SECTION 10 - MISCELLANEOUS

ELECTRICAL SYSTEM PREVENTIVE MAINTENANCE SCHEDULE

GENERAL

Preventive maintenance is the systematic approach to keeping the trucks and related systems and components in good operating condition. Proper implementation of a preventive maintenance program should result in improvements in component life, optimum performance, and maximum availability through reduced, unscheduled downtime and repair.

Records of all maintenance should be kept. Information such as the condition of components, brush lengths, components changed or serviced, etc. should be included. Good information can be useful in preventing problems and in troubleshooting improper operation of a system.

It should be noted that the Preventive Maintenance Table included here does not include all of the components in the system. However, the entire system should be checked at intervals based on the operating conditions of the mine. The Pre-Operational Inspection outlined in the Operator's and Mechanical Manuals should be performed as it is part of a good preventive maintenance program.

Some of the components in the items columns are optional equipment. They are included to cover the trucks so equipped.

The hour intervals shown in the Table reflects the maximum hours that preventive maintenance on any part should be performed. The individual mine operating and environmental conditions may require more frequent inspection and service.

For successful truck operation the mine must provide:

1. Knowledgeable workers and supervision.

2. Adequate maintenance facilities, tools, shop supplies, and proper parts.

3. Lubricating oil and greases equal or superior to those specified.

4. Inspection and maintenance to a regular planned schedule with adequate records kept.

When servicing:

1. Never mix lubricants of different brands or grades.

2. Never overfill lubricants - too much lubricant can be as harmful as too little.

3. Clean equipment covers before removal for maintenance to prevent the ingress of contamination.

4. Use only clean containers to handle lubricants.

5. After servicing, operate the truck for at least 30 minutes, unloaded and at low speeds (10 mph (16 km/hr) or less.

The following equipment contains sealed bearings that do not require additional lubrication until the component is overhauled:

1. Wheelmotors

2. Alternator

3. Retarding grid blower motors

⚠WARNING

All checks and inspections should be made with the truck parked in a SAFE POSITON and secured by means other than the trucks friction brake system. Also the truck's engine and battery power should be off except where indicated and required.

⚠ CAUTION

When performing any of the inspections, extra care must be taken to prevent the ingress of contamination into the gearcase or interior or any of the components.

⚠ CAUTION

When welding on the truck:
1. Connect the welding ground as close as possible to the area being welded. Normally this is directly attached to the part being welded.
2. Never connect the welding ground so that the current will pass through the bearings or electrical components of any rotating equipment.
3. Do not pull any cards or remove panel connections. This practice puts unnecessary cycles on connector pins, and may cause loose or dirty pins. These could cause control system problems.

⚠WARNING

Lethal voltages may be present. Before working on the truck and any of the propulsion or retarding systems or components, always:
1. Turn off and remove the key from the Master Switch and install an appropriate Safety or Lock-out Tag.
2. Turn the battery isolation switch off, lock-out as required, and install an appropriate Safety or Lock-out Tag.

UNIT RIG

ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE

RECOMMENDED MINIMUM SERVICE FREQUENCY ALL STATEX SYSTEMS	LEVEL 1 Operator Shift/Daily L-1	LEVEL 2 250 HOURS L-2	LEVEL 3 500 HOURS L-3	LEVEL 4 1,000 HOURS L-4	LEVEL 5 2,500 HOURS L-5	LEVEL 6 3,000 HOURS L-6	LEVEL 7 AS REQUIRED L-7	LEVEL 8 @ Tire Change Int. L-8
PERFORM DURING (PREFERABLY @ THE BEGINNING OF) EACH OPERATOR'S SHIFT.								
PERFORM EACH 250 HOURS OF OPERATION. INCLUDES LEVEL L-1.		L-2						
PERFORM EACH 500 HOURS OF OPERATION. INCLUDES LEVELS L-1 AND L-2.			L-3					
PERFORM EACH 1,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2 AND L-3.				L-4				
PERFORM EACH 2,500 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3 AND L-4.					L-5			
PERFORM EACH 3,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3, L-4 AND L-5.						L-6		
PERFORM AS REQUIRED BY OPERATING CONDITIONS AND ENVIRONMENT.							L-7	
PERFORM WHENEVER THE DUAL TIRES ARE REMOVED FROM THE WHEELMOTOR, EASING ACCESS TO THE AREAS REQUIRED.								L-8
PERFORM PREVIOUS INTERVAL ITEMS AT MULTIPLES OF THE ORIGINAL RECOMMENDATION. FOR EXAMPLE, AT 500 HOURS (LEVEL L-3) OF OPERATION, ALSO PERFORM THOSE ITEMS LISTED UNDER SHIFT INSPECTION (LEVEL L-1) AND 250 HOURS INSPECTION (LEVEL L-2) ETC.								

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-1

LEVEL 1	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT BEGINNING OF EACH OPERATOR'S SHIFT/DAILY.	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA 1. Check the oil level in the gear sump on each wheelmotor. **NOTE:** *On GE 787 and 788 wheelmotors without histories of oil consumption, this interval may be extended to as much as once a week.*			
2. Check the condition of the dipstick or oil fill cap gasket.			
3. On GE 772 and 776 wheelmotors not equipped with the newer style dirt seals and still having greasing provisions, add 0.5 ounces (14 grams) to each dirt seal grease fitting. **NOTE:** *Those wheelmotors that have the follow-up Felt (FUF) seal do not require this greasing.*			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-2

LEVEL 2	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 250 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA			
1. Inspect and clean the magnetic plugs on the sun pinion cover (wheelmotors equipped with mineral based gearcase oil).			
2. Clean or replace the gearcase sump breather filters.			
3. Check the ventilation hoses for evidence of leakage, obstruction, restrictions, or accumulations of oil.			
4. Check the current shunts for proper installation and discoloration or other evidence of damage.			
5. Check all wires, cables and connections for proper installation and discoloration or other evidence of damage.			
6. Check the axlebox door to be in good repair. Closely inspect the seal's ability to properly form a good, air tight seal.			
7. Inspect for oil and grease leaks.			
8. Take a sample of the gearcase lubricant for analysis (776 and 791 wheelmotors using mineral based oil in the gearcase). **NOTE:** *Oil samples on wheelmotors with less than 1,000 hours should be taken at 1/2 this interval.*			
9. Clean the axlebox interior. **NOTE:** *Avoid water contamination of the wheelmotor. If steam or water is used to clean, it could migrate to the wheelmotor through the cooling air passageways.*			
10. On GE 772 and 776 wheelmotors not equipped with the newer style dirt seals and still having greasing provisions, add 1.0 ounce (28 grams) to each dirt seal grease fitting. **NOTES:** *1. Those wheelmotors that have the Follow-up Felt (FUF) seal do not require this greasing.* *2. On all GE 787 and 788 wheelmotors except those newer production models with the low maintenance type seals, grease the dirt seals with 2.0 ounces (55 grams) at each fitting at least twice a week. The current production wheels do not include a fitting for greasing the dirt seals. Extreme conditions may require more frequent greasing.*			
ALTERNATOR			
1. Check the brush length, condition and freedom of movement. Record. **NOTE:** *Any brushes with chipping or broken carbon or loose or frayed pigtails should be serviced or replaced immediately.*			
2. Check the brush holder condition, spacing, and tension.			
3. Check the commutator/slip ring condition, film, etc.			
4. Clean the string or Teflon band.			
5. Using clean, dry compressed air (70 psi (485 kPa) maximum), blow out and wipe clean the inside of the alternator including the drain holes. **NOTE:** *When cleaning electrically insulated parts, use a quick drying cleaner which will not leave an oily deposit. Dip a clean, lint free cloth into the cleaner and wipe off the part. Do not dip insulating materials in liquid cleaner.*			
6. Inspect cooling air blower housings for evidence of cracks or damage.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-2

LEVEL 2	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 250 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
CONTROL BOX CHECKS			
1. Vacuum the control cabinet. Compressed air should not be used to remove dirt from the compartment.			
2. Inspect all control equipment for evidence of loose connections, clamps, or cable ties.			
3. Check the current shunts for proper installation and discoloration or other evidence of damage.			
4. Check all insulators, terminals and springs, etc. for proper installation and evidence of breakage or damage.			
5. Check the reverser, contactors, interlocks, resistors and relays for proper installation and evidence of tip wear, burning, breakage, over-travel, or improper pressure and frayed, broken or discolored components. Also check that the arc chutes are in good condition, free of cracks or other damage.			
6. Check the operation and sealing of all magnet valves.			
7. Check the doors and door gaskets for proper sealing.			
MISCELLANEOUS AREA			
1. Check the flexible air ducts for evidence of leakage or damage. Run static pressure checks, especially in the axlebox.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-3

LEVEL 3	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA 1. On GE 772, 776 and 791 wheelmotors (using mineral based gear oil) a. Change the gear sump lubricant. **NOTE:** *On all GE wheelmotors using synthetic gear lubricants, change the oil after the first 500 hours and then at a maximum of 3,000 hours (if oil sampling results will allow). Item 1b should also be performed at this time.*			
b. Clean the sump magnetic plugs when changing the gearcase oil.			
c. Remove and inspect the sun pinion assembly including visually checking: (1) Gear teeth condition. (2) Spline wear. (3) Oil baffle and snap rings for damage. (4) For sufficient clearance from the cover.			
WHEELMOTOR ARMATURE AREA 1. Check the brush length, condition and freedom of movement. Record the lengths. **NOTE:** *Any brushes with chipping or broken carbon or loose or frayed pigtails should be serviced or replaced immediately.*			
2. Check the brush holder condition, spacing and tension.			
3. Check the commutator condtion and film.			
4. Clean the Teflon band.			
5. Using clean, dry compressed air (70 psi (485 kPa) maximum), blow out the brush holder and commutator area.			
6. Check the brake lines and connection for evidence of leakage or damage. Clean out any fluid found in the motor.			
7. Check the condition of the field coils, particularly the insulation for cracks, damage or other examples of damage			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-3

LEVEL 3	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
RETARDING GRIDS AND BLOWER UNIT			
1. Check the brush length, condition and freedom of movement. Record the lengths. **NOTE:** *Any brushes with chipping or broken carbon or loose or frayed pigtails should be serviced or replaced immediately.*			
2. Check the brush holder condition, spacing and tension.			
3. Check the commutator condition and film.			
4. Clean the string/Teflon band.			
5. Using clean, dry compressed air (70 psi (485 kPa) maximum), blow out the brush holder and commutator area.			
6. Check the cables for evidence of abrasion or burning.			
7. Check the condition of the field coils, particularly the insulation for cracks, damage or other examples of damage.			
8. Check the grids for loose connections, shorted turns and overheated, buckled, or otherwise damaged resistors.			
9. Clean the grid insulators and remove any build up.			
10. Check that the securing bolt and insulator assembly on the base of the grids is preloaded.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-4

LEVEL 4	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 1,000 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX			
1. Check the gear end play.			
MISCELLANEOUS EQUIPMENT			
1. Check the rectifier and static exciter air passages.			
2. Check all connections for tightness and evidence of damage.			
3. Check the blower inlet screen or filter to be free of obstruction and foreign objects.			
RETARDING GRIDS AND BLOWER UNIT			
1. Clean and inspect the retarding grids paying particular interest to damaged parts or foreign objects.			
VEHICLE OPERATION TESTS			
NOTE: *If found not to specification, adjust as required.*			
1. Check the battery and battery charging voltage.			
2. Check the speedometer and tachometer calibration.			
3. Check all speed event calibrations.			
4. Check the engine low and high idle, rated, and no load speeds.			
5. Check the operation of the engine's control system high idle and throttle cut-off solenoids or relays.			
6. Check the operation of the Low Blower Pressure indicator and alarm.			
7. Check the operation of the Ground and Diode Fault Detection and alarm systems.			
8. Check the dynamic retarding operating parameters noting: a. Motor field current. b. Motor armature current as a function of speed. c. Alternator voltage.			
9. Check engine and electrical system speed and horsepower operation through either a road test or static load box procedure.			
10. Check the operation of the grid motor in normal truck operation.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-5

LEVEL 5	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 2,500 HOURS (Maximum) OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX 1. On GE 787 and 788 wheelmotors a. Check the gear end play.			
b. Remove and inspect the sun pinion including visually checking: (1) Gear teeth condition. (2) Spline wear. (3) Oil baffle and snap rings for damage. (4) For sufficient clearance from the cover.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-6

LEVEL 6	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 3,000 HOURS (Maximum) OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX/WHEELMOTOR AREA 1. On all GE wheelmotors using approved synthetic lubricants in the gearcase: a. Sample then change the gear sump lubricant. **NOTE:** *On all GE wheelmotors using approved synthetic lubricants in the gearcase, change the oil after the first 500 hours and then at a maximum of 3,000 hours (if oil sampling results will allow). Item 1b. should also be performed at this time.*			
b. Inspect and clean the sump magnetic plugs.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-7

LEVEL 7	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AS REQUIRED	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX/WHEELMOTOR AREA 1. Measure armature, commutator, field and tertiary resistances to ground. Record to monitor the degradation of the insulation.			
CONTROL BOX AREA 1. Clean the cards and connections.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-8

LEVEL 8	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT TIRE CHANGE INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA 1. Remove dirt and grease build up from the dirt seal area.			
2. 772, 776 and 791 wheelmotors with Triple Lip Dirt Seals only: a. Inspect the wear of the torque tube wear band. b. Inspect the dirt seal grease fittings. c. Lubricate the dirt seal area until purged.			
3. Check all bolts to be tight.			
4. Lubricate Wheel hub bearings (787 and 788 wheelmotors only). a. Remove 6 grease plugs in hub and install zerk grease fittings. b. Add 4 ounces (115 grams) grease to each fitting. c. Remove grease zerks and reinstall plugs.			

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METRIC CONVERSIONS

GENERAL

Information concerning metric conversions is provided here to aid and supplement the use of dual dimensioning in this manual. Two tables are presented here to show conversions from U.S. Standard units to their metric equivalents.

TABLE 1 - METRIC CONVERSIONS

Table 1 - Metric Conversions, includes some of the most common units and the metric conversions from practical use. Also included are the unit abbreviations used in this manual. Multiply the U.S. standard unit in the left column by the figure shown in the second column to obtain the metric equivalent. Multiply the metric number in the center column by the number in the column to its right to obtain the desired U. S. standard equivalent.

TABLE 2 - DECIMAL EQUIVALENTS

Table 2 - Decimal Equivalents contains fraction of inches with the appropriate decimal equivalents in inches and millimeters. The fractions are shown in intervals of 1/64 inch (0.4 mm).

Multiply:	by:	to get:	Multiply:	by:	to get:
		LINEAR			
inches (in.)	x 25.4	= millimeters (mm)		x 0.03937	= inches
feet (ft.)	x 0.3048	= meters (m)		x 3.281	= feet
yards (yds.)	x 0.9144	= meters (m)		x 1.0936	= yards
miles (mi.)	x 1.6093	= kilometers (km)		x 0.6214	= miles
microinches (μ in.)	x 0.0254	= micrometers (μm)		x 39.37	= microinches
		AREA			
inches^2 (sq. in.)	x 645.16	= millimeters^2 (mm^2)		x 0.000155	= inches^2
feet^2 (sq. ft.)	x 0.0929	= meters^2 (m^2)		x 10.764	= feet^2
yards^2 (sq. yds.)	x 0.8361	= meters^2 (m^2)		x 1.196	= yards^2
acres	x 0.4047	= hectometers (hm^2) [hectares (ha)]		x 2.471	= acres
		VOLUME			
inches^3 (cu. in.)	x 16387	= millimeters^3 (mm^3)		x 0.000061	= inches^3
inches^3 (cu. in.)	x 0.01639	= liters (l)		x 61.024	= inches^3
quarts (qts.)	x 0.94635	= liters (l)		x 1.0567	= quarts
gallons (gal.)	x 3.7854	= liters (l)		x 0.2642	= gallons
feet^3 (cu. ft.)	x 28.317	= liters (l^3)		x 0.03531	= feet^3
feet^3 (cu. ft.)	x 0.02832	= meters^3 (m^3)		x 35.315	= feet^3
fluid oz. (fl. oz.)	x 29.57	= millileters (ml)		x 0.03381	= fluid oz.
yards^3 (cu. yds.)	x 0.7646	= meters^3 (m^3)		x 1.3080	= yards^3
teaspoons (tsp.)	x 4.929	= millileters (ml)		x 0.2029	= teaspoons
cups	x 0.2366	= liters (l)		x 4.227	= cups
		MASS			
ounces (oz.)	x 28.35	= grams (g)		x 0.03527	= ounces
pounds (lbs.)	x 0.4536	= kilograms (kg)		x 2.2046	= pounds
tons (2000 lb.)	x 907.18	= kilograms (kg)		x 0.001102	= tons (2000 lb.)
tons (2000 lb.)	x 0.90718	= metric tons (t)		x 1.1023	= tons (2000 lb.)
tons (long) (2240 lb.)	x 1016.05	= kilograms (kg)		x .000984	= tons (long) (2240 lb.)
		FORCE			
ounces - - f	x 0.278	= newtons (N)		x 3.597	= ounces - - f
pounds - - f	x 4.448	= newtons (N)		x 0.2248	= pounds - - f
kilograms - - f	x 9.807	= newtons (N)		x 0.10197	= kilograms - - f

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TABLE 1 - METRIC CONVERSION

Multiply:	by:	to get:	Multiply: by:	to get:
ENERGY OR WORK (watt-second = joule = newton-meter)				
foot-pounds (ft.-lbs.)	x 1.3558	= joules (J)	x 0.7376	= foot-pounds
calories (c)	x 4.187	= joules (J)	x 0.2388	= calories
Btu	x 1055	= joules (J)	x 0.000948	= Btu
watt-hours (w-h)	x 3600	= joules (J)	x 0.0002778	= watt-hours
kilowatt-hrs. (kw-h)	x 3.600	= megajoules (MJ)	x 0.2778	= kilowatt-hrs.
PRESSURE OR STRESS (newton sq. meter = pascal)				
inches Hg (60°F)	x 3600	= kilopascals (kPa)	x 0.2961	= inches Hg
pounds/sq. in.	x 6.895	= kilopascals (kPa)	x 0.145	= pounds/sq. in.
inches H_20 (60°F)	x 0.2488	= kilopascals (kPa)	x 4.0193	= inches H_20
bars	x 100	= kilopascals (kPa)	x 0.01	= bars
pounds/sq. ft. (psf)	x 47.88	= pascals (Pa)	x 0.02088	= pounds/sq. ft.
POWER				
horsepower (hp)	x 0.746	= kilowatts (kW)	x 1.34	= horsepower
ft.-lbs./min.	x 0.0226	= watts (W)	x 44.25	= ft.-lbs./min.
TORQUE				
pound-inches (in.-lbs.)	x 0.11298	= newton-meters (Nm)	x 8.851	= pound-inches
pound-feet (ft.-lbs.)	x 1.3558	= newton-meters (Nm)	x 0.7376	= pound-feet
VELOCITY				
miles/hour (mph)	x 1.6093	= kilometers/hour (km/hr)	x 0.6214	= miles/hour
feet/sec (ft./sec.)	x 0.3048	= meters/sec (m/sec)	x 3.281	= feet/sec
kilometers/hr. (km/hr)	x 0.27778	= meters/sec (m/sec)	x 3.600	= kilometers/hr
miles/hour (mph)	x 0.4470	= meters/sec (m/sec)	x 2.237	= miles/hour

