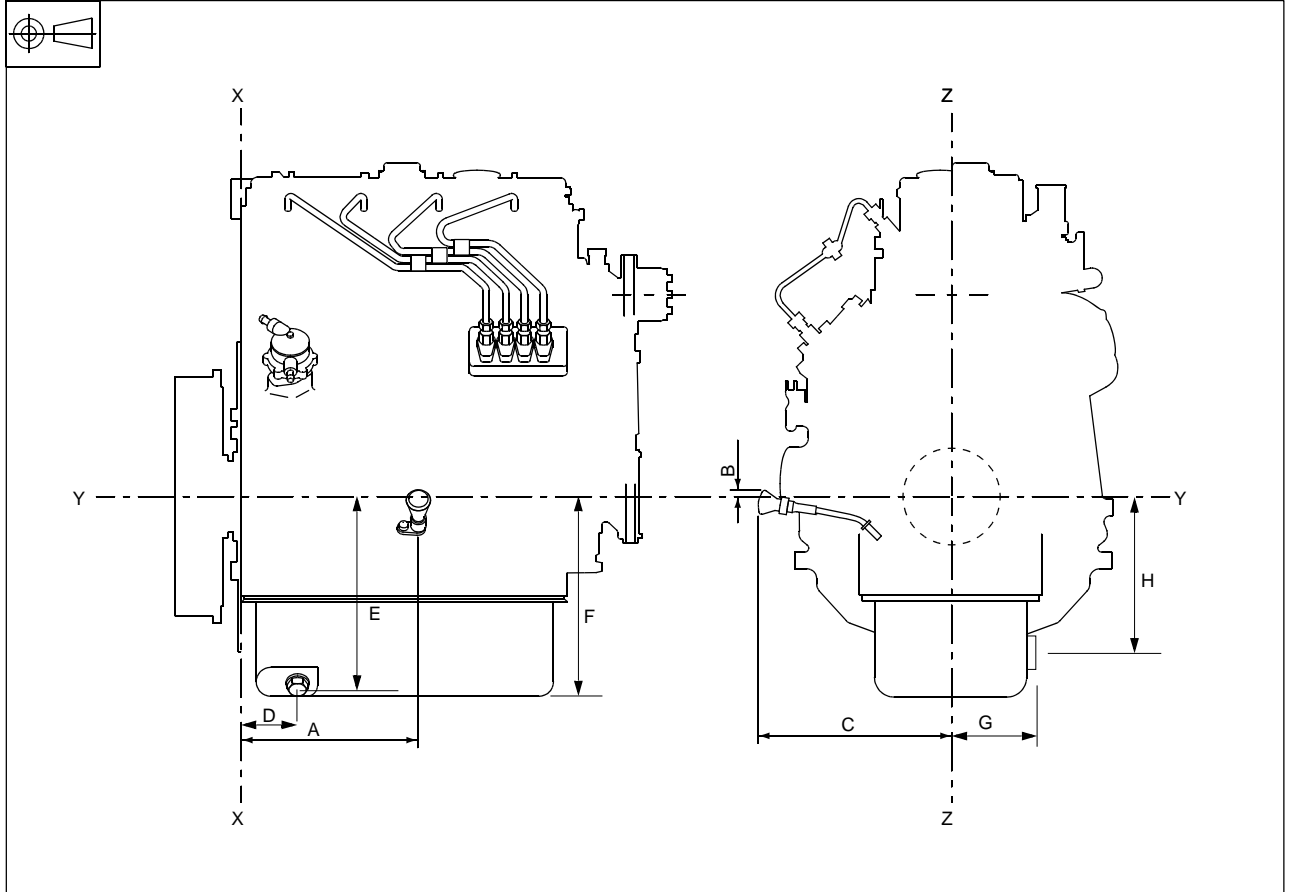


GB002 - Standard sump, short dipstick, 403D-15, 403D-15T, 403D-17,



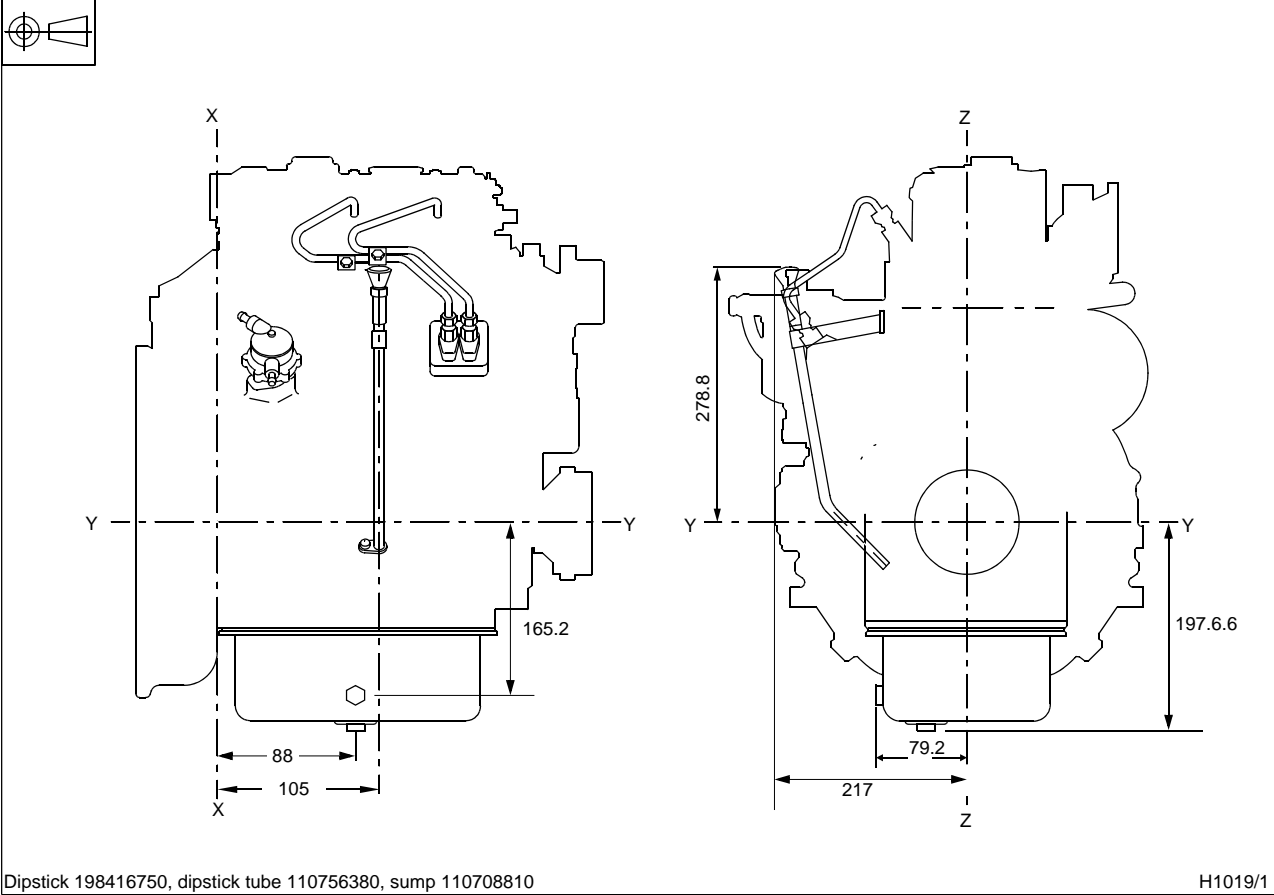
Engine	Description	Dim. A	Dim.B	Dim.C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H
403D-15 403D-15T	Dipstick 198416730 Dipstick tube 110756560 Sump 110708461	125.0	59.0	240.0	67.0	210.0	219.2	107.2	187.2
403D-17	Dipstick 198416700 Dipstick tube 110756550 Sump 110708461	125.0			67.0	219.0	229.2	106.2	197.2

GB002 - Standard sump, short dipstick, 404D-15, 404D-22, 404D-22T, 404D- 22TA

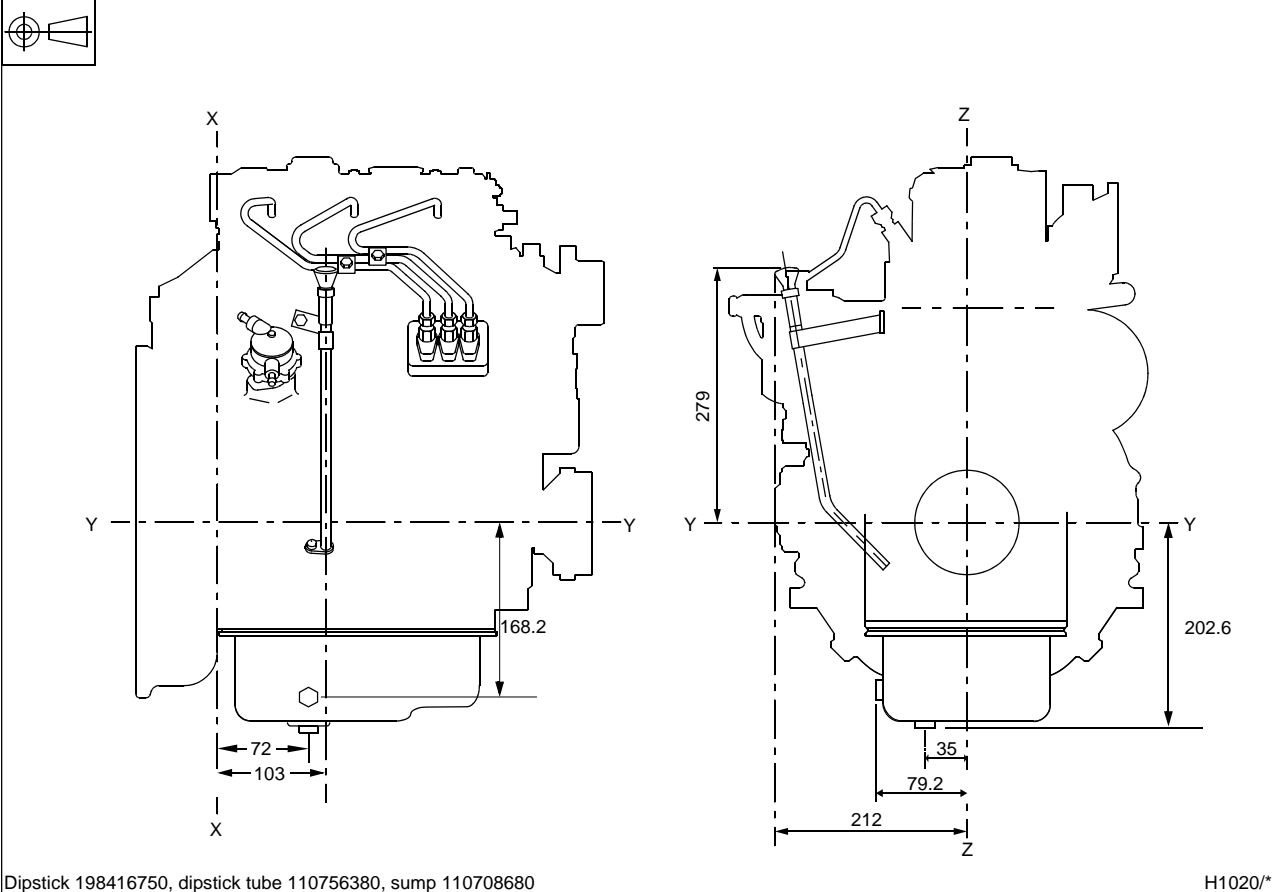


Engine	Description	Dim. A	Dim. B	Dim. C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H
404D-15	Dipstick 198416810 Dipstick tube 110756550 Sump 110700060	115	25	222	67	206	216.2	87.2	183.7
404D-22 404D-22T 404D-22TA	Dipstick 198416700 Dipstick tube 110756550 Sump 110708381	222	5.2	242	70.5	221.7	254.2	107.6	221.7

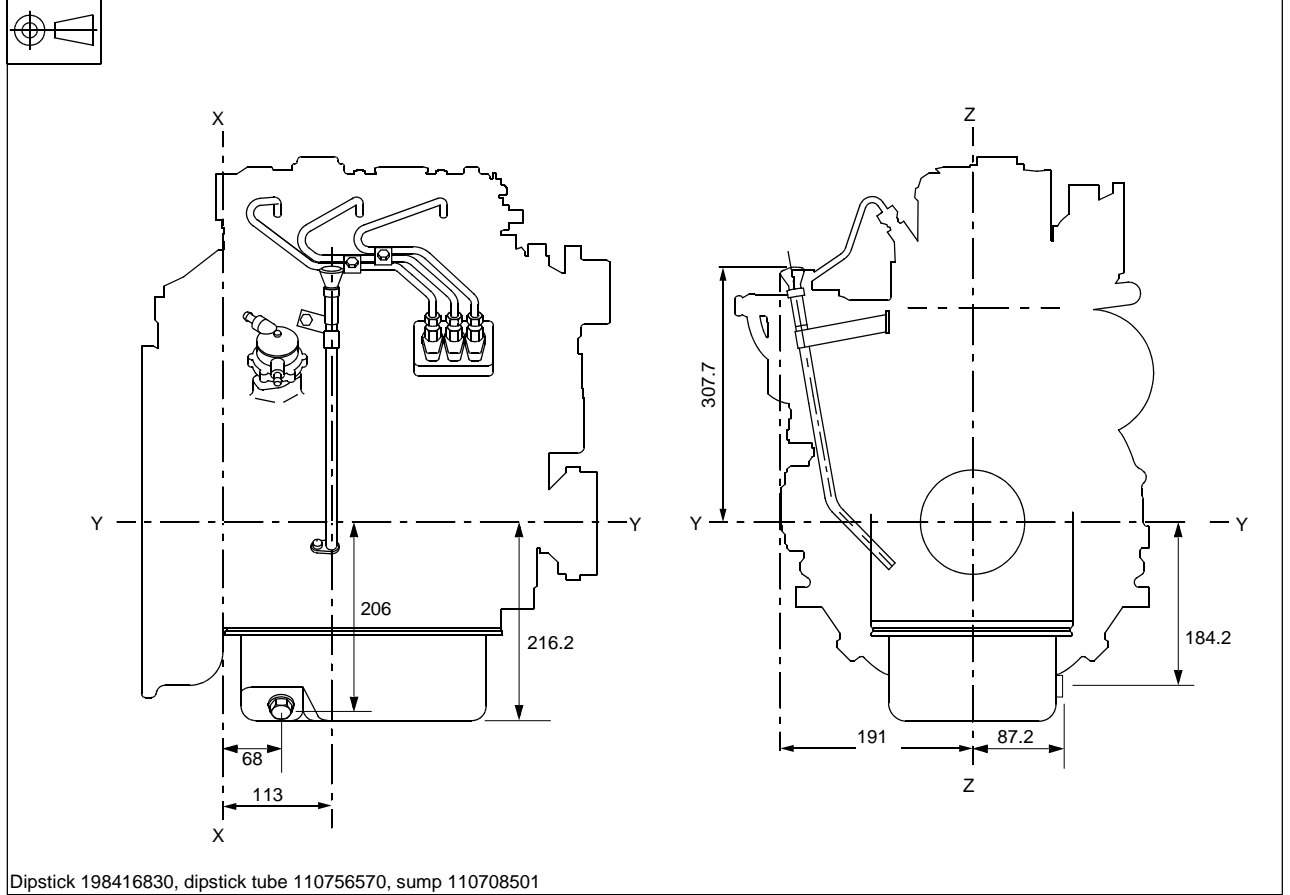
GB003 - Standard sump, long dipstick, 402D-05



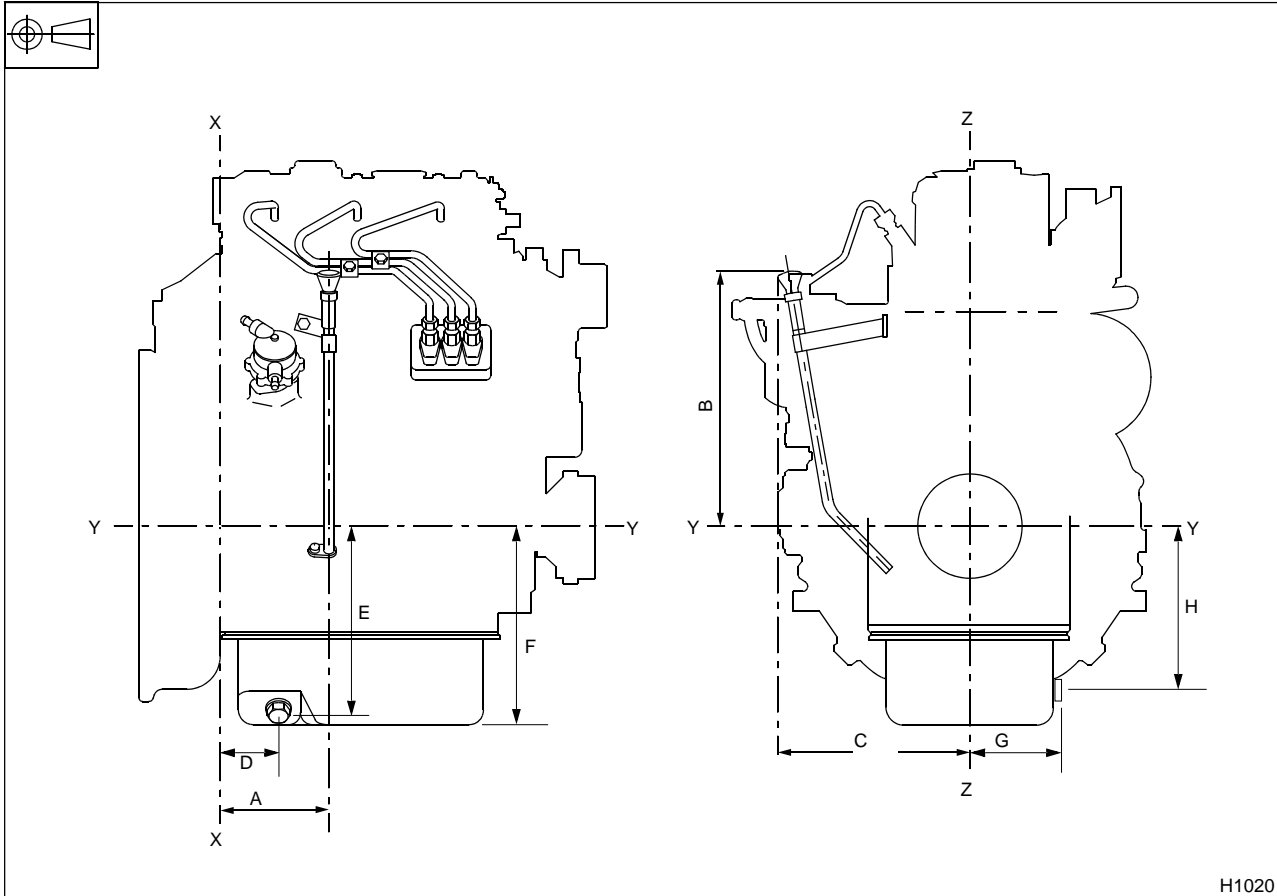
GB003 - Standard sump, long dipstick, 403D-07



GB003 - Standard sump, long dipstick, 403D-11

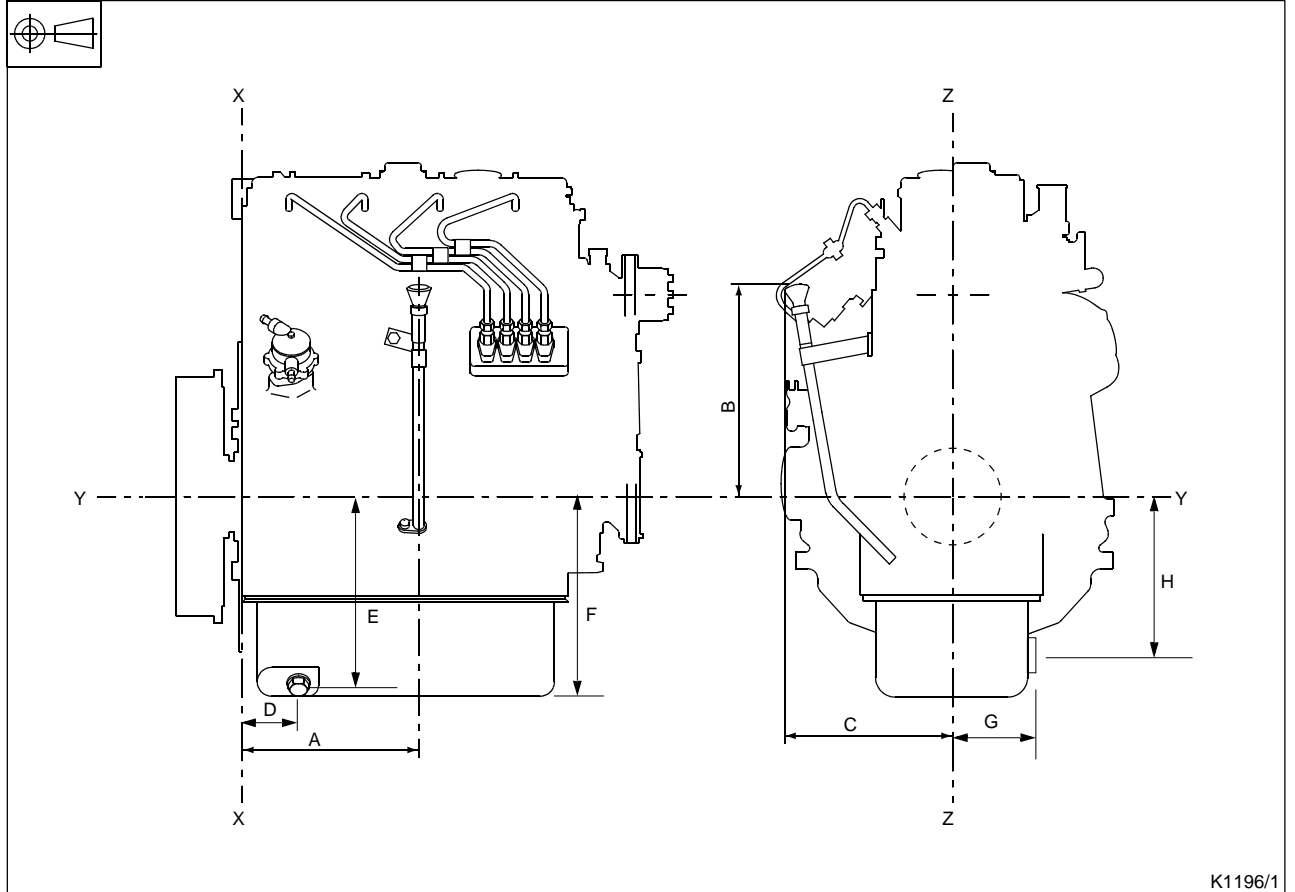


GB003 - Standard sump, long dipstick, 403D-15, 403D-15T, 403D-17



Engine	Description	Dim. A	Dim.B	Dim.C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H
403D-15 403D-15T	Dipstick 198416740 Dipstick tube 110756580 Sump 110708461	125.0	282.0	217.0	67.0	210.0	219.2	107.2	187.2
403D-17	Dipstick 198416710 Dipstick tube 110756590 Sump 110708461	125.0			67.0	219.0	229.2	106.2	197.2

GB003 - Standard sump, long dipstick, 404D-15, 404D-22, 404D-22T, 404D-22TA



Engine	Description	Dim. A	Dim. B	Dim. C	Dim. D	Dim. E	Dim. F	Dim. G	Dim. H
404D-15	Dipstick 198416830 Dipstick tube 110756570 Sump 110700060	115	307.7	191	67	206	216.2	87.2	183.7
404D-22 404D-22T 404D-22TA	Dipstick 198416710 Dipstick tube 110756590 Sump 110708381	222	260	202	70.5	221.7	254.2	107.6	221.7

Sump eco drain valve

Engine type	Description	Option
All models	No eco drain valve - 2 of sump plugs fitted	GC000
403D-11 403D-15 403D-15T 403D-17 404D-15 404D-22 404D-22T 404D-22TA	Eco drain valve - 1 of sump plug	GC001

Note: Installation dimensions can be found on the GB001, GB002 and GB003 option drawings

GC000 - No eco drain valve - 2 of sump plugs fitted

GC001 - Eco drain valve (M16), 403D-15, 403D-15T, 404D-22, 404D-22T, 404D-22TA

198736310 drawing not available at time of print

Note: The drain valve can only be fitted in the horizontal drain position, this is due to packaging when the engine is delivered.

Supply with or without oil

Engine type	Description	Option
All models	Engine supplied without oil	GD000
	Engine supplied with oil	GD001

Engine type	Description	Oil quantity litres
402D-05	For sump options GB001, GB002, GB003	2.01 Max. 1.61 Min.
403D-07	For sump options GB001, GB002, GB003	3.05 Max. 2.35 Min.
403D-11	For sump options GB001, GB002, GB003	4.40 Max. 3.40 Min.
403D-15 403D-15T 403D-17	For sump options GB001, GB002, GB003	6.00 Max. 4.50 Min.
404D-15	For sump options GB001, GB002, GB003	5.60 Max. 3.90 Min.
404D-22 404D-22T 404D-22TA	For sump options GB001, GB002, GB003	10.6 Max. 8.90 Min.

Maximum angle of continuous operation ⁽¹⁾

Engine model	Front down	Rear down	LHS down	RHS down
402D-05	TBA	TBA	TBA	TBA
403D-07	TBA	TBA	TBA	TBA
403D-11	25	25	25	25
404D-15	25	25	25	25
403D-17	35	35	35	35
403D-15T 403D-15	30	30	30	30
404D-22TA 404D-22T 404D-22	35	35	35	35

GD000 - Engine supplied without oil**GD001 - Engine supplied with oil**

1. When fitted with sump option GB001/GB002/GB003.

Lubricating oil filler

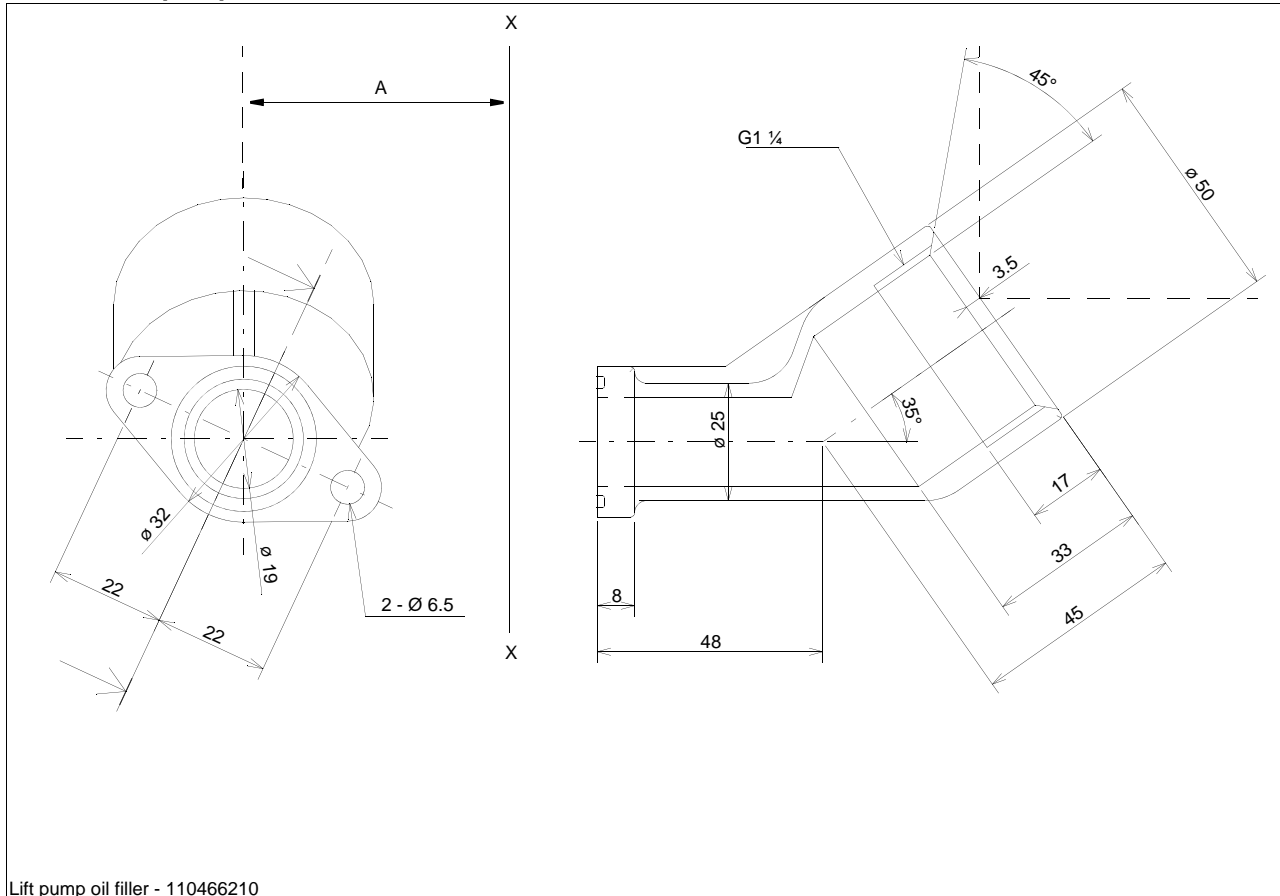
Lift pump oil filler

Engine type	Description	Option
All models	No lift pump oil filler	HB000
	Lift pump oil filler fitted ⁽¹⁾	HB003

1. Incompatible with VB000/VB006.

HB000 - No lift pump oil filler

HB003 - Lift pump oil filler, all models



Lift pump oil filler - 110466210

Engine	Dimension 'A' (mm)
402D-05	45 mm (1.77 in)
403D-07	45 mm (1.77 in)
403D-11	47 mm (1.85 in)
403D-15 403D-15T	64 mm (2.52 in)
404D-15	64 mm (2.52 in)
403D-17	64 mm (2.52 in)
404D-22 404D-22T 404D-22TA	64 mm (2.52 in)

Lubricating oil filter mount

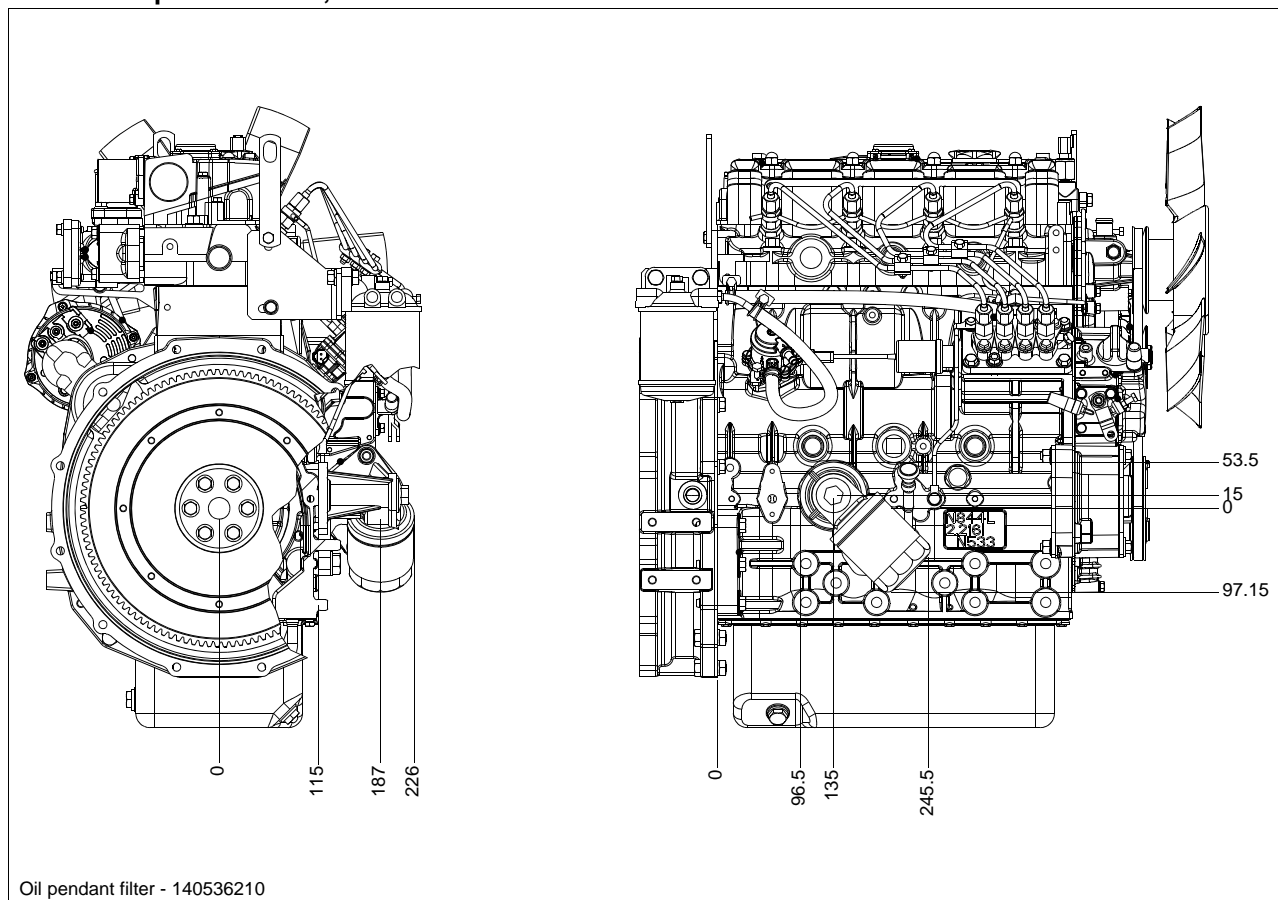
Engine type	Description	Option
All models	No pendant oil filter	JC000
404D-22 404D-22T 404D-22TA	Oil pendant filter 45° ⁽¹⁾ ⁽²⁾	JC001
403D-11	Oil pendant filter 90°	JC002

1. Incompatible with ZC101 and ZM100.
2. Must be used with long dipstick GB003.

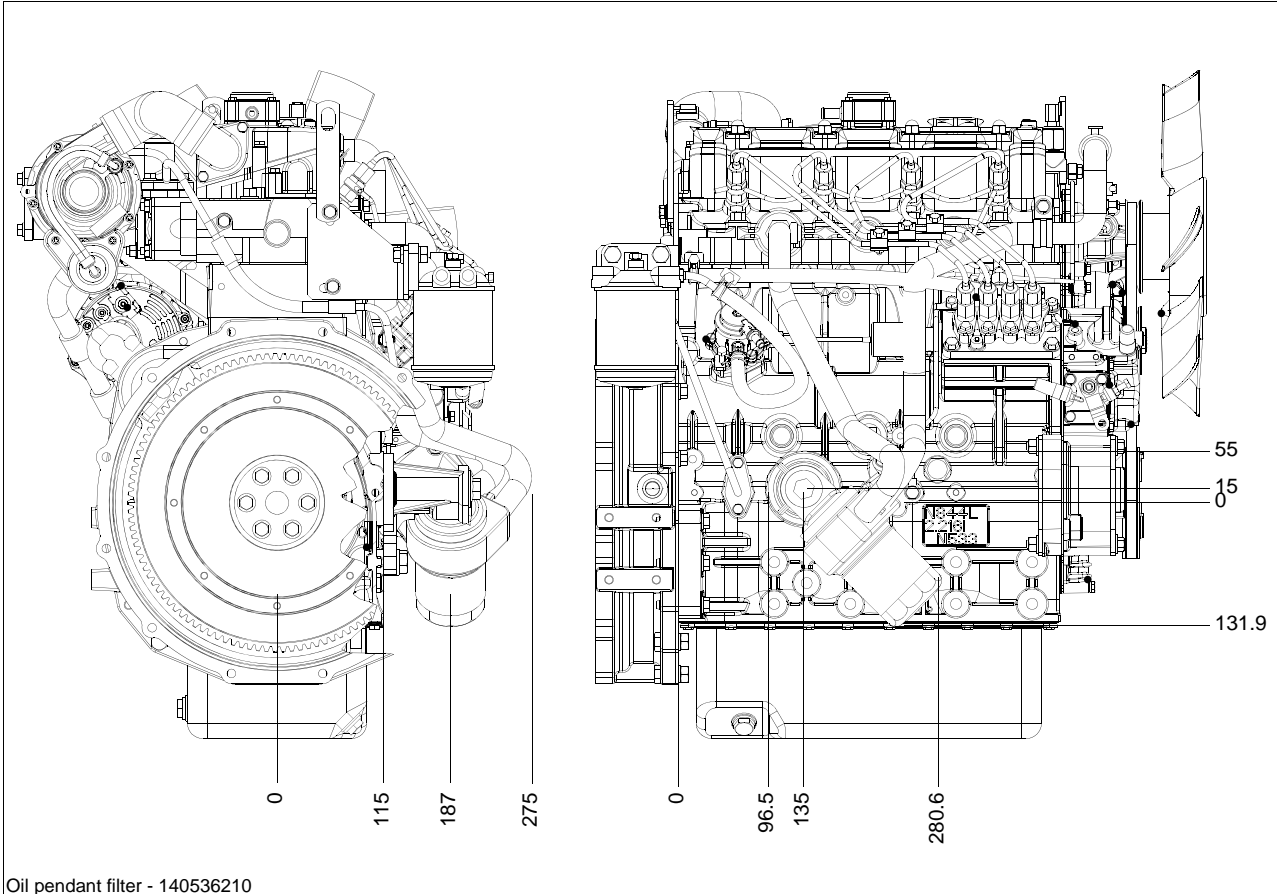
Note: No pendant oil filter option has been developed for the 402D-05, 403D-07, 404D-15.

JC000 - No pendant oil filter

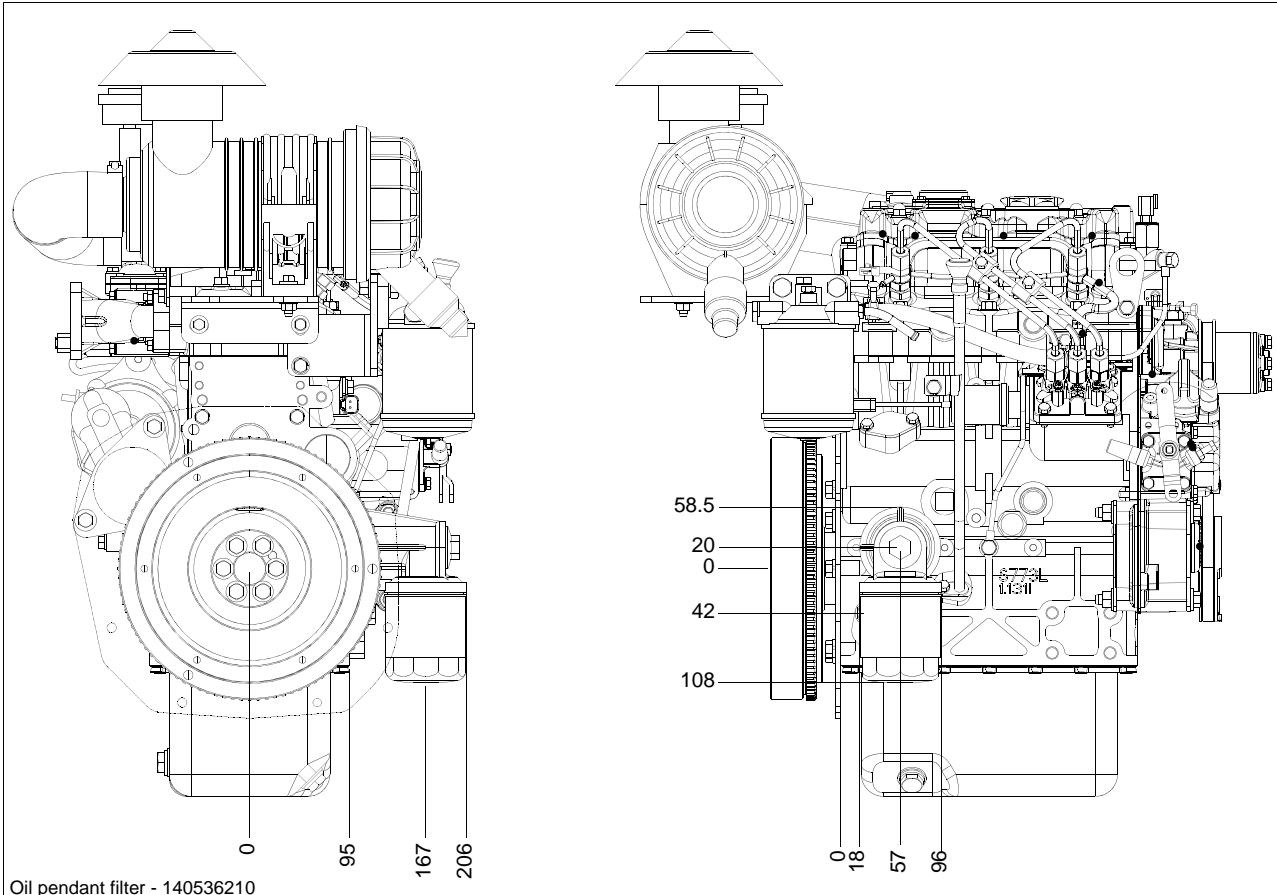
JC001 - Oil pendant filter, 404D-22



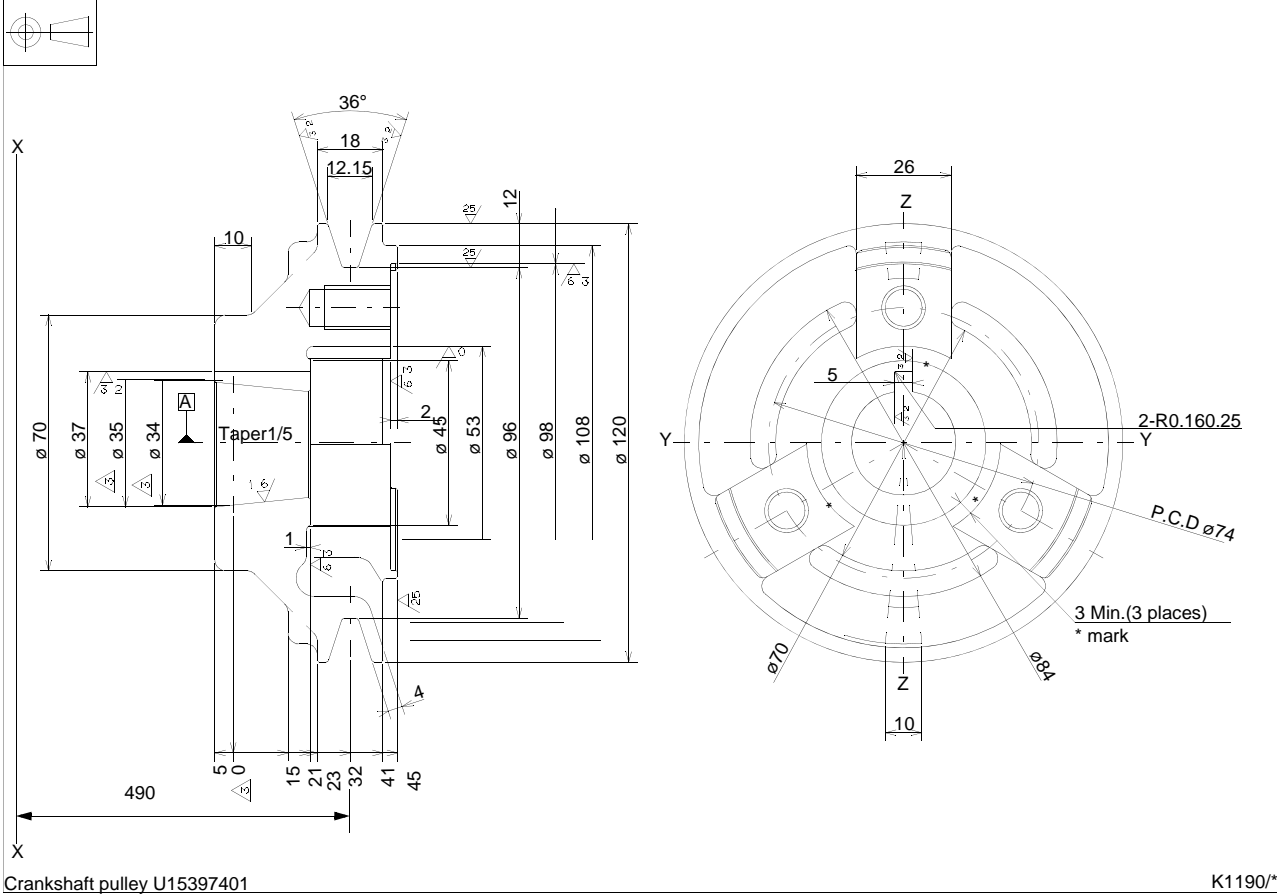
JC001 - Oil pendant filter, 404D-22T, 404D-22TA



JC002 - Oil pendant filter 90°, 403D-11

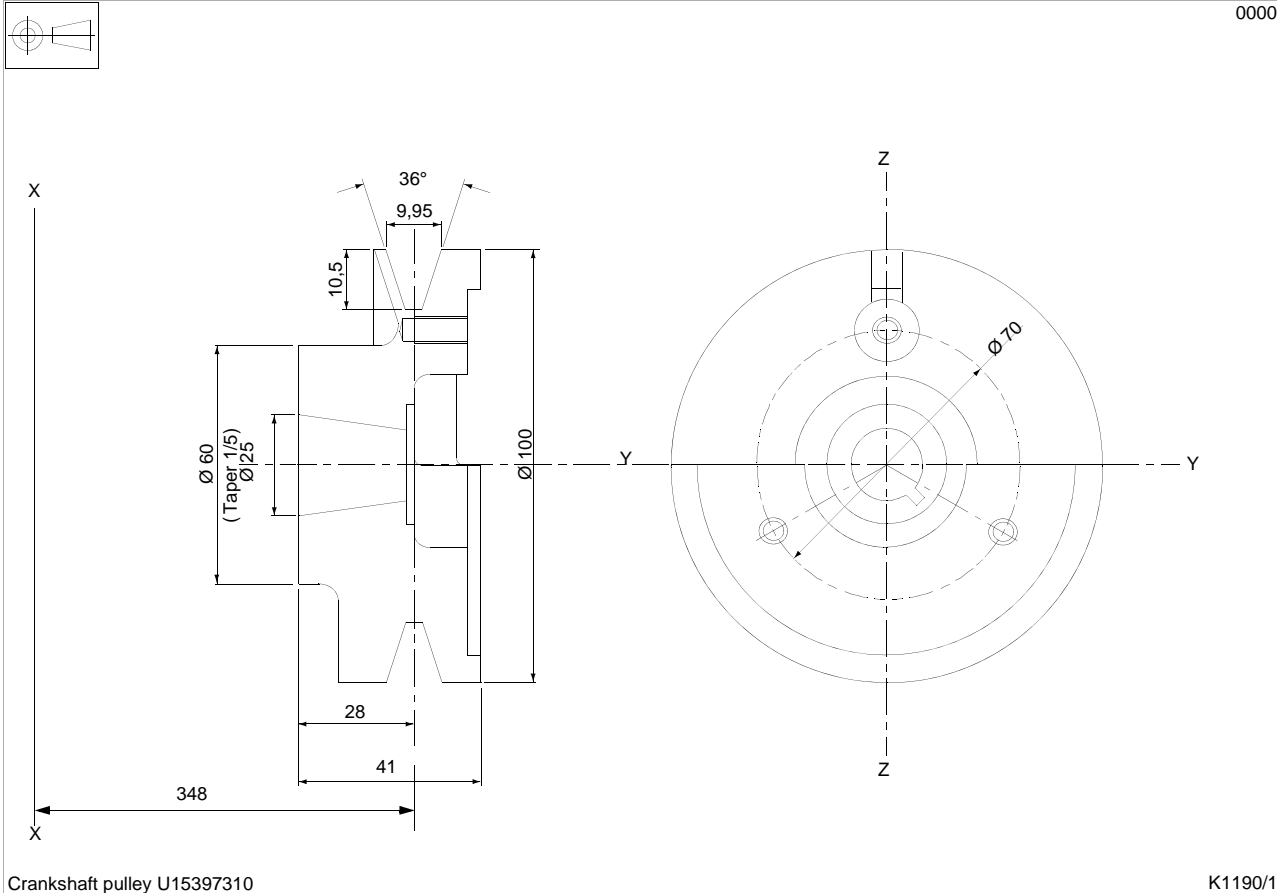


KB001 - Crankshaft pulley, Ø 120 mm, 404D-22, 404D-22T, 404D-22TA

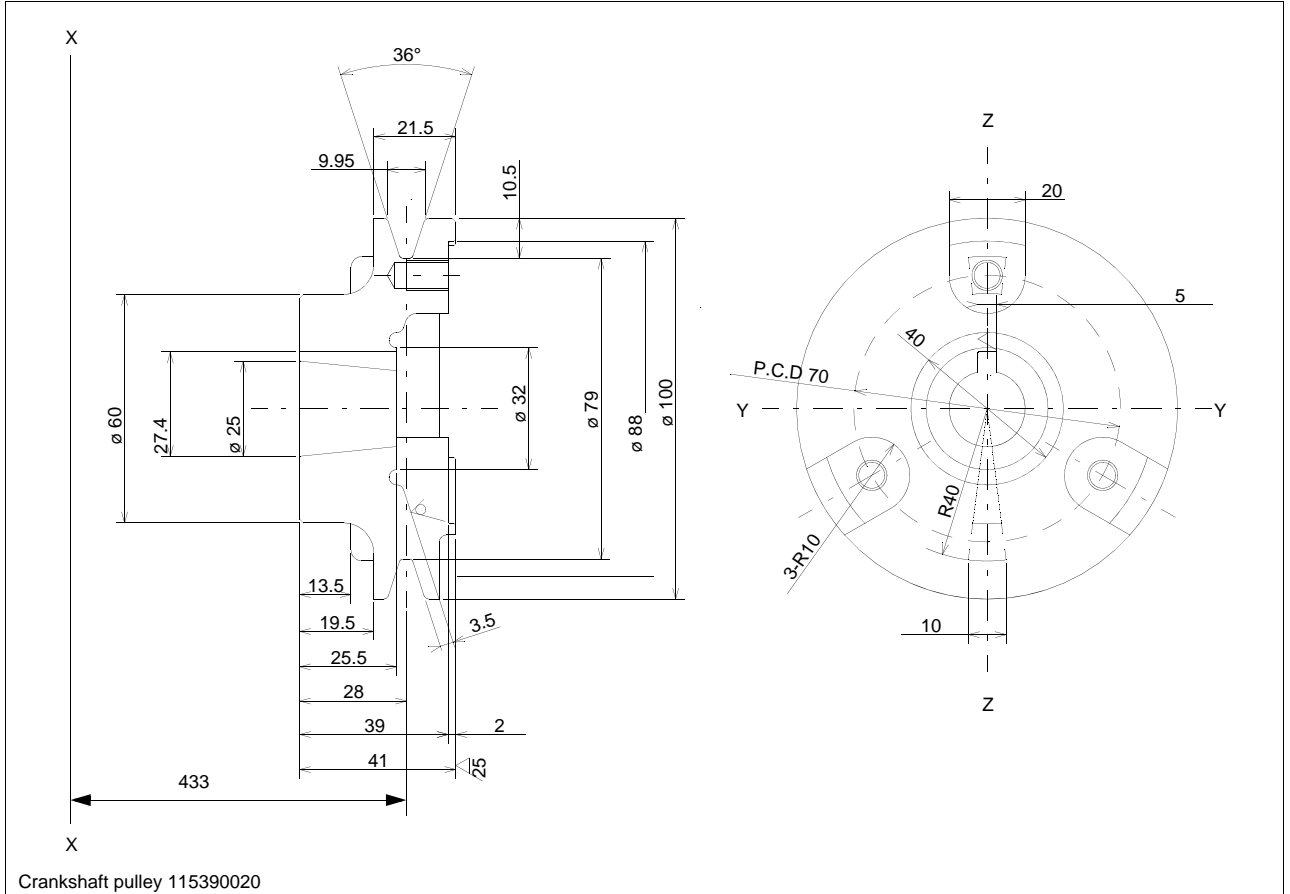


KB003 - Crankshaft pulley, drive ratio 1.285:1, 403D-11

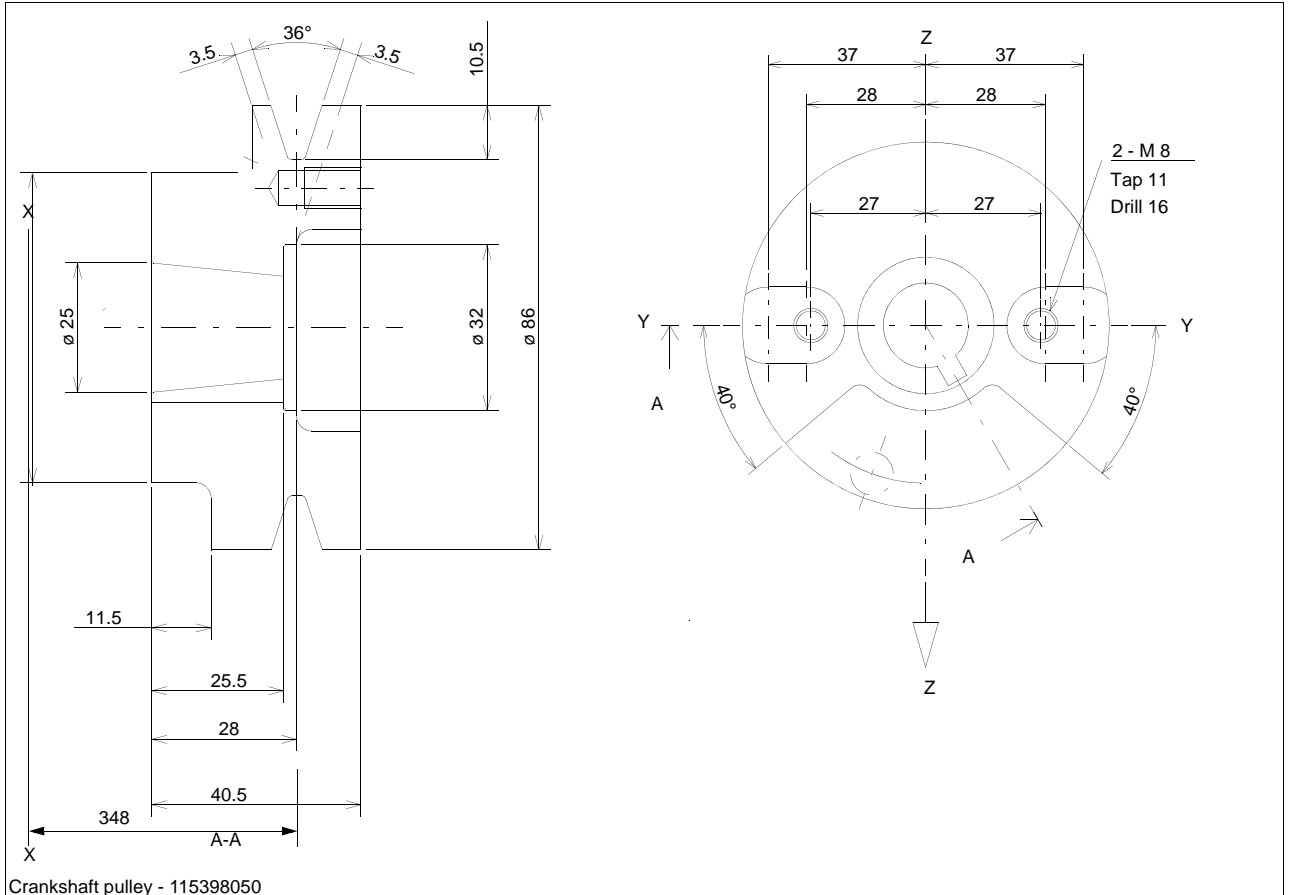
0000



KB003 - Crankshaft pulley, drive ratio 1.285:1, 404D-15



KB004 - Crankshaft pulley, drive ratio 1.105:1, 403D-11



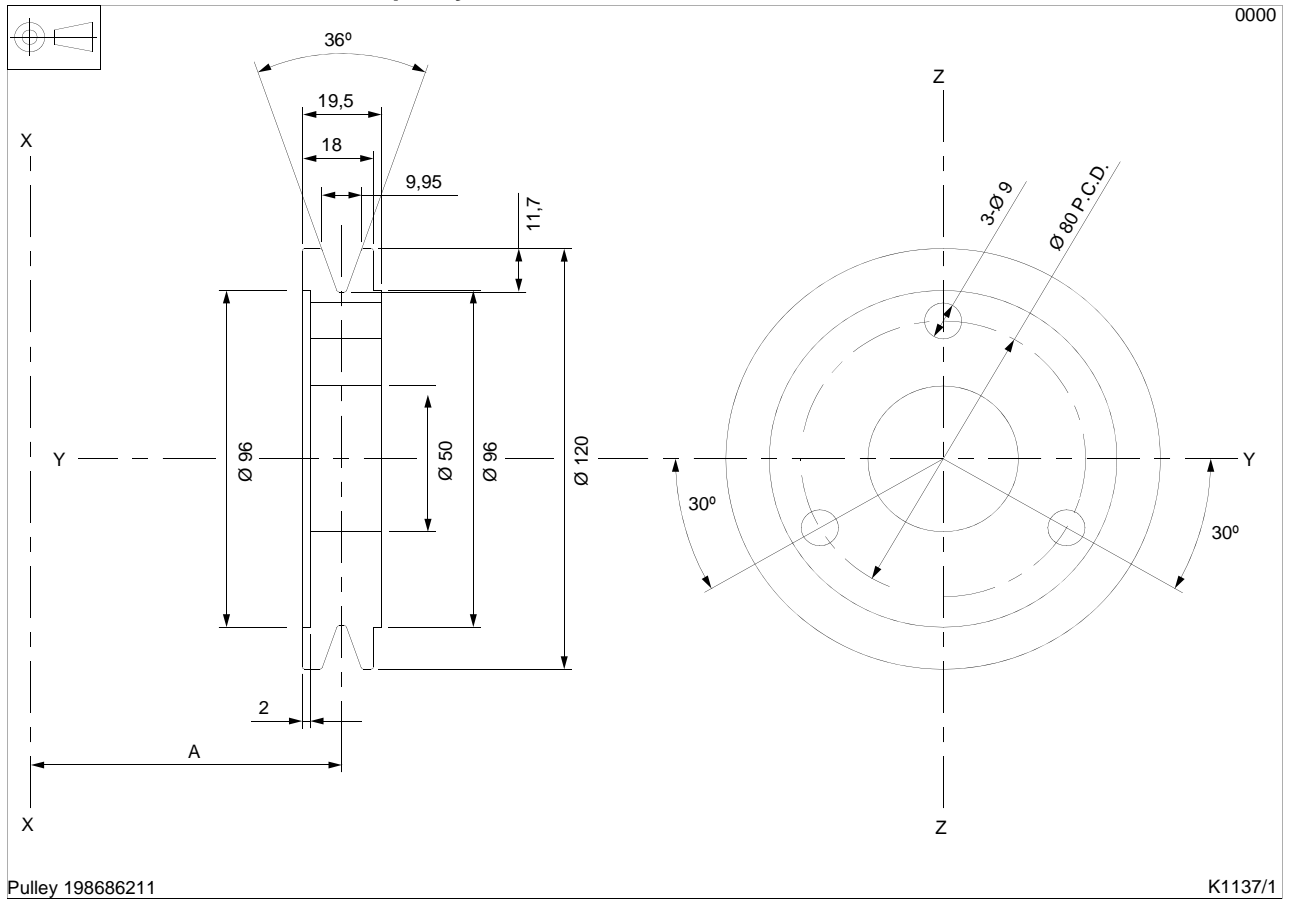
Front end drive - output

Engine type	Description	Option
All models	Not required	KD000
402D-05 403D-07 403D-11 403D-15 403D-15T 404D-15 403D-17 404D-22 404D-22T 404D-22TA	Additional crankshaft pulley ⁽¹⁾	KD001

1. Incompatible with ZM001/ZM002.

KD000 - Not required

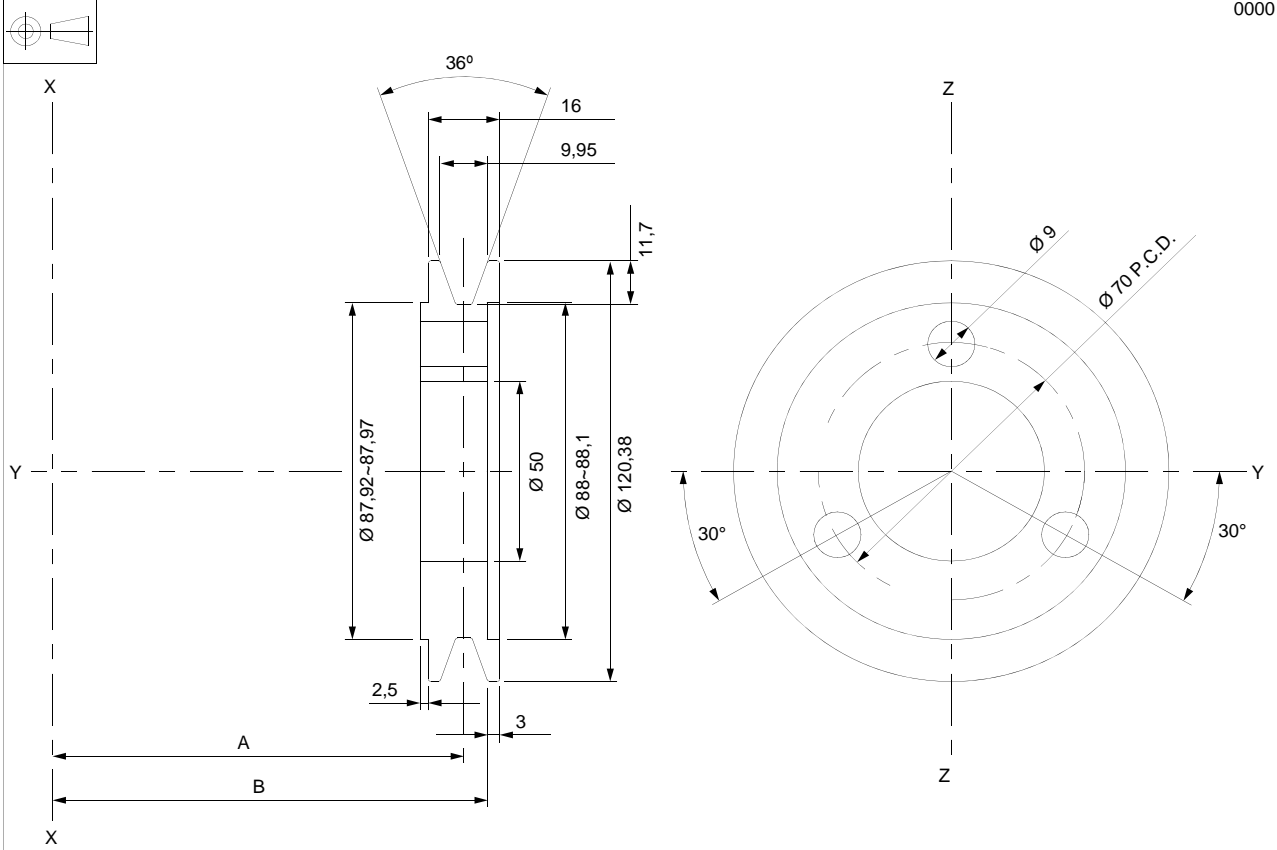
KD001 - Additional crankshaft pulley, 402D-05, 403D-07



Engine type	Dimension "A" mm (in)
402D-05	272
403D-07	346

KD001 - Additional crankshaft pulley, 403D-11, 404D-15

0000

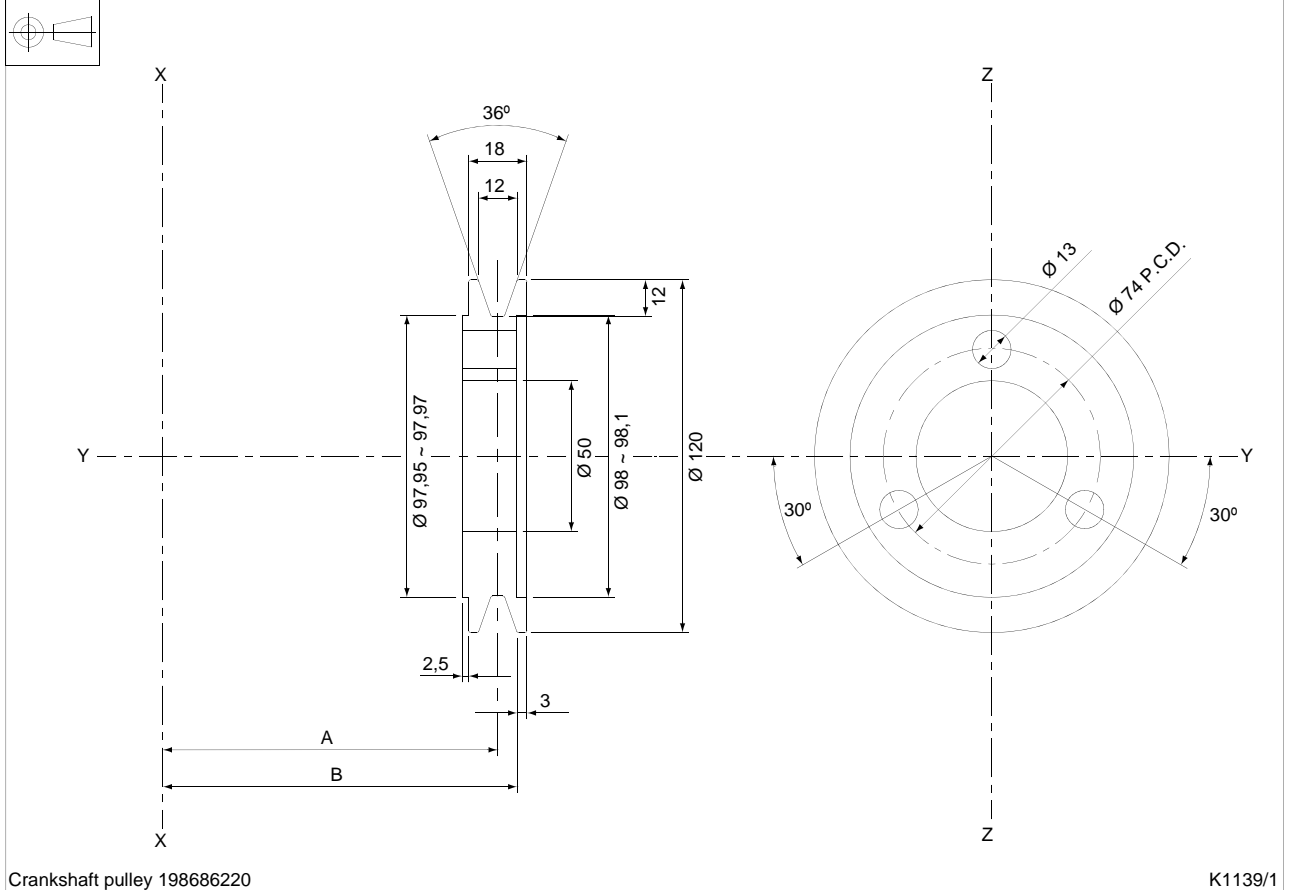


Pulley 198686191

K1138/1

Engine type	Dimension "A" mm (in)	Dimension "B" mm (in)
403D-11	366,5 (14.4)	371,5 (14.6)
404D-15	456,4 (17.9)	461,4 (18.2)

KD001 - Additional crankshaft pulley, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA



Engine	Dimension "A" mm (in)	Dimension "B" mm (in)
403D-15 403D-15T 403D-17	431 (16.9)	437 (17.2)
404D-22 404D-22T 404D-22TA	512	518

Oil cooler

Engine type	Description	Option
402D-05 403D-07 403D-11 403D-15 403D-15T 403D-17 404D-15 404D-22	No oil cooler required	LB001
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Oil cooler fitted ⁽¹⁾	LB002

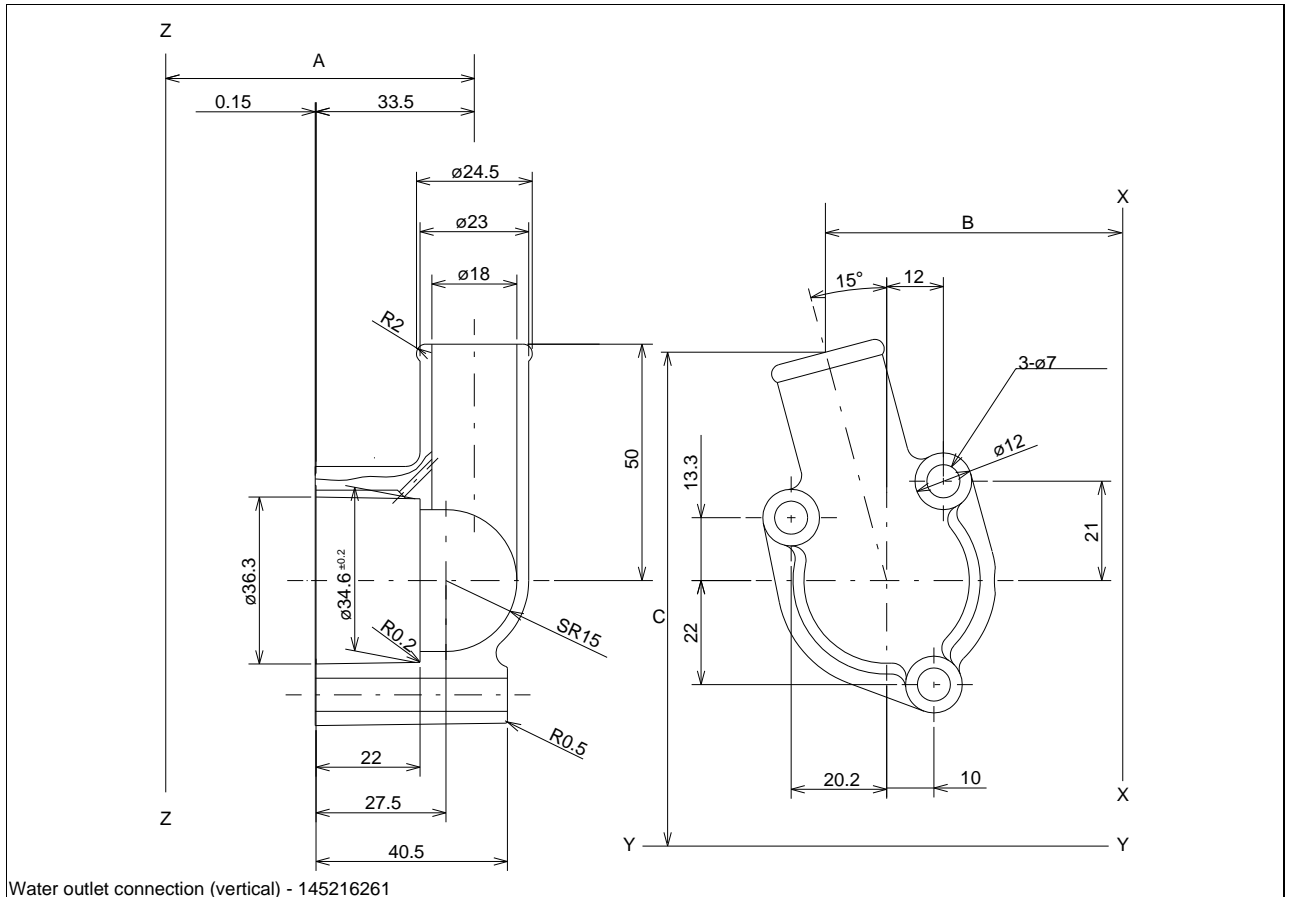
1. It is mandatory that the oil cooler option LB002 is selected for the 403D-15T, 404D-22T, and the 404D-22TA.

For installation dimensions showing the oil cooler fitted with the pendant filter option JC001, see “JC001 - Oil pendant filter, 404D-22” on page 115.

Water outlet connections

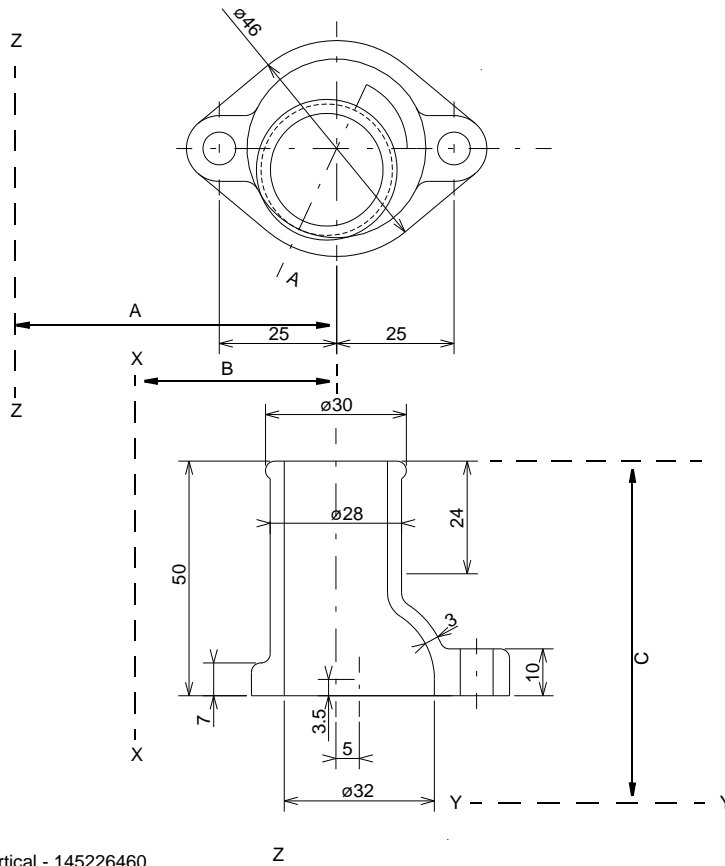
Engine type	Description	Option
All models	Water outlet connection, vertical	LD001
403D-11	Water outlet connection, horizontal <i>incompatible with cooling packs</i>	LD002
403D-15	Water outlet connection, horizontal <i>incompatible with cooling packs</i>	LD002
403D-15T 403D-17	Water outlet connection, 45° <i>incompatible with cooling packs</i>	LD003
404D-22	Water outlet connection, horizontal	LD002
404D-22T 404D-22TA	Water outlet connection 45°	LD003

LD001 - Water outlet connection, vertical, 402D-05, 403D-07



Option	Engine type	Dimension A	Dimension B	Dimension C
LD001	402D-05	108.7	162.7	256.7
	403D-07	108.7	236.7	256.7

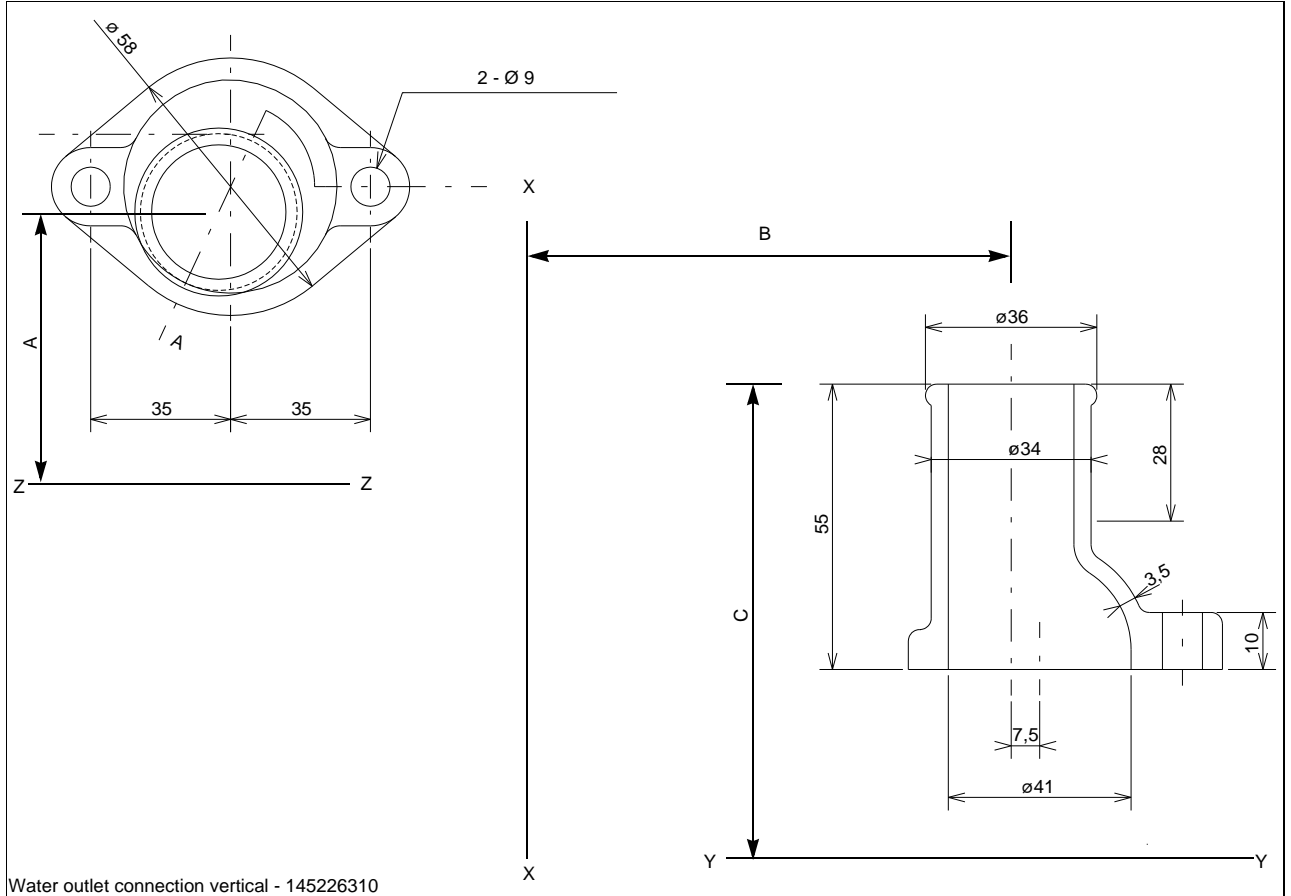
LD001 - Water outlet connection, vertical, 403D-11, 404D-15



Water outlet connection vertical - 145226460

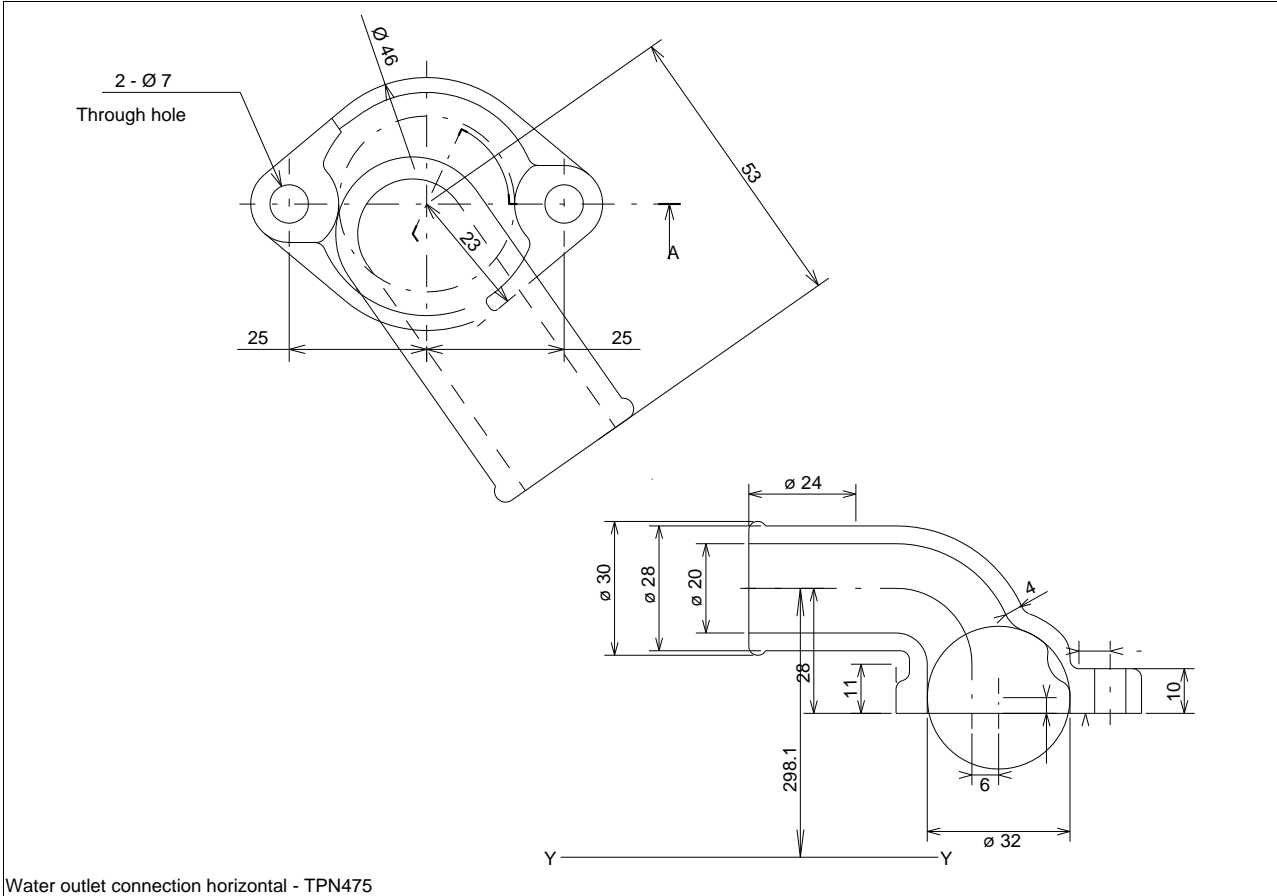
Engine	Dimension A	Dimension B	Dimension C
403D-11	107 mm (4.2 in)	253 mm (13.3 in)	320,1 mm (12.6 in)
404D-15	107 mm (4.2 in)	337 mm (10.0 in)	320,1 mm (12.6 in)

LD001 - Water outlet connection, vertical, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA



Engine	Dimension A mm (in)	Dimension B mm (in)	Dimension C mm (in)
403D-15 403D-15T	127 (5.0)	280.7 (11.1)	371.3 (14.6)
403D-17	125.5 (4.9)	281.8 (11.1)	391.3 (15.4)
404D-22 404D-22T 404D-22TA	127.4 (5.0)	374.7 (14.7)	392.4 (15.4)

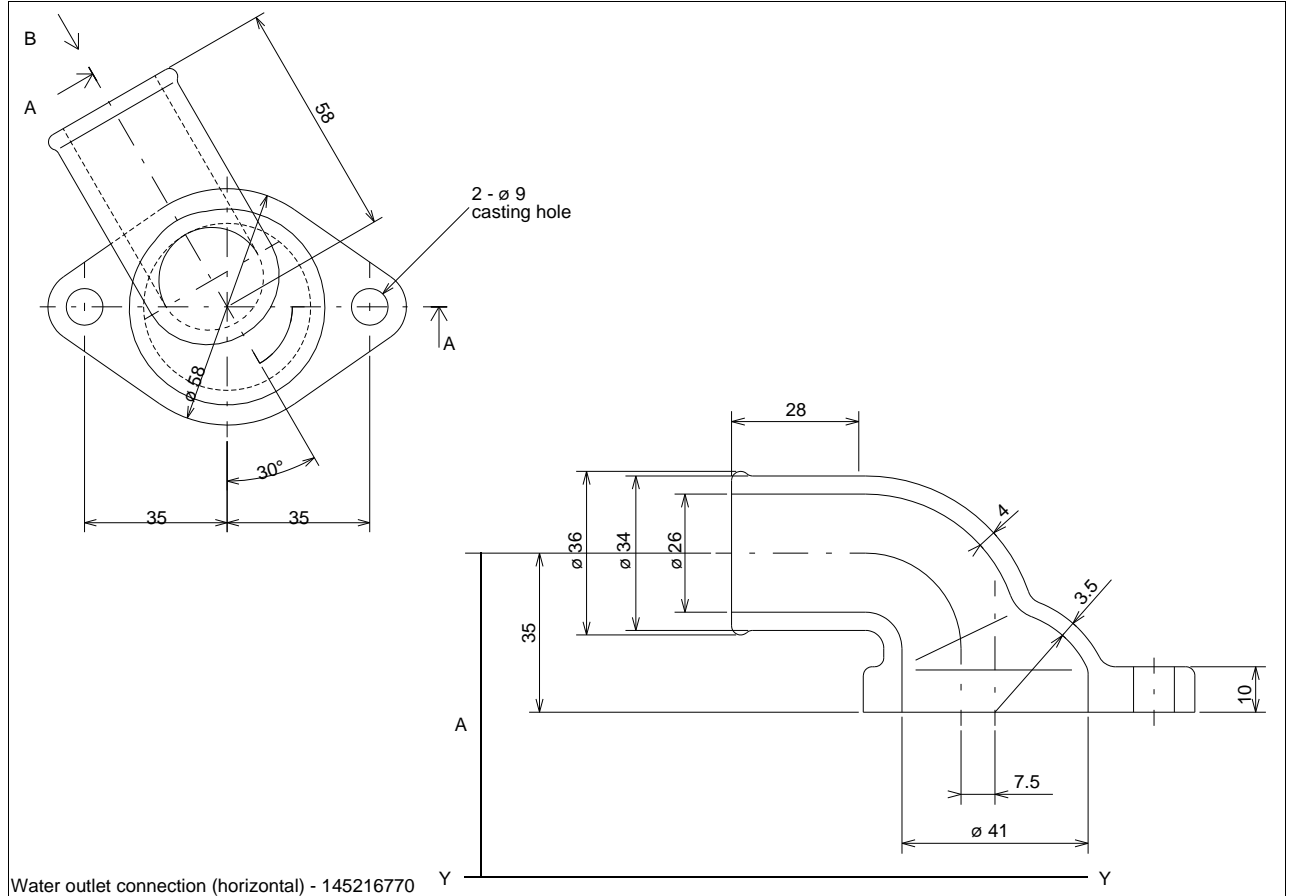
LD002 - Water outlet connection, horizontal, 403D-11



Water outlet connection horizontal - TPN475

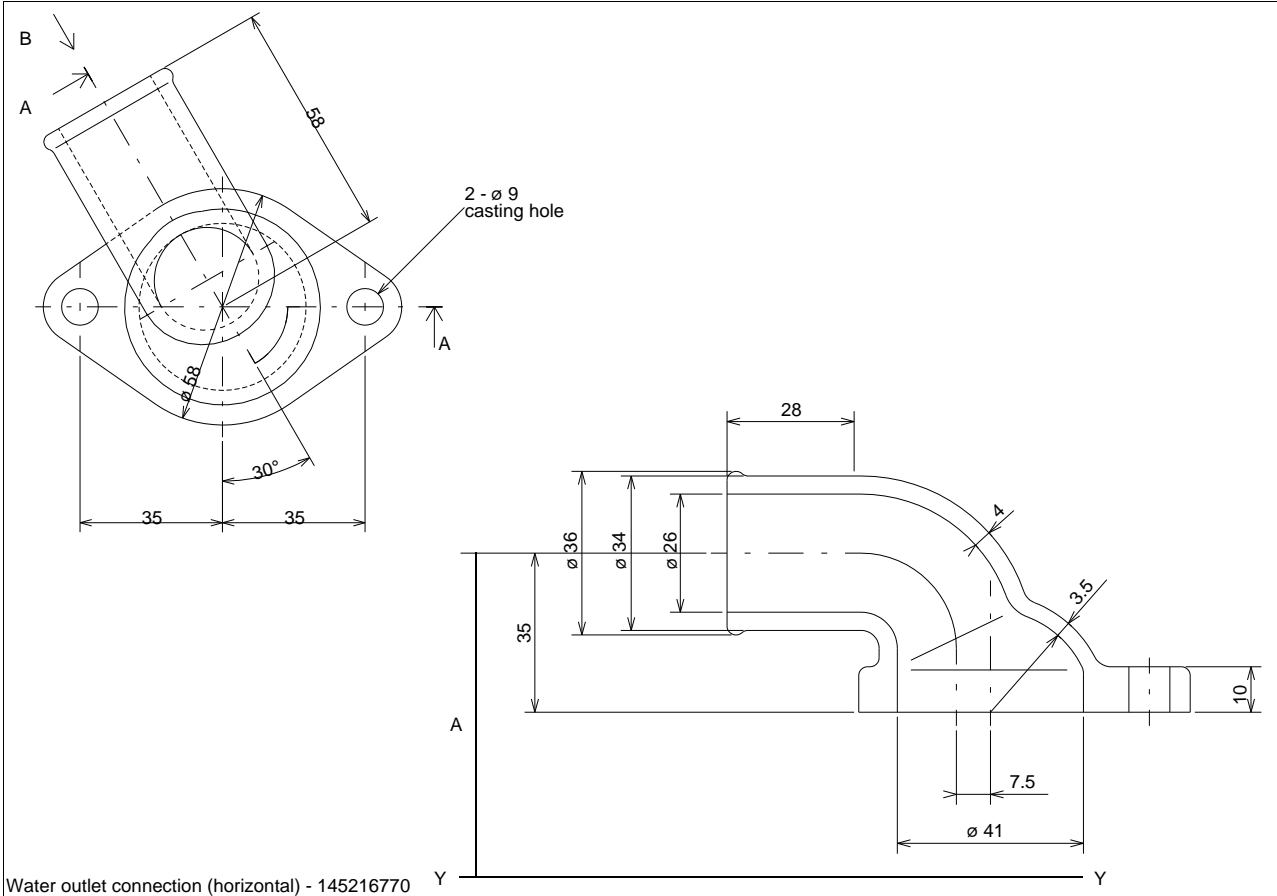
Engine	Dimension A mm (in)	Dimension B mm (in)	Dimension C mm (in)
403D-11			

LD002 - Water outlet connection, horizontal, 403D-15, 403D-15T403D-17

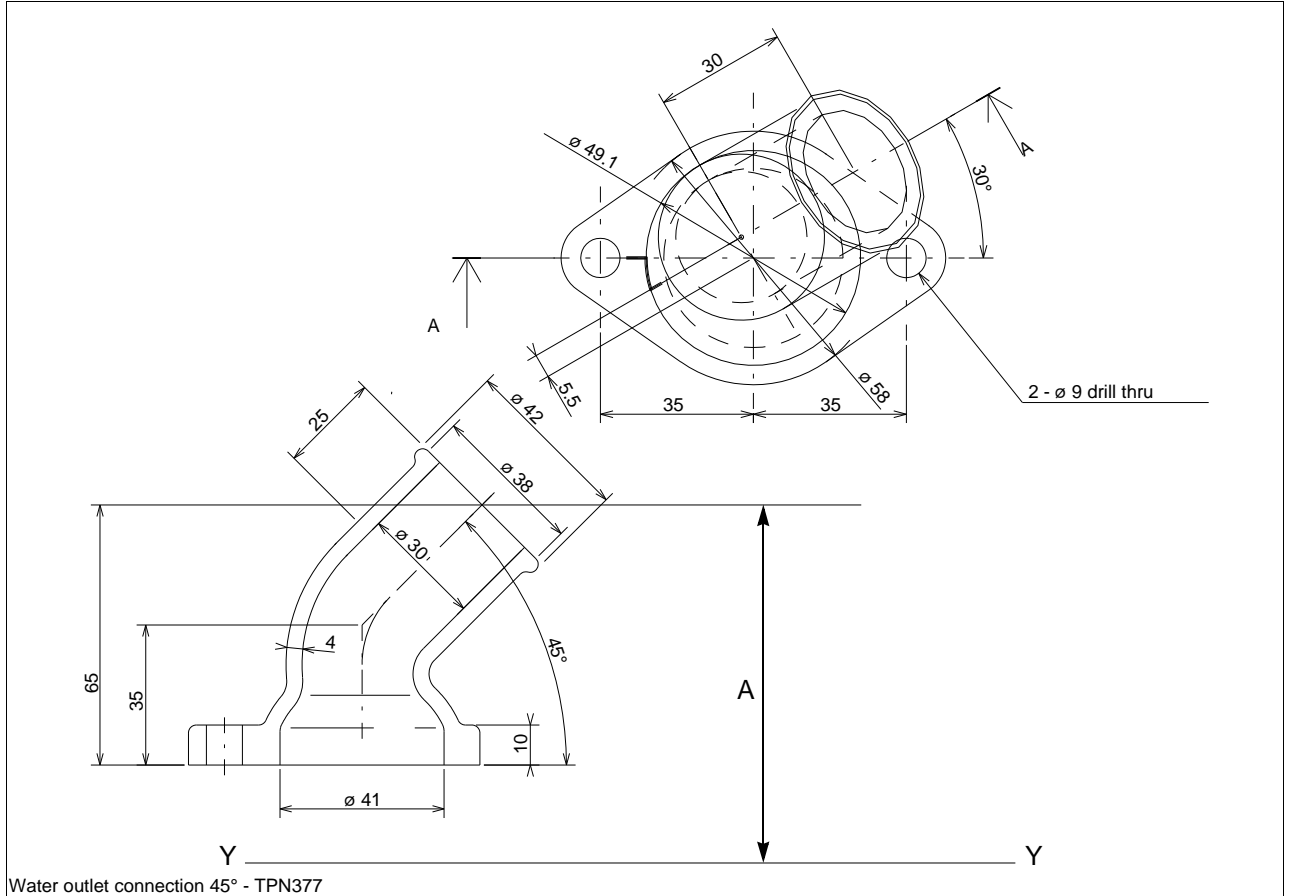


Engine	Dimension A mm (in)	Dimension B mm (in)	Dimension C mm (in)
403D-15			
403D-15T			
403D-17			

LD002 - Water outlet connection, horizontal, 404D-22, 404D-22T, 404D-22TA



LD003 - Water outlet connection, 45°, 403D-15, 403D-15T, 403D-17



Engine	Dimension A mm (in)	Dimension B mm (in)	Dimension C mm (in)
403D-15			
403D-15T			
403D-17			

Cooling fan

Engine type	Description	Option
402D-05 403D-07 403D-11 404D-15	Fan not required - 2.3 mm fan plate fitted	MD002
402D-05	Puller fan (250 mm)	MD011
	Pusher fan (260 mm)	MD012
403D-07	Puller fan (280 mm)	MD009
	Pusher fan (280 mm)	MD010
403D-11	Cooling pack required/320 mm fan ⁽¹⁾	MD000
403D-11	Puller fan (330 mm)	<i>incompatible with ZM001/ZM002</i>
	Pusher fan (330 mm)	<i>incompatible with ZM001/ZM002</i>
403D-15	Cooling pack required/320 mm puller fan ⁽¹⁾	MD000
403D-15 403D-15T	Fan not required - 4.5 mm plate fitted	MD001
	Puller fan (390 mm)	<i>incompatible with ZM001/ZM002</i>
	Pusher fan (390 mm)	<i>incompatible with ZM001/ZM002</i>
	Puller fan (340 mm)	<i>incompatible with ZM001/ZM002</i>
	Pusher fan (340 mm)	<i>incompatible with ZM001/ZM002</i>
403D-17	Fan not required - 4.5 mm plate fitted	MD001
	Puller fan (340 mm)	MD005
	Pusher fan (340 mm)	MD006
404D-15	Fan not required - 2.3 mm fan plate fitted	MD002
	Puller fan (340 mm)	MD005
	Pusher fan (340 mm)	MD006
404D-22	Cooling pack required/320 mm fan ⁽¹⁾	MD000
404D-22 404D-22T 404D-22TA	Fan not required - 4.5 mm plate fitted	MD001
	Puller fan (390 mm)	<i>incompatible with ZM001</i>
	Pusher fan (390 mm)	<i>incompatible with ZM001</i>
All models	Not required - no fan plate ⁽²⁾	MD023

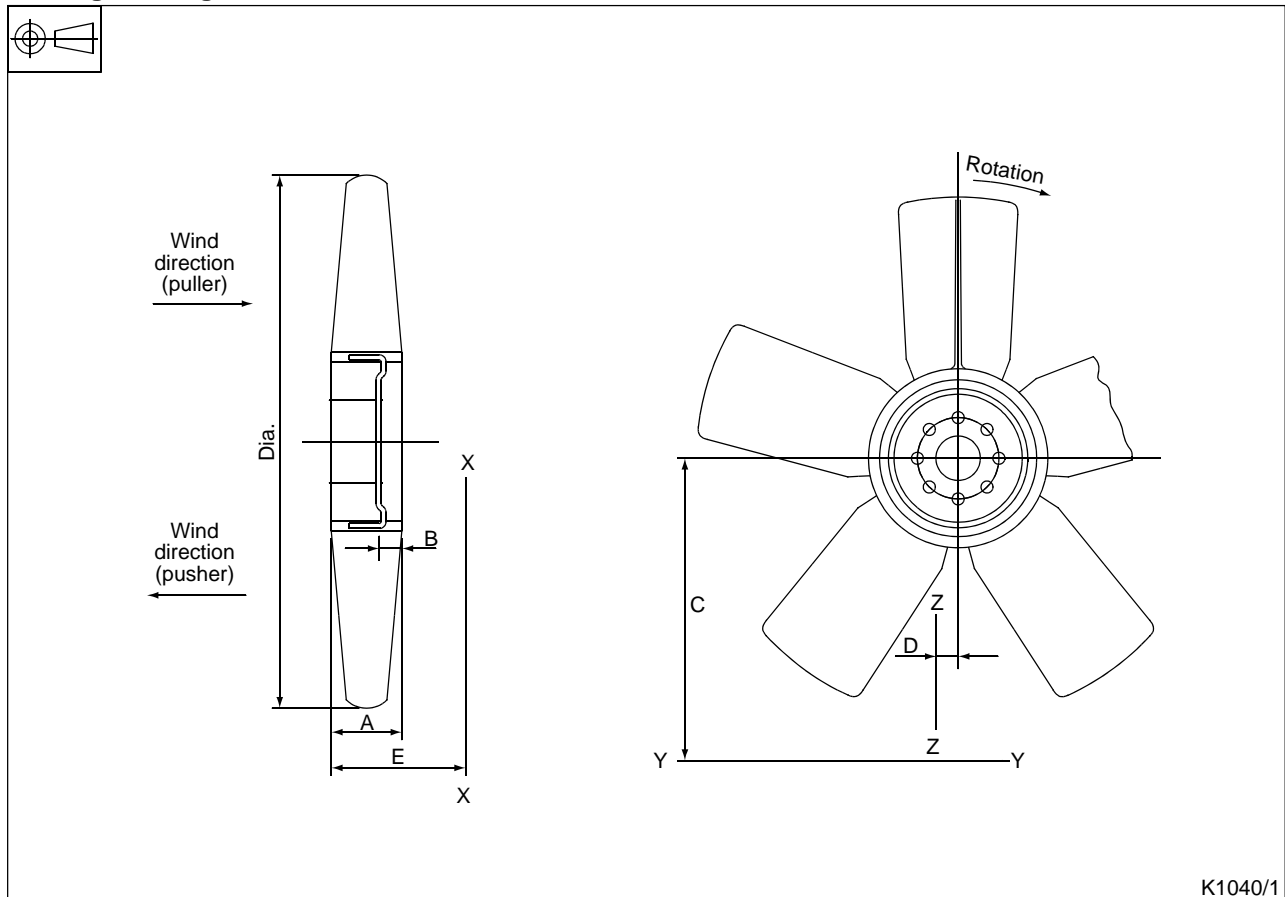
1. If a radiator assembly is specified for 403D-11, 403D-15 404D-22 then the '**MD000**' option must be entered on the order form. The radiator assemblies all include a fan.
2. Option MD023 should be selected if no fan is required but a fan spacer ME*** from page 141 must be selected.

Cautions:

- In open power installations, where the fan is exposed to long periods of direct sunlight, some degradation of the plastic material may occur due to the effects of ultraviolet rays. In extreme cases, this may lead to the fan material becoming brittle.
- Where fans are subject to long periods of exposure to sunlight, it is recommended that a special provision is made to shield the fan, (or that the fan is made of an alternative material).

Note: All fans specified above are plastic.

