

990 Excavator

**John Deere Dubuque Works
TM-1230 (May-87)**

LITHO IN U.S.A.

990 EXCAVATOR TECHNICAL MANUAL TM-1230 (MAY-87)

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SAFETY AND YOU

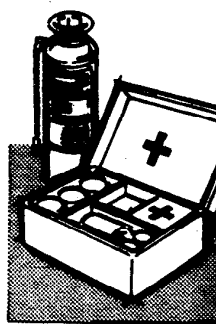


CAUTION: This safety symbol is used for important safety messages. When you see this symbol, follow the safety message to avoid personal injury.



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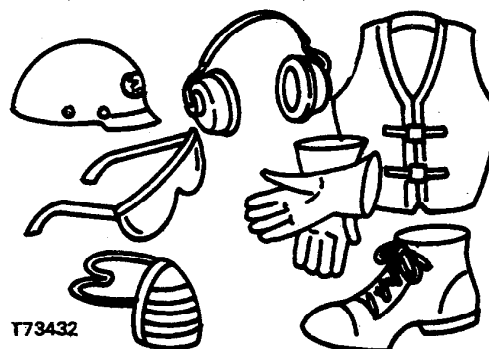
Be prepared for an accident or fire.
Know where the first aid kit and fire extinguisher are.
Know how to use them.
Know where to get help.



T27504N

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Wear safety equipment.



T73432

30A/T73432 T28:1 I104 260881

Wear fairly tight clothing.



T4567C

30A/T45672 T28:1 I105 280581

AVOID HIGH PRESSURE-FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Keep hands and body away from pinholes and nozzles which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. DO NOT use your hand.

If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type injury or gangrene may result.



30A:K9811 T28:1 1106 161182

KEEP SHOP AND STORAGE AREA CLEAN

Maintenance area should be well-ventilated.

Keep maintenance area clean and dry.

Store flammable materials in a cool and well-ventilated area out of reach of unauthorized personnel.



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FOLLOW SAFE WORKING CONDITIONS

Do not work on the equipment unless you are approved to do so. Then be sure you know the correct procedure.

Do not work on equipment while it is being operated.

Keep hands away from moving parts.

When the engine is running, do not work on equipment unless the procedure is approved.

If you must work on the machine with the engine running, ALWAYS USE TWO service technicians. One must be at the controls. The other must be within sight of the operator.

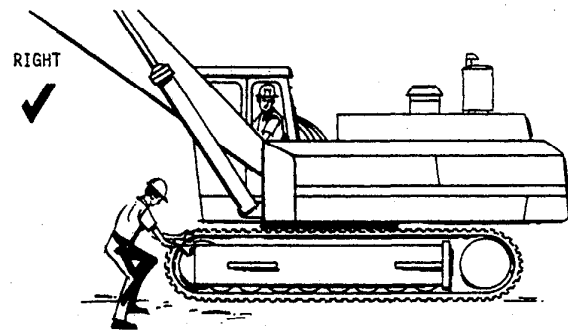
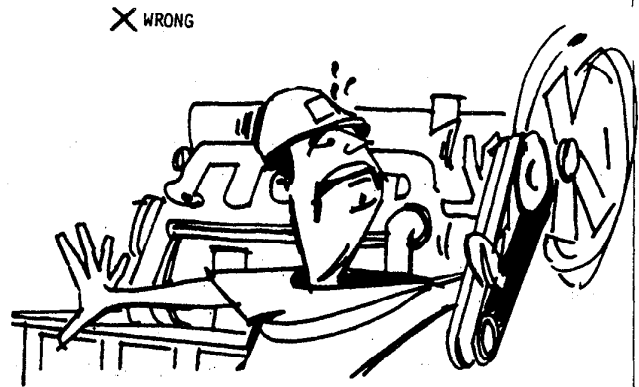
Put a support under all raised equipment.

Park the machine across a slope, or use blocks to hold it in place.

Do not lift heavy parts by yourself. Use a hoist or jack.

TAKE CARE! WATCH OUT FOR OTHER PEOPLE IN THE AREA.

When you drill, grind or hammer metal, wear safety glasses.



