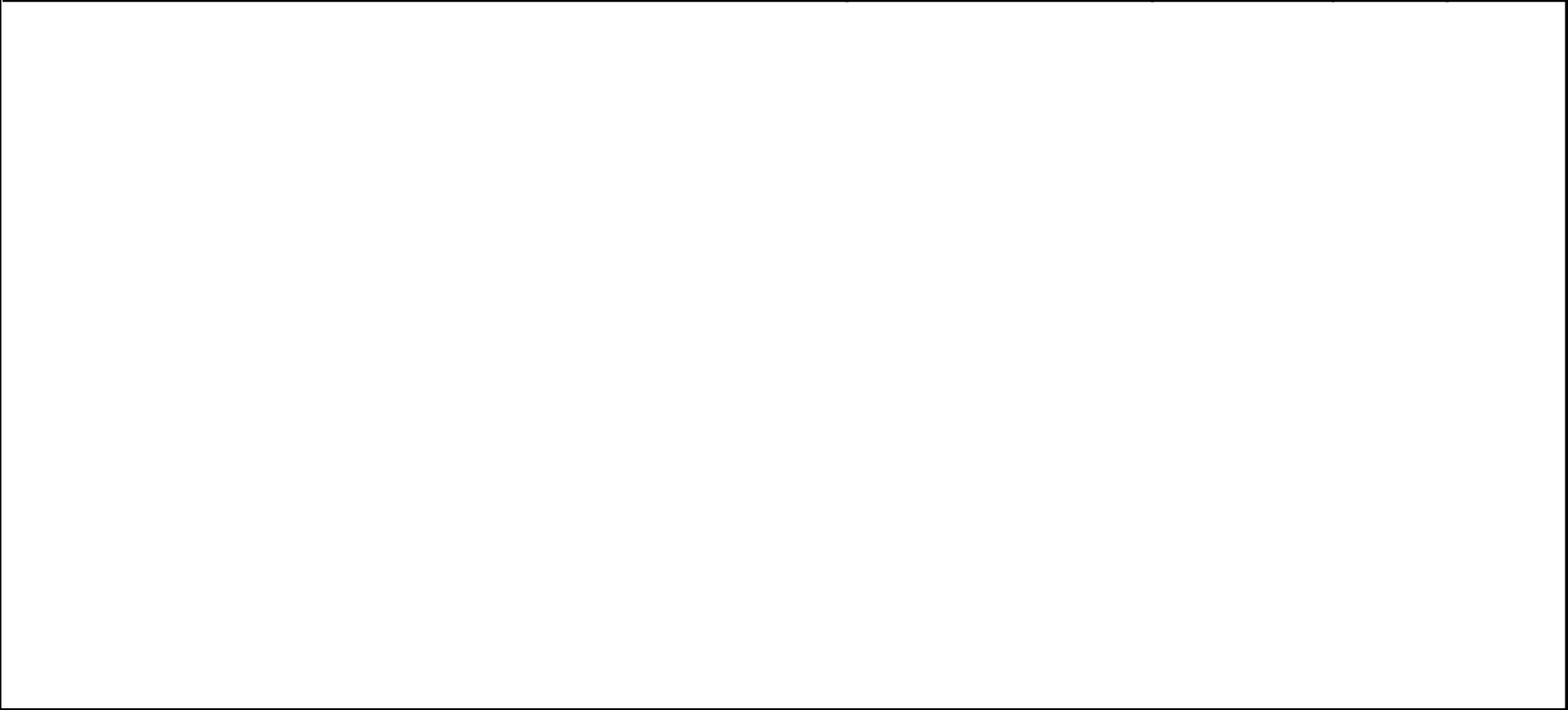


Tightening Torques

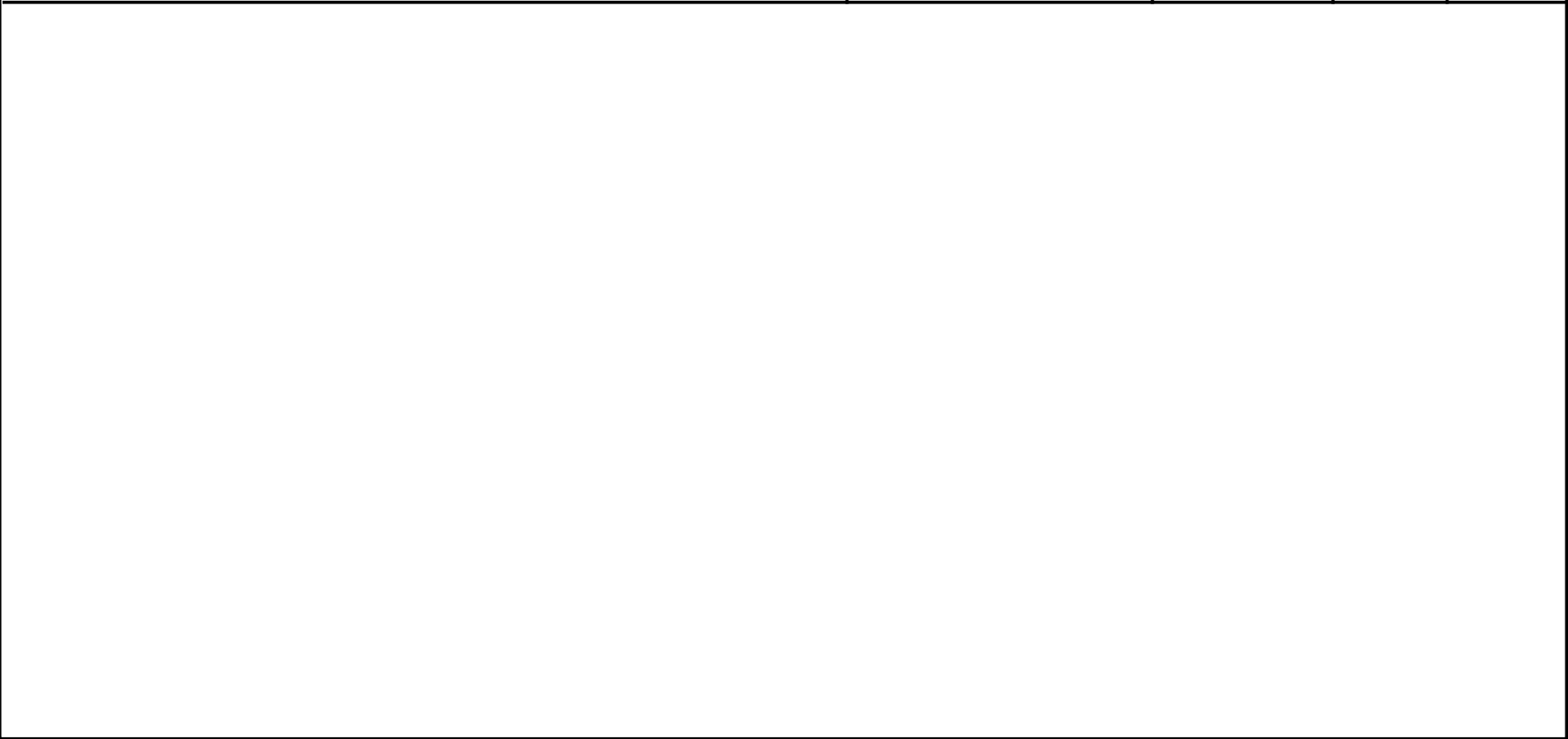
00 - 1 General Instructions	Type	Screw	Dimension	Unit
00 00 Extract from company standard BMW N 600 02.0				
<p>The maximum tightening torques are:</p> <p>Only applicable to shaft screws with metric standard and fine threads acc. to DIN 13, sheet 13 and nuts with height of 0,8 x d acc. to DIN 934 and only for a μ total = 0.125 (screws phosphatized, screws untreated or galvanized. Lubrication condition: unlubricated and also oiled).</p> <p>For cadmium-plated screws or nuts (μ total = 0.08 to 0.09) the tightening torque with screw material at the same level of utilization ca. must be 30% less than shown in the table.</p> <p>The values specified in this table apply to all screw connections conforming to the aforementioned conditions.</p> <p>Not applicable when using a different surface or lubricant condition on the thread, or if the height of the nut differs.</p> <p>Not applicable to necked-down bolts, self-tapping screw connections or to connections between parts made of different materials.</p> <p>Important! Maintaining specified tightening torques is vital for performing repair work to a professional standard. This presupposes that the torque wrenches required for this are subjected to a regular inspection. Approved torque testing equipment is listed in the catalogue of workshop equipment planning documents.</p>				

00 - 2 General Instructions	Type	Screw	Dimension	Unit
00 00 M4 and M5 - maximum tightening torques in accordance with BMW N 600 02.0				
Applicable range for tightening torques, refer to extract from company standard BMW N 600 02.0				
M4 thread		M4 8.8	2.9	Nm (ft. lbs.)
		M4 10.9	4.1	Nm (ft. lbs.)
		M4 12.9	4.9	Nm (ft. lbs.)
M5 thread		M5 8.8	5.9	Nm (ft. lbs.)
		M5 10.9	8.3	Nm (ft. lbs.)
		M5 12.9	10.0	Nm (ft. lbs.)

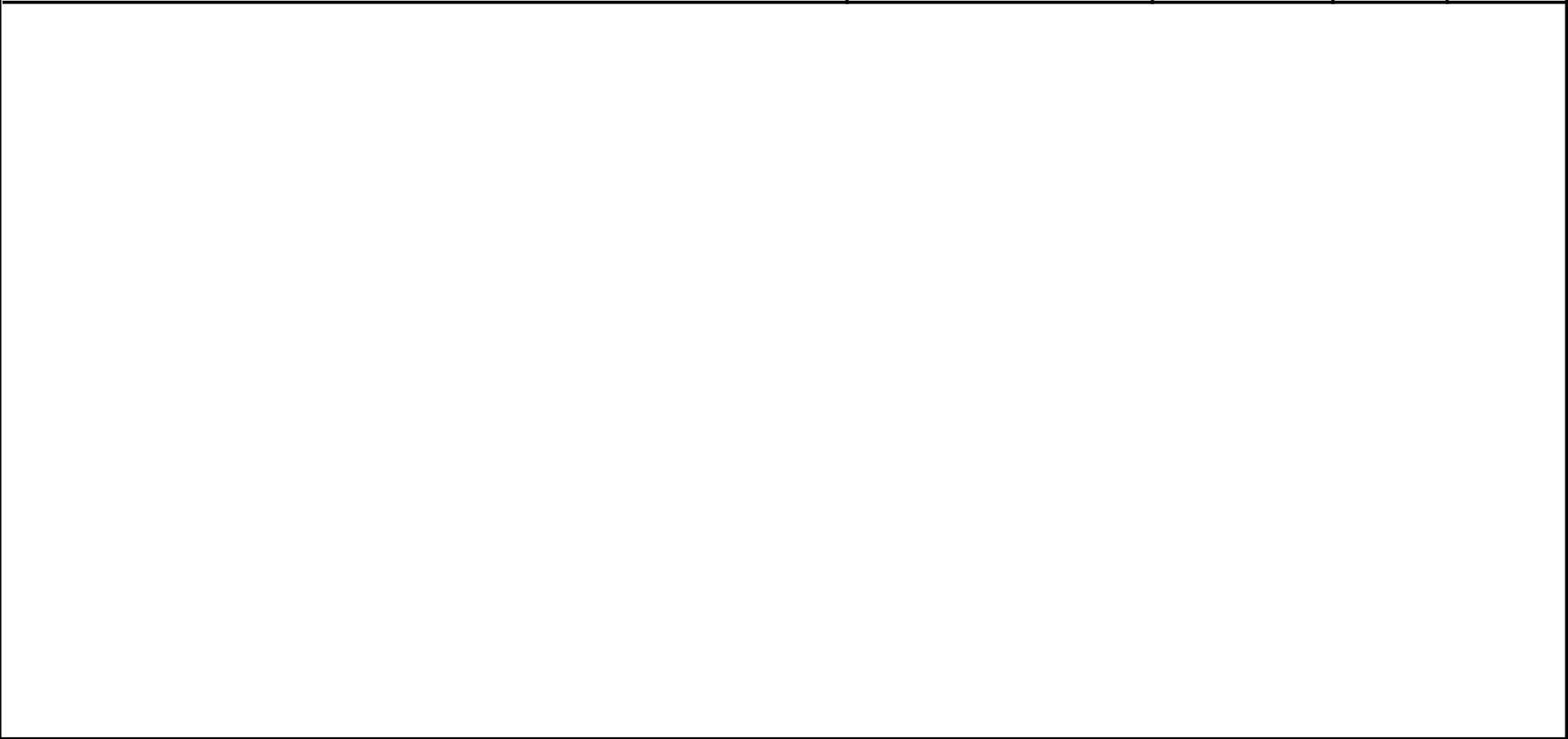


00 - 3 General Instructions	Type	Screw	Measure	Unit
00 00 M6 and M7 - maximum tightening torques accord. to BMW N 600 02.0				
Applicable range for tightening torques, <u>refer to extract from company standard BMW N 600 02.0</u>				
M6 thread		M6 8.8	9.9	Nm
		M6 10.9	14.0	Nm
		M6 12.9	16.5	Nm
M7 thread		M7 8.8	14.8	Nm
		M7 10.9	21.3	Nm
		M7 12.9	25.5	Nm

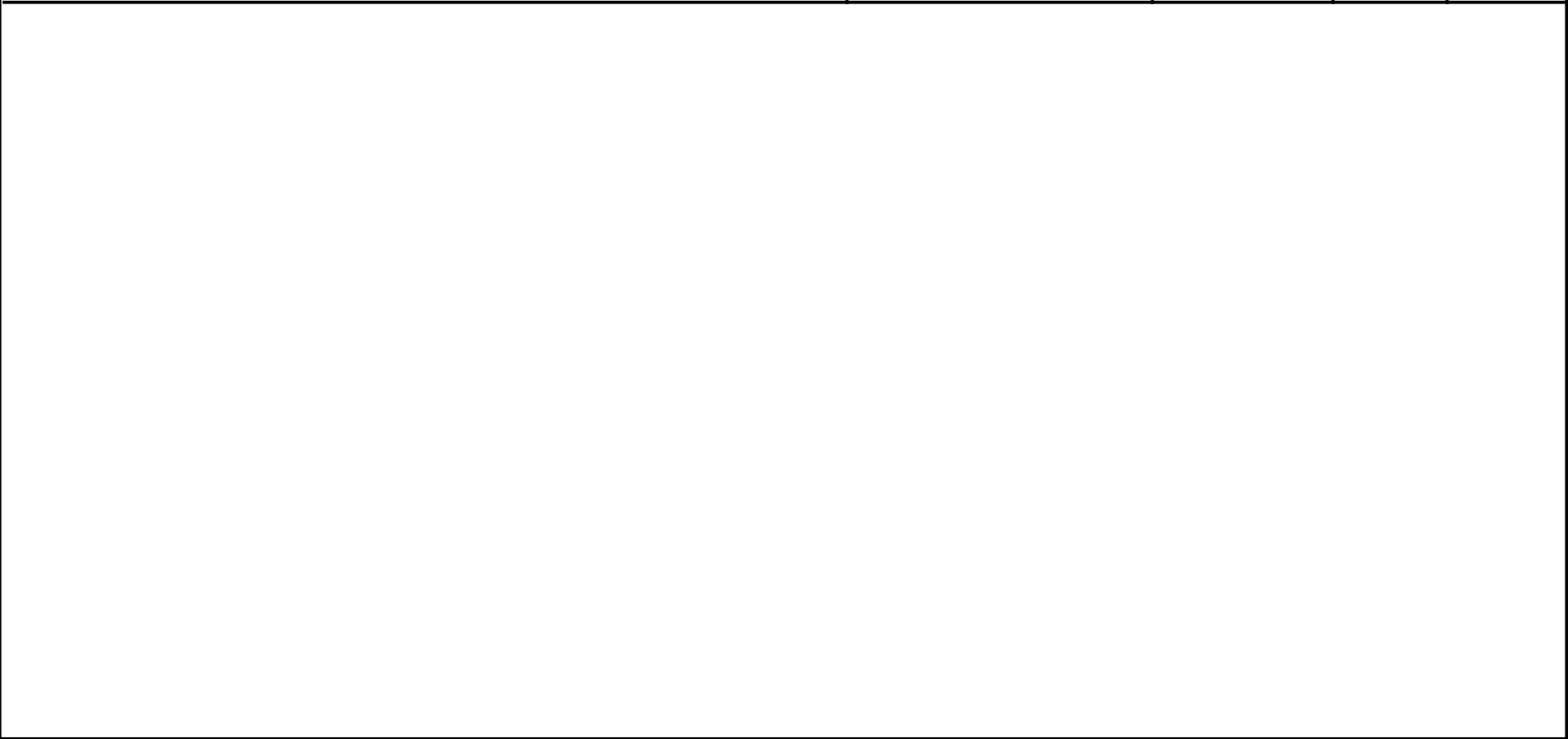
00 - 4 General Instructions	Type	Screw	Dimension	Unit
00 00 M8 and M8x1 - maximum tightening torques in acc. with BMW N 600 02.0				
Applicable range for tightening torques, <u>refer to extract from company standard BMW N 600 02.0</u>				
M8 thread		M8 8.8	24	Nm (ft. lbs.)
		M8 10.9	34	Nm (ft. lbs.)
		M8 12.9	40	Nm (ft. lbs.)
M8x1 thread		M8x1 8.8	26	Nm (ft. lbs.)
		M8x1 10.9	36	Nm (ft. lbs.)
		M8x1 12.9	44	Nm (ft. lbs.)



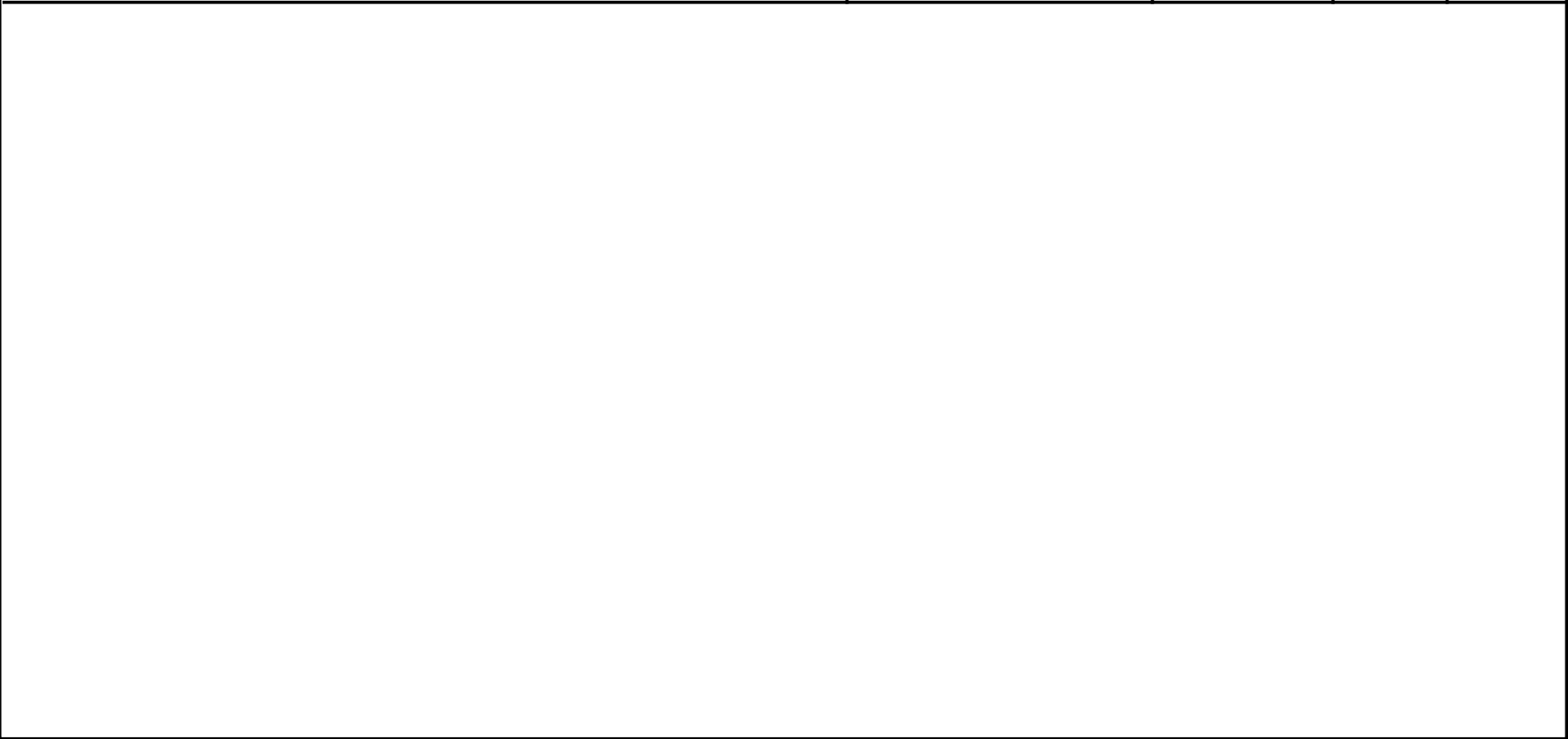
00 - 5 General Instructions	Type	Screw	Dimension	Unit
00 00 M10 and M10x1 - maximum tightening torques acc. to BMW N 600 02.0				
Applicable range for tightening torques, <u>refer to extract from company standard BMW N 600 02.0</u>				
M10 thread		M10 8.8	47	Nm (ft. lbs.)
		M10 10.9	66	Nm (ft. lbs.)
		M10 12.9	79	Nm (ft. lbs.)
M10x1 thread		M10x1 8.8	54	Nm (ft. lbs.)
		M10x1 10.9	75	Nm (ft. lbs.)
		M10x1 12.9	91	Nm (ft. lbs.)



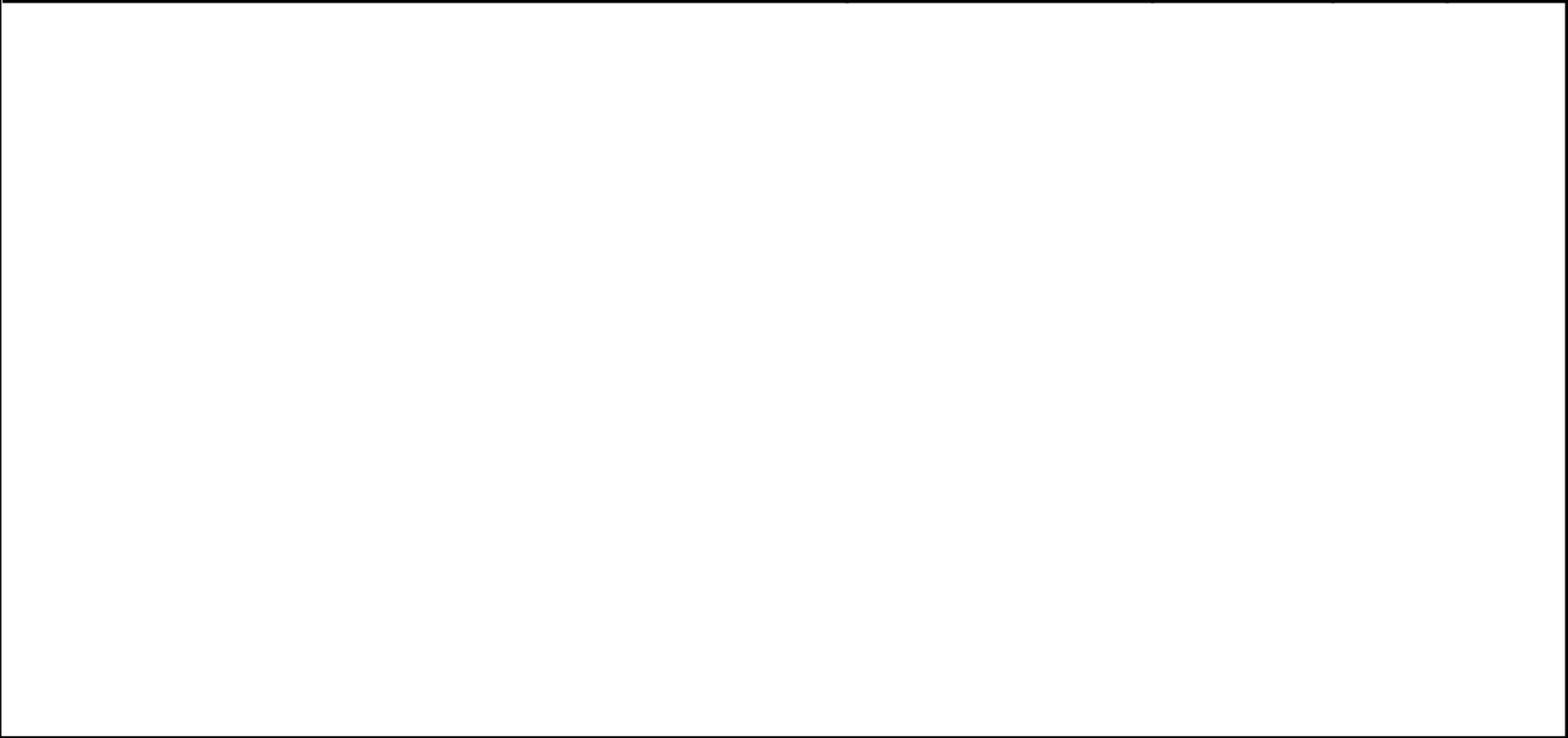
00 - 6 General Instructions	Type	Screw	Dimension	Unit
00 00 M12 and M12x1.5 - maximum tightening torques acc. to BMW N 600 02.0				
Applicable range for tightening torques, <u>refer to extract from company standard BMW N 600 02.0</u>				
M12 thread		M12 8.8	82	Nm (ft. lbs.)
		M12 10.9	115	Nm (ft. lbs.)
		M12 12.9	140	Nm (ft. lbs.)
M12x1.5 thread		M12x1.5 8.8	87	Nm (ft. lbs.)
		M12x1.5 10.9	123	Nm (ft. lbs.)
		M12x1.5 12.9	147	Nm (ft. lbs.)



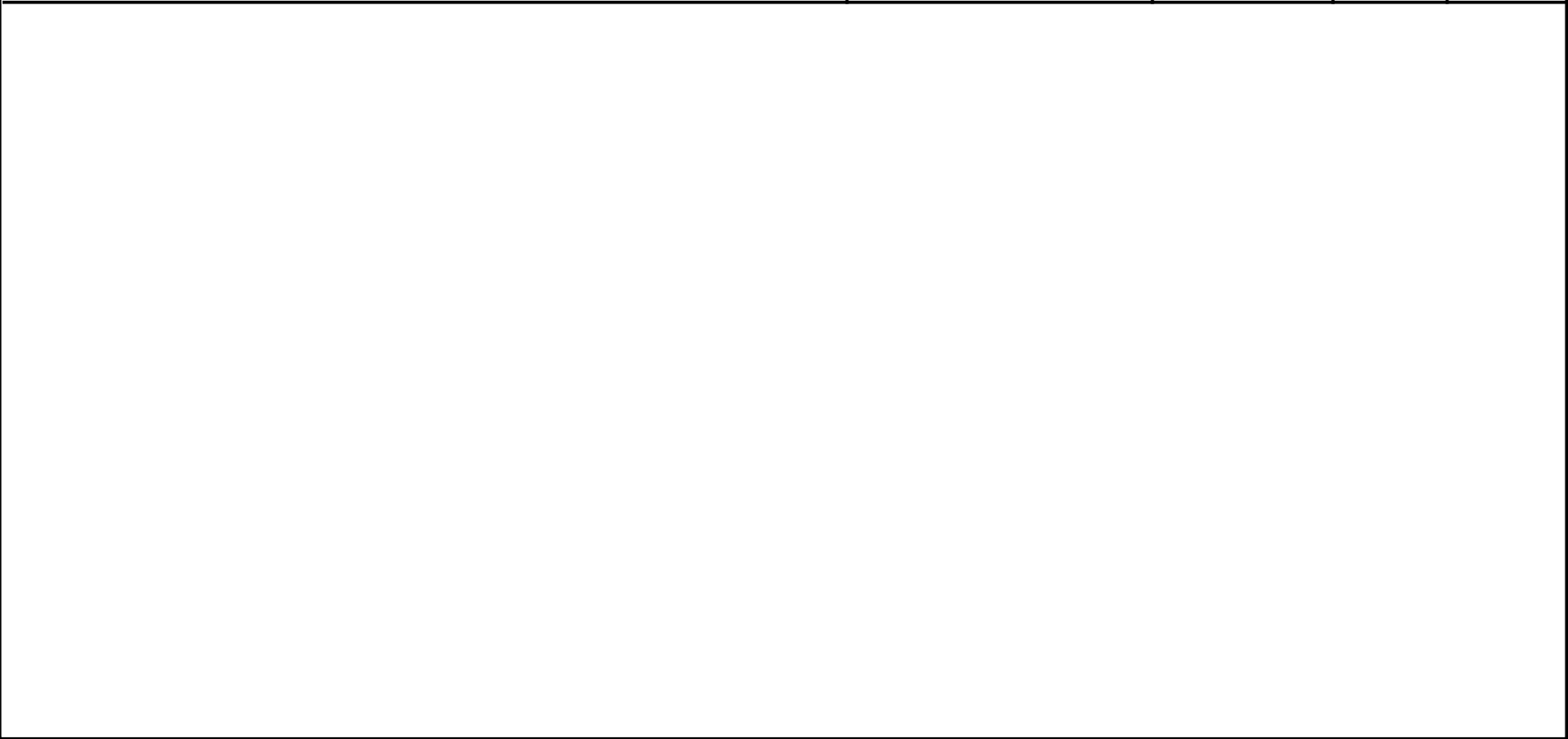
00 - 7 General Instructions	Type	Screw	Dimension	Unit
00 00 M14 and M14x1.5 - maximum tightening torques acc. to BMW N 600 02.0				
Applicable range for tightening torques, refer to extract from company standard BMW N 600 02.0				
M14 thread		M14 8.8	130	Nm (ft. lbs.)
		M14 10.9	180	Nm (ft. lbs.)
		M14 12.9	220	Nm (ft. lbs.)
M14x1.5 thread		M14x1.5 8.8	143	Nm (ft. lbs.)
		M14x1.5 10.9	200	Nm (ft. lbs.)
		M14x1.5 12.9	240	Nm (ft. lbs.)



00 - 8 General Instructions	Type	Screw	Dimension	Unit
00 00 M16 and M16x1.5 - maximum tightening torques acc. to BMW N 600 02.0				
Applicable range for tightening torques, <u>refer to extract from company standard BMW N 600 02.0</u>				
M16 thread		M16 8.8	200	Nm (ft. lbs.)
		M16 10.9	280	Nm (ft. lbs.)
		M16 12.9	340	Nm (ft. lbs.)
M16x1.5 thread		M16x1.5 8.8	216	Nm (ft. lbs.)
		M16x1.5 10.9	303	Nm (ft. lbs.)
		M16x1.5 12.9	364	Nm (ft. lbs.)



00 - 9 General Instructions	Type	Screw	Dimension	Unit
00 00 M18 and M18x1.5 - maximum tightening torques acc. to BMW N 600 02.0				
Applicable range for tightening torques, refer to extract from company standard BMW N 600 02.0				
M18 thread		M18 8.8	280	Nm (ft. lbs.)
		M18 10.9	390	Nm (ft. lbs.)
		M18 12.9	470	Nm (ft. lbs.)
M18x1.5 thread		M18x1.5 8.8	313	Nm (ft. lbs.)
		M18x1.5 10.9	440	Nm (ft. lbs.)
		M18x1.5 12.9	527	Nm (ft. lbs.)



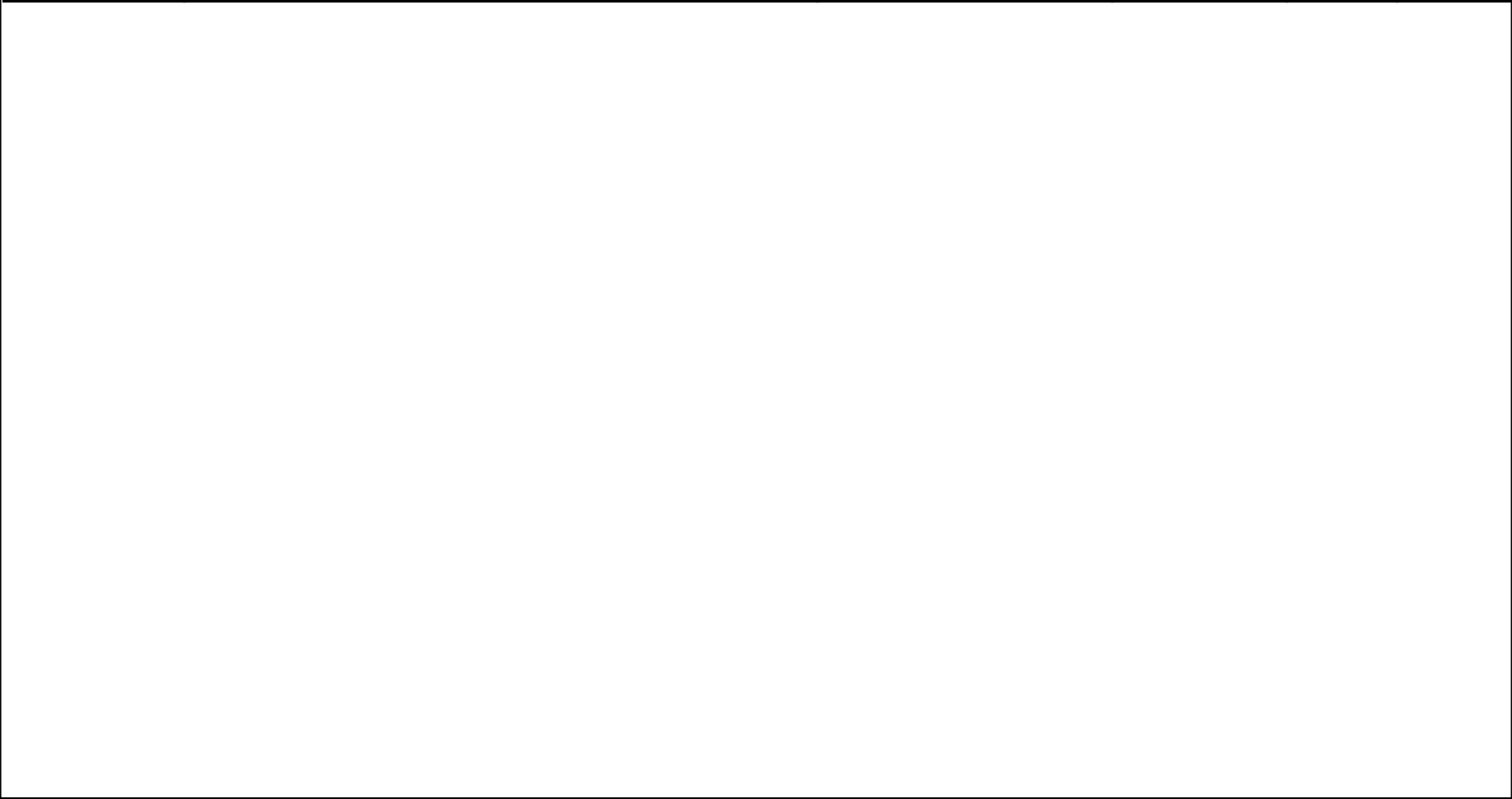
11 - 1 Engine		Type	Screw	Measure	Unit
11 11 Crankcase					
1AZ	Main bearing screws Replace, wash and oil main bearing screws	M10/M20/M30	M10	60	Nm
		M21	M10	65	Nm
		S38/S14/M40/M42/M43/M44/M50/ M41/M51/S50/S50 US	M10		
	Torque			20	Nm
	Torque angle			50	°
2AZ	Main bearing screws Replace main bearing screws Do not wash off coating on main bearing screw	M70/S70/M73/M52 With cast aluminium engine block			
	Torque			20	Nm
	Torque angle		M10	70	°
		M60/1/M60/2/M62			
	Torque			20	Nm
	Torque angle on engines with M10 main bearing screws		M10	70	°
	Torque angle on engines with M11 main bearing screws		M11	100	°
	Main bearing screws Replace, wash and oil main bearing screws	S52/M52 With cast iron engine block			
	Torque			20	Nm
	Torque angle		M10	50	°

11 - 1 Engine		Type	Screw	Measure	Unit
11 11 Crankcase					
1AZ	Main bearing screws Replace, wash and oil main bearing screws	M10/M20/M30	M10	60	Nm
		M21	M10	65	Nm
		S38/S14/M40/M42/M43/M44/M50/ M41/M51/S50/S50 US	M10		
	Torque			20	Nm
	Torque angle			50	°
2AZ	Main bearing screws Replace main bearing screws Do not wash off coating on main bearing screw	M70/S70/M73/M52 With cast aluminium engine block			
	Torque			20	Nm
	Torque angle		M10	70	°
		M60/1/M60/2/M62			
	Torque			20	Nm
	Torque angle on engines with M10 main bearing screws		M10	70	°
	Torque angle on engines with M11 main bearing screws		M11	100	°
	Main bearing screws Replace, wash and oil main bearing screws	S52/M52 With cast iron engine block			
	Torque			20	Nm
	Torque angle		M10	50	°

11 - 2 Engine		Type	Screw	Measure	Unit
11 11 Crankcase					
3AZ	Main bearing cap inclined bolts				
Screws (replace hex and collar screws) and spacer pin		M60/1/M60/2/M62/M70/S70/M73	M8		
	Torque			20	Nm
	Torque angle			45	°
Threaded support sleeves		M70/M60/1/M60/2/M62/S70/M73		10	Nm
4AZ	Struts/bracing shell	All	M10	43	Nm
		All	M8	22	Nm
5AZ	Drain plug for coolant on engine block	All	M14 x 1.5	25	Nm
6AZ	Main oil duct screw plugs	All	M16 x 1.5	34	Nm
7AZ	Oil spray nozzle on engine block	All	M8x1	12	Nm



11 - 4 Engine		Type	Screw	Measure	Unit
11 12 Cylinder Head and Cover					
2AZ Cylinder head bolts Replace, wash and oil cylinder head bolts.					
For repair work, only use screws with Torx head		M20	M10		
	torque			30	Nm
	torque angle			90	°
	torque angle No settling time. No warm-running time.			90	°



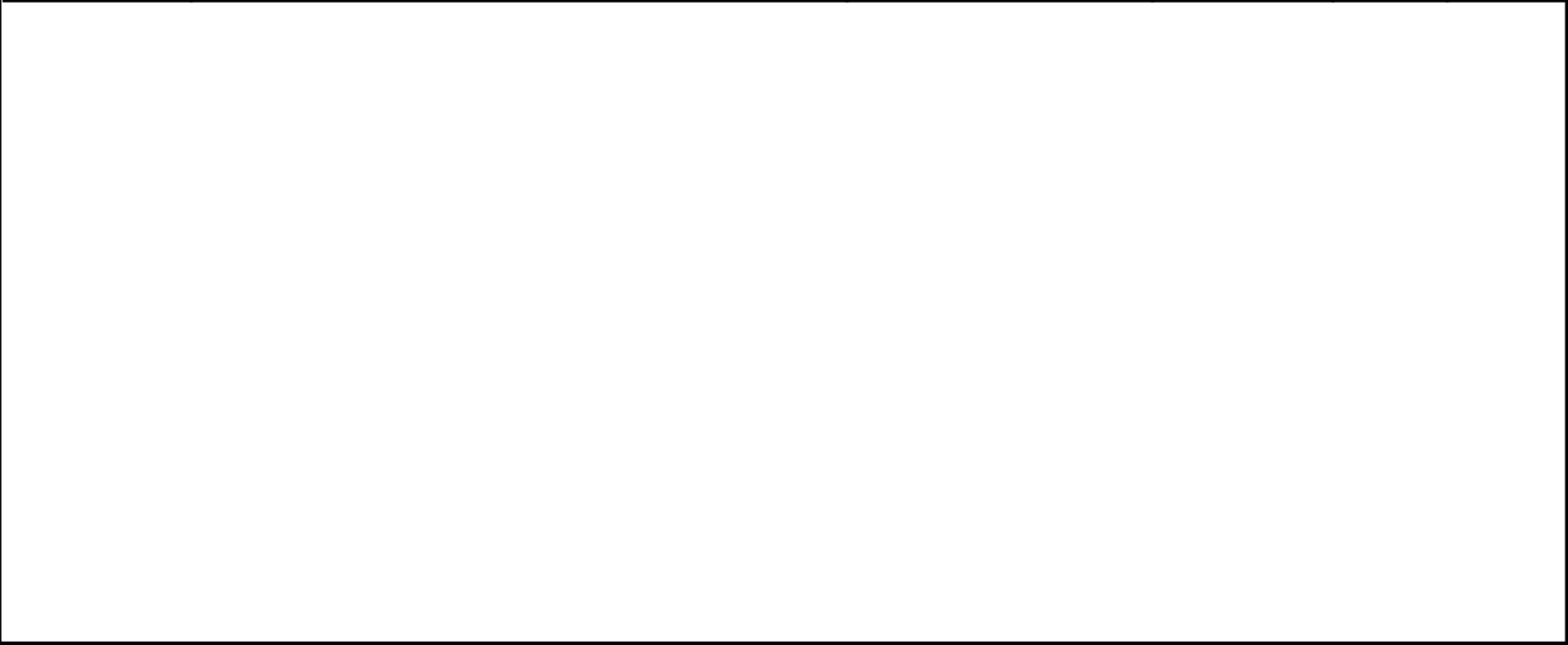
11 - 5 Engine		Type	Screw	Measure	Unit
11 12 Cylinder Head and Cover					
3AZ Cylinder head bolts Replace, wash and oil cylinder head bolts.		M21			
	torque			50	Nm
	Torsion angle (screws no. 1 - 10)			90	°
	Torsion angle (screws no. 11 - 14)			73	°
	warm-running time			15	min
	torque angle			90	°
4AZ Cylinder head bolts Replace, wash and oil cylinder head bolts.		M30			
	torque			60	Nm
	settling time			20	min
	torque			80	Nm
	warm-running time			25	min
	torque angle			35	°

11 - 6 Engine		Type	Screw	Measure	Unit
11 12 Cylinder head with cover					
5AZ Cylinder head bolts Replace, wash and oil cylinder head bolts		M51/M41	M11		
	Torque			80	Nm
	Loosen all bolts 1/2 turn				
	Torque			50	Nm
	Torque angle			90	°
	Torque angle			90	°
	warm-running time			25	min
	Torque angle			90	°
6AZ Cylinder head bolts Replace, wash and oil cylinder head bolts		M40/M42/M43/M44/M50/S50 US/ S52/M52 With cast iron engine block	M10		
	Torque			30	Nm
	Torque angle			90	°
	Torque angle			90	°
Cylinder head bolts Fit new cylinder head bolts Do not wash away coating on cylinder head screws		M52 With cast aluminium engine block	M10		
	Torque			40	Nm
	Torque angle			90	°
	Torque angle			90	°