Cooling fan diagram, 402D-05



K1040/1

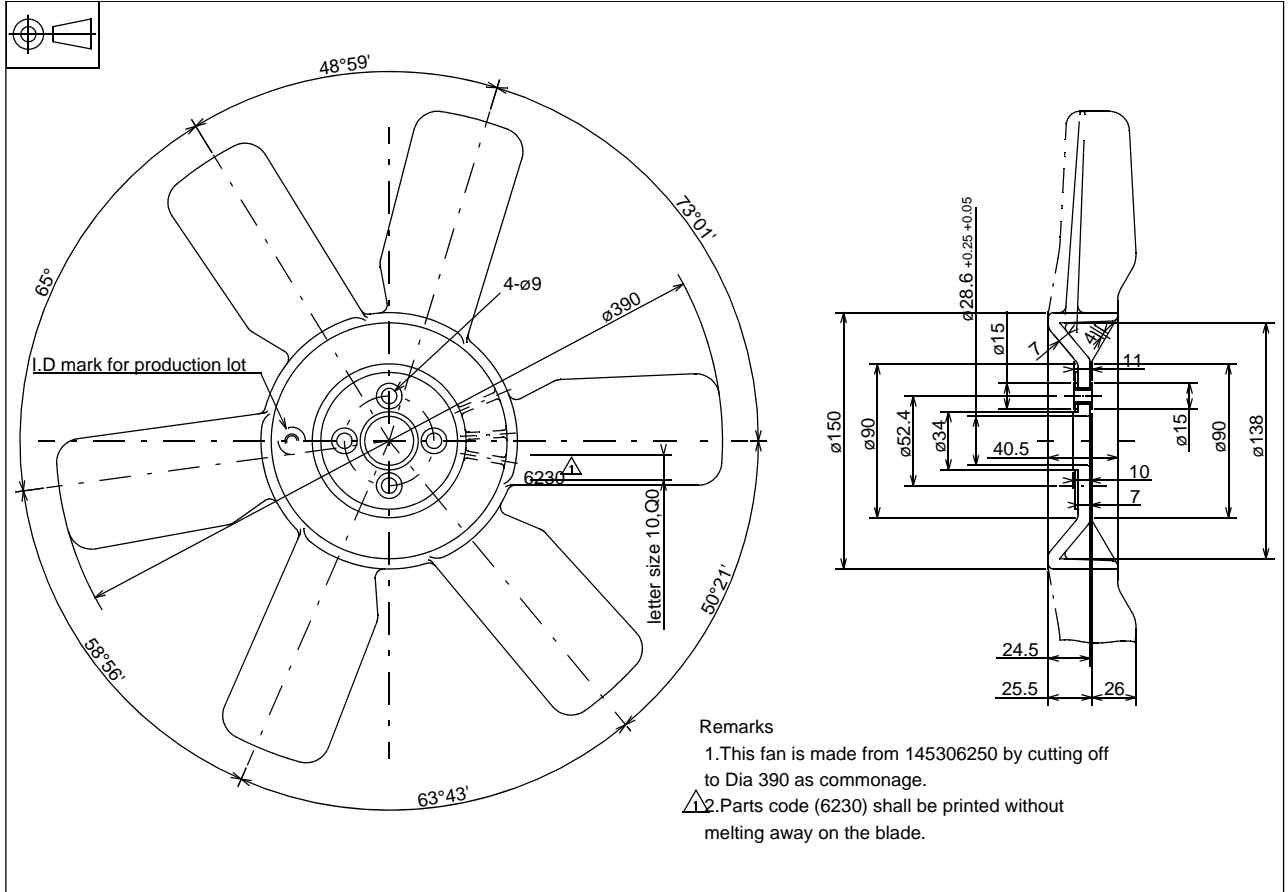
Fan specification

Engine type	Fan type	Number of blades	P.C.D. centres	Fitment holes	Dimension						Option
					Dia.	A	B	C	D	E	
402D-05	Puller	6	40	4	250	37	16	175	0	310,3 ⁽¹⁾	MD011
	Pusher	5	40	4	260	40	28	175	0	315	MD012
403D-07	Puller	6	40	4	280	37	16	175	0	384,5 ⁽¹⁾	MD009
	Pusher	5	40	4	280	40	28	175	0	389	MD010
403D-11	Puller	7	40/52,4	4	330	31	24,5	195	6	399	MD007
	Pusher	6	40	4	330	46	26	195	6	412	MD008
403D-15 403D-15T	Puller	7	40	4	340	38	16	254	0	474,0	MD005
	Pusher	6	40	4	340	33,5	16,5	254	0	472,0	MD006
	Puller	6	52,4	4	390	40,5	20	254	0	474,4 ⁽²⁾	MD003
	Pusher	6	40	4	390	50	16,5	254	0	471,5	MD004
403D-17	Puller	7	40	4	340	38	16	254	0	474,0	MD005
	Pusher	6	40	4	340	33,5	16,5	254	0	472,0	MD006
404D-15	Puller	7	40	4	340	38	16	188	2	512,0	MD005
	Pusher	6	40	4	340	33,5	16,5	188	2	510,0	MD006
404D-22 404D-22T 404D-22TA	Puller	6	52,4	4	390	40,5	20	276	0	569,5 ⁽²⁾	MD003
	Pusher	6	40	4	390	50	16,5	276	0	566,5	MD004

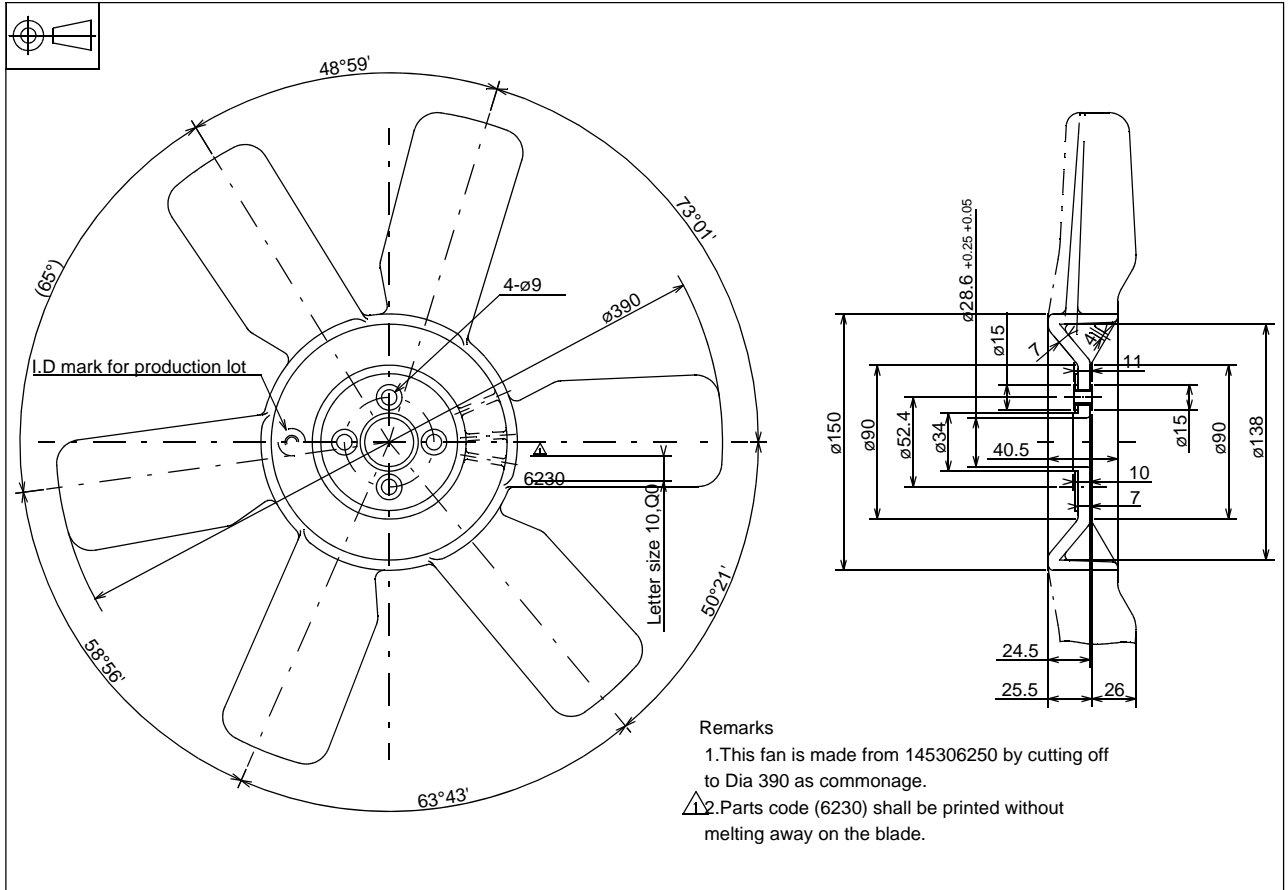
1. Fitted with a 2.3 mm fan spacer
2. Fitted with a 11.0 mm fan spacer.

Note: See page 335 for the fan performance curves.

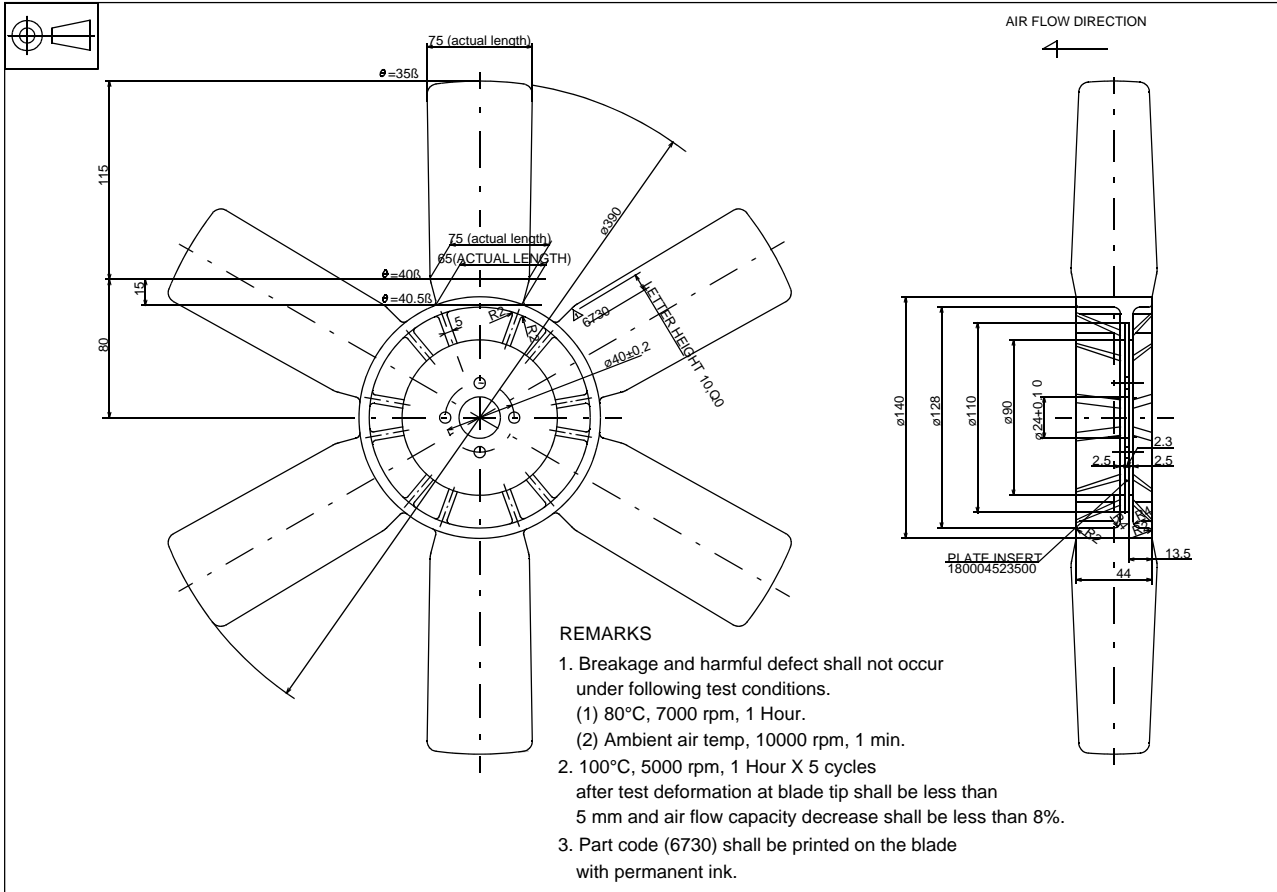
MD003 - 390 mm puller fan, 403D-15, 403D-15T



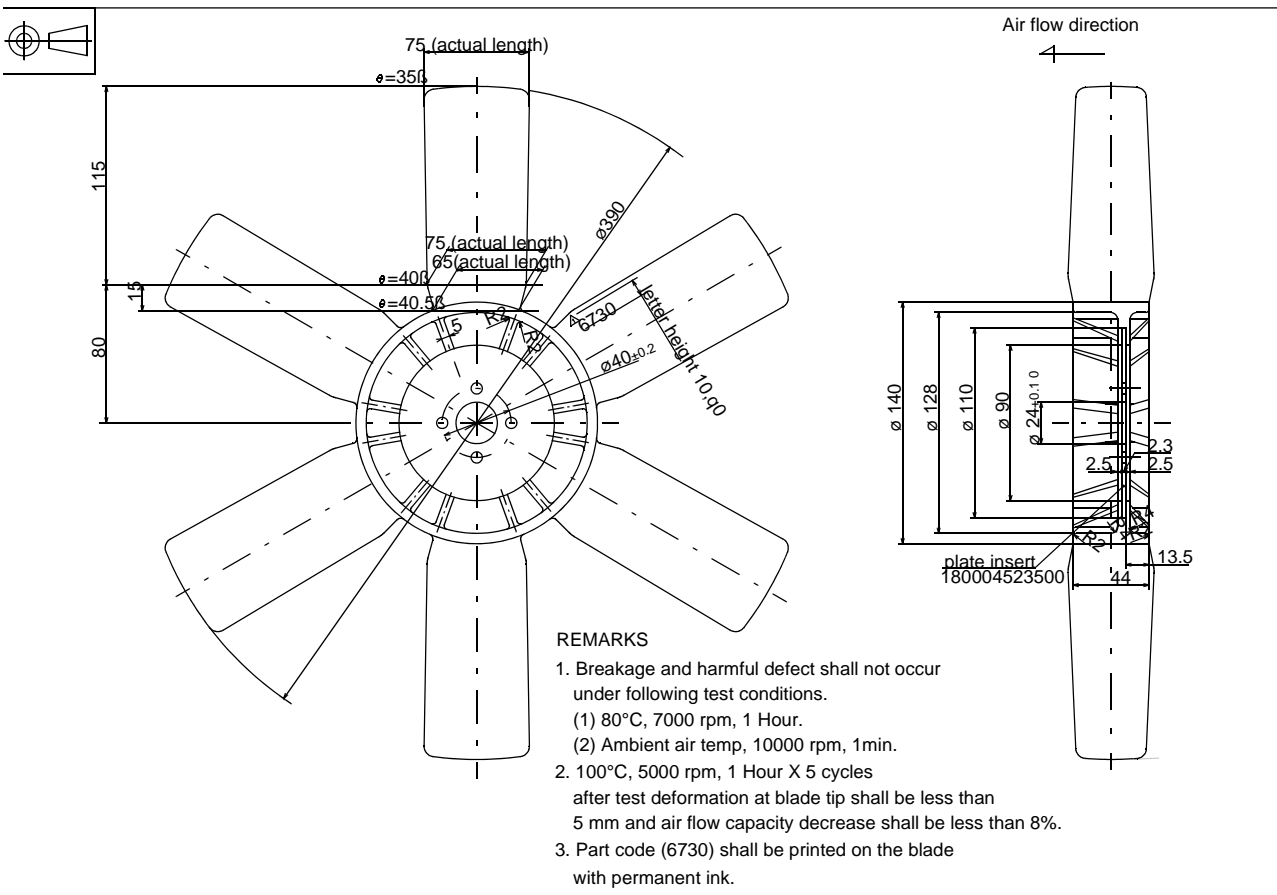
MD003 - 390 mm puller fan, 404D-22, 404D-22T, 404D-22TA



MD004 - 390 mm pusher fan, 403D-15, 403D-15T



MD004 - 390 mm pusher fan, 404D-22, 404D-22T, 404D-22TA



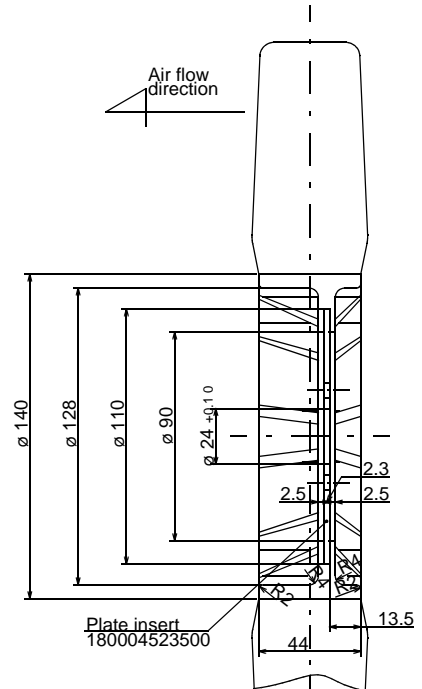
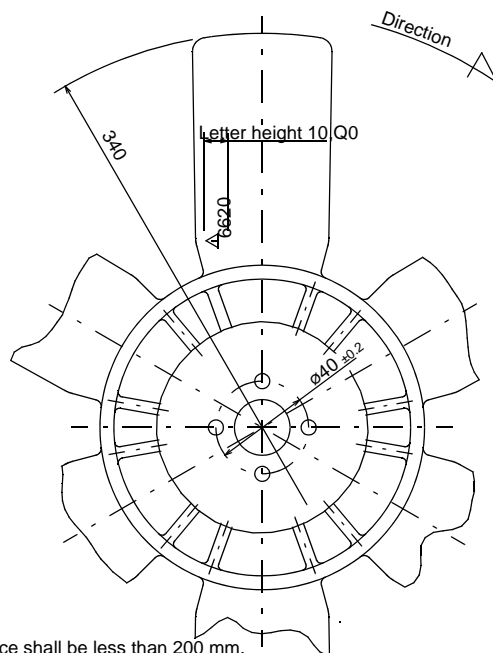
MD005 - 340 mm puller fan, 403D-15, 403D-15T, 404D-15, 403D-17



Drawing not available at time of print

Puller fan - 145306520

MD006 - 340 mm pusher fan, 403D-15, 403D-15T, 404D-15, 403D-17



- Remarks
1. Static unbalance shall be less than 200 mm.
 2. Breakage and harmful defect shall not occur under following test conditions.
 - (1) 80°C, 7000 rpm, 1 Hr
 - (2) Ambient air Temp, 10000 rpm, 1 min
 3. 100°C, 5000 rpm, 1 Hr X 5 cycles after test, deformation at blade tip shall be less than 5 mm and air flow capacity decrease shall be less than 8%.
 4. Part code (6620) shall be printed on the blade with unerasable ink.

MD009 - 280 mm puller fan, 403D-07



Drawing not available at time of print

Puller fan - 145306590

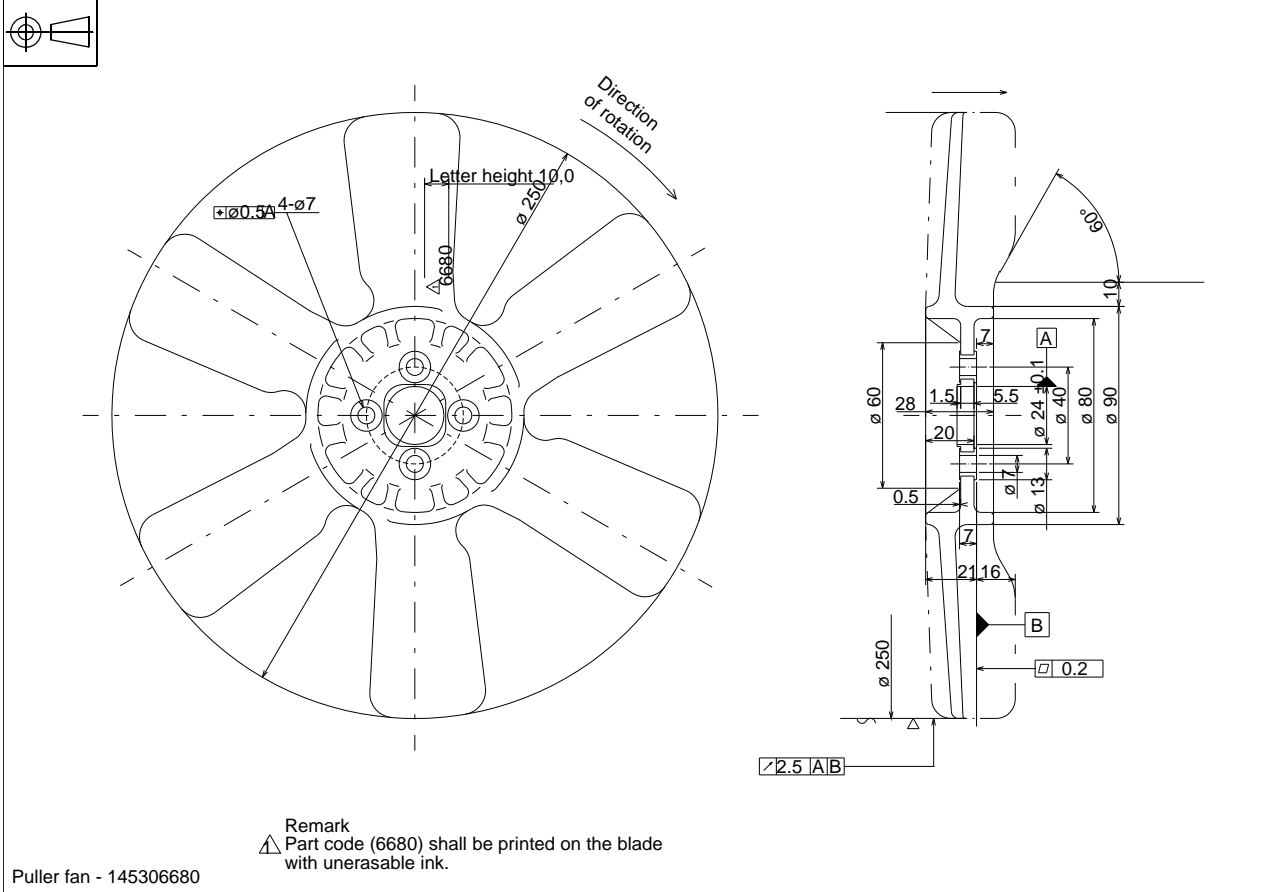
MD010 - 280 mm pusher fan, 403D-07



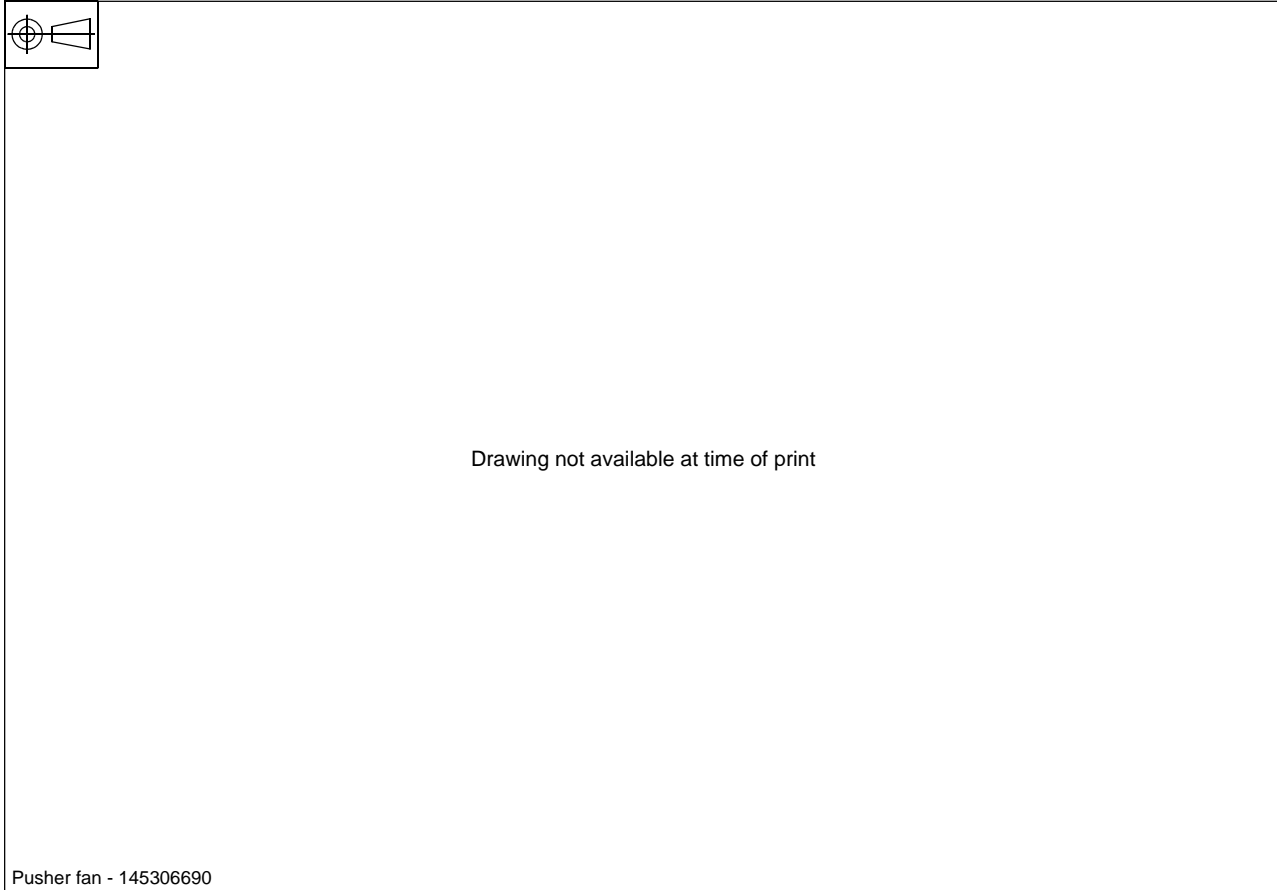
Drawing not available at time of print

Pusher fan - 145306600

MD011 - 250 mm puller fan, 402D-05



MD012 - 260 mm pusher fan, 402D-05



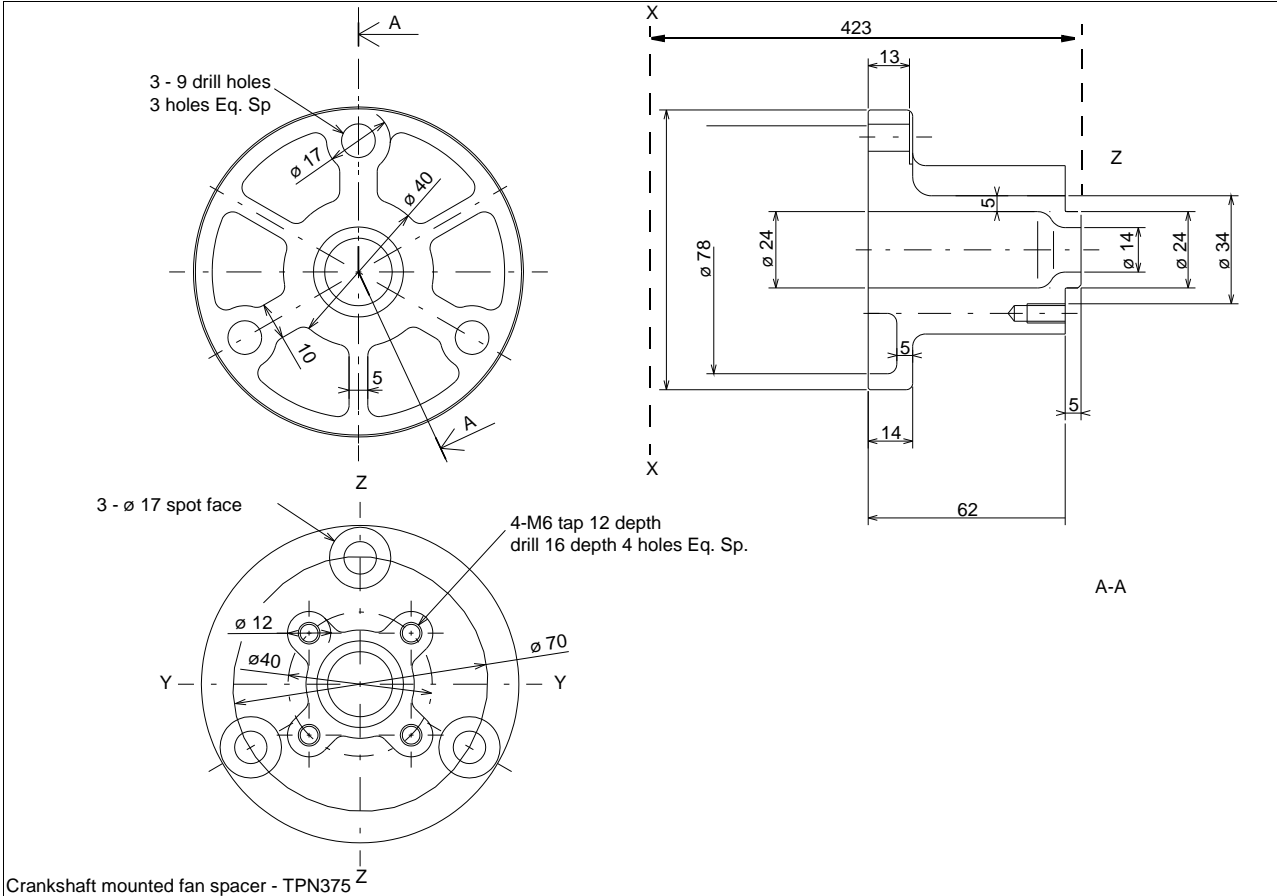
Fan Spacer

Engine type	Description	Option
All models	Not required	ME000
402D-05	Fan spacer 10 mm	ME001
403D-07		
403D-11		
403D-15		
403D-15T		
403D-17	Fan spacer 20 mm	ME003
404D-15		
404D-22		
404D-22T		
404D-22TA		
403D-15	Fan spacer 11 mm	ME002
403D-15T		
403D-17		
404D-15		
404D-22		
404D-22T		
404D-22TA		
403D-15	Fan spacer 30 mm, with a 24 mm boss	ME004
403D-15T		
403D-17		
404D-22	Fan spacer 30 mm, with a 28 mm boss	ME005
404D-22T		
404D-22TA		
403D-11	Crankshaft mounted fan spacer 62 mm	ME006

Notes:

- Option ME002 is fitted for 403D-15, 403D-15, 403D-17, 404D-22, 404D-22T, 404D-22TA as standard when puller fan MD003 is specified
- Option ME000 should be selected if fan option MD000 is required, this is because the correct fan spacer suitable for the radiator options is included in the ZM option selection.

ME006 - Crankshaft mounted fan spacer (62 mm), 403D-11

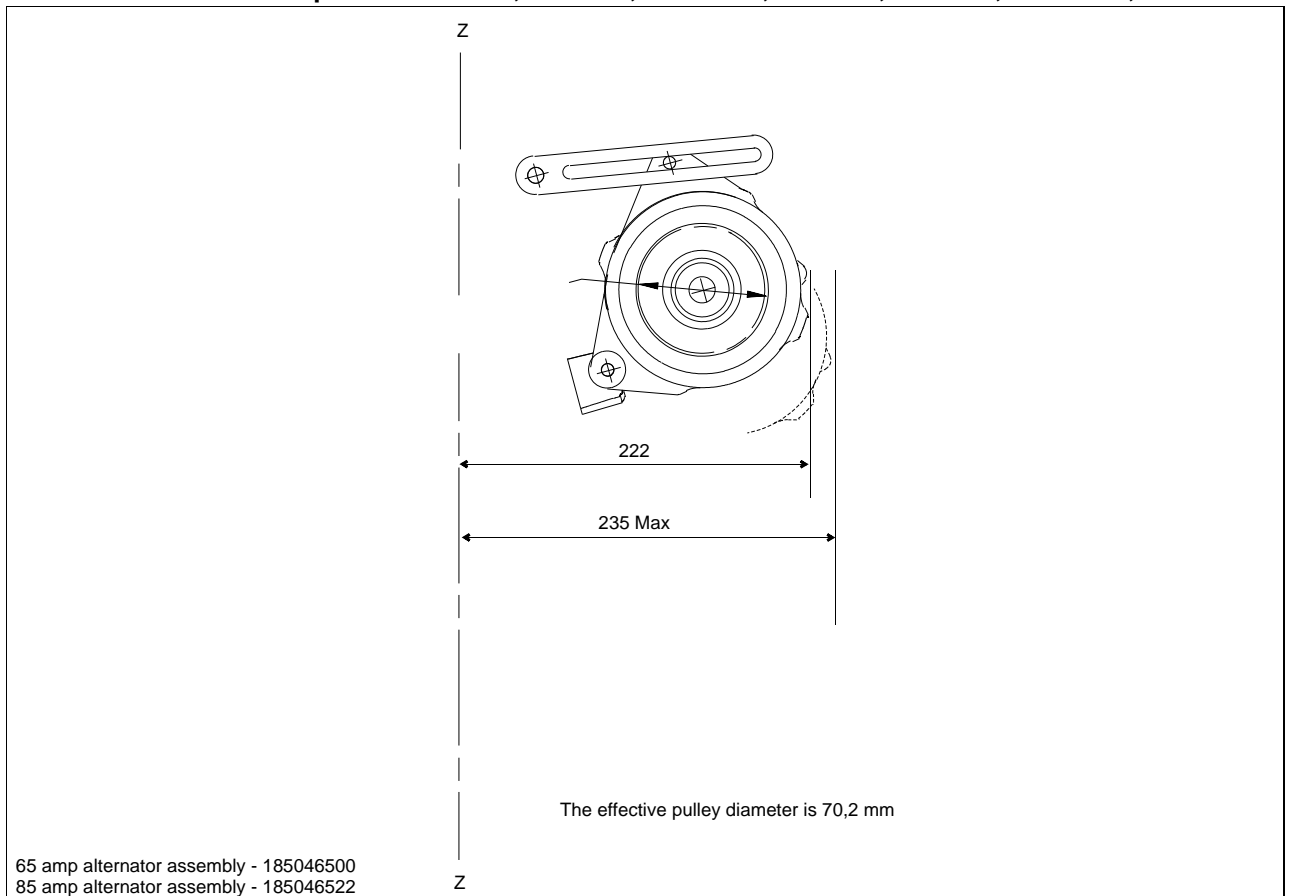


Alternators

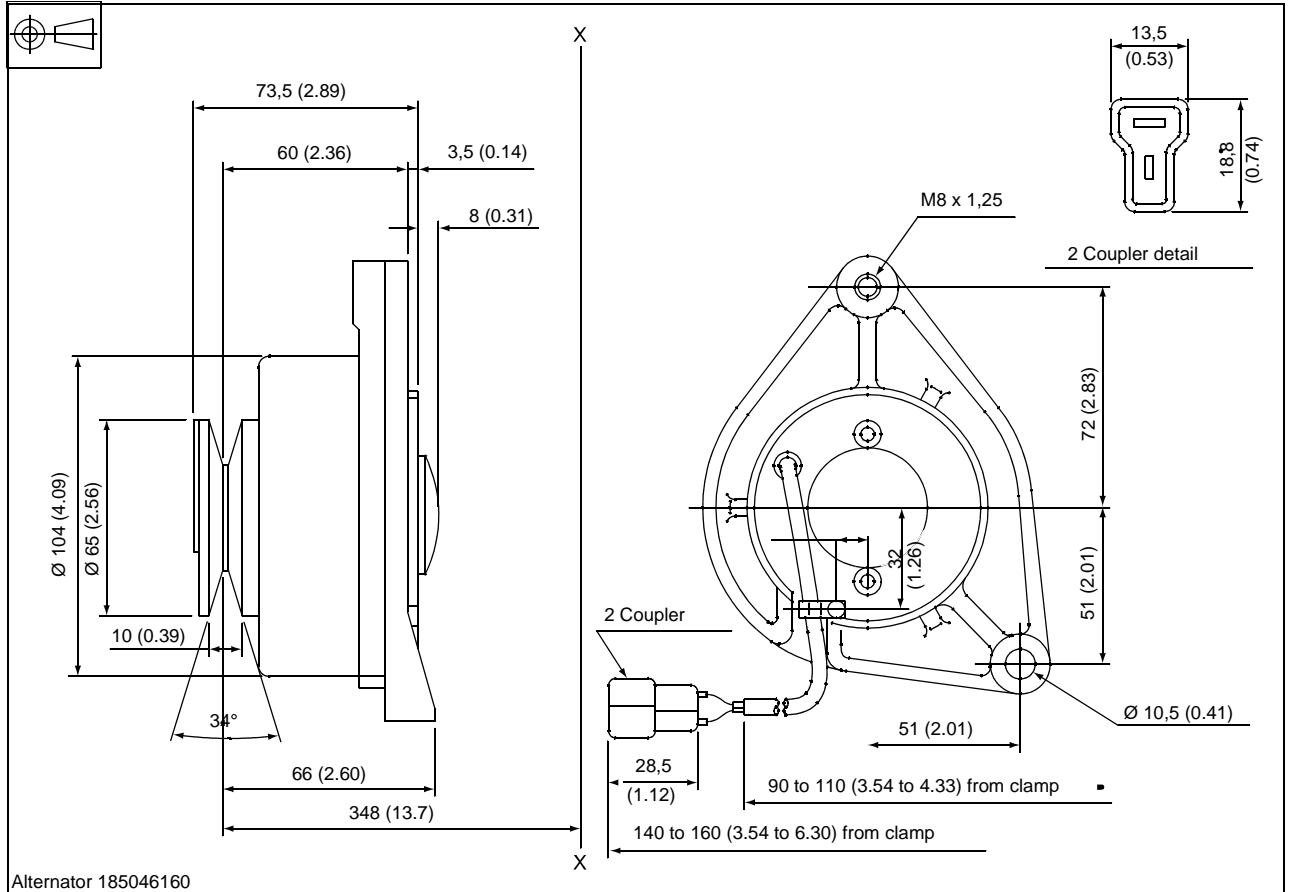
Engine type	Description	Option
All models	Not required	ND000
403D-15	Alternator 12V, 65 amp Denso	ND001
403D-15T 403D-17 404D-22 404D-22T 404D-22TA	Alternator 12V, 85 amp Denso	ND003
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Alternator 24V, 55 amp <i>Incompatible with FB002/FB003</i>	ND005
403D-11 404D-15	Alternator 12V, 40 amps ⁽¹⁾	ND009
403D-11	Alternator 12V, 15 amps ⁽²⁾	ND011
402D-05 403D-07	Alternator 12V, 14 amps ⁽²⁾	ND013

1. Supplied with a connector block (385620290) in the loose parts kit.
2. Supplied with a regulator (185516061) and a connector block (385620290) in the loose parts kit.

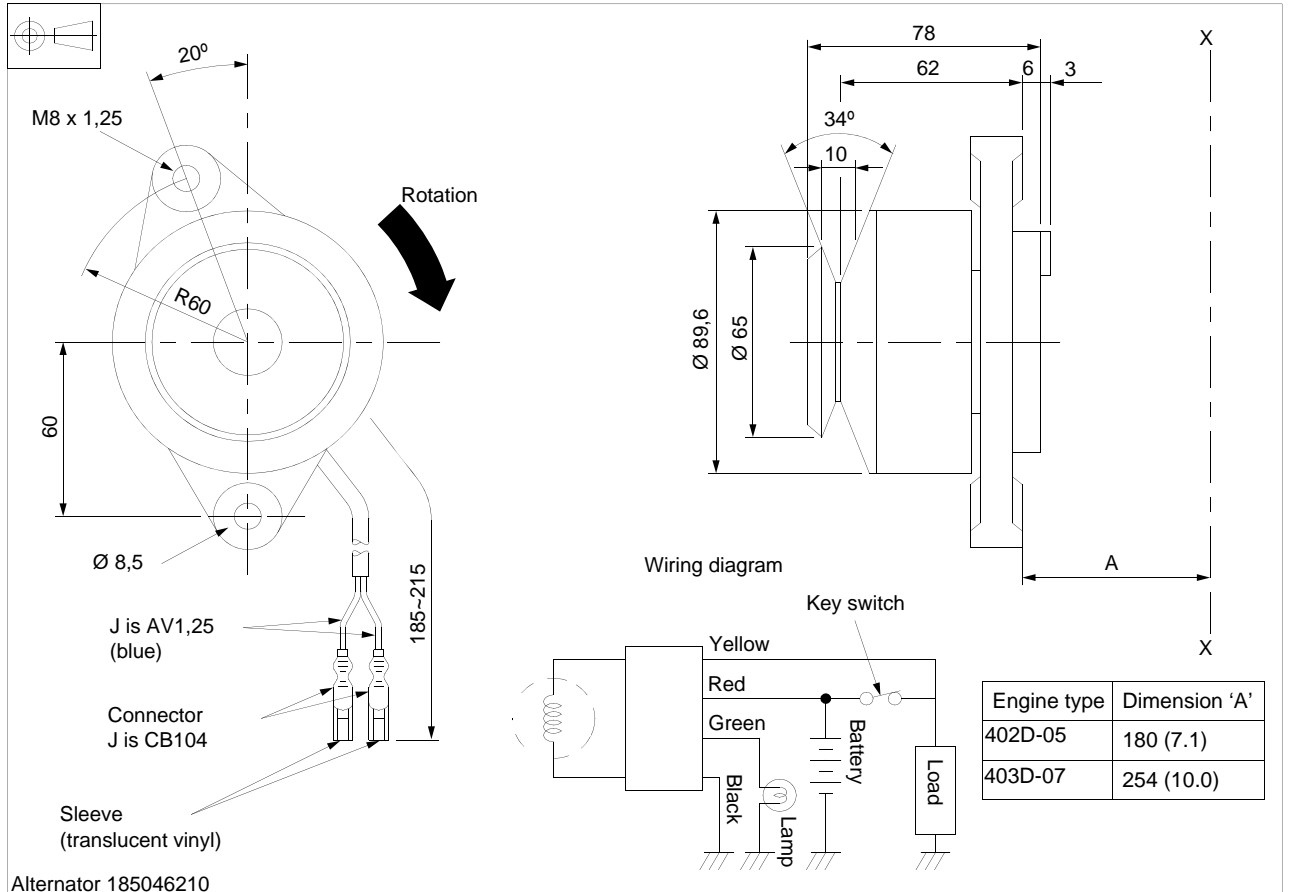
ND001/ND003 - 65/85 amp alternator 12V, 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T, 404D-22TA



ND011 - Alternator 12V, 15 amp, 403D-11



ND013 - Alternator 12V, 14 amp, 402D-05, 403D-07



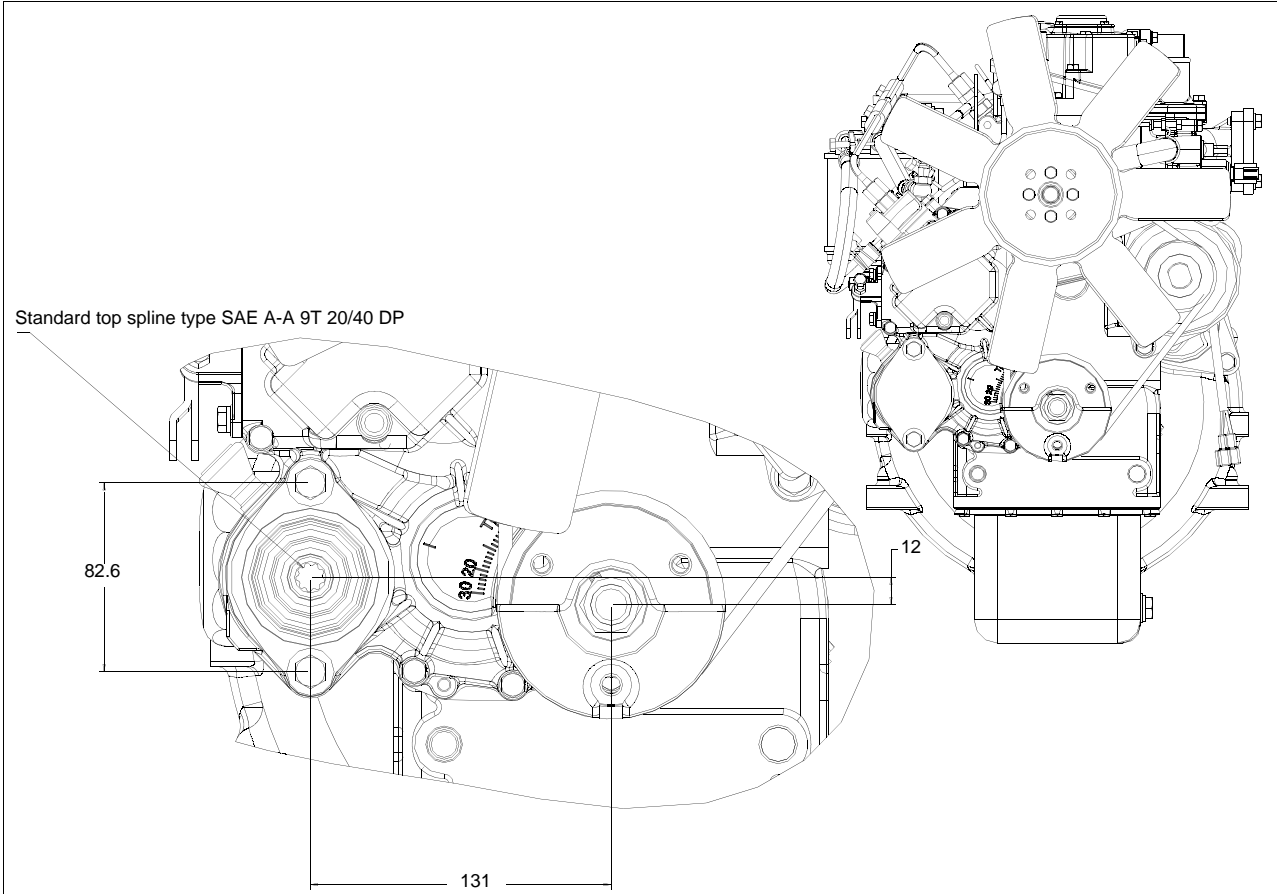
Drive belt

Engine type	Description	Option
All models	No belt required	NE000
	V belt	NE001

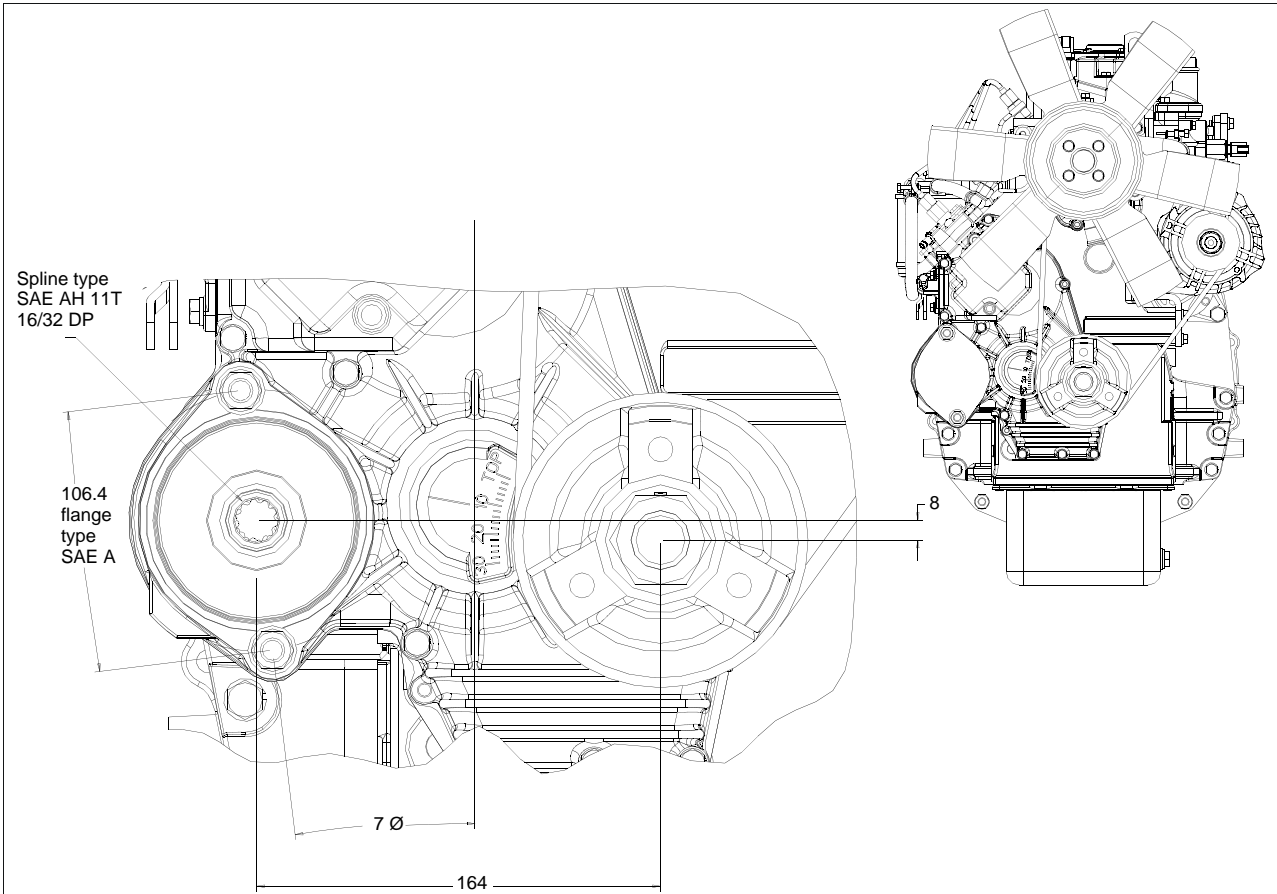
Timing case blanks and bearing holder

Engine type	Description	Option
403D-11 403D-15 403D-15T 404D-15 403D-17 404D-22 404D-22T and 404D-22TA	Industrial, bearing holder, no PTO gear	QC001
402D-05 403D-07 403D-11 403D-15 403D-15T 404D-15 404D-22 404D-22T and 404D-22TA	Genset, no bearing holder, no PTO gear	QC003
403D-11 403D-15 403D-15T 404D-15 403D-17 404D-22 404D-22T and 404D-22TA	Industrial, bearing holder and PTO gear	QC007
402D-05 403D-07 403D-11 403D-15 403D-15T 404D-15 404D-22 404D-22T and 404D-22TA	Industrial, no bearing holder, no PTO gear	QC011

QC007 - 403D-11, 404D-15



QC007 - 403D-15, 403D-15T, 404D-22, 404D-22T and 404D-22TA

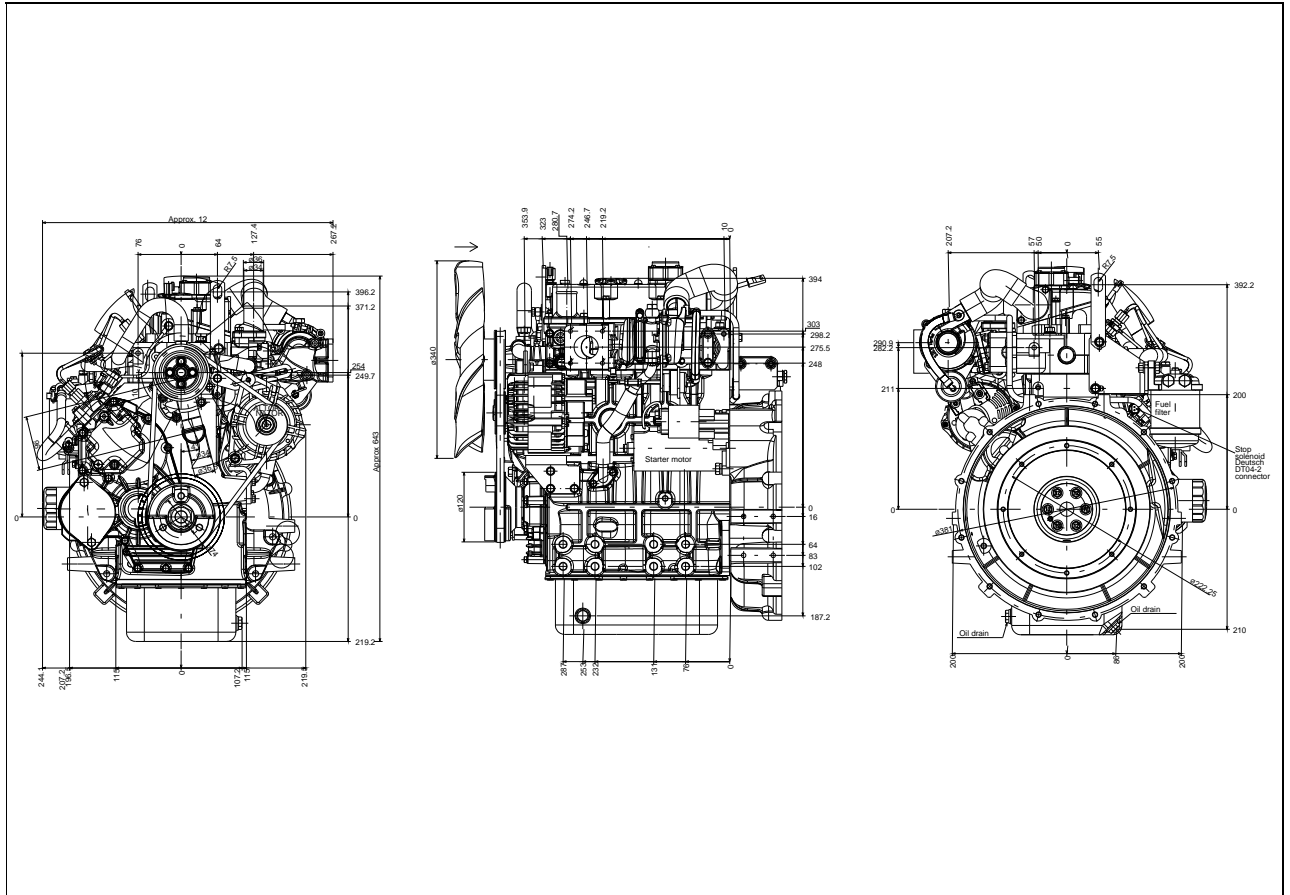


Intake/exhaust manifolds (turbocharged)

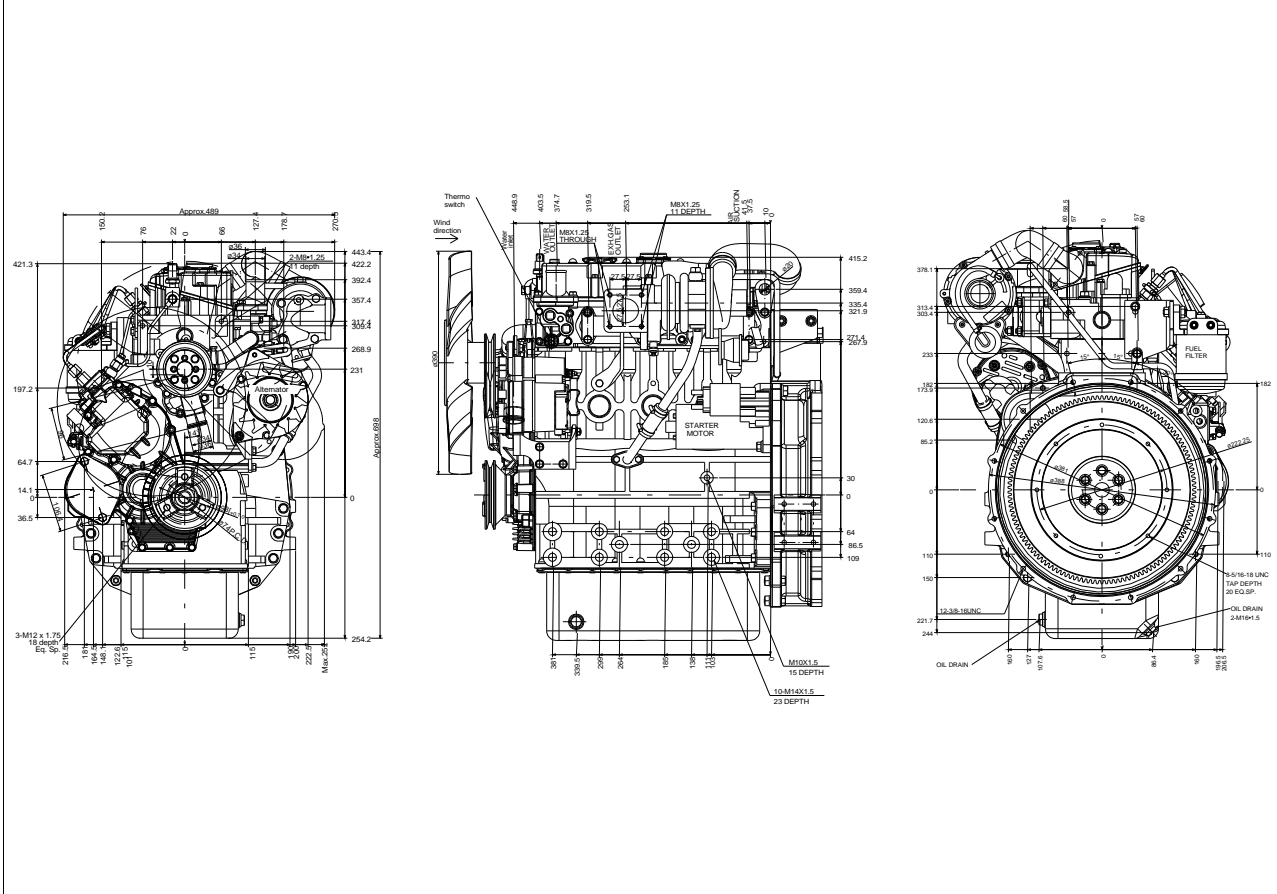
Engine type	Description	Option
402D-05 403D-07 403D-11 403D-15 404D-15 403D-17 404D-22	Naturally aspirated engine selected ⁽¹⁾	SB000
403D-15T 404D-22T 404D-22TA	Intake manifold rear, exhaust position side outlet	SB001
404D-22T	Intake manifold rear, exhaust position vertical up outlet	SB002
404D-22TA	Intake manifold rear, no exhaust manifold, blanking plate fitted	SB003

1. Select this option when completing any 402D-05, 403D-07, 403D-11, 403D-15, 403D-17, 404D-15, 404D-22 SPES's or option templates.

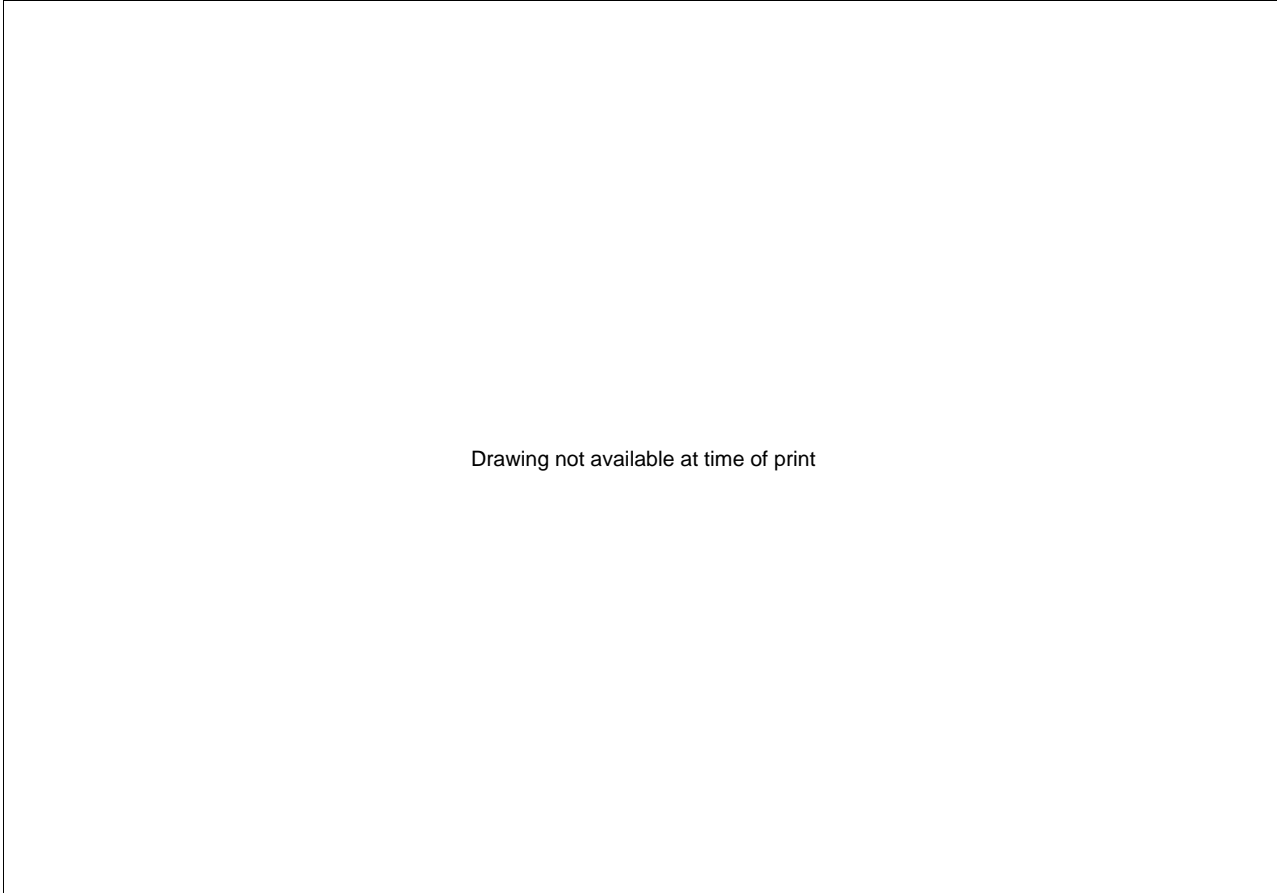
SB001 - Rear intake manifold, side outlet exhaust, 403D-15T



SB001 - Rear intake manifold, side outlet exhaust, 404D-22T, 404D 22TA



SB002 - Rear intake manifold, vertical up outlet exhaust, 404D-22T, 404D 22TA



SB003 - Rear intake manifold, no exhaust manifold, blanking plate fitted, 404D-22T, 404D-22TA

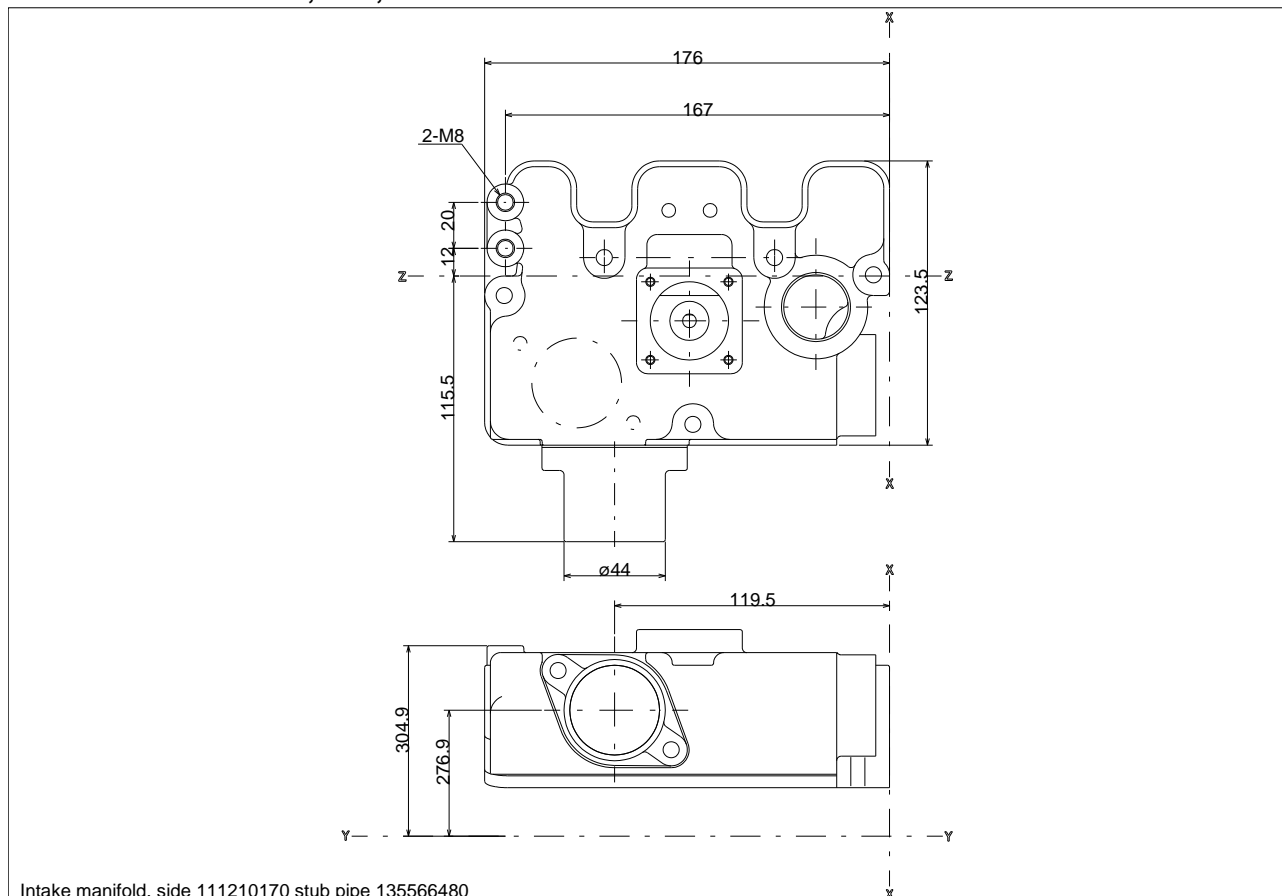
Drawing not available at time of print

Intake manifolds (naturally aspirated)

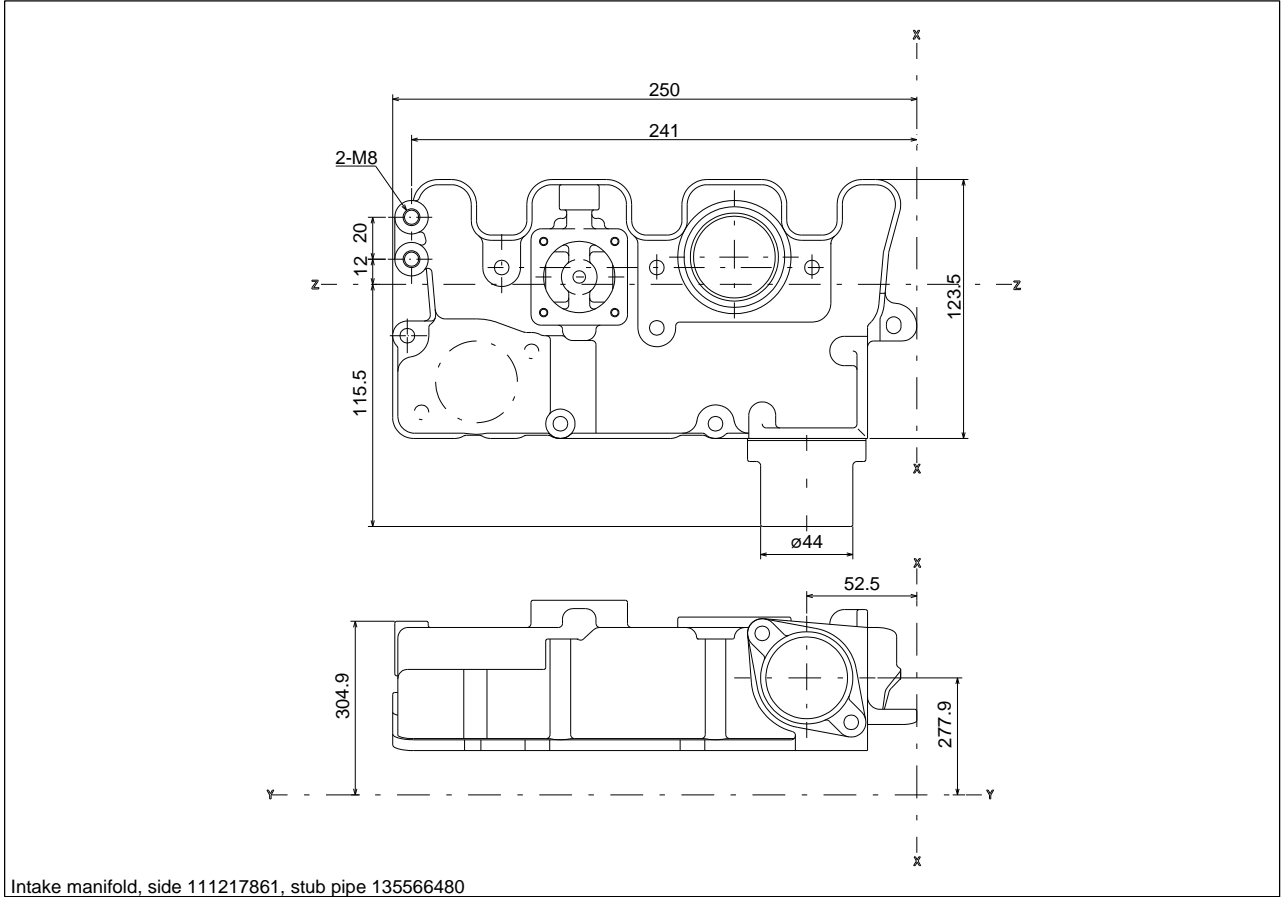
Engine type	Description	Option
403D-15T 404D-22T 404D-22TA	Turbo engine selected ⁽¹⁾	TB000
402D-05 403D-07 403D-11 403D-15 404D-15 403D-17 404D-22	Intake manifold, side	TB001
402D-05 403D-07 403D-11 403D-15 404D-15 403D-17 404D-22	Intake manifold, vertical ⁽²⁾	TB002
402D-05 403D-07 403D-11 403D-15 404D-15 403D-17 404D-22	Intake manifold, rear ⁽²⁾	TB003

1. Select this options when completing any 403D-15T, 404D-22T, and 404D-22TA SPES's or option template.
2. Not compatible with 403D-11, 403D-15,404D-22 when TD001 selected.

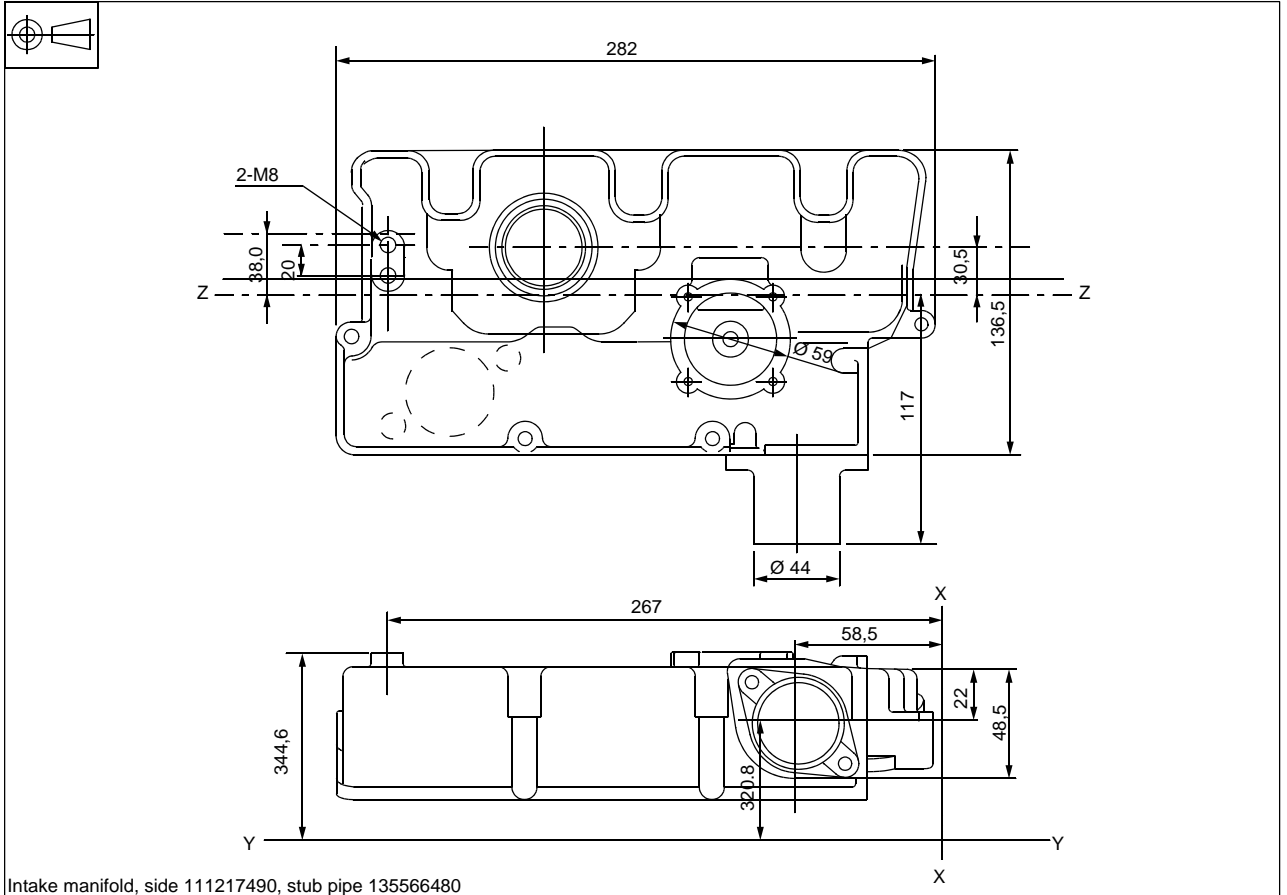
TB001 - Intake manifold, side, 402D-05



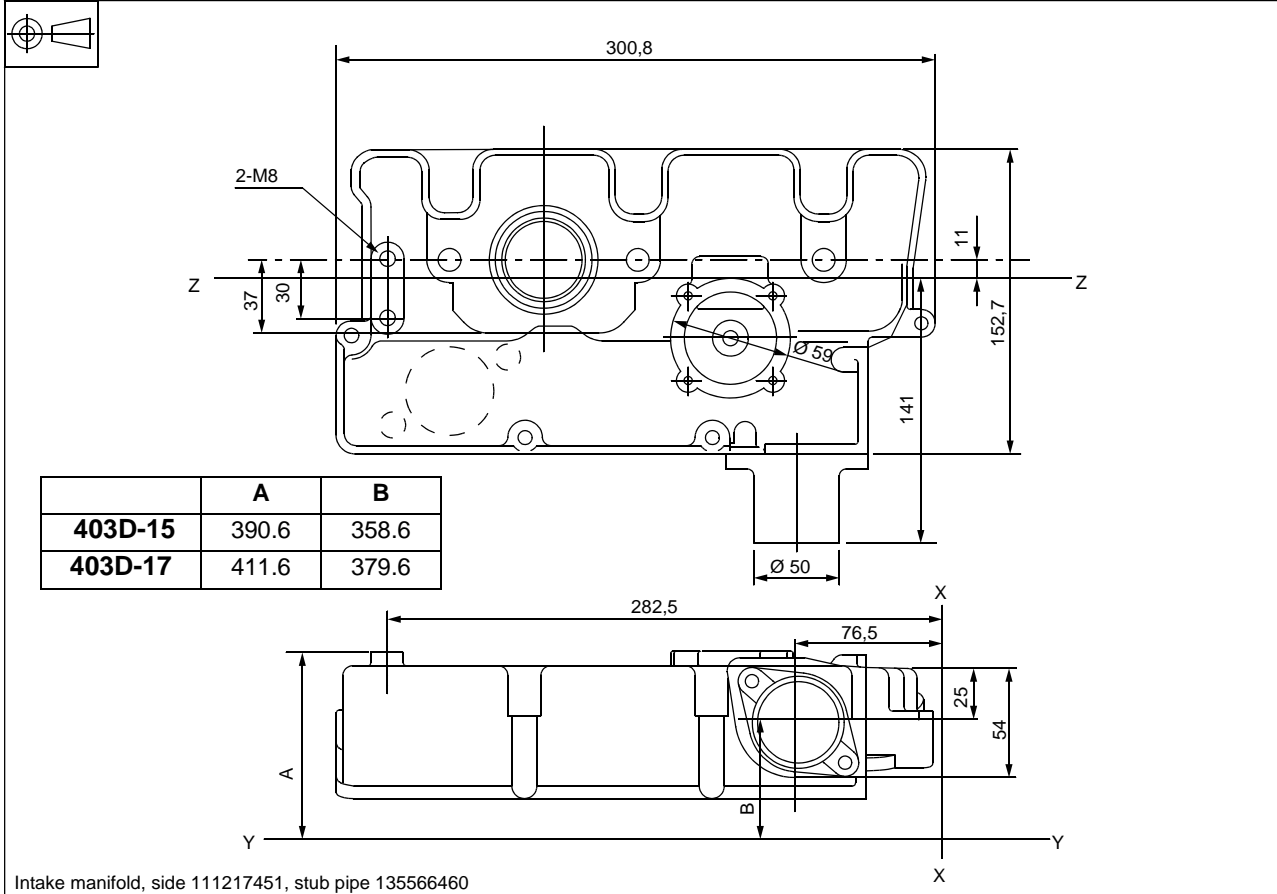
TB001 - Intake manifold, side, 403D-07



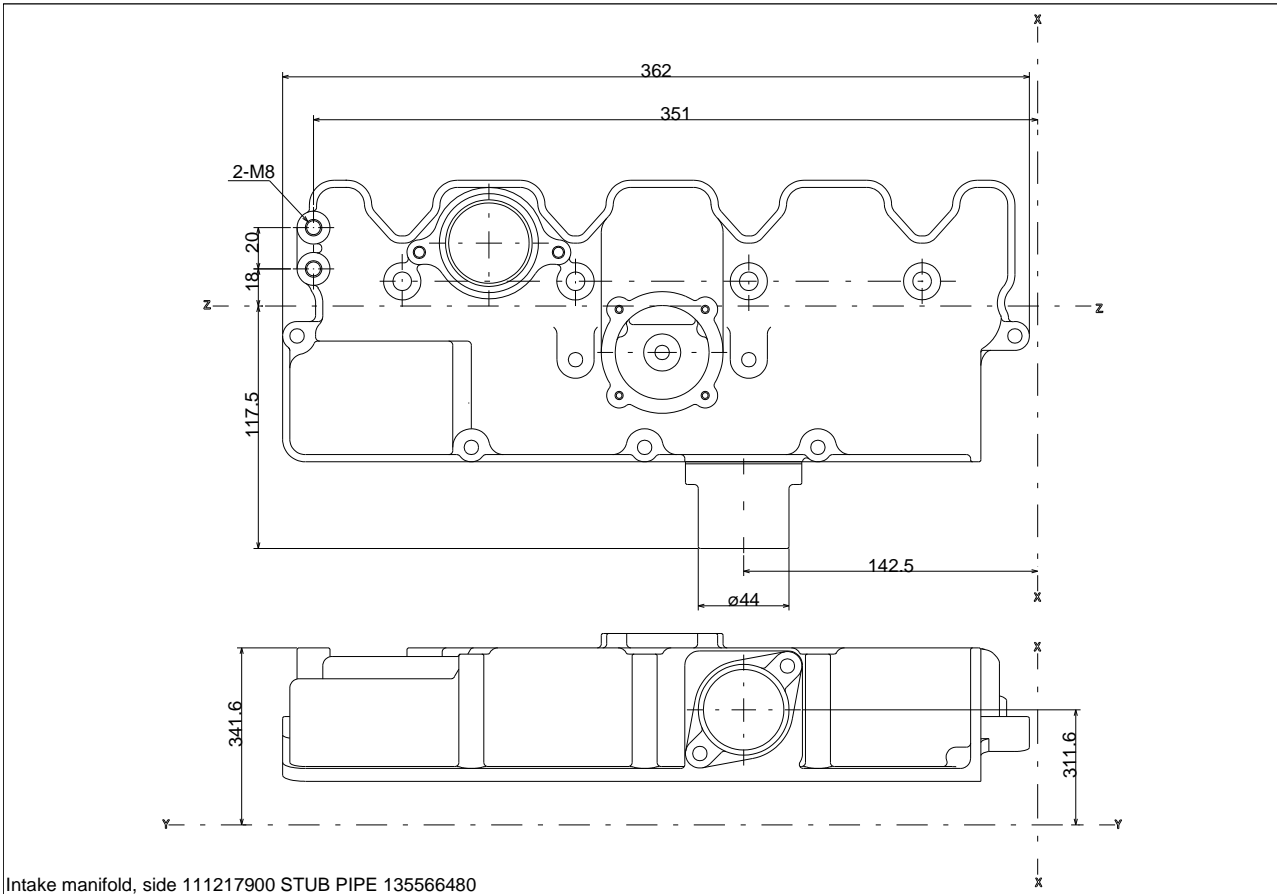
TB001 - Intake manifold, side, 403D-11



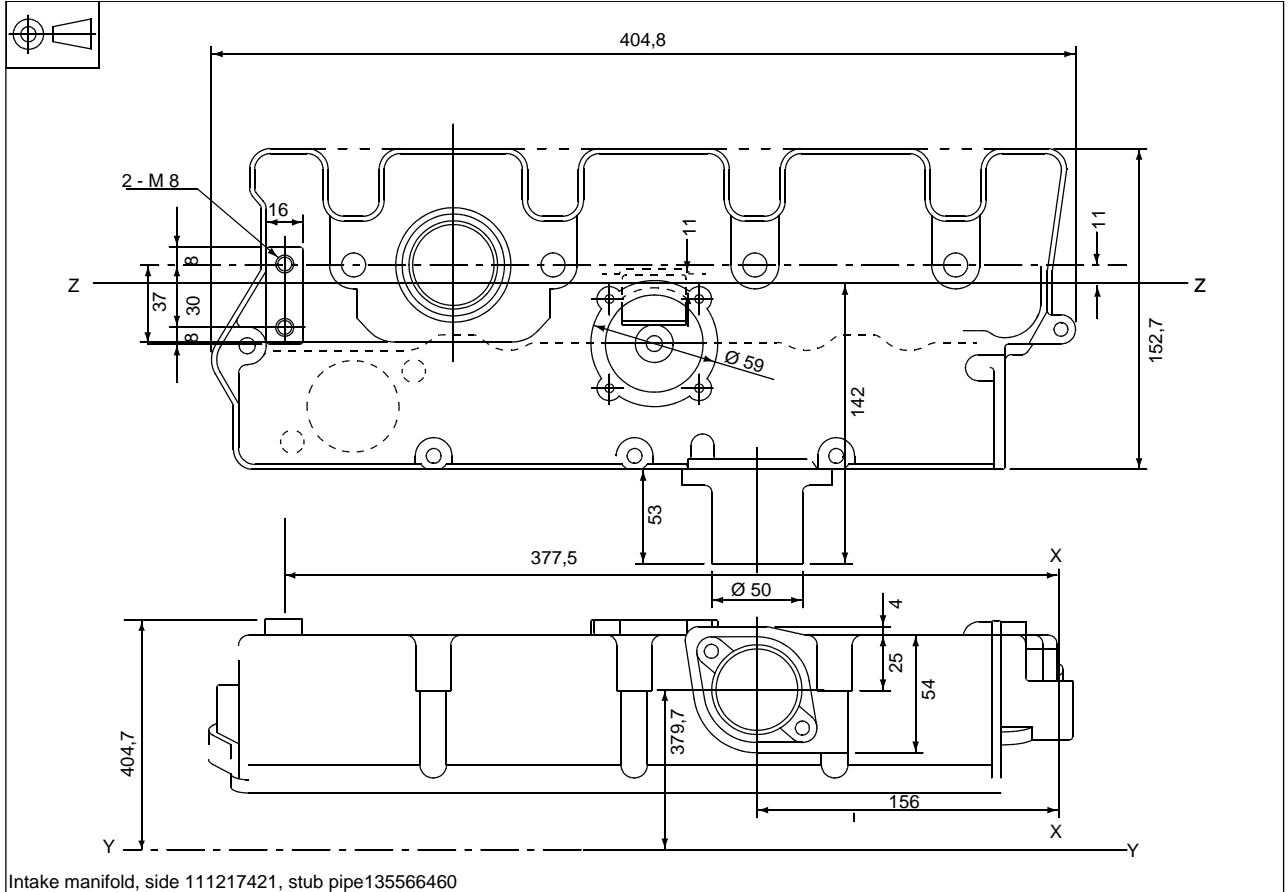
TB001 - Intake manifold, side, 403D-15, 403D-17



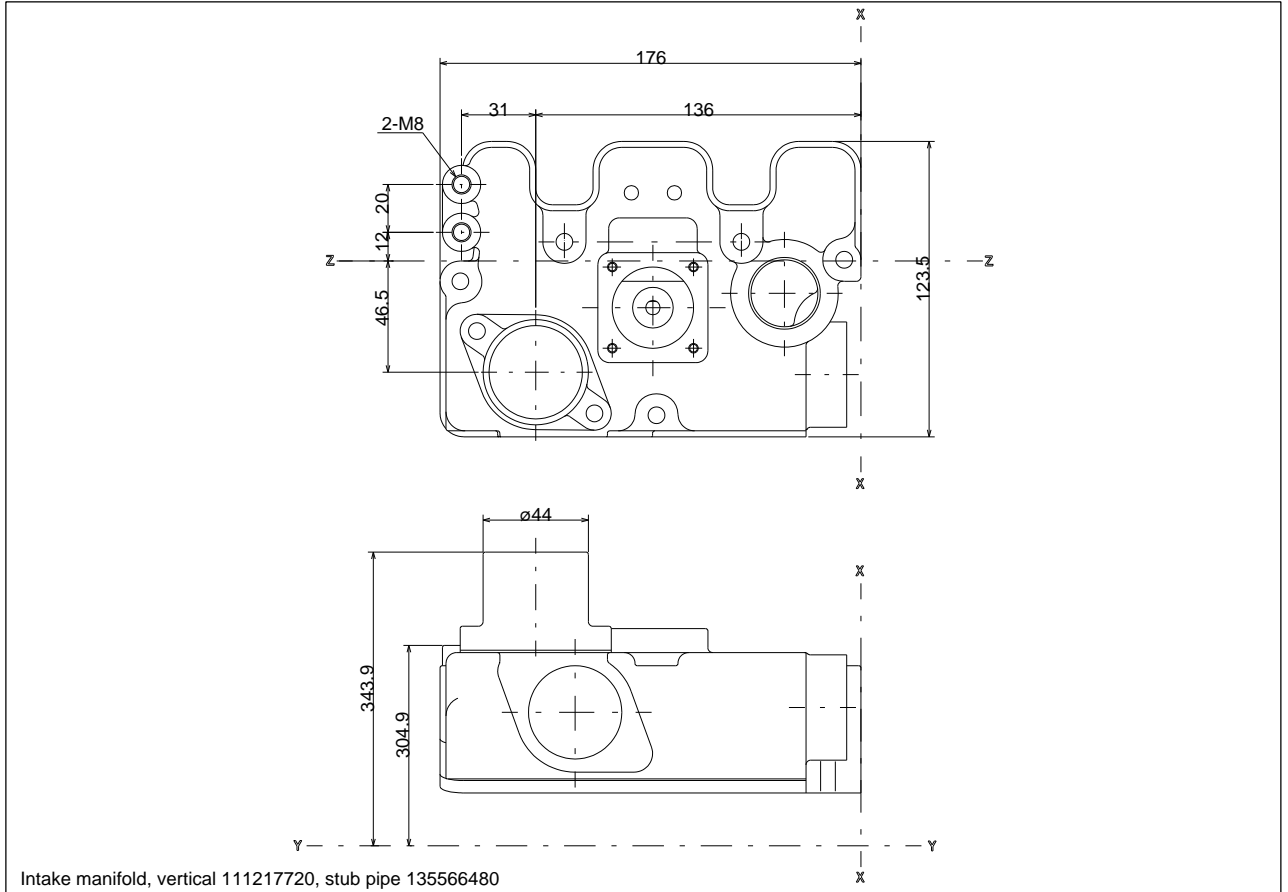
TB001 - Intake manifold, side, 404D-15



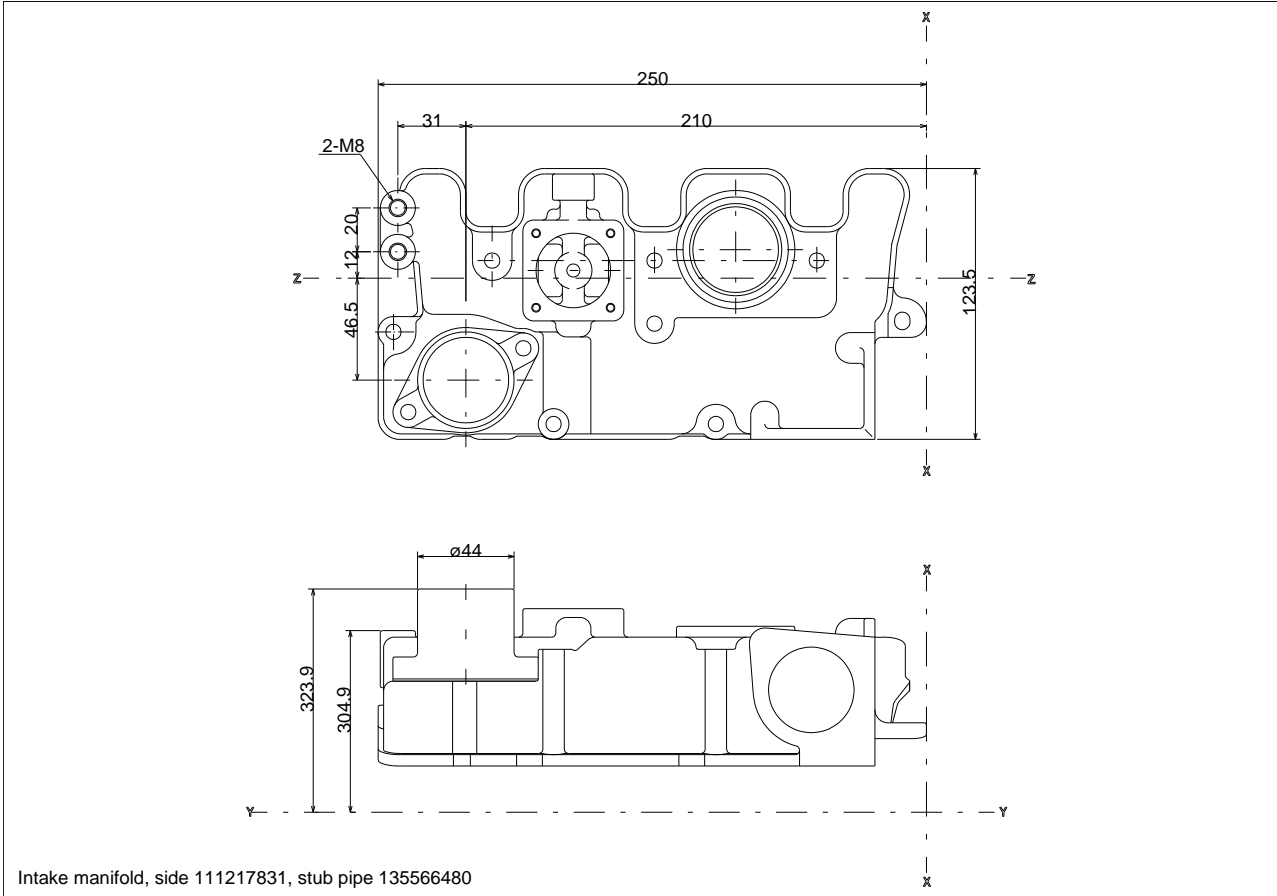
TB001 - Intake manifold, side, 404D-22



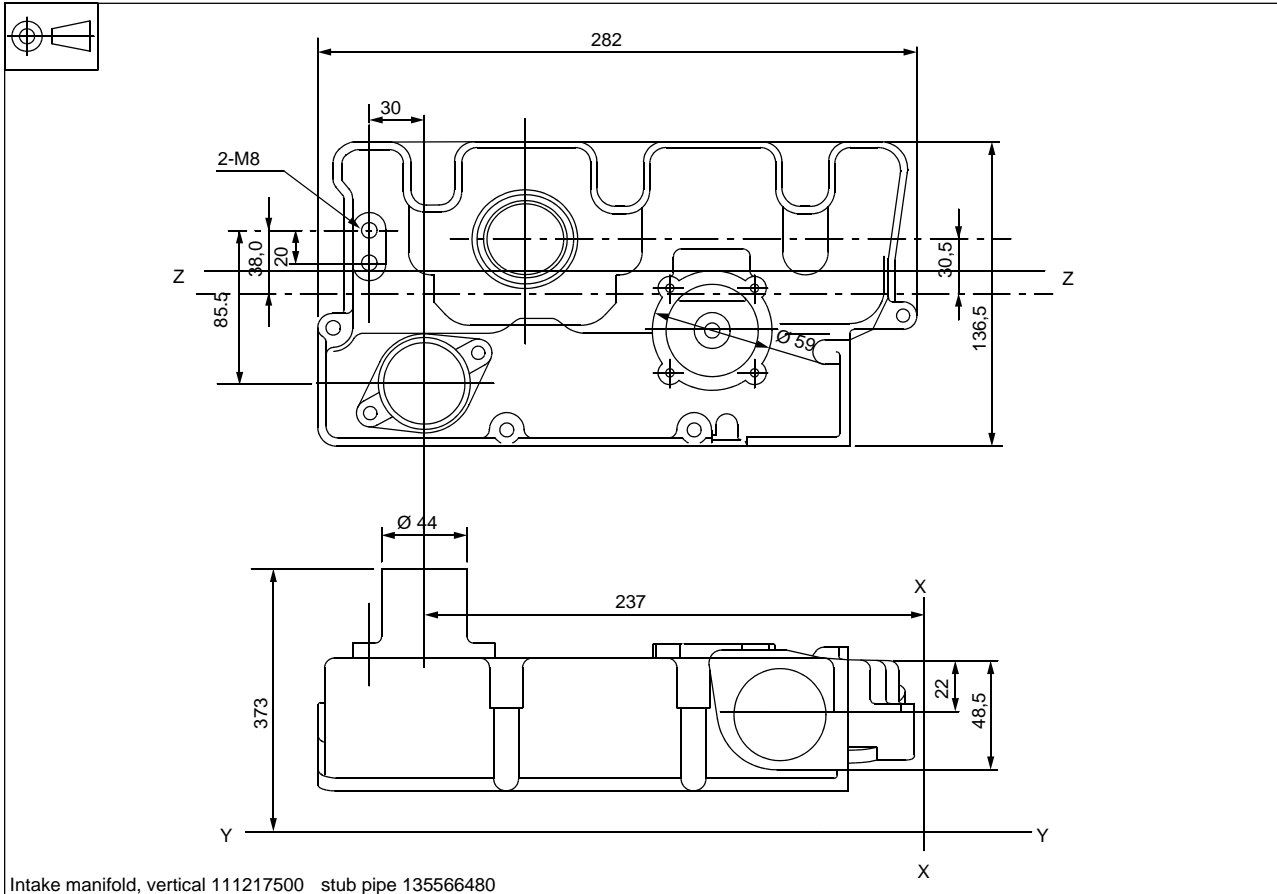
TB002 - Intake manifold, vertical, 402D-05



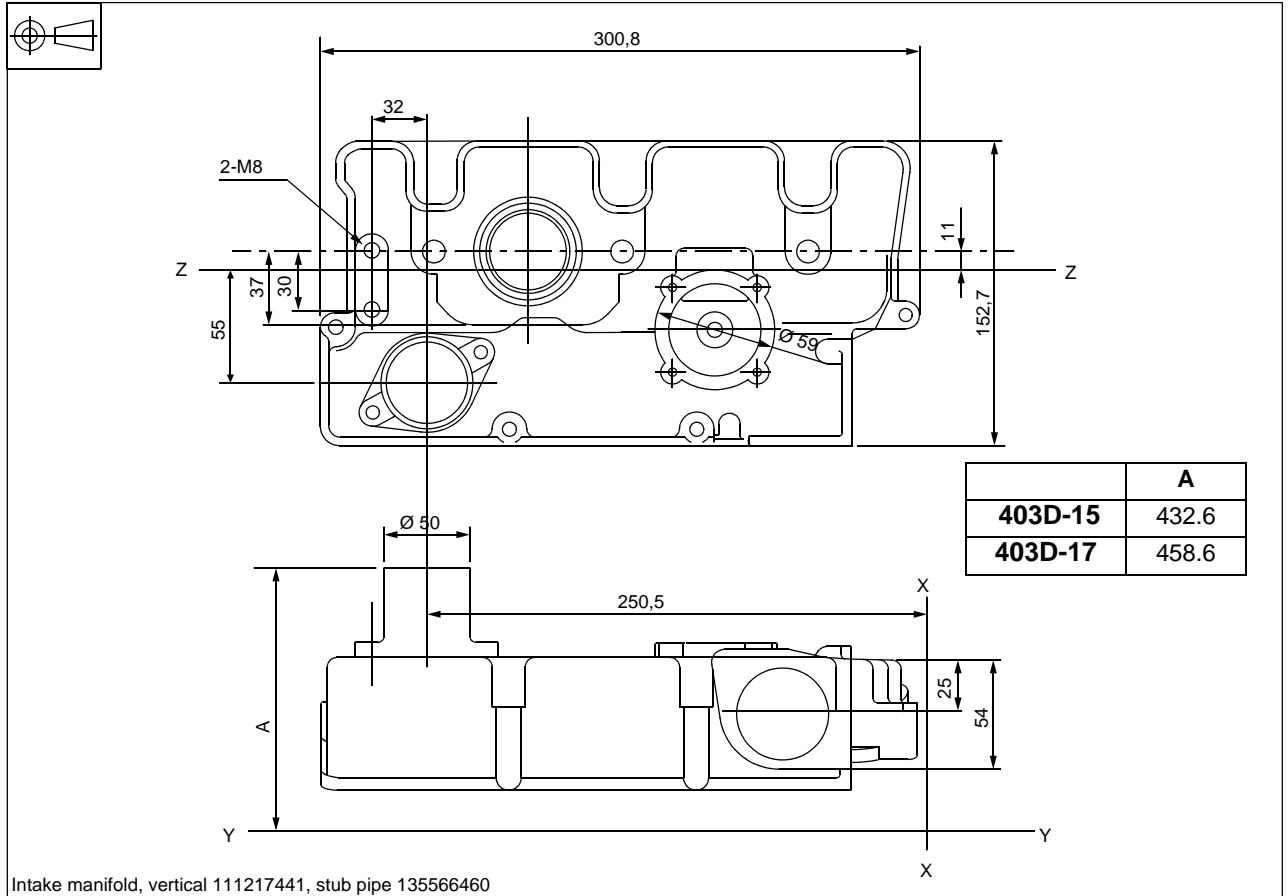
TB002 - Intake manifold, vertical, 403D-07



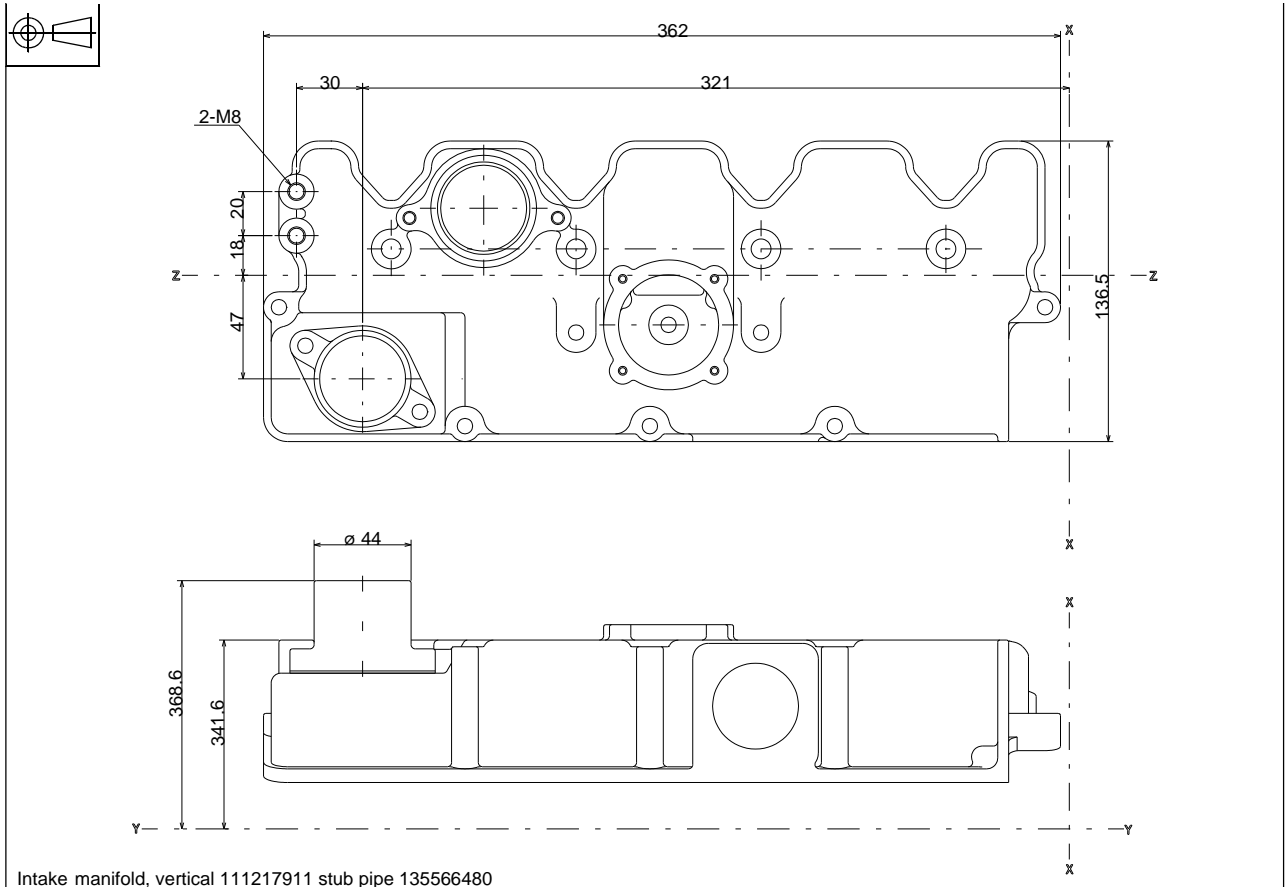
TB002 - Intake manifold, vertical, 403D-11



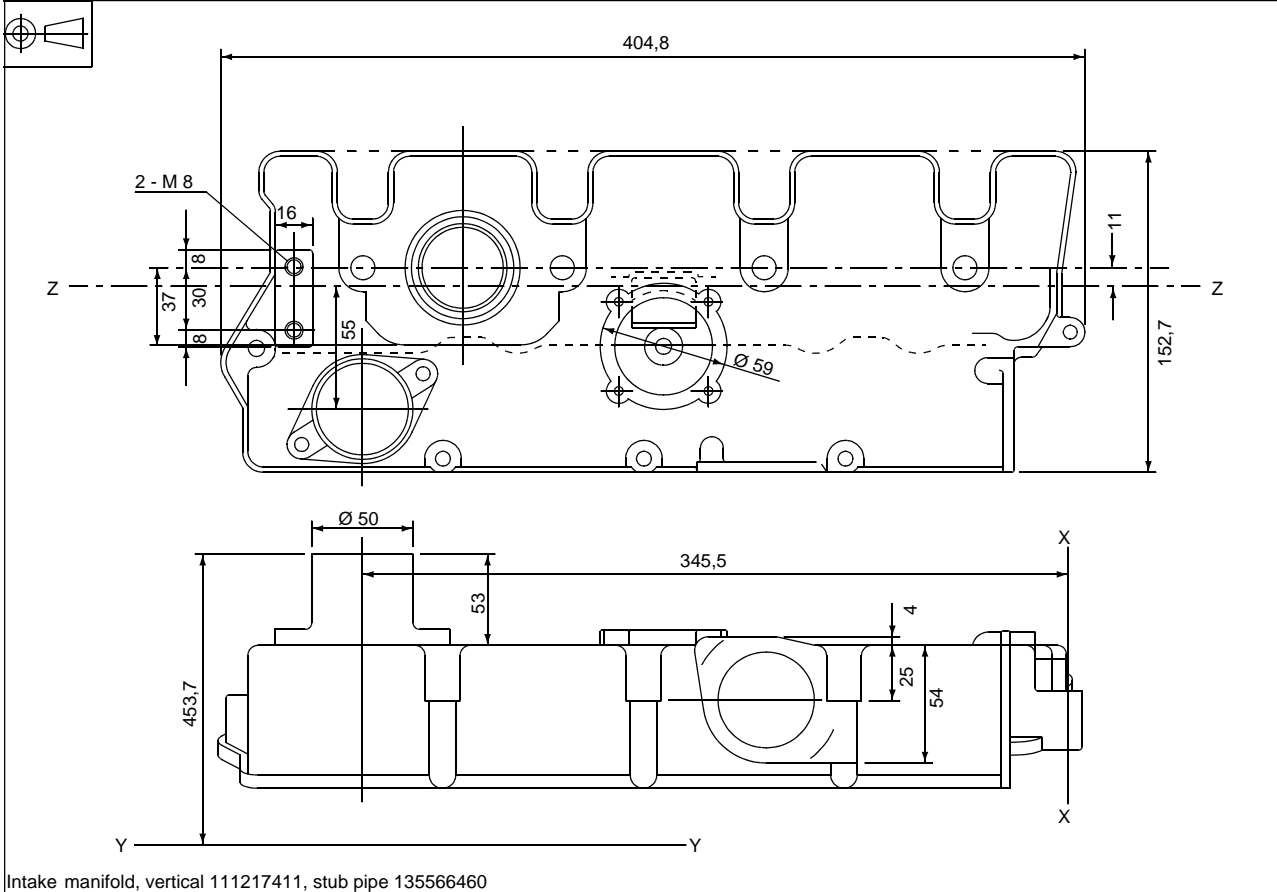
TB002 - Intake manifold, vertical, 403D-15, 403D-17



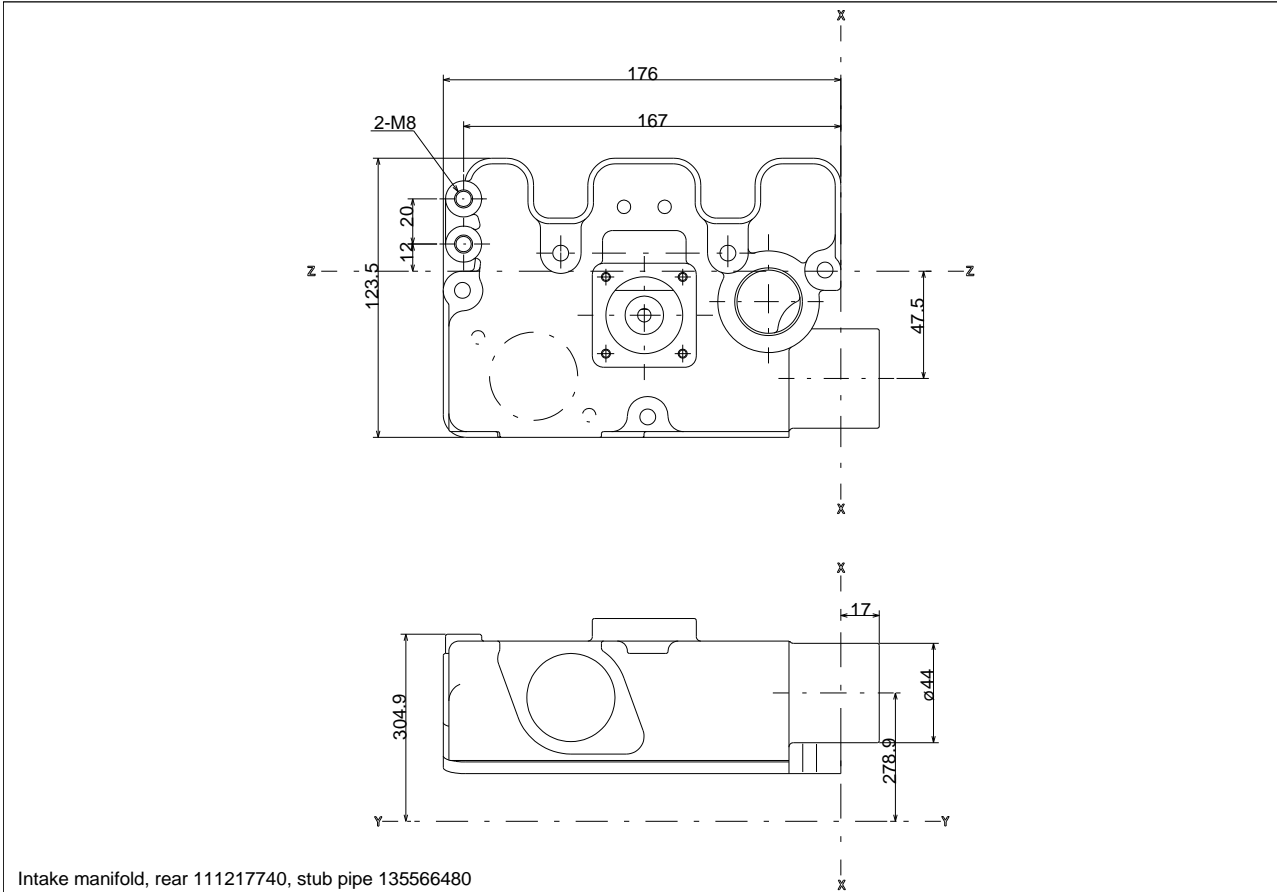
TB002 - Intake manifold, vertical, 404D-15