30A/T32709 N, T82412 T28:1 1108 260861

OBSERVE SERVICE PRECAUTIONS

Keep ALL equipment free of dirt and oil.

Clean oil, grease, mud, ice or snow from the operator's station, steps and hand rails.

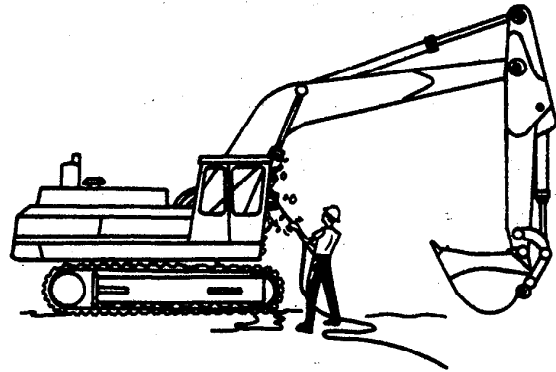
Do not remove the radiator cap unless the engine is cool. First, loosen the cap slowly to the stop. Then release all pressure in the cooling system before you remove the cap.

Check the exhaust system regularly for leaks.

Release hydraulic pressure before you work on the hydraulic system. See page I-I-06.

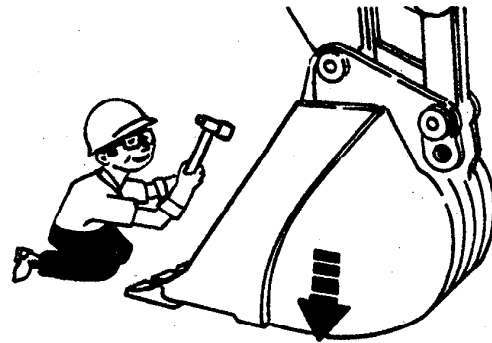
When you check hydraulic pressure, be sure to use the correct test gauge.

Before you work on the fuel system, close the fuel shutoff valve.



30A/T82345 T28:1 (109 09128)

Do not work under a raised bucket. Lower the bucket to the ground, or put blocks under the bucket.



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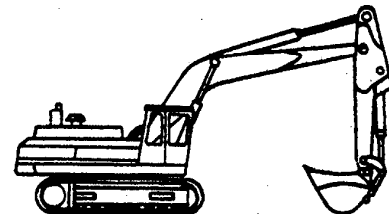
CHECK SAFETY EQUIPMENT ON MACHINE

All protective parts (shields, guards, ROPS, etc.) should be in good condition and fastened in place.

Check for leaks in all systems:

- Air intake system
- Engine oil system
- Hydraulic system
- Fuel system
- Cooling system

RIGHT



30A/T82325 T28:1 (111 24088)

AVOID EXPLOSIONS OR FIRE

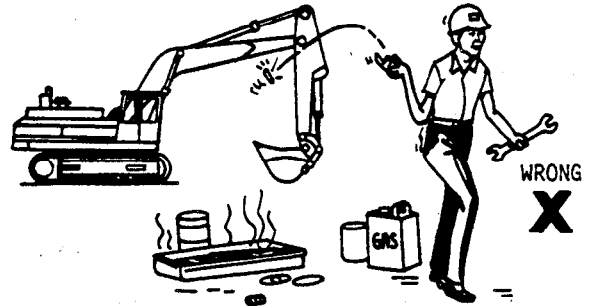
Do not smoke while you fill the fuel tank.

Do not smoke while you work with material that will start on fire easily.

Stop the engine before you fill the fuel tank.

Do not fill fuel tank if engine is hot.

Do not use gasoline or diesel fuel for cleaning parts. Use solvents that will not start on fire.



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OBSERVE BATTERY PRECAUTIONS

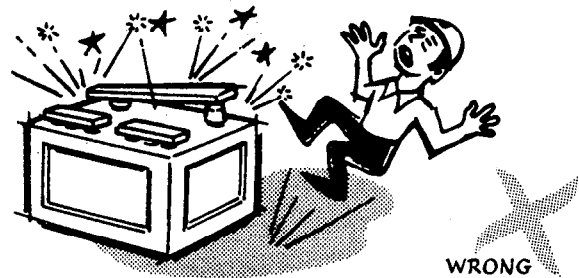
Do not put metal objects across terminals to check the battery charge.

