

**Turbine &
Engine
Drive**

Water-Reel



AG-RAIN[®]

OPERATOR'S MANUAL

Owner is advised to read this manual in its entirety prior to initial operation



P.O. Box 290 - 707 S. Schrader Ave.
Havana, Illinois 62644
Phone 309/543-4425

AG-RAIN®

OPERATOR'S MANUAL

“A” SERIES
WATER-REELS®

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Introduction

Thank You for purchasing an Ag-Rain Water-Reel.

Read This Manual carefully to learn how to operate and service your Water-Reel properly. Failure to do so can result in personal injury and/or property damage.

This manual is a permanent part of your Water-Reel and should always be available for reference by the operator. This manual should remain with the Water-Reel when it is sold.

Measurements in this manual are in U.S. units unless otherwise noted.

The Serial Number of your machine should be written in the space provided in the specification section of this manual.

If You Have A Problem if you do not understand some feature of this equipment, contact your Kifco/Ag-Rain dealer.

Warranty is provided as part of the Kifco/Ag-Rain product support. Please see specific warranty statement in this manual.

The warranty excludes:

- Alterations or modifications not previously approved. Neither Kifco/Ag-Rain dealers or representatives are authorized to make exceptions to warranty policy. Any deviations from standard warranty requires written authorization from an officer of Kifco Inc. Irrigation tube which is longer, larger in diameter, or made from non approved materials will void the warranty on the entire machine.
- Damage caused by normal wear, accident, lack of reasonable care and maintenance, neglect or abuse.
- The replacement cost of normal service items such as belts, gaskets, brake bands, etc. unless these parts are known to be defective.
- Transportation, mailing, service call, diagnosis costs. Labor for repairs is also excluded unless unusual circumstances exist and then only if pre-approved.

Dealer Checklist

Owner's Name _____

Address _____

City _____ State _____ Zip _____

Model _____ Serial No. _____ Date Sold _____

Pre-delivery Checklist: Check below before delivery to customer.

- | | |
|-------------------------------------|---------------------------------|
| ___ 1. Guards and shields in place. | ___ 6. Turbine valve operation. |
| ___ 2. Decals in place and legible. | ___ 7. Sprinkler nozzles. |
| ___ 3. Tire pressure. | ___ 8. Drive disengage/engage. |
| ___ 4. Lubrication points. | ___ 9. Supply Hose Fittings. |
| ___ 5. Spool Brake adjustment. | ___ 10. Touch up paint & clean. |

Delivery Checklist: Review operator manual with the user and explain the following:

- _____ 1. Kifco warranty policy and claims procedure.
- _____ 2. Safe operation and service.
- _____ 3. How to operate the Water-Reel
- _____ 4. Transporting the Water-Reel on roads or highways.
- _____ 5. Speed adjustment and effect on depth of application.
- _____ 6. Effect of flow and pressure on Water-Reel performance.
- _____ 7. Have customer record serial no. in specifications section.
- _____ 8. Discuss winterization and storage procedures.
- _____ 9. Give the customer this manual and encourage the customer to read and study the information in the manual.

Date Delivered _____ Customer Signature _____

Name of Dealer _____

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Safety

Owners Responsibilities

The owner is responsible for the safe operation of this product. The important safeguards and instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. It must be understood that common sense and caution are factors that cannot be built into any product. These factors must be supplied by the person(s) caring for and operating the product.

It is the owner's responsibility to:

1. Read and understand these instructions.
2. Operate the machine according to prescribed limitations.
3. Properly train others who may be permitted to operate the machine.
4. Heed rules of safety, including but not limited to those in these instructions.
5. Exercise good judgement relating to safe operation and safe conduct by operators and spectators whether invited or not.
6. Always bring the safety decals and placards on the machine to the attention of operators and spectators.
7. **Keep All Shields and Guards In Place!**

Read and Heed The Special Messages!

This safety alert symbol is used to indicate messages related to safety. When you see this safety symbol, obey the safety message to avoid personal injury, property damage or both.



A "**Caution**" message in this manual or on a machine placard means that you could be injured and/or equipment or property may be damaged if you do not follow instructions.

A "**Warning**" message in this manual or on a machine placard means that a hazard exists that could result in severe personal injury or death.

A "**Danger**" message in this manual or on a machine placard means that a hazard exists that will result in severe personal injury or death.

1 CAUTION
Stabilizer legs must be fully extended and firmly anchored before operating the machine.

2 CAUTION
PTO Rewind will not automatically stop when the cart arrives at the machine.

3 WARNING
Do not operate unless all safety shields are in place.

Location of Safety Messages:

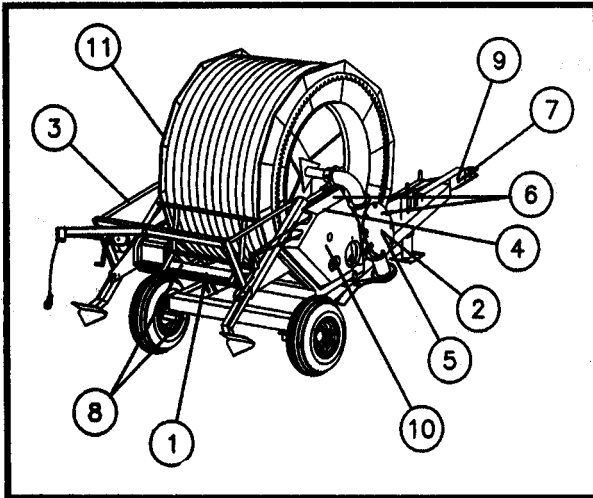
1. Machine frame.
2. Runner cover.
3. Level wind chain guard.
4. Top of drive train shield.
5. Runner cover.
6. Runner cover and top of drive train shield.
7. Side of tongue.
8. Machine frame. Level wind support.
9. Side of tongue.
10. Behind drive train shield.
11. Operator manual housing

4 WARNING
Do not operate unless all safety shields are in place.

5 CAUTION
ALWAYS Operate PTO Rewind SLOWLY.
(540 RPM Drive Shaft ONLY)

6 WARNING
Stay clear of moving parts

7 WARNING
When towing this machine do not exceed 2 mph in farm fields or 12 mph on smooth highways. Loss of control and personal injury may result.



8 WARNING
Personal injury may result if this machine is improperly operated. Safe machine operation is user's responsibility.
Do not operate or service this machine until you have been instructed and understand.
Read Owner's Manual before attempting to operate.

9 CAUTION
Do not operate off the rear of the machine unless a tractor with brakes set is firmly attached to the tongue. The machine is designed to operate when the tube is pulled off the side so the wheels and tongue jack help to stabilize the machine.

11 WARNING
Do not operate this machine until you have read and understand the operators manual. If you do not have a copy of the operators manual contact your dealer or our factory immediately.
Kifco Inc. 707 S. Strader Ave.
Havana, IL 62644 Phone (639) 542-4425
Do not do any late cable adjust or repair this machine while in operation.
Do not ride or climb on this machine at any time.
Do not place hands or hand shields while this machine is in operation.
Do not allow children or others near the sprinker, cart or machine during operation.

10 WARNING
Replace Shield.
If you can read this decal a shield is missing.

--Safety--

Learn To Be A Safe Operator

Read This Manual.

Know the controls on the Water-Reel and also how to stop the supply pump!

Do not allow children to operate the Water-Reel. Do not allow anyone to operate the equipment with out proper instruction.



Protect Children

Keep children away when you operate the Water-Reel.

Do not allow children to operate the tractor that is positioning the Water-Reel.

Never allow children to climb or ride on the machine at any time.



Use Caution Around Pressurized Lines

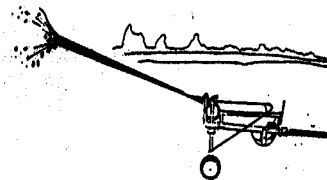
Be sure pressure is relieved from the supply line when disconnecting.

If the sprinkler plugs, there may be pressure trapped in the Water-Reel tube.



Stay Away From Operating Sprinklers

Stay away and keep others away from the sprinkler head during operation. Pressurized fluid from a sprinkler can inflict serious injury to by-standers.



--Safety--

Use Caution When Towing

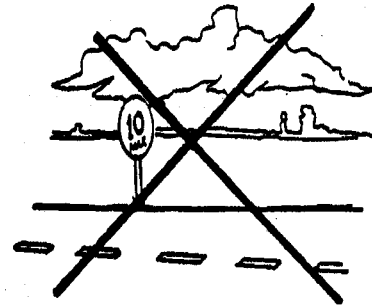
Your Water-Reel is not intended for highway towing.

Towing Speed:

12 MPH maximum on smooth surfaces.

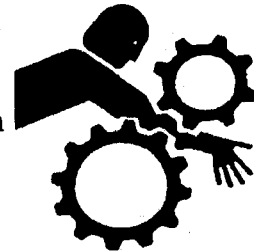
3 MPH maximum on rough surfaces.

Never tow the Water-Reel in excess of 12 MPH.



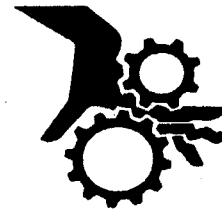
Keep Hands and Clothing Away

Do not under any circumstances reach into the Water-Reel while it is in operation.



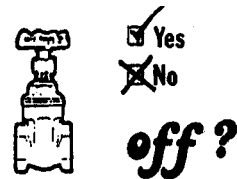
Keep All Guards and Shields In Place

Never Operate This Machine With Safety Guards Removed!



Never Service Or Make Adjustments While The Water-Reel Is Pressurized

Shut the Pump off at the source before attempting to do any service, maintenance or adjustments.



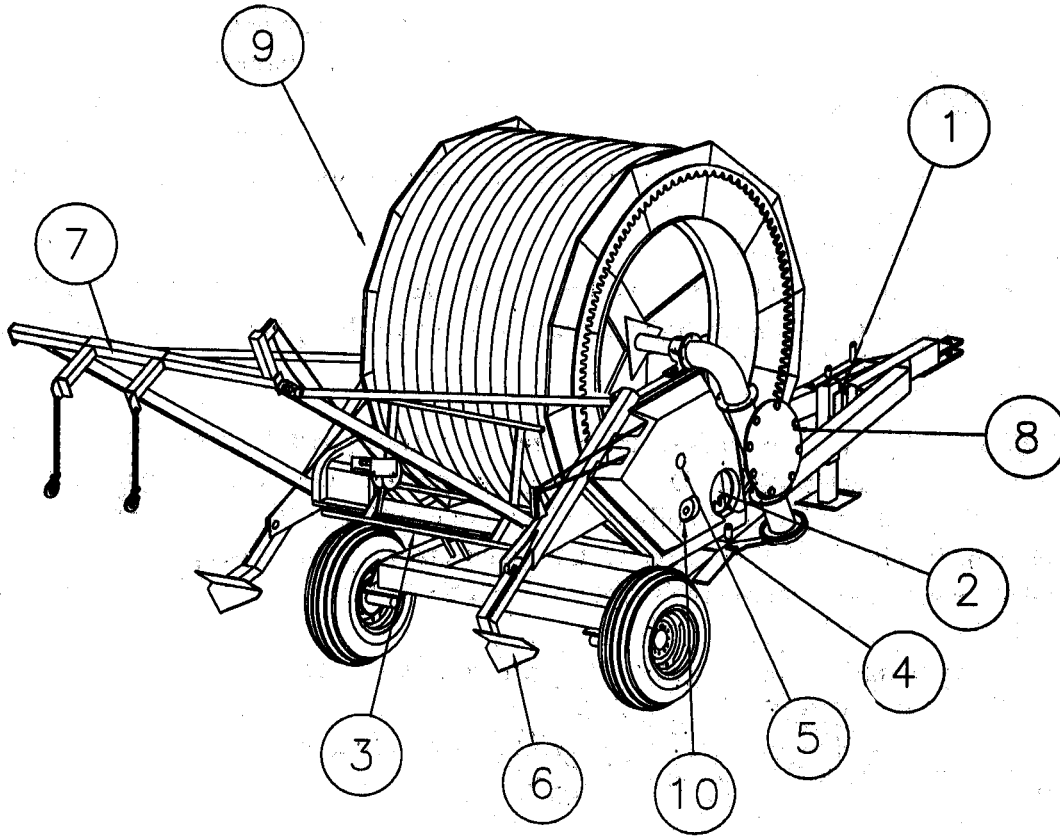
Stay Away From Power Lines

Avoid letting water contact power lines.

Be careful not to contact power lines with irrigation pipe or mechanical equipment



Controls



- 1- Tongue Jack
- 2- Drive Disengage
- 3- Shut-Off Bar
- 4- Turntable Lock Pin
- 5- Ground Speed Indicator
- 6- Stabilizer Leg
- 7- Cart Transport Lift
- 8- Anti-Return Pawl
- 9- Brake Adjustment (Prior to s/n 340000)
- 10- PTO Shaft Attachment Point

Note: These controls are the same for turbine or engine drive systems. The controls for the specific drive types are shown in the "Start-up & Operation" section of this manual.

Handling The Polyethylene Tube

The polyethylene irrigation tube is a durable product that will operate reliably for many years if handled properly and given a reasonable amount of care.

Unlike rubber hose or hose with a woven jacket (lay flat hose), polyethylene is a semi-ridged product that retains its shape when it is not pressurized. This characteristic makes it feasible to pump fluid through it while it is rolled up on a reel.

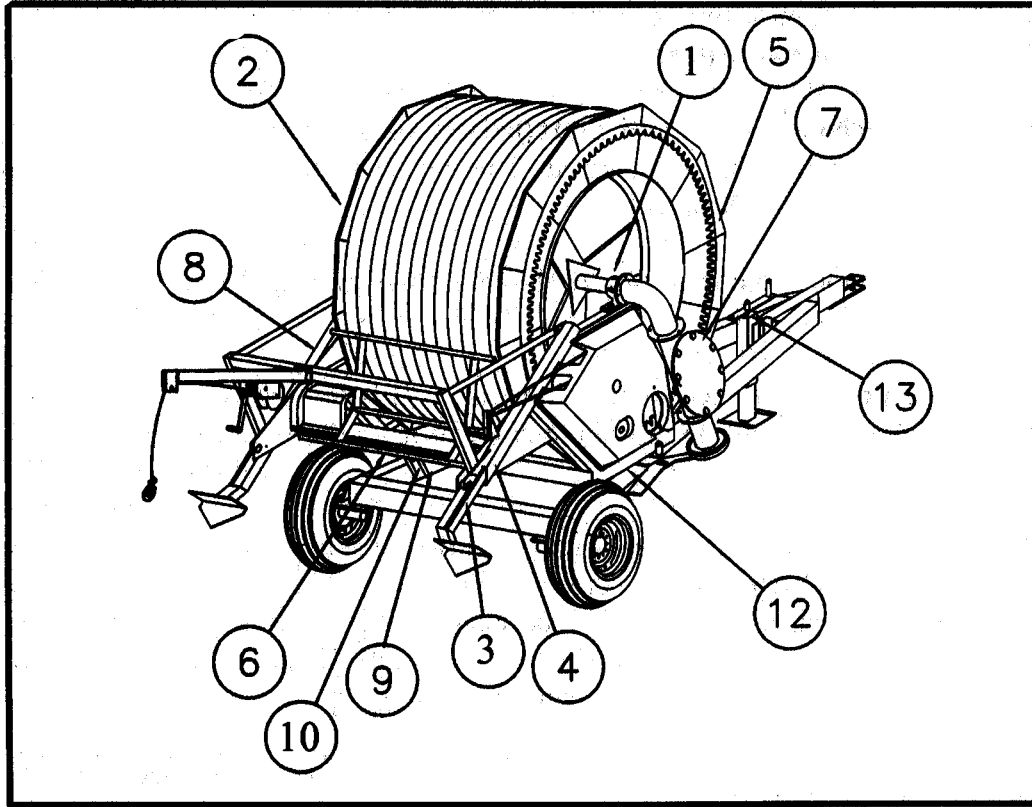
A few simple precautions need to be observed to prevent damaging the tube when operating your Water-Reel.

When starting a new water-reel for the first time. It is important that the tube be pulled nearly all the way out in order to tighten the new tube on the spool.

1. **Never transport the Water-Reel with the anti-return pawl disengaged! The tubing will become loose and tangled.** Do not attempt to operate if there are any coils of tube that are loose or misplaced. If loose coils of tube are noticed after pulling the tube out, they must be tightened up by rotating the spool with the hand crank. If this is not possible then pull all of the tube out before attempting to rewind the tube.
2. Never try to move or relocate the machine if the tube is not fully rewound onto the machine.
3. Never pull the tube off the machine other than by pulling on the sprinkler cart (straight out from the machine).
4. Never run over the tube with any kind of vehicle and avoid pinching or pulling the tube around objects. Make it a point to never bend the tube sharper than 25 times the diameter of the tube.
5. Be careful when operating other equipment near the tube that it doesn't get gouged or punctured.
6. Avoid using the PTO or Engine Drive to rewind the tube when it is un-pressurized. When the tube is not pressurized the tube flattens and the rewind mechanism can not function properly. Keep the tube pressurized when rewinding!

Remember, polyethylene tube is semi-ridged and subject to being kinked. These foregoing precautions will reduce the possibility of kinking or damaging your tube. Throughout the irrigation industry the words 'tube' and 'hose' are used interchangeably in connection with hard hose traveling irrigation machines.

Lubrication



Lubrication Points

Lubricate each 100 hours of operation:

- | | |
|-------------------------------|---|
| 1. * Drum Axle Bearings | 8. Level Wind Drive Chain |
| 2. **Grease Brake Pads & Ring | 9. Level Wind Guide Chain |
| 3. Grease Stabilizer Slides | 10. Level Wind Fork Slide |
| 4. Stabilizer Crank Bearings | 11. Gun Cart Wheel Bearings (Not Shown) |
| 5. Grease Final Drive Cog | 12. Turntable Bearing |
| 6. Level Wind Idler Bearing | 13. Tongue Jack |
| 7. * Turbine gate Bearings | |

* Grease until grease comes out of bearing.

** After S/N 340,000 only models smaller than 3.3.

--Lubricate once each season:--

Pack Main Running Gear Wheels

Check Oil Level in Reduction Gearbox. Use 90 wt. Gear Oil.

Note: For Engine Drives, Keep Hyd. Oil 1" From Top of Reservoir.

--Tire pressures--

Inflate tires to the pressure imprinted on each tire wall.