TEMPERATURE

°Celsius = 0.556 (F-32) °F = (1.8°C)+32

COMMON METRIC PREFIXES

mega (M)	= 1 000 000	or 10^6	deci (d)	= 0.1	or 10^1
kilo (k)	= 1 000	or 10^3	centi (c)	= 0.01	or 10^2
hecto (h)	= 100	or 10^2	milli (m)	= 0.001	or 10^3
deka (da)	= 10	or 10^1	micro (μ)	= 0.000 001	or 10^6

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TABLE 1 - METRIC CONVERSION - CONTINUED

FRACTION (IN.)	DECIMAL EQUIVALENT (IN.)	DECIMAL EQUIVALENT (MM)
1/64	0.015625	0.39688
1/32	0.03125	0.79375
3/64	0.046875	1.19063
1/16	0.0625	1.5875
5/64	0.078125	1.98438
3/32	0.09375	2.38125
7/64	0.109375	2.77813
1/8	0.125	3.17501
9/64	0.140625	3.57188
5/32	0.15625	3.96878
11/64	0.171875	4.36563
3/16	0.1875	4.76251
13/64	0.203125	5.15939
7/32	0.21875	5.55626
15/64	0.234375	5.95314
1/4	0.25	6.35001
17/64	0.265625	6.74689
9/32	0.28125	7.14376
19/64	0.296875	7.54064
5/16	0.3125	7.93752
21/64	0.328125	8.33439
11/32	0.34375	8.73127
23/64	0.359375	9.12814
3/8	0.375	9.52502
25/64	0.390625	9.92189
13/32	0.40625	10.31877
27/64	0.421875	10.71565
7/16	0.4375	11.11252
29/64	0.453125	11.50940
15/32	0.46875	11.90627
31/64	0.484375	12.30315
1/2	0.50	12.70002
33/64	0.515625	13.09690
17/32	0.53125	13.49378
35/64	0.546875	13.89065
9/16	0.5625	14.28753
37/64	0.578125	14.6844
19/32	0.59375	15.08128
39/64	0.609375	15.47816
5/8	0.625	15.87503
41/64	0.640625	16.27191
21/32	0.65625	16.66878
43/64	0.671875	17.06566
11/16	0.6875	17.46253
45/64	0.703125	17.85941
23/32	0.71875	18.25629
47/64	0.734375	18.65316
3/4	0.75	19.05004
49/64	0.765625	19.44691
25/32	0.78125	19.84379
51/64	0.796875	20.24066
13/16	0.8125	20.63754
53/64	0.828125	21.03442
27/32	0.84375	21.43129
55/64	0.859375	21.82817
7/8	0.875	22.22504
57/64	0.890625	22.62192
29/32	0.90625	23.0188
59/64	0.921875	23.41567
15/16	0.9375	23.81255
61/64	0.953125	24.20942
31/32	0.96875	24.6063
63/64	0.984375	25.00317
1	1.0	25.40005

TABLE 2 - DECIMAL EQUIVALENTS

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STANDARD TORQUE VALUES

BOLTS, STUDS, ETC.

GENERAL INFORMATION

These torque specifications are based on SAE bolt steel classifications. They should be observed in all cases unless directed otherwise by instructions in this manual. If a particular grade of bolt is to be replaced but is not available, only a higher specification bolt should be substituted.

PROCEDURE

When tightening a series of bolts, tighten them alternately and in even torque increments.

Never tighten bolts to the maximum on the first tightening sequence. Alternate the tightening process by tightening bolts directly opposite each other. In some cases, a specific tightening sequence may be outlined in this manual.

GRADE OF BOLTS

The higher the grade of the bolt, the stronger the bolt is - i.e. a Grade 8 or Class 10.9 bolt is stronger than a Grade 5 or Class 8.8 bolt. Terex|Unit Rig products use Grade 5 or Class 8.8 bolts or stronger.

NOTES:

1. The charts shown in Figures 1 and 2 should be used as guides to torque all fasteners according to size, number of threads per standard length, and grade.
2. These charts are for both assembly and maintenance procedures.
3. The torque values are valid for any of the following lubricants (or equivalents):
a. All plated hardware
b. Thin oil film as received
c. 30 wt. engine oil
d. Hardened washers
4. The use of anti seize compounds is not recommended.
5. Grade 8 and Class 10.9 capscrews shall not be re-used. Re-tightening of previously tightened capscrews that may have loosened, as a result of tightening adjacent capscrews shall not be considered a reuse.
6. Class 8.8 is approximately equivalent to SAE Grade 5.
7. Class 9.8 has properties approximately 9% stronger than SAE Grade 5.
8. Class 10.9 is approximately equivalent to SAE Grade 8.
9. It is recommended that to prevent damaging fine thread fasteners:
a. Both sets of threads are cleaned prior to installation.
b. The fastener is installed "hand" tightened sufficiently to ensure proper thread installation.
c. Impact tools are not employed in the tightening and torquing processes.

HYDRAULIC FITTINGS

GENERAL INFORMATION

Proper assembly and torque tightening of hydraulic system fittings will reduce external leakage, service time and requirements and improve overall system integrity and reliability.

NOTES:

1. The assembly torque values in the tables are for steel and stainless steel fittings, adapters, flanges, and hose ends manufactured to SAE specifications and ports manufactured to SAE specifications.
2. The fittings and ports are to be non-lubricated.
3. The O-rings must be lubricated with hydraulic oil or grease compatible with the oil in the hydraulic system.
4. The pipefittings require sealant or Teflon tape on the threads. These sealants should be selected for low hydraulic system contamination.

ASSEMBLY TORQUE METHODS

There are three primary methods of torque tightening the fittings:

1. Torque Method.

a. Uses a standard torque wrench, possibly incorporating "crows foot" or other adapters to allow for proper tightening.

b. Installation involves standard torque procedures used in conjunction with the torque values specified in the appropriate table.

c. Typical installations include the assembly of:

(1) O-ring boss fittings, port fittings, nipples and couplings.

SUGGESTED ASSEMBLY TORQUE VALUES				
SIZE	SAE GRADE 5 ASSEMBLY TORQUE		GRADE 8 ASSEMBLY TORQUE	
	Ft.-Lb.	N.m	Ft.-Lb.	N.m
1/4 - 20	6	8	9	12
1/4 - 28	7	9	10	14
5/16 - 18	13	18	18	24
5/16 - 24	14	19	20	27
3/8 - 16	23	31	32	43
3/8 - 24	26	35	37	50
7/16 - 14	37	50	53	72
7/16 - 20	41	56	58	79
1/2 - 13	55	75	80	108
1/2 - 20	65	90	90	122
9/16 - 12	80	108	115	156
9/16 - 18	90	122	130	176
5/8 - 11	115	156	160	217
5/8 - 18	125	170	180	244
3/4 - 10	200	271	280	380
3/4 - 16	225	305	315	427
7/8 - 9	325	441	455	617
7/8 - 14	355	481	500	678
1 - 8	485	658	680	922
1 - 12	530	719	745	1010
1 - 14	440	597	600	814
1 1/8 - 7	590	800	970	1315
1 1/8 - 12	670	900	1080	1465
1 1/4 - 7	835	1132	1360	1844
1 1/4 - 12	935	1268	1510	2048
1 3/8 - 6	1095	1485	1790	2427
1 3/8 - 12	1255	1702	2030	2753
1 1/2 - 6	1455	1973	2380	3228
1 1/2 - 12	1645	2231	2660	3607

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FIGURE 1 - STANDARD BOLT TORQUE VALUES

(2) Tube nuts and swivels (if identical to plating or manufacturer of mating parts).

2. Flats from finger tight method (FFFT) (Figure 3)

a. Uses whatever appropriate wrench is available to tighten fitting.

b. Installation procedure:

SIZE	CLASS 8.8		CLASS 9.8		CLASS 10.9	
	Ft.-Lb.	N.m	Ft.-Lb.	N.m	Ft.-Lb.	N.m
M6.0 - 1.00	-	-	6	9	-	-
M6.3 - 1.00	-	-	8	10	10	13
M6.0 - 0.75	-	-	7	10	9	12
M8.0 - 1.25	-	-	15	21	20	27
M8.0 - 1.00	-	-	17	23	21	29
M10.0 - 1.50	-	-	31	42	39	54
M10.0 - 1.25	-	-	32	45	41	57
M12.0 - 1.75	-	-	53	74	68	94
M12.0 - 1.25	-	-	58	81	74	103
M14.0 - 2.00	-	-	85	118	109	151
M14.0 - 1.50	-	-	92	128	118	163
M16.0 - 2.00	122	169	-	-	169	234
M16.0 - 1.50	130	181	-	-	180	250
M18.0 - 2.50	169	234	-	-	234	323
M18.0 - 1.50	190	263	-	-	262	363
M20.0 - 2.50	239	330	-	-	330	457
M20.0 - 1.50	265	367	-	-	366	507
M22.0 - 2.50	325	451	-	-	450	623
M22.0 - 1.50	357	495	-	-	494	684
M24.0 - 3.00	412	571	-	-	570	790
M24.0 - 2.00	450	623	-	-	622	861
M27.0 - 3.00	605	837	-	-	836	1158
M27.0 - 2.00	652	903	-	-	902	1250
M30.0 - 3.50	820	1135	-	-	1134	1570
M30.0 - 2.00	908	1258	-	-	1256	1740
M30.0 - 1.50	939	1300	-	-	1299	1799
M36.0 - 4.00	1433	1985	-	-	1982	2745
M36.0 - 3.00	1517	2102	-	-	2099	2907

13805

FIGURE 2 – STANDARD BOLT TORQUE VALUES (METRIC FASTENERS)

(1) Tighten the fitting "finger tight" (removing all slack from the fitting components).

NOTE: *If tools or other instruments are used to assist in this initial tightening of the fittings, care must be taken to prevent actually applying clamping torque to the fittings.*

(2) Mark initial corresponding flats on the stationary and swiveling surfaces.

(3) Mark the appropriate position that will indicate proper final torque.

(4) Using the appropriate tools, turn the swivel portion of the fitting the appropriate number of flats to

align the designated marks. Leave in this position.

c. Typical installations include the assembly of:

(1) Tube nuts and swivels (if different or unknown plating or manufacturer of mating parts).

(2) Port fittings, and tube and swivel nuts not accessible with a torque wrench.

3. Turns from finger tight method (TFFT) (Figure 3)

a. Uses whatever appropriate wrench is available to tighten fitting.

b. Installation procedure:

(1) Tighten the fitting "finger tight" (removing all slack from the fitting components).

NOTE: *If tools or other instruments are used to assist in this initial tightening of the fittings, care must be taken to prevent actually applying clamping torque to the fittings.*

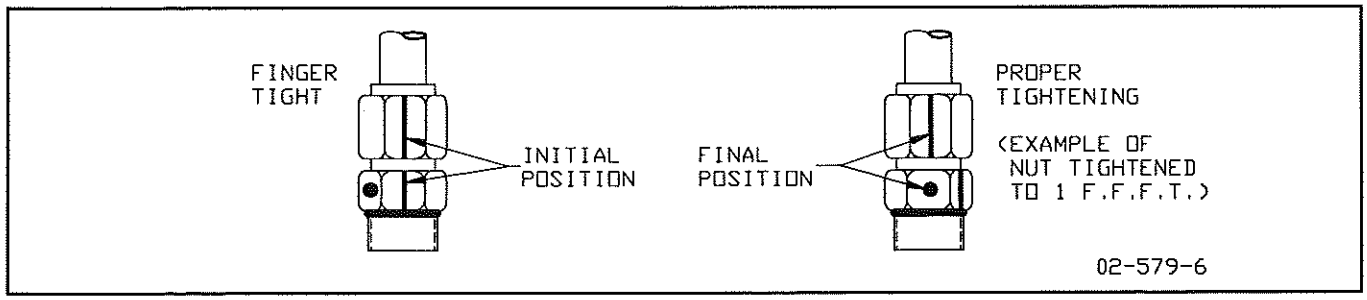


FIGURE 3 - TIGHTENING PROCEDURE FOR FITTINGS

TABLE 1

37 DEGREE FLARE AND FLARELESS NUTS
O'RING BOSS CONNECTORS
ADJUSTABLE O'RING BOSS CONNECTORS
HOSE SWIVEL ENDS
SOCKET/HEX O'RING BOSS PLUGS

DASH SIZE	PORT THREAD SIZE	PORT TORQUE (FT-LBS)	PORT TORQUE (N-M)	PORT F.F.F.T.	NUT THREAD SIZE	NUT TORQUE (FT-LBS)	NUT TORQUE (N-M)	TUBE NUT F.F.F.T.	SWIVEL NUT F.F.F.T.
2	5/16-24	5 +/- 1	7 +/- 1	1	5/16-24	3 +/- 1	4 +/- 1	-	-
3	3/8-24	11 +/- 1	15 +/- 1	1	3/8-24	6 +/- 1	8 +/- 1	-	-
4	7/16-20	14 +/- 1	19 +/- 1	1	7/16-20	12 +/- 1	16 +/- 1	2	2
6	9/16-18	27 +/- 2	37 +/- 3	1 1/2	9/16-18	21 +/- 1	29 +/- 1	1 1/2	1 1/4
8	3/4-16	42 +/- 2	57 +/- 3	1 1/2	3/4-16	45 +/- 2	61 +/- 3	1 1/2	1
10	7/8-14	60 +/- 2	82 +/- 3	1 1/2	7/8-14	60 +/- 5	82 +/- 7	1 1/2	1
12	1 1/16-12	80 +/- 5	109 +/- 7	1 1/2	1 1/16-12	85 +/- 5	116 +/- 7	1 1/4	1
14	1 3/16-12	105 +/- 6	143 +/- 8	1 1/2	1 5/16-12	105 +/- 5	143 +/- 7	1	1
16	1 5/16-12	115 +/- 6	156 +/- 8	1 1/2	1 5/16-12	120 +/- 5	163 +/- 7	1	1
20	1 5/8-12	225 +/- 12	306 +/- 16	1 1/2	1 5/8-12	170 +/- 10	231 +/- 14	1	1
24	1 7/8-12	250 +/- 12	340 +/- 16	1 1/2	1 7/8-12	200 +/- 15	272 +/- 20	1	1
32	2-12	325 +/- 15	442 +/- 20	1 1/2	2 1/2-12	270 +/- 20	367 +/- 27	1	1

02-579-1

TABLE 2

O'RING FACE SEAL FITTINGS

DASH SIZE	PORT THREAD SIZE	PORT TORQUE (FT-LBS)	PORT TORQUE (N-M)	PORT F.F.F.T.	NUT THREAD SIZE	NUT TORQUE (FT-LBS)	NUT TORQUE (N-M)	TUBE NUT F.F.F.T.	SWIVEL NUT F.F.F.T.
4	7/16-20	15 +/- 1	20 +/- 1	1 1/2	9/16-18	11 +/- 1	15 +/- 1	2	2
6	9/16-18	25 +/- 1	34 +/- 1	1 1/2	11/16-16	19 +/- 1	26 +/- 2	1 1/2	1 1/4
8	3/4-16	55 +/- 5	73 +/- 5	1 1/2	13/16-16	33 +/- 2	45 +/- 2	1 1/2	1
10	7/8-14	76 +/- 4	104 +/- 6	1 1/2	1-14	48 +/- 2	64 +/- 4	1 1/2	1
12	1 1/16-12	130 +/- 5	177 +/- 7	1 1/2	1 3/16-12	67 +/- 3	93 +/- 2	1	1
16	1 5/16-12	210 +/- 10	285 +/- 15	2	1 7/16-12	96 +/- 4	130 +/- 5	1	1
20	1 5/8-12	245 +/- 35	333 +/- 48	2	1 11/16-12	133 +/- 7	180 +/- 10	1	1
24	1 7/8-12	315 +/- 45	430 +/- 60	2	2-12	157 +/- 7	212 +/- 12	1	1

02-579-2

TABLE 3

PIPE THREAD FITTINGS

PIPE THREAD SIZE	TORQUE W/ SEALANT (FT-LBS)	TORQUE W/O SEALANT (FT-LBS)	TORQUE W/ SEALANT (N-M)	TORQUE W/O SEALANT (N-M)	T.F.F.T.
1/16-27	10 +/- 1	15 +/- 1	14 +/- 1	20 +/- 1	2-3
1/8-27	15 +/- 1	20 +/- 1	20 +/- 1	27 +/- 3	2-3
1/4-18	20 +/- 2	25 +/- 2	27 +/- 3	34 +/- 3	1.5-3
3/8-18	25 +/- 2	35 +/- 2	34 +/- 3	48 +/- 3	2-3
1/2-14	35 +/- 2	45 +/- 3	48 +/- 3	61 +/- 4	2-3
3/4-14	45 +/- 3	55 +/- 3	61 +/- 4	75 +/- 4	2-3
1-11 1/2	55 +/- 3	65 +/- 3	75 +/- 4	88 +/- 4	1.5-2.5
1 1/4-11 1/2	70 +/- 4	80 +/- 4	95 +/- 5	109 +/- 5	1.5-2.5
1 1/2-11 1/2	80 +/- 4	95 +/- 5	109 +/- 5	129 +/- 7	1.5-2.5
2-11 1/2	95 +/- 5	120 +/- 5	129 +/- 7	163 +/- 7	1.5-2.5

02-579-3

TABLE 4

FLANGED FITTING - SCHEDULE 61
4 BOLT SPLIT FLANGE

FLANGE SIZE	BOLT THREAD	BOLT LENGTH	TORQUE (FT-LBS)	TORQUE (N-M)
1/2	5/16-18	1 1/4	17 +/- 2	22 +/- 2
3/4	3/8-16	1 1/4	25 +/- 4	34 +/- 6
1	3/8-16	1 1/4	31 +/- 4	43 +/- 5
1 1/4	7/16-14	1 1/2	40 +/- 5	56 +/- 6
1 1/2	1/2-13	1 1/2	52 +/- 7	70 +/- 9
2	1/2-13	1 1/2	61 +/- 7	81 +/- 9
2 1/2	1/2-13	1 3/4	86 +/- 7	113 +/- 9
3	5/8-11	1 3/4	145 +/- 7	194 +/- 9
3 1/2	5/8-11	2	125 +/- 8	169 +/- 12
4	5/8-11	2	125 +/- 8	169 +/- 12
5	5/8-11	2 1/4	125 +/- 8	169 +/- 12

02-579-4

TABLE 5

FLANGED FITTING - SCHEDULE 62
4 BOLT SPLIT FLANGE

FLANGE SIZE	BOLT THREAD	BOLT LENGTH	TORQUE (FT-LBS)	TORQUE (N-M)
1/2	5/16-18	1 1/4	17 +/- 2	22 +/- 2
3/4	3/8-16	1 1/2	29 +/- 4	40 +/- 5
1	7/16-14	1 3/4	46 +/- 4	62 +/- 6
1 1/4	1/2-13	1 3/4	69 +/- 6	93 +/- 9
1 1/2	5/8-11	2 1/4	125 +/- 7	169 +/- 12
2	3/4-10	2 3/4	208 +/- 8	282 +/- 12

02-579-5

(2) Mark initial corresponding position on the stationary and swiveling surfaces.

