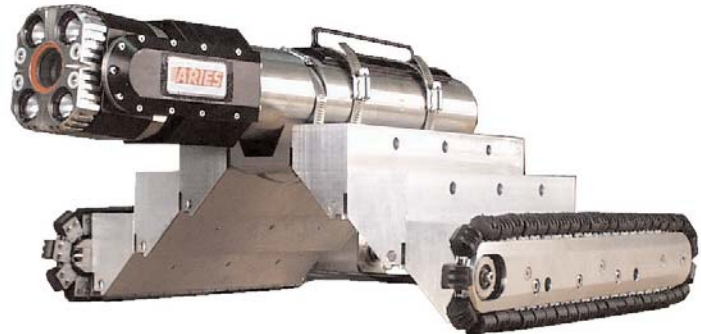
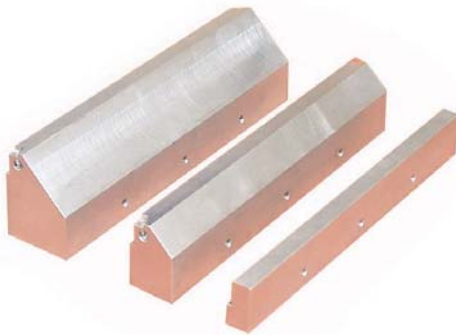




Industries, Inc.

Taurus, TR2000 Tractor Operation and Maintenance



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SECTION ONE

**Introduction, Safety, Components,
Adjustments, Operation, Maintenance**



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Introduction

The ARIES TR2000 Tractor is a track tractor that transports a video inspection camera through pipeline diameters of 6 to 24 inches. It is free wheel, chain driven, and operates from the ARIES TC1000 and 2000 Series Tractor Controllers. It is powered by a 0 - 100 VDC continuous duty rated motor. The tractor is designed for use with all ARIES portable or Mainline (truck-mounted) systems and with many systems other than ARIES.

Optimum tractor operation requires proper electrical wiring and connections to TV cable reels, proper width adjustment to fit the pipeline diameter being inspected, and proper maintenance.

This manual is designed to assist personnel when performing tractor set-up, width conversion, and maintenance procedures.

Operator and Equipment Safety

Care and precautions are needed when operating ARIES tractors and cameras.

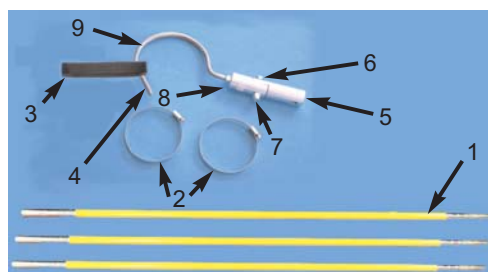
1. Read the entire manual before operating equipment.
2. To prevent personal injury or damage to equipment, disconnect all power to the control station and tractor/camera/lights when making electrical connections, width adjustments, or performing maintenance.
3. Inspect all tractor, camera, and lighting cables before and after each use. Replace any damaged cables.
4. When connecting or disconnecting cables, verify all system power is off.
5. Do not lift a tractor by its power cable. Always use a lifting device (lifting hook and poles arrangement or a hoist) when lowering or raising tractor/camera equipment.



Always use a lifting hook when lowering or raising the TR2000 and camera equipment with the retrieval pole assembly.

Lift Hook Assy (Item 4) 610025

Item #	Description	Qty	P/N
5	Lift Hook Pivot	1	620026
6	Screw, 3/8-16X1-3/4	1	104008
7	Nut, Lock 3/8-16	1	105014
8	Nut, 3/8-16	1	105013
9	Lift Hook, 3/8 Formed	1	610022



Retrieval Pole Assembly 610700

Item #	Description	Qty	P/N
1	Pole Extension	3	610714
2	Worm Clamp	2	120613
3	Lift Strap	1	610043
4	Lift Hook Assy	1	610025

NOTE: The TR2000 operates best in a clean pipe.

TR2000 Tractor
Introduction, Safety,
Components, Adjustments,
Operation, Maintenance



Components

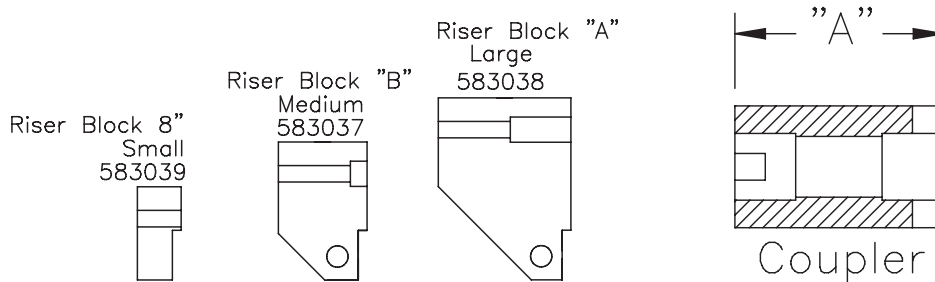
The ARIES TR2000 tractor is designed for use in pipeline diameters of 6 to 24 inches. It can be fitted with all ARIES camera systems.

Couplers, Riser Blocks, Sprockets

The TR2000 is shipped in the 8 inch diameter pipe inspection configuration. Refer to the next six pages for tractor width configurations.

RISER BLOCK SETUP	PIPE ID	COUPLER PART #	DIM "A"
583039 -QTY 2	8"	583030	1.780
583037 -QTY 2	10"	583031	3.230
583038 -QTY 2	12"	583032	4.640
583038 -QTY 2 583037 -QTY 2	15"	583033	7.510
583038 -QTY 4	18"	583034	8.920
583038 -QTY 4 583037 -QTY 2	21"	583035	11.790
583038 -QTY 6	24"	583036	13.200

INCLUDED WITH ASSEMBLY
ORDER AS OPTION



Tools: ARIES recommends a power driver and 3/16 inch Allen wrench when changing Riser Blocks. Tow Cable attachment requires a 3/32 inch Allen wrench. Cable Clamps require a 5/16 inch nut driver. Secure Tow Cables to the Riser Blocks closest to the treads for stability.





Camera Adjustment, Sprocket Change, Width Conversion

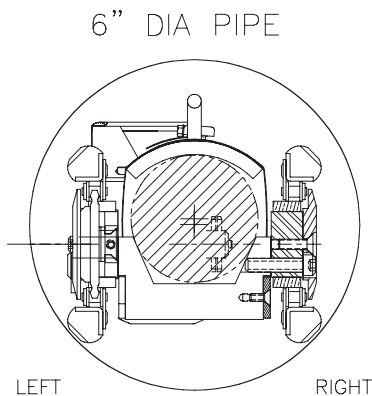
The TR2000 is capable of operating in pipeline diameters between 6 and 24 inches. Pan and tilt camera adjustments, tractor right rear sprocket changes and width conversions are required for operation in various pipe sizes.

Camera Removal, Width Conversion, Sprocket Change and Camera Reattachment for 6 Inch Lines

Pan & Tilt Camera Removal

Refer to the drawing on page 2-2. The numbers in () refer to item numbers on that drawing.

Disconnect the 12 pin cable assembly (p/n 841501) connections to the camera and remove the camera from the weight tube.



**Use Rear Sprocket 583024
for 6 Inch Pipes**

Width Conversion for 6 Inch Lines

All riser blocks and the transmission coupler must be removed to inspect 6 inch diameter pipe. The proper rear sprocket must be attached to the right side track assembly and motor/transmission assembly. Refer to the Sprocket Changeover description on page 1-4.



Camera Removal, Width Conversion, Sprocket Change and Camera Reattachment for 6 Inch Lines (cont'd)

Sprocket Change for 6 Inch Lines

The tractor requires right rear sprocket p/n 583024 when inspecting 6 inch diameter lines and rear sprocket p/n 583027 when inspecting pipelines between 8 and 24 inches. To change from an 8 inch and larger pipe diameter sprocket (as shipped) to a 6 inch diameter pipe socket refer to drawing 583049 on page 2-2. The numbers in () below refer to item numbers on that drawing.



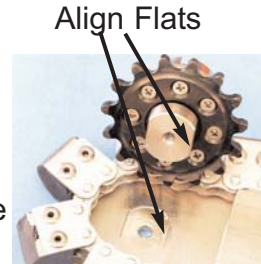
1. Remove the 6 screws, three on each side, position (6), that hold the left and right track assemblies to the riser blocks (25, 26, or 30) and cradle (27) for 8 inch pipe diameter configurations. For other configurations remove the track assemblies from the lower riser blocks and the upper riser block(s) from the cradle (refer to page 1-8). Remove the coupler (15) from the transmission (16).



2. Remove the sprocket screw (28) from the right side track assembly. Turn the track assembly over. Push up on the sprocket (14) and chain to remove the sprocket from the right side track assembly.



3. Engage the 6 inch sprocket/coupler assembly (13) sprockets with the chain and place the sprocket/coupler on the right side track assembly. Reattach the sprocket/coupler to the track assembly with the sprocket screw (28). Make sure the flats on the drive sprocket/coupler align with the flats in the recess in the track assembly.



4. Engage the sprocket collar with the transmission spring pin. Align the right side track assembly with the cradle. Attach the track assembly to the cradle with three 1 inch long screws, p/n 107528.
5. Reattach the left side track assembly to the cradle with three 1 inch long screws, p/n 107528.

Pan & Tilt Camera Reattachment

1. Remove Camera Weight Tube Assembly (11), including Lifting Loop Cable (37) and Camera Clamps (12), by removing two socket head screws (31). Front screw can be accessed by first removing rear Camera Clamp (12). Place assembly in storage.
2. Reconnect the 12 pin cable connections to the camera and tractor and place the camera on the cradle. Place Retrieval Pole Lift Bracket (p/n 610705) on top of the camera.



Pan & Tilt Camera Reattachment (cont'd)

3. Attach the camera Lift Bracket Assembly to the cradle with two #64 clamps p/n 120613 (see page 1-1). Place the clamps around the cradle and the camera rotation motor housing/Lift bracket. Put the clamp screws at or near the top of the motor housing, between the 11 and 1 o'clock positions.
4. Tape the 12 pin connector cable to the motor/transmission assembly (16) at about the 11 o'clock position when viewing the tractor from the rear. Use electrical or duct tape. Reconnect the 12 pin connector to the pull reel.

Camera Adjustment, Sprocket Change and Width Conversion for 8 Inch and Larger Lines

Pan & Tilt Camera Adjustment for 8 inch and Larger Lines

Reverse the pan & tilt camera adjustment for 6 inch lines procedures on pages 1-3 to 1-5 to adjust the camera from 6 inch to 8 inch and larger lines.

Sprocket Change for 8 Inch and Larger Lines

The tractor requires rear sprocket p/n 583027 when inspecting lines between 8 and 24 inches and rear sprocket p/n 583024 when inspecting 6 inch diameter lines.



To change from the 6 inch line sprocket to the 8 inch and larger diameter pipe sprocket refer to drawing 583049 on page 2-2. The numbers in () below refer to item numbers on that drawing.

1. Remove the three 1-3/4 inch long screws, p/n 107524 in position (6) that were attached in step 4 on page 1-4, that hold the right side track assembly to the cradle (27).



2. Remove the sprocket screw (28) from the right side track assembly.

Turn the track assembly over and push up on the sprocket (13) and chain and remove the sprocket from the chain.