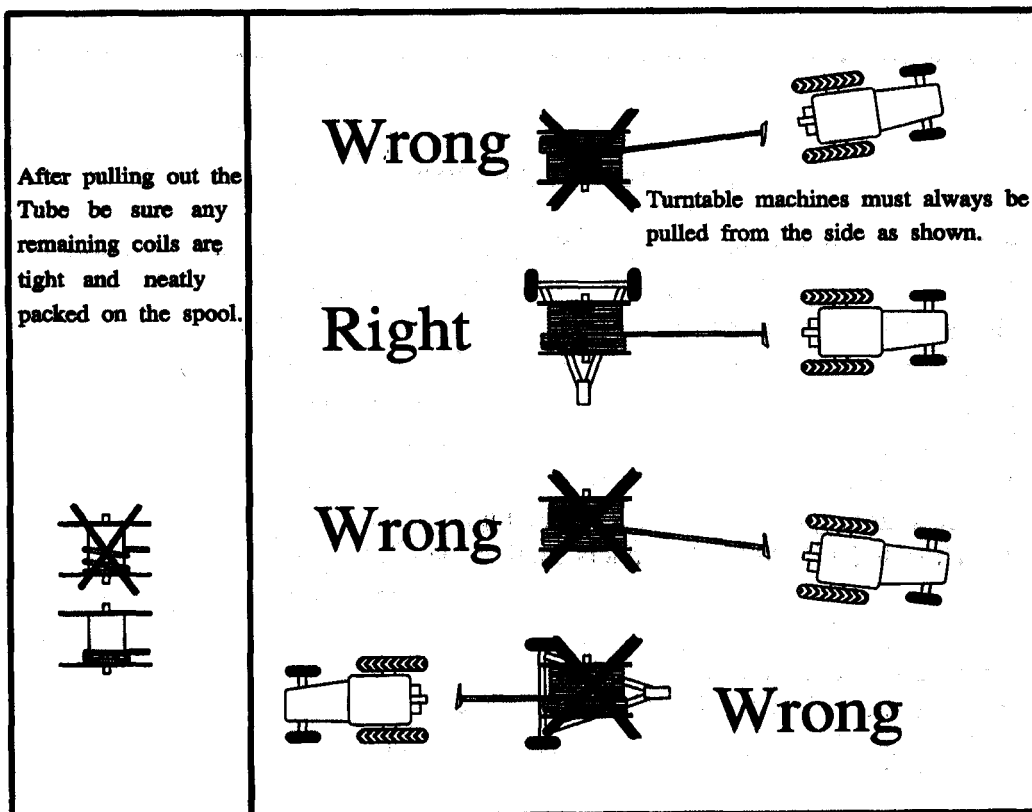
Start-Up & Operation

The success of the Water-Reel irrigation system depends a great deal on the operator's understanding of the proper pull out and start up procedure. **Unless you are an experienced operator of this type of equipment, do not attempt to operate this Water-Reel until you read and understand the preceding section titled "Handling the Polyethylene Tube"!**

The following steps are important.

1- Pull the Water-Reel along side the area to be irrigated. Rotate the unit so the sprinkler cart is towards the run to be sprinkled. Be especially careful to have the spool square and in good alignment with the sprinkler cart travel path.

Warning! Do not pull the hose out of the back of the machine. The stabilizer legs will not hold the load of incoming hose if the main wheels of the Water-Reel are not approximately crosswise to the sprinkler cart travel path. (Does not apply to Squatter Machines).



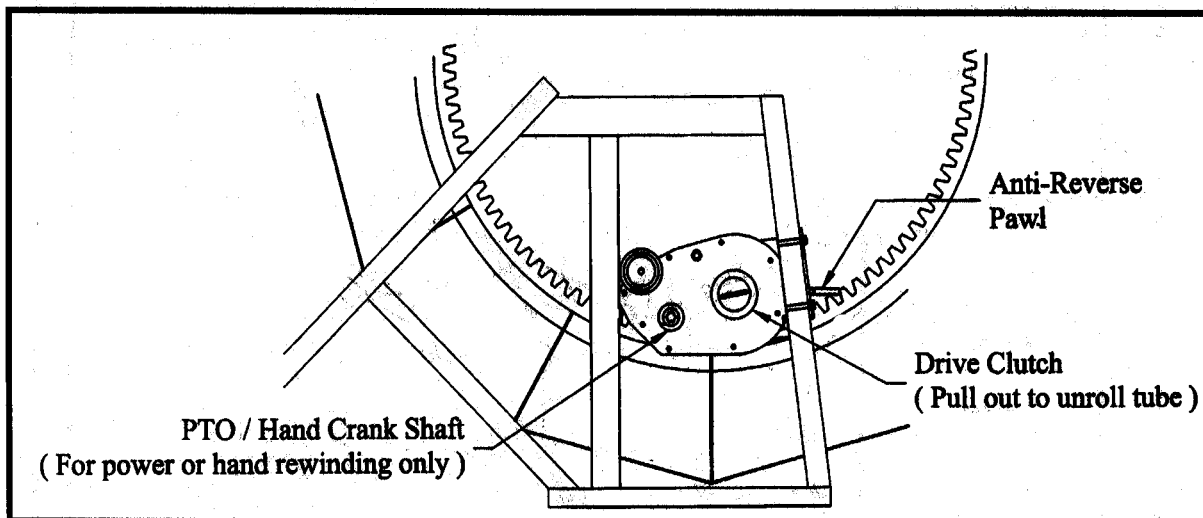
--Start Up--

It is allowable for the tube not to be pulled out in a straight line, however, it is important that the **first 20% of the tube be pulled straight away from the machine.** Failure to observe this limitation places excessive side load on the level wind mechanism and may result in equipment failure or tube damage.

1. When the tube is pulled out to follow a contour or to avoid an obstacle, the extent that it is pulled in a curve should be very gradual. Under no circumstances should the tube curve more than 90 degrees in its entire length. How well the tube will follow its laid out path back to the machine will depend mostly on the surface of the ground. For example, if there are contours or furrows to follow, the tube may track back very well. If the soil or vegetation is slick and no rows or furrows exist, the tube may cut across the laid out path and be recoiled back on the machine in the shortest distance. (a straight line)
2. Crank down the stabilizer legs and confirm they have made good ground contact. Make sure both stabilizer feet are firmly inserted into the ground. **Never attempt to operate the Water-Reel with only one leg down.**
3. Disengage the drive. There are three drive reductions used on the "A" series Water-Reels. On the larger turbine driven units, serial nos. 320000 through 339999, the drive train reduction is accomplished by a large 5 shaft oil bath gearbox. This gearbox eliminates all chains from the drive system.

The disengage is as shown in the diagram below. **Warning: Do not remove the PTO clutch to unroll the tube.**

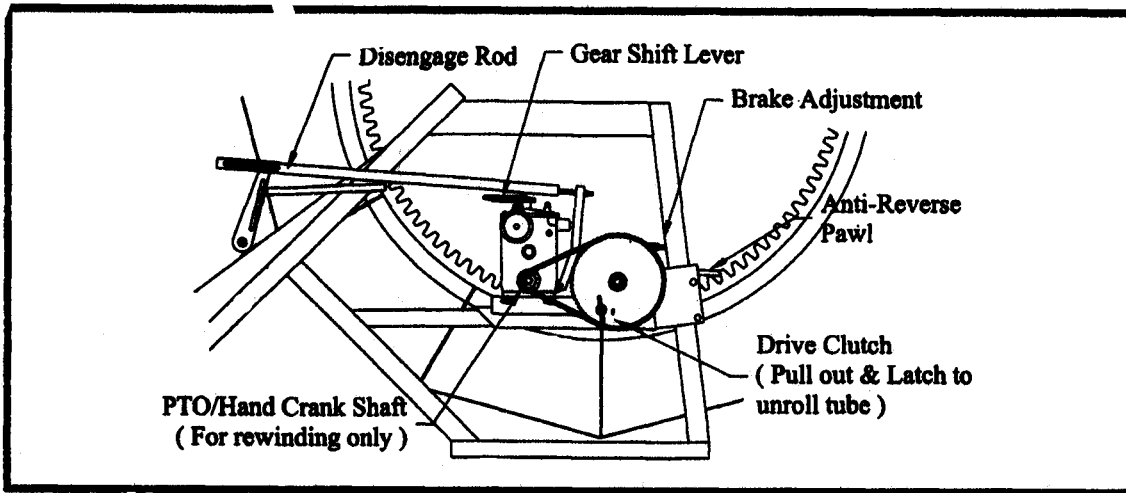
Gear Reduction Drive



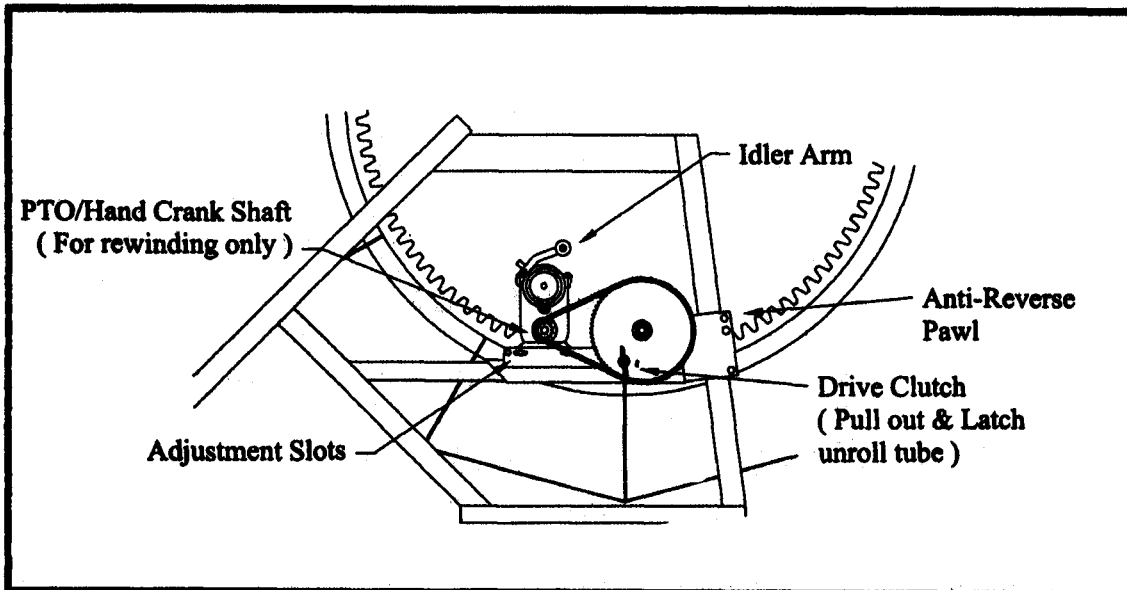
--Start Up--

On the other turbine drive "A" series Water-Reel models a three shaft gearbox is used along with a chain reduction. On Serial Nos. 340000 and later a two speed, three shaft reducer was used on models 37A and larger. This gear box also provides the means for stopping travel at the end of the irrigation run. The machine stops when the sprinkler cart contacts the stop bar by shifting the gearbox in to neutral. Note: This does stop the drive when using the PTO rewind!

Two Speed Gear & Chain Reduction Drive



Single Speed Gear & Chain Reduction Drive



--Start Up--

4 Set the spool brake for proper unrolling tension.

If the Water Reel has a brake directly on the hose spool, make sure the brake ring has been liberally greased on both sides. Tighten the brake until it engages the brake ring then tighten 1/4 turn more, (See placard on Water-Reel). Other models with the brake on the transmission do not require lubrication.

Use a gear in your tractor that goes not more than 3 MPH at full throttle. Pull the tube out at a steady rate and do not exceed 3 MPH. Do not start and stop. Slow the tractor to only 1MPH or less for fifty feet prior to stopping.

IMPORTANT! After the tube is pulled out, engage the anti-reverse pawl **before** loosening the brake.

The purpose of the brake is to prevent coils of tube from becoming loose on the hose spool. Loose coils of tube will make the level-wind mechanism appear to be out of time. The level-wind system will be damaged and a mis-wrap will occur.

It is important that the first run be a full length run so the hose becomes packed tightly on the reel.

NOTE: Coasting of the spool during the hose pull out is the most frequent cause of mis-wrap problems! This problem is most common when the Water-Reel is used often in short runs and the entire hose is seldom pulled all the way out. When the spool coasts, the irrigation hose will become loose on the spool.

5. Attach the water supply line to the machine to confirm that all lines reach and the Water-Reel is set in the proper place. **Do not turn on the water.** Be sure there are no kinks in the supply hose and that all gaskets are in place and in good condition.

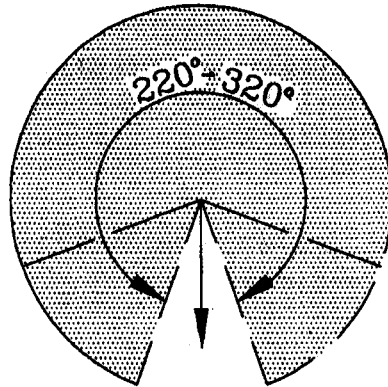
6. Lower the sprinkler cart from its transport position. Set the desired sprinkler arc and confirm that the sprinkler is equipped with the proper nozzle. Note: Turbine drive irrigators have a **minimum G.P.M. flow requirement. Do not attempt to use different nozzles or operate at pressures different from those listed on the "Performance Guide" placard which is installed on the machine!**

Adjust sprinkler cart to desired width. See "Specification Section"

7. Pull the sprinkler cart out the desired distance. (For first run pull out the full length.)

--Start up--

8. Turn on the pump. Confirm the sprinkler is operating as expected and in the desired arc. See below.



The arc of the sprinkler will affect the precipitation rate of the system. Note the "Precip Rate" column on the performance guide located on the Water-Reel.

The lowest precipitation rate will occur when the sprinkler is operating a full 360 degree circle.

NOTE: Arc settings, where the sprinkler never throws water forward of the gun cart, could make the gun cart track off line . This is caused by the continuous thrust of the sprinkler which tries to push the tube towards the Water-Reel. It is necessary to have some sprinkler thrust which puts the tube under tension.

9. After all air is purged from the system and the sprinkler is operating smoothly, you can start the drive system if you have an engine drive. For turbine drives, allow the water to go through the system for several minutes to carry out any trash or debris that may have been in the mainline pipe. After the system is thoroughly flushed, start the drive system.
10. Observe pressure, travel speed, and sprinkler operation. See "Specification" section of this manual for performance information, then adjust speed to the desired travel rate.
11. **Important!** Exercise the shut-off bar that the sprinkler cart contacts to stop the travel. Confirm that it works easy and it stops the turbine or engine, which ever the case may be.
12. When the sprinkler cart completes the irrigation run and has contacted the shut-off bar, the retraction of the hose will stop. With the irrigation run completed, stop the pump, lift the sprinkler cart into transport position, retract the stabilizer legs, and disconnect the supply hose . The Water-Reel is now ready to be moved and set up in a new location. **Notice!** On Water-Reels after s/n 340000 (equipped with a 2 speed gearbox that stops by shifting to neutral), this exercise must be done before engaging the drive.

--Start up--

Depth Of Water Applied:

The depth of water applied by the Water-Reel is regulated by the speed the sprinkler is moving over the ground. It is also affected by the amount of water being discharged by the sprinkler head.

The amount of water discharged is determined by the sprinkler nozzle size and the water pressure. These two factors are determined by the available water and the capability of the water pump at the water supply. The selection of the sprinkler nozzle needs to be made based on the water supply and pump performance.

TRAVEL SPEED SETTINGS: (Prior to S/N 340000)

40A PERFORMANCE GUIDE

40A X 1250' WATER-REEL PERFORMANCE					Inches Depth of Application								320° Degree Precip Rate	
Nozzle SR200 & NOZ:	Sprinkler Performance			System Inlet PSI	**Irrigated AREA Width X Length	Travel Speed Feet Per Hour								
	PSI	GPM	OIA			40	50	75	100	125	150	200		400
1.25" Ring or 1.00" Taper	50	230	325	78	228 X 1384	2.1	1.7	1.1	0.9	0.7	0.6	0.3	0.2	0.37
	60	260	340	91	238 X 1369	2.2	1.8	1.2	0.9	0.7	0.6	0.4	0.2	0.36
	70	270	365	104	248 X 1374	2.3	1.9	1.2	0.9	0.7	0.6	0.4	0.2	0.36
	80	290	378	117	258 X 1368	2.4	1.9	1.3	0.9	0.6	0.6	0.4	0.2	0.36
1.40" Ring or 1.2" Taper	50	300	355	89	248 X 1374	2.5	2.0	1.4	1.0	0.8	0.7	0.4	0.3	0.40
	60	330	370	105	259 X 1380	2.7	2.1	1.4	1.1	0.9	0.7	0.4	0.3	0.41
	70	355	385	120	270 X 1385	2.8	2.2	1.5	1.1	0.9	0.7	0.4	0.3	0.40
	80	380	400	135	280 X 1380	2.9	2.3	1.5	1.1	0.9	0.8	0.5	0.3	0.40
1.50" Ring or 1.3" Taper	50	350	370	99	259 X 1380	2.8	2.3	1.5	1.1	0.9	0.8	0.5	0.3	0.43
	60	385	390	116	273 X 1387	3.0	2.4	1.6	1.2	1.0	0.8	0.5	0.3	0.43
	70	415	405	133	284 X 1392	3.1	2.5	1.6	1.2	1.0	0.8	0.5	0.3	0.43
	80	445	429	151	294 X 1397	3.2	2.6	1.7	1.3	1.0	0.9	0.5	0.3	0.42
1.60" Ring or 1.4" Taper	50	410	390	112	273 X 1387	3.2	2.5	1.7	1.3	1.0	0.8	0.5	0.3	0.45
	60	445	410	131	287 X 1394	3.3	2.6	1.7	1.3	1.0	0.9	0.5	0.3	0.45
	70	480	425	150	298 X 1399	3.4	2.7	1.8	1.4	1.1	0.9	0.5	0.3	0.45
	Hours For 1250 Feet of Travel:						31.3	25.0	16.7	12.5	10.0	6.3	5.0	3.1


System Inlet pressure shown above is for Turbine Drives. Engine Drives will be approx 10 PSI lower.
 ** Area covered may vary depending on wind conditions, field dimensions and use of unspecified sprinklers. The average area covered per run is 9 acres.
 * The precipitation rate is in Inches per hour and is based on a sprinkler arc of 320 degrees.
 The 'System Inlet Pressure' is the pressure required at the traveler inlet. It includes allowances for the traveler plumbing and drive, PE tube and sprinkler pressure. It does not include any pressure allowances for field elevation or mainline pressure loss.

IMPORTANT! Turbine drives will have higher pressure losses at higher RPM and are not recommended for travel speeds above 250 feet per hour. For speeds above 250 Ft. per hour use an Engine Drive.

Follow the belt pulley selections below.

Lowest speed pulleys:	Up to 75 feet per hour.
Medium speed pulleys:	From 75 to 125 feet per hour.
Highest speed pulleys:	From 125 to 250 feet per hour.

NOTE: Specifications are subject to change without notice.



Turbine
Gearbox

--Start Up--

After the desired depth of water has been determined and the proper nozzle has been installed, follow the steps in the following example to set the speed: (Assume: 1.46" ring nozzle, 120 psi inlet pressure, and a desired depth of water of 1 inch.)

