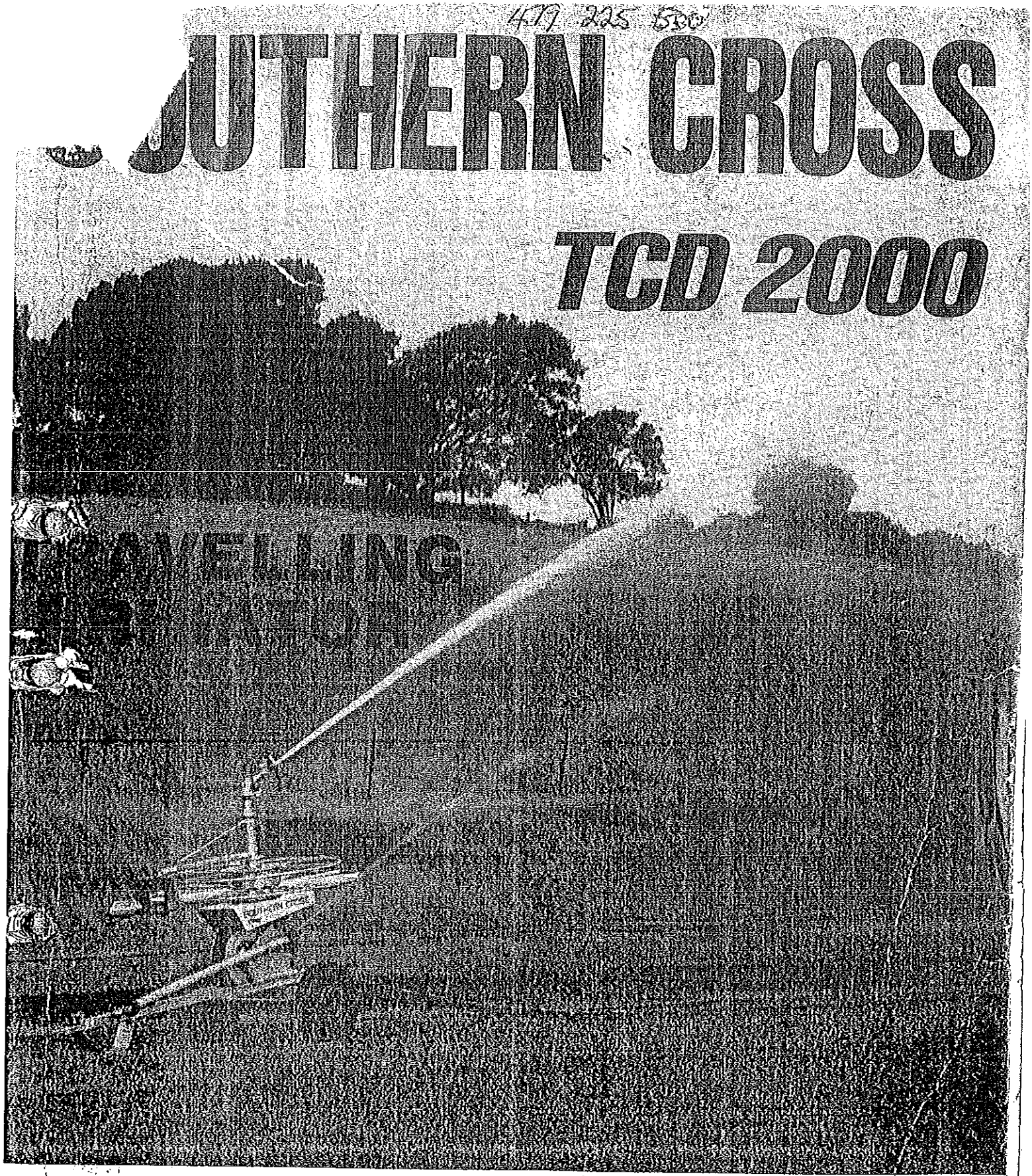
SOUTHERN CROSS

TCD 2000



Designed and Manufactured
in Australia by

TOOWOOMBA FOUNDRY PTY. LTD.

Manufacturing Division of

SCC
SOUTHERN CROSS CORPORATION

WARRANTY

The Company warrants to the original Purchaser that it will repair or supply parts free of charge to the original point of despatch to replace parts which on return to the Company with Transport charges prepaid shall be acknowledged by the Company to be defective in material or workmanship.

The above Warranty is subject to the following conditions:—

(i) No claim under warranty will be acknowledged after one year from the date of delivery.

(ii) The terms of payment contained in the contract for the supply of the goods have been complied with.

(iii) The equipment has been installed and maintained as set out in the Instruction Manual of the Company and has been subject to normal use and service.

The foregoing Warranty is given in lieu of all other Conditions and Warranties, express or implied, which might otherwise be binding on the Company (all of which are expressly excluded) and no further responsibility for any consequential damages or any other expenses incurred will be accepted by the Company.

WARNINGS

Maximum Towing speed of Irrigator:— 25 km/h on smooth roadways.

10 km/h under field conditions.

Operating Speeds:—

Laying out Hose	—	4 km/h
Laying out Cable	—	4 km/h
Hose Winding	—	540 PTO - Low Speed

Use on fixed drawbar only — Three point linkage bar is unsatisfactory.

Hose guide arm must be in forward locked position during irrigation.

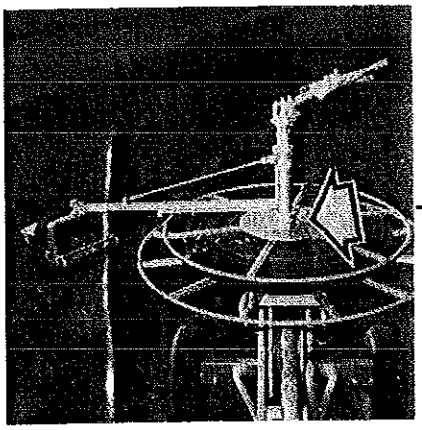
Lubricate grease points before each spraying run.

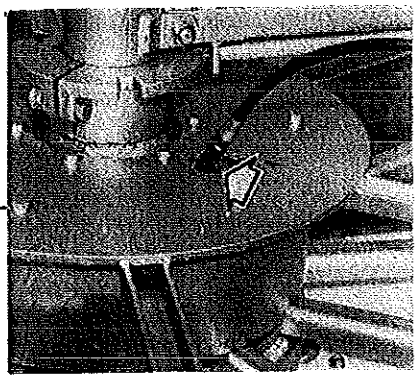
Do not stand at front or rear of irrigator while laying out cable or while Irrigator is operating. NEVER dismount from tractor during hose reeling operation. All other persons must stand well clear at all times.

The distance from the hydrant or mainline connection to the stopping position must be less than the length of the hose. Damage to hose or fittings could result from the irrigator travelling beyond the effective length of the hose.

LUBRICATION

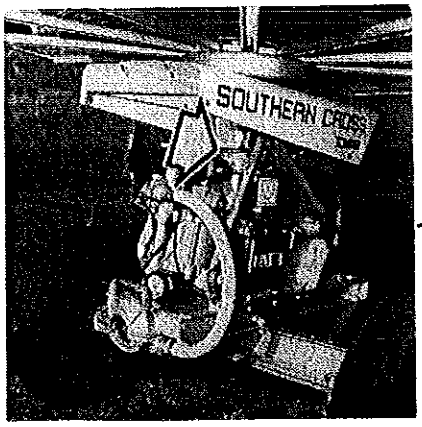
Apply grease to grease nipples, as shown below before the start of each irrigation run.