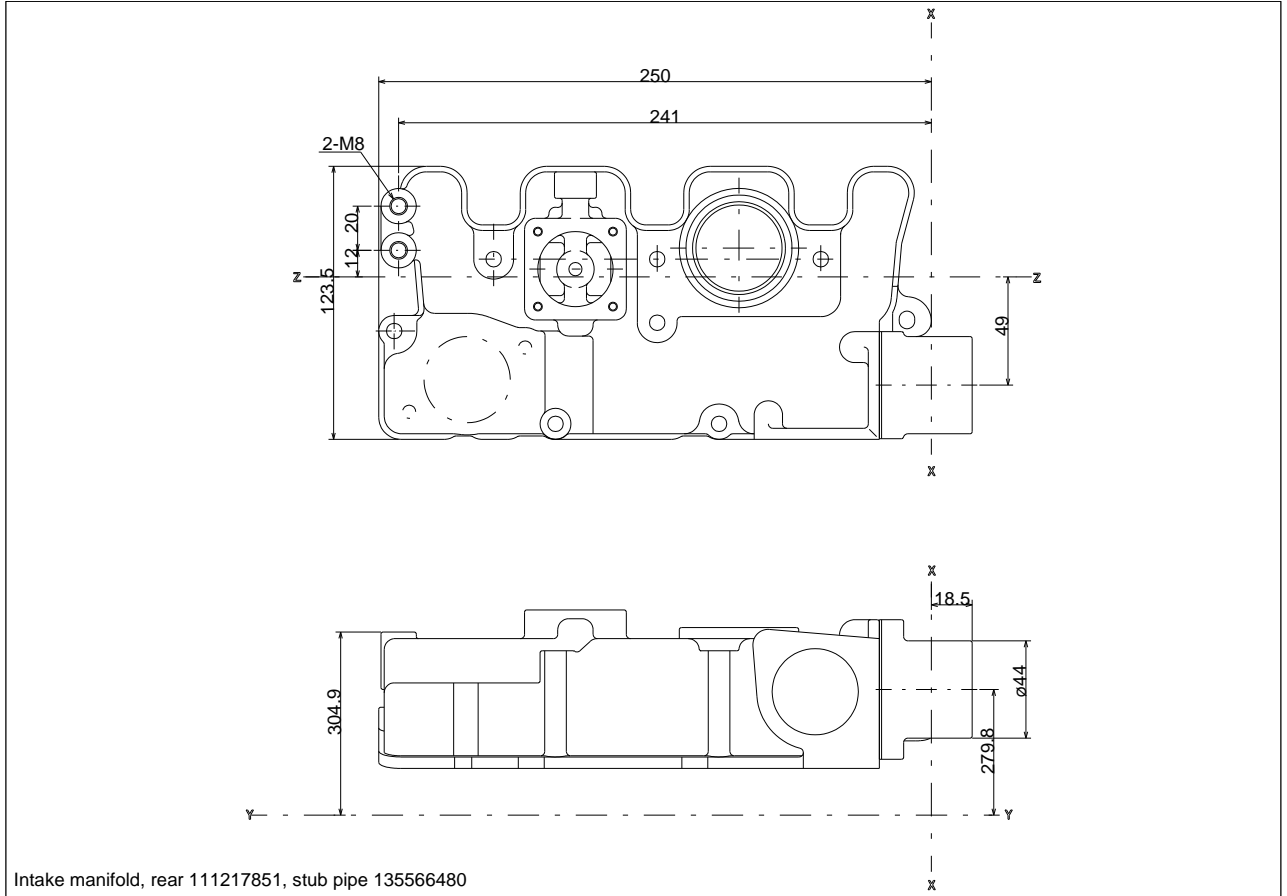
TB002 - Intake manifold, vertical, 404D-22



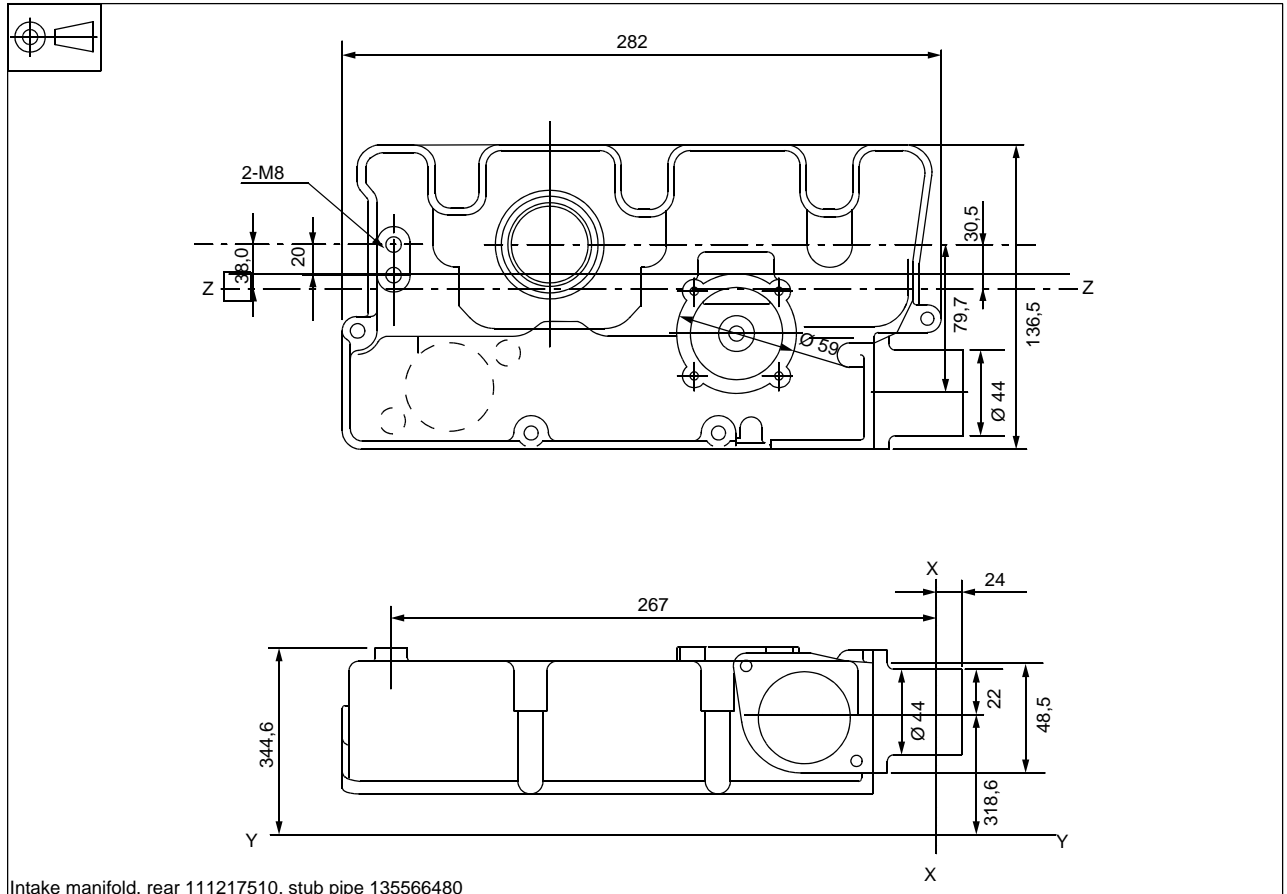
TB003 - Intake manifold, rear, 402D-05



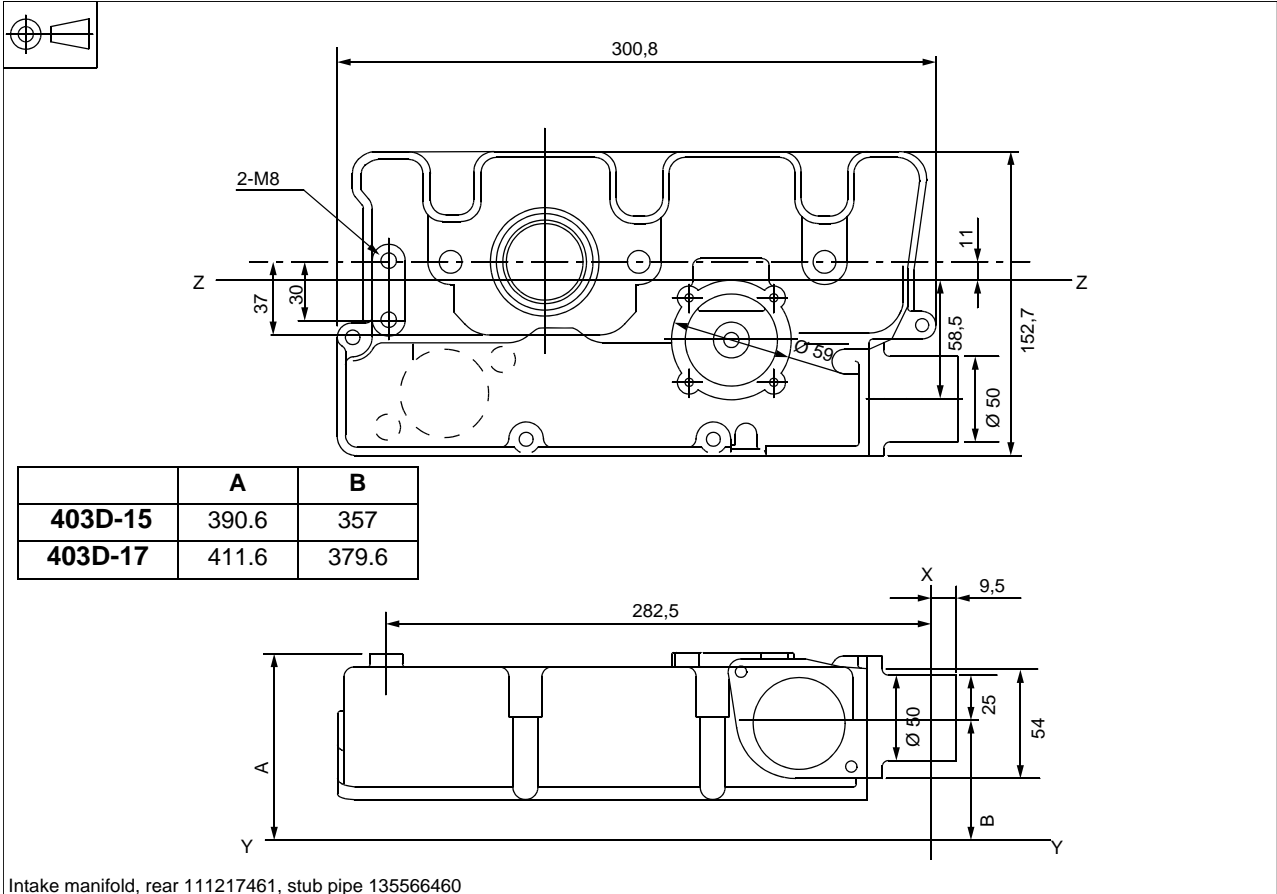
TB003 - Intake manifold, rear, 403D-07



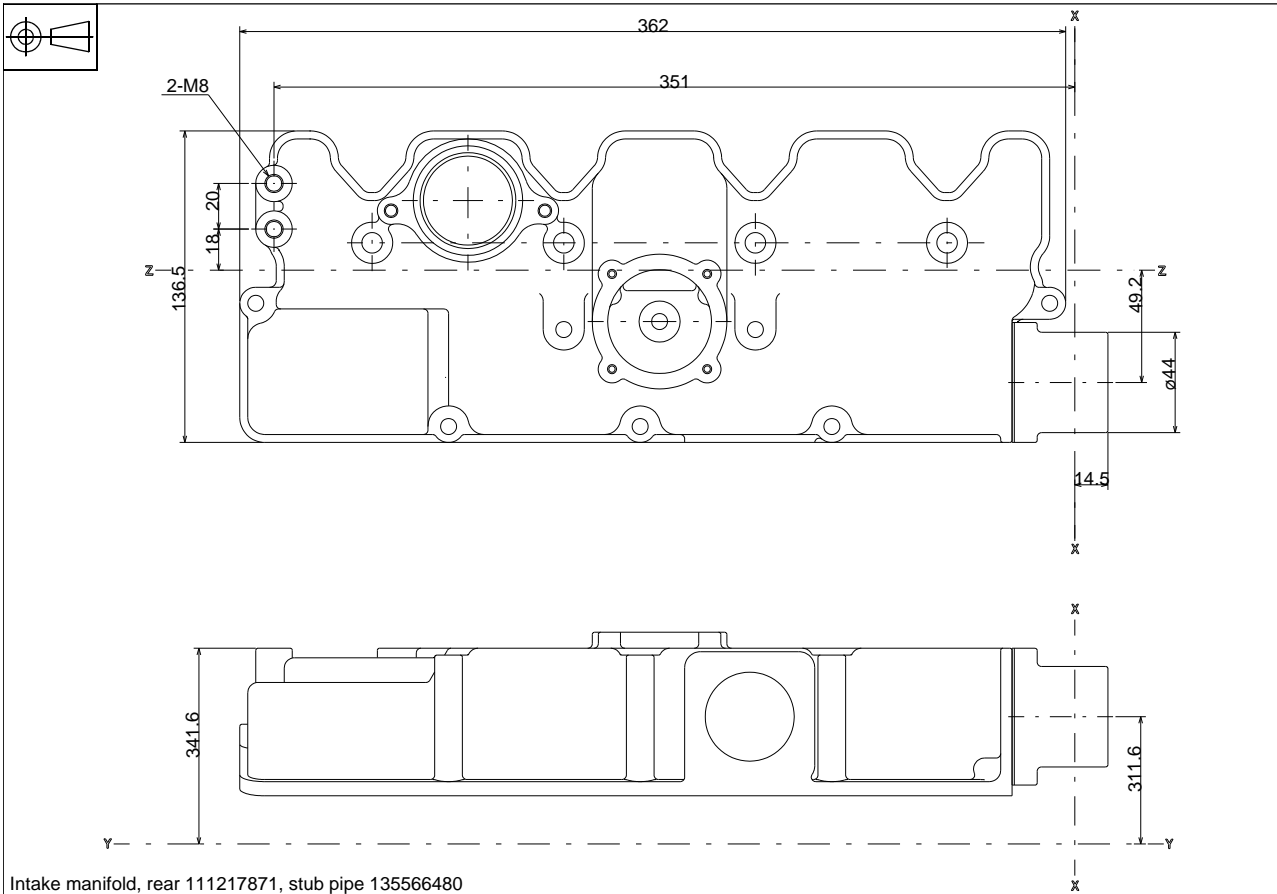
TB003 - Intake manifold, rear, 403D-11



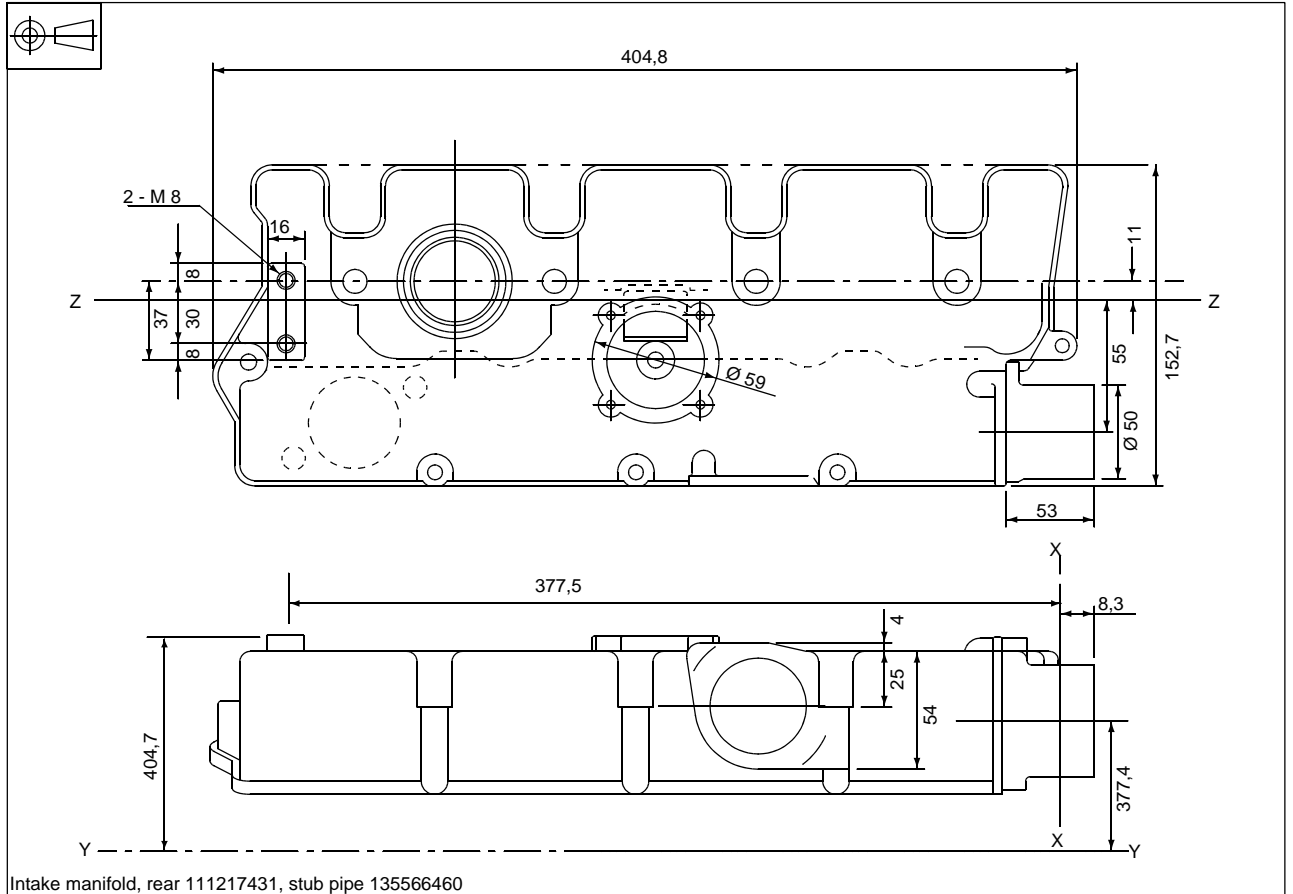
TB003 - Intake manifold, rear, 403D-15, 403D-17



TB003 - Intake manifold, rear, 404D-15



TB003 - Intake manifold, rear, 404D-22

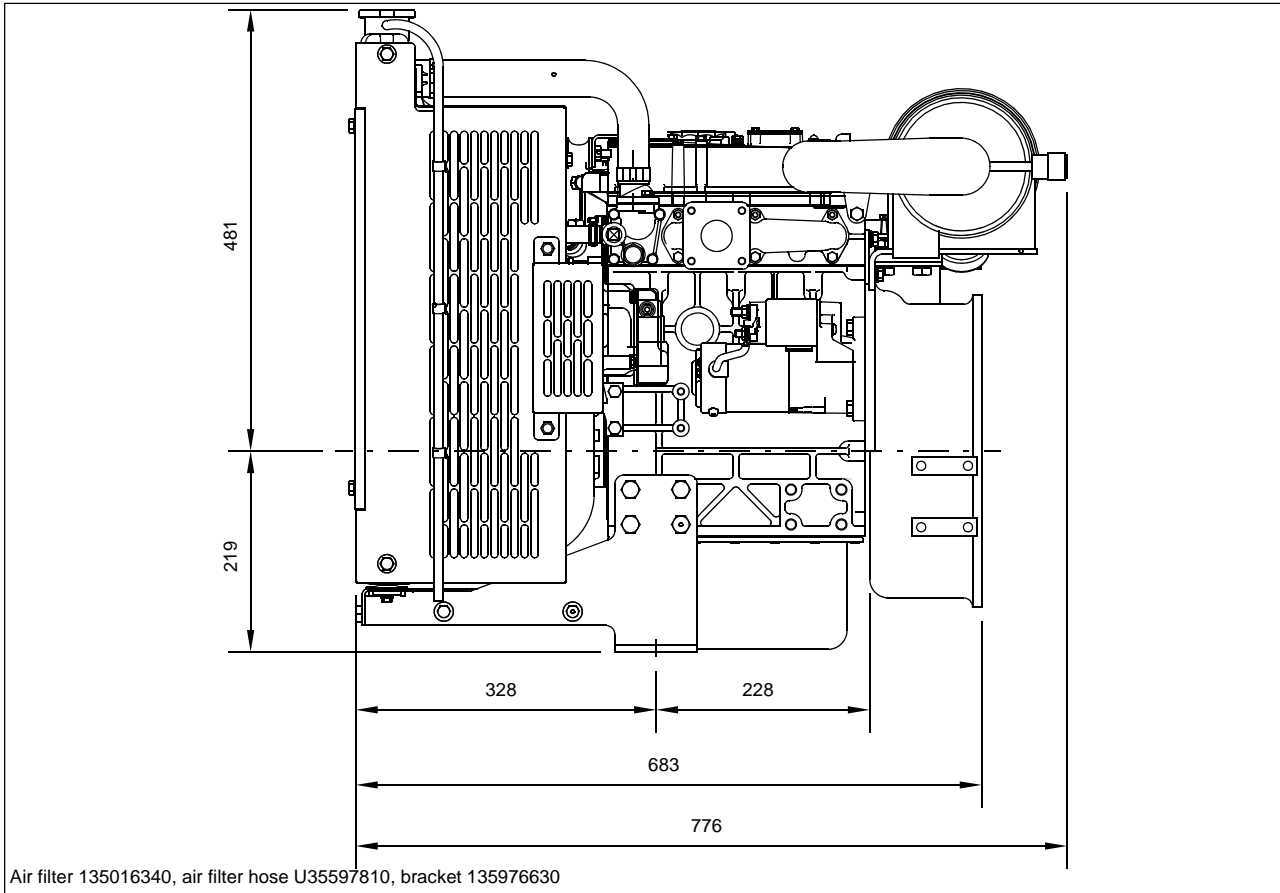


Air filter, bracket and hose

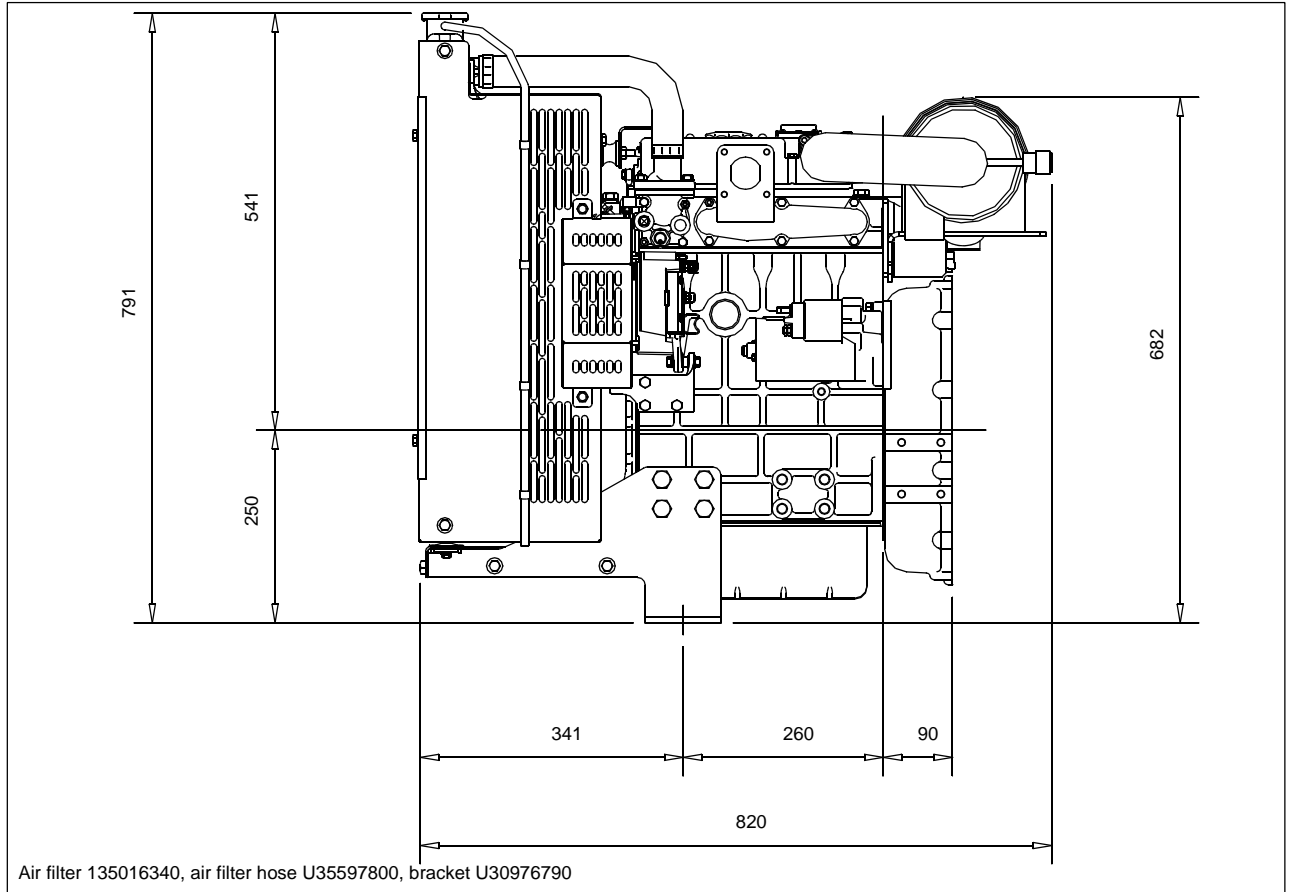
Engine type	Description	Option
All models	Not required	TD000
403D-11 403D-15 404D-22	Air filter, bracket and hose	TD001

Note: An air filter option has not been developed for the 403D-15T, 403D-17, 404D-15.

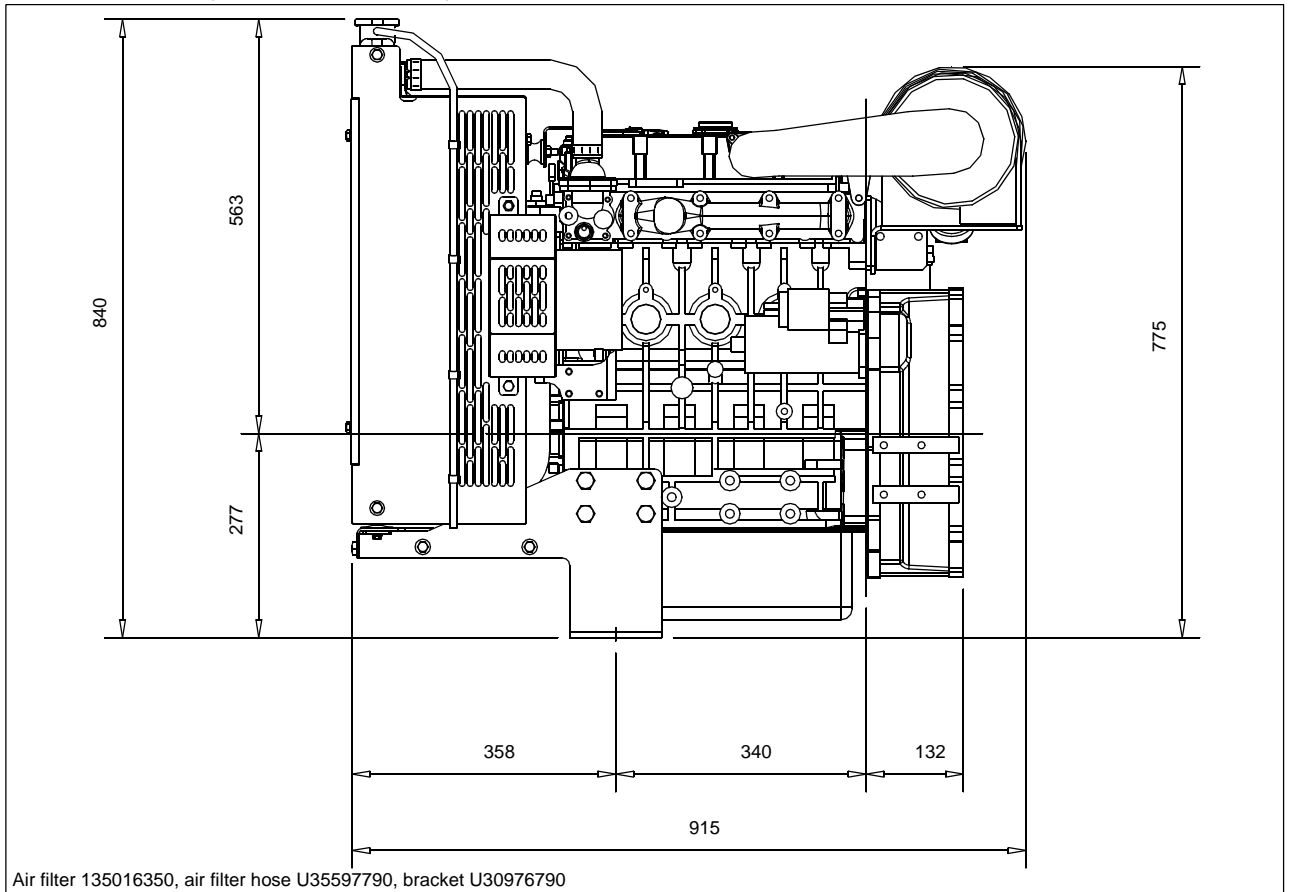
TD001 - Air filter, bracket and hose, 403D-11



TD001 - Air filter, bracket and hose, 403D-15



TD001 - Air filter, bracket and hose, 404D-22



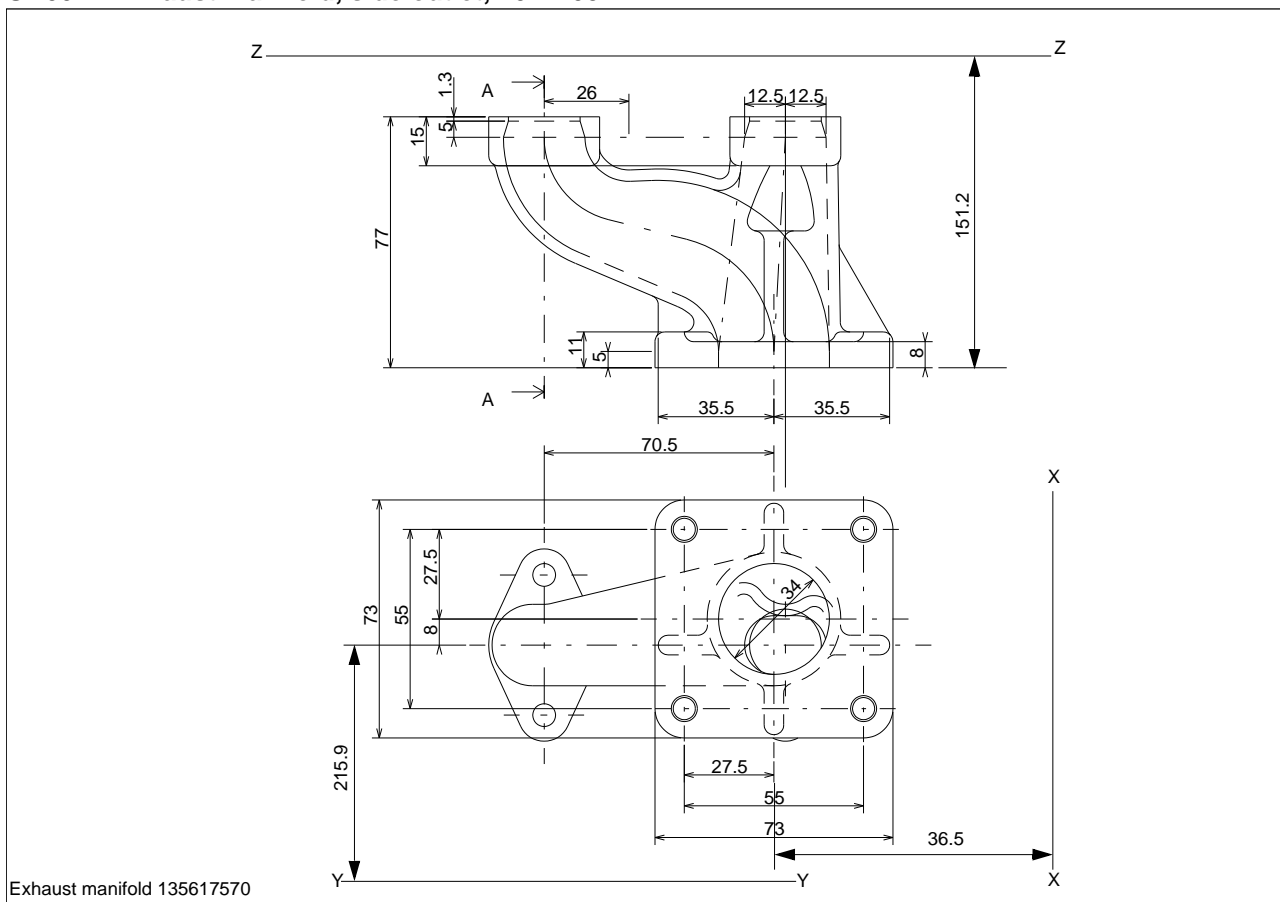
Exhaust manifolds

Engine type	Description	Option
403D-15T 404D-22T 404D-22TA	Turbo engine selected ⁽¹⁾	UB000
402D-05	Not required	UB001
403D-07 403D-11	Exhaust manifold, side outlet	UB002
403D-15 404D-15 403D-17 404D-22	Exhaust manifold, vertical outlet	UB003

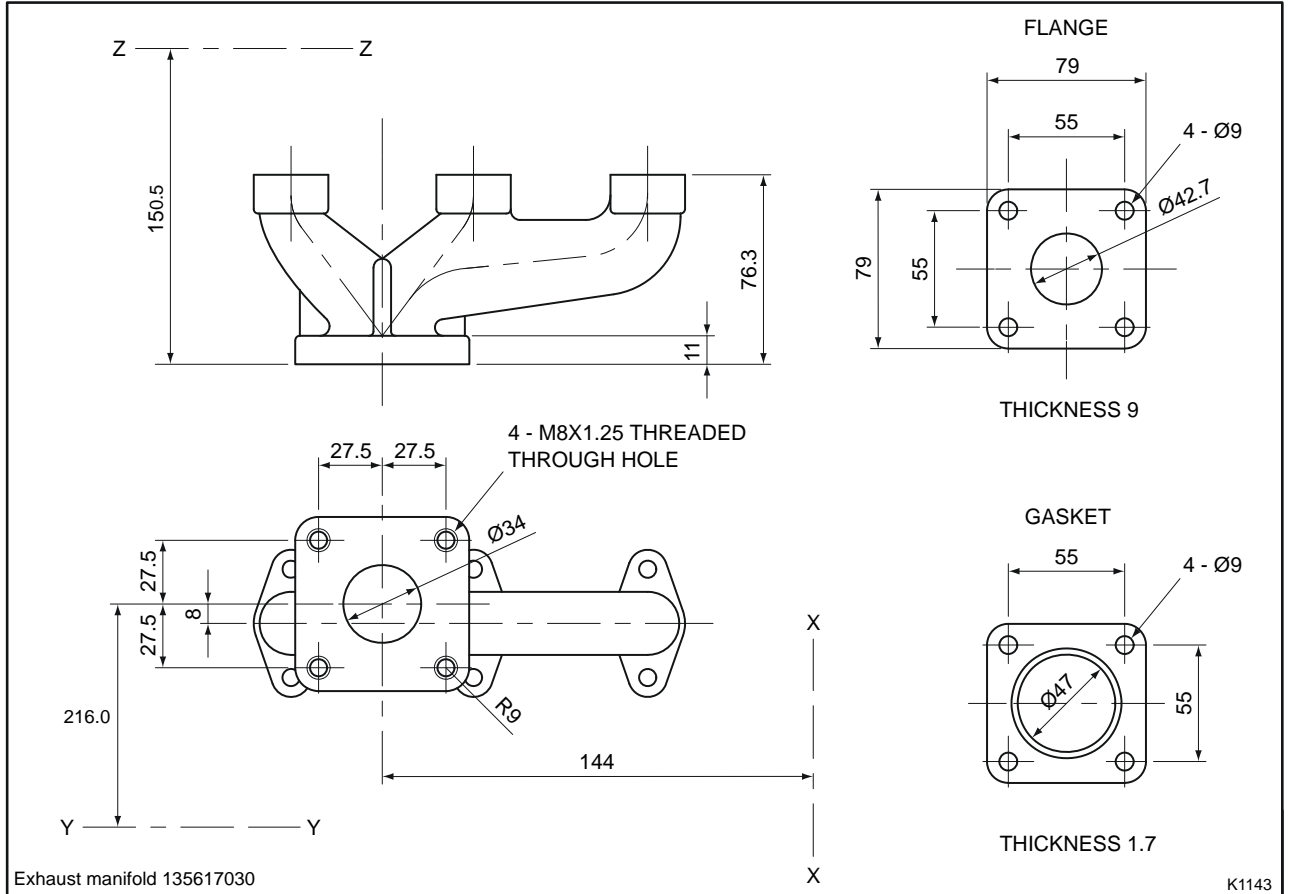
1. Select this options when completing any 403D-15T, 404D-22T, 404D-22TA SPES's or option template.

Note: See page 164 for compatible exhaust elbow.

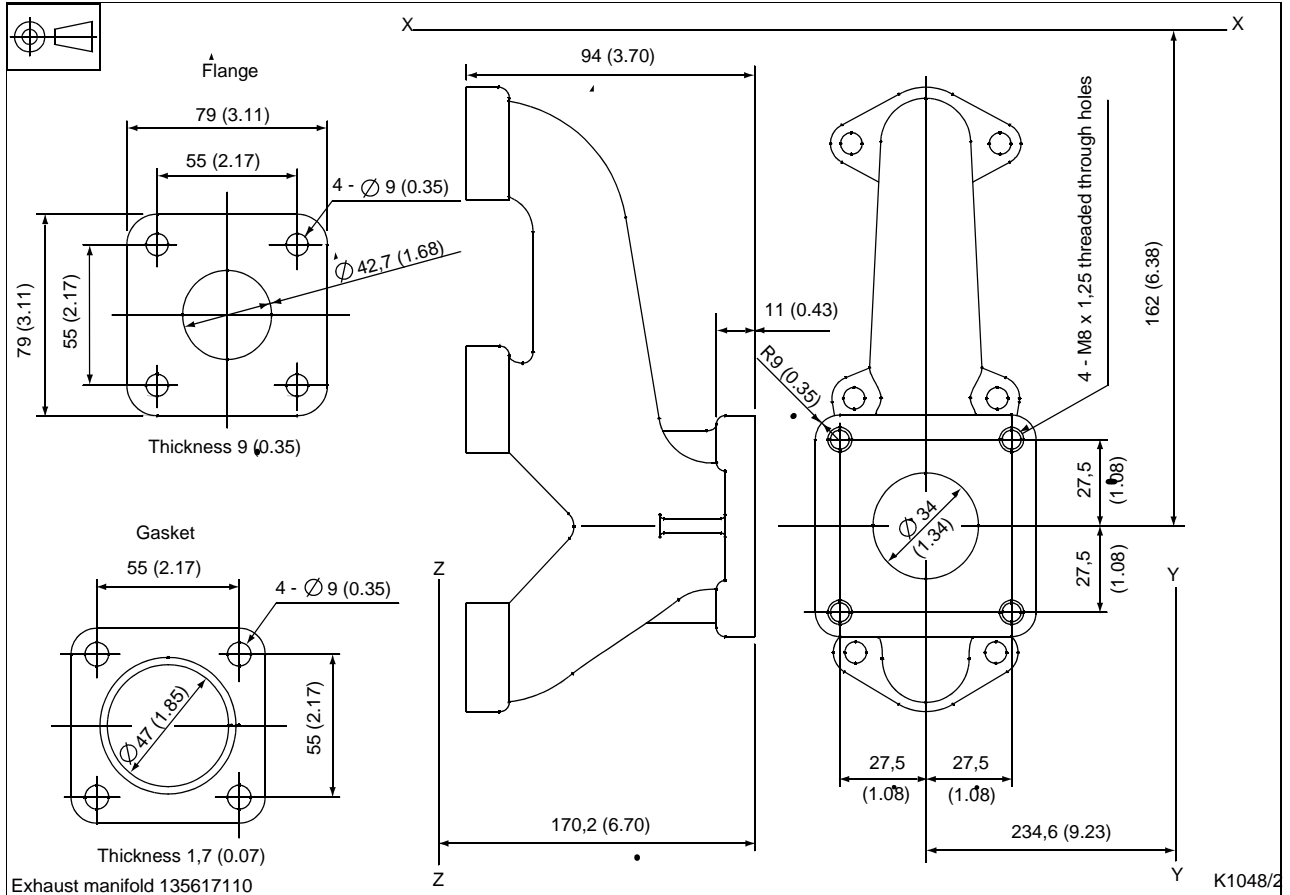
UB002 - Exhaust manifold, side outlet, 402D-05



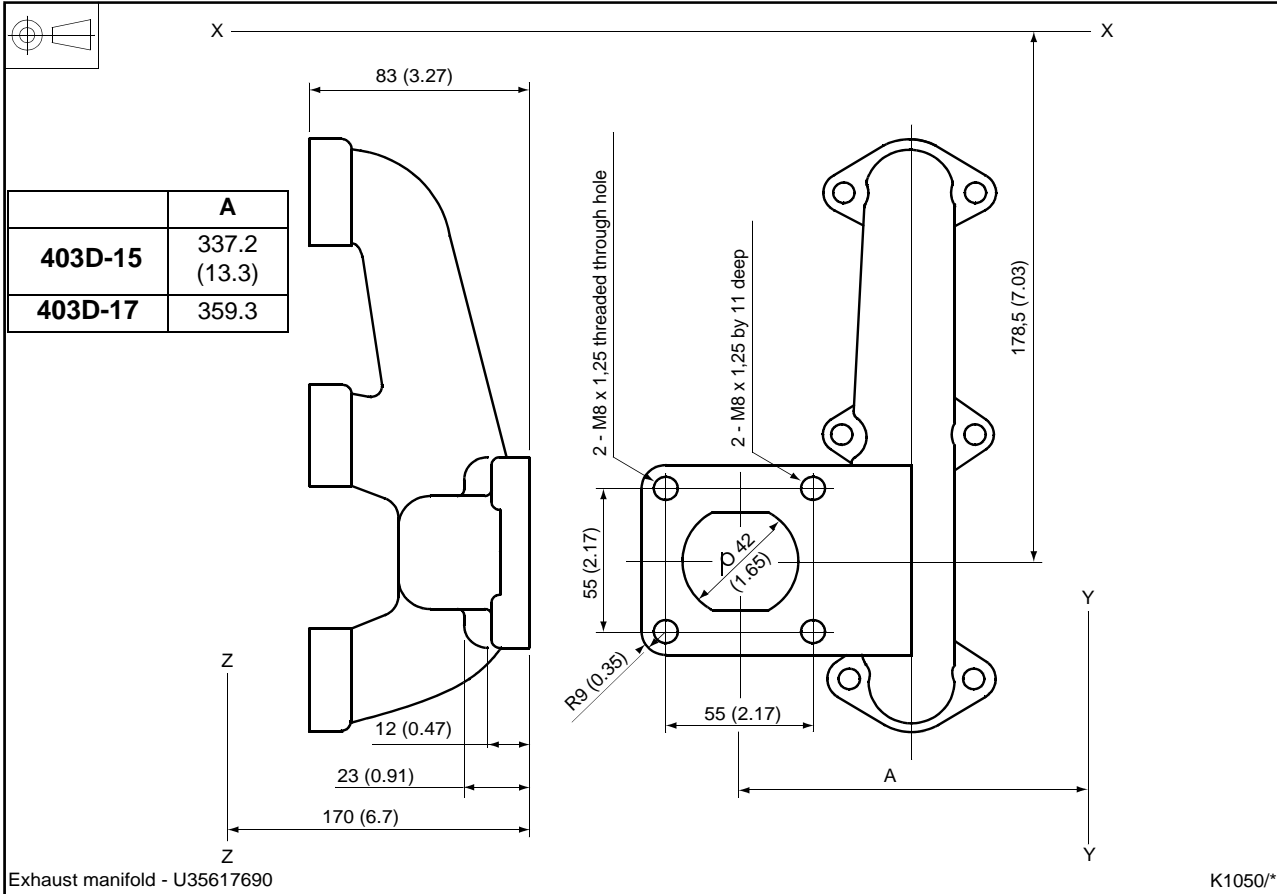
UB002 - Exhaust manifold, side outlet, 403D-07



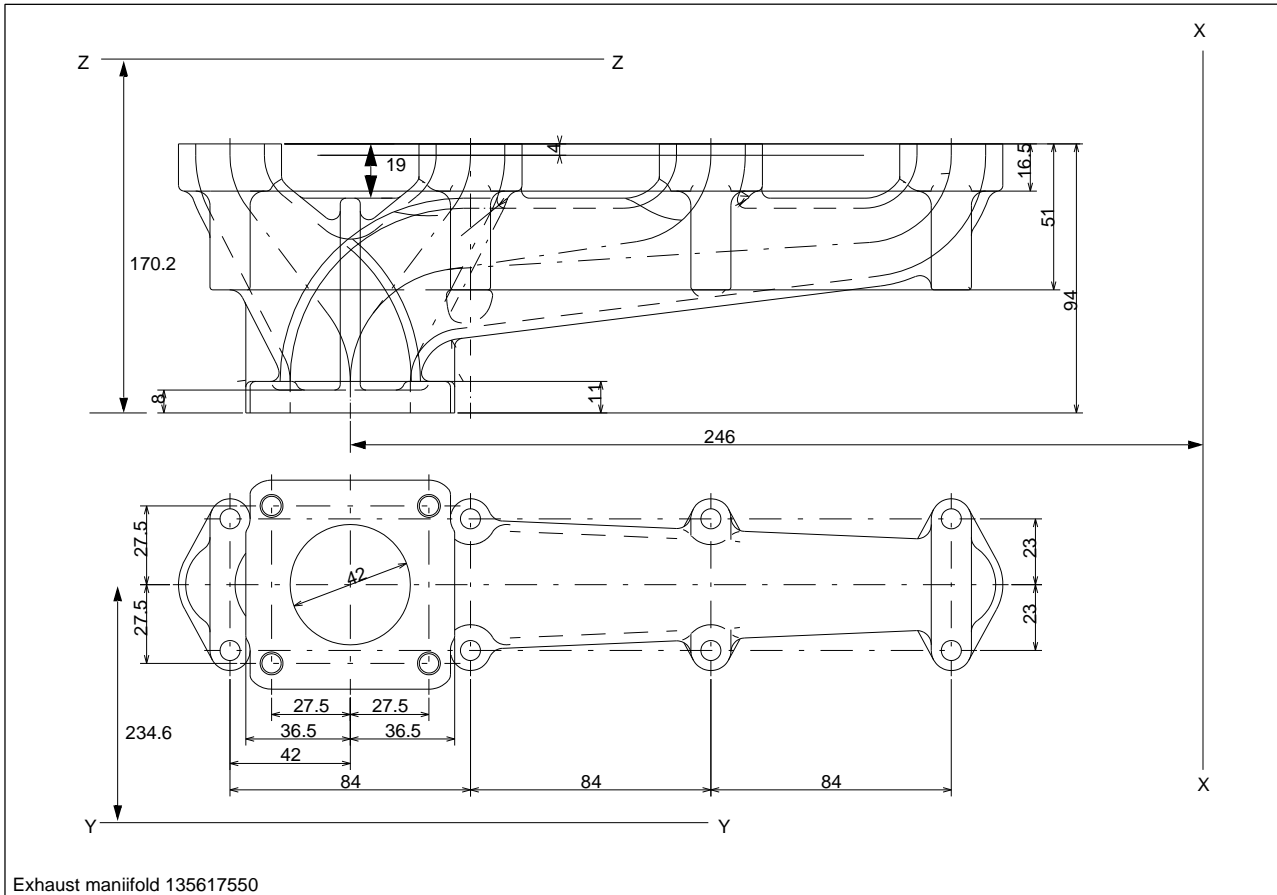
UB002 - Exhaust manifold, side outlet, 403D-11



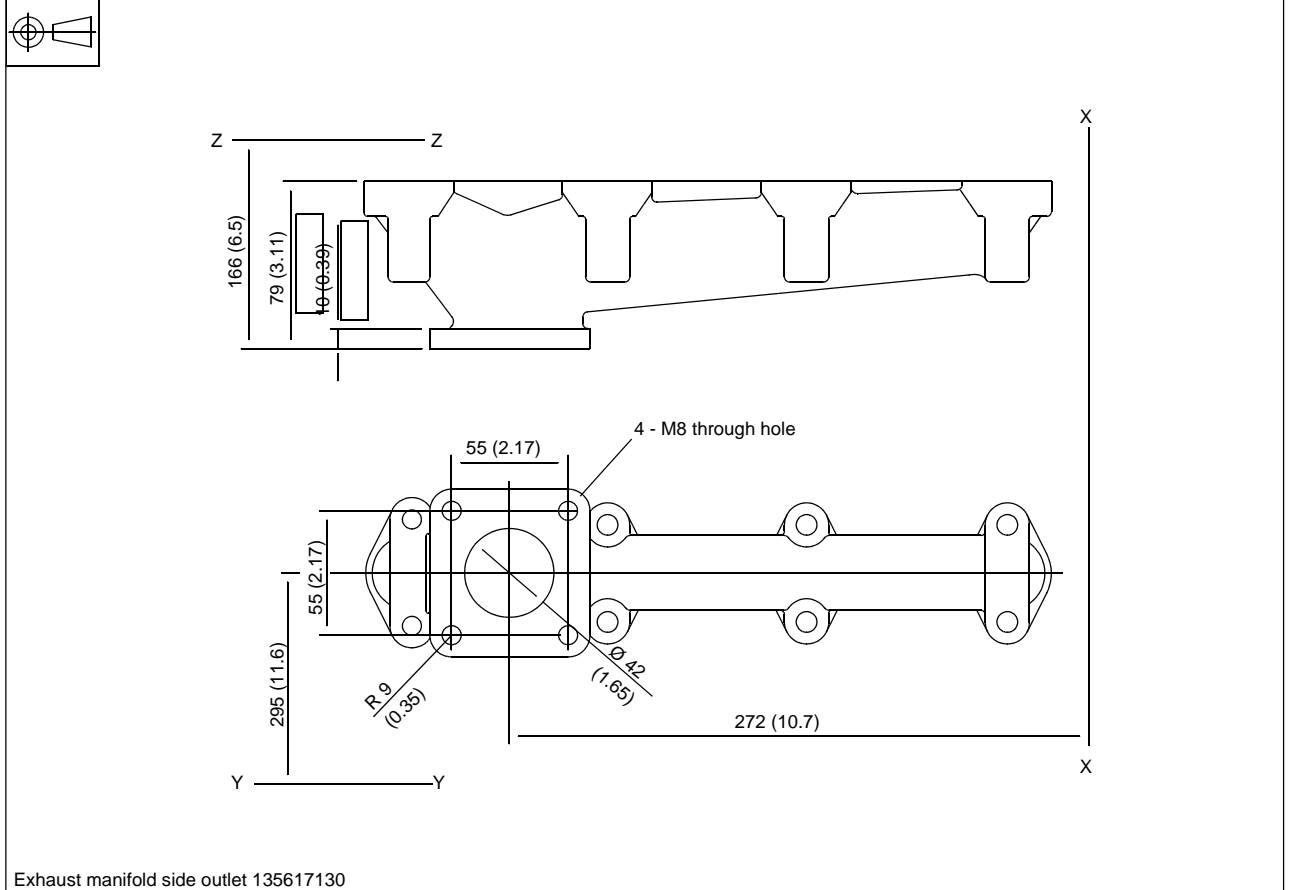
UB002 - Exhaust manifold, side outlet, 403D-15, 403D-17,



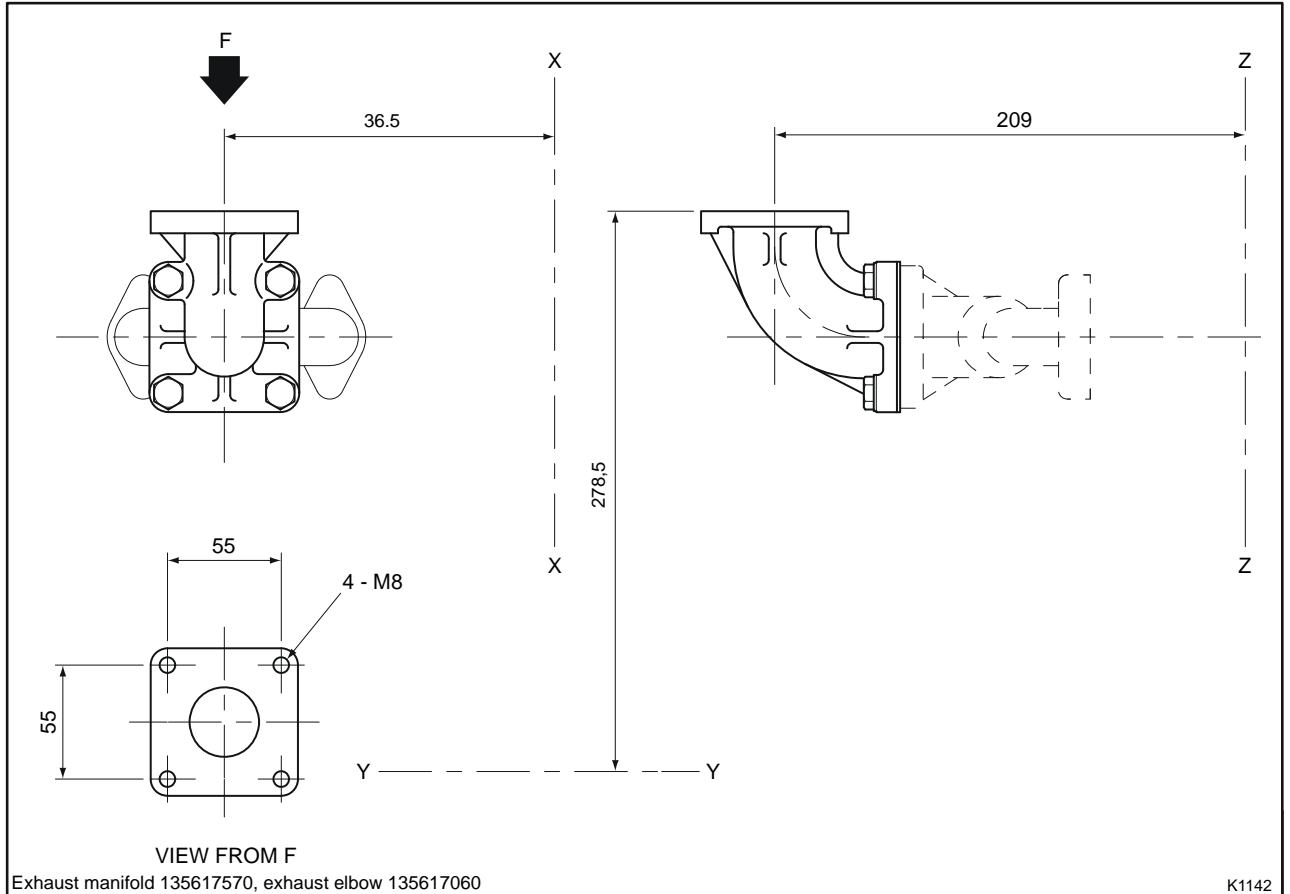
UB002 - Exhaust manifold, side outlet, 404D-15



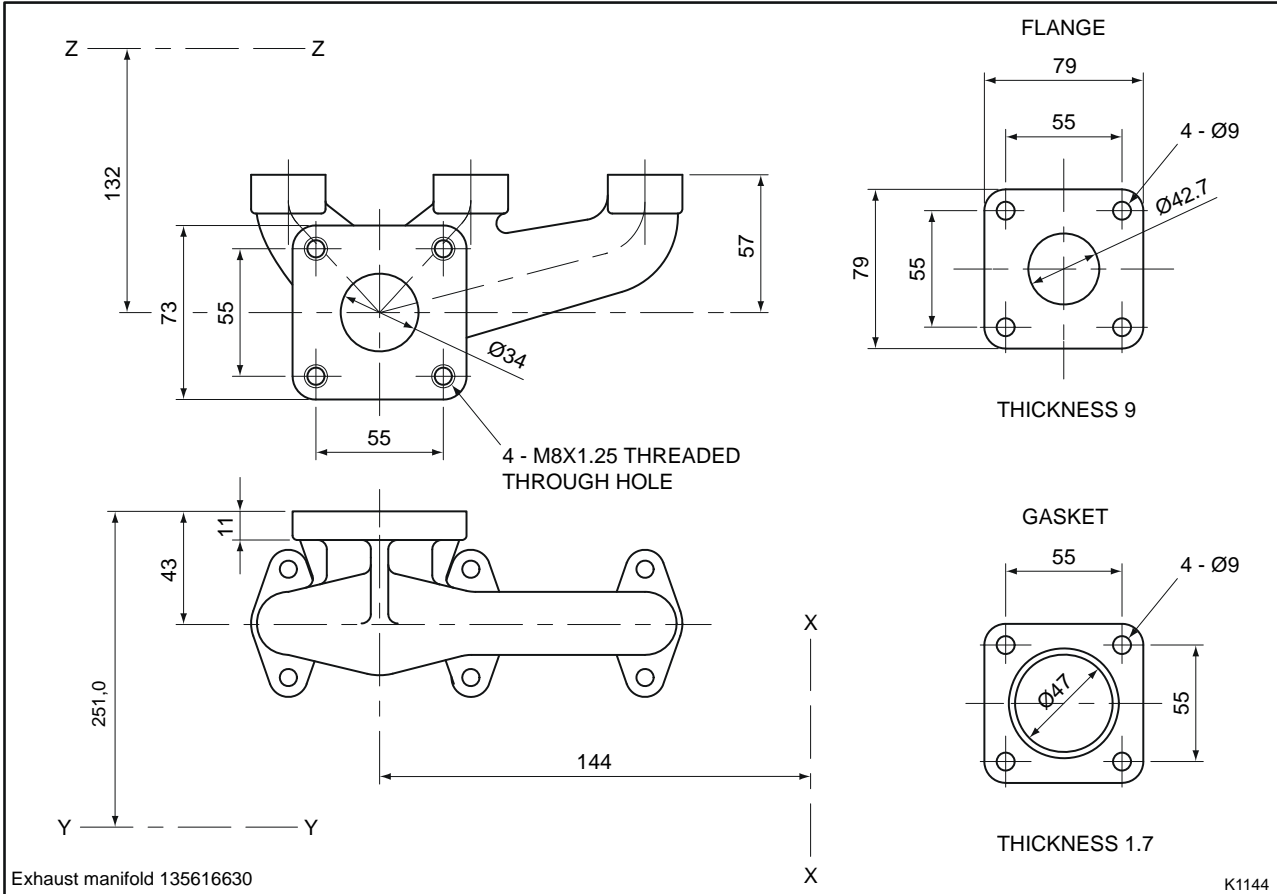
UB002 - Exhaust manifold, side outlet, 404D-22



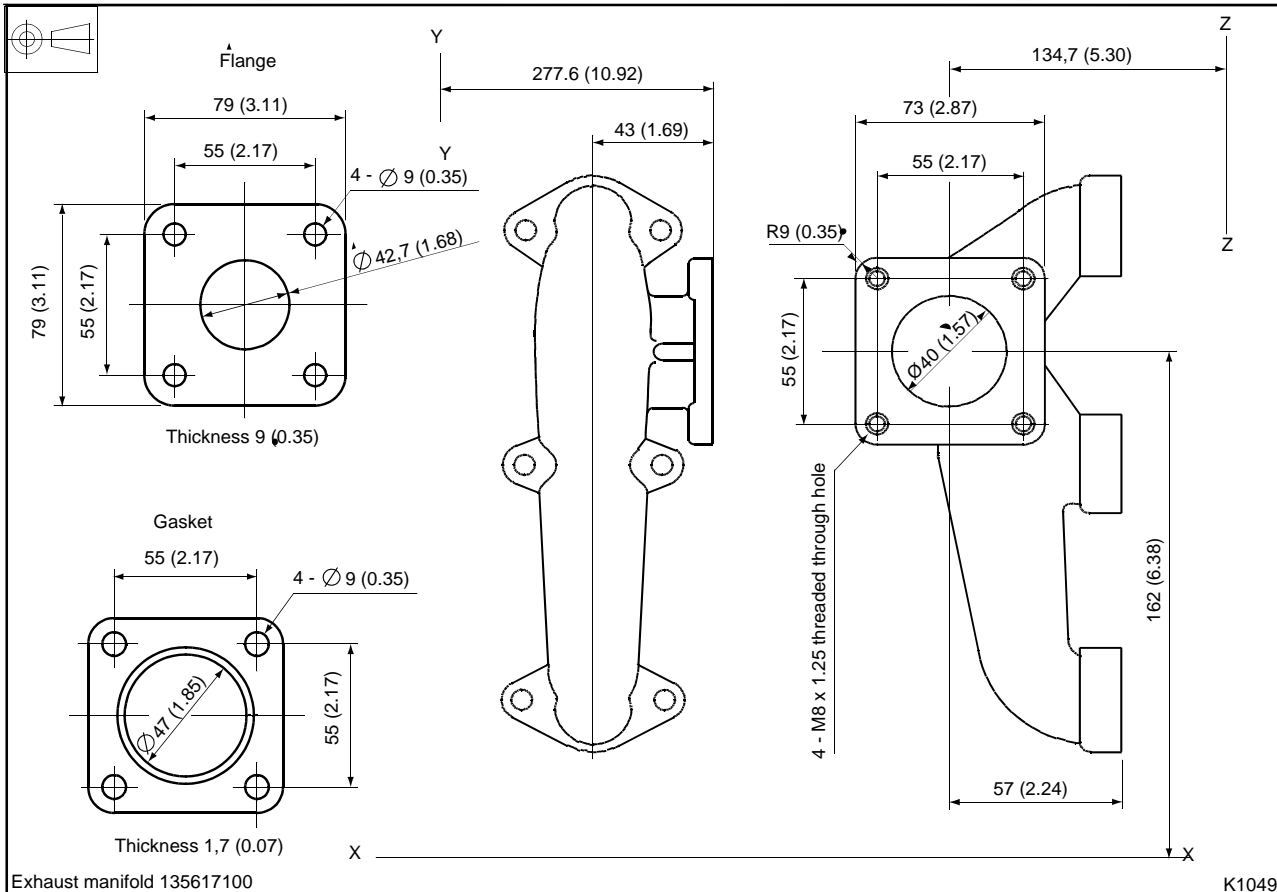
UB003 - Vertical up exhaust elbow, 402D-05



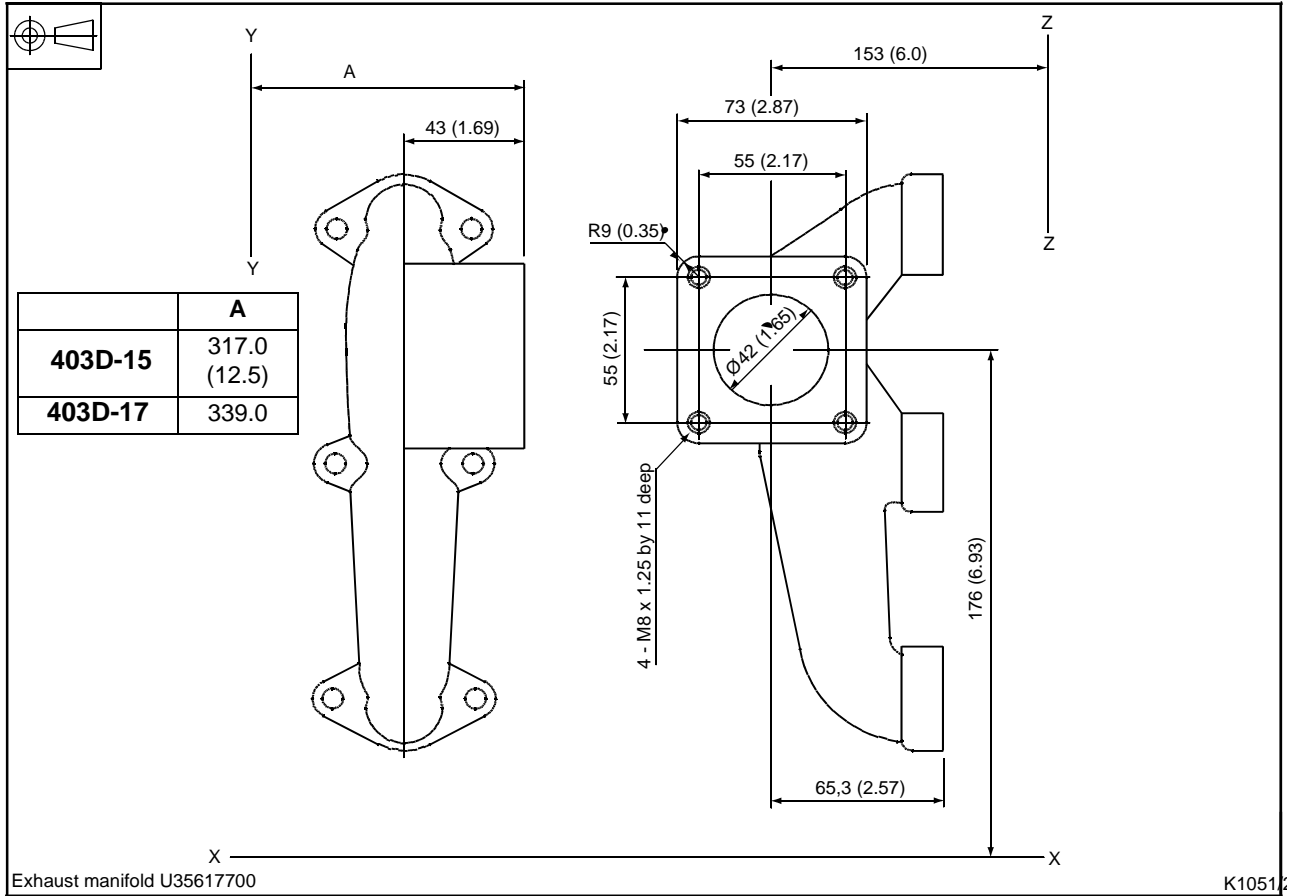
UB003 - Exhaust manifold, vertical outlet, 403D-07



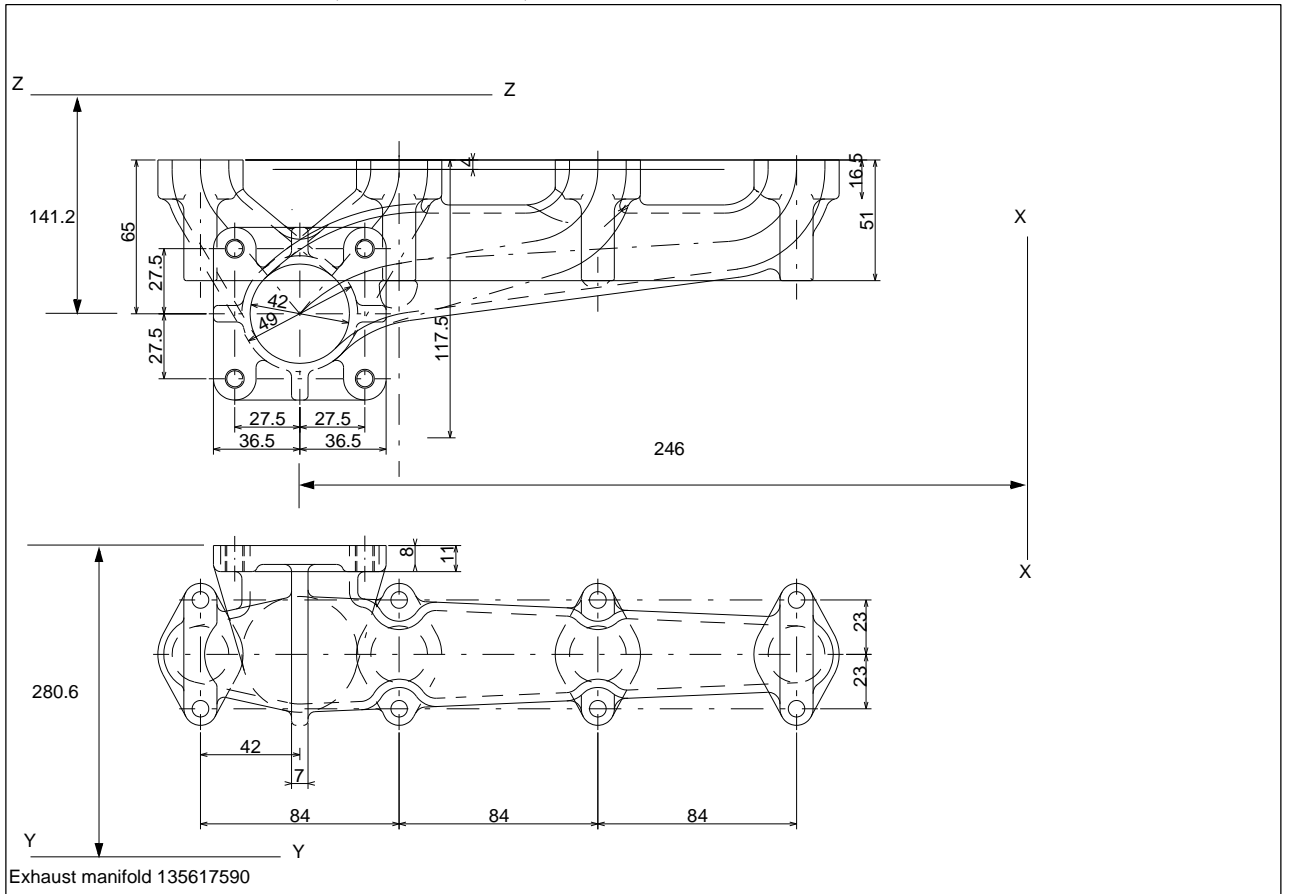
UB003 - Exhaust manifold, vertical outlet, 403D-11



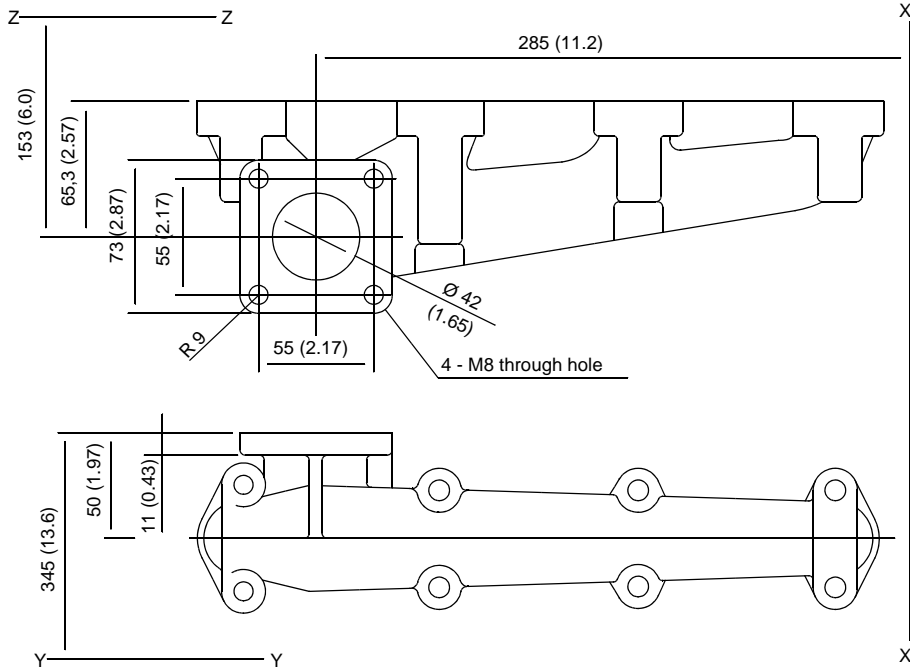
UB003 - Exhaust manifold, vertical outlet, 403D-15, 403D-17



UB003 - Exhaust manifold, vertical outlet, 404D-15



UB003 - Exhaust manifold, vertical outlet, 404D-22



Exhaust manifold vertical outlet 135617160

K1053/1

Low pressure fuel system (lift pump and filter)

Engine type	Lift pump	fuel filter	Fuel filter/primer	Option
All models	Mechanical	No	No	VB000
	Electric	No	No	VB001
	Mechanical	Yes	No	VB003
	Electric	Yes	No	VB004
	Mechanical	No	Yes	VB006
	Mechanical	Yes (filter separator)	No	VB007

VB000/VB006/VB007- Mechanical lift pump, all models

General section

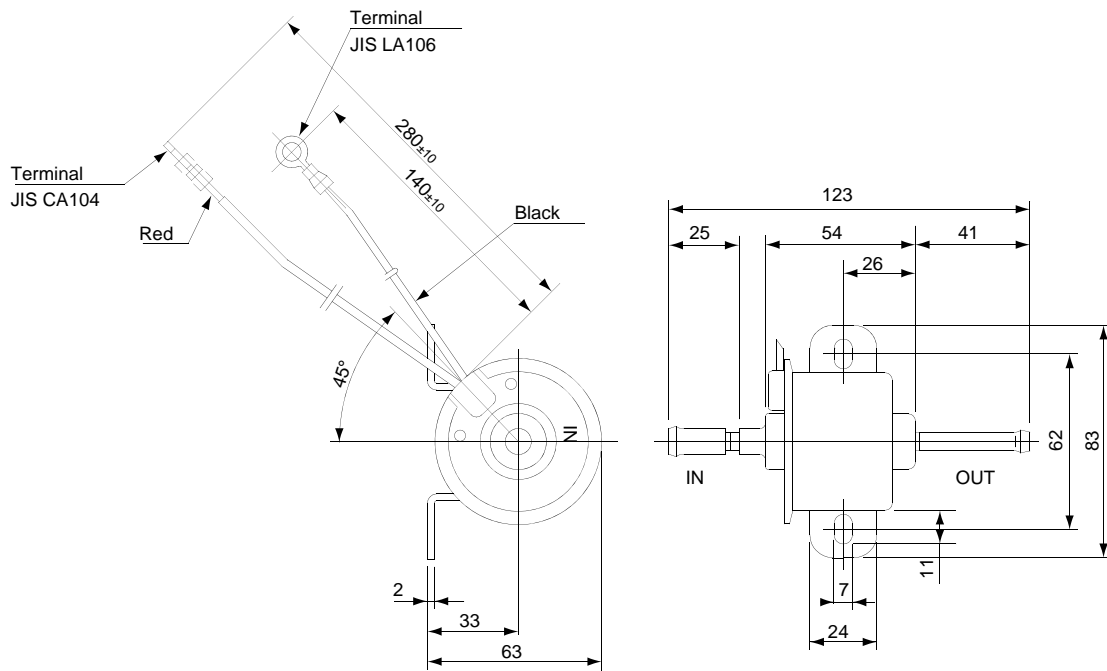
No	Component List	Pcs
1	Lower Body	1
2	Upper Body	1
3	Cover	1
4	O Ring	1
5	M5 X 15 Bolt	1
6	O-ring	1
7	M5 X 15 Bolt	6
8	M5 Spring Washer	6
9	Valve Assembly	2
10	Valve Seal	2
11	Return Spring	1
12	Diaphragm Spring	1
13	Piston	1
14	Piston Pin	1
15	Diaphragm Assembly	1
16	Filter	1
17	O-ring	1

Fuel lift pump 130506351

Notes:

- Maximum suction head: 1.5 m (4.9 ft)
- For a compatible hand primer see page 214.

VB001/VB004 - Electric lift pump (12V) all models



Electric lift pump 485510011

K1058/1

Fuel pump specification

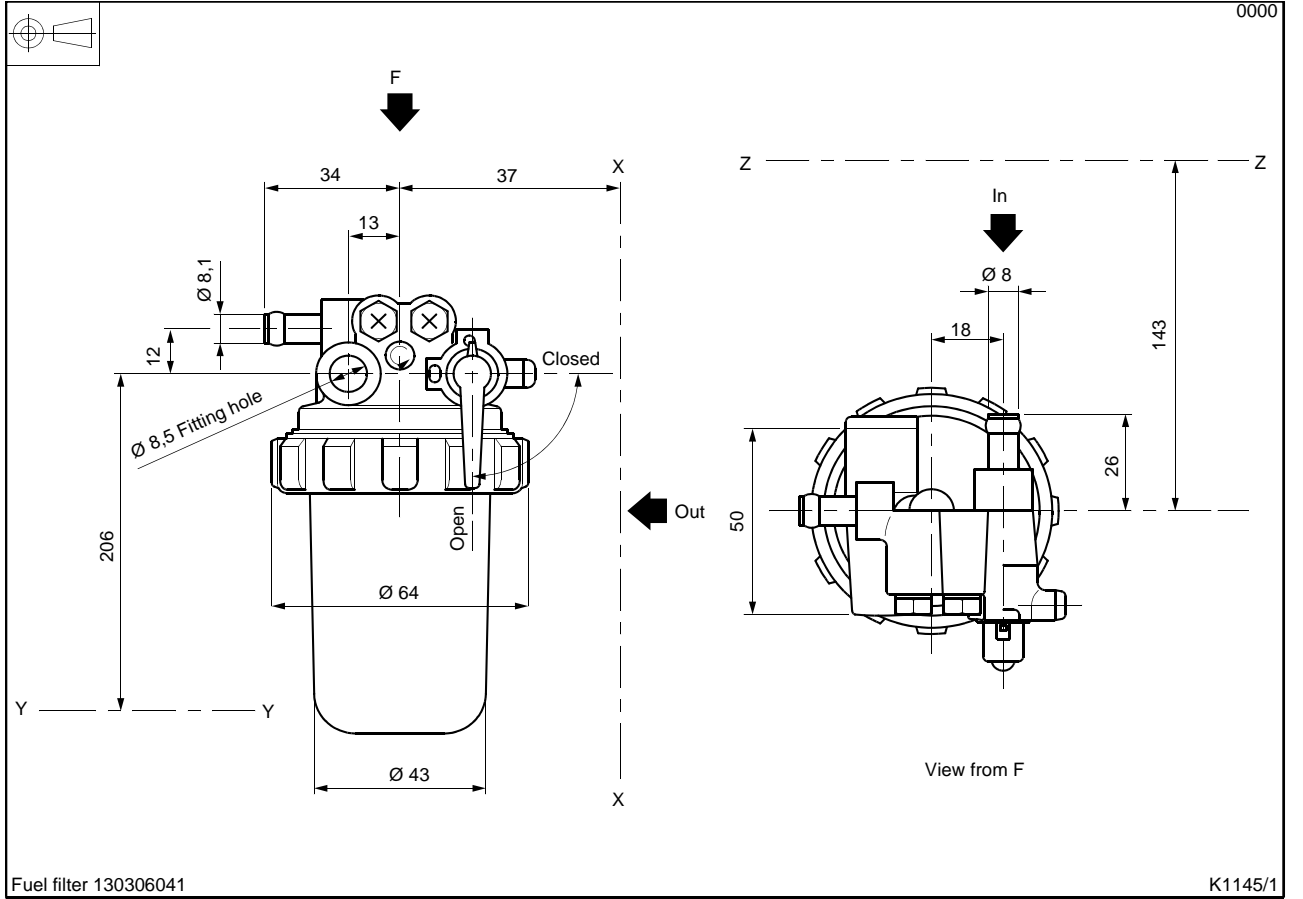
Rated voltage	Operating voltage	Operating current	Minimum delivery	Suction pressure	Total pressure (delivery + suction)
12V	8.5V ~ 16.5V	Maximum 1.5A	400 cc/min at free flow (0,1 kgf/cm ² total pressure)	4 kPa Max.	35 kPa

Notes:

- Use a 25 µm mesh filter (paper type) between pump and fuel tank
- Fix pump inlet and outlet pipes horizontally or vertically
- Secure hoses with clips
- Do not operate fuel pump without fuel for more than 2 minutes
- VB001/VB004 includes mounting kit, electrical connections and filter.

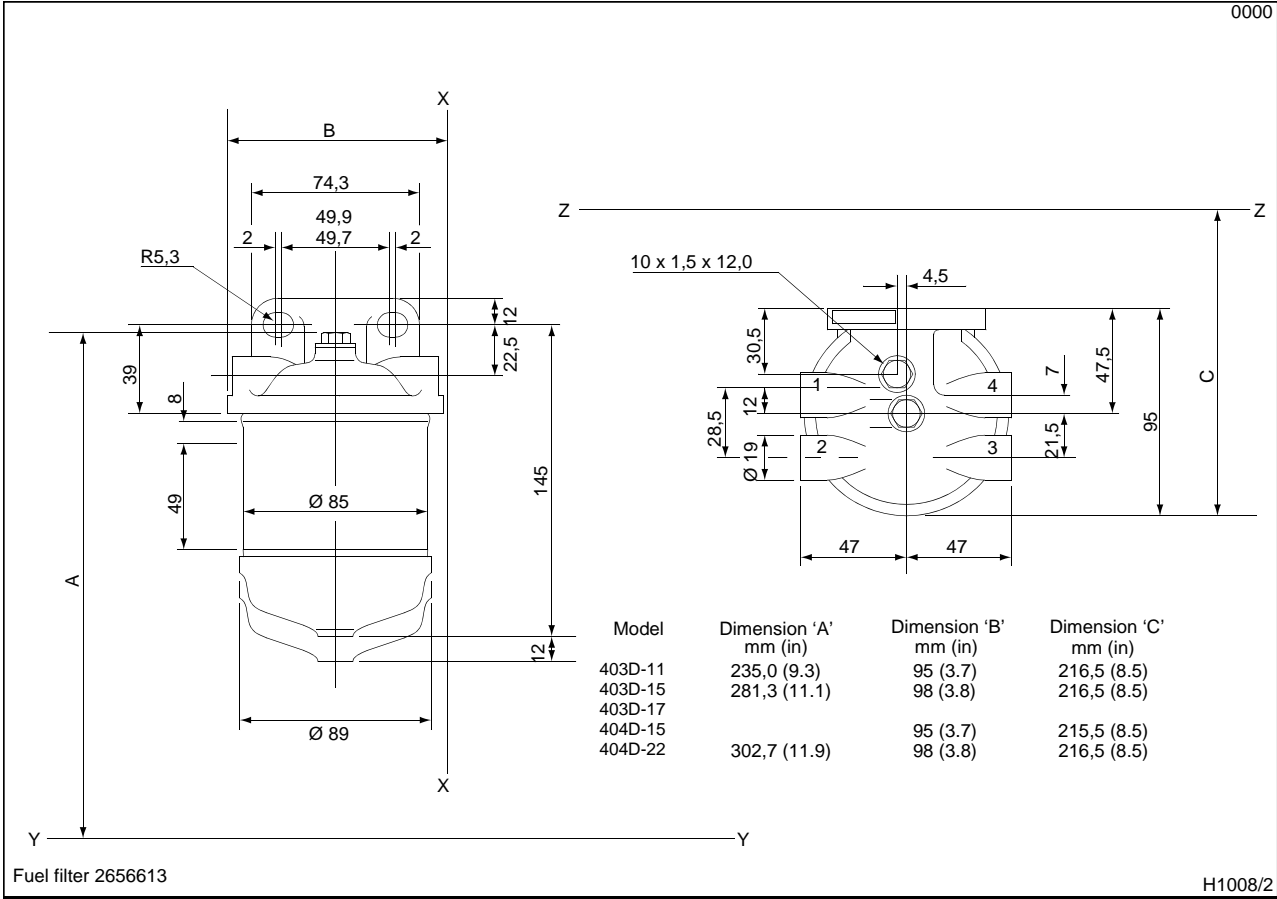
VB003 / VB004 - Fuel filter, 402D-05, 403D-07

0000



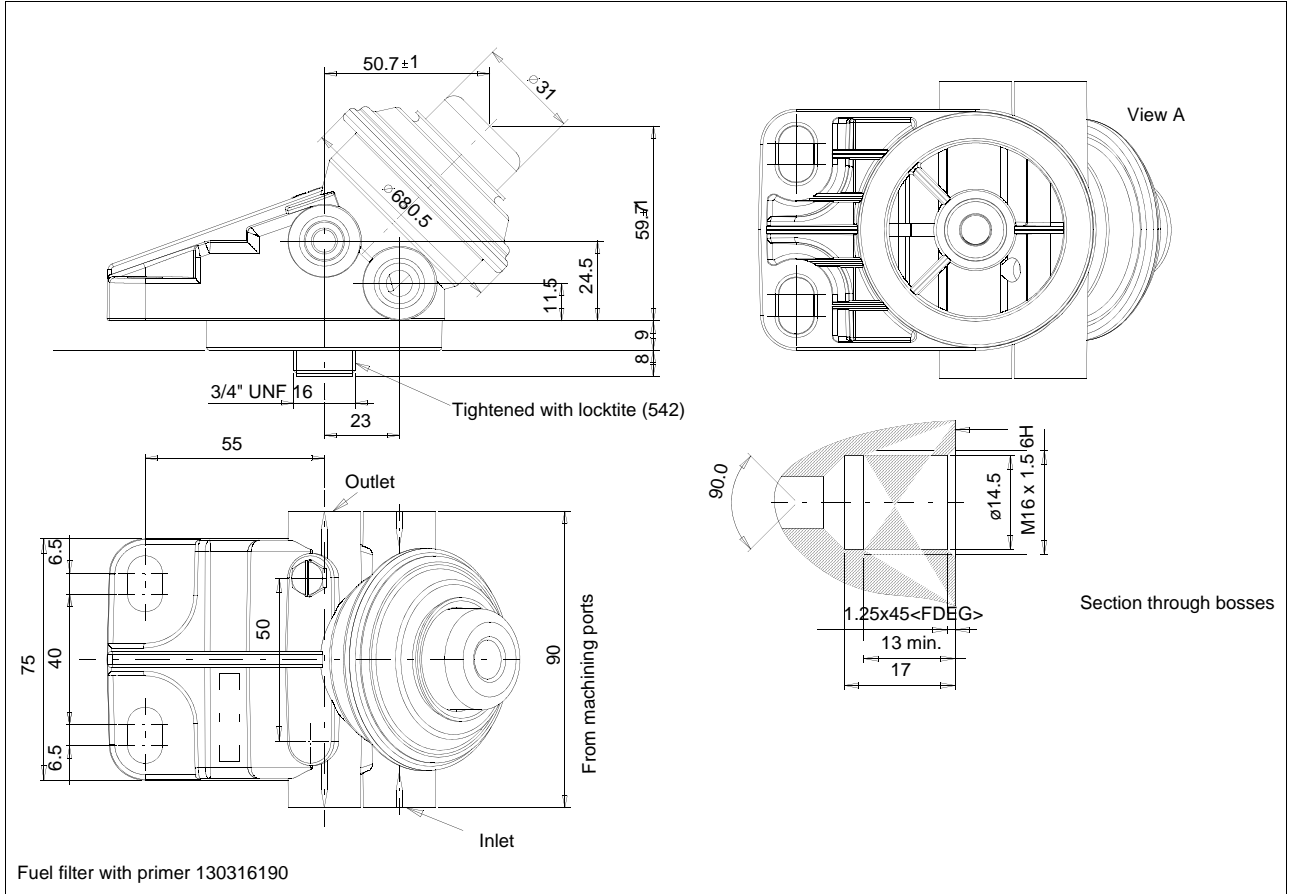
VB003 / VB004 - Fuel filter, 403D-11, 403D-15, 403D-17, 403D-15T, 404D-15, 404D-22, 404D-22T, 404D-

0000



22TA

VB006 - Fuel filter with primer, all models



Notes:

- Fuel filter brackets are being designed, therefore, it is not possible to advise of installation dimensions, at the time of going to print.
- Not Available on 402D-05, 403D-07, 403D-11 and 403D-15.

VB007 - Fuel filter, 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T, 404D-22TA

Fuel filter 2656615

Engine paint

Engine type	Description	Option
402D-05 403D-07 403D-11 403D-15 403D-17 403D-15T 404D-15 404D-22 404D-22T 404D-22TA	Lacquer	YD000

Engine packaging

Engine type	Description	Option
All models	Triwall packaging	YZ000

Electronic controlled governor (governor/control options)

Engine type	Description	Option
All models	Standard forked 12V	ZA001
	Long lever 2 holes 12V	ZA002
	Standard forked 24V	ZA003
	Long lever 2 holes 24V	ZA004
403D-15 403D-15T 403D-17 404D-15 404D-22 404D-22T 404D-22TA	Standard forked 12V eGov no speed sensor ⁽¹⁾	ZA005
403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Standard forked 12V eGov inc speed sensor will include controller/actuator/speed sensor and the relevant calibration file	ZA010
404D-22T 404D-22TA	Standard forked 12V EBCD	ZA012
	Long lever 2 holes 12V EBCD	ZA015
	Standard forked 12V eGov + IPFC no speed sensor will include controller/actuator/intake pressure fuel control system and the calibration file	ZA016
	Standard forked 12V eGov + IPFC including speed sensor will include controller/actuator/intake pressure fuel control system/speed sensor and the calibration file	ZA017

1. Incompatible with constant speed ratings AA041 (1500 rpm) and AA043 (3000 rpm).

Notes:

- Currently the electronic controlled governor has not been developed for the 402D-05, 403D-07, 403D-11, 403D-17, 404D-15.
- The electronic governor has been developed for 1800 rpm Gen Set to allow switching to 1500 rpm Gen Set rating.
- It is recommended that the controller is not located on the engine or alternator. The effects of vibration and temperature should be within the specified range
- Operating temperature: -40°C to +85°C (-40 °F to +185 °F)
- Vibration: 6G's from 40 to 2000 Hz
- The controller should be installed as per the orientation in the drawing
- (with the 12 pins Deutsch connectors pointing down). It is also recommended that the controller is installed in a suitable place so that the LED on the controller can be seen easily as the LED can flash giving important diagnostic information
- Option ZA005 will include controller/actuator and the relevant calibration file.

ZA001/ZA005 - Fork throttle lever (12/24V), 402D-05, 403D-07, 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T, 404D-22TA

Drawing not available at time of print

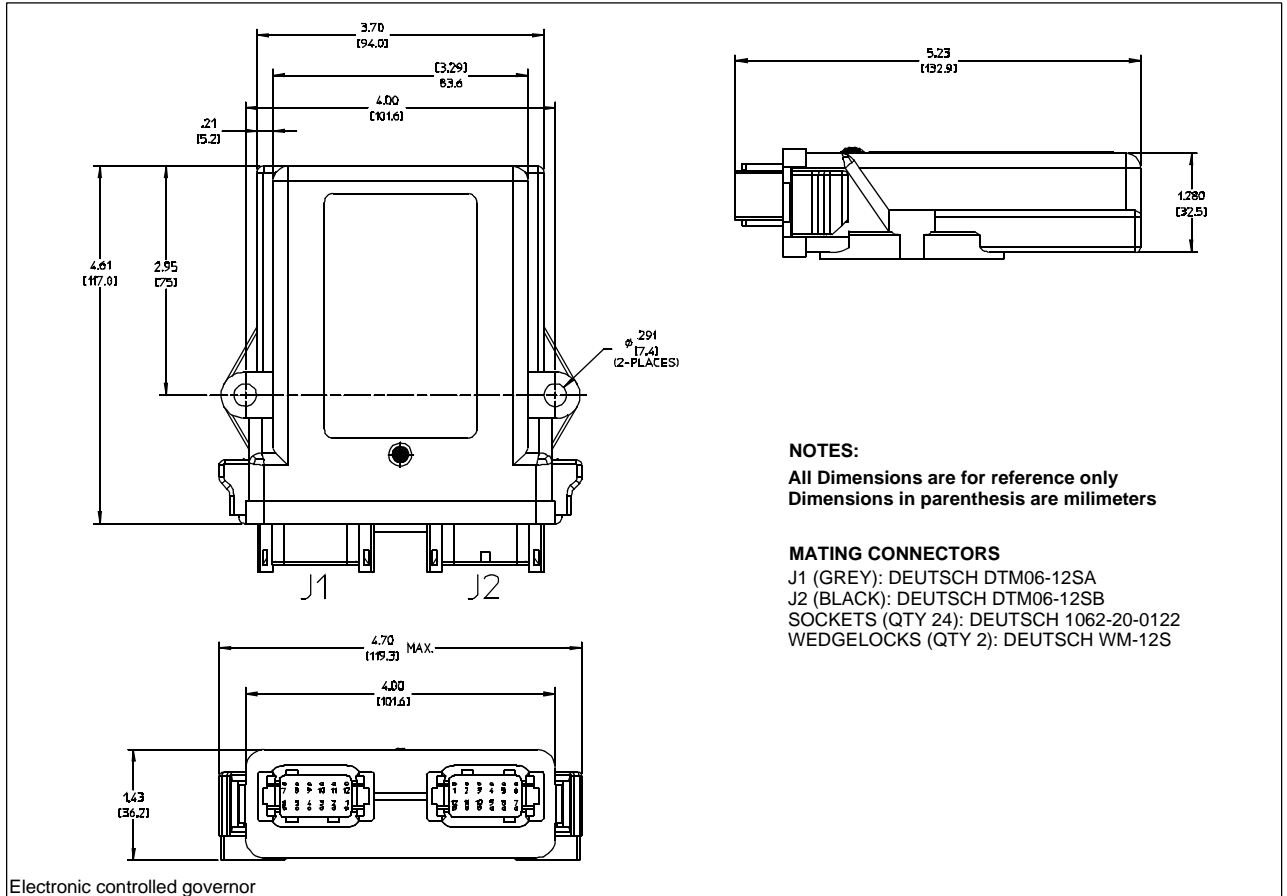
Throttle lever - 125416020

ZA002 - Long 2 holes throttle lever (12/24V), 402D-05, 403D-07, 403D-11, 403D-15, 403D-17, 403D-15T, 404D-15, 404D-22, 404D-22T, 404D-22TA

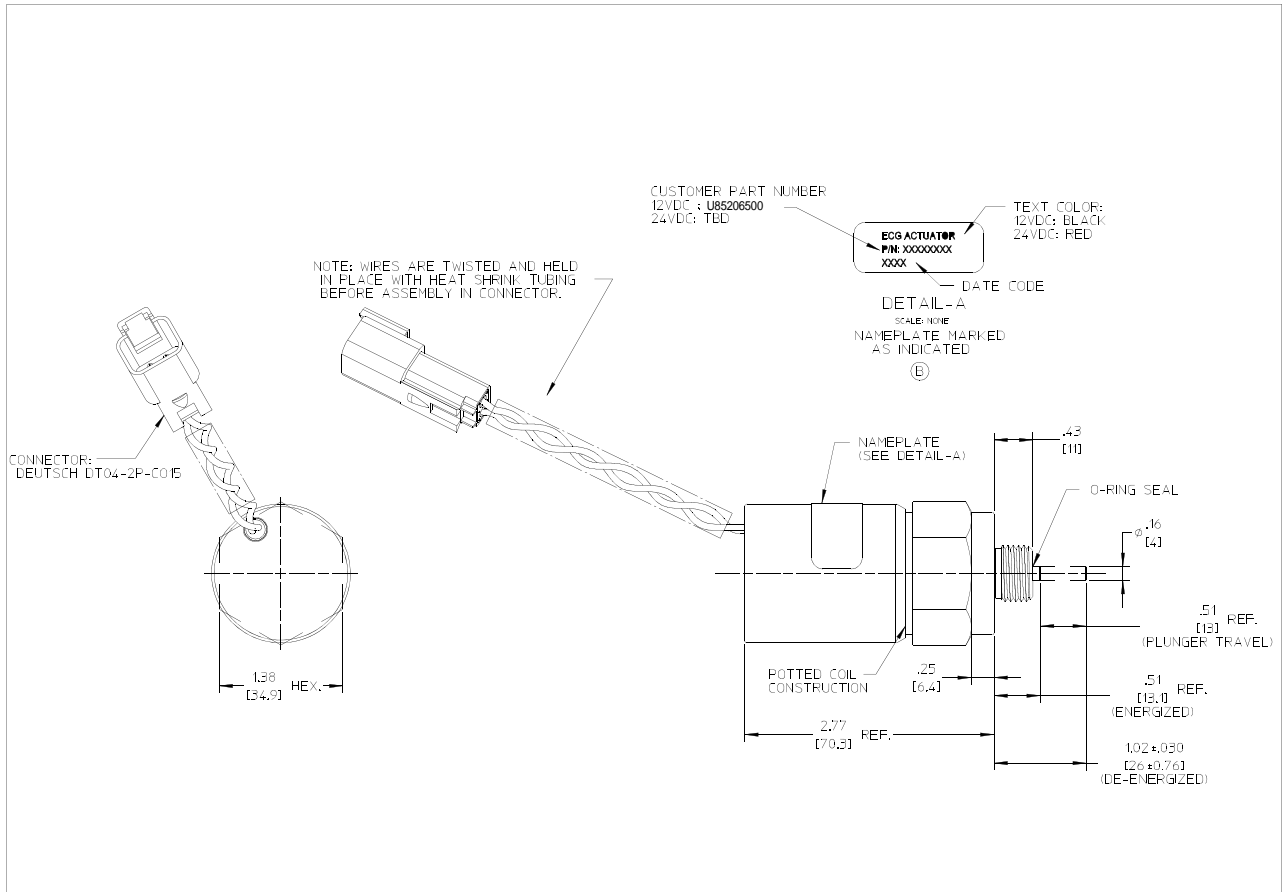
Drawing not available at time of print

Throttle lever - 125416300

ZA005 - Electronic controlled governor, 403D-15, 404D-22



ZA005 - Electronic controlled governor - actuator, 403D-15T, 404D-22, 404D-22T, 404D-22TA



Oil pressure switch

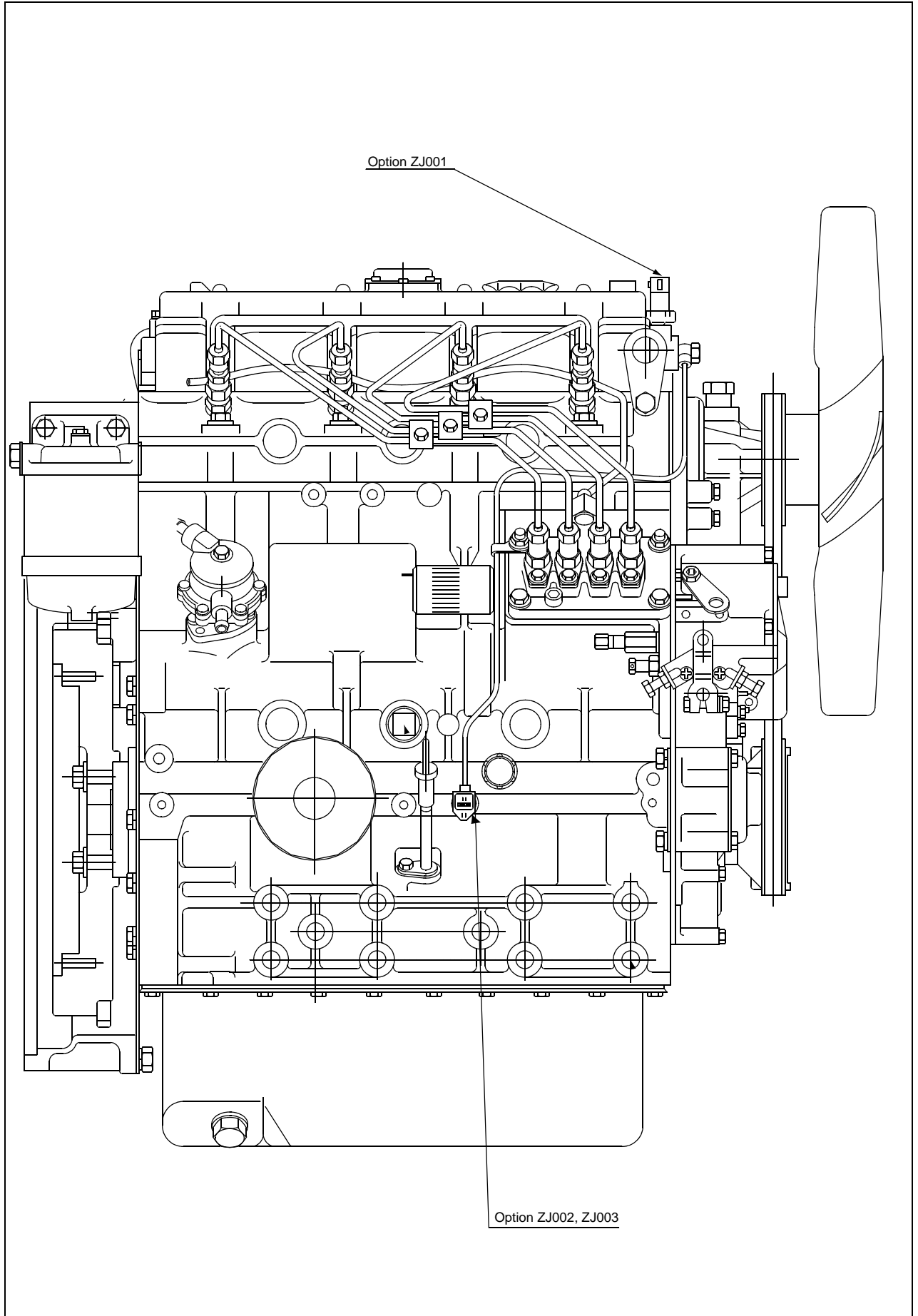
Engine type	Description	Option
All models	Not required	ZJ000
402D-05 403D-07 403D-15 403D-15T 403D-17 404D-15 404D-22 404D-22T 404D-22TA	Oil pressure switch (top cover 0,3 kgf/cm ²) (Deutsch connector) switch identified by a green circular sticker with a white dot	185246210 ZJ001
403D-11	Oil pressure switch (top cover 0,5 kgf/cm ²) (Deutsch connector) switch identified by a brown circular sticker <i>Incompatible with ZM001 and ZM002</i>	185246280 ZJ001
403D-07 403D-15 403D-15T 403D-17 404D-22 404D-22T 404D-22TA	Oil pressure switch (oil rail 0,7 kgf/cm ²) (Deutsch connector) switch identified by a green circular sticker with a red dot	185246290 ZJ002
403D-11	Oil pressure switch (oil rail 0,5 kgf/cm ²) (Deutsch connector) switch identified by a green circular sticker with a red dot	185246280 ZJ002
404D-15	Oil pressure switch (oil rail 0,3 kgf/cm ²) (Deutsch connector) switch identified by a green circular sticker with a white dot	185246210 ZJ002
403D-11	Oil pressure switch/sender (oil rail)	ZJ003
403D-15 403D-15T 403D-17 404D-22 404D-22T 404D-22TA	Oil pressure sender/switch 1,0 kgf/cm ² (14.22 lbf/in ²) (oil rail)	185246190 ZJ003

Notes:

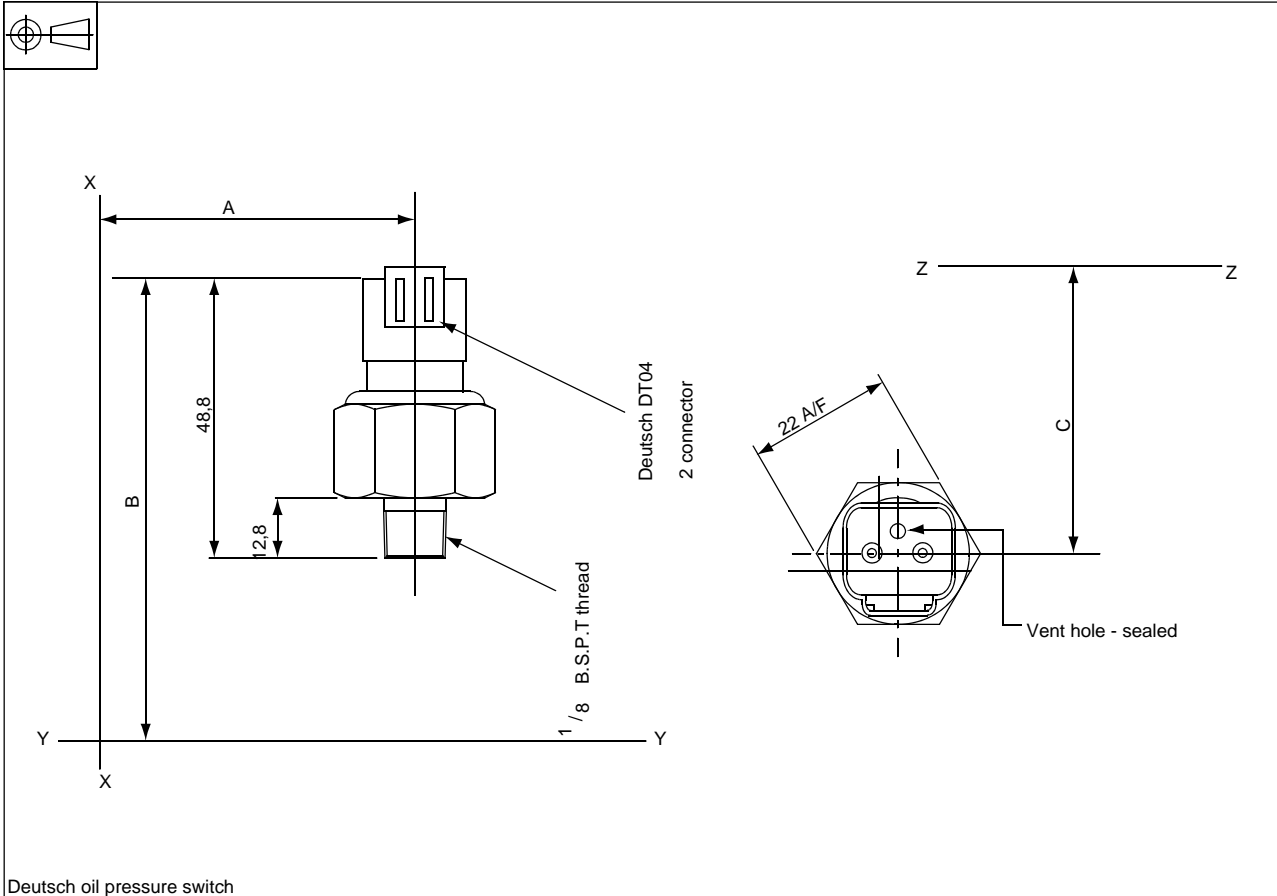
- Option ZJ001 and ZJ002 have a dust water protection to IP69 standard when connected to wiring loom
- The oil pressure switch will vary depending on which oil pressure switch option selected
- ZJ003 the sender ratings are detailed with the option drawings
- All pressures listed in the table above refer to a falling pressure @ 20°C.

