Operation Manual

DBT- UN-A-TRAC ®
Model - 488-6DM

Doc. No.: A6474X245

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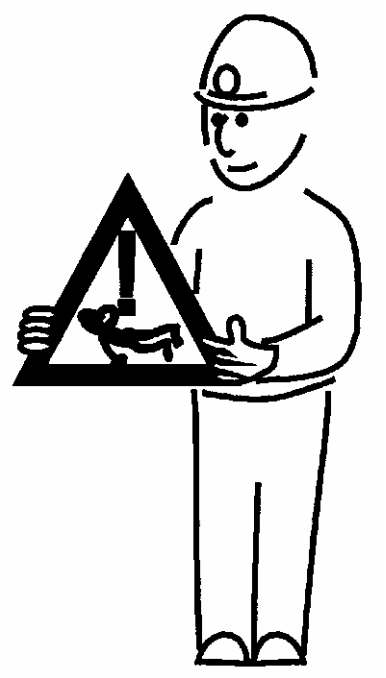
2 Your safety



maintenance, repair

Only persons who have and can demonstrate a special knowledge of hydraulics are allowed to work on the hydraulic system.

Avoid, whenever possible, servicing, cleaning or examining the machine in congested areas.

Avoid, whenever possible, servicing or providing maintenance to the unit unless the wheels are chocked and steering lockout device is connected to prevent accidental movement of the unit.

Do not alter the electrical or hydraulic settings from that indicated in this manual or as set at the factory.

Always replace damaged or lost decals and metal instruction plates.

Disconnect the battery when working with the electrical system, or when welding on the unit to prevent electrical shock.

Be sure the battery area is well ventilated (clear of fumes) when it is necessary to connect battery charger. Fumes from the battery could ignite from a spark and explode.

Always follow all safety procedures of each particular mine when performing maintenance.

It is important that any procedure not specifically recommended in this guide be thoroughly evaluated from the standpoint of safety before it is implemented.

Some illustrations in this manual show guards or cover panels removed for purposes of clarity. Never operate unit without guards or cover panels in place.

Carry out a visual inspection of all the hydraulic components at regular intervals. In particular check that:

- the hoses are not pinched or trapped.
- the hoses have no bubbles or blisters.
- the hose or outer sheathes of the hose are not abnormally rigid or hard.
- the outer sheath of the hoses is not damaged.
- the connectors are securely inserted into the sockets.
- the connections are leak-tight.

Ensure that no dirt enters the hydraulic system during repair work. Dirt in the hydraulic system can cause serious damage in the whole system! Flush out the hydraulic lines thoroughly before connecting.

IMPORTANT!
The drive and pump motors do not require periodic lubrication. The pump motor bearings are sealed. The drive motors have one bearing sealed and the other bearing receives lubrication from the gear case oil.

WARNING!
In order to check and adjust the steering system relief pressure, it is necessary to steer the machine to the turning limit in both directions. Care must be taken to avoid having anyone or any part of your body in the articulation area while the unit is being steered. All adjustments to the steering relief pressure must be made from inside the operator's compartment and not from outside the unit.

WARNING!
Some procedures must be carried out with the cover of the electrical controller removed and some procedures require the controller to be energized during the tests. It is extremely important that you take all necessary precautions to prevent accidental electrical shock while working within the controller. An MSHA-certified electrician must supervise and inspect all work performed.

Chapter 6: Technical data

IMPORTANT!
Due to the application of fasteners being subject to great stresses and heavy or extreme vibration, it is imperative that all bolts be applied with an adequate amount of torque. For this reason this list of recommended torque settings for different types and sizes of fasteners used has been compiled.
The tightening torques stated in the spare parts lists have to be observed, as well, for installation and maintenance.

NOTICE!
Use only lubrication fluids and greases approved by DBT America! These fluids and greases have been tested at DBT America and guarantee reliable operation of the mechanical and hydraulic functions of the machine.

IMPORTANT!
The lubrication fluids and greases listed in the same table can be mixed. Other products may only be used if the supplier can guarantee that they are equivalent.
Differently composed fluids and greases must not be mixed as this may change the consistency, i.e. the mixture can become thinner so that the lubrication effect is not sufficient. It may also be dangerous to use lubricating greases and fluids having the same specification base but different origins.
In case of doubt, the manufacturer of the lubrication to be used should be contacted as to the compatibility of the lubrication in question.

Installation

Points to observe prior to installation

Who is allowed to carry out installation?

Installation is only allowed to be carried out by personnel having received adequate training to perform this task.