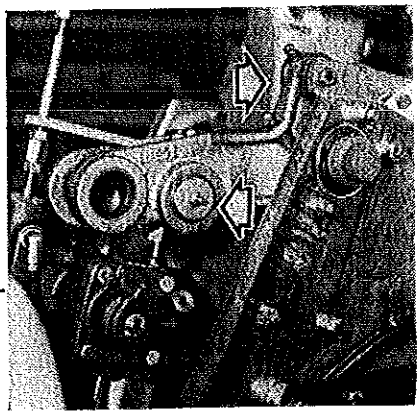




Hose Reel Hub (1 Point)

Plunger Rod (1 Point)





Plunger Rod to Rocker Arm
Connecting Spindle (1 Point)
Rocker Arm (2 Points)

Hose Reel Drive Gears

Smear some grease over the teeth of the bevel gear and pinion and the hose reel gear, as required.

Grease for Lubrication

E.P. (Extreme Pressure) Grease, as recommended by a reputable Oil Company.

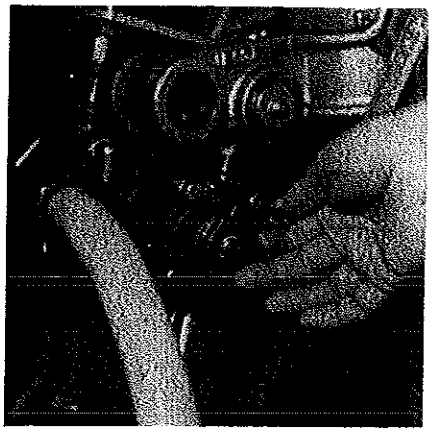
Wheel Hub Bearings

Check grease in wheel hubs once a year and add recommended grease, if required.

Other Bearings

All other bearings are lubricated for life of the bearing.

EXHAUST WATER JETS



Screw exhaust water jets into angled holes in the valve end caps, at opposite sides of the water motor. Refer table below for approximate rate of progress for exhaust jet and water pressure combinations.

APPROXIMATE RATE OF PROGRESS — Metres/Hour

Exhaust Jet Size	Pressure (kPa)					Pressure (P.S.I.)				
	300	400	500	600	700	50	60	70	80	90
1/16 in	5	6	7	8	9	4	5	6	7	8
3/32 in	10	11	12	13	14	9	11	13	15	17
1/8 in	18	21	24	28	32	18	21	24	27	30
5/32 in	24	28	33	39	45	26	30	34	38	42
3/16 in	33	40	48	56	65	38	43	48	53	59
1/4 in	48	58	69	—	—	54	60	67	75	—
3/8 in	58	70	—	—	—	66	73	—	—	—

Intermediate speeds may be obtained by fitting Jets of two different sizes.

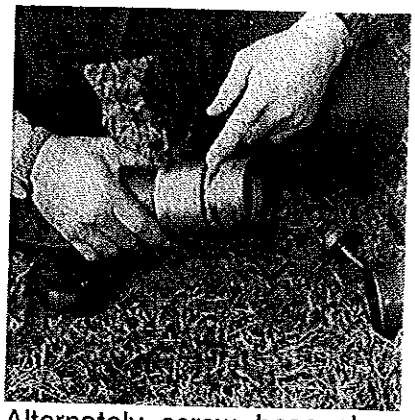
FITTING HOSE ENDS

DO NOT USE ANY LUBRICATION ON HOSE OR FITTINGS WHEN ASSEMBLING

1. Trim end of hose square.

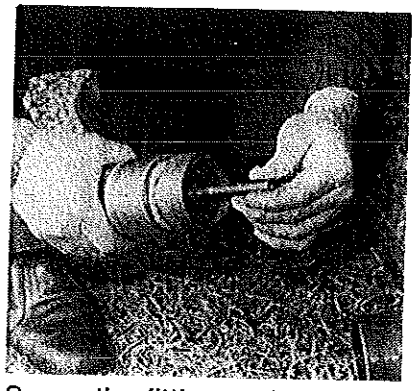
2. Fit hose sleeve onto hose tail, smaller end of taper first.

3. Push hose onto hose tail and work end of hose into inside of hose sleeve.



4. Alternately screw hose sleeve onto hose and push hose onto the hose tail until hose just comes through the sleeve.

NOTE: It may be necessary to tap on the end of the hose sleeve with a piece of timber to assist in bringing hose through the sleeve.



5. Screw the fitting tool insert into the hose tail.

6. Place the fitting tool over the insert and screw on the nut. Tighten nut hard, to force sleeve and hose onto taper of hose tail. Remove fitting tool and the insert.

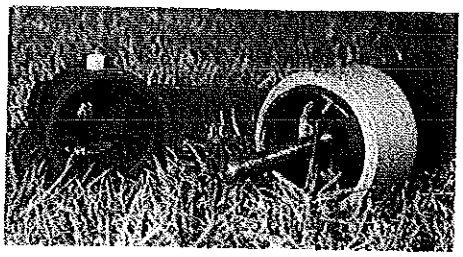
7. Check, using the hose connection retainer, to see that the retainer fits around the hose tail, clear of the hose and sleeve. Trim surplus hose back to the sleeve if necessary.

FITTING HOSE ENDS

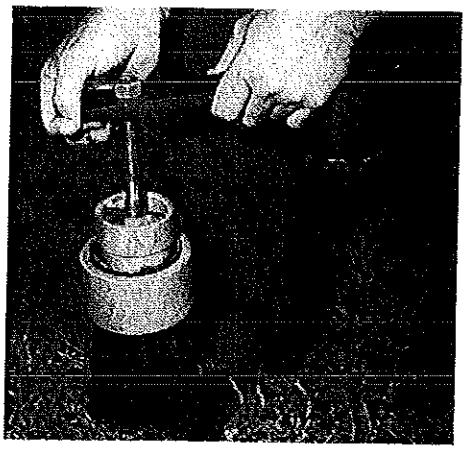
GALVANISED HOSE TAIL TYPE

DO NOT USE ANY LUBRICATION ON HOSE OR FITTINGS WHEN ASSEMBLING.

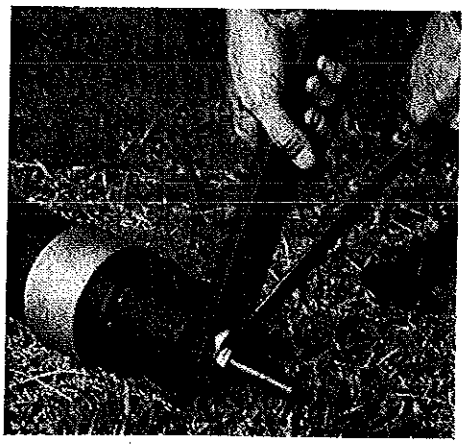
1. Trim end of hose square.



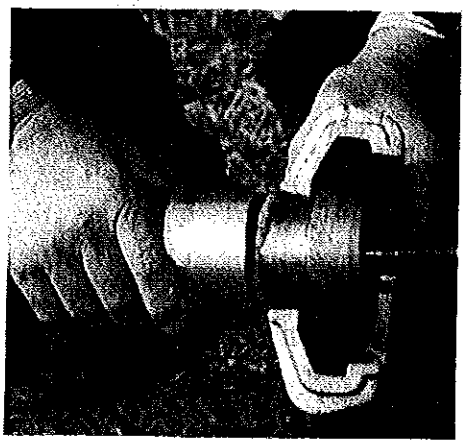
2. Insert fitting tool insert in the hose tail and twist to lock. Push hose tail into end of hose and then work hose sleeve (larger end first) onto hose until hose just comes through the sleeve.