Part number	Operating pressure (contacts normally closed)
185246190	Contacts to close @ 1,0 kgf/cm ² ± 0.15 kgf/cm ²
185246210	Contacts to close @ 0,3 kgf/cm ² ± 0.14 kgf/cm ²
185246280	Contacts to close @ 0,5 kgf/cm ² ± 0.14 kgf/cm ²
185246290	Contacts to close @ 0,7 kgf/cm ² ± 0.14 kgf/cm ²

Oil pressure switch location in a typical engine



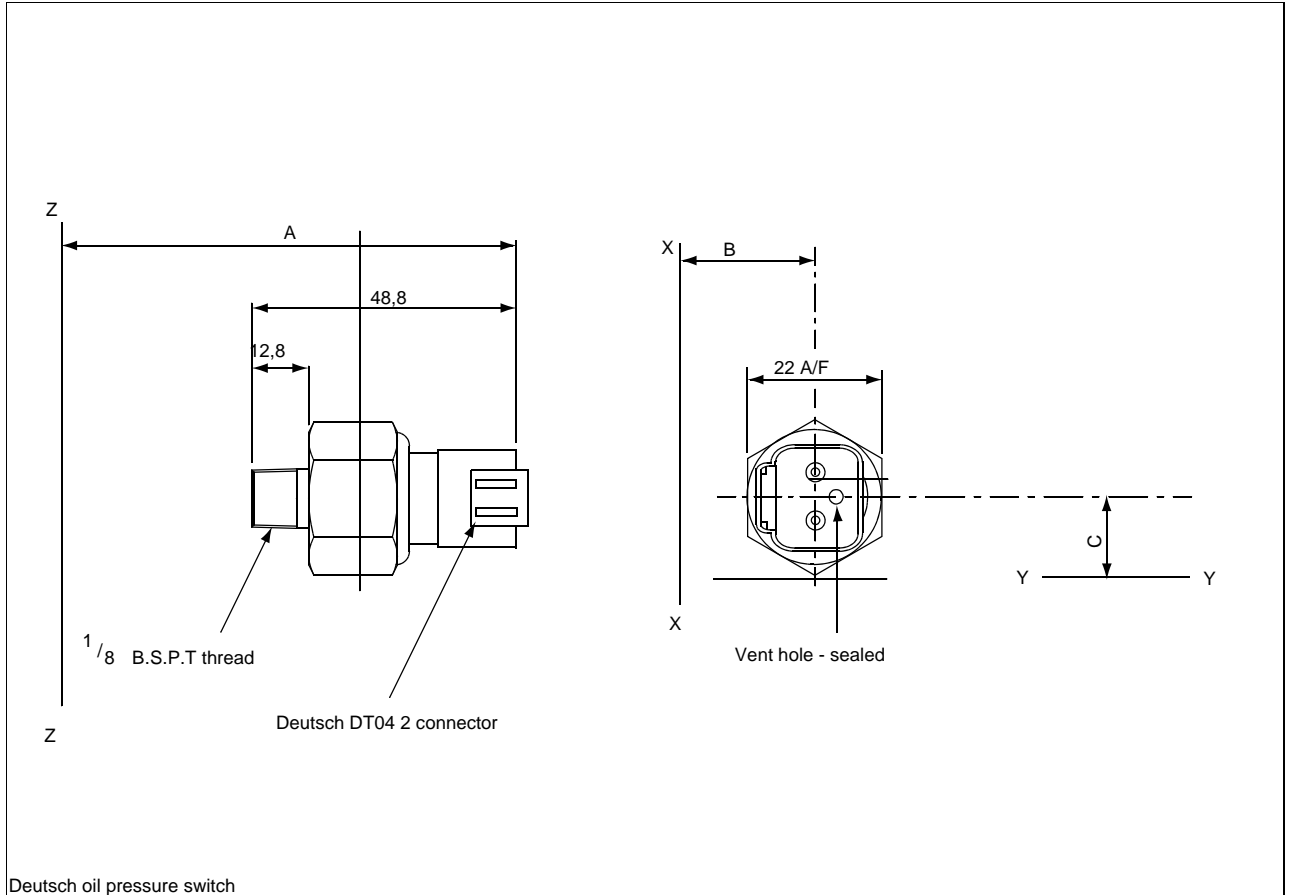
ZJ001 - Deutsch oil pressure switch all models



Deutsch oil pressure switch

Engine type	Dimension A (mm)	Dimension B in (mm)	Dimension C in (mm)
402D-05	194.0	323.3	15
403D-07	268.0	323.3	15
403D-11	291.0	359.5	38
403D-15 403D-15T	309.5	411.0	22
403D-17	309.5	433.0	22
404D-15	376.7	358.5	38
404D-22	403.5	430.0	22
404D-22T 404D-22TA	403.5	430.0	22

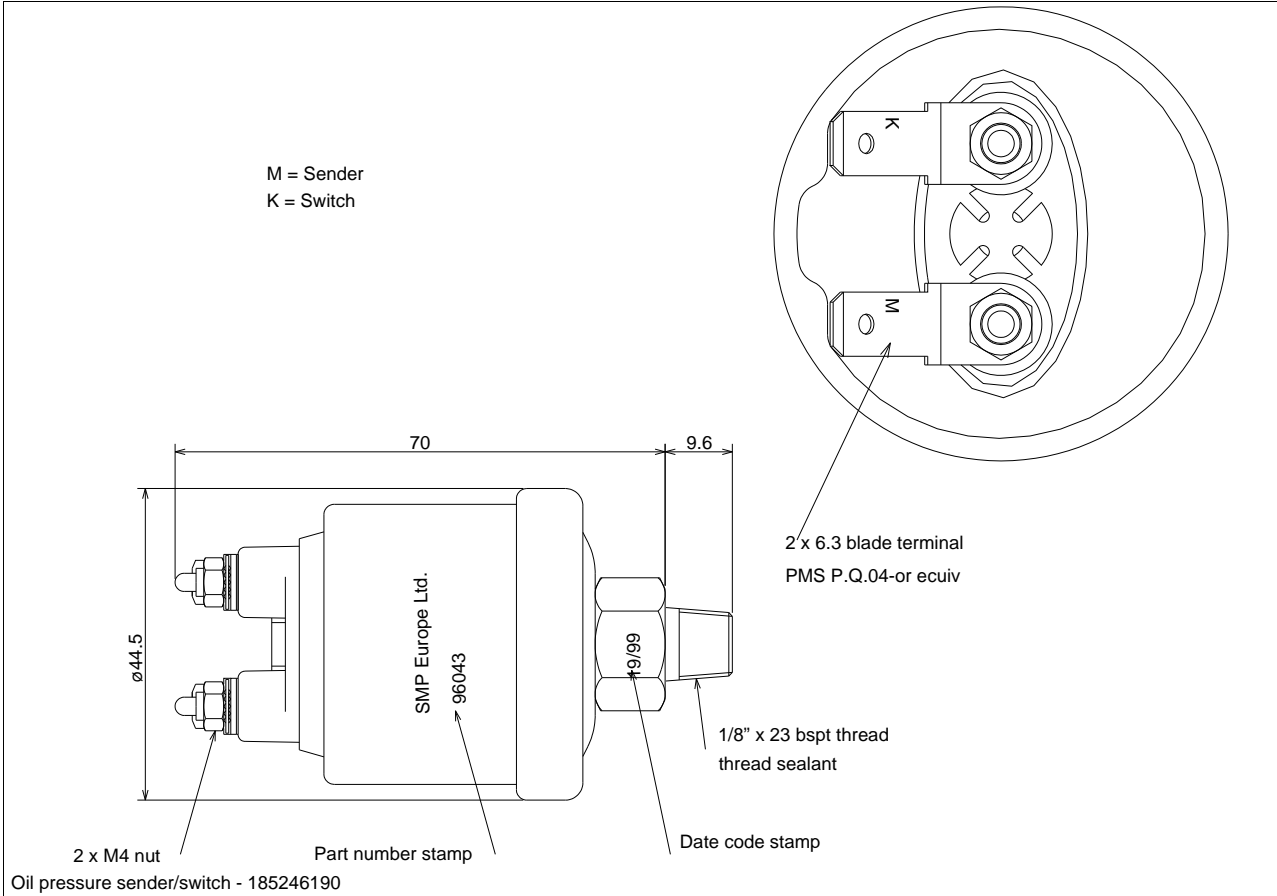
ZJ002 - Deutsch oil pressure switch, 403D-07, 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T, 404D-22TA



Deutsch oil pressure switch

Engine	A	B	C
403D-07	168	125	21
403D-11	178,8	139	20
403D-15 403D-15T	192	158	11
403D-17	192	158	11
404D-15	178.8	180	20
404D-22	192	252	11
404D-22T 404D-22TA	192	252	11

ZJ003 - Oil pressure sender/switch - 185246190



Notes:

- Max load = 5 Watts
- Operating pressure = 0 - 10 bar
- Switching value = $1 \pm 0,15$ bar
- Zero pressure = 10 Ohms
- Full scale pressure = 180 Ohms
- Dust/water protection = IP65
- M terminal = Sender, K Terminal = Switch.

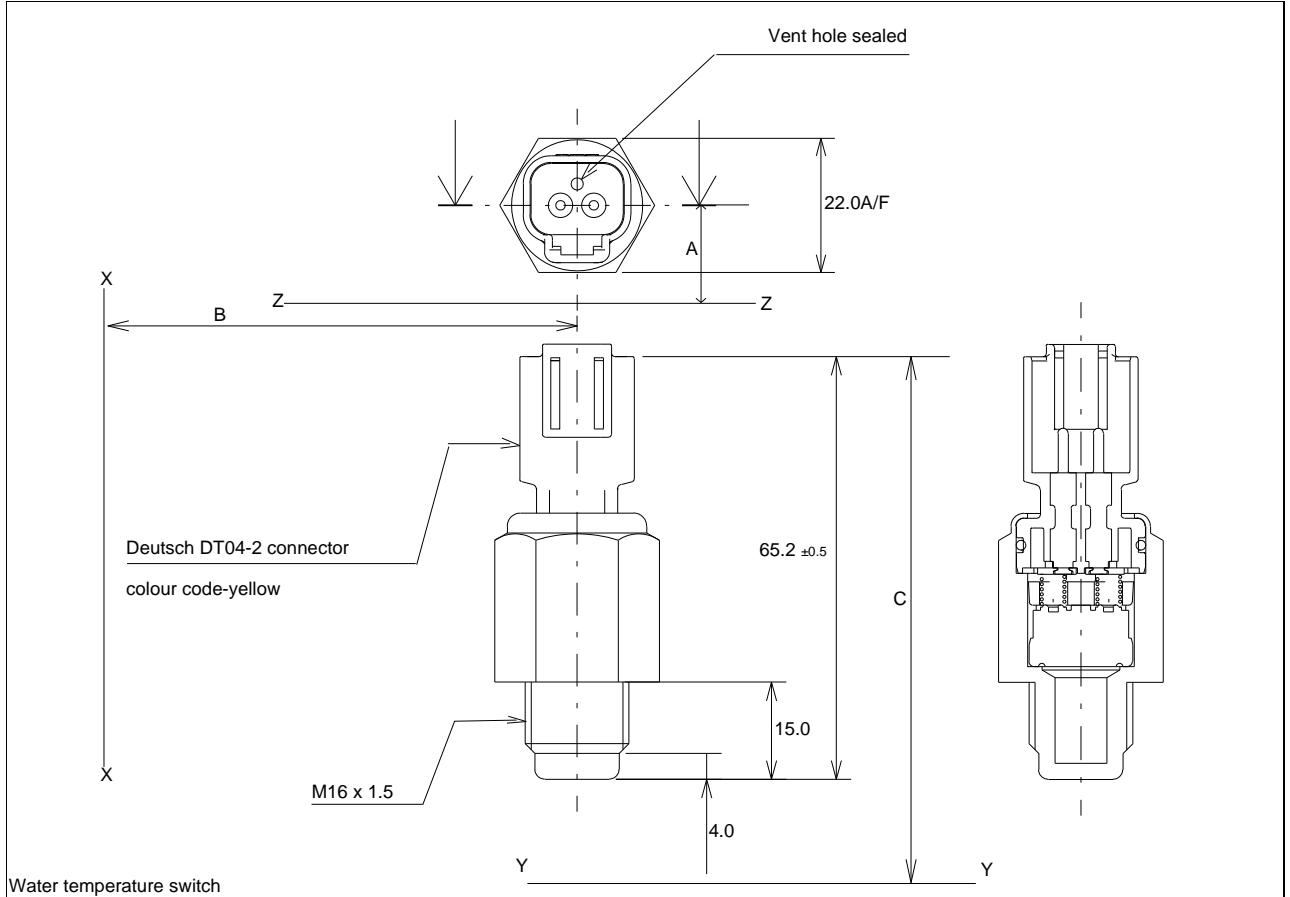
Pressure Bar	Nominal Ohm	Tolerance Ohm	Suggested calibration points
0	10		
2	48		
4	86	82 - 90	*
6	124	119 - 129	
8	154	147 - 161	*
10	184		

Note: All values are for falling pressure.

Water temperature switch

Engine type	Description	Option
All models	Not required	ZL000
	Water temperature switch 112°C (Deutsch connector)	ZL001
	Water temperature sender/switch	385720500 ZL002

ZL001 - Water temperature switch 112°C (Deutsch connector) 402D-05, 403D-07

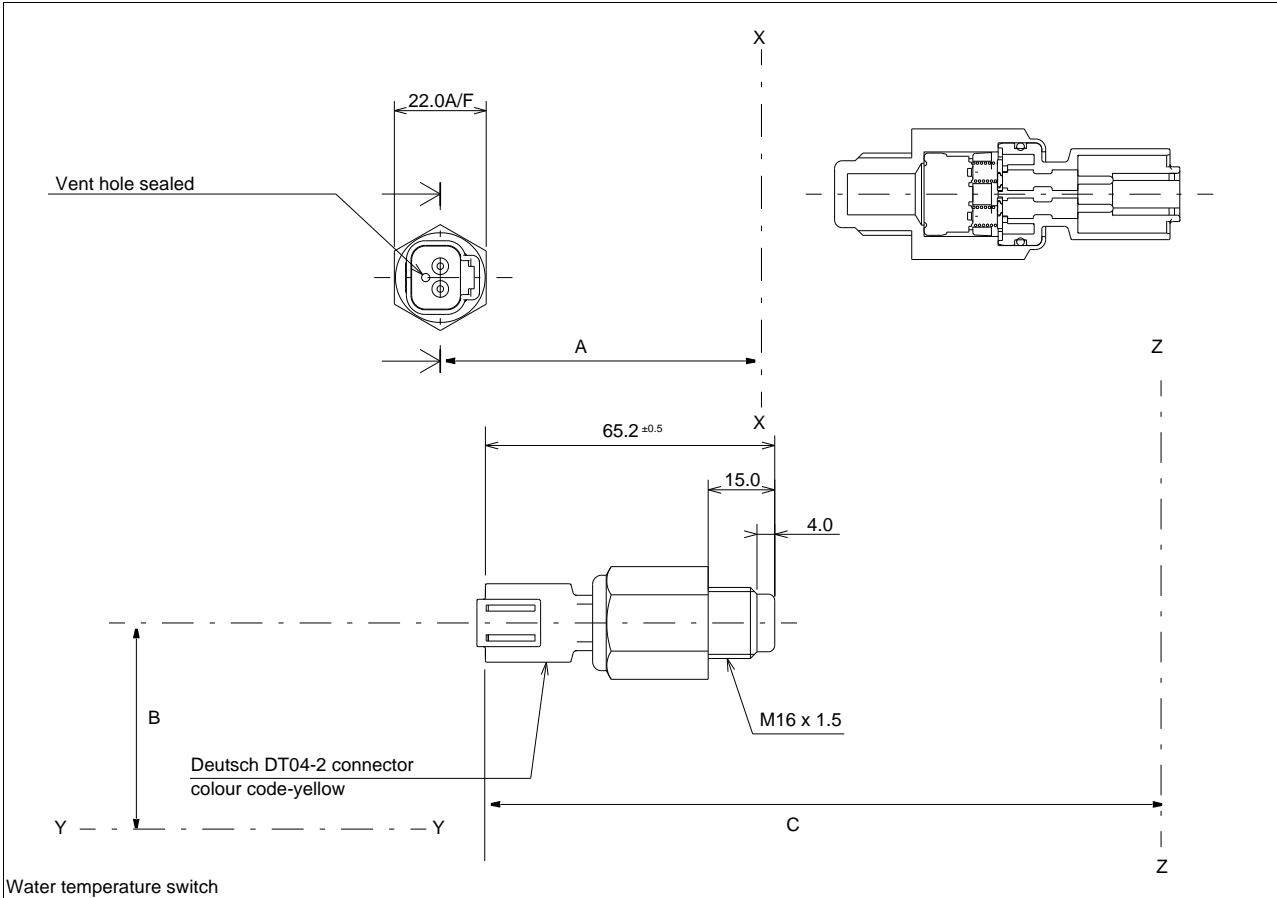


Note: When the Deutsch oil pressure switch and Deutsch water temp switch are selected the Deutsch solenoid (ESOS) will also be included.

Option	Switch operation	Colour code
ZL001	Normally open contacts. Closed @ 112°C ± 3°C/Open 100°C ± 4°C	Yellow sticker

Engine	Dimension A	Dimension B	Dimension C
402D-05	46	195.6	281.8
403D-07	46	269.6	281.8

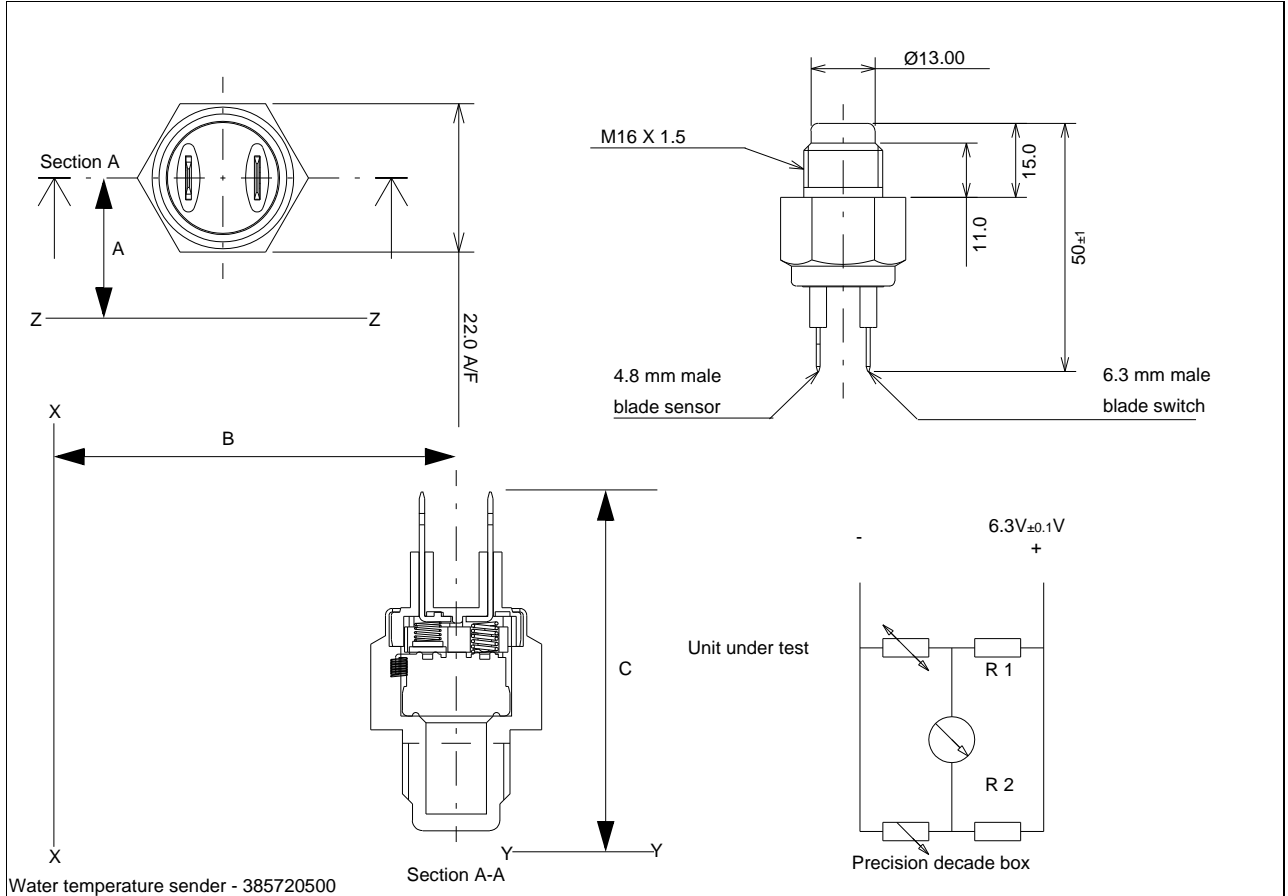
ZL001 - Water temperature switch 112°C (Deutsch connector) 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404DT-22, 404D-22TA



Option	Switch operation	Colour code
ZL001	Normally open contacts closed @ 112°C ± 3°C/open @ 100°C ± 4°C	Yellow sticker

Engine	Dimension A	Dimension B	Dimension C
403D-11	253.0	214.1	182.4
403D-15 403D-15T	289.0	254.0	193.9
403D-17	289.0	273.3	193.9
404D-15	337.0	214.1	182.4
404D-22 404D-22T 404D-22TA	383.0	271.0	193.9

ZL002 - Water temperature sender/switch, 402D-05, 403D-07

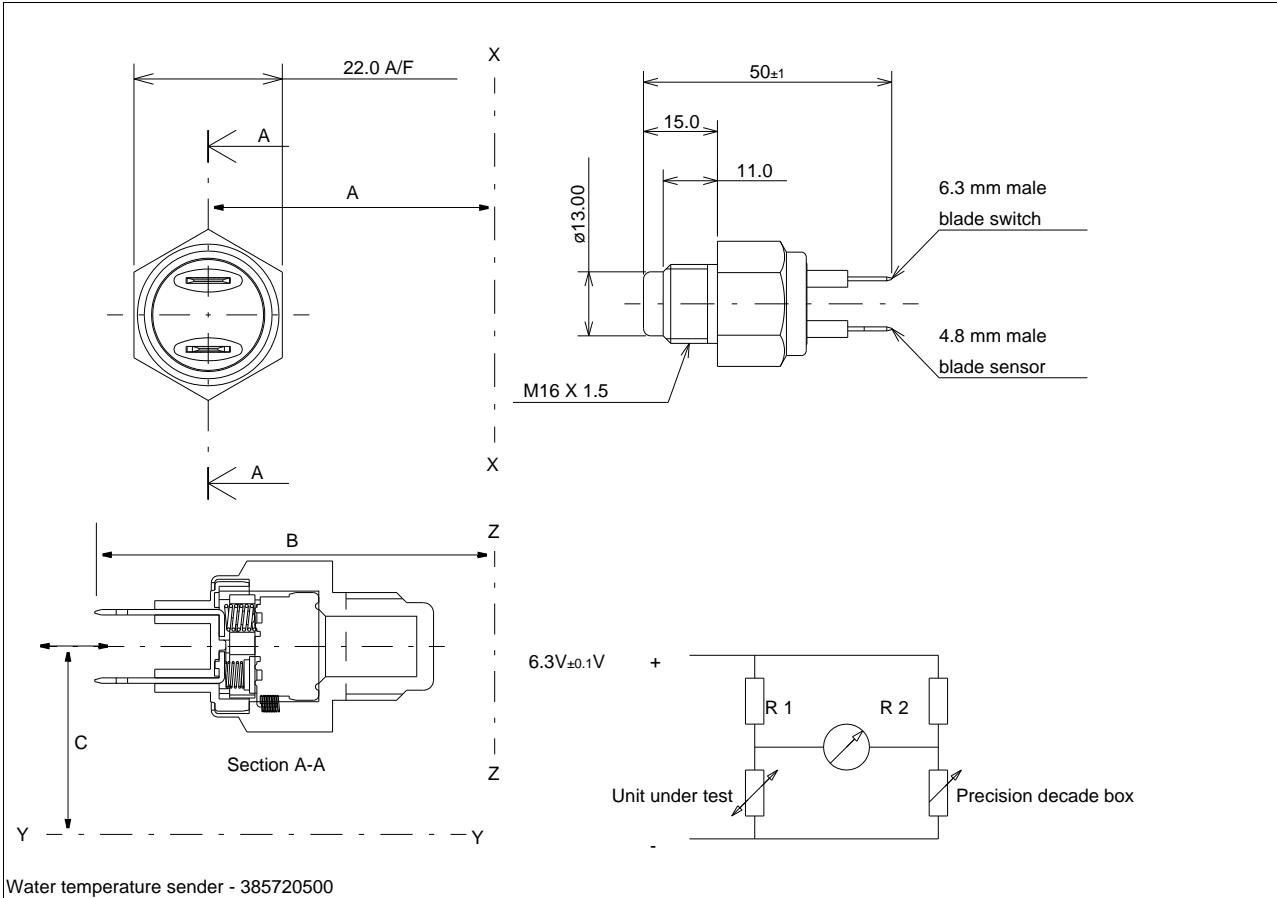


Note: Coolant temperature switch is rated at 112°C (233 °F) ± 4°C (7 °F).

Sender rating temp	Resistance
90°C	46.9/55.5 ohms
100°C	35.5/41.5 ohms

Engine	Dimension A	Dimension B	Dimension C
402D-05	46	195.6	266.6
403D-07	46	269.6	266.8

ZL002 - Water temperature switch/sender, 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T, 404D-22TA



Note: Coolant temperature switch is rated at 112°C (233 °F) ± 4°C (7 °F).

Sender rating temp	Resistance
90° C	46.9/55.5 ohms
100° C	35.5/41.5 ohms

Engine	Dimension A	Dimension B	Dimension C
403D-11	247.8	167.2	214.1
403D-15 403D-15T	289.0	178.9	254.0
403D-17	289.0	178.9	273.3
404D-15	337.0	167.4	214.1
404D-22 404D-22T 404D-22TA	383.0	178.9	271.0

Kit offering**Kits available for 402D-05****Notes:**

- When ordering kits, order by kit number reference.
- Some of the kits listed in the table below may not be available for order as they have not been completely released into the system. Availability should be checked with your sales contact.

Kit No.	Kit Description	Equivalent to ESM Option	402D - 05
ZZ7A000	Backplate	CD001	X
ZZ7A003	Flywheel housing long	CD004	X
ZZ7A009	Flywheel housing short	CD003	X
ZZ7A200	Starter motor 0.8 kW	ED005	X
ZZ7A402	PTO adapter	KD001	X
ZZ7A507	10 mm fan extension	ME001	X
ZZ7A508	15 mm fan extension		X
ZZ7A509	22 mm fan extension		X
ZZ7A510	30 mm fan extension		X
ZZ7A513	10 mm extension for puller fan		
ZZ7A514	20 mm extension for puller fan		
ZZ7A515	30 mm extension for puller fan		
ZZ7A516	Pusher fan 260 mm	MD012	X
ZZ7A517	Puller fan 250 mm	MD011	X
ZZ7A604	Alternator 27 A		X
ZZ7A906	Exhaust elbow		X
ZZ7B000	Fuel filter		X
ZZ7B005	Fuel hand primer	ZV002	X
ZZ7B101	Auto shut down	ZR001	X
ZZ7B212	Front engine and housing mount brackets	ZC001	X
ZZ7B800	Silencer	ZU001	X
ZZ7B901	Fuel pre filter	ZV001	X
ZZ7B902	Electric lift pump		X
ZZ7H014	Electronic governor - controller		
ZZ7H015	Electronic governor - actuator		
ZZ7H016	Electronic governor - speed probe		
ZZ7H017	Electronic governor - CD software		
ZZ7H018	Electronic governor - comms link		
ZZ7H032	Electronic governor - connector kit		
ZZ7M100	Cab heater connections	ZW002	X

Kits available for 403D-07

Kit No.	Kit Description	Equivalent to ESM Option	403D - 07
ZZ7A000	Backplate	CD001	X
ZZ7A003	Flywheel housing long	CD004	X
ZZ7A009	Flywheel housing short	CD003	X
ZZ7A100	Flywheel flatface	D0116	X
ZZ7A104	Flywheel heavy	D0118	X
ZZ7A118	Flywheel light	D0117	X
ZZ7A200	Starter motor 0.8 kW	ED005	X
ZZ7A300	Side oil filler	HB002	X
ZZ7A309	Oil filler extension	ZD001	X
ZZ7A402	PTO adapter	KD001	X
ZZ7A500	Pusher fan 280 mm	MD010	X
ZZ7A503	Puller fan 280 mm	MD009	X
ZZ7A507	10 mm fan extension	ME001	X
ZZ7A508	15 mm fan extension		X
ZZ7A509	22 mm fan extension		X
ZZ7A510	30 mm fan extension		X
ZZ7A513	10 mm extension for puller fan		
ZZ7A514	20 mm extension for puller fan		
ZZ7A515	30 mm extension for puller fan		
ZZ7A604	Alternator 27 A		X
ZZ7A900	Exhaust manifold vertical	UB002	X
ZZ7A903	Exhaust manifold horizontal	UB001	X
ZZ7A906	Exhaust elbow		X
ZZ7B000	Fuel filter		X
ZZ7B005	Fuel hand primer	ZV002	X
ZZ7B101	Auto shut down	ZR001	X
ZZ7B205	Front engine and housing mount brackets	ZC001	X
ZZ7B800	Silencer	ZU001	X
ZZ7B901	Fuel pre filter	ZV001	X
ZZ7B902	Electric lift pump		X
ZZ7H013	Electronic governor - full kit		
ZZ7H014	Electronic governor - controller		
ZZ7H015	Electronic governor - actuator		
ZZ7H016	Electronic governor - speed probe		
ZZ7H017	Electronic governor - CD software		
ZZ7H018	Electronic governor - comms link		
ZZ7H032	Electronic governor - connector kit		
ZZ7M100	Cab heater connections	ZW002	X

Kits available for 403D-11

Kit No.	Kit Description	Equivalent to ESM Option	403D - 11
ZZ7A001	Backplate	CD001	X
ZZ7A004	Flywheel housing long	CD004	X
ZZ7A006	Flywheel housing short	CD003	X
ZZ7A101	Flywheel flatface	DD001	X
ZZ7A105	Flywheel heavy	DD003	X
ZZ7A108	Flywheel light	DD002	X
ZZ7A203	Starter motor 1.4 kW	ED003	X
ZZ7A309	Oil filler extension	ZD001	X
ZZ7A403	PTO adapter	KD001	X
ZZ7A501	Pusher fan 330 mm	MD008	X
ZZ7A504	Puller fan 330 mm	MD007	X
ZZ7A507	10 mm fan extension	ME001	X
ZZ7A508	15 mm fan extension		X
ZZ7A509	22 mm fan extension		X
ZZ7A510	30 mm fan extension		X
ZZ7A513	10 mm extension for puller fan		
ZZ7A514	20 mm extension for puller fan		
ZZ7A515	30 mm extension for puller fan		
ZZ7A600	Alternator 15 A	ND011	X
ZZ7A605	Alternator 40 A	ND009	X
ZZ7A901	Exhaust manifold vertical	UB002	X
ZZ7A904	Exhaust manifold horizontal	UB001	X
ZZ7A906	Exhaust elbow		X
ZZ7B001	Fuel filter		X
ZZ7B005	Fuel hand primer	ZV002	X
ZZ7B101	Auto shut down	ZR001	X
ZZ7B206	Front engine and housing mount brackets	ZC001	X
ZZ7B800	Silencer	ZU001	X
ZZ7B901	Fuel pre filter	ZV001	X
ZZ7B902	Electric lift pump		X
ZZ7H001	IOPU full kit		X
ZZ7H004	Radiator kit		X
ZZ7H007	Air filter kit	TD001	X
ZZ7H013	Electronic governor - full kit		
ZZ7H014	Electronic governor - controller		
ZZ7H015	Electronic governor - actuator		
ZZ7H016	Electronic governor - speed probe		
ZZ7H017	Electronic governor - CD software		
ZZ7H018	Electronic governor - comms link		
ZZ7H019	Puller fan 320 mm		X
ZZ7H020	Pusher fan 320 mm		X
ZZ7H029	Top cover - side inlet	TB001	X
ZZ7H030	Top cover - vertical inlet	TB002	X
ZZ7H031	Top cover - rear inlet	TB003	X
ZZ7H032	Electronic governor - connector kit		
ZZ7M100	Cab heater connections	ZW002	X

Kits available for 403D-15, 403D-15T and 403D-17

Kits available for 404D-15

Kit No.	Kit Description	Equivalent to ESM Option	404D-15
ZZ7A001	Backplate	CD001	X
ZZ7A006	Flywheel housing short	CD003	X
ZZ7A004	Flywheel housing long	CD004	X
ZZ7A309	Oil filler extension	ZD001	X
ZZ7A403	PTO adapter	KD001	X
ZZ7A506	Puller fan 340 mm	MD005	X
ZZ7A502	Pusher fan 340 mm	MD006	X
ZZ7A507	10 mm fan extension	ME001	X
ZZ7A508	15 mm fan extension		X
ZZ7A509	22 mm fan extension		X
ZZ7A510	30 mm fan extension		X
ZZ7A513	10 mm extension for puller fan		
ZZ7A514	20 mm extension for puller fan		
ZZ7A515	30 mm extension for puller fan		
ZZ7A605	Alternator 40 A	ND009	X
ZZ7A906	Exhaust elbow		X
ZZ7B005	Fuel hand primer	ZV002	X
ZZ7B101	Auto shut down	ZR001	X
ZZ7B206	Front engine and housing mount brackets	ZC001	X
ZZ7B800	Silencer	ZU001	X
ZZ7B901	Fuel pre filter	ZV001	X
ZZ7B902	Electric lift pump	V5101 V5103 V5105	X
ZZ7H013	Electronic governor - full kit		
ZZ7H014	Electronic governor - controller		
ZZ7H015	Electronic governor - actuator		
ZZ7H016	Electronic governor - speed probe		
ZZ7H017	Electronic governor - CD software		
ZZ7H018	Electronic governor - comms link		
ZZ7H019	Puller fan 320 mm		
ZZ7H020	Pusher fan 320 mm		
ZZ7H032	Electronic governor - connector kit		
ZZ7M100	Cab heater connections	ZW002	X

Kits available for 404D-22, 404D-22T and 404D-22TA

Kit No.	Kit Description	Equivalent to ESM Option	404D-22	404D-22T	404D-22TA
ZZ7A010	Backplate	CD001	X	X	X
ZZ7A011	Flywheel housing long	CD004	X	X	X
ZZ7A012	Flywheel housing short	CD003	X	X	X
ZZ7A120	Flywheel flatface	DD001	X	X	X
ZZ7A121	Flywheel heavy	DD003	X	X	X
ZZ7A122	Flywheel light	DD002	X	X	X
ZZ7A206	Starter motor 2.0 kW	ED001	X	X	X
ZZ7A309	Oil filler extension	ZD001	X	X	X
ZZ7A404	PTO adapter	KD001	X	X	X
ZZ7A507	10 mm fan extension	ME001	X	X	X
ZZ7A508	15 mm fan extension		X	X	X
ZZ7A509	22 mm fan extension		X	X	X
ZZ7A510	30 mm fan extension		X	X	X
ZZ7A513	10 mm extension for puller fan		X	X	X
ZZ7A514	20 mm extension for puller fan		X	X	X
ZZ7A515	30 mm extension for puller fan		X	X	X
ZZ7A518	Puller fan 390 mm	MD003	X	X	X
ZZ7A519	Pusher fan 390 mm	MD004	X	X	X
ZZ7A906	Exhaust elbow	ZU101	X	X	X
ZZ7A911	Exhaust manifold vertical	UB002	X		
ZZ7A912	Exhaust manifold horizontal	UB001	X		
ZZ7B003	Fuel filter		X	X	X
ZZ7B005	Fuel hand primer	ZV002	X	X	X
ZZ7B101	Auto shut down	ZR001	X	X	X
ZZ7B215	Front engine and housing mount brackets	ZC001	X	X	X
ZZ7B800	Silencer	ZU001	X		
ZZ7B901	Fuel pre filter	ZV001	X	X	X
ZZ7B902	Electric lift pump		X	X	X
ZZ7H006	Radiator kit		X		
ZZ7H009	Air filter kit	TD001	X		
ZZ7H010	Oil cooler - 400S			X	X
ZZ7H011	Top cover - side inlet	TB001	X		
ZZ7H013	Electronic governor - full kit		X		
ZZ7H014	Electronic governor - controller		X		
ZZ7H015	Electronic governor - actuator		X		
ZZ7H016	Electronic governor - speed probe		X		
ZZ7H017	Electronic governor - CD software		X		
ZZ7H018	Electronic governor - comms link		X		
ZZ7H019	Puller fan 320 mm		X		
ZZ7H020	Pusher fan 320 mm		X		
ZZ7H021	Alternator 65 A	ND001	X	X	X
ZZ7H022	Alternator 85 A	ND003	X	X	X
ZZ7H025	Top cover - vertical inlet	TB002	X		
ZZ7H026	Top cover - rear inlet	TB003	X		
ZZ7H032	Electronic governor - connector kit		X		

Kit No.	Kit Description	Equivalent to ESM Option	404D-22	404D-22T	404D-22TA
ZZ7H047	24 V electrics conversion kit		X	X	X
ZZ7H054					
ZZ7M100	Cab heater connections	ZW002	X		

5

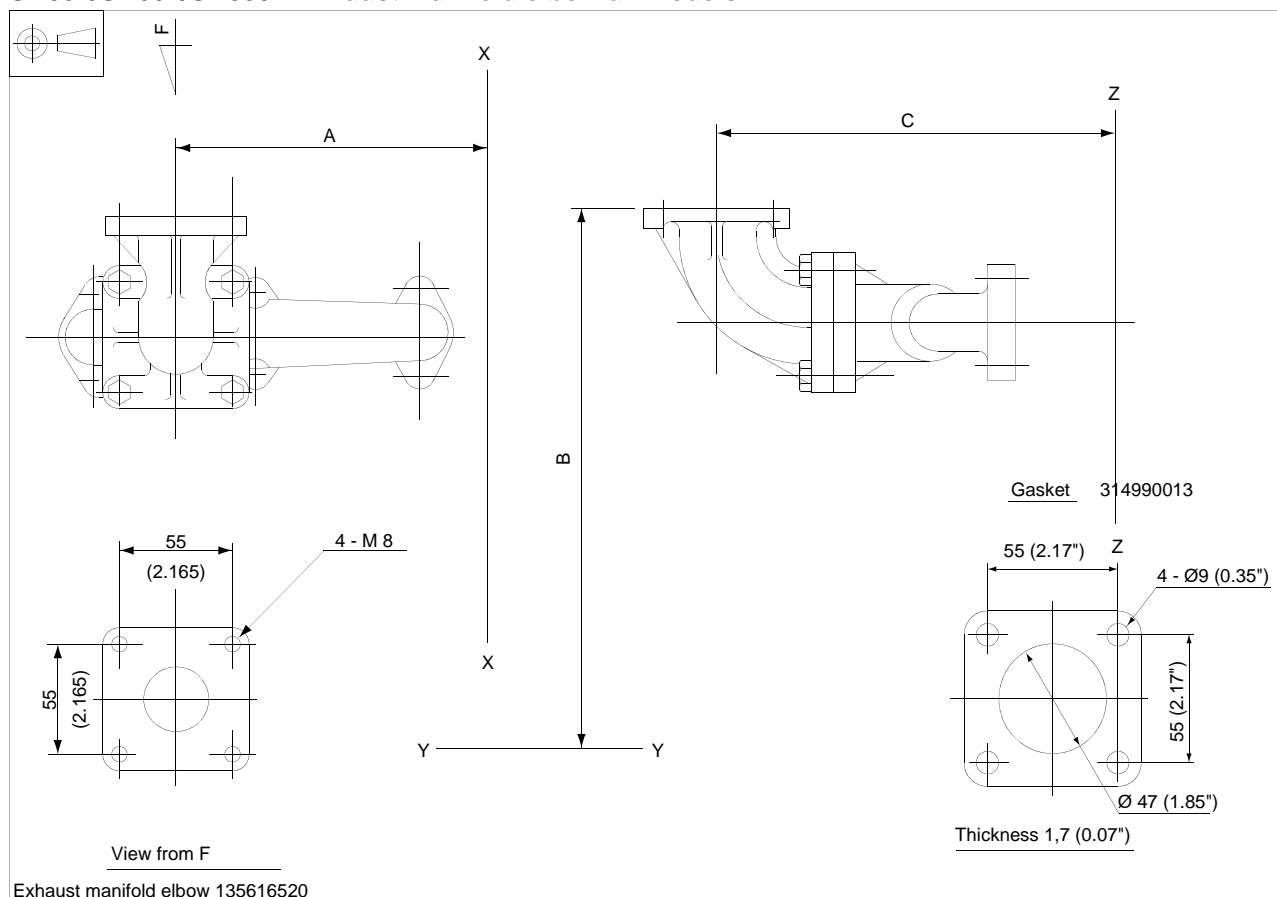
Accessories

Exhaust manifold side outlet - elbow

Engine type	Exhaust elbow	Flange (quantity 1)	Flange gasket	Flange bolts (toy 4)	Option
All models	No	No	No	No	UD000
	No	Yes	Yes	Yes	UD001
	Yes	No	No	No	UD002
	Yes	Yes	Yes	Yes	UD003

UD000 - Not required

UD001/UD002/UD003 - Exhaust manifold elbow all models



Note: Quantity 4 flange bolts, part number 011510825 and quantity 1 flange part number 314120070 and 1 flange gasket, part number 314990013 are supplied with options UD001 and UD003.

Engine type	Dimension A mm (in)	Dimension B mm (in)	Dimension C mm (in)
402D-05	36.5 (1.4)	278.5 (10.9)	210.0 (8.3)
403D-07	144.0 (5.7)	278.5 (10.9)	210.0 (8.3)
403D-11	162.0 (6.4)	298.0 (11.7)	229.4 (9.0)
403D-15	178.5 (7.0)	401.2 (15.8)	230.4 (9.1)
403D-15T	246.7 (9.7)	338.0 (13.3)	326.4 (12.9)
403D-17	178.5 (7.0)	423.2 (16.7)	230.4 (9.1)
404D-15	246.0 (9.7)	298.0 (11.7)	229.4 (9.0)
404D-22	272.5 (10.7)	358.0 (14.1)	227.0 (8.9)
404D-22T ⁽¹⁾ 404D-22TA	253.1 (9.9)	384.4 (15.1)	320.0 (12.6)

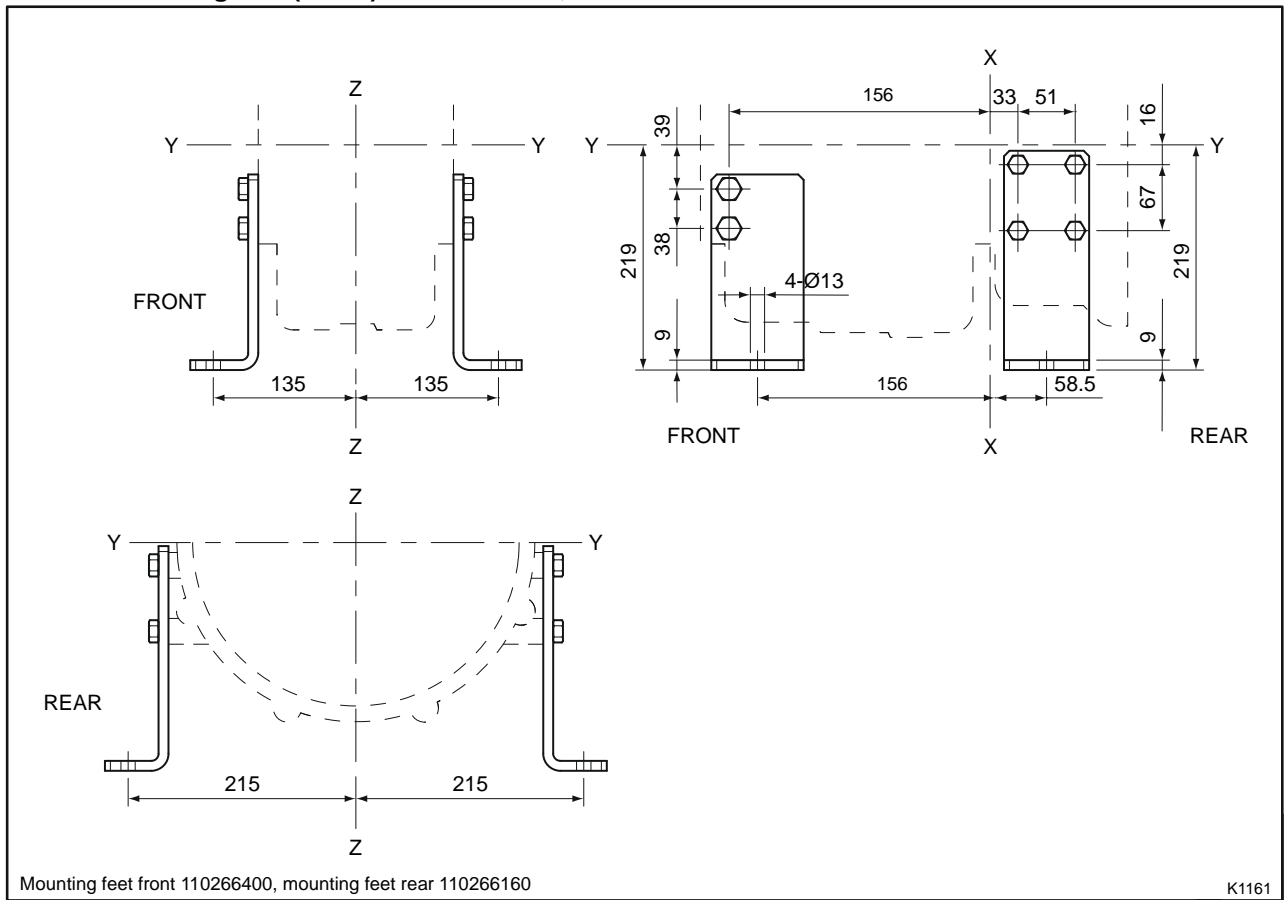
1. With option horizontal exhaust elbow U0106.

Mounting feet loose

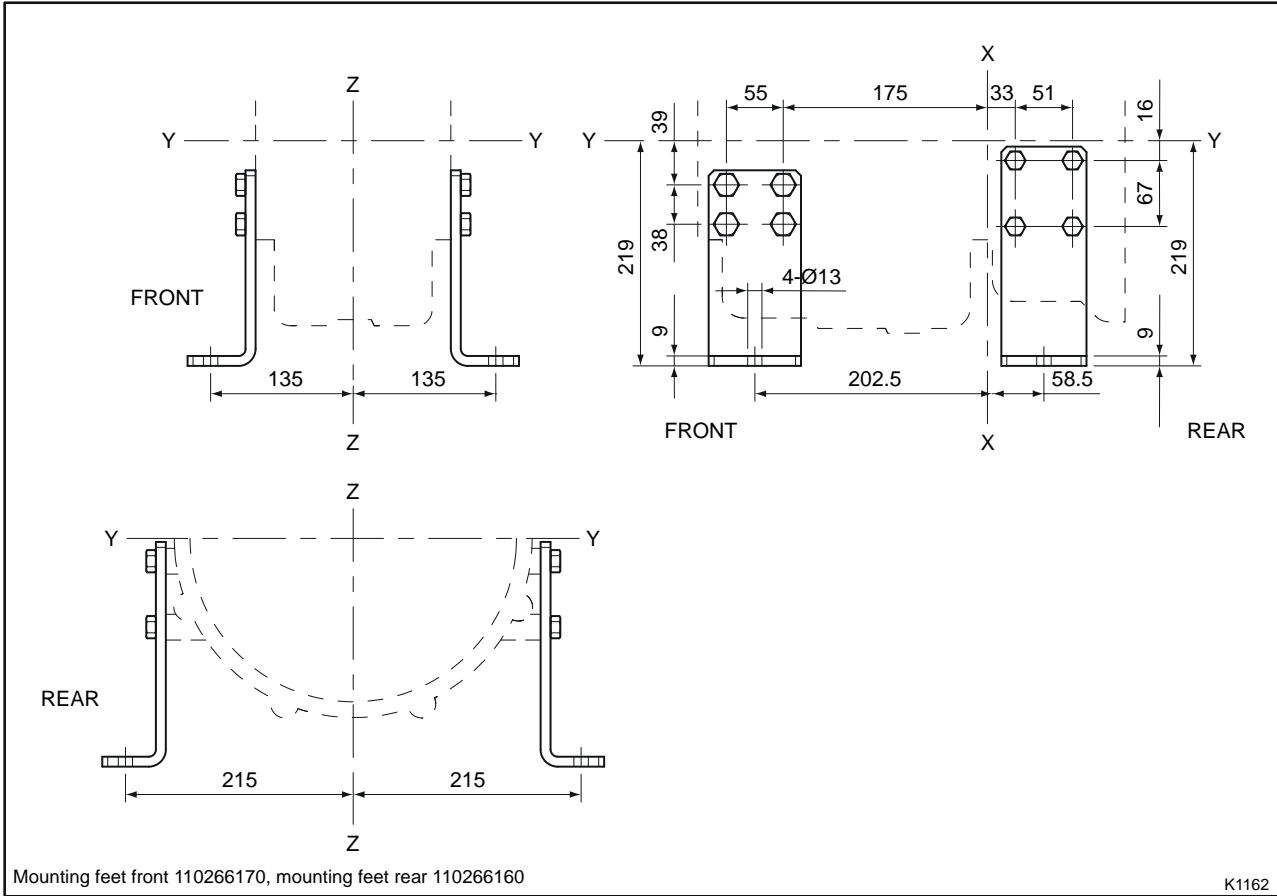
Engine type	Description	Option
All models	Not required	ZC000
402D-05 403D-07 404D-15	Mounting feet (loose) front and rear <i>incompatible with CD001</i>	ZC001
403D-11 403D-15 403D-15T 404D-22 404D-22T 404D-22TA	Mounting feet (loose) front and rear <i>incompatible with CD001/ZM001/ZM002</i>	ZC001
All models	Block mounting feet (4 off)	ZC002

ZC000 - Not required

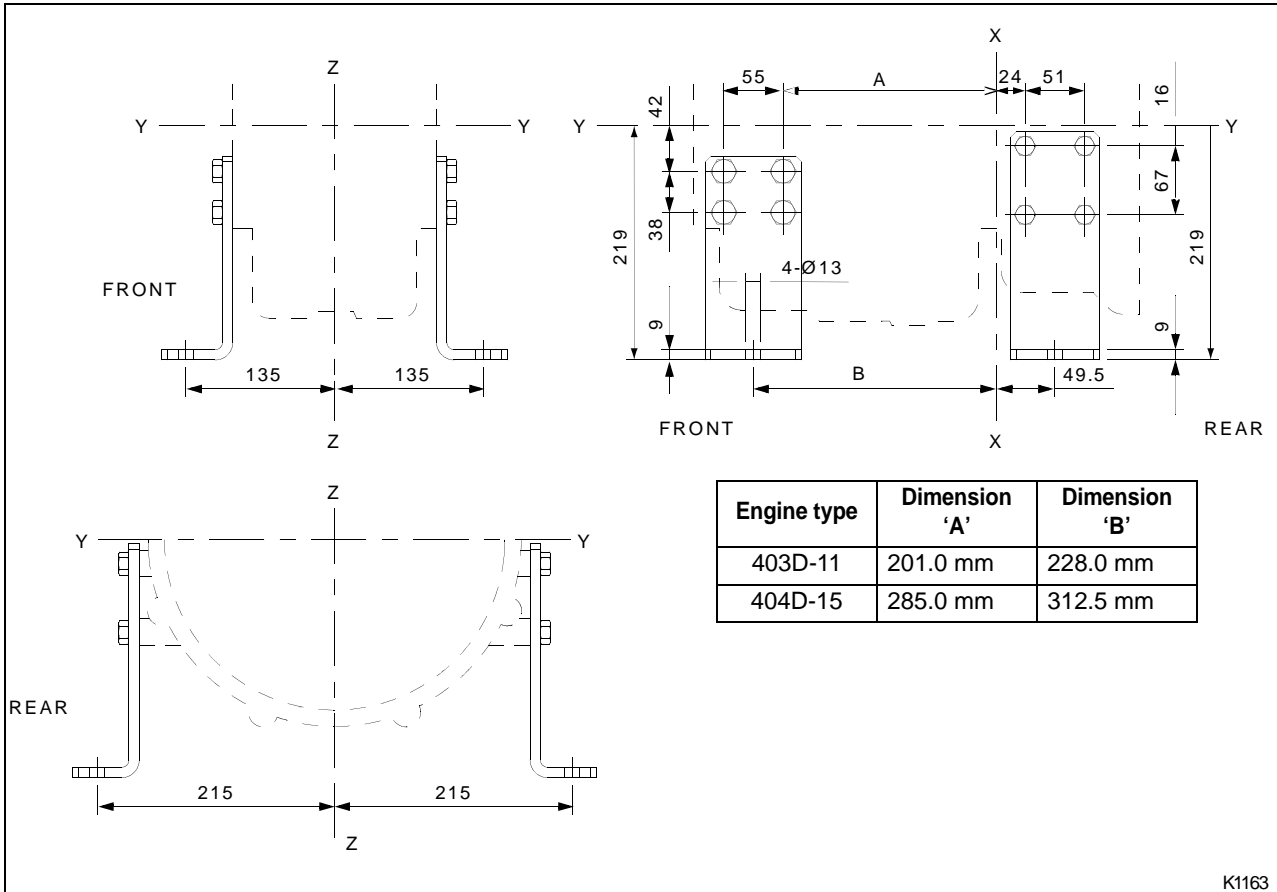
ZC001 - Mounting feet (loose) front and rear, 402D-05



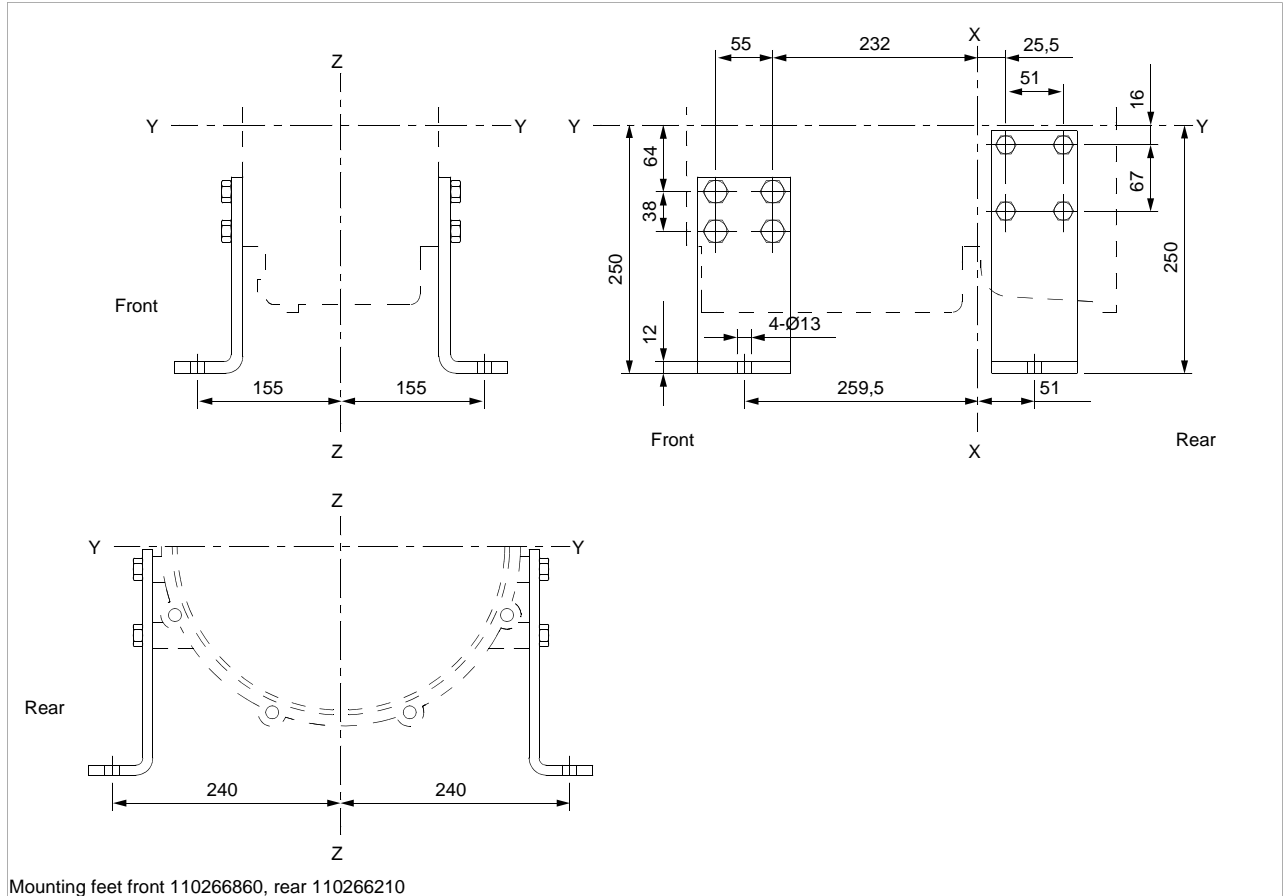
ZC001 - Mounting feet (loose) front and rear, 403D-07



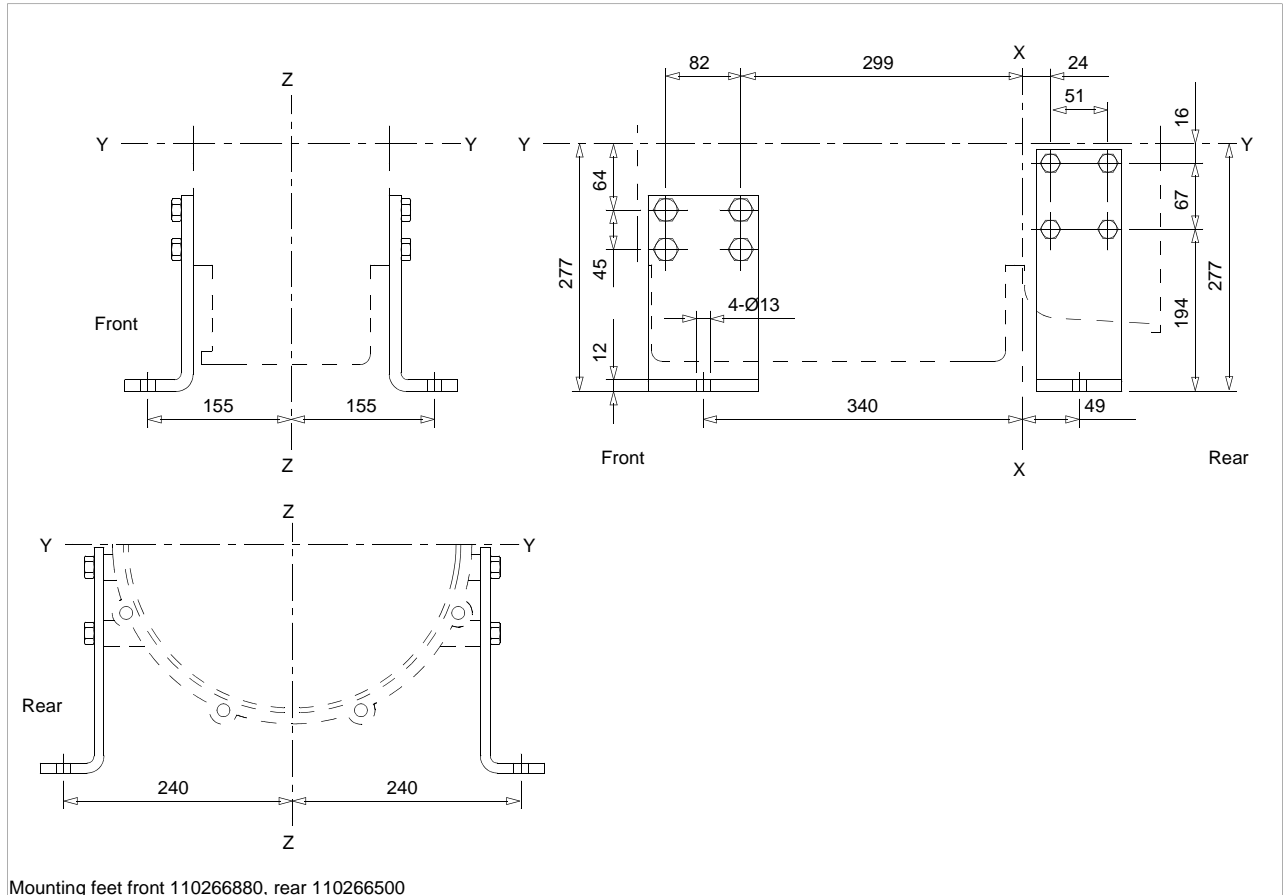
ZC001 - Mounting feet (loose) front and rear, 403D-11, 404D-15



ZC001 - Mounting feet (loose) front and rear, 403D-15, 403D-15T



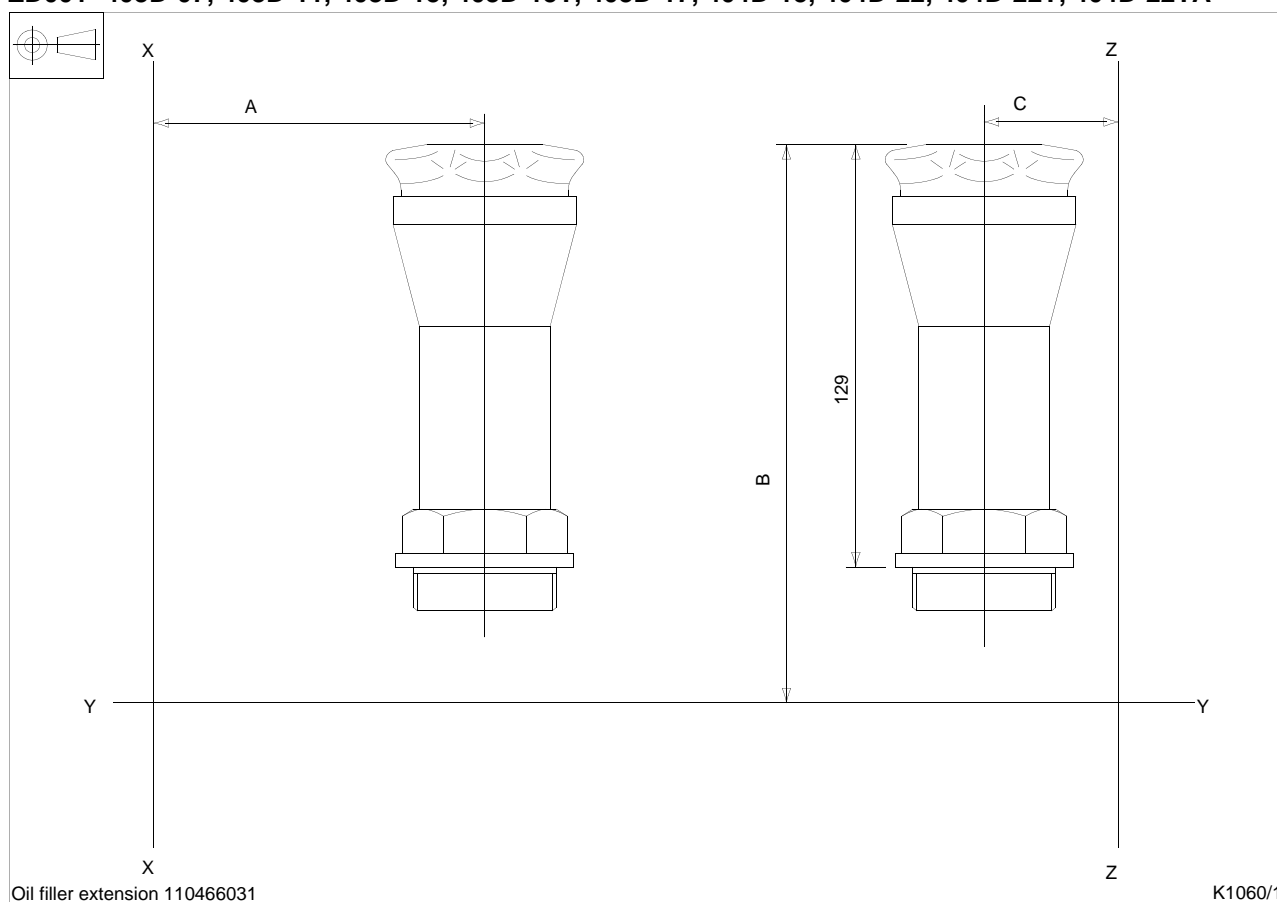
ZC001 - Mounting feet (loose) front and rear, 404D-22, 404D-22T, 404D-22TA



Oil filler extension

Engine type	Description	Option
All models	Not required	ZD000
403D-07 403D-11 403D-15 403D-15T 403D-17 404D-22 404D-22T 404D-22TA	Oil filler extension	ZD001

Note: This option is not compatible with the 402D-05 top cover arrangement (TB001/TB002/TB003).

ZD000 - Not required**ZD001- 403D-07, 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T, 404D-22TA**

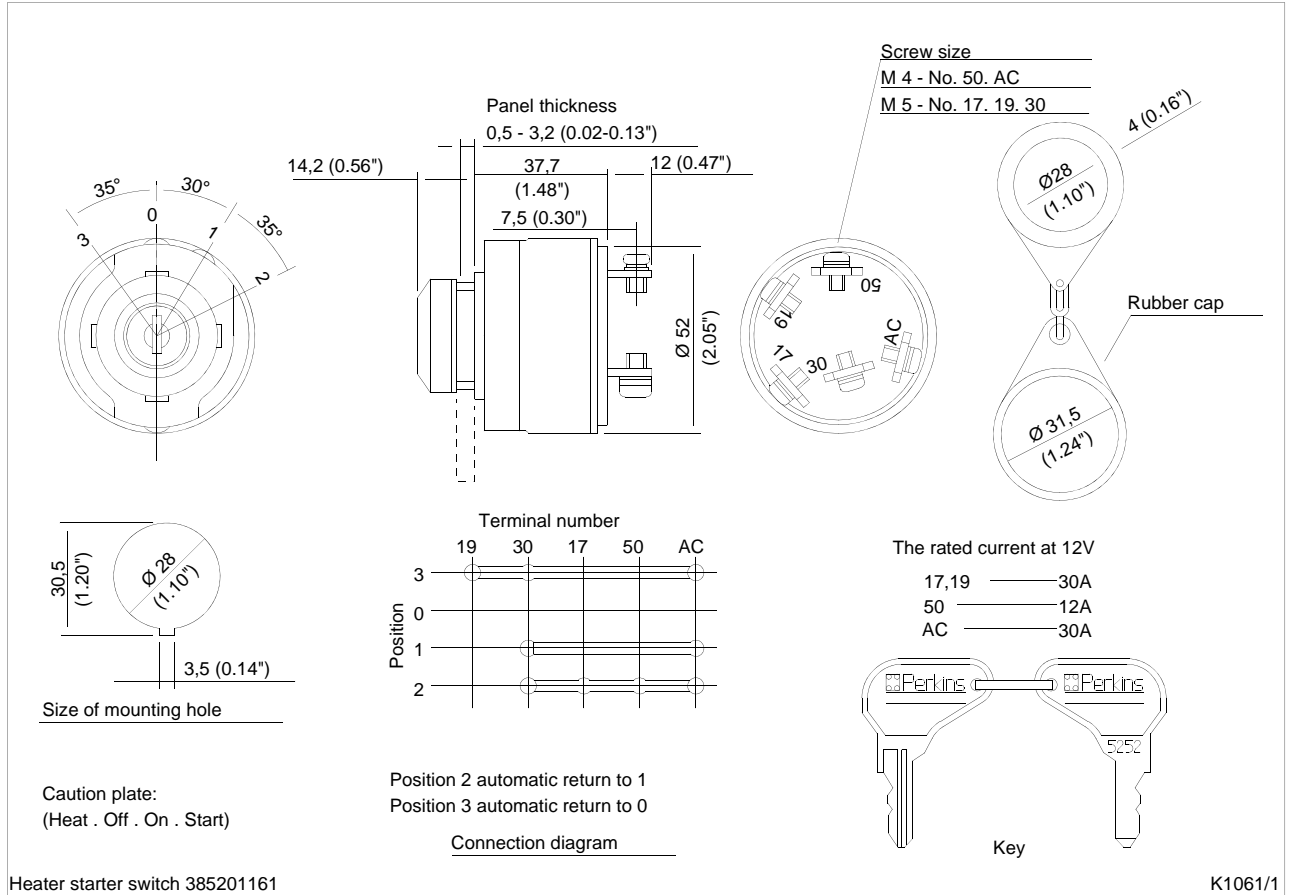
Engine type	Dimension 'A'	Dimension 'B'	Dimension 'C'
403D-07	87,0 mm (3.4 in)	436,0 (17.1 in)	13,0 mm (0.53 in)
403D-11	182,0 mm (7.17 in)	459,0 mm (18.1 in)	30,5 mm (1.20 in)
403D-15 403D-15T	204,5 mm (8.05 in)	505,0 mm (19.9 in)	11,0 mm (0.43 in)
403D-17	204,5 mm (8.05 in)	526,1 mm (20.7 in)	11,0 mm (0.43 in)
404D-15	266,0 mm (10.5 in)	TBA	30,5 mm (1.20 in)
404D-22 404D-22T 404D-22TA	298,5 mm (11.75 in)	526,0 mm (20.7 in)	11,0 mm (0.43 in)

Heater/starter switch (12V)

Engine type	Description	Option
All models	Not required	ZE000
	Heater/starter switch (12V)	ZE001

ZE000 - Not required

ZE001 - Heater/starter switch (12V), all models



Caution: This switch is not suitable for applications where there is a high risk of shock loading (such as earth moving applications) or where it is open to rain water/machine hose cleaning.

Radiator assembly with mounting feet

Engine type	Description	Option
402D-05 403D-07 403D-11 403D-15 403D-15T 403D-17 404D-15 404D-22 404D-22T 404D-22TA	Not required	ZM000
403D-11	Radiator assembly with mounting feet (puller fan)	ZM001
403D-15 404D-22	Radiator assembly with mounting feet (pusher fan)	ZM002

The cooling pack option has not been developed for the 402D-05, 403D-07, 403D-15T, 403D-17, 404D-15.

Notes:

- All radiators are fitted with a 0.9bar (13 lbf/in²) pressure cap.
- Engine guards supplied by Perkins for use with Perkins engines are designed specifically to prevent access to the top, sides and front by human limbs and loose debris
- The Perkins guards are designed for Perkins engines, that are mounted only at ground level; in this position they prevent access to the underside of the engine.
- If the user requires the engine to be mounted above ground level, then the fitting of Perkins engine guards will not necessarily prevent the access by either human limbs or loose debris of a particular size. In such cases it is the sole responsibility of the user to provide adequate engine guarding to protect both the operator and the engine.
- Radiator supplied with a 320 mm, 7 blade, plastic puller or pusher fan, dependant on option.
- The cooling pack option for the 404D-22T is currently being developed.

Engine type	Face area	Rows and materials	Matrix density and material	Width/height of matrix
403D-11	0.147 m ² 1.52 ft ²	2 rows aluminium	14.5 fins/inch aluminium	334 mm (13.1 in) 440 mm (17.3 in)
403D-15 404D-22	0.167 m ² 1.79 ft ²	2 rows aluminium	14.5 fins/inch aluminium	334 mm (13.1 in) 500 mm (19.7 in)

Coolant capacities

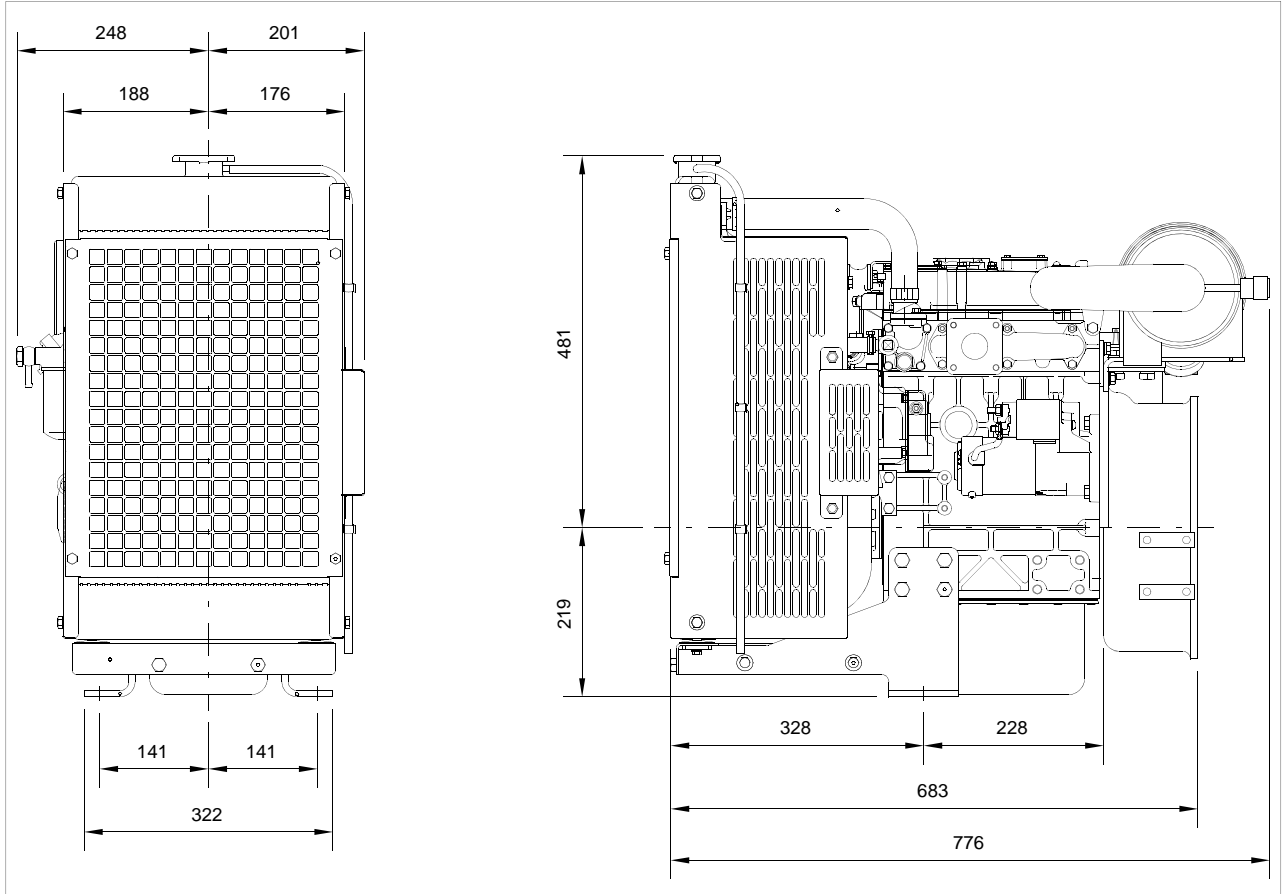
403D-11 total system volume (including engine, radiator, and hoses) = 5.21 litres.

403D-15 total system volume (including engine, radiator, and hoses) = 5.98 litres.

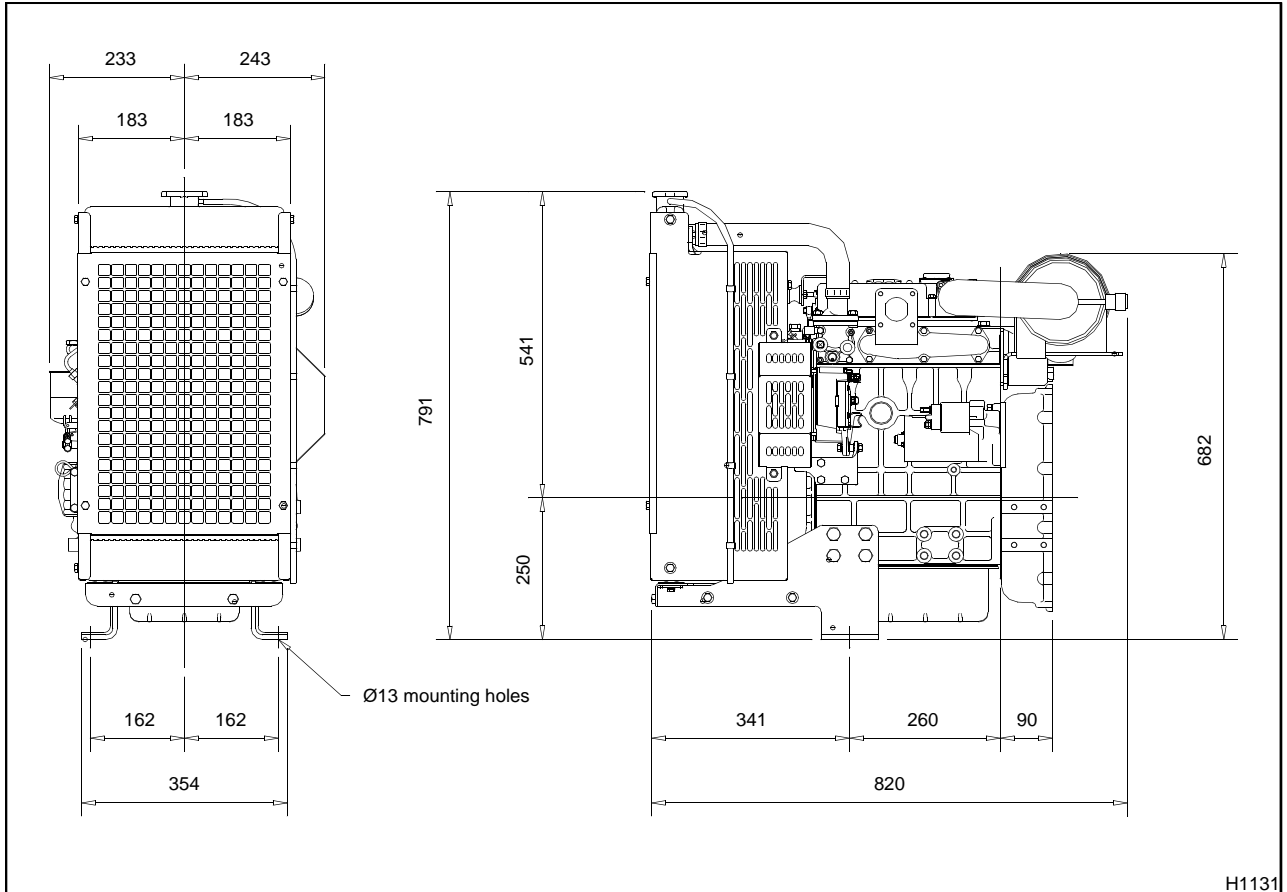
404D-22 total system volume (including engine, radiator, and hoses) = 6.98 litres.

ZM000 - Not required

ZM001/ZM002 - Radiator assembly with mounting feet, 403D-11

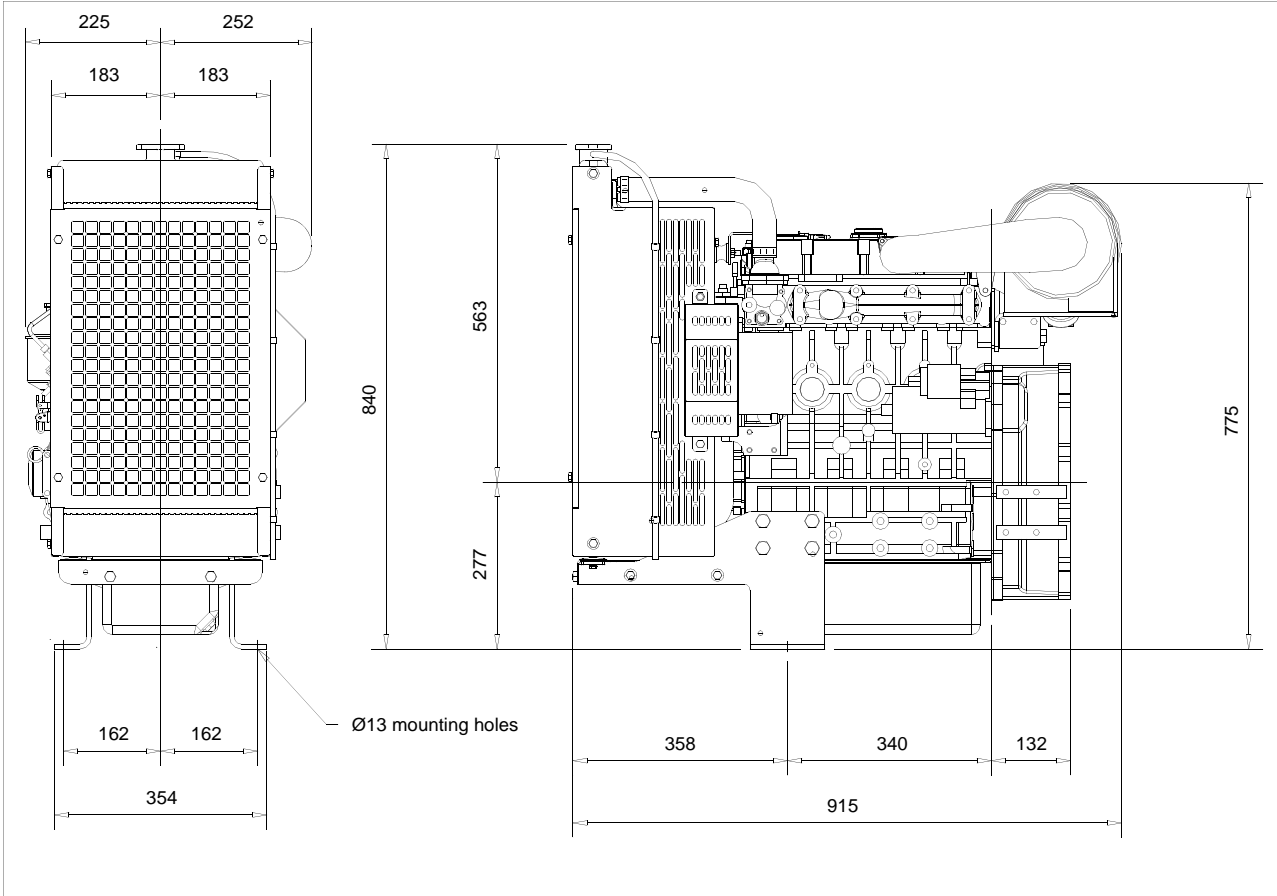


ZM001/ZM002 - Radiator assembly with mounting feet, 403D-15



H1131

ZM001/ZM002 - Radiator assembly with mounting feet, 404D-22




Deutsch connectors

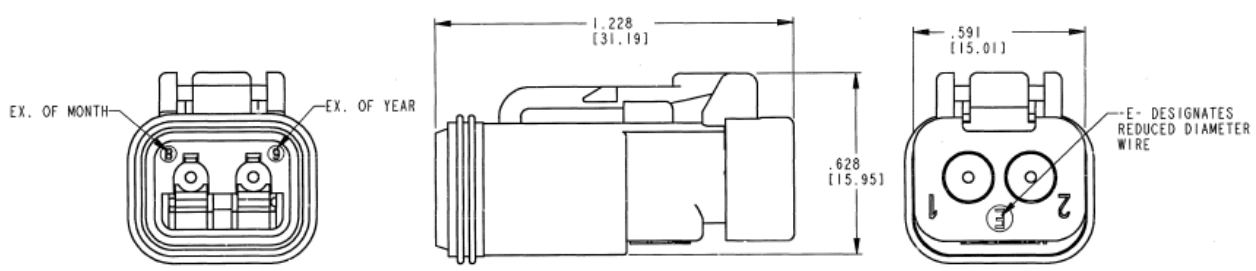
Engine type	Deutsch connector (quantity 3)	Deutsch/Lucar adaptor (quantity 3)	Starter motor connection (quantity 2)	Option
All models	No	No	No	ZP000
	Yes	No	No	ZP001
	Yes	No	Yes	ZP002
	No	Yes	No	ZP003
	No	No	Yes	ZP004
	No	Yes	Yes	ZP005

ZP000 - Not required

ZP001/ZP002 - Deutsch connector, all models



Contact size	Min. insulation O.D.	Max. insulation O.D.	Wire range (mm ²)
16	0.053 (1.35)	0.120 (3.05)	14 - 20 AWG (2.0 - 0.5)



EX. OF MONTH EX. OF YEAR

---E--- DESIGNATES REDUCED DIAMETER WIRE

Date legend

Years to be represented by last numerical digit, e.g. 9 = 1999 or 2009

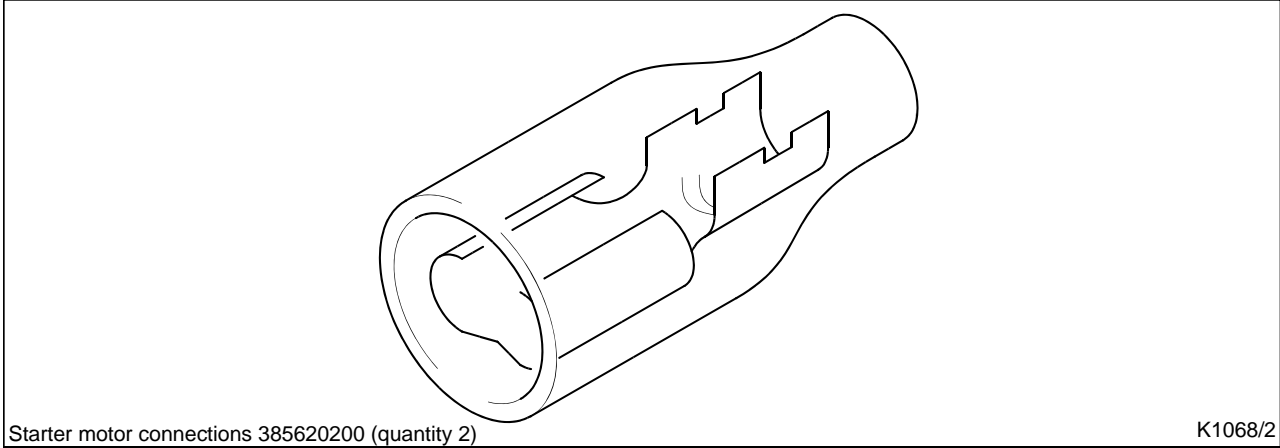
Month uses sequential alpha characters, e.g. A = January.

1. All dimensions are inches (millimetres).
2. All dimension ± 0.025 (0.63).
3. Consult factory for specifications and application.
4. For more information. see envelope drawing 0425-017-0000 and 0425-015-0000.
5. This plug mates with DT04-2P-**** Receptacle (**** = All modifications).

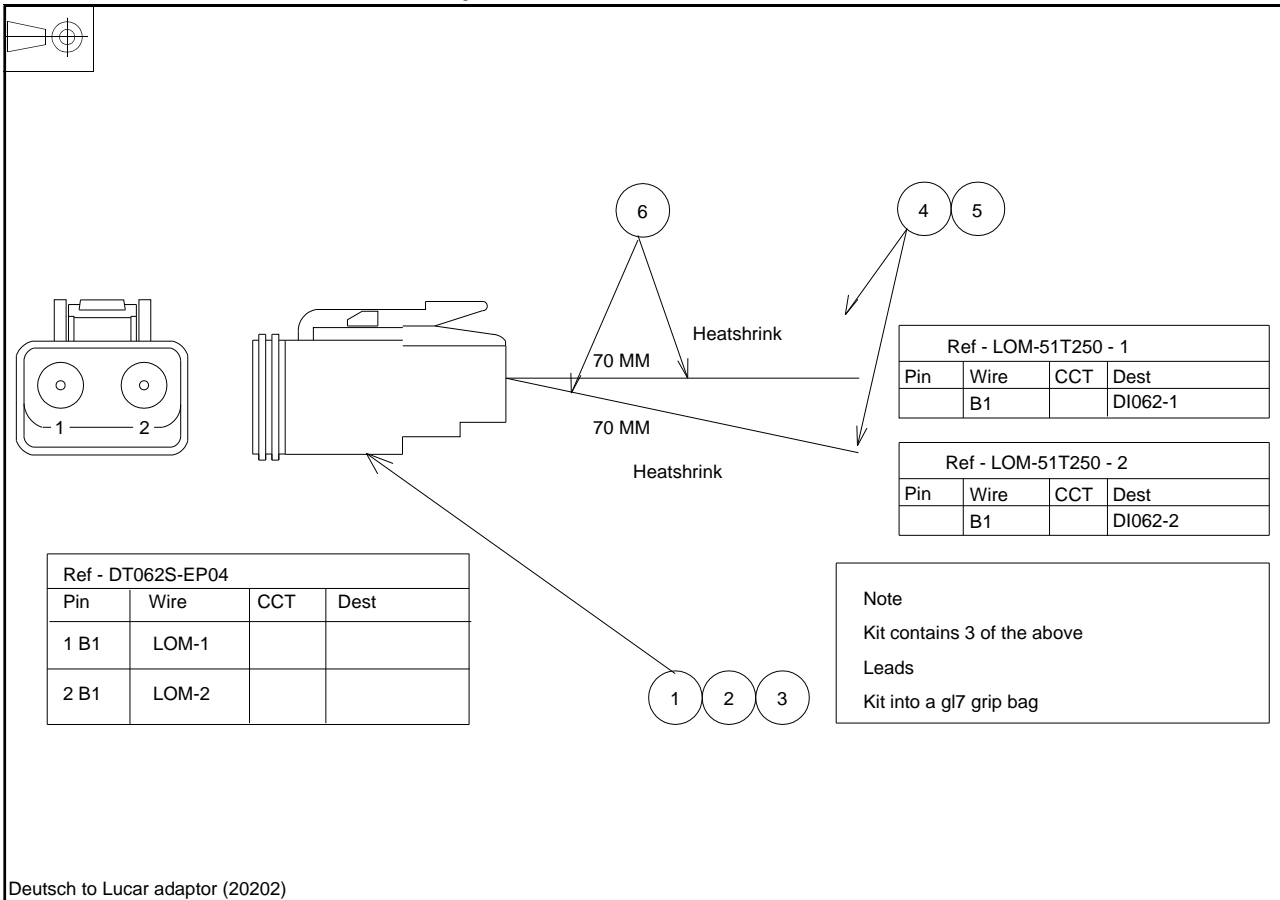
Deutsch connector kit 20195

Note: ZP001/ZP002 includes 3 housing connectors and six terminals.

ZP002/ZP004/ZP005 - Starter motor connections, all models



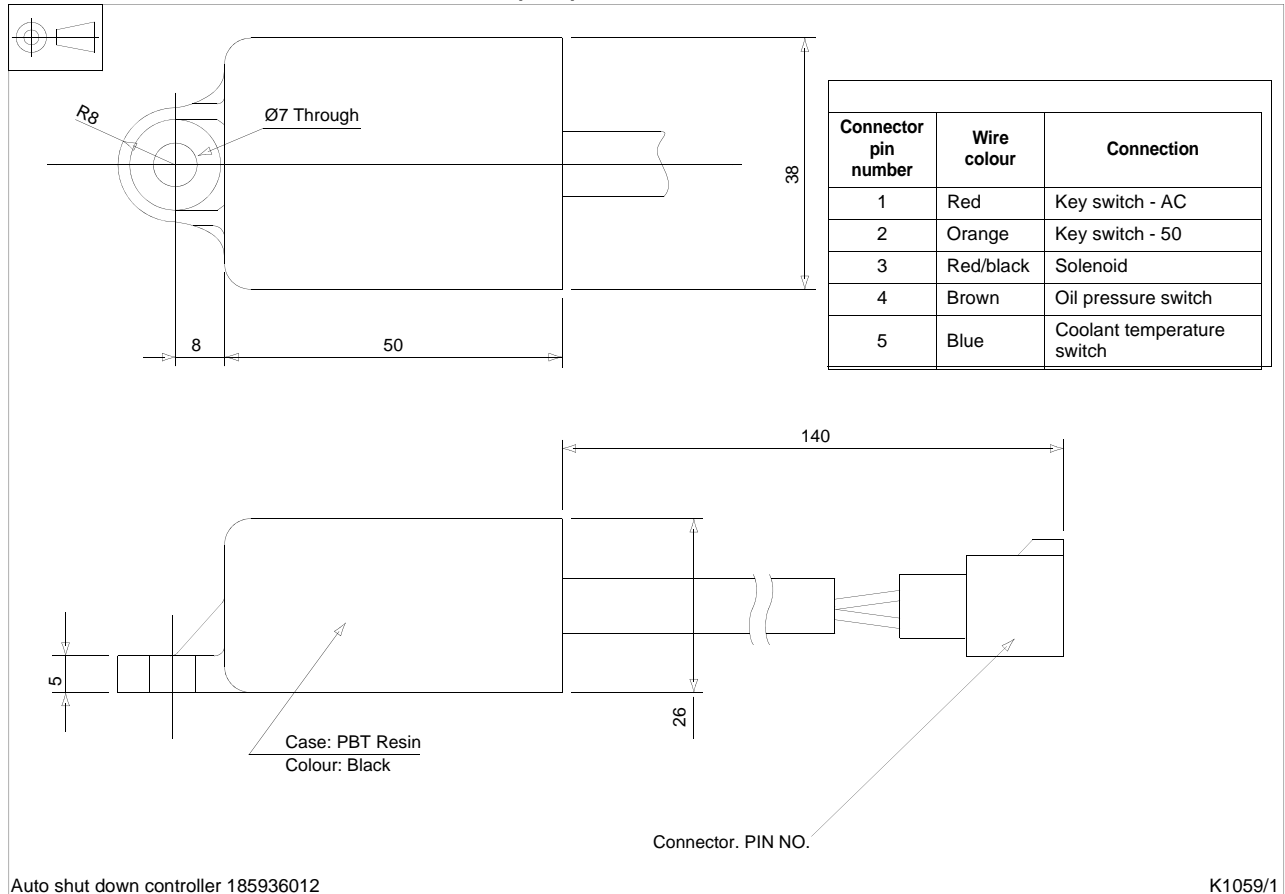
ZP003/ZP005 - Deutsch to Lucar adaptor, all models



Deutsch to Lucar adaptor (20202)

Automatic shutdown**Automatic shutdown controller (12V)**

Engine	Description	
All models	Not required	ZR000
	Automatic shutdown controller (12V)	ZR001

ZR000 - Not required**ZR001 - Automatic shutdown controller (12V), all models****Operating conditions**

Note: The engine will stop automatically if the coolant temperature exceeds 112°C (234°F) $\pm 3^{\circ}\text{C}$ (5°F). The engine will also stop automatically if the oil pressure falls for more than 10 seconds during starting, or if the oil pressure falls for more than 2 seconds while the engine runs, at the oil pressure values as listed below:

- 0,3 kgf/cm² (4.27 lbf/in²) for the 403D-07, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T and 404D-22TA engines, or 0,5 kgf/cm² (7.11 lbf/in²) for 403D-11 engines when the oil pressure switch is located on the top cover (ZJ001).
- 0,7 kgf/cm² (10 lbf/in²) for the 402D-05, 403D-07, 403D-11, 403D-15, 403D-17, 403D-15T, 404D-15, 404D-22, 404D-22T and 404D-22TA engines, or 0,5 kgf/cm² (7.11 lbf/in²) for 403D-11 engines when the oil pressure switch is located on the oil rail (ZJ002).

Caution: There is no protection against low coolant levels.

Literature

Engine	Warranty leaflet	Users' handbook ⁽¹⁾	Option
All models	No	No	ZT000
	Yes	No	ZT001

1. The users' handbook (OMM) is available in the following languages.
The OMM if required should be ordered at the same time as ordering engines.

Language	Publication number
English	SEBU8312
French	SFBU8312
Italian	SLBU8312
German	SGBU8312
Spanish	SSBU8312
Norwegian	SNBU8312

ZT000 - All models no literature

ZT001 - All models warranty leaflet required

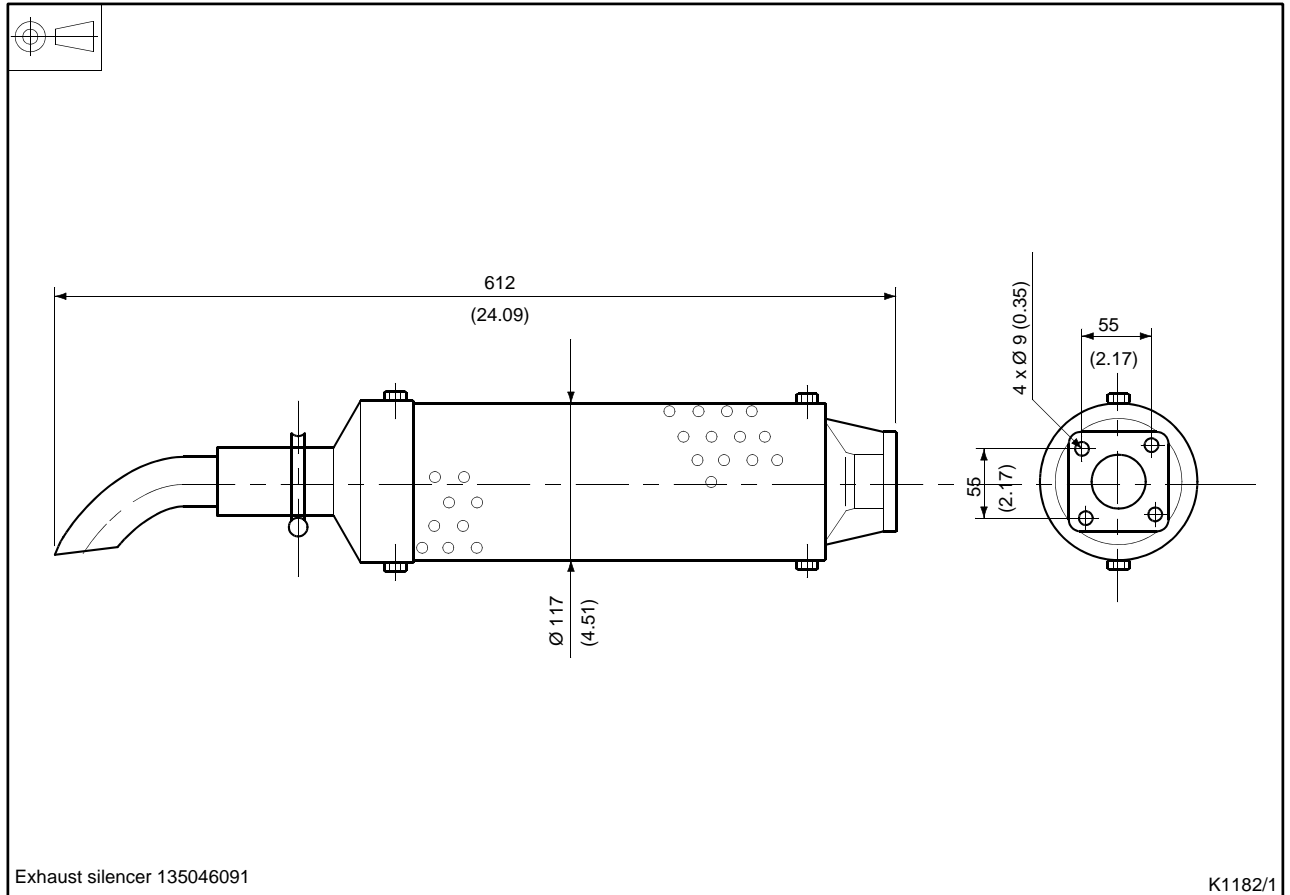
Exhaust silencer

Engine type	Description	Option
All models	Not required	ZU000
402D-05 403D-07 403D-11 403D-15 403D-17 404D-15 404D-22	Exhaust silencer ⁽¹⁾	ZU001

1. Incompatible with AA091, AA083, AA087, AA088, AA089, AA0909.

ZU000 - Not required

ZU001 - Exhaust silencer 402D-05, 403D-07, 403D-11, 403D-15, 403D-17, 404D-15, 404D-22



Cautions:

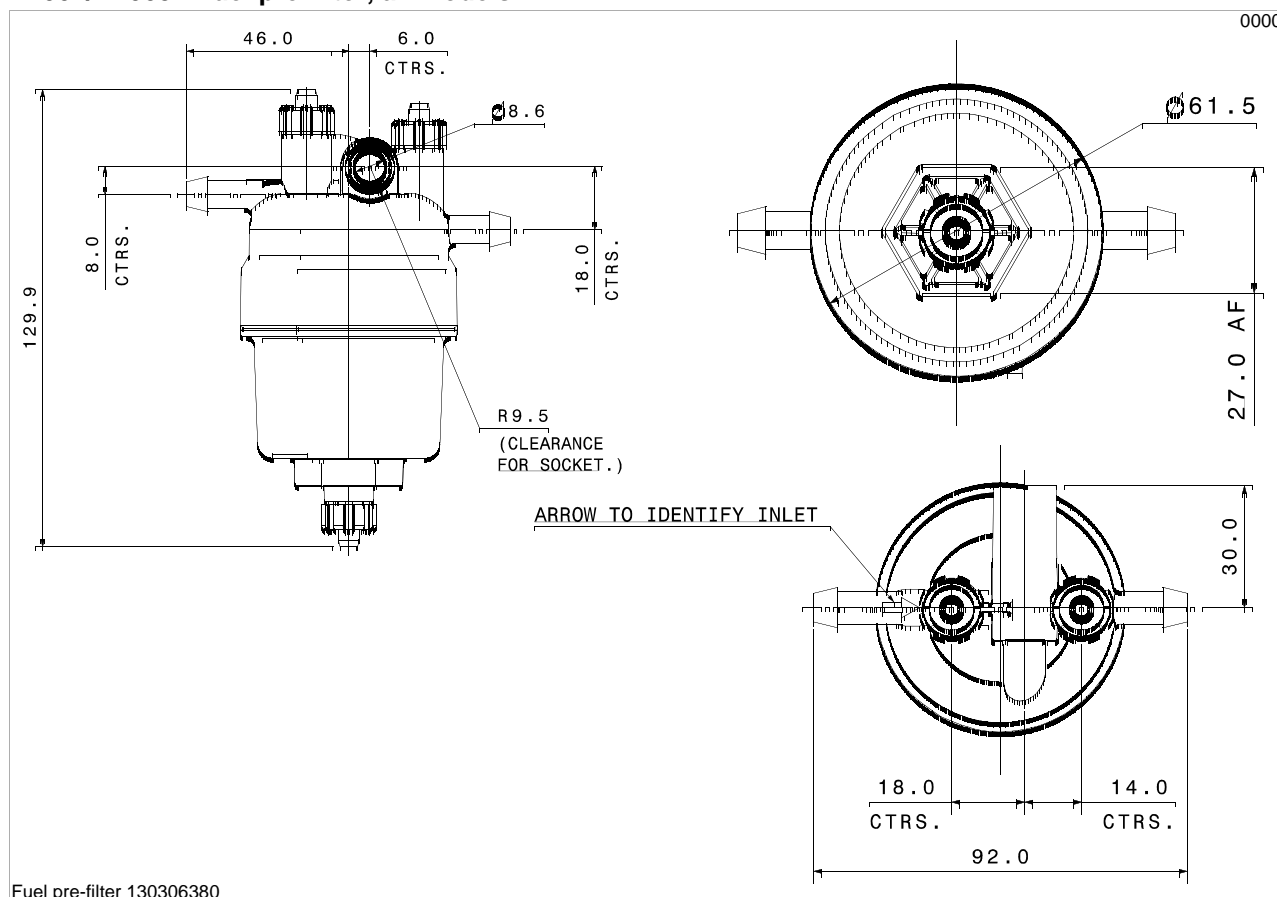
- The exhaust silencer may require additional support dependent on application.
- Generally not suitable for flexible mounted engines unless supported.