Work on:

the safety components (pressure relief valves, fire extinguishing equipment etc.)

the electrical equipment (control units, signaling devices, etc.)
And

the hydraulic equipment (cylinders, directional control valves, hoses etc.)

should only be carried out by DBT America service engineers or by specially trained personnel.

Which tools are required for installation?

tool box

No special tools are required to put the UN-A-TRAC ® into service.

The battery plugs and receptacles come with a special wrench for connecting and disconnecting battery plugs and receptacles.

In addition, various items of auxiliary equipment and machines may be required at the point of installation.

These include i.e.:

- hoists with adequate lifting capacity
- means of attachment with adequate lifting capacity
- unloading dock
- jacks with adequate lifting capacity

accelerator pedal

This pedal (Fig. 9), operated by the right foot, is used to start the tram (traveling) motors and regulate the speed of the machine.

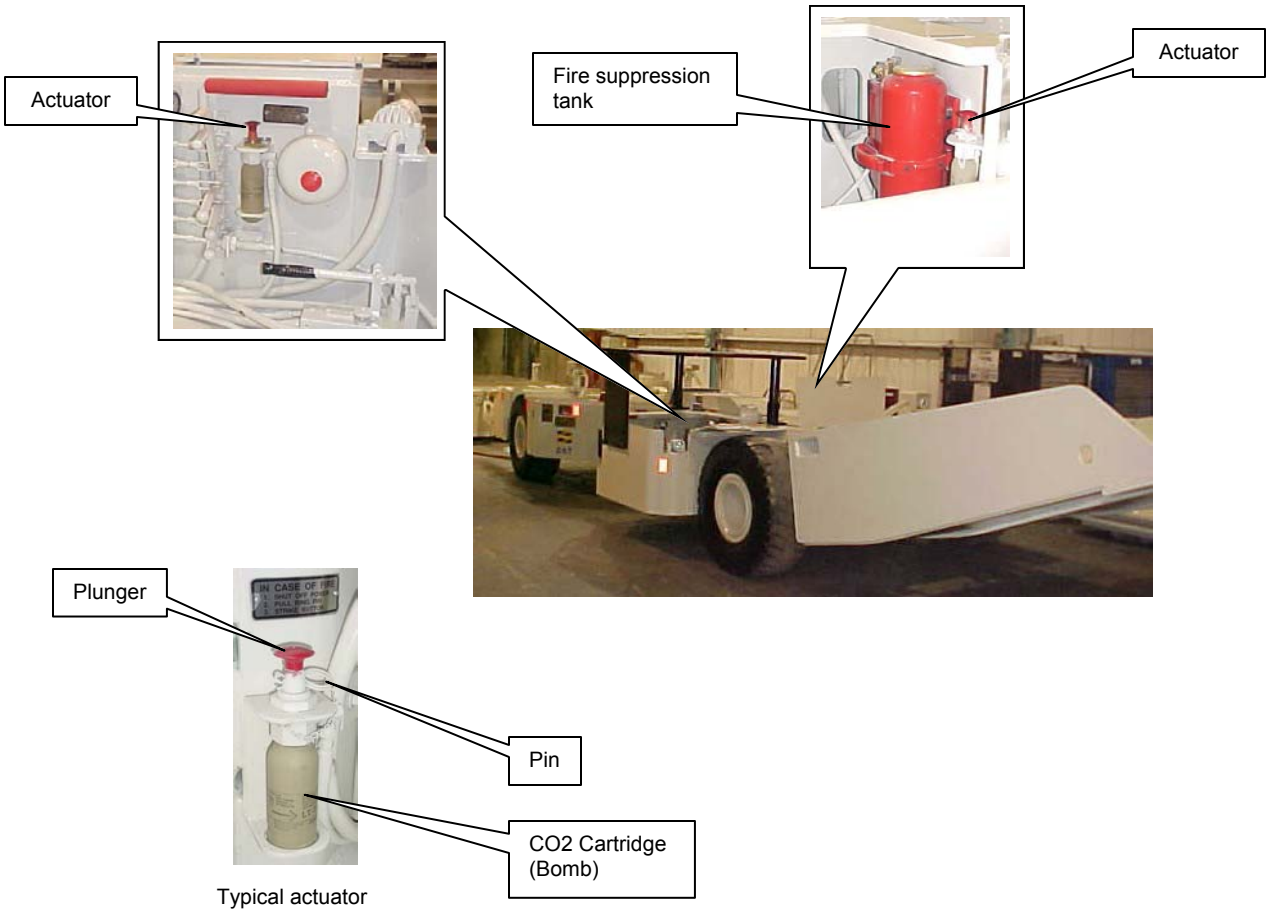
CAUTION!
The speed switch foot pedal should not be depressed at the same time as the foot brake pedal or when the parking brakes are set. To do so may overload the tram motors and could shorten their usefulness. The UN-A-TRAC ® is provided with overload protection, but continued abuse can shorten motor life.