(3) Mark the appropriate position that will indicate proper final torque.

(4) Using the appropriate tools, turn the swiveling portion of the fitting to the appropriate position to align the designated marks. Leave in this position.

c. Typical installations include the assembly of:

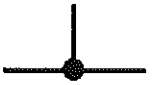
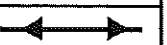
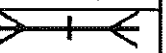
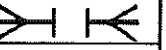
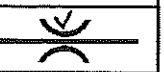
(1) Pipe fittings.

(2) Pipe fittings not accessible to torque wrenches.

STANDARD GRAPHIC SYMBOLS

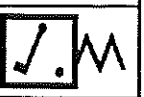
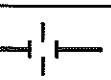
GENERAL

Figure 1, Standard Graphic Symbols, represents the standard graphic symbols used on the hydraulic and pneumatic schematics in this manual. For detailed explanations of each schematic, refer to the appropriate information in Section 5 - Hydraulic System, Section 6 - Pneumatic System, Section 9 - Options, or the appropriate manufacturer's information.

LINES AND LINE FUNCTIONS	
LINE, WORKING	
LINE, PILOT (L > 20 W)	
LINE, DRAIN OR EXHAUST (L < 5 W)	
CONNECTOR (DOT TO BE 5X WIDTH OF LINES)	
LINE, FLEXIBLE	
LINE, JOINING	
LINE, PASSING	
DIRECTION OF FLOW — hydraulic	
DIRECTION OF FLOW — pneumatic	
QUICK DISCONNECT — CONNECTED	
QUICK DISCONNECT — DISCONNECTED	
PLUG OR PLUGGED CONNECTION	
TESTING STATION (GAUGE CONNECTION)	
POWER TAKEOFF (HYD.)	
RESTRICTION, FIXED	
RESTRICTION, VARIABLE	

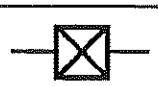
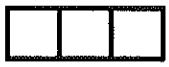
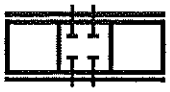
COMPRESSORS OR PUMPS	
COMPRESSOR, FIXED-DISPLACEMENT	
PUMP, HYDRAULIC	

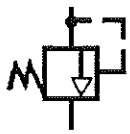
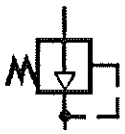
MOTORS AND CYLINDERS	
PNEUMATIC MOTOR, UNI-DIRECTIONAL	
PNEUMATIC MOTOR, BI-DIRECTIONAL	
ELECTRIC MOTOR	
CYLINDER, SINGLE ACTING	
Double-acting cylinder in which diameter of rod compared to diameter of bore is significant to circuit function	
PRESSURE INTENSIFIER	

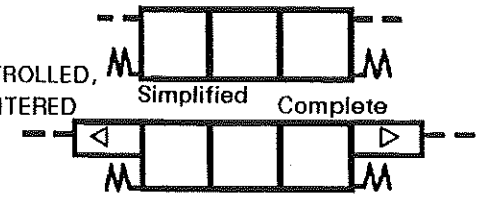
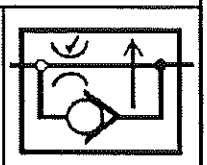
MISCELLANEOUS UNITS	
ROTATING SHAFT (ARROW IN FRONT OF SHAFT)	
COMPONENT ENCLOSURE	
RESERVOIR	
PRESSURE GAUGE	
PRESSURE SWITCH	
MUFFLER	
ORIFICE PLATE	
TEMPERATURE GAUGE	
INTERNAL-COMBUSTION ENGINE	

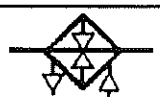
12322 (SHEET 1 OF 2)

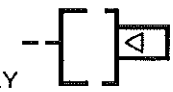
FIGURE 1 - STANDARD GRAPHIC SYMBOLS

VALVES AND BASIC SYMBOLS	
VALVE, CHECK	
VALVE, MANUAL SHUT OFF	
VALVE, MAXIMUM PRESSURE (RELIEF)	
VALVE, BASIC SYMBOL SINGLE FLOW PATH IS MODIFIED	
VALVE, BASIC SYMBOL MULTIPLE FLOW PATHS ARE CHANGED	
VALVE, SINGLE FLOW PATH, NORMALLY CLOSED	
VALVE, SINGLE FLOW PATH, NORMALLY OPEN	
VALVE, MULTIPLE FLOW PATHS, BLOCKED INFINITE POSITIONING	
VALVE, MULTIPLE FLOW PATHS, OPEN (ARROWS DENOTE DIRECTION OF FLOW)	
TWO - POSITION, SNAP ACTION WITH TRANSITION	

VALVE EXAMPLES	
VALVE, RELIEF REMOTELY OPERATED (UNLOADING VALVE)	
VALVE, TWO WAY NORMALLY OPEN	
VALVE, PRESSURE PROTECTION	
VALVE, PRESSURE REDUCING	

VALVE EXAMPLES (CONT.)	
PILOT - CONTROLLED, SPRING - CENTERED	
ADJUSTABLE, PRESSURE-COMPENSATED FLOW CONTROL, WITH BYPASS	

FLUID CONDITIONERS	
FILTER - STRAINER	
COOLER, GASEOUS COOLING MEDIA	
HEATER, GASEOUS HEATING MEDIA	

METHODS OF CONTROL	
SPRING	
PILOT OPERATED	
PILOT OPERATED, DIFFERENTIAL AREA REMOTE SUPPLY - INTERNAL SUPPLY	
MANUAL, PUSH BUTTON	
MANUAL, PUSH-PULL LEVER	
MANUAL, PEDAL OR TREADLE	
MECHANICAL	
OTHER *INSERT APPROPRIATE SYMBOL OR NAME	

12322 (SHEET 2 OF 2)

FIGURE 1 - STANDARD GRAPHIC SYMBOLS, CONTINUED

FIELD REPAIR WELDING PROCEDURES

These instructions are mandatory guidelines for the field repair and remanufactured processes of Terex|Unit Rig structures. The procedures are based on the shielded metal arc welding process using low hydrogen electrodes and flux cored arc welding. They provide welding guidelines on Terex|Unit Rig Products – Unit Rig and Lectra Haul, Dart, and Payhauler.

REVISION DESCRIPTION

Terex|Unit Rig makes a constant effort to offer our customer maintenance information to reduce operating costs through increased service life and reduced downtime. Terex|Unit Rig's Engineering Department has reviewed the previous welding documentation and the following information has been included in these procedures.

1. Weld Filler Material (SMAW)

The weld filler material considered for weld repairs is AWS E8018C3 (with E7018-1 as an alternative) and is recommended as the primary choice. These both have excellent cold weather impact properties and provide the required tensile strength.

2. Flux Cored Arc Welding (FCAW)

Also known as Dual Shielded Welding is approved using AWS Lincoln 71M or Frontarc 711 (Koby). Shielding is obtained through decomposition of the flux within the tubular wire. Additional shielding is obtained from an externally supplied gas mixture of 75% Argon 25% CO_2.

NOTE: *CO_2 by itself will not meet Terex|Unit Rig Engineering Charpy requirements.*

3. Roll Over Protective Structure (R.O.P.S.)

To avoid violation of the R.O.P.S. certification, do not weld to or modify the R.O.P.S. in any way without the prior written permission of Terex|Unit Rig. The R.O.P.S. may not provide sufficient protection if it has been altered, damaged, or previously involved in a roll over. Contact your Terex|Unit Rig Service Advisor or Service Department for assistance with R.O.P.S. related questions.

4. Tack Welds

We previously allowed tack welds no larger than a rod diameter without preheating. These tack welds, under certain adverse conditions, could produce hydrogen embrittlement cracking. To eliminate this possibility the information on Welding Application and Tack Weld has been revised.

MATERIAL SPECIFICATIONS

1. All plate material must conform to constructional alloy steel ASTM-A514, Type A.2 on trucks built prior to 1985; after 1985, Unit Rig specification 02-560, 561, 562 - similar to Bethstar 80.

NOTE: *Some dump bodies still use 04 - 578 material. Contact a Terex|Unit Rig representative for material specification.*

2. The main frames of Unit Rig (and Lectra Haul) trucks and Dart products plus many of the other major structural components are now being fabricated from a HSLA (High Strength, Low Alloy) steel. This material has a minimum yield strength of 55 to 80 ksi (55 to 80 MPa), depending on thickness and where used, and is very similar to Bethstar 80, except with a lower allowable sulfur content and is produced by the "controlled rolled" process. The result is a superior quality steel with very favorable weld characteristics and good fatigue qualities.

However, in order to take advantage of these characteristics it is still necessary to carefully follow the weld and repair procedures. Further questions should be directed through the Terex|Unit Rig Engineering or Technical Service Departments or a Service Advisor.

ELECTRODE/WIRE SPECIFICATIONS

1. All shield metal arc welding (stick) electrodes must conform to AWS E8018 C3 or approved equivalent, such as E-7018-1. Welding should be DC, reverse polarity. Alternate electrodes require Terex|Unit Rig Mining Engineering approval.

NOTE: *The material has excellent cold weather impact properties and provides the required tensile strength.*

2. Flux core arc welding (FCAW) must conform to Lincoln 71M or Frontarc 711 (Koby).

a. The approved wires are Lincoln outer shield 1/16 inch (0.052) and 0.045 - dual shield 1170. Gas flow rate 35 to 45 cfh (1 to 1.3 m^3/hr).

b. External shielding gas shall be CO_2 or a mixture of 75% Argon, 25% CO_2. For further detailed information

refer to your electrode supplier or Unit Rig Specification 02-150.

NOTE: *CO_2 by itself will not meet Terex/Unit Rig Engineering Charpy requirements.*

ELECTRODE CARE (STICK)

1. All electrodes must be purchased in hermetically sealed containers. Immediately on opening the container, the electrodes must be removed from container and transferred to a ventilated holding oven at 250 to 300° F (125 to 150° C).

2. If the electrode container has been damaged so as to allow electrode exposure to air, or if it is not of hermetically sealed type, the electrode should be baked at the temperature and for the time as specified by the electrode manufacturer. One to one and a quarter hours at 700 to 800° F (271 to 427° C) is common. They should then be returned to the holding oven as in Step 1.

3. Heating electrodes at a low temperature, 250 to 300° F (125 to 150° C), for several hours is not equivalent to using specified temperatures as outlined in Step 2.

4. Stick electrodes contaminated with oil, grease, water, or with damaged coating must be discarded.

5. No more than a 15 minute supply of electrodes should be removed from oven at one time. Unused electrodes out of oven more than 30 minutes must be discarded or reconditioned as outlined in Step 2.

ELECTRODE CARE (WIRE REELS)

1. Welding wire must be maintained free of dirt, oil and other contaminants.

2. Wire that has been accidentally contaminated must be scrapped.

3. Wire reels should not be removed from shipping box until ready to use.

WELDING PREPARATION

1. Clean the surface prior to making repairs. Use a gas torch, buffer, or grinder to remove paint, rust, oil, and/or dirt.

2. For proper electrode grounding, attach ground cable directly to part being welded. For example, superstructure-to-superstructure, frame-to-frame, and axlebox-to-axlebox. This will avoid current passing through bearings. Grounding leads from the power supply should have good ground clamps.

⚠ CAUTION

During wet weather, when welding leads have bare wire exposed, improper grounding can occur causing damage to truck parts.

3. To protect the truck's electrical system, refer to General Electric TIPS, Issue 34, Oct. 1989, or later information.

DO NOT pull any control cards or remove panel connectors. This practice can cause more damage than it prevents. It puts unnecessary cycles on the connector pins and may result in loose or dirty pins which could result in a control system failure.

4. If the truck has a Detroit Diesel engine equipped with DDEC controls or an Allison transmission with ATEC controls, the ECM power must be disconnected either by a suitable switch or disconnecting the power plug. The Master Switch must be kept in the Off position.

5. Air arcing is required when removing weldment and removing cracks in welds and parent material. The maximum size air arc electrode recommended is 1/4 inch (6.35 mm) in diameter. Scarfing or gas gouging is not permitted. Air arcing should begin 1/2 inch (12 mm) past the propagating end of crack. After air arcing, remove carbon deposits by grinding metal until bright, including all cavities. A die grinder with a carbide burr is recommended for all grinding. Complete removal of crack should be verified by NDT, such as dye penetrant or magnetic particle inspection.

6. An oxygen and gas cutting torch is recommended for web plate cut-outs and preheating. Correct tip size compatible with metal thickness is important to avoid over-heating metal edges. Flame-cut surfaces having burn marks deeper than 1/16 inch (1.6 mm) will require grinding.

WELDING PRECAUTIONS

1. The weld joint plus a three inch (75 mm) area either side must be preheated to 213° F (101° C) (minimum) prior to welding. A temperature crayon, such as tempilstick, can be used for checking the temperature.

2. Interpass temperatures should not exceed 400° F (204 C). Discontinue work until surface cools to approximately 250° F (118° C).

3. All welds must be made with stringer passes. No weaving of welds is acceptable; however, a slight oscillation may be necessary, but movements should never exceed 1/8 inch (3 mm) maximum width or 1/16 inch (1.5 mm) per side of oscillation.

4. When cold weather welding, the overall temperature must be above 50° F (10° C) on the truck or component parts. Cold climates require covering the work piece and using heaters to raise the temperature above 50° F (10° C) and maintaining this temperature control throughout the welding process.

5. Preheat and interpass temperature control are recommended for optimum mechanical properties, crack resistance and hardness control. This is particularly important on multiple pass welds and heavier plate. Job conditions, prevailing codes, high restraint, alloy level and other considerations may also require preheat and interpass temperature control.

WELDING APPLICATION AND TACK WELDS

1. Preheating is required for all tack welds, regardless of size.

2. Cracks that occur in tack (or skip) welds must be removed.

3. Tacks must not leave an uneven finished weld profile on a single or multiple pass welds.

4. Tack welds should be consumed in the final weld or removed by grinding 1/64 inch (1 mm) into the parent material.

5. It is very important that each weld bead be thoroughly cleaned before the following bead is deposited. Pneumatic or hand chipping must be done with a blunt tool after each pass. Wire brushing after chipping is required. Air must never be blown on the weld area.

6. In multiple pass welding all starts and stops must be staggered.

7. Welds must be finish ground as specified in current Terex|Unit Rig T-drawings and blueprints.

WIRE APPLICATIONS

1. All welds should be made with stringer passes.

2. Flux Core Arc Welding (FCAW)

a. Lincoln 71M (or Frontarc 711 (Koby))

These are both all position flux cored wires that display exceptional impact properties in both the as-welded and stress-relieved conditions. Arc characteristics are smooth and splatter level is low. It is recommended for the wide range of low and medium carbon steels used extensively in the construction, shipbuilding, rail car and heavy equipment industries.

Shielding Gas - 75% Argon/25% CO_2

NOTE: *CO_2 by itself will not meet Terex|Unit Rig Engineering Charpy requirements.*

3. Proper AWS classification of filler material, flux-core can be applied in the vertical-up position. All welds should be made with stringer passes. Flat position is preferred as this improves melted metal flow, bead contour and shielding gas coverage. All starts and stops using multi-pass welding should be staggered wherever possible. A pneumatic chipping hammer is used to clean each weld bead and remove the slag covering.

TIG DRESSING PROCEDURE

1. The surface shall be clean and free of mill scale and slag prior to initial welding. Blasting is the preferred method of cleaning.