1. Find the proper section in the performance guide for 1.16" ring nozzle. (1)
2. Locate the 120 psi inlet pressure.(2)
3. Locate 1.1 inches depth. (3)
4. Read "feet per hour" travel speed required. (100 ft/hr.) (4)
5. *You can see that the water pressure on the sprinkler nozzle is 70 psi. the flow in gallons per minute discharged through the sprinkler is 355 and the wetted diameter is 385 feet. (5)
6. *The effective irrigated width is 270 feet and the maximum effective irrigated length is 1385 (6)
7. *You can also note the precipitation rate (the rate that water is being applied to the soil) is .40 inches per hour. This computation is based a 320 degree arc of the sprinkler with the arc symmetrical to the direction of travel. See sprinkler arc setting in the section (7)
8. *Hours required for a complete run can be read from the chart at the bottom of the performance Guide entitled "Retaction speed of Irrigation Tube (Ft/Hr) (8)

*Note: This information is based on standard lengths of tube for the various models. Any tub of a non standard length or diameter will substantially change the performance. Consult the factory for performance information on non-standard tubes.

TRAVEL SPEED SETTINGS: (S/N 340000 and Above)

40A PERFORMANCE GUIDE

Range SR200 & Req.	T/E 40 X 1320" Water-Roll Performance				Inches Depth of Application						320" Opns Precip. Rate	
	Sprinkler Performance		*System Inlet PSI	*Irrigated Area Width X Length	0.30	0.50	0.75	1.00	1.25	1.50		
	GPM	BSA			Travel Speed - Feet Per Hour							
1.20" Ring or 1.00" Taper	50	320	325	70	220 X 1434	284	170	114	66	68	57	0.37
	60	250	340	92	230 X 1430	296	177	118	69	71	60	0.38
	70	270	308	105	240 X 1444	305	183	122	72	73	61	0.39
1.40" Ring or 1.2" Taper	60	290	370	110	250 X 1450	314	189	126	74	75	63	0.39
	80	310	300	130	260 X 1453	327	196	131	76	79	65	0.39
	90	360	356	91	240 X 1444	330	203	136	102	61	68	0.40
1.50" Ring or 1.3" Taper	80	350	378	107	250 X 1450	350	215	143	107	90	72	0.41
	70	365	305	122	270 X 1450	370	222	146	111	80	74	0.40
	80	360	400	138	290 X 1460	391	228	150	114	91	76	0.40
1.60" Ring or 1.4" Taper	80	405	411	104	291 X 1466	382	235	151	117	94	78	0.40
	50	350	370	101	250 X 1450	360	228	152	114	91	76	0.40
	60	385	390	119	270 X 1457	396	239	158	119	96	79	0.43
1.80" Ring or 1.6" Taper	70	415	405	130	284 X 1463	--	247	164	123	98	82	0.43
	80	440	420	104	294 X 1467	--	255	170	128	102	85	0.42
	50	410	390	115	270 X 1457	--	253	169	127	101	84	0.45
1.00" Ring or 1.4" Taper	60	445	410	154	297 X 1464	--	261	174	131	105	87	0.45
	70	460	465	154	298 X 1468	--	272	181	136	109	91	0.46

System inlet pressure shown above is for Turbine Drives. Engine Drives will be approx. 10 PSI lower.
 * Area covered may vary depending on wind conditions, field dimensions, and use of unspecified sprinklers. The average area covered per run is 9.0 acres.
 The "System Inlet Pressure" is the pressure required at the traveler inlet. It includes allowances for the traveler plumbing and drive, PE tube and sprinkler pressure. It does not include any pressure allowance for the field elevation or mainline loss.
WARNING! Do not leave this machine to shut-off travel automatically unless the shut-off has been exercised manually to ensure it functions properly and operates easily. For more information see the Operator Manual.

Tube Length: 1320 Feet	Retraction Speed of Irrigation Tube (F/HR)																
	400	350	300	275	250	225	200	175	150	125	100	90	80	70	60	50	40
	3.3	3.6	4.4	4.8	5.3	5.9	6.6	7.5	8.5	10.0	13.2	14.7	16.5	18.0	22.0	28.4	35.0

(AG1-PS1-077) 000-0075-1

--Start Up--

After the desired depth of water has been determined and the proper nozzle has been installed, follow the steps in the following example to set the speed: (Assume: 1.46" ring nozzle, 120 psi inlet pressure, and a desired depth of water of 1 inch.)

1. Find the proper section in the Performance Guide for the 1.46" ring nozzle. (1)
2. Locate the 120 psi inlet pressure. (2)
3. Find depth of application 1.00 inch (3)
4. Locate 111 feet per hour. (4)
5. *You can see that the water pressure on the sprinkler nozzle is 70 psi. The flow in gallons per minute being discharged through the sprinkler is 355 and the wetted diameter is 385 feet. (5)
6. *The effective irrigated width is 270 feet and the maximum effective irrigated length is 1385 feet. (6)
7. *You can also note the precipitation rate (the rate that water is being applied to the soil) is .40 inches per hour. This computation is based on a 320 degree arc of the sprinkler with the arc symmetrical to the direction of travel. See sprinkler arc setting in this section. (7)
8. *Hours required for a complete run can be read from the chart at the bottom of the performance Guide entitled "Retraction Speed of Irrigation Tube (Ft/Hr) (8)

*Note: This information is based on standard lengths of tube for the various models. Any tube of a non standard length or diameter will substantially change the performance. Consult the factory for performance information on non-standard tubes.

Speed Compensation:

Speed compensation is necessary for economical operation and water use efficiency. The build up of hose on the drum gives the drum a larger effective circumference as the hose is rewound. Each layer of hose on the spool makes a significant increase in the rate of sprinkler cart retraction speed during the irrigation run. From the beginning of the irrigation run to the end of the run the typical speed increase of a hard hose traveler is about 40%. This means that if you set the travel speed to apply 1 inch of water at the beginning of the run, you will get only .6 inches at the end of the run. On the average the depth is only .8 inches. This level of uniformity is unacceptable in most cases.

--Start Up--

To manage this characteristic, the Water-Reels are equipped with a speed compensator. The compensator slows the rotation of the hose reel at approximately the same rate that the tube builds up on the drum so the velocity of the incoming tube stays approximately constant.

The compensation system monitors the diameter of the hose drum by use of a bar that rides on the hose so it senses the diameter of the hose reel and slows the drive system to offset the increase in the circumference of the hose drum. The bar is attached mechanically to the turbine motor or to the drive train components of the engine drive system.

The compensator systems will maintain a reasonably constant hose retraction speed throughout the run.

See the "Maintenance & Adjustments" section in this manual for more information about adjusting the turbine or engine compensators.

Travel Speed Indicator:

The speed indicator displays the ground speed of the sprinkler cart. The speed is shown in feet per hour.

The speed indicator installed on the Water-Reel is driven by a rotating shaft in the drive train which turns at a speed relative to the RPM of the hose drum. It is a sensitive instrument which provides important information. To make full use of the information displayed on the speed indicator the operator must understand the various lines and symbols on the dial.

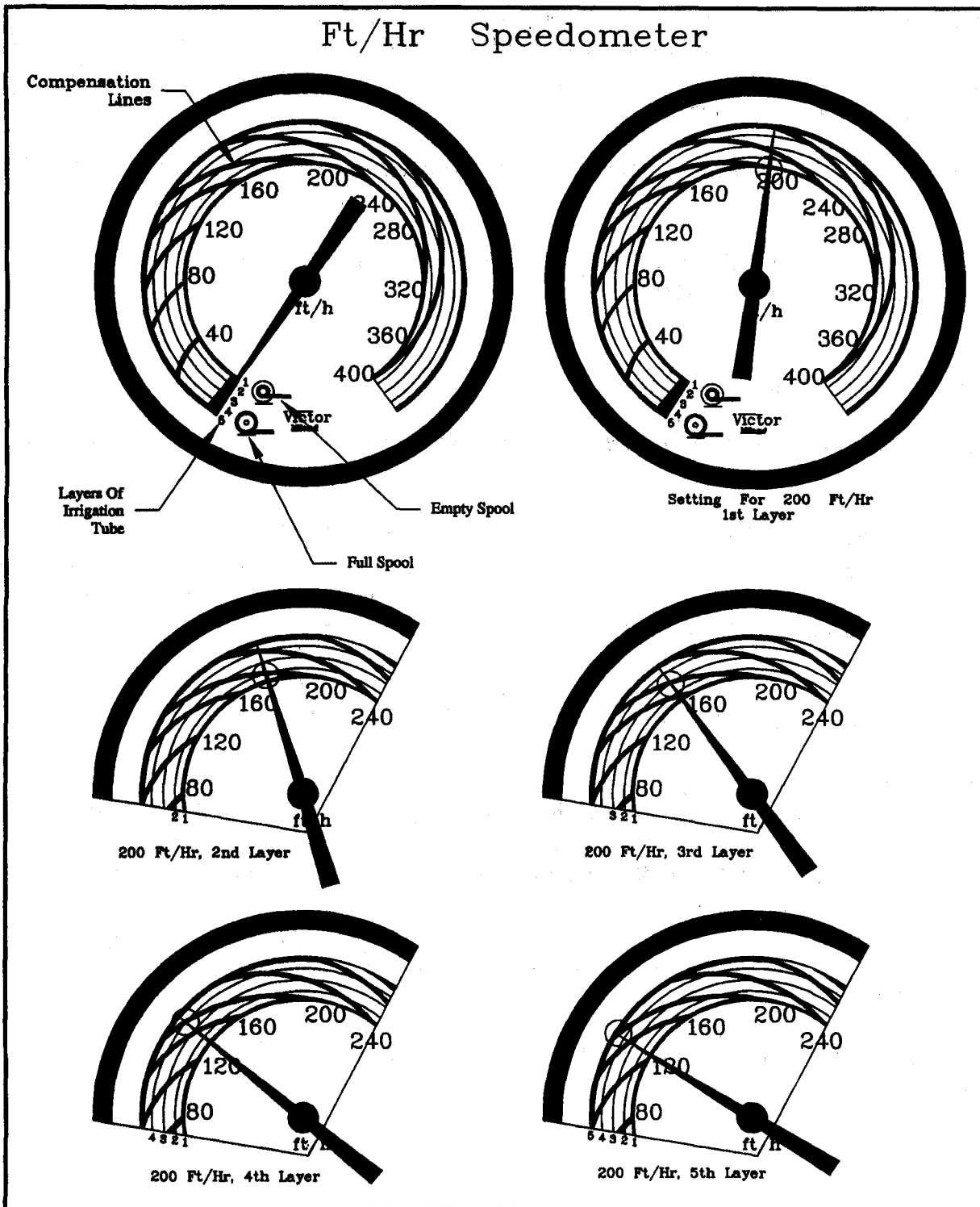
The following information and the diagram on the next page of this manual will be helpful. Also, you should read the part of this section about "Speed Compensation" before proceeding.

During operation, with the compensator operating properly, the needle will move counter clockwise (indicating slower) as the layers of tube build up on the spool. This movement is normal.

The lines in the dial numbered 1 thru 5 represent layers of tube on the spool. No. 1 represents the first layer of tube on an empty spool.

The radial lines (compensation lines) that go across tube layer lines represent the track of the needle during the run.

Study the diagrams on the following page until you understand the information on the speed indicator dial.

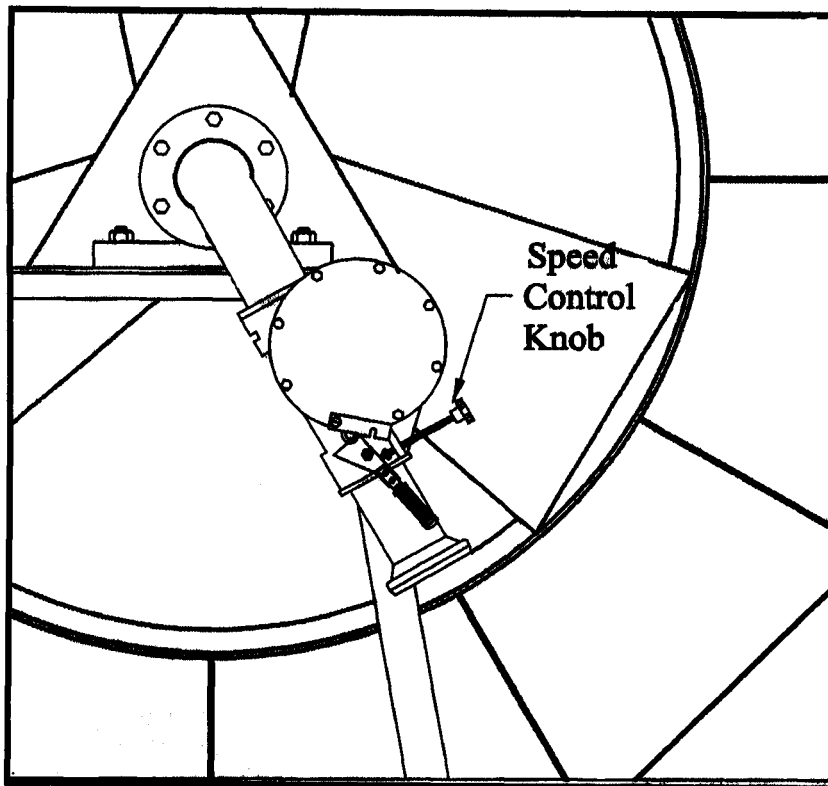


--Start Up--

Turbine Drive Speed Settings:

Select the proper turbine/gearbox v-belt pulley. Refer to the diagram in the lower right corner of the "Performance Guide". In the previous example where 100 feet per hour was required the medium pulleys must be used. **IMPORTANT! The proper pulleys must be used to prevent excessive pressure loss!** The life expectancy of the turbine motor bearings and seal will be substantially shortened if the turbine is allowed to run faster than necessary.

With water flowing through the system and the proper pulleys selected, adjust the speed control knob (see illustration) until the desired speed is indicated on the travel speed indicator.

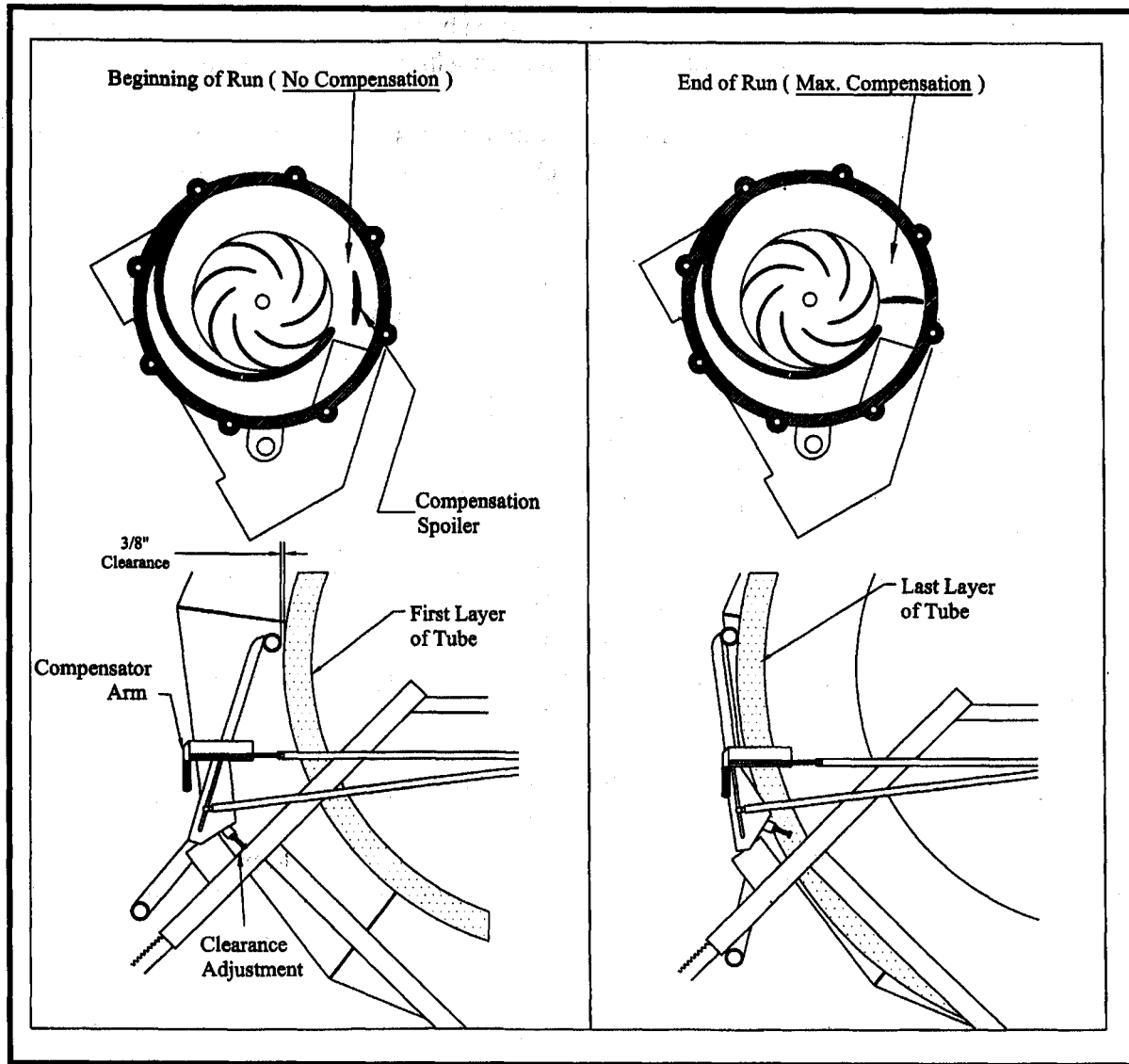


--Start Up--

The Turbine Compensator System

The turbine motors are compensated by a "spoiler" installed at the periphery of the turbine runner. As the tube builds up on the drum, the compensator arm moves the spoiler toward the runner so as to spoil the flow through the runner thereby reducing the RPM.

The following diagrams indicate the movement of the spoiler.



Engine Drive Section

Some times Water-Reels need to be powered by engines. There are three circumstances that usually dictate the need for engines to be used to power the retraction of the irrigation hose:

- 1- If high travel speeds are needed to apply light applications. Where it is important to apply .3 inches of water or less the machine should be engine powered. Engine driven travelers are capable of speeds two times that of turbine drives.
- 2- If the Water-Reel is applying slurry or any substance which contains significant solids. The turbine drives are limited to the size of particles which can pass through the turbine motor.
- 3- If the pressure of the water is marginal it may be wise to choose an engine drive machine. The turbine drive system will take approximately 6 psi to 10 psi to power the turbine depending on the speed of travel.

When these three factors are not involved the turbine drive is the best choice. The turbine drive requires the least service and attention and most operators prefer the operating simplicity. There are no oil changes, refueling or an engine to start when you begin pumping. When the pump runs, the turbine runs and when the pump stops, the turbine stops.

This manual addresses the current version of the engine drive Water-Reels (S/N 340000+) as well as an older version. The most current configuration is discussed first.