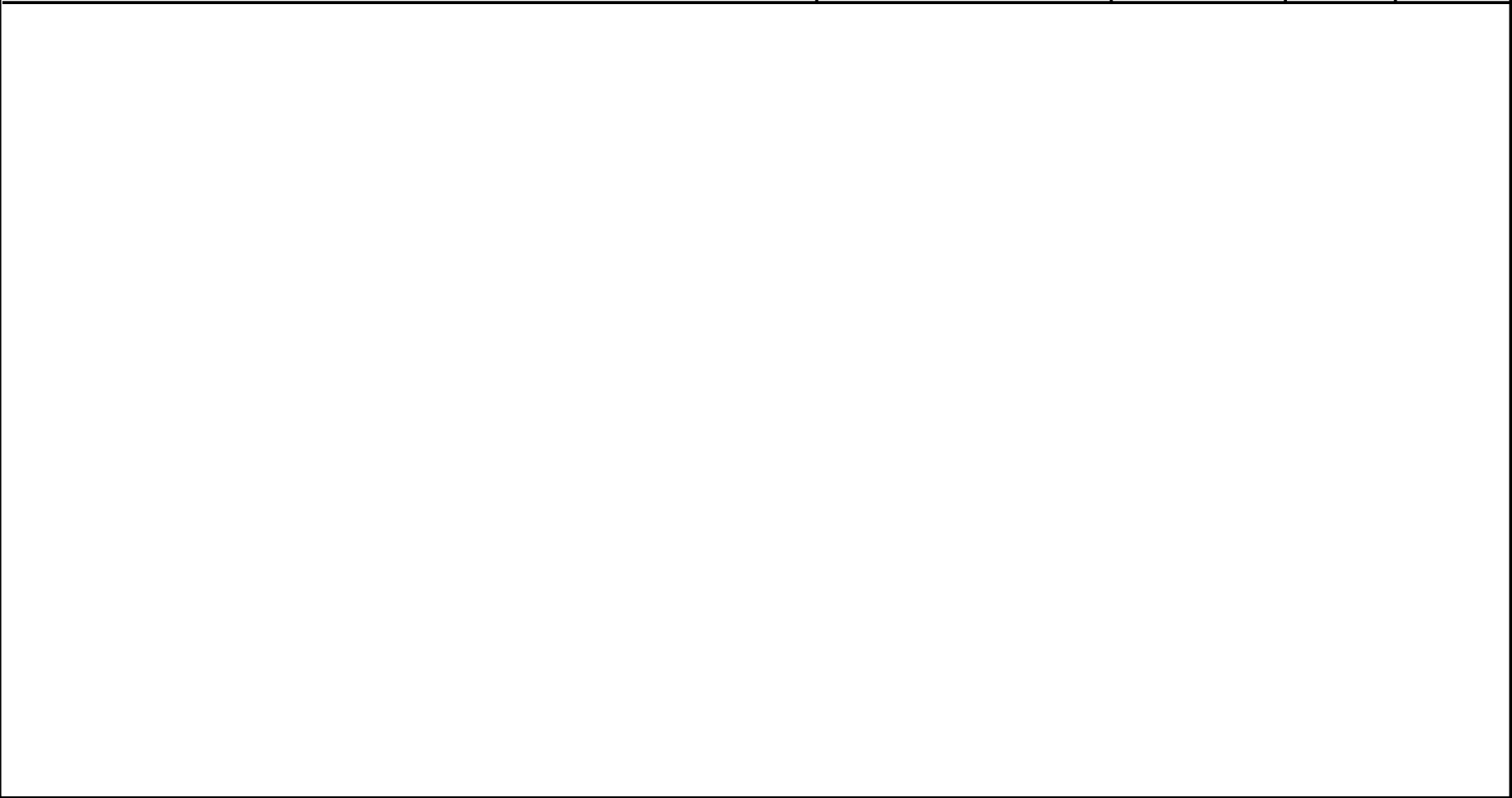
11 - 7 Engine		Type	Screw	Measure	Unit
11 12 Cylinder head with cover					
6AZ Cylinder head bolts Replace, wash and oil cylinder head bolts		S50	M11		
	Torque			30	Nm
	Torque angle			90	°
	Torque angle			90	°

11 - 8 Engine		Type	Screw	Measure	Unit
11 12 Cylinder head with cover					
7AZ Cylinder head bolts Fit new cylinder head bolts Do not wash away coating on cylinder head screws For repair work, only use screws with Torx head		M70/S70/M73	M10		
	Torque			30	Nm
	Torque angle			60	°
	Torque angle			60	°
8AZ Cylinder head bolts Fit new cylinder head bolts Do not wash away coating on cylinder head screws		M60/1/M60/2/M62	M10		
	Torque			30	Nm
	Torque angle			80	°
	Torque angle			80	°

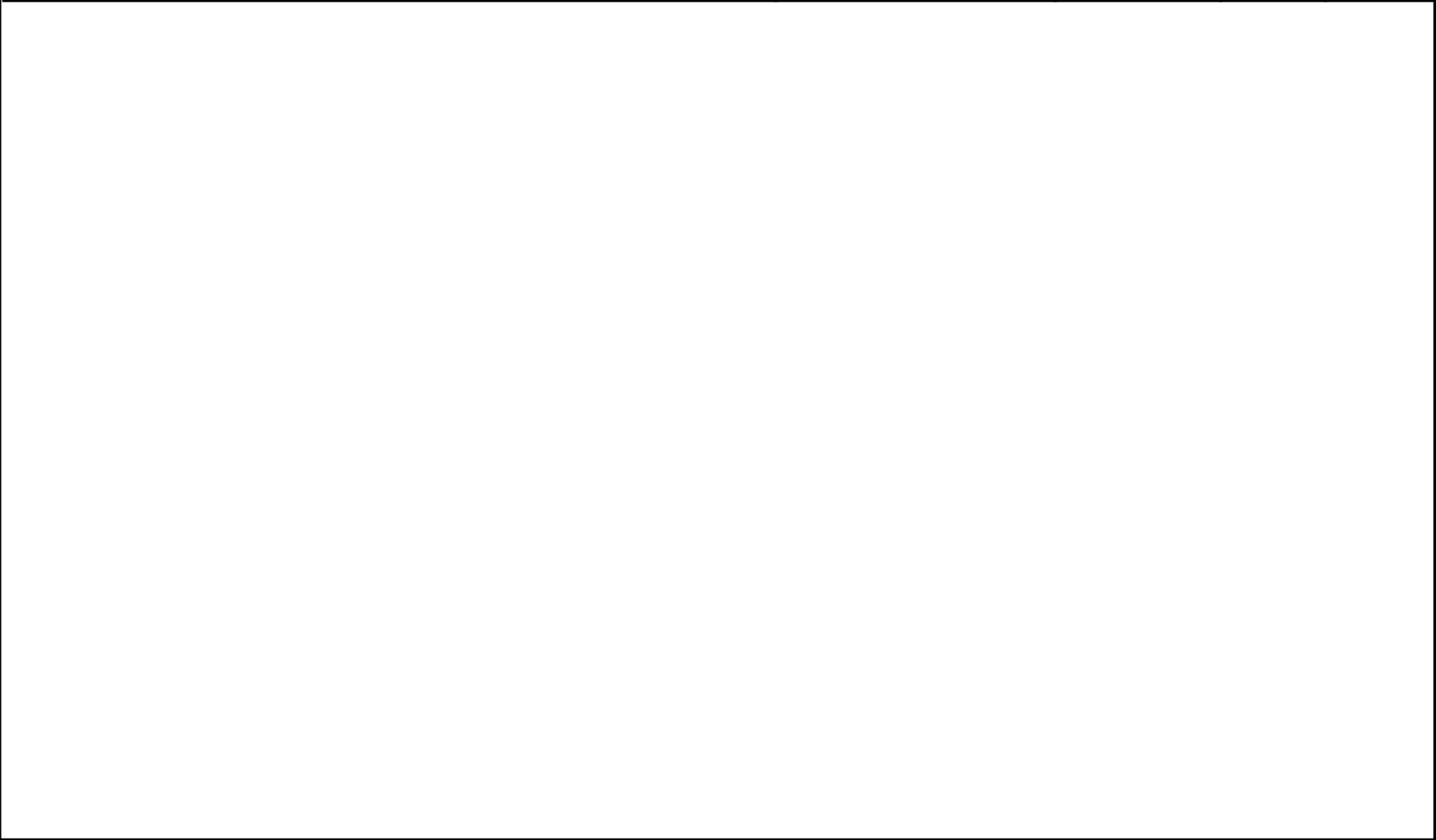
11 - 9 Engine		Type	Screw	Measure	Unit
11 12 Cylinder Head and Cover					
9AZ Cylinder head bolts Replace, wash and oil cylinder head bolts.		S14/S38 B35	M12		
	torque			50	Nm
	torque			80	Nm
	settling time			15	min
	torque			100	Nm
10AZ Cylinder head bolts Replace, wash and oil cylinder head bolts.		S38 B36/S38 B38	M12		
	torque			20	Nm
	torque angle			60	°
	torque angle			70	°



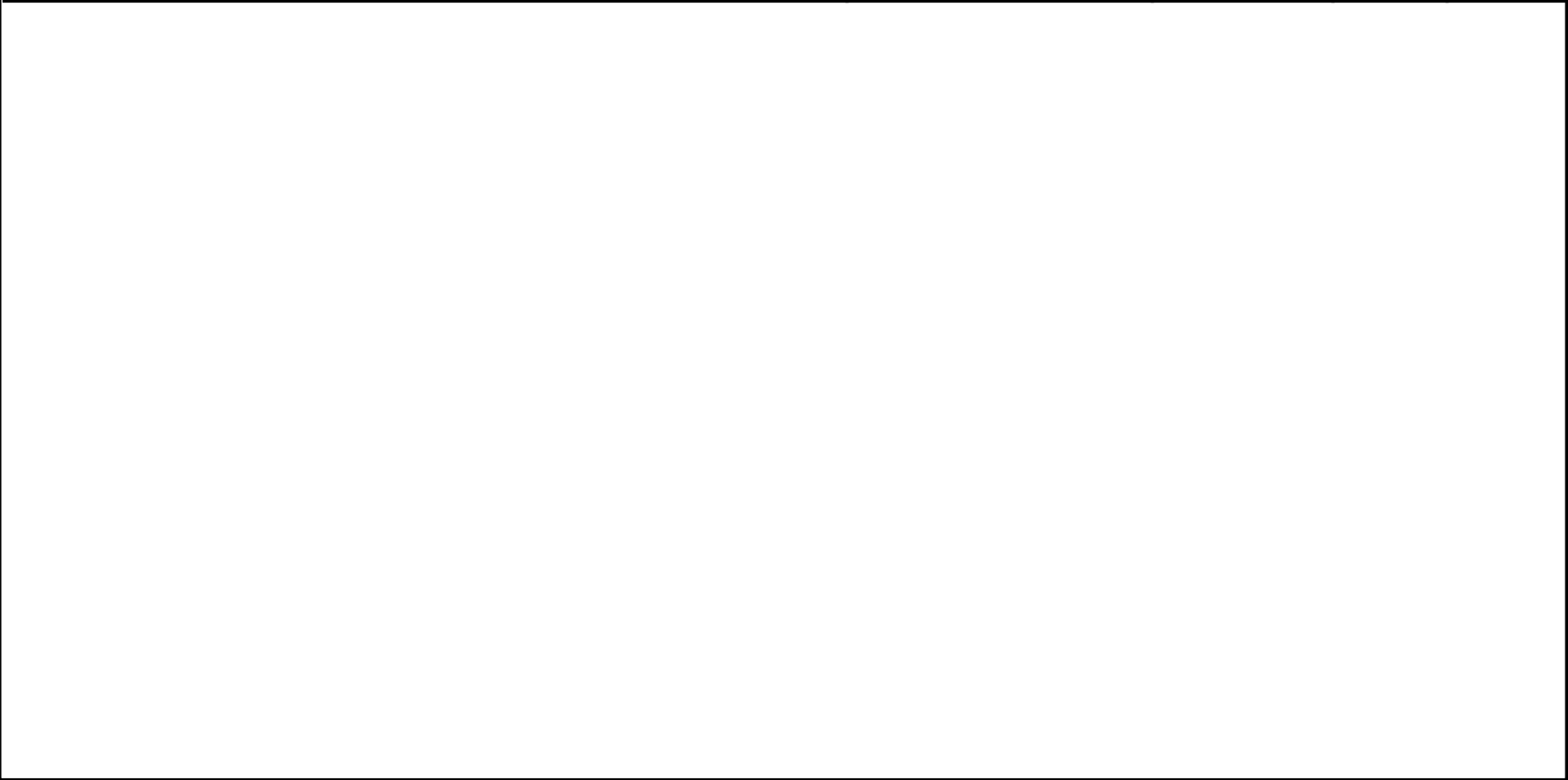
11 - 10 Engine	Type	Screw	Measure	Unit
11 12 Cylinder Head and Cover				
11AZ Cylinder head cover	All	M6	10	Nm
	All	M7	15	Nm
	M21	M8	15	Nm
12AZ Oil trap to cylinder head cover	M21	M8	17	Nm
13AZ Timing case to cylinder head	All	M7	15	Nm
	All	M8	20	Nm



11 - 11 Engine	Type	Screw	Measure	Unit
11 13 Oil Pan				
1AZ Oil drain plug	All	M12 x 1.5	25	Nm
	All	M22 x 1.5	60	Nm
2AZ Oil pan on engine block	All	M6 8.8	10	Nm
	All	M6 10.9	12	Nm

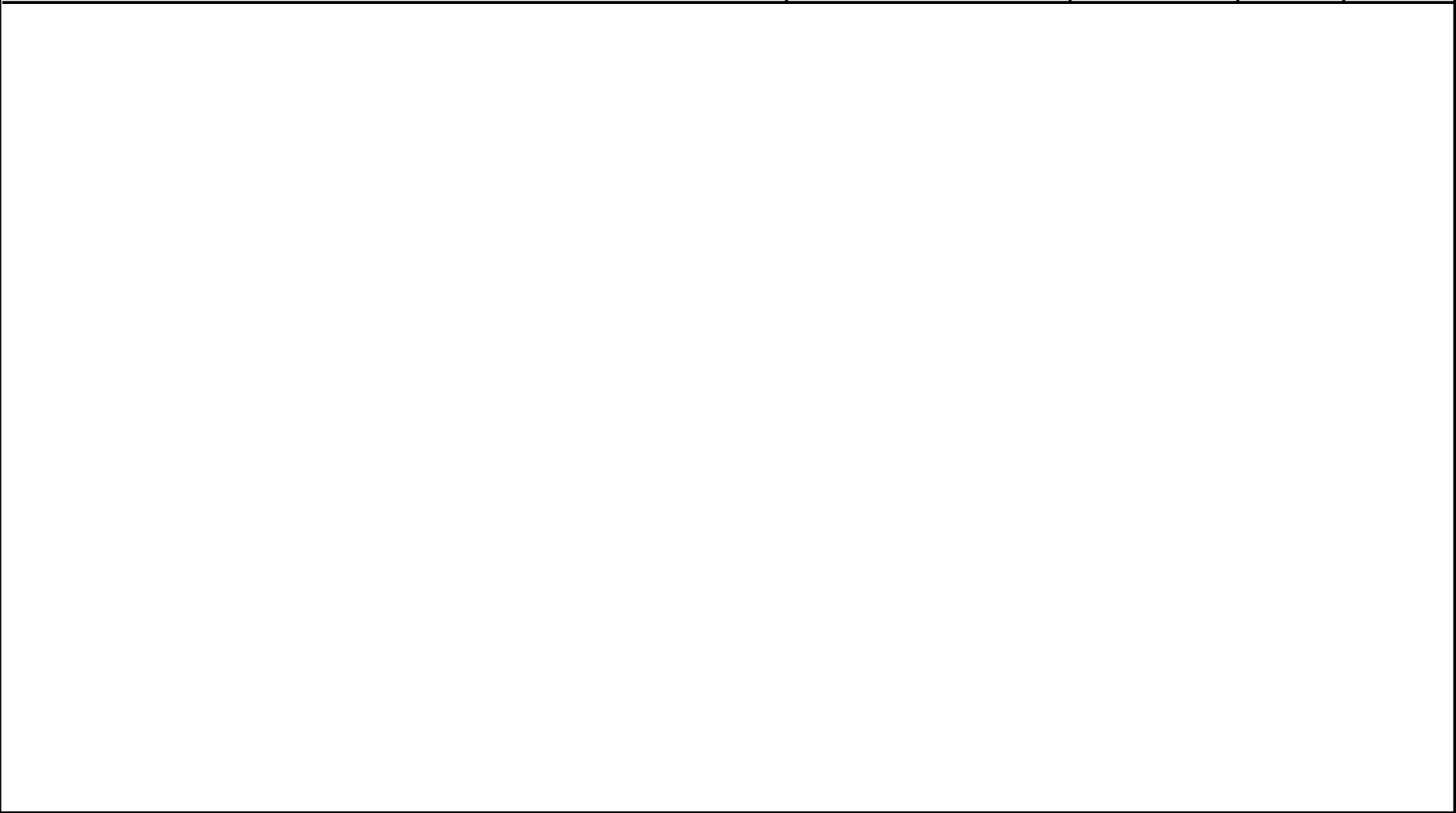


11 - 12 Engine	Type	Screw	Measure	Unit
11 14 Case covers				
1AZ Timing case and top and bottom timing case cover	All	M6	10	Nm
	All	M8	22	Nm
	All	M10	47	Nm
2AZ Front/rear end cover to crankcase	All	M6	10	Nm
	All	M8	22	Nm
3AZ Bolts on timing case cover	M51/M41	M42x1.5	65	Nm
4AZ Sealing plug or connector on timing case cover	M51/M41	M20x1.5	30	Nm



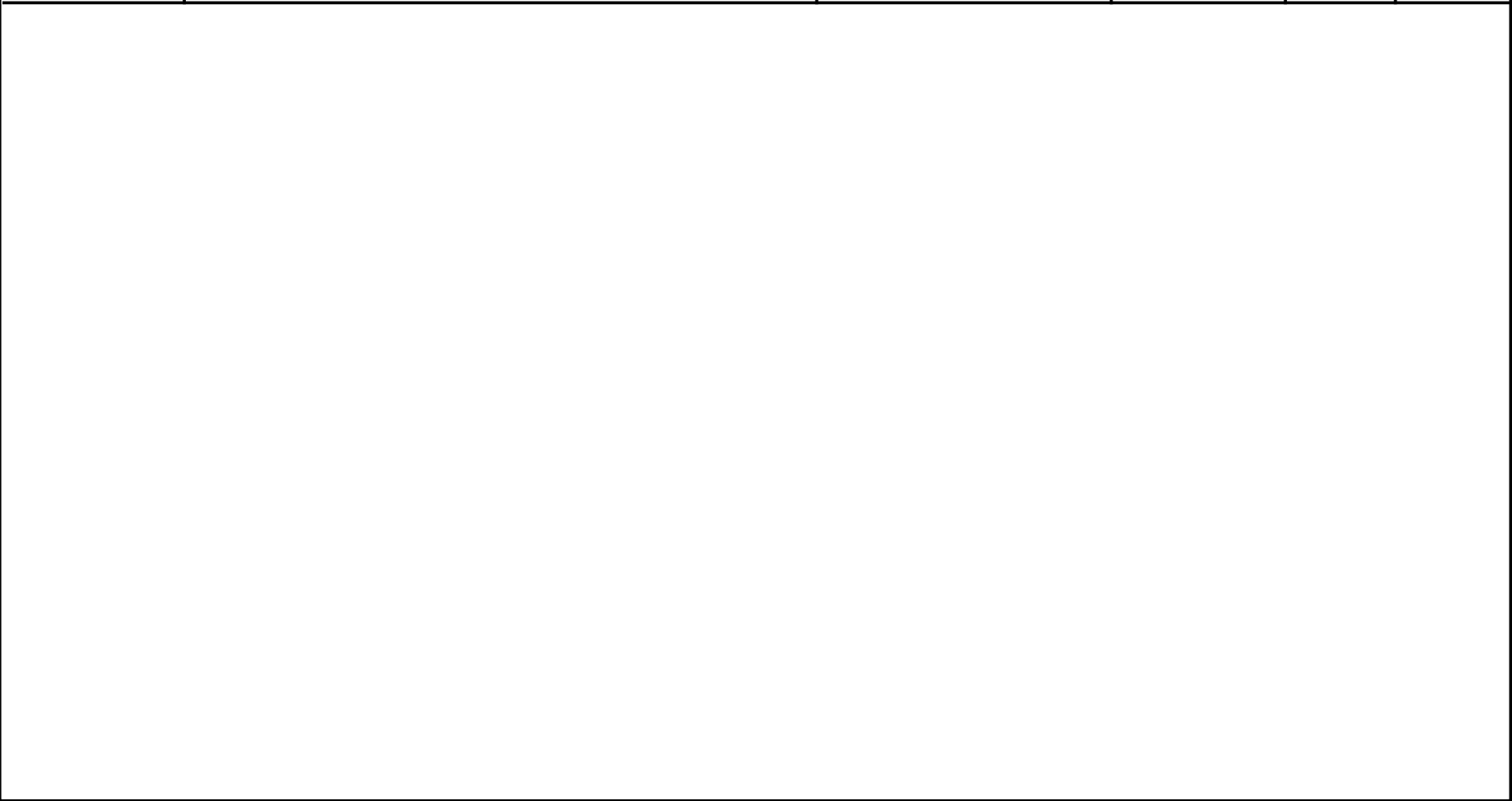
11 - 13 Engine	Type	Screw	Dimension	Unit
11 21 Crankshaft and Bearings				
1AZ Increment wheel on crankshaft	All	M5 10.9	13	Nm (ft. lbs.)

11 - 14 Engine	Type	Screw	Measure	Unit
11 22 Flywheel				
1AZ Flywheel to crankshaft				
Do not install with screw retaining compound. Bolts are a component part of the flywheel. Screw threads oiled.	M60/1/M60/2/M62 Manual Transmission		105	Nm
New micro-encapsulated screws	M40/M42/M43/M44/ M51 Automatic/M52 Automatic		120	Nm
New micro-encapsulated screws	All others		105	Nm



11 - 15 Engine		Type	Screw	Measure	Unit
11 23 Vibration Damper					
1AZ	Vee belt pulley on crankshaft	M10		190	Nm
2AZ	Vibration damper hub on crankshaft Replace screws	M20/M21/M50/M52/S50 US/S52	M18 x 1.5	410	Nm
		M30/S14/S38 B 35	M24 x 1.5	440	Nm
		M41/M51/M60/1/M60/2/M62	M18 x 1.5		
	Torque			100	Nm
	Torque angle			60	°
	Torque angle			60	°
	Torque angle			30	°
		M70/S70/M73	M18 x 1.5		
	Torque			100	Nm
	Torque angle			60	°
	Torque angle			60	°
		S38 B36	M20 x 1.5		
	Torque			150	Nm
	Unfasten screw one half turn				
	Torque			60	Nm
	Torque angle			60	°
	Torque angle			60	°
	Torque angle			30	°

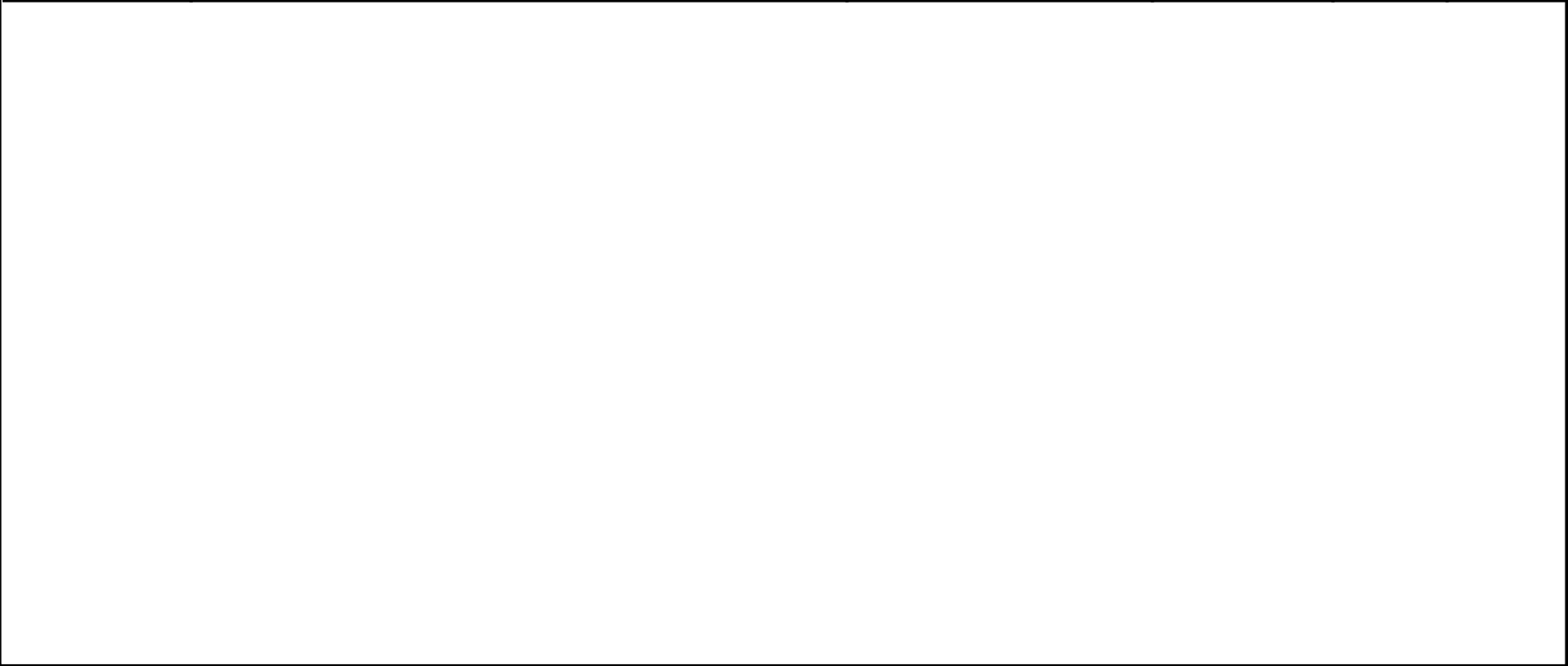
11 - 16 Engine		Type	Screw	Dimension	Unit
11 23 Vibration Damper					
2AZ	Vibration damper hub on crankshaft Replace screws	S38 B38	M12x1.5		
		S50	M12x1.5		
	torque			60	Nm
	torque angle			50	°
	torque angle			50	°



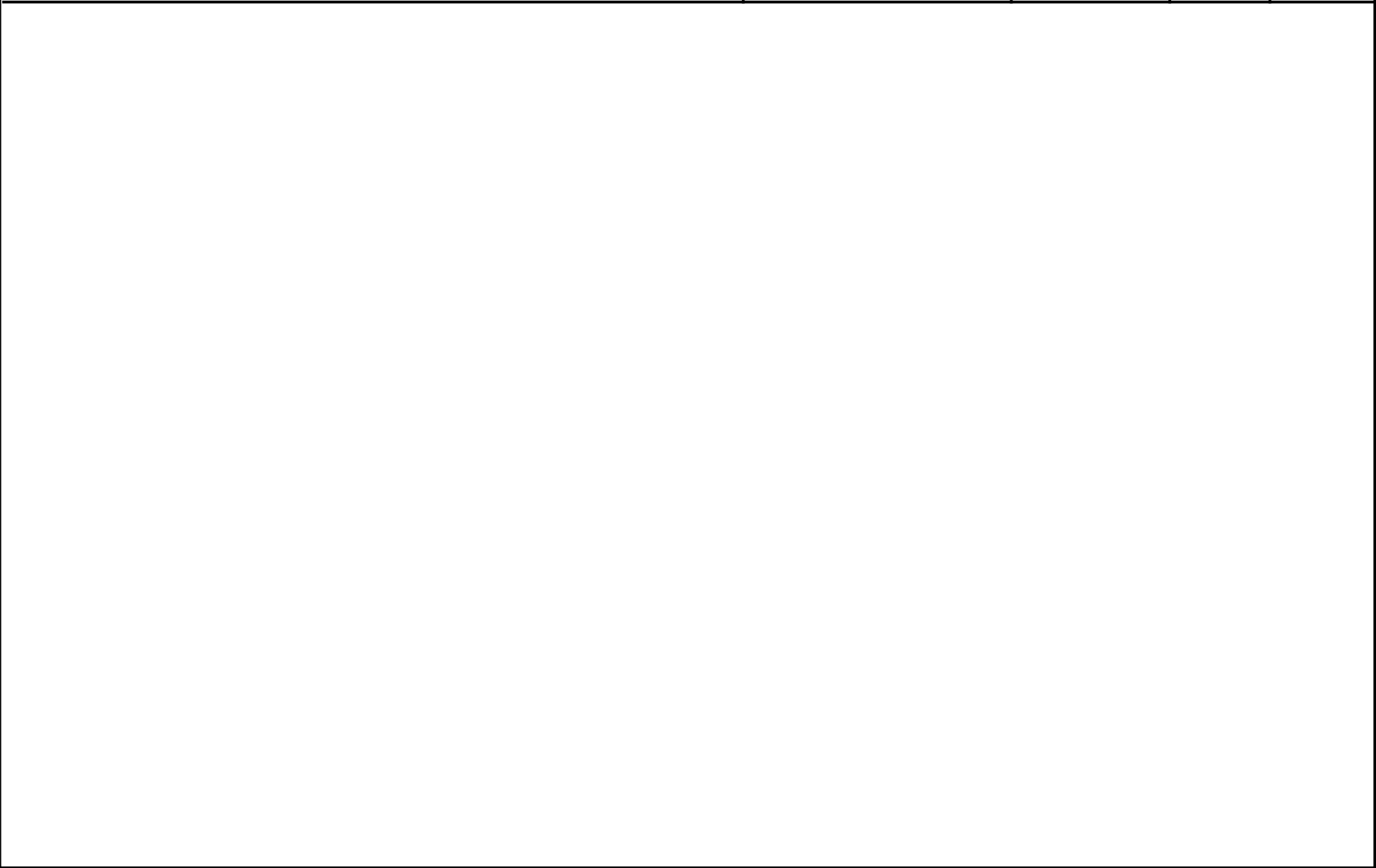
11 - 17 Engine	Type	Screw	Measure	Unit
11 23 Vibration Damper				
3AZ Vee belt pulley / vibration damper on hub	S38 B36	M8 10.9	34	Nm
	S38 B 38	M8 10.9	34	Nm
	All others	M8	22	Nm
4AZ Pulley to vibration damper	S38 B 35	M8 8.8	22	Nm
	S50	M8 8.8	22	Nm
5AZ Sprocket with hub or hub to crankshaft Replace screw	M40	M16 x 1.5	310	Nm
	M42/M43/M44	M16 x 1.5	330	Nm

11 - 18 Engine		Type	Screw	Measure	Unit
11 24 Connecting Rods and Bearings					
1AZ	Connecting rod bolts Replace, wash and oil conrod bolts	M10/M30		55	Nm
		M20/M21/M40/M41/M42/M43/ M44/M50/M51/M52/S52/S50 US/ M70/S70/M73			
	Application torque			5	Nm
	Torque			20	Nm
	Torque angle			70	°
		M60/1/M60/2/M62			
	Application torque			5	Nm
	Torque			20	Nm
	Torque angle			80	°

11 - 19 Engine		Type	Screw	Measure	Unit
11 24 Connecting Rods and Bearings					
1AZ	Connecting rod bolts Replace, wash and oil conrod bolts	S14		55	Nm
		S38			
	Application torque			5	Nm
	Torque			30	Nm
	Torque angle			60	°
		S50			
	Application torque			5	Nm
	Torque			20	Nm
	Torque angle			65	°



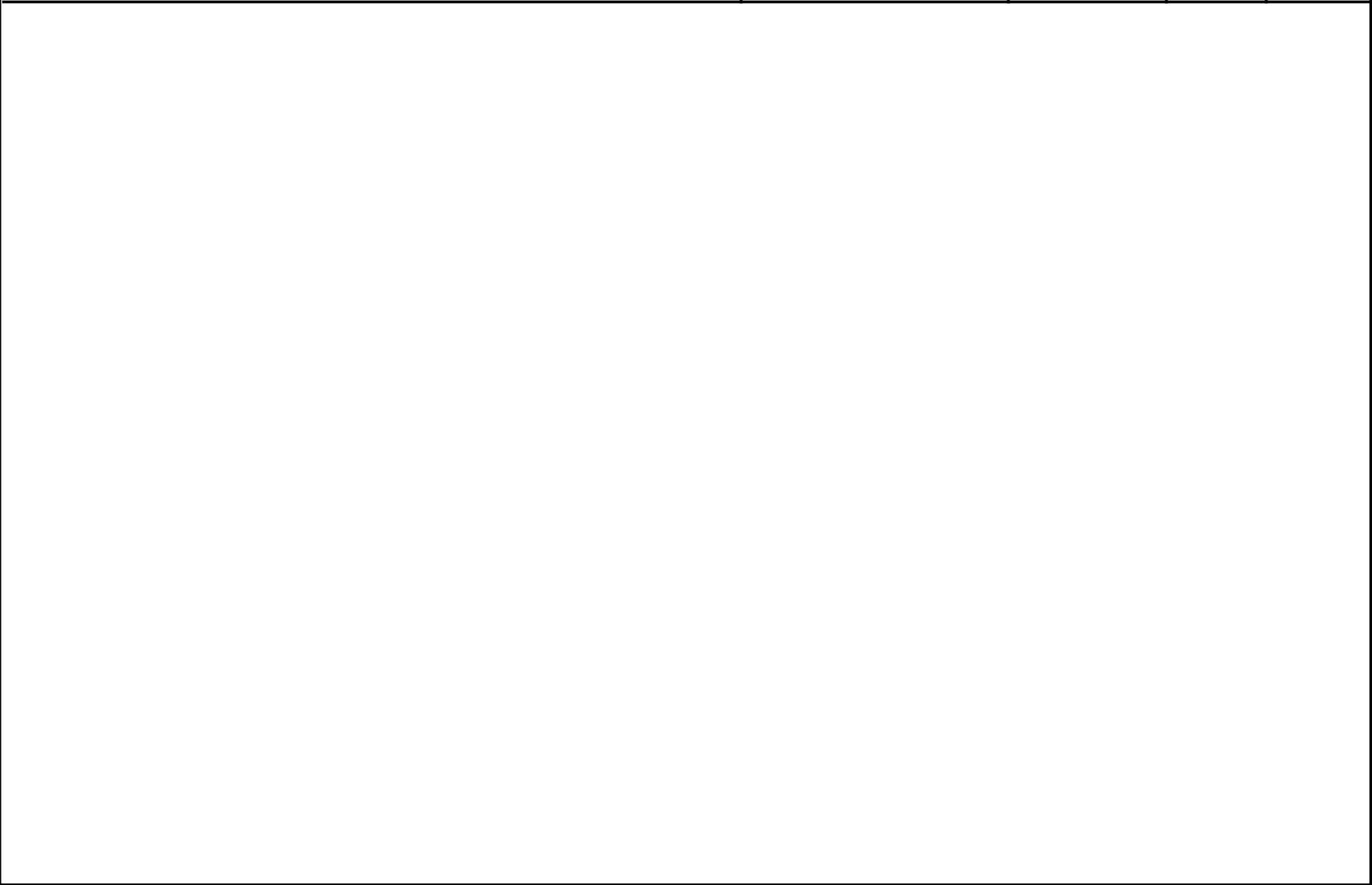
11 - 20 Engine	Type	Screw	Measure	Unit
11 28 V-ribbed belt with tension and deflection element				
1AZ Idler lever to alternator bracket Replace screw	M43	M10 10.9	90	Nm
2AZ Screw plug for bearing pin	M51/M41		20	Nm



11 - 21 Engine		Type	Screw	Measure	Unit
11 31 Camshaft					
1AZ	Camshaft bearing cap	All	M6	10	Nm
		All	M7	15	Nm
		All	M8	20	Nm
2AZ	Sprocket to camshaft	M20/M21/M40	M10	65	Nm
3AZ	Sprocket to camshaft flange	M60/1/M60/2/M62	M6	15	Nm
		All others	M6	10	Nm
		M50/M52/S52/S50 US/M50 VANOS	M7		
	Application torque			5	Nm
	Torque			22	Nm
		All others	M7	15	Nm
4AZ	Sprocket to camshaft	M51/M41			
	Torque			20	Nm
	Torque angle			35	°
5AZ	Splined shaft to intake camshaft	M52/S52/S50 US/M50 VANOS	M14 x 1.5		
	Torque			40	Nm
	Torque angle			60	°

11 - 22 Engine	Type	Screw	Measure	Unit
11 31 Camshaft				
6AZ Flange to camshaft	M30		145	Nm
7AZ Plug for chain tensioner	M50/S50 US	M22 x 1.5	50	Nm
	All others	M22 x 1.5	40	Nm
8AZ Cylinder for chain tensioner plunger	M50/M52/S52/S50 US	M26 x 1.5	70	Nm
	All others	M26 x 1.5	50	Nm
9AZ Bearing flange on engine block	M60/1/M60/2	M6	13	Nm
10AZ Reversing rail on engine block	M62	M6	13	Nm
11AZ Screw-in pin on camshaft	All	M7	15	Nm
Nut on screw-in pin	All	M6	10	Nm

11 - 23 Engine	Type	Screw	Measure	Unit
11 33 Rocker Arms/Drag Arms and Bearings				
1AZ Clamping bolt in rocker arm	M10/M20/M30	M6	10	Nm
Clamping bolt in drag arm	M21	M6	8	Nm



11 - 24 Engine	Type	Screw	Measure	Unit
11 35 Intermediate Shaft				
1AZ Toothed belt pulley to intermediate	M20/M21	M10	60	Nm

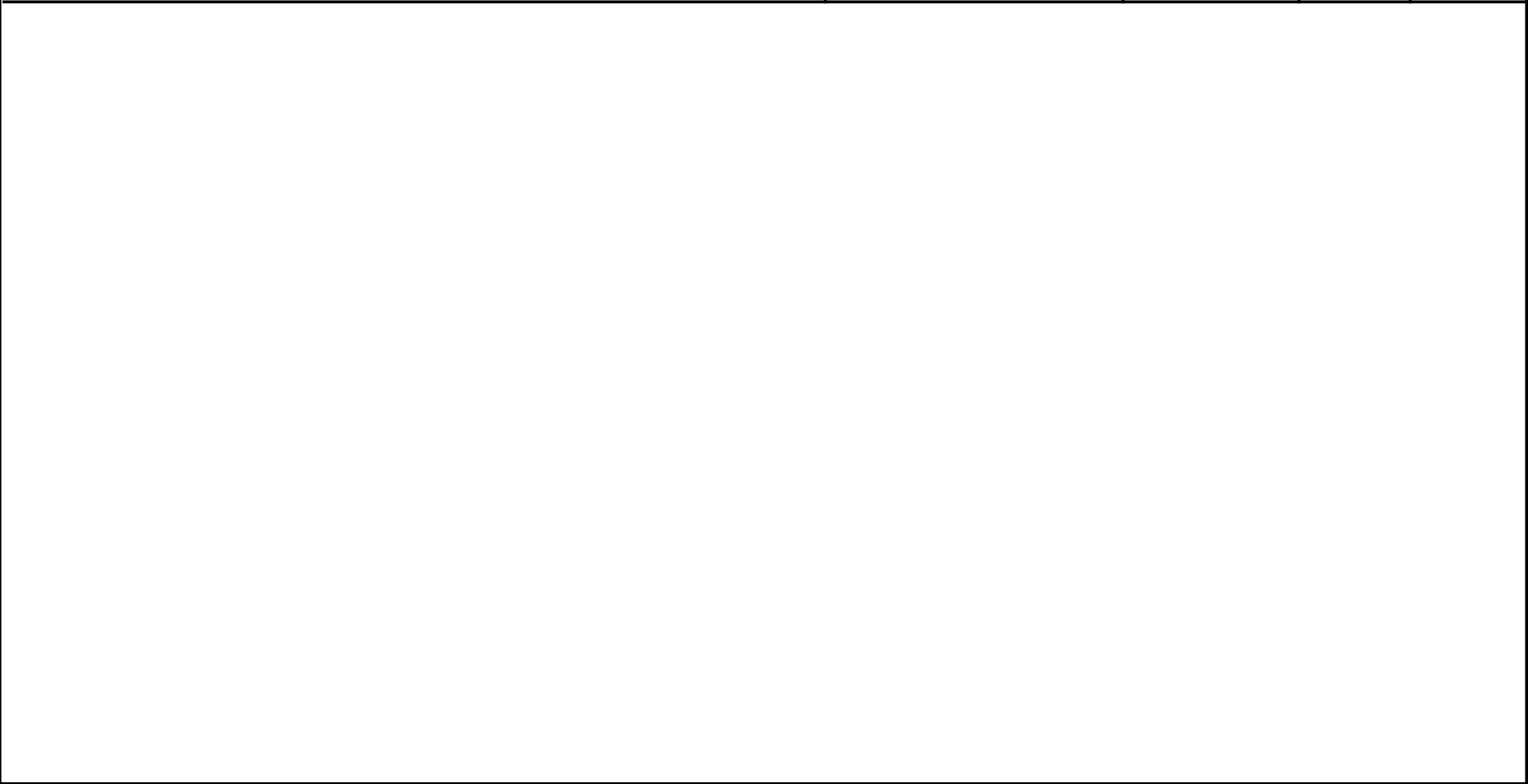
11 - 25 Engine	Type	Screw	Measure	Unit
11 36 Variable Camshaft Control				
1AZ 4/2 way directional valve/solenoid valve on VANOS housing	M52/S52/S50 US/M50 VANOS		30	Nm
2AZ Banjo bolt to VANOS controller	M52/S52/S50 US/M50 VANOS	M14 x 1.5	32	Nm
3AZ Plug to VANOS adjusting unit	M52/S52/S50 US/M50 VANOS	M22 x 1.5	50	Nm
4AZ Plug to hydraulic plunger	M52/S52/S50 US/M50 VANOS	M36x1	60	Nm
5AZ Hydr. line for VANOS on oil filter aggregate carrier	M52/S52/S50 US/M50 VANOS		32	Nm
6AZ Collar nut on toothed shaft (nut secured with Loctite)	S50	M6	9	Nm
7AZ Cover on VANOS control unit (hydraulic pistons, intake side)	S50	M5	5	Nm
8AZ Filter screw on VANOS adjusting unit	S50	M10x1	12	Nm
9AZ Pressure line on pressure accumulator and VANOS adjustment unit	S50	M12x1	20	Nm
10AZ Cover for solenoid valve on VANOS control unit	S50 B 30	M5 8.8	6	Nm
	S50 B 32	M5 10.9	8	Nm
11AZ Cover on VANOS control unit (hydraulic pistons, exhaust side)	S50 B 32	M6 10.9	13	Nm