2. The completed weld shall be clean and free of slag before TIG dressing.

3. The tip of the electrode shall be kept sharp and clean.

4. There shall be no undercut at the resulting dressed profile.

5. Weld parameters:

a. Electrode:	Thoriated tungsten, 0.12 to 0.016 inch (0.3 to 0.4 mm) diameter
b. Welding current:	150 to 250 amp range
c. Welding voltage:	10 to 25 V range
d. Welding speed:	4 to 8 inches/minute (101 to 203 mm/minute) range 6 inches/minute (152 mm/minute) target
e. Heat input:	25 to 63 kj/inch (1 to 2.5 kj/mm) range 45 kj/inch (1.8 kj/mm) target

ELECTRODE CHART (out of position welds) ELECTRODE SIZES AND APPLICATIONS				
APPLICATION	DESCRIPTION	STICK ELECTRODE DIAMETER	SHIELDED MANUAL ARC WELDING (SMAW)	
			Primary	Alternate
Flange Repair	1" Plate	3/32" - 1/8"	E-8018 C3	E-7018-1*
Web Plates	Bell Cut-Outs	3/32" - 1/8"	E-8018 C3	E-7018-1*
Tack Welds	All	3/32" - 1/8"	E-8018 C3	E-7018-1*
Original Welds	Under 10" (255 mm) Long	3/32" - 1/8"	E-8018 C3	E-7018-1*
	Over 10" (255 mm) Long	1/8"	E-8018 C3	E-7018-1*
Dump Bodies		1/8" - 5/32"	E-8018 C3	E-7018-1*
APPLICATION	DESCRIPTION	FLUX CORE WIRE DIAMETER	FLUX CORE ARC WELDING (FLAW)	
			Primary	Alternate
Wrapper Repair*	1" Plate	.045 - 1/16"	Lincoln 71M	Frontarc 711
Web Plates	Bell Cut-Outs	.045 - 1/16"	Lincoln 71M	Frontarc 711
Tack Welds	All	.045 - 1/16"	Lincoln 71M	Frontarc 711
Original Welds	Under 10" (255 mm) Long	.045 - 1/16"	Lincoln 71M	Frontarc 711
	Over 10" (255 mm) Long	.045 - 1/16"	Lincoln 71M	Frontarc 711
Dump Bodies		.045 - 1/16"	Lincoln 71M	Frontarc 711
* Lincoln, Essb, Hobart, etc. * (Note: Do not exceed 400° F (205° C) Interpass Temperature				13695

f. Preheat: As required by base material composition

g. Shielding gas: Argon

h. Gas flow: 0.35 to 0.42 cfm (9.85 to 11.83 liters/minute)

6. Added weld material is not required, but compatible weld consumable may be used to fill undercut resulting from initial welding.

TIG DRESSING PROCEDURE

PURPOSE: TO IMPROVE THE FATIGUE STRENGTH OF WELDED JOINTS THAT ARE NORMALLY SUSCEPTIBLE TO FATIGUE FAILURE AT THE WELD TOE.

REQUIREMENTS:

1. SURFACE SHALL BE CLEAN AND FREE OF MILLSCALE AND SLAG PRIOR TO INITIAL WELDING. BLASTING IS PREFERRED METHOD.

2. COMPLETED WELD SHALL BE CLEAN AND FREE OF SLAG BEFORE TIG DRESSING.

3. THE TIP OF THE ELECTRODE SHALL BE KEPT SHARP AND CLEAN.

4. THERE SHALL BE NO UNDERCUT AT THE RESULTING DRESSED PROFILE.

5. WELD PARAMETERS:

ELECTRODE	THORIATED TUNGSTEN, 0.12"-0.016" DIAMETER
WELDING CURRENT	150-250A RANGE
WELDING VOLTAGE	10-25V RANGE
WELDING SPEED	4-8 IN/MIN. RANGE, 6 IN/MIN. TARGET
HEAT INPUT	25-63 KJ/IN RANGE, 45 KJ/IN TARGET
PREHEAT	AS REQ'D BY BASE MAT'L COMPOSITION.
SHIELDING GAS	ARGON
GAS FLOW	0.35-0.42 CFM

6. ADDED WELD METAL IS NOT REQUIRED, BUT COMPATIBLE WELD CONSUMABLE MAY BE USED TO FILL UNDERCUT RESULTING FROM INITIAL WELDING.

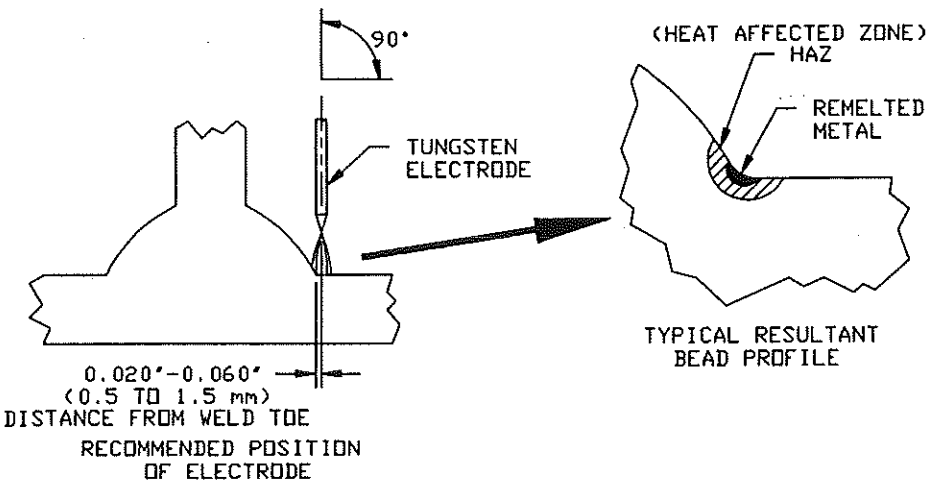


FIGURE 1 - TIG WELD DRESSING RECOMMENDATIONS (T-5089)

PREVENTIVE MAINTENANCE FOR MT 4400

GENERAL

Preventive maintenance is a systematic approach to keeping the truck and its components in good condition and operational. This can reduce down time and increase the life of the truck. In addition, a higher level of safety during the truck's operation can be met.

Records of all maintenance should be kept. Information such as pressure readings, condition of components, etc. should be included. Good information can be useful in preventing problems and in determining the causes of improper operation of a system.

USE OF THE PREVENTIVE MAINTENANCE TABLES

Two inter-related tables are included to summarize the recommended practices.

Table 1 - Preventive Maintenance Guidelines - A matrix of service items and the recommended intervals.

Table 2 - Mechanical Preventive Maintenance Schedule - A detailed list of instructions and recommendations on the items listed in Table 1.

TABLE 1

This table is divided into several sections separated by main headings. The sections are of the same title and sequence as the sections in this manual.

To use the table, locate the Hours column that matches the procedure to be scheduled. Look down the column to see what items need attention. The letter or letters appearing in the Hours column and beside the components designate what kind of attention is needed, and are defined in the Key.

If a specific component is to be found, determine the general section in which the component would most likely be included. The components are generally included in the same section that they are covered in the Items column. The main components are in alphabetical order.

TABLE 2

This table is divided into eight levels, each with a preset service interval.

To use this section, determine the service interval (e.g. from Table 1). Use this information to locate the corresponding level. After locating the appropriate level, review the information for detailed instructions.

IMPORTANT NOTES

It should be noted that the Preventive Maintenance Tables do not include all of the components on the truck. However, the entire truck should be checked at intervals based on the operating conditions of the mine. The pre-operational inspection outlined in the Operator's Manual should be performed, as it is a part of preventive maintenance.

Some of the components in the Items columns are optional equipment. They are included to cover the trucks equipped with options.

The hours shown in the table are the maximum recommended hours that preventive maintenance should be scheduled. Preventive maintenance on any part of the truck should be performed more frequently if the conditions of the mine require so.

If a truck is equipped with an automatic lubrication system, its operation should not be taken for granted. Verify that the parts serviced by this system are lubricated.

TABLE 1
PREVENTIVE MAINTENANCE GUIDELINES

KEY	
I	INSPECT
L	LUBRICATE
R	REPLACE
S	SERVICE
T	TEST
V	VISUALLY INSPECT
*	Refer to the appropriate manufacturer's specific instructions

NOTE: Where L, R, S or T are used, a visual inspection should also be performed.

13578

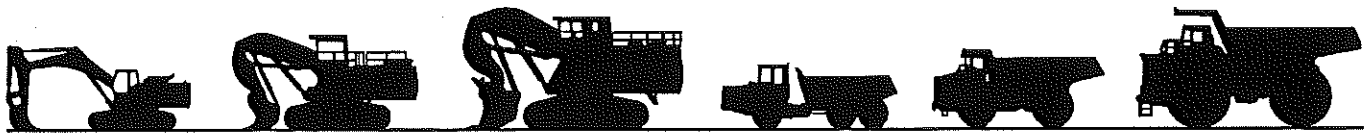
TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES STRUCTURE									
ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Cab									
Cab Mounts			I						
Controls	V		I						
Defroster	V		I						
Door	V		I						
Gauges	V		I						
Heater	V		I						
Horn	V		I						
Indicators	V		I						
Mirrors	V		I						
Seats and Belts	V		I						
Shifter and Linkage	V		I						
Windows	V		I						
Wipers	V		I						
Dump Body									
Body and Liners	V		I						
Canopy	V		I						
Pads	V		I						
Pivot Pins	V		I						
Rock Ejectors	V		I						
Dump Cylinder									
Attachment Points	V		I						
Frame	V		I						
Fuel and Hydraulic Tanks	V		I, S						
Ladder and Rails	V		I						
Superstructure	V		I						

13579

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES
24 V dc ELECTRICAL

ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Batteries	V		I						
Battery Charging Alternator	V		I						
Clearance Lights	V		I						
Gauges	V		I						
Headlights	V		I						
Indicators	V		I						
Switches	V		I						
Taillights	V		I						
Wiring	V		I						Inspect wiring for damage & loose connections. Secure away from moving parts.

13580



NOTES:

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES POWER PACKAGE									
ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Alternator	V		I						
Blower	V		I						
Blower Ducting	V		I						
Engine Cooling System:	V		I						
Belts (if so equipped)	V		I						
Coolant Filter	V								
Coolant Level	V								
Coolant Lines and Clamps	V		I						
Engine Water Pump	V		I						
Fan Assy., Bushings & Bearings	V		I		L				
Sheave	V		I		L				
Radiator Cap	V								
Radiator Core/Aux. Coolers	V		I						
Radiator Mounts & Stabilizer	V		I						
Radiator Tanks	V		I						Steam clean if necessary.
Engine	V								*Check engine area for leaks. Check for damaged or loose connections and pipes.
Air Cleaners and Dry Filter Elements	V		I, S						
Air Cleaner Restriction Indicators	V		I						
Starter	V		I						
Emergency Shut-off Device (if so equipped)	V		I						
Engine Speed Control and Actuator	V		T						
Exhaust System	V		I						
Inlet Manifold and Air Piping	V		I						
Mounts	V		I						
Turbocharger	V		I						
Engine Crankcase Breather	V								*
Engine Oil									*
Oil Filters and Bypass Filters (if so equipped)	V								*
Fuel Filters (Primary and Secondary)	S								*Drain H2O daily.

13790

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES
HYDRAULIC SYSTEM

ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Accumulators	V		I, T						
Brake Valves	V		I, T						
Dump Valve/Cylinders	V		I, T						
Hydraulic Lines/Cooler	V		I, T						
Hydraulic Oil	V						R		
Hydraulic Oil Filters			R						
Hydraulic Pump U-Joints & Spline	V		L						Chassis grease
Hydraulic Tank Air Breathers/Relief Valve	V		I, S	R					Clean with solvent and dip in clean oil unless replaceable.
Steering:									
Manual Power Supply (if so equipped)	V		I, T	S					
Cylinders	V		I						
Linkage	V		I						
Manifolds	V		I, T						
Autolube System			I,S,T						

13791

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES
PNEUMATIC SYSTEM (if so equipped)

ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Air Aftercooler (if so equipped)	V		I, T				S		
Air Compressor	V		I, T				S		
Air Governor	V		I, T				S		*
Air Starter and Lubricator	V		I, T				S		
Air Tank(s)	V		I, T				S		

13583

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES
RUNNING GEAR

ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Axlebox:									
Access Door	V		I						
Grease Hoses	V		I						
Nosecone Bushing	V		I		S				
Panhard Bar	V		I						
Suspension Mounts	V		I						
Front Axle Kingpin Assembly	V		I, T						Clearance measurements.
Front Wheel Bearings/Grease Lubricated	V		I				S	R	
Front Wheel Bearings/Oil Lubricated	V	S	S	S					Sample @ 250 Hours. Change @ 1,000 Hours.
Hub Caps	V		I						Ensure hub caps are sealed.
Rims	V		I						
Steering Linkage			I, T						Inspect toe-in. Inspect tightness of linkage.
Suspension (Front):			I						
Mounting Bolts			I						
Ride Height	V		T						
Seals	V								
Tubes	V								
Suspension (Rear):									
Bushings and Mounting Pins			I						
Ride Height	V	T	I, T						
Tires	V		I						
Wheels	V	I	I						
Wheelmotors:									
Dirt Seals	V								*
Gear Box Lubricant	V		S			R			Sample @ 500 Hours (max.). Change @ 3,000 Hours (max.).
Sump Breathers	V		I						
Mounting			I						
Drive			S						

13792

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES
BRAKE SYSTEM

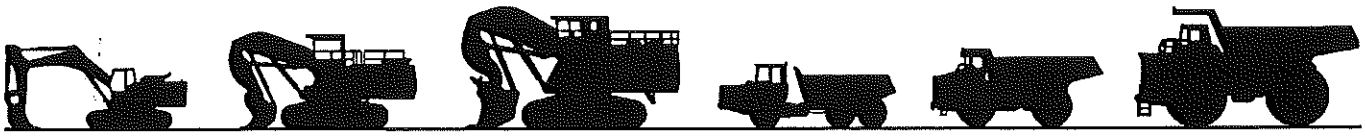
ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Supply Lines	V		I						
Calipers and Discs	V		I						
Friction Pads	V		I						
Hand, Loading & Park Controls	V		I						
Park Brake System	V		I, T						
Valves	V		I						

13585

TABLE 1 - PREVENTIVE MAINTENANCE GUIDELINES
ACCESSORIES/OPTIONS

ITEM	HOURLY INTERVAL								REMARK
	Every Shift	Every 250	Every 500	Every 1,000	Every 2,500	Every 3,000	Every 5,000	Every 10,000	
Autolube System			I, T						
Fire Suppression System									
Manual			I, T						
Automatic			I, T						
Weigh System			I, S						

13855



NOTES:

TABLE 2
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

RECOMMENDED MINIMUM SERVICE FREQUENCY FOR MT 4400	LEVEL 1 Operator Shift/Daily L-1	LEVEL 2 250 HOURS L-2	LEVEL 3 500 HOURS L-3	LEVEL 4 1,000 HOURS L-4	LEVEL 5 2,500 HOURS L-5	LEVEL 6 3,000 HOURS L-6	LEVEL 7 5,000 HOURS L-7	LEVEL 8 10,000 HOURS L-8
PERFORM DURING (PREFERABLY @ THE BEGINNING OF) EACH OPERATOR'S SHIFT.								
PERFORM EACH 250 HOURS OF OPERATION. INCLUDES LEVEL L-1.		L-2						
PERFORM EACH 500 HOURS OF OPERATION. INCLUDES LEVELS L-1 AND L-2.			L-3					
PERFORM EACH 1,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2 AND L-3.				L-4				
PERFORM EACH 2,500 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2 AND L-3.					L-5			
PERFORM EACH 3,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3 AND L-4.						L-6		
PERFORM EACH 5,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3, L-4 AND L-5.							L-7	
PERFORM EACH 10,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3, L-4, L-5 AND L-7.								L-8

PERFORM PREVIOUS INTERVAL ITEMS AT MULTIPLES OF THE ORIGINAL RECOMMENDATION. FOR EXAMPLE, AT 500 HOURS (LEVEL L-3) OF OPERATION, ALSO PERFORM THOSE ITEMS LISTED UNDER SHIFT INSPECTION (LEVEL L-1) AND 250 HOURS INSPECTION (LEVEL L-2) ETC.

13793

TABLE 2 - LEVEL 1
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

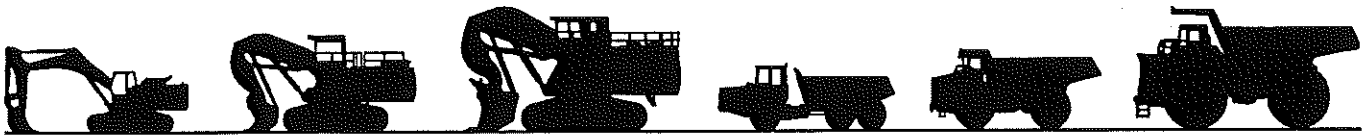
LEVEL 1	TRUCK MODEL **MT 4400**, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT BEGINNING OF EACH OPERATOR'S SHIFT.	OK	REPAIRS NEEDED	PERFORMED BY
1. Perform a walk-around visual inspection as outlined in SECTION 1 - DESCRIPTION AND OPERATION. Check for fuel and hydraulic leaks, damaged, frayed, or improperly secured cables, hoses or components, and the general overall condition of the truck.			
2. Drain water and contaminants from fuel filters daily or each shift.			

13646

TABLE 2 - LEVEL 2
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 2	TRUCK MODEL MT 4400, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 250 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Perform any engine maintenance as outlined in the engine manufacturer's recommendations. Typically this includes changing the engine oil and filters. **NOTE:** Refer to the engine manufacturer's manual for detailed instructions.			
2. Check the hydraulic oil level.			
3. Sample the front wheel bearing lubricant (oil lubricated wheel bearings) as outlined in Section 7 - Running Gear.			
4. Inspect the front wheel bearing reservoir breather (if so equipped).			

13648



NOTES:

TABLE 2 - LEVEL 3
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 3	TRUCK MODEL **MT 4400,** S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Wash the truck thoroughly. The frame & components must be clean in order to facilitate inspection. Use care to avoid water entering & contaminating the traction alternator, wheelmotors, electrical system cooling ducts, the retarding grid box, electrical control cabinet, hydraulic & fuel reservoirs, & any other area adversely affected by water or accumulation. **NOTE:** *Use caution when cleaning in the wheelmotor hubcap & thrust ring area. High pressure should NOT be used here. Refer to GE Tips No. 16 for details.*			
2. Visually inspect the main frame for evidence of damage. Special attention should be paid to weldments. **NOTE:** *Any defects should be repaired promptly & in accordance with recommendations. For applicable welding procedures see the instructions of Field Welding in Section 10 - Miscellaneous in this manual. Use only approved welding rod & practices.*			
3. Inspect all access & service ladders & railings for evidence of wear or damage.			
4. Inspect the engine area components for evidence of improper operation & adjustment, leakage, wear, or damage, particularly the following items: a) All engine inlet & exhaust pipes. b) Air cleaner elements (free of dirt & properly serviced). c) Radiator, fan, fan drives & guards. d) All engine coolant system piping & components. e) Fan & accessory drive belts.			
5. Inspect the front axle assembly components for proper lubrication & evidence of wear or damage: (make sure that all grease seals are in place) a) Kingpin assemblies (measure radial & vertical wear clearances). b) Steering cylinders. c) Steering linkage & components including measuring the toe-in of the front tires. d) Trailing & lateral mounting arm assemblies.			
6. Inspect the front brake system components for evidence of leakage, wear or damage.			