When you charge a battery, be sure there is enough ventilation.

Keep sparks and flames away from batteries.

Do not smoke near battery.

Before you work on the electrical system, or make major repairs, turn off the battery disconnect switch.



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BEFORE YOU WORK ON THE HYDRAULIC SYSTEM

Follow these steps before you work on any part of the hydraulic system:

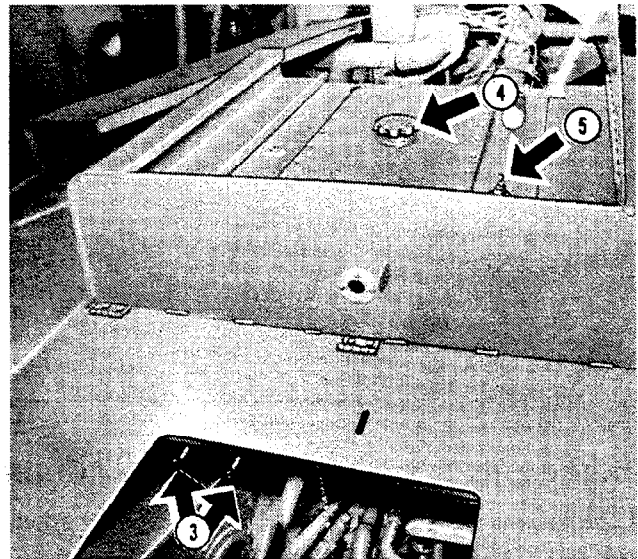
1. Park the excavator on level ground.
2. Lower hydraulic pressure:
 - Lower bucket to ground.
 - Stop engine.
 - Move control levers until boom and bucket do not move.
3. Push valve levers in all the way to stop oil flow.
4. Loosen the reservoir filler cap slowly to release pressure.
5. Open the diffuser vent. Turn it counterclockwise.

IMPORTANT: After you finish:

- Close diffuser vent.
- Pull levers out.



CAUTION: Do not walk or stand on sloping fenders or other sheet metal to service the excavator.



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GENERAL SPECIFICATIONS

990 EXCAVATOR

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with PCSA and SAE Standards. Except where otherwise noted, these specifications are based on a unit equipped with 140-in. (3.56 m) arm, 45-in. (1143 mm) bucket, 30-in. (750 mm) track shoes, and standard equipment.)

Power (@2100 engine rpm):

Gross290 hp(216 kW)
Net260 hp(194 kW) 264 PS

Net engine flywheel power is for an engine equipped with fan, air cleaner, water pump, lubricating oil pump, alternator, and muffler. Gross engine power is without fan. Power ratings are under SAE standard conditions of 500-ft. (150 m) altitude and 85°F (29.5°C) temperature, and DIN 6270 conditions (non-corrected). No derating is required up to 7,500 ft. (2286 m) altitude.

Engine: John Deere turbocharged V-8 diesel, valve-in-head, 4-stroke cycle.

[illegible]

Lubrication Pressure system w/full-flow filter
Cooling Pressurized w/thermostat and fixed bypass
Air cleaner w/restriction indicator Dry
Electrical system 24 volts w/alternator
Batteries (4) 12-volt . Reserve capacity:420 minutes
each

Hydraulic System:

Three open-center pumps mounted in line are coupled directly to the flywheel. The total flow is 170 gpm (10.72 L/s) at rated engine rpm. System operating pressure is 2800 psi (19 306 kPa) (196.8 kg/cm²) for the propel circuit and 2700 psi (18 616 kPa) (190 kg/cm²) for the digging circuit.