fire suppression actuators

The machine is equipped with two (2) fire suppression (remote) actuators (Fig. 10). One is located to the operator's right inside the operator's compartment and the other is located next to the controller enclosure on the opposite side of the machine. This particular suppression system is pneumatically actuated and extinguishes with dry chemicals. To actuate the system from either of the two (2) actuators, pull the safety pin and strike downward on the plunger. Immediately after the plunger is struck, dry chemical will be dispensed throughout the machine. The fire suppression system must be completely recharged with dry chemicals and expellants after it has been actuated.

WARNING!
If either of the fire suppression actuators is actuated, the system must be completely recharged with dry chemicals and expellants.

Fig. 10: Fire suppression locator (typical)



“BATTERY” control lever

The "BATTERY" lever (Fig. 17) controls the battery changing system, which is made up of two hydraulic cylinders (battery lifting cylinders), one on each side of the batteries. When the "BATTERY” control lever is pulled toward the operator, the battery-lifting cylinders will raise the batteries. Pushing the handle away from the operator will lower the batteries.

WARNING!
The "BATTERY” changer lever should only be operated at a battery change station. The battery may be damaged if accidentally raised in a low roof area. For more information on how to change the batteries see the Battery change procedure in this chapter.

WARNING!
Never attempt to disconnect a hydraulic hose from the battery lifting cylinders with the battery in the "UP" position. This would allow the battery to fall and could result in injury.

General hydraulic control system information (machines equipped with optional QDS bellcrank)

In the operator's compartment located to the right of the operator’s seat is a group of control levers and gauges (Fig. 18). These levers control the bucket position, lift, tilt, QA pins, ejector blade position, winch operation and battery changer system by means of a hydraulic valve bank located behind the panel to the operator's right. The gauges include emergency brake, accumulator, and system pressure. The hydraulic system pressure relief valve is set at the factory at 2000 psi (138 bar), and should not be changed. Should the "SYSTEM PRESSURE" gauge (Fig. 16) read more than 2250 psi (155 bar), shutdown the machine and call a maintenance person (see Shutdown procedure in this chapter).

Table 3: Hydraulic control panel gauge readings (optional QDS)

Gauge	Pressure reading
Emergency brake	1500 – 1800 psi (103 –124 bar)
Accumulator	1500 – 1875 psi (103 – 129 bar)
System pressure	2250 psi (155 bar)

WARNING!
Should either gauge show above or below the pressures listed above, shutdown the UN-A-TRAC ® and call a maintenance person (see Shutdown procedure in this chapter).

Towing a disabled machine

WARNING!
It is not possible, within the scope of this guide, to anticipate all possible arrangements for towing a disabled vehicle, you must take all possible precautions to protect the operators and anyone around both vehicles from being injured by either the towing vehicle, the towing device used (cables, bars, etc.) and the towing vehicle (scoop, tractor, etc.) must be strong and heavy enough to maintain control of both vehicles through all bottom conditions to be encountered at all times. Safety chains or other safety devices must be used in case of failure of the primary towing device. All operators must be alert at all times to prevent either unit from running away or running out of control during towing. The vehicle to be towed must be securely coupled to the towing vehicle before the brakes are released on the disabled unit. The operator of the towing vehicle must be in place in the towing vehicle with the brakes applied before the brakes of the disabled vehicle are released.

- ☞ Couple the towing vehicle securely to the disabled vehicle.
- ☞ Turn the valve selector handle to “PUMP TO RELEASE” on the Emergency/Park Brake Release Hand Pump located inside the operator’s compartment (this isolates the park brake solenoid from the circuit).
- ☞ Begin pumping the hand pump. The building pressure moves the shuttle valve and allows the Automatic (Park) Brake system to be pressurized.
- ☞ The Automatic (Park) Brake is released when a minimum of 1500 psi is indicated by the Brake Release gauge.

CAUTION!
For long distance towing, disconnect and remove front and rear drive lines.

WARNING!
At no time during towing should anyone ride in or on the vehicle being towed or stand in between the towing vehicle and the disabled vehicle.

- ☞ Begin towing the vehicle.
- ☞ Once the destination is reached, stop both vehicles and set the parking brake on the disabled vehicle before removing the towing devices. The disabled vehicle should be choked in both direction at all four wheels for additional stability. The brake is set by turning the valve handle on the hand pump to “NORMAL RE-APPLY”.