3. Bolt a suitable bar on to the insert stud. Stand on hose to anchor it and then lift hose tail as far as possible.



4. Remove lifting bar, fit fitting tool and screw on nut. Tighten nut hard to force sleeve and hose onto taper of hose tail. Remove fitting tool and the insert.

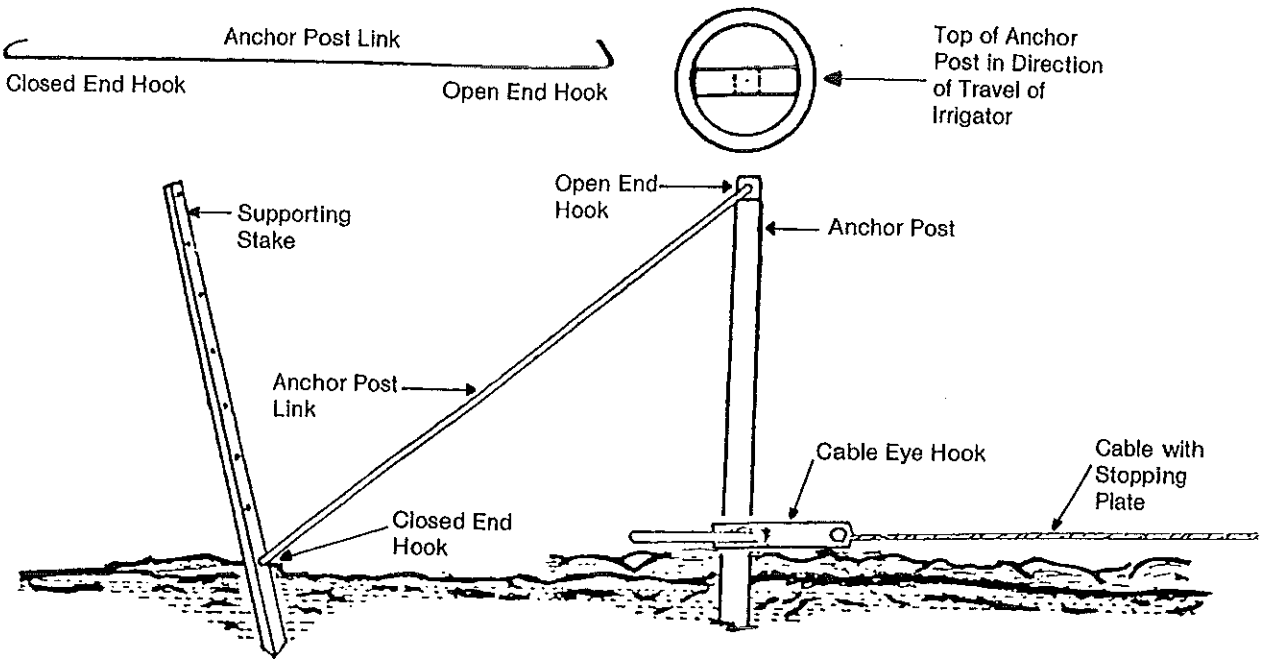


5. Check, using the hose connection retainer to see that the retainer fits around the hose tail, clear of the hose and sleeve. Trim surplus hose back to the sleeve if necessary.

CABLE ANCHORAGES

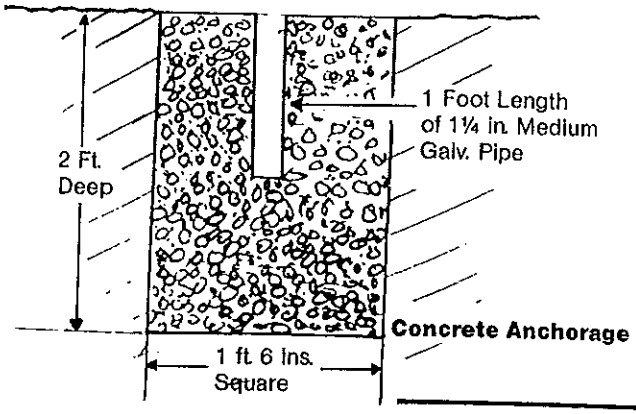
IMPORTANT — Stopping Plate **must be used with all anchorages.**

CABLE STAKED TO GROUND (Maximum Load 1500 lbs)

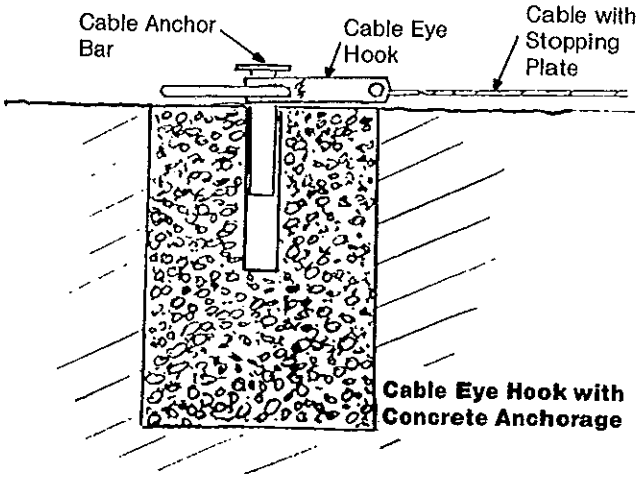


1. Drive anchor post into ground.
2. Place **open hook end** of anchor post link through anchor post.
3. Hold link out along ground and drive supporting stake at angle, where link touches ground, until a hole in the stake is at ground level.
4. Place cable eye hook over anchor post.
5. Locate closed end hook of link in support stake at ground level.
6. Fit open end hook of link through hole in top of anchor post.

CONCRETE ANCHORAGE



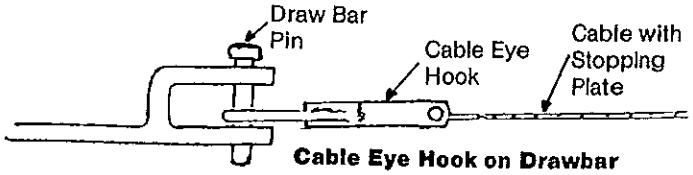
Concrete Anchorage



Cable Eye Hook with Concrete Anchorage

TRACTOR ANCHORAGE

Fit the drawbar pin through loop on the cable eye hook.



Cable Eye Hook on Drawbar

LAYING HOSE AND CABLE

SEQUENCE OF OPERATIONS

FRONT TOWING METHOD

OPERATION	REFER NUMBER	PAGE
Attach irrigator towbar to tractor.		
Tow irrigator into lane at anchoring end of field, up to hydrant or mainline connection.		
Place hose guide arm towards side of lane to which hose is to be laid.	1	10
Place hose through hose guide rollers.	2	10
Attach hose to hydrant or mainline connection and open hydrant.	3	11
Drive slowly up to starting end of lane.		
Remove remaining hose from hose reel.		
Turn irrigator into lane, facing anchoring end.		
Unhitch irrigator from tractor.		
Apply Wheel Brakes (If Fitted).	11	14
Place hose guide arm at position towards towing end.	1	9
Connect hose to irrigator.	3	11
Support driving arms.	4	11
Set stopping mechanism.	5	11
Attach cable to tractor and drive up to anchoring position.		
Anchor the cable.		
Fit stopping plate to cable.	6	12
Start the pump.		
Check speed of irrigator (initial run only).	12	15
Adjust sprinkler pattern (initial run only).	13	15

The irrigator will proceed, up to the anchorage end of the lane, where it will stop automatically when the stopping plate operates the stopping mechanism. The sprinkler will continue to operate until the pump is stopped.