LEVEL 3 - Continued next page

13649-1

TABLE 2 - LEVEL 3
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 3	TRUCK MODEL **MT 4400,** S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
7. Service the front wheel assembly including: a) Inspecting the wheel clamps & studs for proper installation & torque. b) Inspecting the tires for proper inflation pressure & evidence of wear or damage. c) Inspecting the wheel bearing area for evidence of leakage.			
8. Inspect the front suspension assemblies for: a) Evidence of proper lubrication & leakage, wear or damage. b) Proper installation of the grease seals. c) Proper empty truck ride height.			
9. Visually inspect the superstructure & support structure for proper mounting & evidence of wear or damage. Special attention should be paid to weldments. **NOTE:** *Any defects should be repaired promptly & in accordance with recommendations. For applicable welding procedures see the instructions of Field Welding in Section 10 - Miscellaneous in this manual. Use only approved welding rod & practices.*			
10. Inspect the hydraulic tank & filter assembly for proper mounting.			
11. Sample the hydraulic oil, then change all filter elements in the hydraulic systems. **NOTE:** *Oil sampling & monitoring of the condition of the filtration system may provide a different filter change interval.*			
12. Inspect the dump cylinders & mounts for evidence of leakage, wear or damage.			
13. Inspect the hydraulic pump driveshaft assembly for evidence of proper lubrication & leakage, wear or damage. If equipped with re-lubable type U-joints, carefully lubricate with chassis grease. **NOTE:** *Do not over-grease as this can damage the seals.*			
14. Inspect the cooling air blower & ducting for proper installation & evidence of leakage, wear or damage.			
15. Inspect the hydraulic pump assembly for proper mounting & evidence of leakage, wear or damage.			

13649-2

LEVEL 3 - Continued next page

TABLE 2 - LEVEL 3
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 3	TRUCK MODEL **MT 4400,** S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
16. Inspect the axlebox assembly for proper installation, lubrication & evidence of wear or damage. Make sure that all grease seals are in place. a) Nosecone assembly. b) Radius rod assembly. c) Access door assembly & seal.			
17. Inspect the wheelmotor area for proper installation & mounting & evidence of leakage, wear or damage including: a) Inspecting the structure both internally & externally. b) Wheelmotor to axlebox attachment. c) Inspecting the wheel clamps & studs for proper installation & torque. d) Inspecting the tires for proper inflation pressure & evidence of wear or damage. e) Inspecting the wheel bearing & hubcap areas for evidence of leakage. f) Sample the gear lubricant as outlined in the service requirements from the wheelmotor manufacturer. g) Inspect then clean the magnetic plugs in the wheelmotor gear case sump.			
18. Inspect each of the rear brake assemblies for proper installation & evidence of leakage, wear or damage. Also, verify that the hubcaps are properly installed & free of damage.			
19. Inspect the rear suspension assemblies for: a) Evidence of proper lubrication & leakage, wear or damage. b) Proper installation of the grease seals. c) Proper empty truck ride height.			
20. Inspect the dump body pivot pin & bushing assemblies for evidence of wear or damage.			
21. Inspect the dump body assembly for proper installation & evidence of wear or damage including: a) Rock ejectors. b) Structural components. c) Liners. d) Pads. e) Guides on frame.			
22. Inspect the fuel tank assembly for proper mounting. Drain any accumulated moisture or other contaminants.			
23. Inspect grid box & components for proper installation & evidence of wear or damage. Remove any dirt or other contamination.			

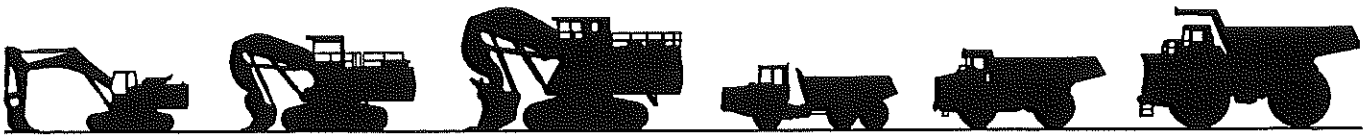
13649-3

LEVEL 3 - Continued next page

TABLE 2 - LEVEL 3
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 3	TRUCK MODEL MT 4400, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
24. Inspect the elctrical drive system components box for proper installation & evidence of wear or damage. Remove any dirt or other contamination.			
25. Inspect the cab & all components, plumbing, & wiring for proper installation & evidence of wear or damage. Include checking all of: a) Windows & doors. b) Controls & interlocks. c) System operation.			
26. Test the operation of the following systems as outlined in the proper publication: a) Dump system (including the oil cooler system). b) Steering system. c) Brake system. d) 24 Vdc system including the battery charging alternators, batteries & operating components. e) Light system. f) Warning horn systems. g) Engine & propulsion & retarding systems.			
27. Test the operation of the autolube system as outlined in the proper procedures in Section 9. Also, on trucks equipped with the rotary pump configuration, check the level of the lubrication oil in the separate reservoir.			
28. Weigh system: a) Inspect & test the operation system components as outlined in the instructions in the separate manual. Repair or replace as required. b) Download the data stored in the system. Review for problems & correct as required. Keep the data for later reference.			
29. Fire suppressant system: a) Inspect & test the operation of the system components as outlined in the instructions in the publications. Repair or replace as required.			

13649-4



NOTES:

TABLE 2 - LEVEL 4
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 4	TRUCK MODEL **MT 4400**, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 1,000 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Inspect the operator's cab filter element. Replace if required.			
2. Sample, then change the front wheel bearing lubricant (oil lubricated bearings).			

13653

TABLE 2 - LEVEL 5
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 5	TRUCK MODEL **MT 4400**, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 2,500 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Recheck the torque on the axlebox nosecone bearing bolts.			
2. Check the allowable movement of the axlebox as outlined in Section 7 - Running Gear.			
3. Sample then change the front wheel bearing lubricant (oil lubricated bearings).			
4. Recheck the torque on the expander pin retainer bolts on the steering system components.			

13654

TABLE 2 - LEVEL 6
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 6	TRUCK MODEL **MT 4400**, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 3,000 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Sample then change the oil in the wheelmotor gear case sump. **NOTE:** *Change the oil after the first 500 hours of operation of a new or rebuilt wheelmotor. After that, change at the 3,000 hour intervals. The 3,000 hour interval is the maximum. More frequent oil changes may be required, depending upon individual mine or component conditions. An oil sampling & monitoring program should be used in making these determinations.*			
2. Inspect & clean the magnetic plugs in the wheelmotor gear case sump.			

13862

TABLE 2 - LEVEL 7
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

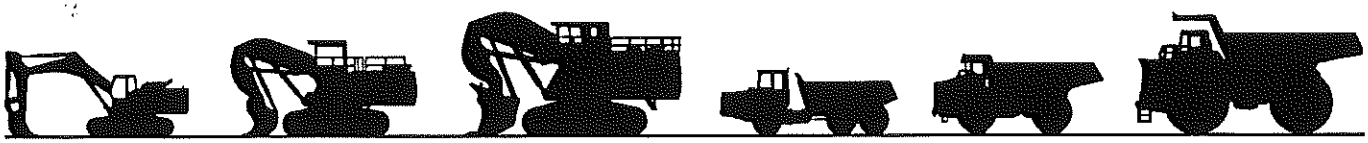
LEVEL 7	TRUCK MODEL MT 4400, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 5,000 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Change the hydraulic oil. Clean the internal tank suction screens while the tank is empty. Inspect the tank for indications of damage or contamination or residue. Repair and/or clean prior to refilling. **NOTE:** *Use oil outlined in information on lubricants in Section 10 - Miscellaneous.* **NOTE:** *Oil sampling & monitoring of the condition of the filtration system may provide a different oil change interval.*			
2. Clean, inspect, & repack & reshim the front wheel bearings.			
3. Replace the hydraulic tank relief valve.			
4. On Cummins engine equipped trucks; clean, inspect & repack the engine fan hub & drive belt backside idler assemblies (using Areoshell 5 lubricant) or equivalent. **NOTE:** *On Detroit Diesel engine equipped trucks, bearing packing & replacement is recommended at engine overhaul time.*			

13655

TABLE 2 - LEVEL 8
MECHANICAL PREVENTIVE MAINTENANCE SCHEDULE

LEVEL 8	TRUCK MODEL MT 4400, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 10,000 HOUR INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
1. Replace front wheel bearings. Install & reshim. Install new seals.			

13750



NOTES:

FIELD ASSEMBLY INSTRUCTIONS
MT 4400

DESCRIPTION

The TEREX|UNIT RIG trucks are too massive to usually be shipped in one piece. Typically the trucks are assembled without dump bodies at the manufacturing plant, then disassembled and prepared for shipment in a modular form.

The trucks may be assembled in many ways depending upon many factors including the equipment and manpower available. These instructions focus on what has been found as the most typical assembly process. The remaining versions are but variations on this process.

PREPARATION

Before the components begin arriving at the field assembly site, a plan should be developed for receiving and assembling the trucks. The plan should include several key items:

Personnel requirements
Hand tool requirements
Welding equipment requirements
Site requirements
Safety requirements

Personnel Requirements

A typical assembly crew consists of the following:

1 Lead man - to supervise the crew. Should have heavy equipment experience.
1 or more experienced crane operators (quantity dependent upon equipment requirements and availability).
3 experienced journeyman welders - primarily for dump body assembly and final bracket securing.
3 mechanical/electrical laborers - experienced in heavy component assembly.
1 crew member who is experienced in the installation of electrical, mechanical, and hydraulic/pneumatic components, and well versed in the troubleshooting and testing of them.

TOOL REQUIREMENTS (Minimums)

A "Master Mechanics" Tool Box with at least the following:

Special Tools
- Adjustable wrenches: 12, 18, and 24 inch (300, 450, and 600 mm)
- Pipe wenches:
  - Steel: 12 and 18 inch (300 and 450 mm)
  - Aluminum: 24 and 36 inch (600 and 900 mm)
- Sledge hammers: 8, 12, and 16 lb (3.5, 5.5 and 7 kg)
- Air impact wrenches:
  - 1/2 Inch drive with 3/8 to 1-1/2 inch sockets
  - 3/4 or 1 Inch drive with sockets up to 2-1/2 inches
- Assortment of line up bars (18 to 24 inches (450 to 600 mm))
- Assortment of heavy duty pry bars
- Torque wrenches:
  - 1/2 inch drive
  - 3/4 or 1 inch drive (500 ft-lb (680 Nm))
    - Minimum/ 1000 ft-lb (1 360 Nm) maximum)
- 18:1 Torque multiplier

Welding Equipment
- 3 300 amp (minimum) dc welding machines with 100 ft (31 m) leads (600 amp dc machines preferred).
- 2 Carbon air arc attachments
- 2 Sets cutting/heating torches with assortment of tips

1 Electrode oven
3 Air chipping hammers
2 Heavy duty grinders with assortment of wheels (Typically 5 to 9 inch (125 to 225 mm))
An assortment of wedges and clamps

Lifting Equipment
1 75 ton (68 mton) crane
1 35 ton (32 mton) crane
1 10 ton (9 mton) fork truck/crane
1 Assortment of lifting slings and clevises for above
1 3 ton (3 mton) "come-a-longs"
1 10 ton (9 mton) "port-a-power" or jack assembly

Support Equipment
1 Set front and rear stands
1 Assorted miscellaneous heavy cribbing (may be used instead of stands also)
1 100 scfm (minimum) portable air supply with adequate long hoses

Test Equipment
2 Digital volt-ohmmeters
3 0 - 5000 psi (0 - 35 000 kPa) hydraulic test gauges
1 IBM Windows compatible laptop computer (with GE Statex III and TEREX|UNIT RIG Weigh System programs)
1 1000 V meggar-ohmmeter

COMPONENT WEIGHTS

SHIPPING CONFIGURATION (Typical - including shipping crates)

	lb	kg
Main frame assembly	100,000	45 360
Superstructure (standard)	24,500	9 920

NOTE: *The following weights should be added if the features are incorporated:*

14 grid package	*1,600*	*725*
20 grid retarding package	*1,000*	*455*
7 step extended range retarding	*500*	*225*
Fuel tank	4,250	1 930
Wheelmotors (787)	29,300	13 290
Front axle assembly	30,000	13 610
Air cleaner assemblies (with brackets)	1,600	725
Tear down (Miscellaneous parts)	5,000	2 270
Rim sets (per pair)		
For 40x57 tires	6,820	3 090
For 48/95R57 tires	8,000	3 630

COMPONENT INSTALLATION WEIGHTS (Each)

NOTE: *Crating material removed:*

	lb	kg
Main frame assembly	100,000	45 360
Superstructure assembly (standard)	22,000	9 395

	lb	kg
NOTE: *The following weights should be added if the features are incorporated:*		
14 grid package	*1,600*	*725*
20 grid retarding package	*1,000*	*455*
7 step extended range retarding	*500*	*225*
Fender assemblies	1,500	680
Air cleaner assemblies	1,000	500
Fuel tank	3,710	1 685
Front axle assembly	28,500	12 930
Tire and rim assemblies		
With 40X57 tires	10,950	4 965
With 48/95R57 tires	13,250	6 000
Wheelmotor assemblies (each w/brakes)	26,900	9 395
Dump body (Varies with size and liners installed. Refer to TEREX|UNIT RIG Service Representative for actual weights).		

SITE REQUIREMENTS (Figure 1)

The assembly site should be a clean, dry, relatively flat area with sufficient room to off-load all of the parts around the main frame to minimize later efforts. If more than one truck is to be assembled, arrange the frame locations so that the same tools, equipment, and manpower can be used on them all and they all share easy access to them. Make sure that sufficient room is left to maneuver the cranes and other equipment easily and safely and that no electrical lines or other obstacles are in the working area.

Reserve a level part of the area for the assembly, welding, and installation of the dump bodies. Remember to allow adequate room for the bodies to be turned over during the welding process.

SAFETY REQUIREMENTS

Always review all mine, local, and other safety requirements and practices with all parties prior to beginning any work. This will minimize any problems that may later occur.

DUMP BODY ASSEMBLY

NOTE: *The dump bodies for the haulage trucks are typically fabricated in two or more pieces to facilitate handling and transportation. This procedure will allow assembly of the components in the upside down, horizontal position, typically the configuration in which it is shipped.*

1. Prepare a suitable fabrication/assembly area. It must be flat and of sufficient size to set the sections together and later permit the turning and "rolling" of a complete body.

2. Remove all items tack welded inside of the bed. These are parts that will be used in the field fabrication.

NOTE: *The dump body sections must have the same serial number.*

3. Two types of bodies can be welded by this procedure - center split and off-set split. If the body was shipped in a more disassembled (or "flat pack") configuration, contact your TEREX|UNIT RIG Service Advisor for supplemental detailed information.

4. Check weight of fabrications and assure correct crane size and cable sizes are utilized. These weights are most likely found with the dump body bill of lading or contact the TEREX|UNIT RIG Service Advisor.

5. Set each half section on concrete/steel or wood cribbing with the sections facing one another. Weld on the guide bars furnished top and bottom of floor plate, header plate, and canopy.

NOTE: *Typically it is found desirable to place pieces of steel under the points at which the body contacts the supports. The steel in the body will slide more easily on this intermediate steel plate, easing the moving of the sections when pulled together.*

6. With the dump body in the inverted position, one side should be positioned into the mating side and all bolts drawn up but not securely tightened. Halves can be pulled together with come-alongs attached to the inside of the side assemblies.

7. Boards, typically 3 X 12 inch X 4 ft (75 X 300 mm X 1.2 m), or similar material should be installed under the canopy to reduce the potential for damage during the "rollover". Set the remaining parts on wood or steel to ease their

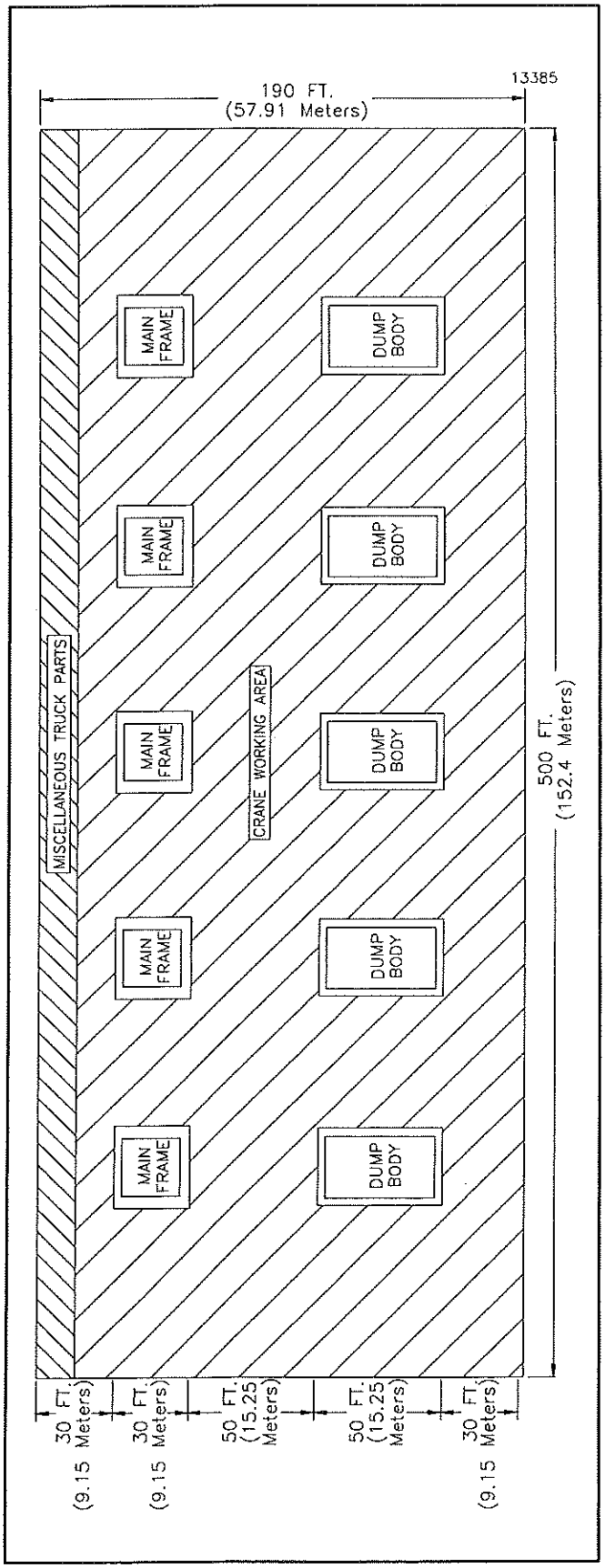


FIGURE 1 - TYPICAL ASSEMBLY SITE (13385)

movement during assembly. The dump body should slide across the concrete/steel or wood cribbing/steel for alignment of the halves.