WARNING!
Failure to set the parking brake on the disabled vehicle before removing the towing device could allow the disabled vehicle to roll away uncontrolled.

Critical torque values

Torque values are expressed in lubricated and dry thread values. Lubricated thread torque values should be used any time the bolt threads are covered with oil, grease, anti-seize or thread-locking compounds. Dry thread torque values should be used when threads are completely clean and dry.

Table 4: Critical torque values

Location	Bolt size	Grade	Dry	Lubricated
Steering cylinder pins	7/8 NC	8	N/A	460
Tire-Wheel mounting bolts	3/4” X 2 1/4”	8	N/A	300
Oscillating bearing	1 1/4” X 9”	8	N/A	1840
Drive motor-to-gear case mounting bolts	3/4” X 2 3/4”	8	N/A	280 - 320
Axle mounting bolts	7/8” X 9”	8	N/A	455
Center section mounting bolts	7/8” X 9”	8	N/A	620

Lubricants, fluids and capacities

Table 5: Lubricants, fluids and capacities

Location	Specification	Approximate capacity	Notes
Hydraulic oil tank	Spec. 100-1		1
Gear box (reducer)	Spec. 100-6	2.75 quarts. or as required	
Lubrication points	Spec. 100-3	As Required	3
Winch	API GL4 (140) Gear oil Peragma Grade 8	5 pints	
Axle housing (Meritor) (Kessler)	Spec. 100-6	As required	2
Planetary wheel ends (Meritor) (Kessler)	Spec. 100-6	As required	2
Wet disc brakes (Meritor) (Kessler)	Spec. 100-12	As required	
Axle (John Deere)	John Deere Hy-Gard oil	20 quarts	2
Wet disc brake (PT Tech)	Spec. 100-1	As required	
Wet disc brake (SROIB)	SROIB brake cooling fluid	1.9 quarts	

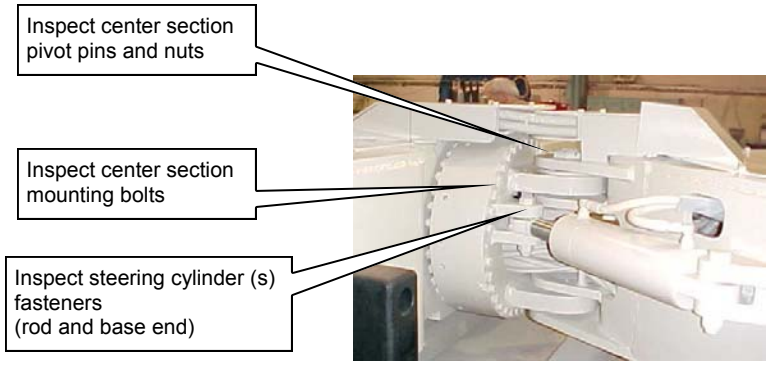
Notes:

1. With ejector blade completely retracted (if equipped with bucket).
2. The axle housing and planetary wheel end assemblies do not have a common oil source. Each assembly must be filled separately.

   Make sure the level and fill hole in the planetary wheel end cover is in the proper position. Rotate the wheel end as required to bring the fill hole to either the 3 o'clock or 9 o'clock position.

   When filling the axle housing and planetary wheel ends, allow enough time for the lubricant to fill the various cavities and around component parts in each assembly. Continue adding oil into each assembly until the required oil level is reached.
3. Pump grease into fitting until old grease can be observed coming out of component.

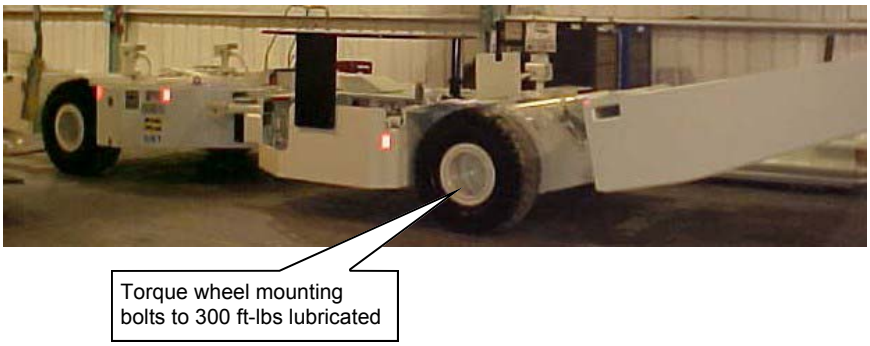
Fig. 45: Center section and steering cylinder pins and nuts



tire/wheel mounting bolts

Check the wheel mounting bolts (Fig. 46). The mounting bolts should be torqued to 300 ft-lbs lubricated. Use Loctite 242 on wheel mounting bolts.