Relief valves:

Boom (2) ...3000 psi (20 685 kPa) (210.9 kg/cm²)
Arm (2) ...3000 psi (20 685 kPa) (210.9 kg/cm²)
Bucket (2) ..3000 psi (20 685 kPa) (210.9 kg/cm²)

Oil filtration:

Two 149-micron suction screens
Two 10-micron filters in return lines
Three 40-micron high pressure filters

Cylinders:

Cylinders:	Bore	Stroke
Boom (2) . . .	7.50 in. (190 mm)	62.87 in. (1597 mm)
Arm	7.50 in. (190 mm)	78.17 in. (1986 mm)
Bucket	7.50 in. (190 mm)	40.51 in. (1029 mm)
Boom cylinder rods	3.75 in. (95 mm dia.)	
Arm and bucket cylinder rods	4.50 in. (114 mm dia.)	

All cylinders have phenolic wear rings. Boom, arm and bucket cylinders have a built-in hydraulic cushion at each end of the stroke. Full-width hydraulic oil cooler matched with engine coolant radiator.

Operating Information:

Swing speed	5.8 rpm
Bucket tangential digging force:	
39, 45, or 51-in. (990, 1143, or 1295 mm) bucket ..	42,500 lb. (190 kN)(19 278 kg)
33 or 39-in. (838 or 990 mm) heavy-duty bucket ..	41,000 lb. (184 kN)(18 598 kg)
45-in. (1143 mm) heavy-duty bucket	42,500 lb. (190 kN)(19 278 kg)
Gradability	90 percent
Travel	0 to 2.1 mph (3.38 km/h)
Locked in low	0 to 0.9 mph (1.45 km/h)

Arm

	140 in. (3.56 m)	108 in. (2.74 m)
Digging depth	27 ft. 8 in. (8.43 m)	25 ft. (7.62 m)
Reach at ground level from center of rotation	39 ft. 11 in. (12.17 m)	36 ft. 9 in. (11.2 m)
Dumping height	21 ft. 5 in. (6.53 m)	19 ft. 9 in. (6.02 m)

General Specifications

Swing mechanism:

Swing 360-degree, internal drive, continuous
Turntable bearing Single row, ball
Case-hardened ring and pinion gears run in lubricant.

Undercarriage:

Propel motors (one for each track) . High-torque axial-piston hydraulic motors with planetary drive. Multiple-disk brakes automatically release while propelling, and apply when stationary. Independent drive to each track permits counterrotation.

Undercarriage, car body, and track frame Each track frame is a formed, reinforced U-channel. Track frames are joined by reinforced boxed car body with swing bearing mount.

Track Chain Sealed track chain

Track Adjustment Hydraulic

Buckets: High-strength steel, ribbed and plated bottom section.

Cab:

Steel, with urethane sound-proofing on ceiling and side walls, and cushioned neoprene floor mat. Safety glass on all sides and top. Front and rear windows open. Front window can be stored overhead.

Seat:

Fully adjustable heavy-duty cloth, foam-rubber cushioned seat.

Controls:

Pilot-operated two-lever for boom, arm, bucket, and swing. Pilot-operated right and left pedals control forward and rearward movement of right and left tracks respectively.

		Capacity		
Nominal Width	Bite Width	SAE	Struck	Weight
39 in. (991 mm)	42 in. (1067 mm)	1½ cu. yd. (1.15 m³)	1¼ cu. yd. (0.96 m³)	2550 lb. (1157 kg)
45 in. (1143 mm)	47 in. (1194 mm)	1⅞ cu. yd. (1.43 m³)	1½ cu. yd. (1.15 m³)	2670 lb. (1211 kg)
51 in. (1295 mm)	54 in. (1372 mm)	2⅞ cu. yd. (1.62 m³)	1¾ cu. yd. (1.34 m³)	2820 lb. (1279 kg)
Heavy-duty				
33 in. (838 mm)	37 in. (940 mm)	1½ cu. yd. (1.15 m³)	1¼ cu. yd. (0.96 m³)	3050 lb. (1383 kg)
39 in. (991 mm)	44 in. (1118 mm)	1⅞ cu. yd. (1.43 m³)	1½ cu. yd. (1.15 m³)	3575 lb. (1622 kg)
45 in. (1143 mm)	50 in. (1270 mm)	2 cu. yd. (1.53 m³)	1½ cu. yd. (1.15 m³)	3660 lb. (1660 kg)
Track Shoes:		Ground		Ground
Width	Shoes	Contact	Pressure	
30 in. (750 mm)	Triple-bar semigrouser	9723 sq. in. (62 731 cm²)	9.18 psi (63.3 kPa) (0.65 kg/cm²)	
36 in. (900 mm) (optional)	Triple-bar semigrouser	11,668 sq. in. (75 278 cm²)	7.85 psi (54.1 kPa) (0.55 kg/cm²)	

General Specifications

Boom and Arm:

Internally reinforced tapered box construction with heat-treated steel bushings. Machined and bored after welding for accurate alignment. All pivot points are sealed to allow extended lubrication intervals.