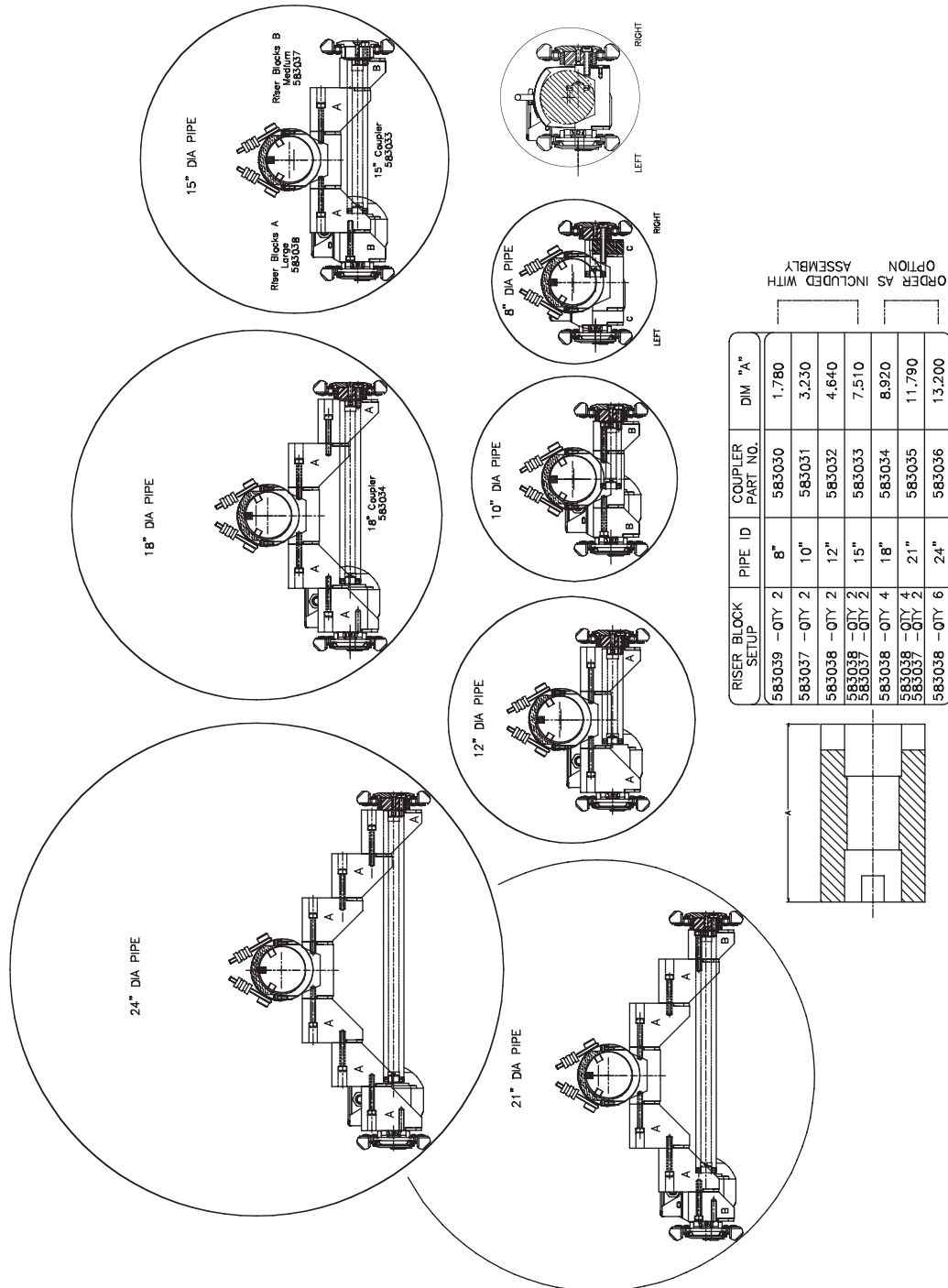
3. Engage the 8 inch sprocket assembly (14) sprockets with the chain and place the sprocket on the right side track assembly. Align the flats on the Sprocket Assembly with those in the recess on the track assembly. Reattach the sprocket to the track assembly with the sprocket screw (28).



Camera Adjustment, Sprocket Change and Width Conversion for 8 Inch and Larger Lines (cont'd)

Width Conversion for 8 inch and Larger Lines

Specific coupler and riser block arrangements are required to configure the TR2000 to inspect 8 to 24 inch diameter lines.



Riser Block and Coupler Configurations
 TR2000 Tractor



Width Conversion for 8 inch and Larger Lines (cont'd)

To change transmission couplers and riser blocks:

1. Locate the proper transmission coupler and risers for the selected pipe width.
2. Remove the attached risers from the cradle and left and right track assemblies.
3. Remove the transmission coupler.
4. Configure the risers. Refer to the list below and the drawings on page 1-6.
5. Always attach the complete left side riser configuration to the cradle first.
6. Place one end of the required coupler on the transmission spring pin. Engage the other coupler end with the right side sprocket collar and attach the right side riser configuration to the cradle.
7. After configuration, run the tractor slowly and observe for proper operation. Correct any malfunctions.

Below are parts and arrangement descriptions of coupler/riser block configurations for various size pipe.

NOTE: Verify that a plastic wear strip, p/n 583022 (29), is attached to each riser that connects to the track assemblies.

8 inch diameter pipe

8" coupler, p/n 583030

Attach 8" risers to track assemblies and cradle with 1-3/4 inch long screws p/n 107524.

10 inch diameter pipe

10" coupler, p/n 583031

Attach B risers to cradle with 1-3/4 inch long screws p/n 107524.

Attach B risers to track assemblies with 1-3/4 inch long screws p/n 107524.

12 inch diameter pipe

12" coupler, p/n 583032

Attach A risers to cradle with 1-3/4 inch long screws p/n 107524.

Attach A risers to track assemblies with 1-3/4 inch long screws p/n 107524.

15 inch diameter pipe

15" coupler, p/n 583033

Attach B risers to A risers and A risers to cradle with 1-3/4 long screws p/n 107524.

Attach B risers to track assemblies with 1-3/4 inch long screws p/n 107524.



To change transmission couplers and riser blocks (cont'd)

18 inch diameter pipe

18" coupler, p/n 583034

Attach A risers to A risers and A risers to cradle with 1-3/4 inch long screws p/n 107524.

Attach A risers to track assemblies with 1-3/4 inch long screws p/n 107524.

21 inch diameter pipe

21" coupler, p/n 583035

Attach A and B risers to A risers and A risers to cradle with 1-3/4 inch long screws p/n 107524.

Attach B risers to track assemblies with 1-3/4 inch long screws p/n 107524.

24 inch diameter pipe

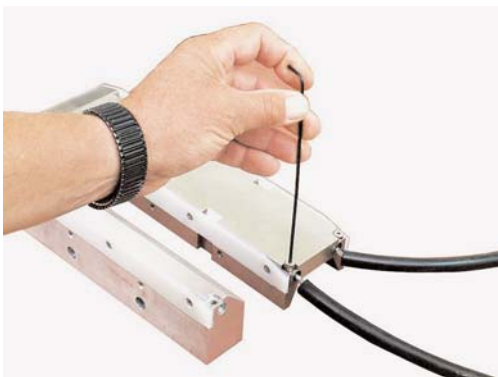
24" coupler, p/n 583036

Attach A risers to A risers and A risers to cradle with 1-3/4 inch long screws p/n 107524.

Attach A risers to track assemblies with 1-3/4 inch long screws p/n 107524.

NOTE: Verify that a plastic wear strip, p/n 583022 (29), is attached to each riser that connects to the track assemblies.

Tow Cables



Tow Cable attachment requires a 3/32 inch Allen wrench. Secure Tow Cables to the Riser Blocks closest to the treads for stability.



Tractor Feet/Chain

Clean and inspect tractor feet and chains at the beginning and end of each work day. Verify that the feet are in place and not cracked or missing. To clean tractor feet and chains wash them with low pressure fresh water spray to remove grit, grease, and sand. Chain Assembly part numbers, for chain with feet and master link attached, are shown on the table on page 2-5.



583002
Foot

Feet, p/n 583002, are used on the 300912 tractor chain. Feet must be attached with 1/8 x .063-.125 rivets, p/n 100109. Each foot has two rivet holes on one side to attach it to the 300912 chain. There is one rivet hole on the other side for attachment to chain links with one rivet hole that may still be in use on older tractors.

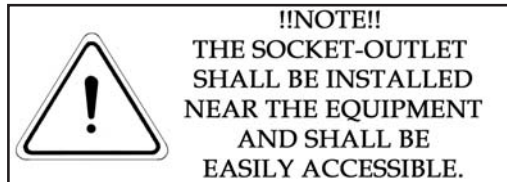
To replace feet:

1. Drill out the rivets from any damaged or missing foot. Use a #30 drill to remove the 1/8 inch rivets.
2. Align the foot rivet holes with the chain connecting link rivet hole(s) and attach the rivets.

Operation

Drive Forward/Drive Backward

NOTE: Always verify the Speed Adjustment rheostat is set to zero before activating transporter Forward/Reverse toggle switch. Failure to do so can damage the Transmission Clutch.



Mainline

To drive TR2000 Forward from a Mainline (Truck) System:

Verify the Tractor Controller, TC1000, TC2000 is connected to the PCU and to the 120VAC power source.

1. Verify Speed Adjustment rheostat is set to zero, counterclockwise.
2. Move ON/OFF toggle switch **up**, to **ON**.
3. Press the Forward/Reverse toggle switch **up**, **FORWARD**, while at the same time turn the Speed Adjustment rheostat clockwise until TR2000 reaches the desired speed. Return the Forward/Reverse toggle switch to the center **OFF** position to stop forward movement. Return the Speed Adjustment rheostat to zero.



To drive TR2000 Backward from a Mainline System:

1. Verify Speed Adjustment rheostat is set to zero, counterclockwise.
2. Move ON/OFF toggle switch **up**, to **ON**.
3. Press the Forward/Reverse toggle switch **down**, **REVERSE**, while at the same time turn the Speed Adjustment rheostat clockwise until TR2000 reaches the desired speed. Return the Forward/Reverse toggle switch to the center **OFF** position to stop backward movement. Return the Speed Adjustment rheostat to zero.



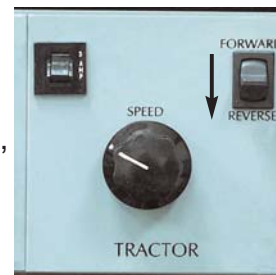


Drive Forward/Drive Backward (cont'd)

Portable

To drive TR2000 Forward from a Portable (Saturn III) System:

1. Verify Speed Adjustment rheostat is set to zero, counterclockwise.
2. Turn the Saturn III power switch **up**, to **ON**.
3. Press and hold the Forward/Reverse toggle switch **up, Forward**, while at the same time turn the Speed Adjustment rheostat clockwise until TR2000 reaches the desired speed. Release the Forward/Reverse toggle switch to stop forward movement. Return the Speed Adjustment rheostat to zero.