LAYING HOSE AND CABLE

SEQUENCE OF OPERATIONS

BACK TOWING METHOD (Not to be used for Irrigator with Front Wheels)

OPERATION	REFER NUMBER	PAGE
Attach back towing links to tractor	7	13
Tow irrigator into lane at anchoring end of field.		
Support Driving Arms.	4	11
Pull out cable and attach cable to anchorage.		
Attach stopping plate to cable.	6	12
Tow irrigator up to hydrant or mainline connection.		
Place hose guide arm towards side of lane to which hose is to be laid.	1	9
Place hose through hose guide rollers.	2	10
Attach hose to hydrant or mainline connection and open hydrant.	3	11
Drive slowly up to starting end of lane.		
Disconnect tractor and stow back towing links.		
Apply Wheel Brakes (If Fitted).	11	14
Remove remaining hose from hose reel.		
Connect hose to irrigator.	3	11
Set stopping mechanism.	5	11
Place hose guide arm at position towards towing end of irrigator.	1	9
Start pump.		
Check speed of irrigator (initial run only).	12	15
Adjust sprinkler pattern (initial run only).	13	15

The irrigator will proceed, up to the anchorage end of the lane, where it will stop automatically when the stopping plate operates the stopping mechanism. The sprinkler will continue to operate until the pump is stopped.

REWINDING HOSE ONTO HOSE REEL

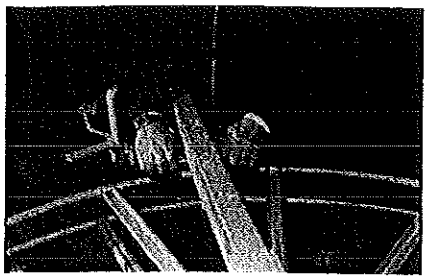
SEQUENCE OF OPERATIONS

CAUTION: DO NOT ATTEMPT ANY OF THE FOLLOWING OPERATIONS UNTIL TENSION HAS BEEN REMOVED FROM CABLE AND HOSE.

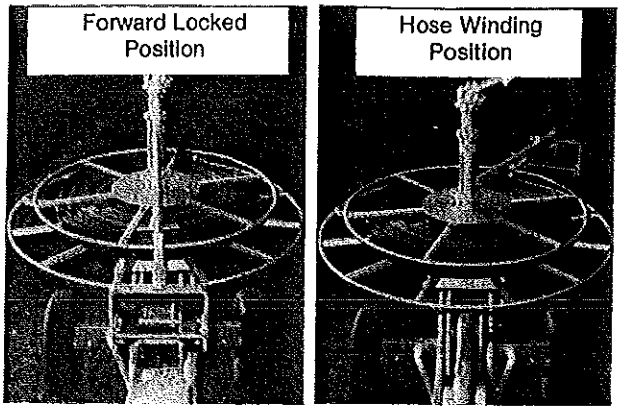
OPERATION	REFER NUMBER	PAGE
Remove tension from cable and hose.	8	13
Disconnect hose from hydrant or mainline connection and close hydrant.		
Disconnect hose from irrigator.		
Disconnect cable from anchorage.	8	13
Remove stopping plate from cable.	6	12
Wind in surplus cable, by hand.	10	14
Release Wheel Brakes (If Fitted).	11	14
Attach tractor to irrigator.		
Reverse irrigator to provide sufficient hose for starting onto hose reel.		
Position hose guide arm directly towards rear of irrigator.	1	9
Place hose below scraper bar and between hose guide rollers.	2	10
Push hose end into hole in hose reel.	9	14
Wind hose on by hand for a few turns.		
Connect tailshaft to tractor P.T.O. and to hose reel drive shaft.	14	15
Start tractor and wind hose slowly onto hose reel. (If hose has tendency to fold at top or bottom, refer section "To Adjust Hose Guide Arm Height", in General Instructions.)		
With some hose still outside hose guide, stop tractor P.T.O.		
Remove tailshaft and stow on irrigator.		
Wind remaining hose onto hose reel by hand.		
Retain hose connection on hose reel.		

1. HOSE GUIDE ARM —

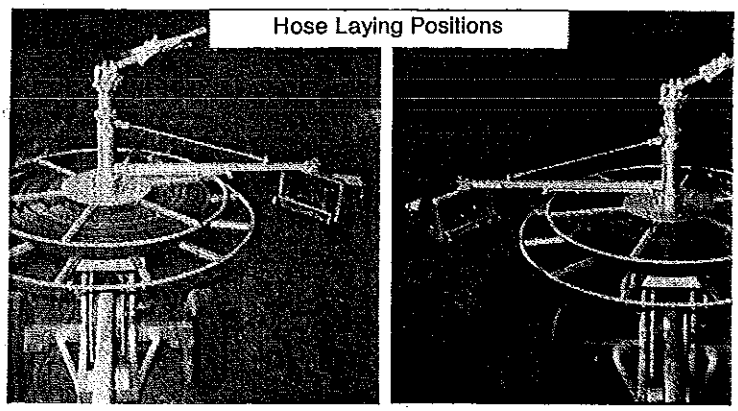
Positioning Hose Guide Arm



(a) Pull hose guide lock outwards.

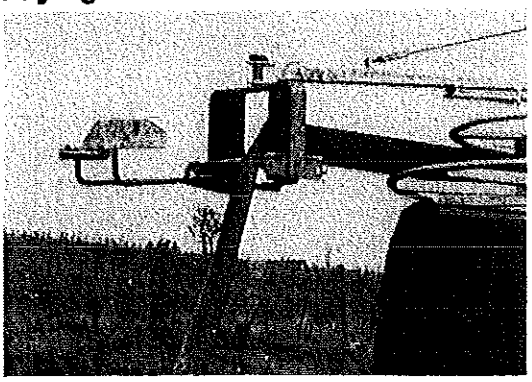


(b) Turn hose guide arm towards the required position and release the lock. Positive locking positions are towards the front and at each side of the irrigator. When positioned towards the rear, the hose guide arm can move through an arc for hose winding.



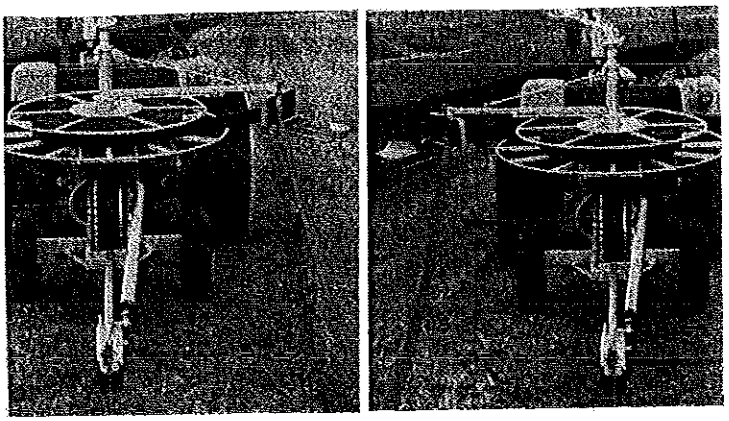
2. HOSE IN HOSE GUIDE ROLLERS —

Laying out the Hose



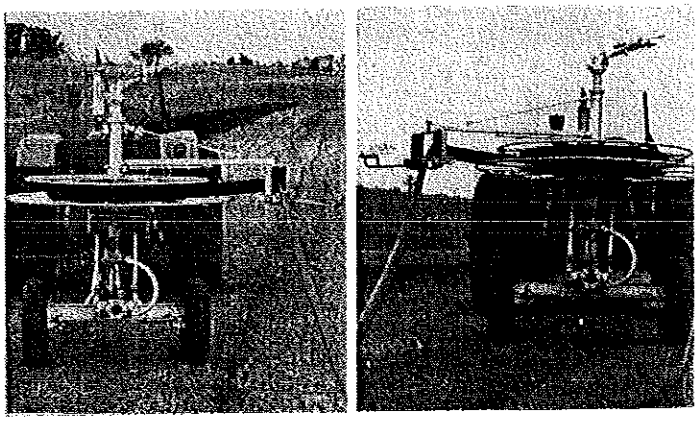
(a) Pull some hose from the hose reel.