Servicing and Vandal Protection:

Swingaway service doors expose built-in platforms for easy access to engine and hydraulic systems. Cab and access covers to fuel tank, radiator, and hydraulic lock with switch key.

Capacities:	U.S.	Imp.	Liters
Fuel tank	143 gal.	119.2 gal.	541.3
Cooling system	17 gal.	14.2 gal.	64.4
Engine lubrication, including filter	38 qt.	31.7 qt.	36.0
Hydraulic system	220 gal.	183.3 gal.	832.8
Planetary propel drive (each)	21 qt.	17.5 qt.	20.0
Swing drive (each)	8 qt.	6.7 qt.	7.5

Weights:	lb.	kg
Operating weight, excavator less bucket:		
30-in. (750 mm) track shoes	85,700	38 873
36-in. (900 mm) track shoes	89,700	40 688
Upper structure (without counterweight and boom)	22,600	10 251
Undercarriage:		
30-in. (750 mm) track shoes	34,270	15 549
36-in. (900 mm) track shoes	38,270	17 359
One piece mainboom (without hydraulic cylinders)	6,050	2744
Standard arm, 140 in. (3.56 m)	3,900	1769
Optional Arm, 108 in. (2.74 m)	3,600	1633
Main boom lift cylinders (2)	1,434	650
Arm cylinder	1,075	488
Bucket cylinder and bucket linkage	1,375	624
Main counterweight	15,000	6804
Auxiliary counterweight	4,500	2041

Additional Standard Equipment:

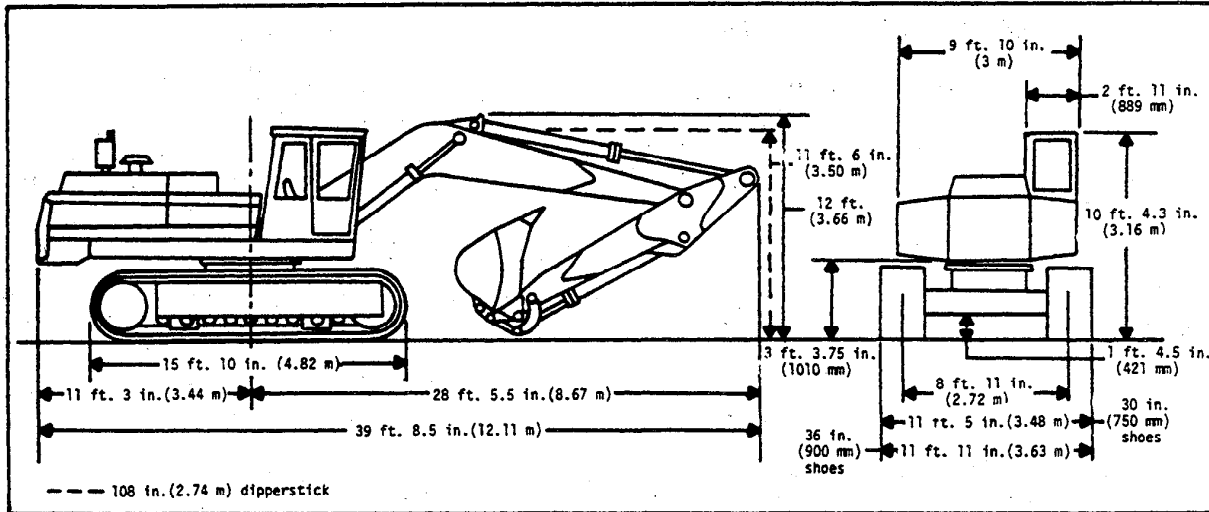
Electric hour meter
Alternator charge indicator light
Hydraulic oil filter pressure warning light
Engine overheating warning light
Gauges (internal illuminated):
Engine coolant temperature
Hydraulic oil temperature
Engine oil pressure
Fuel
Key switch
Cold weather starting aid
Horn
Positive-position hand throttle
15,000 lb. (6804 kg) counterweight
Counterweight removal system
Track guides
Cab with heater
Floor mat
Lifting hook
Tinted roof window