To drive TR2000 Backward from a Saturn III System:

1. Verify Speed Adjustment rheostat is set to zero, counterclockwise.
2. Turn the Saturn III power switch **up**, to **ON**.
3. Press and hold the Forward/Reverse toggle switch **down, Reverse**, while at the same time turn the Speed Adjustment rheostat clockwise until TR2000 reaches the desired speed. Release the Forward/Reverse toggle switch to stop backward movement. Return the Speed Adjustment rheostat to zero.

Tractor Retrieval

Mainline (Truck) System

To retrieve the Tractor after inspection:

Verify the Tractor controller, TC1000 or TC2000 Series is connected to the PCU.

1. Turn the speed control rheostat all the way counterclockwise (the **Off** position).
2. Select **Reverse** on the Tractor controller.
3. Turn the Speed Dial approximately $\frac{1}{4}$ turn clockwise until the tractor moves, then turn the dial all the way counterclockwise (the **Off** position).
4. The Tractor will now freewheel in reverse, and is ready for retrieval with either the Mainline or Portable reel.

Portable (Saturn III) System

To retrieve the Tractor after inspection:

Verify the Tractor controller, TC1000 or TC2000 Series is connected to the PCU.

1. Turn the speed control rheostat all the way counterclockwise (the **Off** position).
2. Select **Reverse** on the Tractor controller.
3. Turn the Speed Dial approximately $\frac{1}{4}$ turn clockwise until the tractor moves, then turn the dial all the way counterclockwise (the **Off** position).
4. The Tractor will now freewheel in reverse, and is ready for retrieval with either the Mainline or Portable reel.



Maintenance

Inspect and verify tractor operation at the end of each work day. Place the tractor on a frame with the tracks off the ground. Operate it at full speed while putting some resistance on the track. ARIES recommends holding a small block of wood, with slight pressure, on the track. The transmission experiences a periodic momentary pause, which is normal, without resistance applied.

Observe the amp meter. On Saturn I, II, and on truck mounted units the amp meter is on the tractor control box. On Saturn III units the amp meter is part of the Test Meter module. The tractor should draw between $\frac{1}{2}$ and 1 amp. If a higher amp reading is displayed it is an indication of grease, grit, and/or sand fouling the chains causing a binding action on sprockets or wheels.

The following are common tractor maintenance procedures:

Tractor Chains and Links

Inspect, clean, and lubricate the tractor chains and verify or adjust chain tension at the beginning and end of each work day. When a chain becomes too loose, or when a chain becomes tight and binds, improper tractor operation will result. Replace any broken chain links immediately.



1. Place the tractor on a fixture so that the tracks are off the ground.
2. While running the tractor, wash the chains with low pressure fresh water spray to remove grit, grease, and sand until the amp reading drops to between $\frac{1}{2}$ and 1 amp and the chain runs smoothly.
3. Continue to run the tractor. Spray the chains with a rust inhibiting lubricant, Tri-Flow or equivalent. The spray lubricates the chain without chemicals that can gather and accumulate sand or grit.



Maintenance (cont'd)

Chain Tension Adjustment

Refer to Drawing 583025 on page 2-11.

1. Disconnect the tractor from its power source.
2. Loosen Set Screw (p/n 107905), if present, with a 5/64 Allen wrench. This screw is on the back of the Sprocket Assembly between the Camera Tube and the Support. Later models are not equipped with this Set Screw.
3. Loosen the Sprocket Assembly Cap Screw on the front sprocket with a 5/32 Allen wrench to release the Shaft Idler.
4. Turn the Chain Adjustment Tension Screw (p/n 107905) in or out with a 5/64 Allen wrench until the chain deflection has approximately 1/2 inch clearance at the midpoint.
5. Tighten the Sprocket Assembly Cap Screw.
6. "Snug up" Set Screw 107909, if applicable.

NOTE: Sometimes chain tension is affected when the Sprocket Assembly Cap Screw is tightened. Always verify chain deflection after tightening the Cap Screw.

7. Repeat steps 1 to 6 on the other chain.

Replacing Chain Components

Have an adequate supply of replacement connecting links when replacing chain components.

1. Use a "chain breaker" to dislodge any broken connecting link(s).
2. Replace connecting links, plates, and clips.
3. Adjust chain tension and lubricate as described above.

SECTION TWO

Drawings/Parts Lists

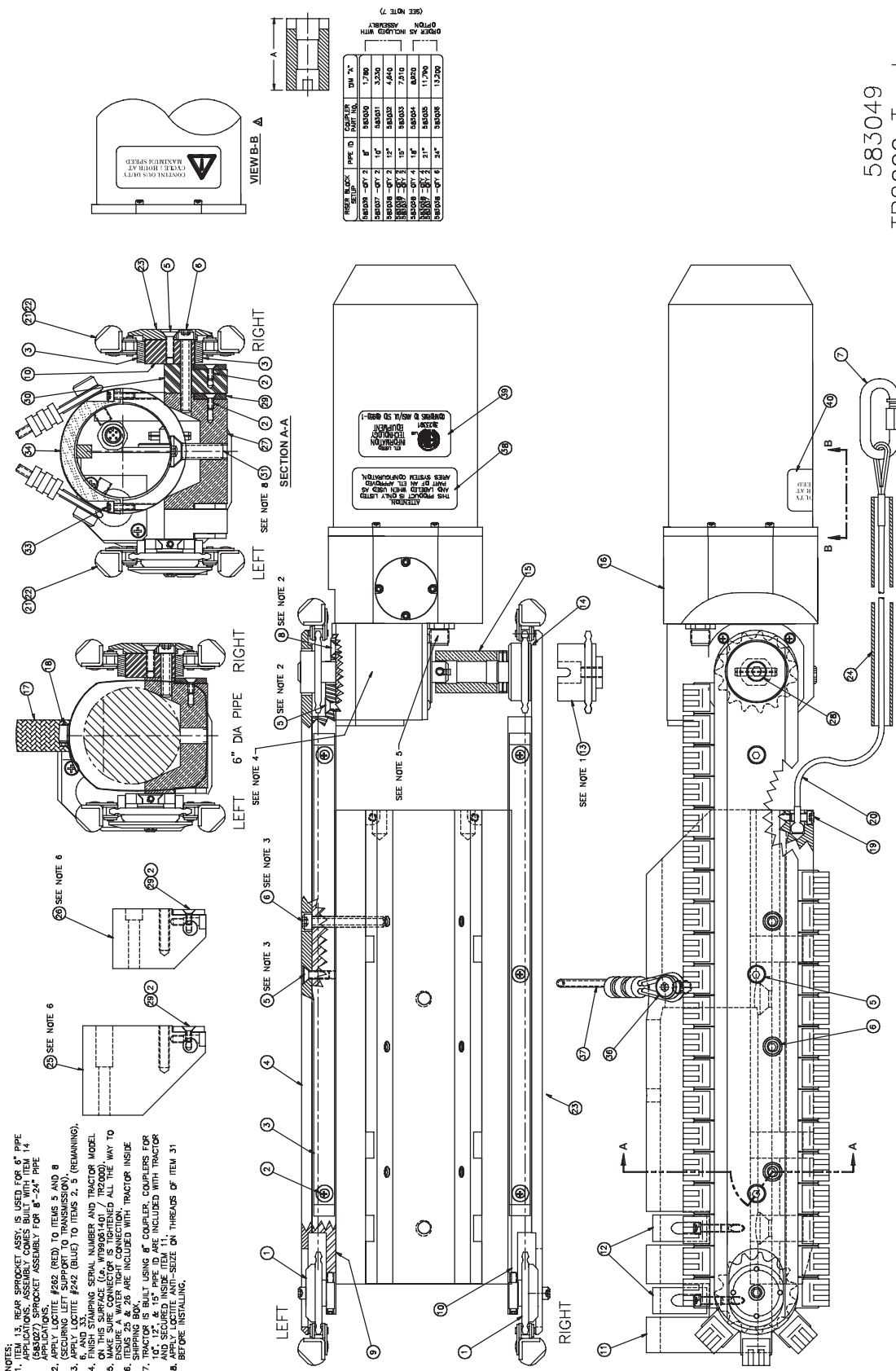
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841207	Cable Assembly	2-17
841501	Cable Assembly, SYS140 12 Pin to P&T + Tractor.	2-18
841505	Cable Assembly, SYS140 12 Pin to P&T + Tractor + Auxiliaries	2-19
950179	Rebuild Kit, TR2000 Tractor Transmission.	2-20
589006	Kit, Frame Spreader 18-24 Inch Pipe Option.	2-22



583049
TR2000 Tractor
Final Assembly
Setup for 8" diameter
Pipe shown L



(SEE NOTE 7)

ORDER AS SHOWN WITH OPTION ASSEMBLY

PIPE BLOCK	PIPE ID	COUPLER	PART NO.	DIAM.
583049-007.2	8"	583049	1790	
583049-007.2	8"	583049	1790	
583049-007.2	10"	583049	2220	
583049-007.4	10"	583049	2410	
583049-007.4	14"	583049	6820	
583049-007.4	14"	583049	6820	
583049-007.2	21"	583049	11790	
583049-007.6	24"	583049	12200	

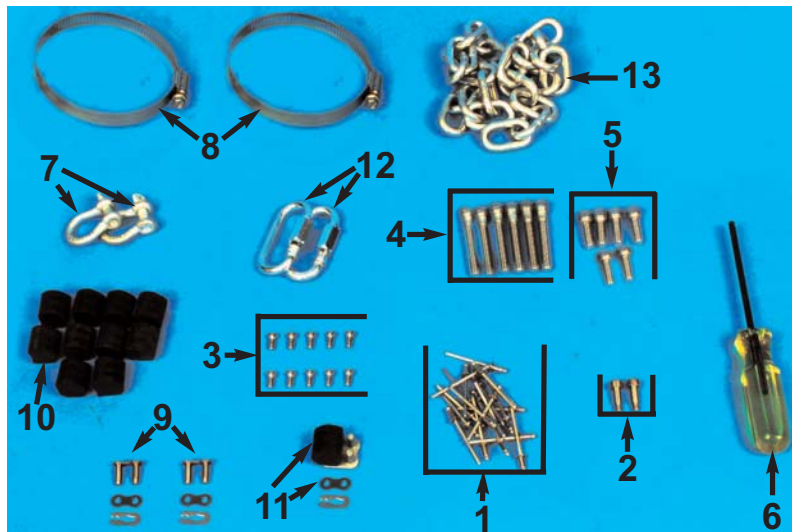
- NOTES:
- ITEM 13, REAR SPROCKET ASSY, IS USED FOR 6" PIPE TRACTOR APPLICATIONS. ITEM 14 (SARCO) SPROCKET ASSSEMBLY, FOR 6"-24" PIPE APPLICATIONS.
 - APPLY LOCOTITE #262 (RED) TO ITEMS 5 AND 8.
 - APPLY LOCOTITE #242 (BLUE) TO ITEMS 2, 9, (REMAINING), 6, AND 33.
 - MAKE SURE SERIAL NUMBER AND TRACTOR MODEL ON THIS SURFACE ARE WORKING AND TRACTOR MODEL IS CORRECT.
 - MAKE SURE CONNECTOR IS TIGHTENED ALL THE WAY TO THE END OF THE HIGH CONNECTION.
 - ITEMS 25 AND 26 ARE INCLUDED WITH TRACTOR INSIDE SHIPPING BOX.
 - TRACTOR IS BUILT USING 8" COUPLER ASSEMBLY FOR 8" PIPE. ITEM 11 IS INCLUDED WITH TRACTOR AND SECURED INSIDE ITEM 11.
 - APPLY LOCOTITE ANTI-SEIZE ON THREADS OF ITEM 31 BEFORE INSTALLING.



