

9020 Excavator Service Manual

Table of Contents

Description	Section No.	Form No.
General	Tab 1	
Section Index - General		7-45990
Standard Torque Specifications for 9000 Series Excavators	1001	7-44790
Fluids and Lubricants	1002	7-45590
Engines	Tab 2	
Section Index - Engines		7-46000
Engine Removal and Installation	2001	7-46700
Radiator Removal and Installation	2002	7-46710
Detailed Engine Specifications	2402	8-24163
Aftercooler	2411	7-43510
Cylinder Head and Valve Train	2415	8-24173
Cylinder Block	2425	8-24183
Lubrication	2445	8-24193
Cooling System	2455	8-24203
Turbocharger	2465	8-25550
Turbocharger Failure Analysis	2565	9-78235
Fuel System	Tab 3	
Section Index - Fuel System		7-46010
Fuel System and Filters	3410	8-24212
Fuel Injectors	3413	8-24233
Fuel Injection Pump (Bosch)	3415	7-37141
Electrical	Tab 4	
Section Index - Electrical		7-46020
Electrical Specifications and Troubleshooting	4001	7-45770
Electric Schematic Foldout	In Rear Pocket	7-45970
Batteries	4002	7-44950
Systems Display Panel	4005	7-44980
Starter and Starter Solenoid	4006	8-42191
Alternator	4009	8-16570
Tracks	Tab 5	
Section Index - Tracks		7-46030
Troubleshooting the Track System	5001	7-44830
Tracks, Rollers, and Idlers	5002	7-46040
Power Train	Tab 6	
Section Index - Power Train		7-46050
Troubleshooting - See Section 8001		
Drive Motor and Final Drive Transmission	6000	7-46060

9020 Excavator Service Manual

Table of Contents

Description	Section No.	Form No.
Hydraulics	Tab 8	
Section Index - Hydraulics		7-46070
Cleaning the Hydraulic System	8000	7-45050
Hydraulic Specifications, Troubleshooting, and Pressure Checks	8001	7-45850
Hydraulic Schematic Foldout	In Rear Pocket	7-45970
Main Hydraulic Pump	8002	7-46080
Pilot Control Circuit Pump	8003	7-46090
Hydraulic Swivel	8004	7-46100
Main Control Valve	8005	7-46110
Remote Control Valves	8006	7-45780
Solenoid Valves	8007	7-46960
Swing Motor and Swing Reduction Gear Box	8008	7-46120
Cylinders	8009	7-46130
Cushion Control Valve	8010	7-46750
Boom Holding Valve	8011	7-46780
Auxiliary Control Valve	8012	7-46790
Mounted Equipment	Tab 9	
Section Index - Mounted Equipment		7-46140
Pedals and Levers	9001	7-45670
Turntable Bearing	9003	7-46720
Boom and Arm	9004	7-46150
Seat and Seat Belts	9006	7-45170
Electric and Hydraulic Schematic Foldout	In Rear Pocket	7-45970

SECTION INDEX - GENERAL

Section Title	Section Number
Standard Torque Specifications for 9000 Series Excavators	1001
Fluids and Lubricants	1002

Section

1001

STANDARD TORQUE SPECIFICATIONS FOR
9000 SERIES EXCAVATORS

TABLE OF CONTENTS

TORQUE SPECIFICATIONS - DECIMAL HARDWARE	2
TORQUE SPECIFICATIONS - METRIC HARDWARE	3
TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS	4
TORQUE SPECIFICATIONS - O-RING FACE SEAL FITTINGS	5

TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs		
  		
Size	Pound-Feet	Newton metres
1/4 in	9-11	12-15
5/16 in	17-21	23-28
3/8 in	35-42	48-57
7/16 in	54-64	73-87
1/2 in	80-96	109-130
9/16 in	110-132	149-179
5/8 in	150-180	203-244
3/4 in	270-324	366-439
7/8 in	400-480	542-651
1.0 in	580-696	787-944
1-1/8 in	800-880	1085-1193
1-1/4 in	1120-1240	1519-1681
1-3/8 in	1460-1680	1980-2278
1-1/2 in	1940-2200	2631-2983