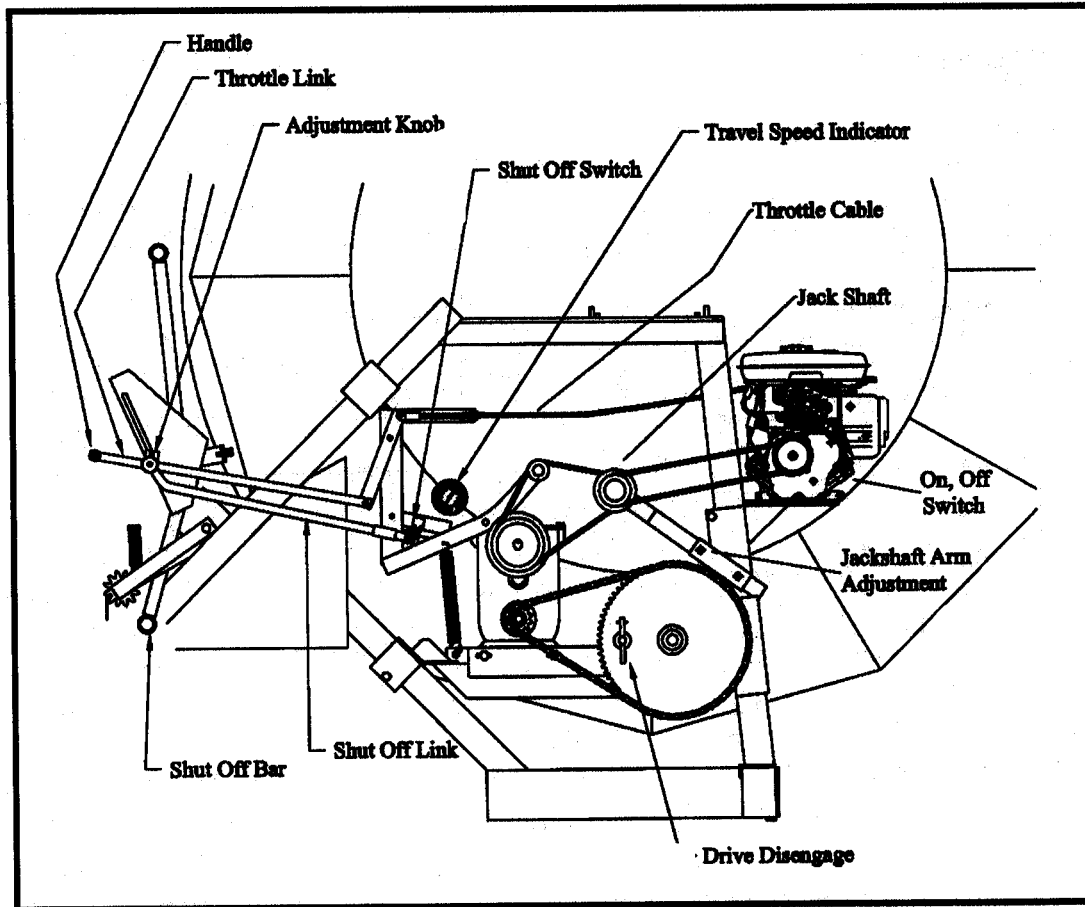
The Water-Reels in this serial no. range are powered by a 4 HP gasoline engine driving the machine through a set of three-step pulley reductions that provide a wide speed range. Most engine powered Water-Reels have a travel speed range from 40 ft/hr to 400 ft/hr. They are speed compensated by the engine throttle. This generation of engine driven machines is especially economical to buy and maintain and they operate on a very small amount of fuel.

The engines used on these machines are the Subaru "Robin" EH-12 or the Honda GX-120.

There is no information in this manual pertaining to the particular engine in use. Operating and service information on the engine is provided by the engine manufacturer and is packed separately with the Water-Reel engine drive machine.

-- Engine Drives --

Steps 1 through 8 of the previous "Travel Speed Setting" section applies to the engine drive Water-Reels as well as the turbine drives.



MECHANICAL ENGINE DRIVE (S/N 340000+)

Setting the Travel Speed.

The following steps are required to set the desired travel speed.







- 1- Determine the travel speed required to apply the desired depth by referring to the "Performance Guide" decal located on the Water-Reel.






-- Engine Drives --

2- Select the proper speed range from the following "Engine Drive Speed Range" charts.

There are two charts. One pertains to the machines that are equipped with a 2-Speed gearbox. It provides 6 different speed ranges. The 2-speed gearboxes are used on all Water-Reels "37A" and larger.

All other Water-Reels smaller than the "37A" use a double belt reduction which has 5 speed ranges.

	Gearbox	Engine	Ft/Hr
1	1st		40 - 70
2	1st		70 - 100
3	2nd		100 - 130
4	1st		130 - 160
5	2nd		160 - 230
6	2nd		230 - 400

	Gearbox	Engine	Ft/Hr
1			50 - 75
2			75 - 125
3			100 - 150
4			150 - 250
5			240 - 380

3- Disengage the drive and pull out the irrigation hose. Leave the drive disengaged until speed is set!

4- Start the motor. Making reference to the "Engine Drive System" illustration, loosen the speed control knob and slide the throttle link handle back or forth until the desired speed is shown on the travel speed indicator.

5- The drive can now be engaged and the irrigation process can begin. As the machine progresses the compensator bar will move the throttle linkage and slow the travel speed as the irrigation hose accumulates on the hose spool.

6- **Warning!** Before leaving the machine unattended, exercise the shut-off bar to confirm that the engine stops when the bar is pushed toward the machine. This confirms that the engine shut-off switch is properly adjusted and working. Do not allow the machine to operate if the shut-off system is not working properly.

Expensive damage will result if the machine fails to stop when the irrigation hose is completely rewound!

Engine Drive prior to Ser. N^o. 340000

Engine Drive Speed Control Linkage:

The speed control linkage adjustment should be made with the tube nearly all pulled out.

1. Start the engine and set the throttle at full throttle.
2. Set the speed control knob to the slowest position.
3. Adjust stop (S1) to read 40 feet per hour on the speed indicator.

Compensator Adjustment:

There is seldom any adjustment required unless a part has been removed or replaced.

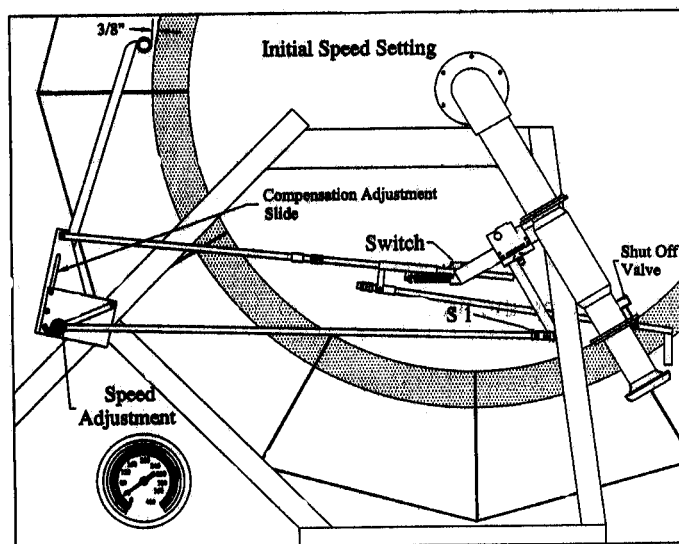
To increase compensation raise the “ compensation adjustment slide “ up in the slot.

The degree of compensation can be observed by exercising the compensator bar and noting the speed change on the speed indicator.

Engine Drive Speed Settings:

The Hydraulic engine drive units are able to go from slow to full fast by adjusting the flow control on the hydraulic system.

The engine drive system uses a large high torque, low RPM oil motor to propel the drive system. Travel speed is changed by moving a slide which in turn adjusts a flow control valve. Compensation on this system is provided by a compound linkage on the flow control.

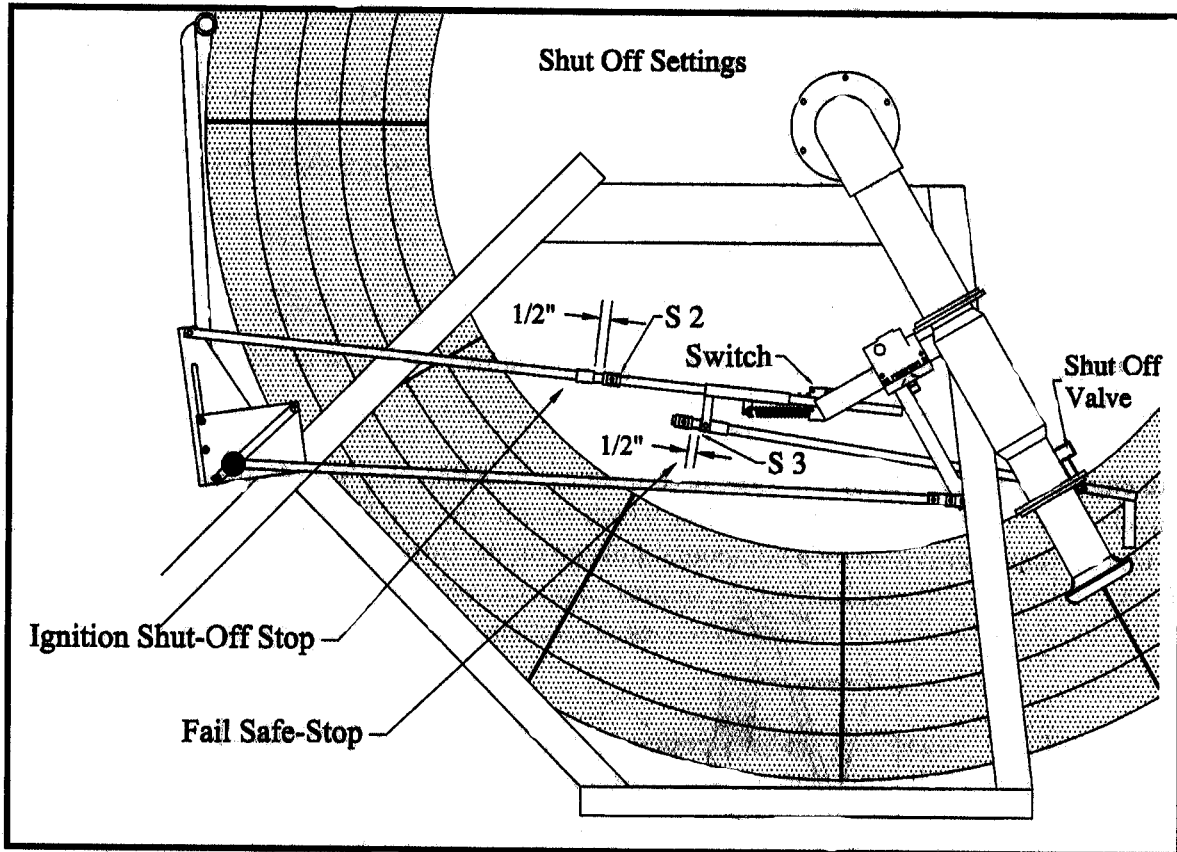


Engine Drive Shut-Off Linkage Adjustment:

To adjust the shut-off linkage the tube should be nearly all wound on to the drum as shown in the following diagram.

1. Set the ignition shut-off stop (S2) as shown.
2. Set the fail safe-stop (S3) as shown.

Note: The fail-safe system will likely be activated each time the sprinkler cart is lifted. The shut-off valve will need to be reset each time the unit is re-started. **Always exercise the shut-off bar each time the unit is re-started to confirm proper operation!**



Hydraulic Controls Section

Hydraulic controls are available as an option on many models of Water-Reels.

On some models certain hydraulic functions are standard. For example, the stabilizer legs and gun cart lift on some of the larger models are available only in a hydraulic controlled version. The stabilizer legs and cart lift are tied together mechanically so the movement of the hydraulic cylinders moves both the stabilizer legs and the guncart lift at the same time.

The hydraulic power is typically provided by the tractor that is towing the Water-Reel. On units that have only the stabilizer legs and gun cart lift, the control valve on the tractor controls the lifting and lowering of the legs and cart.

On units that have more than one hydraulic control function there is a multi-port control valve on the machine. The tractor hydraulic system energizes the system by sending pressurized oil through the control valves on the Water-Reel. The tractor hydraulic system must be hooked to the machine and be kept on while any hydraulic operations are being executed. On some tractors it may necessary to tie the hydraulic control lever with a bungee cord or tarp strap in order to keep the flow of hydraulic oil flowing through the hydraulic system on the machine.

The functions that are often done hydraulically are: 1-stabilizer legs and gun cart; 2-turntable; 3-tongue jack.



Water-Reel With Hydraulic Controls

The operator needs an understanding of the hydraulic functions before attempting to operate the various hydraulic controls. The typical functions and the usual sequence of use is outlined as follows.

CAUTION! **When using the hydraulic controls always operate the tractor engine at slow idle speed.**

For machines with stabilizer legs and sprinkler cart lift only:

- 1- Pull the machine into position at the beginning of the irrigation run. Rotate the turntable by hand and align the hose drum with the travel path. Confirm the position of the machine is correct. If it needs moved for better alignment, do so now.

- 2- Extend the tongue jack to accept the weight of the machine from the tractor drawbar and unhitch the tractor from the machine. If the hydraulic hoses have been connected to the tractor do not yet disconnect them. By using the tractor's hydraulic control valve, extend the hydraulic cylinders on the stabilizer legs until they are firmly planted in the ground. The sprinkler cart is carried by a linkage on the stabilizer legs so as the stabilizer legs are extended the sprinkler cart is also lowered.

- 3- Unhook the chains from the sprinkler cart and the machine can now be made ready to irrigate.

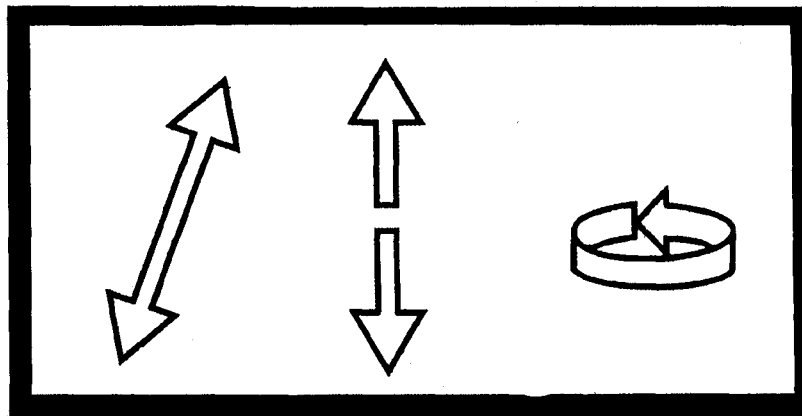
WARNING! Do not attempt to operate the machine with the stabilizer legs straight behind the chassis! (Without rotating on the turntable.)

-- Hydraulic Controls --

For machines with hydraulic control of the stabilizer legs & sprinkler cart and turntable and tongue jack:

- 1- Pull the machine into position at the beginning of the irrigation run. Engage the tractor hydraulic system. Always operate the tractor engine at slow idle speed when using the hydraulic controls. Go to the hydraulic control valves on the machine and rotate the turntable to align the hose drum with the travel path. Confirm the position of the machine is correct. If it needs moved for better alignment, do so now.
- 2- Return to the hydraulic control valves, and with the indicated control valve, extend the tongue jack to accept the weight of the machine from the tractor drawbar and unhitch the tractor from the machine. By using the indicated hydraulic control valve, extend the hydraulic cylinders on the stabilizer legs until they are firmly planted in the ground. The sprinkler cart is carried by a linkage on the stabilizer legs so as the stabilizer legs are extended the sprinkler cart is also lowered.
- 3- Disconnect the hydraulic lines from the tractor and unhook the chains from the sprinkler cart. The machine can now be made ready to irrigate.

WARNING! Do not attempt to operate the machine with the stabilizer legs straight behind the chassis! (without rotating on the turntable.)



Stabilizer/Cart

Hitch Jack

Turntable

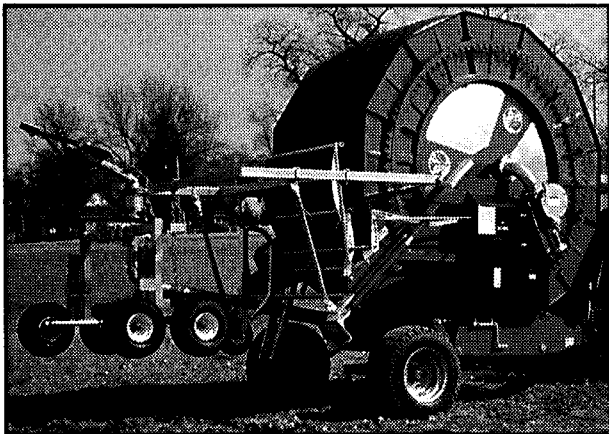
Hydraulic Valve Control Symbols

The "M" Series (Squatters)

The "Squatter" version of the Water-Reel operates in principle and mechanically the same as the other models except it is designed to lower itself to the ground and set on a specially designed galvanized frame and turntable bearing when it is operating.

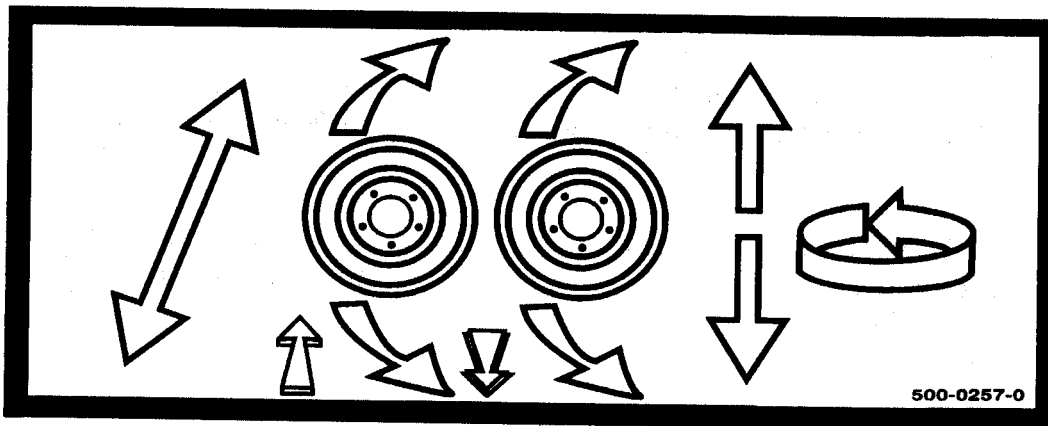
This feature offers several advantages:

- 1- Because there is no frame below the turntable bearing the machine is not as tall. As a result the center of gravity is lower so transport stability is greater.
- 2- When the unit is operating the wheels are raised off the ground. The galvanized portion of the frame contacts the ground along with the extended stabilizer legs and the tongue jack. This configuration anchors the unit exceptionally well. Because of this the Squatters are often preferred in extra heavy pull conditions such as sod or certain vegetable crops that have a high coefficient of friction between the irrigation hose and the vegetation.
- 3- Sometimes operators prefer to pull the tube from the machine directly from the back of the unit without rotating it first. While this is prohibited on a standard machine it works very well on the squatter because the wheels are raised up anyway.
- 4- The incoming irrigation hose is low to the ground, therefore when the sprinkler cart arrives back at the unit at the completion of the run, the front of the sprinkler cart does not raise up which eliminates the need for a self leveling cart.
- 5- Because the entire chassis rotates on its turntable bearing, the unit can operate a full 360 degrees from where it is parked.
- 6- The lower height makes the unit easier to store indoors and the wheels can be raised off the ground thereby removing the weight from the tires during long periods of storage.