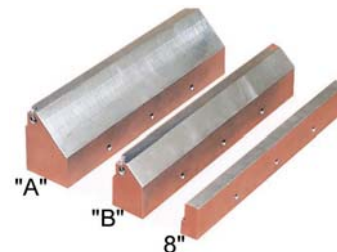
40	980096	LABEL MAX SPEED	1	
39	970047	LABEL ETL LISTED UL 60950-1	1	
38	980103	LABEL ETL ARIES SYSTEM	1	
37	120173	CABLE, TOW 7.5 IN LNG 2 LOOP	1	
36	100510	SCREW, SHLDR 3/8 X 3/8 SOC STL	2	
35				
34	097626	PIN, DOWEL 5/16 X 3/4 SS	1	
33	810290	SCREW, 8-32 X 1/2 CAP SOC SS	4	
32				
31	104059	SCREW, 3/8-16 X 1-1/4 FL SOC SS	2	
30	583039	BLOCK, RISER SMALL 8 IN -C	2	
29	583022	STRIP, WEAR CHAIN SIDE	8	
28	9419905	SCREW, 1/4-20 X 5/8 FL SOC SS	1	
27	583026	CRADLE, SHORTY TRACTOR	1	
26	583037	BLOCK, RISER MEDIUM -B	2	
25	583038	BLOCK, RISER LARGE -A	2	
24	010740	TUBING, 3/8 ID X 1/2 OD POLY BLK	2.5	FT (2x15")
23	583004	PLATE, RIGHT OUTER	1	
22	583048	LINK, MASTER W/FOOT	2	
21	583047	CHAIN/FOOT ASSY, 46 LINKS	2	
20	120158	CABLE, TOW 12 PKR 18 IN LNGLOOP	2	
19	104080	SCREW, SHLDR 3/16 X 3/8 SOC SS	2	
18	120611	CLAMP, HOSE #56 SS	2	
17	610043	STRAP, LIFT RETRIEVAL POLE 3/4X13IN BLK	1	
16	583051	MOTOR/TRANS ASSY RETROFIT	1	
15	SEE CHART	COUPLER	1	
14	583027	SPROCKET ASSY, REAR 8 IN	1	
13	583024	SPROCKET ASSY, REAR 6 IN	1	SHIPPED LOOSE
12	583063	CLAMP, CAMERA TR2000/TR3000	2	
11	150070	TUBE, CAMERA WEIGHT	1	
10	583015	SUPPORT, RIGHT TRACTOR TR2000	1	
9	583016	SUPPORT, LEFT TRACTOR TR2000	1	
8	107030	SCREW, 10-32 X 5/8 FL SOC SS	2	
7	200051	CONN, THRD CHAIN 1/4 ZN	1	
6	107524	SCREW, 1/4-20 X 1-3/4 CAP SOC SS	6	
5	9419899	SCREW, 10-32 X 1/2 FL SOC SS	8	
4	583005	PLATE, LEFT OUTER	1	
3	583023	STRIP, WEAR TOP & BOTTOM	4	
2	107205	SCREW, 6-32 X 3/8 FL PH SS	44	
1	583025	SPROCKET ASSEMBLY, FRONT	2	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

583049
TR2000 Tractor
Final Assembly
Setup for 8" diameter
Pipe shown

L



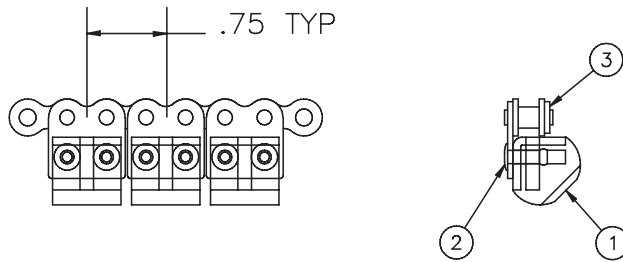
SPARE PARTS KIT, TR2000			950171
ITEM #	DESCRIPTION	QTY	ARIES P/N
1	RIVET, 1/8X.063-.125 SS	20	100109
2	SCREW, SHLDR 8-32X3/16DIA X3/8 SOC SS18-8	2	104080
3	SCREW, 6-32X3/8 FL PH SS	10	107205
4	SCREW, 1/4-20X1-3/4 CAP SOC SS	6	107524
5	SCREW, 1/4-20X1 CAP SOC SS	6	107528
6	HEXDRIVER, 9/64 IN	1	940039
7	SHACKLE, ANCHOR 3/16 STL	2	120426
8	CLAMP, HOSE #56 SS	2	120611
9	LINK, MASTER SS TRACTOR	2	300924
10	FOOT, TRACTORS	10	583002
11	LINK, MASTER W/FOOT TRACKED/SHORTY TRACTOR	1	583048
12	CONN, THRD CHAIN 1/4 ZN	2	200051
13	CHAIN, TRACTOR PULL	2 FT.	300902
14	HOSE, 2.09"ID PVC LAY FLAT (NOT SHOWN)	3 FT.	010433



Weight, 10 pounds 1 583040
(use only with 18" to 24" spreader kit)

Screw, 1/4-20 x 3 hex ss 2 107535

Riser Blocks		
Description	Qty.	P/N
Riser Block, 8" Small	2	583039
Riser Block, "B" Medium	2	583037
Riser Block, "C" Large	2	583038



Foot/Rivet/Chain Components

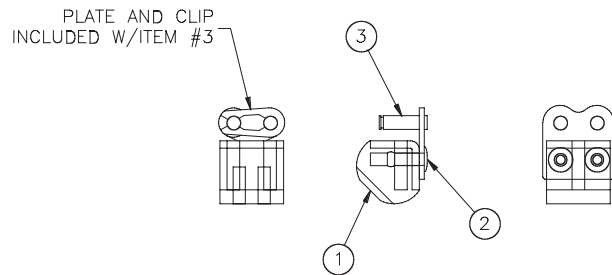
Foot Rivet Chain Components (use when ordering individual chain parts)			
ITEM #	P/N	DESCRIPTION	QTY
1	583002	FOOT	Ref. Chart Below
2	100109	RIVET, BLIND 1/8 X .063-.125, SS	Ref. Chart Below
3	300912	CHAIN, #35 3/8P 2-HOLE, COATED	Ref. Chart Below

To determine quantities needed when ordering individual chain parts from the list above, use this chart.

To order assembled chains, compare the ASSY # and USED ON: columns on this chart. Order the ASSY # that matches your tractor.

ASSY #	QTY FEET	QTY RIVETS	QTY LINKS	CHAIN LENGTH (FT)	USED ON:
583042	53	106	53	3.31	CCV RETROFIT
583043	68	136	68	4.25	CUES RETROFIT
583044	50	100	50	3.13	TR1000, TR1001, LE2000
583045	72	144	72	4.50	TR4000
583046	67	134	67	4.19	TR1100, TR1101
583047	46	92	46	2.88	TR2000 & CUES SHORTY
583079	57	114	57	3.56	LE2040
583095	28	56	28	1.75	TR2100

ALL CHAIN ASSEMBLIES USE
MASTER LINK ASSEMBLY #583048

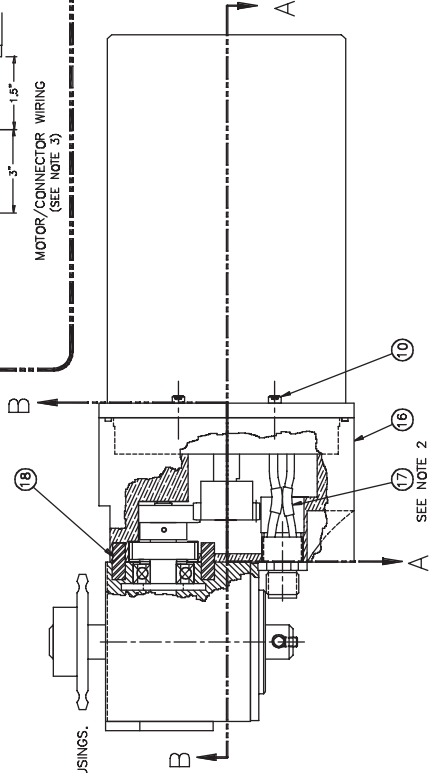
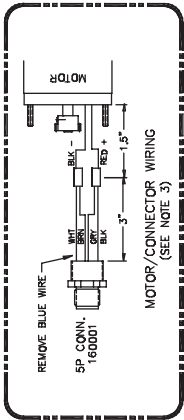


583048
Master Link/Foot Assembly

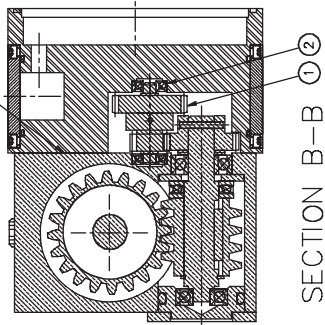
TR2000 Master Link/Foot Assembly			583048
Item #	P/N	Description	Qty.
1	583002	Foot, Tractor	1
2	100109	Rivet, 1/8 X .063-.125 SS	2
3	300910	Link, #35 Conn, WSA-2 Coated .496 Pin Length, .129 Hole	1



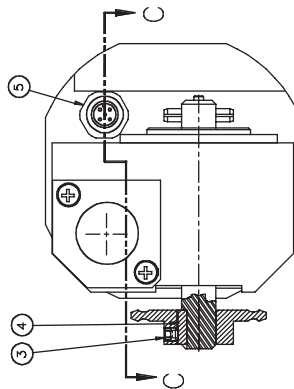
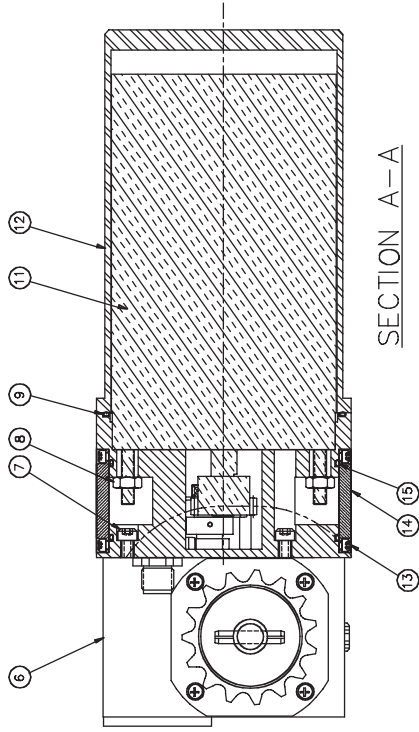
- NOTES:
1. APPLY LOCTITE #242 (BLUE) TO ITEMS 3 (SET SCREWS), 5, 7, 10, AND 13.
 2. WHEN PUSHING MOTOR ASSY (ITEM #11) INTO MOTOR/GEAR HOUSING (ITEM #16), MAKE SURE NOT TO PINCH WIRES BETWEEN CONDUCTIVE SURFACES.
 3. TRIM BLUE WIRE FLUSH WITH CONNECTOR HOUSING. TRIM REMAINING WIRES TO APPROX. 3". STRIP WIRES BACK .25" AND TWIST TOGETHER PER SCHEMATIC. WIRES SHOULD BE SECURELY SPLICED USING BLUE CRIMPS (ITEM #17).
 4. NO REVISION WITHOUT INTERTEK TESTING SERVICES APPROVAL.
 5. * - ITEMS ARE CONTROLLED. NO SUBSTITUTION WITHOUT ENGINEERING AUTHORIZATION.