11 - 26 Engine	Type	Screw	Dimension	Unit
11 41 Oil Pump with Strainer and Drive				
1AZ Plug for pressure relief valve	M10/M30		40	Nm
	M20		30	Nm
2AZ Oil pump to crankcase	All	M8	22	Nm
3AZ Oil pump cover	All	M6	10	Nm
4AZ Sprocket to oil pump	All	M6	10	Nm
	All	M10	47	Nm
	All	M10x1	25	Nm

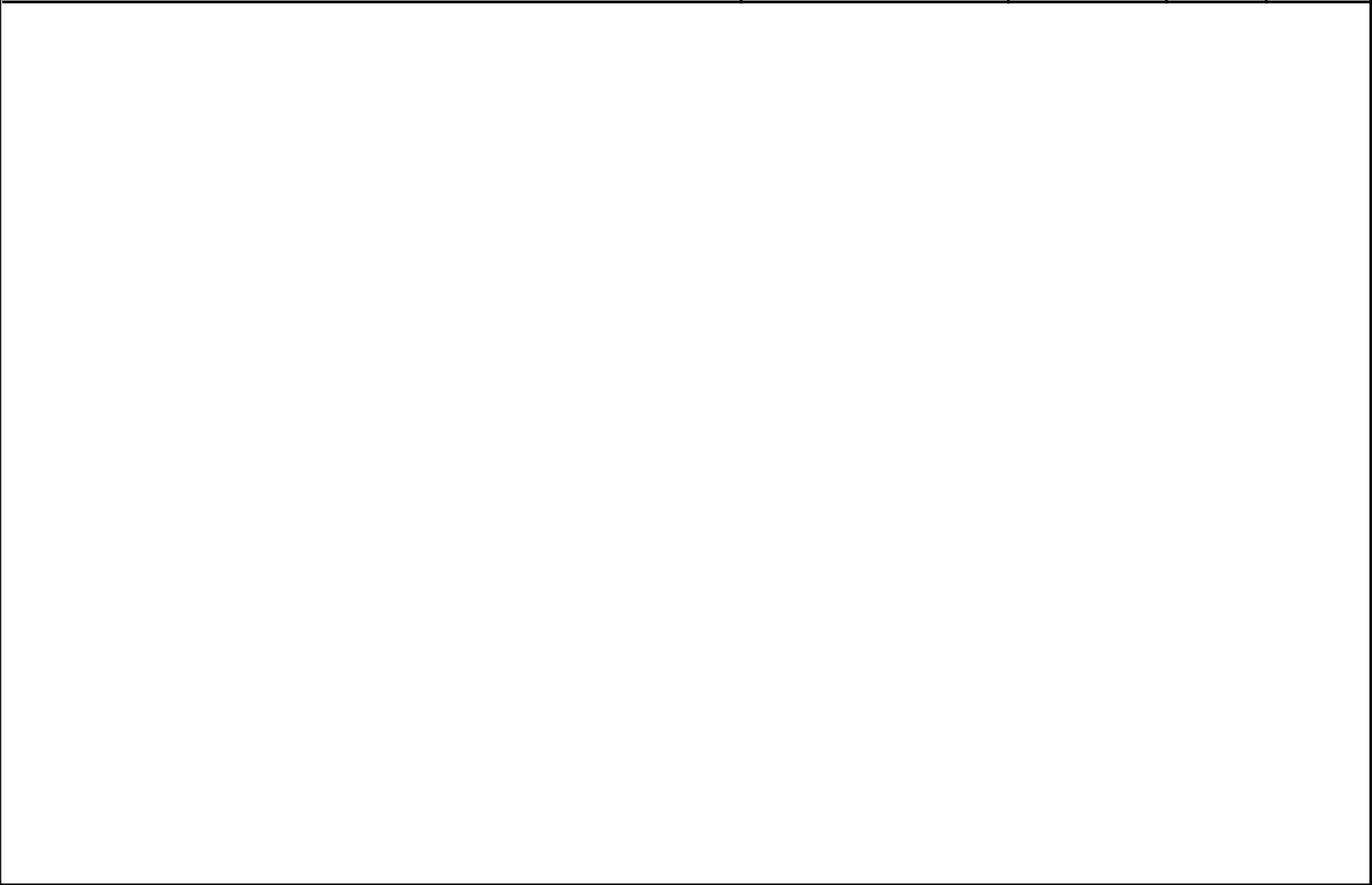
11 - 27 Engine	Type	Screw	Measure	Unit
11 42 Oil Filter and Pipes				
1AZ Oil filter (one-way cartridge) (Tightening torque by hand in acc. with specification on spin-on oil filter)	All			Nm
2AZ Full flow oil filter (cover)	All	M8	22	Nm
	All	M10	33	Nm
	All	M12	33	Nm
Screwed-on cover	All		25	Nm
3AZ Oil filter housing and lines on crankcase	All	M8	22	Nm
	All	M20 x 1.5	40	Nm

11 - 28 Engine	Type	Screw	Measure	Unit
11 42 Oil Filter and Pipes				
4AZ Oil filter drain plug				
Hollow bolt	M21/S38		20	Nm
Solid aluminium screw	M21		10	Nm
Full length screw in threaded insert	M21		23	Nm
5AZ Oil drain line on oil filter and upper section of oil pan (banjo bolt)	M60/1/M60/2/M62/M70/S70/M73		30	Nm
6AZ Oil line to bearing points and camshaft lubrication	All	M6	10	Nm
7AZ Oil line for camshaft lubrication on cylinder head				
Hollow bolt	All	M8x1	10	Nm
	All	M5	5	Nm

11 - 29 Engine	Type	Screw	Measure	Unit
11 42 Oil Filter and Pipes				
8AZ Oil cooler oil pipes to oil filter housing	All	M8	22	Nm
9AZ Oil pipes to turbocharger	All	M8	22	Nm
10AZ Oil lines from turbocharger to engine block Hollow bolt	All	M16 x 1.5	40	Nm
11AZ Oil supply pipe to turbocharger				
Hollow bolt	All		25	Nm
Coupling nut	All		30	Nm

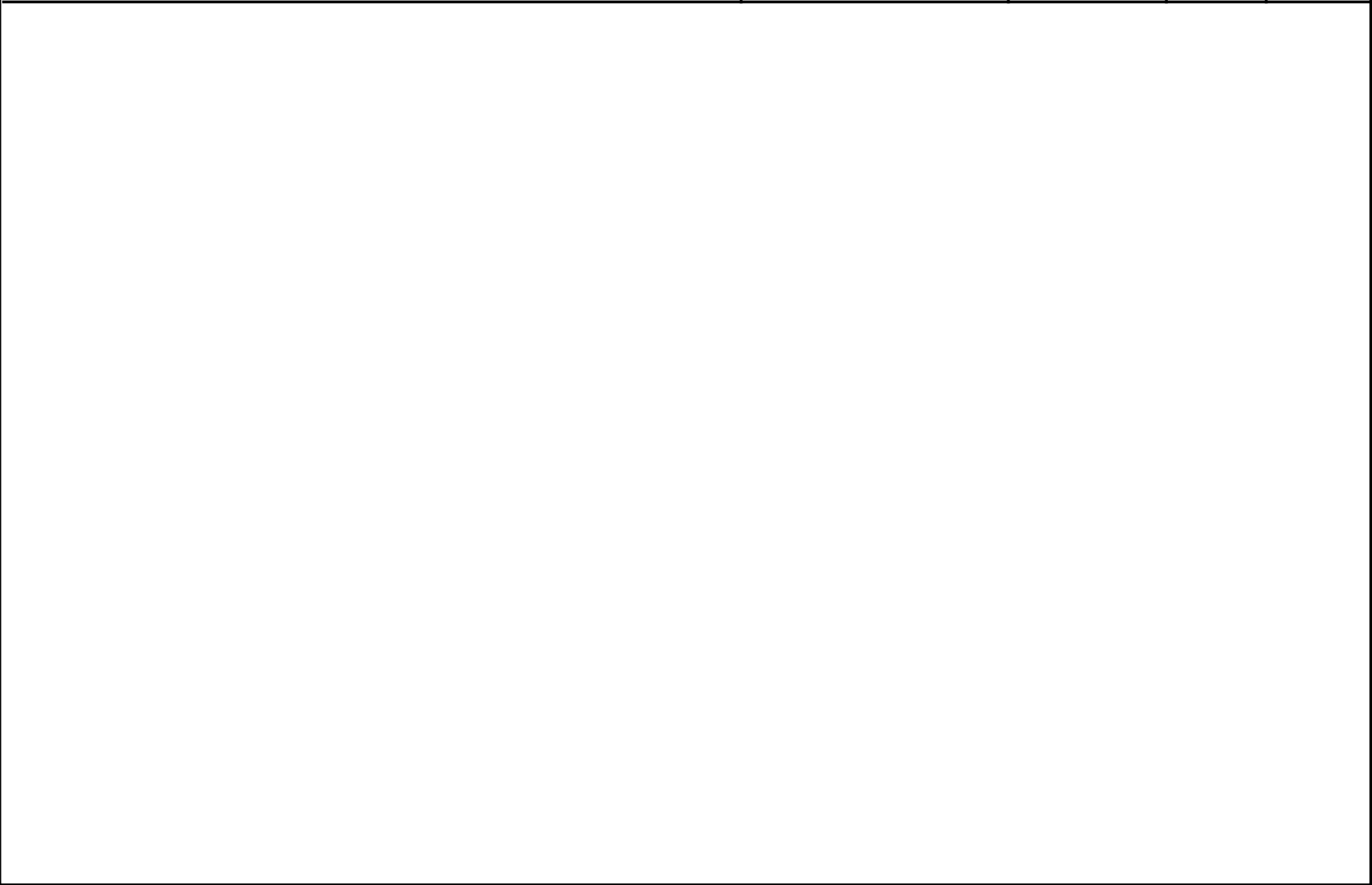


11 - 30 Engine	Type	Screw	Measure	Unit
11 51 Water Pump and Drive				
1AZ Water pump to crankcase	All	M8	22	Nm
	All	M6	10	Nm

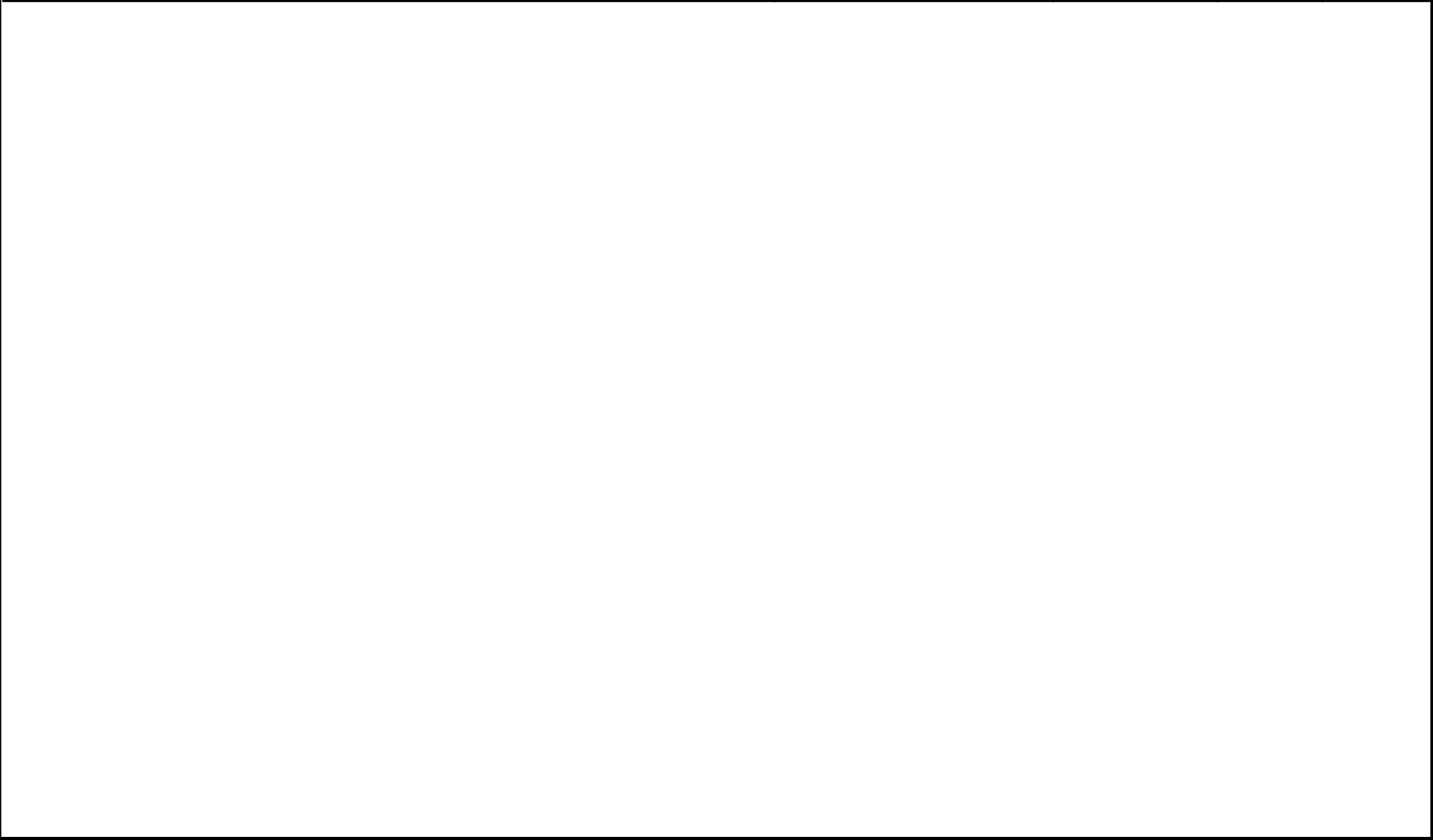


11 - 31 Engine	Type	Screw	Measure	Unit
11 52 Fan				
1AZ Fan clutch on water pump Coupling nut (left-hand threads)	All		40	Nm

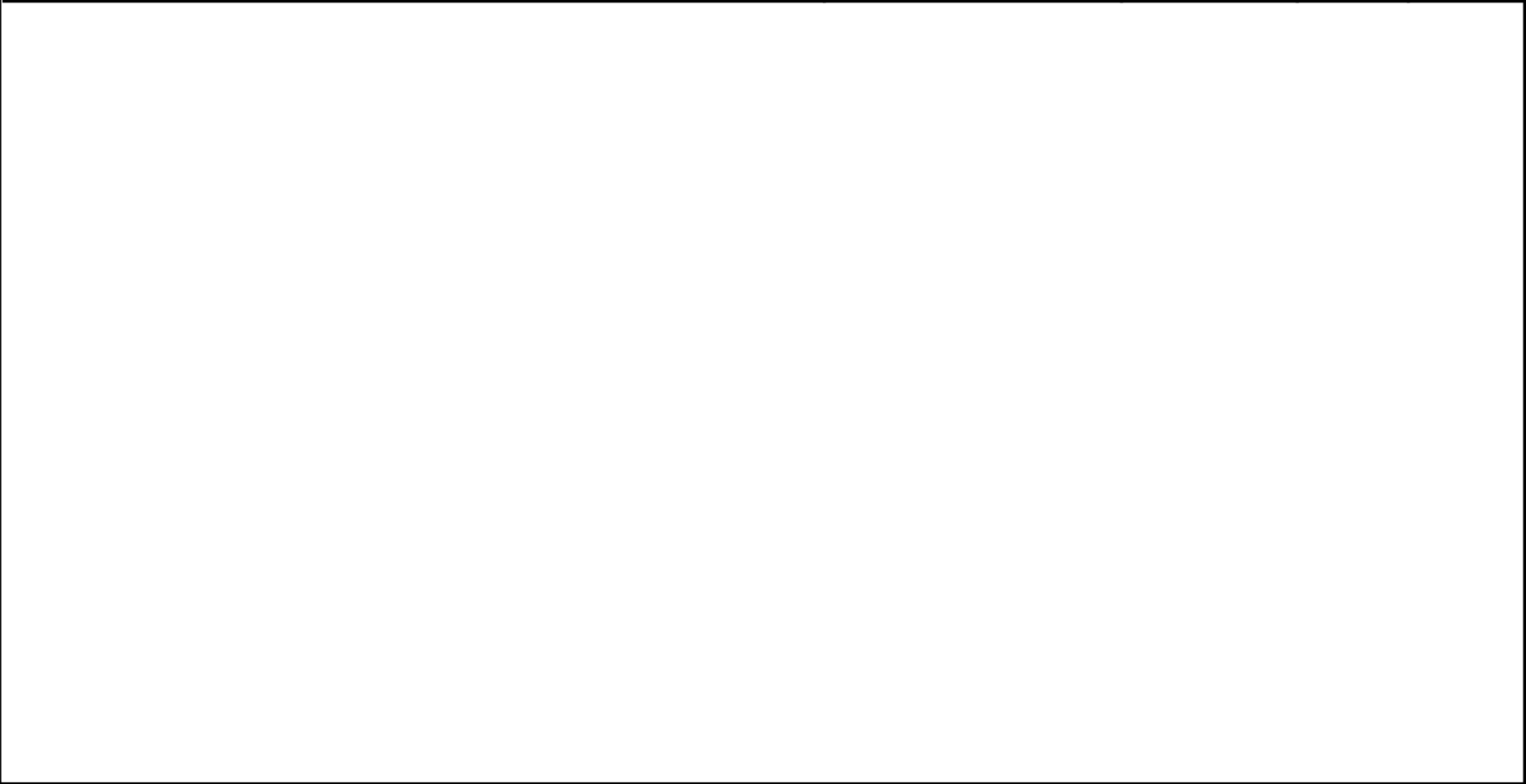
11 - 32 Engine	Type	Screw	Measure	Unit
11 53 Thermostat and Connections				
1AZ Thermostat housing	All	M6	10	Nm
2AZ Bleeder screw	All	M8	8	Nm



11 - 33 Engine	Type	Screw	Measure	Unit
11 61 Intake manifold				
1AZ Intake manifold on cylinder head	All	M8	22	Nm
	All	M7	15	Nm
	All	M6	10	Nm
2AZ Soundproofing hood to holder	M60/1/M60/2/M62	M6	8	Nm



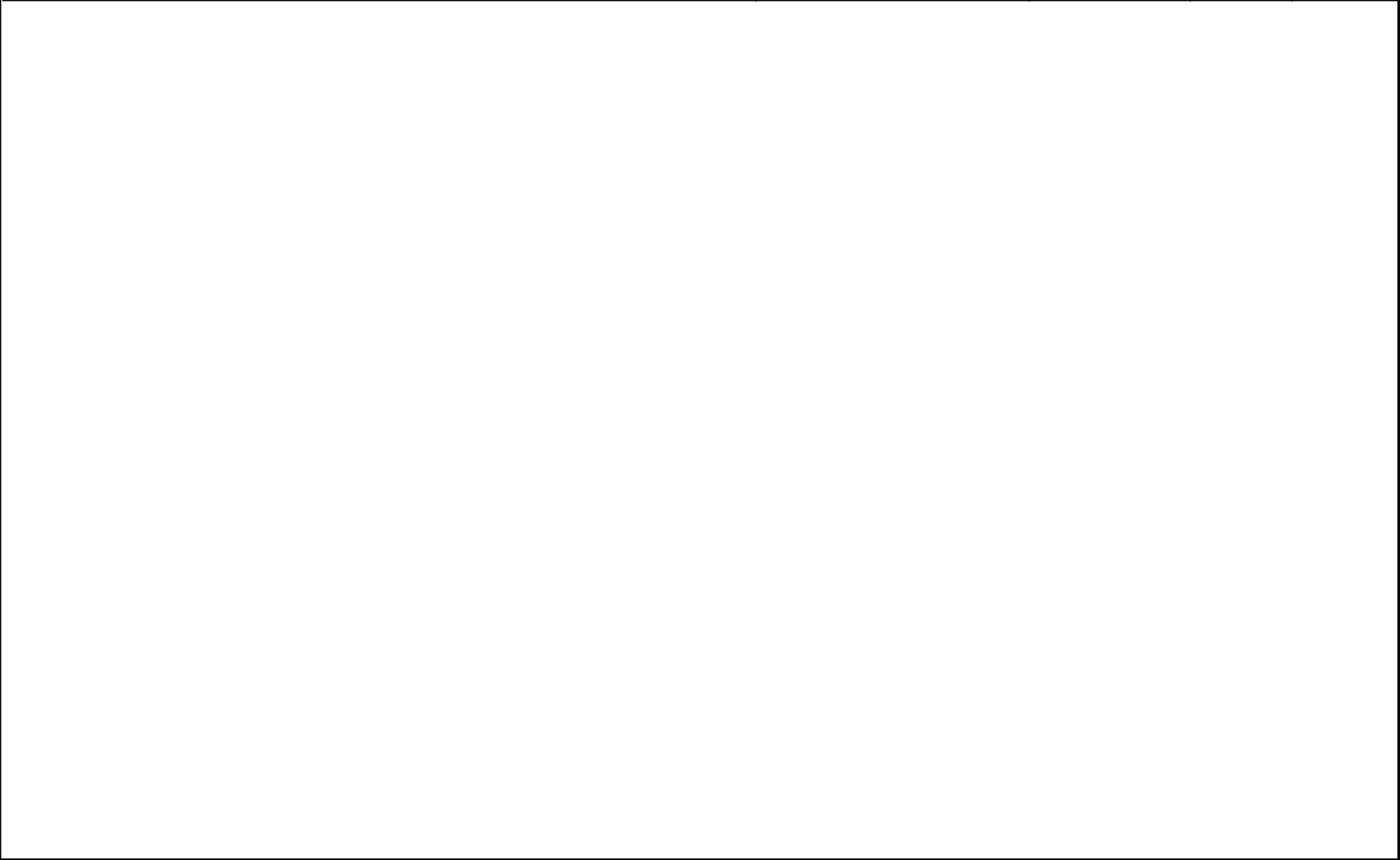
11 - 34 Engine	Type	Screw	Measure	Unit
11 62 Exhaust manifold				
1AZ Exhaust manifold to cylinder head Screw connections on exhaust with Molykote HSC compound coat	All	M6	10	Nm
	M50/M52/S52/S50 US	M7	20	Nm
	All others	M7	15	Nm
Upper row of staybolts installed with bolt cement	All	M8	22	Nm
Retorque after 2000 km Loosen bolt first	M21	M8	12	Nm



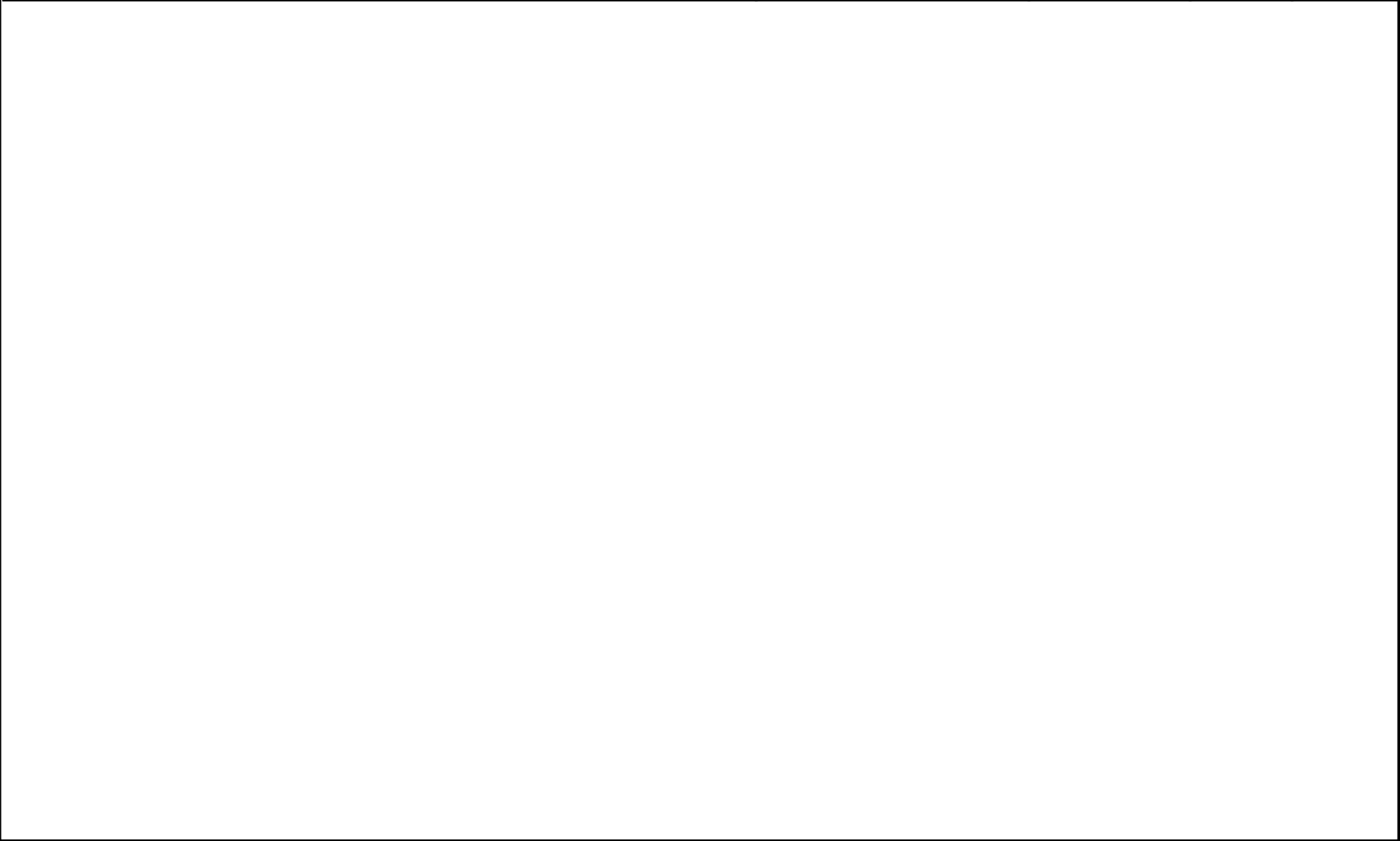
11 - 35 Engine		Type	Screw	Measure	Unit
11 62 Exhaust manifold					
2AZ	Exhaust manifold to cylinder head (Apply Molykote HSC paste to exhaust nuts and bolts)	M30 Turbo	M10		
	When mounting on new cylinder head or with new studs			28	Nm
	Subsequent mounting			15	Nm
	Retorque after 2000 km Loosen bolt first Install studs with Molykote HSC			15	Nm
	Protrusion from head: Short studs			88 + 1.0	mm
	Protrusion from head: Long studs			98 + 0.5	mm

11 - 36 Engine	Type	Screw	Measure	Unit
11 65 Turbocharger and Control				
1AZ Turbocharger to exhaust manifold	M21	M10	25	Nm
	M30/M51/M41		45	Nm
2AZ Bypass valve to flow section	M30	M8	25	Nm
3AZ Ring nut to exhaust manifold	M30		220	Nm
4AZ Screws to bypass valve	M30	M6	10	Nm
5AZ Charge tract to exhaust manifold	M30	M8	22	Nm
6AZ Oil return flange to turbocharger	M30	M8	22	Nm
7AZ Oil supply for turbocharger and engine block Hollow bolt	M51/M41		25	Nm
8AZ Threaded plug to oil return	M30	M16	45	Nm
9AZ Control pipe to bypass valve/turbocharger	M30		30	Nm

11 - 37 Engine	Type	Screw	Measure	Unit
11 66 Vacuum pump				
1AZ Vacuum pump on cylinder head	All	M6	10	Nm
	M51/M41	M8	22	Nm
microencapsulated	M51/M41	M9	22	Nm



11 - 38 Engine	Type	Screw	Dimension	Unit
11 72 Air pump, lines and control valves				
1AZ Cap nut on air intake tube	M60/1/M60/2		30	Nm
2AZ Compression screw	M60/1/M60/2	M6	5	Nm
Lock nut	M60/1/M60/2	M6	5	Nm

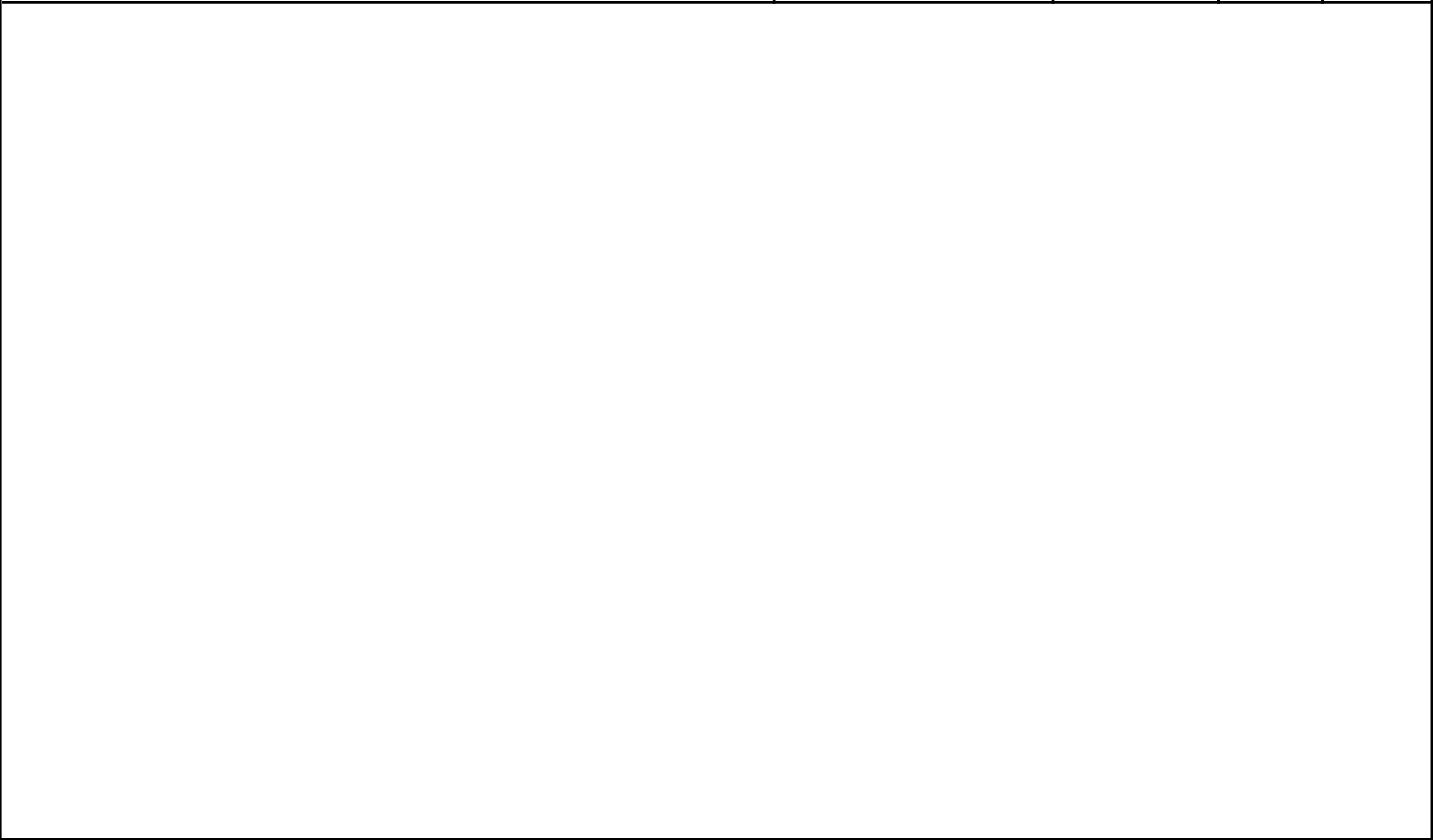


11 - 39 Engine	Type	Screw	Measure	Unit
11 78 Emissions-control, Lambda oxygen sensor				
1AZ Oxygen sensor and oxygen monitor sensor	All		55	Nm

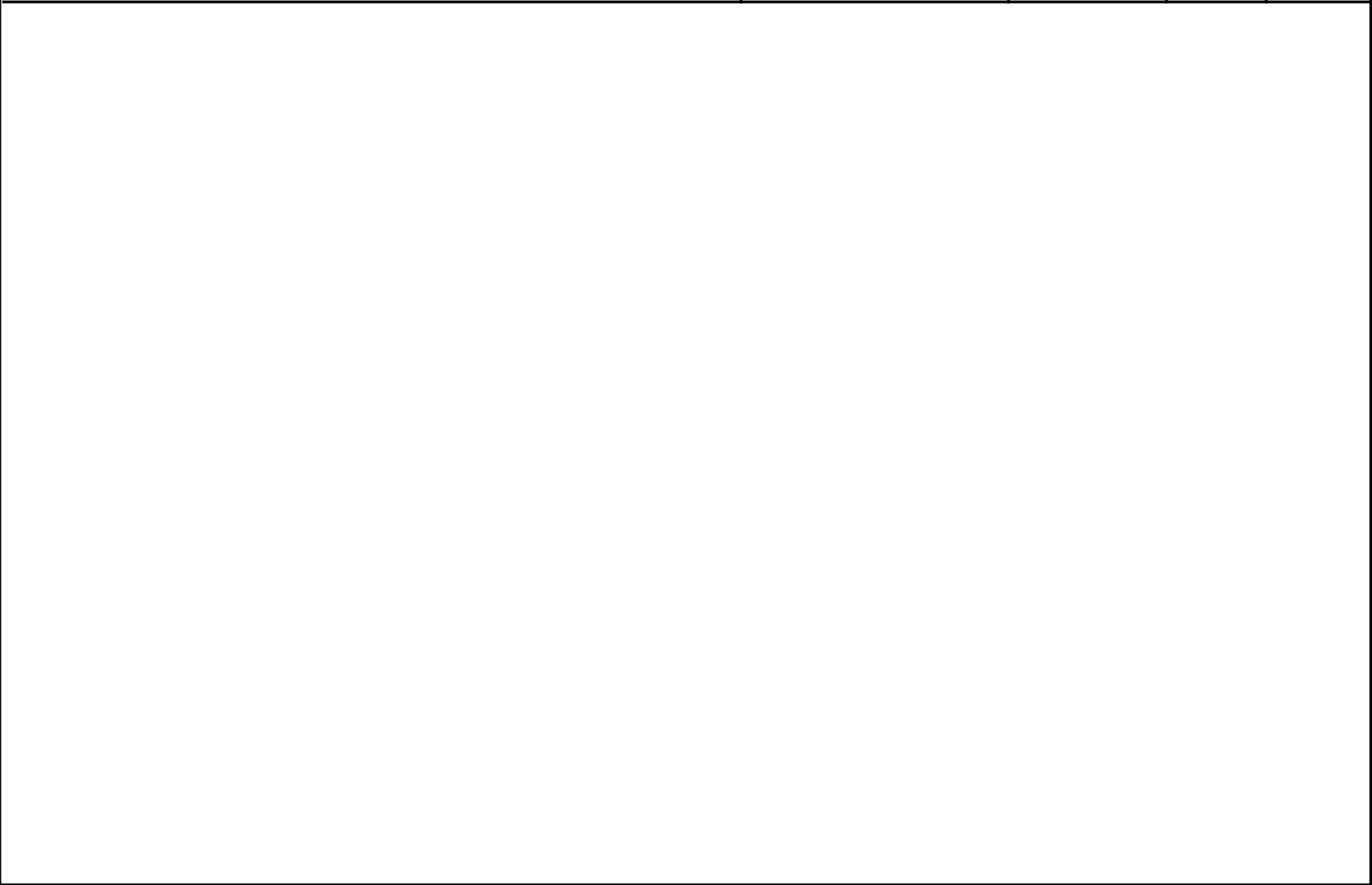
11 - 40 Engine	Type	Screw	Measure	Unit
11 81 Engine Suspension				
1AZ Rubber mount to front axle carrier	All	M8	22	Nm
	All	M10	47	Nm
2AZ Rubber mount to engine console	All	M8	22	Nm
	All	M10	47	Nm
3AZ Engine console to engine	All	M8	22	Nm
	All	M10	47	Nm



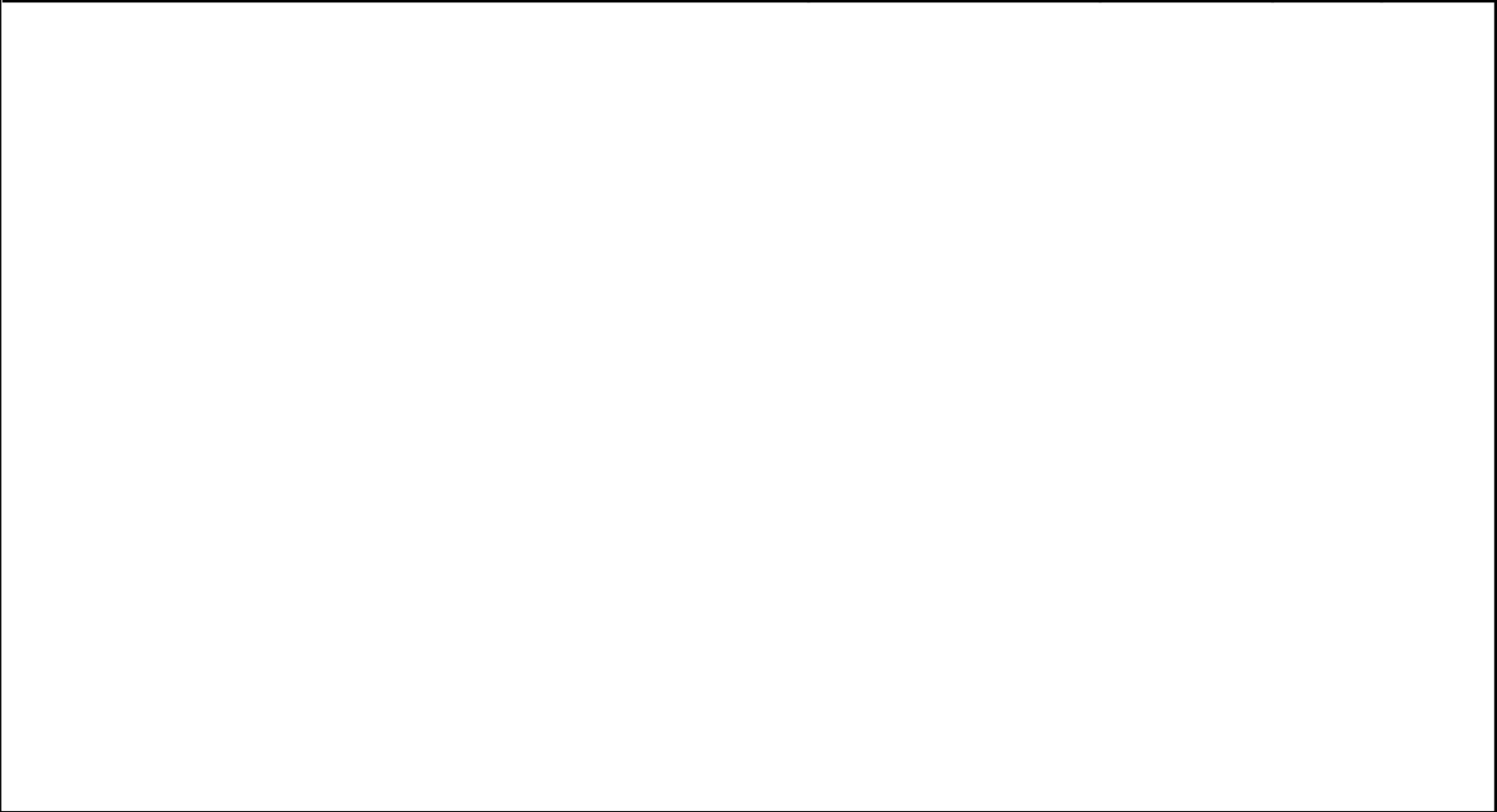
12 - 1 Engine Electrical Equipment	Type	Screw	Measure	Unit
12 11 Distributor				
1AZ Distributor	M20		22	Nm
	M10/M30		10	Nm
2AZ Distributor rotor to adapter with DME	All		2.8	Nm
3AZ High-tension distributor cap	All		4	Nm



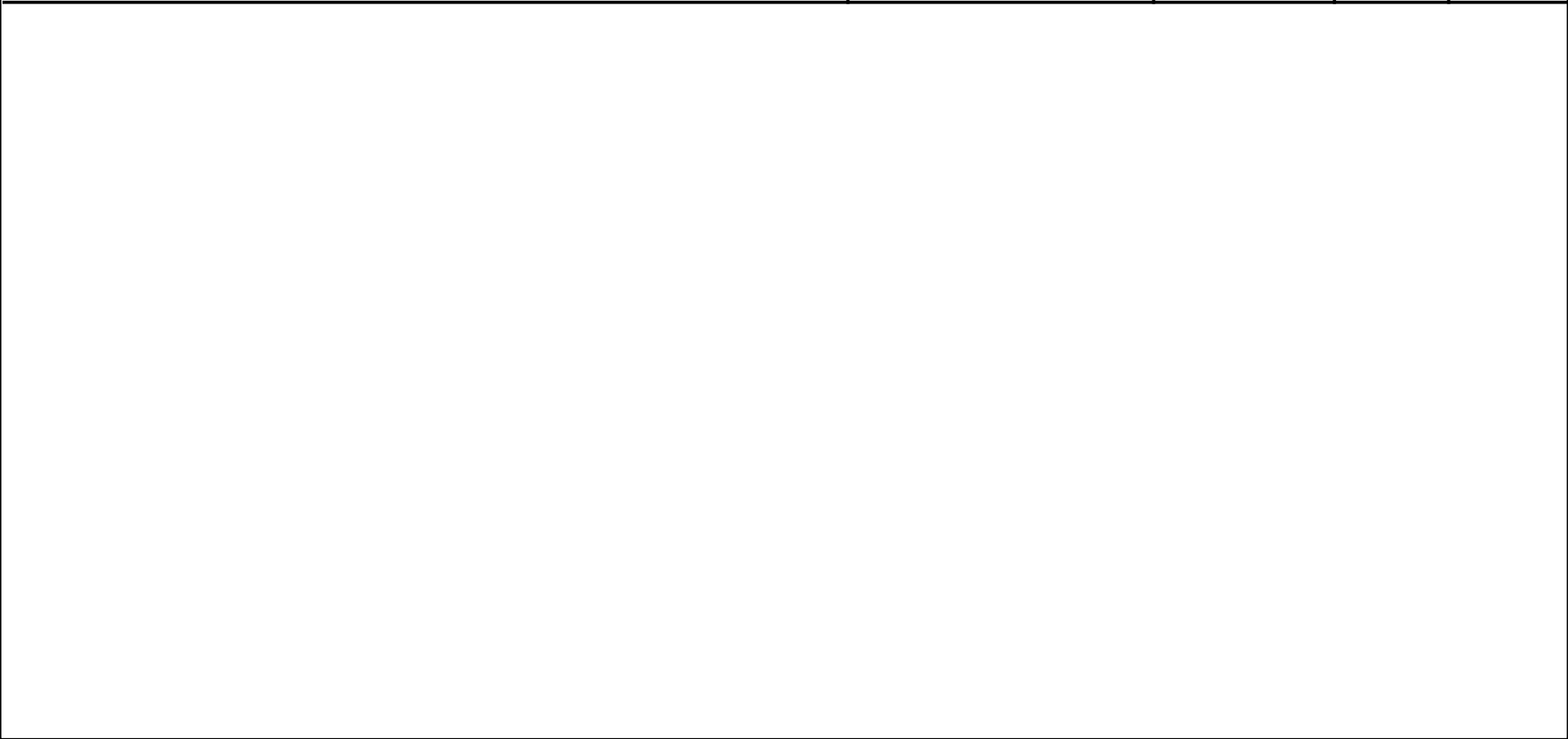
12 - 2 Engine Electrical System	Type	Screw	Measure	Unit
12 12 Spark plugs				
1AZ Spark plugs (ungreased)	All	M12x1.25	23 ± 3	Nm
	All	M14x1.25	30 ± 3	Nm



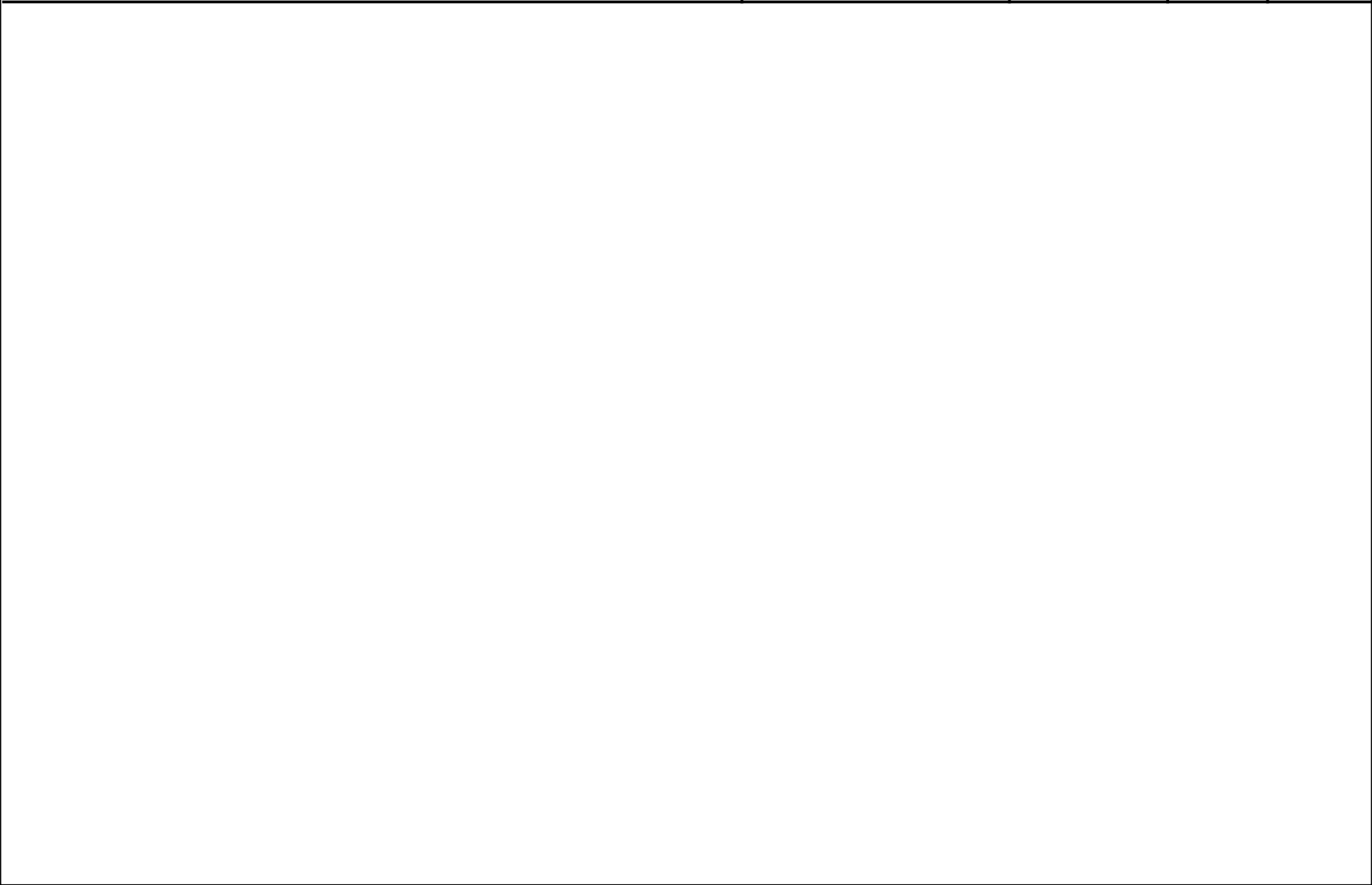
12 - 3 Engine Electrical System	Type	Screw	Dimension	Unit
12 13 Ignition Coil				
1AZ Primary connections				
Terminal 1	All		3.0	Nm (ft. lbs.)
Terminal 15	All		4.5	Nm (ft. lbs.)
2AZ Ignition coil on wheel arch / end wall	M42/M43/M44		5	Nm (ft. lbs.)
3AZ Ignition coil on wheel arch	M40		16	Nm (ft. lbs.)