(b) Place hose end between vertical rollers and pull hose around, towards the hydrant or mainline connection.

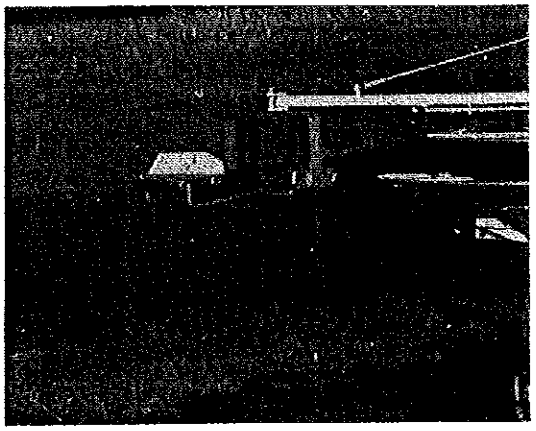


Back Towing Method

Front Towing Method



Winding on the Hose



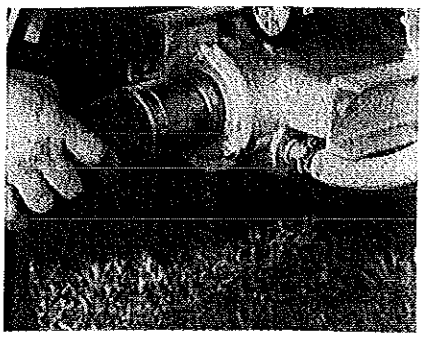
(a) Place end of hose under the front scraper bar and through the hose guide.

(b) Fit hose end between the vertical rollers and connect the hose end to the hose reel hub.

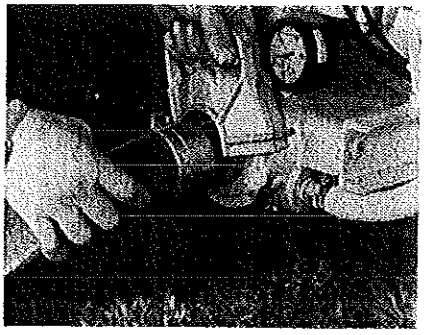
(c) REFER SECTION, "TO ADJUST HOSE GUIDE ARM HEIGHT", Page 16.

3. ATTACHING HOSE —

Hydrant, Mainline Connection or Irrigator Inlet



(a) Push hose tail into the U-Cup Packing.



(b) Fit the hose connection retainer down, around the flange and the hose tail.

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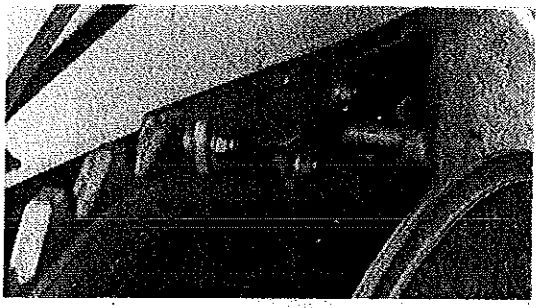
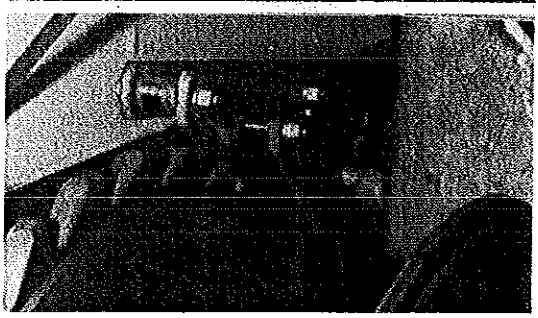
4. DRIVING ARMS — SUPPORTING —

(a) Lift the end of the top driving arms.

(b) Fit pointed ends of bottom driving arms into recesses in the bottom edge of the top driving arms.

(c) Rest top driving arms on the bottom driving arms, clear of the cable drum.





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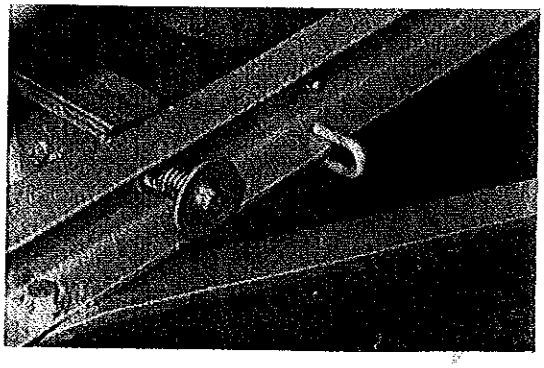
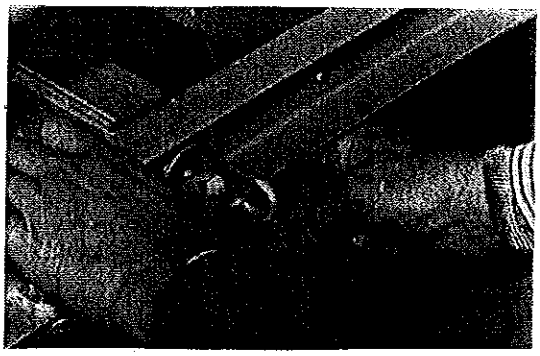
5. SETTING STOPPING MECHANISM



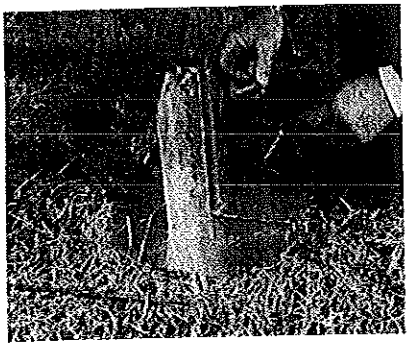
(a) Depress stopping valve setting plate and move stopping valve setting arm forward, as far as it will go.



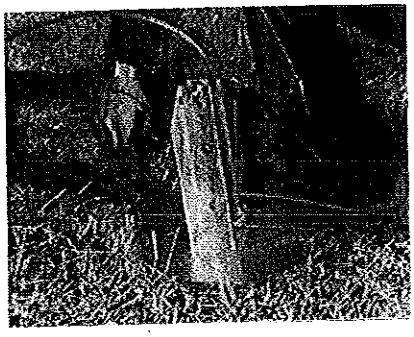
(b) Release stopping valve setting plate.

6. STOPPING PLATE

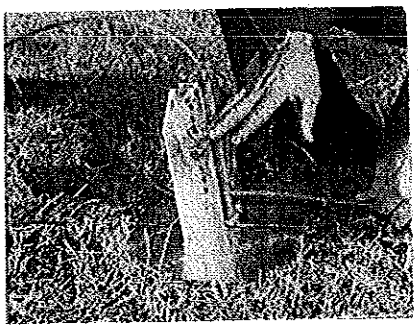
Attaching Stopping Plate



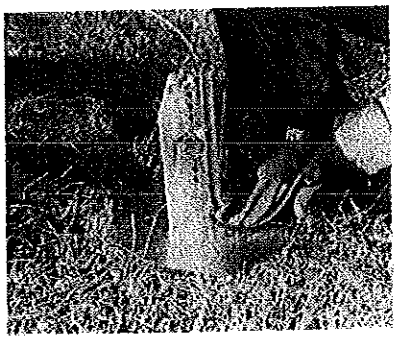
(a) Remove lynch pin and lift out loose pin.