APPLY LOCTITE GASKET ELIMINATOR #515 (PURPLE - #940214) BETWEEN HOUSINGS.



SECTION C-C



583051
Motor/Transmission Assembly
TR2000 Tractor

c



18	097615	DOWEL PIN, 3/16 X 1/2, SS	2	
17	824017	TERMINAL, CRIMP BUTT SPLICE, BLUE	2	
16	583006	MOTOR/GEAR HOUSING	1	
15	*130164*	O-RING, #022, VITON NO SUBSTITUTION	2	
14	583014	GEAR HOUSING CAP	2	
13	107013	#4-40 X 3/16 SHCS, SS	8	
12	583008	MOTOR CAP	1	
11	583050	MOTOR ASSEMBLY	1	
10	810190	#4-40 X 1/2 SHCS, SS	8	
9	*130154*	O-RING, 84MMX2MM VITON 75DURO NO SUBSTITUTION	1	
8	105047	KEPS NUT, #10-32, SS	2	
7	810290	#8-32 X 1/2 SHCS, SS	3	
6	583029	TRANSMISSION ASSEMBLY	1	
5	*160001*	CONNECTOR, 5P W/ O-RING NO SUBSTITUTION	1	
4	580156	KEY, 1/8 SQ. X 1/2, SS	1	
3	580335	SPROCKET, 35P, 15T MOD.	1	
2	300356	BALL BEARING, R3/MRC	1	
1	500300	REDUCTION GEAR ASSEMBLY	1	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

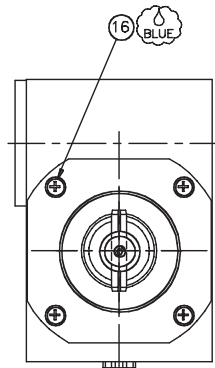
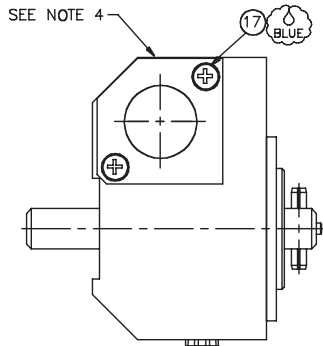
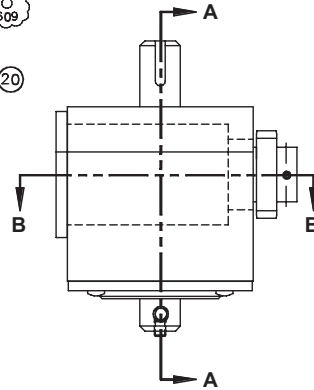
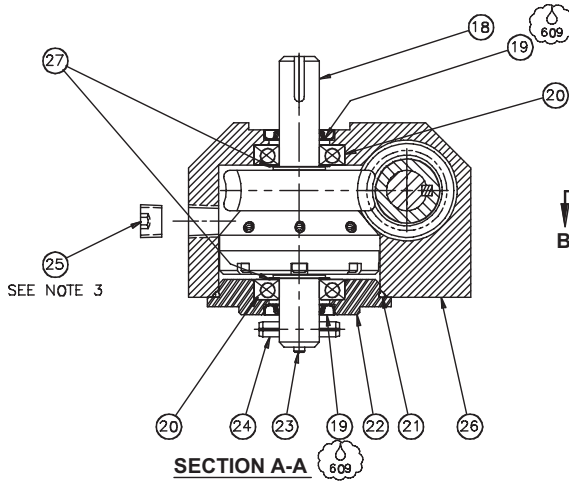
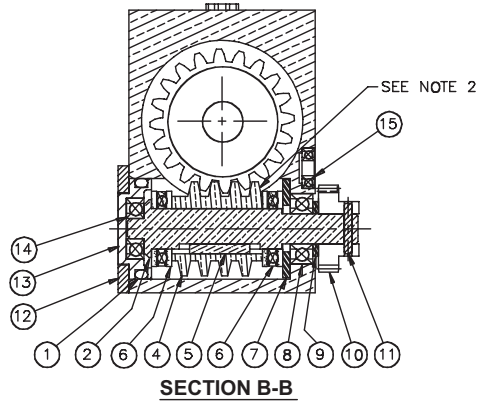
583051
TR2100 Motor/Transmission
Assembly
Bill of Materials

c



NOTES:

1. USE LOCTITE AS SPECIFIED (LOCTITE 242-BLUE, LOCTITE 262-RED, LOCTITE 609).
2. APPLY/PACK MYSTIK WHEEL BEARING GREASE (980172) TO UPPER WORM GEAR AREA, BEARINGS, AND CLUTCH GEAR BEFORE INSTALLING HOUSING COVER.
3. USE ANTI-SIEZE LUBRICANT ON ITEM #25 BEFORE INSTALLING.
4. STAMP "WT" ON THIS SURFACE. REMAINING SERIAL NUMBER AND MODEL NUMBER WILL BE STAMPED AT FINAL ASSEMBLY.



583029
TR2000
Transmission Assembly

D

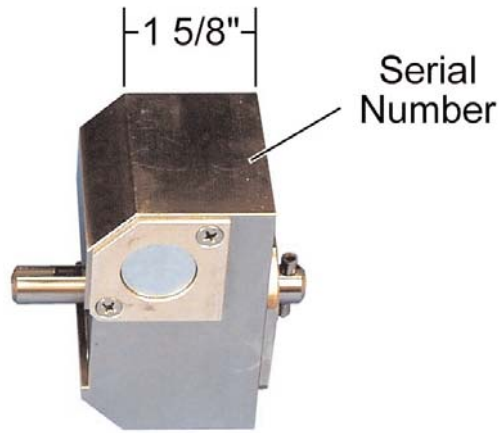


27	107035	SHIM, 1/2 ID X 3/4 OD X .020 CRS	2	
26	583007	HOUSING, TRANSMISSION TRACTOR	1	
25	113025	FIT, PLUG 1/8 NPT SOC HD SS	1	
24	097548	PIN, SPRING 3/16 X 1 SS	1	
23	810520	SCREW, SET 6-32 X 3/16 SS CUP	1	
22	583017	HOUSING, BEARING COVER SHORTY TRACTOR	1	
21	815502	O-RING, #033 VITON 75	1	
20	300359	BEARING, BALL R8/S5K TRACTOR	2	
19	130120	SEAL, OIL 4925	2	
18	583041	CLUTCH ASSY, TR2000	1	
17	107300	SCREW, 8-32 X 3/8 FL PH SS	2	
16	107111	SCREW, 4-40 X 3/8 FL PH SS	4	
15	300356	BEARING, BALL R3/MRC TRACTOR	1	
14	300357	BEARING, BALL R4A/S1K TRACTOR	1	
13	580332	HOUSING, BEARING WORM GEAR TRACTOR	1	
12	580328	RETAINER, PLATE TRANS TRACTOR	1	
11	097552	PIN, SPRING 3/32 X 5/8 SS TRACTOR	1	
10	580002	GEAR, REDUCTION S242 MODIFIED	1	
9	580414	SPACER, REDUCTION GEAR HOUSING TRACTOR	2	
8	300358	BEARING, BALL .875 OD X .375 ID X .2812 W	1	
7	580359	SPACER, WORM GEAR TRACTOR	1	
6	300354	BEARING, THRUST TRACTOR	2	
5	097617	KEY, 1/8 X 1/8 X 3/4 UNDERSIZED	1	
4	300256	GEAR, WORM SINGLE THREAD TRACTOR	1	
3				
2	580327	SHAFT, WORM GEAR TRACTOR	1	
1	130117	O-RING, #214 VITON TRACTOR	1	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

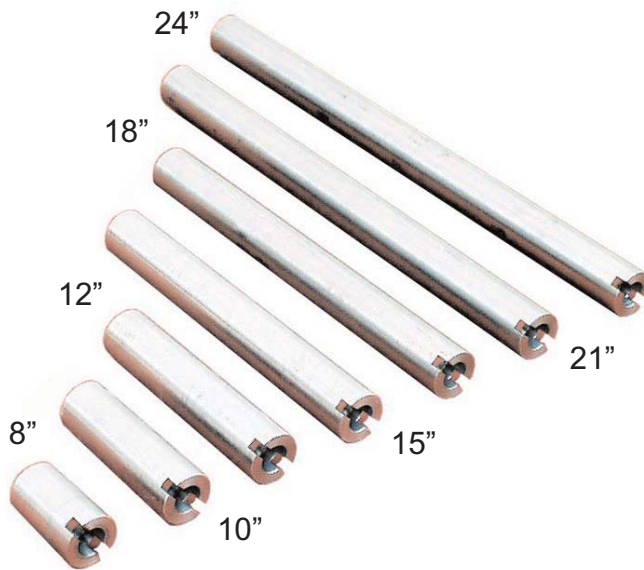
583029
TR2000
Transmission Assembly
Bill of Material

D

**NOTE: SEE MANUAL 970119 FOR TRANSMISSION DISASSEMBLY
AND ASSEMBLY INSTRUCTIONS.**



Transmission 583029

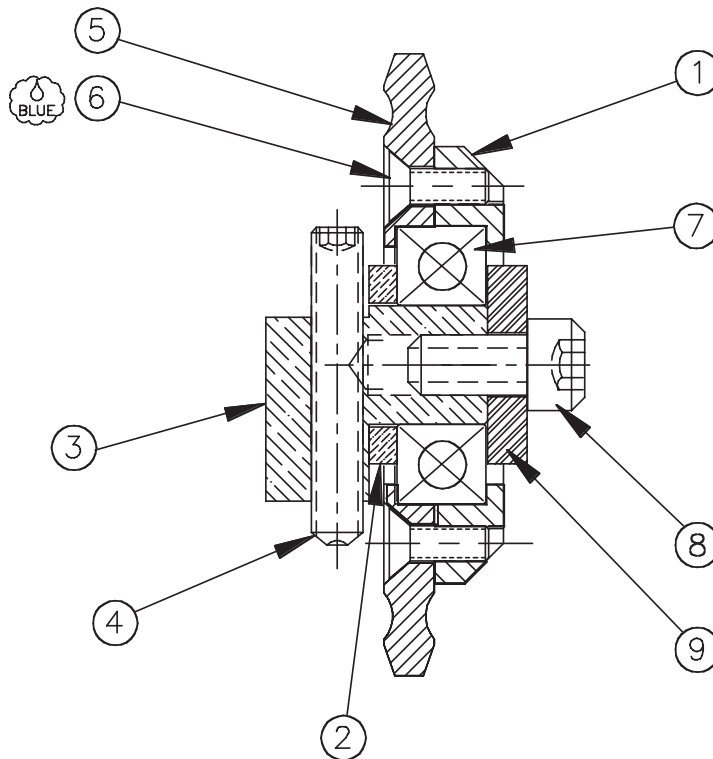


Transmission Couplers		
Description	Qty.	P/N
8 Inch Coupler	1	583030
10 Inch Coupler	1	583031
12 Inch Coupler	1	583032
15 Inch Coupler	1	583033
18 Inch Coupler	1	583034
21 Inch Coupler	1	583035
24 Inch Coupler	1	583036



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. APPLY LOCKTITE #242 (BLUE) TO ITEM #6.