Low pressure fuel accessories (fuel pre-filters and hand primer)

Engine type	Pre-filter	Hand primer	Option
All models	No	No	ZV000
	Yes	No	ZV001
	No	Yes	ZV002
	Yes	Yes	ZV003

ZV000 - No pre filter and no hand primer

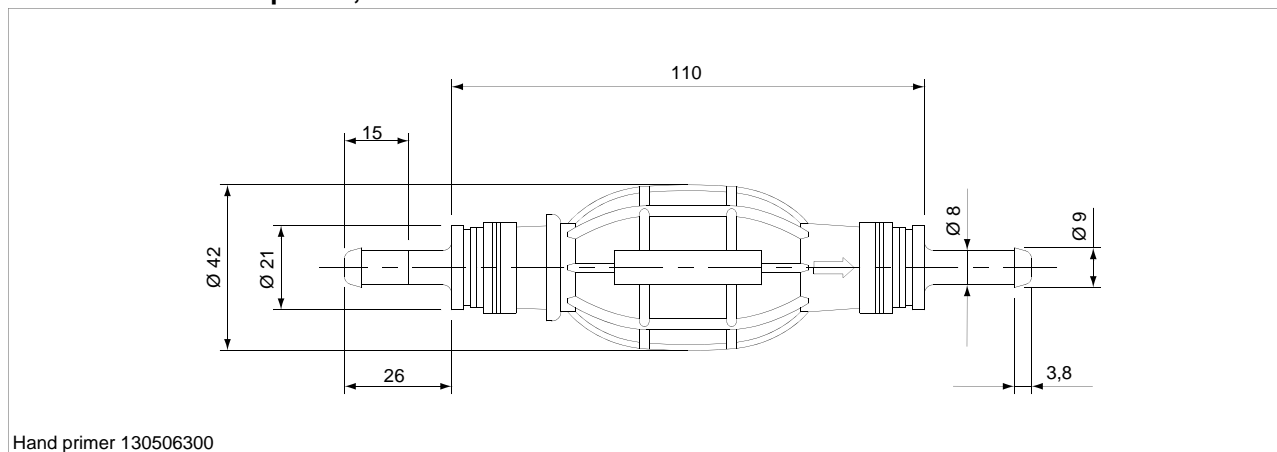
ZV001/ZV003 - Fuel pre-filter, all models



Fuel pre-filter 130306380

Note: Flow rate: 2,5 litres/minimum.

ZV002/ZV003 - Hand primer, all models



Hand primer 130506300

Cab heater connections

Engine type	Description	Option
All models	Not required	ZW000
	Cab heater connection (1 of)	ZW001
402D-05 403D-07 403D-11 403D-17 404D-15	Cab heater connection (2 of)	ZW002
403D-15 403D-15T	Cab heater connection (2 of) <i>incompatible with AA031/AA032/AA033/AA034/AA035</i>	ZW002
404D-22 404D-22T 404D-22TA	Cab heater connection (2 of) <i>incompatible with AA091/AA083/AA087/AA088/AA089/AA0909</i>	ZW002

ZW000 - Not required**ZW001/ZW002 - Cab heater connection, all models**

Cab heater connection 198487890

Notes:

- ZW001 includes one connections as shown above.
- ZW002 includes two connections as shown above.
- The system is to be fed from the connection on the thermostat housing and should be returned to the connection on the water pump.
- Option ZW002 is incompatible with the turbocharged 403D-15T, 404D-22T and 404D-22TA because the oil cooler hose obstructs the cab heater tapping in the coolant pump.

This page is intentionally blank

6

Technical data

Introduction

The information given in this chapter will enable the user to install a 400 Series engine to Perkins minimum standards and so ensure its correct operation in service. If more information is needed, refer to the Perkins Installation Manual with the technical data supplement and the installation standards booklet. If these publications do not provide the information that you require, consult your nearest Perkins Distributor.

Note: At this stage some of the data in this section is preliminary.

Basic technical data**402D-05**

Number of cylinders	2
Cylinder arrangement	Vertical in-line
Cycle	4 stroke
Induction system	Naturally aspirated
Combustion system	Indirect injection
Bore	67 mm (2.64 in)
Stroke	72 mm (2.83 in)
Compression ratio	23.5 : 1
Cubic capacity	0,507 litres (31.0 in ³)
Firing order	1, 2
Governing at rated rpm	± 2%
Rotation	Clockwise, viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	2,01 Litres/3.5 pints
Minimum	1,61 Litres/2.8 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length	406,0 mm (16.0 in)
Width	371,0 mm (14.6 in)
Height	523,0 mm (20.6 in)

Dry weight

Engine with options ⁽²⁾	57,0 kg (126.0 lb)
Engine with options ⁽³⁾	69,0 kg (152.0 lb)
Engine with options ⁽⁴⁾	73,0 kg (161.0 lb)

Note: Final weight will depend on the completed specification.

1. Final dimensions will depend on the completed specification.

2. Includes fan, backplate CD001, flywheel DD001, starter ED005, and alternator ND013.

3. Includes fan, short housing CD003, flywheel DD002, starter ED005, and alternator ND013.

4. Includes fan, long housing CD004, flywheel DD003, starter ED005, and alternator ND013.

403D-07

Number of cylinders.	3
Cylinder arrangement.	Vertical in-line
Cycle.	4 stroke
Induction system.	Naturally aspirated
Combustion system.	Indirect injection
Bore	67 mm (2.64 in)
Stroke	72 mm (2.83 in)
Compression ratio	23.5 : 1
Cubic capacity	0,762 litres (46.5 in ³)
Firing order	1, 2, 3
Governing at rated rpm.	8% ± 2
Rotation	Clockwise, viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit.	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	3,05 Litres/5.36 pints
Minimum	2,35 Litres/4.13 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length.	480,0 mm (18.9 in)
Width	371,0 mm (14.6 in)
Height	528,0 mm (20.8 in)

Dry weight

Engine with options ⁽²⁾	71,0 kg (156.5 lb)
Engine with options ⁽³⁾	83,0 kg (183.0 lb)
Engine with options ⁽⁴⁾	87,0 kg (191.8 lb)

Note: Final weight will depend on the completed specification.

1. Final dimensions will depend on the completed specification.

2. Includes fan, backplate CD001, flywheel DD001, starter ED005, and alternator ND013.

3. Includes fan, short housing CD003, flywheel DD002, starter ED005, and alternator ND013.

4. Includes fan, long housing CD004, flywheel DD003, starter ED005, and alternator ND013.

403D-11

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	4 stroke
Induction system	Naturally aspirated
Combustion system	Indirect injection
Bore	77 mm (3.03 in)
Stroke	81 mm (3.19 in)
Compression ratio	23 : 1
Cubic capacity	1,131 litres (69.0 in ³)
Firing order	1, 2, 3
Governing at rated rpm	8% ± 2
Rotation	Clockwise viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	4,4 Litres/7.7 pints
Minimum	3,4 Litres/6.0 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length	491,0 mm (19.33 in)
Width	400,0 mm (15.75 in)
Height	576,0 mm (22.67 in)

Dry weight

Engine with options ⁽²⁾	87,0 kg (191.0 lb)
Engine with options ⁽³⁾	96,0 kg (211.0 lb)
Engine with options ⁽⁴⁾	114,0 kg (251.0 lb)
Engine with options ⁽⁵⁾	129,2 kg (284.8 lb)
Engine with options ⁽⁶⁾	111,2 kg (245.1 lb)

Note: Final weight will depend on the completed specification.

1. Final dimensions will depend on the completed specification.
2. Includes fan, backplate CD001, flywheel DD001, starter ED***, and alternator ND011.
3. Includes fan, short housing CD003, flywheel DD002, starter ED***, and alternator ND011.
4. Includes fan, long housing CD004, flywheel DD003, starter ED***, and alternator ND011.
5. Includes fan, long housing CD004, flywheel DD003, starter ED***, alternator ND011, cooling pack ZM001, and air filter TD001.
6. Includes fan, short housing CD003, flywheel DD002, starter ED***, alternator ND011, cooling pack ZM001, and air filter TD001.

403D-15

Number of cylinders.	3
Cylinder arrangement	Vertical in-line
Cycle.	4 stroke
Induction system.	Naturally aspirated
Combustion system.	Indirect injection
Bore	84 mm (3.3 in)
Stroke	90 mm (3.5 in)
Compression ratio	22.5 : 1
Cubic capacity	1,496 litres (91.0 in ³)
Firing order	1, 2, 3
Governing at rated rpm.	8% ± 2
Rotation	Clockwise viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit.	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	6,0 Litres/10.5 pints
Minimum	4,5 Litres/7.9 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length.	572,0 mm (22.5 in)
Width	453,0 mm (17.9 in)
Height	643,0 mm (25.3 in)

Dry weight

Engine with options ⁽²⁾	149,0 kg (328.0 lb)
Engine with options ⁽³⁾	154,0 kg (340.0 lb)
Engine with options ⁽⁴⁾	176,0 kg (388.0 lb)
Engine with options ⁽⁵⁾	197,0 kg (434.0 lb)
Engine with options ⁽⁶⁾	175,0 kg (386.0 lb)

Note: Final weight will depend on the completed specification.

1. Final dimensions will depend on the completed specification.
2. Includes fan, backplate CD001, flywheel DD001, starter ED001, and alternator ND001.
3. Includes fan, short housing CD003, flywheel DD002, starter ED001, and alternator ND001.
4. Includes fan, long housing CD004, flywheel DD003, starter ED001, and alternator ND001.
5. Includes fan, long housing CD004, flywheel DD003, starter ED001, alternator ND001, cooling pack ZM001 and air filter TD001.
6. Includes fan, short housing CD003, flywheel DD002, starter ED001, alternator ND001, cooling pack ZM001 and air filter TD001.

403D-15T

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	4 stroke
Induction system	Turbocharged
Combustion system	Indirect injection
Bore	84 mm (3.3 in)
Stroke	90 mm (3.5 in)
Compression ratio	22.5 : 1
Cubic capacity	1,496 litres (91.0 in ³)
Firing order	1, 2, 3
Governing at rated rpm	8% ± 2
Rotation	Clockwise viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	6,0 Litres/10.5 pints
Minimum	4,5 Litres/7.9 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length	572,0 mm (22.5 in)
Width	512,0 mm (20.2 in)
Height	643,0 mm (25.3 in)

Dry weight

Engine with options ⁽²⁾	156.5 kg (345.0 lb)
Engine with options ⁽³⁾	161.5 kg (356.0 lb)
Engine with options ⁽⁴⁾	183.5 kg (404.5 lb)

Note: Final weight will depend on the completed specification.

1. Final dimensions will depend on the completed specification.

2. Includes fan, backplate CD001, flywheel DD001, starter ED001, and alternator ND001.

3. Includes fan, short housing CD003, flywheel DD002, starter ED001, and alternator ND001.

4. Includes fan, long housing CD004, flywheel DD003, starter ED001, and alternator ND001.

404D-15

Number of cylinders.	4
Cylinder arrangement.	Vertical in-line
Cycle.	4 stroke
Induction system.	Naturally aspirated
Combustion system.	Indirect injection
Bore	77 mm (3.03 in)
Stroke	81 mm (3.19 in)
Compression ratio	22.9 : 1
Cubic capacity	1,508 litres (92.0 in ³)
Firing order	1, 3, 4, 2
Governing at rated rpm. . . . .	.8% ± 2
Rotation	Clockwise viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit.	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	5,6 Litres/9.9 pints
Minimum	3,9 Litres/6.9 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length.	591,0 mm (23.3 in)
Width	408,0 mm (16.1 in)
Height	576,0 mm (22.7 in)

Dry weight

Engine with options ⁽²⁾	106,8 kg (235.5 lb)
Engine with options ⁽³⁾	113,6 kg (250.4 lb)
Engine with options ⁽⁴⁾	132,0 kg (291.0 lb)

Note: Final weight will depend on the completed specification.

-
1. Final dimensions will depend on the completed specification.
 2. Includes fan, backplate CD001, flywheel DD001, starter ED003, and alternator ND009.
 3. Includes fan, short housing CD002, flywheel DD002, starter ED003, and alternator ND009.
 4. Includes fan, long housing CD004, flywheel DD003, starter ED003, and alternator ND009.

403D-17

Number of cylinders	3
Cylinder arrangement	Vertical in-line
Cycle	4 stroke
Induction system	Naturally aspirated
Combustion system	Indirect injection
Bore	84 mm (3.3 in)
Stroke	100 mm (3.9 in)
Compression ratio	23 : 1
Cubic capacity	1,662 litres (101.4 in ³)
Firing order	1, 2, 3
Governing at rated rpm	8% ± 2
Rotation	Clockwise viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	6,0 Litres/10.5 pints
Minimum	4,5 Litres/7.9 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length	564 mm (22.2 in)
Width	466 mm (18.3 in)
Height	654 mm (25.7 in)

Dry weight

Engine with options ⁽²⁾	160,0 kg (353.0 lb)
Engine with options ⁽³⁾	TBA kg (TBA lb)
Engine with options ⁽⁴⁾	TBA kg (TBA lb)
Engine with options ⁽⁵⁾	TBA kg (TBA lb)
Engine with options ⁽⁶⁾	TBA kg (TBA lb)

Note: Final weight will depend on the completed specification.

- Final dimensions will depend on the completed specification.
- Includes fan, backplate CD001, flywheel DD001, starter ED001, and alternator ND001.
- Includes fan, short housing CD003, flywheel DD002, starter ED001, and alternator ND001.
- Includes fan, long housing CD004, flywheel DD003, starter ED001, and alternator ND001.
- Includes fan, long housing CD004, flywheel DD003, starter ED001, alternator ND001, cooling pack ZM001 and air filter TD001.
- Includes fan, short housing CD003, flywheel DD002, starter ED001, alternator ND001, cooling pack ZM001 and air filter TD001.

404D-22

Number of cylinders.	4
Cylinder arrangement.	Vertical in-line
Cycle.	4 stroke
Induction system.	Naturally aspirated
Combustion system.	Indirect injection
Bore	84 mm (3.3 in)
Stroke	100 mm (3.9 in)
Compression ratio	23.3:1
Cubic capacity	2,216 litres (135 in ³)
Firing order	1, 3, 4, 2
Governing at rated rpm.	8% ± 2
Rotation	Clockwise, viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit.	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	10,6 Litres/18.6 pints
Minimum	8,9 Litres/15.6 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length.	661,5 mm (26.0 in)
Width	464,0 mm (18.3 in)
Height	676,0 mm (26.6 in)

Dry weight

Engine with options ⁽²⁾	184,0 kg (406.0 lb)
Engine with options ⁽³⁾	196,0 kg (432.0 lb)
Engine with options ⁽⁴⁾	220,0 kg (485.0 lb)
Engine with options ⁽⁵⁾	242,0 kg (533.0 lb)
Engine with options ⁽⁶⁾	218,0 kg (480.0 lb)

Note: Final weight will depend on the completed specification.

-
1. Final dimensions will depend on the completed specification.
 2. Includes fan, backplate CD001, flywheel DD001, starter ED001, and alternator ND001.
 3. Includes fan, short housing CD003, flywheel DD002, starter ED001, and alternator ND001.
 4. Includes fan, long housing CD004, flywheel DD003, starter ED001, and alternator ND001.
 5. Includes fan, long housing CD004, flywheel DD003, starter ED001, alternator ND001, cooling pack ZM001 and air filter TD001.
 6. Includes fan, short housing CD003, flywheel DD002, starter ED001, alternator ND001, cooling pack ZM001 and air filter TD001.

404D-22T

Number of cylinders	4
Cylinder arrangement	Vertical in-line
Cycle	4 stroke
Induction system	Turbocharged
Combustion system	Indirect injection
Bore	84 mm (3.3 in)
Stroke	100 mm (3.9 in)
Compression ratio	23.3:1
Cubic capacity	2,216 litres (135 in ³)
Firing order	1, 3, 4, 2
Governing at rated rpm	8% ± 2
Rotation	Clockwise, viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	10,6 Litres/18.6 pints
Minimum	8,9 Litres/15.6 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length	662,0 mm (26.1 in)
Width	489,0 mm (19.3 in)
Height	698,0 mm (27.5 in)

Dry weight

Engine with options ⁽²⁾	194 kg (427.7 lb)
Engine with options ⁽³⁾	206 kg (454.2 lb)
Engine with options ⁽⁴⁾	230 kg (507.1 lb)

Note: Final weight will depend on the completed specification.

1. Final dimensions will depend on the completed specification.

2. Includes fan, backplate CD001, flywheel DD001, starter ED001, and alternator ND001.

3. Includes fan, CD003 short housing, flywheel DD002, starter ED001, and alternator ND001.

4. Includes fan, CD004 long housing, flywheel DD003, starter ED001, and alternator ND001.

404D-22TA

Number of cylinders.	4
Cylinder arrangement.	Vertical in-line
Cycle.	4 stroke
Induction system.	Turbo charged/air/air after cooling
Combustion system.	Indirect injection
Bore	84,0 mm (3.3 in)
Stroke	100,0 mm (3.9 in)
Compression ratio	23.3:1
Cubic capacity	2,216 litres (135.0 in ³)
Firing order	1, 3, 4, 2
Governing at rated rpm.	8% ± 2
Rotation	Clockwise viewed from front
Basic thread form	Metric
Cooling system	Liquid, 50/50 anti freeze
Standard starter motor cold start limit.	-20°C (-4 °F)

Capacity of oil sump and filter (when sump option GB001/GB002/GB003 is fitted)

Maximum	10,6 Litres/18.6 pints
Minimum	8,9 Litres/15.6 pints

Overall dimensions as shown on general arrangement drawings, see page 23 ⁽¹⁾

Length.	662 mm (26.1 in)
Width	489 mm (19.3 in)
Height	698 mm (27.5 in)

Dry weight


Engine with options ⁽²⁾	194 kg (427.7 lb)
Engine with options ⁽³⁾	206 kg (454.2 lb)
Engine with options ⁽⁴⁾	230 kg (507.1 lb)

Note: Final weight will depend on the completed specification.

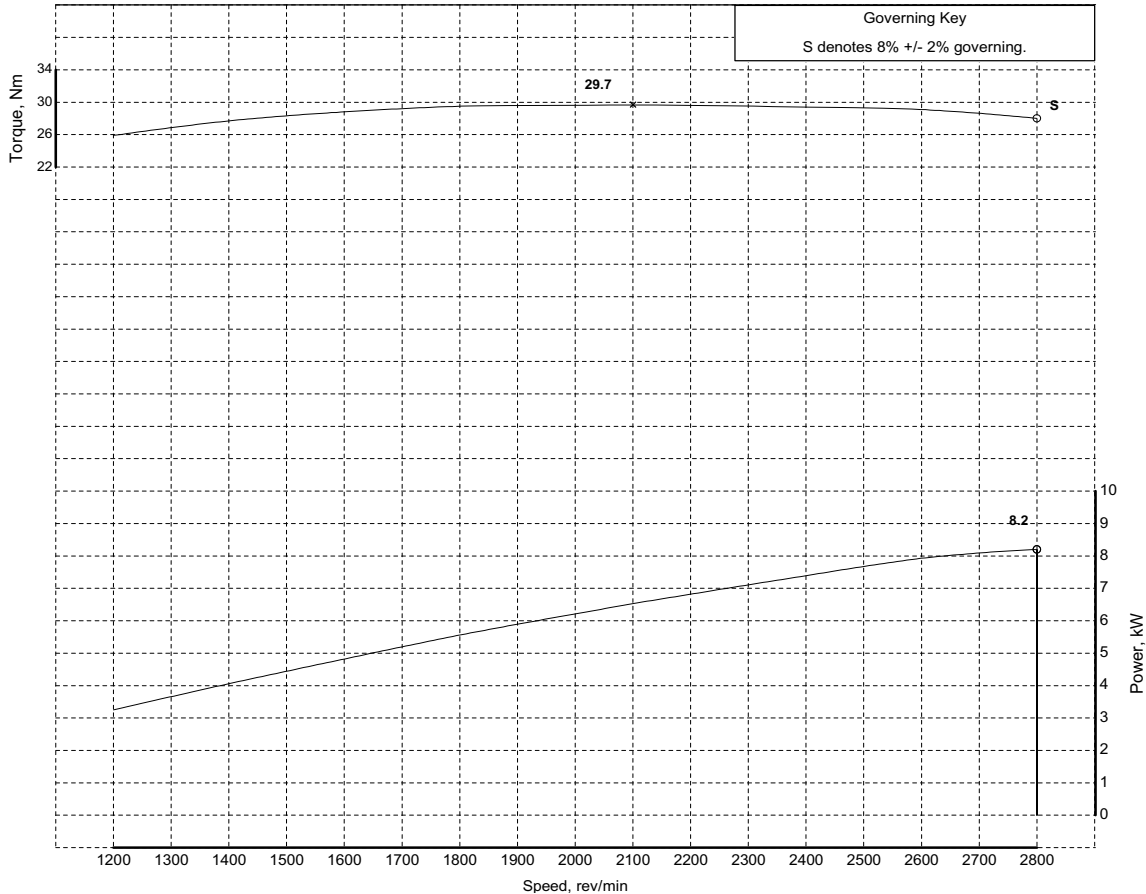
-
1. Final dimensions will depend on the completed specification.
 2. Includes fan, backplate CD001, flywheel DD001, starter ED001, and alternator ND001.
 3. Includes fan, short housing CD003, flywheel DD002, starter ED001, and alternator ND001.
 4. Includes fan, long housing CD004, flywheel DD003, starter ED001, and alternator ND001.

Power curves

402D-05 @ 2800 rpm T3144 - ISO TR14396

 <p>Perkins Engines Company Limited ©2009 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 402D-05	Curve: T 3144 Issue: 2 Date: 22-Sep-2009	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	ISO/TR 14396	Fuel Types: Fuel Specification: USA FED Off Highway Europe Off Highway Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
--	--------------	---



Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.


Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120 Emissions: US EPA 40 CFR Part 1039 Tier 4 Final Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
--	--

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

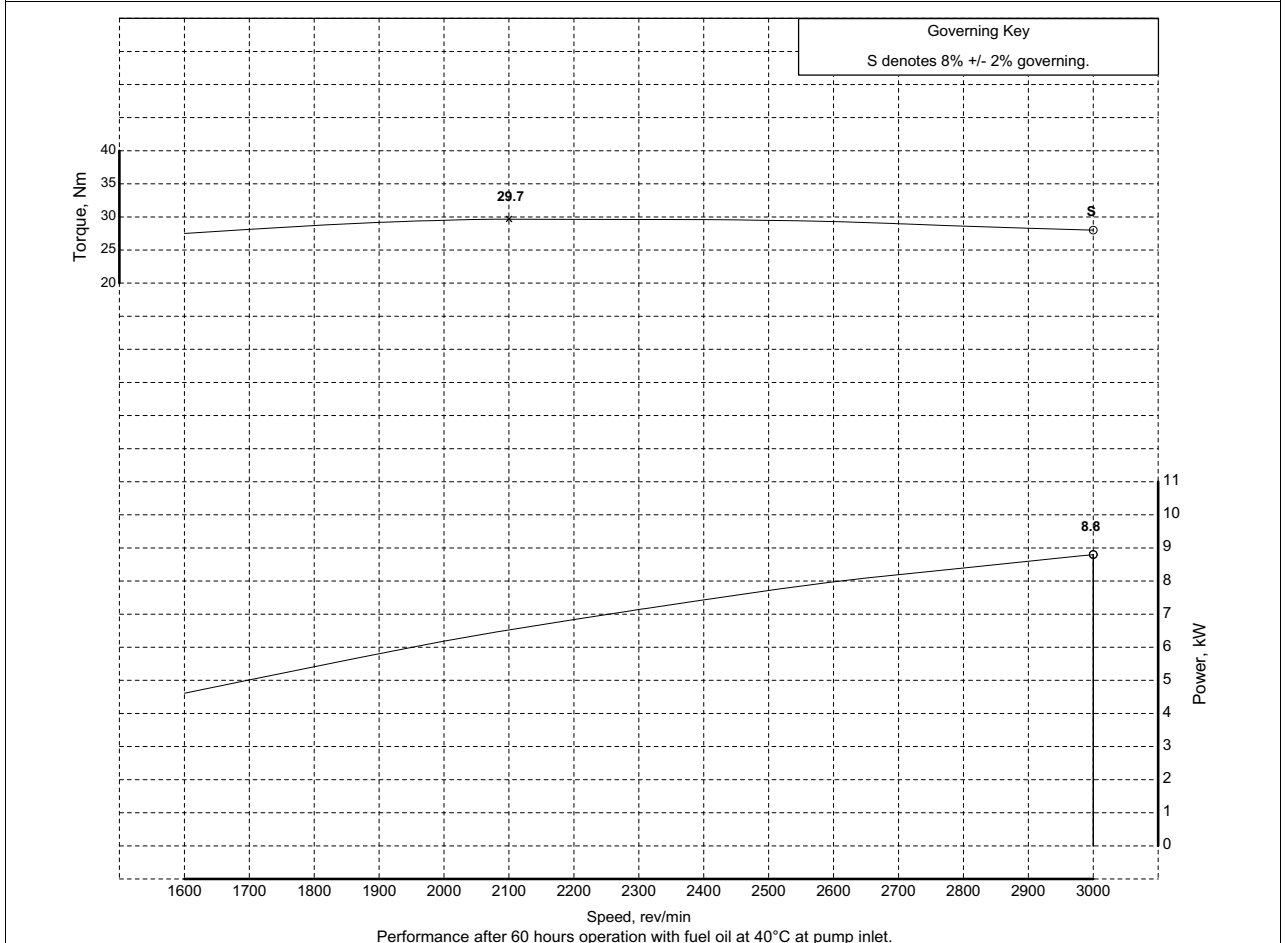
Power Standard	Certification Refs (Rated Speeds)
-----------------------	--

Approved by: G. Nash Date 17-Aug-2009	Accepted by: A.P. Mitchell Date 8-Sep-2009	Issued by: J.H. Flatters (Legislation Engineer)
--	---	---

402D-05 @ 3000 rpm T3148 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 402D-05	Curve: T 3148 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	ISO/TR 14396	Fuel Types: Fuel Specification: EPA Part 1065.703 ULSD Density (kg/l @ 15°C): 0.840 - 0.865 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	USA FED Off Highway Europe Off Highway EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
--	--------------	--	--



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 29-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

402D-05 @ 3600 rpm T3150 - ISO TR14396



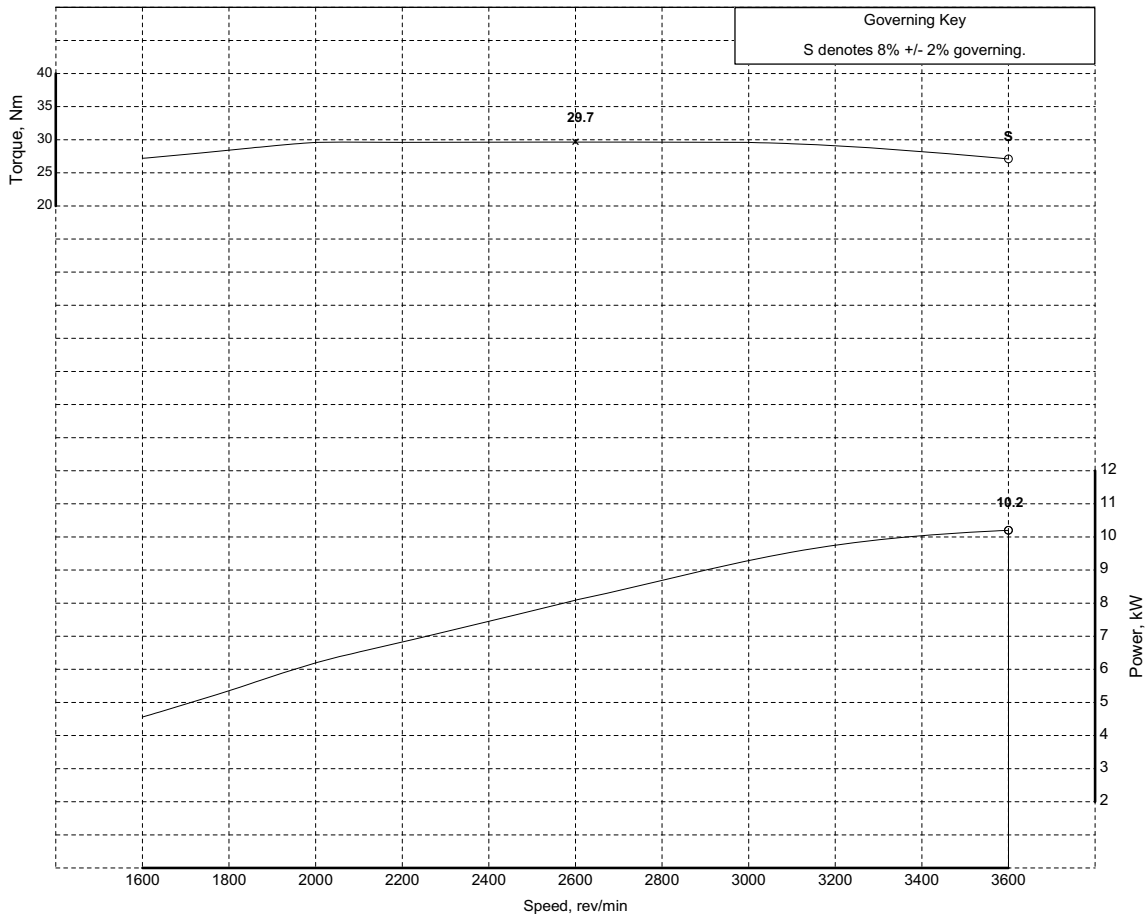
Engine Model:
402D-05

Curve: T 3150 **Sheet 1**
Issue: 2 **Date:** 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Final.
Less than 19 kW EC Certification not required

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash


Date: 29-Mar-2011

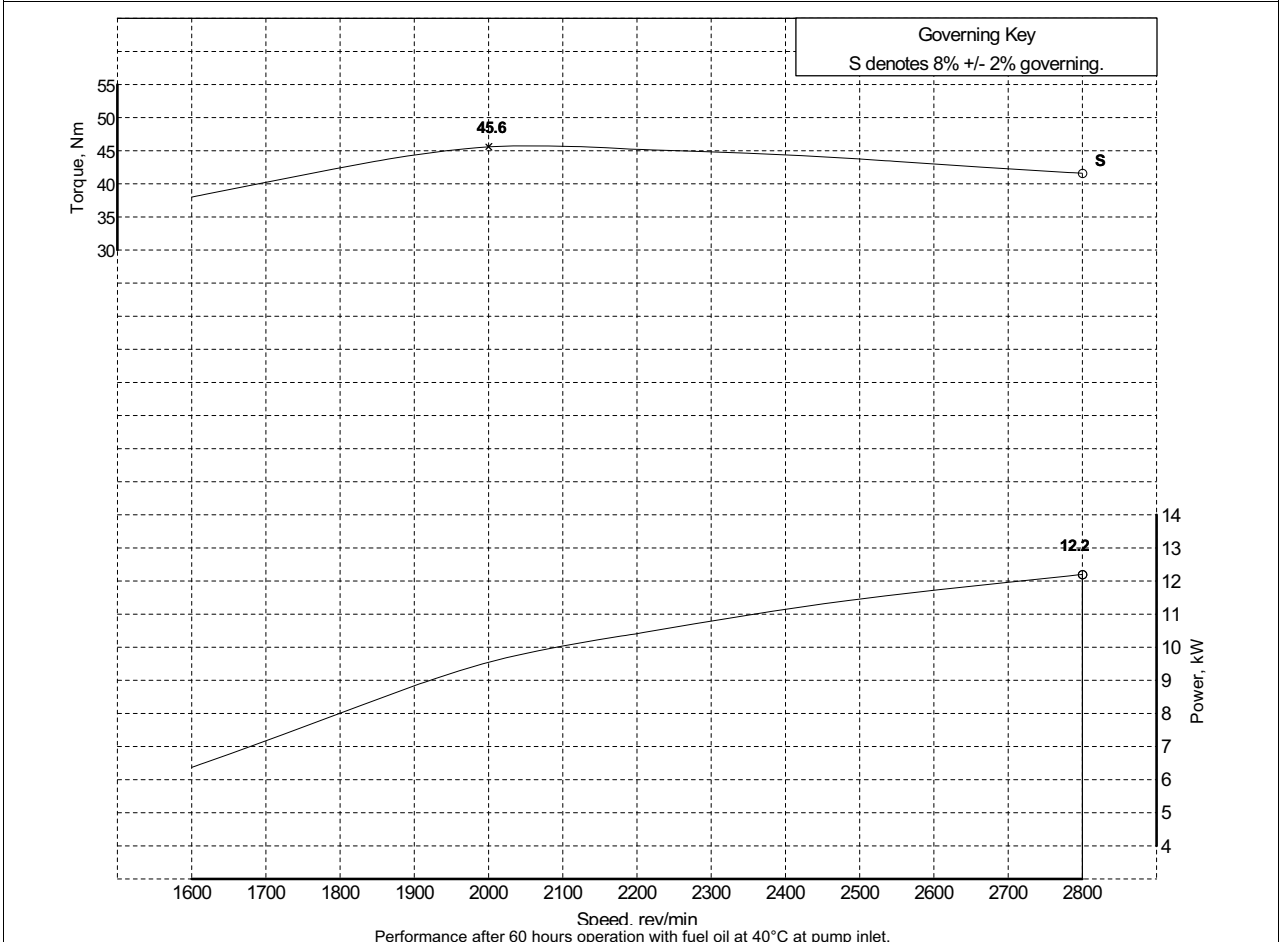
Accepted by:
J. Reed
(Engineering Manager)

Date: 30-Mar-2011

Issued by:
R.L. Hill
(Legislation Engineer)

403D-07 @ 2800 rpm T3138 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-07	Curve: T 3138 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120 Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 28-Mar-2011		Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011		Issued by: R.L. Hill (Legislation Engineer)	
---	---	--	---	--	---

403D-07 @ 3000 rpm T3142 - ISO TR14396



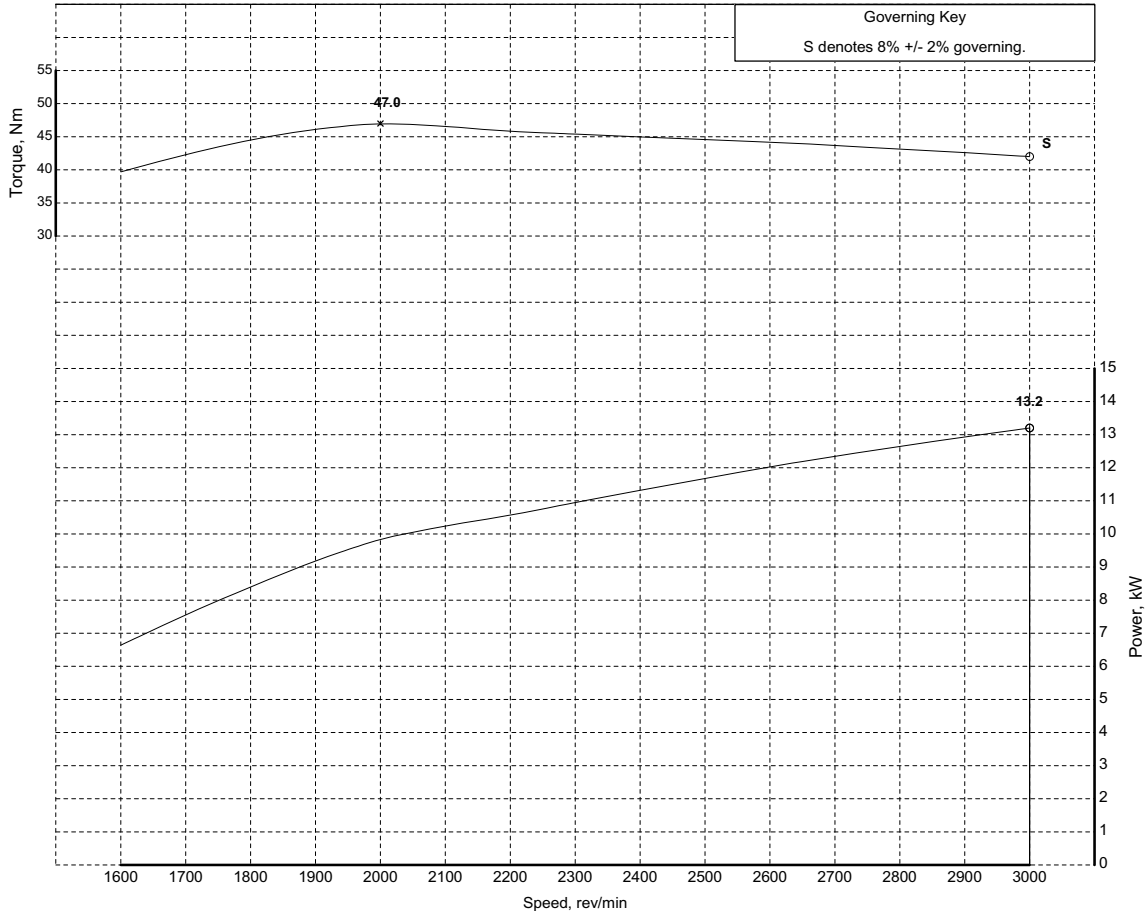
Engine Model:
403D-07

Curve: T 3142 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Final.
Less than 19 kW EC Certification not required

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash

Date: 28-Mar-2011

Accepted by:


J. Reed
(Engineering Manager)

Date: 29-Mar-2011

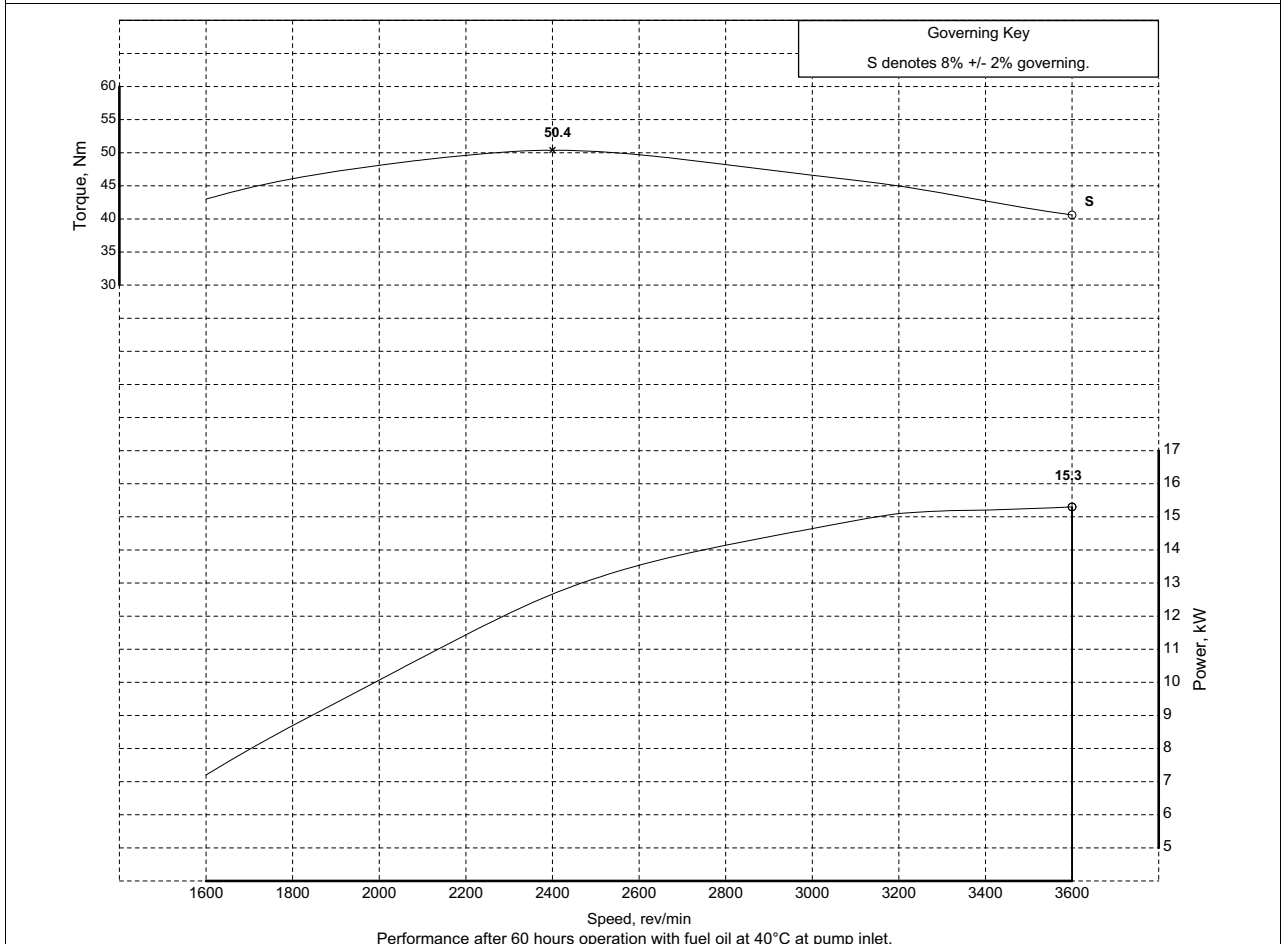
Issued by:

R.L. Hill
(Legislation Engineer)

403D-07 @ 3600 rpm T3146 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-07	Curve: T 3146 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Europe Off Highway EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
---	--



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 29-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 30-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	--	--

403D-11 @ 2200 rpm T3110 - ISO TR14396



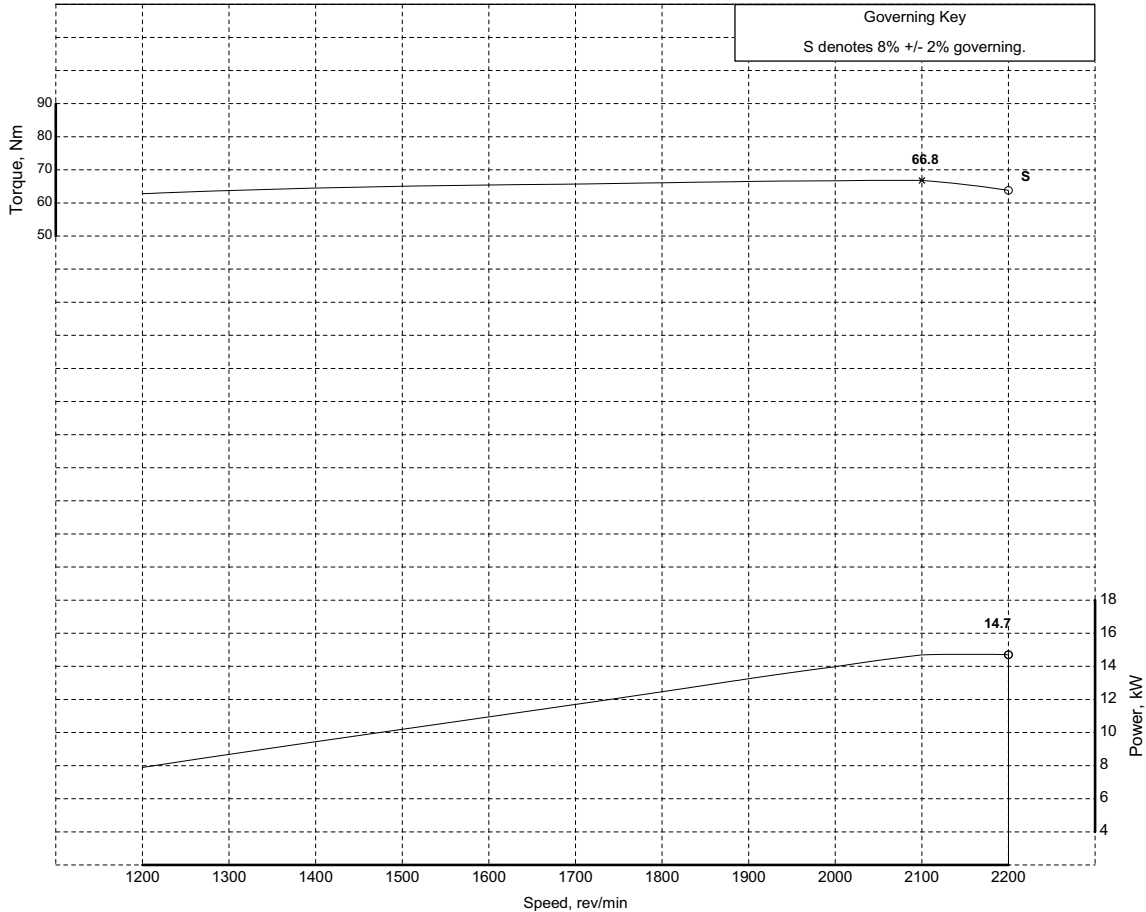
Engine Model:
403D-11

Curve: T 3110 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA 2D 89.330 ULS 2007	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard
Smoke:
77/537/EEC Includes FAS & R120

Certification Refs (Rated Speeds)

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Final.
Less than 19 kW EC Certification not required

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash


Date: 17-Mar-2011

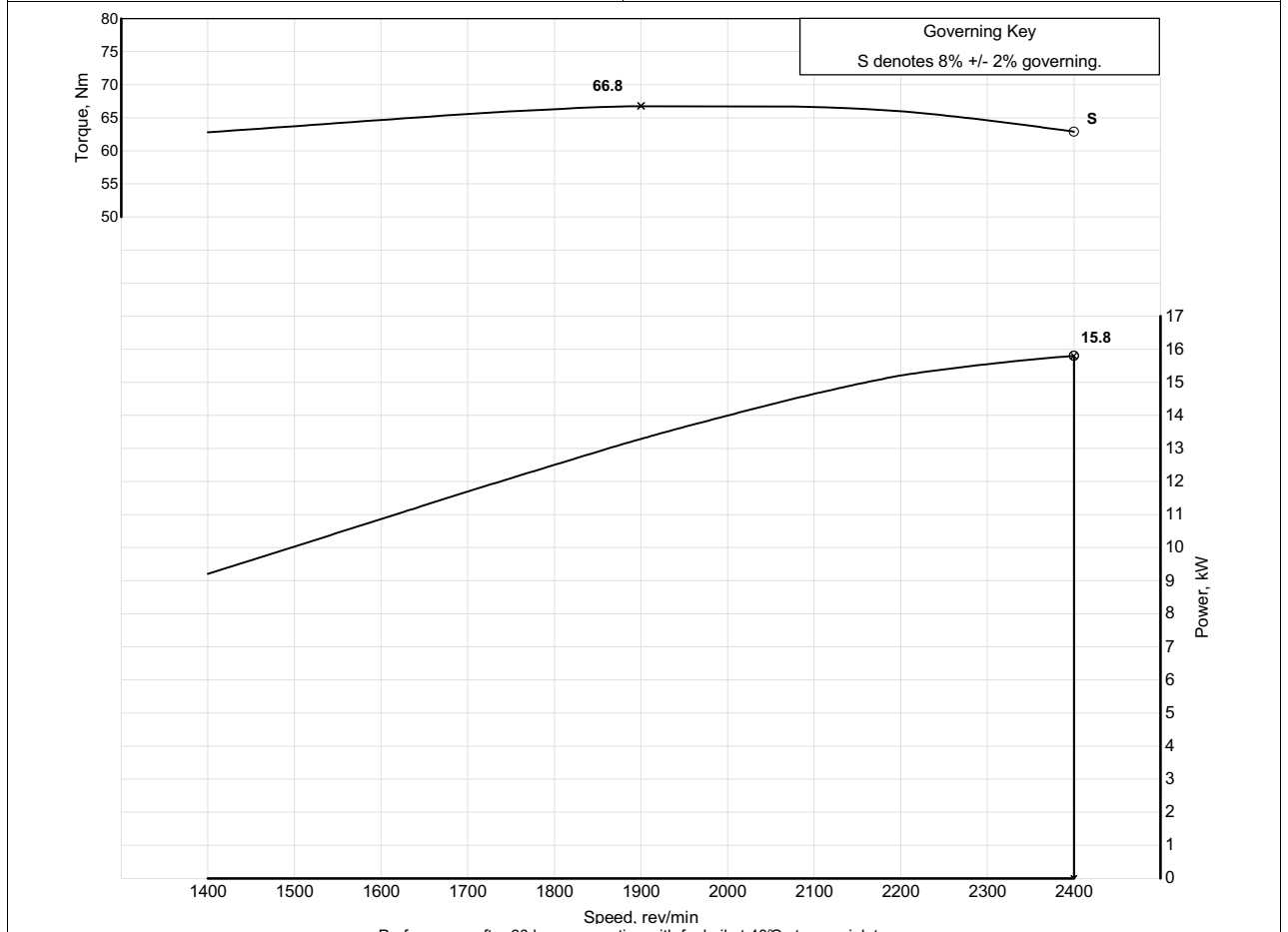
Accepted by:
J. Reed
(Engineering Manager)

Date: 28-Mar-2011

Issued by:
R.L. Hill
(Legislation Engineer)

403D-11 @ 2400 rpm T3112 - ISO TR14396

 <p>Perkins Perkins Engines Company Limited ©2005 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-11	Curve: T 3112 Issue: 1 Date: 31-Oct-2005	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Europe Off Highway Fuel Specification: CEC RF-06-99 Density (kg/l @ 15°C): 0.833 - 0.837 Viscosity (mm ² /s @ 40°C): 2.5 - 3.5 Sulphur Content (% mass): 0.03 max Cetane No: 52 - 54	USA FED Off Highway EPA 2D 89.330 1999 0.845 - 0.85 2.0 - 3.2 0.03 - 0.4 40 - 48	



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted	Exhaust Quality Standard Smoke: 77/537/EEC- Includes FAS. Maximum 2,0 BSU across speed range at 100% load. Emissions: Certified to EU NRMM 97/68/EC Stage 3A. US EPA 40 CFR Part 89 Tier 3. Japanese MLIT Step 3.	Certification Refs (Rated Speeds)
	Power Standard	Certification Refs (Rated Speeds)

Approved by: M.J. Dalziel (Product Manager)	Accepted by: A. Roddham (Engineering Manager)	Issued by: D.J. Campbell (Legislation Manager)
Date: 28-Oct-2005	Date: 28-Oct-2005	

403D-11 derate @ 2200 rpm T3114 - ISO TR14396



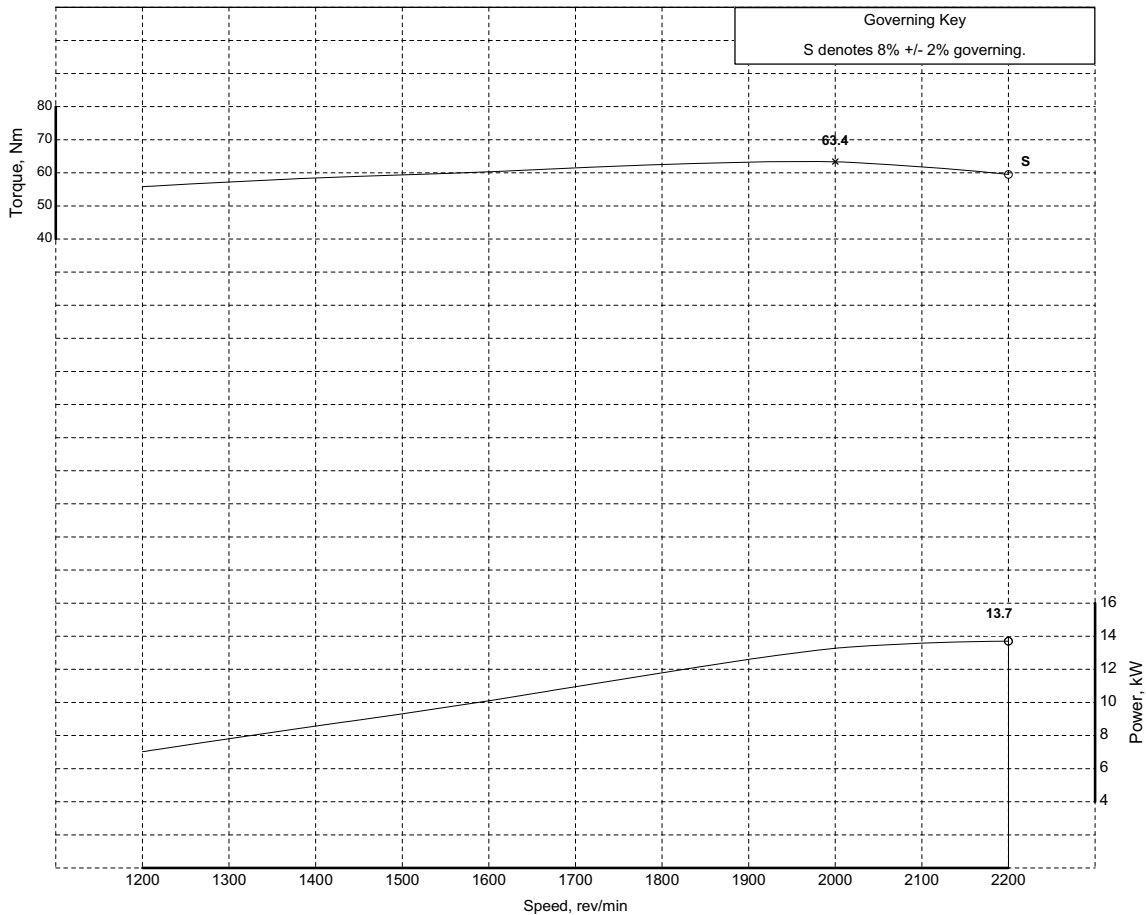
Engine Model:
403D-11

Curve: T 3114 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Final.
Less than 19 kW EC Certification not required

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash

Date: 17-Mar-2011

Accepted by:


J. Reed
(Engineering Manager)

Date: 28-Mar-2011

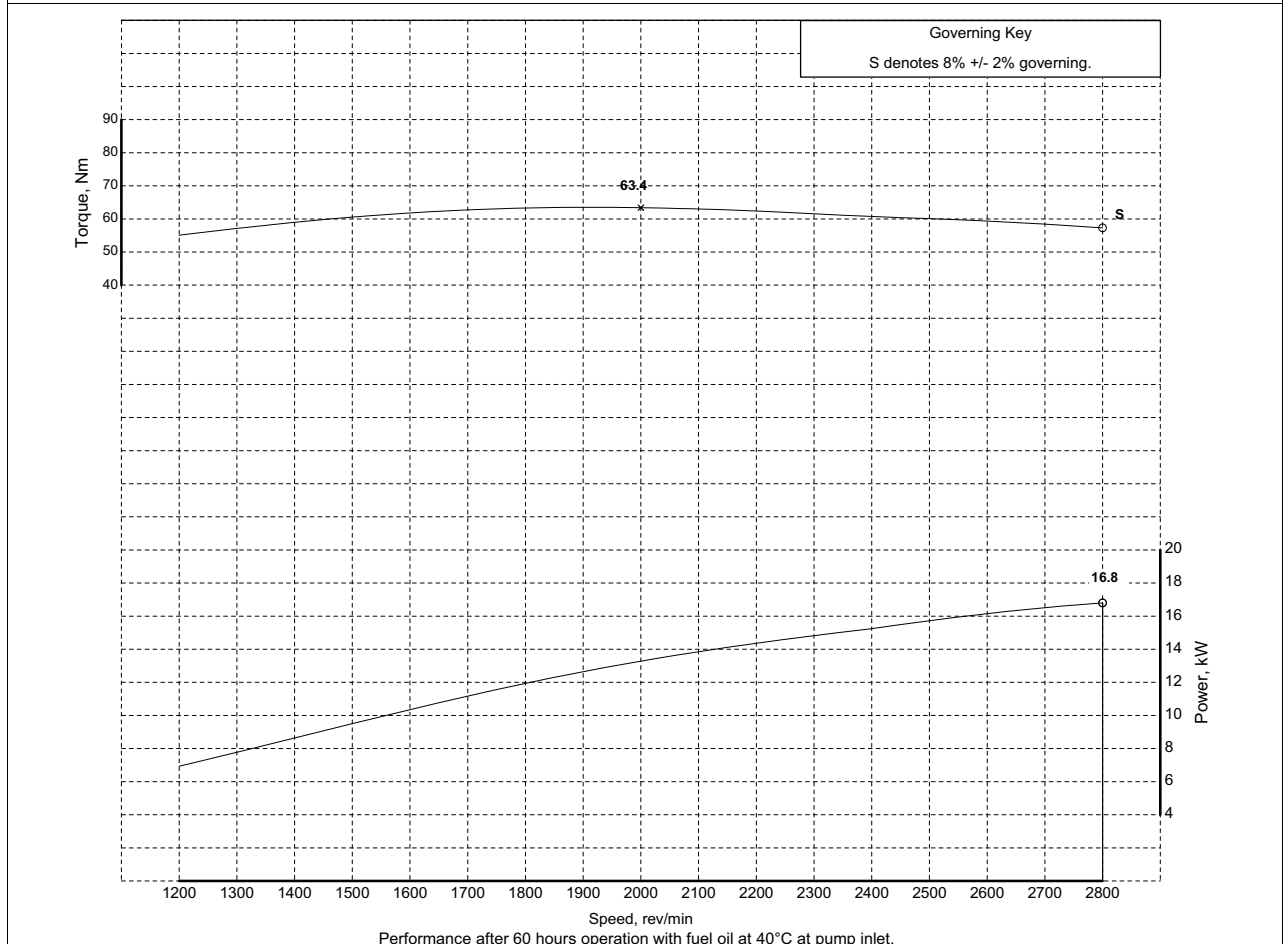
Issued by:

R.L. Hill
(Legislation Engineer)

403D-11 derate @ 2800 rpm T3116 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-11	Curve: T 3116 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Europe Off Highway EPA 2D 89.330 ULS 2007 EU 2004/26/EC Stage 3B/4 Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
--	--



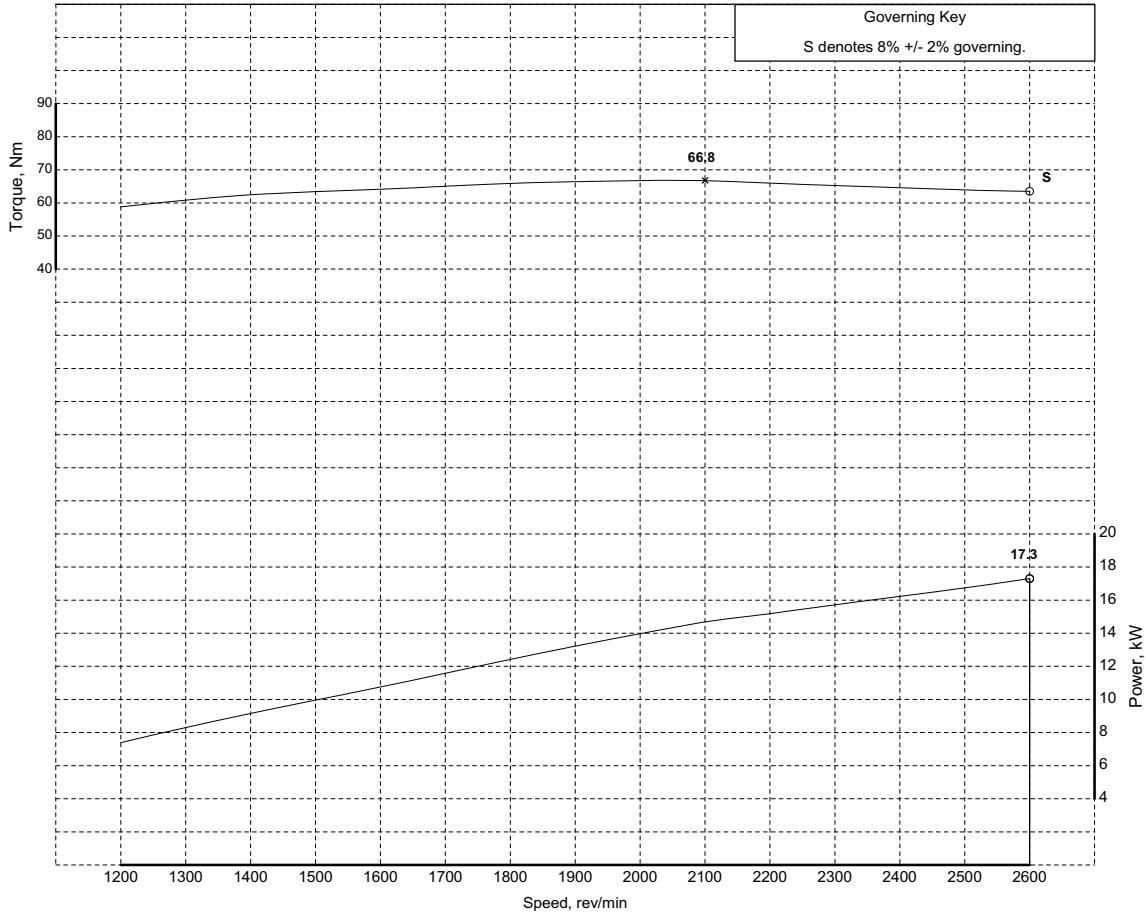
Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

403D-11 @ 2600 rpm T3118 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-11	Curve: T 3118 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Europe Off Highway EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
--	--




Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

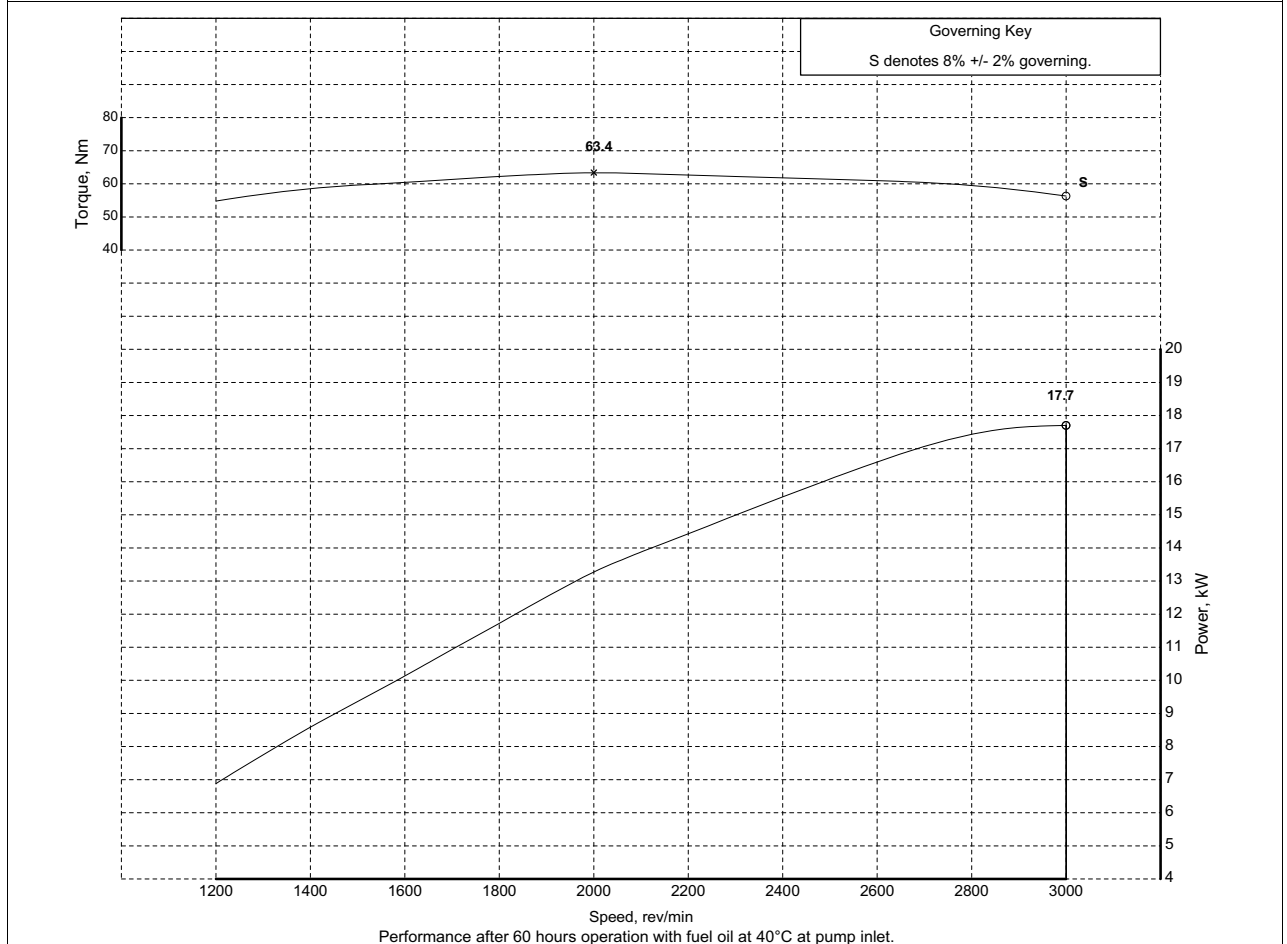
Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	--	--

403D-11 derate @ 3000 rpm T3120 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-11	Curve: T 3120 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	ISO/TR 14396	Fuel Types: Fuel Specification: USA FED Off Highway Density (kg/l @ 15°C): 0.840 - 0.865 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	Europe Off Highway EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
--	--------------	---	---



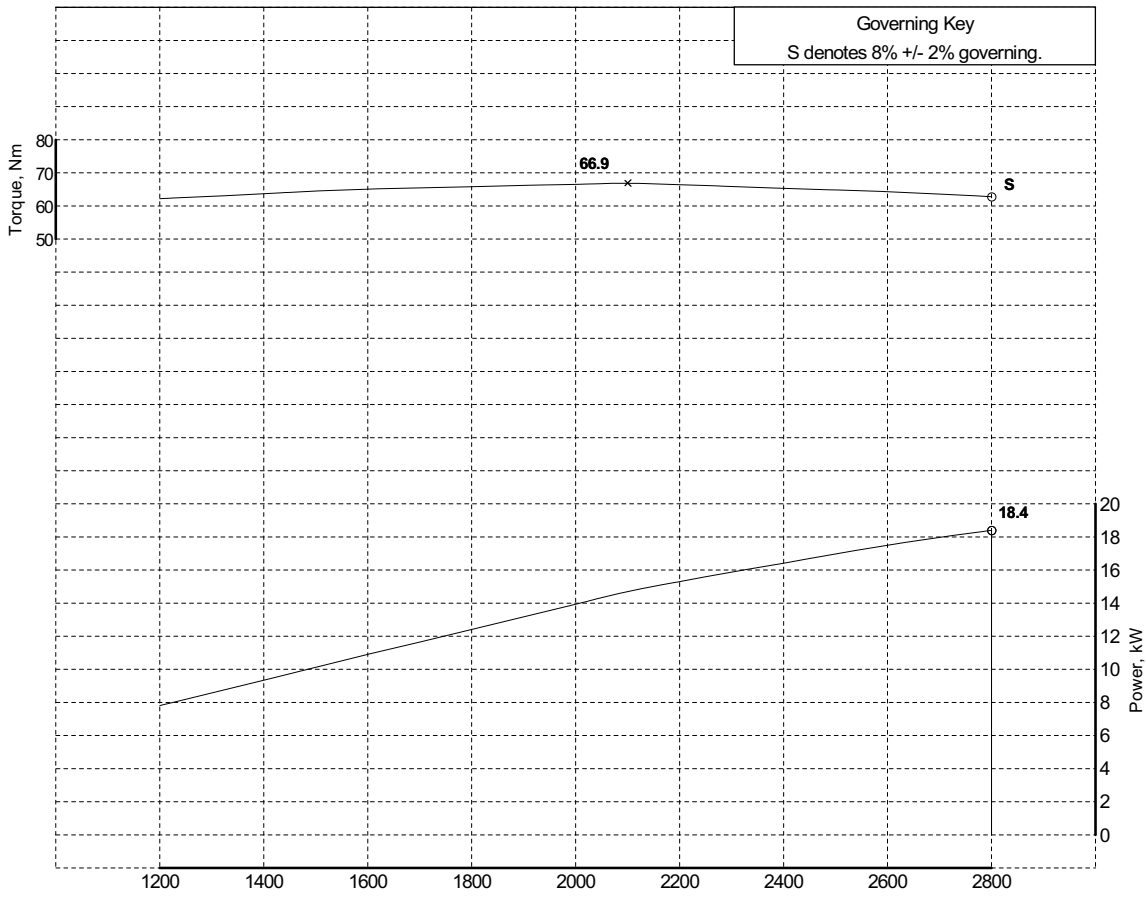
Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	--	--

403D-11 @ 2800 rpm T3122 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-11	Curve: T 3122 Issue: 3 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Density (kg/l @ 15°C): 0.840 - 0.865 Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	Europe Off Highway EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
--	--	---




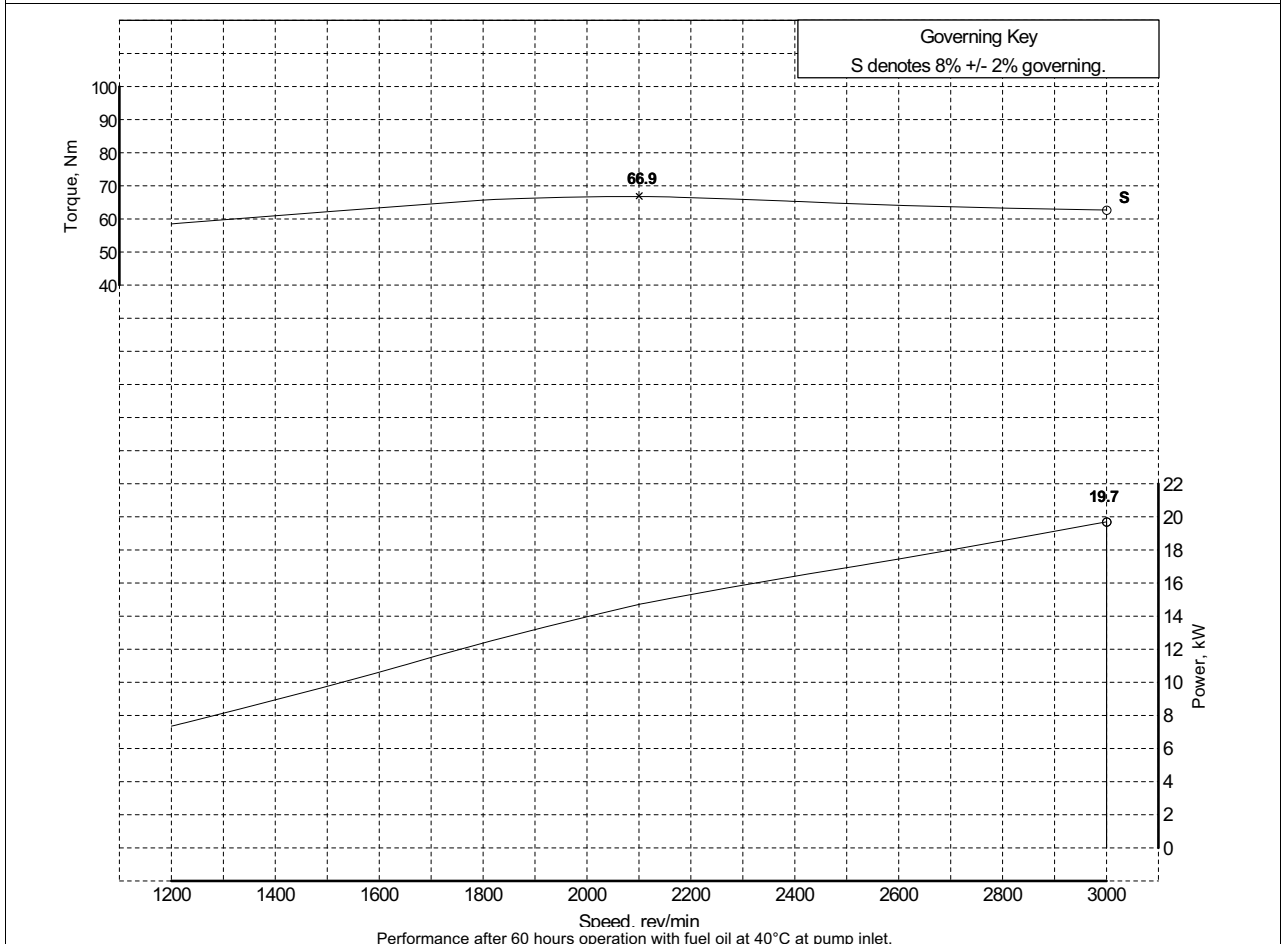
Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Final. Less than 19 kW EC Certification not required	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - 0mm diameter, 0 blades, Perkins p/n: Fan Not Fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	--	--

403D-11 @ 3000 rpm T3124 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-11	Curve: T 3124 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0139* (3000)
	Power Standard	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.		

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 17-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

403D-11 @ 3400 rpm T3156 - ISO TR14396



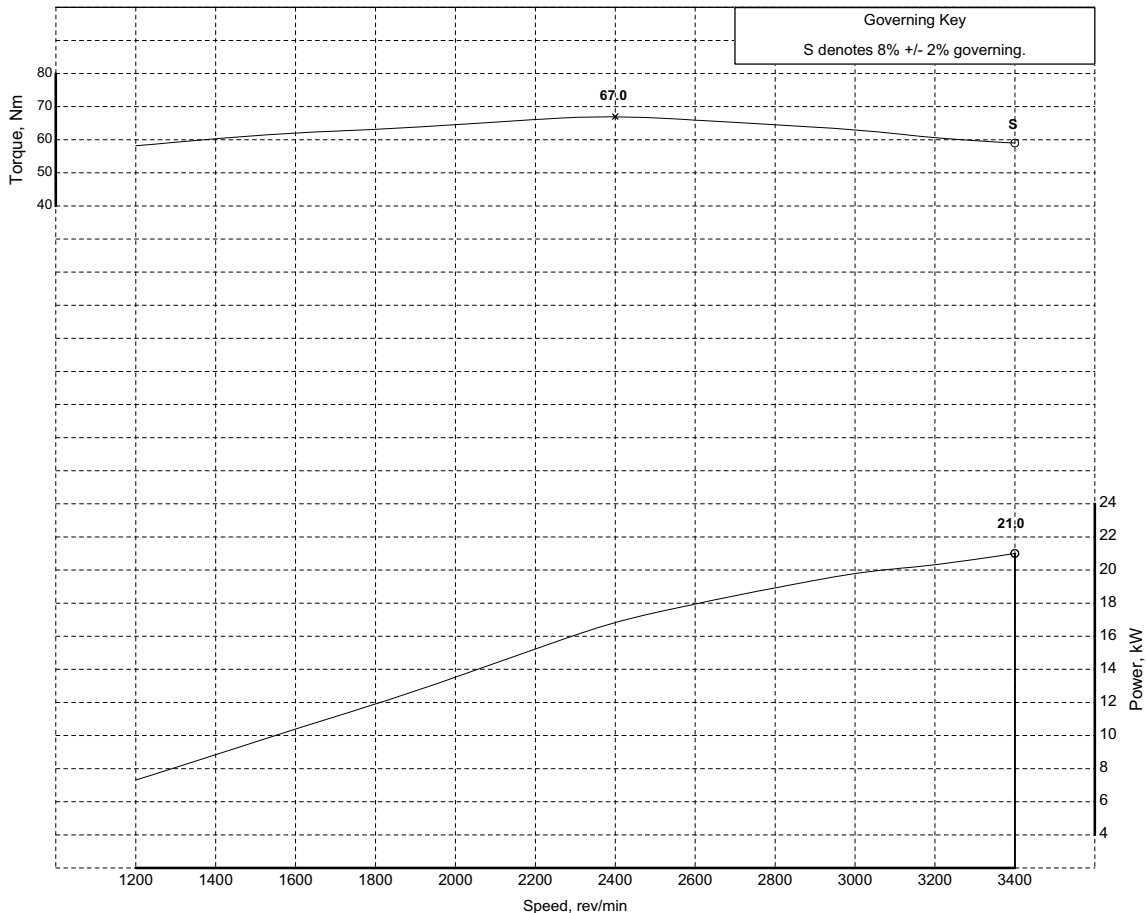
Engine Model:
403D-11

Curve: T 3156 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:

US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68KA*2004/26*0139* (3400)

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:

Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash

Date: 29-Mar-2011

Accepted by:


J. Reed
(Engineering Manager)

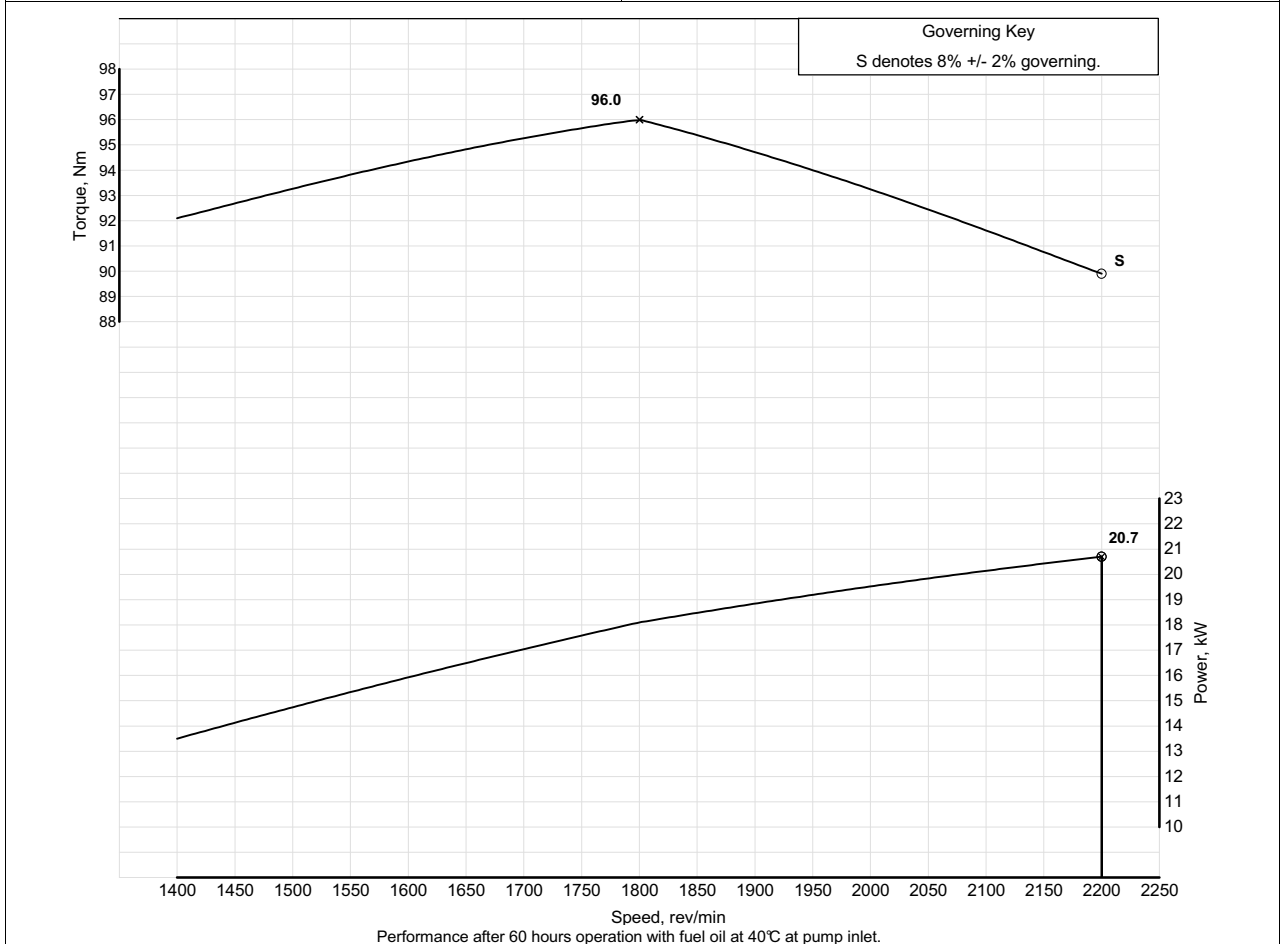
Date: 29-Mar-2011

Issued by:

R.L. Hill
(Legislation Engineer)

403D-15 @ 2200 rpm T3090 - ISO TR14396

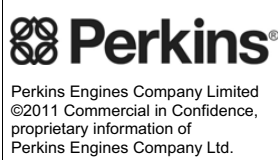
 <p>Perkins Engines Company Limited ©2005 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-15	Curve: T 3090 Issue: 1 Date: 31-Oct-2005	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Europe Off Highway Fuel Specification: CEC RF-06-99 Density (kg/l @ 15°C): 0.833 - 0.837 Viscosity (mm ² /s @ 40°C): 2.5 - 3.5 Sulphur Content (% mass): 0.03 max Cetane No: 52 - 54	USA FED Off Highway EPA 2D 89.330 1999 0.845 - 0.85 2.0 - 3.2 0.03 - 0.4 40 - 48	



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Note - Fan not fitted Alternator - off load.	Exhaust Quality Standard Smoke: Maximum 2,0 BSU across speed range at 100% load. 77/537/EEC- Includes FAS. Emissions: Certified to EU NRMM 97/68/EC Stage 3A. Certified to US EPA 40 CFR Part 89 Tier 3. Japanese MLIT Step 3.	Certification Refs (Rated Speeds)
	Power Standard	Certification Refs (Rated Speeds)

Approved by: M.J. Dalziel (Product Manager)	Accepted by: A. Roddham (Engineering Manager)	Issued by: D.J. Campbell (Legislation Manager)
Date: 28-Oct-2005	Date: 28-Oct-2005	

403D-15 @ 2400 rpm T3092 - ISO TR14396



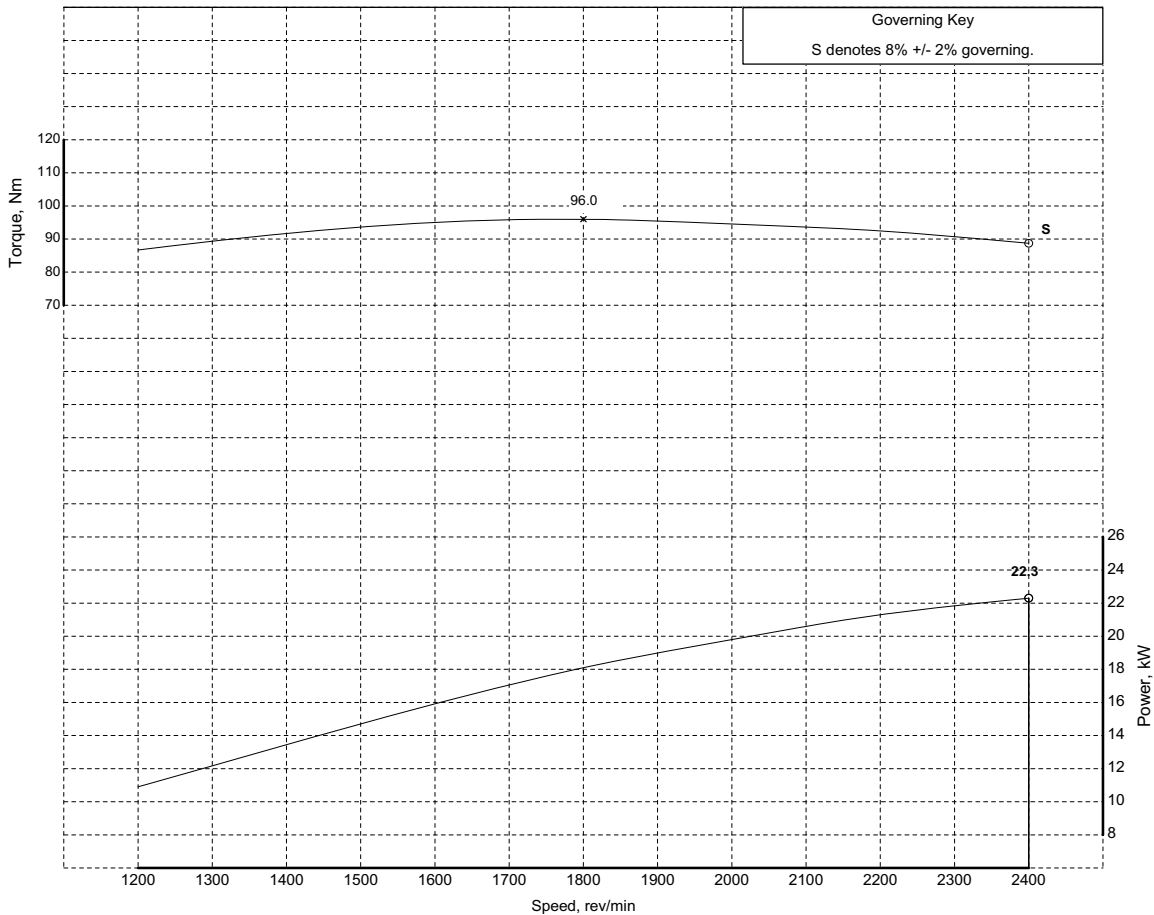
Engine Model:
403D-15

Curve: T 3092 Sheet 1
Issue: 2 Date: 15-Apr-2011

**Development Target -
May be Subject to Change**

Rating Standards: ISO/TR 14396
Production Tolerance On Power Output: +5%, -5%
Total Barometric Pressure (kPa): 100
Vapour Pressure (kPa): 1
Air Inlet Temperature (°C): 25

Fuel Types: USA FED Off Highway Europe Off Highway
Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4
Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837
Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3
Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max
Cetane No: 40 - 50 54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A.

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash

Date: 28-Mar-2011

Accepted by:


J. Reed
(Engineering Manager)

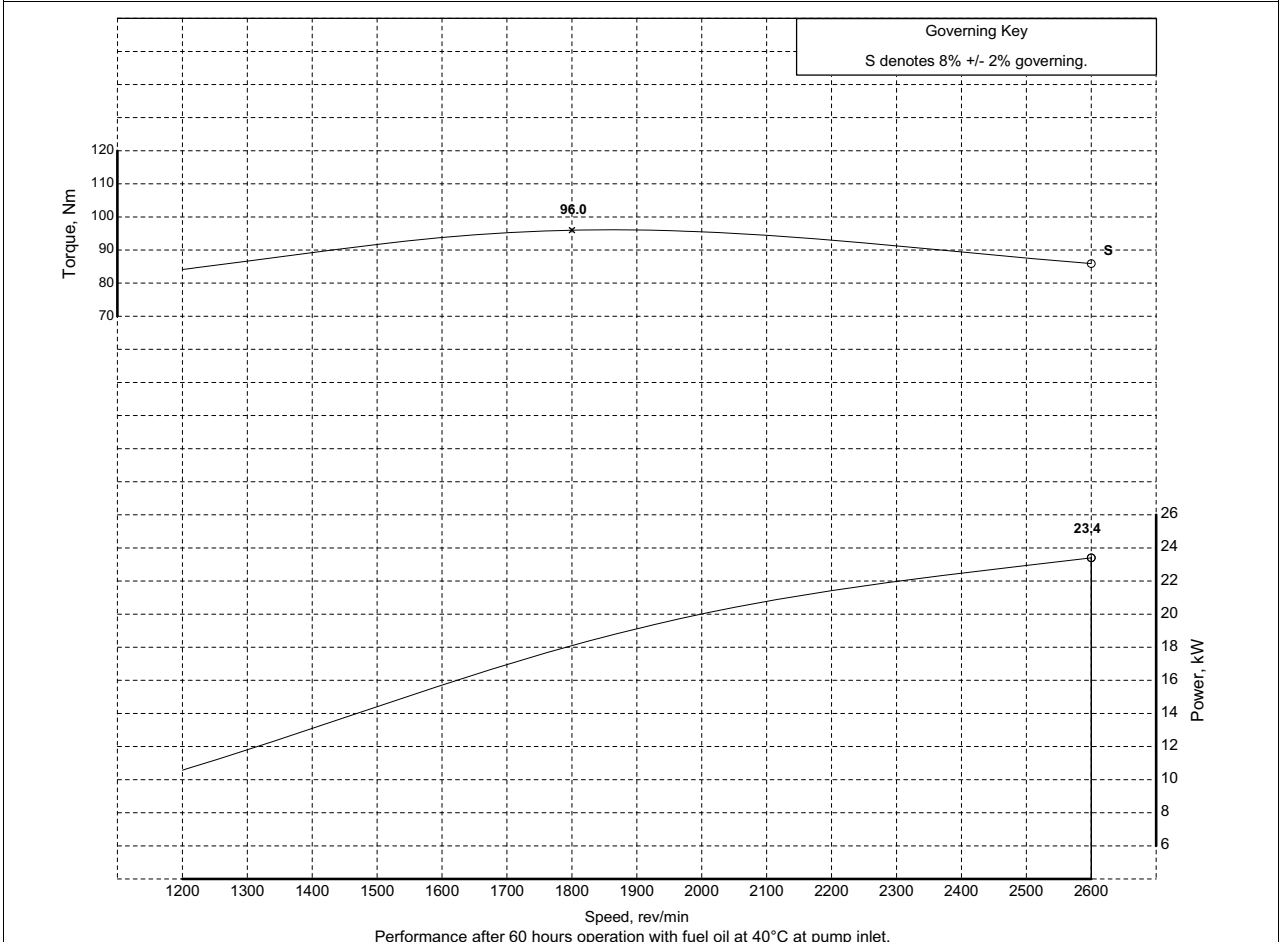
Date: 29-Mar-2011

Issued by:

R.L. Hill
(Legislation Engineer)

403D-15 @ 2600 rpm T3094 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-15	Curve: T 3094 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120 Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	Certification Refs (Rated Speeds)
Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 28-Mar-2011		Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011		Issued by: R.L. Hill (Legislation Engineer)	
---	---	--	---	--	---

403D-15 @ 2800 rpm T3096 - ISO TR14396



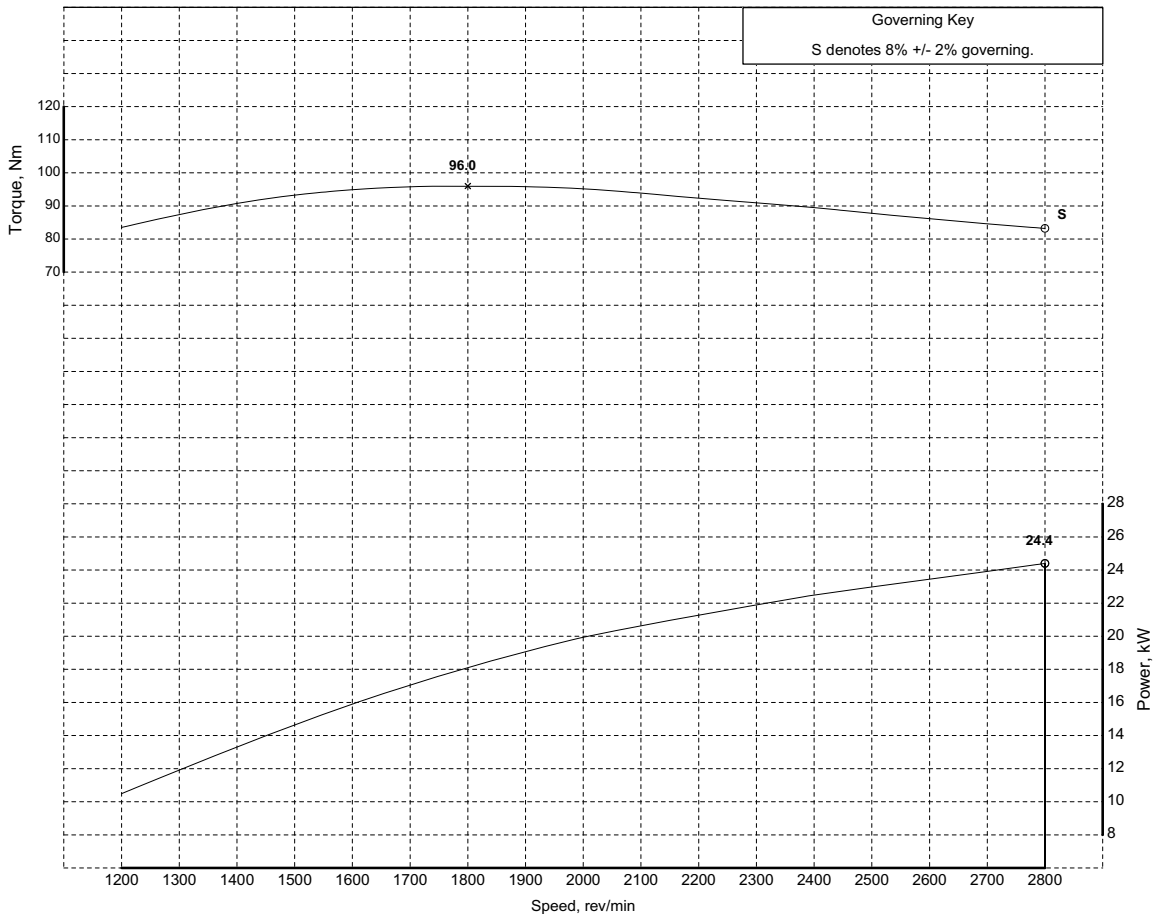
Engine Model:
403D-15

Curve: T 3096 Sheet 1
Issue: 2 Date: 21-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
EU NRMM 97/68/EC Stage 3A.

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash
Date: 21-Apr-2011

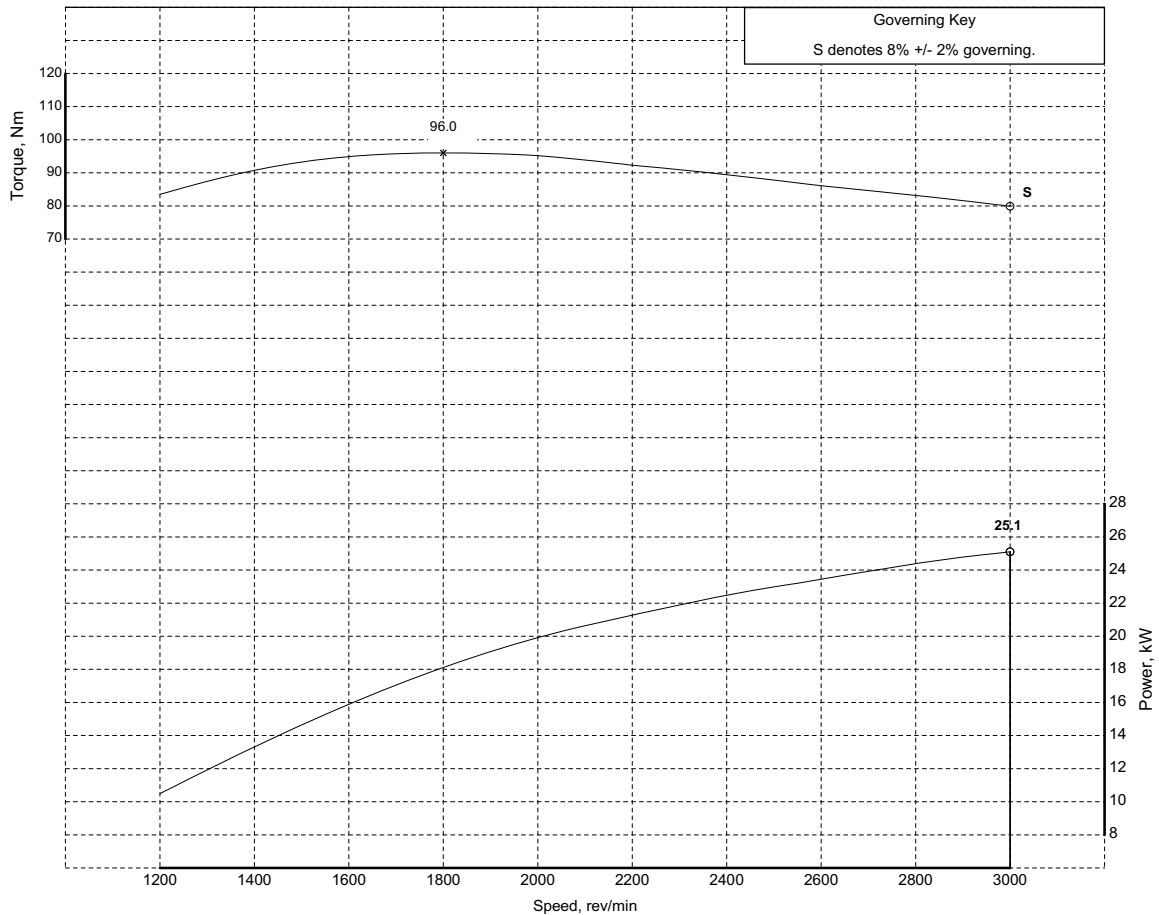
Accepted by:
J. Reed
(Engineering Manager)
Date: 21-Apr-2011

Issued by:
R.L. Hill
(Legislation Engineer)

403D-15 @ 3000 rpm T3098 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-15	Curve: T 3098 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Density (kg/l @ 15°C): EPA Part 1065.703 ULSD Viscosity (mm²/s @ 40°C): 0.840 - 0.865 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	Europe Off Highway EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
---	--	---



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120 Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	Certification Refs (Rated Speeds)
	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 28-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

403D-15T @ 2200 rpm T3100 - ISO TR14396



Engine Model:
403D-15T

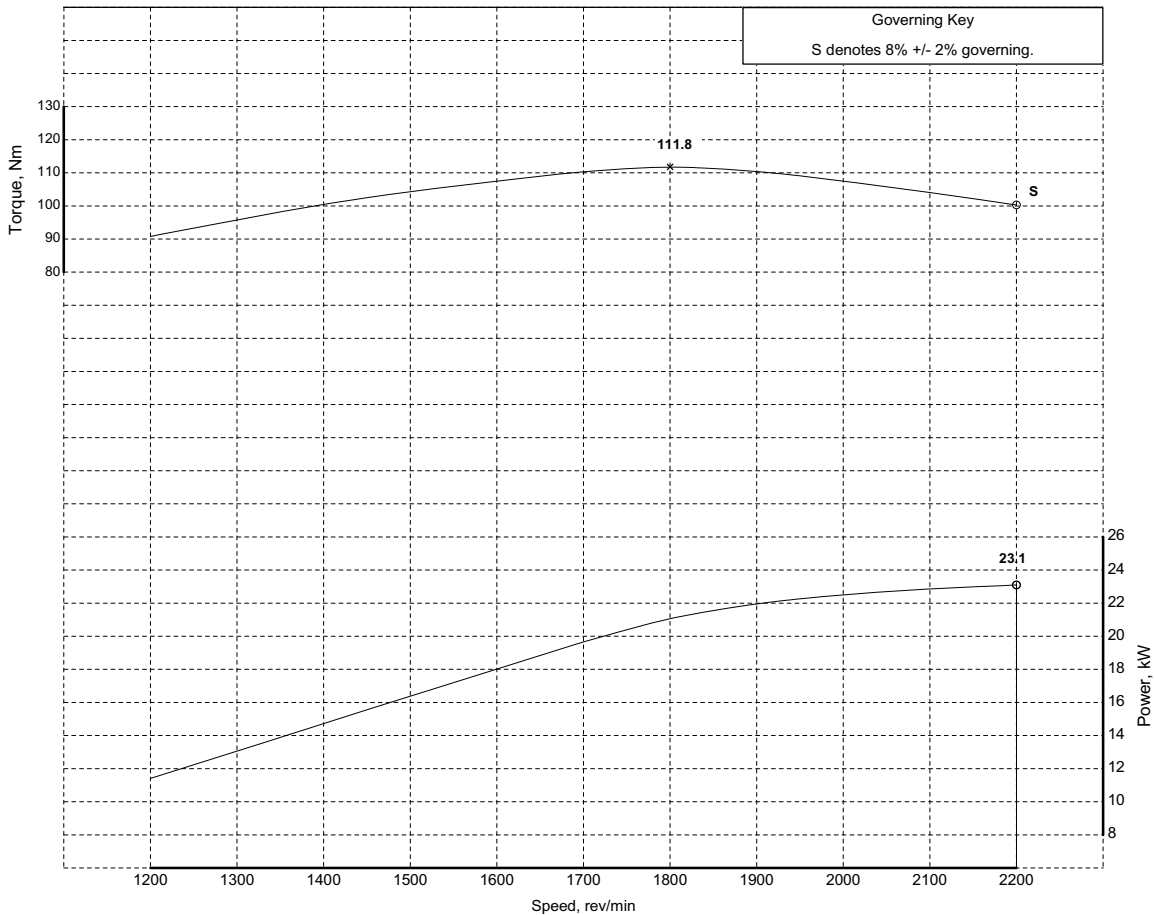
Curve: T 3100 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards: ISO/TR 14396
Production Tolerance On Power Output: +5%, -5%
Total Barometric Pressure (kPa): 100
Vapour Pressure (kPa): 1
Air Inlet Temperature (°C): 25

Fuel Types: USA FED Off Highway Europe Off Highway
Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4
Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837
Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3
Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max
Cetane No: 40 - 50 54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:

US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68KA*2004/26*0854* (2200)

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:

Alternator - off load.
Fan - 0mm diameter, 0 blades, Perkins
p/n: Fan Not Fitted.