8. Since proper pivot alignment is essential, refer to the dump body assembly print for the proper alignment information.

NOTES:

1. A pivot alignment tube that passes through all four pivot bosses is required. Typically one is shipped with each truck or dump body order.

2. The bores must be concentric within 1/16 inch (1.5 mm). The above listed tube should be 5.950 inches (151 mm) in diameter and at least 90 inches (2.3 m) in length.

3. Typically the above dimension is 64-1/2 +/- 1/16 inches (1 638 +/- 1.5 mm) from the inside surfaces of the inboard pivot bosses.

9. Pull the sections together to mate the floor sections. Tighten the mating bolts to obtain proper alignment of the "V" groove in the floor plate. As the mating bolts are tightened, make sure that the pivot boss spacing is maintained and that the alignment tube can be turned by hand in the bosses.

NOTE: *Some prying, wedging or "dogging" could be required to obtain this alignment. Even light trimming or grinding could be necessary.*

10. With the bottom tight and the pivots aligned, start aligning the front plate and the canopy sections.

NOTE: *The front plate can have a "V" groove in either side, inside or outside. Later versions are positioned more forward and to the outside. Align the plates so that they are level with each other. The canopy plates should be aligned at the same time.*

11. Pull the front section of the canopy into alignment and skip weld to assure alignment.

NOTE: *If there is a misalignment of the canopy section, this is not uncommon due to handling and tie downs while transporting from fabrication centers to mine sites. This situation can be readily corrected by the use of wedges and similar implements.*

12. With the front section of the canopy aligned, tighten the mating bolts on the canopy and front plates, verify that the plates are all level with one another.

13. With all of the bolts tight, inside and out, recheck the

pivot alignment and pivot boss spacing. Make sure that the pivot alignment tube can still be rotated by hand.

If the pivot is aligned, install a bar (typically 3/4 X 3 inches (19 X 75 mm) between the inside pivot bosses and tack weld in place (to maintain the minimum inside dimensions).

NOTE: *On beds with dump body support beams, check the beams for flatness.*

14. After all bolting clips are tightened and proper alignment secured, install a 3 inch (75 mm) standard spreader pipe welded on the inside of the two halves. This will ensure less stress on welds while turning the dump body, plus it will help keep the sides and runner support beams parallel.

NOTE: *Typically this is supplied with the first dump body shipped with a truck order.*

15. Welding procedures should be followed as per the instructions on Field Welding in Section 10 - Miscellaneous in this manual. All weld sizes should be that specified on the TEREX|UNIT RIG Assembly Drawings for the particular body as each body is custom built per customer's request or requirements.

NOTE: *Cold weather welding should be followed after ambient temperature drops below 50°F or 10°C.*

16. All weld areas should be cleaned and free of rust, dirt or paint. The recommended method for cleaning is to burn the paint or use a rotary brush or grinder and clean the metal until it is shiny.

17. Weld the "horseshoes" on all bolsters as required. Weld the center between the bolsters. Use a grinder to grind a V or use minor air arc cutting.

NOTES:

1. While welding is in process, make sure that the pivot pin alignment pipe still can be turned by hand.
2. When welding the front plate "V" groove inside - grind a "V", 3/16 inch (4 mm) on the forward side. Weld up this groove completely. Remove the mating bolts and angles as you weld the groove.
3. When welding the canopy, weld the "V" area or flat bar, as called for on the drawings. Remove the mating bolts and angles as you weld the groove. Weld all vertical welds in the canopy header and grind the welds smooth, except the metal letters or logo (per TEREX|UNIT RIG *Engineering or customer request). Complete all bottom welds prior to rolling the dump body over.*

18. If equipped with dump body mounted pads, install the pads. Shimming will be done later.

19. Turn the dump body over.

IMPORTANT: *Due to safety implications, it has been found that turning the body end for end is the safest method. Side to side turning often results in a "humping" or "turtle" effect. Also, provision must be made to secure the body as it goes "overcenter". D-rings have been installed inside of the floor plate to assist in this form of movement.*

A four part cable, sized to carry the appropriate weight, is recommended. Two cables are connected at the pivots. Cut two 3 inch (75 mm) pieces of schedule 40 pipe, approximately the length of the two bosses. Place caps on each end of the pipe as a safety precaution, so that the pipes cannot fall out. Proper judgment is required; always consider the safety aspects and maintain complete control of the body's movement.

The cables attached to the D-rings will lift first (protection against damage when in contact with body parts may be required). As the body reaches the effective overcenter point, the pivot mounted cables begin to be loaded and control movement. These are used to lower the body back to the ground.

20. Block the body so that the floor is level and the canopy is also at some degree of level.

21. Verify that all joints to be welded are free of rust, paint, and other contaminants as outlined previously.

22. Weld the "V" groove in the floor plate. Grinding or air arcing may be required to reach the final desired condition. The bottom weld must be 100% weld. This weld should be kept as flat as possible to the plate surface, particularly if liners are to be installed, but should not be under-welded.

NOTE: *Preheat of the weld area maybe required. Consult your* TEREX|UNIT RIG *representative for further information pertaining to your particular configuration and application.*

23. If dump body liners were added at the factory, there should be center wear bars to be added between the liners in the middle of the body between the existing wear plates. Grinding may be required to allow the bars to lay flat against the bottom plate. These beveled seams should be welded at this time.

NOTE: *Preheat of the weld area is required.*

24. Grind or air arc out and grind all weld joints made on the canopy and front plate from the opposite side down to good weld to ensure 100% penetration weld.

25. Install the impact cover plate between the canopy and the front plate after the body seam welding is complete.

26. Install the bevel plate at the bottom inside of the center cover plate.

27. Install the rock deflector per drawing specifications. The cab side is considered the primary side and has a standard deflector.

28. Reprimer and paint all welds and other damaged or "skinned" surfaces to match existing colors. Proper paint should be included in the truck ship kits.

TRACTOR ASSEMBLY

ARRIVAL ON SITE

When the components and boxes of loose parts arrive on site:

1. Immediately check their condition and note any shipping damage.

2. Verify their receipt against the shipping or packing lists.

3. As components are unloaded, place them in the vicinity of their installation point:

NOTES:
1. Attach two or more guide ropes to each assembly to assist in preventing unwanted movement in positioning.
2. The crane or cranes should be centered and positioned to allow the frame to be safely lifted and moved onto the awaiting supports/cribbing. Do not lift the frame or any other component higher than is required.
3. If more than one truck is being assembled at one time, be sure that the serial numbers correspond to that on the frame assembly.
4. Never lift a wheelmotor by means of a cable around the outside. Always use suitable lifting brackets as identified in the vendor supplied information with the wheelmotors.

a. Wheelmotors on the correct side and near the axlebox.

b. Front axle assembly properly oriented to the side of where the frame will be set. It should be positioned first to minimize the lifting of the frame and set on stable 12 inch (300 mm) high blocks with a steel cap plate between the blocks and the axle while remaining stable during installation.

c. Fuel and hydraulic tanks (hydraulic - driver' side, fuel - off driver's side) on the correct side and near the center of the frame.

d. Superstructure near the front of the frame (and supported by stands or cribbing to prevent damage to the underside).

NOTE: *Special lifting eyes which mount near the front and rear corners of the superstructure should be used to lift the assembly. Also a spreader beam or equivalent is recommended to assist in distributing the lifting force through the assembly. If no spreader beam is available, four cable slings of a minimum of 20 ft (6.5 m) in length may be used.*

4. When unloading the main frame assembly:

a. Measure the frame and prepare to locate the appropriate stands or cribbing to support the frame. This is typically done under the front bumper or front lower frame crossmember and at the bottom of the axlebox or the dump cylinder lower mounting support assembly.

NOTE: *The stands or cribbing should not extend out beyond the outside of the frame to interfere in the installation of the remaining components.*

b. Attach the appropriate cables, clevises and other devices to the front lifting eyes on the frame. Install protective covering where required to prevent the cables from marking or damaging any components it contacts.

c. If not already in place, install the rear frame lifting fixtures in the dump body pivot bushings. Secure the pin with a cotter pin or other suitable keeper.

NOTES:
1. Attach guide ropes to each assembly to assist in preventing unwanted movement and in positioning.
2. The crane or cranes should be centered and positioned to allow the frame to be safely lifted and moved onto the awaiting supports/cribbing. Do not lift the frame or any other component higher than is required.

d. Slowly, carefully, and evenly raise the frame off the carrier, remove the carrier, install the stands or cribbing (following appropriate safety practices), and lower until

resting on it. Be sure that the frame is secure enough to be worked on prior to loosening or removing the lifting cables.

ASSEMBLY PROCESS

NOTES:
1. Prior to installing each component, make sure that the mating surfaces on both the component and the frame or other assembly is clean of all dirt, paint, rust, damage or any other contaminant or irregularity.
2. Attach guide ropes to each assembly to assist in preventing unwanted movement and in positioning.
3. The crane or cranes should be centered and positioned to allow the component to be safely lifted and moved as required. Do not lift the frame or any other component higher than is required.

The "tractor" may be assembled as follows:

1. Install the front axle assembly as follows: (See the information in Section 7 - Running Gear for additional information.)

a. Raise the main frame and position squarely over the axle.

b. Install the two bottom radius rods first:

(1) Move the rod end into position and place the neoprene rings into position.

(2) Install the radius rod pins.

NOTE: *Use the standard pins only. The eccentric pins are used only in designated locations and will be used last.*

(3) Install the pin retainer and secure with the capscrews and washers.

c. Install the left side upper radius rod.

d. Install the upper right side radius rod.

NOTE: *Two upper connection points employ eccentric pins to allow for assembly variations. If the axle has not been previously fitted to the truck:*
1. Install the radius rod as before, except use the eccentric pin in the axle end. Rotate the pin until the pin bore in the link is aligned with the frame bore.
2. Weld the pin retainer to the boss with 1/4 inch (26 mm) fillet weld.

2. When the axle installation is complete secure the main frame/axle assembly on cribbing of sufficient height and stability to allow installation of the wheelmotors and all tire and rim assemblies.

3. Have the appropriate trained personnel install the tire and rim assemblies on each of the front wheels as outlined in the instructions in Section 7 - Running Gear. During assembly, make sure that the valve stems are properly installed in the cut-out in the wheel, the rims are properly seated on the hub and closely aligned, and that the clamps are properly torqued.

4. Install the left and right wheelmotor assemblies as outlined in the instructions in Section 7 - Running Gear. During assembly, make sure to use the proper flatwasher and properly torque each of the mounting bolts.

5. Have the appropriately trained personnel install the dual tire and rim assemblies on each of the wheelmotors as outlined in the instructions in Section 7 - Running Gear. During assembly, make sure that the valve stems are properly installed in the cut-out in the wheelmotor hub, the rims are properly seated on the hub and closely aligned, and that the clamps are properly torqued.

6. Have the appropriately trained personnel fill each tire assembly with air to the proper pressure determined for the application and load. If the pressure is not known, contact the tire supplier or the TEREX|UNIT RIG Service Advisor.

7. Lift the front and rear ends of the frame as outlined previously, remove the stands or cribbing and allow the assembly to rest on the tires.

NOTE: *Unless two cranes of 75 ton (68 mton) or greater are used, it is typically found that the large crane is used to lift each end of the truck off of the stands or cribbing separately, remove the material, and then lower until the tires rest on the ground.*

8. Install and securely weld the handrails onto the superstructure as outlined in the information in Section 2 - Structure.

9. Install the engine air cleaners as outlined in the instructions in Section 4 - Power Package.

10. Install the fender and mud guard assemblies on the back corners of the superstructure as outlined in the Assembly Parts Manual.

11. Install the left and right hand side mirror assemblies.

12. Remove the hood and grille assembly as outlined in the information in Section 2 - Structure.

13. Install the superstructure onto the frame as outlined in the information in Section 2 - Structure. During assembly, be sure to install all bolts before tightening any, then properly torque. Routing and connection of all cables, wires and hoses can now begin. See the appropriate TEREX|UNIT RIG Assembly "As-Built" or Parts Manual for details.

14. Reinstall the hood and grille assembly as outlined in the instructions in Section 2 - Structure.

15. Install the superstructure access ladder as outlined in the information in Section 2 - Structure.

16. Install all engine air intake and exhaust ducting as outlined in the TEREX|UNIT RIG Assembly "As-Built" or Parts Manual provided with the truck.

17. Install the fuel tank as outlined in the information in Section 2 - Structure. During assembly make sure to properly tension all stabilizers and struts and to connect all plumbing as required.

18. If equipped with frame mounted pads, install the dump body pad assembly as outlined in the information in Section 2 - Structure.

19. Complete and check all plumbing and electrical wiring and cabling.

20. Fill and service all components and reservoirs as outlined in the information of that components or assembly or as defined in the Preventive Maintenance information in Section 10 - Miscellaneous.

a. If not done previously, service the front and rear suspension assemblies as outlined in the information in Section 7 - Running Gear.

b. Purge the manual or automatic lubrication system lines as required and make any initial adjustments.

21. Statically test the electrical assembly as outlined in the instructions in the TEREX|UNIT RIG Electrical, "As-Built" and/or Assembly Parts Manual.

22. Test the mechanical systems as outlined in the information in the following sections in this manual:

a. Pneumatic - Section 6 - Pneumatic System (on trucks so equipped)

b. Steering - Section 5 - Hydraulic System

c. Dump - Section 5 - Hydraulic System

d. Brakes - Section 5 - Hydraulic System

23. When the tractor assembly and dump body are complete they may be mated as outlined in the information in Section 2 - Structure. After mating, shim the pad assembly as outlined in the same instructions.

24. Clean, reprise, and repaint any area requiring touch-up.

25. Verify all hoses, wiring and cabling is secure to prevent movement or chaffing.

26. Assembly of the truck is now complete.

TESTING

The completed truck testing may be done as follows:

1. Complete any testing not done prior to the mounting of the dump body.

NOTE: *Burnish the brake linings as per the instructions for the specific vendor and lining used, as outlined in the information in Section 8 - Brake System, before driving a loaded truck.*

2. Perform a road test as outlined in the instructions in the TEREX|UNIT RIG and system vendor's instructions and any other testing required to meet mine, engine or drive system representative requirements.

3. Check the alignment of the front wheels as outlined on the information on the mechanical steering assembly in Section 7 - Running Gear. Adjust as required.

4. Recheck the wheel clamp torque on both the front and rear wheel assemblies as outlined in Section 7 - Running Gear.

5. Check and shim the dump body pads as outlined in the information on the dump body in Section 2 - Structure.

6. Recheck the empty truck ride height clearance on the suspensions and adjust as required as outlined in the instructions in Section 7 – Running Gear.

COMPONENT WEIGHTS

The following represent typical weights for normally serviced truck components. These are representative only, may vary between installations and may change without notice.

Care should be given whenever attempting to lift or move these components to prevent personnel injury or damage to these or other equipment.

Component	Weight lb	Weight kg
Structure		
Cab	6,000	2 721
Fuel Tank	3,710	1 685
Hydraulic Tank	675	305
Electrical		
Electrical Control Box		
Control Panel - 17FL275	65	30
Contactor - GF, MF		
17CM53 Contactor	20	10
17CM55 Contactor	35	15
Contactor - P1 (Airless)	70	30
Contactor - RP1, 2	35	16
Contactor - RP3 - 5, 6 - 9	35	16
Rectifier	60	27
Reverser (Airless)	60	27
Static Exciters		
AFSE	40	18
MFSE	40	18
Retarding Grid Box Assembly		
Blower Motor		
18 and 20 grid based systems	950	320
14 grid based systems	850	385
Grids		
18 grid based systems	75	35
20 grid based systems	100	45
14 grid based system	220	100
Power Package		
Air Cleaner Assembly	275	125
Engine		
MTU 396	13,450	6 100
DDC 16V4000	15,815	7 175
Cummins	15,320	6 950
Radiator Assembly		
L & M	5,000	2 265
Traction Alternator		
GTA26	7,300	3 310
Hydraulic System		
Brake System		
Accumulator	55	25

Component	Weight lb	Weight kg
Controller Valve Assembly	11	05
Manifold Assembly	35	16
Pedal Valve Assembly	06	03
Dump System		
Control Valve	310	140
Cylinder	2,000	910
Pilot Valve	10	05
Pumps (Double Pump Assembly)		
With dry valve (Early version)	290	130
Without dry valve (Early version)	275	125
Later Version	295	135
Steering System		
Accumulator	520	235
Cylinder	300	135
Flow Amplifier	65	35
Hand Pump	20	10
Manifold	30	13
Manual Power Supply Pump	75	35
Pump (Rear Section)		
Standard	75	35
With hydraulic scavenger blower	100	45
Pneumatic System		
Not available		
Running Gear		
Front Axle Assembly (with brakes)	28,500	12 925
Spindle Assembly	1,925	875
Suspension Assembly		
Top charge port	1,400	635
Side charge port	1,900	860
Steering Linkage		
Steering Arms	400	180
Tie Rod Assembly	800	360
Wheel Assembly		
Inner Bearing	190	80
Outer Bearing	75	35
Seal	10	05
Seal Ring	40	18
Rear Axle Assembly		
Axlebox Assembly	12,000	5 445
Suspension Assembly		
Top charge ports	1,300	590
Side charge ports	1,750	795
Wheelmotors GE787		
Without brakes	26,000	11 790
With brakes	26,900	12 200

Component	Weight lb	Weight kg
Tire and Rim Assemblies		
Assemblies		
40X57 tires	10,950	4 965
48/95R57 tires	13,250	6 000
Rims		
40X57 tires	3,410	1 545
48/95R57 tires	4,000	1 815
Tires		
40X57	7,540	3 405
48/95R57	9,250	4 195
Brake System		
Front		
Bracket		
Carlisle (Goodrich)	415	188
Arvin/Meritor (Rockwell/Goodyear)	400	180
Caliper		
Carlisle (Goodrich)	130	60
Arvin/Meritor (Rockwell/Goodyear)	215	98
Discs		
Carlisle (Goodrich)	315	145
Arvin/Meritor (Rockwell/Goodyear)	375	170
Park		
Bracket		
Carlisle (Goodrich)	65	30
Arvin/Meritor (Rockwell/Goodyear)	73	33
Caliper		
Carlisle (Goodrich)	125	55
Arvin/Meritor (Rockwell/Goodyear)	85	40
Rear		
Caliper		
Carlisle (Goodrich)	125	55
Arvin/Meritor (Rockwell/Goodyear)	140	65
Disc		
Carlisle (Goodrich)	110	45
Arvin/Meritor (Rockwell/Goodyear)	110	45

STANDARD MAN-HOURS FOR COMPONENT REMOVAL AND REPLACEMENT MT 3000/3300/3300AC/3600B/3700B/3700AC/ 4000AC/4400/4400AC

GENERAL

The information in Table 1 reflects the typical man-hours required to remove and replace the listed component.