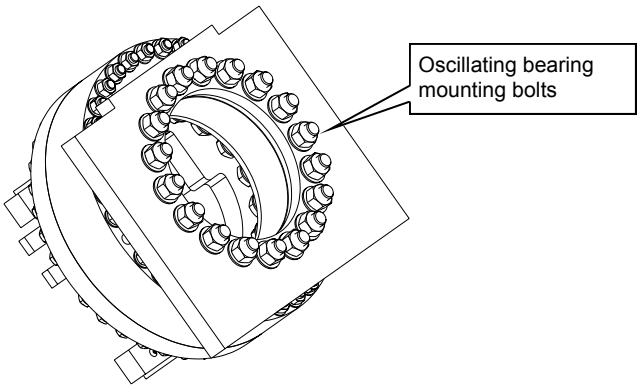
Fig. 46: Tire/wheel mounting bolts



oscillating bearing mounting bolts

Check the oscillating bearing mounting bolts (Fig. 47). The mounting bolts should be torqued to 1840 ft-lbs lubricated. Use Loctite 242 on mounting bolts.

Fig. 47: Oscillating bearing mounting bolts



hydraulic oil tank (s) and strainer (s)

Change oil and clean or change the suction strainer in the hydraulic oil tank (s) (Fig. 63).

- ☞ Park the UN-A-TRAC ® on solid level ground, clean dirt and debris from around the drain plug (s) located on each side tank.
- ☞ Remove drain plug (s) and allow oil to completely drain from the tanks. The two (2) drain plugs will allow oil to drain from all three (3) tanks.
- ☞ Clean and reinstall drain plug (s).
- ☞ Clean dirt and debris from around fill cap and cover on the right and left tanks.
- ☞ Remove the bolts that secure the fill cap and cover.
- ☞ Reaching down into each tank, unscrew the suction strainer (s) and remove from tank.
- ☞ If the strainer (s) is not torn or damaged, it can be cleaned using kerosene and a soft brush and dried thoroughly. If strainer (s) is damaged, it must be replaced.
- ☞ Replace the strainer (s) in the tank (s) and hand tighten.
- ☞ Replace the fill cap and cover on both tanks.
- ☞ Refill the tank to the proper level.
- ☞ Start the machine and allow the hydraulic pump to run in order to purge air from the system.
- ☞ Shutdown the machine and recheck the oil level. Add oil if necessary.