Special Equipment:

36-in. (900 mm) triple-bar semigrouser shoes
Bucket side cutters
Fire extinguisher
Engine water heater
Window protection group
Air conditioner
Auxiliary counterweight
Two electric cab fans
Vandal protection
108-in. (2.74 m) dipperstick

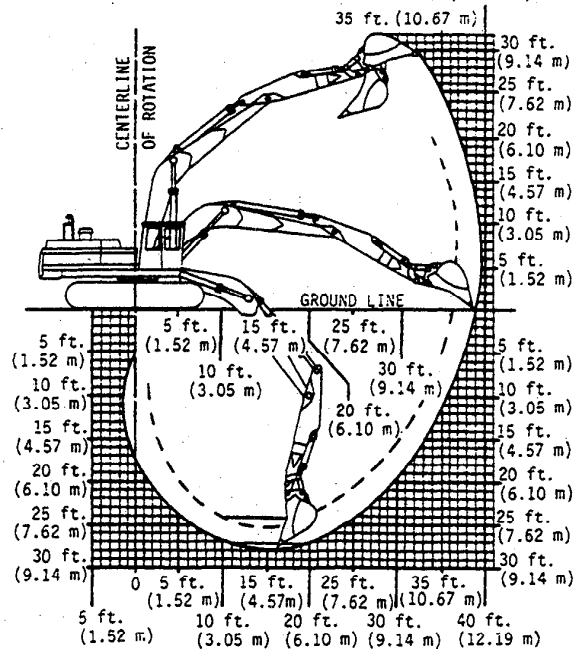
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General Specifications



Digging Depth and Lifting Height:

— 140 in. (3.56 m) dipperstick
 --- 108 in. (2.74 m) dipperstick



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Group III CAP SCREW TORQUE VALUES

CUSTOMARY TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is $\pm 10\%$.

Cap Screw In.	Plain Head* (lb-ft.)	N-m	Three Dashes* (lb-ft.)	N-m	Six Dashes* (lb-ft.)	N-m
1/4	-----	-----	(10)	14	(14)	19
5/16	-----	-----	(20)	27	(30)	41
3/8	-----	-----	(35)	47	(50)	68
7/16	(35)	47	(55)	75	(80)	108
1/2	(55)	75	(85)	115	(120)	163
9/16	(75)	102	(130)	176	(175)	237
5/8	(105)	142	(170)	230	(240)	325
3/4	(185)	251	(300)	407	(425)	576
7/8	(160)	217	(445)	603	(685)	929
1	(250)	339	(670)	908	(1030)	1396
1-1/8	(330)	447	(910)	1234	(1460)	1979
1-1/4	(480)	651	(1250)	1695	(2060)	2793

All torques are dry torque unless noted.

*Dashes identify the grade of hardware.

T28:1 III09 170582

METRIC TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is $\pm 10\%$.

Cap Screw Diameter	Property Class 8.8* (lb-ft)	N-m	Property Class 10.9* (lb-ft)	N-m
M5	(4.4)	6.0	(6.3)	8.5
M6	(7.4)	10.0	(10.7)	14.5
M8	(18.1)	24.5	(25.8)	35.0
M10	(36.1)	49.0	(51.6)	70.0
M12	(62.7)	85.0	(89.2)	121.0
M16	(154.9)	210.0	(221.2)	300.0
M20	(265.5)	360.0	(368.7)	500.0
M24	(457.2)	620.0	(634.2)	860.0
M30	(885.0)	1200.0	(1224.2)	1660.0
M36	(1541.3)	2090.0		

All torques are dry torque unless noted.

*Numbers identify the grade of hardware.

T28:1 III10 190582

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