Squatter in Operation

The squatters are equipped with all available hydraulic functions plus the lowering and lifting of the main chassis is done hydraulically. This adds two hydraulic circuits, one for each main wheel, so there are a total of 5 control valves.



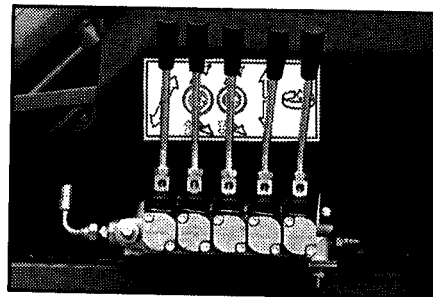
Stabilizer/Cart

Under carriage

Hitch Jack

Turntable

Control Valve Symbols for Squatters



The various functions and sequence of operations are outlined below:

- 1- Pull the unit to the starting end of the irrigation run. Be sure the hydraulic lines from the machine are properly attached to the tractor. Engage the hydraulic system on the tractor to provide oil flow through the Water-Reel control valves.
- 2- With the tractor engine at idle speed, use the hydraulic tongue jack to disconnect the tractor draw bar from the machine and move the tractor away far enough to eliminate draw bar/hitch conflict when the machine rotates. Uncoil the hydraulic lines so as to provide adequate length to allow rotation of the turn table.
- 3- **Caution!** Carefully lower the machine to the ground by using the tongue jack control valve and the control valve on each wheel. (Always operate the tractor engine at idle speed when using the hydraulic controls.) Gradually move each lever one at a time and keep the machine approximately level while it is being lowered or raised.
- 4- After the unit is lowered and setting on the turntable bearing, the wheels and tongue jack should be completely retracted. Confirm there is clearance for the machine to rotate and use the turntable control valve to align the Water-Reel to the irrigation path.

- - Squatters - -

5- Using the control valve for the stabilizer legs lower the legs and sprinkler cart until the cart lift rests on its' supports and the stabilizer feet are firmly set. (Make sure the supports are adjusted to allow clearance of the sprinkler cart shut-off at the completion of the run.) Lower the tongue jack enough to apply some support for the front of the machine. Unhook the lift chains from the cart and complete the layout process.

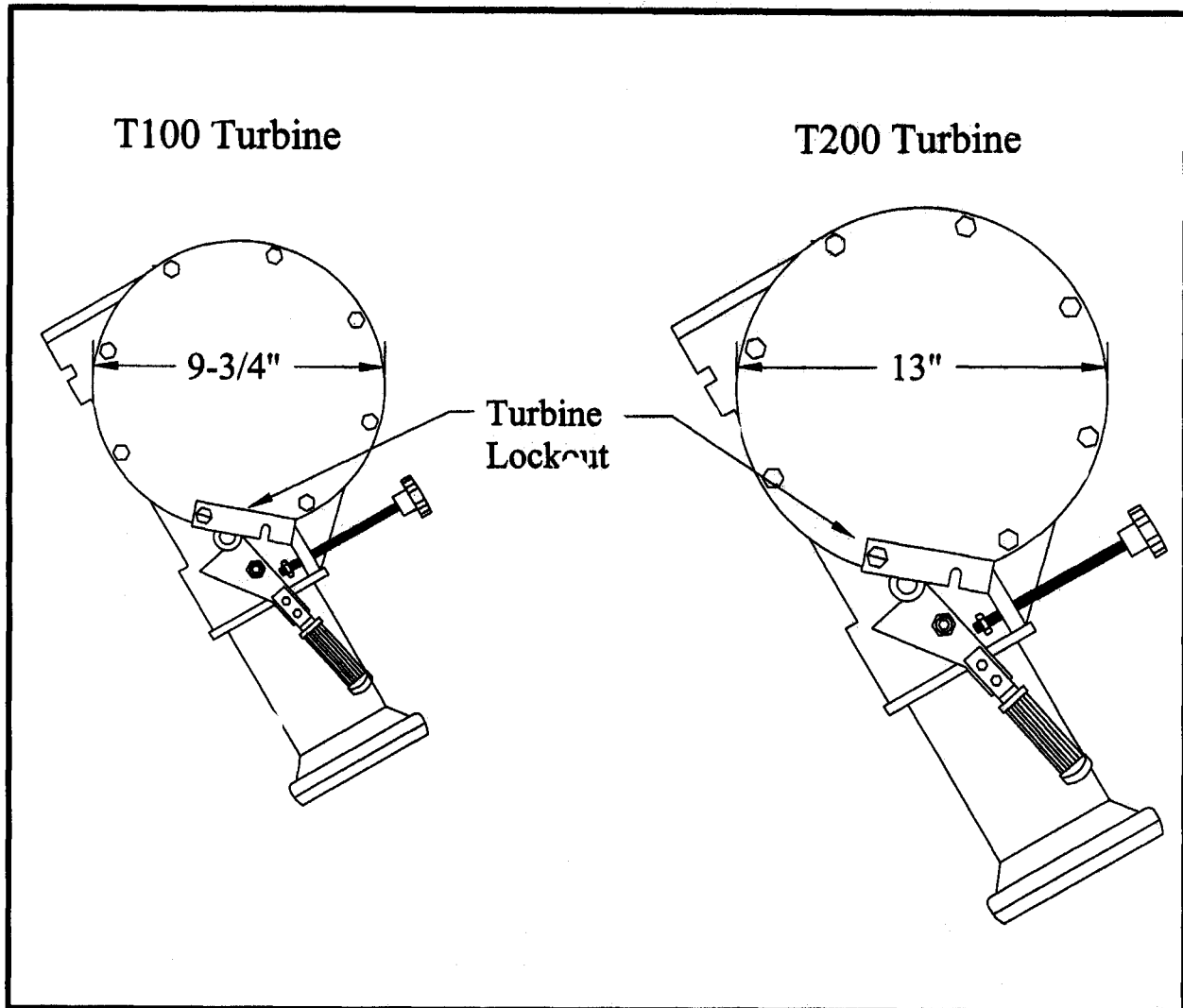
6- After the irrigation run is completed, Disconnect the water line, lift the sprinkler cart and stabilizer legs, then rotate the machine as needed to operate in a different direction or to hitch it to a tractor.

7- If the unit is to be hitched to a tractor, carefully raise the machine and keep it approximately level by moving each wheel valve and the tongue jack valve a little at a time. Hitch up the tractor and it is ready to relocate.

Maintenance & Adjustments

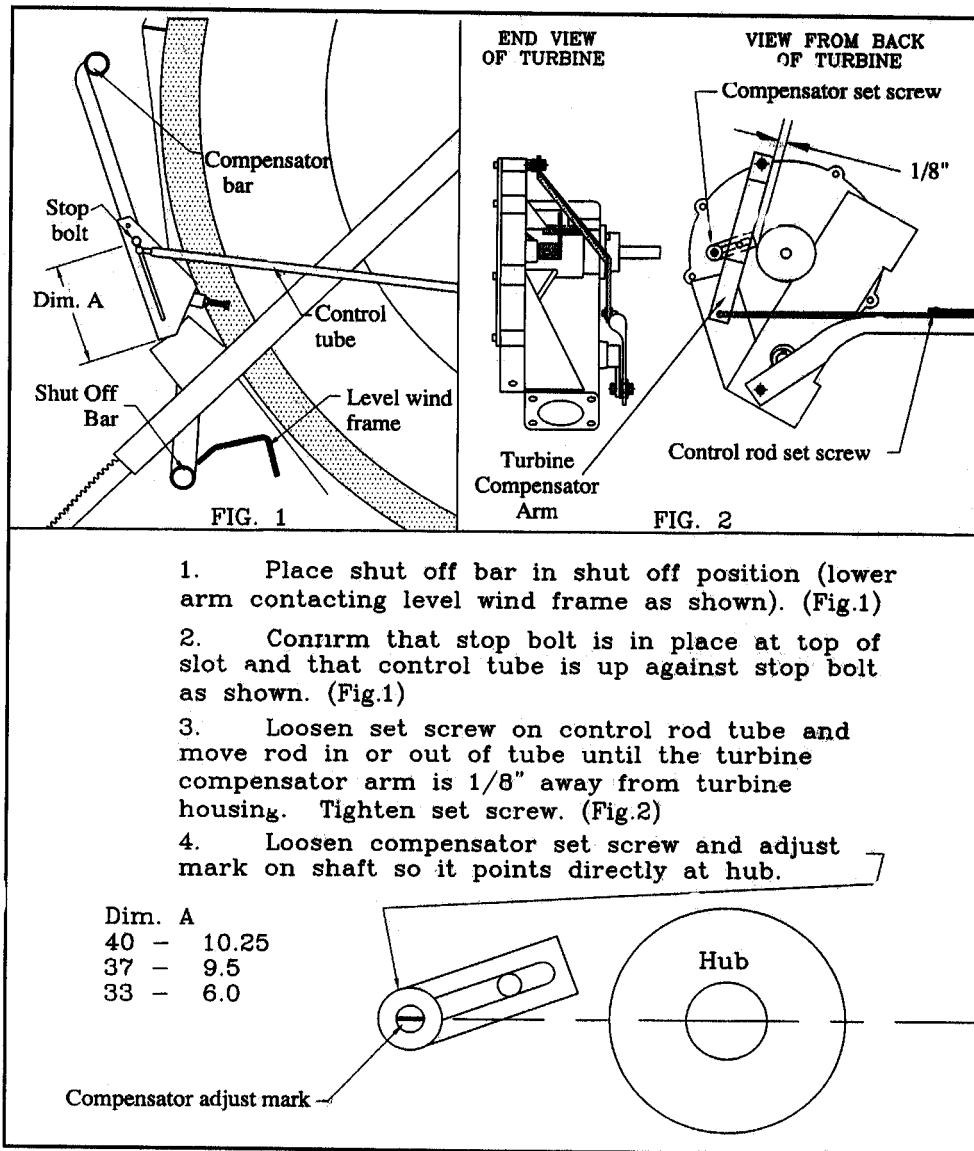
Turbine Identification

To identify which turbine you have, measure the diameter of the turbine cover plate.



T200 Turbine Compensator Adjustment:

Used on all "A" series turbine machines T33 and larger.
(To identify turbine model see page 35.)

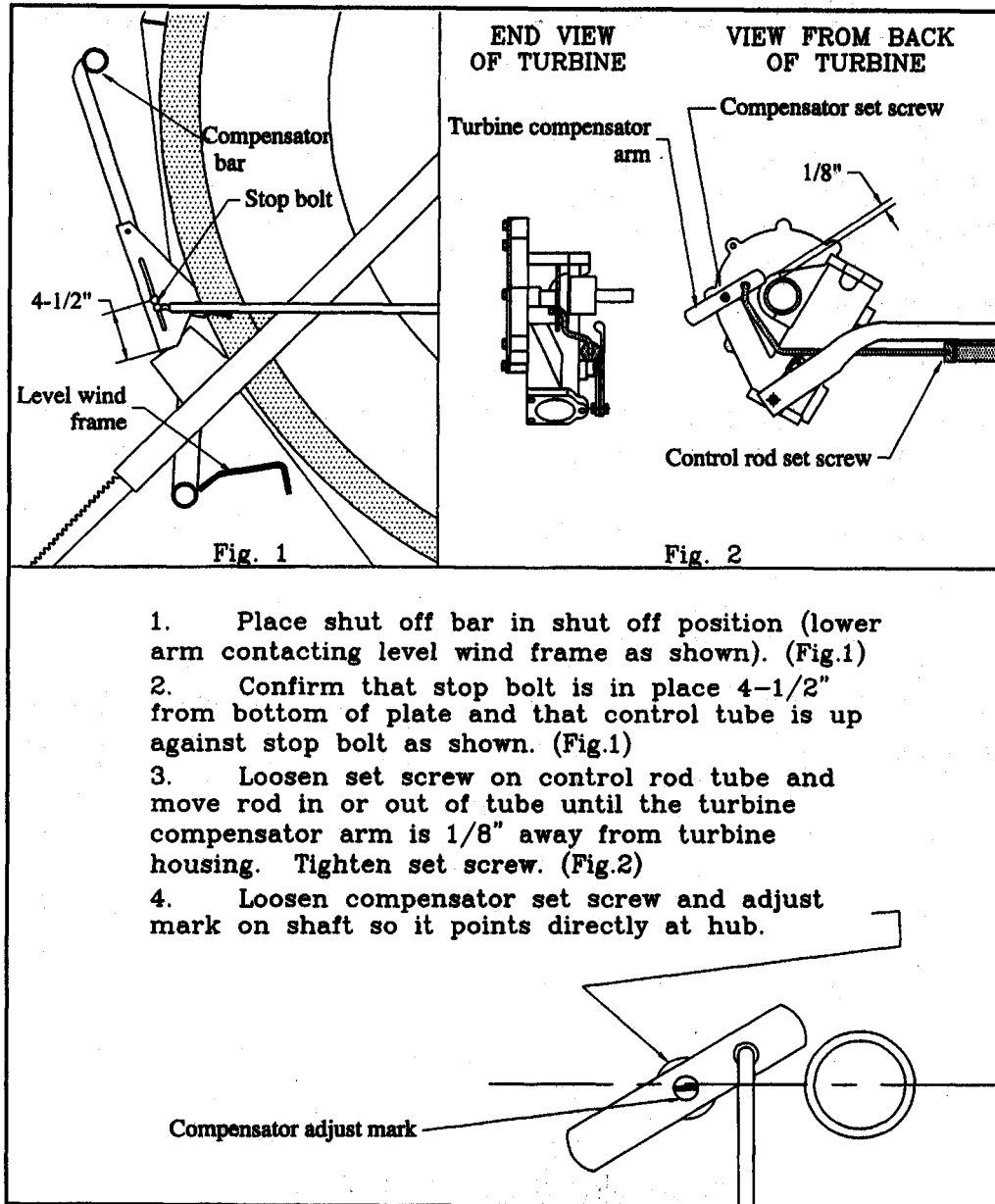


Follow these steps to set the compensator to your field conditions:

- 1- Set the desired speed at the beginning of the run with the turbine speed control knob.
- 2- At the end of the run loosen the "control rod set screw" and telescope the rod in or out to the proper compensated speed and re-tighten set screw.

T100 Turbine Compensator Adjustment:

Used on all turbine machines T30 and smaller.
(To identify turbine model see page 35.)



Follow these steps to set the compensator to your field conditions:

- 1- Set the desired speed at the beginning of the run with the turbine speed control knob.
- 2- At the end of the run loosen the "control rod set screw" and telescope the rod in or out to the proper compensated speed and re-tighten set screw.

Safety Shut Down Adjustments S/N 320000

Fig. 1

- (1) Latch the turbine in the off position. (Page 35)
- (2) Adjust the shut-down arm dimension (A) so that the end of the shut-down arm is in full contact with the stand-off on the gate shaft, but not more than full contact. Tighten the shut-down arm bracket to the upright of the frame

Fig. 2

- (3) Set the safety shut-down bar 1/2" from the P. E. Tube.
- (4) With the shut-down arm in contact with the stand-off and the safety shut-down bar 1/2" from the P. E. Tube Tighten the two adjustment set screws.

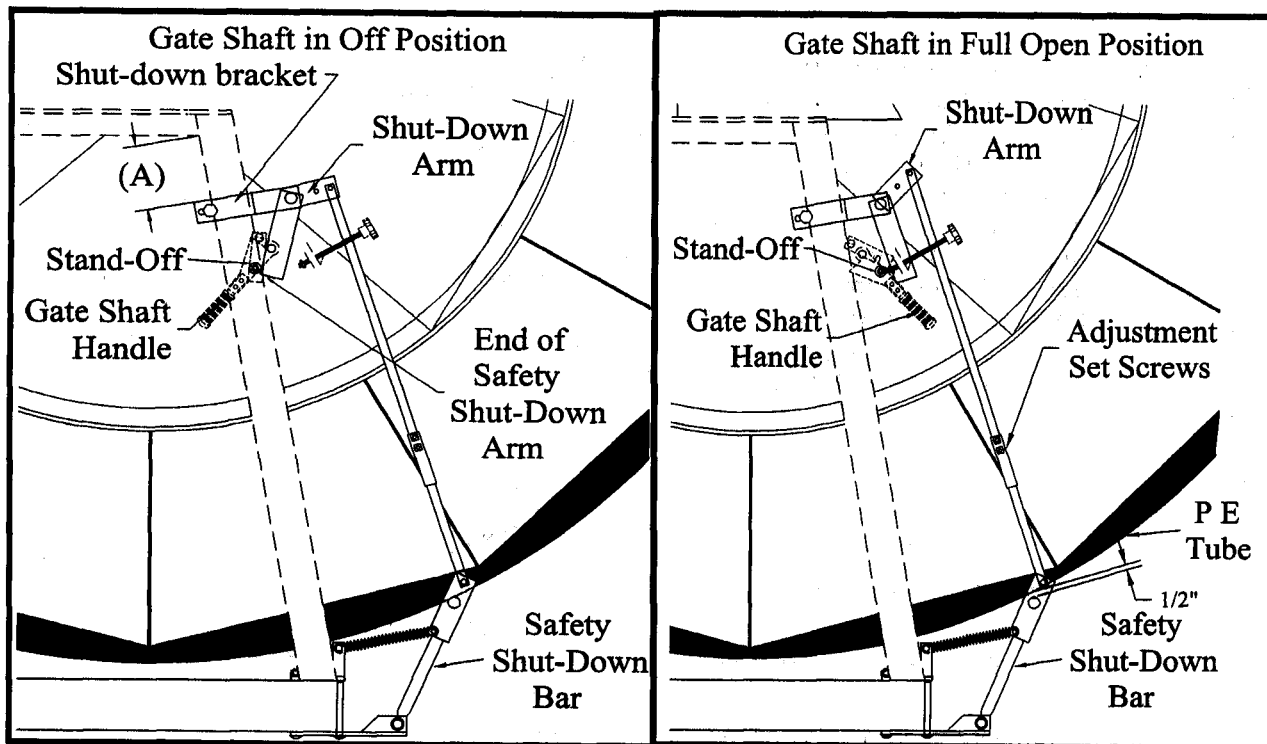


Fig. 1

Fig. 2

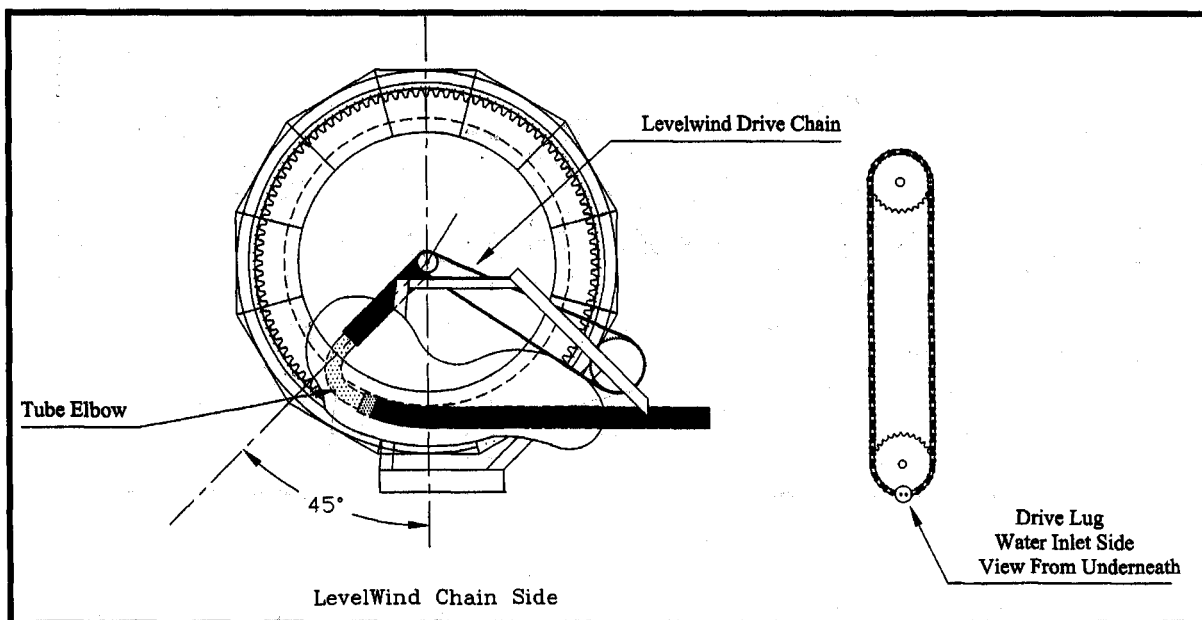
Levelwind Timing:

Proper timing of the levelwind mechanism is essential to the successful operation of the Water-Reel. Improper levelwind timing will result in mis-wrapped tube. Travel will be interrupted because the auto shutoff bar will stop the drive system in order to prevent damage to the irrigation tube. **Do not continue to operate if the tube is not winding properly!**

IMPORTANT! Be positive that the timing is really at fault before attempting to change the timing. Your machine was shipped from the factory with the tubing wound on it. The levelwind timing was set at the factory prior to installing the tube. If there has been no disassembly of the levelwind mechanism, or the tubing removed & reinstalled, it is very unlikely that the timing is wrong. If the tubing is loose on the spool the levelwind system will appear to be out of time. (See item #4 in the Water-Reel Start-up & Operation section of this manual).