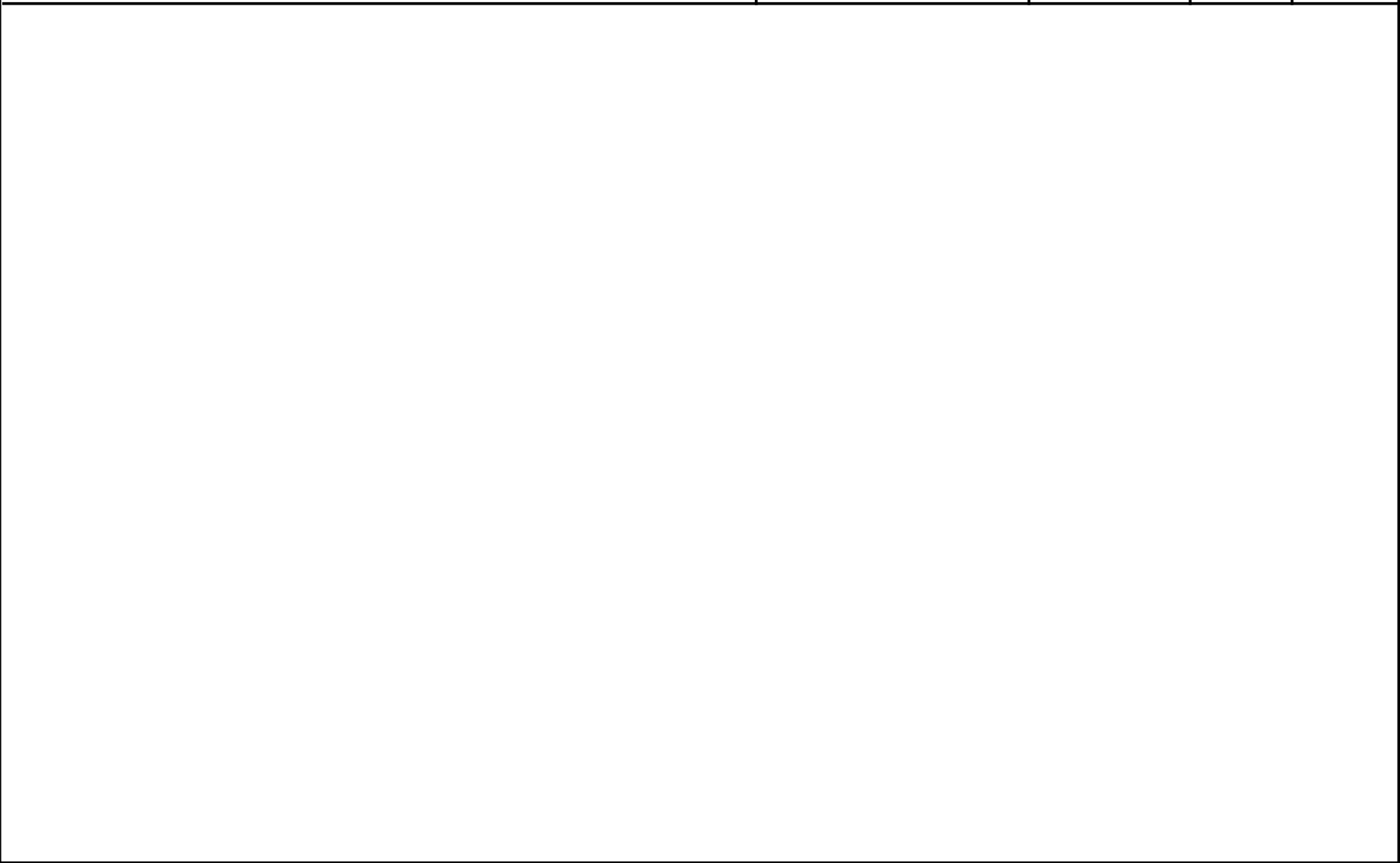
12 - 4 Engine Electrical System	Type	Screw	Dimension	Unit
12 14 Electronic Shift Units or Control Units				
1AZ TCI control unit	All		2.5	Nm (ft. lbs.)
2AZ Knock sensor	E23		13	Nm (ft. lbs.)
	All		20	Nm (ft. lbs.)
3AZ Speed and reference mark senders	All with DME		7	Nm (ft. lbs.)
4AZ Cover on control unit box	E38		4.4	Nm (ft. lbs.)
5AZ Angle impulse sensor on cylinder head	M52		5.0	Nm (ft. lbs.)
6AZ Crankshaft sensor on timing case cover Crankshaft sensor on cylinder crankcase	M52		5.0	Nm (ft. lbs.)



12 - 5 Engine Electrical Equipment	Type	Screw	Measure	Unit
12 21 Preheating Relay				
1AZ Terminal 30 wire to glow plug relay	M41/M51		4	Nm
2AZ 80 A fuse on glow plug relay	M41/M51		2	Nm



12 - 6 Engine Electrical Equipment	Type	Screw	Value	Unit
12 23 Glow Plugs				
1AZ Glow plug	M21		25	Nm
2AZ Glow plug 4"	M21/M41/M51		20	Nm
3AZ Wire to glow plug	M21/M41/M51		4	Nm



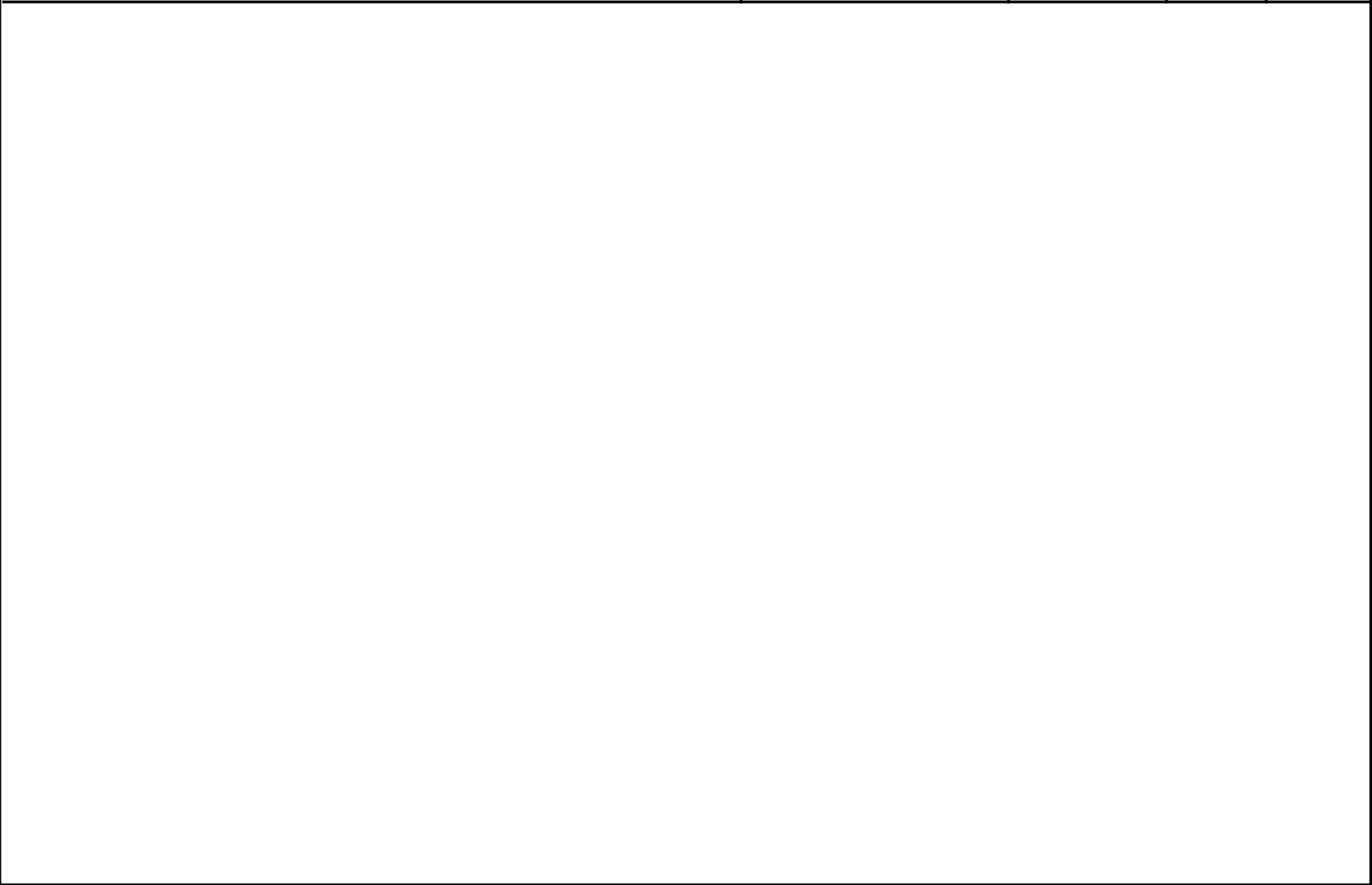
12 - 7 Engine Electrical System	Type	Screw	Dimension	Unit
12 31 Alternator with Drive and Mounting Parts				
1AZ Wires to alternator				
KI. D+	M10/M20		5	Nm (ft. lbs.)
	All others	M6	7	Nm (ft. lbs.)
KI. B+	S38 B 38		8	Nm (ft. lbs.)
	All others	M8	13	Nm (ft. lbs.)
2AZ Pulley	All		45	Nm (ft. lbs.)
3AZ Pulley (ribbed drive belt)	All		60	Nm (ft. lbs.)
4AZ Rear holder	All		3.5	Nm (ft. lbs.)
5AZ Fillister head screw for wire holder	All		3.5	Nm (ft. lbs.)
6AZ Alternator on bearing block	M40/M42/M43/M44		43	Nm (ft. lbs.)

12 - 8 Engine Electrical Equipment	Type	Screw	Value	Unit
12 32 Governor				
1AZ Regulator switch	All	M4	2	Nm
	All	M5	4	Nm

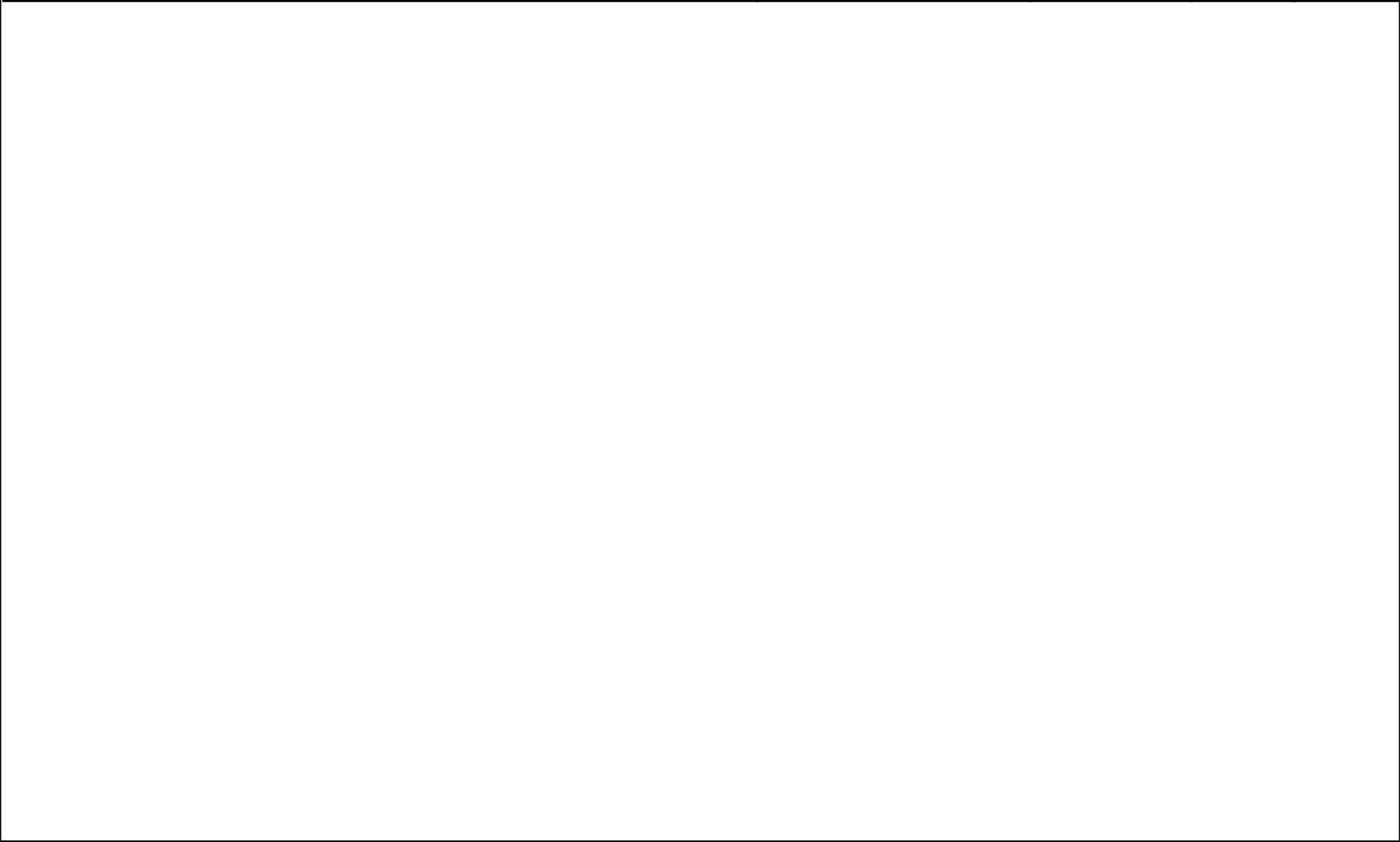
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12 - 9 Engine electrics	Type	Screw	Dimension	Unit
12 41 Starter and Mounting Parts				
1AZ Starter mount	All		50	Nm
2AZ Support to starter	All	M5	5	Nm
3AZ Support to crankcase	All		47	Nm
4AZ Electrical leads to starter				
Terminal 30h	All	M5	5	Nm
Terminal 50	All	M6	6	Nm
Terminal 30	All	M8	12	Nm
5AZ Bolt connection, pole tube	All	M6	6	Nm

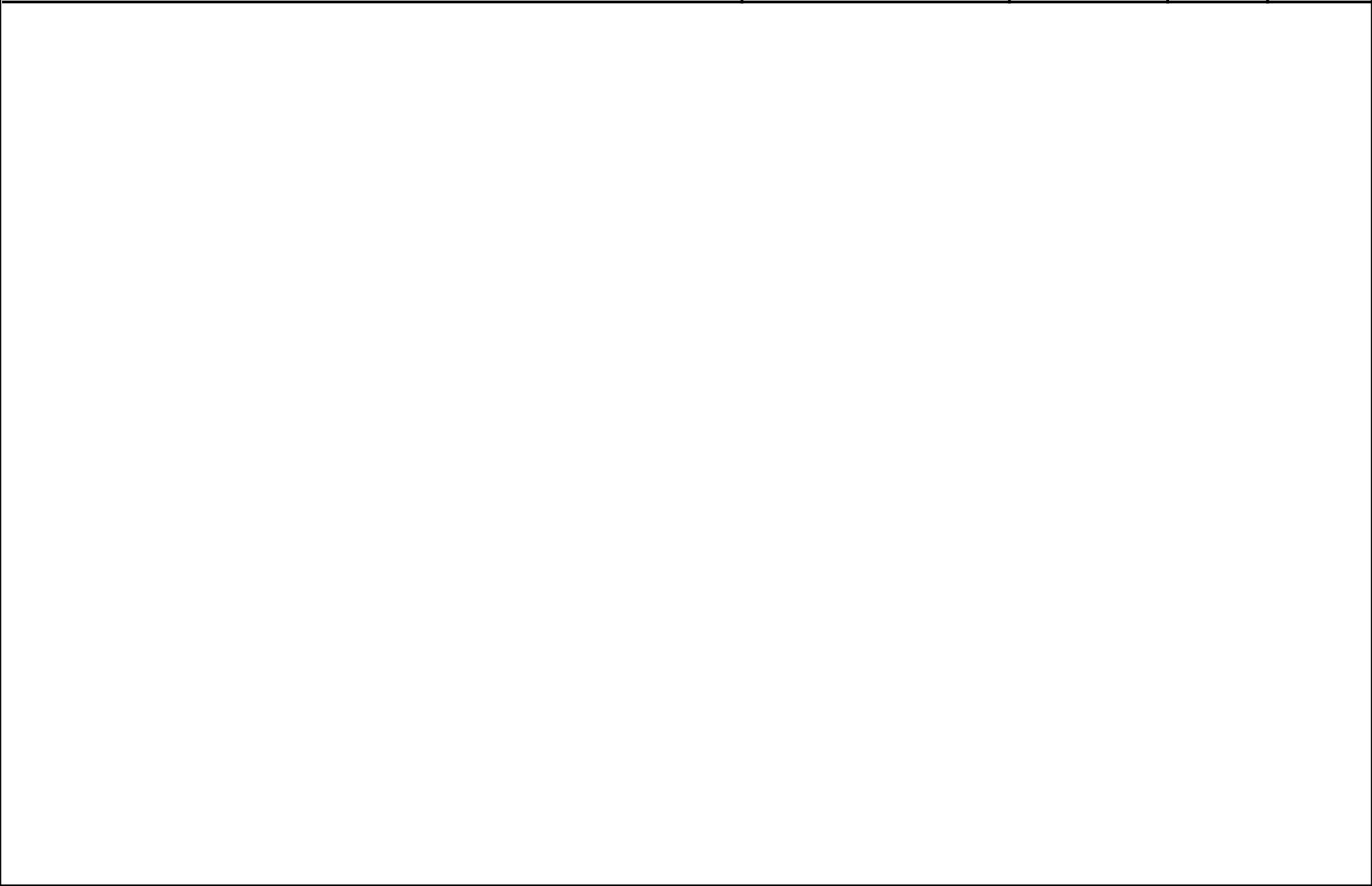
12 - 10 Engine Electrical Equipment	Type	Screw	Measure	Unit
12 42 Wires to starter				
1AZ Battery positive connection point in power distributor	E32/E34/E31/E36	M8	20	Nm
2AZ Wiring harness on distributor	E36 M41	M8	10	Nm



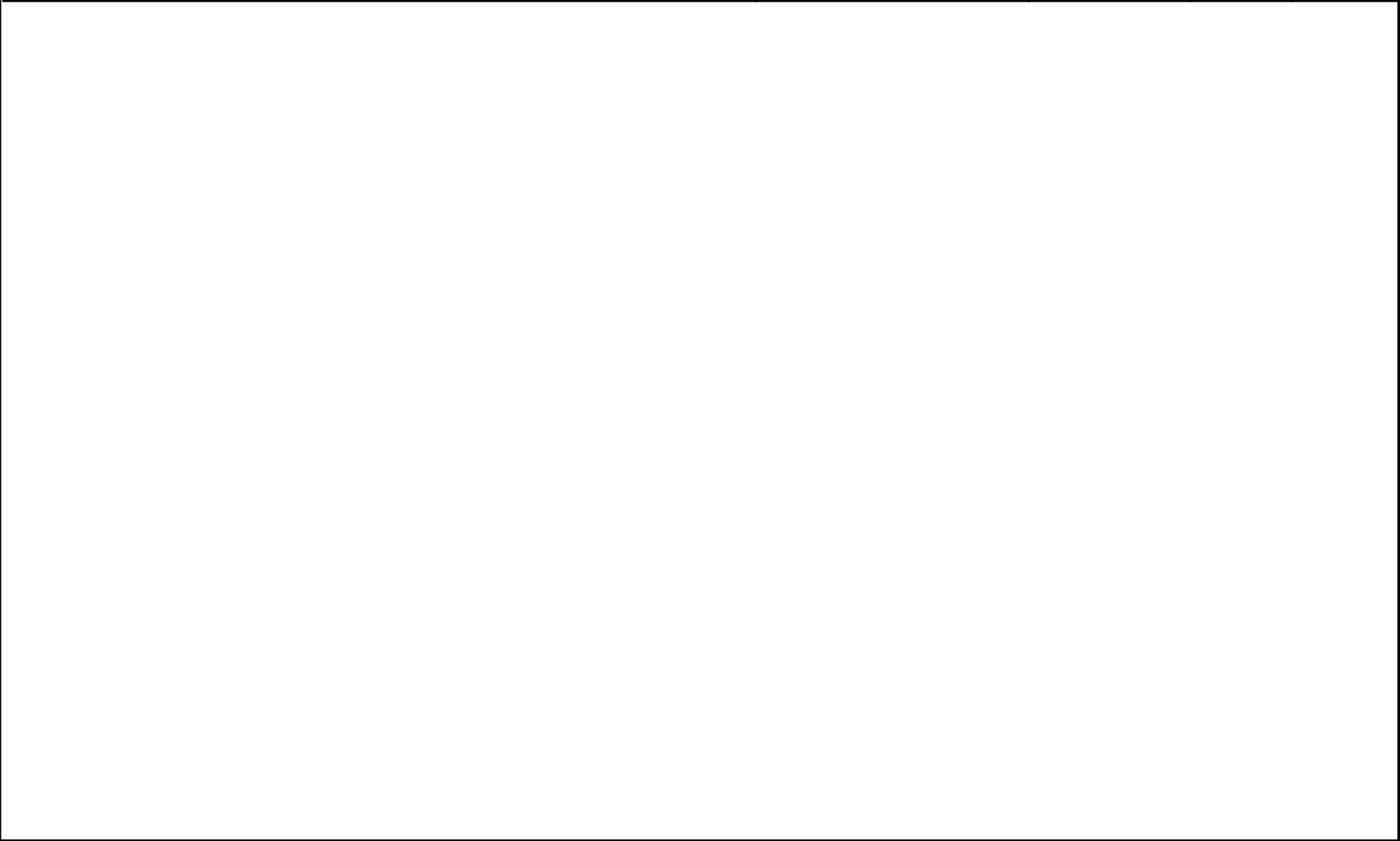
12 - 11 Engine Electrical Equipment	Type	Screw	Value	Unit
12 52 Plug Connectors, Terminals				
1AZ Holder for modules	E36	M6	9	Nm
2AZ Ground connections Flange nut	E36		16	Nm
3AZ Cover on heating splash wall	E36		1.1	Nm



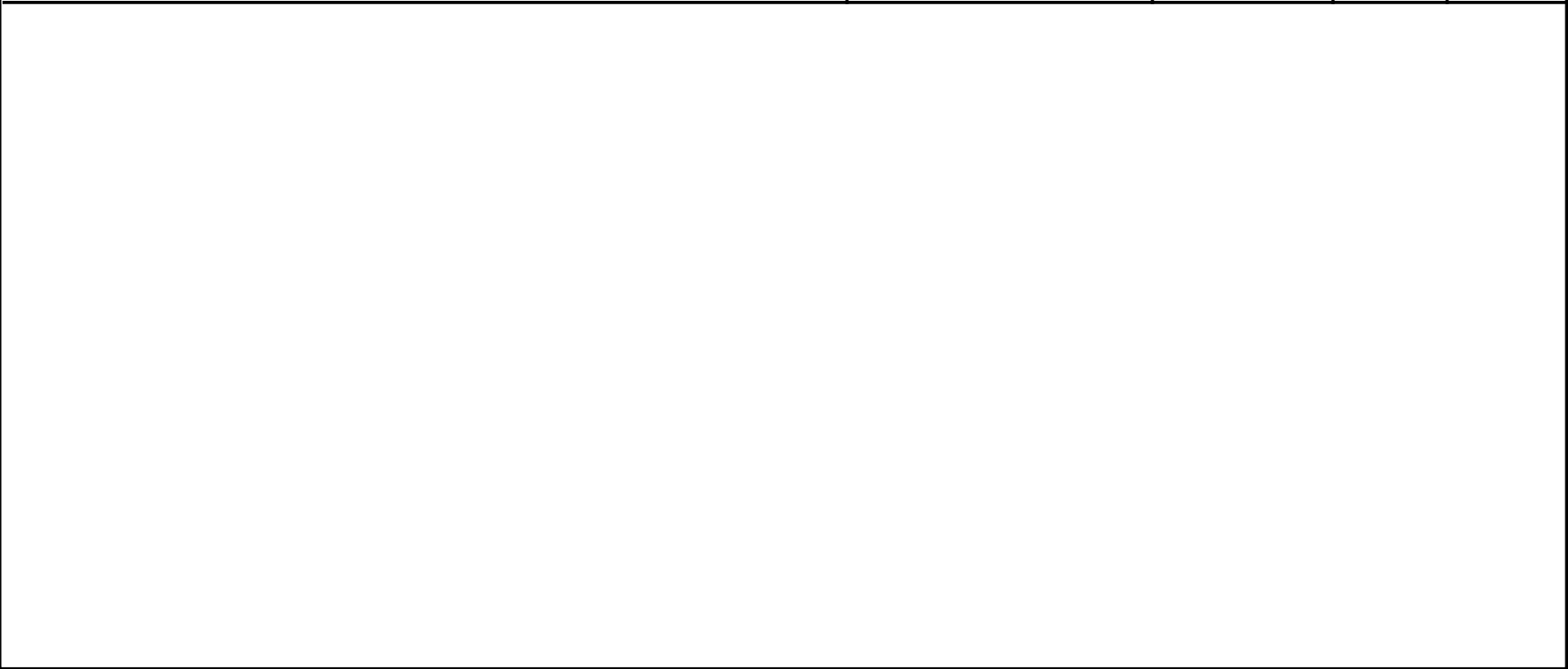
12 - 12 Engine Electrical Equipment	Type	Screw	Measure	Unit
12 51 Engine wiring harness				
1AZ Wiring harness on electrical cutout device	M51/M41	M5	2.5	Nm
2AZ Wiring harness connection on distributor	E36 M41	M8	10	Nm



12 - 13 Engine Electrical System	Type	Screw	Measure	Unit
12 61 Oil pressure, oil temperature, oil level display				
1AZ Oil-pressure switch/oil-temperature switch Note: Oil and screw in	S14/S50/S38		20	Nm
	M60/M62/M73		27	Nm
	All others		35	Nm

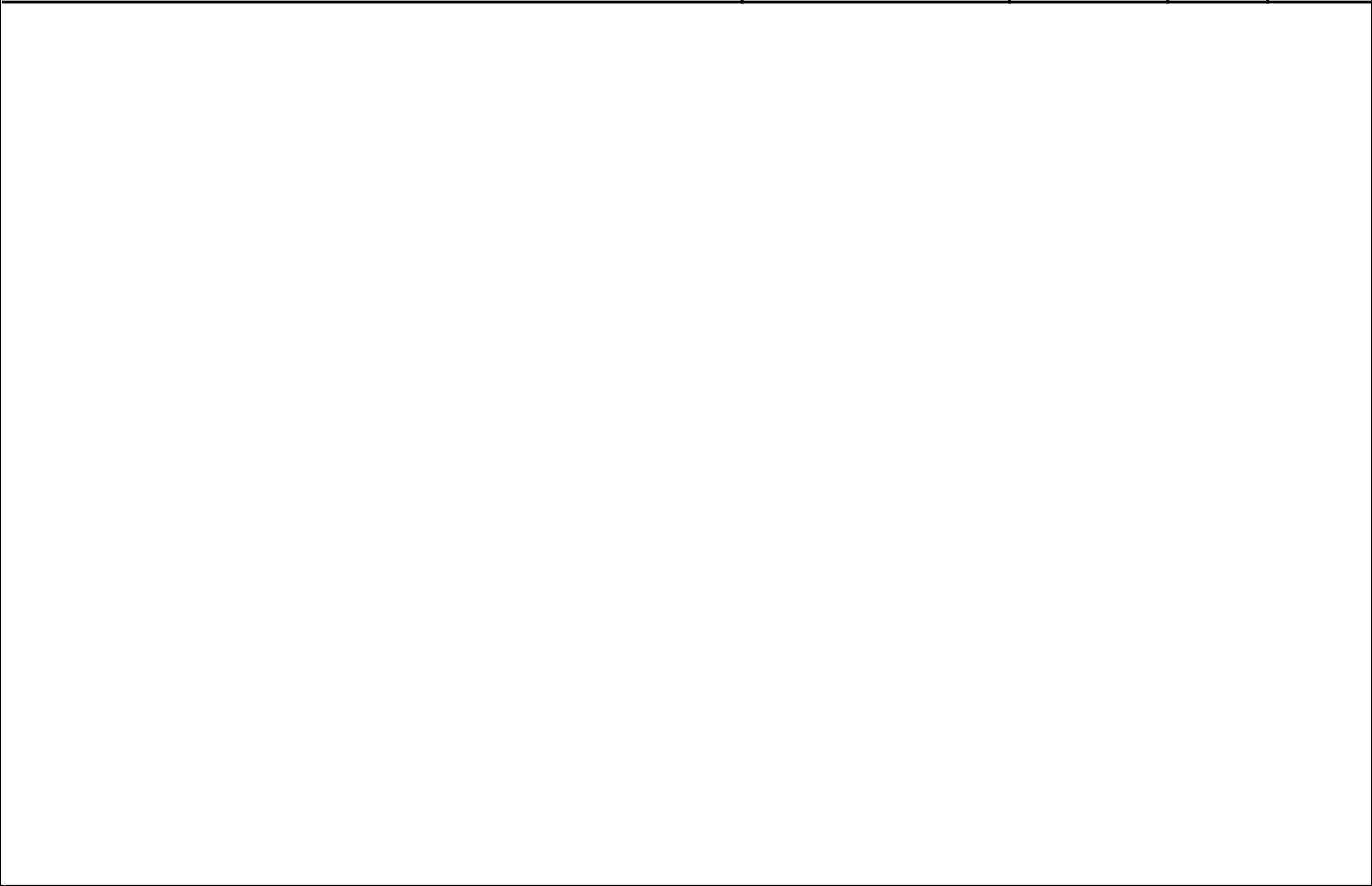


12 - 14 Engine electrics	Type	Screw	Dimension	Unit
12 62 Coolant Temperature				
1AZ Temperature sensor to water flange (glow time/coolant temperature gage)	M21		18	Nm
	M51		13	Nm
2AZ Temperature switch (5.5 °C / 17 °C) to fuel filter/cylinder head	M21		18	Nm
3AZ Coolant temperature sensor (2-pin plug-in connection)	S38/S50		13	Nm
	All others		20	Nm
4AZ Remote thermometer sensor (2-pin plug-in connection)	All others		20	Nm
5AZ Remote thermometer sensor on coolant flange	S50		18	Nm
6AZ Temperature sensor - air	S38/S50		13	Nm
7AZ Temperature sensor - oil	S38/S50		13	Nm



12 - 15 Engine Electrical Equipment	Type	Screw	Measure	Unit
12 63 Switches and Relays				
1AZ Temperature switch for electronic box	E32/E34/E31		15	Nm

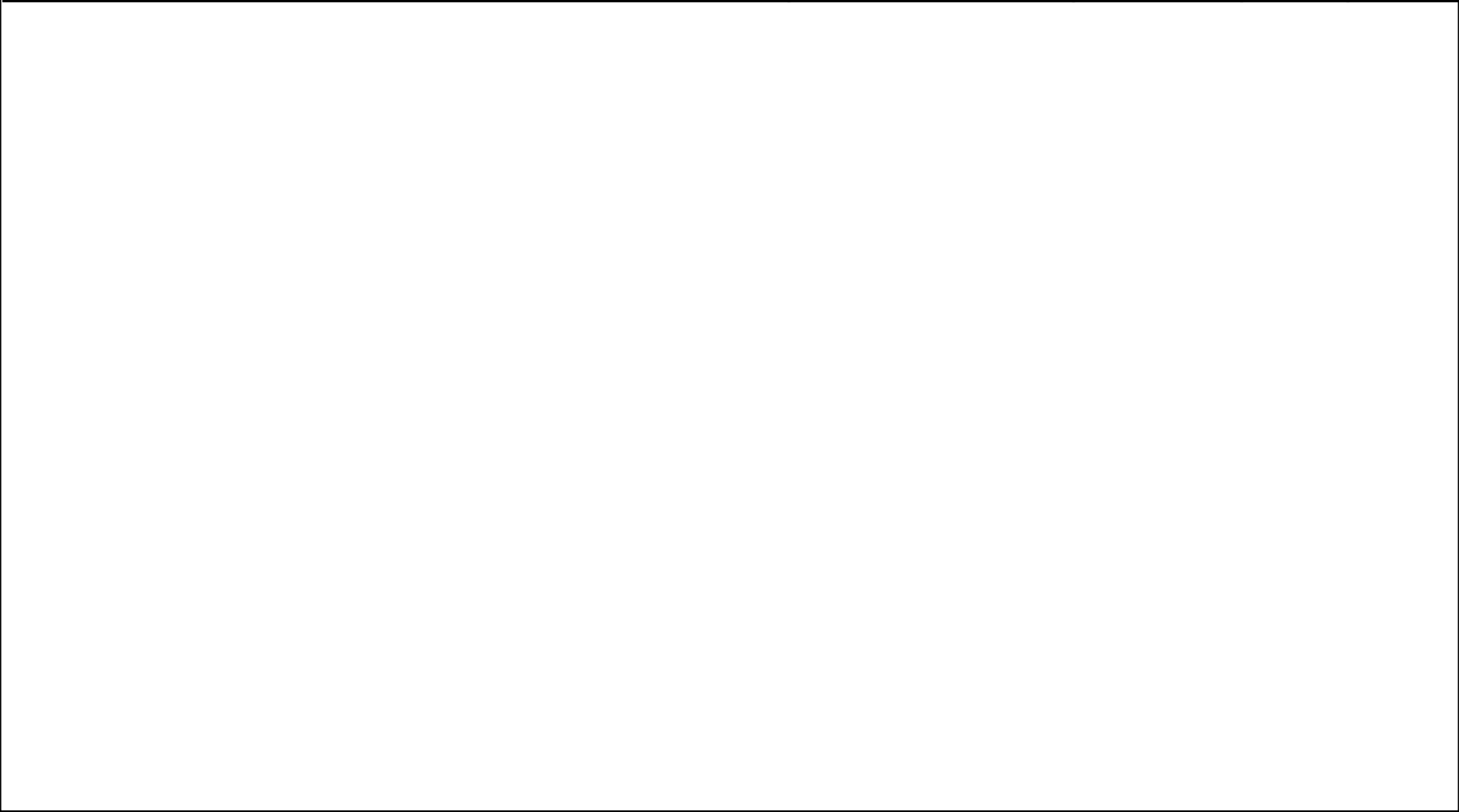
12 - 16 Engine Electrical System	Type	Screw	Measure	Unit
12 72 Senders for Control Unit				
1AZ Lever to pedal value sender	E32/E34/E31/E36		9	Nm
2AZ Pedal value sender to pedal console	E32/E34/E31		5	Nm



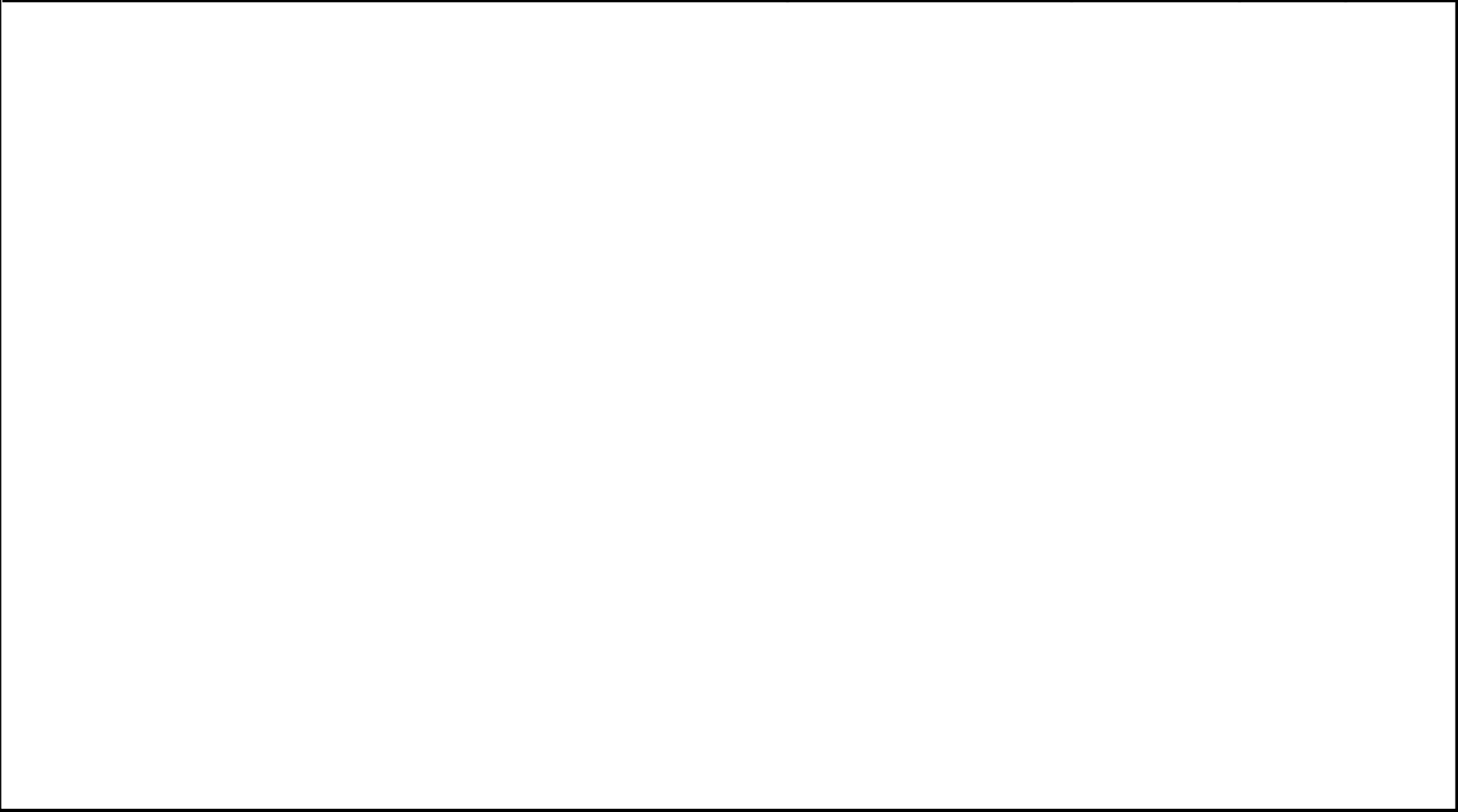
12 - 17 Engine Electrical System	Type	Screw	Dimension	Unit
12 90 Control unit housing				
1AZ Assembly of upper and lower sections	E32/E34/E36		5	Nm (ft. lbs.)
2AZ Center section to body	E32/E34		3	Nm (ft. lbs.)
3AZ Control unit holder in E box	E36		5	Nm (ft. lbs.)
4AZ Control unit box cover	E38/E39		4.4	Nm (ft. lbs.)