10				
9	580252	WASHER .193 ID X .625 OD X .125 THK	1	
8	107024	#10-32 X 3/8 SHCS, SS	1	
7	300358	BALL BEARING, .875OD X .375ID ABEC-3	1	
6	107111	#4-40 X 3/8 FL PH SCREW, SS	4	
5	583000	SPROCKET, 35P, 15T MOD.	1	
4	107905	SET SCREW, #8-32 X 1 LG, CUP PT, SS	1	
3	583096	TENSIONER, FRONT SPROCKET ASSY	1	
2	580403	SPACER, FRONT SPROCKET	1	
1	583012	SPROCKET RETAINER	1	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

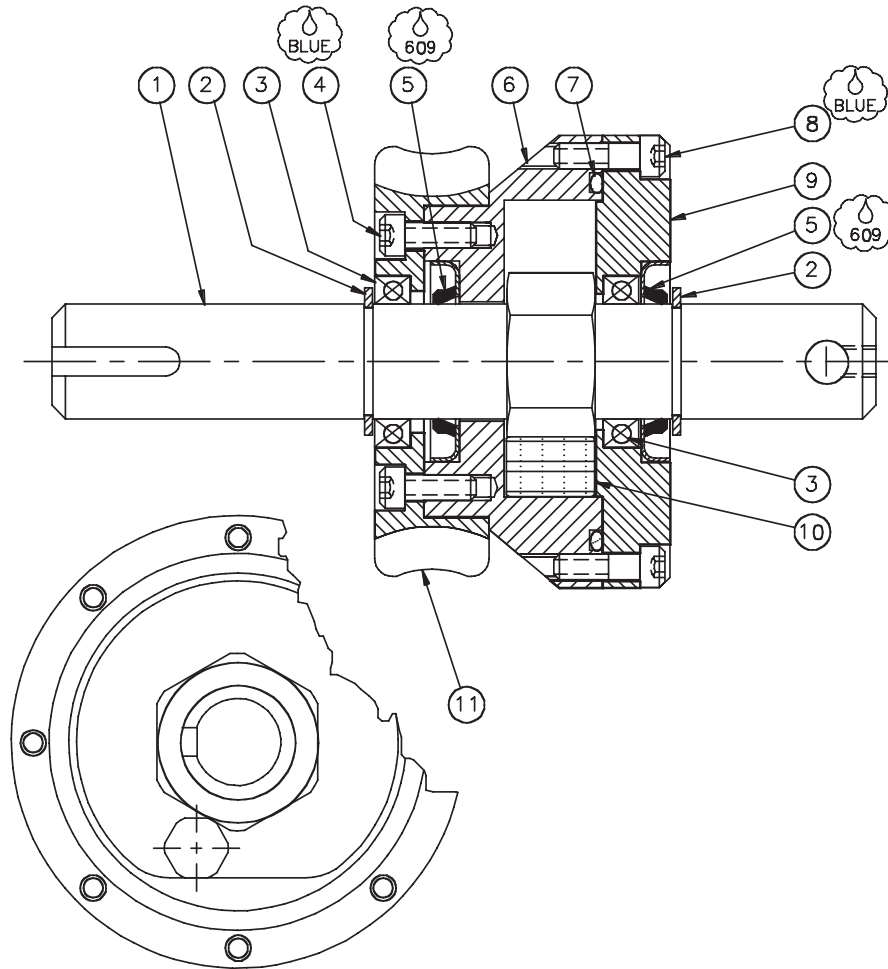
583025
Front Sprocket Assembly
TR2000

E



NOTES:

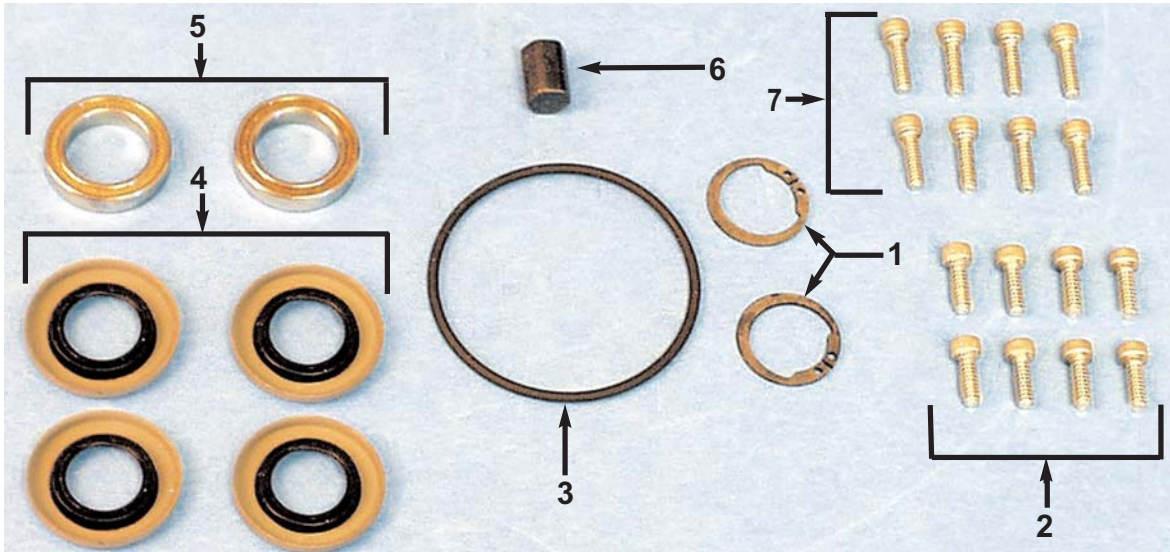
- USE LOCTITE AS SPECIFIED (LOCTITE 242-BLUE, LOCTITE 262-RED, LOCTITE 609).



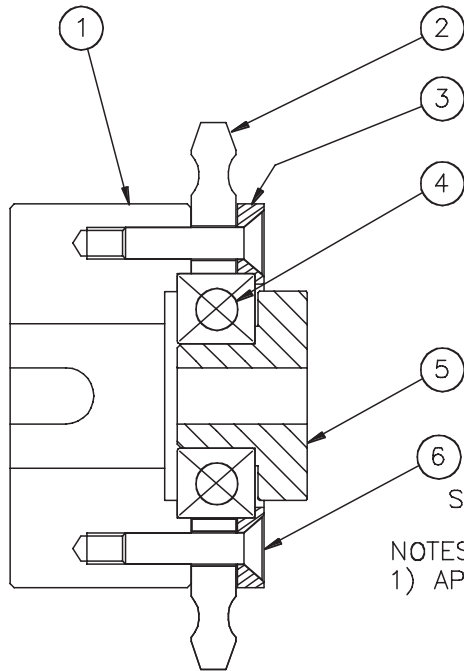
15				
14				
13				
12				
11	583003	WORM GEAR, MODIFIED	1	
10	583021	CLUTCH ROLLER	1	
9	583018	CLUTCH COVER	1	
8	810181	#4-40 X 3/8 SHCS, SS	8	
7	130111	O-RING, #029	1	
6	583019	CLUTCH HOUSING	1	
5	130120	OIL SEAL 4925	2	
4	107012	#4-40 X 5/16 SHCS, SS	8	
3	300353	BALL BEARING, 1/2 X 3/4 X 5/32	2	
2	097503	EXTERNAL RETAINING RING, 1/2	2	
1	583020	HEX SHAFT	1	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

583041
Clutch Assembly
TR2000 Tractor

c



REBUILD KIT, TR2000 TRACTOR CLUTCH			950291
ITEM #	DESCRIPTION	QTY	P/N
1	RING, RETAINING EXTL 1/2	2	097503
2	SCREW, 4-40 X 5/16 CAP SOC SS	8	107012
3	O-RING, #29 HI-PERF LTHD GOGGLE	1	130111
4	SEAL, OIL 4925	4	130120
5	BEARING, BALL 1/2ID X 3/4OD X .156W	2	300353
6	ROLLER, CLUTCH SHORTY TRACTOR	1	583021
7	SCREW, 4-40 X 3/8 CAP SOC SS	8	810181
8	MANUAL, M/C CLUTCH REPAIR TRACTOR (NOT SHOWN)	1	970119



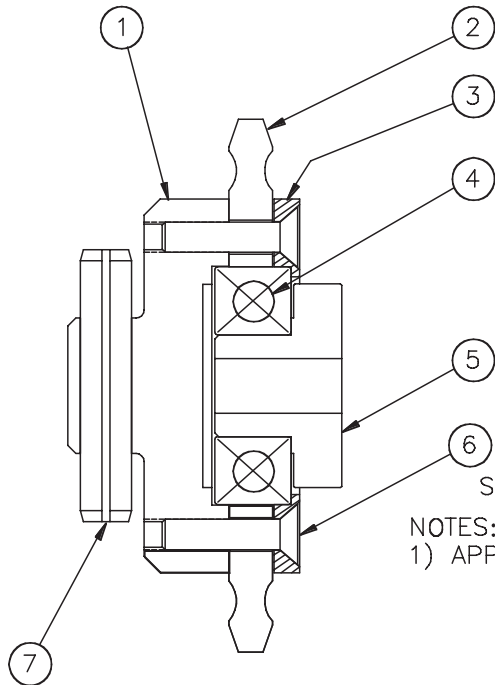
SEE NOTE 1

NOTES:
1) APPLY LOCTITE 242 (BLUE) TO ITEM #6.

10				
9				
8				
7				
6	107112	#4-40 X 3/8 FL HD PH SCREW, SS	6	
5	583010	BEARING SEAT	1	
4	300358	BALL BEARING, R6/2RS	1	
3	583011	SPROCKET RETAINER	1	
2	583001	SPROCKET, 35P 15T MOD.	1	
1	583013	SPROCKET COLLAR	1	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

583024
Rear Sprocket Assembly
6 inch pipe

A



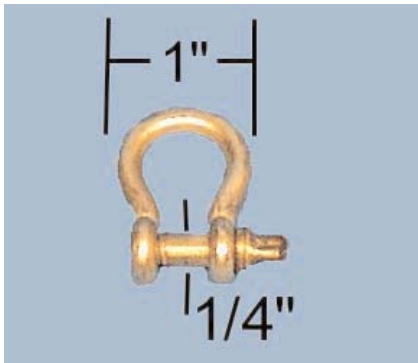
SEE NOTE 1

NOTES:
1) APPLY LOCTITE 242 (BLUE) TO ITEM #6.