Grade 8 Bolts, Nuts, and Studs		
  		
Size	Pound-Feet	Newton metres
1/4 in	12-15	16-20
5/16 in	24-29	33-39
3/8 in	45-54	61-73
7/16 in	70-84	95-114
1/2 in	110-132	149-179
9/16 in	160-192	217-260
5/8 in	220-264	298-358
3/4 in	380-456	515-618
7/8 in	600-720	814-976
1.0 in	900-1080	1220-1465
1-1/8 in	1280-1440	1736-1953
1-1/4 in	1820-2000	2468-2712
1-3/8 in	2380-2720	3227-3688
1-1/2 in	3160-3560	4285-4827
NOTE: Use thick nuts with Grade 8 bolts.		

TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or molydisulfide grease or oil is used.

Grade 8.8 Bolts, Nuts, and Studs 		
Size	Pound-Feet	Newton metres
M6	6-7	8-9
M8	14-17	20-23
M10	29-34	39-46
M12	50-59	68-80
M16	128-149	173-202
M20	249-291	337-393
M22	342-399	464-541
M24	431-503	584-681
M27	637-743	864-1008
M30	863-1007	1170-1365
M33	1180-1377	1600-1867
M36	1977-2307	2680-3127
M42	2434-2840	3300-3850
M45	3054-3563	4140-4830
M48	3658-4268	4960-5787
M52	4757-5549	6450-7525
M56	5908-6893	8010-9345
M64	8925-10413	12100-14117

Grade 10.9 Bolts, Nuts, and Studs 		
Size	Pound-Feet	Newton metres
M6	8-10	11-13
M8	20-24	28-32
M10	41-47	55-64
M12	71-83	96-112
M16	178-208	242-282
M20	350-408	475-554
M22	481-561	652-761
M24	606-707	821-958
M27	900-1050	1220-1423
M30	1217-1420	1650-1925
M33	1667-1945	2260-2637
M36	2124-2478	2880-3360
M39	2773-3235	3760-4387
M42	3422-3992	4640-5413
M45	4293-5009	5820-6790
M48	5141-5998	6970-8132
M52	6690-7805	9070-10582
M56	8334-9723	11300-13183
M64	12612-14714	17100-19950

Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
37 Degree Flare Fittings			
1/4 in 6.4 mm	7/16-20	6-12	8-16
5/16 in 7.9 mm	1/2-20	8-16	11-22
3/8 in 9.5 mm	9/16-18	10-25	14-34
1/2 in 12.7 mm	3/4-16	15-42	20-57
5/8 in 15.9 mm	7/8-14	25-58	34-79
3/4 in 19.0 mm	1-1/16-12	40-80	54-108
7/8 in 22.2 mm	1-3/16-12	60-100	81-135
1.0 in 25.4 mm	1-5/16-12	75-117	102-158
1-1/4 in 31.8 mm	1-5/8-12	125-165	169-223
1-1/2 in 38.1 mm	1-7/8-12	210-250	285-338

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres
Straight Threads with O-ring			
1/4 in 6.4 mm	7/16-20	12-19	16-26
5/16 in 7.9 mm	1/2-20	16-25	22-34
3/8 in 9.5 mm	9/16-18	25-40	34-54
1/2 in 12.7 mm	3/4-16	42-67	57-91
5/8 in 15.9 mm	7/8-14	58-92	79-124
3/4 in 19.0 mm	1-1/16-12	80-128	108-174
7/8 in 22.2 mm	1-3/16-12	100-160	136-216
1.0 in 25.4 mm	1-5/16-12	117-187	159-253
1-1/4 in 31.8 mm	1-5/8-12	165-264	224-357
1-1/2 in 38.1 mm	1-7/8-12	250-400	339-542

Split Flange Mounting Bolts*		
Size	Pound- Feet	Newton metres
5/16-18	15-20	20-27
3/8-16	20-25	27-34
7/16-14	35-45	47-61
1/2-13	55-65	74-88
5/8-11	140-150	190-203

**NOTE: Use standard metric hardware torque for metric split flange mounting bolts.*

Click on the image link below for the full version of the service manual