To re-time the levelwind, these steps **must** be followed:

- 1- Pull all the irrigation tube out from the Water-Reel, The elbow to which the tube is fastened must be 45 degrees behind the axle center line on the bottom of the spool (See diagram). Be especially careful not to pull the tube off the elbow.
- 2- Observe the position of the levelwind carrier drive lug on the horizontal levelwind chain. (The chain that runs left to right just back of the auto shut-off bar). The drive lug must be in its most extreme position (half way around the sprocket) and on the same side of the Water-Reel as the spool elbow. (See diagram).



--Maintenance & Adjustments--

3- To change the timing, remove the shield and the cap-screws from the level-wind input sprocket. Rotate the hub of the gearbox shaft until the drive lug is positioned as described in step #2. Re-install the cap-screws in the new position. Reinstall the levelwind drive chain shield.

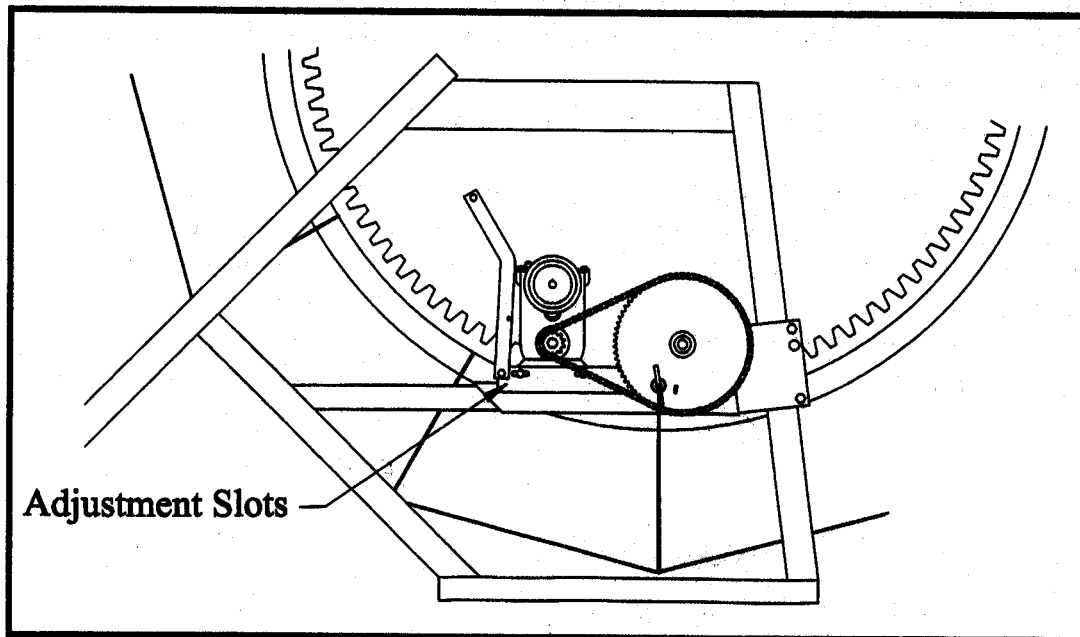
The levelwind will now be in proper register.

-----Important-----

Never attempt to retime the Water-Reel without first pulling all the tube out. Changing the timing with some of the tube still on the spool may result in damage to the irrigation tube and/or the Water-Reel.

Drive Chain Adjustment:

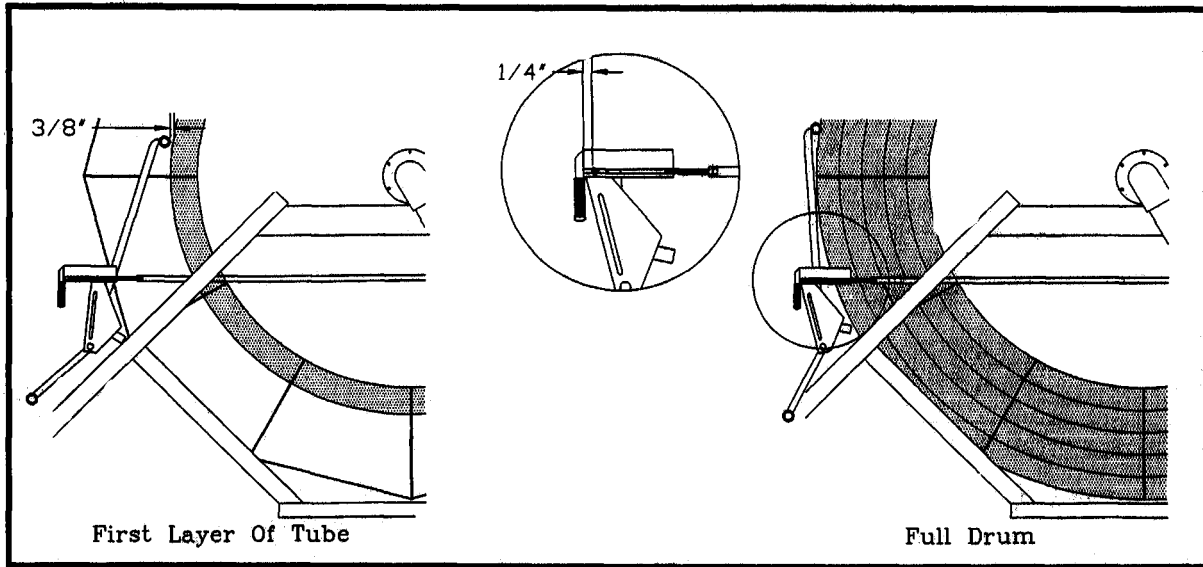
Adjust the tension of the drive chains by moving the gearbox in the mounting slots as indicated in the diagram below. The larger model Water-Reels have a gearbox reduction. If your machine does not have the chain reduction assembly as shown below, disregard this section.



Do Not Attempt To Adjust The Drive Chains While The Machine Is Running Or When The Tube Is Under Tension!

Turbine Drive Shut-Off Linkage Adjustment:

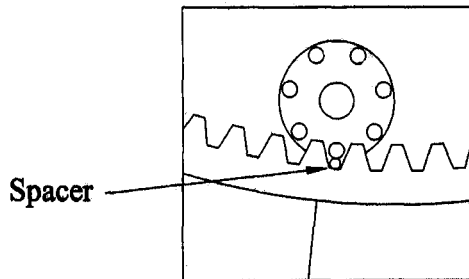
The shut-off linkage to the turbine motor must be adjusted so as to always stop the travel. The following illustration shows the proper settings for the turbine drive. **Always exercise the shut-off bar each time the unit is re-started to confirm proper operation!**



Cog Drive Adjustment:

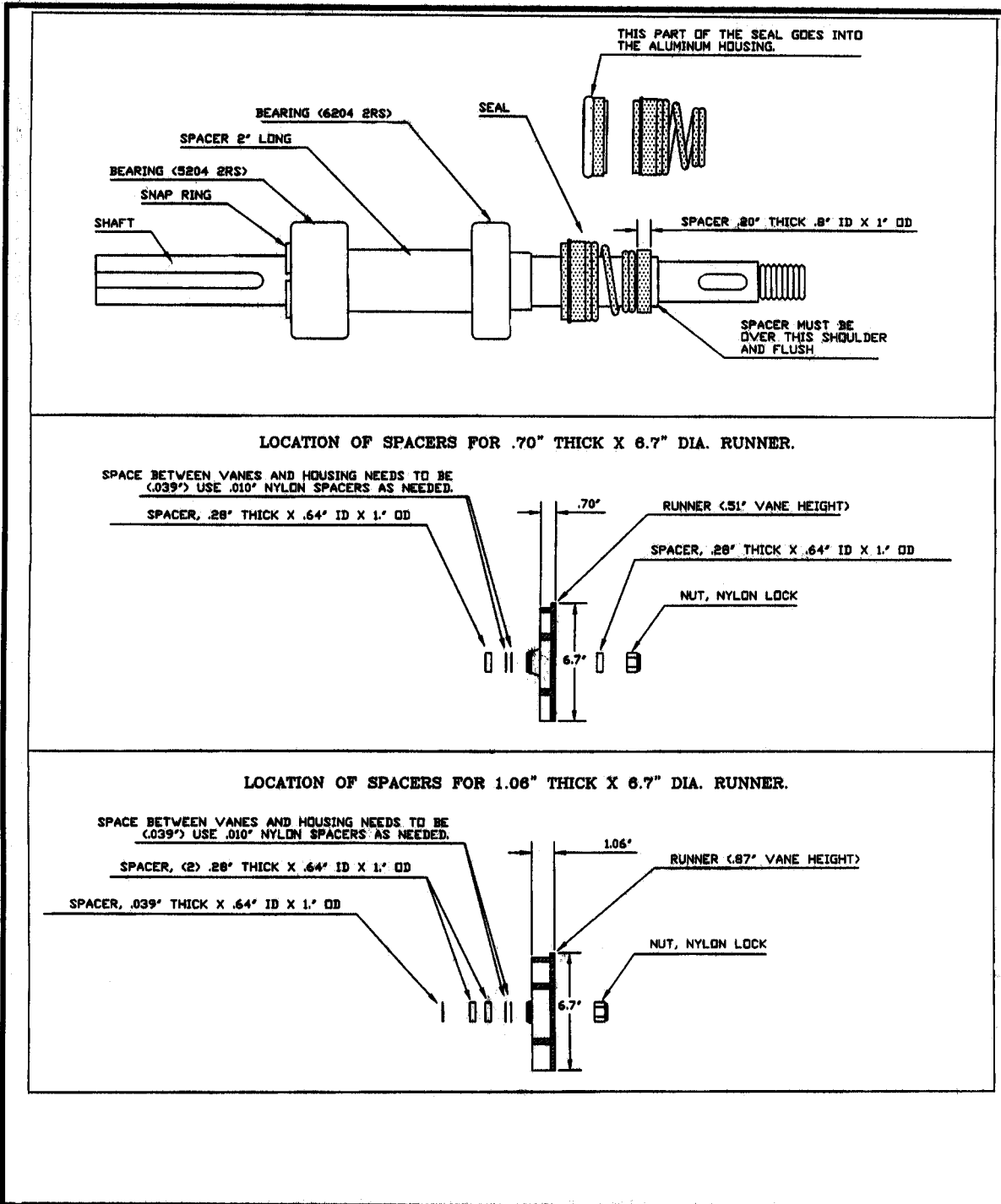
If the drive system has been disassembled it will be necessary to adjust the mesh of the gear teeth to the drive cog. The main gear is a flame cut part that will not be perfectly concentric. Use a felt tip marker and rotate the drum with the marker touching the outside face of the main gear. This will mark the point in which the teeth are closest to the drive cog. Rotate this point on the gear so it is exactly under the drive cog. The clearance is adjusted by moving the clamps which fasten the drive assembly to the frame of the Water-Reel. Different models have different tolerances. The following chart should be followed. Use a piece of round stock the size indicated to space the cog.

Model:	Spacer
21A/23A	1/4"
25A/27A	1/4"
30A/33A/37A	5/16"
40A	1/2"

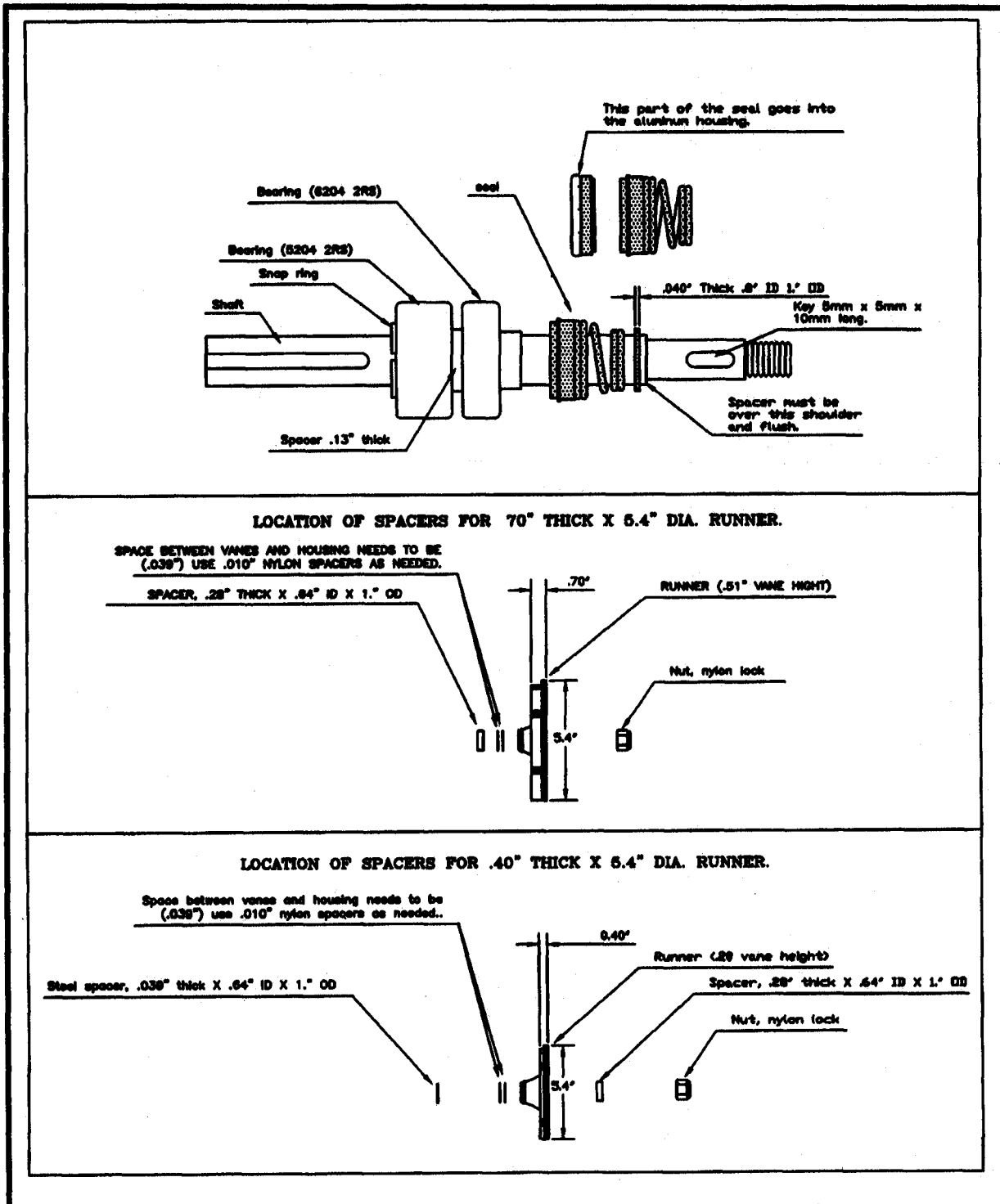


The drum must rotate smoothly all the way around. There should be no tight spots.