Approved by:
G. Nash

Date: 28-Mar-2011

Accepted by:


J. Reed
(Engineering Manager)

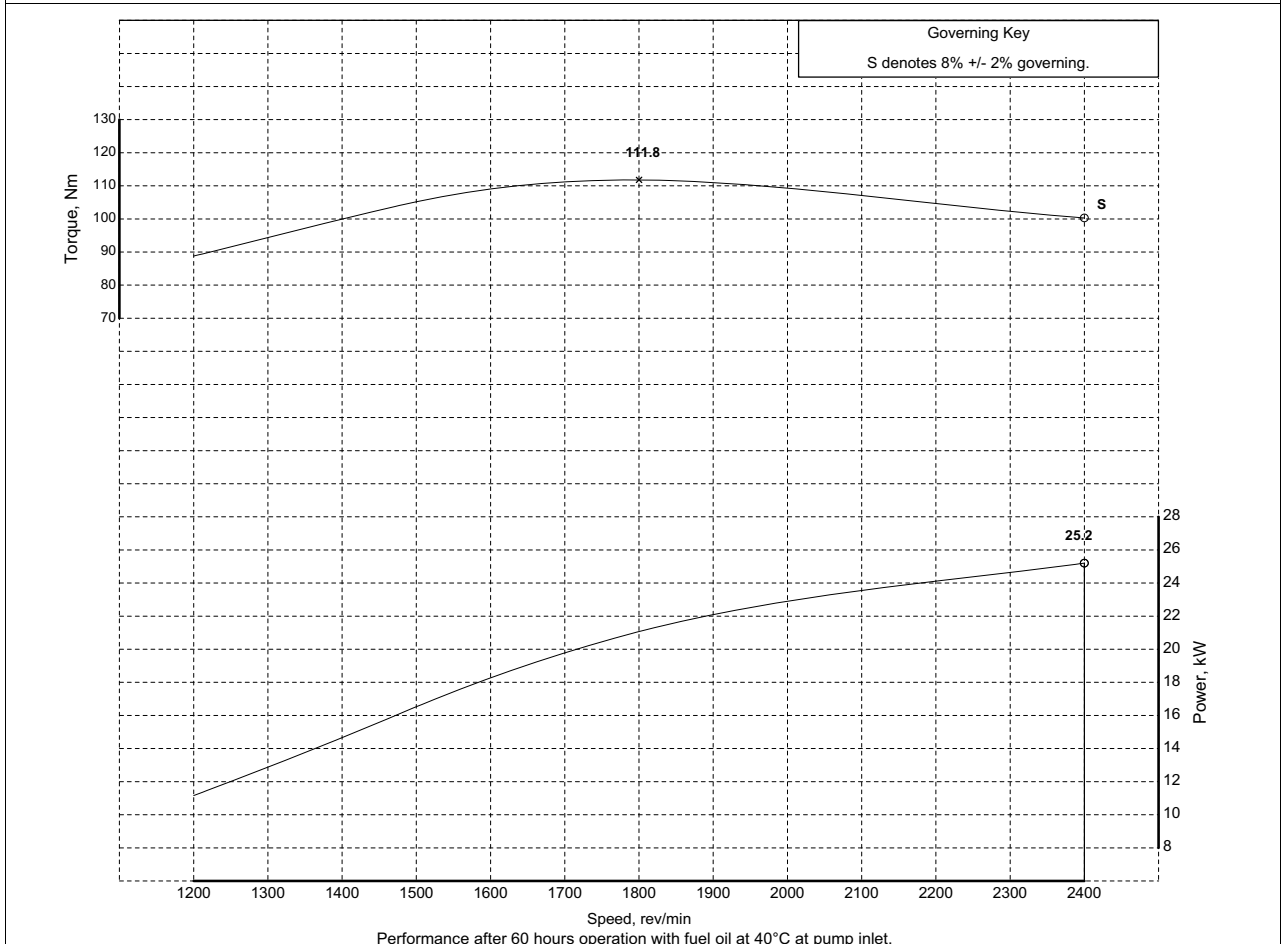
Date: 29-Mar-2011

Issued by:

R.L. Hill
(Legislation Engineer)

403D-15T @ 2400 rpm T3102 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-15T	Curve: T 3102 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0854* (2400)
	Power Standard	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.		

Approved by: G. Nash  Date: 29-Mar-2011	Accepted by: J. Reed (Engineering Manager)  Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer) 
--	---	---

403D-15T @ 2600 rpm T3104 - ISO TR14396



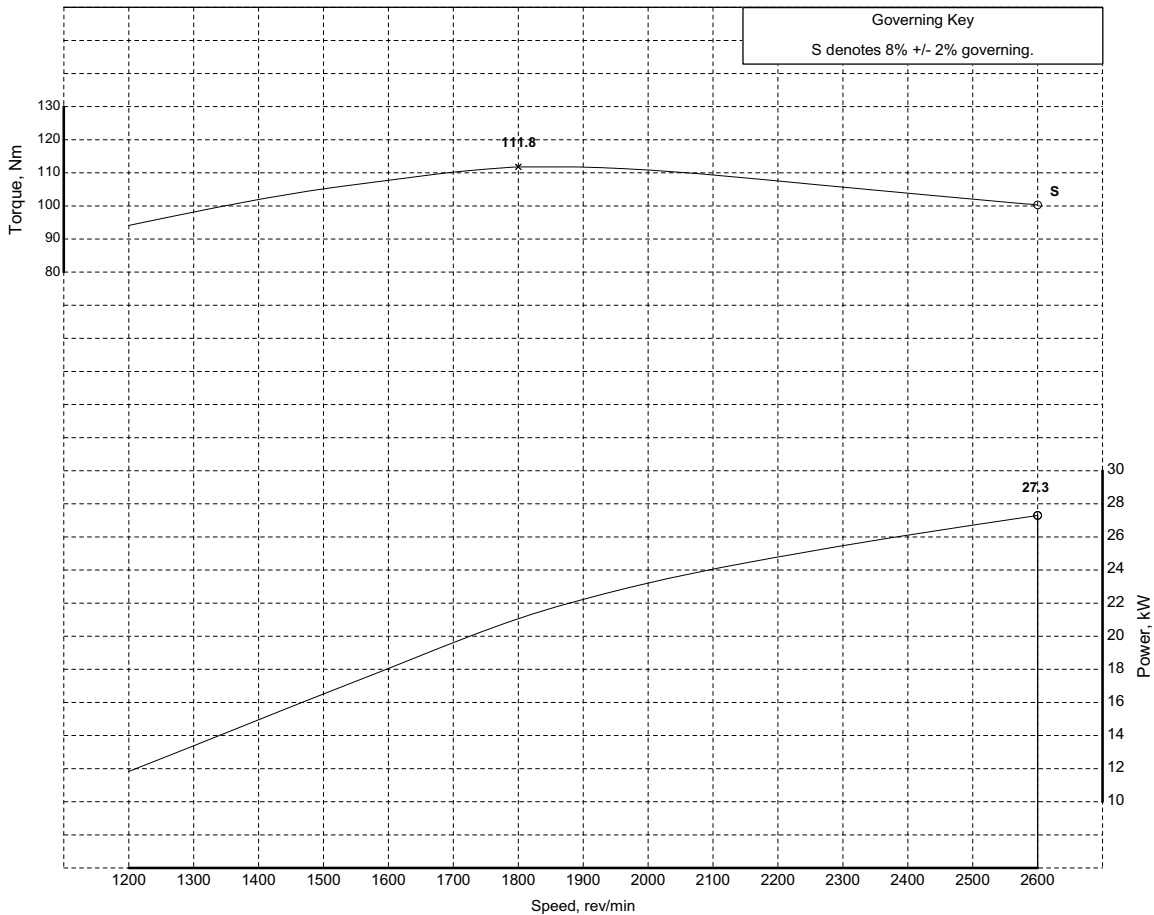
Engine Model:
403D-15T

Curve: T 3104 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Exhaust Quality Standard
Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68KA*2004/26*0854* (2600)

Power Standard


Certification Refs (Rated Speeds)

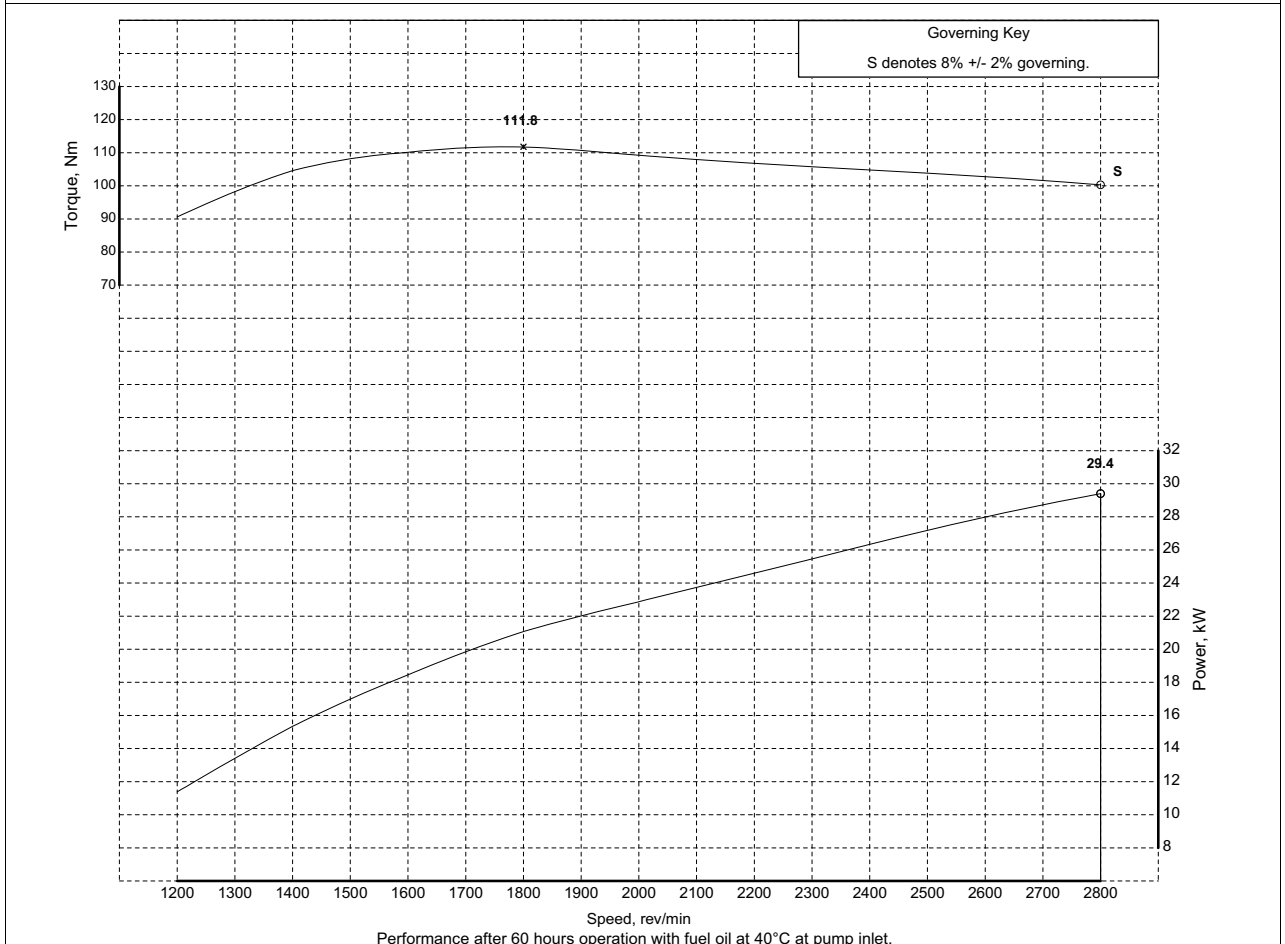
Approved by:
G. Nash
G. Nash
Date: 28-Mar-2011

Accepted by:
J. Reed
(Engineering Manager)
J. Reed
Date: 29-Mar-2011

Issued by:
R.L. Hill
(Legislation Engineer)
R.L. Hill

403D-15T @ 2800 rpm T3106 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 403D-15T	Curve: T 3106 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0854* (2800)
	Power Standard	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.		

Approved by: G. Nash  Date: 28-Mar-2011	Accepted by: J. Reed (Engineering Manager)  Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer) 
--	---	---

403D-15T @ 3000 rpm T3108 - ISO TR14396



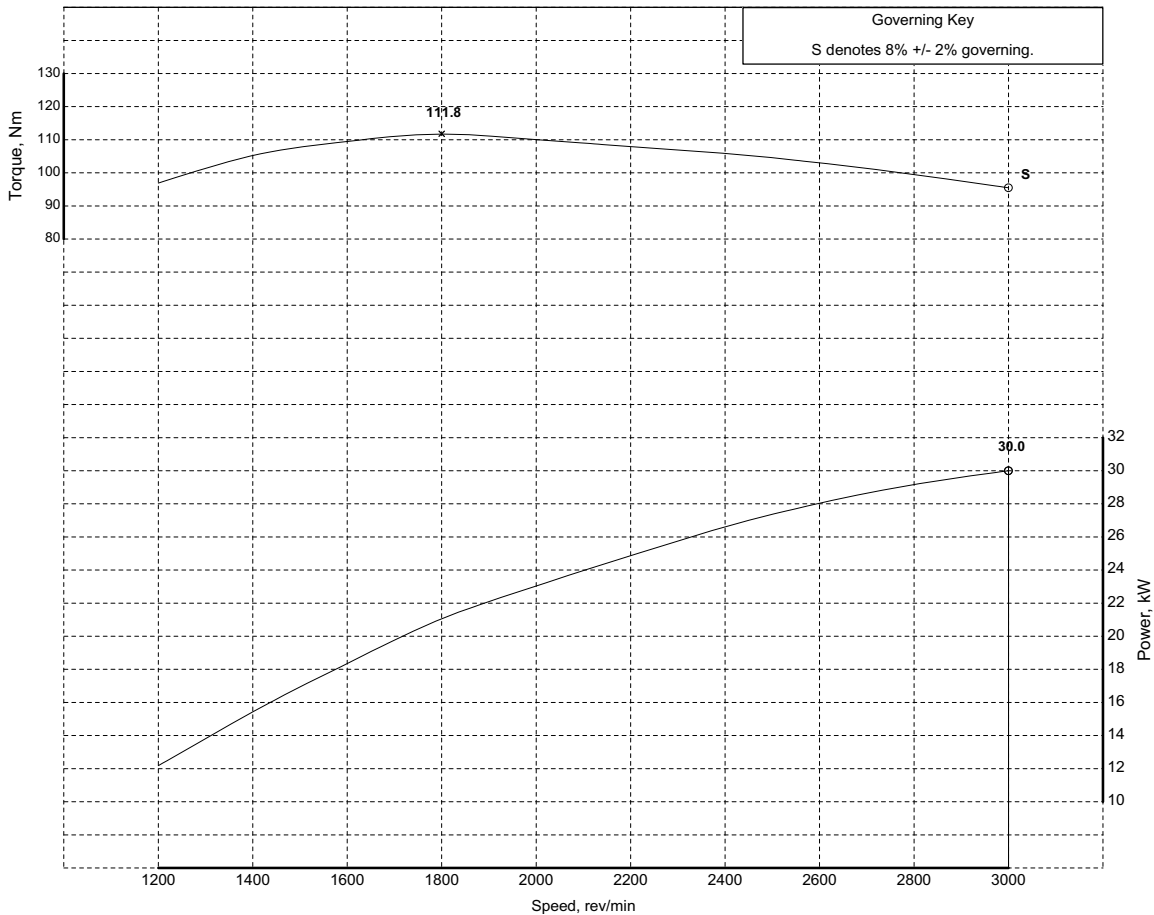
Engine Model:
403D-15T

Curve: T 3108 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA 2D 89.330 ULS 2007	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Exhaust Quality Standard
Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68KA*2004/26*0854* (3000)

Power Standard

Certification Refs (Rated Speeds)

Approved by:
G. Nash
G. Nash
Date: 17-Mar-2011


Accepted by:
J. Reed
(Engineering Manager)
J. Reed
Date: 28-Mar-2011

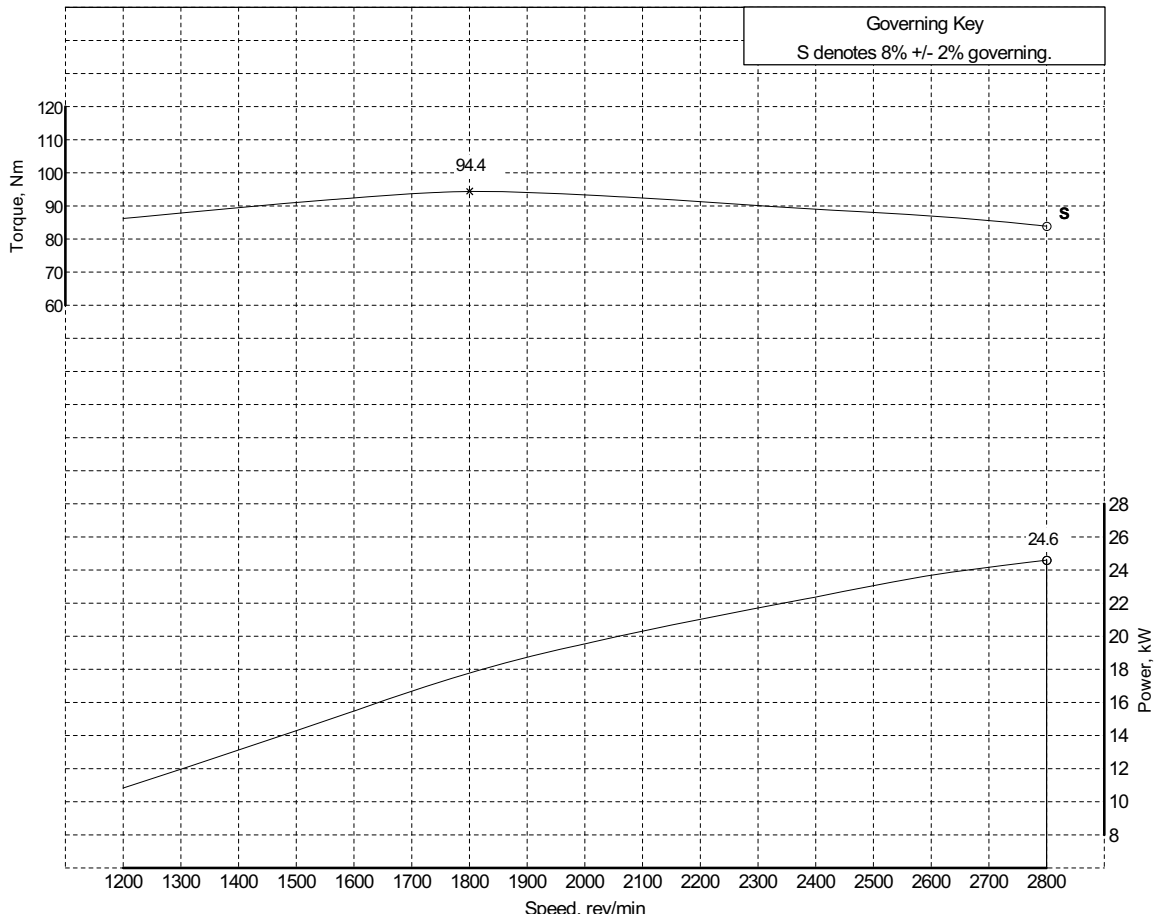
Issued by:
R.L. Hill
(Legislation Engineer)
R.L. Hill

Power curves are being updated contact
applications for further details

Power curves are being updated contact
applications for further details

404D-15 @ 2800 rpm T3086 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-15	Curve: T 3086 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A.

Certification Refs (Rated Speeds)

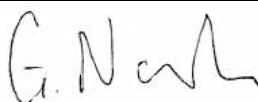
e11*97/68KA*2004/26*0139* (2800)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash



Date: 28-Mar-2011

Accepted by:

J. Reed
(Engineering Manager)




Date: 29-Mar-2011

Issued by:

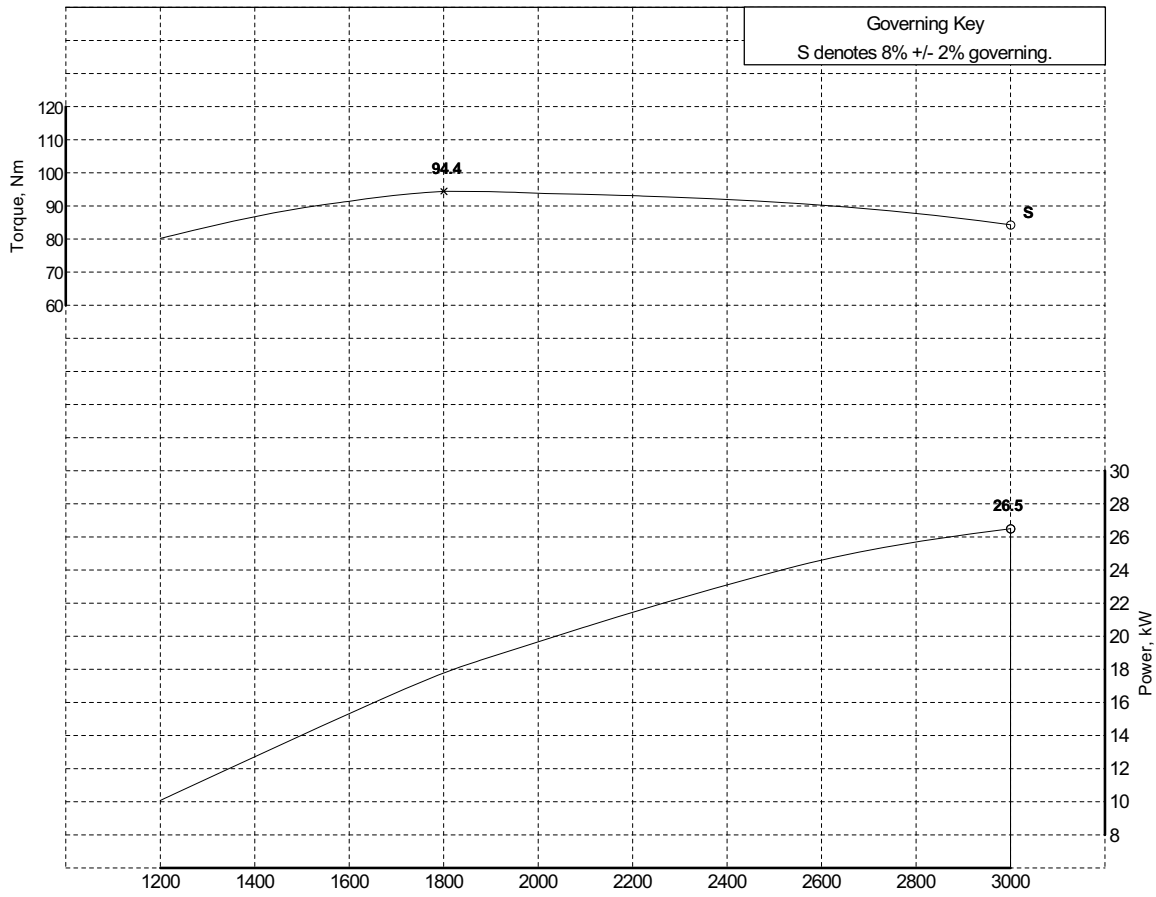
R.L. Hill
(Legislation Engineer)



404D-15 @ 3000 rpm T3088 - ISO TR14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-15	Curve: T 3088 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: USA FED Off Highway EPA Part 1065.703 ULSD Density (kg/l @ 15°C): 0.840 - 0.865 Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	Europe Off Highway EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
--	--	---




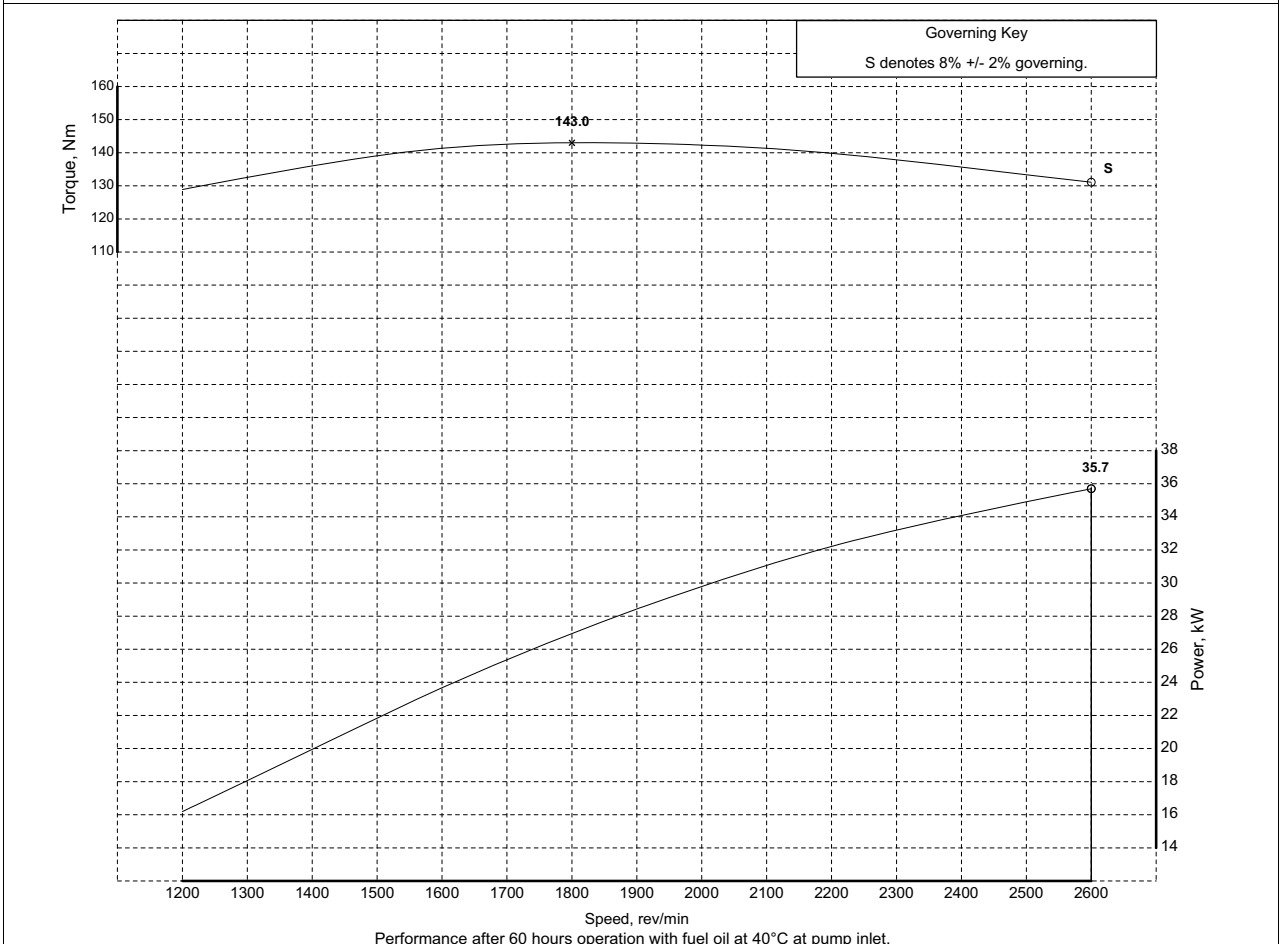
Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0139* (3000)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 28-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

404D-22 @ 2600 rpm T3132 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22	Curve: T 3132 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



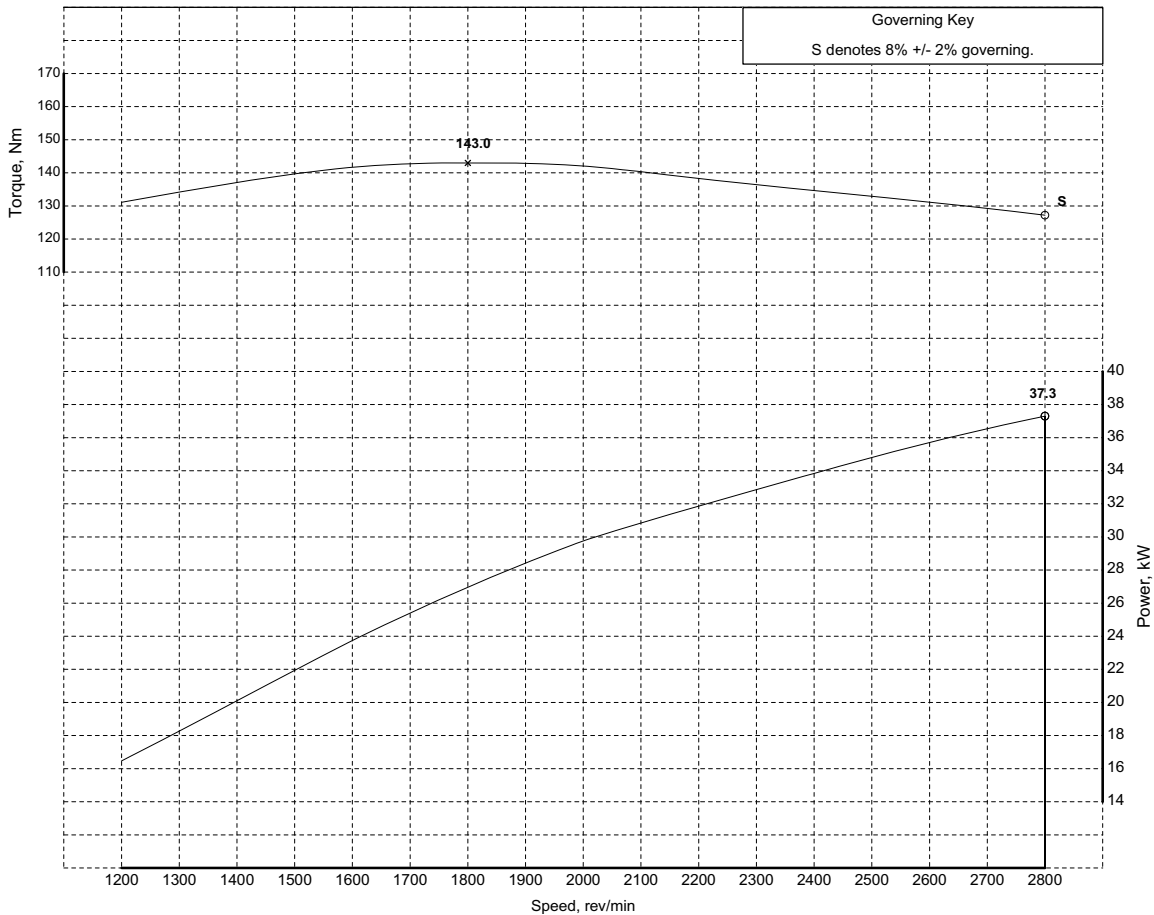
Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0135* (2600)
	Power Standard	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.		

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

404D-22 @ 2800 rpm T3134 - ISO/TR 14396

<p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22	Curve: T 3134 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865 0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2 2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015 0.001 max
		Cetane No:	40 - 50 54 max




Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

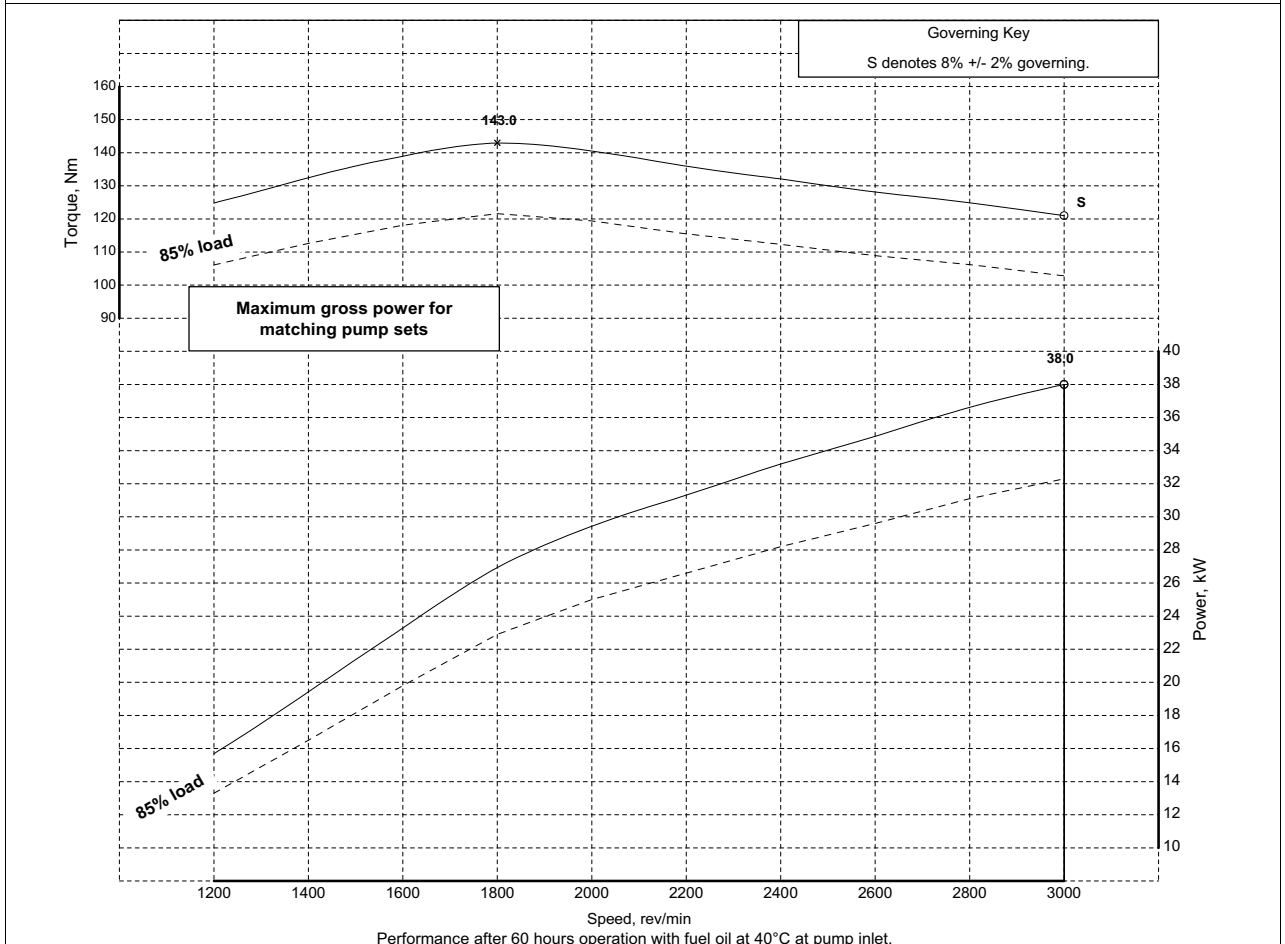
Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120 Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	Certification Refs (Rated Speeds) Certification Refs (Rated Speeds) e11*97/68JA*2004/26*0885* (2800)
	Power Standard	
	Certification Refs (Rated Speeds)	

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	--	--

404D-22 @ 3000 rpm T3136 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22	Curve: T 3136 Issue: 3 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: USA FED Off Highway Europe Off Highway Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
---	---



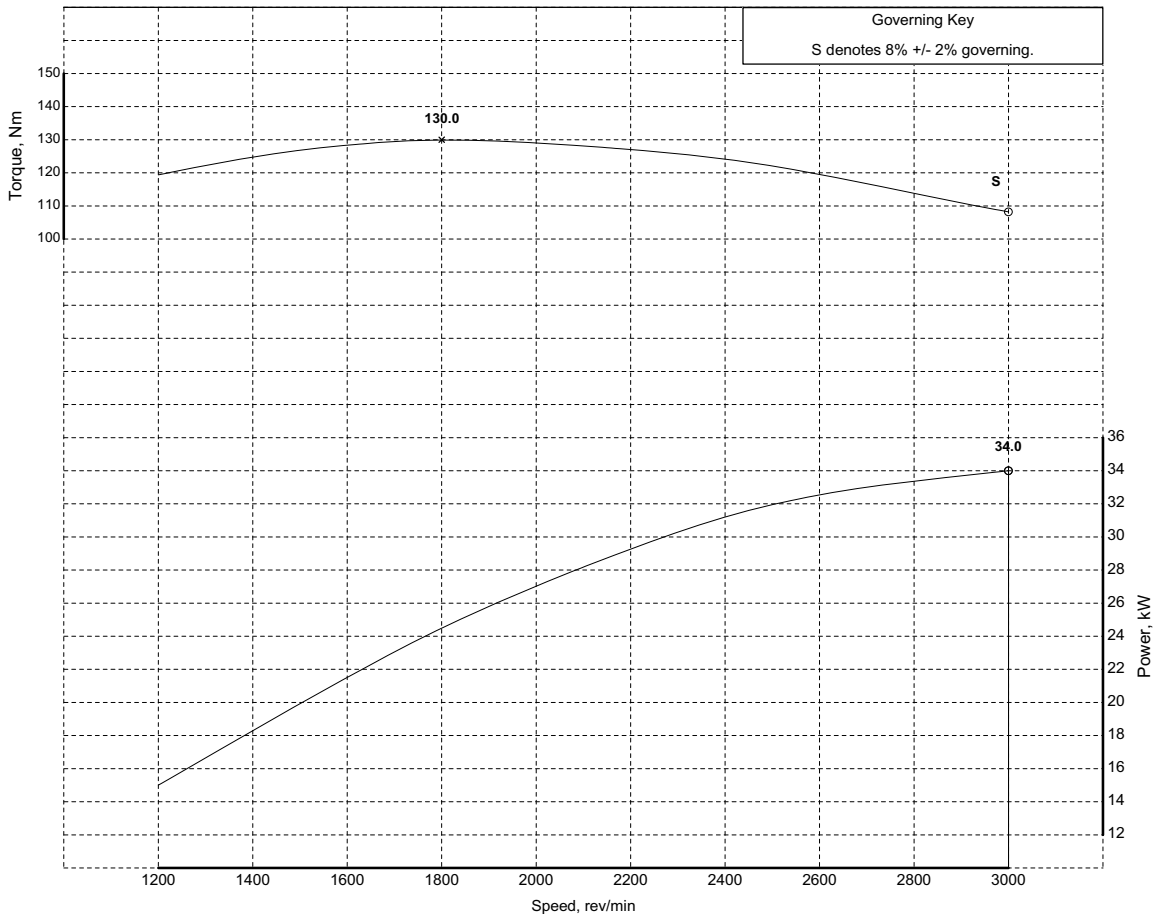
Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68JA*2004/26*0885* (3000)
	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 29-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

404D-22 derate @ 3000 rpm T3170 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22	Curve: T 3170 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Density (kg/l @ 15°C): 0.840 - 0.865 Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	Europe Off Highway EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
--	--	---




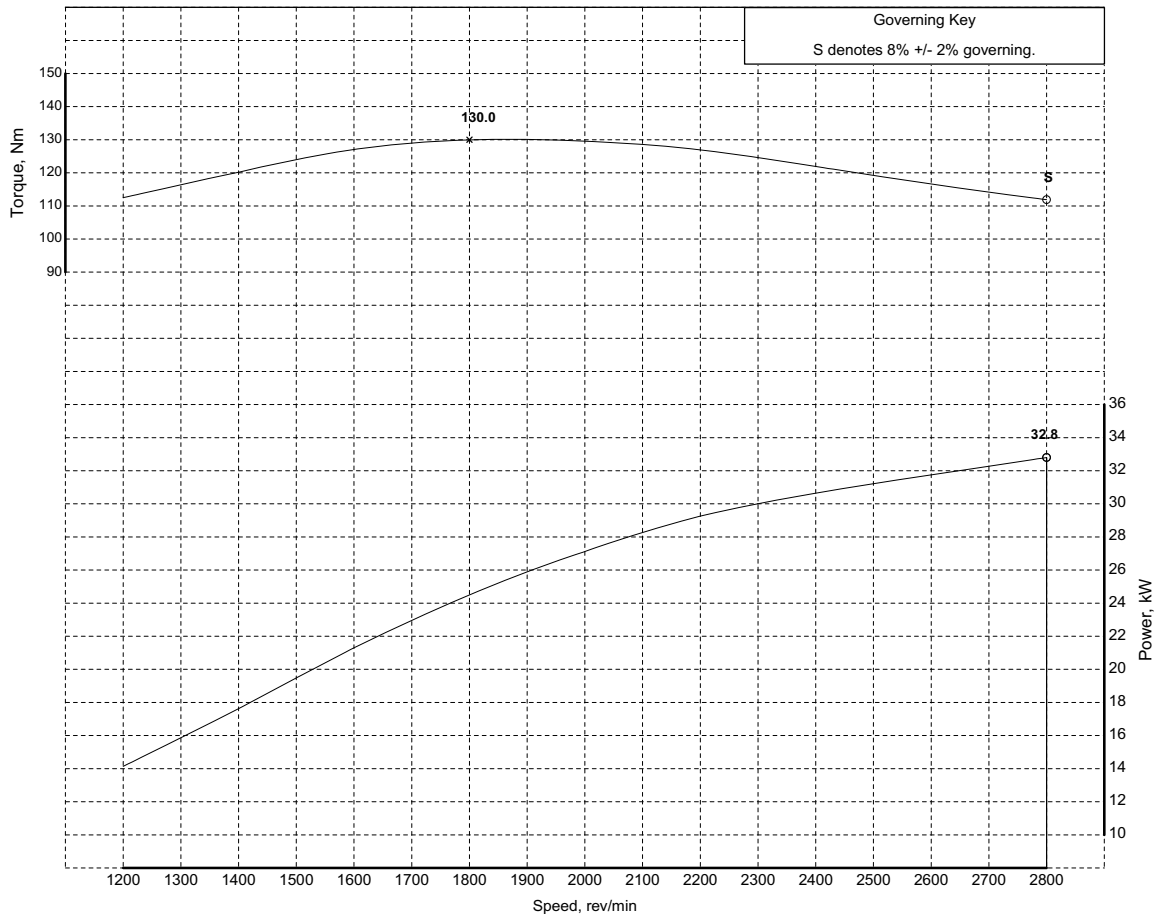
Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0135* (3000)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash  Date: 29-Mar-2011	Accepted by: J. Reed (Engineering Manager)  Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer) 
--	---	---

404D-22 derate @ 2800 rpm T3172 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22	Curve: T 3172 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A.

Certification Refs (Rated Speeds)

e11*97/68KA*2004/26*0135* (2800)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash



Date: 29-Mar-2011

Accepted by:

J. Reed
(Engineering Manager)



Date: 29-Mar-2011


Issued by:

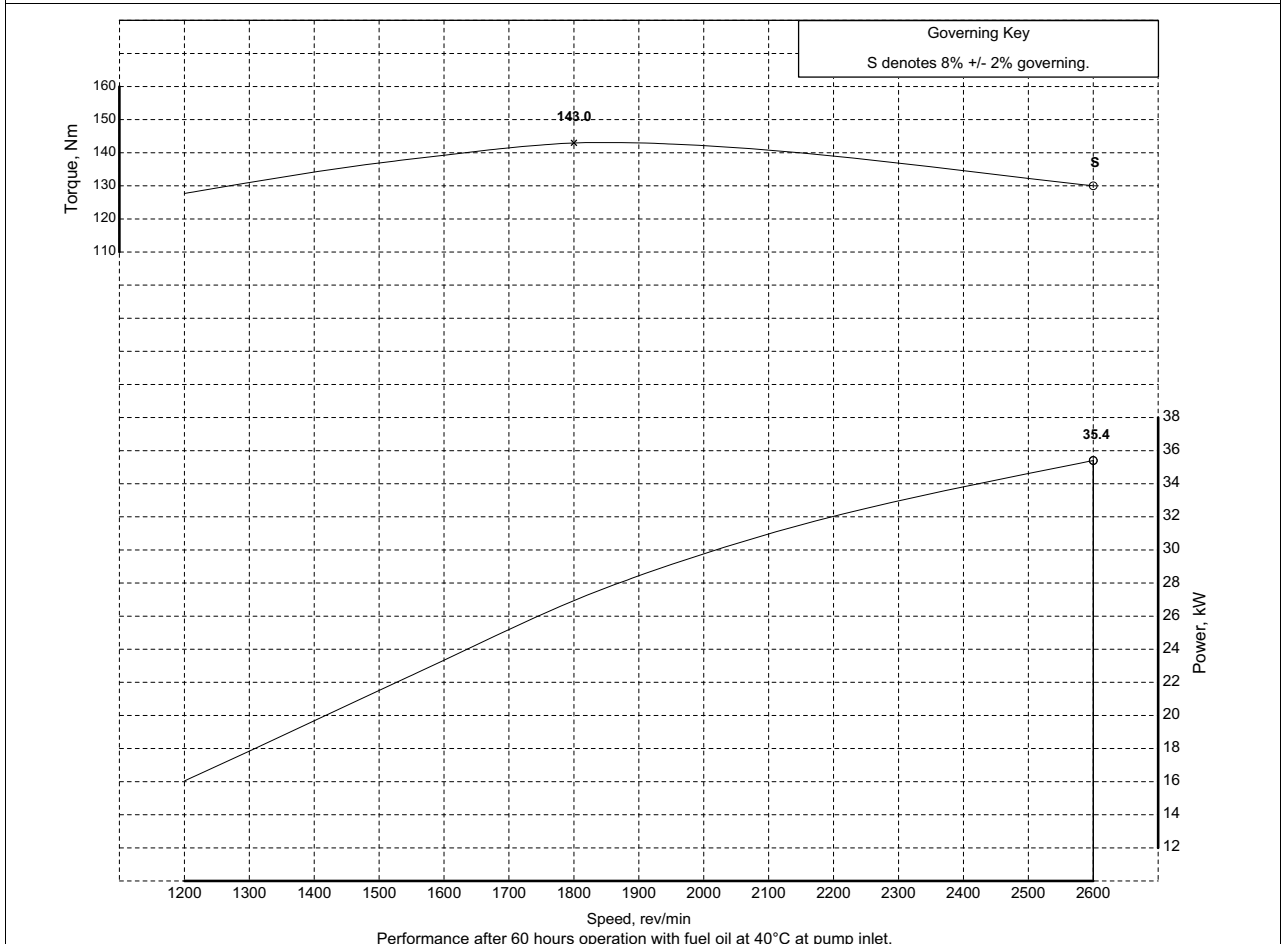
R.L. Hill
(Legislation Engineer)



Not available at time of going to print

404D-22 balanced @ 2600 rpm T3179 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22	Curve: T 3179 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		
Rating Standards: ISO/TR 14396	Fuel Types: USA FED Off Highway Europe Off Highway		
Production Tolerance On Power Output: +5%, -5%	Fuel Specification: EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4		
Total Barometric Pressure (kPa): 100	Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837		
Vapour Pressure (kPa): 1	Viscosity (mm ² /s @ 40°C): 2.0 - 3.2 2.3 - 3.3		
Air Inlet Temperature (°C): 25	Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max		
	Cetane No: 40 - 50 54 max		



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68KA*2004/26*0135* (2600)
	Power Standard	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted. Balancer - not fitted.		

Approved by: G. Nash Date: 29-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 29-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

404D-22T @ 3000 rpm T2980 - ISO/TR 14396

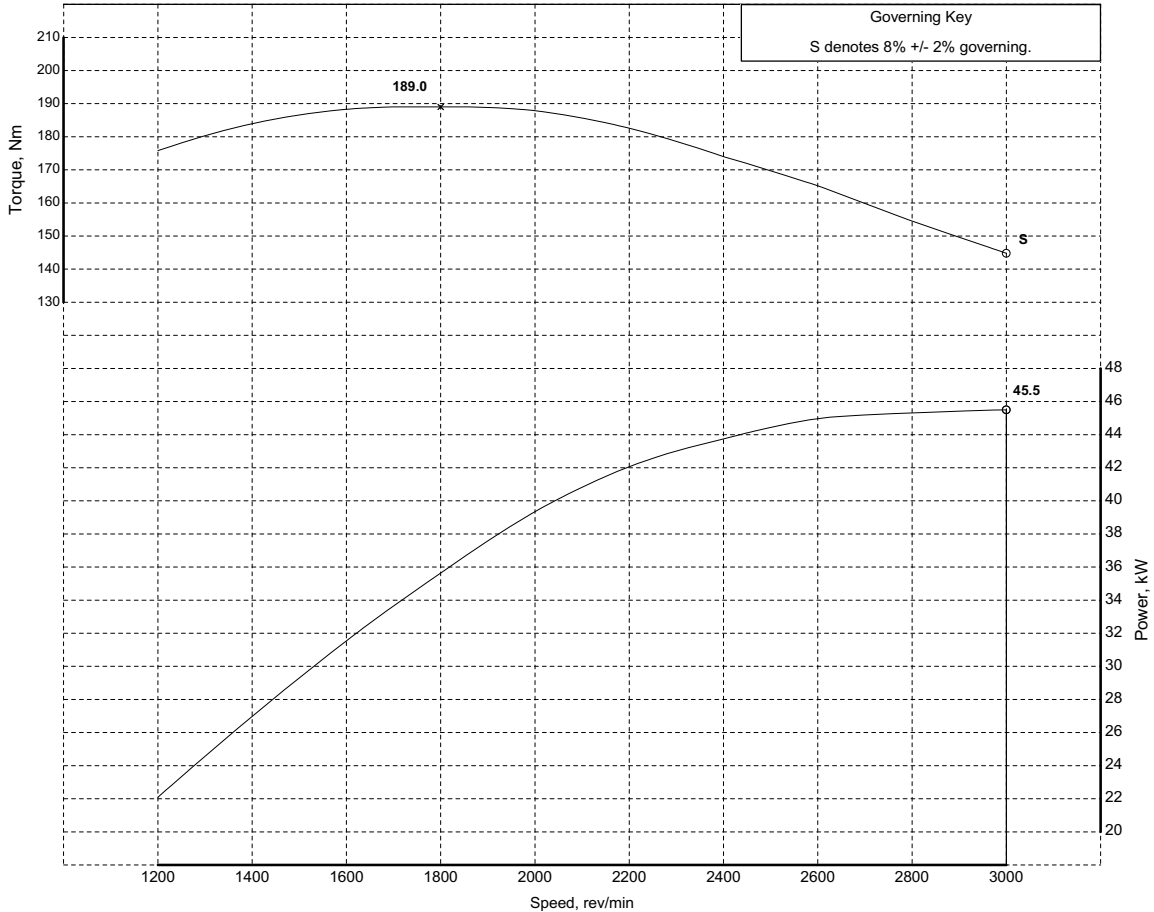


Engine Model:
404D-22T

Curve: T 2980 Sheet 1
Issue: 3 Date: 21-Apr-2011

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:

US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68JA*2004/26*0886* (3000)

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:
Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash

Date: 20-Apr-2011

Accepted by:


J. Reed
(Engineering Manager)

Date: 20-Apr-2011

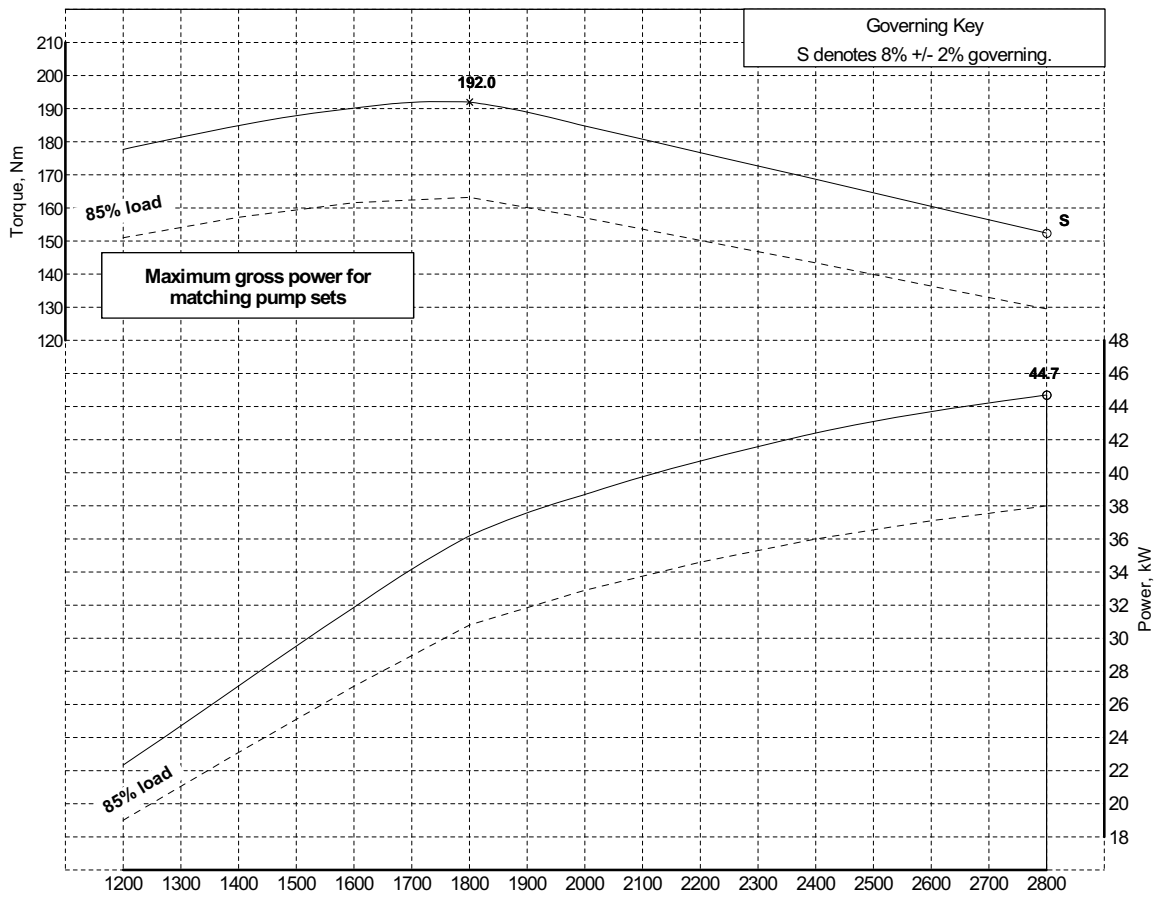
Issued by:

R.L. Hill
(Legislation Engineer)

404D-22T @ 2800 rpm T3140 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22T	Curve: T 3140 Issue: 3 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Europe Off Highway EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
---	--



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68JA*2004/26*0886* (2800)
	Power Standard	Certification Refs (Rated Speeds)

Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

404D-22T balanced @ 2600 rpm T3183 - ISO/TR 14396



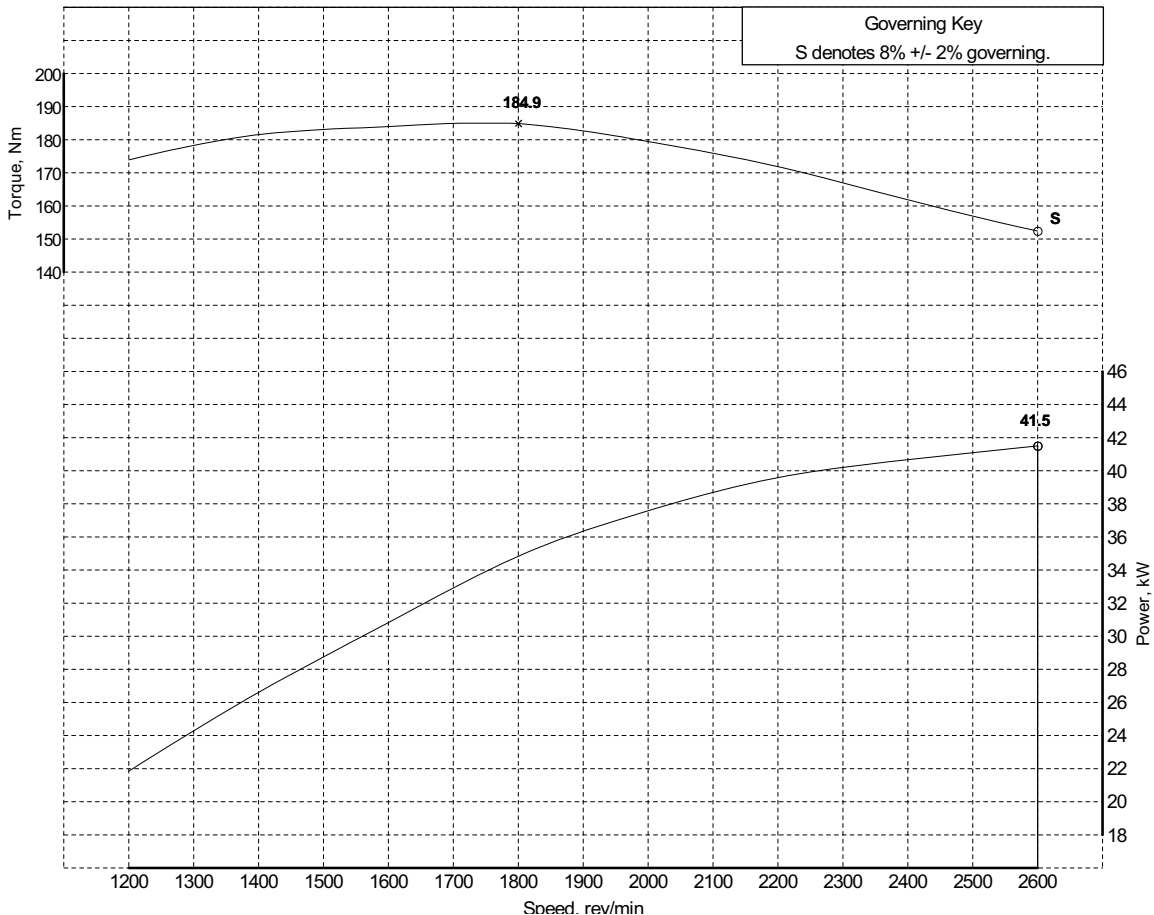
Engine Model:
404D-22T

Curve: T 3183 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Auxiliaries fitted to engine:
Alternator - off load.
Balancer - fitted.
Fan - not fitted.

Exhaust Quality Standard
Smoke:
77/537/EEC Includes FAS & R120

Emissions:
US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68JA*2004/26*0886* (2600)

Power Standard

Certification Refs (Rated Speeds)

Approved by:
G. Nash
G. Nash
Date: 29-Mar-2011

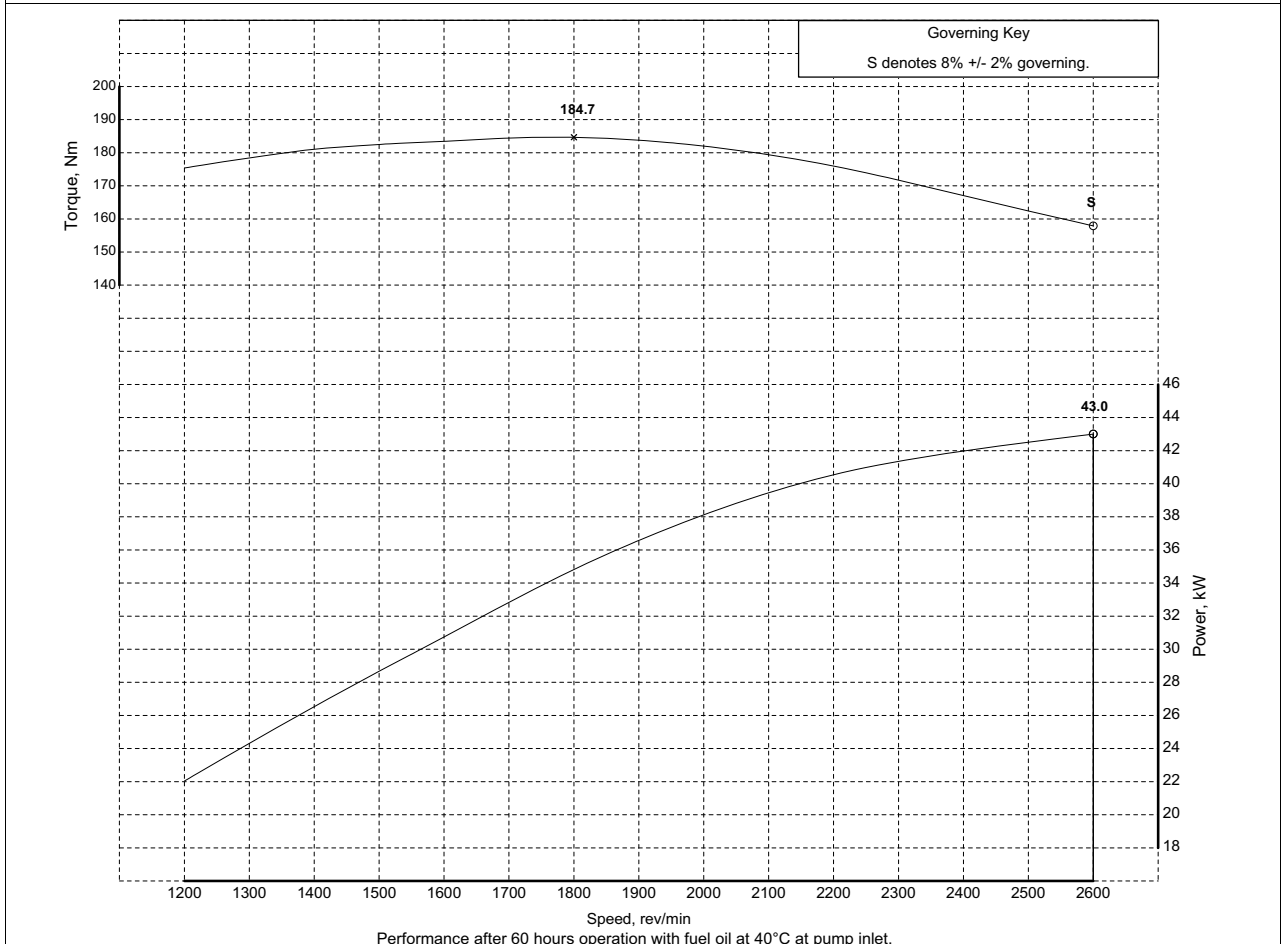
Accepted by:
J. Reed
(Engineering Manager)
J. Reed
Date: 29-Mar-2011

Issued by:
R.L. Hill
(Legislation Engineer)
R.L. Hill

404D-22T @ 2600 rpm T3184 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22T	Curve: T 3184 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	ISO/TR 14396	Fuel Types: Fuel Specification: USA FED Off Highway Density (kg/l @ 15°C): 0.840 - 0.865 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 Sulphur Content (% mass): 0.0007 - 0.0015 Cetane No: 40 - 50	Europe Off Highway EU 2004/26/EC Stage 3B/4 0.833 - 0.837 2.3 - 3.3 0.001 max 54 max
--	--------------	---	---



Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120	Certification Refs (Rated Speeds)
	Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	e11*97/68JA*2004/26*0886* (2600)
	Power Standard	Certification Refs (Rated Speeds)
Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.		

Approved by: G. Nash Date: 29-Mar-2011		Accepted by: J. Reed (Engineering Manager) Date: 30-Mar-2011		Issued by: R.L. Hill (Legislation Engineer)	
---	---	--	---	--	---

404D-22T @ 2600 rpm T3186 - ISO/TR 14396



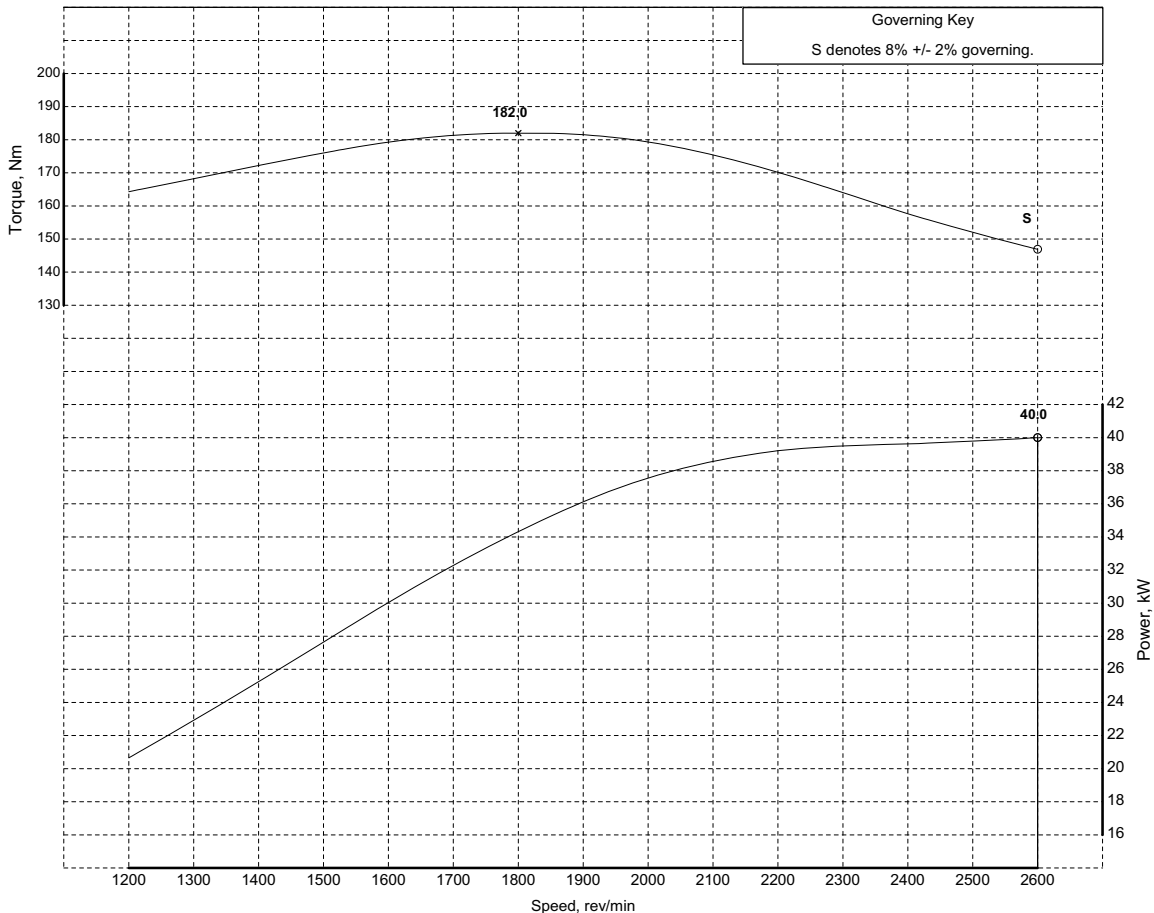
Engine Model:
404D-22T

Curve: T 3186 Sheet 1
Issue: 2 Date: 15-Apr-2011

Perkins Engines Company Limited
©2011 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

**Development Target -
May be Subject to Change**

Rating Standards:	ISO/TR 14396	Fuel Types:	USA FED Off Highway	Europe Off Highway
Production Tolerance On Power Output:	+5%, -5%	Fuel Specification:	EPA Part 1065.703 ULSD	EU 2004/26/EC Stage 3B/4
Total Barometric Pressure (kPa):	100	Density (kg/l @ 15°C):	0.840 - 0.865	0.833 - 0.837
Vapour Pressure (kPa):	1	Viscosity (mm ² /s @ 40°C):	2.0 - 3.2	2.3 - 3.3
Air Inlet Temperature (°C):	25	Sulphur Content (% mass):	0.0007 - 0.0015	0.001 max
		Cetane No:	40 - 50	54 max



Performance after 60 hours operation with fuel oil at 40°C at pump inlet.

Notes:
1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations.

Exhaust Quality Standard

Smoke:
77/537/EEC Includes FAS & R120

Emissions:

US EPA 40 CFR Part 1039 Tier 4 Interim.
Certified to EU NRMM 97/68/EC Stage 3A. e11*97/68JA*2004/26*0886* (2600)

Certification Refs (Rated Speeds)

Power Standard

Certification Refs (Rated Speeds)

Auxiliaries fitted to engine:

Alternator - off load.
Fan - not fitted.

Approved by:
G. Nash

Date: 29-Mar-2011

Accepted by:


J. Reed
(Engineering Manager)

Date: 29-Mar-2011

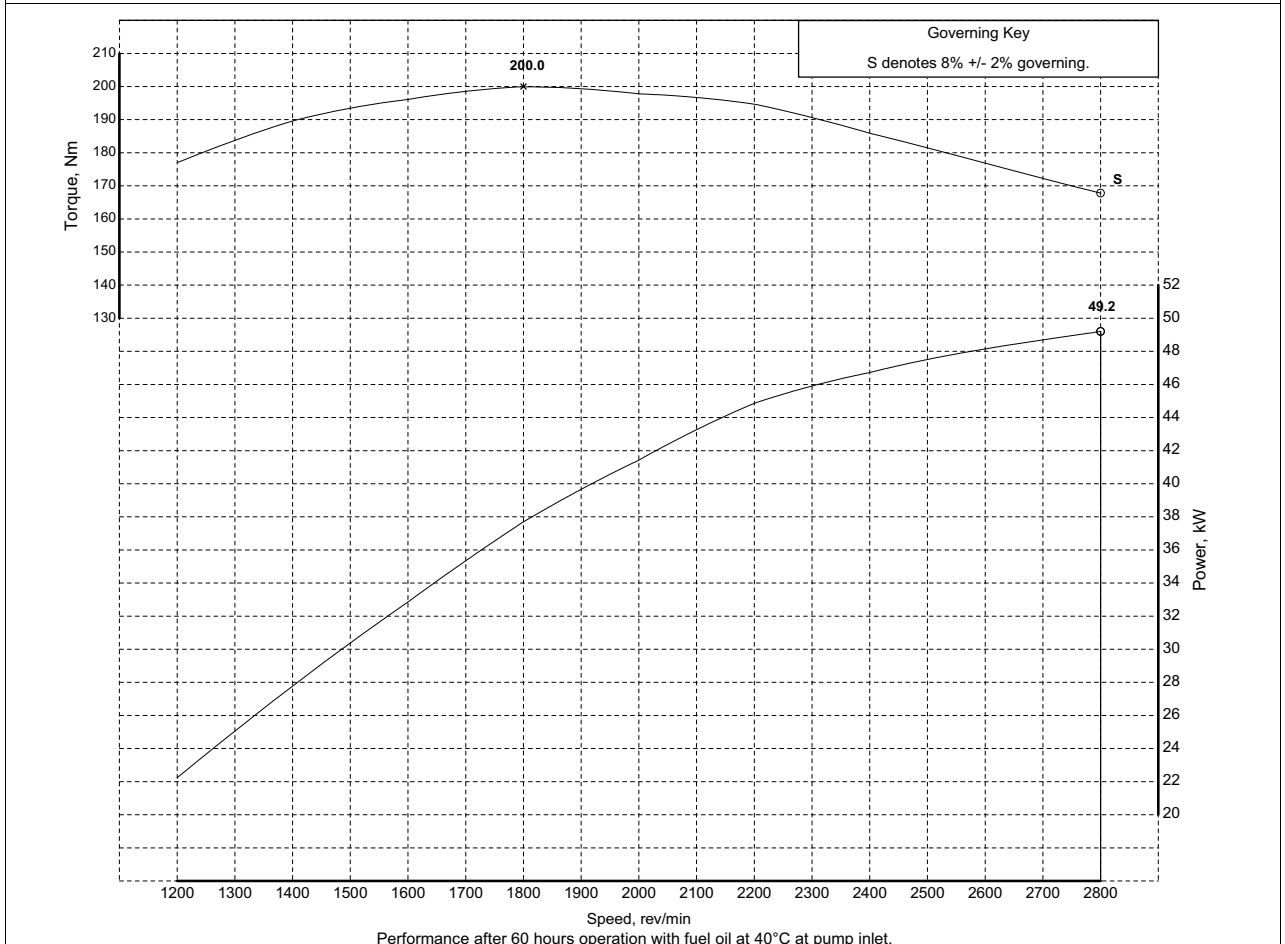
Issued by:

R.L. Hill
(Legislation Engineer)

404D-22TA @ 2800 rpm T3126 - ISO/TR 14396

 <p>Perkins Engines Company Limited ©2011 Commercial in Confidence, proprietary information of Perkins Engines Company Ltd.</p>	Engine Model: 404D-22TA	Curve: T 3126 Issue: 2 Date: 15-Apr-2011	Sheet 1
	Development Target - May be Subject to Change		

Rating Standards: ISO/TR 14396 Production Tolerance On Power Output: +5%, -5% Total Barometric Pressure (kPa): 100 Vapour Pressure (kPa): 1 Air Inlet Temperature (°C): 25	Fuel Types: Fuel Specification: USA FED Off Highway Europe Off Highway EPA Part 1065.703 ULSD EU 2004/26/EC Stage 3B/4 Density (kg/l @ 15°C): 0.840 - 0.865 0.833 - 0.837 Viscosity (mm²/s @ 40°C): 2.0 - 3.2 2.3 - 3.3 Sulphur Content (% mass): 0.0007 - 0.0015 0.001 max Cetane No: 40 - 50 54 max
---	--

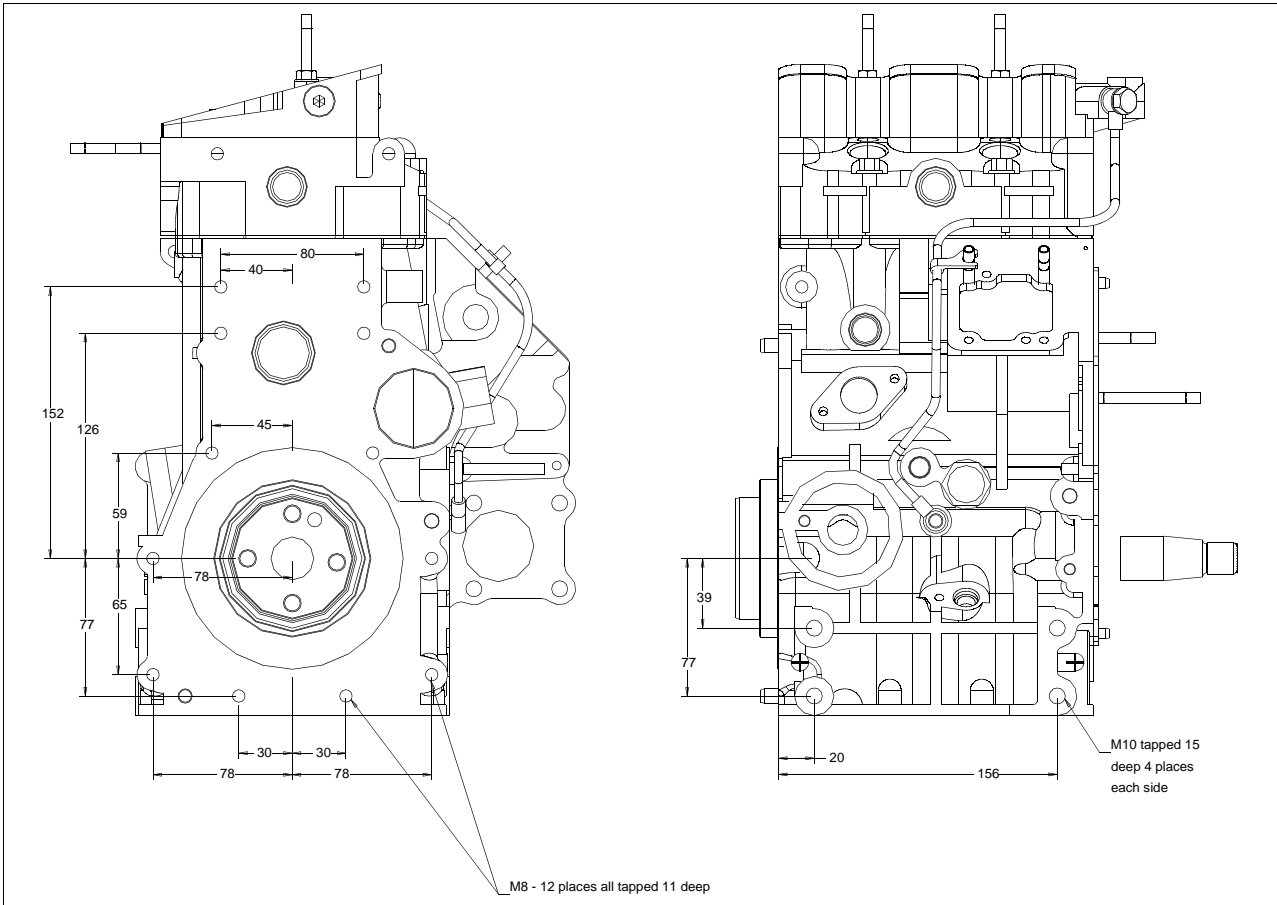


Notes: 1. For duty cycle refer to Perkins Engines (Peterborough) Limited statement on Product Duty Usage Limitations. Auxiliaries fitted to engine: Alternator - off load. Fan - not fitted.	Exhaust Quality Standard Smoke: 77/537/EEC Includes FAS & R120 Emissions: US EPA 40 CFR Part 1039 Tier 4 Interim. Certified to EU NRMM 97/68/EC Stage 3A.	Certification Refs (Rated Speeds) e11*97/68JA*2004/26*0887* (2800)
	Power Standard	Certification Refs (Rated Speeds)

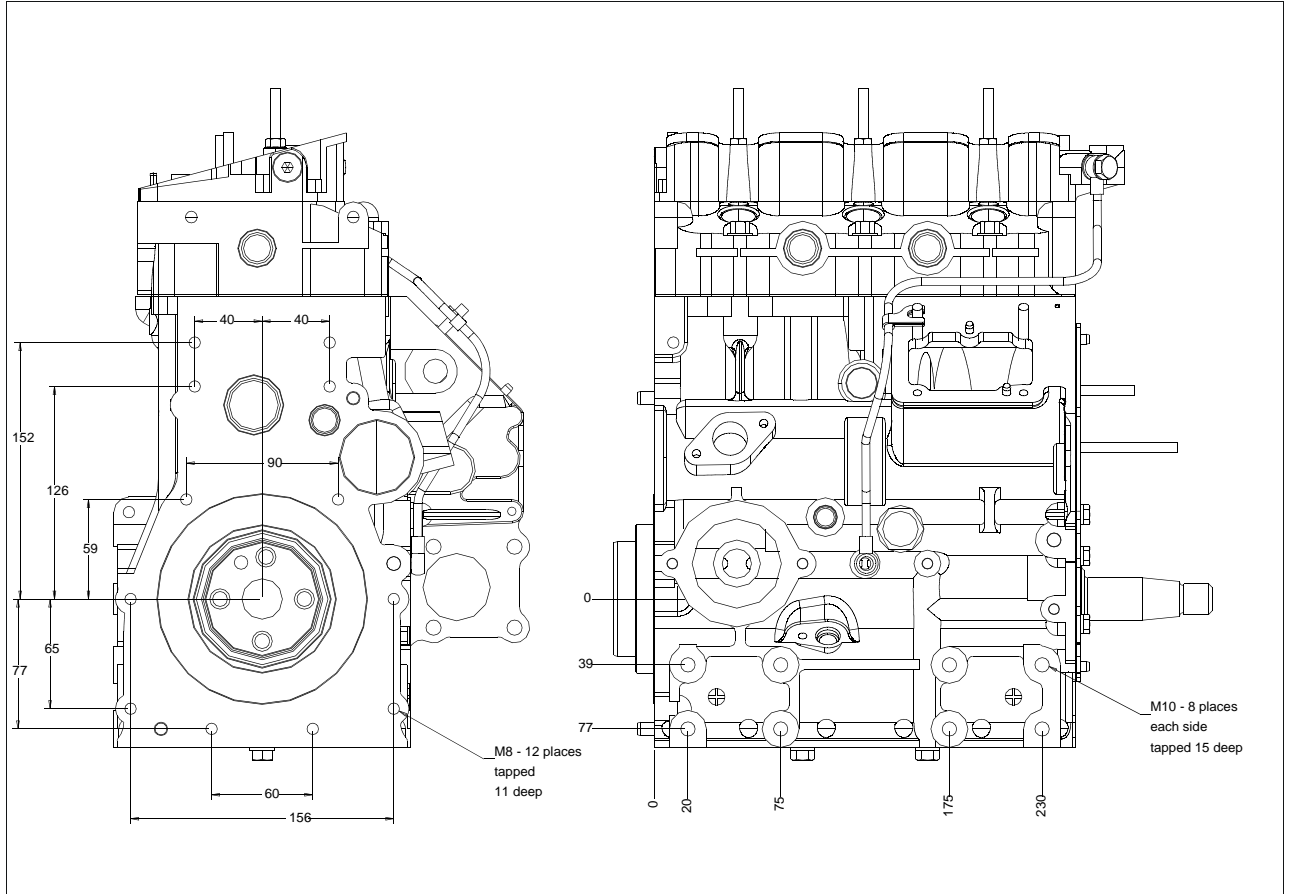
Approved by: G. Nash Date: 17-Mar-2011	Accepted by: J. Reed (Engineering Manager) Date: 28-Mar-2011	Issued by: R.L. Hill (Legislation Engineer)
---	---	---

Cylinder block views non-stressed block

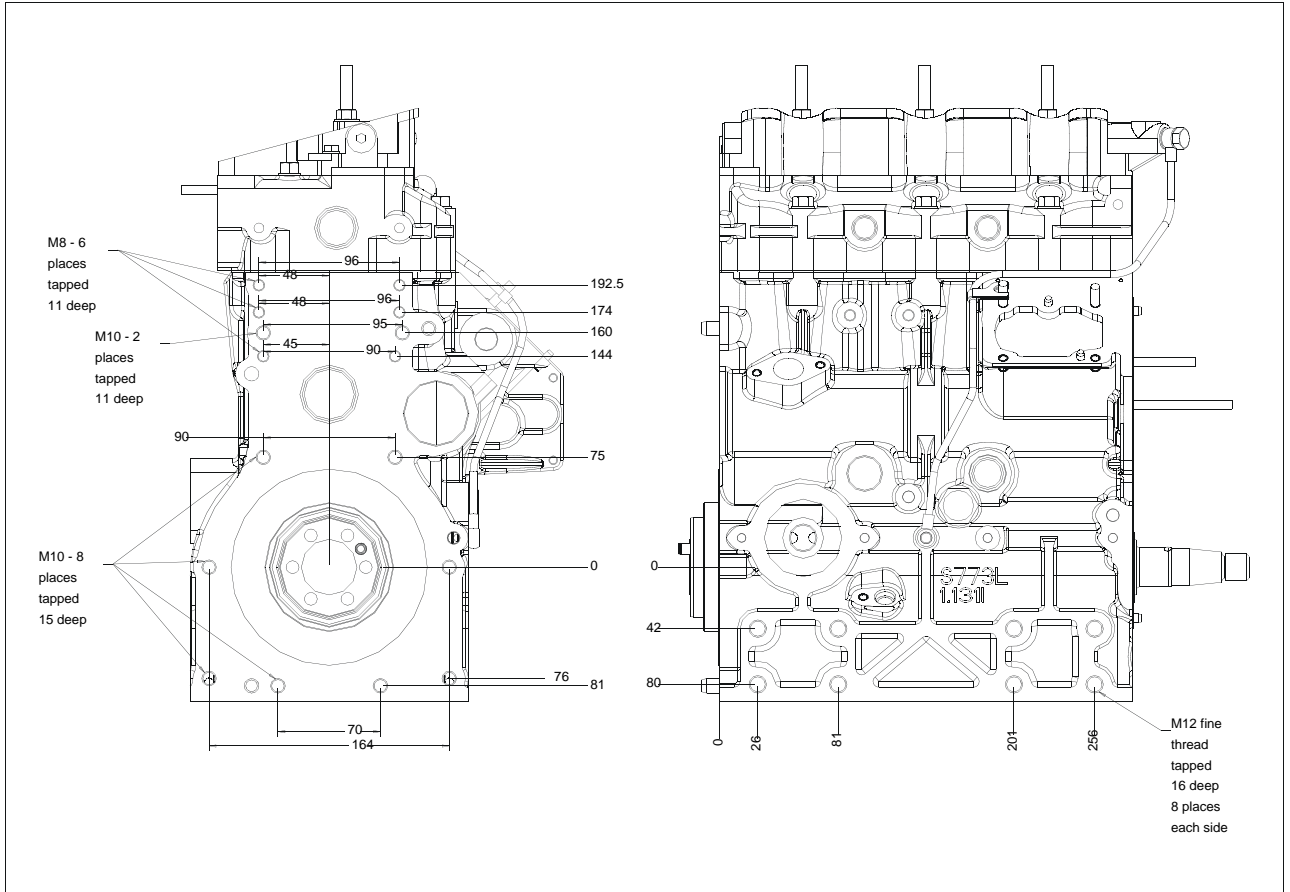
Block and head - 402D-05



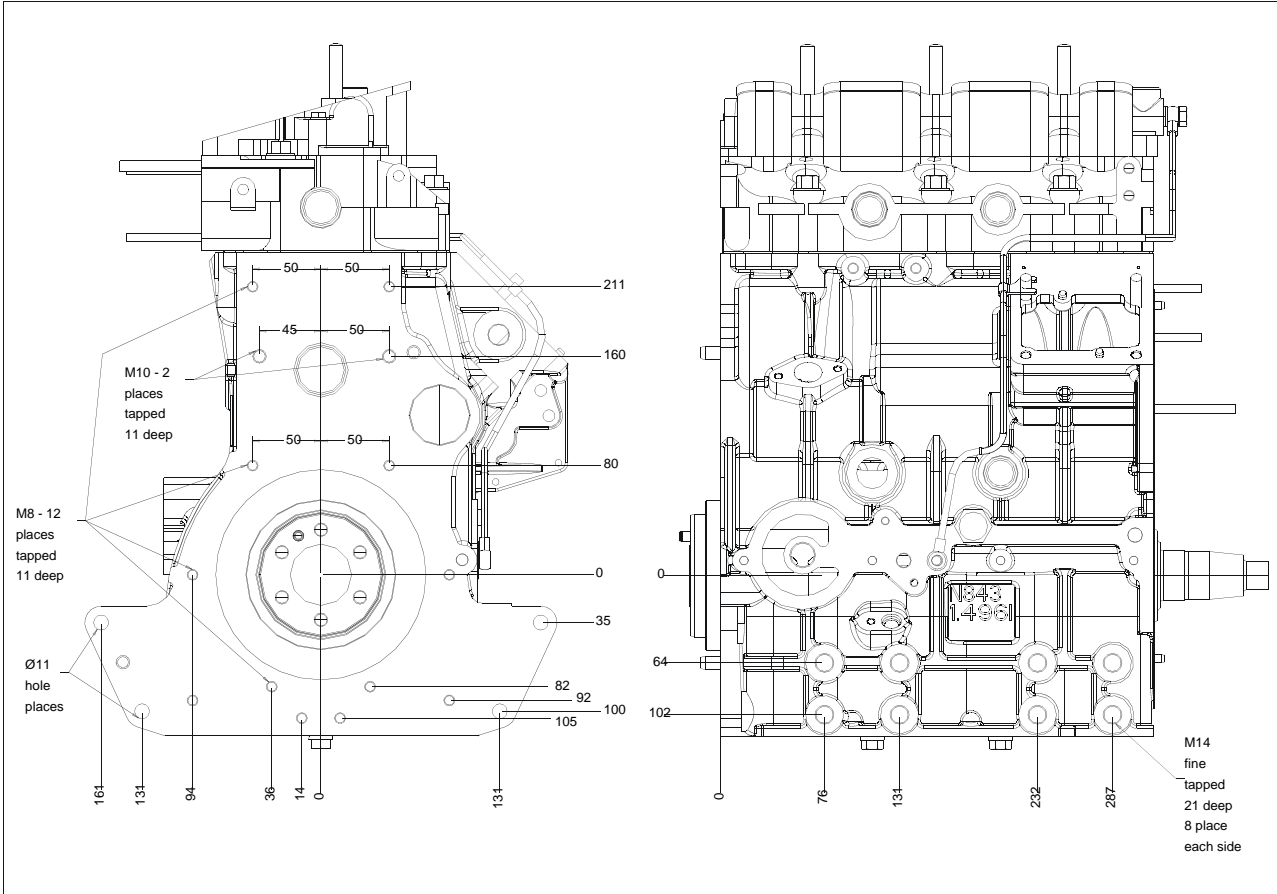
Block and head - 403D-07



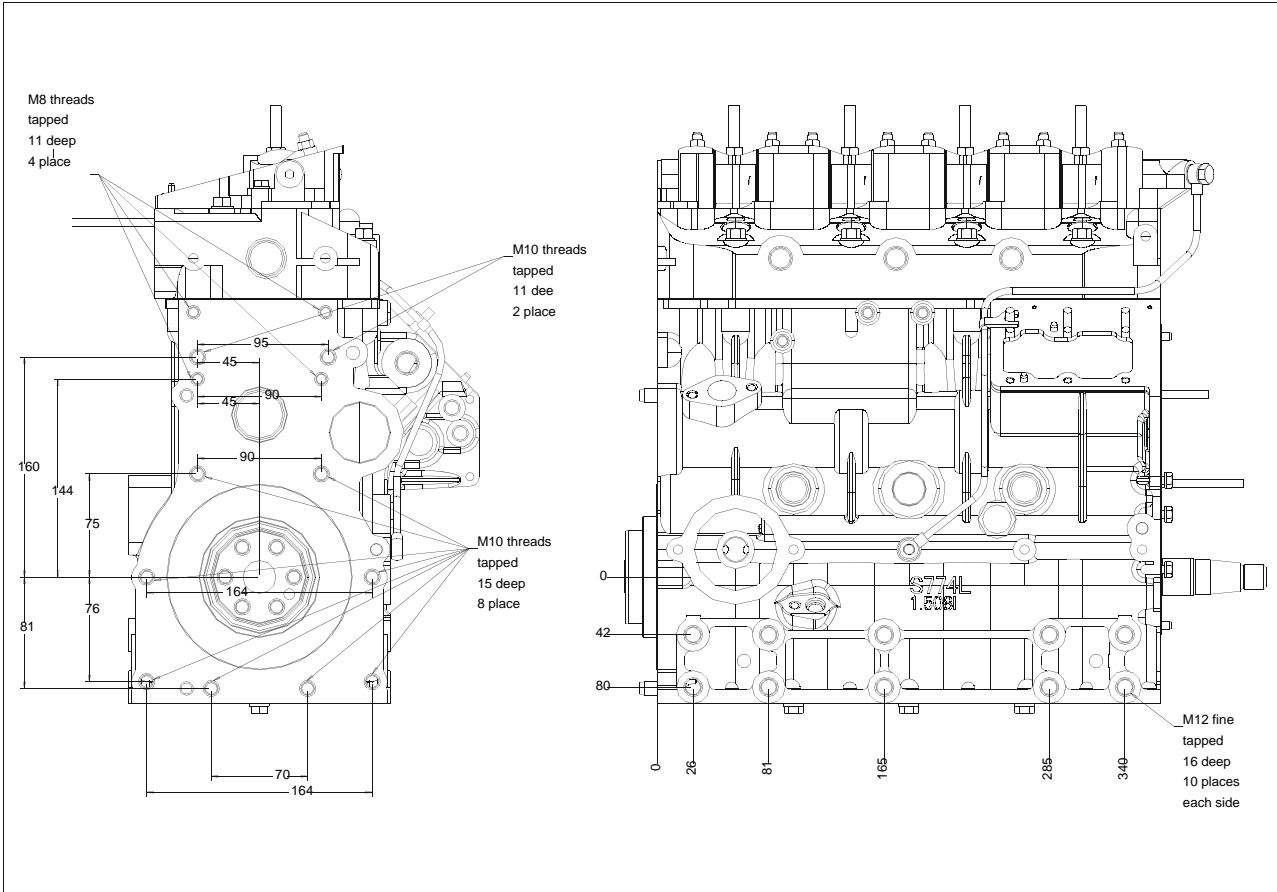
Block and head - 403D-11



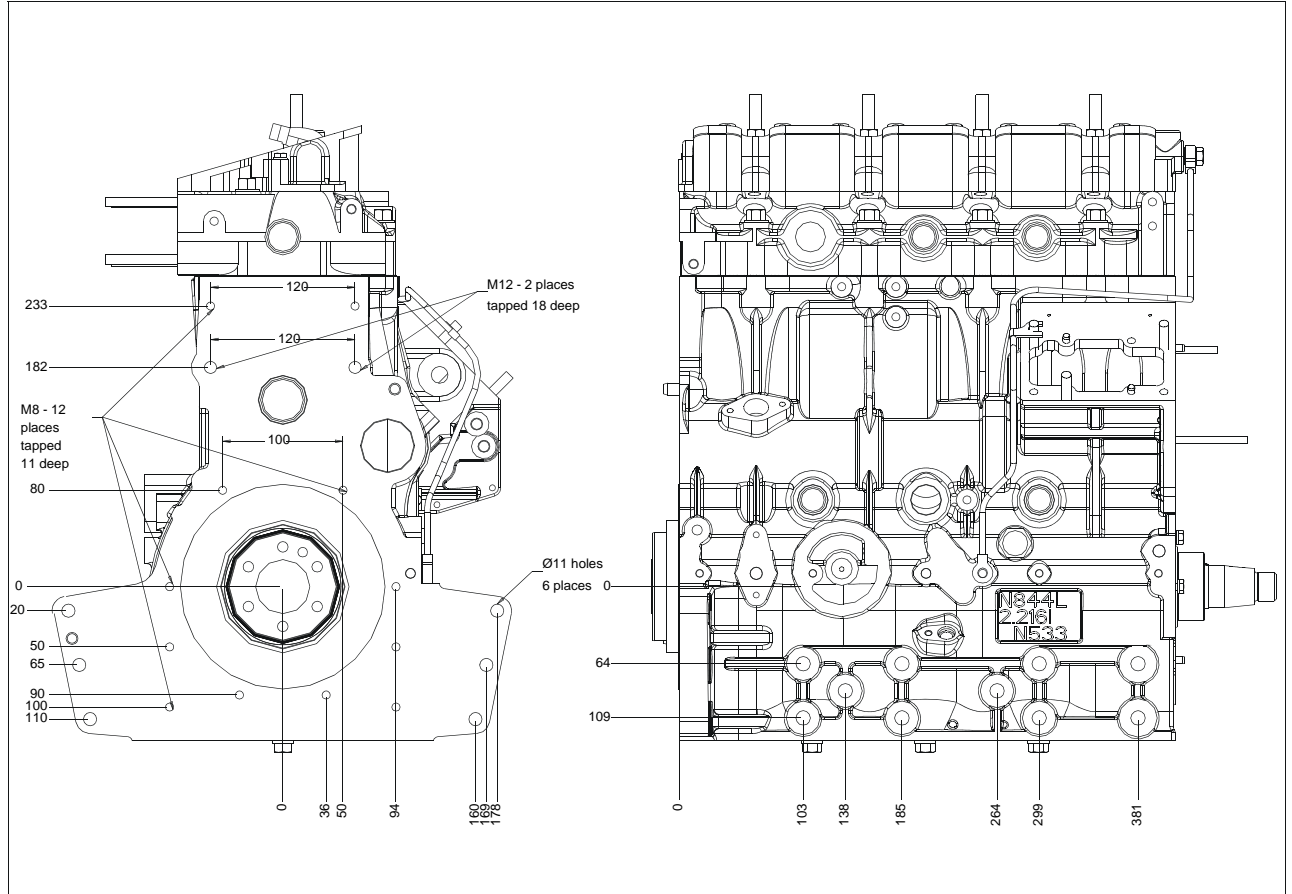
Block and head - 403D-15T



Block and head - 404D-15



Block and head - 404D-22T



Installation data

Cold start system

The following conditions will determine the minimum temperatures at which the engine will start:

- Starter motor performance
- Battery type
- Lubricating oil grade
- Cold start aid.

Refer to the Perkins Installation Manual, or your local Distributor, for more information on minimum start temperatures and types of starter motors etc.

Equipment required for cold temperatures

The chart below gives the minimum temperature at which a combination of engine oil, battery, starter motor and ring gear will start the engine.

Engine type	Temperature	0°C (32 °F)	-15°C (5 °F)	-20°C (-4 °F)
	Lubricating oil viscosity	20W	10W	5W
402D-05	Battery	049	049	069
	Starter motor (kW)	0,8	0,8	1,2
	Ring gear teeth	88	88	88
403D-07	Battery	049	049	069
	Starter motor (kW)	0,8	0,8	1,2
	Ring gear teeth	88	88	88
403D-11	Battery	069	069	069
	Starter motor (kW)	1,1	1,1	1,4
	Ring gear teeth	96	96	96
403D-15 403D-15T	Battery	072	072	647
	Starter motor (kW)	2,0	2,0	2,0
	Ring gear teeth	109	109	109
404D-15	Battery	TBA	TBA	TBA
	Starter motor (kW)	1,4	TBA	TBA
	Ring gear teeth	96	96	96
404D-22 404D-22T 404D-22TA	Battery	647	647	655
	Starter motor (kW)	2,0	2,0	2,0
	Ring gear teeth	126	126	126

The table below shows the ratio between the flywheel ring gear and the starter motor pinion.

Engine	No. teeth on ring gear	No. teeth on starter motor pinion	Ratio
402D-05	88	8	11.0 : 1
403D-07	88	8	11.0 : 1
403D-11	96	9	10.6 : 1
403D-15 403D-15T	109	9	12.1 : 1
403D-17	109	11	9.9 : 1
404D-15	96	9	10.6 : 1
404D-22 404D-22T 404D-22TA	126	9	14.0 : 1

Battery performance

Commercial reference number	Cold cranking amps			Reserve capacity (minutes)
	BS 3911/IEC (8.4V/60sec)	SAE J537 (7.2V/30sec)	DIN 72311 (9V/30sec)	
049	175	285	150	55
069	340	540	300	120
072	420	590	380	120
647	540	740	450	220
655	600	780	540	235

Caution: The use of ether is **prohibited**, it may damage the engine and it will invalidate the warranty.

Batteries that meet this specification will give suitable start performance. If the auxiliary loads are large, it may be necessary to specify a battery with a higher ampere-hour capacity (or reserve capacity) or to use a separate battery system. Any battery that is chosen because of its higher reserve capacity must not have inferior high rate discharge characteristics.

Battery to starter lead resistance

The resistance of the lead(s) used between the battery/batteries and the starter motor must not be more than 0.001 ohms for 12V systems and 0.0034 Ohms for 24V systems. More detailed information on types of battery is available in the Perkins installation manual.

Glow plugs

The use of glow plugs will not affect the specification of the battery, but may reduce by a small amount, the voltage available at the starter motor.

The total voltage drop for the "glow plug to battery" leads must not exceed 0.5 volts (this includes all connectors).

Cooling system

Coolant

The antifreeze mixture used to prevent frost damage must have an ethanediol base (ethylene glycol) with a corrosion inhibitor. The antifreeze mixture must be an efficient coolant at all ambient temperatures and it must provide protection against corrosion. If an antifreeze other than Perkins POWERPART is used the specification must be either BS6580, ASTM D3306 - 89 or AS 2108. The system must be filled with a solution of 50% antifreeze and 50% soft water.

Concentrations of more than 50% of antifreeze must not be used because these can affect the performance of the coolant, and seriously damage the engine. Fill slowly and check concentration of antifreeze.

If tests are to be conducted to establish the ambient clearance temperature of a cooling system, the system must be filled with a solution of 50% water and be suitable for operating worldwide in ambient temperatures of up to 46°C (115 °F). If an antifreeze other than Perkins POWERPART is used, the specification must be to BS6580 or MOD AL39.

All cooling systems must be filled in accordance with the procedures in the Perkins installation manual TPD1249.

If a machine that has been prepared for low ambient temperature operation is moved to a high ambient area (20°C and above), the concentration of antifreeze should be reviewed.

With a 0,9 Bar (13 lbf/in²) pressure cap fitted to the system, the coolant temperature must not be more than 112°C (233.6 °F) at sea level. This temperature must be reduced at higher altitudes.

Coolant capacities (engines only)

Engine type	Litre	UK pint	US quart
402D-05	1,1	1.9	1.2
403D-07	1,2	2.1	1.3
403D-11	1,9	3.3	2.0
403D-15 403D-15T	2,6	4.6	2.7
403D-17	2,5	4.4	2.6
404D-15	2,4	4.2	2.5
404D-22 404D-22T 404D-22TA	3,6	6.3	3.8

Radiators

The engine must be installed so that there is no restriction to the flow of air through the radiator. Discharged hot air from the radiator must not be re-circulated through the radiator again because the ambient air temperature will then be raised above the safe temperature for engine operation. Baffles can be fitted to prevent air re-circulation when the radiator is installed, or a change made to the design of the basic cooling system for the purpose of radiator installation. If the installation space is restricted, then a cooling test must be carried out before the installation can be approved. For further details on cooling tests refer to the Perkins Product Support Publications.

Thermostat

The thermostat opening for the 403D-11 and 404D-15 begins to open at 75°C (167 °F) and is fully open at 87°C (189 °F).

Thermostat opening for the 402D-05, 403D-07, 403D-15 and 404D-22, 404D-22T, 404D-22TA begins to open at 82°C (180 °F) and is fully open at 95°C (203 °F).

Coolant temperature switch

All 400 Series engines are fitted with the same coolant temperature switch as standard. The switch is colour coded with a yellow sticker and rated at 112°C (233.6 °F) ± 3°C (5 °F).

Radiator coolant flow rates

Engine type	Coolant pump ratio	Units	Engine speed rpm					
			2200	2400	2600	2800	3000	3600
402D-05	1.23:1	Litre/min	N/A	N/A	N/A	37,0	40,1	47,9
		UK gal/min	N/A	N/A	N/A	8.1	8.8	10.5
		US gal/min	N/A	N/A	N/A	9.7	10.6	12.7
403D-07	1.23:1	Litre/min	30,8	N/A	N/A	40,3	42,9	51,1
		UK gal/min	6.7	N/A	N/A	8.9	9.4	11.2
		US gal/min	8.1	N/A	N/A	10.6	11.3	13.5
403D-11	1.285:1	Litre/min	39,6	43,3	47,1	50,4	54,1	64,8
		UK gal/min	8.7	9.5	10.4	11.1	11.9	14.3
		US gal/min	10.5	11.4	12.4	13.3	14.3	17.2
403D-15	1.25:1	Litre/min	80,1	87,2	94,2	100,5	108,0	N/A
		UK gal/min	17.6	19.2	20.7	22.1	23.8	N/A
		US gal/min	21.2	23.0	24.9	26.5	28.5	N/A
	1.15:1	Litre/min	73.7	80.2	86.7	92.4	99.3	N/A
		UK gal/min	16.2	17.6	19.1	20.3	21.8	N/A
		US gal/min	19.5	21.2	22.9	24.4	26.2	N/A
	1.10:1	Litre/min	70.5	76.7	82.9	88.4	95.0	N/A
		UK gal/min	15.5	16.9	18.2	19.4	20.9	N/A
		US gal/min	18.6	20.3	21.9	23.4	25.1	N/A
403D-17	1.25:1	Litre/min	N/A	76.7	88.4	N/A	N/A	N/A
		UK gal/min	N/A	16.9	19.4	N/A	N/A	N/A
		US gal/min	N/A	20.3	23.4	N/A	N/A	N/A
	1.15:1	Litre/min	N/A	70.6	81.3	N/A	N/A	N/A
		UK gal/min	N/A	15.5	17.9	N/A	N/A	N/A
		US gal/min	N/A	18.7	21.5	N/A	N/A	N/A
	1.10:1	Litre/min	N/A	67.5	77.8	N/A	N/A	N/A
		UK gal/min	N/A	14.8	17.1	N/A	N/A	N/A
		US gal/min	N/A	17.8	20.6	N/A	N/A	N/A
404D-15	1.285:1	Litre/min	N/A	N/A	N/A	56,5	63,6	N/A
		UK gal/min	N/A	N/A	N/A	12.4	14.0	N/A
		US gal/min	N/A	N/A	N/A	14.9	16.8	N/A
404D-22 404D-22T 404D-22TA	1.25:1	Litre/min	75.4	82.3	89.1	96.0	102.9	N/A
		UK gal/min	16.6	18.1	19.6	21.1	22.6	N/A
		US gal/min	19.9	21.7	23.5	25.4	27.2	N/A
404D-22 404D-22T 404D-22TA	1.15:1	Litre/min	69.4	75.7	82.0	88.3	94.6	N/A
		UK gal/min	15.3	16.7	18.0	19.4	20.8	N/A
		US gal/min	18.3	19.9	21.7	23.3	24.9	N/A
404D-22 404D-22T 404D-22TA	1.10:1	Litre/min	66.4	72.4	78.4	84.5	90.5	N/A
		UK gal/min	14.6	15.9	17.2	18.6	19.9	N/A
		US gal/min	17.5	19.1	20.7	22.3	23.9	N/A

Note: The table above shows coolant flow rates through a typical pressurised radiator system at normal operation temperature and with the thermostat fully open.

Heat balance

The following tables show the total heat passed to the radiation, exhaust and coolant at the principal industrial ratings at full load conditions and different speeds.