Fig. 63: Hydraulic oil and suction strainer

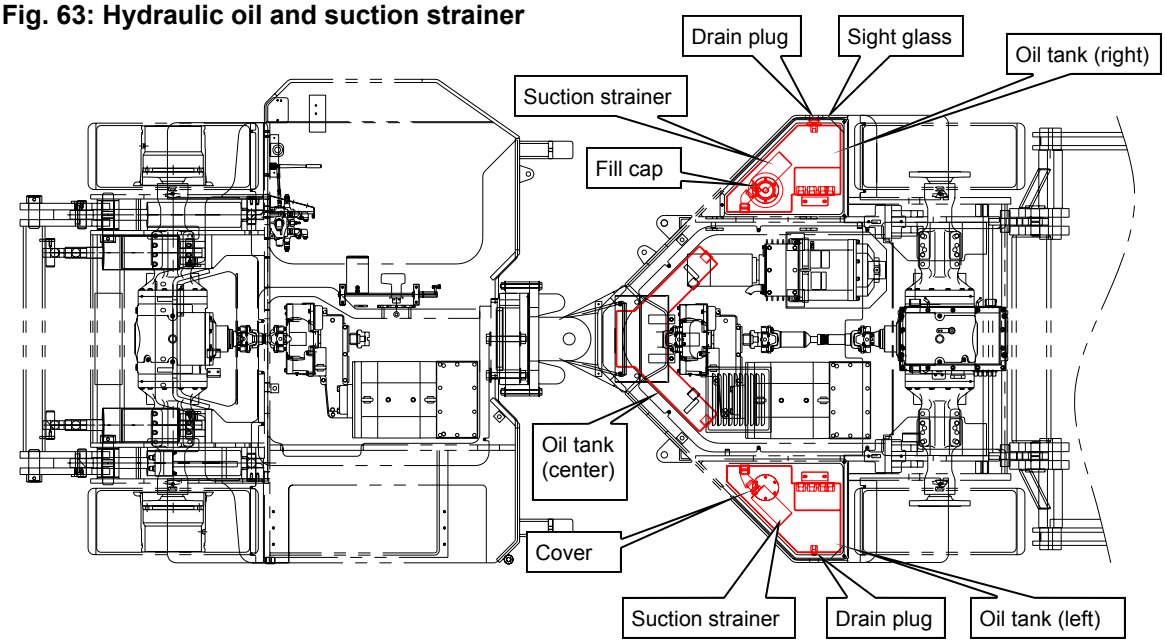


Table 7 (continued): Hydraulic system (general) troubleshooting

Trouble, symptom or cause	Probable cause	Test, check and/or remedy
overheating of system (continued)	☞ Improper air circulation around reservoir.	☞ Check to see if the area around the reservoir is clear.
	☞ System relief valve set too high or too low.	☞ Reset the relief valve to specifications.
foreign matter sources in the circuit	☞ Sealing compound (pipe dope, Teflon tape).	☞ Clean or replace seals.
	☞ Burrs inside piping components.	☞ Disassemble piping components and remove any burrs.
	☞ Tag ends of packing coming loose.	☞ Remove old packing and replace with new.
	☞ Lines left unprotected and dirty, repaired components.	☞ Drain and replace oil.
	☞ Repair parts not properly protected while stored.	☞ Clean parts thoroughly before installation.
Accumulator charging cycle repeats frequently when accumulator is not normally being discharged in service	☞ Leaking accumulator lines or fittings.	☞ Check lines and fittings for leaks and correct.
	☞ Accumulator gas charge too low.	☞ Check accumulator gas charge.
	☞ Accumulator gas charge too high.	☞ Check accumulator.
	☞ Line to accumulator plugged.	☞ Replace line.
Accumulator starts to charge but doesn't reach high limit	☞ No oil or low oil in tank.	☞ Check oil level.
	☞ Defective or worn pump (pump doesn't deliver full flow or pressure).	☞ Check pump pressure and flow.
	☞ Defective system relief valve (valve leaking or has low setting so full flow and pressure are not available).	☞ Check relief valve.
	☞ Defective charging valve.	☞ Replace valve.
No steering or inadequate steering when accumulator is charging but steering satisfactory when accumulator is not charging	☞ Pump worn (not delivering full flow or pressure).	☞ Check pump pressure and flow.
	☞ Relief valve defective (valve leaking so that full flow and pressure not available).	☞ Check relief valve.
	☞ Defective charging valve.	☞ Replace charging valve .

Technical data

This chapter contains the most important technical data on the 488-6DM UN-A-TRAC ®. Further data can be found in the spare parts lists. At the end of this chapter you will find information on the bolt tightening torques, HFA fluids, greases, etc. Read this chapter through carefully and pay particular attention in particular to the safety instructions.

The technical data listed in this chapter is for stock machines only. Customer specials may not be listed.

Components of the 488-6DM UN-A-TRAC ®

Technical data sheet

general	Length (overall):	approx. 31’ 4.5”
	Bucket:	approx. 9’ 7”
	Outside operator’s compartment:	approx. 9’ 9.5”
	Wheelbase:	approx. 14’ 2”
	Ground clearance (w/35x15-15 tires):	approx. 11”
	Ground clearance (w/38x16-15 tires):	approx. 12”
	Chassis height (w/38x16-15 tires):	approx. 3’
	Weight (empty less battery):	approx. 36,700 lbs
	Weight (w/64-SS125-21 battery):	approx. 49,000 lbs
performance	Inside turning radius:	approx. 12’ 6.5”
	Outside turning radius:	approx. 24” 2”
	Steering articulation:	90 degrees total
	Tram speed:	4 to 5 mph
	Lift capacity (36” from the face of lift plate):	approx. 16 tons

axles Front and rear rigid mounted planetary axles (John Deere 1200 Series or Meritor). Axles are equipped with a wet disc service brake mounted at each planetary

drive lines Heavy duty off-highway type drive shafts and slip joints.

reducer Foot mounted gearbox.

brakes (service) Left foot-pedal actuated wet disc brakes at all four wheels. Hydraulic power is supplied through a one gallon accumulator which continues to provide stopping power in the event of a power loss and is monitored by a charging/unloading valve.
Accumulator is not permitted to fall below a certain residual pressure to assure this continued availability. A dash mounted monitoring gauge keeps the operator constantly informed of the accumulator’s status.

automatic emergency/park brake release hand pump Wall mounted hand pump located to the right of operator. Activating this pump enables the operator to release the brake without power on the unit for towing a disabled vehicle.