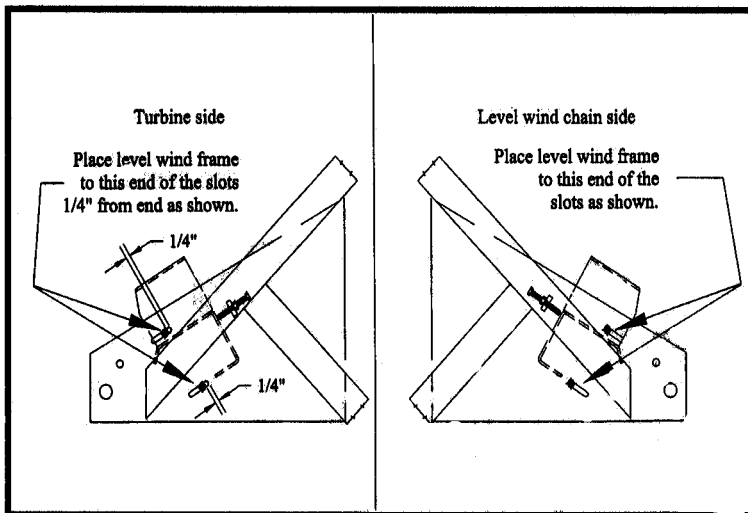
T200 Turbine Bearing and Seal Replacement:



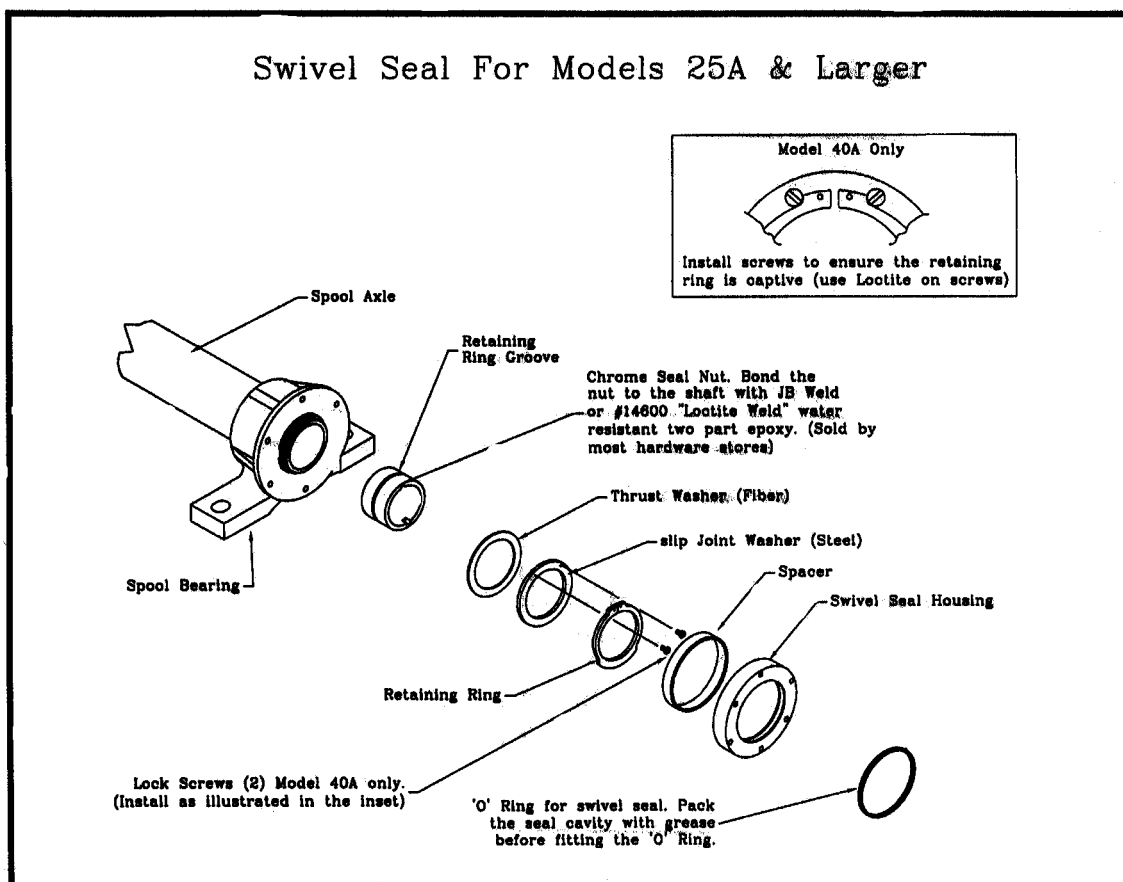
T100 Turbine Bearing and Seal Replacement:



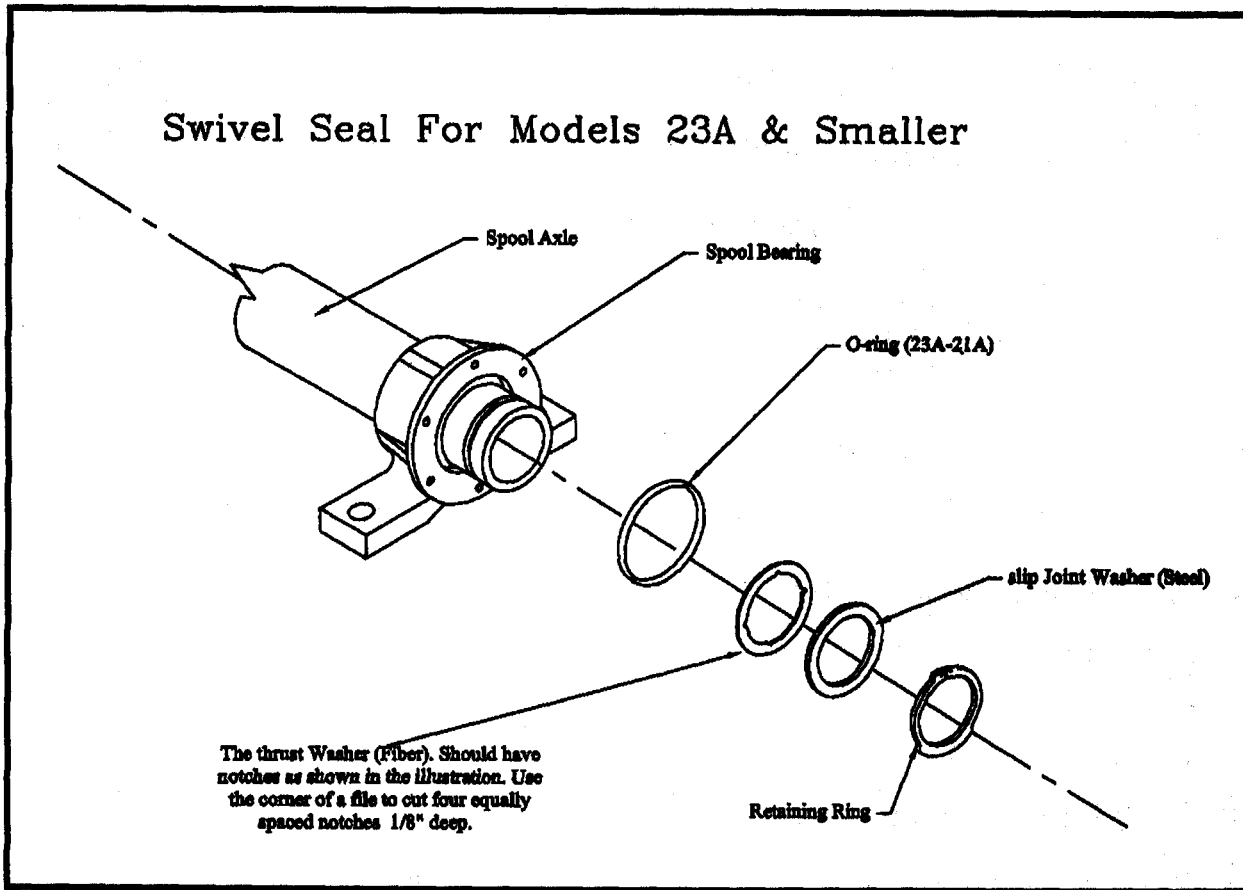
Level-Wind Frame Installation and Adjustment:



Swivel Seal Installation 25A & Larger:



Swivel Seal Installation 23A & Smaller:



Sprinkler Cart Lift

The sprinkler cart lift utilizes a cable winch for transport. The only adjustment required is to locate the lift on the frame so it is exactly in line with the sprinkler cart at the end of the run. Because the tube wraps differently when it is pressurized and full of water, it is not possible to locate the lift in the proper position prior to operation of a new machine.

Sprinkler Cart

The sprinkler carts used on the "A" series Water-Reels are designed to operate in row crops with the crop clearance somewhat higher than the crop clearance on standard tractors that might be used to pull the hose out.

For best performance it is desirable to keep the sprinkler height as low as possible! There are two important reasons. First, the stability of the cart is less affected by the thrust of the sprinkler. Second, wind has considerably less effect on the performance of the sprinkler. See "Specification Section"

Safety Alert! Keep All Persons Away From The Operating Sprinkler!

The sprinkler carts have adjustable width rear axles. The rear axle should be adjusted to maximum width compatible with the crop being irrigated for best stability. For adverse conditions such as hill sides, extra high flow, or high pressure, ballast may be required to prevent the cart from tipping. Additional ballast can be obtained by filling the rear tires with fluid.

The steering of the front wheel is adjustable. To assure straight tracking, it is recommended that the cart be taken to a concrete floor and pushed 50 or so feet down a chalk line to confirm it tracks straight. It can also be corrected by trial and error in the field. If the cart does not track, it will appear as though the tube has a bend in it. If this condition is observed it will **not** be corrected by cutting the end off the hose.

Study the chart regarding sprinkler cart specifications in the "specifications" section of this manual before adding riser pipe extensions or adjusting the wheel track width.

The chart shows the height of the water stream at 5 and 10 foot distances from the riser pipe. Be sure to consider the trajectory of the sprinkler when determining the sprinkler height and keep the sprinkler as low as possible.

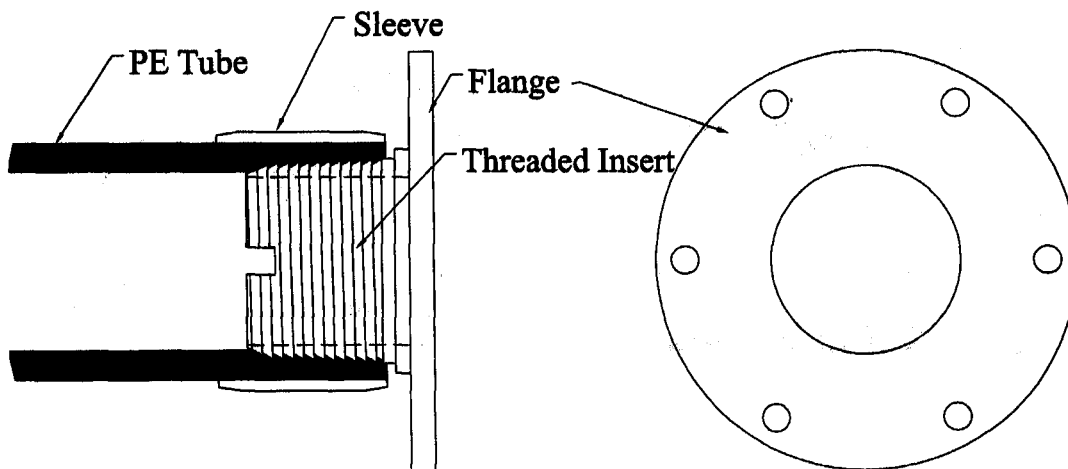
Installing Polyethylene Tube Fittings:

Warning! Installing fittings or repairing polyethylene tube used on your water-reel is hazardous! The tube has a memory from being coiled on a reel and will try to coil back up if the tube is loosened from one end or cut in two. This condition poses a serious hazard to person and/or property. The tube must be restrained any time the tube has a loose end!

The fittings used on the ends of the tube are made to screw into the tube much the same way as a field repair of a hydraulic hose.

A threaded insert screws into the inside of the tube while an outer sleeve keeps the hose from enlarging as the insert is installed. This provides a water-tight seal and a secure grip on the hose for dragging.

Cutaway of Installed Gun Cart Fitting.



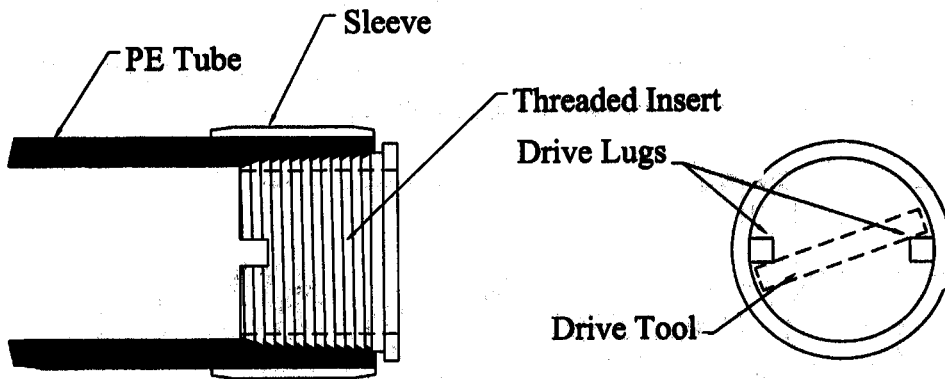
The following steps should be followed when installing fittings:

- 1- Secure the end of the tube by fastening it to a tractor or other heavy object. Cut the tube off square on the end.
- 2- Chamfer the inside of the tube by using a sharp knife, wood rasp or a reamer. Reamers are available for tubes 2.5 inch I.D. through 4.5 inch I.D. Your dealer may have a reamer that you may rent or buy. The tube should be chamfered evenly until approx. 1/4 of the threaded portion of the fitting can be pushed into the tube by hand with out turning it.
- 3- Before putting the sleeve on the outside of the tube, screw the threaded portion of the fitting into the tube and be especially careful to keep it straight. This process cuts a partial thread in the tube which will make it easier to keep the fitting straight during the final installation.

--Maintenance & Adjustments--

- 4- Now place the sleeve on the tube and push it on until it is flush with the cut end of the hose.
- 5- Apply lubricant to the fitting and to the inside of the tube. The best lubricant is liquid dish washer soap. Now screw the fitting in until all the threads are in the hose be careful to keep it straight.
- 6- Reach inside coupling and remove any shreds of polyethylene created as a result of cutting the thread in the tube.

Tools used to drive the fitting in will depend on which fitting is being installed. On the larger hoses that use a flange attachment on the gun cart, a bar 5 or 6 feet long placed between two bolts inserted through the holes in the flange works well. For the elbow in the drum at the reel end of the tube a pipe and/or a large pipe wrench is needed. For fittings other than the elbow and flanged fittings there are drive lugs inside the fitting. An installation tool which is required to install these fittings and is



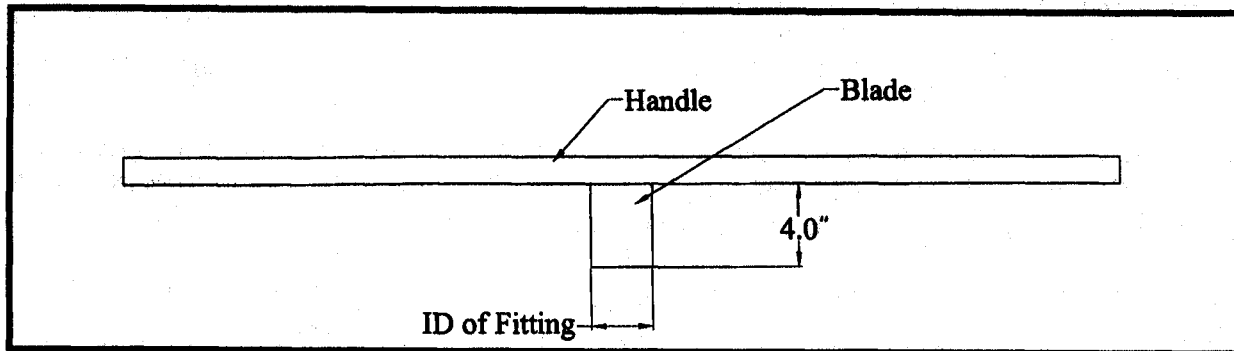
not provided with the fittings.

Fittings that Require a Driver

The following diagram shows a driver that is easy to make.

Make the blade of the driver from 3/8" x 4" plate. Cut the length of the blade the same as the diameter of the fitting. Weld the blade to a heavy steel bar or 1" schedule 80 water pipe approx 48" long.

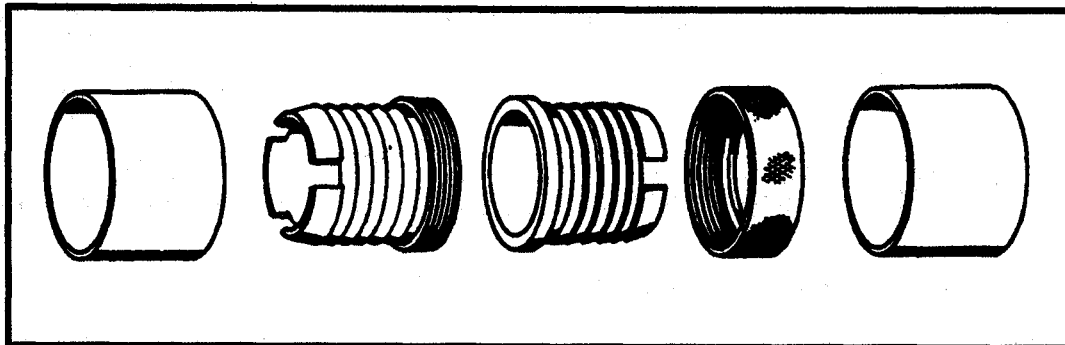
--Maintenance & Adjustments--



Typical Driver Tool

This type of fitting is also utilized in the screw-in mender kits.

The screw in menders have two fittings as previously described and they are joined with a threaded collar much the same as a typical pipe union. See following diagram:



Screw in Mender

Butt Fusion Welding

Another way to repair a tube is by fusion welding. This method requires special welding equipment but it puts the tube back to original condition if properly done and if the tube is in good condition. Tubes that are old or badly worn may be difficult or impossible to weld.

Note: It is necessary for the tube to "cure" after welding which requires 1 day out of service.

To have a tube fusion welded, contact your Kifco dealer or call Kifco Inc. and ask for customer service.

Winterizing and Storage

For winter and/or off season storage do the following:

Winterizing:

1. Be certain the drain valve or pipe plug on the gun cart body is open and the gun cart is lowered so that all water is drained from the gun cart. Disconnect the sprinkler cart from the end of the irrigation tube if necessary to be sure all of the water is out!
2. Be certain the water inlet to the Water-Reel is open and the water supply hose removed. Pull 1 or 2 coils of tube off the hose spool to expel some of the water from the spool axle and sprinkler cart fittings. Rewind the coils of tube by using the hand crank or PTO rewind. (**Caution! When using the PTO rewind, the stop bar will not stop the machine. The operator must stop the rewind or serious damage will result.**)

Polyethylene tube of the type used on your Water-Reel will not be damaged by freezing! Pulling the hose all the way out to drain the water then rewinding with the PTO is not recommended! This process is not effective and exposes the system to damage. See no. 6 in the "Handling the Polyethylene Tube" section of this manual.

Even though the polyethylene tube does not need to be drained, you must take care to drain all metal parts!

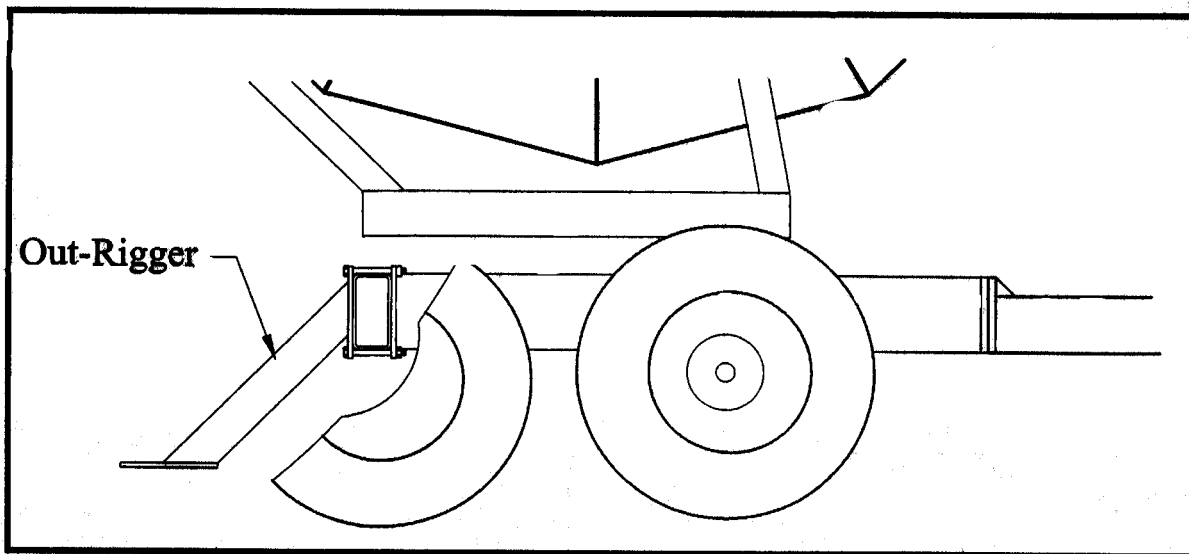
Storage:

1. Lubricate all points in the lubrication chart to prevent rust and corrosion from forming.
2. Store the Water-Reel away from the direct rays of the sun.
3. Make sure all openings such as the water inlet are plugged so rodents and insects can not bring foreign material into the Water-Reel.
4. When taking the Water-Reel out of storage, be sure there are no rodent or insect nests inside the tube or machine.