Engine type	Item	Units	Engine speed rpm						
			2200	2400	2600	2800	3000	3400	3600
402D-05	Fuel energy	kW Btu/min	N/A	N/A	N/A	27,8 1582	29,5 1679	N/A	36,7 2089
	Power	kW Btu/min	N/A	N/A	N/A	8,2 467	8,8 501	N/A	10,2 581
	Radiation	kW Btu/min	N/A	N/A	N/A	2,5 142	2,8 159	N/A	3,8 216
	Exhaust	kW Btu/min	N/A	N/A	N/A	8,2 467	8,5 484	N/A	11,0 626
	Coolant	kW Btu/min	N/A	N/A	N/A	8,9 507	9,4 535	N/A	11,7 666
403D-07	Fuel energy	kW Btu/min	N/A	N/A	N/A	40,0 2277	42,3 2408	N/A	50,9 2897
	Power	kW Btu/min	N/A	N/A	N/A	12,2 694	13,2 751	N/A	15,3 871
	Radiation	kW Btu/min	N/A	N/A	N/A	3,5 199	3,7 209	N/A	4,5 256
	Exhaust	kW Btu/min	N/A	N/A	N/A	11,5 655	11,9 674	N/A	14,7 837
	Coolant	kW Btu/min	N/A	N/A	N/A	12,8 729	13,5 768	N/A	16,3 928
403D-11 (Derate)	Fuel energy	kW Btu/min	44,4 2522	46,8 2664	50,5 2870	55,3 3142	59,8 3403	N/A	63,3 3601
	Power	kW Btu/min	13,7 779	14,6 830	15,8 899	16,8 956	17,7 1007	N/A	19,1 1086
	Radiation	kW Btu/min	3,6 205	3,7 209	3,9 221	4,7 270	5,6 321	N/A	5,6 318
	Exhaust	kW Btu/min	12,9 732	13,6 773	14,6 832	16,0 911	17,4 987	N/A	18,4 1044
	Coolant	kW Btu/min	14,2 807	15,0 852	16,1 918	17,7 1005	19,1 1089	N/A	20,3 1152
403D-11	Fuel energy	kW Btu/min	45,9 2613	50,6 2880	55,4 3152	60,6 3447	65,6 3729	68,5 3899	74,4 4235
	Power	kW Btu/min	14,3 813	15,8 899	17,2 978	18,5 1052	19,7 1121	21,0 1195	22,3 1269
	Radiation	kW Btu/min	3,9 222	4,6 262	4,8 273	5,0 284	5,4 307	5,6 319	6,2 353
	Exhaust	kW Btu/min	13,0 742	14,0 797	15,7 892	17,7 1007	19,5 1108	19,9 1133	23,8 1355
	Coolant	kW Btu/min	14,7 836	16,2 922	17,7 1009	19,4 1103	21,0 1193	21,9 1247	22,1 1258
403D-15	Fuel energy	kW Btu/min	63,0 3584	68,5 3895	74,2 4219	77,2 4391	80,1 4558	N/A	N/A
	Power	kW Btu/min	20,7 1177	22,3 1269	23,4 1330	24,4 1389	25,1 1428	N/A	N/A
	Radiation	kW Btu/min	5,5 312	6,1 347	7,0 397	7,1 404	7,5 427	N/A	N/A
	Exhaust	kW Btu/min	16,7 948	18,2 1033	20,1 1142	21,0 1193	22,0 1231	N/A	N/A
	Coolant	kW Btu/min	20,2 1147	21,9 1246	23,7 1350	24,7 1405	25,5 1452	N/A	N/A

Engine type	Item	Units	Engine speed rpm						
			2200	2400	2600	2800	3000	3400	3600
403D-15T	Fuel energy	kW Btu/min	71,5 4070	79,1 4502	87,6 4986	97,1 5527	100,9 5743	N/A	N/A
	Power	kW Btu/min	23,1 1315	25,2 1434	27,3 1554	29,4 1673	30,0 1708	N/A	N/A
	Radiation	kW Btu/min	7,0 398	8,0 455	9,0 512	10,3 586	10,6 603	N/A	N/A
	Exhaust	kW Btu/min	18,7 1064	21,6 1229	24,9 1417	28,5 1622	30,2 1719	N/A	N/A
	Coolant	kW Btu/min	22,7 1292	24,3 1383	26,4 1503	28,9 1645	30,0 1708	N/A	N/A
404D-15	Fuel energy	kW Btu/min	N/A	N/A	N/A	73,6 4189	81,3 4628	N/A	N/A
	Power	kW Btu/min	N/A	N/A	N/A	24,6 1400	26,5 1508	N/A	N/A
	Radiation	kW Btu/min	N/A	N/A	N/A	7,9 450	7,3 416	N/A	N/A
	Exhaust	kW Btu/min	N/A	N/A	N/A	18,8 1070	21,5 1224	N/A	N/A
	Coolant	kW Btu/min	N/A	N/A	N/A	23,5 1338	26,0 1480	N/A	N/A
403D-17	Fuel energy	kW Btu/min	N/A	70.6 4019	81.2 4622	N/A	N/A	N/A	N/A
	Power	kW Btu/min	N/A	23.6 1343	26.1 1486	N/A	N/A	N/A	N/A
	Radiation	kW Btu/min	N/A	6.2 353	7.9 450	N/A	N/A	N/A	N/A
	Exhaust	kW Btu/min	N/A	19.0 1081	22.0 1252	N/A	N/A	N/A	N/A
	Coolant	kW Btu/min	N/A	21.8 1241	25.2 1434	N/A	N/A	N/A	N/A
404D-22 (Derate)	Fuel energy	kW Btu/min	84,0 4779	92,0 5233	98,5 5605	103,7 5899	110,7 6296	N/A	N/A
	Power	kW Btu/min	27,5 1564	29,7 1689	31,4 1786	32,8 1866	34,0 1934	N/A	N/A
	Radiation	kW Btu/min	6,9 392	7,5 429	8,1 460	8,5 484	9,1 516	N/A	N/A
	Exhaust	kW Btu/min	22,7 1294	25,3 1440	27,5 1566	29,2 1662	32,2 1831	N/A	N/A
	Coolant	kW Btu/min	26,9 1529	29,4 1675	31,5 1794	33,2 1888	35,4 2015	N/A	N/A
404D-22	Fuel energy	kW Btu/min	90,1 5126	102,0 5800	107,4 6108	111,6 6344	115,0 6542	N/A	N/A
	Power	kW Btu/min	31,0 1763	34,1 1939	35,7 2030	37,3 2121	38,0 2161	N/A	N/A
	Radiation	kW Btu/min	7,4 421	8,4 476	8,8 502	9,1 516	9,4 537	N/A	N/A
	Exhaust	kW Btu/min	22,9 1302	26,9 1529	28,5 1621	29,5 1677	30,8 1751	N/A	N/A
	Coolant	kW Btu/min	28,8 1640	32,6 1856	34,4 1955	35,7 2030	36,8 2093	N/A	N/A

Engine type	Item	Units	Engine speed rpm						
			2200	2400	2600	2800	3000	3400	3600
404D-22T Balanced	Fuel energy	kW Btu/min	N/A	N/A	132,2 7525	N/A	N/A	N/A	N/A
	Power	kW Btu/min	N/A	N/A	41,5 2362	N/A	N/A	N/A	N/A
	Radiation	kW Btu/min	N/A	N/A	10,8 615	N/A	N/A	N/A	N/A
	Exhaust	kW Btu/min	N/A	N/A	37,5 2134	N/A	N/A	N/A	N/A
	Coolant	kW Btu/min	N/A	N/A	42,3 2408	N/A	N/A	N/A	N/A
404D-22T	Fuel energy	kW Btu/min	128,9 7333	133,0 7566	136,4 7760	137,7 7838	150,8 8579	N/A	N/A
	Power	kW Btu/min	41,5 2361	42,5 2418	43,1 2452	44,7 2543	45,5 2588	N/A	N/A
	Radiation	kW Btu/min	10,6 601	10,9 620	11,2 636	9,9 564	12,4 703	N/A	N/A
	Exhaust	kW Btu/min	35,6 2024	37,0 2107	38,5 2188	34,9 1986	44,7 2542	N/A	N/A
	Coolant	kW Btu/min	41,2 2347	42,6 2421	43,6 2483	48,2 2744	51,4 2926	N/A	N/A
404D-22TA	Fuel energy	kW Btu/min	N/A	N/A	N/A	148.2 8435	N/A	N/A	N/A
	Power	kW Btu/min	N/A	N/A	N/A	49.2 2800	N/A	N/A	N/A
	Radiation	kW Btu/min	N/A	N/A	N/A	11.8 672	N/A	N/A	N/A
	Exhaust	kW Btu/min	N/A	N/A	N/A	39.8 2265	N/A	N/A	N/A
	Coolant	kW Btu/min	N/A	N/A	N/A	47.4 2698	N/A	N/A	N/A

404D-22TA Charge Air Cooler (CAC) Specification

Industrial

Rated Speed - 2800rpm (49.2kW)

Maximum allowable pressure drop = 8kPa

Mass charge flow rate = 235kg/h

Heat rejected to CAC = 2.6kW

Charge Inlet Temperature = 90°C

Charge Outlet Temperature = 50°C

Charge Outlet Boost Pressure = 58.1kPa

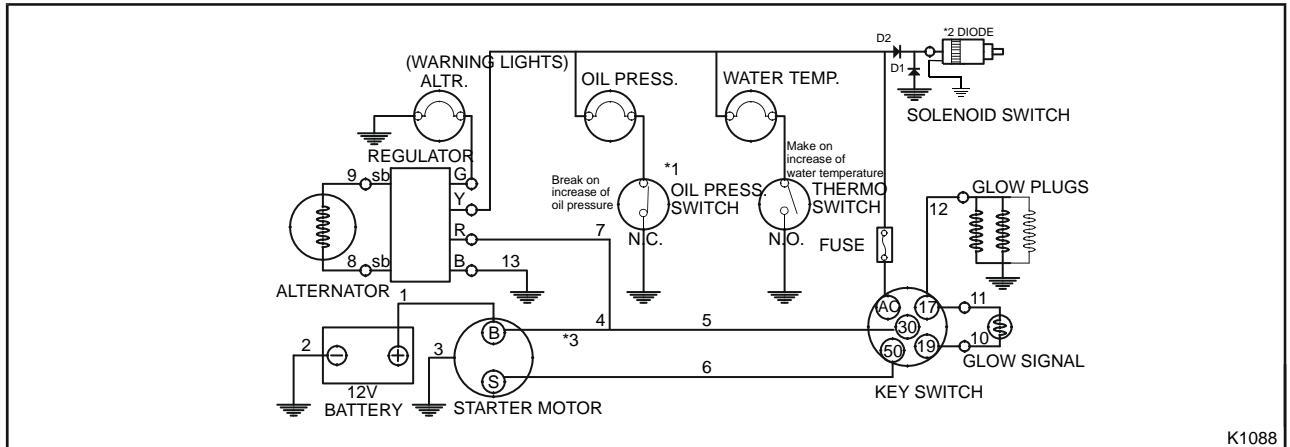
Electrical system

Back EMF warning

As with all electro-magnetic devices, the Electrical Shut Off Solenoid (ESOS) uses a coil to generate a magnetic field to control the plunger position. When voltage is applied to, or removed from, the coil in normal operation of the engine a voltage spike (back EMF) may occur. This spike should be suppressed using diodes D1 and D2 in order to avoid damage to other electronic components that may be fitted to the machine, e.g. voltage regulators, auto shut down units etc. See the wiring diagrams on page 283 to page 285.

Wiring diagrams

402D-05, 403D-07 and 403D-11 (14 amp, 15 amp alternator)



- * 1 - Maximum current draw for standard oil pressure switch is 0.42 amps (5 Watts maximum bulb).
 - * 2 - Diode capacity: current 3 amps, reverse voltage 600V (D1 is mandatory).
 - * 3 - A fuse can be fitted if desired (delayed fuse).
- D1 and D2 = Diodes.

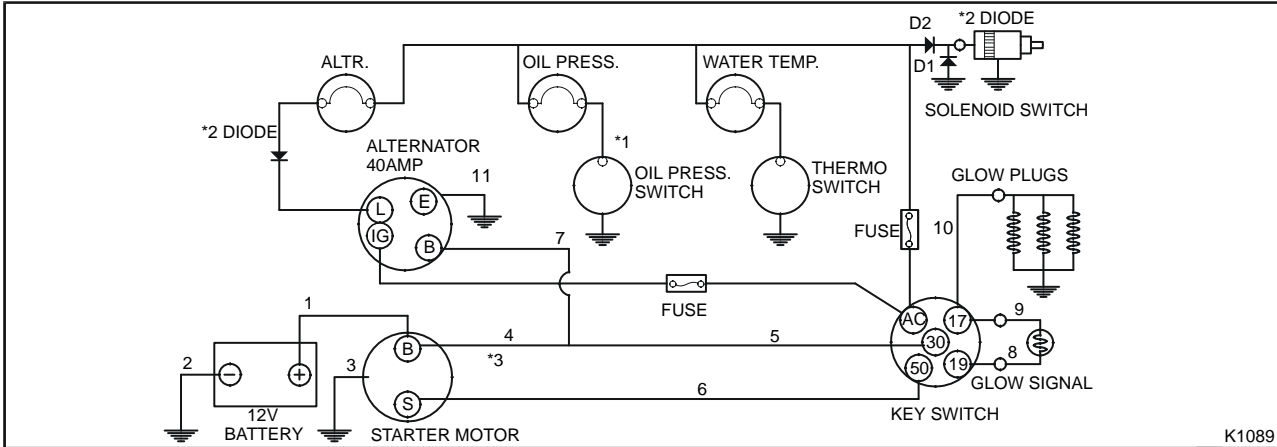
Maximum circuit resistance

The resistance of battery cables 1, 2 and 3 must not exceed 0.001 ohm.

Circuit	Cable number	Circuit current	Maximum circuit resistance	Maximum circuit volt drop	Remarks
Alternator charging	4, 7, 8, 9, 13	14 amps 15 Amps	0.036 ohm 0.033 ohm	0.5 Volt	See glow plugs circuit.
Starter motor solenoid	4, 5, 6	15.75 Amps	0.04 ohm	0.63 Volt	See glow plugs circuit.
STD glow plugs (via glow signal)	4, 5, 10, 11, 12	(Peak max) 26 Amps (2 cyl) 39 Amps (403D-07) 63 Amps (403D-11)	0.0192 ohm (2 cyl) 0.0128 ohm (403D-07) 0.0079 ohm (403D-11)	0.5 Volt	-

If a glow signal is not used, it is still necessary to connect terminals 17 and 19 on the key switch.

403D-11, 404D-15 (40 amp alternator)



- * 1 - Maximum current draw for standard oil pressure switch is 0.42 amps (5 Watts maximum bulb).
 - * 2 - Diode capacity: current 3 amps, reverse voltage 600V (D2 is mandatory).
 - * 3 - A fuse can be fitted if desired (delayed fuse).
- D1 and D2 = Diodes.

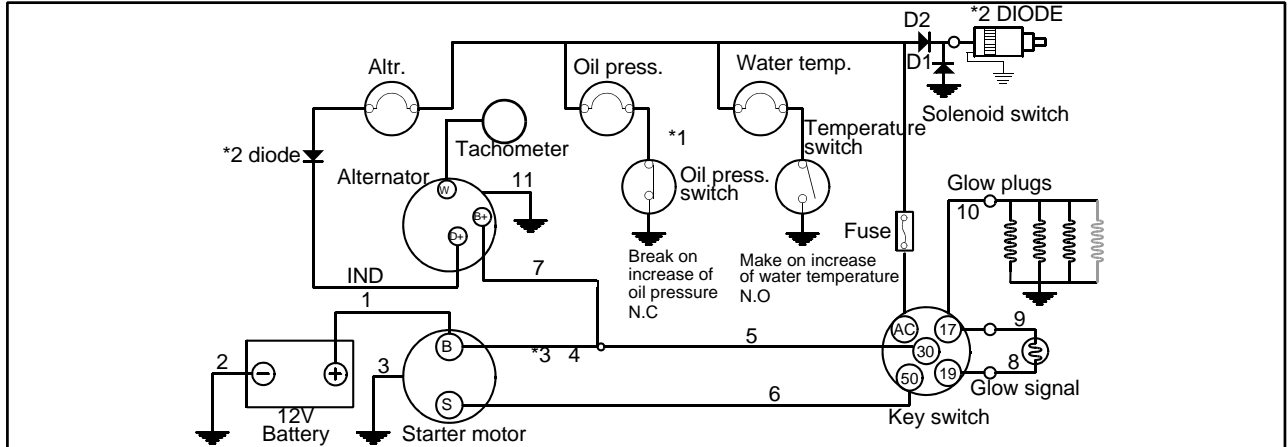
Maximum circuit resistance

The resistance of battery cables 1, 2 and 3 must not exceed 0.001 ohm.

Circuit	Cable number	Circuit current	Maximum circuit resistance	Maximum circuit volt drop	Remarks
Alternator charging	4, 7, 11	40 Amps	0.0125 ohm	0.5 Volt	See glow plugs circuit
Starter motor solenoid	4, 5, 6	15.75 Amps	0.04 ohm	0.63 Volt	See glow plugs circuit
STD glow plugs (via glow signal)	4, 5, 8, 9, 10	63 Amps (3 cyl) 52 Amps (4 cyl)	0.0079 ohm (3 cyl) 0.0096 ohm (4 cyl)	0.5 Volt	-

Note: If a glow signal is not used, it is still necessary to connect terminal 17 and 19 on the key switch.

403D-15, 403D-17, 403D-15T, 404D-22, 404D-22T, 404D-22TA (65/85 amp alternator)



Note: Minimum cable size for the 65 amp alternator is 8.50 mm², and 16.00 mm² for the 85 amp alternator.

- * 1 - Maximum current draw for standard oil pressure switch is 0.42 amps (5 Watts maximum bulb).
 - * 2 - Diode capacity: current 3 amps, reverse voltage 600V (D2 is mandatory).
 - * 3 - A fuse can be fitted if desired (delayed fuse).
- D1 and D2 = Diodes.

Maximum circuit resistance

The resistance of battery cables 1, 2 and 3 must not exceed 0.001 ohm, for 12V systems and 0.0034 ohms for 24V systems.

Circuit	Cable number	Circuit current	Maximum circuit resistance	Maximum circuit volt drop	Remarks
Alternator charging	4, 7, 11	65/85 Amps	0.0077 ohm (65A) 0.0059 ohm (85A)	0.5 Volt	See glow plugs circuit
Starter motor solenoid	4, 5, 6	15.75 Amps	0.04 ohm	0.63 Volt	See glow plugs circuit
STD glow plugs (via glow signal)	4, 5, 8, 9, 10	57 Amps (3 cyl) 76 Amps (4 cyl)	0.0087 ohm (3 cyl) 0.0065 ohm (4 cyl)	0.5 Volt	-

Note: If a glow signal is not used, it is still necessary to connect terminal 17 and 19 on the key switch.

Alternator charge lamp.

Alternator charge lamp rating: 12V - 2,2W at 850 rpm.

When the engine is at rest the alternator charge lamp is illuminated via the battery and it extinguishes when the alternator is generating. Using a lower wattage bulb than the rating above, will increase the speed at which self excitation occurs upon initial run up e.g. a charge lamp with a lower wattage bulb will have a rating of 12V - 1,2W at 1300 rpm.

Exhaust system**Temperature, flow rate and back pressure**

In the tables below, exhaust gas flow rates are quoted against the maximum permitted back pressure of 10,2 kPa, (3.012 in (76,5 mm) Hg) 0,104 kgf/cm² for the engine types shown. Exhaust back pressure should be measured within (12.0 in) 305 mm of the outlet exhaust manifold. Exhaust gas temperature should be measured at the exhaust manifold outlet.

Exhaust gas flow rates

Engine type	Temperature/ flow rate	Engine speed rpm						
		2200	2400	2600	2800	3000	3400	3600
402D-05	Rating (kW)	N/A	N/A	N/A	8,2	8,8	N/A	10,2
	°C	N/A	N/A	N/A	540	560	N/A	610
	°F	N/A	N/A	N/A	1004	1040	N/A	1130
	m ³ /min	N/A	N/A	N/A	1,73	1,86	N/A	2,28
	ft ³ /min	N/A	N/A	N/A	61,1	65,7	N/A	80,5
403D-07	Rating (kW)	9.0	N/A	N/A	12,2	13,2	14.5	15,3
	°C	425	N/A	N/A	530	550	N/A	620
	°F	797	N/A	N/A	986	1022	N/A	1148
	m ³ /min	N/A	N/A	N/A	2,65	2,87	N/A	3,69
	ft ³ /min	N/A	N/A	N/A	93,6	101,4	N/A	130,3
403D-11 (Derate)	Rating (kW)	13,7	14,6	15,8	16,8	17,7	N/A	N/A
	°C	510	530	545	570	600	N/A	N/A
	°F	950	986	1013	1058	1112	N/A	N/A
	m ³ /min	2,97	3,33	3,67	4,07	4,52	N/A	N/A
	ft ³ /min	104,9	117,6	129,6	143,7	159,6	N/A	N/A
403D-11	Rating (kW)	14,7	16,1	17,3	18,5	19,7	21.0	22.3
	°C	535	545	555	570	605	583	650
	°F	995	1013	1031	1058	1121	1081	1202
	m ³ /min	3,1	3,4	3,7	4,1	4,5	4.91	5.6
	ft ³ /min	108.3	119.6	131.1	143.7	160.4	173.4	197.8
403D-15	Rating (kW)	20,7	22,3	23,4	24,4	25,1	N/A	N/A
	°C	575	600	615	615	620	N/A	N/A
	°F	1067	1112	1139	1139	1148	N/A	N/A
	m ³ /min	4,25	4,73	5,20	5,54	5,90	N/A	N/A
	ft ³ /min	150.1	167.2	183.7	195.8	208.4	N/A	N/A
403D-15T	Rating (kW)	23,1	25,2	27,3	29,4	30,0	N/A	N/A
	°C	545	575	600	584	640	N/A	N/A
	°F	1013	1067	1112	1083	1184	N/A	N/A
	m ³ /min	4.77	5.49	5.96	6.75	7.20	N/A	N/A
	ft ³ /min	168.5	193.9	210.5	238,4	254.3	N/A	N/A
403D-17	Rating (kW)		23.6	26.1	N/A	N/A	N/A	N/A
	°C	N/A	550	600	N/A	N/A	N/A	N/A
	°F	N/A	1022	1112	N/A	N/A	N/A	N/A
	m ³ /min	N/A	4.91	5.66	N/A	N/A	N/A	N/A
	ft ³ /min	N/A	173.4	199.9	N/A	N/A	N/A	N/A
404D-15	Rating (kW)	N/A	N/A	N/A	24,3	26,5	N/A	N/A
	°C	N/A	N/A	N/A	525	570	N/A	N/A
	°F	N/A	N/A	N/A	977	1058	N/A	N/A
	m ³ /min	N/A	N/A	N/A	5.5	5,65	N/A	N/A
	ft ³ /min	N/A	N/A	N/A	194.2	199.5	N/A	N/A

Engine type	Temperature/ flow rate	Engine speed rpm						
		2200	2400	2600	2800	3000	3400	3600
404D-22 (Derate)	Rating (kW)	27,5	29,7	31,4	32,8	34,0	N/A	N/A
	°C	535	565	560	555	585	N/A	N/A
	°F	995	1049	1040	1031	1085	N/A	N/A
	m ³ /min	6,01	6,80	7,32	7,83	8,70	N/A	N/A
	ft ³ /min	212.2	240.1	258.5	276.5	307.2	N/A	N/A
404D-22	Rating (kW)	31,0	34,1	35,7	37,3	38,0	N/A	N/A
	°C	550	585	600	600	600	N/A	N/A
	°F	1022	1085	1112	1112	1112	N/A	N/A
	m ³ /min	6,14	7,00	7,71	8,27	8,85	N/A	N/A
	ft ³ /min	217	247	272	292	313	N/A	N/A
404D-22T	Rating (kW)	N/A	N/A	43,0	44,7	45,5	N/A	N/A
	°C	N/A	N/A	539	565	585	N/A	N/A
	°F	N/A	N/A	1002	1049	1085	N/A	N/A
	m ³ /min	N/A	N/A	10,3	10,9	11,4	N/A	N/A
	ft ³ /min	N/A	N/A	364	384	403	N/A	N/A
404D-22TA	Rating (kW)	N/A	N/A	N/A	49,2	N/A	N/A	N/A
	°C	N/A	N/A	N/A	666	N/A	N/A	N/A
	°F	N/A	N/A	N/A	1231	N/A	N/A	N/A
	m ³ /min	N/A	N/A	N/A	11.2	N/A	N/A	N/A
	ft ³ /min	N/A	N/A	N/A	396	N/A	N/A	N/A

Fuel system

Fuel specification

Use good quality fuel to get the correct power and performance from the engine. The recommended fuel specification for Perkins engines is shown below:

Cetane number	45 minimum
Viscosity	2.0/4.5 centistokes at 40°C (104 °F)
Density	0,835/0,855 kg/litre
Sulphur	0.2% of mass, maximum
Distillation	85% at 350°C (662 °F)

Cetane number: Cetane number indicates ignition performance. Fuel with a low cetane number can cause cold start problems and affect combustion.

Viscosity: Viscosity is the resistance to flow and if this is outside limits, engine performance can be affected.

Density: Low density will reduce engine power, higher density will increase engine power and exhaust smoke.

Sulphur: High sulphur content (not normally found in Europe, North America or Australasia) can cause engine wear. If only high sulphur fuels are available, it will be necessary to use a highly alkaline lubricating oil in the engine or reduce the lubricating oil change interval.

Distillation: This is an indication of the mixture of different hydrocarbons in the fuel. A high ratio of light weight hydrocarbons can affect the combustion characteristics.

Low temperature fuels: Special winter fuels may be available for engine operation at temperatures below 0 °C (32 °F). These fuels limit the formation of wax in the fuel oil at low temperatures. If wax forms in the fuel oil, this could stop the flow of fuel oil through the filter.

Aviation kerosene and R.M.E. type fuels: These fuels may be used, but can effect the engine performance and starting ability. The only aviation fuels that are permitted for use with these engines are: JP5, JET A and JP8 providing that 5% spindle oil is added, Aviation fuel JP4 is not recommended. For more information on aviation fuels refer to the Perkins application department. Only up to 5% R.M.E. in mineral oil diesel fuel is permitted.

Low pressure fuel system

The fuel lift pump should not be more than 0,8 metres (2.6 ft) above the lowest fuel level possible in the fuel tank. With the engine running at full load rated speed, the depression at the inlet to the fuel lift pump should not exceed 127 mm (5 Inches) Hg.

Electrical shut-off solenoid (ESOS)

The ESOS is fitted to the right hand side of the cylinder block, at the rear of the fuel injection pump. When the solenoid is de-energised, a control rod pushes the fuel control rack to the 'no fuel position' in the injection pump. The unit operates from a 12V or 24V supply depending on option in an 'energise to run' condition, an electrical failure will give automatic fuel shut-off.

Specific fuel consumption (typical)

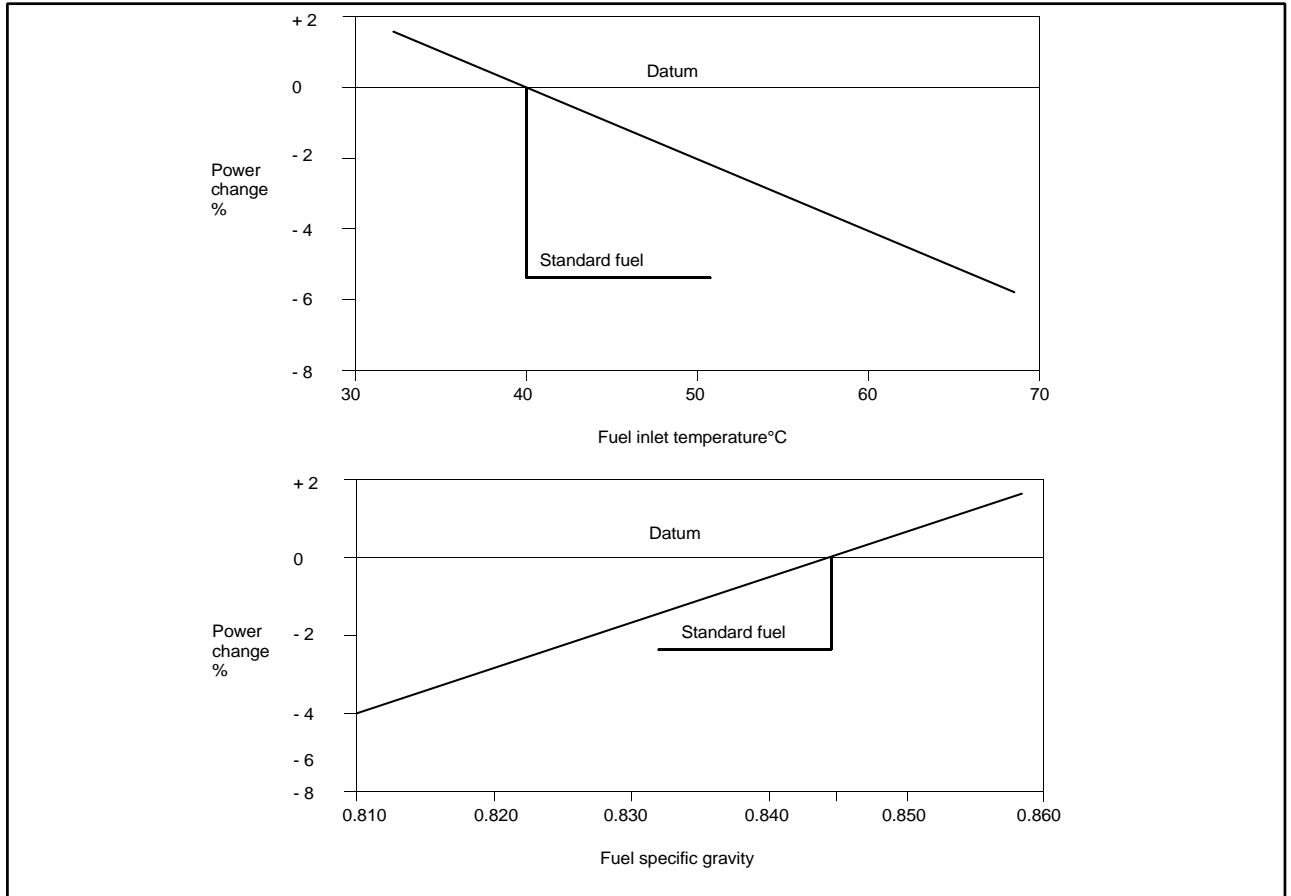
Full load rated speed conditions (industrial engines - variable speed).

Engine type	Rated speed (rpm)	g/kWhr	l/hr
402D-05	2800	275	2.7
	3000	274	2.9
	3600	299	3.7
403D-07	2800	273	4
	3000	272	4.2
	3600	276	5.1
403D-11 (Derate)	2200	262	4.3
	2800	263	5.3
403D-11	2200	267	4.7
	2400	266	5.2
	2600	253	5.3
	2800	264	5.9
	3000	265	6.3
403D-15	2200	262	6.6
	2400	269	7.2
	2600	266	7.5
	2800	276	8.1
	3000	272	8.2
403D-15T)	2200	261	7.3
	2400	263	8
	2600	270	8.9
	2800	282	10
	3000	277	10
403D-17	2400	254	7.2
	2600	260	8.2
404D-15	2800	249	7.4
	3000	256	8.2
404D-22 (Derate)	2600	251	9.5
	2800	259	10.2
	3000	268	11
404D-22	2200	260	9.7
	2400	263	10.8
	2600	258	11.1
	2800	266	11.9
	3000	272	12.4
404D-22T	2600	268	13.9
	2800	271	14.6
	3000	275	15.1
404D-22TA	2800	275	15.3

Fuel temperature and specific gravity

Engine power is affected by changes to the temperature and specific gravity of the fuel oil. The results are shown in the graphs below, and should only be used for guidance.

Fuel inlet temperature and specific gravity graphs



Induction system

Air flow requirements

Engine type	Units	Engine speed rpm						
		2200	2400	2600	2800	3000	3400	3600
402D-05	m ³ /min	N/A	N/A	N/A	0,633	0,665	N/A	0,763
	ft ³ /min	N/A	N/A	N/A	22,4	23,4	N/A	26,9
403D-07	m ³ /min	N/A	N/A	N/A	0,91	0,96	N/A	1,2
	ft ³ /min	N/A	N/A	N/A	32,1	33,9	N/A	42,4
403D-11	m ³ /min	1,1	1,2	1,3	1,4	1,5	1.64	1.80
	ft ³ /min	38,2	41,7	45,2	48,6	52,1	57.9	63.6
403D-15	m ³ /min	1,50	1,62	1,75	1,87	1,98	N/A	N/A
	ft ³ /min	52,9	57,3	61,9	65,9	69,9	N/A	N/A
403D-15T	m ³ /min	1.73	1.92	2.03	2.28	2.35	N/A	N/A
	ft ³ /min	61.1	67.8	71.7	80.5	83.0	N/A	N/A
403D-17	m ³ /min	N/A	1.70	1.84	N/A	N/A	N/A	N/A
	ft ³ /min	N/A	60.0	65.0	N/A	N/A	N/A	N/A
404D-15	m ³ /min	N/A	N/A	N/A	1.9	1,9	N/A	N/A
	ft ³ /min	N/A	N/A	N/A	67,1	67,1	N/A	N/A
404D-22	m ³ /min	2,15	2,34	2,54	2,73	2,93	N/A	N/A
	ft ³ /min	75,8	82,6	89,5	96,4	103,3	N/A	N/A
404D-22T	m ³ /min	N/A	N/A	3,50	3,72	3,90	N/A	N/A
404D-22TA	ft ³ /min	N/A	N/A	123,6	131,4	137,7	N/A	N/A

Inlet restriction

The table below shows the maximum permitted depressions for clean and dirty air filter elements.

Engine type	Measurement taken at	Units	Maximum permitted depression	
			Clean filter	Dirty filter ⁽¹⁾
402D-05	Induction manifold	mm H ₂ O	305	650
403D-07		in H ₂ O	12	25,6
403D-11		kPa	3	6,4
403D-15				
404D-15	Induction manifold	mm H ₂ O	508	813
403D-17		in H ₂ O	20	32
404D-22		kPa	5	8
404D-22T				
404D-2TA				

1. The element must be changed as necessary, and a depression indicator should be fitted by the OEM so that the correct servicing is achieved. A dirty filter will result in either early element change or loss in engine power due to extra inlet restriction.

Closed breather requirements**Cautions:**

- *When lubricating oil is added to the engine, it is important that the oil level must not exceed the maximum mark on the dipstick. Oil may enter the breather and intake system if the engine is excessively overfilled with lubricating oil, or operated at gradients above those specified on [page 298](#). If this happens, control of the engine speed may be lost.*
- *The maintenance and use of closed circuit breathers on 400 Series engines must conform to the procedures below:*
- *The breather assembly (especially the vent hole) should always be kept clean and free from dirt. For service requirement refer to the 400 Series Users Handbook.*
- *If the breather valve is not fitted correctly, dirt can enter the intake system and damage the engine.*
- *The closed circuit breather system has been approved to -20°C (-4 °F). If the engine is to operate in ambient temperatures below -20°C (-4 °F), you must first contact Perkins Applications Department.*
- *If the engines are to be painted at the customer's premises, they must ensure that the paint does not enter the vent hole and that the hole is not restricted after the painting process is finished.*
- *403D-15T, 404D-22T and 404D-22TA engines only: The outlet pipe (supplied by the customer) from the breather assembly must be fitted into either the side or into the top of the engine air intake system on the clean side of the air filter, this pipe should not have a rise. The connection must be within 150 mm (5.9 in) of the turbocharger compressor inlet. A connection position more than 150 mm (5.9 in) from the turbocharger compressor inlet may be allowed but this must be approved by the Perkins Applications Department.*

Lubrication system

Lubricating oil temperature

The normal maximum permissible lubricating oil temperature measured in the filter bowl is 125°C (257 °F). If the engine does not operate at its maximum speed and load for more than one hour at a time, then the maximum lubricating oil temperature can be extended to 135°C (275 °F).

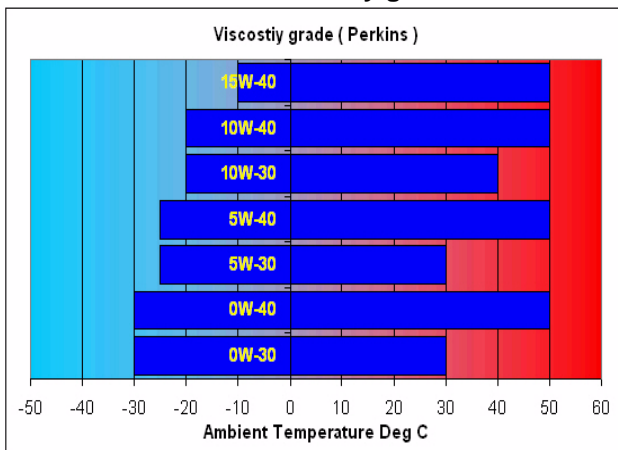
Lubricating oil specification

Use only good quality lubricating oil which meets, either of the following:

- API-CH-4.
- ACEA E5.

Caution: Always ensure that the correct viscosity grade of lubricating oil is used for the ambient temperature range in which the engine will run as shown in the chart below.

Recommended SAE viscosity grades



Viscosity chart

A = Recommended viscosity

B = Ambient temperature

Ensure the lubricating oil sump is filled slowly after warm up, check with the dipstick that the oil level is correct. Change the oil and filter in accordance with the service instruction.

Note: The space needed to remove the oil filter canister is 20 mm.

Lubricating oil pump delivery

Engine type	Units	Engine speed rpm					
		2200	2400	2600	2800	3000	3600
402D-05 403D-07	Litre/min	10.0	N/A	N/A	12,8	13,7	16,4
	UK gal/min	2.2	N/A	N/A	2.8	3.0	3.6
	US gal/min	2.6	N/A	N/A	3.4	3.6	4.3
403D-11	Litre/min	9,7	10,6	11,4	12,3	13,2	15,8
	UK gal/min	2.1	2.3	2.5	2.7	2.9	3.5
	US gal/min	2.56	2.80	3.01	3.24	3.49	4.2
404D-15	Litre/min	9,7	10,6	11,4	12,3	13,2	N/A
	UK gal/min	2.1	2.3	2.5	2.7	2.9	N/A
	US gal/min	2.56	2.80	3.01	3.24	3.49	N/A
403D-15 403D-15T 403D-17 404D-22 404D-22T 404D-22TA	Litre/min	16,1	17,5	19,0	20,40	21,9	N/A
	UK gal/min	3.53	3.85	4.18	4.49	4.82	N/A
	US gal/min	4.24	4.63	5.01	5.39	5.79	N/A

Lubricating oil pressure switch

Rated voltage: 12V and 24V.

Rated load: 5W (lamp load).

Operating pressure: 0,3 kg/cm² (4.27 lbf/in²). Top cover option ZJ001.

Operating pressure: 0,5 kg/cm² (7.11 lbf/in²). Top cover option ZJ001 (403D-11).

Operating pressure: 0,7 kg/cm² (10.0 lbf/in²). Oil rail option ZJ002.

Operating pressure: 0,5 kg/cm² (7.11 lbf/in²). Oil rail option ZJ002 (403D-11).

Operating pressure: 1.0 kg/cm² (14.22 lbf/in²). Oil rail option ZJ003.

Installation angle and gradients of operation

Operation of the engine at gradients greater than those approved, either on the side, front or rear, can cause engine failure.

When using an engine in a tilted position continuously, please note the following:

- If tilted continuously to the front an air pocket could be created in the cylinder head.
- The effective volume of the fuel tank is reduced so air suction must be prevented.
- When a wet (oil-bath type) air cleaner is used the oil level will tilt, which could reduce cleaning efficiency and also cause lubricating oil in the filter to drain over the engine intake manifold with consequent problems.

Caution: *The engine must only operate when the oil level registers between the maximum and minimum marks on the dipstick, with the application on a horizontal surface. Failure to do this can result in extensive damage to the engine.*

Note: The angle of installation can be up to 15° on the side and/or up to 15° down at the rear, this applies to all models. Operational gradients are listed below.

Limiting angles of operation

Note: At zero installation angles.

Engine operating position	Maximum angle of continuous operation ⁽¹⁾						
	402D-05	403D-07	403D-11	404D-15	403D-17	403D-15T 403D-15	404D-22TA 404D-22T 404D-22
Front down	TBA	TBA	25	25	35	30	35
Rear down	TBA	TBA	25	25	35	30	35
LHS down	TBA	TBA	25	25	35	30	35
RHS down	TBA	TBA	25	25	35	30	35

1. When fitted with sump option GB001/GB002/GB003.

Note: If a different sump option is specified the gradability may be effected. This should be checked with the applications department.

Engine mountings

Frameless tractor installations

For frameless tractor installations it is important to pay attention to both the front and the rear mounting to the cylinder block.

Caution: The use of the standard industrial housings is **not permitted** for frameless installations.

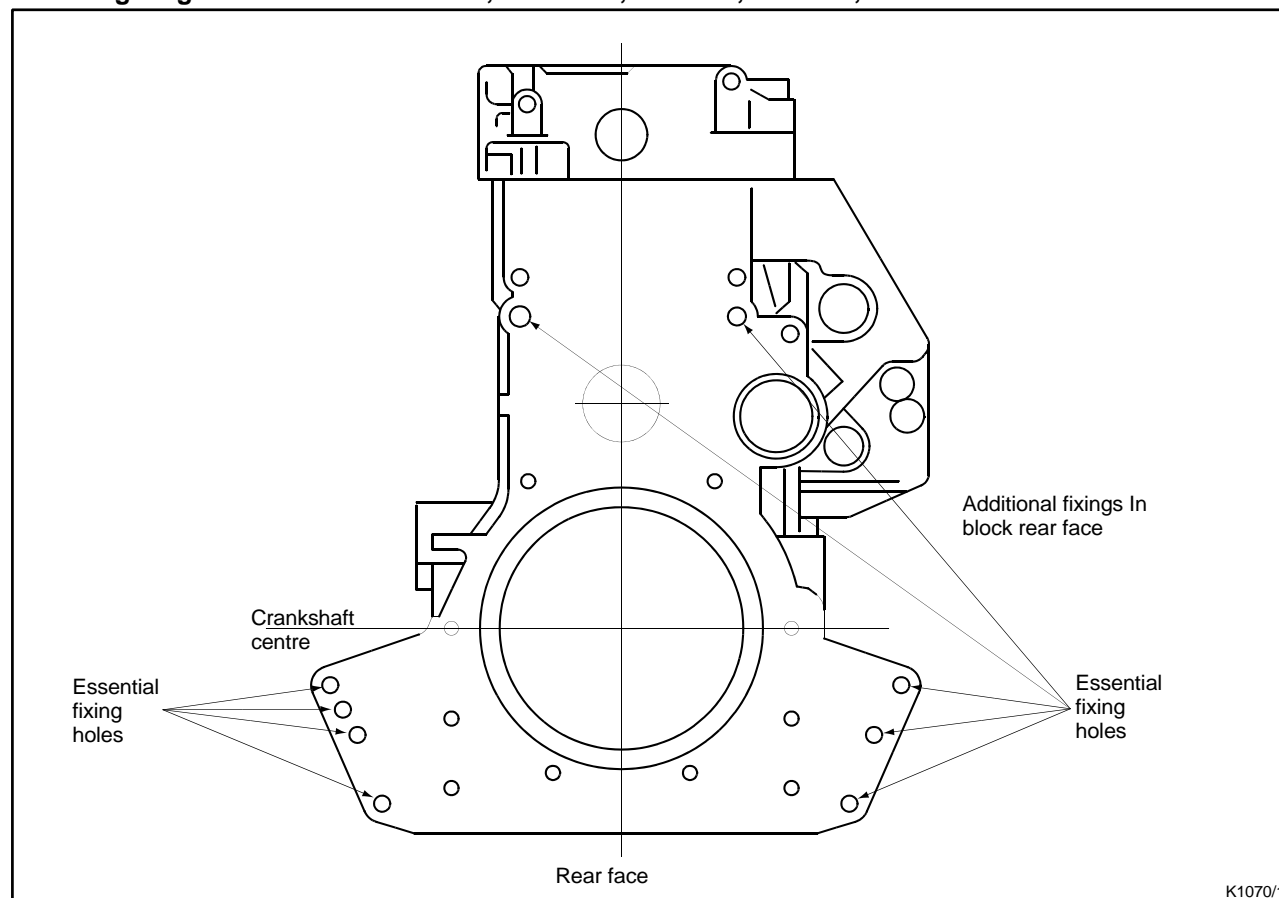
Rear mounting

The standard backplate design uses strong fixings to which it is possible to design housings that are correctly 'tied' to the cylinder block.

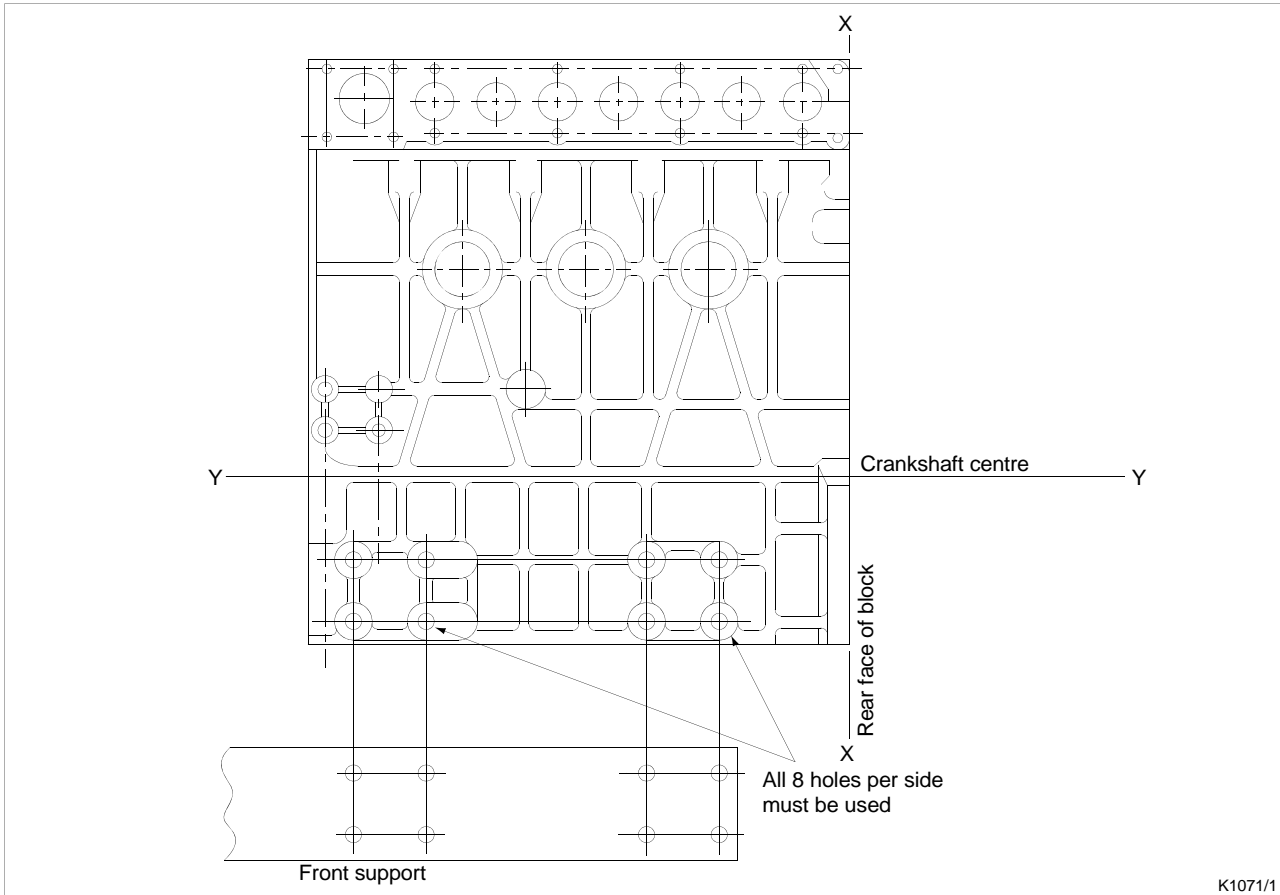
Front mounting

Front support brackets for frameless installations must be extended along the side of the cylinder block, so that both sets of four side mounting holes on each side of the block are used.

Mounting diagram - rear face 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T and 404D-22TA



Mounting diagram - left side 403D-11, 403D-15, 403D-15T, 403D-17, 404D-15, 404D-22, 404D-22T and 404D-22TA



K1071/1

Power take-offs (PTO)**Crankshaft thrust loads**

The table below shows the maximum permissible thrust loads for the crankshaft for both forward and backward movement.

Engine type	Units	Maximum permissible continuous thrust load on the crankshaft	Maximum permissible instantaneous thrust load on the crankshaft
402D-05	N	981	1961
403D-07	lbf	220	440
403D-11	N	883	1666
	lbf	198	374
403D-15	N	980	1960
403D-15T	lbf	220	441
403D-17			
404D-15	N	883	1666
	lbf	198	374
404D-22	N	1176	2352
404D-22T	lbf	264	529
404D-22TA			

Permissible overhung loads

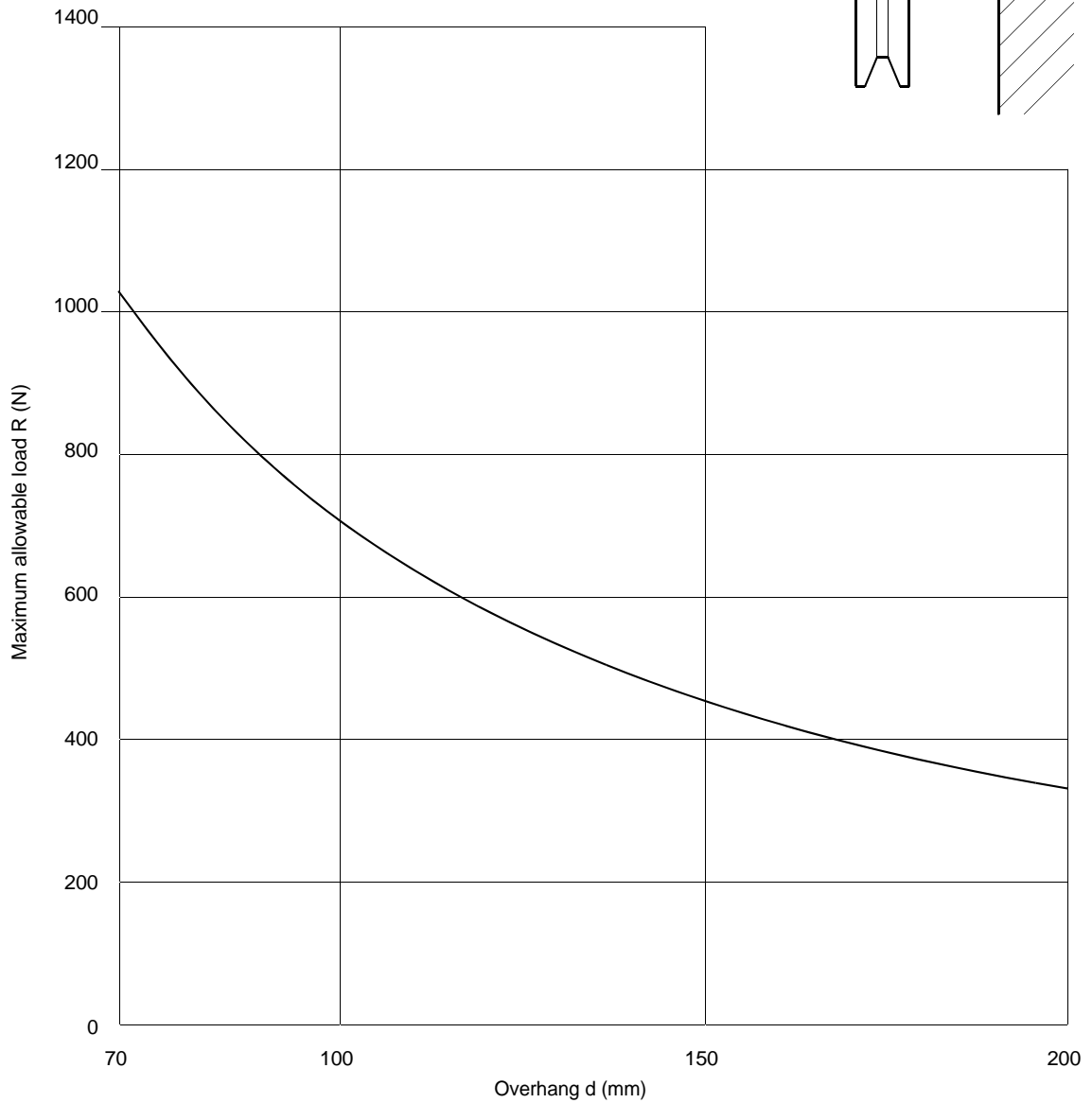
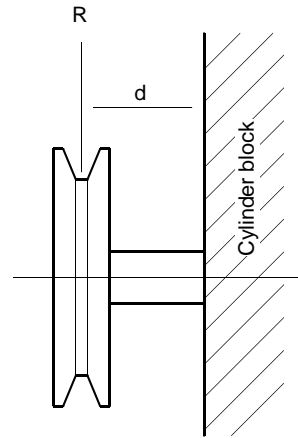
The diagrams on page 302 onwards show the maximum bending moment that can be applied when the power is taken from the crankshaft by a drive belt. The distance the load can be taken from the front face of the cylinder block is shown in each diagram. The load angle, when viewed from the front of the engine is measured clockwise and radially outwards in N.

Maximum allowable load versus overhang, 402D-05, at front of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type : 402D-05
 Loading : At front of crankshaft

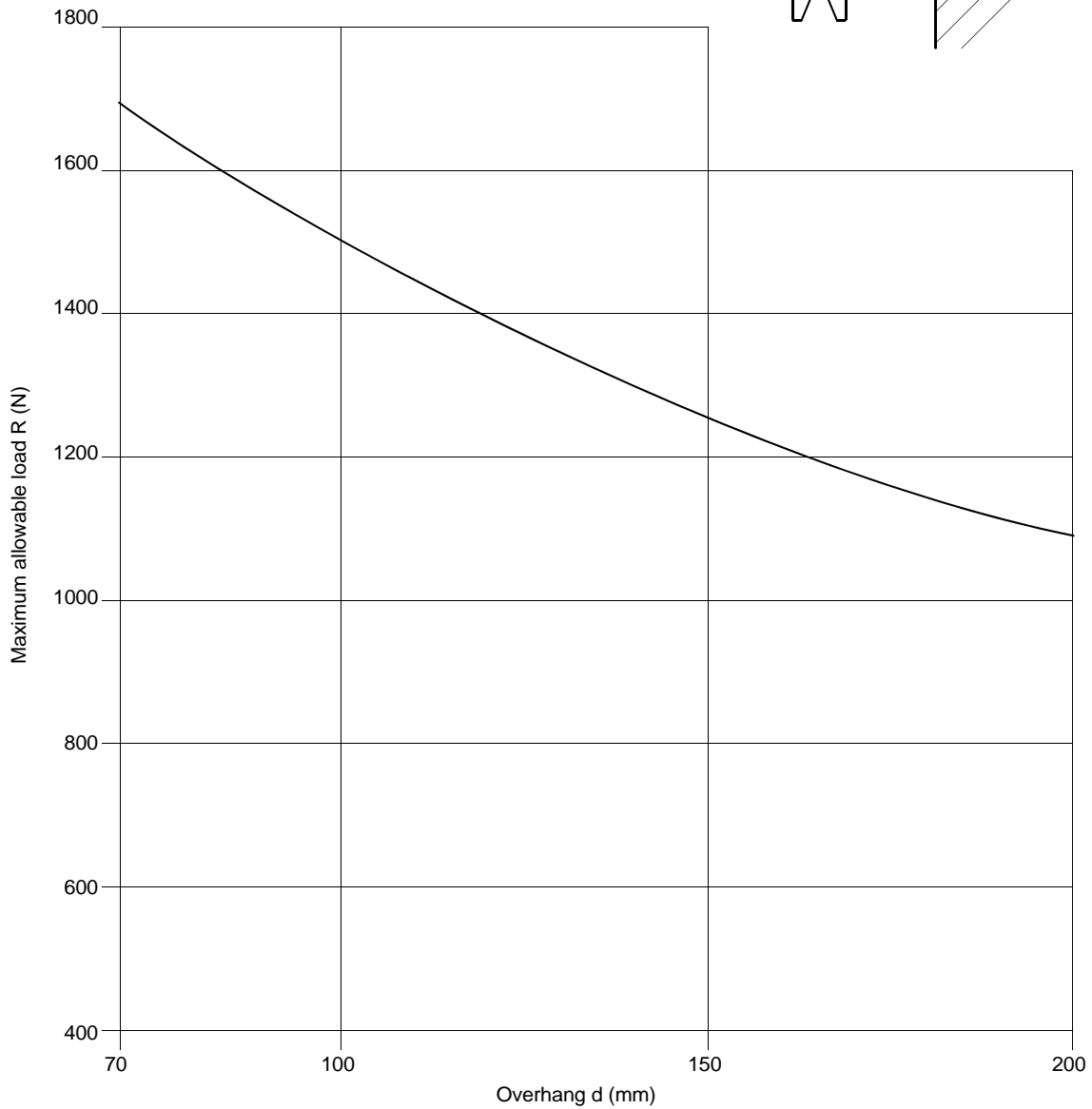
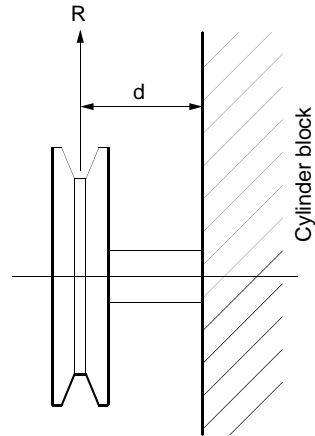


Maximum allowable load versus overhang, 402D-05, at rear of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type : 402D-05
Loading : At rear of crankshaft

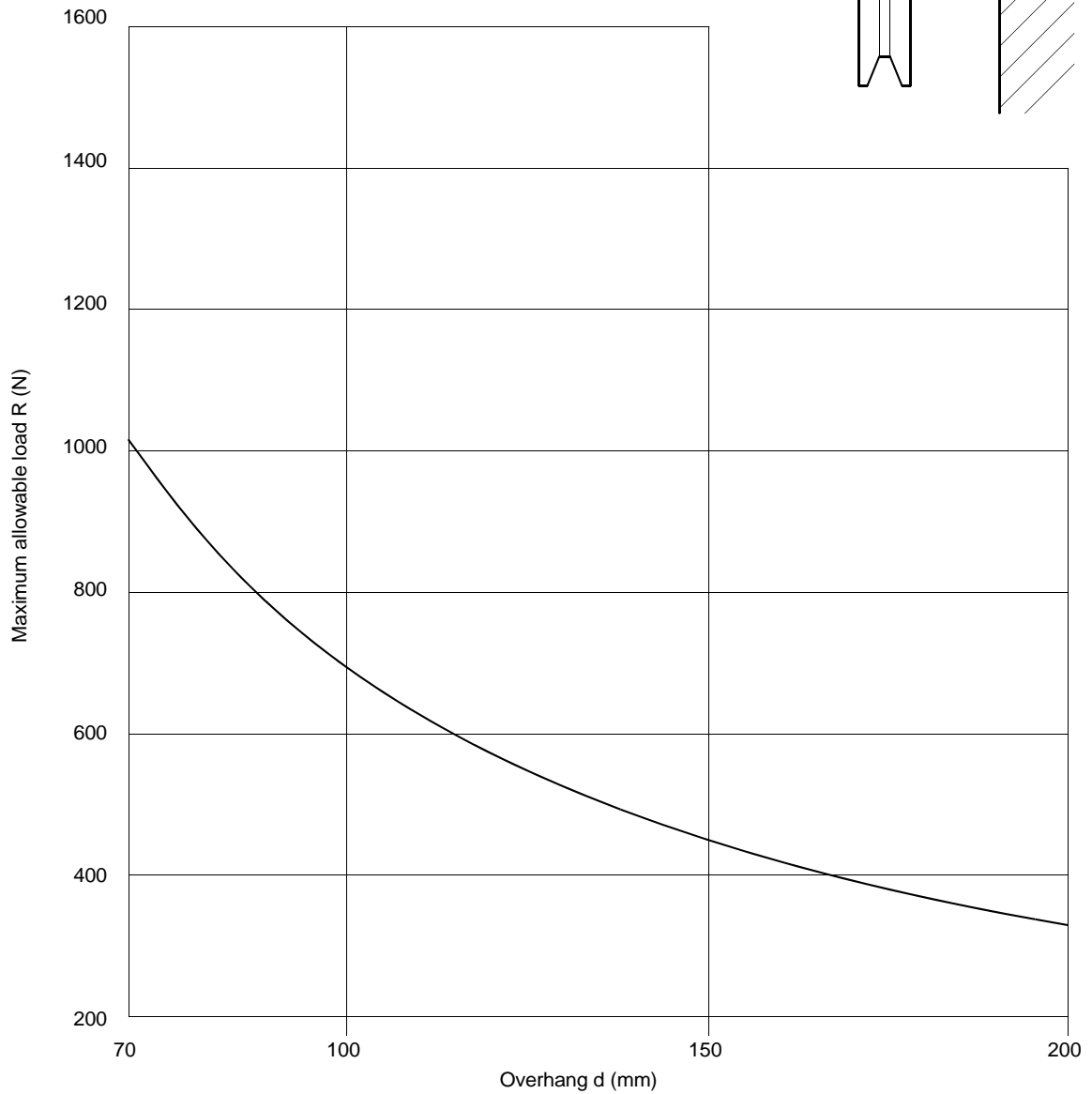
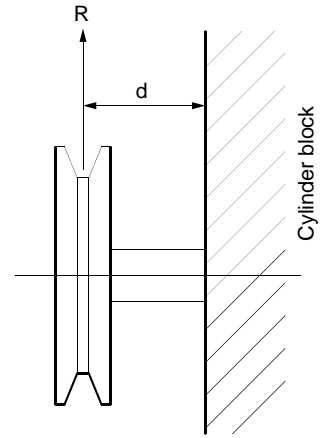


Maximum allowable load versus overhang, 403D-07, at front of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type : 403D-07
 Loading : At front of crankshaft

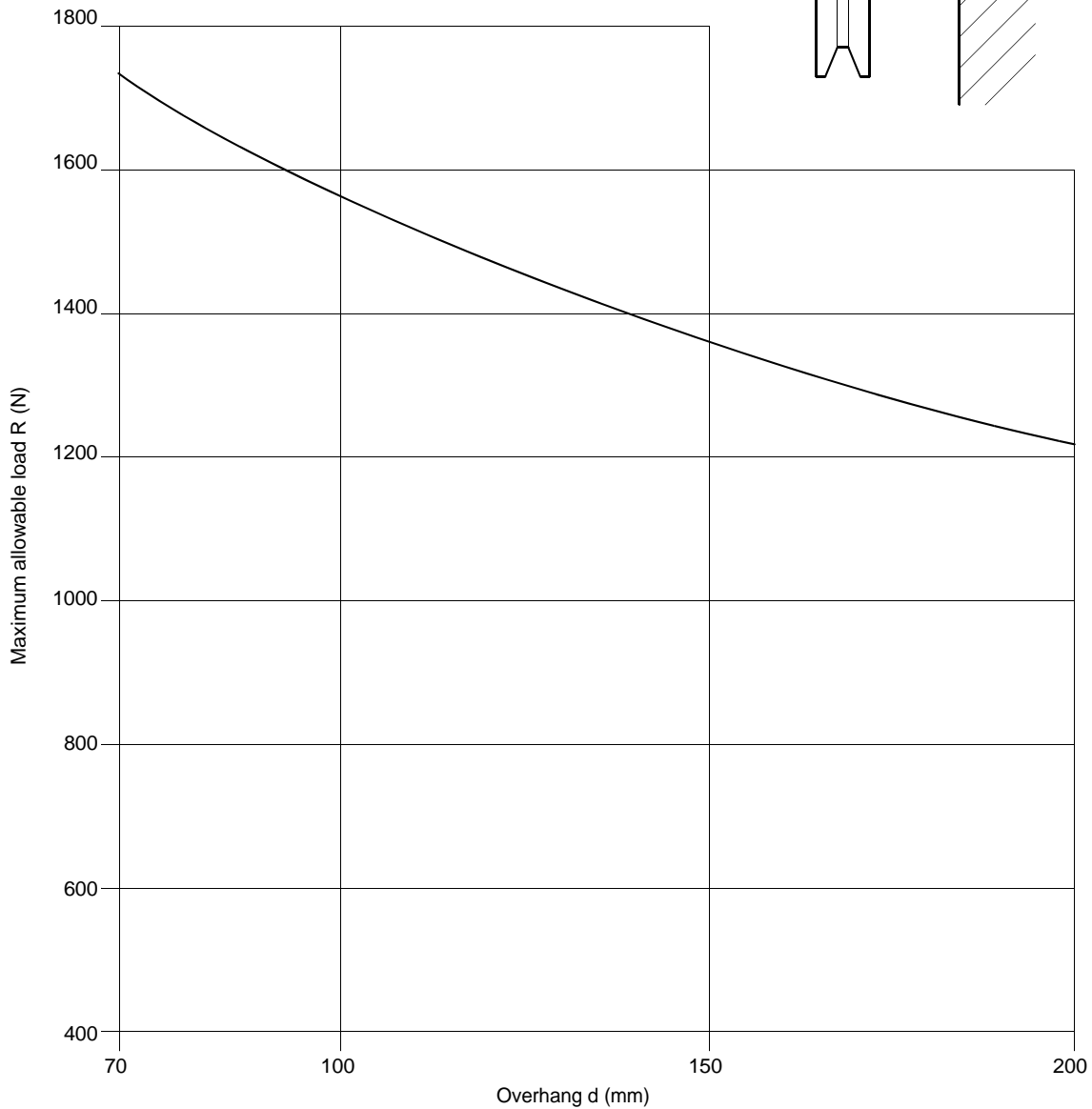
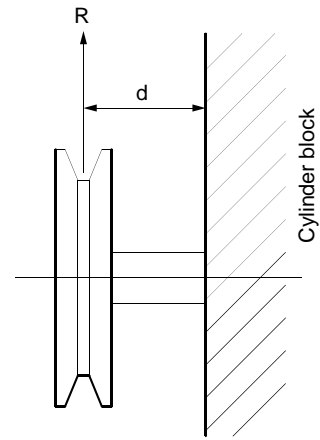


Maximum allowable load versus overhang, 403D-07, at rear of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type : 403D-07
Loading : At rear of crankshaft

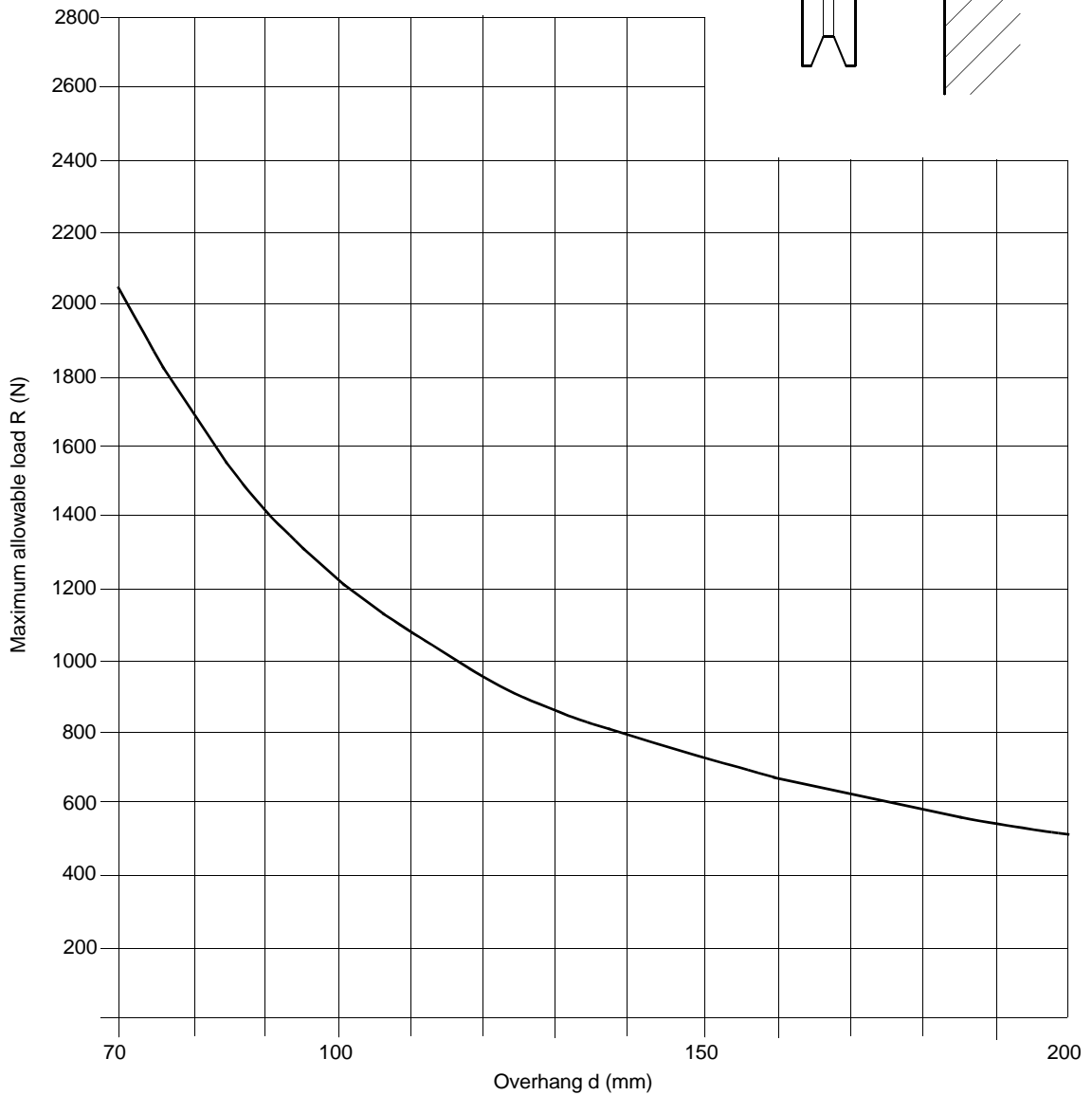
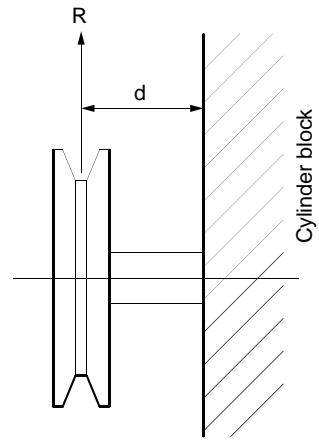


Maximum allowable load versus overhang, 403D-11 and 404D-15, at front of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type 403D-11 and 404D-15
Loading : At front of crankshaft



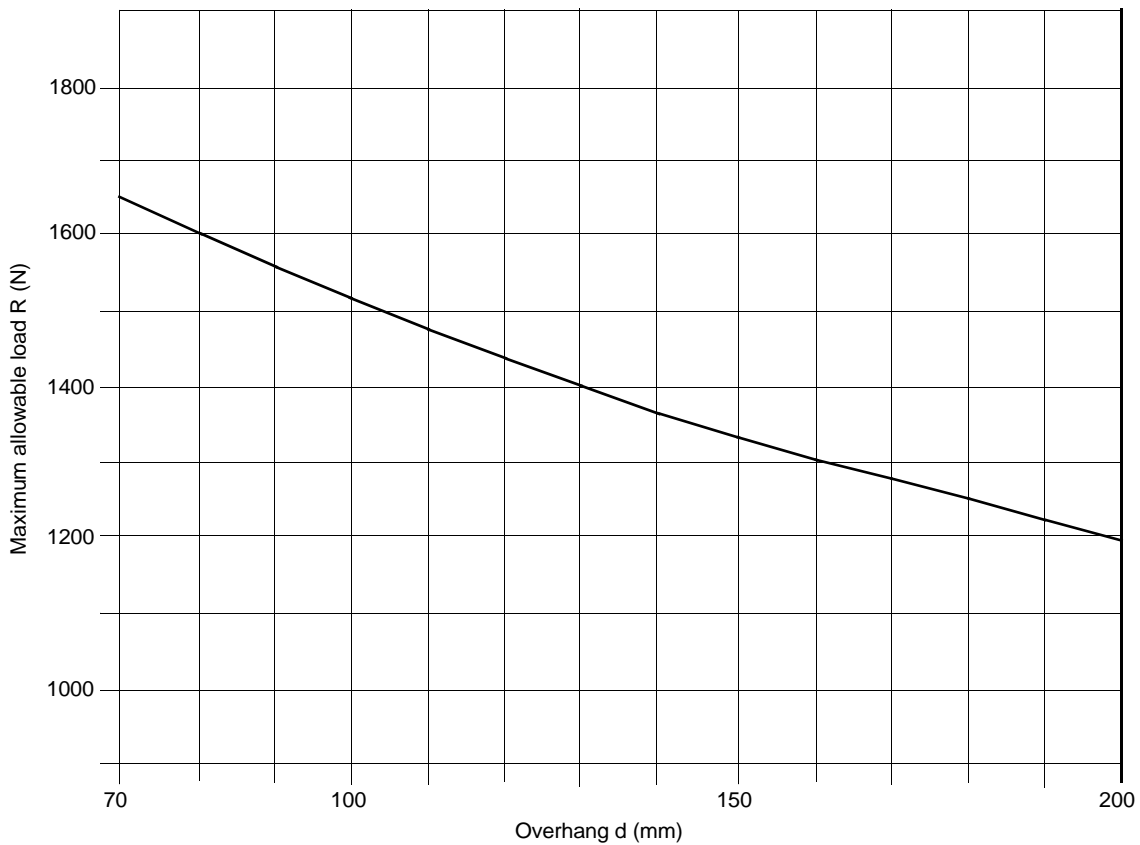
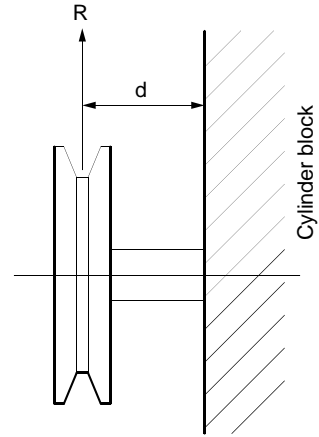
K1234/1

Maximum allowable load versus overhang, 403D-11 and 404D-15, at rear of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type : 403D-11 and 404D-15
 Loading : At rear of crankshaft

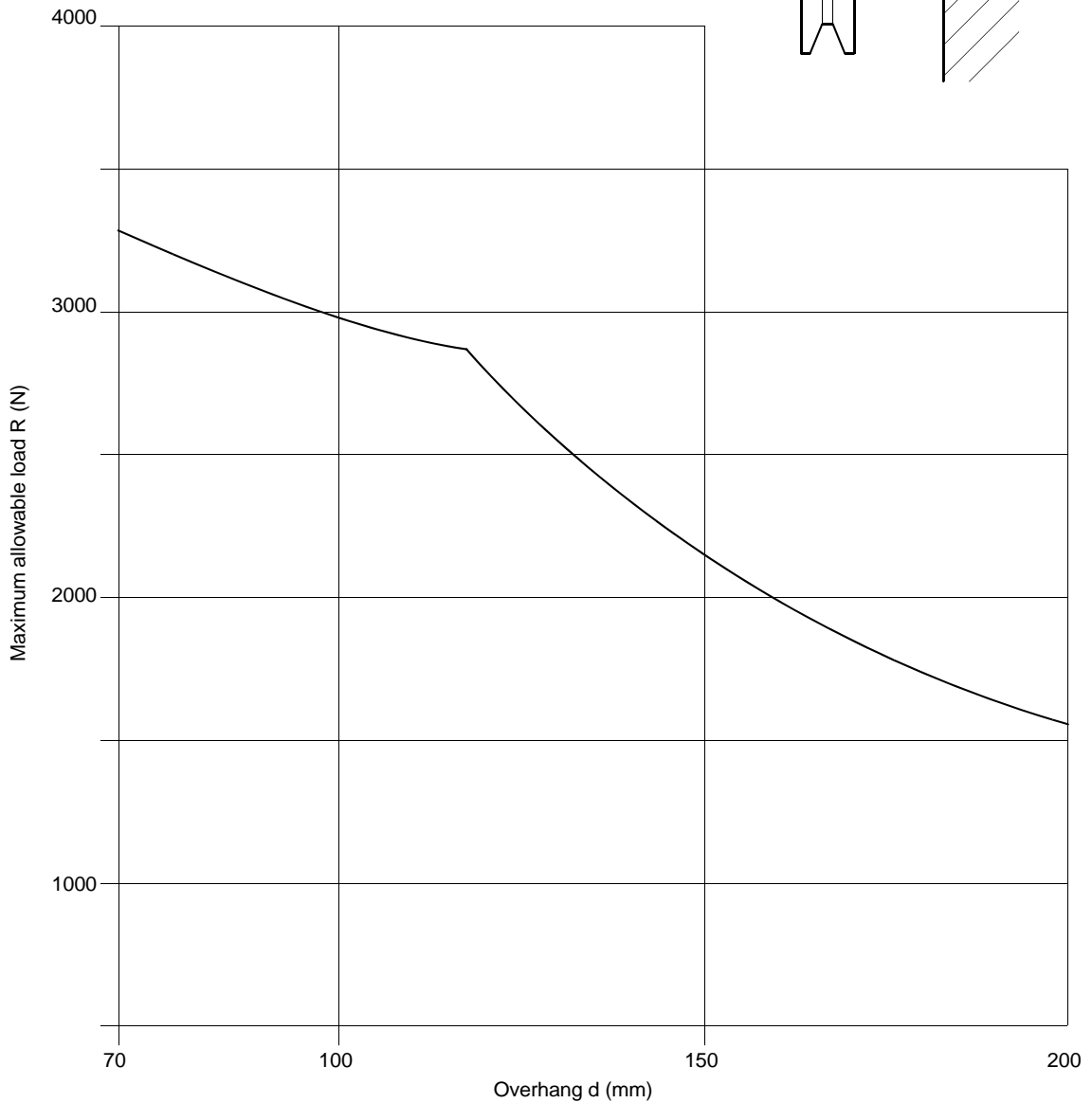
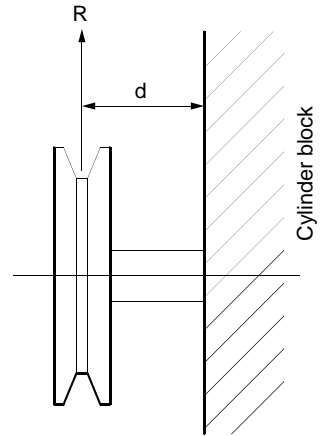


Maximum allowable load versus overhang, 403D-15, 403D-15T, at front of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type 403D-15 and 403D-15T
 Loading : At front of crankshaft

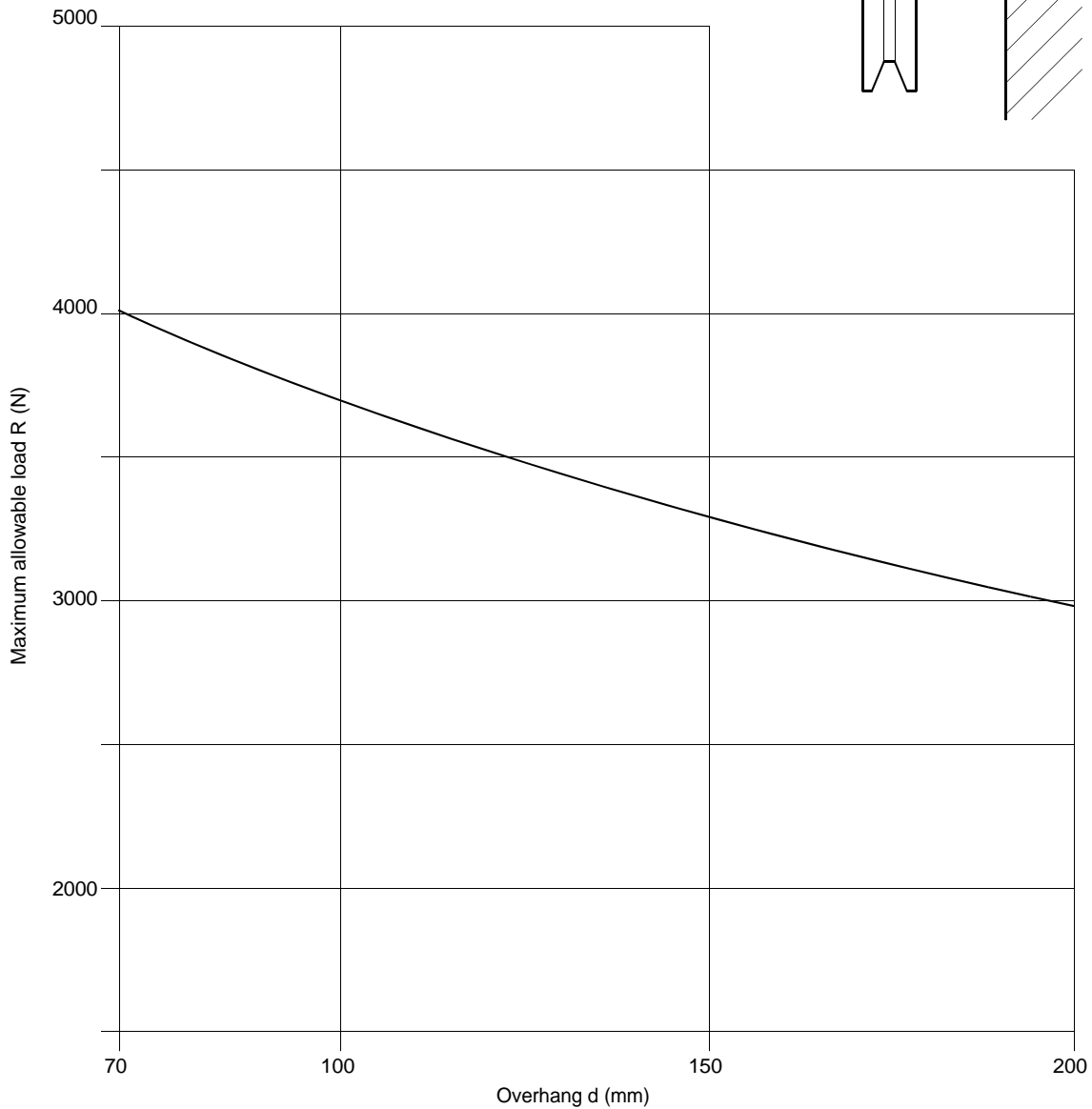
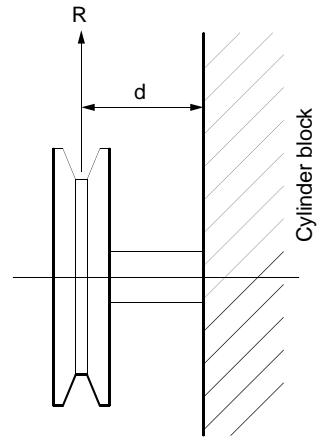


Maximum allowable load versus overhang, 403D-15, 403D-15T, at rear of crankshaft

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type 403D-15 and 403D-15T
 Loading : At rear of crankshaft

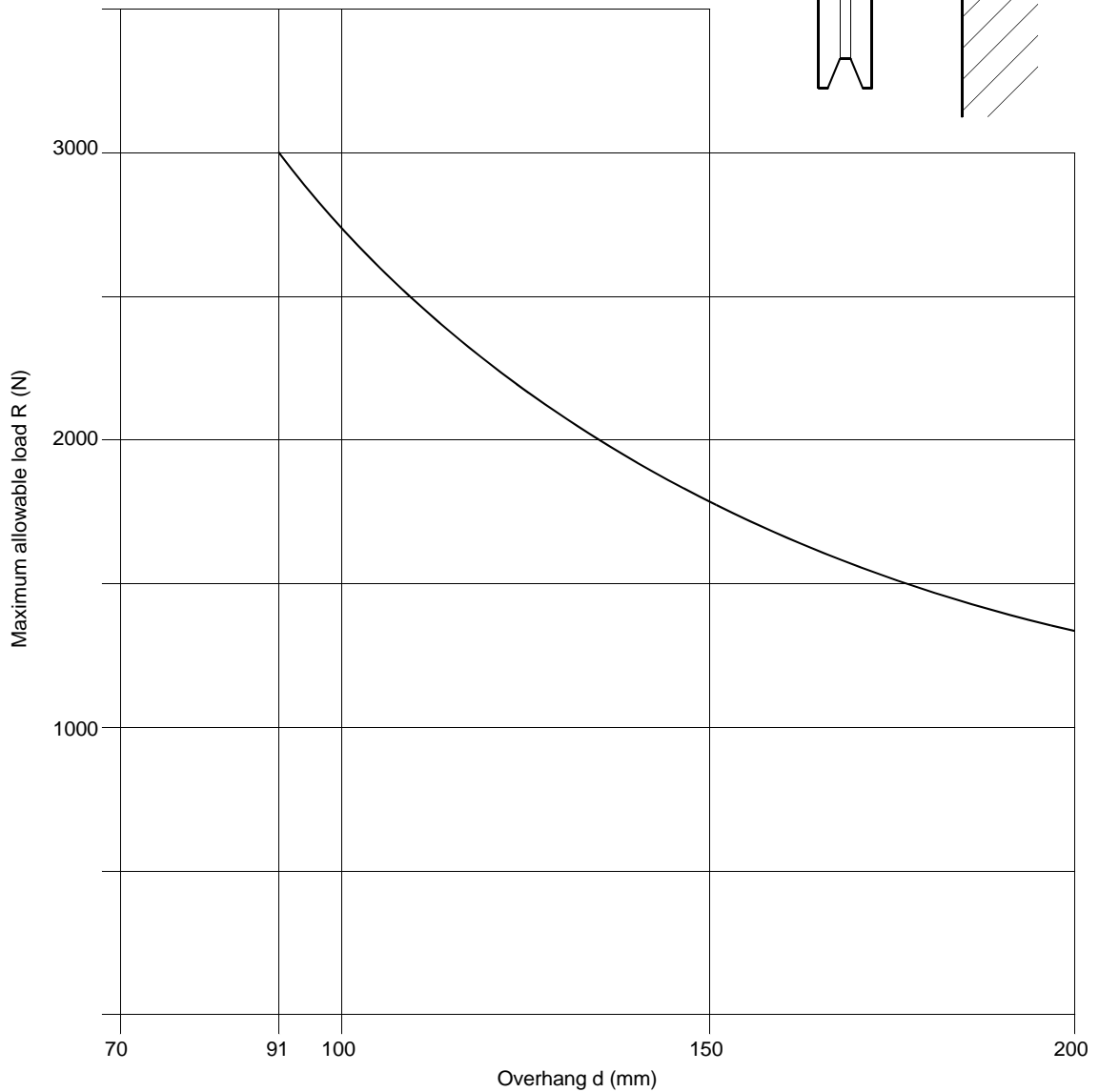
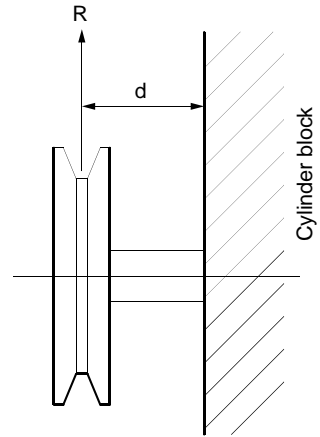


Maximum allowable load versus overhang, 403D-17, 404D-22, 404D-22T and 404D-22TA, crankshaft front

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

Engine type 403D-17, 404D-22, 404D-22T, 404D-22TA
 Loading : At front of crankshaft

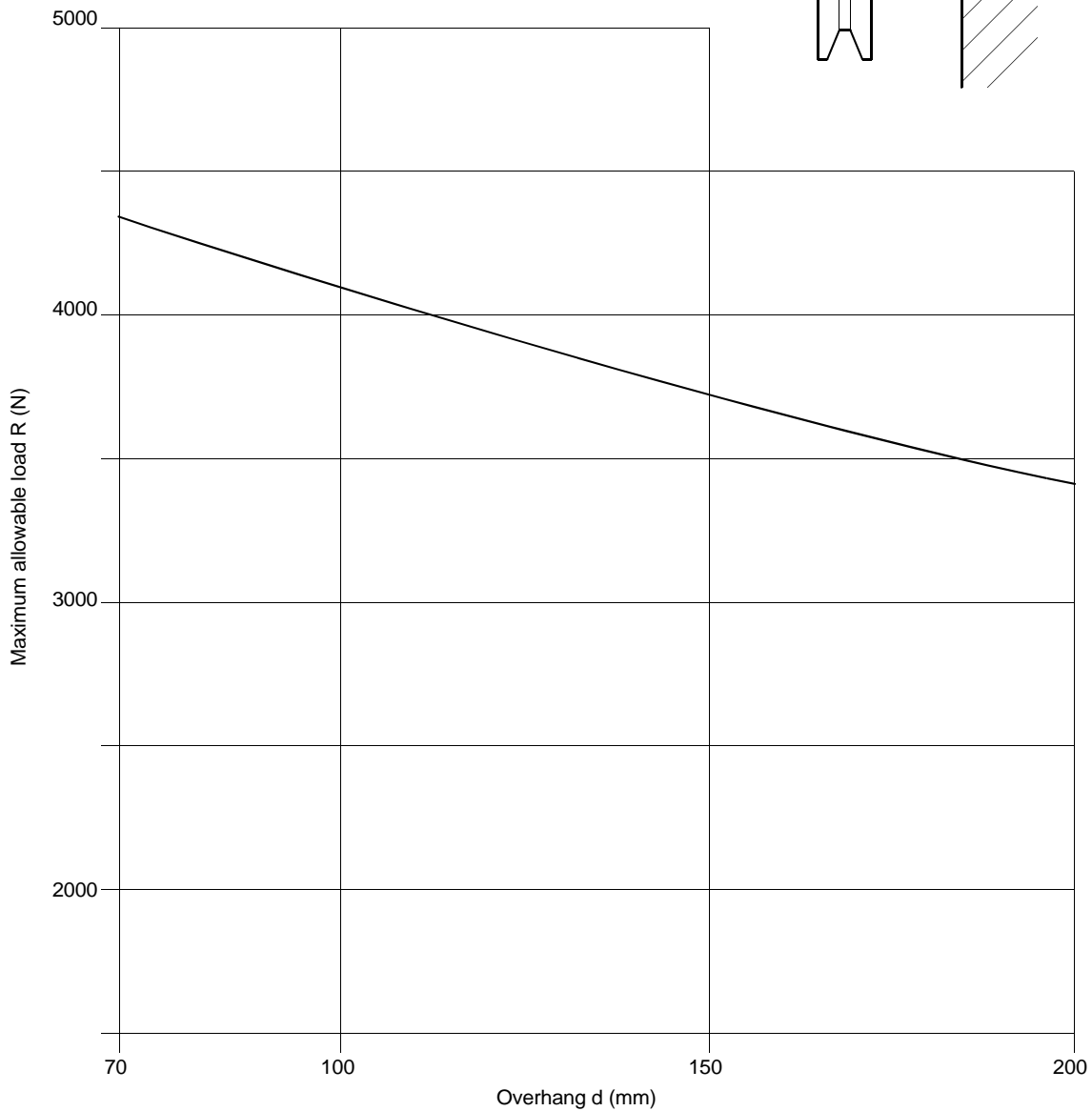
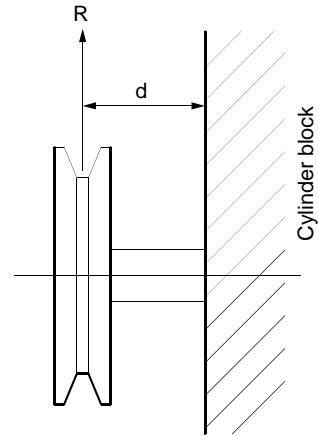


Maximum allowable load versus overhang, 403D-17, 404D-22, 404D-22T and 404D-22TA, crankshaft rear

Maximum allowable load vs. overhang for using belt

Note: Consider the conditions for use and take proper measures if necessary.

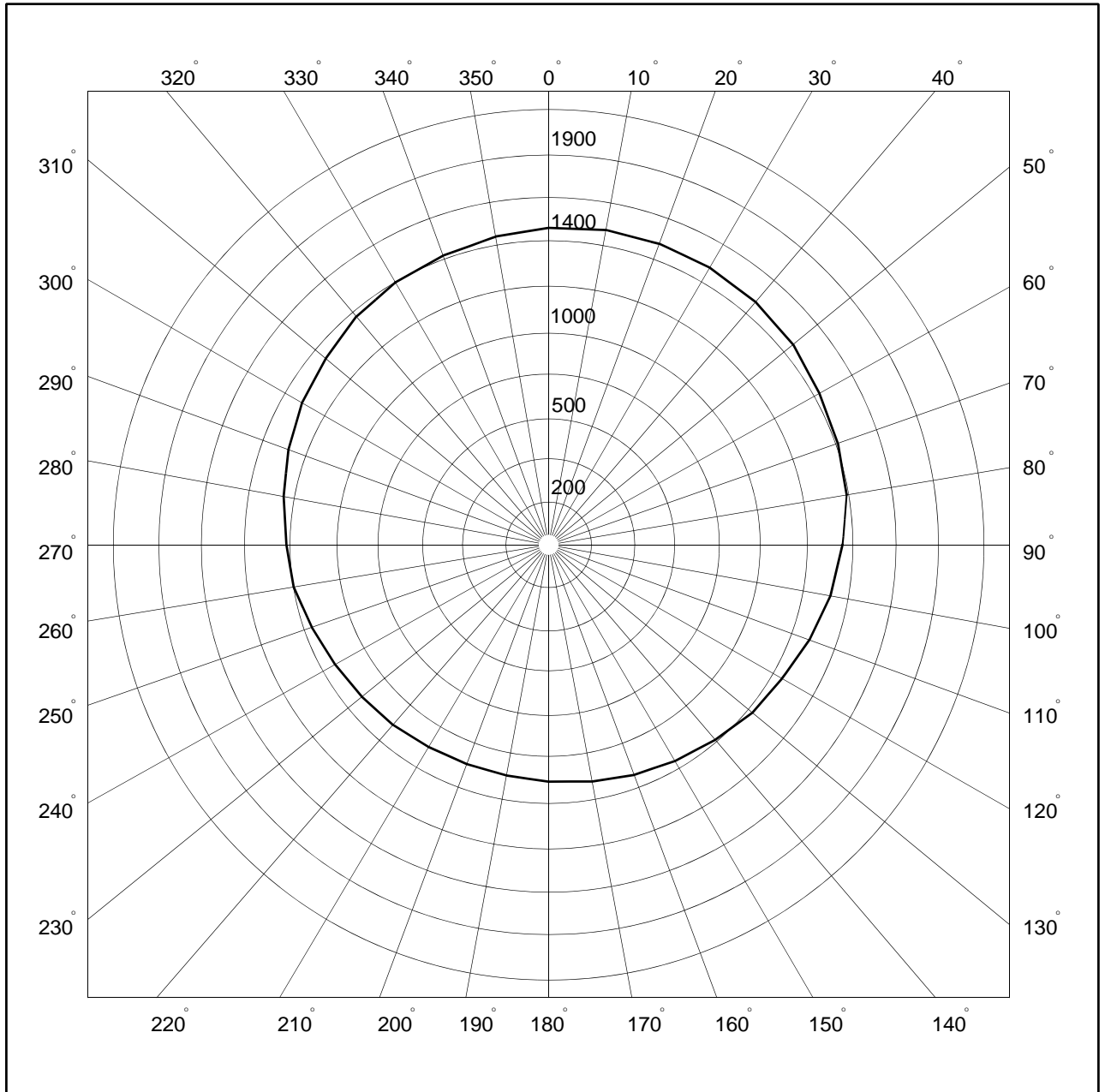
Engine type 403D-17, 404D-22, 404D-22T, 404D-22TA
 Loading : At rear of crankshaft



Maximum allowable crankshaft overhung load PED-0257-14

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

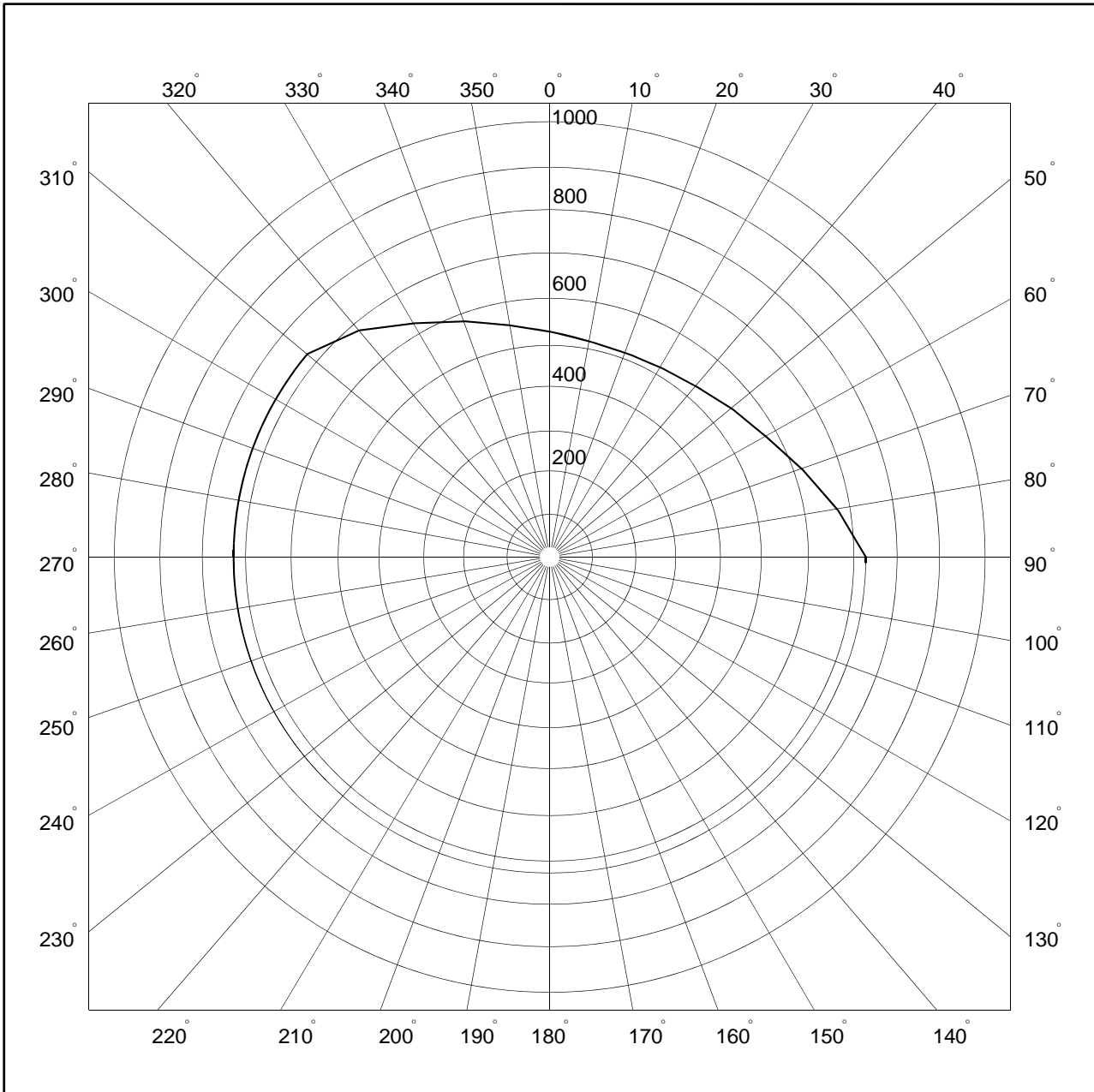


Engine type 402D-05
 Loading at rear of crankshaft
 Engine speed 3600 rpm
 Distance of load from block face 100 mm

Maximum allowable crankshaft overhung load PED-0257-12

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

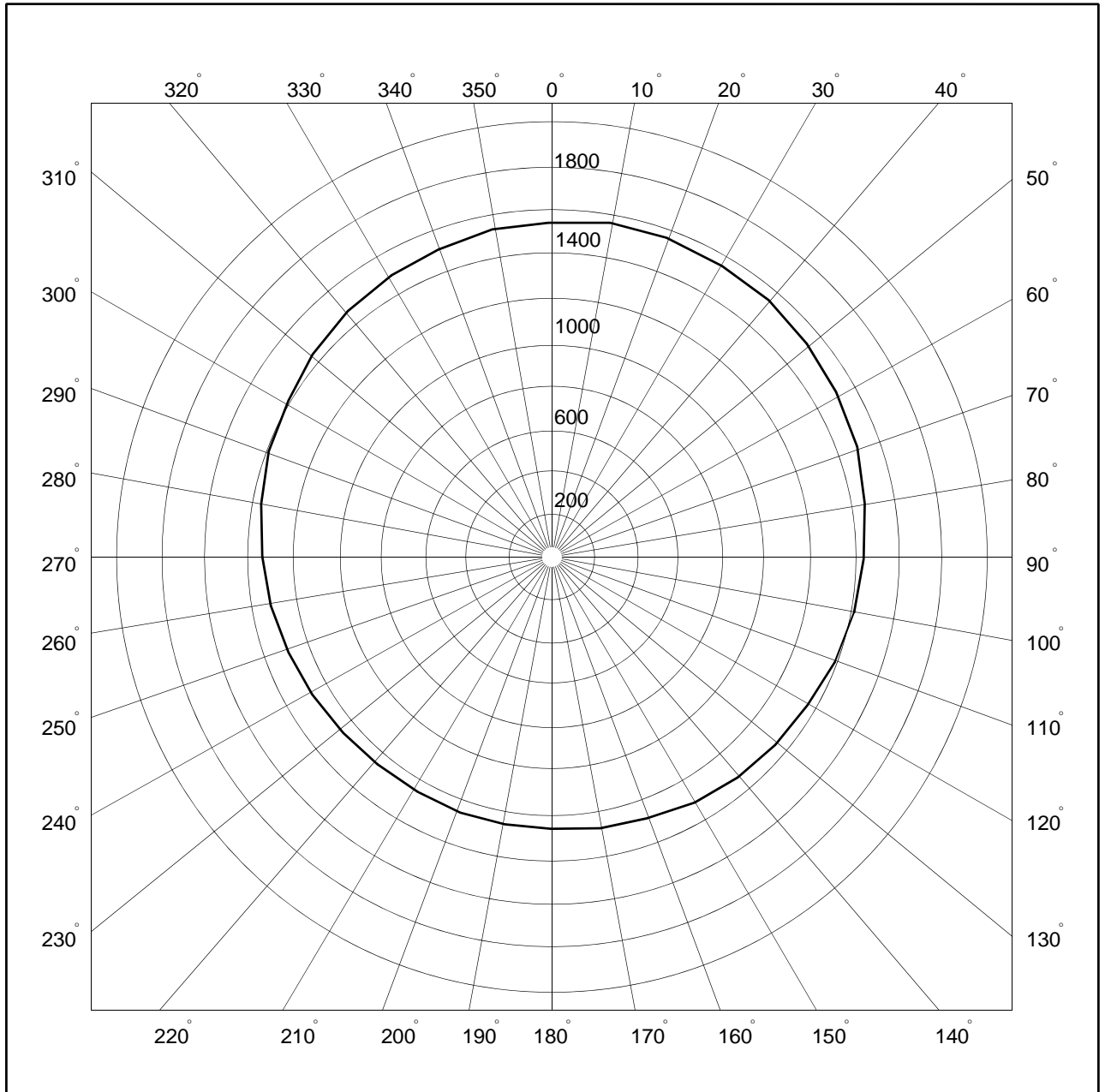


Engine type 402D-05
 Loading at front of crankshaft
 Engine speed 3600 rpm
 Distance of load from block face.. 96,5 mm

Maximum allowable crankshaft overhung load PED-0244-14

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

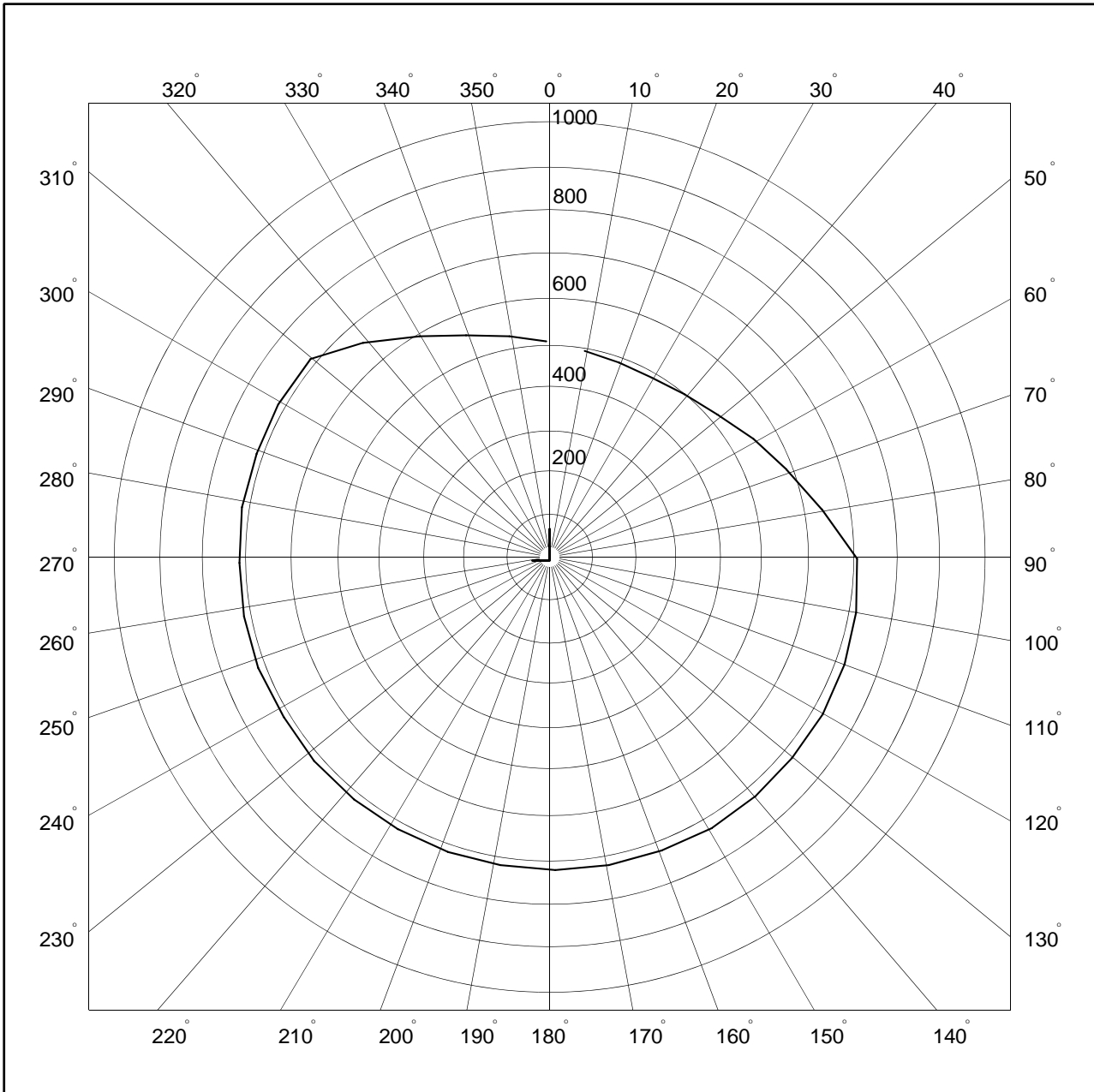


Engine type 403D-07
 Loading at rear of crankshaft
 Engine speed 3600 rpm
 Distance of load from block face 100 mm

Maximum allowable crankshaft overhung load PED-0244-12

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

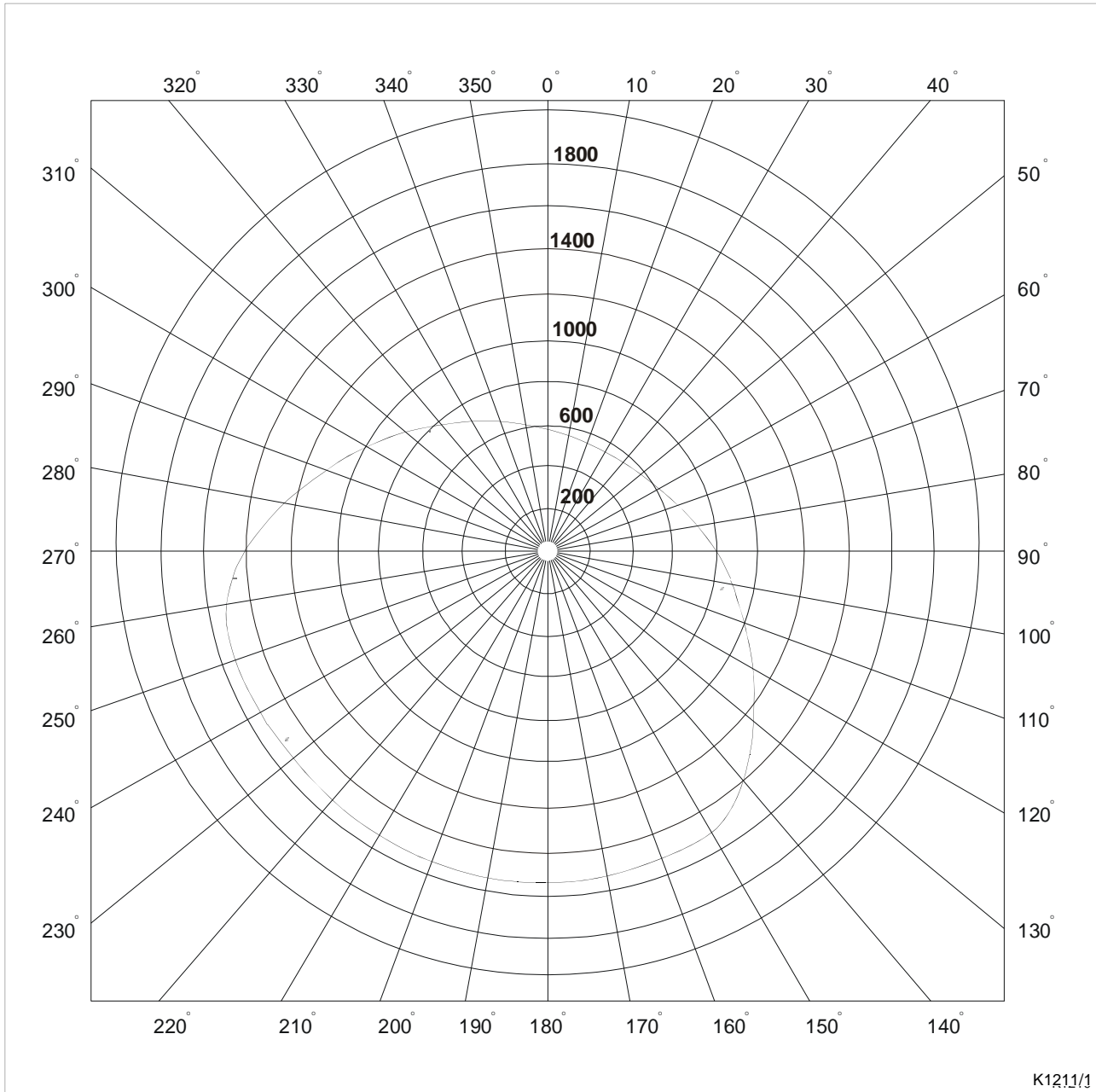


Engine type 403D-07
 Loading at front of crankshaft
 Engine speed 3600 rpm
 Distance of load from block face 96,5 mm

Maximum allowable crankshaft overhung load PED-0371-2

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.