Permissible media

Lubrication fluids and greases

NOTICE!
Use only lubrication fluids and greases approved by DBT America! These fluids and greases have been tested at DBT America and guarantee reliable operation of the mechanical and hydraulic functions of the machine.

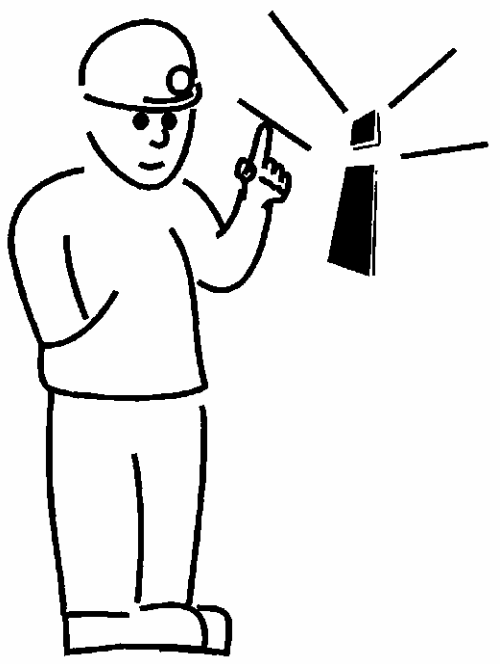
IMPORTANT!
The lubrication fluids and greases listed in the same table can be mixed. Other products may only be used if the supplier can guarantee that they are equivalent.
Differently composed fluids and greases must not be mixed as this may change the consistency, i.e. the mixture can become thinner so that the lubrication effect is not sufficient. It may also be dangerous to use lubricating greases and fluids having the same specification base but different origins.
In case of doubt, the manufacturer of the lubrication to be used should be contacted as to the compatibility of the lubrication in question.

IMPORTANT!
DBT America expressly points out that the approval of the listed products relates only to the pure technical use in our mechanical and hydraulic systems. The responsibility for the constituents used in the hydraulic concentrates lies solely with the respective manufacturer.

IMPORTANT!
Be sure to use the manufacturer's instructions for use.

NOTICE!
When performing maintenance on the machine, all used oil and lubricants should be disposed of per your local EPA standards.

7 For your information



SAFETY PRECAUTIONS AND GUIDELINES

Overview

Before you test, troubleshoot, service or in any other way, use this unit -

READ and **STUDY** this guide. **KNOW** what you must do for safe maintenance.

ALWAYS wear or use the proper safety items required for your personal protection.

If you have ANY QUESTIONS about the safe use or maintenance of this unit:
ASK YOUR SUPERVISOR - NEVER GUESS - ALWAYS CHECK

Maintenance

AVOID, whenever possible, servicing, cleaning or examining the unit in congested areas.

AVOID, whenever possible, servicing or providing maintenance to the unit unless the wheels are adequately choked. If the drive motor (s) is to be run, the unit must be jacked clear of the ground and all four (4) wheels must be free to turn.

DO NOT alter the electrical settings from that indicated in this guide or as set at the factory.

ALWAYS replace damaged or lost decals or metal instruction plates. Refer to the Parts Manual for the proper location and part number of decals and plates.

DISCONNECT the battery when working with electrical systems, or when welding on the unit to prevent electrical shock.

It is important that any procedure not specifically recommended in this guide be thoroughly evaluated from the standpoint of safety before it is implemented.

Some photographs and illustrations in this guide may show guards or covers removed for purposes of clarity. Never operate unit without all guards and covers in place.

NOTICE

SOME PHOTOGRAPHS OR ILLUSTRATIONS IN THIS GUIDE MAY SHOW PROTOTYPE UNITS OR UNITS WITH OPTIONAL EQUIPMENT INSTALLED THAT MAY OR MAY NOT BE ON YOUR PARTICULAR MACHINE. PRODUCTION MODELS MAY VARY IN SOME DETAIL. OPTIONAL EQUIPMENT MAY BE PURCHASED FROM YOUR DBT DEALER.

CONTINUING IMPROVEMENT AND ADVANCEMENT OF PRODUCT DESIGN MAY CAUSE CHANGES TO YOUR MACHINE WHICH MAY NOT BE INCLUDED IN THIS PUBLICATION. EACH PUBLICATION IS REVIEWED AND REVISED, AS REQUIRED, TO UPDATE AND INCLUDE THE CHANGES IN LATER ADDITIONS. DBT RESERVES THE RIGHT TO MODIFY OR MAKE CHANGES WITHIN A SPECIFIC MODEL GROUP WITHOUT NOTICE AND WITHOUT INCURRING ANY LIABILITY TO RETROFIT UNITS PREVIOUSLY SHIPPED FROM THE FACTORY. CONTACT YOUR DBT DEALER FOR MAINTENANCE THAT IS NOT COVERED IN THIS PUBLICATION.