13 - 1 Fuel delivery and metering system	Type	Screw	Measure	Unit
13 11 Carburetor				
1AZ Carburetor to intake manifold	M10/M20/M30		10	Nm
2AZ Carburetor to insulating flange	M10/M20/M30		10	Nm
3AZ Insulating flange to intake manifold	M10/M20/M30		10	Nm
4AZ Idling shutoff valve; max.	M10/M20/M30		5	Nm
5AZ Flow valve; max.	M10/M20/M30		28	Nm
6AZ Throttle valve assembly to float housing; max.	M10/M20/M30		9	Nm
7AZ Throttle valve neck to intake manifold	M10/M20/M30		10	Nm
8AZ Throttle valve control to carburetor; max.	2BE		3	Nm
9AZ Warm-up regulator to engine	M10/M20/M30		23	Nm

13 - 2 Fuel delivery and metering system	Type	Screw	Measure	Unit
13 31 Fuel Pump with Drive and Pipes				
1AZ Fuel pump to engine	All		12	Nm
2AZ Fuel pipe coupling bolt	All with K-Jetr.	M8	9	Nm
3AZ Fuel pipe coupling bolt	All with K-Jetr.	M12	20	Nm
4AZ Fuel pipe to pressure regulator	All with L-Jetr.		30	Nm
5AZ Return pipe connector to pressure regulator	All with L-Jetr.		27	Nm

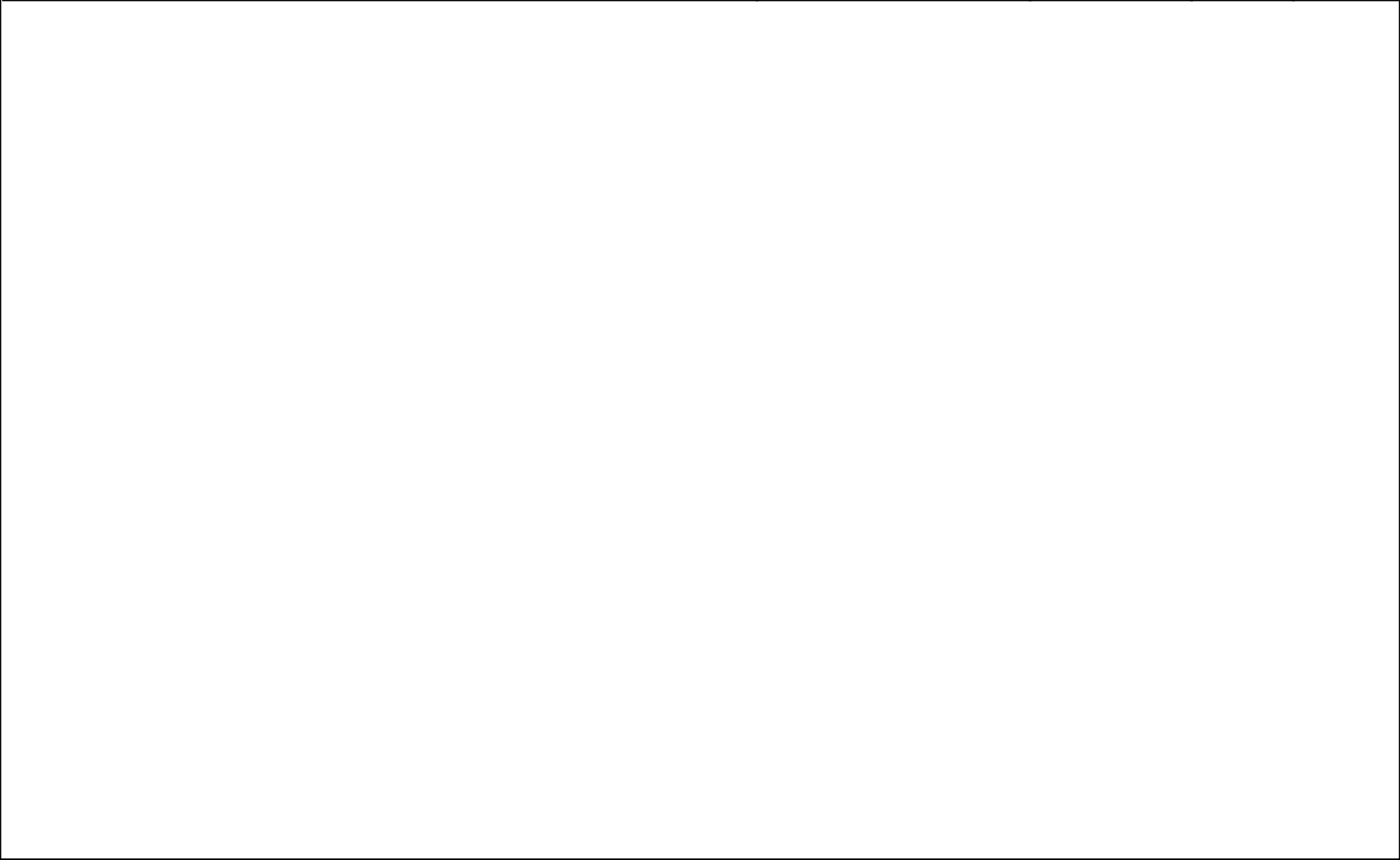


13 - 3 Fuel delivery and metering system	Type	Screw	Measure	Unit
13 32 Fuel filter				
1AZ Fuel line to filter housing and injection pump				
Coupling nut	M21/M51/M41	M14 x 1.5	14	Nm
Adapter	M21/M51/M41	M12 x 1.5	9	Nm
Hollow bolt	M21/M51/M41	M14 x 1.5	14	Nm
2AZ Fuel filter to holder	M51/M41	M8	22	Nm



13 - 4 Fuel delivery and metering system	Type	Screw	Measure	Unit
13 51 Injection Pump Control receptacle				
1AZ Plug for high pressure section of injection pump	M21/M51/M41		25	Nm
2AZ Distributor injection pump to holder	M21/M51/M41		25	Nm
3AZ Electric shutoff to injection pump	M21/M51/M41		20 ± 5	Nm
4AZ Electric cold start valve to injection pump	M21		20	Nm
5AZ Coupling bolt (OUT) to injection pump (fuel return)	M21/M51/M41		25	Nm
6AZ Pressure valve holder to injection pump	M21/M51		45	Nm
7AZ Expansion element housing (temperature dependent idling speed boost) to injection pump	M21		18	Nm
8AZ Distributor injection pump to flange and console	M21/M51/M41		22	Nm
9AZ Electr. line on fuel cutout device	M51/M41		2.5	Nm

13 - 5 Fuel delivery and metering system	Type	Screw	Measure	Unit
13 52 Injection Pump Drive				
1AZ Chain sprocket to injection pump	M21		47	Nm
2AZ Toothed belt pulley to injection pump	M51/M41		50	Nm
3AZ Chain tensioner	M51/M41		15	Nm

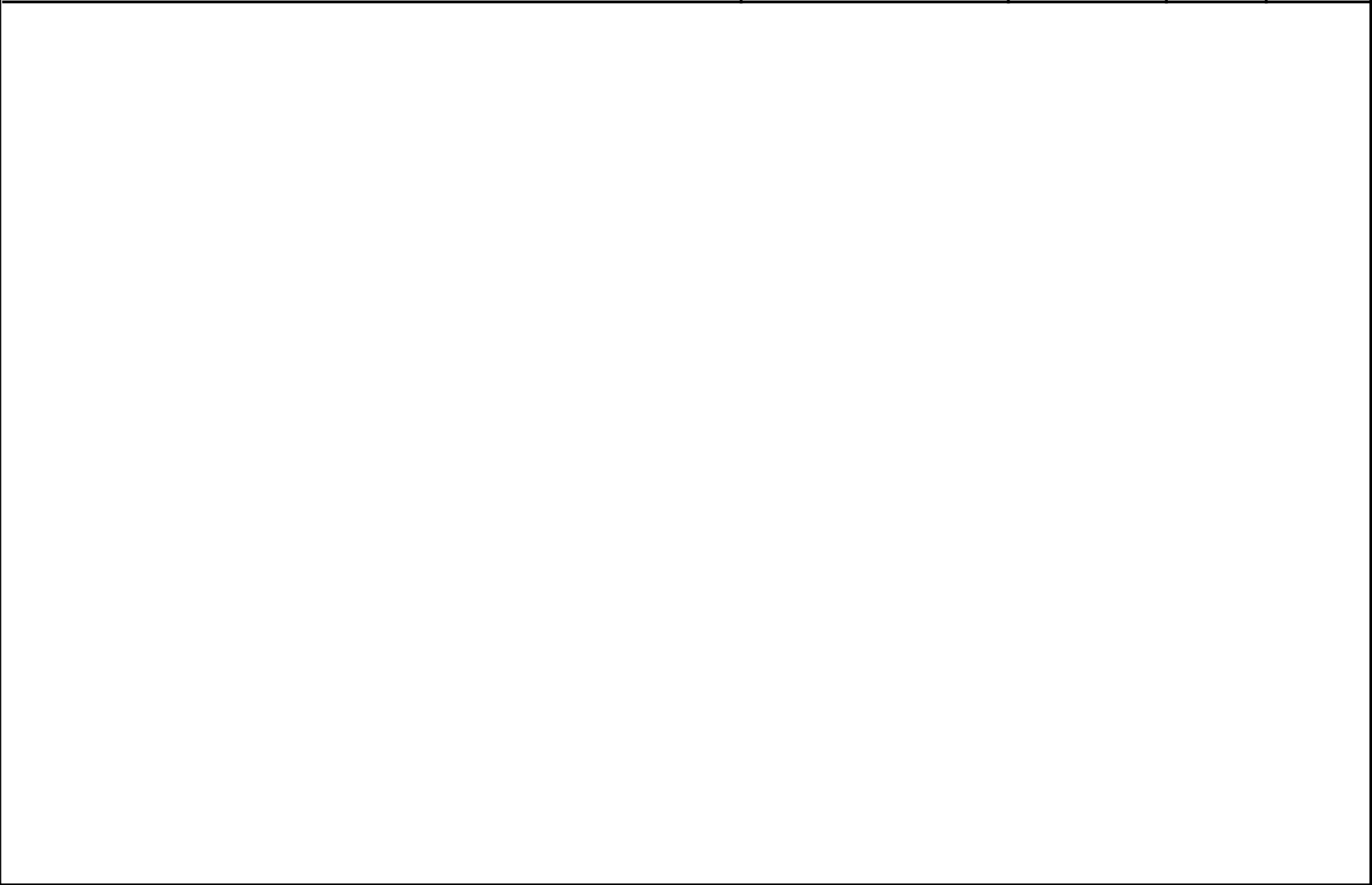


13 - 6 Fuel metering and regulation system	Type	Screw	Dimension	Unit
13 53 Fuel Injection Nozzles and Pipes				
1AZ Injection nozzle combination (assembly)	M21/M51		80	Nm
2AZ Injection nozzle combination to cylinder head	M21		40	Nm
	M51/M41		65	Nm
3AZ Injection pipe (coupling nut) to injection pump and nozzle combination	M21/M51/M41		20	Nm
4AZ Feed line on injection panel	M43/M44		20	Nm

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13 - 7 Fuel System	Type	Screw	Measure	Unit
13 62 Senders for Control Unit				
1AZ Temperature time switch	M21/M51		18	Nm
2AZ Coolant temperature sensor	M60/1/M60/2/M21/M51		18	Nm
	All others		13	Nm
3AZ Temperature switch	All		28	Nm
4AZ Temperature sensor - air	All		13	Nm
5AZ Charge pressure sensor on holder	M51/M41		4	Nm
6AZ Twin temperature sensor (4-pin plug-in connection)	M41/M43/M44/S50/S52/M52/M62/M73		13	Nm
7AZ Air-mass sensor on lower section of air filter housing	M51		3.5	Nm

13 - 8 Fuel delivery and metering system	Type	Screw	Measure	Unit
13 64 Fuel Injectors				
1AZ Fuel injector to intake manifold	All	M6	10	Nm
2AZ Coupling nut on fuel injector	All with K-Jetr.		25	Nm



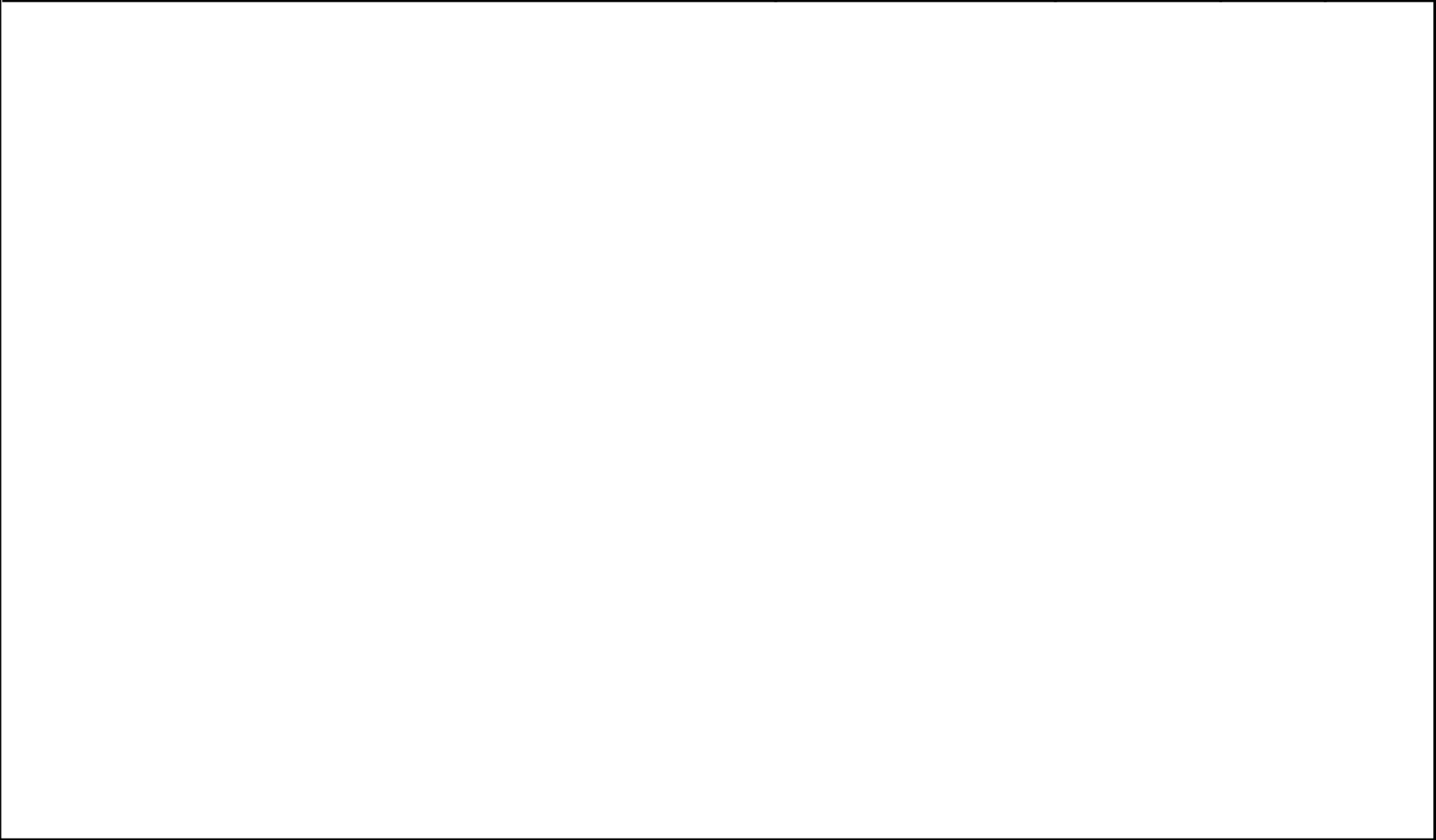
13 - 9 Fuel System	Type	Screw	Measure	Unit
13 71 Air intake silencer				
1AZ Air intake silencer on cylinder head cover	M41/M51	M6	6	Nm

13 - 10 Fuel System	Type	Screw	Measure	Unit
13 80 Gas-powered units				
1AZ Screw plug on low-pressure regulator	316g/518g		3	Nm

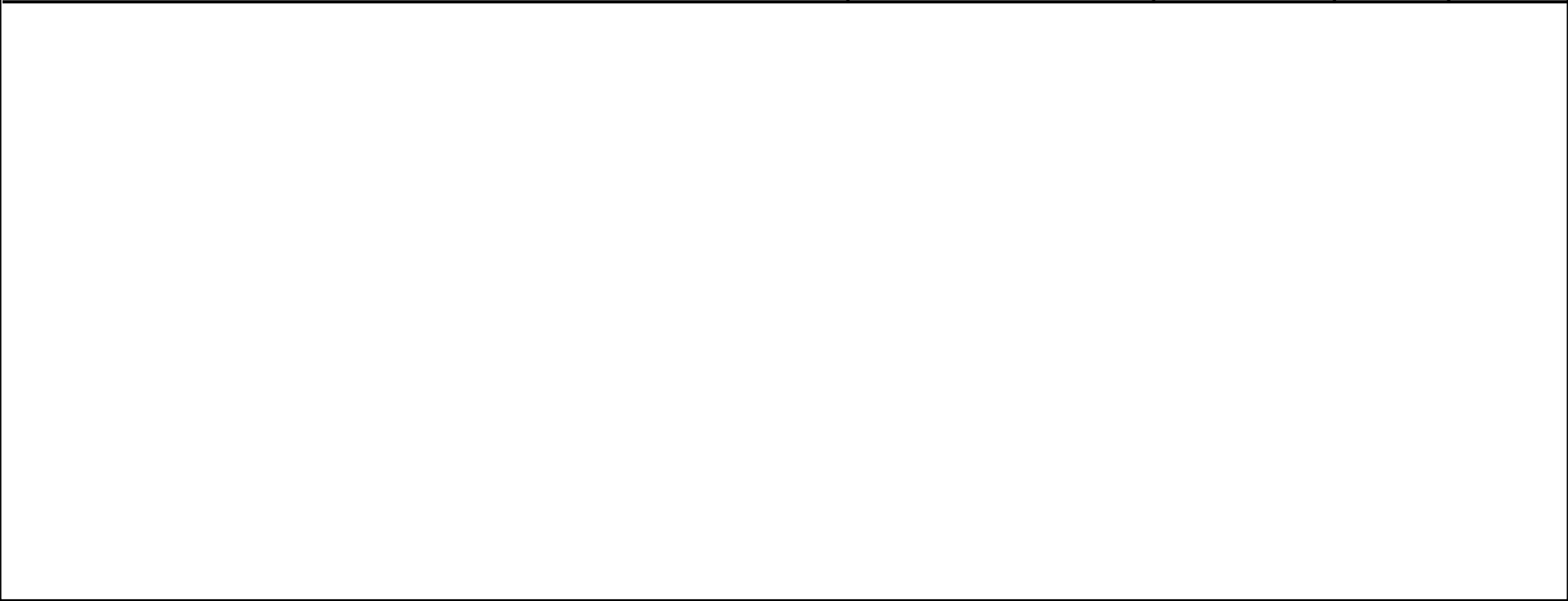
13 - 11 Fuel System	Type	Screw	Measure	Unit
13 81 Air intake valves, low-pressure and vacuum hoses				
1AZ Air intake line on low-pressure unit	316g/518g		22	Nm

13 - 12 Fuel System	Type	Screw	Measure	Unit
13 82 Mixture and metering system, low-pressure reducer				
1AZ MAP sensor on holder	316g/518g		3.5	Nm

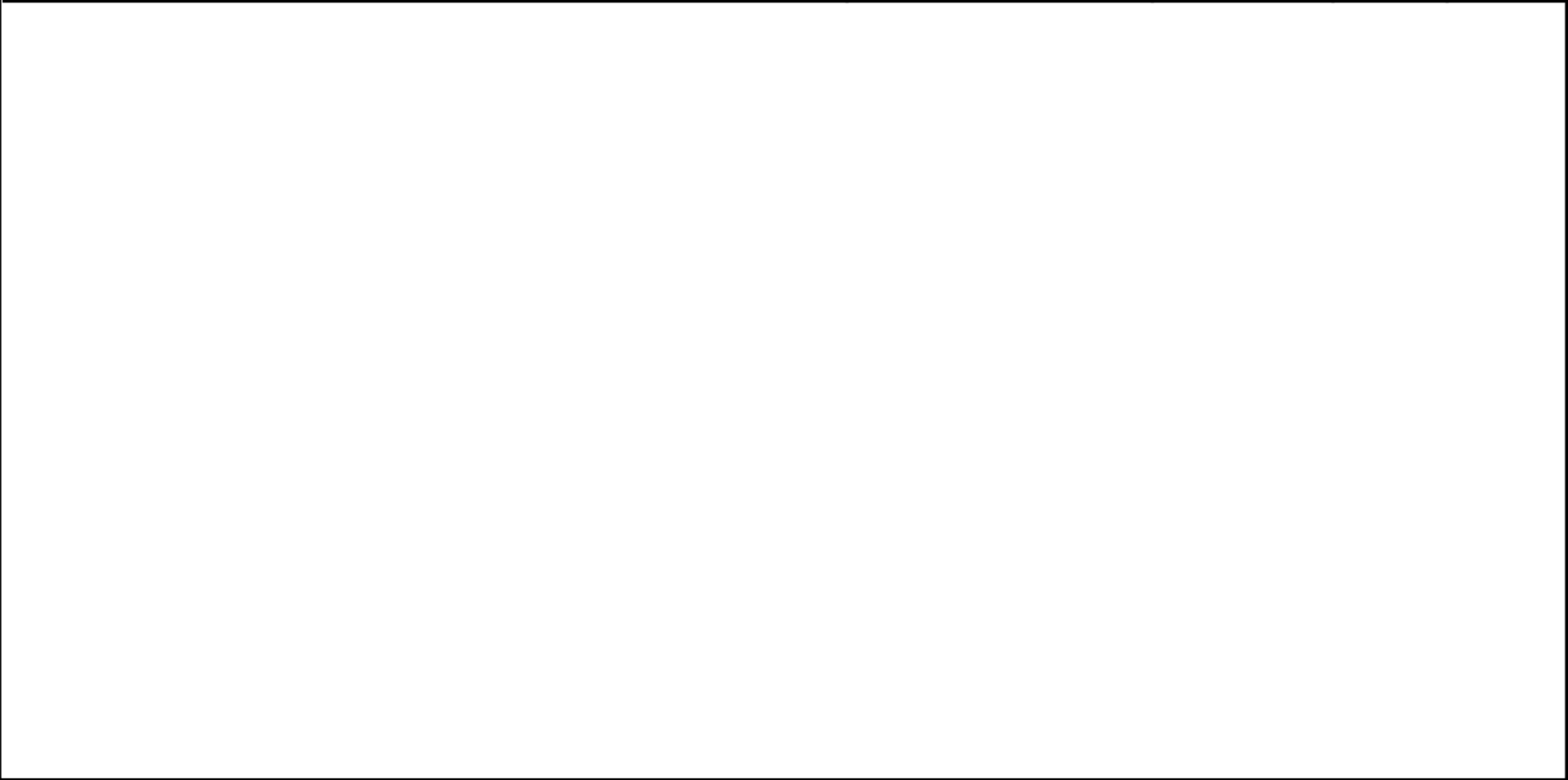
13 - 13 Fuel System	Type	Screw	Measure	Unit
13 83 Gas tank with attachment				
1AZ Support frame on body	316g/518g		45	Nm
2AZ Gas density sensor on non-return cock of gas tank	316g/518g		35	Nm
3AZ Holder of filler connection on body	316g		5	Nm
4AZ Holder for filler connections on body	518g		3	Nm



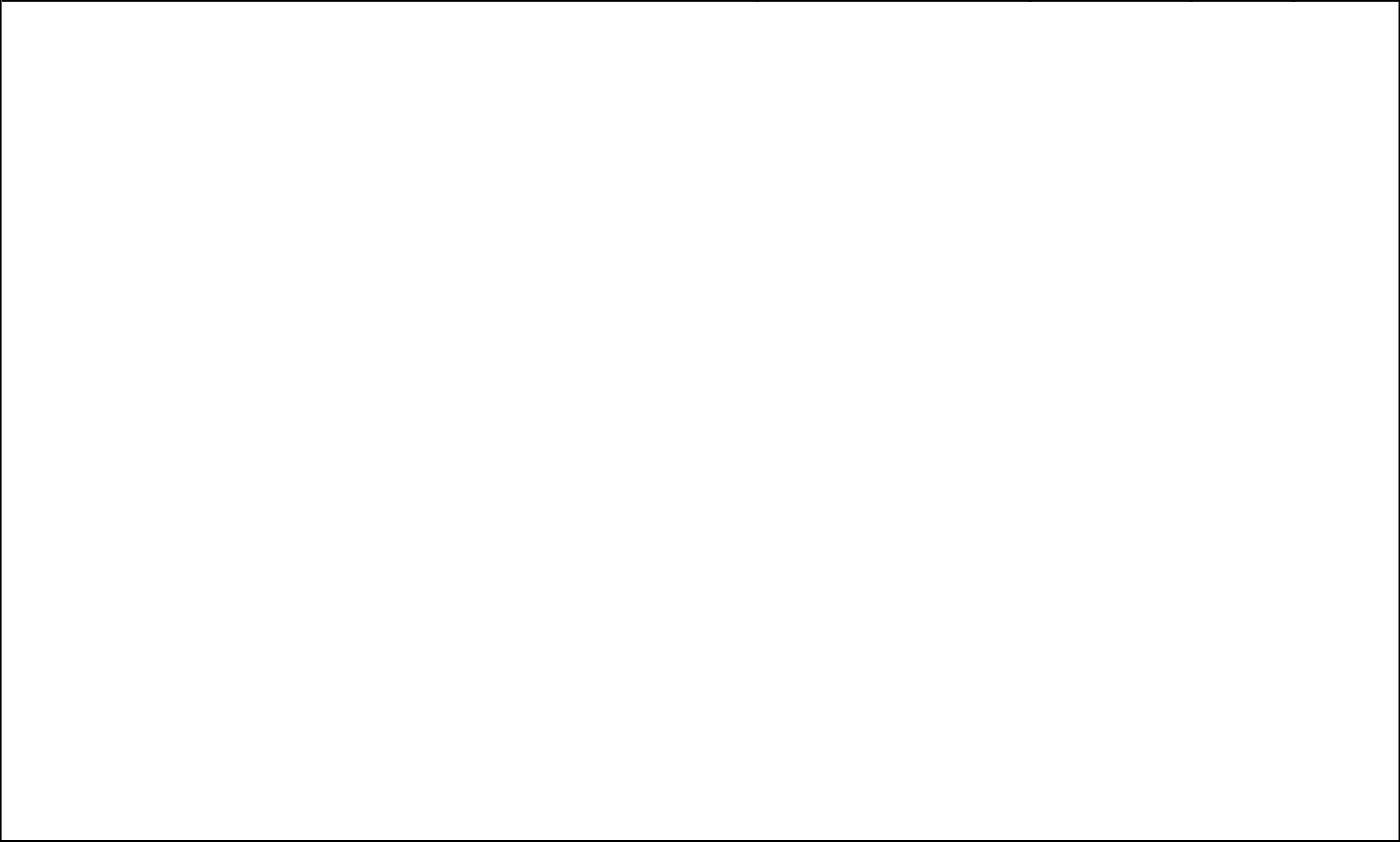
16 - 1 Fuel tank and fuel lines	Type	Screw	Dimension	Unit
16 11 Fuel Tank and Mounting Parts				
1AZ Fuel tank to body Screw	All	M8	23	Nm (ft. lbs.)
nut	E30	M8	25	Nm (ft. lbs.)
nut	E24	M8	45	Nm (ft. lbs.)
Retaining strap			8	Nm (ft. lbs.)
Retaining strap	E39	M8	23	Nm (ft. lbs.)
2AZ Connecting pipe to fuel tank	E30		25	Nm (ft. lbs.)
3AZ Heat shield to fuel tank	E30		8.5	Nm (ft. lbs.)
	E24		1.0	Nm (ft. lbs.)
	E31		3	Nm (ft. lbs.)
4AZ Drain plug on fuel tank	All		25	Nm (ft. lbs.)



16 - 2 Fuel tank and fuel lines	Type	Screw	Measure	Unit
16 12 Fuel Supply				
1AZ Pump assembly to metal-bonded mount	All with fuel injection		6.5	Nm
2AZ Holder to fuel pump or fuel reservoir	All with fuel injection		6.5	Nm
3AZ Electric connections on fuel pump	All with fuel injection		2	Nm
4AZ Electric connections on fuel pump	All with fuel injection	M4	1.2	Nm
5AZ Electric connections on fuel pump	All with fuel injection	M5	1.6	Nm
6AZ Plastic nut on cover for fuel pipes	E30		2	Nm
7AZ Hose clamps 10 - 16 mm dia.	All		2	Nm

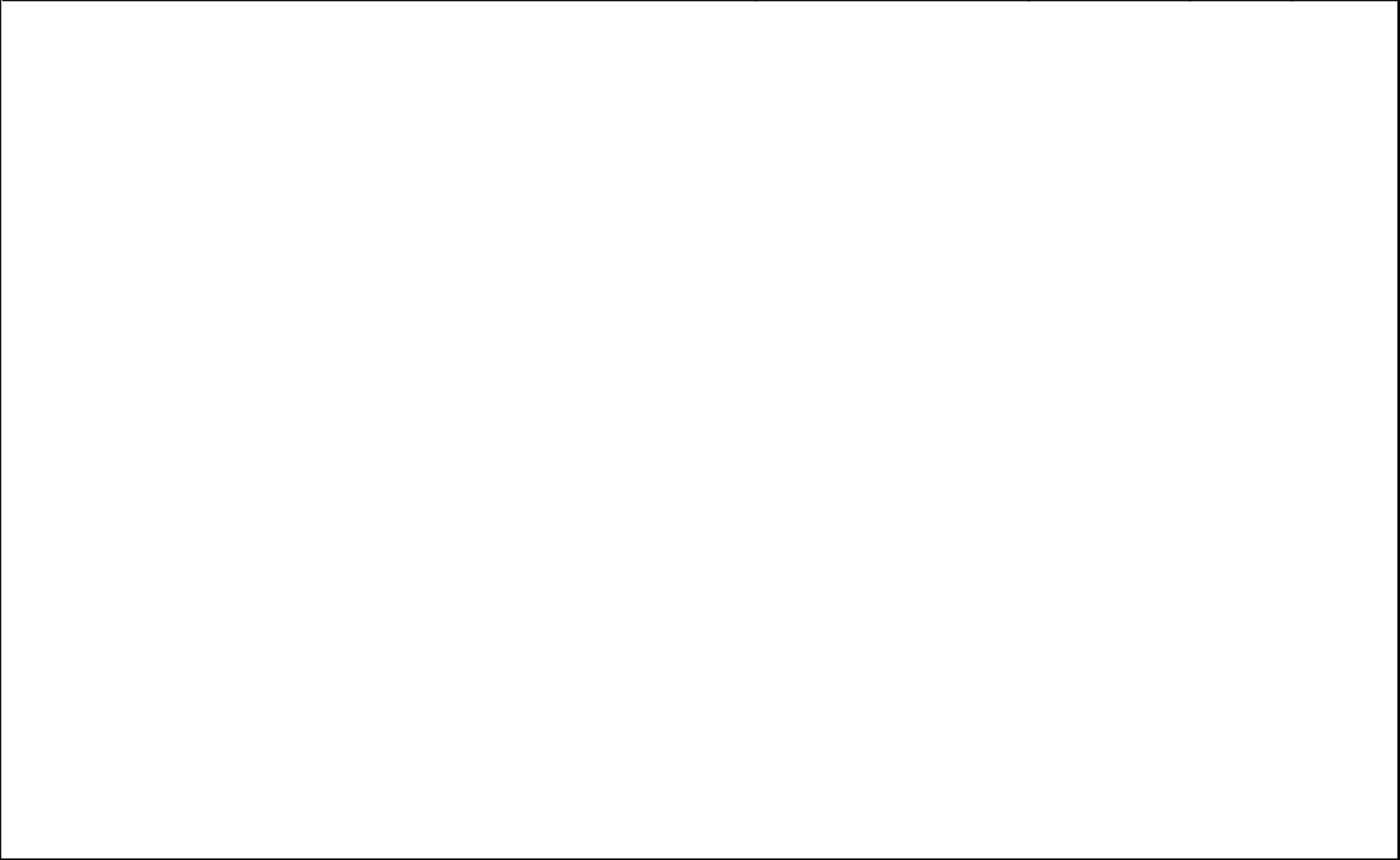


16 - 3 Fuel tank and fuel lines	Type	Screw	Dimension	Unit
16 13 Fuel Vapor Venting				
1AZ Fuel vapor venting tank to body	E24		3	Nm (ft. lbs.)
	E30		4.5	Nm (ft. lbs.)
	E39		4.0	Nm (ft. lbs.)

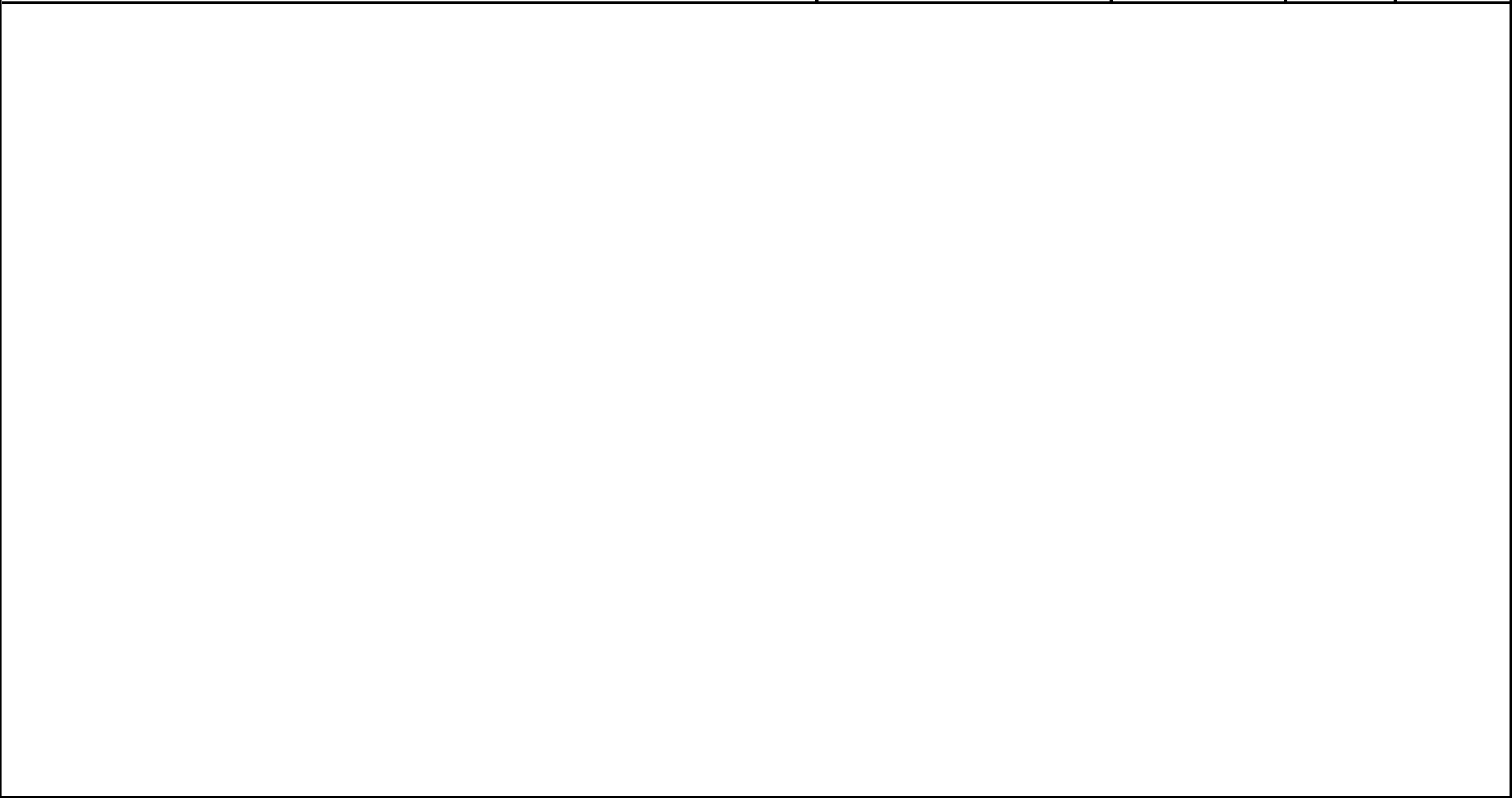


16 - 4 Fuel Tank and Fuel Lines		Type	Screw	Measure	Unit
16 14 Fuel Pump					
1AZ	Fuel level sender to fuel intake	All with transfer pump in tank		2	Nm
		E32		8	Nm
2AZ	End ring for fuel tank (fuel level sender/pump)				
	Plastic sealing ring, 26.5 mm high	E34/E31		40	Nm
	Plastic sealing ring, 31.5 mm high (new)	E36/E34/E31			
	Torque angle			720	°
	Torque			55	Nm
	Metal sealing ring	E39		35	Nm
3AZ	Intank pump with fill level sensor on tank (tighten nuts crosswise)	E38	M6	6.5	Nm

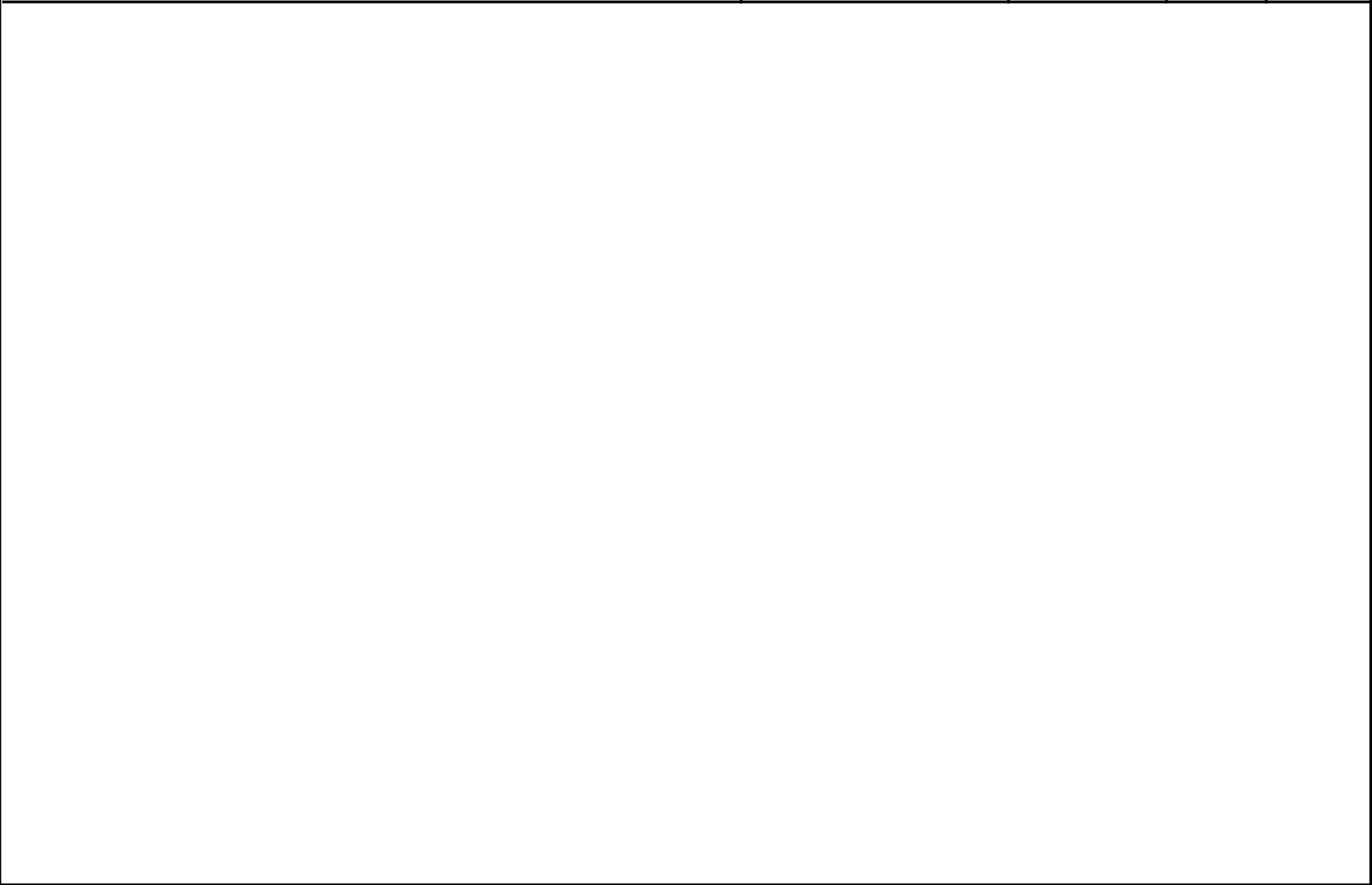
17 - 1 Radiator	Type	Screw	Measure	Unit
17 00 Coolant				
1AZ Cooland hoses 32 ... 48 mm dia.	All		2.5	Nm
2AZ Bleeder screw (8 mm wrench size) on thermostat housing	All		8	Nm
3AZ Level switch (30 mm wrench size) to coolant expansion tank	All		3	Nm