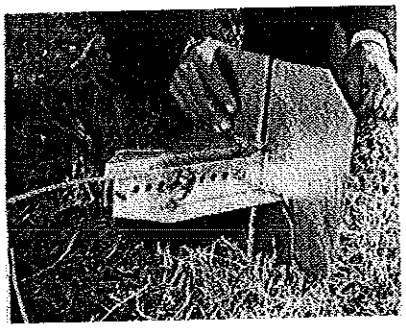
(b) Pull a loop of cable through stopping plate.



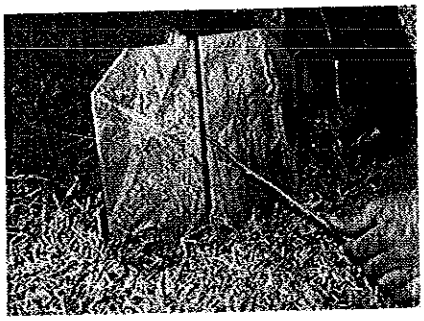
(c) Refit loose pin through stopping plate and retain it with lynch pin.



(d) Fit cable under fixed pin in stopping plate.



(e) Place cable into slot in target plate.



(f) Locate stopping plate ten feet (minimum) from anchorage.

Remove Stopping Plate

With tension removed from the cable —

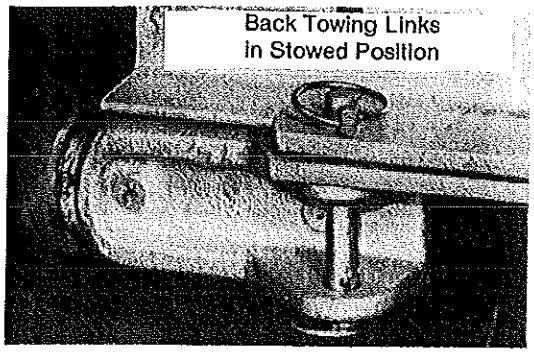
(a) Remove lynch pin and loose pin from stopping plate.

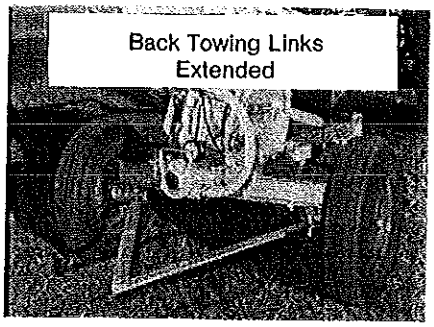
(b) Lift cable up through slot in stopping plate and from under the fixed pin.

(c) Refit loose pin and lynch pin.

7. BACK TOWING LINKS —

Connecting


Back Towing Links in Stowed Position


Back Towing Links Extended

(a) Remove lynch pins from back towing pins.

(b) Swing ends of back towing links with larger holes outwards.

(c) Refit Lynch pins.

(d) Cross ends of links so holes line up.

(e) Fit tractor draw bar pin through draw bar and ends of links.

---

8. REMOVING TENSION FROM CABLE AND HOSE —

DISCONNECTING CABLE FROM ANCHORAGE —

Tractor Anchorage

(a) Reverse tractor to remove tension from cable and hose.

(b) Remove tractor draw bar pin.

Concrete Anchorage

(a) Connect a chain from the tractor draw bar to the loop on the cable eye hook.

(b) Drive forward sufficiently to enable cable anchor bar to be removed.

(c) Reverse tractor to remove tension from cable and hose.

Cable Staked to Ground

(a) Connect a chain from the tractor drawbar to the loop on the cable eye hook.

(b) Drive forward sufficiently to free the cable eye hook on the anchor post.

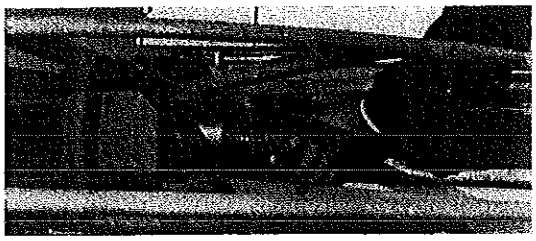
(c) Remove anchor post link.

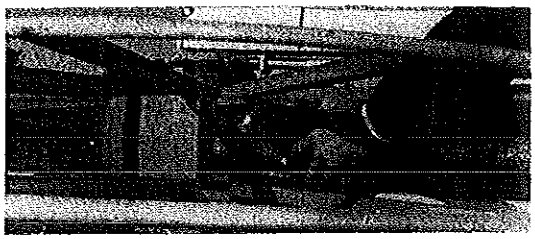
(d) Withdraw anchor post.

(e) Withdraw support stake.

(f) Reverse tractor to remove tension from cable and hose.

9. FITTING HOSE END INTO HOSE REEL —





(a) Locate hose tail in the hole in the side of the hose reel hub and push the hose tail right in.

(b) Wind hose onto hose reel for a few turns, by hand.

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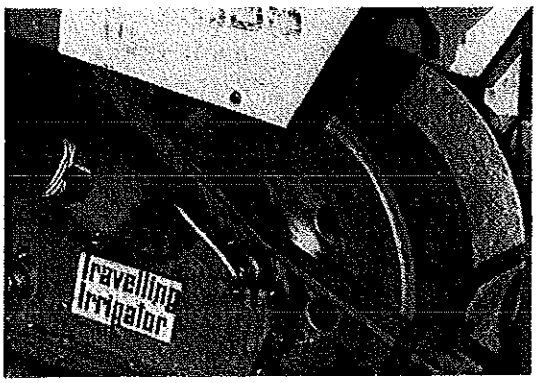
10. TO WIND IN SURPLUS CABLE —



(a) Screw cable drum brake release jackscrew clockwise to release the brake.

(b) Screw threaded section of rewind handle into the cable drum.

(c) Wind in surplus cable.

(d) Turn release jackscrew anticlockwise until loose.

(e) Unscrew rewind handle from cable drum.

NOTE: Cable drum brake should be in the applied position except when surplus cable is being rewound.

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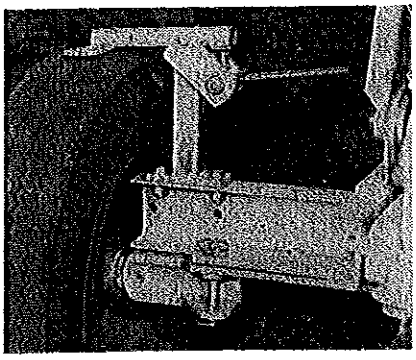
11. WHEEL BRAKES (If Fitted)



To Apply Brakes

Pull brake handle up to the stop on the brake mount, at each end of the axle.

To Release Brakes

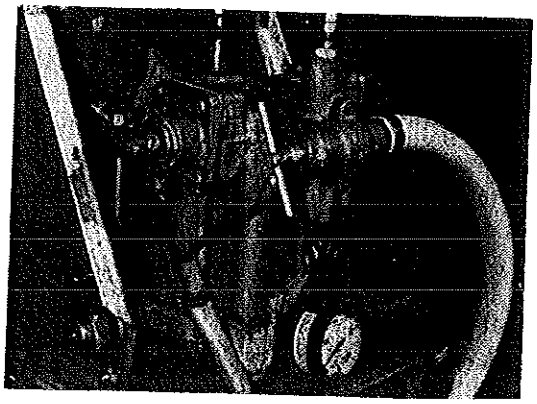
Push handles down to the axle.