Assembly

Water-Reels are usually shipped with all primary assembly complete. The only items to assemble at the destination are:

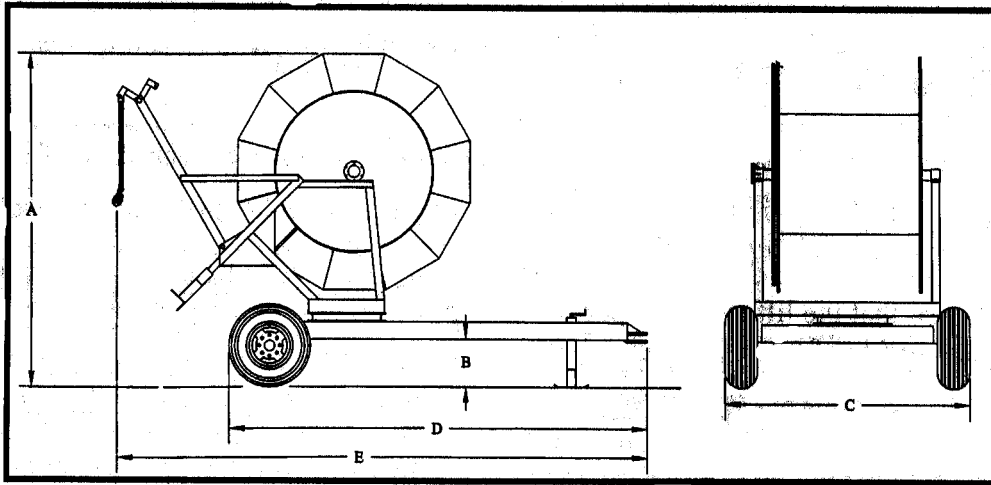
- 1- Install wheels, making sure all lug bolts are tight. They must be rechecked after being towed one mile.
- 2- **On 40A only:** the tongue and the rear axle out-riggers must be installed. The tongue must be installed so that the lift jack transport latch eyes are on top. The rear axle out-riggers must be installed just inside of the swivel bearing support (see diagram)



- 3- Attach the sprinkler cart to the hose end.
- 4- Install the sprinkler on the cart riser pipe.
- 5- Install the appropriate sprinkler nozzle.
- 6- Install the sprinkler cart transport lift arm on Water-Reels equipped with the single arm lift.
- 7- Take the sprinkler cart lift out of the shipping configuration on the larger "A" series machines (30A through 40A)

Final adjustment of the gun cart lift assembly should be made upon completion of the first irrigation run. The lift hooks should be located directly above the sprinkler cart when the sprinkler cart is completely drawn up to the shut-off bar. This exact location is not possible before the Water-Reel has been operated because the irrigation hose may be loose on new units, particularly if they have been shipped a long distance.

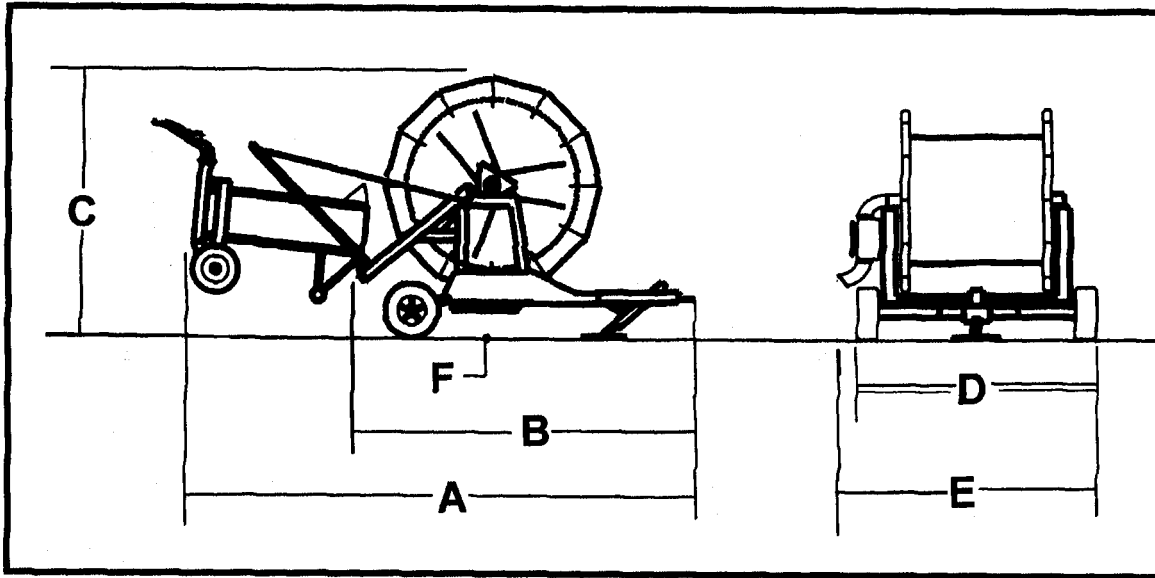
Specifications



Model:		E/T40/1A	E/T40/2A	E/T37A	E/T33A	E/T30 AS
No. Axles		1	2	1	1	1
PE Tube I.D. (In.)		4.0	4.0	3.7	3.3	3.0
Std. PE Tube Length		1250	1250	1100	800	600
Dry Weight (lbs.)		8700	9100	7500	4300	
Weight W/Water (lbs.)		15,980	16380	12380	6900	
Hitch Wt. W/Cart (Dry)		1850	N/A	1700	920	
Hitch Wt. W/Cart (Wet)		3400	N/A	2800	1480	
Speed Range Ft/Hr. (Engine)		400	400	400	400	330
Speed Range Ft/Hr. (Turbine)		200	200	200	150	150
Tire Size		400-15.5	11 L x 15	12.5 L x 15	11 L x 14	155R14
Dimensions: (ft./in.)	(A)	12-6	12-5	11-8	9-3	7-10
	(B)	1-6	1-5	1-7	1-5	1-1
	(C)	8-6	9-9	9-2	7-3	6-3
	(D)	14-9	13-3	13-9	12-11	11-7
	(E)	20-6	20-5	19-5	12-3	14-5

Model:		E/T30A	E/T27A	E/T25A	T23A	T21A
No. Axles		1	1	1	1	1
PE Tube I.D. (In.)		3.0	2.7	2.5	2.3	2.1
Std. PE Tube Length (Ft.)		1000	820	880	600	660
Dry Weight (lbs.)		4300	2600	2600	1610	1610
Weight W/Water (lbs.)		7270	4300	4300	2600	2600
Hitch Wt. W/Cart (Dry)		920	660	660	-	-
Hitch Wt. W/Cart (Wet)		1480	1090	1090	-	-
Speed Range Ft/Hr (Engine)		400	330	330	N/A	N/A
Speed Range Ft/Hr (Turbine)		150	150	150	150	150
Tire Size		11 L x 14	155 R14	155 R14	175/70 R14	175/70 R14
Dimensions: (ft./in.)	(A)	9-3	7-10	7-10	6-7	6-7
	(B)	1-5	1-1	1-1	1-0	1-0
	(C)	7-3	6-3	6-3	5-5	5-5
	(D)	12-11	11-7	11-7	9-8	9-8
	(E)	12-3	14-5	14-5	12-4	12-4

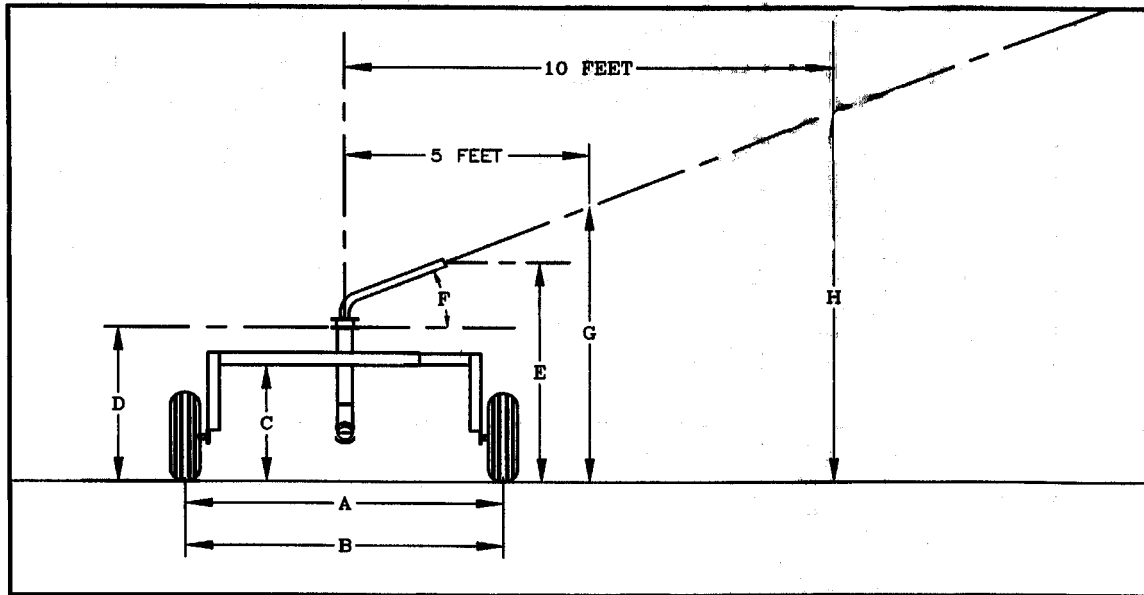
--Specifications--



Model:		E/T45M	E/T40M	E/T37M		
No. Axles		1	1	1		
PE Tube I.D. (In.)		4.5	4.0	3.7		
Std. PE Tube Length		1215	1320	1250		
Dry Weight (lbs.)		10,120	9,860	8,980		
Weight W/Water (lbs.)		18,550	17,540	14,530		
Hitch Wt. W/Cart (Dry)		2000	1900	1760		
Hitch Wt. W/Cart (Wet)		3670	3160	2740		
Speed Range Ft/Hr. (Engine)		400	400	400		
Speed Range Ft/Hr. (Turbine)		200	200	200		
Tire Size		15.0/55-17	15.0/55-17	11.5/80-15.3		
Dimensions: (ft./in.)	(A)	20-10	20-7	19-5		
	(B)	16-5	16-5	17-4		
	(C)	12-7	11-7	11-4		
	(D)	8-1	8-1	7-8		
	(E)	8-6	8-6	7-10		
	(F)	1-1	1-1	1-2		

--Specifications--

Gun carts



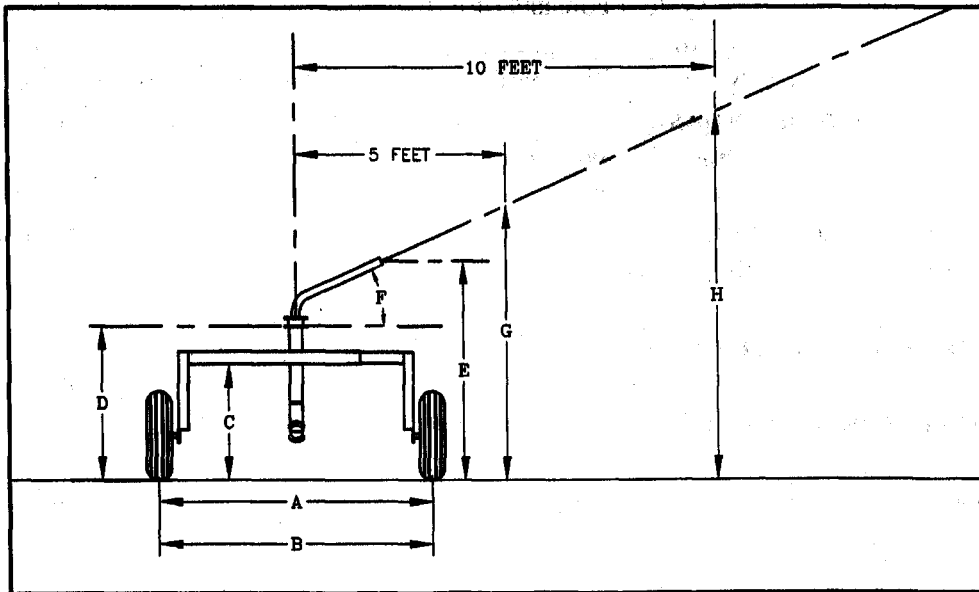
-----Models-----

Dim.	Description	40A/2	37A	30A	30AS	25A	21A
(A)	Wheel Track Min.	70"	70"	70"	71"	70"	46"
(B)	Wheel Track Max.	103"	110"	110"	122"	110"	70"
(C)	Crop Clearance	36"	36"	36"	40"	36"	30"
(D)	Sprinkler Base Ht.	42"	42"	46"	47"	46"	37"
(E)	Nozzle Height	69"	63"	67"	68"	61"	52"
(F)	Trajectory (Deg).	27	24	24	24	24	24
(G)	Stream Ht. 5 Ft.	99"	87"	91"	92"	85"	76"
(H)	Stream Ht. 10 Ft.	130"	116"	120"	121"	114"	105"

The above information is based on the sprinkler heads supplied as standard by Kifco Inc. If a different sprinkler is being used this information may not be correct. The Stream Heights are to the centerline of the stream. **All dimensions are approximate!**

--Specifications--

Gun carts



-----Models-----

Dim.	Description	40A/1	45M	40M	37M		
(A)	Wheel Track Min.	69"	69"	69"	69"		
(B)	Wheel Track Max.	117"	114"	114"	114"		
(C)	Crop Clearance	41"	41"	41"	41"		
(D)	Sprinkler Base Ht.	52"	52"	51"	51"		
(E)	Nozzle Height	79"	79"	78"	72"		
(F)	Trajectory (Deg).	27	27	27	24		
(G)	Stream Ht. 5 Ft.	109"	109"	108"	96"		
(H)	Stream Ht. 10 Ft.	140"	140"	139"	123"		

The above information is based on the sprinkler heads supplied as standard by Kifco Inc. If a different sprinkler is being used this information may not be correct. The Stream Heights are to the centerline of the stream. **All dimensions are approximate!**

Optional Equipment

1. **High Pressure Shut-Off System.** Stops the pump when the sprinkler cart reaches the Water-Reel shut-off bar. The system consists of a diaphragm valve which slowly closes thereby making the pressure increase on the pump. The pump must be equipped with a high-pressure switch. This device requires a supply pump with a performance curve which will provide the appropriate pressure rise to activate the pump switch (not included with this kit). Also the pipe line to the Water-Reel must have a pressure rating high enough to tolerate the total pump head.

Notice: Kifco Inc. accepts no responsibility for any consequential damage resulting from improper installation or operation of this device.

2. **Low Pressure Engine Drive Shutoff.** Used to stop the reel drive engine in the event the supply pump stops. Consists of a Murphy Switch gauge and wire capable of grounding the engine ignition circuit if the machine inlet pressure falls below a predetermined level.

3. **Riser Pipe Extensions.** Extensions for elevating the sprinkler are available. They are available in one and two foot lengths.

4. **Hydraulic Stabilizer Legs & Guncart Lift.** Hydraulic cylinders raise and lower the stabilizer legs and the guncart simultaneously. The system is operated from the towing tractor hydraulics. Fits 40A models only.

5. **Filter Cone.** Should be used on all Turbine drive Water-Reels used for slurry and on irrigation operations where foreign objects such as rocks are known to be present. The stainless steel cone is inserted in the supply hose at the inlet of the machine. Available in three or four inch diameters depending on the supply hose size.



WARRANTY

AG-RAIN products manufactured by Kifco Inc. are warranted to the original user for a period of one year from the date of his purchase invoice, that the equipment will be free from defects in material and workmanship subject to the following conditions:

Satisfaction of this warranty will be limited to the replacement or repair or modification of the equipment involved at the manufacturer's option. The manufacturer's obligation under this warranty shall be limited to a credit to the dealer or customer in the amount of the current list price of the parts or materials required for replacement, repair, or modification of the equipment.

Freight costs shall be paid by the dealer/customer.

This warranty extends only to the original user of AG-RAIN equipment purchased from an authorized AG-RAIN dealership.

This warranty does not apply to certain component parts used on AG-RAIN equipment. Such component parts are warranted by the original manufacturer and KIFCO'S responsibility is limited to communicating the need for warranty service to each manufacturer. Such component parts include, but are not limited to tires and tubes, batteries, gearboxes, transmissions, pumps and sprinklers.

This warranty shall be available only if:

- A) KIFCO has received a properly executed delivery record and
- B) KIFCO is notified in writing within 30 days upon discovery of an alleged defect and
- C) KIFCO'S examination of the equipment discloses, to its satisfaction, that such alleged defect has not been caused by misuse; neglect; improper installation; improper operations; improper maintenance; repair or alteration; accident; or unusual or extraordinary use demands.

THE FOREGOING WARRANTY SUPERSEDES AND IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESSED, IMPLIED OR STATUTORY, AND ALL OTHER LIABILITIES OR OBLIGATIONS ON THE PART OF KIFCO INC.

- A) KIFCO MAKES NO WARRANTY OF MERCHANTABILITY IN RESPECT TO THE EQUIPMENT.
- B) KIFCO MAKES NO WARRANTY THAT THE EQUIPMENT IS FIT FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY

KIFCO SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES (INCLUDING BUT NOT LIMITED TO, DAMAGES FOR INJURY TO THE PERSON OR PROPERTY OR LOST PROFITS) OR ANY INCIDENTAL OR SPECIAL DAMAGES AND/OR EXPENSES, OR CLAIMS FOR INDEMNIFICATION, BY REASON OF ANY DEFECT IN THE EQUIPMENT OR ITS MANUFACTURE, DESIGN OR FUNCTIONING, OR ANY INSTRUCTIONS CONCERNING THE EQUIPMENT.

No agent or representative of KIFCO or any of its dealerships has authority to waive, alter or add to the printed provisions of this warranty and limitations of liability.

KIFCO INC.
707 SOUTH SCHRADER AVE.
HAVANA, ILLINOIS 62644

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