Fault Message Chart

DASHBOARD DISPLAY	CALIBRATOR DISPLAY	DESCRIPTION
“Rotating Disp.”	“OK”	No fault
“Testing”	“Testing”	Only visible when power-up diagnostics is running. Check connections if not clearing.
“System OK”	“System Okay”	Power-up check completed, waiting to closure of Circuit Breaker
“Over Temp.”	“Thermal Cutback”	Controller in thermal cut-back.
“Brkr Open”	“Breaker Open”	Circuit breaker failed to close. Faulty Circuit breaker, UVR, CB Auxiliary or faulty logic board.
“Brkr Weld”	“Breaker Weld”	Circuit breaker welded close. Faulty CB auxiliary switch or faulty logic will give this fault also.
“UVR Coil”	“UVR Coil”	UVR coil driver over-current sensed.
“Cap Fault”	“Capacitor Fault”	Caps failed to charge after power-up.
“Accel Flt.”	“Accel Flt.”	Accelerator fault sensed. Faulty accelerator (accelerator voltage 4.0v; accelerator voltage below 1.2v in NEUTRAL). Faulty FS1 or logic board.
“Seq. Fault”	“Sequence Fault”	FS1 closed at power-up. Possible circuit breaker auxiliary switch not closing
“2 Dir Fault”	“2 Dir Fault”	Both directional switches active.
“Tram Fault”	“Tram Fault”	Motor current imbalance sensed.
“Bat Low”	“Bat Low”	Battery fell below personality level.
“CRC Error”	“CRC Error”	During power-up a personality CRC error occurred. Try adjusting one of the passwords (1 or 2) then power recycle. If not cleared replace logic board.
“IGBT s/c”	“IGBT s/c”	An IGBT short has been detected – SM.
“IGBT s/c”	“IGBT s/c”	A left or right IGBT short has been detected – DM.
“Brake on”	“Brake on”	The vehicle BRAKES are on while there is a direction and demand selected.
“Cur Xducer”	“Cur Xducer Flt”	The controller reads current when it is first powered-up or does not read any current when demand for drive over 50%.
“Bad Logic”	“Bad Logic”	An internal errors has occurred in the software state machine. Faulty logic board.
“Bad Logic”	“Bad Logic”	Invalid status state encountered (internal error). Faulty logic board.
		*** * * * POWER UP TEST STATUS * * * ***
“Cap Fault”	“Cap Fault”	Caps failed to change after power-up.
“PTA Short”	“P. Up PTA Short”	Single motor Block 0 point “A” short Motor short to ground or IGBT shorted Other electrical component (coil/etc.) shorted or grounded not allowing voltage to come up to or above 64VDC on IGBT panel.
“RPTA Short”	“P. Up R. PTA Short”	Dual motor Block 0 point “A” short Motor shorted to ground or RIGHT IGBT shorted Other electrical component (coil/etc.) shorted or grounded not allowing voltage to come up to or above 64VDC on IGBT panel.

TROUBLESHOOTING

This section provides troubleshooting information. This guide assumes you have a working knowledge of IGBT controller servicing and that you have the following equipment.

1. Volt/Ohm Meter with Leads

2. Insulated Basic Hand Tools

WHEN WORKING INSIDE THE CONTROLLER, USE INSULATED GLOVES AND TOOLS WHERE POSSIBLE.

ALL CONNECTIONS MUST BE TIGHT AND CARE MUST BE TAKEN TO PREVENT BOLTS, NUTS, WASHERS AND OTHER SMALL METAL FASTENERS FROM BEING DROPPED OR LOST INSIDE THE CONTROLLER.

BEFORE STARTING ANY POWER-RELATED PERFORMANCE TESTS, THE MACHINE MUST BE JACKED AND SECURELY BLOCKED CLEAR OF THE GROUND WITH ALL FOUR (4) WHEELS FREE TO TURN.

REFER TO THE PARTS MANUAL FOR YOUR PARTICULAR MACHINE WIRING DIAGRAMS AND SCHEMATICS.

THE LOGIC UNIT CONTAINS NO USER-SERVICEABLE PARTS. OPENING THIS SEALED DEVICE WILL VOID THE WARRANTY.