12. CHECK SPEED OF IRRIGATOR

(a) Check speed of irrigator and if it is not as required, stop the irrigator by screwing in the gatevalve on the hydraulic motor.

(b) Change exhaust jets to required size.

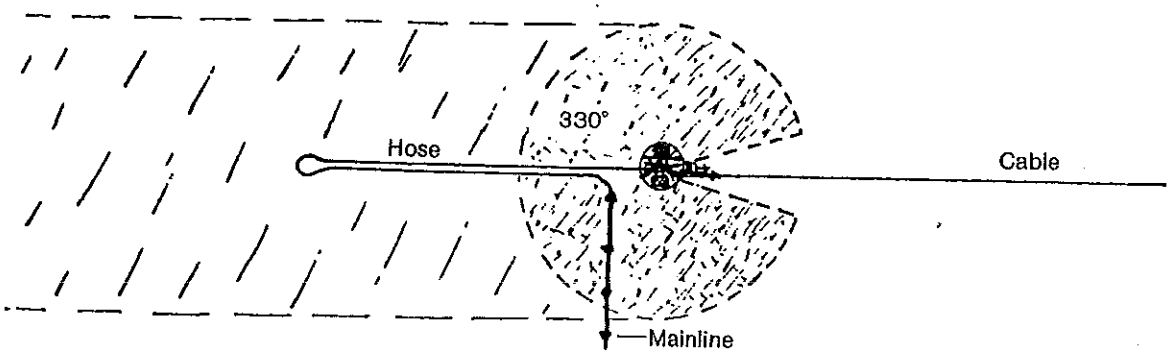
(c) Open gatevalve.



13. ADJUST SPRINKLER PATTERN

(a) Close gatevalve on the hydraulic motor.

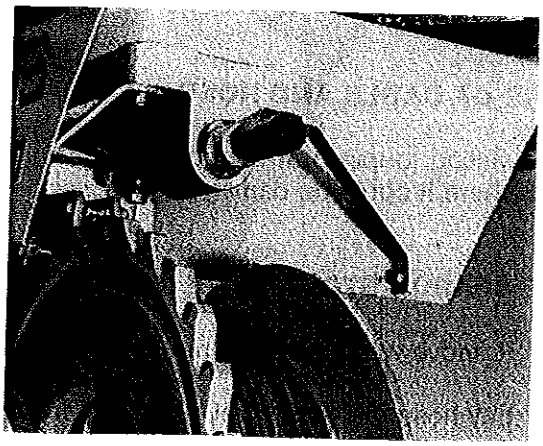
(b) Adjust stops on the sprinkler to give the required arc of wetted area. The recommended angle is 330°, so the irrigator can move forward on dry ground.



14. TO CONNECT TAILSHAFT

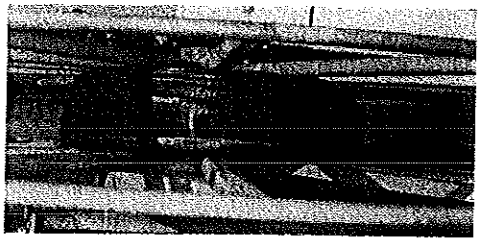
(a) Connect tailshaft to tractor P.T.O.

(b) Fit tailshaft onto hose reel drive shaft of irrigator.



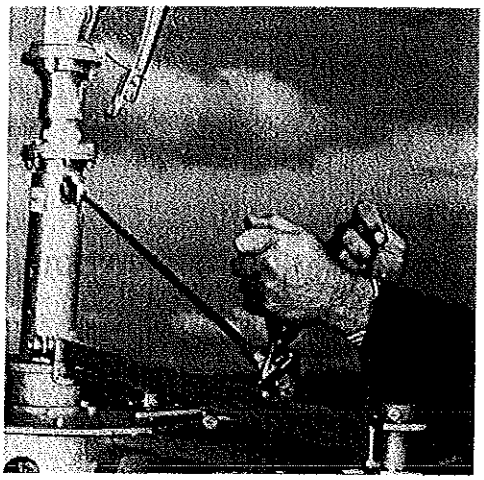
GENERAL INSTRUCTIONS

TO ADJUST HOSE GUIDE ARM HEIGHT



During the first winding in of the hose, check that layers of hose are packing flat on previous layers and that the hose does not scrub on the hose reel deck.

If the hose guide is too low folding of the hose at the bottom, as shown in the illustration at right, will occur. Likewise, if hose guide is too high, folding will occur at the top.

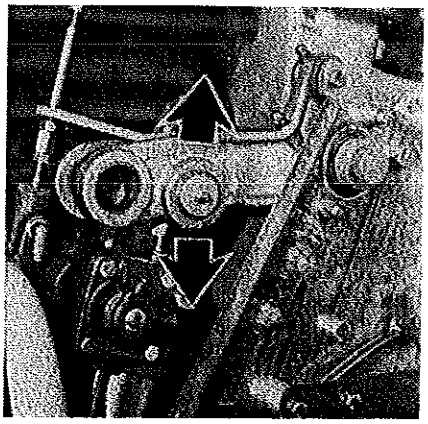


Where folding occurs, stop the tractor P.T.O. and unwind folded section of hose. Reset the height of the hose guide by adjusting nuts on the end of the hose guide brace.

Wind on hose by hand and then engage P.T.O.

Continue to check hose as it is being wound in and adjust hose guide, if necessary, until correct.

TO DRAIN HYDRAULIC MOTOR



(a) Disconnect hose from irrigator.

(b) Raise and lower the plunger rod to rocker spindle several times until no further water is expelled from the motor.

CARE OF CABLE AND HOSE

Twisting, looping and snagging of hose and cable should be avoided. Do not leave hose lying in the field where it could be damaged.

OFF-SEASON STORAGE OF IRRIGATOR

(a) Remove water from hydraulic motor.

(b) Lay hose out on a level, dry, grassed area and rewind it onto the hose reel.

(c) Store irrigator in a cool dry place, under cover, free from direct sunlight.

WINTER OPERATION OF IRRIGATOR —

IF THE IRRIGATOR IS TO STAND IDLE IN FREEZING CONDITIONS, make sure water has been removed from the hydraulic motor. Water freezing in the motor may cause severe damage to motor parts.

MAINTENANCE

SEALS IN HYDRAULIC MOTOR

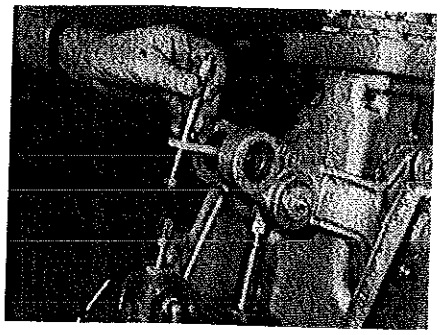
With the irrigator operating there could be some additional escape of water from exhaust jets and pilot valve exhausts. Worn or broken seals will cause an increased quantity of water to escape between chambers, resulting in poor performance or malfunction of the irrigator.