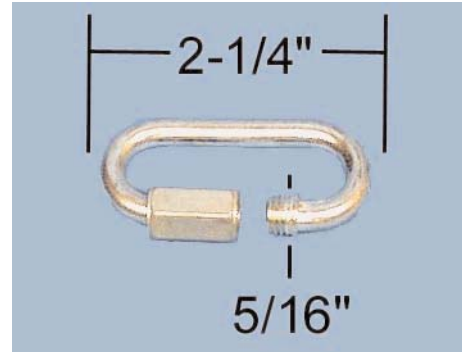
10				
9				
8				
7	097548	SPRING PIN, 3/16 X 1, SS	1	
6	107112	#4-40 X 3/8 FL HD PH SCREW, SS	6	
5	583010	BEARING SEAT	1	
4	300358	BALL BEARING, R6/2RS	1	
3	583011	SPROCKET RETAINER	1	
2	583001	SPROCKET, 35P 15T MOD.	1	
1	583028	DRIVE SHAFT	1	
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
PARTS LIST				

583027
Rear Sprocket Assembly
8-24 inch pipe

A



120426 - Anchor Shackle



200051 - Chain Connector



120174 - Tractor Tow Cable Assembly

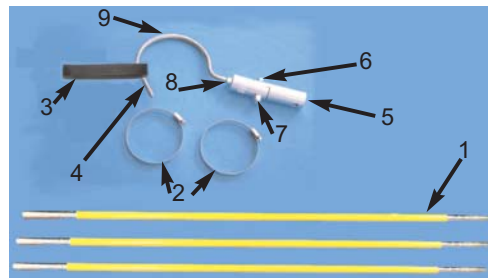
- 120158 - Tow Cable, 18 inch, Loop/Ball
- 200051 - Chain Connector
- 010740 - Tubing, poly black, 2.5 feet



300902 - Chain (per foot)

Lift Hook Assy (Item 4) 610025

Item #	Description	Qty	P/N
5	Lift Hook Pivot	1	620026
6	Screw, 3/8-16X1-3/4	1	104008
7	Nut, Lock 3/8-16	1	105014
8	Nut, 3/8-16	1	105013
9	Lift Hook, 3/8 Formed	1	610022



Retrieval Pole Assembly 610700

Item #	Description	Qty	P/N
1	Pole Extension	3	610714
2	Worm Clamp	2	120613
3	Lift Strap	1	610043
4	Lift Hook Assy	1	610025

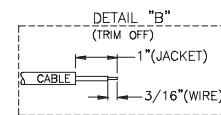
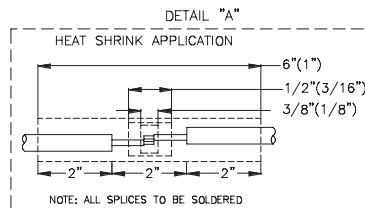
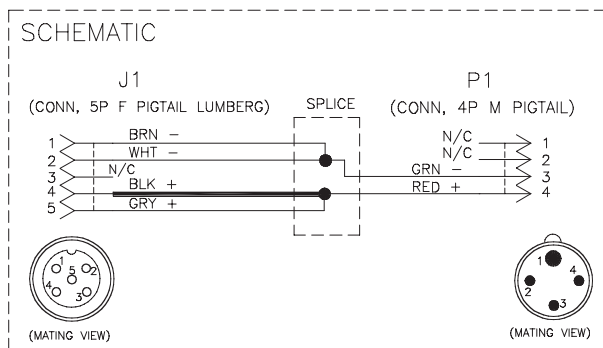
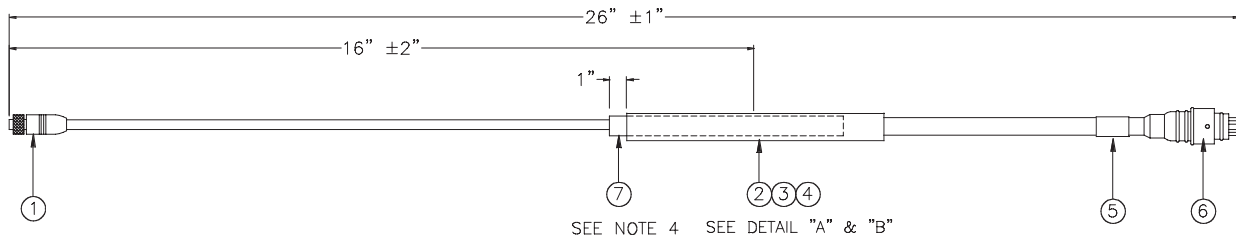


PARTS LIST				
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
1	*160558*	CONN, 5P F PIGTAIL 2M LUMBERG NO SUBSTITUTION	1	J1
2	808803	TUBING, SHRINK 1/8IN BLACK	0.06	FT(2X 3/8")
3	808804	TUBING, SHRINK 3/16IN BLACK	0.08	FT(2X 1/2")
4	808813	TUBING, SHRINK 1IN ADHESIVE ENVIRONMENTAL	0.50	FT (6.00IN)
5	980010	LABEL, ID CABLES	2	Q.C. NOT SHOWN
6	160635	CONN, 4P M PIGTAIL 36IN LONG	1	P1
7	808807	TUBING, SHRINK 1/2IN ADHESIVE BLACK	0.42	FT(5.00IN)

NOTES:

1. TOLERANCES: $\pm 1"$, EXCEPT SPLICE AREA $\pm 0.2"$
2. NO REVISION WITHOUT INTERTEK TESTING SERVICES APPROVAL.
3. * - ITEMS ARE CONTROLLED, NO SUBSTITUION WITHOUT ENGINEERING AUTHORIZATION.
4. ITEM 7 SHOULD EXTEND 1" PASS THE 1" HEAT SHRINK ON THE ITEM 1 SIDED.

ASSEMBLY



NOTE: ALL SPLICES TO BE SOLDERED

841207
Cable Assembly

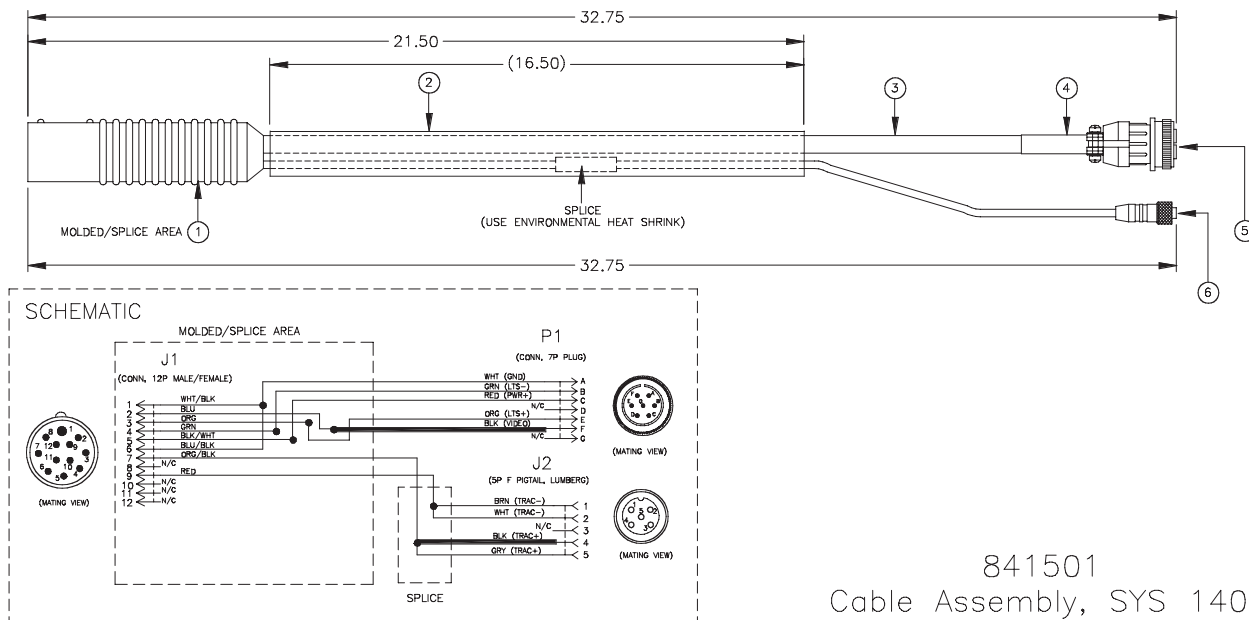


PARTS LIST				
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
1	REF	CONN, 12P MALE/FEMALE PIGTAIL	1.00	J1
2	808820	TUBING, SHRINK 1IN MEDIUM WALL BLACK	1.38	FT(16.50IN)
3	REF	CABLE, 16/5 SOW 600V	2.33	FT(27.75IN)
4	808258	STRAIN RELIEF, BOOT	1.00	
5	REF	CONN, 7P PLUG	1.00	P1
6	160558	CONN, 5P F PIGTAIL 2M, LUMBERG	1.00	J2

NOTES:

1. THE MOLDED SPLICE AREA IS BLACK IN COLOR.
2. PAGE TWO IS FOR "REFERENCE ONLY", NOT FOR VENDOR!

ASSEMBLY

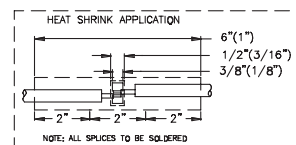
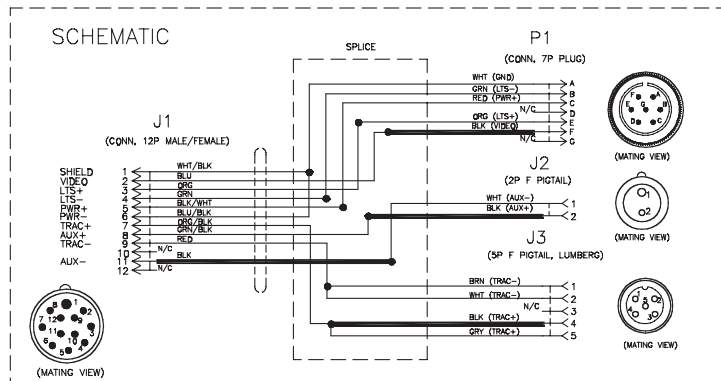
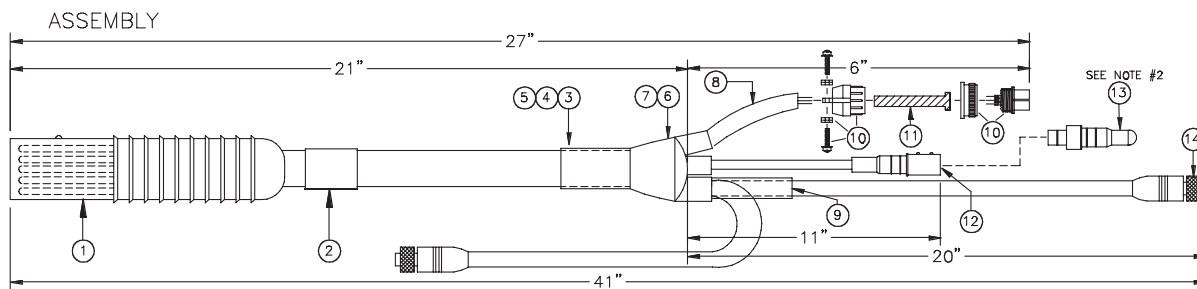