Engine type 403D-11, 404D-15

Loading at front of crankshaft.

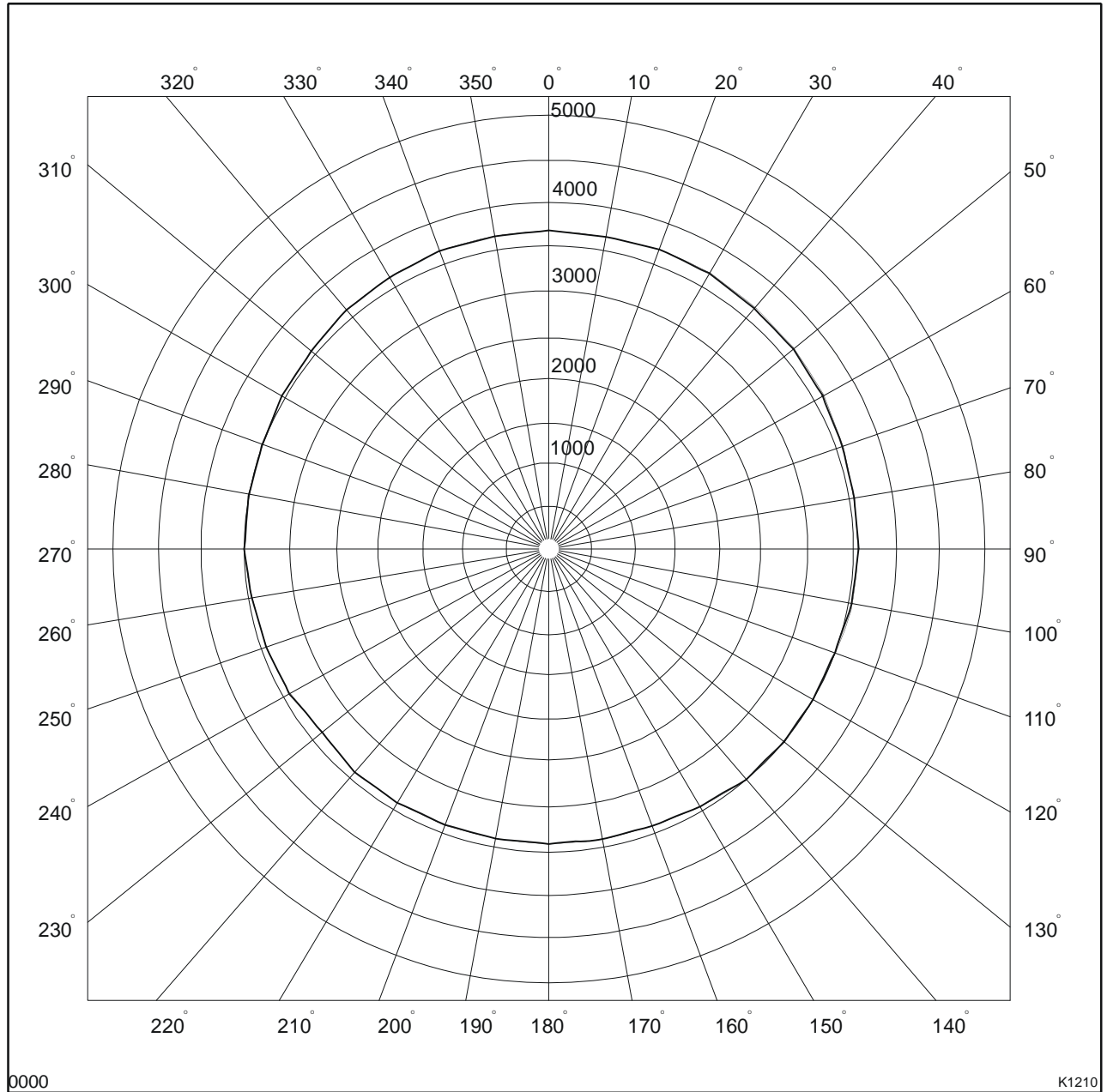
Engine speed 3000 rpm.

Distance of load from block face.. 85 mm.

Maximum allowable crankshaft overhung load PED-0152-11-D

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

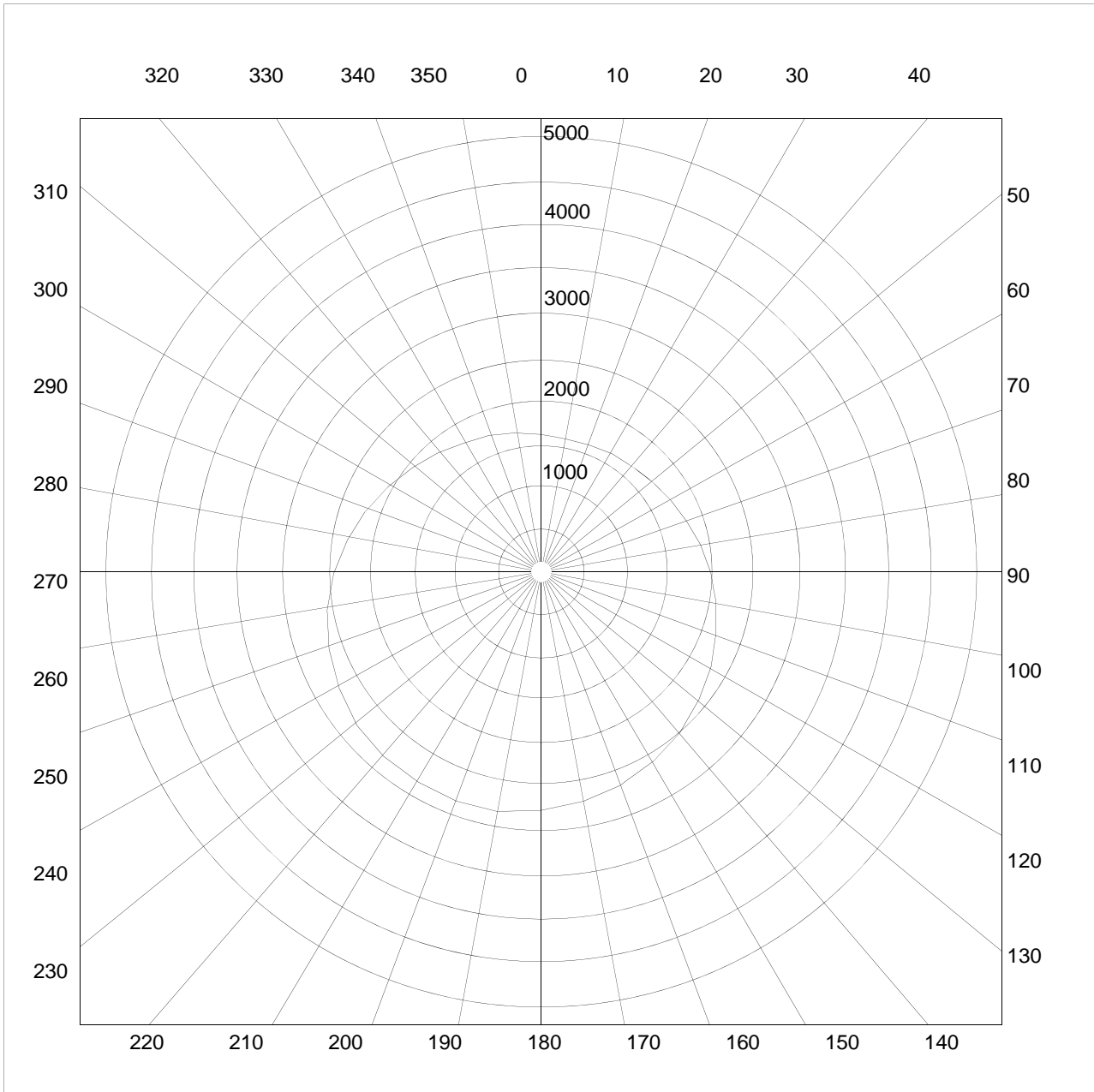


Engine type 403D-15, 403D-15T
 Loading at rear of crankshaft.
 Engine speed 2800 rpm.
 Distance of load from block face 100 mm.

Maximum allowable crankshaft overhung load PED-0152-11-B

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

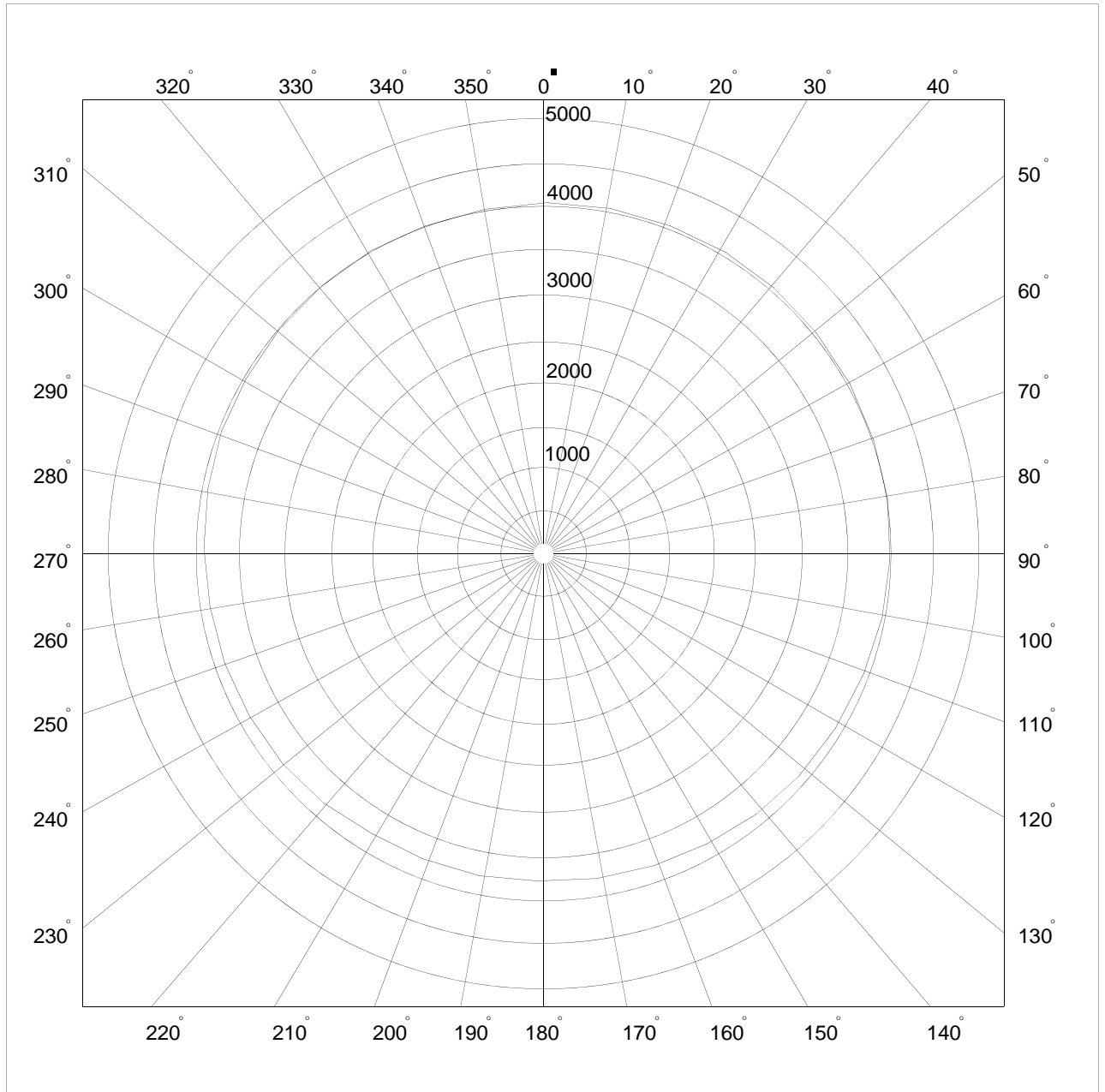


Engine type 403D-15, 403D-15T
 Loading at front of crankshaft.
 Engine speed 2800 rpm.
 Distance of load from block face.. 102,5 mm.

Maximum allowable crankshaft overhung load PED-0290-14

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.

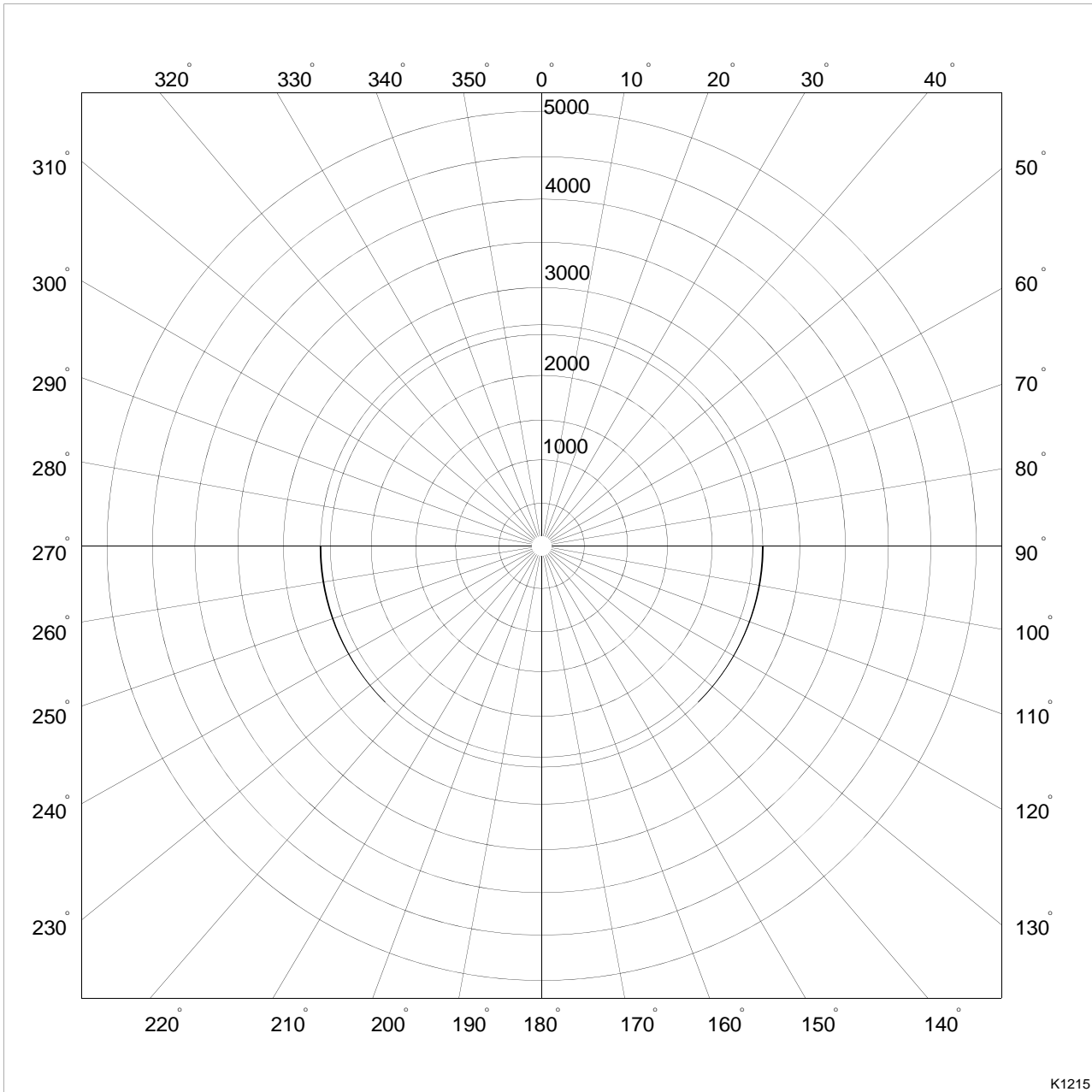


Engine type 403D-17, 404D-22, 404D-22T and 404D-22TA
 Loading at rear of crankshaft.
 Engine speed 2800 rpm.
 Distance of load from block face 100 mm.

Maximum allowable crankshaft overhung load PED-0290-12

Load angle is measured clockwise when viewed from the front of the engine.

Load (N) acts radially outwards.



K1215

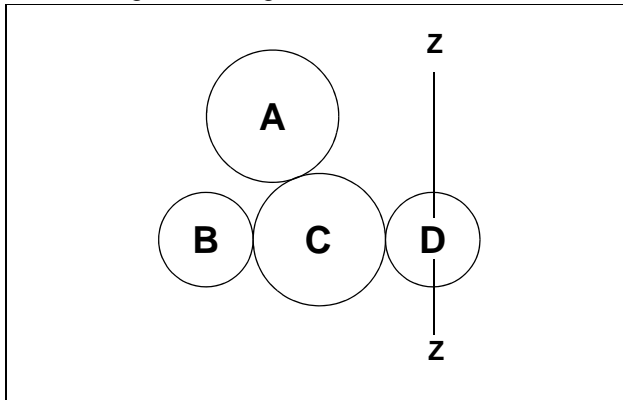
Engine type 403D-17, 404D-22, 404D-22T and 404D-22TA
 Loading at front of crankshaft.
 Engine speed 2800 rpm.
 Distance of load from block face.. . . . 102,5 mm.

Power and torque available

- 1 From crankshaft front pulley (tapered cast iron) (D), full engine power and torque.
- 2 From drive gear (B).

Maximum allowable torque

Gear arrangement diagram



Gear details	Number of teeth	Number of teeth	Number of teeth
	402D-05, 403D-07	403D-11, 404D-15	403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T and 404D-22TA
A = Cam gear/injection pump gear	48	52	66
B = PTO drive gear	23	33	48
C = Idler gear/oil pump gear	48	54	62
D = Crankshaft gear	24	26	33

Gear ratio formula

$$\text{rev/min PTO} = \text{rev/min} \times \frac{\text{Number of teeth on the crankshaft gear}}{\text{Number of teeth on the PTO gear}}$$

The example shown below is for a 404D-22:

$$\text{rev/min PTO} = 2800 \times \frac{33}{48}$$

$$\text{rpm PTO} = 1925$$

Torque available from drive gear (B)

Maximum torque approval for customer hydraulic pumps.

Notes:

- The 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T and 404D-22TA are fitted with a SAE A (2 bolt) type timing case
- 403D-11, and the 404D-15 are fitted with a SAE A-A (2 bolt) type timing case

Engine type	Timing case PTO drive torque limits			
	Maximum continuous torque available		Maximum intermittent torque available	
	Nm	lb ft	Nm	lb ft
402D-05 ⁽¹⁾ 403D-07 ⁽¹⁾	29	21.4	35	25.8
403D-11 ⁽²⁾ 404D-15	36.4	26.8	43.2	31.9
403D-15 403D-15T 403D-17 404D-22 404D-22T ⁽³⁾ 404D-22TA	57.8	42.6	68.9	50.8

1. Single PTO on rear of the timing case RHS only.
2. PTO available from front or rear of timing case (right hand side). If both PTO positions are used simultaneously, the sum of the two torques must not exceed 43.2 Nm (31.9 lb ft).
3. PTO available from front or rear of timing case (right hand side). If both PTO positions are used simultaneously, the sum of the two torques must not exceed 68.9 Nm (50.8 lb ft).

Caution: Failure to observe the above will damage the gears.

SAE-A 11T & 10T (16/32DP)

Engine Service Manuals (PO's) are revised to read:

Maximum Intermittent Torque 68.9 Nm

Maximum Continuous Torque... .. 57.8 Nm

SAE-AA 9T (16/32DP) & 9T (20/40DP)

Engine Service Manuals (PO's) are revised to read:

-Maximum Intermittent Torque... .. 43.2 Nm

-Maximum Continuous Torque... .. 36.4 Nm

Continuous is defined as:

“the upper limit of continuous variable PTO use, for the normal (50%) duty cycle of the engine”.

Intermittent is defined as:

“where the PTO is used for short periods (approximately 30 seconds) for a relatively low proportion of the engine life”.

Hydraulic pumps

Proprietary hydraulic pumps designed for the Perkins 400 Series engines are available from many hydraulic pump manufacturers. Details are available upon request from Perkins Engines Ltd.

SAE A hydraulic pump interface detail 403D-15, 403D-15T, 403D-17, 404D-22, 404D-22T and 404D-22TA

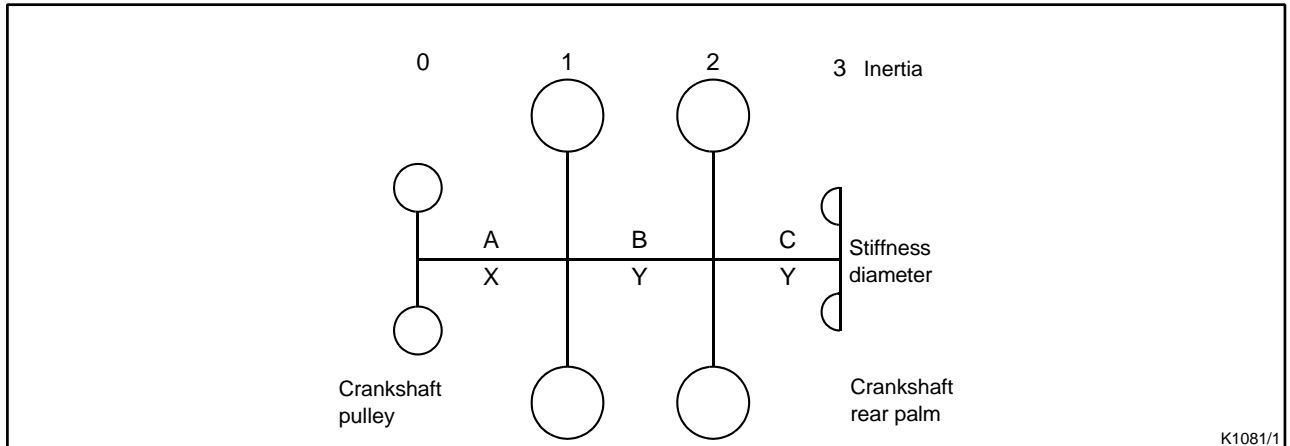
Interface details not available at time of print.
Details can be requested through your usual sales contact.

SAE A-A hydraulic pump interface detail 403D-11, 404D-15

Interface details not available at time of print.
Details can be requested through your usual sales contact.

Mass Elastic System

Diagram - 402D-05



Inertia

Engine type	Inertia (Mk ²) (Kgf cm sec ²)			
	0	1	2	3
402D-05	0,01112	0,02389	0,02383	0,00411

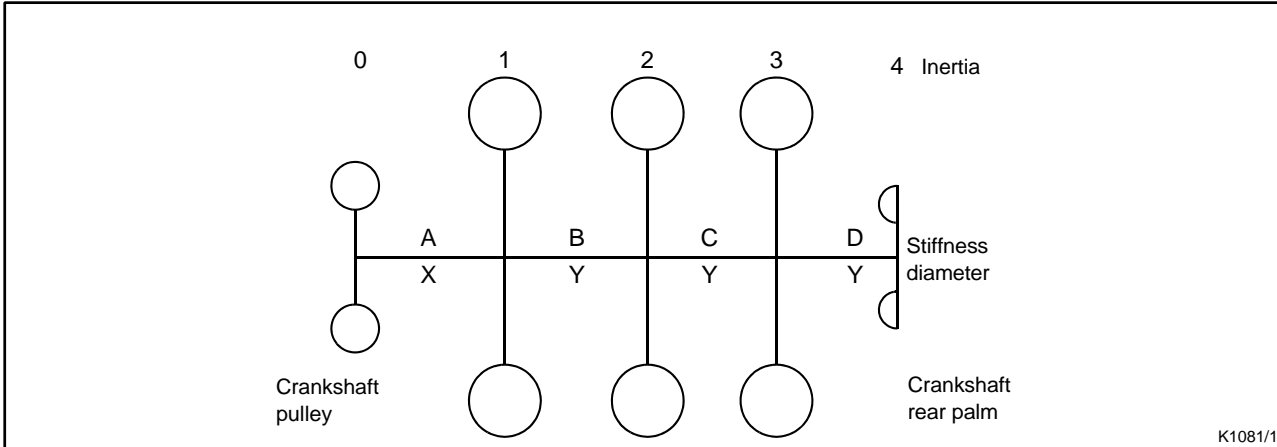
Note: Without flywheel and ring gear.

Stiffness

Engine type	Stiffness (Kgf cm x 10 ⁶ /Radian)			Minimum diameter (mm)	
	A	B	C	X	Y
402D-05	0,46816	2,40896	3,83144	25,0	35,0

Note: Without flywheel and ring gear.

Diagram - 403D-07



K1081/1

Inertia

Engine type	Inertia (Mk ²) (Kgf cm sec ²)				
	0	1	2	3	4
403D-07	0,01077	0,02712	0,01773	0,02762	0,00409

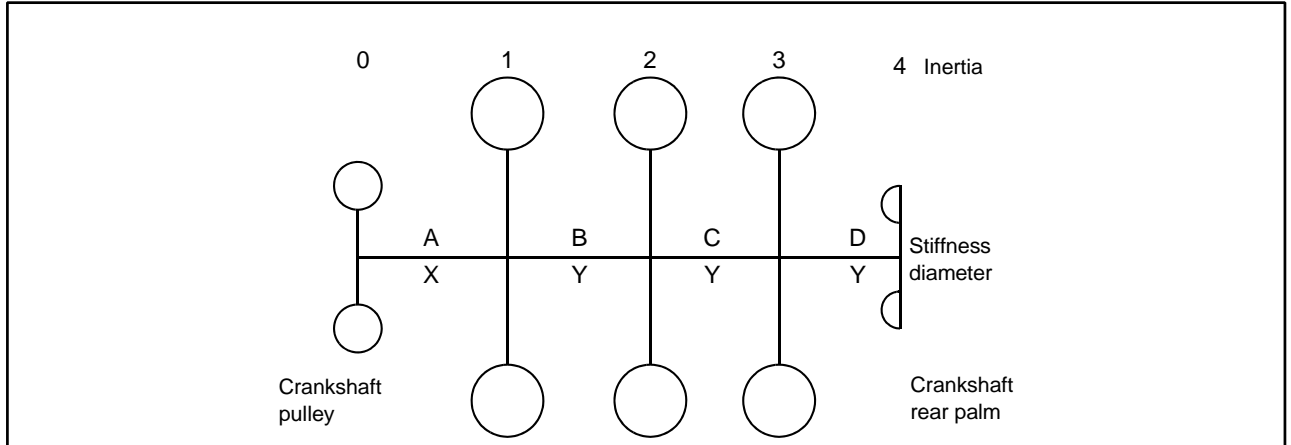
Note: Without flywheel and ring gear.

Stiffness

Engine type	Stiffness (Kgf cm x 10 ⁶ /Radian)				Minimum diameter (mm)	
	A	B	C	D	X	Y
403D-07	0,41787	2,43498	2,42498	4,31012	22,6	35,0

Note: Without flywheel and ring gear.

Diagram - 403D-11



Inertia

Engine type	Inertia (Mk ²) (Kgf cm sec ²)				
	0	1	2	3	4
403D-11	0,01403	0,03827	0,02485	0,03827	0,004039

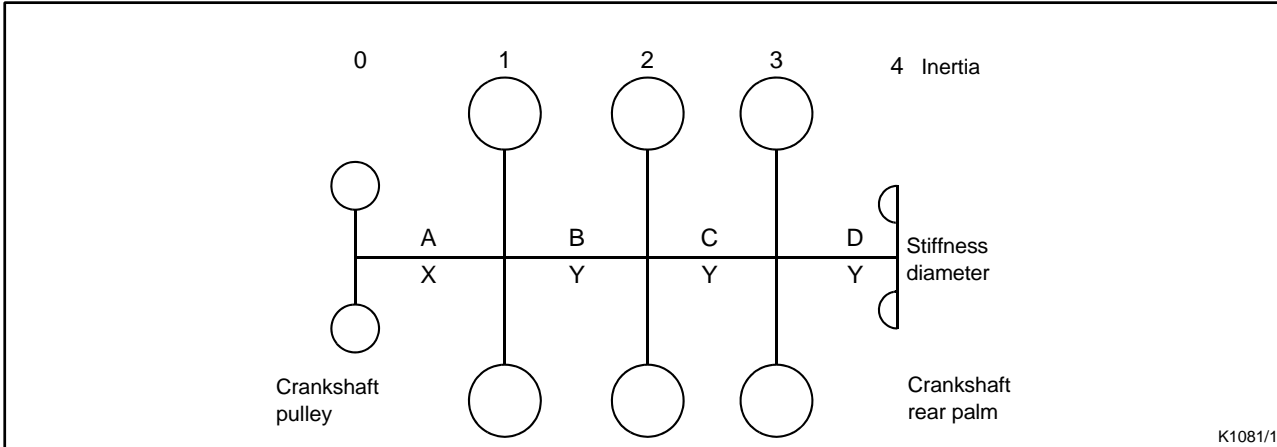
Note: Without flywheel and ring gear.

Stiffness

Engine type	Stiffness (Kgf cm x 10 ⁶ /Radian)				Minimum diameter (mm)	
	A	B	C	D	X	Y
403D-11	0,46771	3,45266	3,45266	5,43074	25,0	39,0

Note: Without flywheel and ring gear.

Diagram - 403D-15 and 403D-15T



Inertia

Engine type	Inertia (Mk ²) (Kgf cm sec ²)				
	0	1	2	3	4
403D-15 403D-15T	0,08281	0,13244	0,08965	0,13244	0,01549

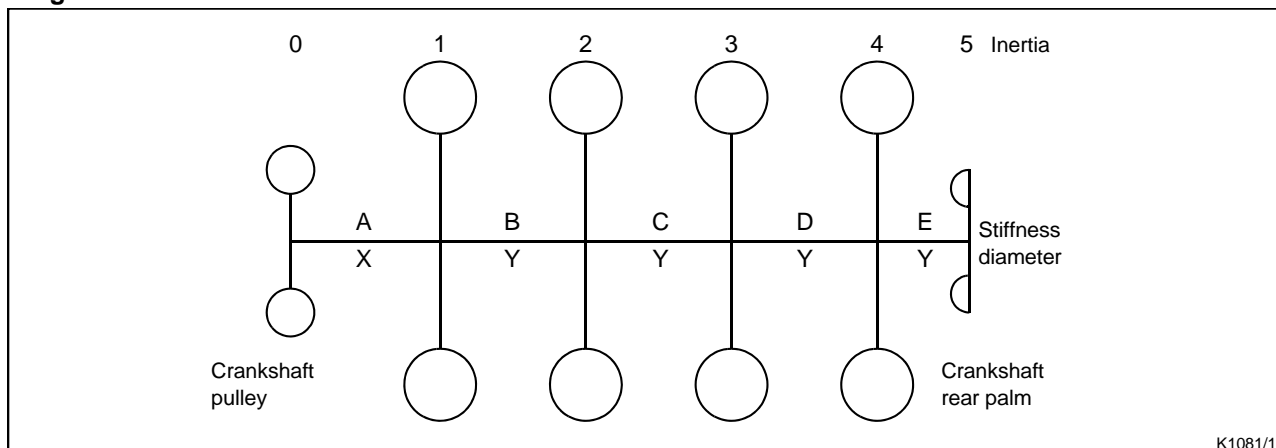
Note: Without flywheel and ring gear.

Stiffness

Engine type	Stiffness (Kgf cm x 10 ⁶ /Radian)				Minimum diameter (mm)	
	A	B	C	D	X	Y
403D-15 403D-15T	1,5917	9,0879	9,0879	14,849	32,4	52,0

Note: Without flywheel and ring gear.

Diagram - 404D-15



Inertia

Engine type	Inertia (Mk ²) (Kgf cm sec ²)					
	0	1	2	3	4	5
404D-15	0,01161	0,04769	0,04768	0,04768	0,04793	0,00404

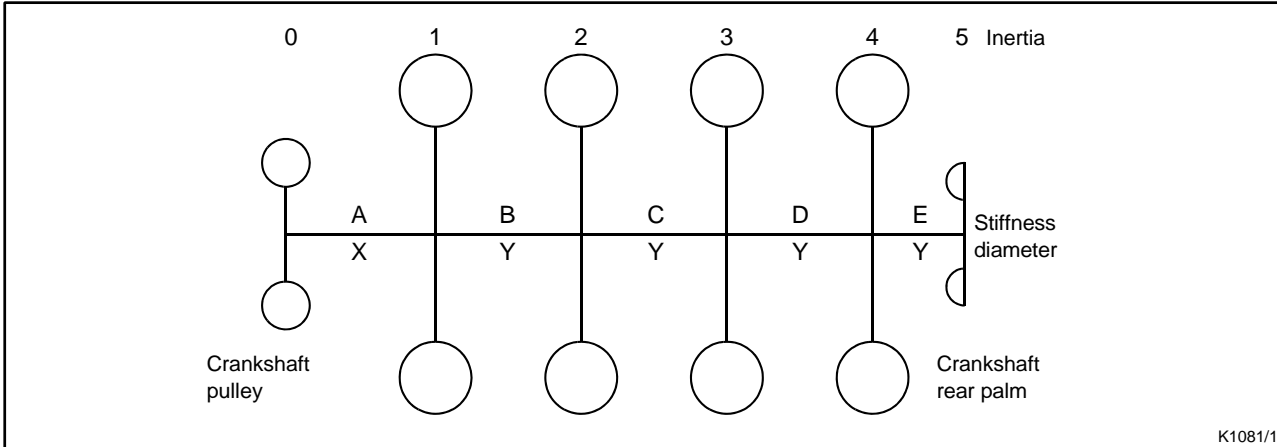
Note: Without flywheel and ring gear.

Stiffness

Engine type	Stiffness (Kgf cm x 10 ⁶ /Radian)					Minimum diameter (mm)	
	A	B	C	D	E	X	Y
404D-15	0,576522	3,81855	3,81855	3,81855	5,76020	26,8	41,0

Note: Without flywheel and ring gear.

Diagram - 404D-22, 404D-22T and 404D-22TA



Inertia

Engine type	Inertia (Mk ²) (Kgf cm sec ²)					
	0	1	2	3	4	5
404D-22 404D-22T 404D-22TA	0,025723	0,099300	0,099300	0,099300	0,106031	0,01479

Note: Without flywheel and ring gear.

Stiffness

Engine type	Stiffness (Kgf cm x 10 ⁶ /Radian)					Minimum diameter (mm)	
	A	B	C	D	E	X	Y
404D-22 404D-22T 404D-22TA	1,59454	9,60988	9,60988	9,60988	9,60988	32,34	52,0

Note: Without flywheel and ring gear.

Centre of gravity

Engine details	Case	From rear face of cylinder block mm (in)	Height above crankshaft centre line mm (in)	Offset to RHS from centre line ⁽¹⁾ mm (in)
402D-05	(A)	TBA	TBA	TBA
	(B)	81	76	0
	(C)	61	57	0
	(D)	54	65	0
403D-07	(A)	TBA	TBA	TBA
	(B)	120 (4.7)	66 (2.6)	0 (0)
	(C)	95 (3.7)	65 (2.6)	-3 (-0.1)
	(D)	85 (3.3)	63 (2.5)	-3 (-0.1)
403D-11	(A)	157 (6.2)	99 (3.9)	16 (0.6)
	(B)	125 (4.9)	84 (3.3)	4 (0.2)
	(C)	115 (4.5)	82 (3.2)	4 (0.2)
	(D)	98 (3.9)	67 (2.6)	2 (0.1)
403D-15	(A)	184 (7.2)	95 (3.7)	12 (0.5)
	(B)	136 (5.4)	72 (2.8)	3 (0.1)
	(C)	131 (5.1)	65 (2.6)	3 (0.1)
	(D)	101 (4.0)	65 (2.6)	3 (0.1)
403D-17	(A)	TBA	TBA	TBA
	(B)	130 (5.1)	75 (3.0)	2.5 (0.1)
	(C)	122 (4.8)	70 (2.8)	3.5 (0.1)
	(D)	TBA	TBA	TBA
403D-15T	(A)	183 (7.2)	98 (3.9)	9 (0.4)
	(B)	135 (5.3)	75 (3.0)	0 (0)
	(C)	130 (5.1)	68 (2.7)	0 (0)
	(D)	100 (3.9)	68 (2.7)	0 (0)
404D-15	(A)	207 (8.1)	98 (3.9)	10 (0.4)
	(B)	169 (6.7)	88 (3.5)	2 (0.08)
	(C)	167 (6.6)	85 (3.3)	2 (0.08)
	(D)	136 (5.4)	70 (2.8)	2 (0.08)
404D-22	(A)	226 (8.9)	110 (4.3)	11 (0.4)
	(B)	187 (7.4)	95 (3.7)	5 (0.2)
	(C)	179 (7.1)	91 (3.6)	4 (0.2)
	(D)	147 (5.8)	79 (3.1)	3 (0.1)
404D-22T 404D-22TA	(A)	225 (8.9)	113 (4.4)	8 (0.3)
	(B)	186 (7.3)	98 (3.9)	2 (0.07)
	(C)	178 (7.0)	94 (3.7)	1 (0.003)
	(D)	146 (5.7)	82 (3.2)	0 (0)

1. When viewed from the rear of the cylinder block.

- (A) Without flywheel, backplate or starter motor.
- (B) With flatface flywheel, backplate and starter motor.
- (C) With light flywheel, short housing and starter motor.
- (D) With heavy flywheel, long or short housing and starter motor.

Ratings

Allowances for engine driven auxiliary equipment

If the engine operates in the ambient conditions shown on the power curve, the only allowances which must be made, are for the power used by accessories such as the fan and the alternator. The amount of power used by accessories driven by the engine must be decided so that the net power available at the flywheel can be found.

De-rating

If the engine operates in ambient conditions other than the conditions shown on the power curve, then suitable allowances must be made for any change in intake air temperature, barometric pressure or humidity.

1 Intake air temperature

High intake air temperature to the engine can cause loss of power and heat problems with the cooling system, the lubricating oil and hydraulic oil systems. This may be either due to high ambient temperatures, or because the engine is being used inside a building, or within the structure of a machine that requires more air flow.

For naturally aspirated engines, the loss of power will be approximately 2-2,5% for every 10°C (18 °F) rise above the reference temperature specified on the power curve.

2 Barometric pressure

For every 25 mm (1 in) Hg reduction of barometric pressure within the normal range of changes at sea level, the rated output of a naturally aspirated engine will decrease by approximately 1-1,5%.

3 Altitude

The naturally aspirated engine will run correctly up to an altitude of 600 m (2000 ft). If the engine is to operate at an altitude above this, an increase in smoke may be seen. This is normal for a naturally aspirated engine.

Turbocharged engines have been developed to operate up to an altitude of 3000 m (9842 ft). Contact Perkins Applications Department if the engine is to operate above this height.

For reference, the curves 3893 and 3952 show how the power of a typical naturally aspirated engine can change with altitude and different ambient air temperatures, see page 345.

4 Humidity

The amount by which the rating will be reduced because of humidity, will be according to the percentage humidity and the ambient temperature (not the intake air temperature).

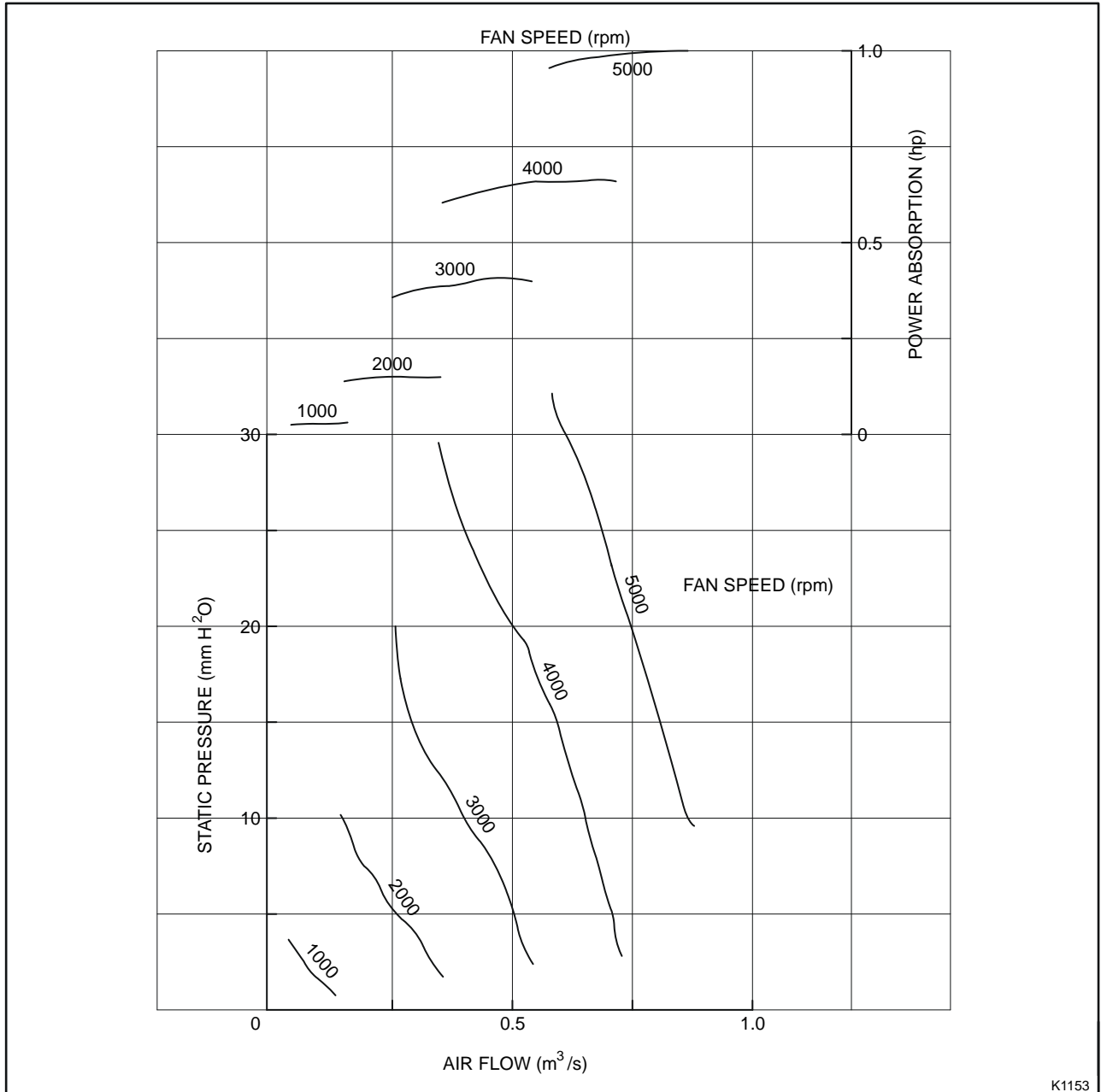
Curves 3892 and 3953 show the loss of power due to humidity at different ambient temperatures, see page 334. High percentage humidity does not normally occur with very high temperatures. A rating reduction of 6% should be used as the maximum reduction in power.

Note: Engine ratings given by Perkins are corrected to the reference conditions shown in the rating standards.

Performance curves

Fan MD011 - curve PED-0257-16 - 402D-05

Curve Number	PED-0257-16	No. of Blades	6
Tip Clearance	14 mm (0.55 in)	Blade Width	62 mm (2.44 in)
Cooling Fan	145306680 Puller	Blade Length	95 mm (3.74 in)
Diameter	250 mm (9.84 in)	Blade Angle	33.5°

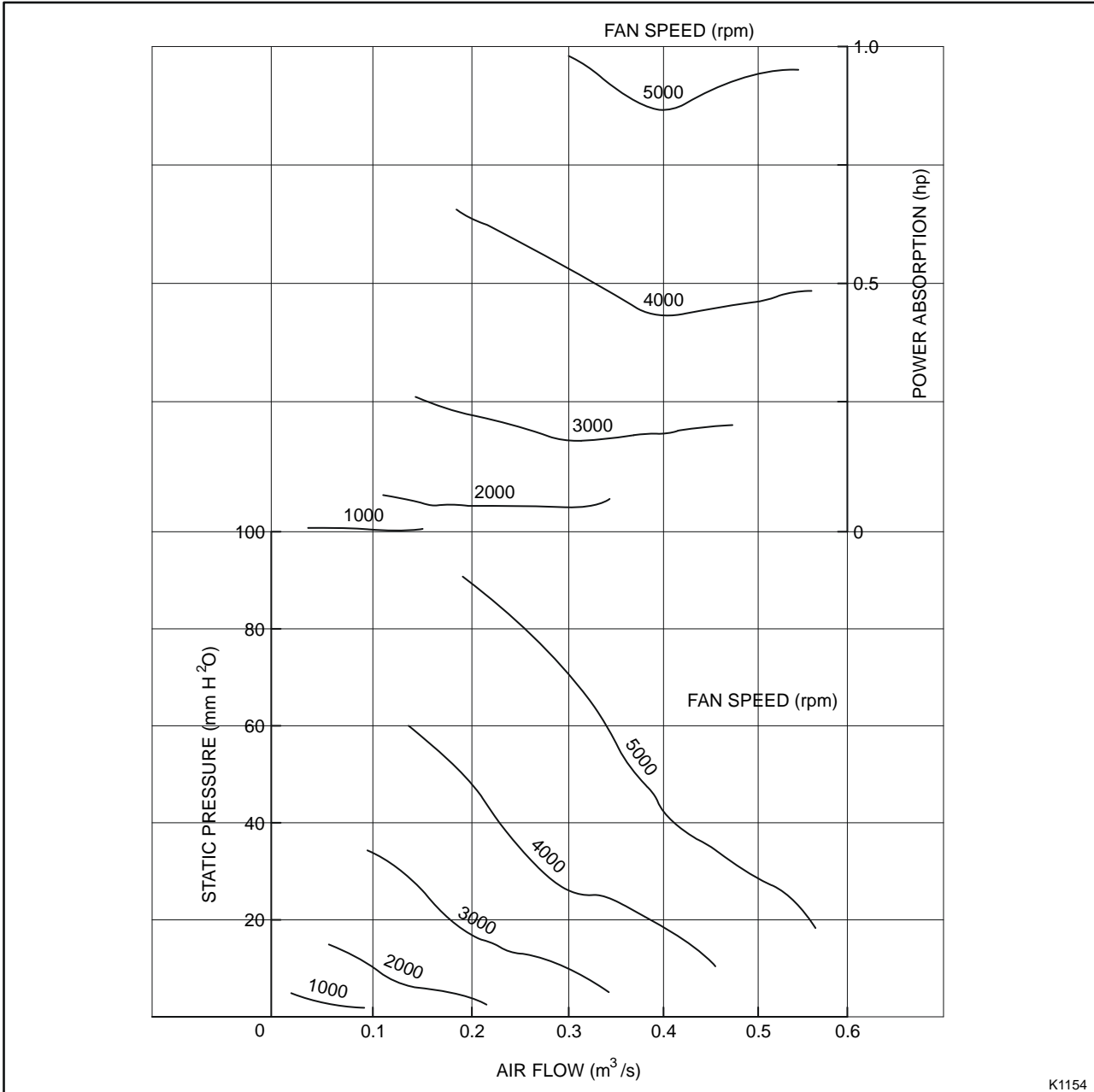


Notes:

- Fan is driven at 1.23 times engine speed.
- The power absorption tolerance is: ± 5%.

Fan MD012 - curve PED-0257-17 - 402D-05

Curve Number	PED-0257-17	No. of Blades	5
Tip Clearance	9 mm (0.35 in)	Blade Width	73 mm (2.87 in)
Cooling Fan	145306690 Pusher	Blade Length	87.5 mm (3.44 in)
Diameter	260 mm (10.24 in)	Blade Angle	22°

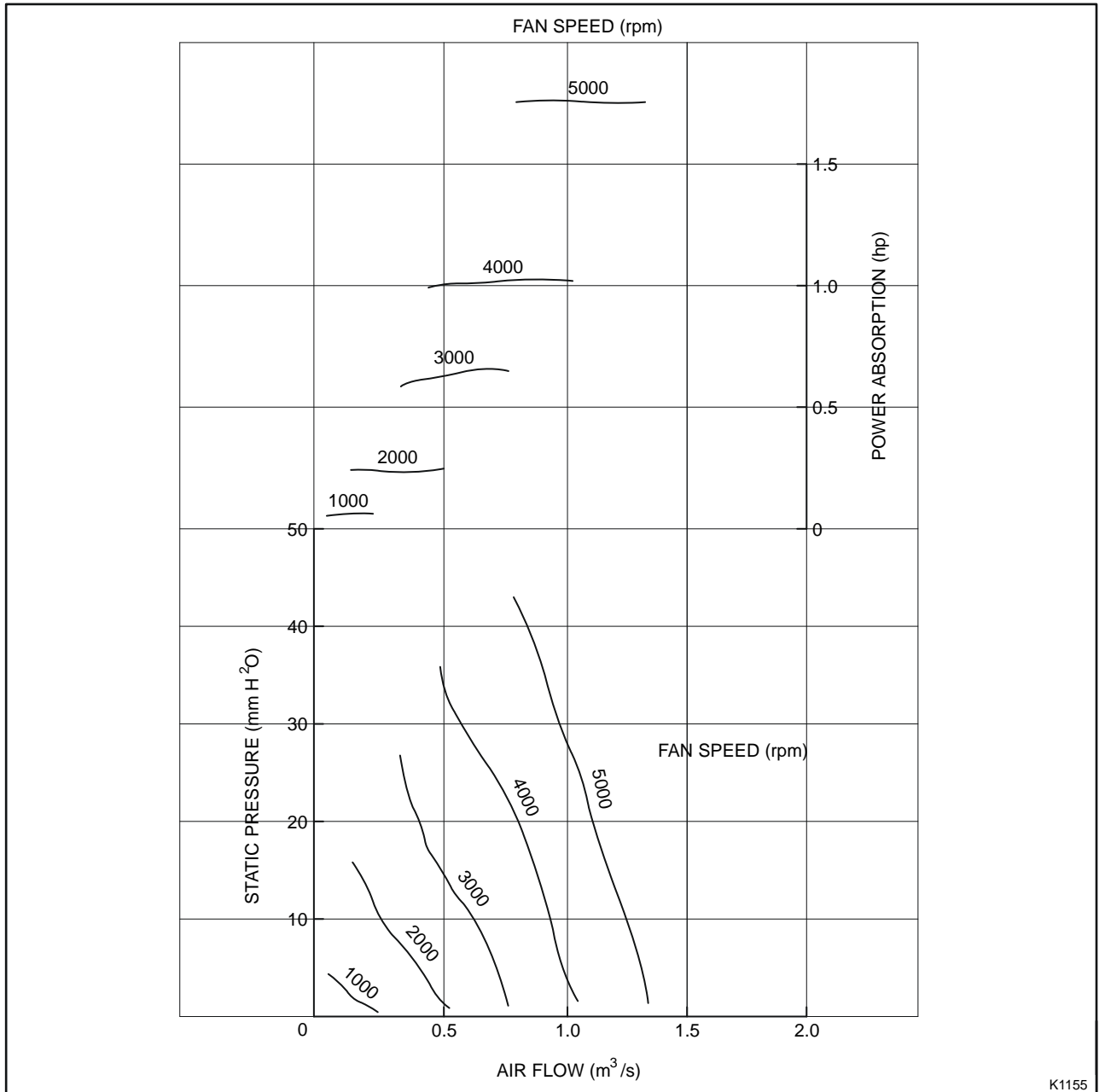


Notes:

- Fan is driven at 1.23 times engine speed.
- The power absorption tolerance is: ± 5%.

Fan MD009 - curve PED-0244-16 - 403D-07

Curve Number	PED-0244-16	No. of Blades	6
Tip Clearance	9 mm (0.35 in)	Blade Width	62 mm (2.44 in)
Cooling Fan	145306590 Puller	Blade Length	95 mm (3.74 in)
Diameter	280 mm (11.02 in)	Blade Angle	33.5°

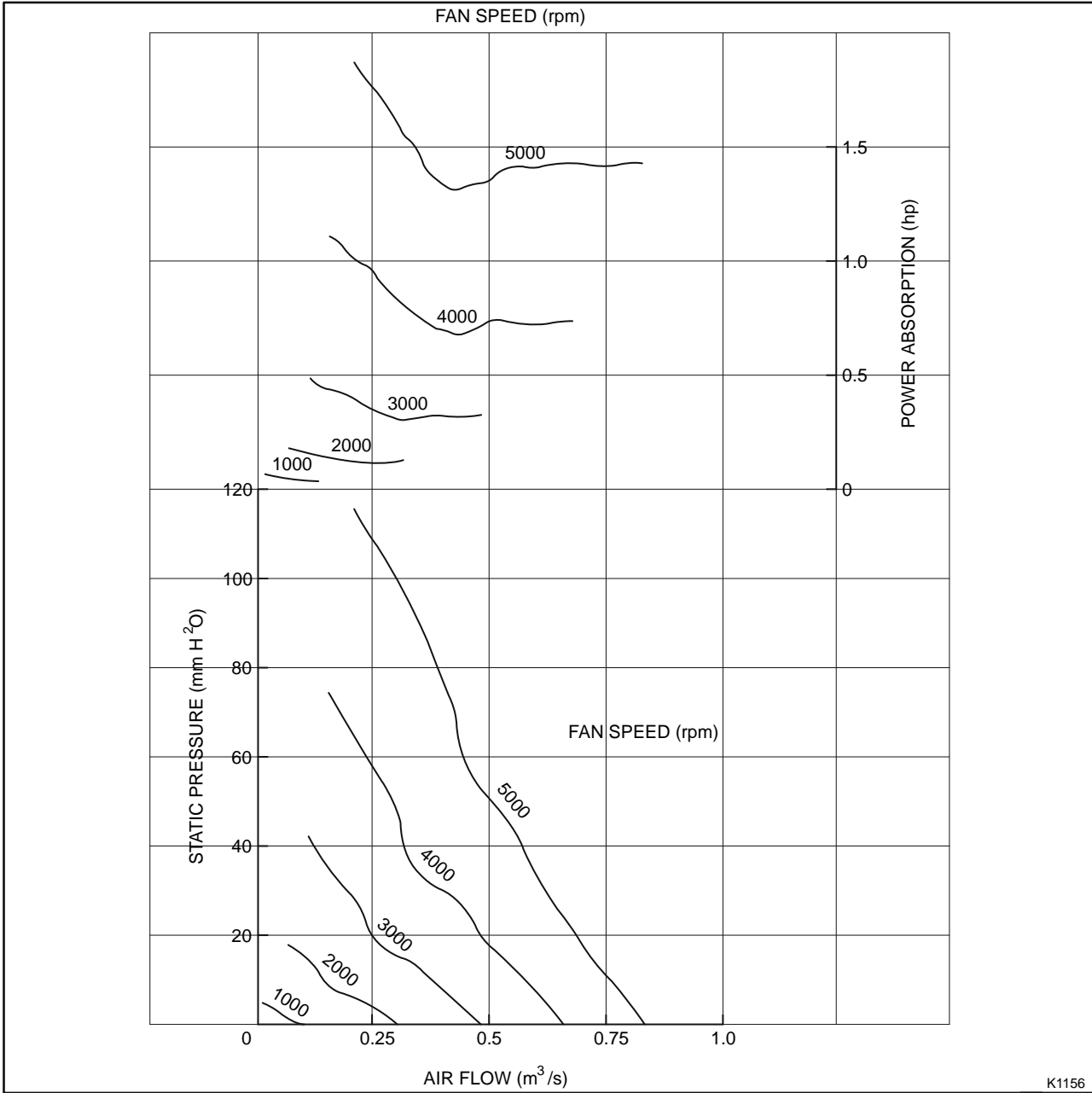


Notes:

- Fan is driven at 1.23 times engine speed.
- The power absorption tolerance is: ± 5%.

Fan MD010 - curve PED-0244-17 - 403D-07

Curve Number	PED-0244-17	No. of Blades	5
Tip Clearance	9 mm (0.35 in)	Blade Width	73 mm (2.87 in)
Cooling Fan	145306600 Pusher	Blade Length	87.5 mm (3.44in)
Diameter	280 mm (11.02 in)	Blade Angle	22°

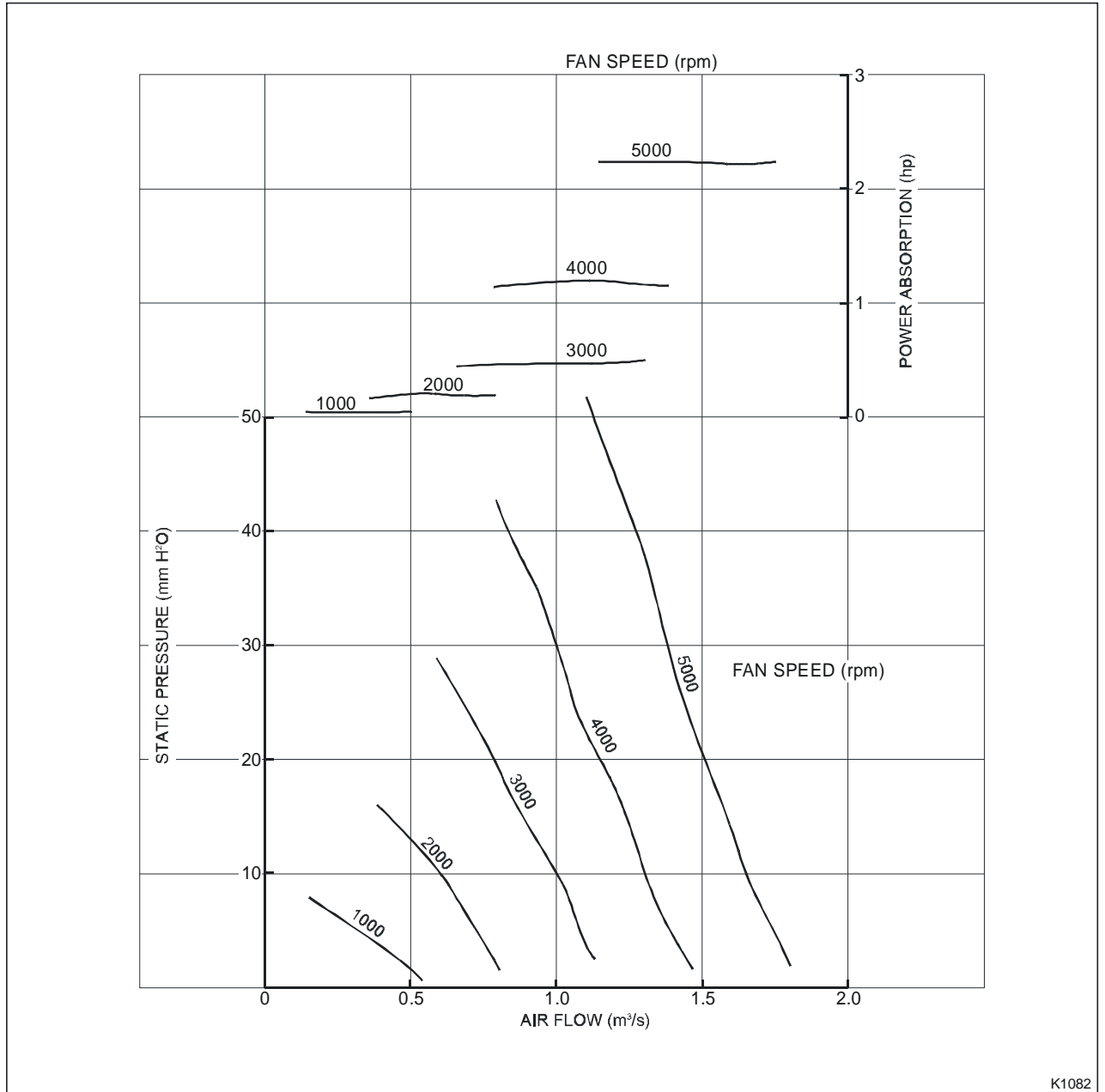


Notes:

- Fan is driven at 1.23 times engine speed.
- The power absorption tolerance is: ± 5%.

Fan MD007 - curve PED-0005-2 - 403D-11

Curve Number	PED-0005-2	No. of Blades	7
Tip Clearance	10 mm (0.39 in)	Blade Width	58 mm (2.28 in)
Cooling Fan	145306460 Puller	Blade Length	90 mm (3.54 in)
Diameter	330 mm (13.0 in)	Blade Angle	31°

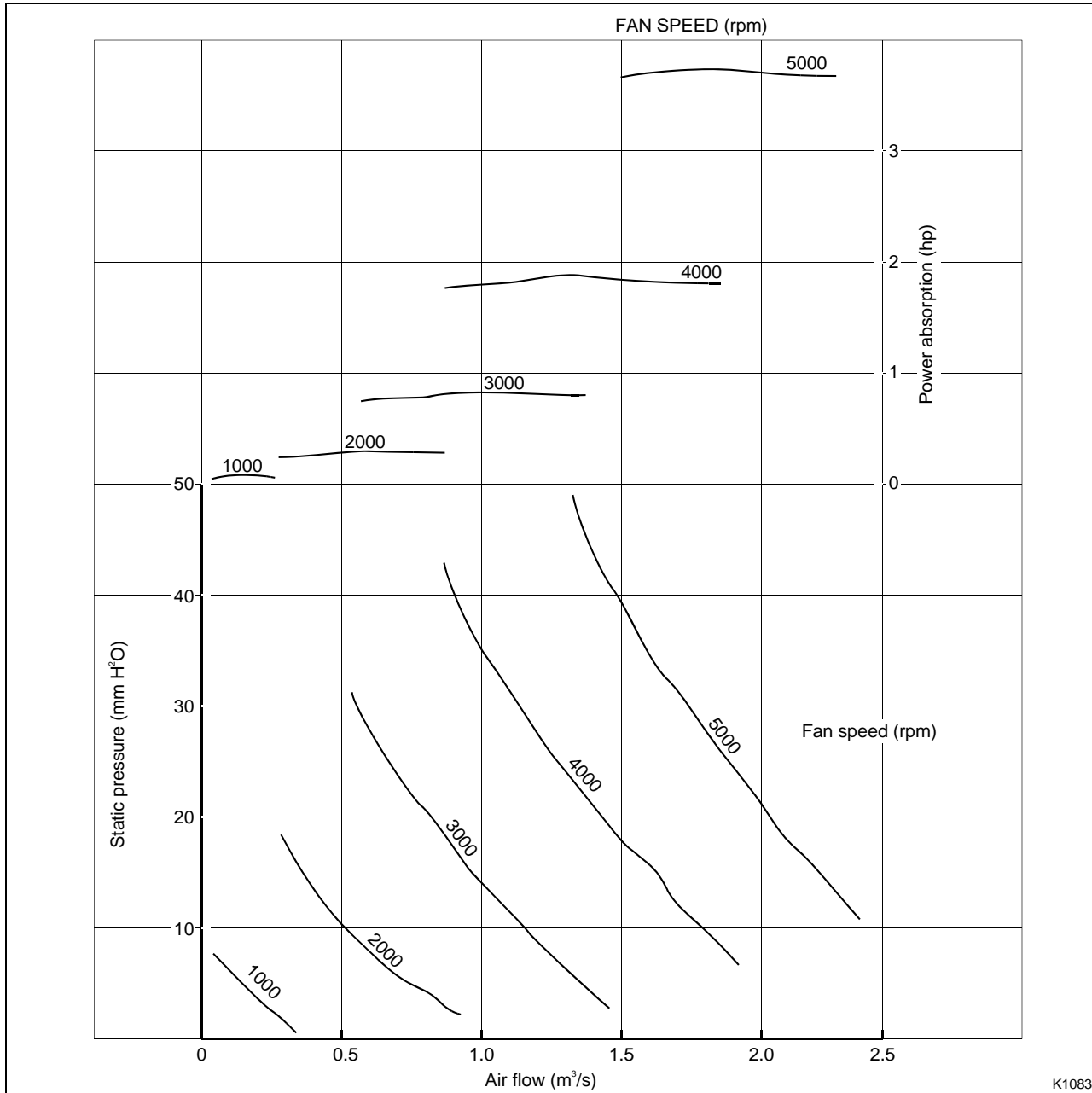


Notes:

- Fan is driven at 1.285 times engine speed, using pulley option FB005, see “Fan drive” on page 98
- The power absorption tolerance is: ± 5%.

Fan MD008 - curve PED-0005-1 - 403D-11

Curve number	PED-0005-1	No. of blades	6
Tip clearance	10 mm (0.39 in)	Blade width	93 mm (2.87 in)
Cooling fan	145306380 Pusher	Blade length	95 mm (3.74 in)
Diameter	330 mm (13.0 in)	Blade angle	32°

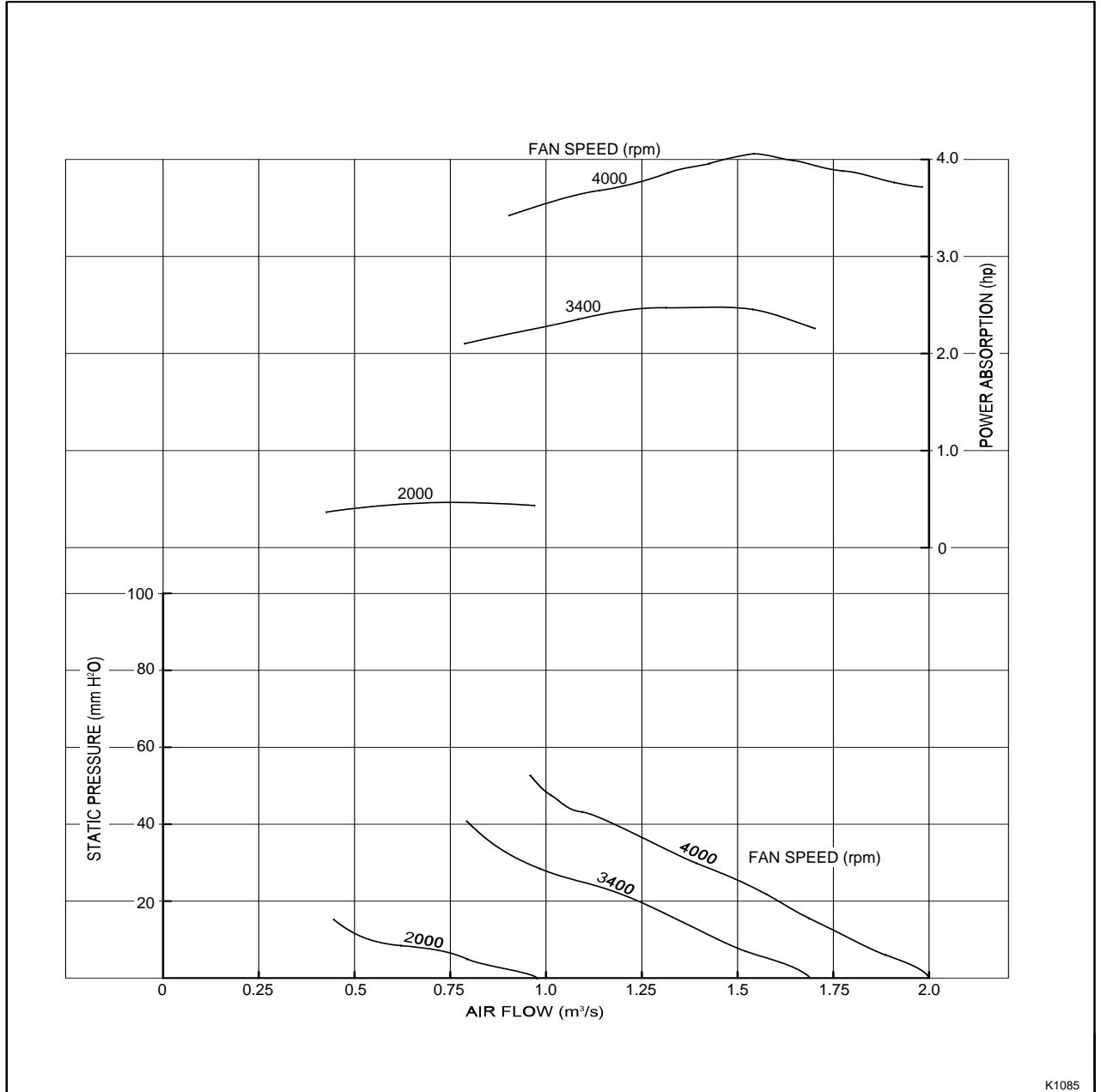


Notes:

- Fan is driven at 1.285 times engine speed, using pulley option FB005, see “Fan drive” on page 98
- The power absorption tolerance is: ± 5%.

Fan MD005 - curve PED-0153 - 403D-15, 403D-15T, 403D-17 and 404D-15

Curve number	PED-0153	No. of blades	7
Tip clearance	20 mm (0.79 in)	Blade width	60 mm (2.36 in)
Cooling fan	145306520 Puller	Blade length	100 mm (3.94 in)
Diameter	340 mm (13.39 in)	Blade angle	31.8°

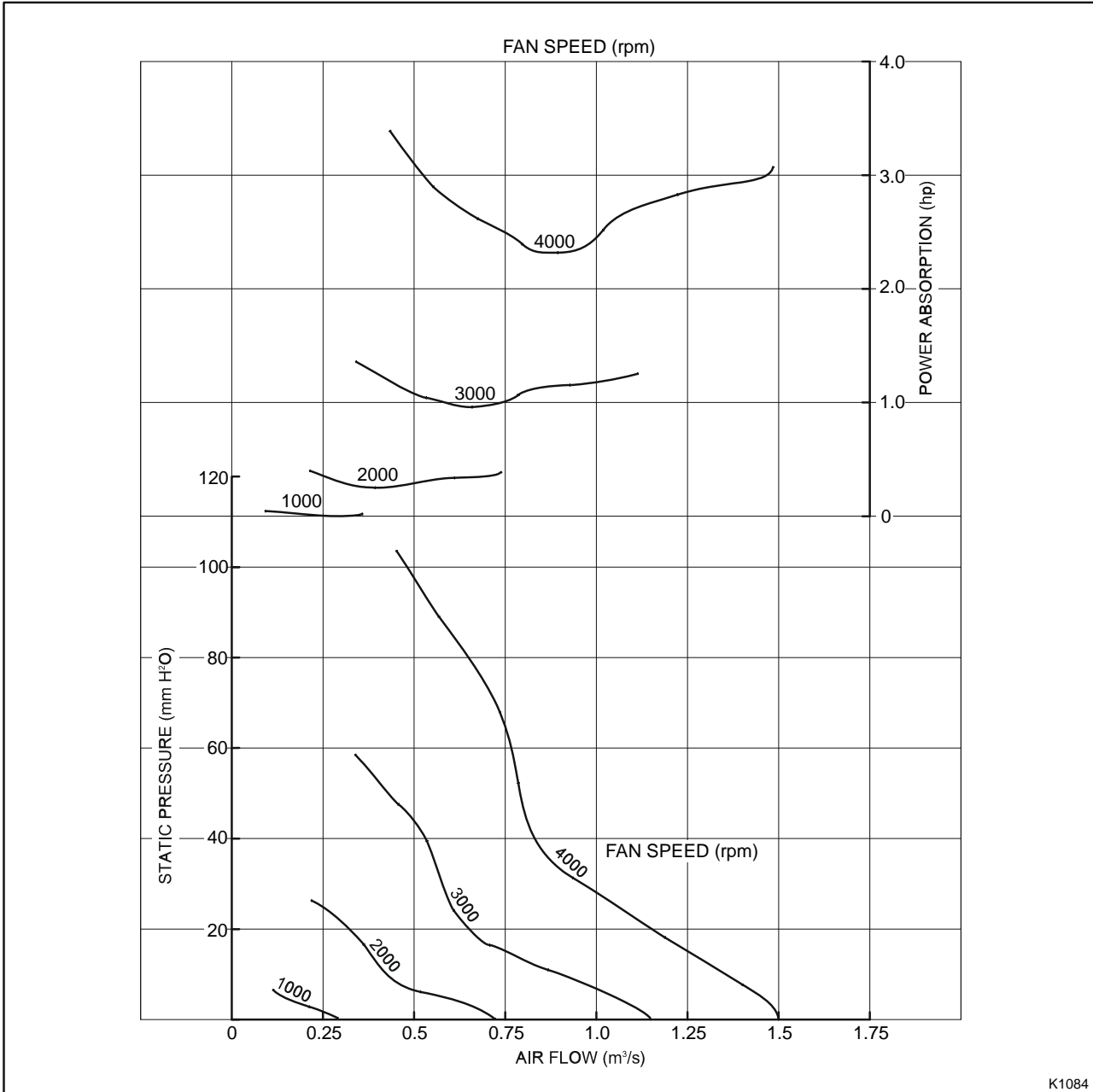


Notes:

- Options to drive fan at 1.25, 1.15 or 1.10 times engine speed for 403D-15, 403D-15T and 403D-17, see “Fan drive” on page 98.
- Fan drive ratio for 404D-15 is 1.285 times engine speed.
- The power absorption tolerance is: ± 5%.

Fan MD006 - curve PED-0146 - 403D-15, 403D-15T, 403D-17 and 404D-15

Curve number	PED-0146	No. of blades	6
Tip clearance	20 mm (0.79 in)	Blade width	75 mm (2.95 in)
Cooling fan	145306620 Pusher	Blade length	100 mm (3.94 in)
Diameter	340 mm (13.39 in)	Blade angle	40°



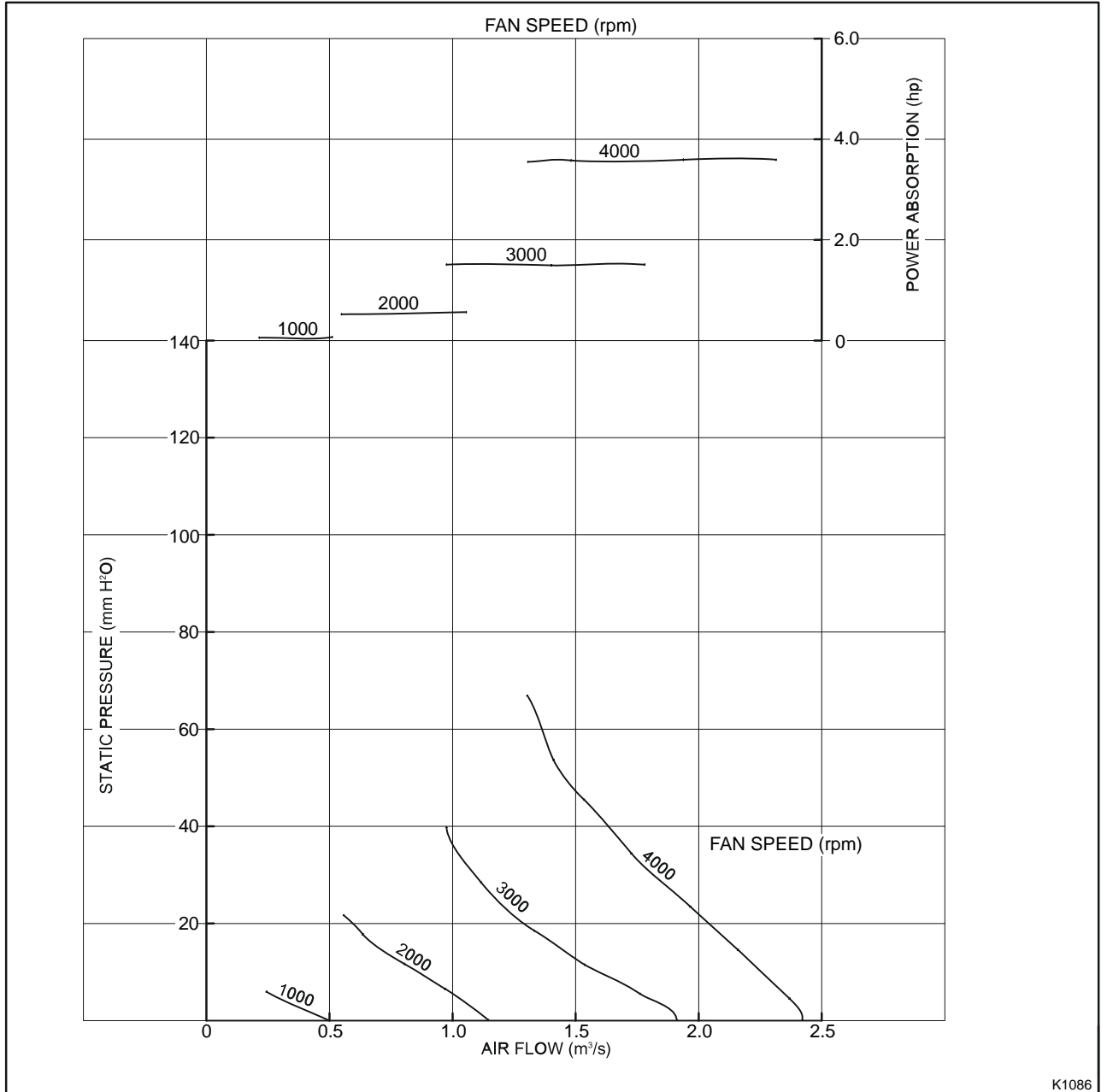
K1084

Notes:

- Options to drive fan at 1.25, 1.15 or 1.10 times engine speed for 403D-15, 403D-15T and 403D-17, see “Fan drive” on page 98.
- Fan drive ratio for 404D-15 is 1.285 times engine speed.
- The power absorption tolerance is: ± 5%.

Fan MD003 - curve PED-0290-17 - 404D-22, 404D-22T and 404D-22TA

Curve Number	PED-0290-17	No. of Blades	6
Tip Clearance	10 mm (0.39 in)	Blade Width	75 mm (2.95 in)
Cooling Fan	145306230 Puller	Blade Length	122 mm (4.8 in)
Diameter	390 mm (15.35 in)	Blade Angle	28.5°

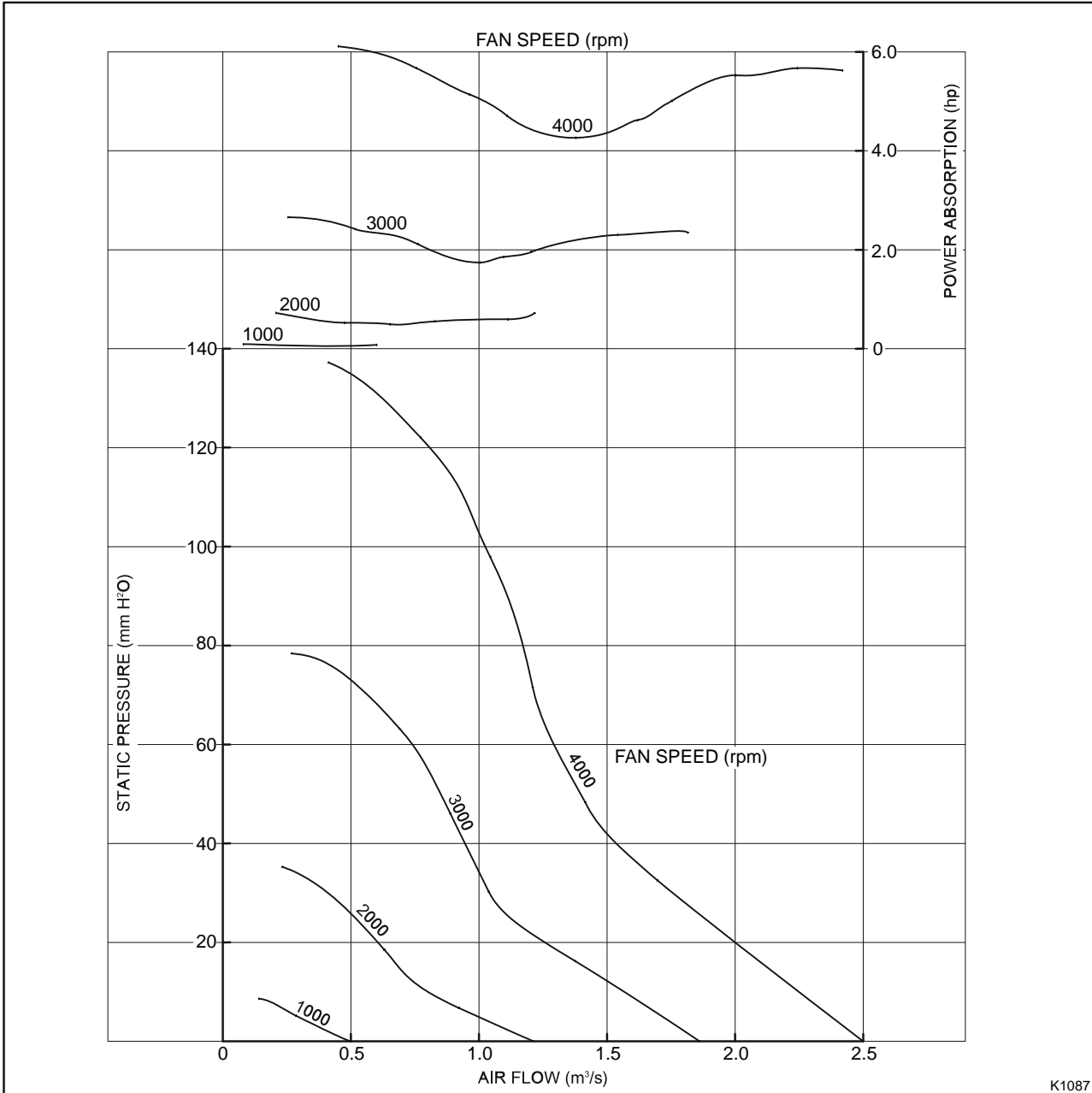


Notes:

- There are options to drive the fan at 1.25, 1.15 or 1.10 x engine speed, see “Fan drive” on page 98.
- The power absorption tolerance is: ± 5%.

Fan MD004 - curve PED-0290-18 - 404D-22, 404D-22T and 404D-22TA

Curve Number	PED-0290-18	No. of Blades	6
Tip Clearance	10 mm (0.39 in)	Blade Width	75 mm (2.95 in)
Cooling Fan	145306730 Pusher	Blade Length	127 mm (5.0 in)
Diameter	390 mm (15.35 in)	Blade Angle	28.5°



Notes:

- Options to drive fan at 1.25, 1.15 or 1.10 times engine speed, see “Fan drive” on page 98.
- The power absorption tolerance is: ± 5%.

Derate curves

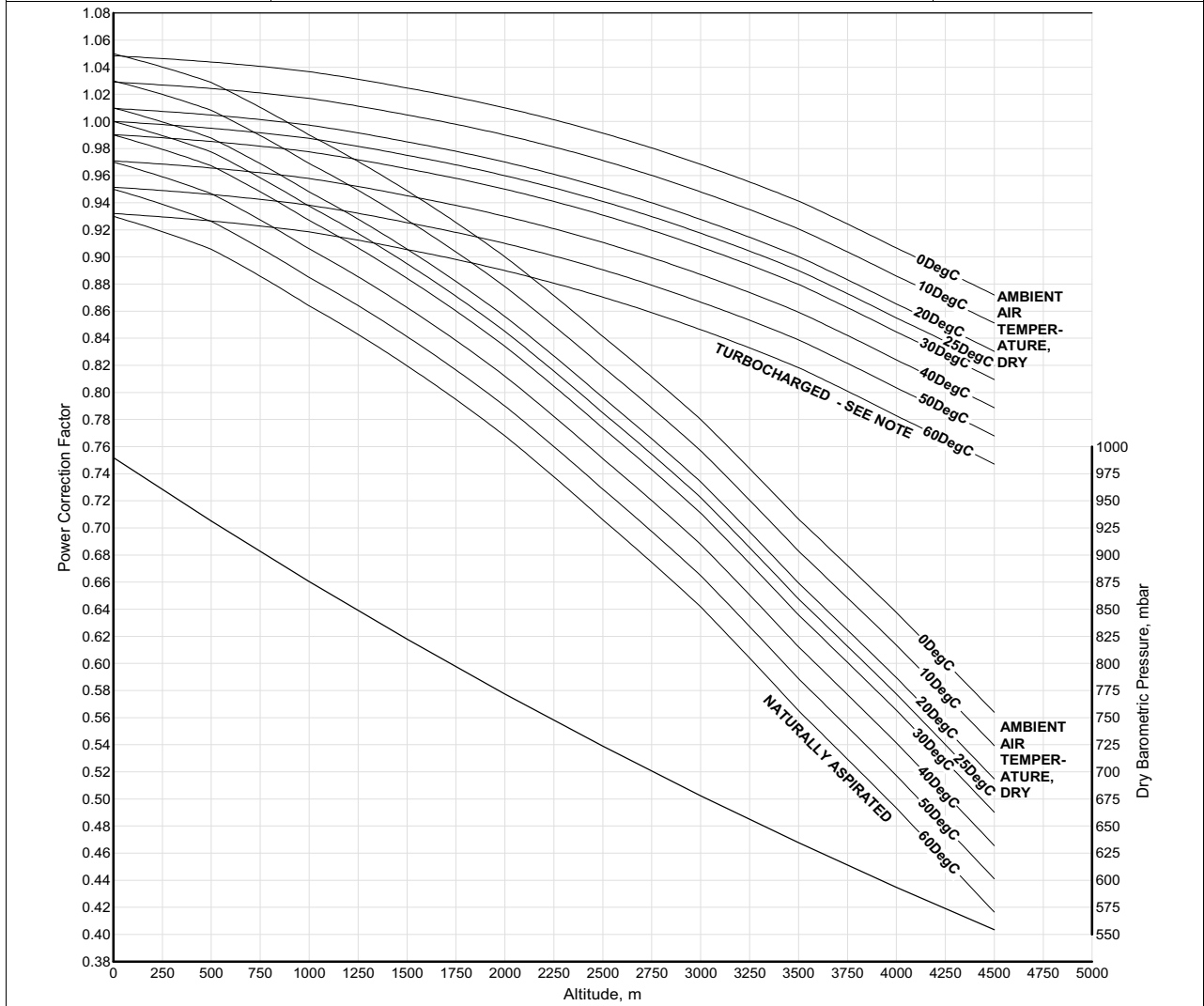
S8001 - Altitude and temperature



Perkins Engines Company Limited
©2006 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

Diagram For:
ESTIMATING THE EFFECTS OF ALTITUDE & TEMPERATURE
ON POWER OUTPUT RELATIVE TO ISO AND SAE
REFERENCE CONDITIONS AT SEA-LEVEL.
APPLICABLE TO ENGINES WITH MECHANICAL FIE ONLY.

Curve: S 8001 Sheet 1
Issue: 1
Date: 11-Apr-2006



NOTE

For air-to-water charge cooled turbocharged engines the power correction shown above does not apply. For these engines the reference temperature of 25°C should be used and not the actual ambient (engine inlet) air temperature. For power correction due to humidity refer to curve S8002.

The above diagram is applicable to correct Engine Power quoted to the following Rating Standards:

Rating Standard	Total Barometric Pressure (kPa)	Vapour Pressure (kPa)	Air Inlet Temperature (°C)
ISO 14396: 2002	100	1	25
80/1269/EEC	100	1	25
88/195/EEC	100	1	25
ISO 1585: 1992	100	1	25
ISO 2288: 1989	100	1	25
ISO 3046-1: 1995	100	1	25
ISO 8665: 1994	100	1	25
ISO 9249: 1989	100	1	25
SAE J1349 4.2.4	100	1	25
SAE J1995 3.1	100	1	25
UN/ECE R120	100	1	25

Drawn by:
A. Bradley

Date: 11-Apr-2006

Issued by:
P. Knight
(Legislation Engineer)

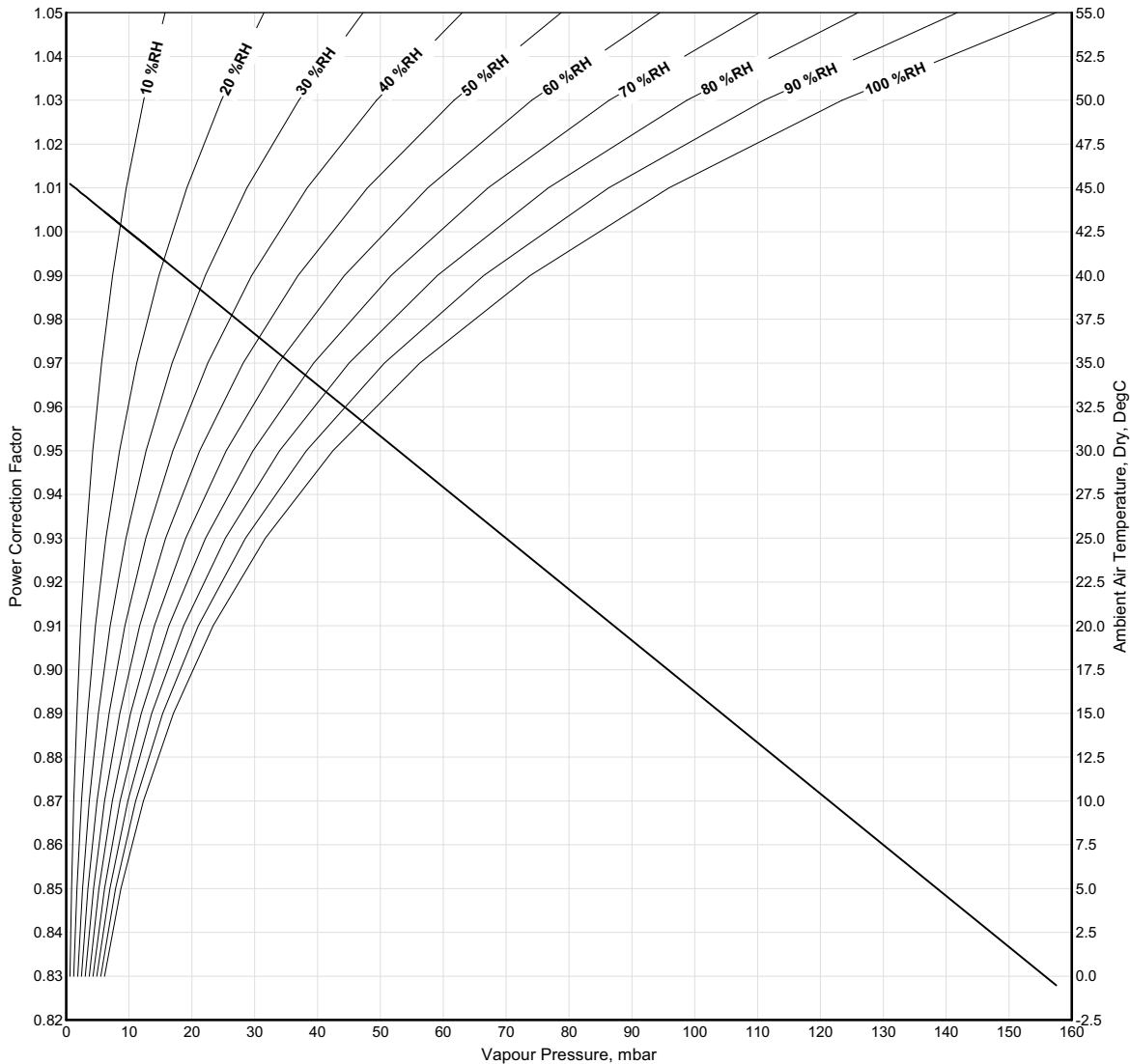
S8002 - Humidity



Perkins Engines Company Limited
©2006 Commercial in Confidence,
proprietary information of
Perkins Engines Company Ltd.

Diagram For:
ESTIMATING THE EFFECTS OF HUMIDITY
ON POWER OUTPUT RELATIVE TO ISO AND SAE
REFERENCE CONDITIONS.
APPLICABLE TO ENGINES WITH MECHANICAL FIE ONLY.

Curve: S 8002 Sheet 1
Issue: 1
Date: 11-Apr-2006



NOTE

When estimating the power correction due to humidity, the relative humidity must be coupled with the AMBIENT AIR TEMPERATURE at which the humidity is measured, and not the air inlet temperature which may be locally heated, to obtain the vapour pressure. The effect of inlet air temperature on power output must be considered separately using diagram S8001. When humidity is expressed in terms of vapour pressure, the power correction can be read off from the diagonal line.

The above diagram is applicable to correct Engine Power quoted to the following Rating Standards:

Rating Standard	Total Barometric Pressure (kPa)	Vapour Pressure (kPa)	Air Inlet Temperature (°C)
ISO 14396: 2002	100	1	25
80/1269/EEC	100	1	25
88/195/EEC	100	1	25
ISO 1585: 1992	100	1	25
ISO 2288: 1989	100	1	25
ISO 3046-1: 1995	100	1	25
ISO 8665: 1994	100	1	25
ISO 9249: 1989	100	1	25
SAE J1349 4.2.4	100	1	25
SAE J1995 3.1	100	1	25
UN/ECE R120	100	1	25

Drawn by:
A. Bradley

Date: 11-Apr-2006

Issued by:

P. Knight
(Legislation Engineer)

Project engines

When installing a 400 Series engine into a new application it is essential that the engine is correctly matched to the machines load characteristics, operating conditions (normal and extreme), cooling and electrical systems.

Unless otherwise agreed, project engines will be supplied representative of the nominal power/performance level customers will receive for production.

During application testing, due consideration must be given to maximum/minimum power/performance engine use in the most extreme usage condition.

Note: 400 Series project engines are not covered by warranty.'

Engine noise data

Sound Pressure Level (SPL) *

- dB(A) at 1 metre, full load.

- Bare engine, excluding induction, exhaust and fan noise.

* For Sound Power Levels (SWL) add 8.0 to the SPL figures below.

Engine type	Engine speed (rpm)	Average dB(A) at 1 metre at full load
402D-05	2800	80.1
	3000	80.6
403D-07	2800	79.9
	3000	80.9
403D-11	2200	79.6
	2400	81.1
	2600	84.6
	2800	83.3
	3000	83.1
403D-15	2200	81.6
	2400	82.7
	2600	83.6
	2800	84.9
	3000	86.4
403D-15T	2200	82.1
	2400	83.3
	2600	85.2
	2800	88.1
	3000	90.5
403D-17	2400	82.8
	2600	84.4
404D-15	2800	82.3
	3000	83.5
404D-22	2200	82.5
	2400	83.2
	2600	85.0
	2800	86.7
	3000	87.4
404D-22T 404D-22TA	2600	85.9
	2800	88.0
	3000	88.5

Important notes

Company liability

The engine supplied must only be used for the purpose approved by the Company and to the Company's specific instructions for its installation and operation. It must not be passed to any other person for any other purpose, or installation, except with the Company's written approval.

The application and installation of the engine must be suitable for the needs of the machine in which it is installed and the conditions in which it will have to operate.

The Company does not have direct control of the type of application and how the engine is installed and used. The Company cannot be held responsible for any loss or damage where the person or persons that installed the engine, or the user, have not followed the advice given by the Company.

It is very important to ensure that the installation of the engine is according to the health and safety legislation of the country in which the engine is to operate.

Installation

The engine must:

- Have the necessary power and torque characteristics for the machine in which it is installed so that it can operate in all necessary environmental conditions.
- Be connected securely and correctly to the driven load according to operation needs and torsional vibration characteristics.
- Be given protection from adverse atmospheric conditions and supplied with the correct clean fuel, lubricating oil and air.
- Have the correct maintenance and operation according to Perkins instructions as given in Installation, Operation and Service books.

It is also important that:

All parts that rotate, such as pulleys, flywheels, fans, shafts, couplings and drive belt systems must have a protection guard fitted over them with a warning that fingers must not be put through the guards.

Electrical terminations are shielded to prevent external short circuits. All electrical cables that supply current must be protected by insulation and all electrical equipment must have a suitable and secure connection to ground.

The exhaust system, where it could be a danger to persons, must be fitted with either a suitable heat shield or with lagging.

Warning! *All build lists referenced in this publication exclude any fan guarding or hot surface protection features. To the extent that it is lawfully possible, the Company accepts no responsibility whatsoever for any injury, damage or death, whether to property or persons, arising directly or indirectly from this exclusion.*

Emissions certification

All other engine models in the 400D Series range will be certified during the engine development.

All the 400D Series engines are EPA compliant and will be certified to 97/68/EC stage IIIA, EPA TIER 3+.

MHSA Certification

If MHSA certification is required a NORF. should be raised.

Legislation

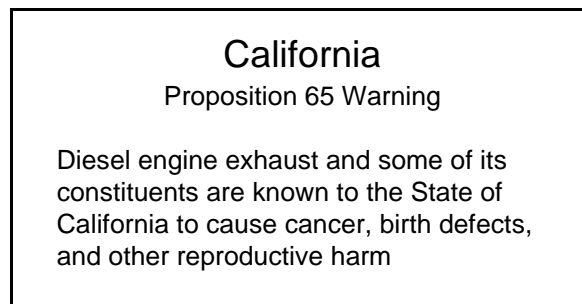
Specific legislation for each country cannot be given here because of the amount and continuous changes that occur. The subjects which can effect operation are:

- Noise
- Emissions
- Operation in explosive atmosphere or areas where there are flammable materials
- Operation where ventilation is limited or health is important.

California Proposition 65

California State law, USA, now stipulates that all equipment that is powered by a diesel engine must carry a warning label that is clearly visible to the operator of that equipment. All Original Equipment Manufacturers that fit Perkins engines to their equipment must comply with this legislation. An example of this label (actual size) is shown below.

Warnings to place on Equipment



Warranty

This can be made invalid if the engine is not installed or operated/maintained according to Perkins instructions.