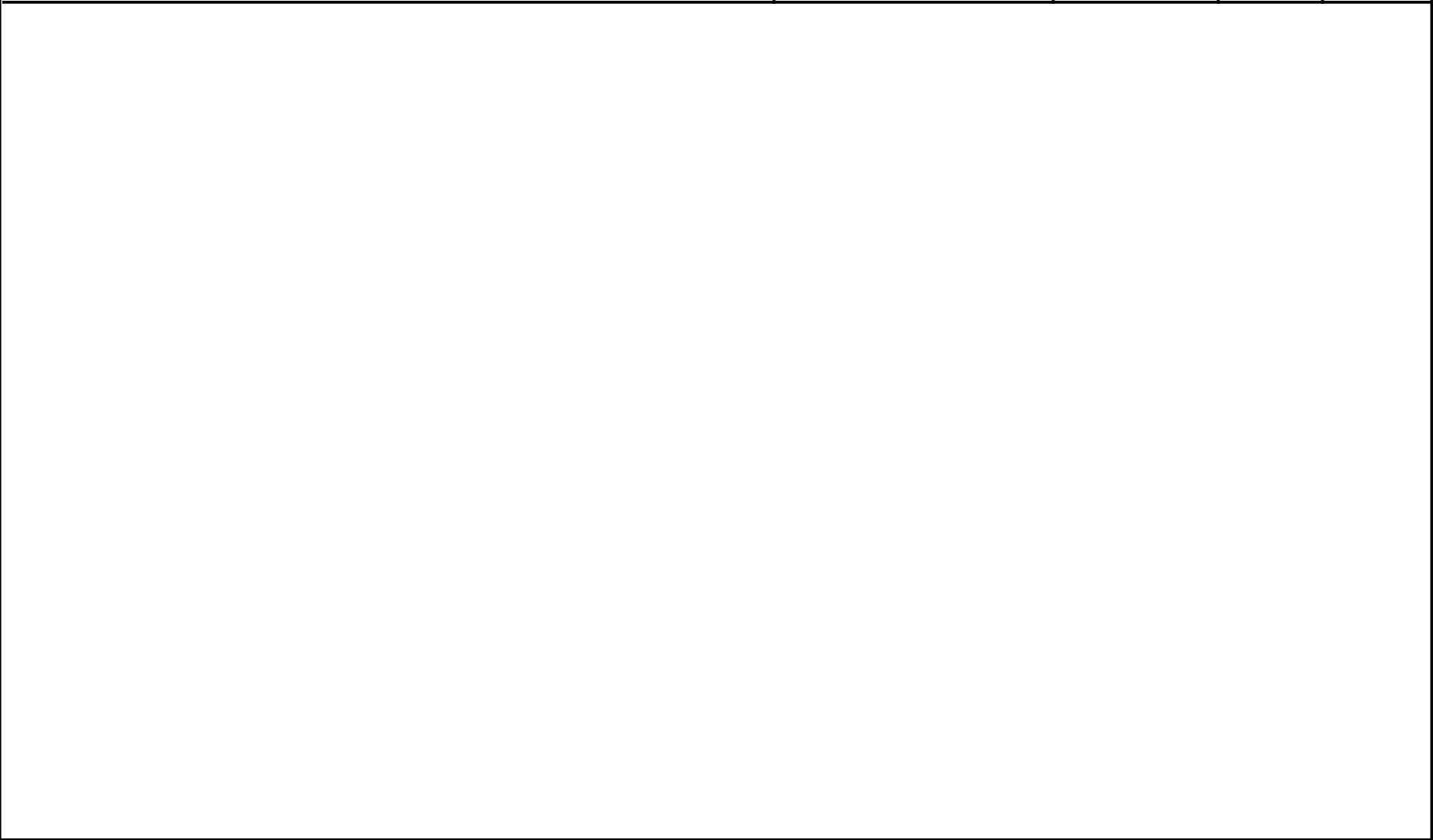
17 - 2 Radiator	Type	Screw	Measure	Unit
17 11 Radiator and Mounting Parts				
1AZ Radiator to body				
self-tapping screw	All	B6.3	9	Nm
	All	M6	10	Nm
2AZ Drain plug on radiator	All		2.5	Nm
3AZ Temperature switch to radiator (91°C / 99°C) max.	All		15	Nm
4AZ Expansion tank to body	All		9	Nm



17 - 3 Radiator	Type	Screw	Measure	Unit
17 21 Engine Oil Cooler				
1AZ Engine oil cooler to body	All		14	Nm
Oil cooler vapor extraction guide to trim panel	E36 M3	B4.8	4	Nm



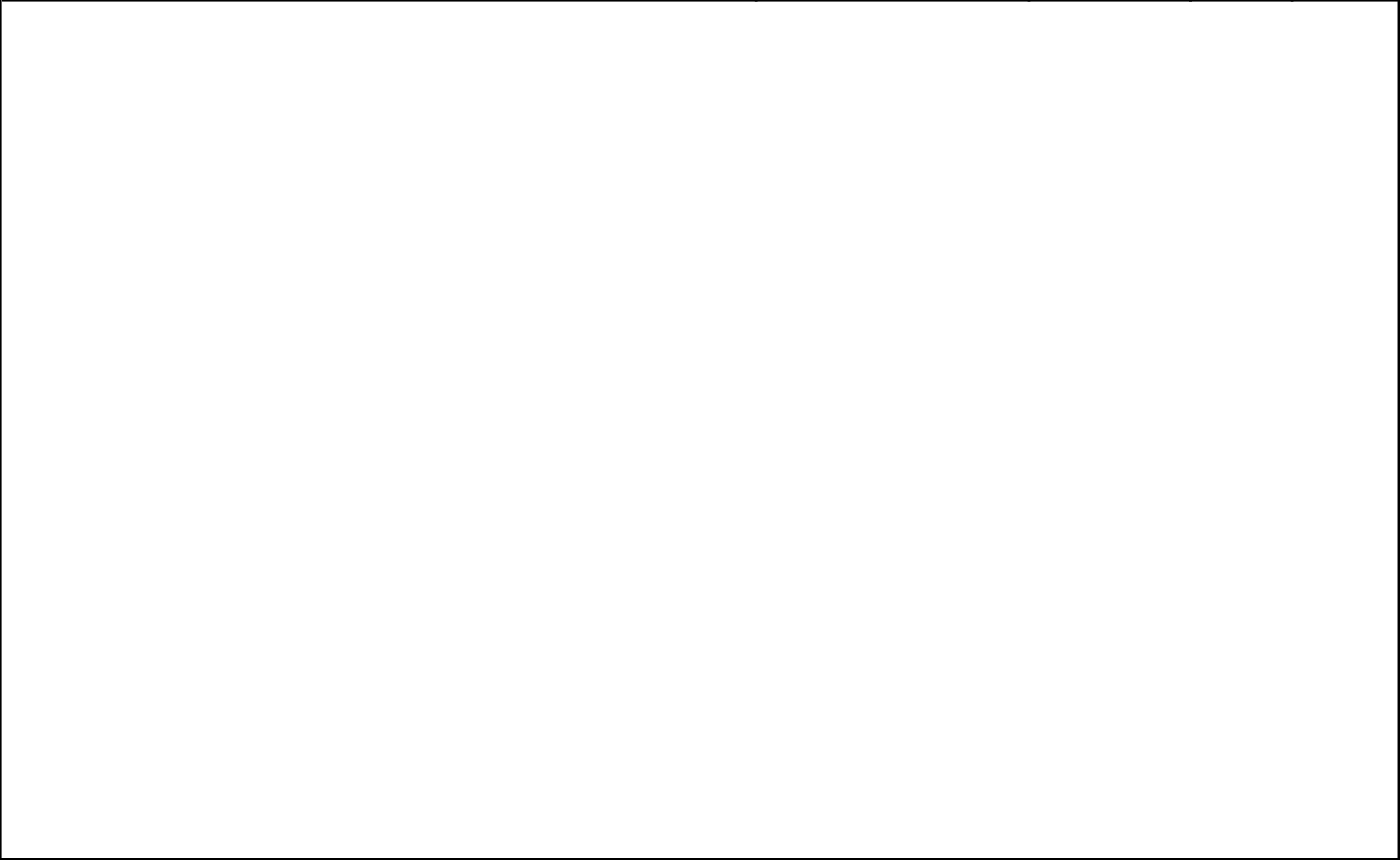
17 - 4 Radiator	Type	Screw	Measure	Unit
17 22 Oil Cooler Pipes				
1AZ Pipes to engine oil cooler	All		28	Nm
2AZ Pipes to oil filter head	E36 M3		25	Nm
3AZ Holder on oil cooler pipes	All		6	Nm
4AZ Holder for oil cooler pipes to alternator	E36 M3	M6	10	Nm



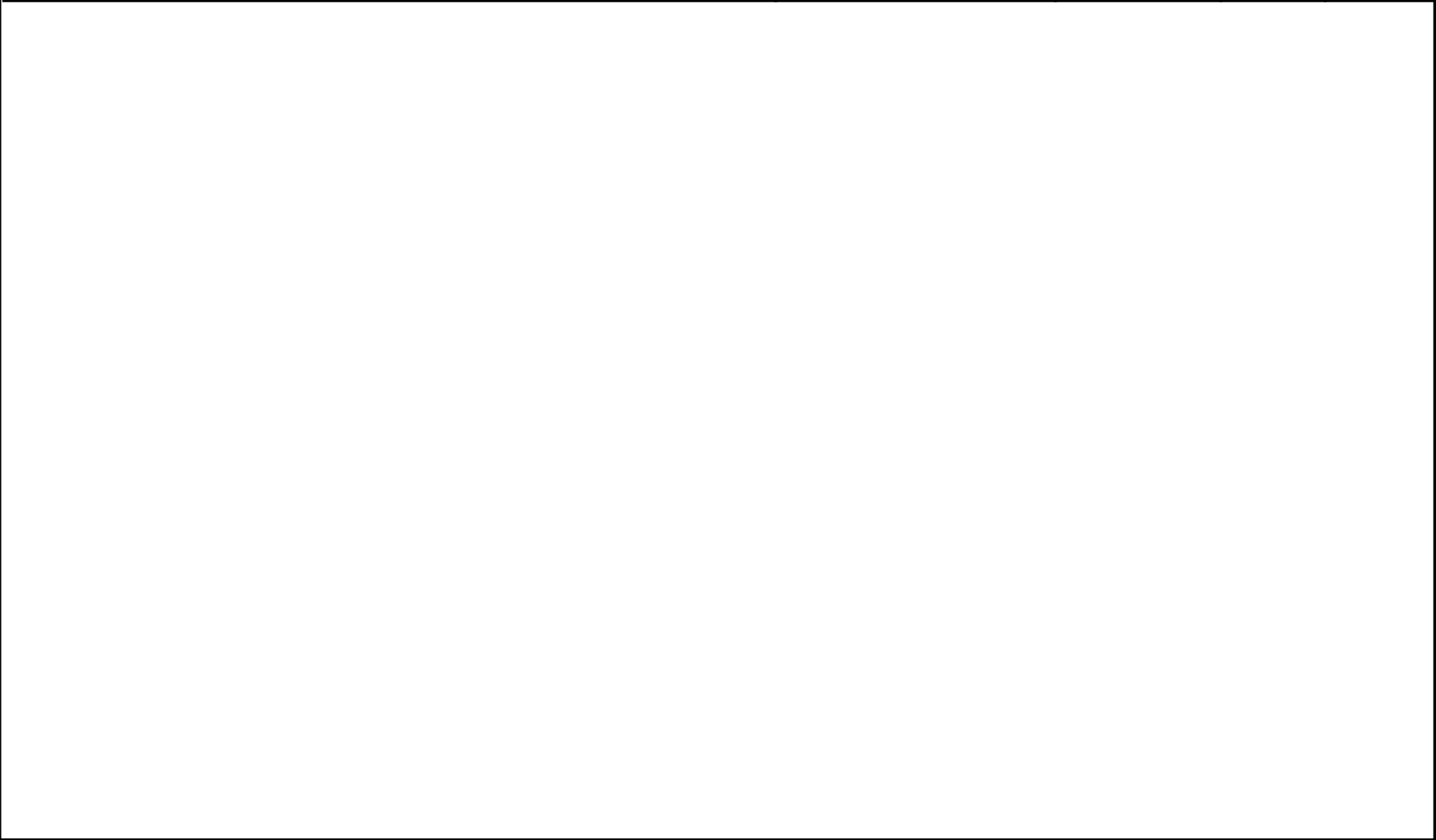
17 - 5 Radiator	Type	Screw	Measure	Unit
17 22 Oil Cooler Pipes				
5AZ Cap nut on transmission oil cooler (on radiator) and on transmission	All	M18x1.5	20	Nm
	5HP30	M22x1.5	28	Nm
6AZ Oil lines on transmission				
Hollow bolt	All	M16 x 1.5	37	Nm
7AZ Oil lines on transmission oil cooler	A5S 300J		28	Nm
Hollow bolt	All	M14 x 1.5	27	Nm
8AZ Screw-in fitting on transmission	All	M14x1.5 und M16x1.5	37	Nm
9AZ Oil hose on oil pipe	E23		28	Nm
10AZ Oil pipe bracket on radiator	E23		2	Nm
11AZ Oil pipe bracket on body	E23		6.5	Nm
12AZ Oil cooler on transmission	5HP30		10	Nm

18 - 1 Exhaust system	Type	Screw	Dimension	Unit
18 00 Exhaust Assembly				
1AZ Exhaust pipe to exhaust manifold or turbocharger				
Version with compression spring: Evenly tighten the compression springs with nuts on the block, then loosen by 1.5 revolutions	M30/M70		10	Nm
Preload compression springs with nuts to 27 ± 1 mm	M51			
Version without compression springs	S50	M10	30	Nm
2AZ Exhaust pipe to flow section	E23		25	Nm
3AZ Clamp for final muffler	All	M8	15	Nm
4AZ Catalytic converter on silencer				
Version with compression spring: Evenly preload compression springs with nuts to 30 mm	E36 M42			

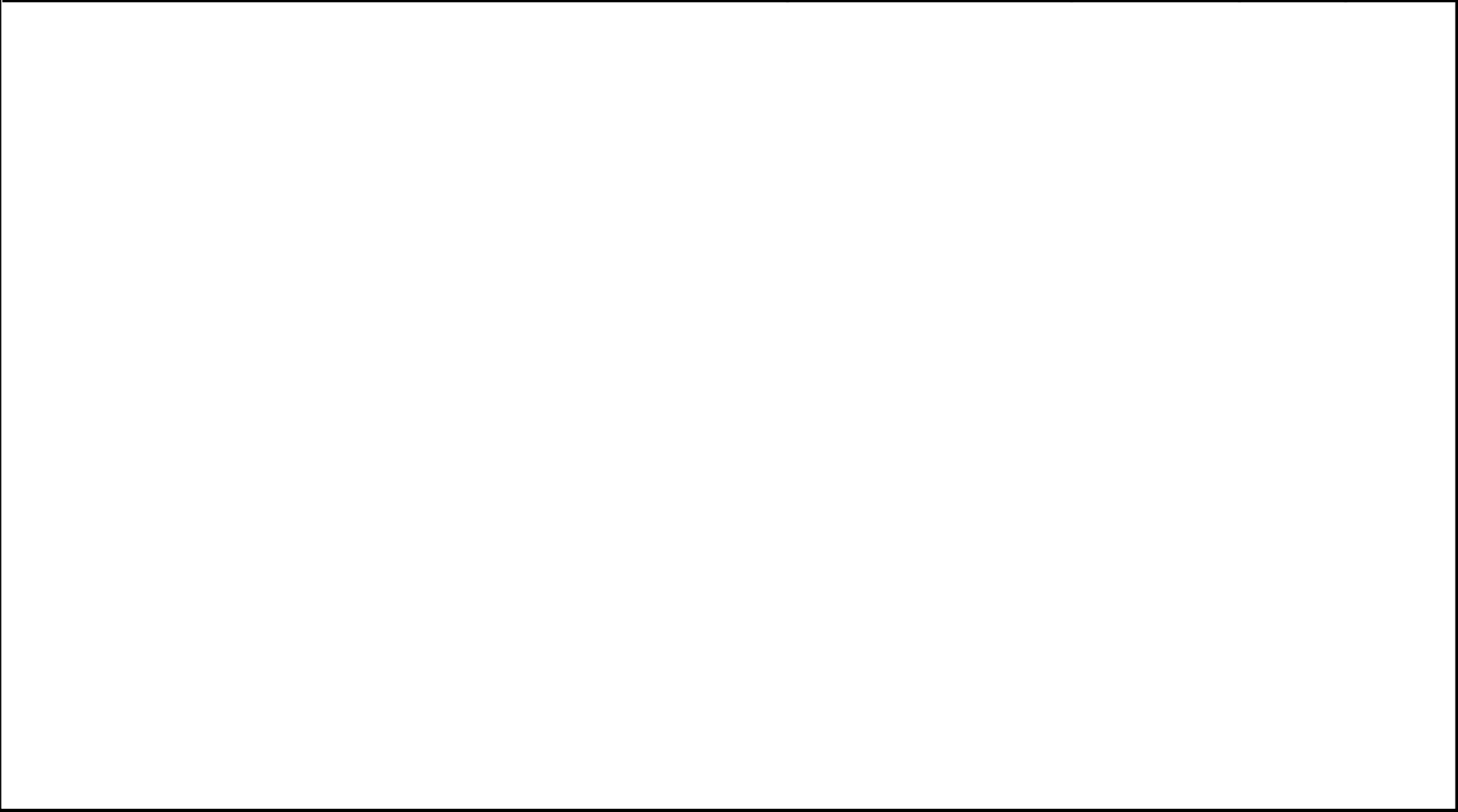
21 - 1 Clutch	Type	Screw	Measure	Unit
21 11 Bell housing				
1AZ Clutch housing to crankcase	All	M8	27	Nm
	All	M10	51	Nm
	All	M12	86	Nm



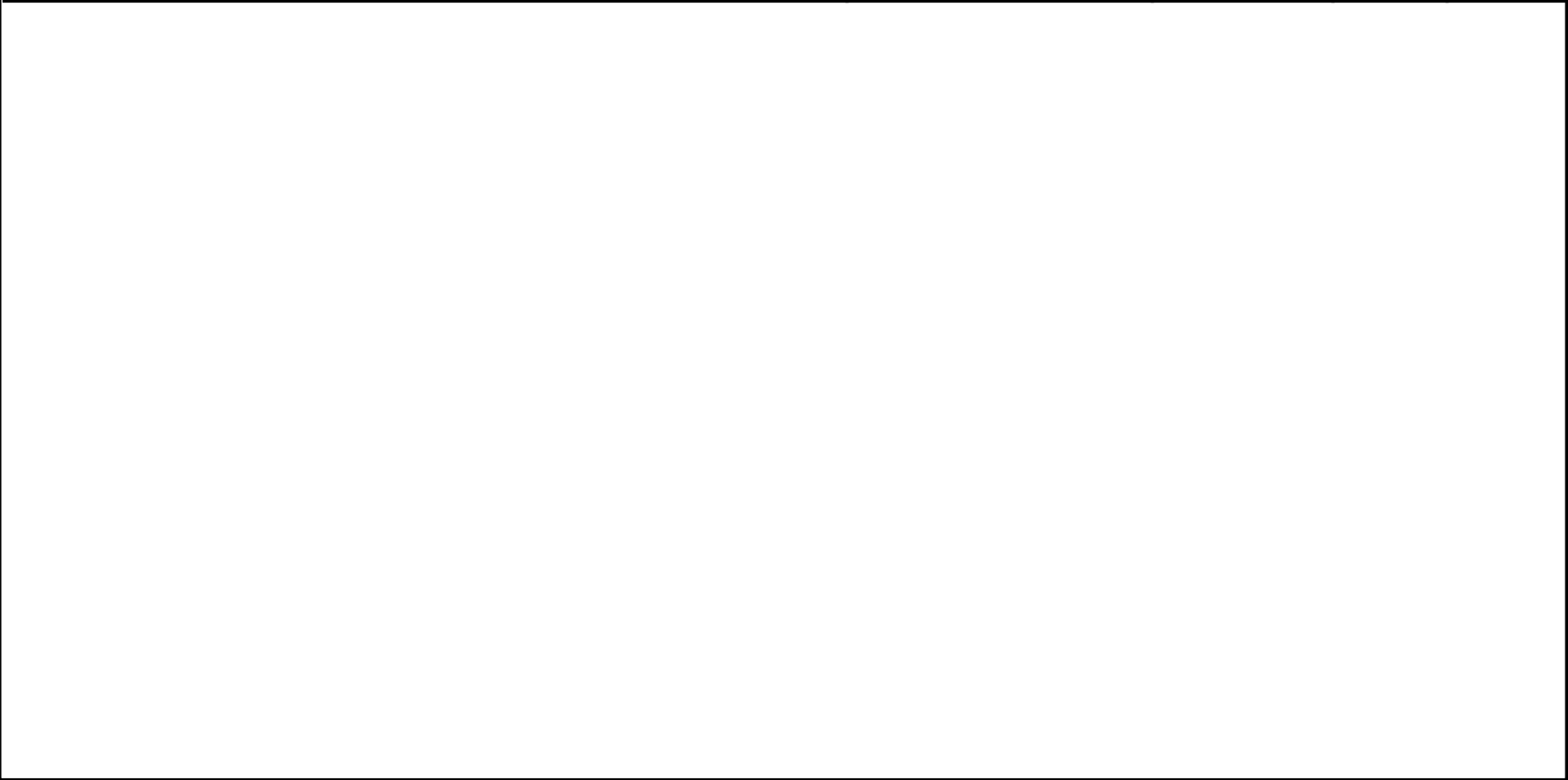
21 - 2 Clutch	Type	Screw	Measure	Unit
21 21 Clutch disc and drive plate				
1AZ Clutch to flywheel				
	All	M8 8.8	24	Nm
	All	M8 10.9	34	Nm
Replace bolt and taper sleeve.	S14/S38 B36	M8 10.9	34	Nm



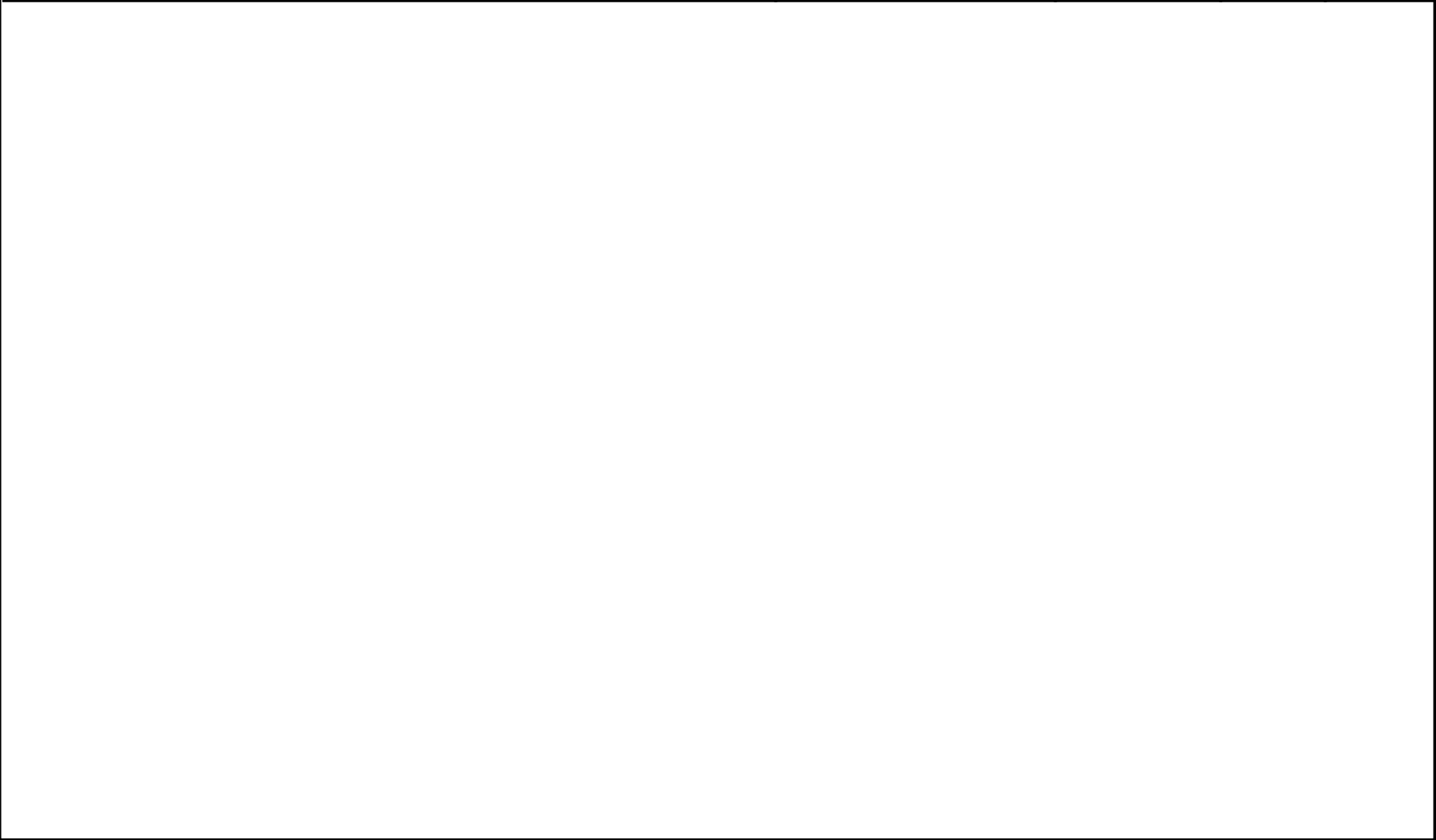
21 - 3 Clutch	Type	Screw	Measure	Unit
21 52 Clutch operation (hydraulic)				
1AZ Coupling bolts for hydraulic pipes	All		17	Nm
2AZ Master cylinder to console	All		22	Nm
3AZ Master cylinder setscrew	All		22	Nm
4AZ Master cylinder to pedal assembly	All		10	Nm
5AZ Slave cylinder to clutch housing or transmission case	All		22	Nm



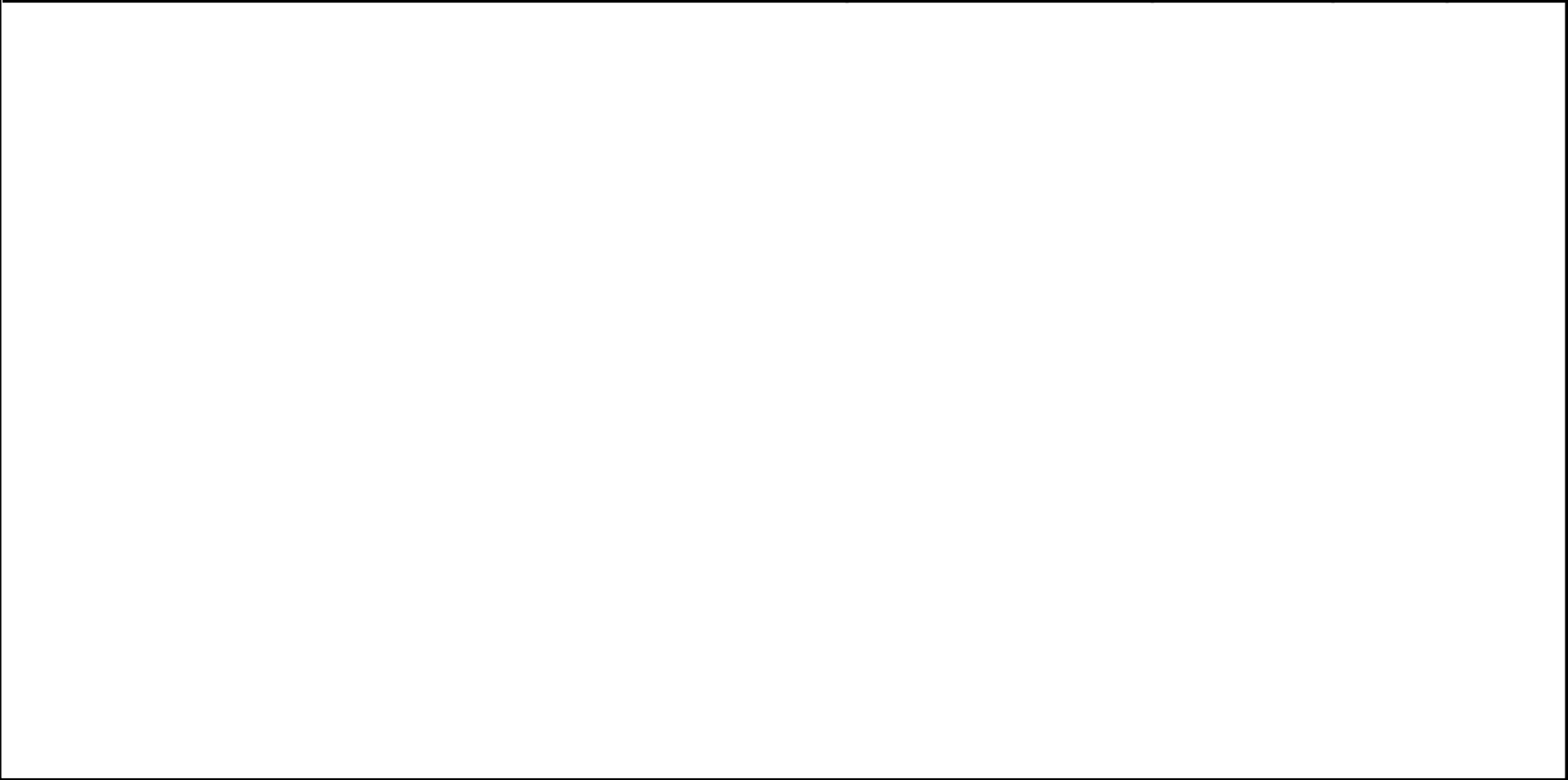
23 - 1 Manual Transmission	Type	Screw	Measure	Unit
23 00 Transmission in general				
1AZ Transmission to engine				
Hex screws	All	M8	25	Nm
	All	M10	49	Nm
	All	M12	74	Nm
Torx bolts	All	M8	22	Nm
	All	M10	43	Nm
	All	M12	72	Nm



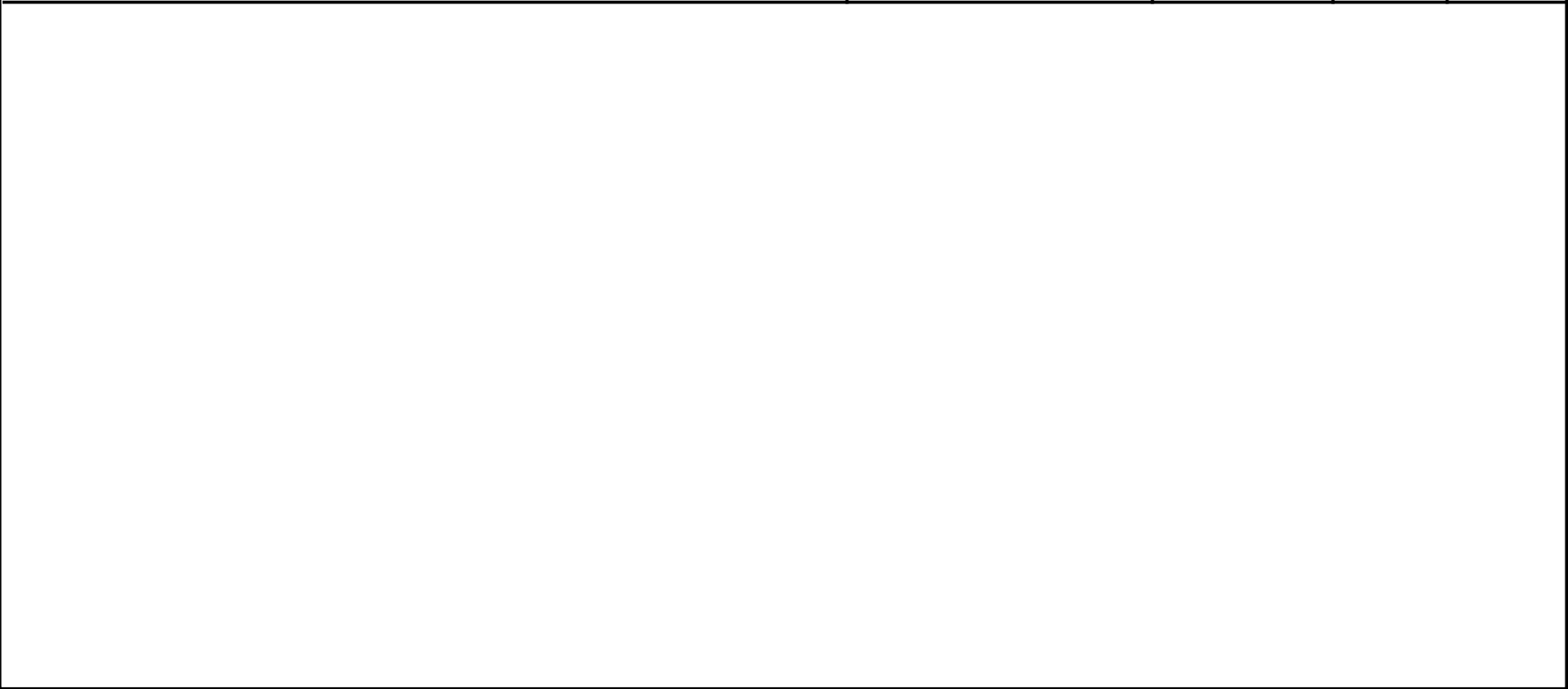
23 - 2 Manual transmission	Type	Screw	Measure	Unit
23 00 Transmission Assembly				
2AZ Transmission to clutch housing	All	M12	76	Nm
3AZ Reinforcement plate to transmission	All	M8	23	Nm
4AZ Oil drain plug/filler plug	All		50	Nm
	S 6 S 560 G		52	Nm



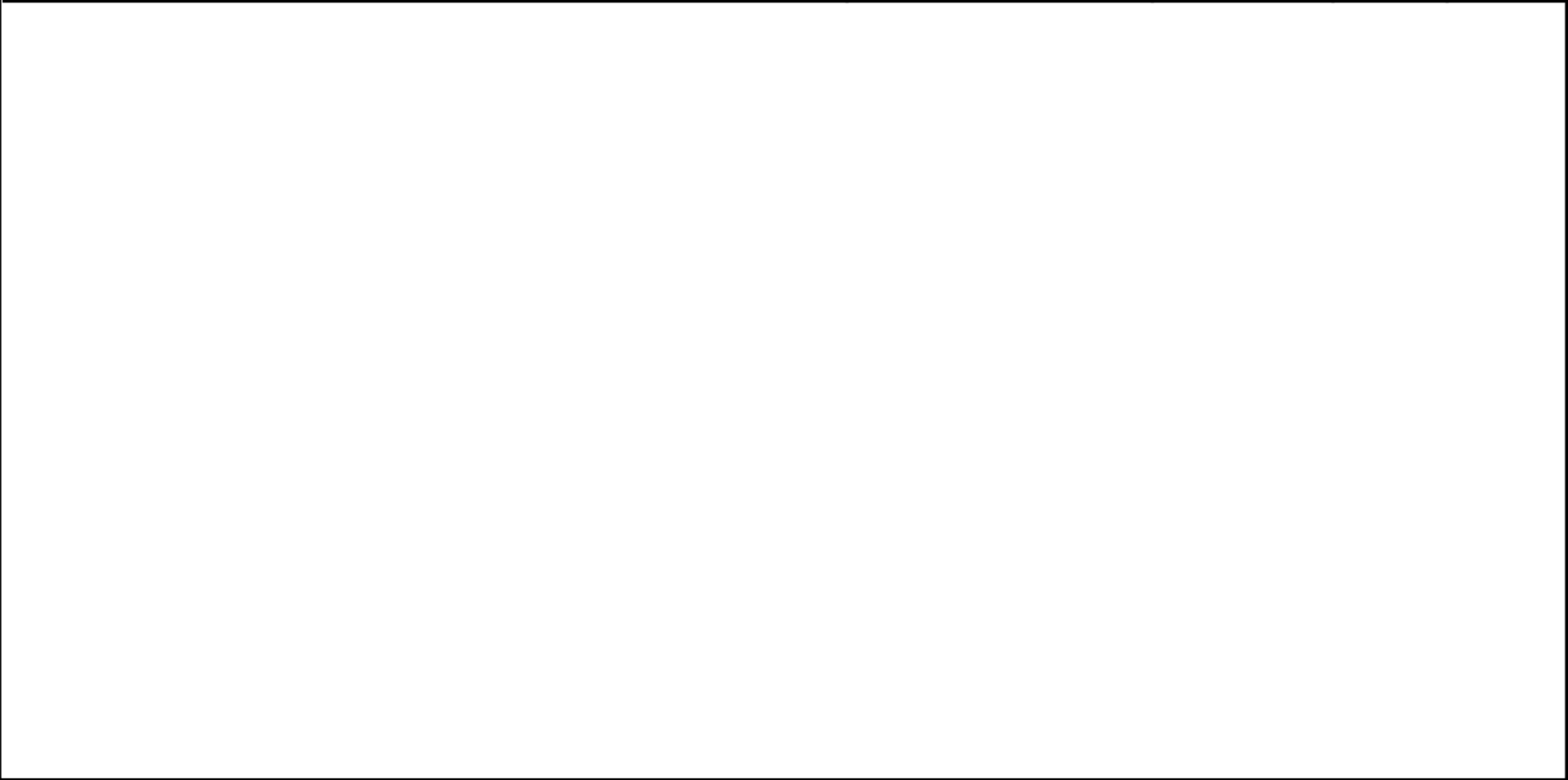
23 - 3 Manual transmission	Type	Screw	Measure	Unit
23 11 Case and Covers				
1AZ Transmission case rear/front sections	All		22	Nm
2AZ Cover with guide tube/transmission case	All	M8x22	18	Nm
	All	M8x30	25	Nm
	All	M6	10	Nm
3AZ Bearing cap/sealing flange	All		10.5	Nm
4AZ Reverse gear shaft on intermediate housing	All		49	Nm
5AZ Retaining plate for reverse gear shaft on intermediate housing	All		25	Nm



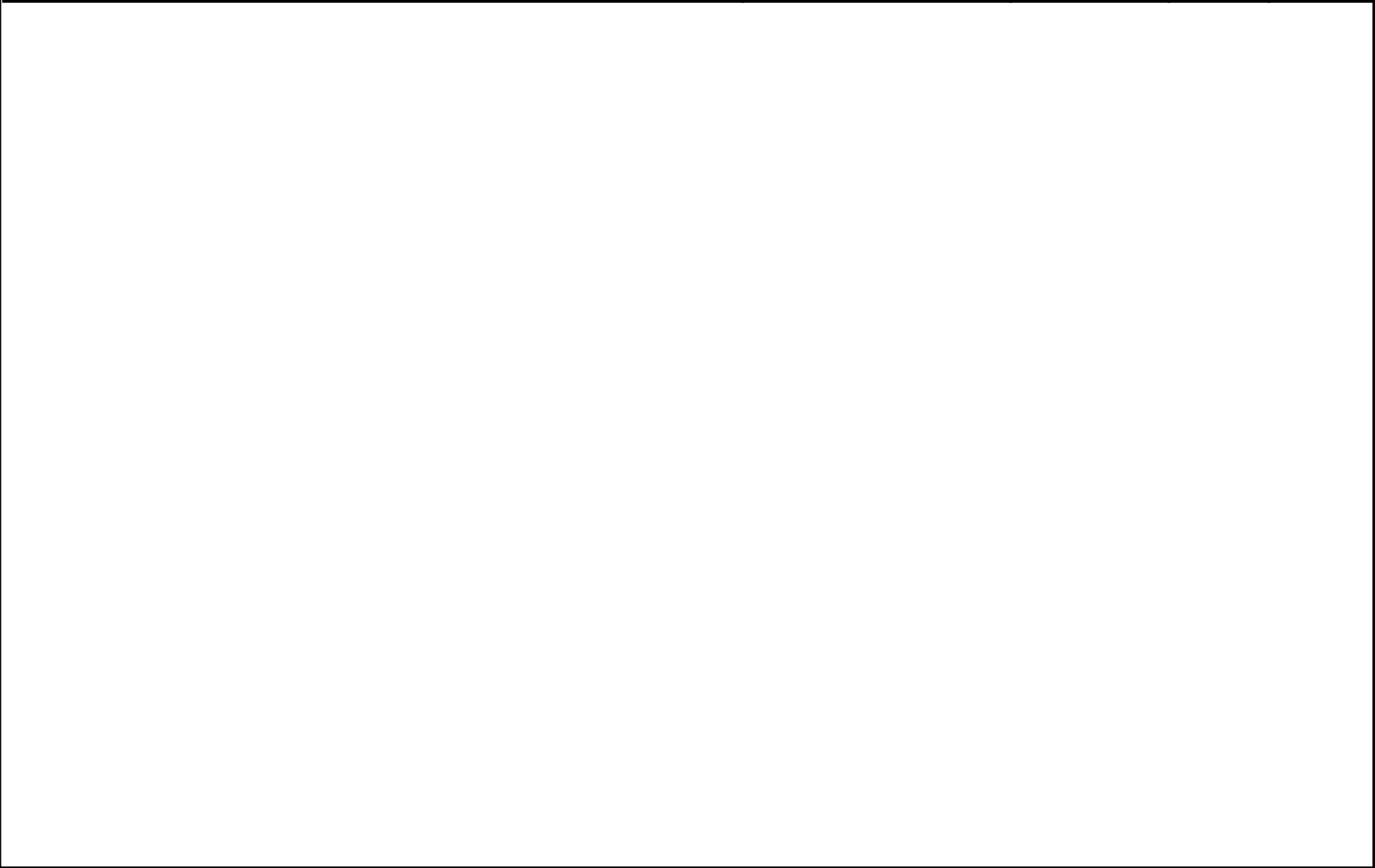
23 - 4 Manual Transmission	Type	Screw	Measure	Unit
23 11 Case and Cover				
6AZ Reverse gear shaft to case	All	M8	25	Nm
	S 5 D 310 Z	M8	20	Nm
	All	M10	45	Nm
7AZ Support for reverse gear shaft	240/260	M8	25	Nm
8AZ Bearing bracket on rear section of case	240/260/265/280	M6	10	Nm
9AZ Mounting tabs for sealing cover	280	M6	10	Nm
10AZ Bearing on countershaft	S 5 D 200 G/S 5 D 250 G	M10	90	Nm
	S 5 D 310 Z	M10	30	Nm
	280	M10	60	Nm



23 - 5 Manual transmission	Type	Screw	Measure	Unit
23 11 Case and Covers				
11AZ Plug in rear casing section	All	M20	60	Nm
	240	M16	40	Nm
	260/280	M22	60	Nm
12AZ Sealing caps on rear case section	240/260/280	M6	10	Nm
13AZ Reversing bolt to reversing lever	ZF S-5-16/S 5 D 310 Z		43	Nm
14AZ Clamping claws to rear case section	ZF S-5-16/S 5 D 310 Z		33	Nm
15AZ Screws on detent plate	ZF S-5-16/S 5 D 310 Z		9	Nm

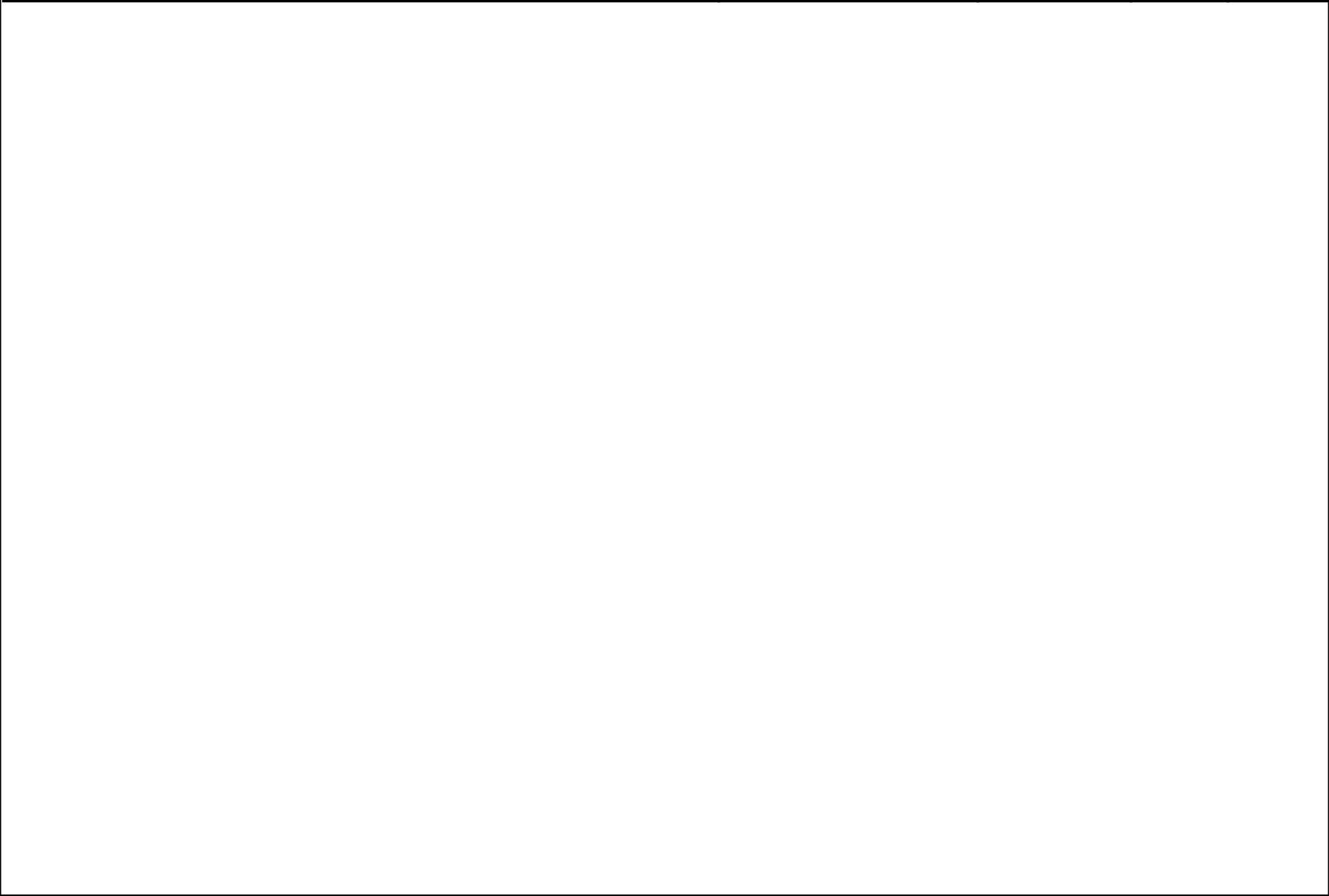


23 - 6 Manual Transmission	Type	Screw	Dimension	Unit
23 11 Case and Cover				
16AZ Holder to transfer case	265 Sport	M6	9	Nm (ft. lbs.)
17AZ Retaining plates for bearings on housing	S 5 D 310 Z/S 5 D 200 G/250 G	M6	10	Nm (ft. lbs.)