Assumptions included in these times include:

1. Prior to beginning the task:

a. The work area is clean and free of obstructions and other possible problems.

b. All required parts, tools and tooling, lifting, safety and other equipment is near or at the work area. It must all be available in a timely manner to avoid wasted time.

c. The truck and components are washed and cleaned and are positioned in safe operating conditions.

2. Time for personnel breaks, including travel, meal, "smoke", etc. are not included.

3. The task hours do not include other tasks that need to be performed prior to or after the listed primary tasks.

4. Time for fluid, oils, lubricants, etc. draining and refilling is included in these hours.

NOTE: *Times are typical only and subject to change without notice.*

TABLE 1 – TYPICAL COMPONENT REMOVE AND REPLACE TIMES

COMPONENTS	REMOVE & REPLACE (TYPICAL MAN-HOURS)	COMPONENTS	REMOVE & REPLACE (TYPICAL MAN-HOURS)
STRUCTURE		**ELECTRICAL**	
Bushing, Dump Body	6	Batteries (1 set)	1
Bushing, Suspension	5	Contactors (each)	1
Cab, R.O.P.S.	24	Dump Body Up Switch	0.5
Door Latch, Cab	1	Grid Blower Motor	3
Door, Cab	3	Master Switch Assembly	0.5
Dump Body	6	Pressure Switch, Axlebox	0.5
Fuel Level Sender	0.5	Switch, Battery Disconnect	0.5
Fuel Tank	4	Switch, Brake Drag	0.5
Gauge, Dash	0.5	Switch, Dash	0.5
Gauge, Hydraulic	0.5	Switch, Electrical	0.5
Heater Blower Motor	1	Switch, Selector	1
Heater Core	4	Turn Signal Flasher	0.5
Pedal, Brake	1		
Pedal, Retard	1	**POWER PACKAGE**	
Pedal, Throttle	1	Air Cleaner	1
Pin, Retaining Dump Body	2	Engine Air Intake Line	4
Seat, Driver	1	Engine Module	48
Seat, Passenger	1	Exhaust Line	4
Steering Column	2	Flex Hose, Wheelmotor Cooling	1
Window, Door	2	Pressure Regulator, Radiator	1
Window, Rear Cab	1	Radiator	7
Windshield	2	Radiator Cap	0.5
Windshield Wiper Motor	1	Sensor, Engine	0.5

COMPONENTS	REMOVE & REPLACE (TYPICAL MAN-HOURS)
HYDRAULIC SYSTEM	
Accumulator, Brake	1
Accumulator, Steering	3
Brake Manifold	6
Brake Pilot Valve	2
Brake System (Dual) Valve	3
Driveshaft	1
Dump Cylinder	3
Dump Lever	2
Dump Pilot Valve	1
Dump Valve	6
Hoses, Hydraulic	1
Hydraulic Tank	5
.Suction Valve	4
Load Brake Shuttle Valve	1
Pump, Manual Power Supply	1.5
Pump, Steering	2
Pump, Hydraulic (Tandem)	4
Sensor, Hydraulic Oil Level	0.5
Sensor, Hydraulic Oil Temperature	0.5
Steering Cylinder	3
Steering Flow Amplifier	2
Steering Hand Pump	1
Steering Manifold	4
RUNNING GEAR	
Axlebox	50
Axlebox Door	0.5
Axlebox Nosecone Bearing	15
Axlebox Nosecone Seal (each side)	1
Front Axle Assembly	14
Front Axle King Pin	6
Front Axle King Pin Bushing	10
Front Axle Spindle (Each)	16
Front Wheel Bearing	6
Pin, Retaining Radius Rod	2
Pin, Retaining Steering Cylinder	1
Pin, Retaining Suspension	2
Radius Rod Arm, Axlebox	4
Radius Rod Arm, Front Axle	3
Steering Yoke	2
Suspension, Front	4
Suspension, Rear	4
Tie Rod	3
Tires (Each position)	
Front	1.5
Rear	2
Wheelmotor	24

COMPONENTS	REMOVE & REPLACE (TYPICAL MAN-HOURS)
BRAKES	
Brake Caliper, Front	3
Brake Caliper Mount, Front	4
Brake Caliper, Park Brake	2
Brake Caliper, Rear Inside	4
Brake Caliper, Rear Outside	2
Brake Disc, Front	8
Brake Disc, Rear	4
OPTIONS	
Autolube Grease Injector	0.5
Autolube System Pump	1
Hoses, Lube	1
Hubodometer	0.5
Weigh System Control Board	1
Weigh System Display	1
Weigh System Transducer	2
MISCELLANEOUS	
A/C Receiver/Dryer	2
Air Compressor, Seat	1
Compressor, Freon	2
Radio	1

RECOMMENDED LUBRICANTS AND FLUIDS MT 4000AC, MT 4400, AND MT 4400AC

GENERAL

The items listed here are a compilation of the recommended lubricants and fluids used in specified operating conditions for the listed equipment. Brand names listed are for reference only and do not necessarily constitute an endorsement of the particular product. For detailed recommendations for specific applications, contact your suppliers or your TEREX Unit Rig representative.

NOTE: *These recommendations are subject to change without notice.*

LUBRICANTS

1. Engine

NOTE: *These listed items are typical and for reference only. Actual fluid recommendations will vary with a number of factors including engine, duty cycle, fuel content and consumption, lubricant/fluid used, etc. See the appropriate engine manufacturer's instructions and directions for detailed information and specifications, or contact your engine or TEREX Unit Rig representative.*

a. Engine crankcase oil

(1) Capacity:

(a) DDC 4000 (2700 hp (2 015 kW))
66 gallons (250 liters)
(b) Cummins QSK 60 (2700 hp (2 015 kW))
72 gallons (273 liters)

(2) Recommend service intervals:

(a) Sample: Typically 250 hours. See engine manufacturer's recommendations.
(b) Change: See engine manufacturer's recommendations.

(3) Recommended fluid:

(a) 15W-40 Category 2 Engine Oil (for extended change intervals) that meets current DDC and Cummins criteria.

NOTES:
1. This is the typical oil requirement. Manufacturer, site, and operating environmental considerations may cause alternative oils to be required.
2. For operation in arctic environments, synthetic CE/SF engine oil with adequate low temperature properties such as a 5W-30 is recommended.
3. At other times during the year, other oils may be recommended to maintain proper operation and engine lubrication.
4. Non-synthetic, petroleum based 15W-40 oil is recommended for break in periods and when operating in the non-arctic temperatures.

b. Engine coolant

(1) Capacity:

(a) DDC 4000 Engine (2700 hp (2 015 kW))/ Wabtec radiator: 160 gallons (605 liters)
(b) Cummins QSK 60 Engine (2700 hp (2 015 kW))/Wabtec radiator: 150 gallons (568 liters)

(2) Recommended service interval:

(a) Sample: See engine manufacturer's recommendations.
(b) Change: See engine manufacturer's recommendations.

(3) Recommended fluid:

(a) Ethylene glycol based antifreeze that does not require a precharge of supplemental coolant additives to be added before use in heavy duty diesel engines. It is to meet TCM RP-329 (ASTM D6210) with cavitation corrosion additive type "A".

NOTES:
1. A mixture of 50% ethylene glycol and 50% water is recommended in normal climates. It may be used year round.
2. A mixture of 67% ethylene glycol and 33% water is recommended in arctic climates. It may be used year round. It is the maximum recommended mixture.

(b) When mixed 50/50 with water, it is to have the following corrosion inhibitor chemistry:

Boron	125 – 500 ppm
Nitrites	800 – 2400 ppm
Nitrates	200 – 750 ppm
Silicon	50 – 250 ppm

Phosphates	0 ppm
Acidity (pH)	8.0 – 11

The water used with this antifreeze must meet the following requirements:

Chlorides	40 ppm (maximum)
Sulfates	100 ppm (maximum)
Total dissolved solids	340 ppm
Total hardness (Magnesium and Calcium)	170 ppm (maximum)

2. Front wheel bearing

a. Grease lubricant

(1) Capacity: 5.3 gallons (20 liters) or 40 lb (18 kg) each

(2) Recommended service intervals:

(a) Sample: As required
(b) Change/repack: 5,000 hours

(3) Recommended lubricant specifications: Synthetic grease, SHC 460 or equivalent

b. Oil lubricant

(1) Capacity: 3.3 gallons (13 liters) each

(2) Recommended service intervals

(a) Sample: 500 hours
(b) Change: 2,500 hours (or when indicated by sampling)

(3) Recommended lubricant specifications: Synthetic lubricant (ambient temperatures listed).

(a) -67° F to 59° F (-55° C to 15° C): SHC 150 or equivalent
(b) -35° F to 77° F (-37° C to 25° C): SHC 220 or equivalent
(c) -29° F to 95° F (-34° C to 35° C): SHC 320 or equivalent
(d) -20° F to 104° F (-29° C to 40° C): SHC 460 or equivalent
(e) -9° F to 122° F (-23° C to 50° C): SHC 680 or equivalent

3. Hydraulic system

a. Hydraulic fluid

(1) Capacity:

(a) Complete System Fill: 252 gallons (953 liters)

NOTE: *This quantity represents an initial system fill. The actual volume required when draining and refilling the system will be somewhat less, depending upon the amount drained from various components.*

(2) Recommended service intervals:

(a) Sample: 500 hours
(b) Change:
[1] Filters: 500 hours
[2] Oil: 5,000 hours

(3) Recommended fluid:

(a) Petroleum based anti-wear hydraulic oil

NOTE: *Must be approved for use with Mannesmann Rexroth axial pump units.*

(b) The recommended viscosity varies with fluid's operating temperature range, which may not directly correspond with the ambient temperature. See Figure 1 – Selecting Hydraulic Fluid Viscosity for the proper recommendation.

(c) Standard viscosities include:

[1] VG 22 Arctic conditions
[2] VG 32 Winter conditions
[3] VG 46 Summer conditions
[4] VG 68 Tropical conditions
[5] VG 100 Excessively high temperatures

NOTES:

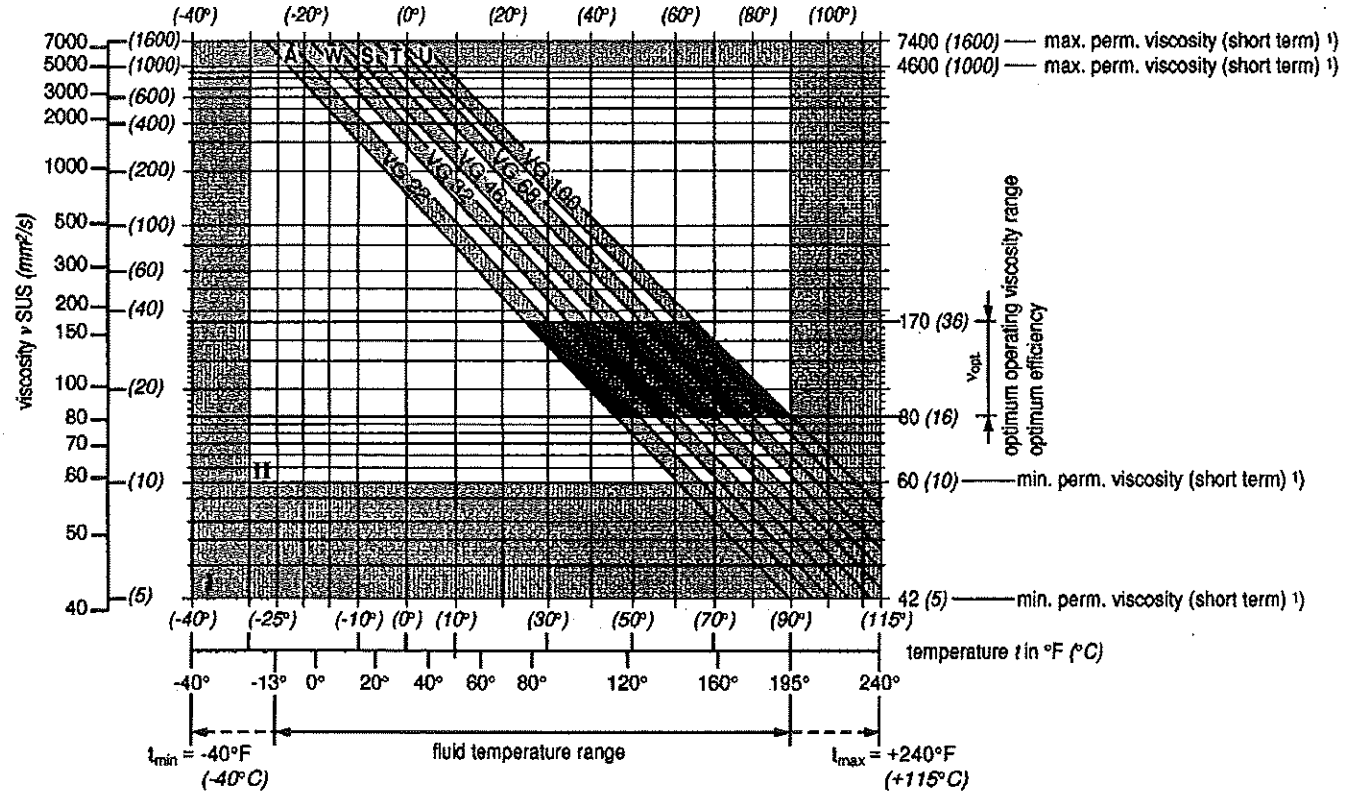
1. In severe arctic environments, the use of TEREX Unit Rig Arctic Hydraulic Oil is recommended. It consists of:
70% Mobil 1 Synthetic ATF
30% Mobil Aero HFA Low Temperature Oil
2. During the warmer months of the year, it is recommended that the normal hydraulic oil be used in the system.

b. System cleanliness recommendation

(1) To increase component life, it is recommended that the system be sampled at regular intervals and maintained at an ISO Cleanliness Code of 16/15. This code specifies that the oil in the system contain between:

Selection Diagram

A = for arctic conditions or for extremely long pipelines
W = for winter conditions in Central Europe
S = for summer conditions in Central Europe or for enclosed areas
T = for tropical conditions or for areas with high temperatures
U = for excessively high temperatures (e.g. due to internal combustion engines)



1) Depending on the product resp. the sizes the following viscosity ranges are valid:
I: 42 SUS (t_{max} = +240°F) ... 7400 SUS (t_{min} = -40°F) / 5 mm²/s (t_{max} = +115° C) ... 1600 mm²/s (t_{min} = - 40° C),
II: 60 SUS (t_{max} = +195°F) ... 4600 SUS (t_{min} = -13°F) / 10 mm²/s (t_{max} = +90° C) ... 1000 mm²/s (t_{min} = - 25° C)
(Please find the max. permissible viscosity range in the catalogue sheets of the singular products)

FIGURE 1 – SELECTING HYDRAULIC FLUID VISCOSITY (REXROTH)

(a) 320 and 640 particles/mL greater than or equal to 4 µm.

(b) 160 and 320 particles/mL greater than or equal to 6 µm.

4. Automatic lubrication system

a. Grease pump reservoir– Lincoln rotary pump

(1) Capacity: 10 fluid ounces (296 ml)

(2) Recommended service intervals:

(a) Check level: 100 hours
(b) Change: 500 hours

(3) Recommended fluid:

(a) Non-arctic environments:
10W-30 engine motor oil

(b) Arctic conditions:
Mobil Aero HFA Low Temperature Hydraulic Oil

NOTE: *The special oil may be used all year.*

b. Lubricating chassis grease

(1) Capacity: Varies with configuration.

(2) Recommended change interval: Not applicable.

(3) Grease Specifications

(a) General: Premium Quality EP Grease that meets the following specifications:

Property	Test	Requirement
Base Oil Viscosity @ 40° C (104° F)	ASTM D 445	320 cSt (minimum)
Base Oil Viscosity @ 100° C (212° F)	ASTM D 445	20 cSt (minimum)
Worked Penetration, 60 Stokes @ 25° C (77° F)	ASTM D 217	370 mm (maximum)
Dropping Point	ASTM D 2265	450° F (232° C) (minimum)
Water washout at 175° F (80° C)	ASTM D 1264	8% of weight (maximum)
4-Ball Wear Scar Diameter	ASTM D 2266	0.5 mm (maximum)
4-Ball EP Weld Point	ASTM D 2596	400 kg (885 lb) (minimum)
Timken OK Load	ASTM D 2509	45 lb (20.5 kg) (minimum)
Molybdenum Disulfide Content		5 – 6% by weight
Molybdenum Particle Size		5 microns (maximum)
Graphite Content		None

Minimum Ambient Temperature (Sustained for 48 hours)	Applicable NLGI Grade
-30° F to 0° F (-34° C to –18° C)	0
0° F to 30° F (-18° C to 0° C)	1
Over 30° F (0° C)	2

NOTES:

1. For applications in which the ambient temperature is expected to be sustained at less than –30° F (-34° C) for greater than 48 hours and possibly to as low as –73° F (-58° C), use TEREX Unit Rig Arctic Grease:

80% Mobiltemp SHC 32

20% Mobil 1 Synthetic ATF

2. During the warmer months of the year, it is recommended that the normal chassis grease be used in the system.

5. Suspensions – Front and rear (Operating Fluid)

a. Capacity:

(1) Front: 9.7 gallons (36.7 liters)
(2) Rear: 8.9 gallons (33.7 liters)

b. Recommended change interval: Not normally required. Change when the assembly is drained for service.

c. Recommended fluid specifications:

(1) Non-arctic ambient temperatures

Good quality 10W hydraulic oil or automatic transmission fluid (Conoco Power Trans III (or equivalent))

(2) Arctic ambient temperatures

Synthetic hydraulic oil or automatic transmission fluid (Conoco Syncon Synthetic R & O (or equivalent))

NOTES:

1. The arctic fluid should have the properties:

ISO 46 viscosity grade

-70° F (-55° C) pour point

PAO synthetic – May be used with common seals

2. May be used all year.

6. Wheelmotor– GE 787 or GEB 25

a. Gearcase oil

(1) Capacity: 10.5 gallons (39.8 liters)

NOTE: *The use of synthetic lubricants is recommended for all applications. See the appropriate General Electric information for detailed fluid requirements at each of*

the listed operating temperature ranges and related service information.

