0316C–04

TORQUE SPECIFICATION

2TR–FE:

Part Tightened		N·m	kgf·cm	ft·lbf
Engine hanger No.1 x Cylinder head		42	420	30
Engine hanger No.2 x Cylinder head		42	420	30
Engine mounting bracket front No.1 LH x Cylinder block		51	520	38
Engine mounting bracket front No.1 RH x Cylinder block		51	520	38
Engine coolant temperature sensor x Cylinder head		20	204	15
Idler pulley sub–assy No.1 x Timing chain cover		43	438	32
Water by–pass pipe No.1 x Timing chain cover		18	179	13
V–ribbed belt tensioner assy x Timing chain cover	Bolt 1 Bolt 2 Bolt 3	40 21 43	408 214 438	30 15 32
Compressor mounting bracket No.1 x Timing chain cover	Bolt A Others	25 45	250 459	18 33
Compressor mounting bracket x Cylinder block		45	459	33
Oil level gauge guide x Engine mounting bracket front No.1 LH		20	204	15
Exhaust manifold x Cylinder head		36	367	27
Exhaust manifold heat insulator No.1 x Exhaust manifold		12	122	9
Intake manifold x Cylinder head		25	255	18
Ventilation pipe x Cylinder head		18	184	13
Ignition coil x Cylinder head cover		9.0	92	80 in.·lbf
Rear end plate x Cylinder block		18	185	13
Drive plate & Ring Gear sub–assy x Crankshaft (A/T)		74	750	54
Flywheel sub–assy x Crankshaft (M/T)	1st 2nd	27 Turn 90°	270 Turn 90°	19 Turn 90°
Engine mounting bracket x Body		51	520	38
Compressor and magnetic clutch x Compressor mounting bracket		25	255	18
Suction tube sub–assy x Oil pan		5.4	55	48
Vane pump assy x Timing chain cover		21	214	15
Air cleaner cap w/ intake air cleaner x Cylinder head cover Clamp		8.0 5.0	82 51	71 in.·lbf 44 in.·lbf
Chain tensioner slipper x Cylinder block		21	214	15
Chain tensioner assy No.1 x Cylinder block		10	102	7
Timing chain guide x Cylinder head		10	102	7
Chain vibration damper No.1 x Cylinder block		21	214	15
Timing chain cover x Cylinder block	Bolt A Others	46 21	469 214	34 15
Oil pan sub–assy x Cylinder block		26	265	19
Oil pan sub–assy No.2 x Oil pan sub–assy		9.0	92	80 in.·lbf
Oil strainer sub–assy x Oil pan sub–assy		26	265	19
Crankshaft pulley x Crankshaft		260	2,651	192
Cylinder head cover x Cylinder head		9.0	92	80 in.·lbf
Camshaft timing gear assy x Camshaft		78	795	58
Camshaft bearing cap x Cylinder heard	Bolt A Others	12 16	122 158	9 11
Camshaft timing sprocket x Camshaft No.2		78	795	58

Part Tightened		N·m	kgf·cm	ft·lbf
Timing chain cover plug x Timing chain		17	170	12
Cylinder head x Cylinder block	1st 2nd 3rd	39 Turn 90° Turn 90°	398 Turn 90° Turn 90°	29 Turn 90° Turn 90°
Chain vibration damper No.2 x Cylinder block		27	275	20
Chain vibration damper No.3 x Cylinder block		18	184	13
Chain tensioner No.2 x Cylinder block		18	184	13
Water pump assy x Fan w/ fluid coupling assy		25	255	18
Balanceshaft x Drive gear		25	255	18

1GR–FE:

Part Tightened		N·m	kgf·cm	ft·lbf
Engine under cover sub–assy No.1 x Frame assy		29	296	21
Camshaft bearing cap x Cylinder head sub–assy	10 mm (0.39 in.) head 12 mm (0.47 in.) head	9.0 24	92 245	80 in.·lbf 18
Chain tensioner No.1 x Cylinder head sub–assy		10	102	7
Chain tensioner No.2 x Cylinder head sub–assy		19	194	14
Chain tensioner No.3 x Cylinder head sub–assy		19	194	14
Camshaft timing gear assy x Camshaft		100	1,020	74
Camshaft timing gear or sprocket x Camshaft		100	1,020	74
Timing chain cover plate x Timing chain cover sub–assy		9.0	92	80 in.·lbf
Ignition coil assy x Cylinder head cover sub–assy		10	102	7
V–bank cover x Intake air surge tank		7.5	76	66 in.·lbf
Engine hanger No.1 x Cylinder head sub–assy RH		33	336	24
Engine hanger No.2 x Cylinder head sub–assy LH		33	336	24
Spark plug x Cylinder head sub–assy		20	204	15
Oil filler cap housing x Cylinder head cover sub–assy LH		9.0	92	80 in.·lbf
Camshaft timing oil control valve assy x Timing chain cover sub–assy		9.0	92	80 in.·lbf
Oil filter bracket sub–assy x Timing chain cover sub–assy		19	194	14
Engine mounting bracket front No.1 RH x Cylinder block sub–assy		43	438	32
Engine mounting bracket front No.1 LH x Cylinder block sub–assy		43	438	32
Engine mounting insulator front No.1 RH x Frame assy		38	387	28
Engine mounting insulator front No.1 LH x Frame assy		38	387	28
Engine wire No.2 (ground cable) x Cylinder block sub–assy		13	133	9
Hood sub–assy x Hood hinge assy RH & LH		13	133	10
Hood support RH & LH x Body		18	184	13
Cylinder head sub–assy RH x Cylinder block sub–assy	1st 2nd	36 Turn 180°	367 Turn 180°	27 Turn 180°
Cylinder head sub–assy LH x Cylinder block sub–assy				
	Recessed head 1st 2nd 14 mm (0.55 in.) head	36 Turn 180° 30	367 Turn 180° 306	27 Turn 180° 22
Chain vibration damper No.1 x Cylinder block sub–assy		19	194	14
Idle gear No.1 x Cylinder block sub–assy		60	612	44
Oil pan sub–assy x Cylinder block and timing chain cover	Bolt A Bolt B Bolt C Nut	21 19 10 21	214 194 102 214	15 14 7 15
Oil pan sub–assy No.2 x Oil pan sub–assy	Bolt Nut	9.0 10	92 102	80 in.·lbf 7
Oil strainer sub–assy x Oil pan sub–assy		9.0	92	80 in.·lbf
Crankshaft pulley x Crankshaft		250	2,549	184

Part Tightened	N·m	kgf·cm	ft·lbf
Cylinder head cover sub–assy RH x Cylinder head sub–assy RH			
Bolt A	10	102	7
Bolt B	9.0	92	80 in.·lbf
Nut	9.0	92	80 in.·lbf
Cylinder head cover sub–assy LH x Cylinder head sub–assy LH			7
Bolt A	10	102	80 in.·lbf
Bolt B	9.0	92	80 in.·lbf
Nut	9.0	92	
Oil level gauge guide x Cylinder head sub–assy	9.0	92	80 in.·lbf
Oil pan sub–assy x Transmission	37	377	27
Idler pulley sub–assy No.1 x Timing chain cover sub–assy	54	551	40
Idler pulley sub–assy No.2 x Timing chain cover sub–assy	39	398	29
V–ribbed belt tensioner assy x Cylinder block sub–assy	36	367	27
Vane pump assy x Cylinder block sub–assy	43	438	32
Intake air surge tank x Intake manifold	28	286	21
Surge tank stay x Intake air surge tank and cylinder head	21	214	15
Throttle body bracket x Throttle body w/ motor and cylinder head	21	214	15
Oil baffle plate x Surge tank stay No.1	9.0	92	80 in.·lbf
Ground cable x Cylinder head sub–assy	8.0	82	71 in.·lbf
Water by–pass joint RR x Cylinder head sub–assy	9.0	92	80 in.·lbf
Intake manifold x Cylinder head sub–assy	26	265	19
Exhaust manifold sub–assy RH x Cylinder head sub–assy RH	30	306	22
Exhaust manifold sub–assy LH x Cylinder head sub–assy LH	30	306	22
Manifold stay x Exhaust manifold sub–assy RH and transmission	40	408	30
Manifold stay No.2 x Exhaust manifold sub–assy LH and transmission	40	408	30
Transmission oil filler tube sub–assy x Cylinder head sub–assy	12	122	9
Air hose w/ pre–cleaner assy x Body	12	122	9
Cool air intake No.1 x Body	12	122	9
Drive plate & ring gear sub–assy x Crankshaft	83	850	61

1KD–FTV:

Part Tightened	N·m	kgf·cm	ft·lbf
Compression gauge attachment x Glow plug hole	13	133	10
Engine under cover sub–assy No.1 x Frame assy	29	296	21
Timing belt No.1 cover x Timing belt No.2 cover	6.0	6	53 in.·lbf
Water hose clamp x Cylinder head	18	184	13
Fanshroud x Radiator assy	5.0	51	44 in.·lbf
Fan w/ fluid coupling assy x Water pump assy	18	184	13
Radiator reserve tank x Radiator assy and fanshroud	5.0	51	44 in.·lbf
Engine under cover sub–assy No.1 x Frame assy	29	296	21
Engine oil level sensor x Oil pan sub–assy	8.0	82	71 in.·lbf
Oil pan cover sub–assy No.1 x Oil pan sub–assy	9.0	92	80 in.·lbf
Crank position No.2 sensor x Timing gear case	8.5	87	75 in.·lbf
Crank position sensor x Timing gear case	8.5	87	75 in.·lbf
Water temperature sender gauge assy x Cylinder head	20	204	15
Vacuum pump assy x Timing gear case	21	214	16
Timing belt idler sub–assy No.1 x Cylinder block	35	357	26
Intercooler support bracket No.2 x Cylinder head	39	398	29
Engine mounting bracket front No.1 x Cylinder block	68	693	50
Water by–pass pipe No.2 x Cylinder block	8.0	82	71 in.·lbf
Water by–pass pipe sub–assy No.2 x Cylinder block	8.0	82	71 in.·lbf
Exhaust manifold heat insulator No.1 x Exhaust manifold	12	122	9.0
Turbo insulator No.1 x Turbo assy	12	122	9.0

Part Tightened	N·m	kgf·cm	ft·lbf
Oil level gauge guide x Water inlet	8.0	82	71 in.·lbf
Ventilation pipe x Cylinder head	20	204	15
Compressor mounting bracket No.1 x Cylinder block	21	214	16
Compressor mounting bracket No.1 x Idle pulley assy	45	459	33
Compressor mounting bracket No.1 x Generator bracket	21	214	16
Viscous heater bracket sub–assy x Cylinder head	47	479	35
Viscous w/ magnet clutch heater assy x Viscous heater bracket sub–assy	45	459	33
Viscous w/ magnet clutch heater assy x Viscous heater bracket No.2	45	459	33
Diesel engine coolant temperature sensor x Cylinder block	20	204	15
Glow plug assy x Cylinder head	13	133	10
Glow plug assy x Glow plug connector No.1	2.2	22	19 in.·lbf
Water outlet x Cylinder head	19	194	14
Intake manifold x Cylinder head	29	296	21
Common rail assy x Cylinder head	38	387	28
Timing belt No.1 cover x Timing belt No.2 cover	6.0	61	53 in.·lbf
Water hose clamp x Cylinder head	18	184	13
Rear end plate x Cylinder block	8.0	82	71 in.·lbf
Engine mounting insulator front x Frame assy	38	387	28
Vane pump assy x Timing gear case assy	39	398	29
Vane pump oil reservoir x Timing gear case assy and intake manifold	18	184	13
Air cleaner assy x Body	12	122	9.0
Intercooler Protector x Intercooler assy	7.0	71	62 in.·lbf
Chain tensioner assy No.1 x Cylinder block	13	133	10
Fan w/ fluid coupling assy x Water pump assy	18	184	13
Timing belt No.2 cover x Timing gear case	10	102	7.0
Timing belt idler sub–assy No.1 x Cylinder block	35	357	26
Camshaft timing pulley x Camshaft	98	1,000	72
Cylinder head cover sub–assy No.2 x Cylinder head			
Bolt A	18	184	13
Bolt B and C	8.0	82	71 in.·lbf
Camshaft bearing cap x Cylinder head	19	194	14
Nozzle holder clamp x Cylinder head	22	220	16
Cylinder head x Cylinder block			
1st	85	867	63
2nd	Turn 90°	Turn 90°	Turn 90°
3rd	Turn 90°	Turn 90°	Turn 90°
Turbochrger sub–assy x Exhaust manifold	52	530	38
Ventilation pipe x Cylinder head	20	204	15
Viscous heater bracket sub–assy x Cylinder head	47	479	35
Viscous heater bracket sub–assy x Cooler compressor assy	25	250	18
Viscous heater bracket sub–assy x Viscous w/ magnet clutch heater assy	45	459	33
Viscous w/ magnet clutch heater assy x Viscous heater bracket No.2	25	250	18
Crankshaft pulley x Crankshaft	365	3,722	270
Engine rear oil seal retainer x Cylinder block and oil pan sub–assy			
Bolt A	13	133	9.6
Bolt B	15	150	11
Rear end plate x Cylinder block	8.0	82	71 in.·lbf
Flywheel sub–assy x Crankshaft	178	1,815	132