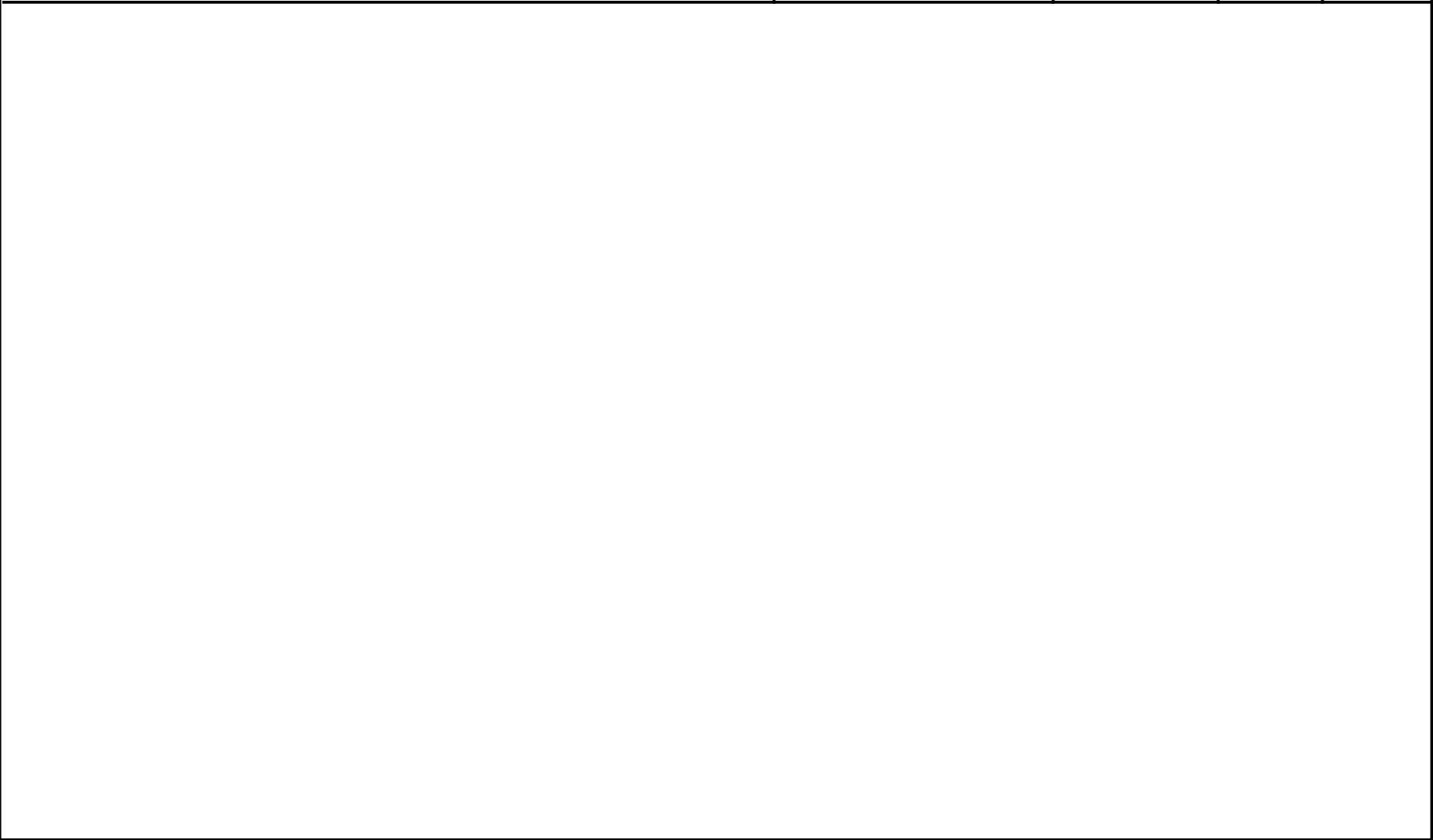


23 - 7 Manual transmission		Type	Screw	Measure	Unit
23 21 Transmission Shafts					
1AZ	Output flange Collar nut installed with bolt cement	All			
	initial torque			190	Nm
	loosen				
	final torque			120	Nm
2AZ	Gear wheel to layshaft	265 Sport	M10	60	Nm

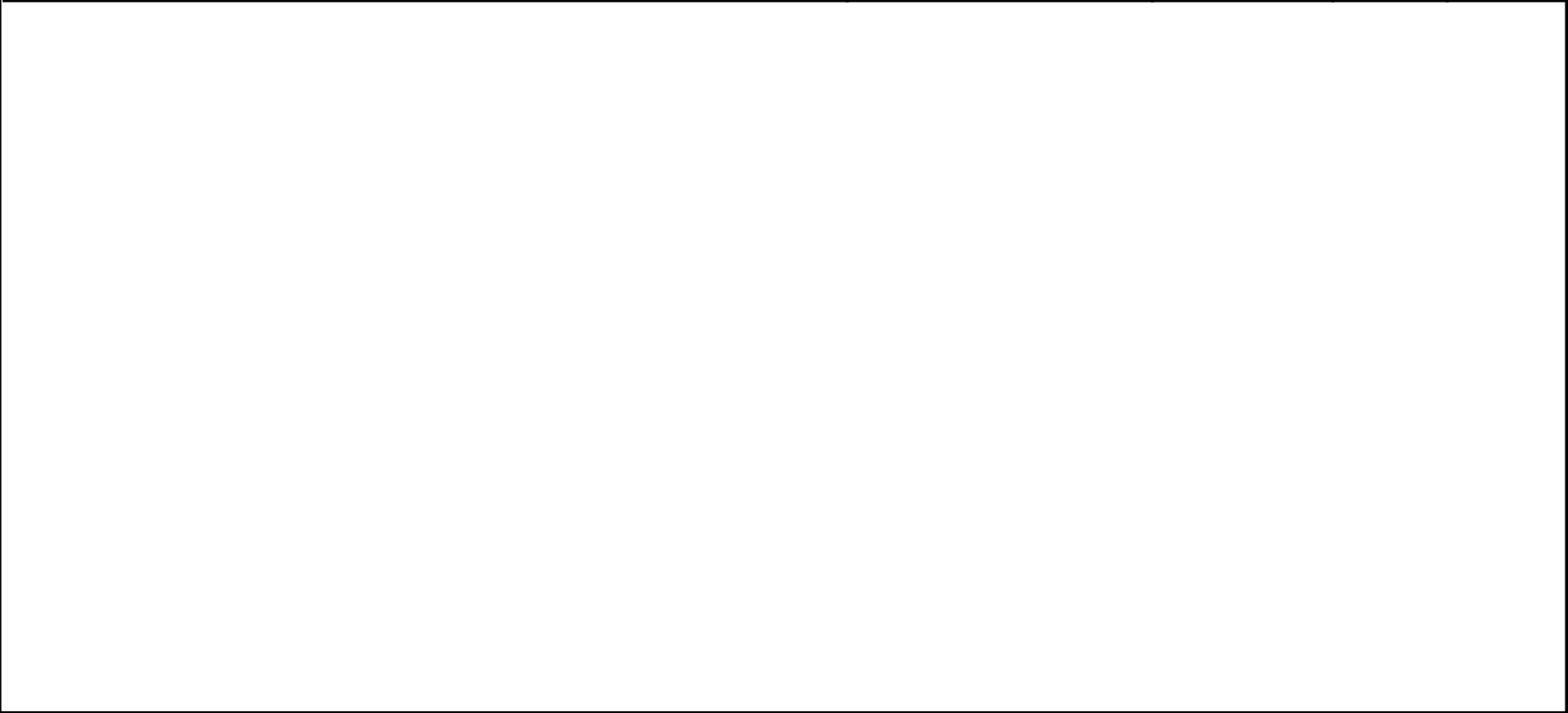
23 - 8 Manual transmission	Type	Screw	Measure	Unit
23 31 Interior Shift Components				
1AZ Shift arms to transmission case	S 5 D 310 Z		45	Nm



23 - 9 Manual transmission	Type	Screw	Measure	Unit
23 71 Transmission mounts				
1AZ Transmission mounts (rubber) to body	All	M10	42	Nm
2AZ Transmission cross member to body	All	M10	42	Nm
	All	M8	21	Nm
3AZ Mount bracket to transmission	All	M8	21	Nm



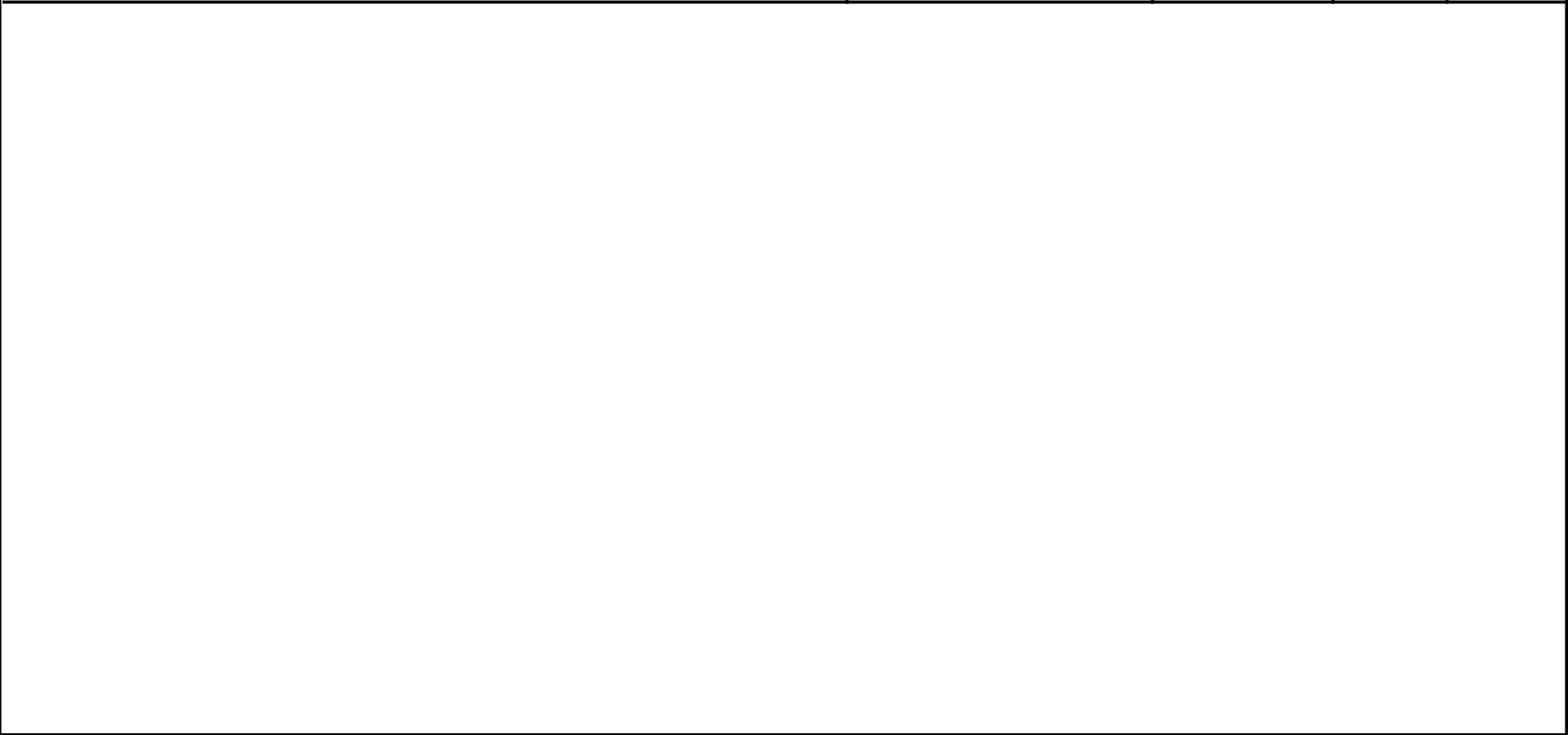
24 - 1 Automatic Transmission	Type	Screw	Dimension	Unit
24 00 Transmission in General				
1AZ Transmission to engine				
Hex screws	All	M8	24	Nm (ft. lbs.)
Hex screws	All	M10	45	Nm (ft. lbs.)
Hex screws	All	M12	82	Nm (ft. lbs.)
Torx bolts	All	M8	21	Nm (ft. lbs.)
Torx bolts	All	M10	42	Nm (ft. lbs.)
Torx bolts	All	M12	72	Nm (ft. lbs.)
2AZ Reinforcement plate to transmission	All	M8	23	Nm (ft. lbs.)



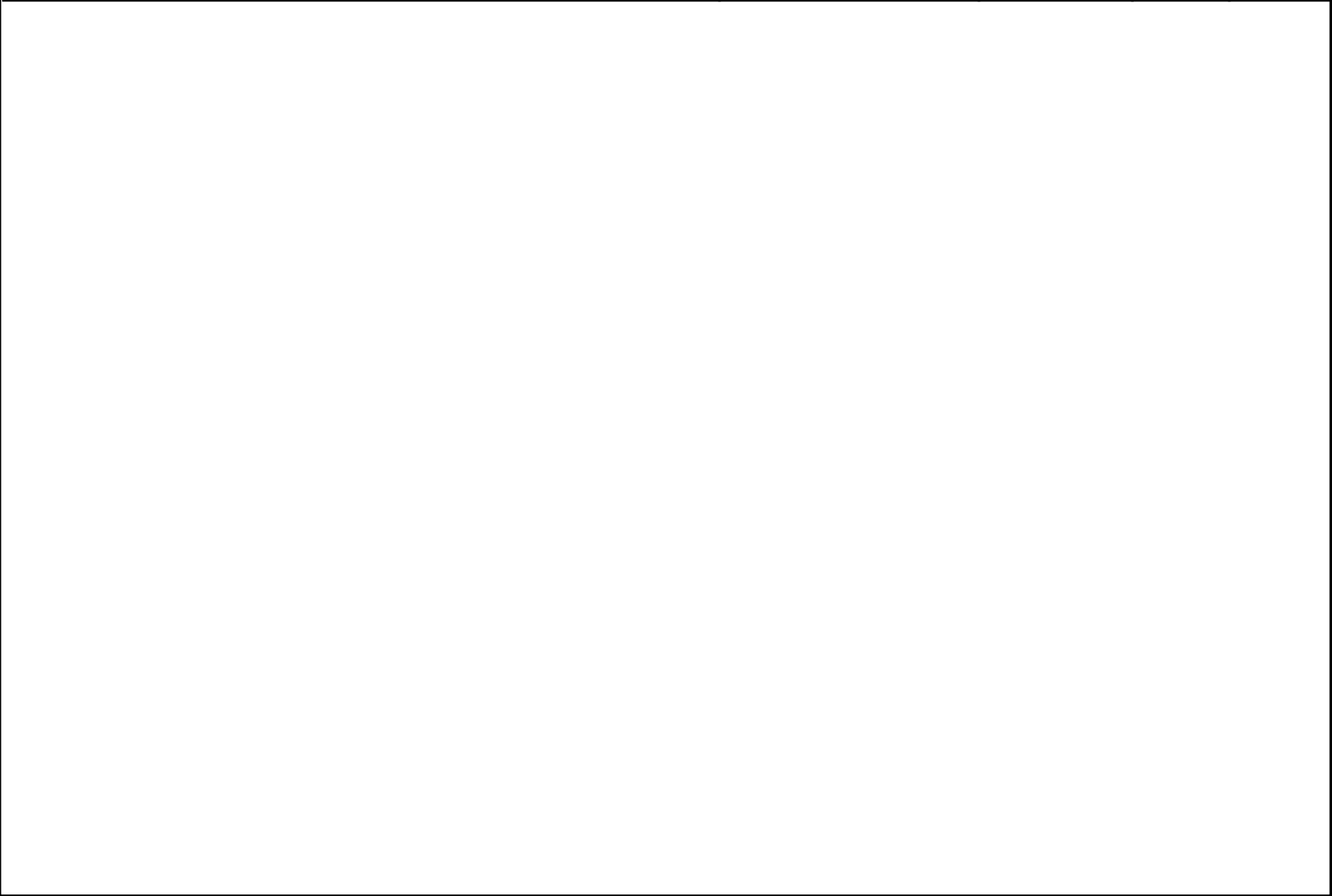
24 - 2 Automatic Transmission	Type	Screw	Measure	Unit
24 11 Transmission Case, Oil Sump				
1AZ Transmission extension	All	M8	25	Nm
	A4S 270R/A4S 310R	5/16"	32	Nm
2AZ Guard	All	M6	9	Nm
3AZ Converter bell housing	All	M8	25	Nm
	4HP-22/4HP-24	M10	46	Nm
	A4S 270R/A4S 310R	1/2"	42	Nm
4AZ Plug on transfer plate	All	M10	16	Nm
	4HP-22/4HP-24	M14	40	Nm
	4HP-22/4HP-24	M20	50	Nm

24 - 3 Automatic Transmission	Type	Screw	Measure	Unit
24 11 Transmission Case, Oil Sump				
5AZ Oil Pan	4HP-22/4HP-24/A5S 310Z	M6	6	Nm
	A5S 300J		9	Nm
	A4S 270R/A4S 310R	M6	12	Nm
	A5S 560Z/A5S 440Z	M6	10	Nm
6AZ Oil drain plug	All	M10	16	Nm
	A4S 270R/A4S 310R		25	Nm
	A5S 300J		35	Nm
	A5S 560Z		50	Nm
	A5S 440Z	M16x1.5	30	Nm
7AZ Oil filler plug	A4S 270R/A4S 310R		33	Nm
	A5S 300J		40	Nm
	A5S 310Z/A5S 560Z		100	Nm
	A5S 440Z	M18x1.5	35	Nm

24 - 4 Automatic Transmission	Type	Screw	Measure	Unit
24 11 Transmission Case, Oil Sump				
8AZ Oil filler pipe	3HP-22		105	Nm
	4HP-22/4HP-24/A5S 310Z		98	Nm
9AZ Plug	All	M18	43	Nm
10AZ Oil bore plugs	A5S 300J		8	Nm
	A5S 310Z/A5S 560Z		15	Nm
11AZ Damper cover on transmission case	A5S 300J	M6	10	Nm
12AZ Radial shaft seal on converter bell housing	A4S 270R/A4S 310R	M4	3	Nm
13AZ Intermediate plate on intermediate housing	A4S 270R/A4S 310R	5/16"	25	Nm



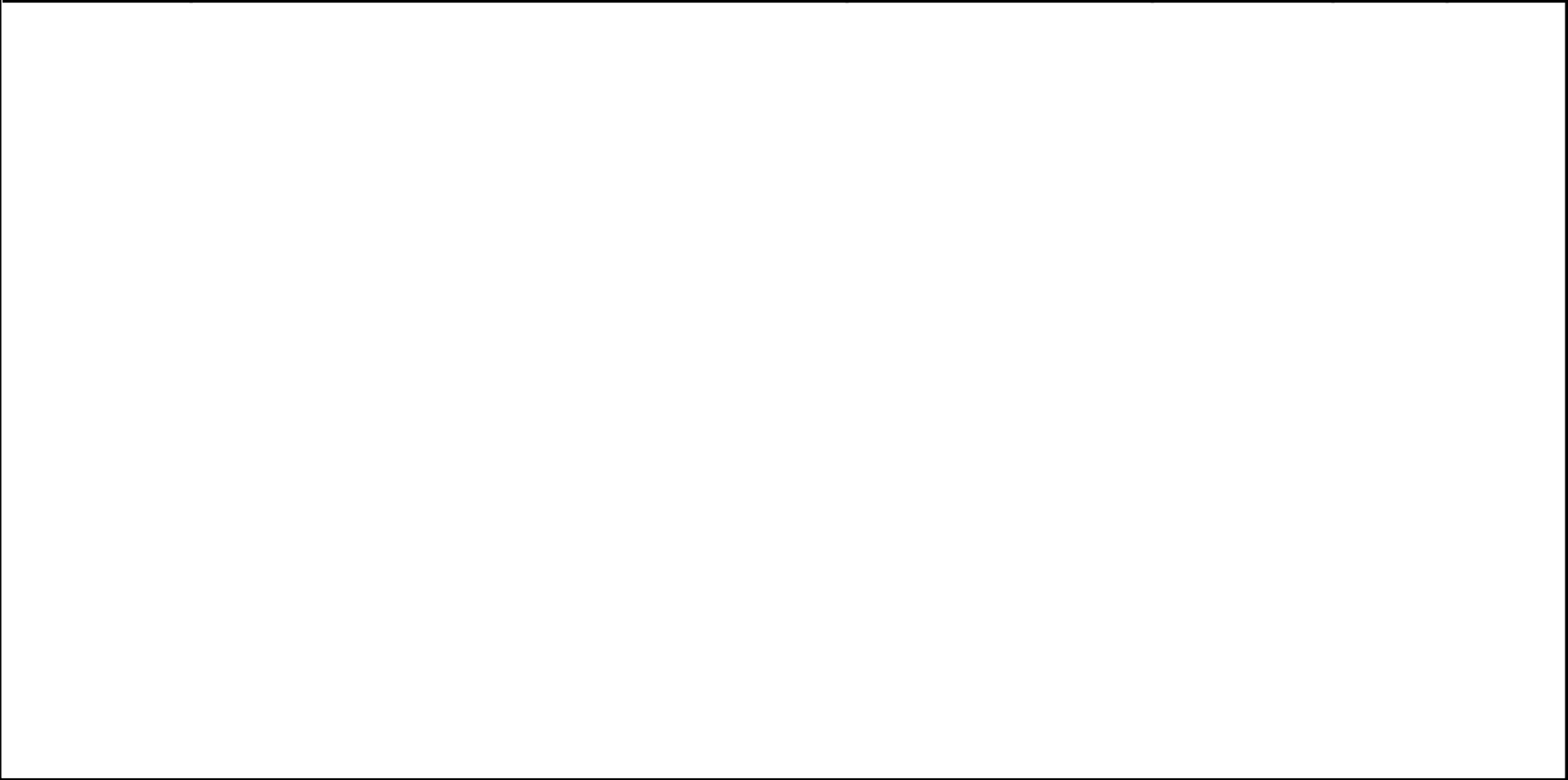
24 - 5 Automatic Transmission	Type	Screw	Measure	Unit
24 13 Transmission Extension, Bearings, Seals				
1AZ Slotted nut/output flange	A5S 310Z/A 5 S 440 Z/A5S 560Z		120	Nm



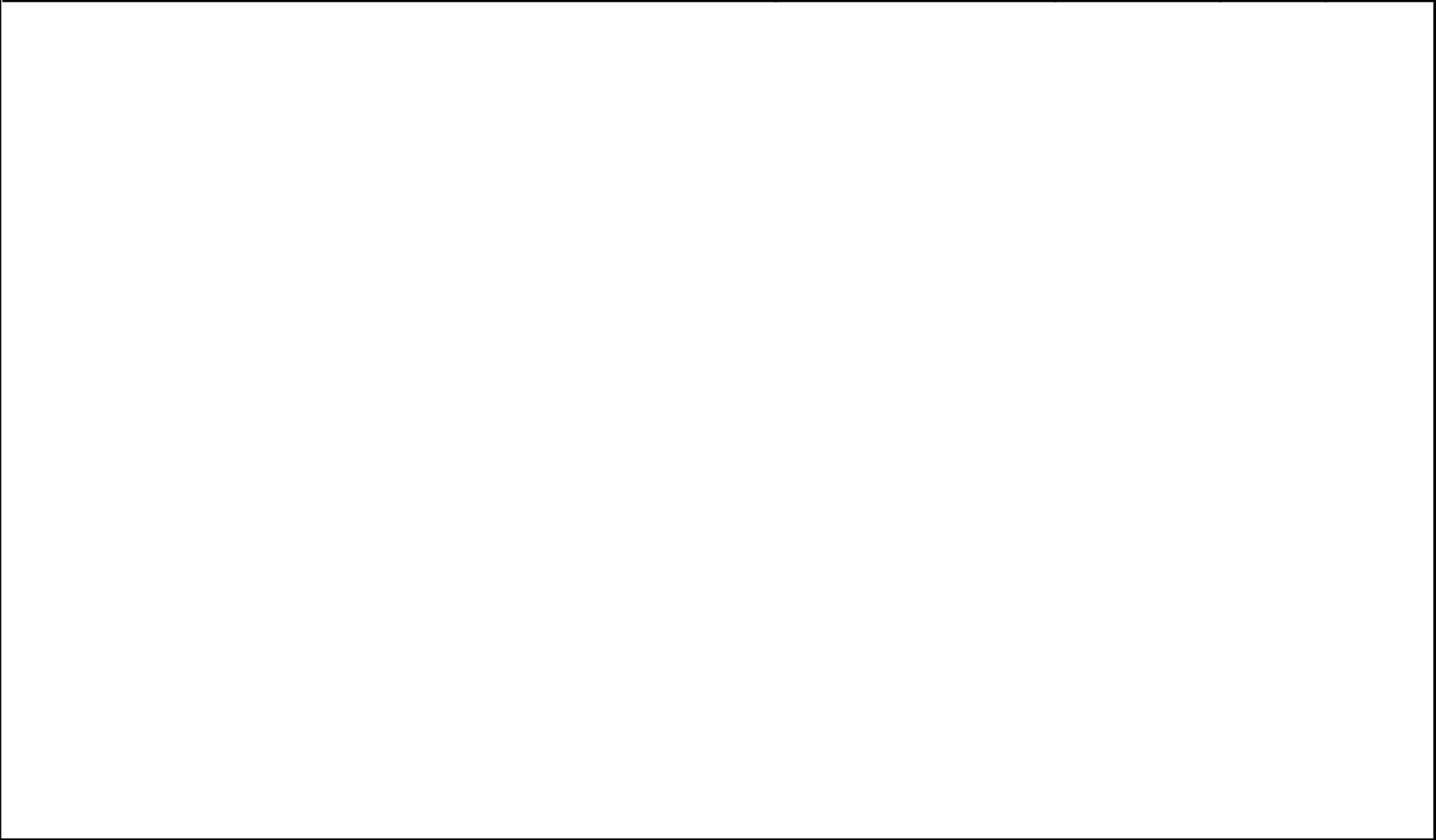
24 - 6 Automatic Transmission	Type	Screw	Measure	Unit
24 21 Input, Intermediate and Output Shafts				
1AZ Output flange collar nut	A5S 300J		225	Nm
	All others		100	Nm

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24 - 7 Automatic Transmission		Type	Screw	Measure	Unit
24 22 Planetary gear drive					
1AZ	Brake coupling D/G on gear box housing	A5S 310Z/A5S 560Z	M10		
	Insert all screws until contact is made with screw head in each case				
	center bolt			30	Nm
	both outer screws			15	Nm
	center bolt			63	Nm
	both outer screws			30	Nm
	both outer screws			63	Nm



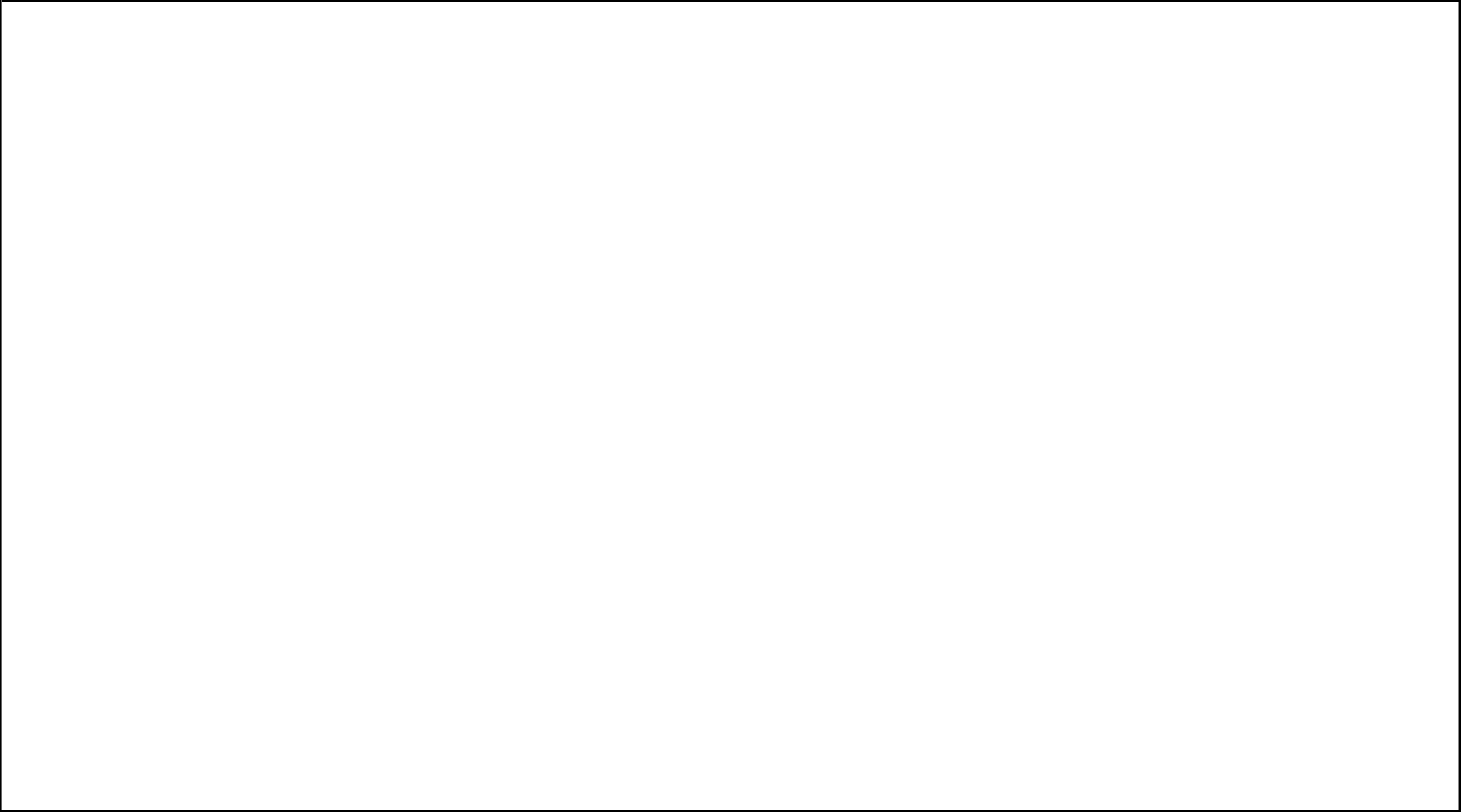
24 - 8 Automatic Transmission	Type	Screw	Measure	Unit
24 23 Shift Clutches				
1AZ Torx screws for F clutch on transmission case	4HP-22/4HP-24	M6	10	Nm
	A5S 560Z	M8	23	Nm
2AZ Brake band adjusting screw	A 4 S 270 R/A 4 S 310 R	5/16"	5	Nm
3AZ Lock nut of brake band adjusting screw	A 4 S 270 R/A 4 S 310 R	5/16"	21	Nm



24 - 9 Automatic Transmission	Type	Screw	Measure	Unit
24 30 Hydr./elec.control elements				
1AZ Valve body to transmission	3HP-22	M6	11	Nm
	4HP-22/4HP-24/A5S 310Z/ A5S 440Z/A5S 300J	M6	8	Nm
	A4S 270R/A4S 310R	5/16"	20	Nm
	A5S 560Z	M6 x 12	6	Nm
	A5S 560Z	M6x55	8	Nm
2AZ Valve housing to valve body	All	M6	5	Nm
3AZ Adapter plate on shift unit	A4S 270R/A4S 310R		13	Nm

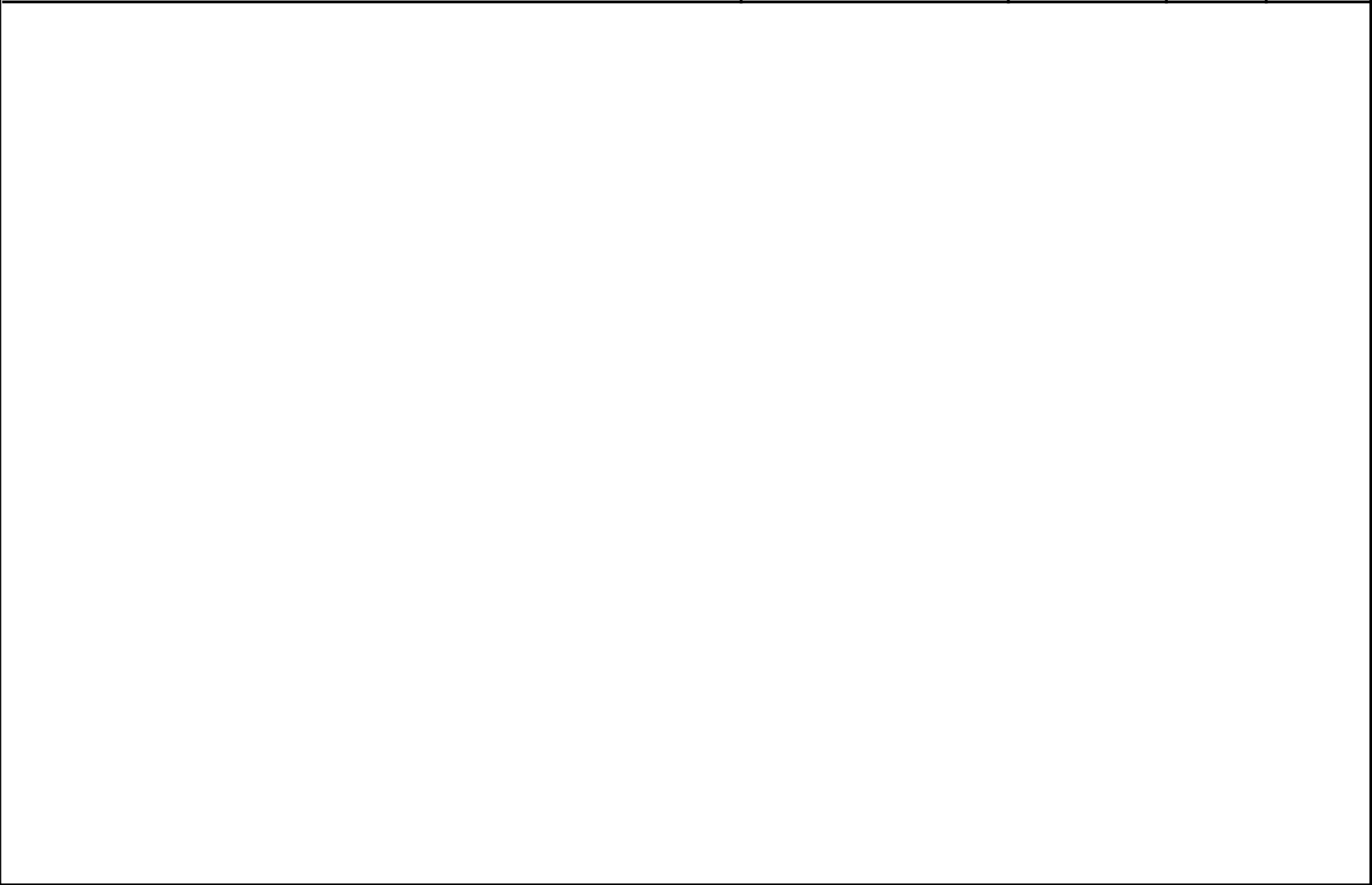
24 - 10 Automatic Transmission		Type	Screw	Measure	Unit
24 31 Primary Pump					
1AZ Oil pump to case					
		A4S 270R/A4S 310R	5/16"		
	1st pass			10	Nm
	2nd pass			20	Nm
		A5S 560Z	M6	10	Nm
		A5S 560Z	M5	5	Nm
		All others	M6	11	Nm
2AZ Oil strainer		A5S 440Z/A5S 560Z		5	Nm
		A5S 310Z		6	Nm
		A4S 270R/A4S 310R	5/16"	20	Nm
		All others		8	Nm
3AZ Oil pump body		A4S 270R/A4S 310R	5/16"	20	Nm
		A5S 310Z/A5S 560Z	M6	10	Nm
4AZ Oil cooler pipe adapter to transmission		A5S 300J/A4S 270R/A 4 S 310 R		28	Nm
Hollow bolt		A5S 440Z	M18x1.5	25	Nm
Cap screw		A5S 440Z	M18x1.5	20	Nm

24 - 11 Automatic Transmission	Type	Screw	Measure	Unit
24 32 Governor				
1AZ Governor flange to transmission	All	M8	16	Nm
2AZ Stud in centrifugal governor	All	M6	3	Nm
3AZ Hexagon nut on stud	All		10	Nm
4AZ Hexagon head screw on centrifugal governor	All	M6	11	Nm
5AZ Governor housing to hub	4 HP-22 H	M6	11	Nm