(2) Recommended service intervals:

(a) Sample: 500 hours
(b) Change: (maximum)
[1] GEB 25: 3,000 hours
[2] GE 787: 3,000 hours

NOTES:

1. This represents the maximum number of hours between oil changes. More frequent oil change intervals may be required, depending upon individual mine and wheelmotor conditions. An oil monitoring or sampling program should begin with a base line at the oil change and proceed throughout the operating interval, with any "early" changes dictated by information derived from this system. For more detailed information, see the appropriate General Electric publication.

2. On new or newly overhauled wheelmotors, it is recommend that the oil be changed after the first 500 hours of operation then at the 3,000 hour intervals or when indicated by sampling.

3. Since synthetic oils may be filtered for reuse rather than discarded, they may be monitored to determine whether or not filtering is required, through a particle analysis process. General Electric recommends an ISO Cleanliness Code of 18/13 be used for motorized wheels. Oil that is qualified to be reused must be filtered to 10 microns absolute. For more detailed information, see the appropriate General Electric publication.

4. When the oil is changed or filtered, the magnetic plugs should be removed, inspected, and cleaned.

(3) Recommended fluid specification: Synthetic lubricant (ambient temperatures listed)

(a) -67° F to 59° F (-55° C to 15° C):
SHC 150 or equivalent
(b) -35° F to 77° F (-37° C to 25° C):
SHC 220 or equivalent
(c) -29° F to 95° F (-34° C to 35° C):
SHC 320 or equivalent
(d) -20° F to 104° F (-29° C to 40° C):
SHC 460 or equivalent
(e) -9° F to 122° F (-23° C to 50° C):
SHC 680 or equivalent

RECOMMENDED JACKING AND SUPPORT POINTS

DESCRIPTION AND LOCATION

The recommended jacking and support points on a truck provide a means of lifting the truck and related components to allow effective servicing.

OPERATION (Figure1)

There are two basic sets of jacking and support points at the front and rear of the truck. One set incorporates points on the front beam axle assembly and the axlebox. The other set is on members of the main frame assembly.

MAINTENANCE AND ADJUSTMENT

Prior to beginning jacking, the truck should be:

1. Located in a clear, flat area that will allow access from all sides and angles.

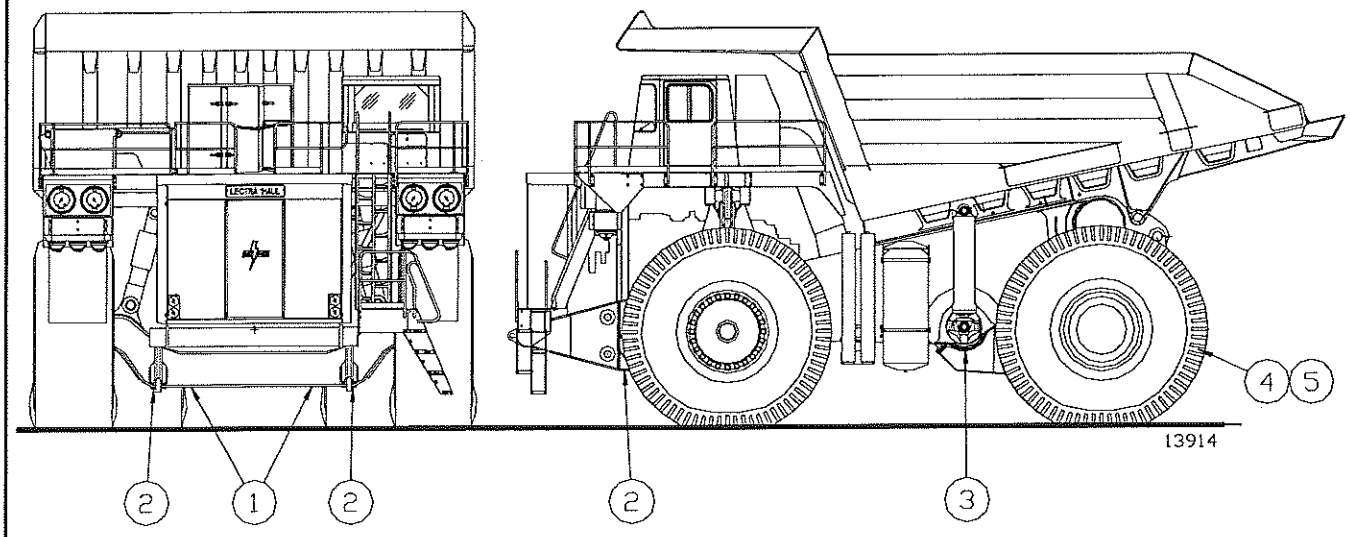
2. Parked in a SAFE POSITION. It must be secured by means other than the trucks friction brake system.

3. Empty of any payload with the dump body fully resting on the main frame. If this is not possible, the dump body must be completely secured to prevent unwanted movement in any direction.

Prior to jacking, the support equipment should be:

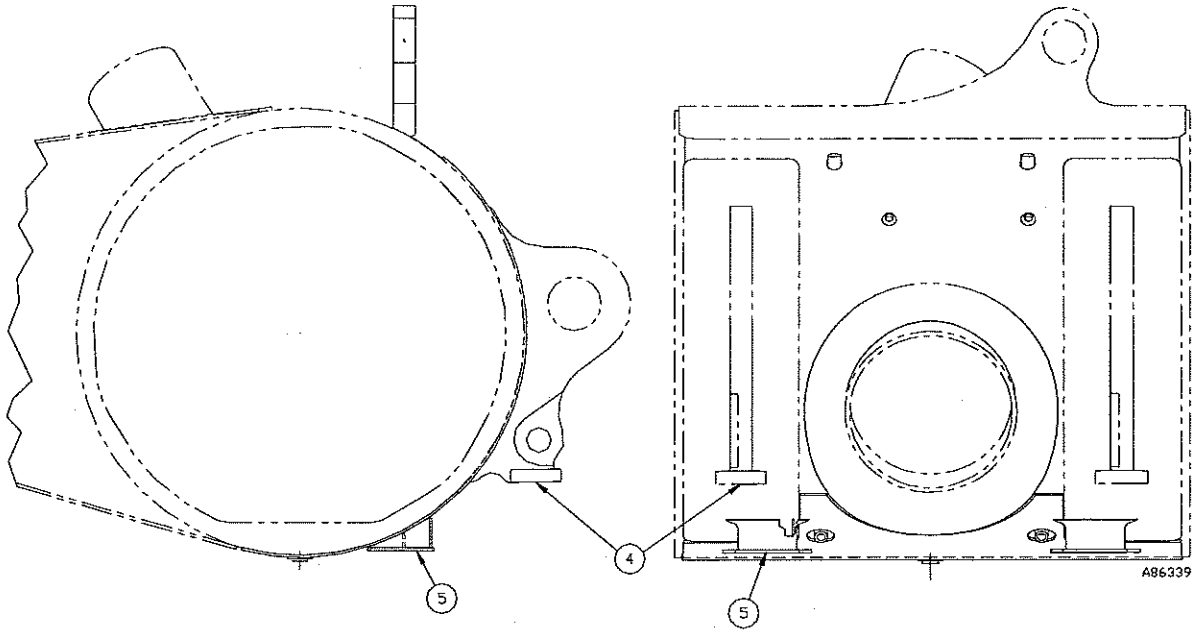
1. Inspected and verified to be of sufficient capacity and in general good repair condition to properly lift and support the weight involved.

2. Securely located on a solid, flat surface, capable of supporting the weights involved.

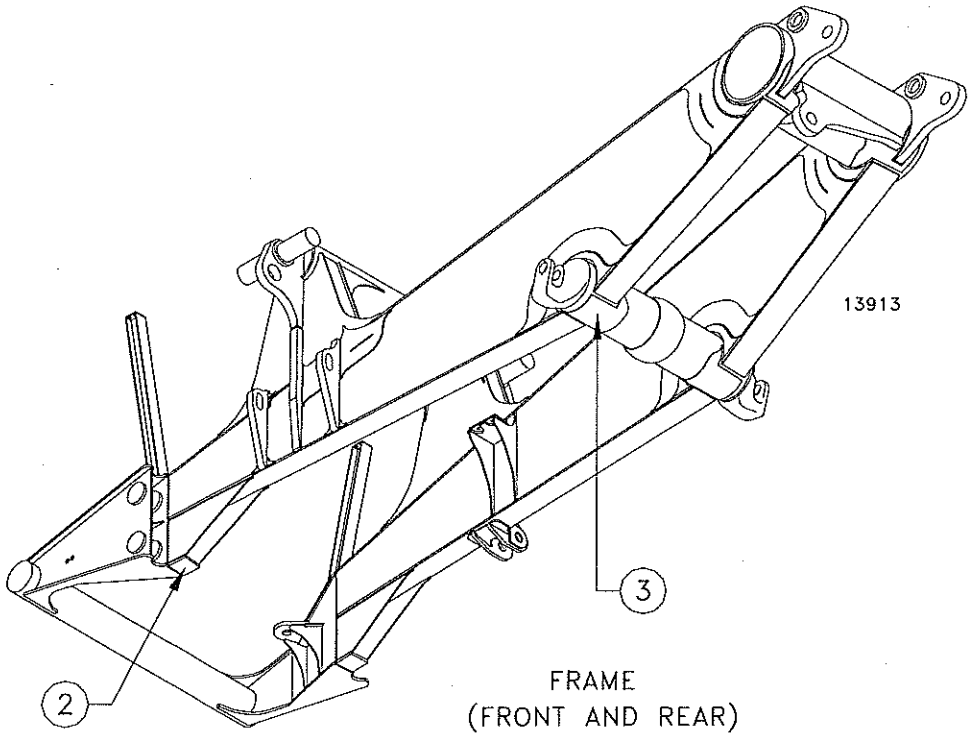


KEY	
01.	Under the lower plate on the front axle beam, just inside the link attachment bracket
02.	On the reinforced flat surface on the bottom of the main frame assembly, near the front edge of the front tires
03.	On the reinforcing plate material on the lower rear main frame crossmember.
04.	On the bottom of the axlebox lower suspension mounting bracket
05.	On trucks equipped with the available jack pad, skid plate assembly, on the flat jacking surface on the bottom of the axlebox, below the suspension lower pointing bracket.

FIGURE 1 - RECOMMENDED JACKING AND SUPPORT POINTS



AXLEBOX



FRAME
(FRONT AND REAR)

KEY	
01.	Under the lower plate on the front axle beam, just inside the link attachment bracket
02.	On the reinforced flat surface on the bottom of the main frame assembly, near the front edge of the front tires
03.	On the reinforcing plate material on the lower rear main frame crossmember.
04.	On the bottom of the axlebox lower suspension mounting bracket
05.	On trucks equipped with the available jack pad, skid plate assembly, on the flat jacking surface on the bottom of the axlebox, below the suspension lower pointing bracket.

FIGURE 1 - RECOMMENDED JACKING AND SUPPORT POINTS (CONTINUED)

PREVENTIVE MAINTENANCE

The following checks should be made whenever the truck is in the shop for its normal preventive maintenance (typically at 500 hour intervals).

PRESSURE TRANSDUCERS

The normal readings of the pressure transducers may be tested as follows:

a. Turn the truck's Master Switch On.

b. Depress the MENU switch on the Display in the cab. (See Figures 1 and 3.)

c. Press the UP and DOWN arrows to position the pointer at "Transducer Status", and then depress ENTER switch.

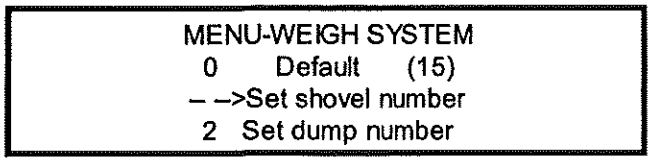


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FIGURE 1 – DISPLAY: MENU

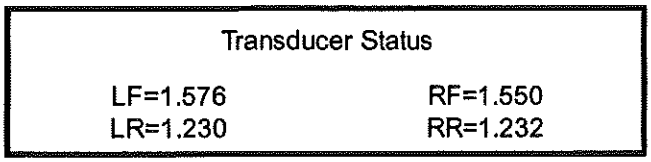

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FIGURE 2 – DISPLAY: TRANSDUCER STATUS

d. Verify that the voltages from all transducers are greater than 1 and less than 6 Vdc. (See Figure 2.)

NOTES:

1. The locations are as follows:
LF refers to Left Front
RF refers to Right Front
LR refers to Left Rear
RR refers to Right Rear
2. The first time these are checked, record the values below. They should be about the same each time they are checked. The rear suspensions will always have a much lower voltage than the front units.
3. Notify the proper personnel if the transducer voltages are not greater than 1 or less than 6 Vdc or if they have changed by more then 0.5 Vdc since the first reading.

TRUCK S/N	DATE	LF	RF	LR	RR

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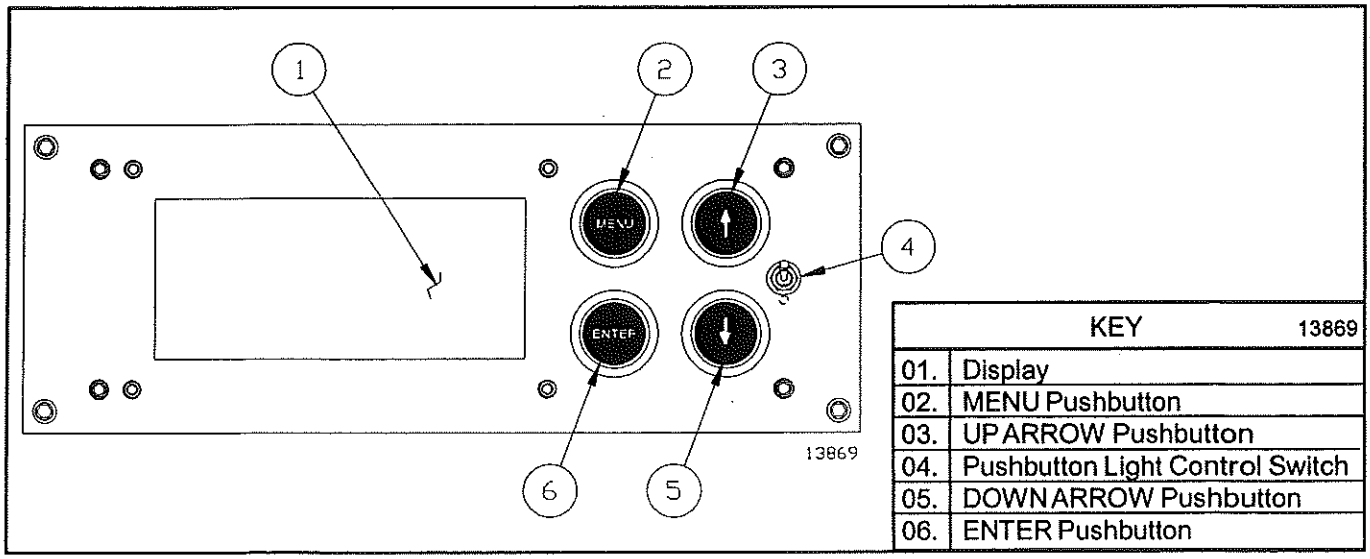
TABLE 1 – TRANSDUCER VOLTAGE READINGS (VDC)

e. Turn the Master Switch Off.



KEY	13869
01.	Display
02.	MENU Pushbutton
03.	UP ARROW Pushbutton
04.	Pushbutton Light Control Switch
05.	DOWN ARROW Pushbutton
06.	ENTER Pushbutton

FIGURE 3 – WEIGH SYSTEM DISPLAY

LOAD LIGHTS

The load lights may be tested as follows:

NOTE: *There are 2 red and 2 amber lights on left side and the right side of the trucks equipped with load lights. To check these, it is best to have 2 people, one in the cab and one where he can see the load lights and the person in the cab.*

1. Verify that the Master Switch is On.

2. Verfiy that there is sufficient supply pressure in the brake accumulators to release and hold the park brake calipers and pressure switches.

3. While holding the truck in place with the Brake Pedal, release all other brakes (Hand, Park and Load).

4. Apply the Load Brake.

5. Verify that all of the load lights flash enough to show that the lamps are operational.

6. Release and apply the Load Brake to repeat light flashing until the non-operational lamps have been identified.

NOTE: *When the Load Brake is applied, the Display should indicate LOADING mode. When the loading brake is released the Display should show EMPTY mode.*

7. Replace/repair any lamp assemblies that are not operational and retest as required.

DOWNLOAD SYSTEM INFORMATION

The information gathered by the Weigh System should be downloaded and analyzed as follows:

1. Following the procedures outlined in this manual the information gathered and stored by the Weigh System should be downloaded to a laptop computer for analysis.

NOTE: *Care must be take when uploading Weigh System data to ensure the desired effect on the data continuity:*
1. If the data is to remain as it is recorded and stored, select the option entitled "Update Data (Do NOT Reset the Haul Count)".
2. If resetting the haul count recorded on the truck is desired, select the option entitled "Update Data and Reset the Haul Count Since Last Update".

2. Also following one of outlined procedures in this manual the data obtained in step 1 should be reviewed and kept for future reference.

a. Weigh System operational problems, once identified, should be repaired to allow the system to operate properly.

b. The range of truck maximum vehicle weights.

(1) Maximum gross vehicle weight should not exceed truck capacity and allowance.

IMPORTANT: *Exceeding the capacity of the truck systems may adversely affect its operation and ability to perform properly. It may ultimately adversely impact maintenance and warranty considerations.*

(2) The range of the maximum vehicle weights carried should be approximately equal with minimal peaks or valleys. This will ensure the maximum productivity without overloading the truck.