841501
Cable Assembly, SYS 140
12 Pin to P&T + Tractor

H



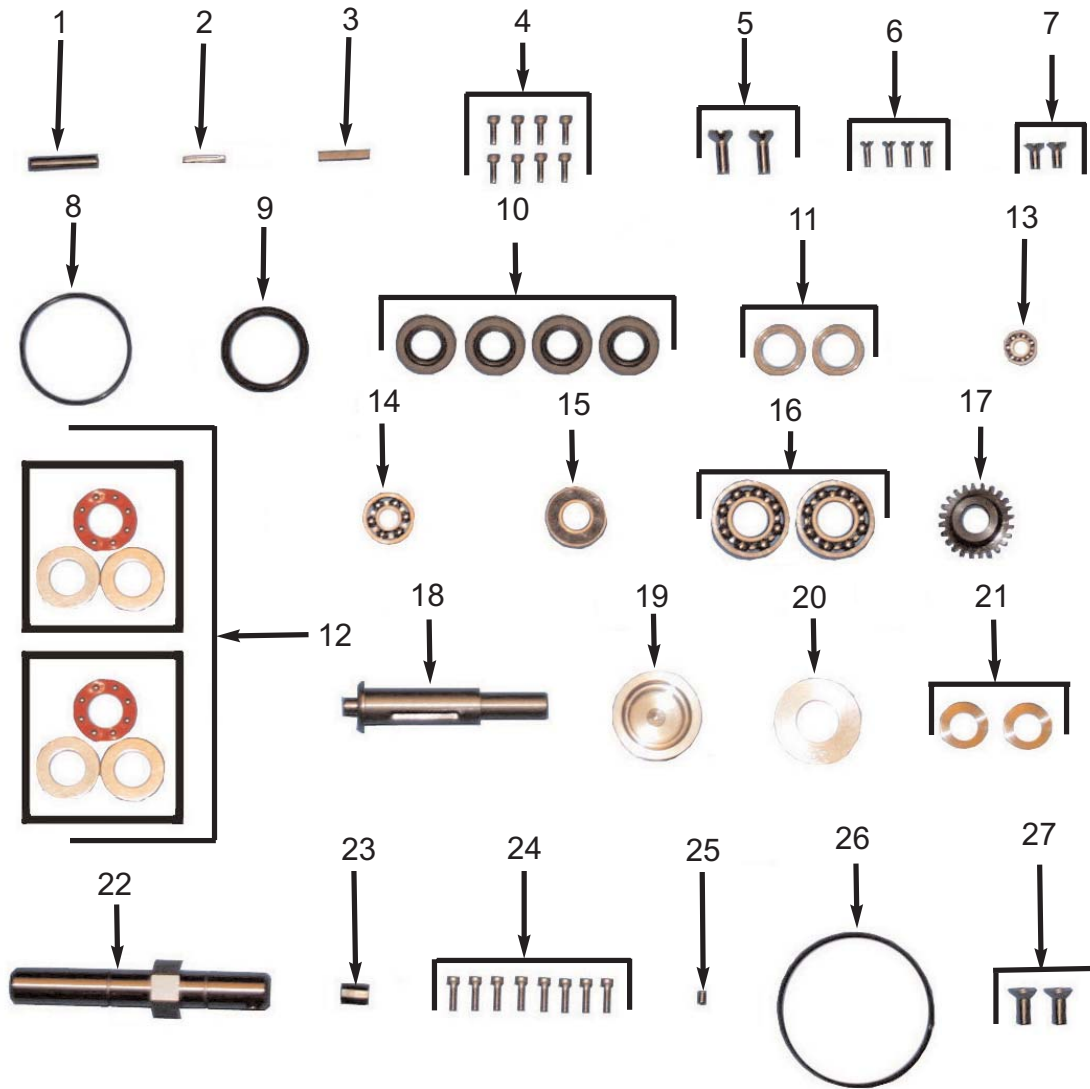
PARTS LIST				
ITEM #	ARIES P/N	DESCRIPTION	QTY	REFERENCE
1	160560	CONN, 12P M/F PIGTAIL	1	J1
2	980010	LABEL, ID CABLES	2	Q.C. NOT SHOWN
3	808813	TUBING, SHRINK 1IN ADHESIVE ENVIRONMENTAL	0.5	FT(6.00IN)
4	808803	TUBING, SHRINK 1/8IN BLACK	0.28	FT(9 X 3/8")
5	808804	TUBING, SHRINK 3/16IN BLACK	0.38	FT(9 X 1/2")
6	808837	TUBING, SHRINK 3WAY BRKOUTBOOT	1	
7	980104	LACING CORD, NYLON BLACK .05	A.R.	
8	820700	CABLE, 18/5 SOOW	0.67	FT(8.00IN)
9	808807	TUBING, SHRINK 1/2IN ADHESIVE BLACK	0.34	FT(4.00IN)
10	808279	CONN, 7P PLUG	1	P1
11	808258	STRAIN RELIEF, BOOT	1	
12	160521	CONN, 2P F PIGTAIL	1	J2
13	160523	PLUG, DUMMY 2,3,4, AND 6-PIN	1	SEE NOTE #2
14	160558	CONN, 5P F PIGTAIL 2M LUMBERG NO SUBSTITUTION	1	J3
15	827002	TIE WRAP, 4-1/2IN	1	SEE NOTE #1



NOTES:

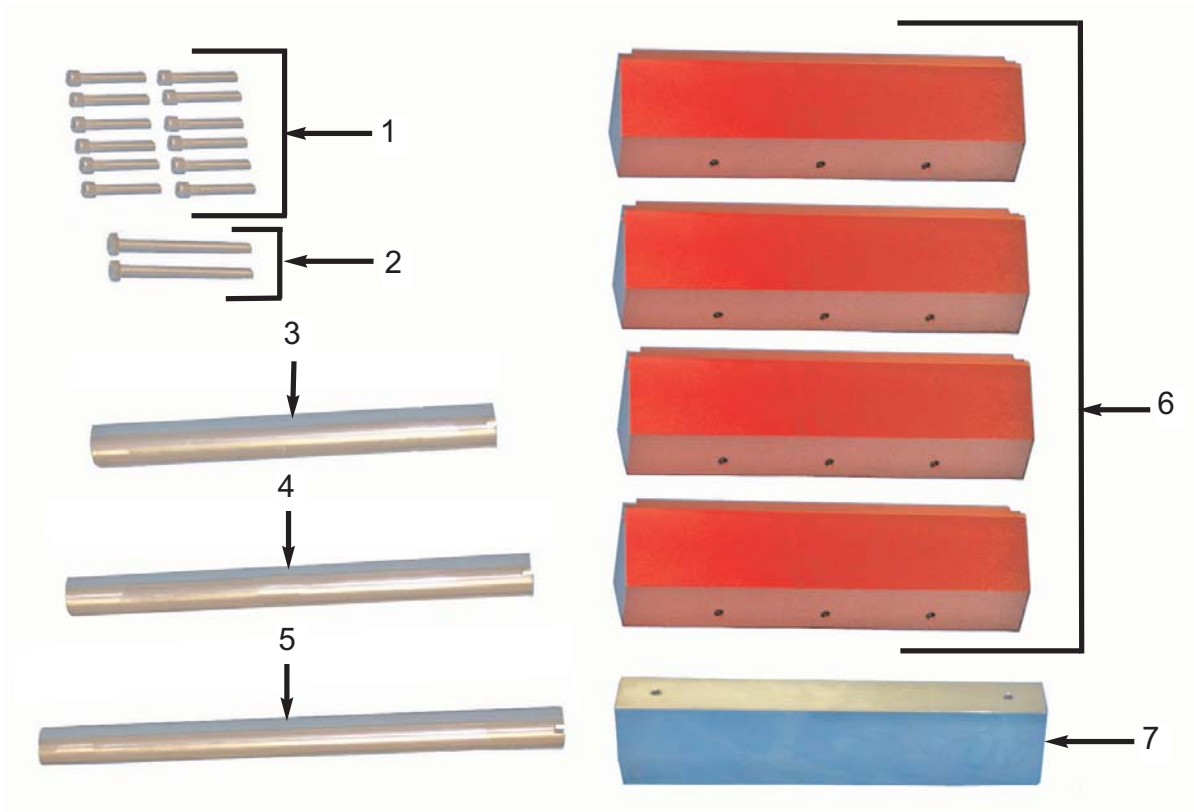
- ITEM 13 SHOULD BE IN A PLASTIC BAG WITH A TIE WRAP, WRAPPED AROUND THE CABLE FOR SHIPPING.
- WHEN CABLE ITEM 12 (2P PIGTAIL) IS NOT IN USE PLUG IN "DUMMY PLUG" TO AVOID DANGER & FOR SAFETY.
- ITEM 10 CLAMP TO FULLY COVER CABLE JACKET.

841505
SYS140, Cable Assembly
12 Pin to P&T, + Tractor + Auxiliaries





Rebuild Kit, TR2000 Tractor Transmission			950179
ITEM	DESCRIPTION	QTY	ARIES P/N
1	PIN, SPRING 3/16X1 SS	1	097548
2	PIN, SPRING 3/32X5/8 SS TRACTOR	1	097552
3	KEY, 1/8X1/8X3/4 UNDERSIZED, SQUARE ENDS	1	097617
4	SCREW, 4-40X5/16 CAP SOC SS	8	107012
5	SCREW, 10-32X5/8 FL SOC SS	2	107030
6	SCREW, 4-40X3/8 FL PH SS	4	107111
7	SCREW, 8-32X3/8 FL PH SS	2	107300
8	O-RING, #029 HI-PERF LTHD GOGGLE	1	130111
9	O-RING, #214 VITON TRACTOR	1	130117
10	SEAL, OIL 4925	4	130120
11	BEARING, BALL 1/2IDX3/4ODX .156W	2	300353
12	BEARING, THRUST TRACTOR	2	300354
13	BEARING, BALL R3/MRC TRACTOR	1	300356
14	BEARING, BALL R4A/S1K TRACTOR	1	300357
15	BEARING, BALL .875X.375X.2812 WITH MPI-0800 SOLID LUBRICANT	1	300358
16	BEARING, BALL R8/S5K TRACTOR	2	300359
17	GEAR, REDUCTION S242 MODIFIED	1	580002
18	SHAFT, WORM GEAR TRACTOR	1	580327
19	HOUSING, BEARING WORM GEAR TRACTOR	1	580332
20	SPACER, WORM GEAR TRACTOR	1	580359
21	SPACER, REDUCTION GEAR HOUSING TRACTOR	2	580414
22	SHAFT, HEX SHORTY TRACTOR	1	583020
23	ROLLER, CLUTCH SHORTY TRACTOR	1	583021
24	SCREW, 4-40X3/8 CAP SOC SS	8	810181
25	SCREW, SET 6-32X3/16 SS CUP	1	810520
26	O-RING, #033 VITON 75	1	815502
27	SCREW, 10-32X1/2 FL SOC SS	2	9419899
28	MANUAL, M/C CLUTCH REPAIR TRACTOR (NOT SHOWN)	1	970119



Kit, Frame Spreader 18-24 Inch Pipe Option		589006	
ITEM	DESCRIPTION	QTY.	ARIES P/N
1	SCREW, 1/4-20X1-3/4 CAP SOC SS	12	107524
2	SCREW, 1/4-20X3 HEX SS	2	107535
3	COUPLER, 18IN SS SHORTY TRACTOR	1	583034
4	COUPLER, 21IN SS SHORTY TRACTOR	1	583035
5	COUPLER, 24IN SS SHORTY TRACTOR	1	583036
6	BLOCK, RISER LARGE -A SHORTY TRACTOR	4	583038
7	WEIGHT, 10LB ZN TR2000 SHORTY TRACTOR	1	583040