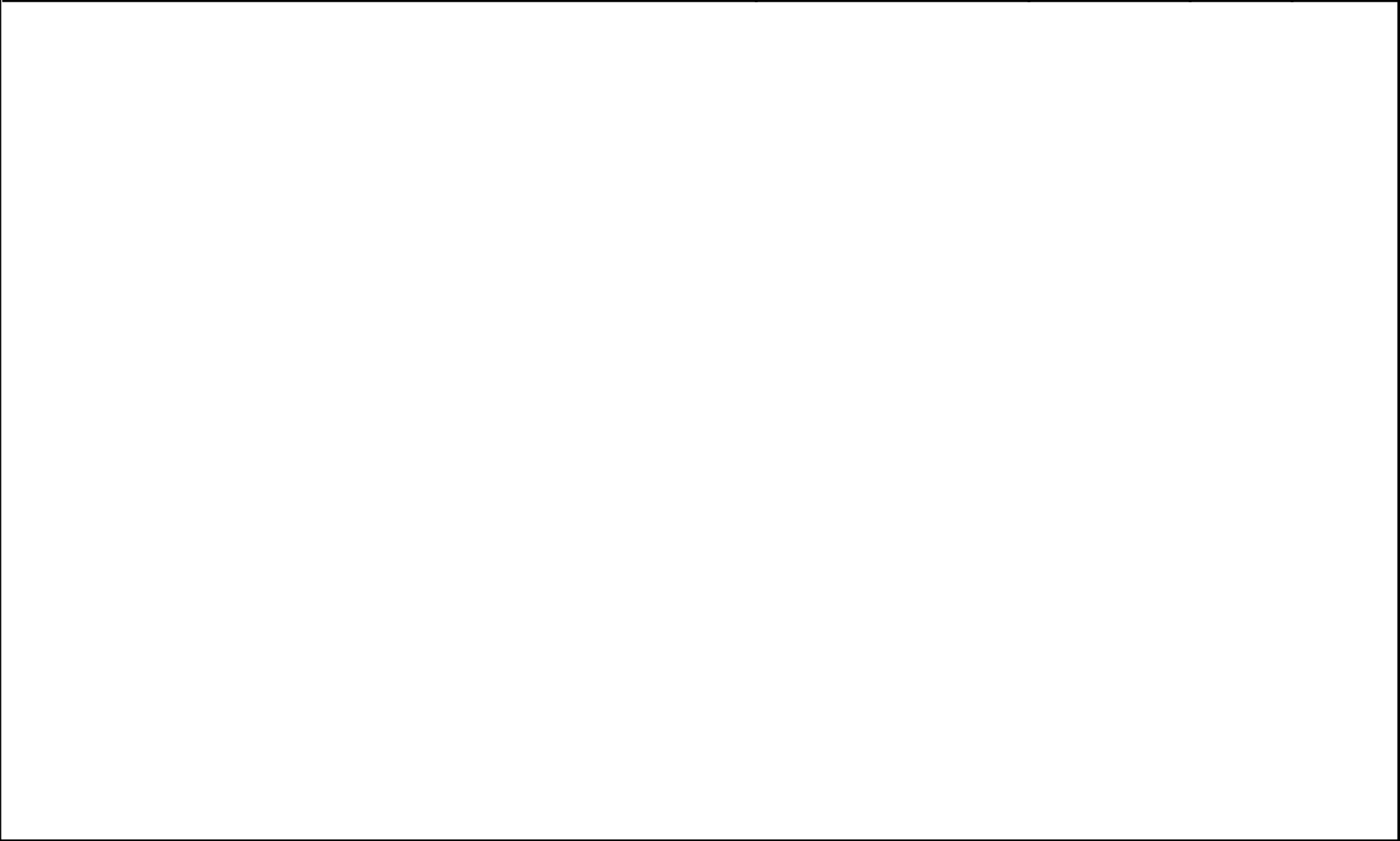


24 - 12 Automatic Transmission	Type	Screw	Measure	Unit
24 34 Shift Valves, Parking Lock				
1AZ Pressure regulator to valve housing	4HP-22 EH/4 HP-24EH/ A5S 310Z	M6	5	Nm
	A4S 270R/A4S 310R		10	Nm
2AZ Solenoid valve to valve housing	4HP-22 EH/4HP-24EH/A5S 310Z	M6	5	Nm
	A4S 270R/A4S 310R		10	Nm
	A5S 560Z		6	Nm
	A5S 300J	M5	3	Nm
	A5S 300J	M6	8	Nm
3AZ Guide plate/parking lock mechanism	A5S 310Z		10	Nm
	A5S 560Z		23	Nm
4AZ Pulse sender	A5S 310Z/A5S 440Z	M5	5	Nm
	A5S 300J	M5	6	Nm
	A5S 560Z	M5	6	Nm
		M8	23	Nm
5AZ Cover for servo piston on shift unit	A4S 270R/A4S 310R	5/16"	25	Nm
6AZ Retaining plate for solenoid valves and pressure regulator on shift unit	A5S 440Z	M5	5	Nm

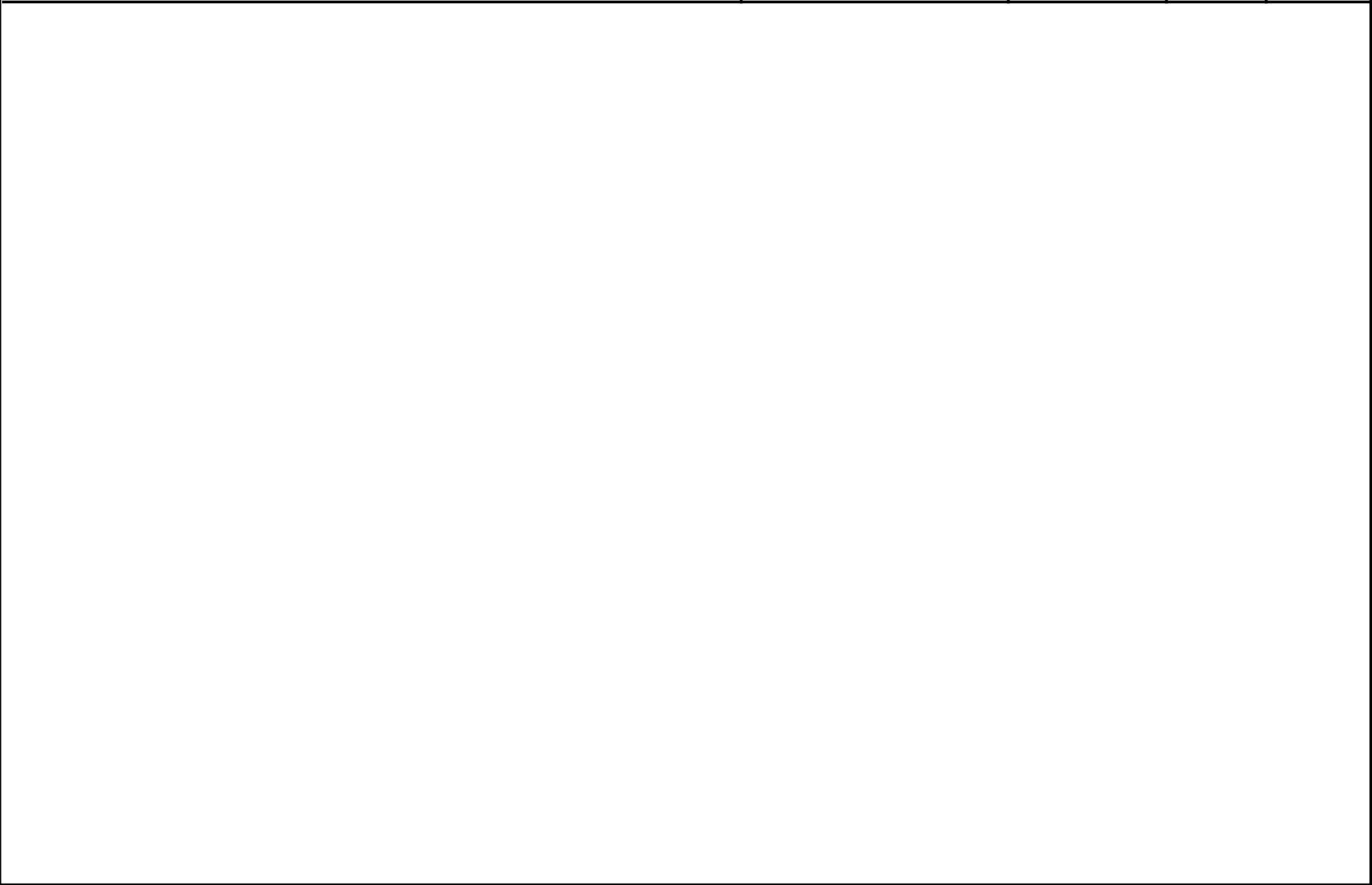
24 - 13 Automatic Transmission	Type	Screw	Measure	Unit
24 35 Wire Harness, Shift Elements and Sensor				
1AZ Transmission socket to case	4HP-22 EH/4HP-24EH/A5S 310Z	M26	12	Nm
	A4S 270R/A4S 310R	M26	14	Nm



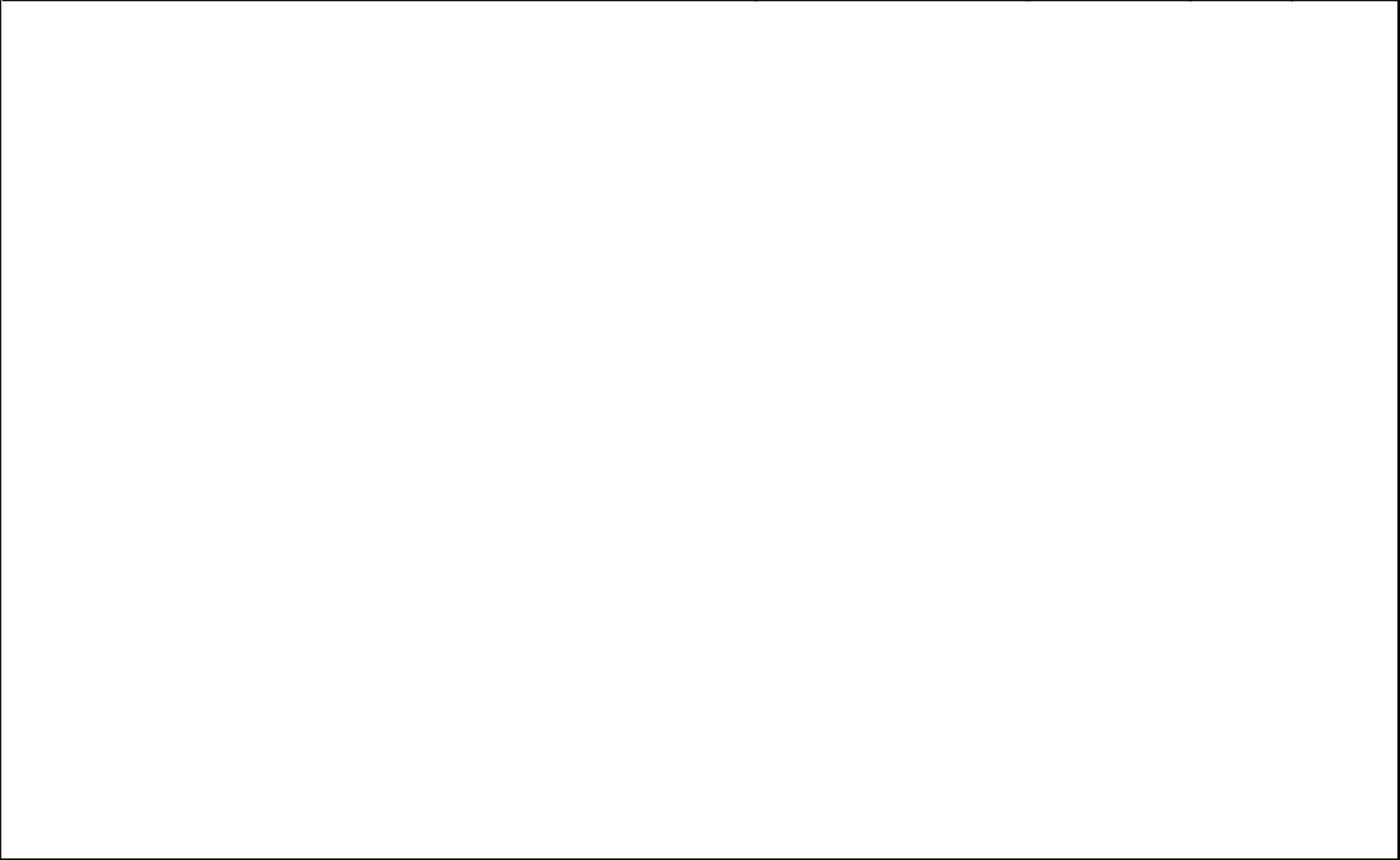
24 - 14 Automatic Transmission	Type	Screw	Measure	Unit
24 40 Torque converter				
1AZ Torque converter to flywheel	All	M8	26	Nm
	A4S 270R/A4S 310R/A5S 310Z/ A5S 300J/A5S 440Z/A5S 560Z	M10	45	Nm
	All others	M10	49	Nm



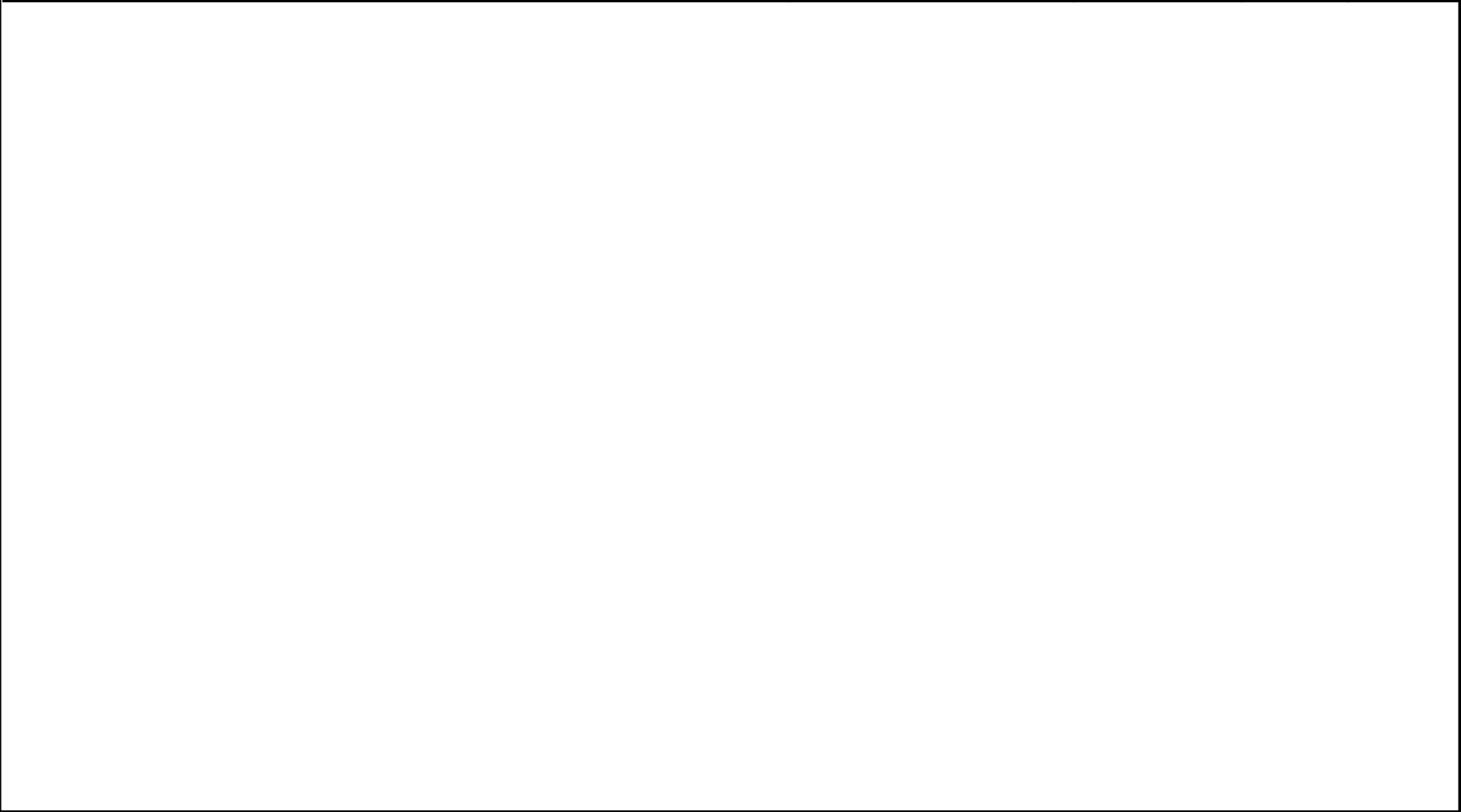
24 - 15 Automatic Transmission	Type	Screw	Measure	Unit
24 51 External shift linkage				
1AZ Selector lever on transmission	All	M8x1	10	Nm
	A5S 300J	M8	15	Nm



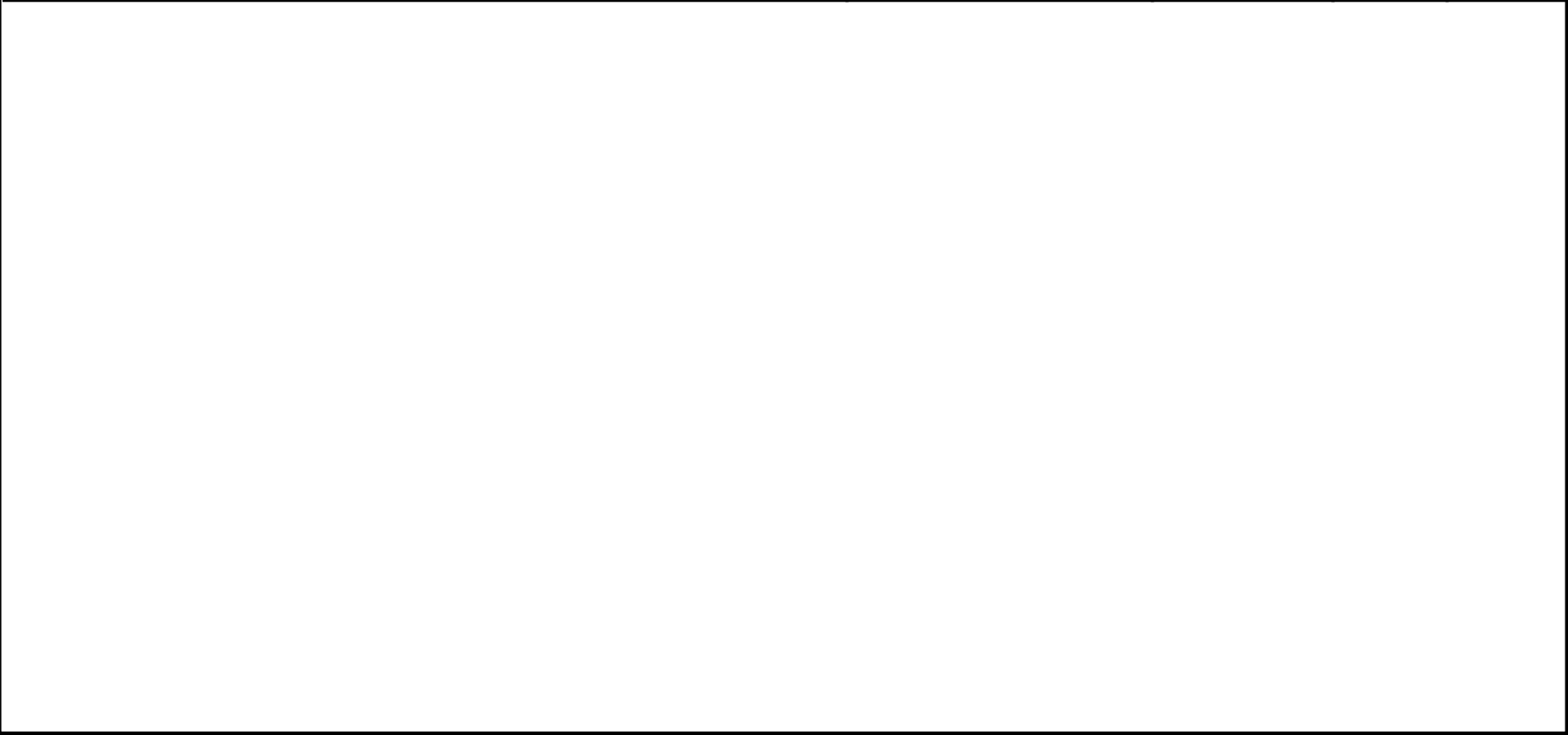
24 - 16 Automatic Transmission	Type	Screw	Measure	Unit
24 52 Interior Shift Elements				
1AZ Shift segment to shaft	A4S 310R/A4S 310R		22	Nm
	A5S 300J	M14x1.5	35	Nm
2AZ Detent spring on shift unit	A4S 270R/A4S 310R	5/16"	25	Nm



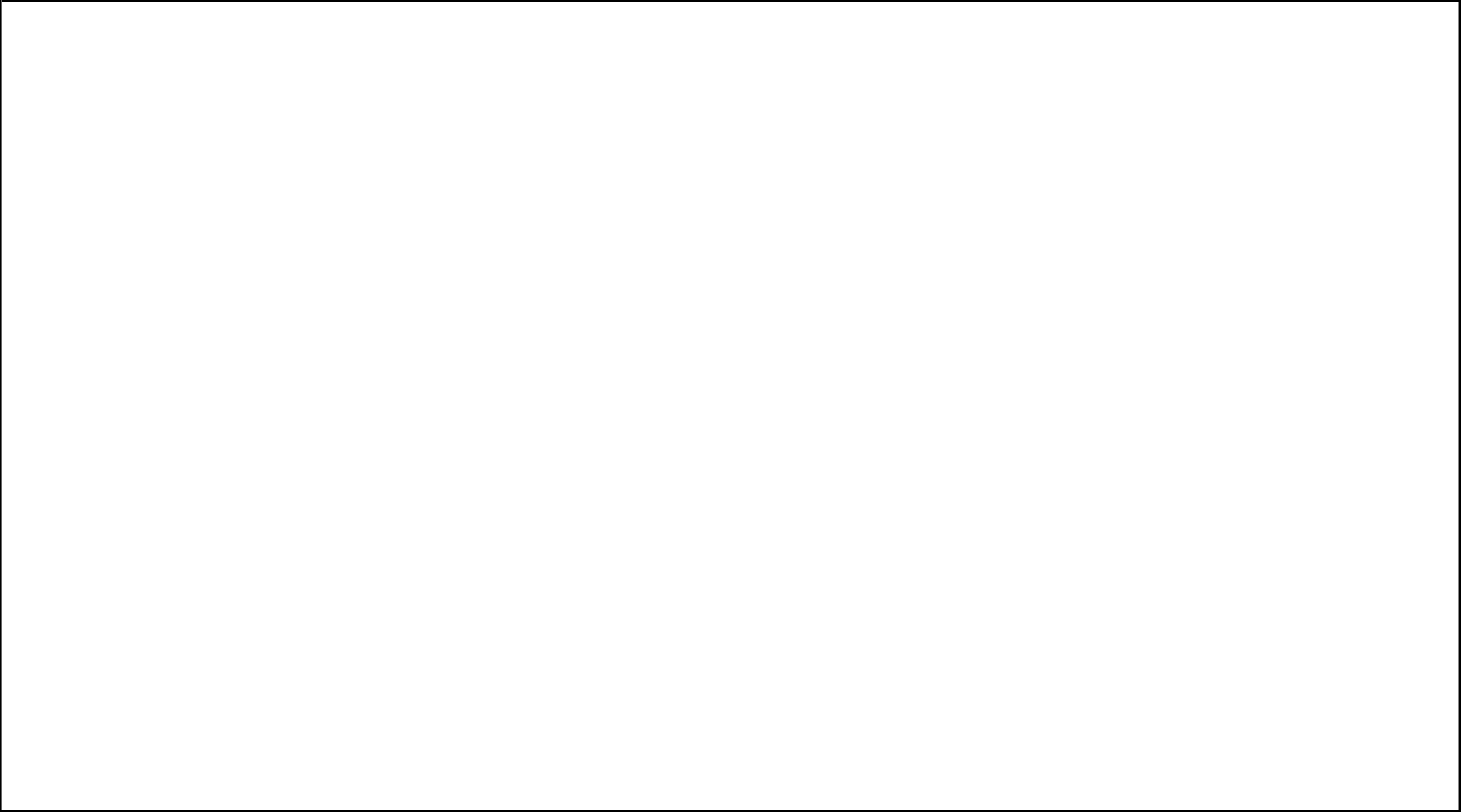
24 - 17 Automatic Transmission	Type	Screw	Measure	Unit
24 71 Transmission mounts				
1AZ Cross member to body	All		21	Nm
2AZ Rubber mounts to cross member or transmission	All		21	Nm
3AZ Support tube to engine subframe	E36		42	Nm
4AZ Rubber mounts to carrier pipe	E36		21	Nm
5AZ Carrier plate	E36		21	Nm



25 - 1 Shift Mechanism	Type	Screw	Measure	Unit
25 11 Shift Console - Manual Transmission				
1AZ Front console to shift console	All with sheet metal console		25	Nm
2AZ Shift console to transmission	All with sheet metal console		23	Nm
3AZ Rear shift console to body	All		11	Nm
4AZ Aluminum shift arm console to transmission	E30 M3		21.5	Nm
5AZ Aluminum shift arm to console	E30 M3		11	Nm
6AZ Shift arm console to body	All except E31		21	Nm
	E31		9	Nm
7AZ Adjustable shift rod (clamp)	E31		23	Nm



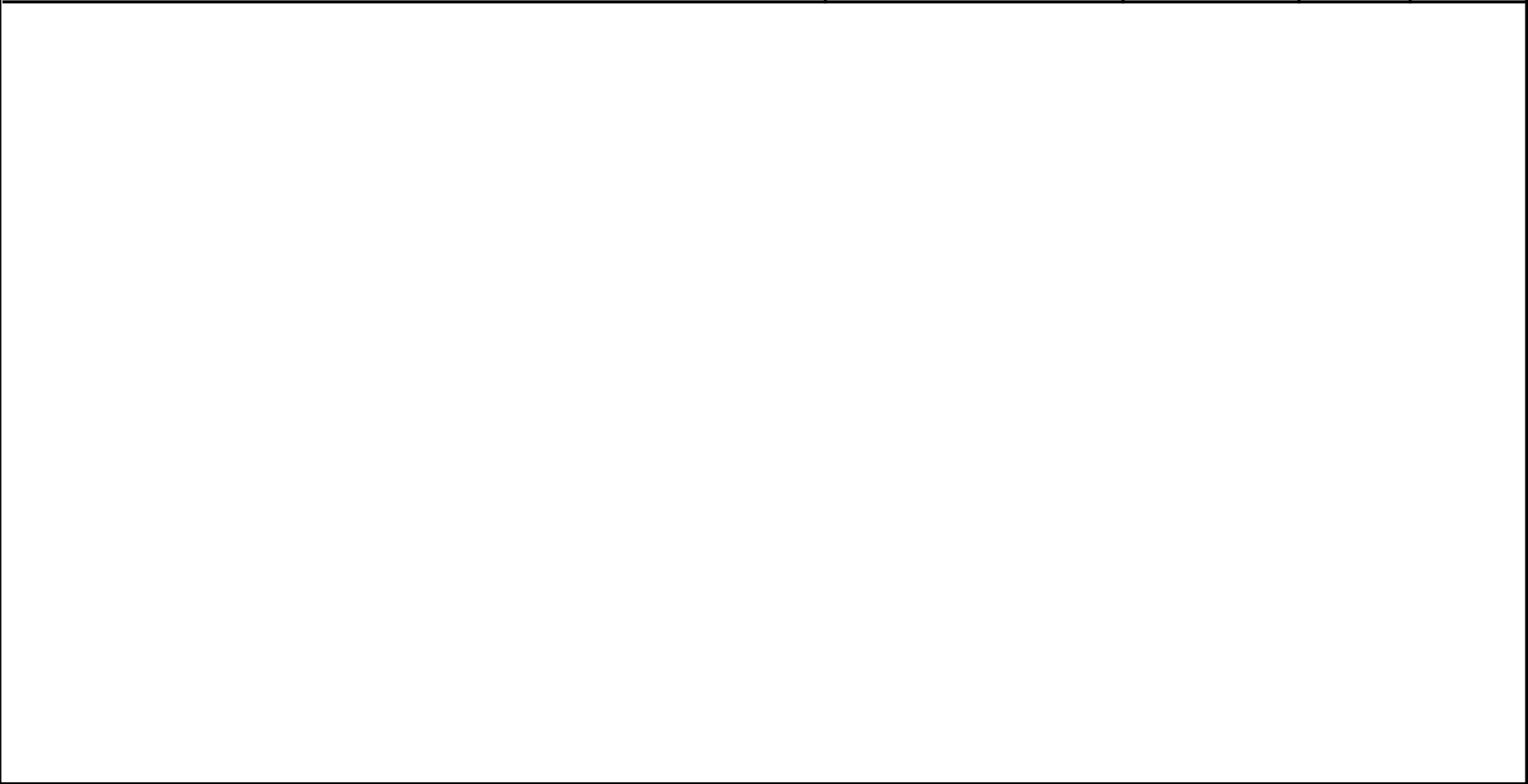
25 - 2 Shift Mechanism	Type	Screw	Measure	Unit
25 16 Shift Console - Automatic Transmission				
1AZ Bowden cable on shift tower/transmission	All		15	Nm
2AZ Clamping screw on shift lever	All		10	Nm
3AZ Shift console to tunnel	All		7	Nm
4AZ Switch to shift console	All		4.5	Nm
5AZ Interlock cable on shift tower	All		7	Nm



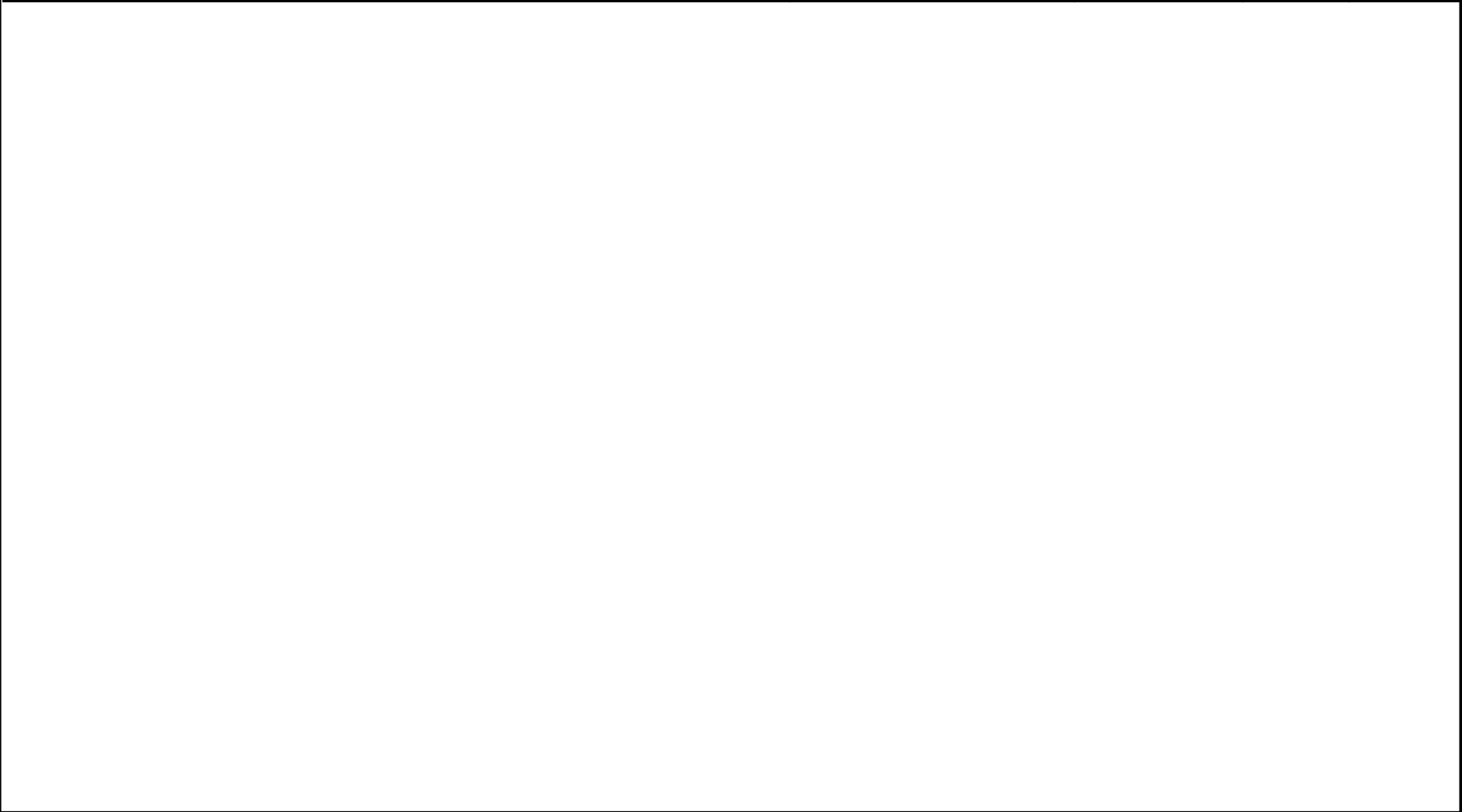
26 - 1 Propeller Shaft	Type	Screw	Measure	Unit
26 11 Propeller Shaft Complete				
1AZ Universal joint to propeller shaft and transmission	All	M10 8.8	48	Nm
	All	M10 10.9	60	Nm
	E31/E38/E39	M14	140	Nm
	E32/E34/E36/E39	M12 8.8	81	Nm
	E32/E34/E36/E38/E39	M12 10.9	100	Nm
	M3/M5	M12 10.9	115	Nm
Aluminum propeller shaft: flexible disk on propeller shaft	E39	M12 10.9	100	Nm
Aluminum propeller shaft: flexible disk on transmission	E39	M12 10.9	90	Nm
2AZ Coupling propeller shaft to transmission	All	M10	60	Nm
	E32/E31	M12	95	Nm
3AZ Clamping ring for slide after installation in car	All		10	Nm
	E30 Four Wheel Drive		22	Nm

26 - 2 Propeller Shaft	Type	Screw	Measure	Unit
26 11 Propeller Shaft Complete				
4AZ Driveshaft to drive flange (rear axle)				
Version, universal joint: Compression nut After loosening connection only use ribbed nuts with higher tightening torque	All	M10	64	Nm
Finned nut	All	M10	80	Nm
Version, constant velocity joint: Compression nut	All	M8	32	Nm
Compression nut	All	M10	64	Nm
Finned nut	All	M8	43	Nm
Finned nut	All	M10	70	Nm
5AZ Pivot to center propeller shaft journal with Loctite (Version without slide)	All		97	Nm
6AZ Center mount to body	All		21	Nm

27 - 1 Transfer Box - Four Wheel Drive -	Type	Screw	Measure	Unit
27 00 Transfer Box in General				
1AZ Transfer box to manual transmission	All	M10	42	Nm
2AZ Transfer box on automatic transmission	All	M8	23	Nm
3AZ Coupling to manual transmission and transfer box	All	M12	90	Nm
4AZ Case bolts	All	M8	25	Nm
5AZ Electromagnetic clutch to case	All	M8	25	Nm
6AZ Output flange Collar nut installed with Loctite 270 or Hylogrip bolt cement	All		110	Nm



27 - 2 Transfer Box - Four Wheel Drive -	Type	Screw	Measure	Unit
27 00 Transfer Box in General				
7AZ Plug	All	M24x1.5	33	Nm
	All	M14 x 1.5	33	Nm
	All	M18x1.5	23	Nm
8AZ Transmission cross member to rubber mounts	All	M12	80	Nm
Transmission cross member to body	All	M8	24	Nm



61 - 1 General Electrical system	Type	Screw	Dimension	Unit
61 13 Plug Connections				
1AZ Door plug connection to body	All		5	Nm
2AZ Fuse box Screws for safety fuse	All	M6	5	Nm
3AZ Ground or positive connections	All		5	Nm

61 - 2 General Electrical system	Type	Screw	Dimension	Unit
61 31 Switch				
1AZ Temperature switch				
91°C	All		14	Nm
99°C	All		14	Nm
2AZ Oil pressure switch Note: oil and screw in				
	M10/M40/M42/M21/M51/M20/ M30/M50/M60/1/M60/2/M70/S70		40	Nm
	S14/S50/S38/M43		20	Nm
3AZ Reversing light switch	All		20	Nm
4AZ Light switch on instrument panel	E36/E38		2	Nm
5AZ Transmission switch on shift block	All		4.5	Nm

61 - 3 General Electrical system	Type	Screw	Measure	Unit
61 35 Control Units, Modules				
1AZ Power window module to drive	E36		1 + 0.5	Nm
2AZ Screws on E-box	E38		4	Nm

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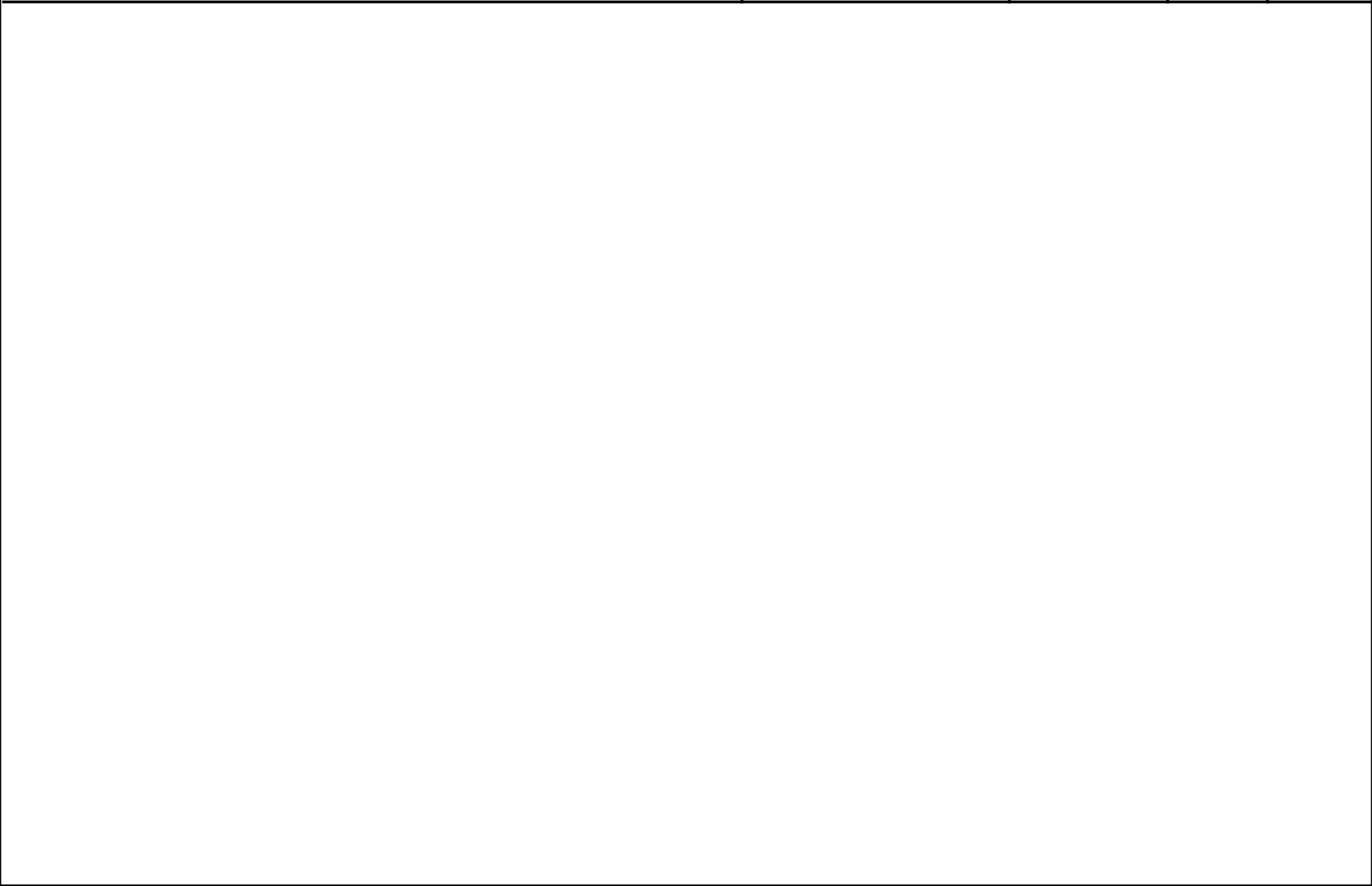
61 - 4 General Electrical system	Type	Screw	Dimension	Unit
61 61 Windshield Wipers				
1AZ Wiper motor secured to wiper bracket	E31LL/E38	M6	7.5	Nm (ft. lbs.)
	E36/E31RL		10	Nm (ft. lbs.)
2AZ Parked position stop to wiper console	E31		15	Nm (ft. lbs.)
3AZ Wiper contact pressure motor to wiper console	E31/E32/E34/E38		6.5	Nm (ft. lbs.)
4AZ Motor crank to wiper motor				
	SWF	M8	27	Nm (ft. lbs.)
	Bosch, Magnet Marelli	M8		Nm (ft. lbs.)
5AZ Wiper shaft nut to body	E31/E36/E32/E34		12	Nm (ft. lbs.)
6AZ Holder to firewall	E31	M6	10	Nm (ft. lbs.)
screws in firewall	E38/E39/E36 Coupé		10	Nm (ft. lbs.)

61 - 5 General Electrical system	Type	Screw	Dimension	Unit
61 61 Windshield Wipers				
7AZ Upper cowl panel support	E31	M4	5	Nm (ft. lbs.)
8AZ Wiper support bracket to firewall	E36		10	Nm (ft. lbs.)
9AZ Wiper support bracket to wiper console	E36		10	Nm (ft. lbs.)
10AZ Wiper arms * after waiting for 15 minutes, retighten to torque				
	E36		25*	Nm (ft. lbs.)
driver's side	E31		40*	Nm (ft. lbs.)
passenger's side	E31/E32/E34/E38/E39		25*	Nm (ft. lbs.)
driver's side with WCPC	E32/E34		21*	Nm (ft. lbs.)
	E38/E39		40	Nm (ft. lbs.)
driver's side without WCPC	E32/E34		25*	Nm (ft. lbs.)
	E38		25*	Nm (ft. lbs.)

61 - 6 General Electrical system	Type	Screw	Dimension	Unit
61 62 Tailgate Window Wiper				
1AZ Wiper shaft to tailgate window	E34 touring		5	Nm
2AZ Wiper console to tailgate (rubber mount)	E34 touring		5	Nm
	E36 comp/touring	M6	10	Nm
3AZ Wiper motor to console	E34 touring		13	Nm
4AZ Motor crank to wiper motor	E34 touring		13	Nm
5AZ Wiper arm to wiper shaft	E34/E36 Touring / E36 comp, touring		13	Nm
6AZ Spray nozzle to tailgate	E34 touring		10	Nm



61 - 7 General Electrical system	Type	Screw	Measure	Unit
61 67 Headlight Cleaners				
1AZ Telescope to bracket	E36		3	Nm
2AZ Bracket to body	E36		15	Nm



62 - 1 Instruments	Type	Screw	Measure	Unit
62 16 Car Electrical System Senders				
1AZ Screws for speedometer sender	All		6,6 ... 8,4	Nm

71 - 1 Equipment and Accessories for Engine and Chassis	Type	Screw	Measure	Unit
71 60 Trailer Hitch				
1AZ Hitch to body: Tighten according to following sequence: 1. Hitch bolts 2. Axial strut bolts 3. Reinforcement bracket collar nut	E36	M10 8.8	42	Nm
		M10 10.9	59	Nm
2AZ Slotted nut for take-up pipe to hitch (use Loctite No. 638)	E32	M40	220	Nm

72 - 1 Equipment and Accessories for Engine and Chassis	Type	Screw	Measure	Unit
72 11 Seat belts				
1AZ Safety belt on body, except for B-pillar	All		48	Nm
Safety belt on B-pillar	All		31	Nm
Safety belt on seat, on touring also on rear seat backrest	All		48	Nm
2AZ Screws for seatbelt height adjustment on body	All		24	Nm
3AZ Seat belt to seat Install bolt with bolt cement	E31		47	Nm
4AZ Seat belt to backrest	E31		24	Nm
5AZ Headrest to backrest	E31		24	Nm
6AZ Safety belt with belt height adjustment	All		31	Nm
7AZ Tension relief between roller blind mount and backrest lock mount	E39/2		24	Nm

72 - 2 Equipment and Accessories for Engine and Chassis	Type	Screw	Measure	Unit
72 12 Airbag generator				
1AZ Airbag module on doors	E36, E38, E39		11	Nm
2AZ Gas generator of ITS head airbag on body	E38		4	Nm
3AZ Bracket of ITS head airbag on body	E38	self-tapping screw	2.5	Nm
4AZ ITS head airbag on body	E38		11	Nm
5AZ Additional steel bracket for ITS head airbag on body	E38 L7	Self-tapping M5 threaded bolt	3	Nm