MOTOR WITH SEALS IN GOOD CONDITION	MOTOR WITH UNSATISFACTORY SEALS
At Pilot Valve Exhaust	
There will be only a short discharge at each change-over of the main valve.	A continuous discharge indicates faulty pilot valve or main valve seals.
At Exhaust Jets	
There will be a distinct shut-off of flow at the top and bottom of the motor stroke.	A continuous but varying flow indicates faulty piston seals or main valve seals.
With Stopping Valve in Stopped Position	
There could be a slight escape of water from pilot valve exhaust or exhaust jets.	Flow from pilot valve exhaust indicates faulty pilot valve seals but could also be caused by faulty main valve seals. Flow from exhaust jets could be caused by faulty main valve seals or piston seals.

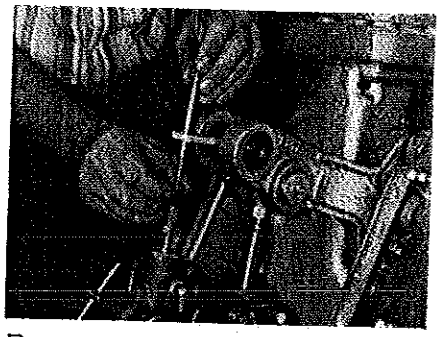
Worn piston seals or faulty main valve seals cause the relative stroking rate to slow down and in some instances, the irrigator may stall under load.

Should the performance of the irrigator be affected by worn seals, the hydraulic motor must be dismantled and new seals fitted, as shown in the following pages.

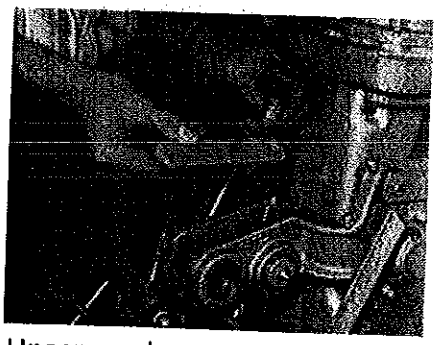
FITTING NEW PISTON SEALS



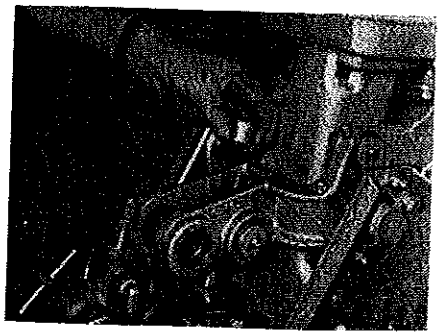
(a) Loosen locknut against top of pilot valve control rod coupling and screw out control rod.



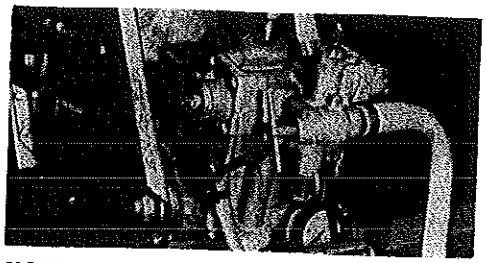
(b) Remove control rod from pilot valve lever.



(c) Unscrew plunger rod nut and remove pilot valve lever.

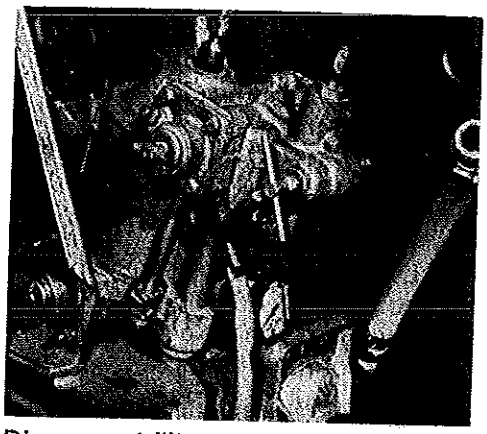


(d) Remove retaining collar and lift rocker arm up, clear of the plunger rod.

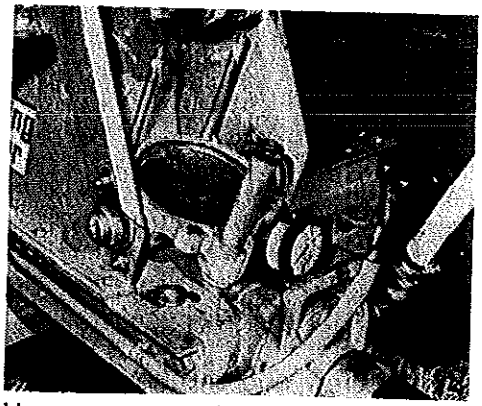


NOTE: Identify one tube and connection for correct re-assembly.

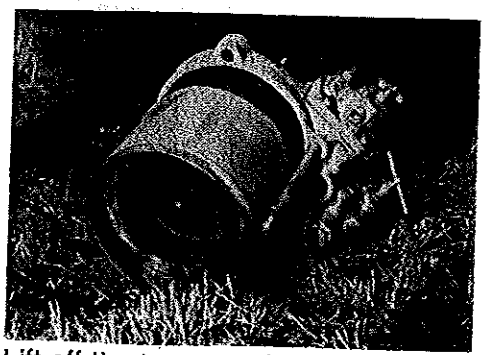
(e) Disconnect feed tubes from pilot valve and main valve end cap.



(f) Disconnect filter to motor hose.

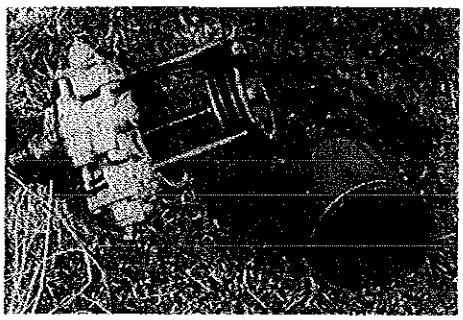


(g) Unscrew nuts from hydraulic motor studs.



(h) Lift off the top cap, plunger and barrel.

FITTING NEW PISTON SEALS (Cont'd)



(i) Slide the barrel from the piston.

(j) Remove piston seals.

(k) Fit new seals into piston grooves so double edges of seals are towards ends of piston.

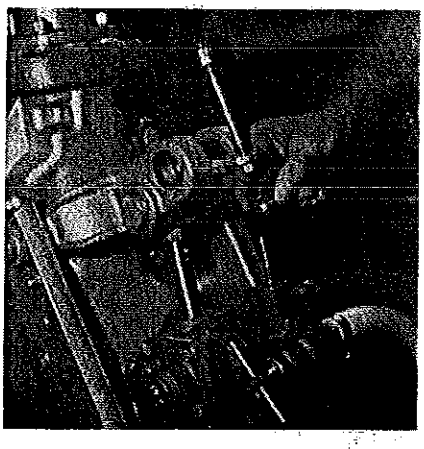
(l) Wet piston seals and fit barrel over the piston. Guide the edge of the leading seal into barrel, using a screw driver or other blunt tool.

(m) Reverse dismantling procedure to re-assemble motor.

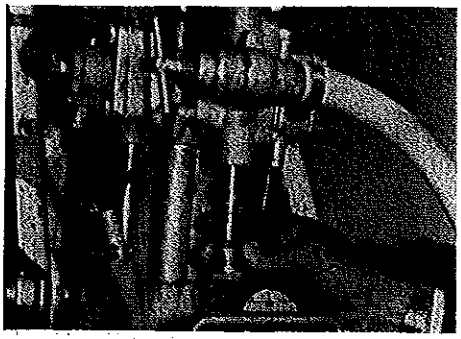
BEFORE OPERATING IRRIGATOR RE-SET PILOT VALVE AND DRIVING ARMS.

FITTING NEW PILOT VALVE SEALS

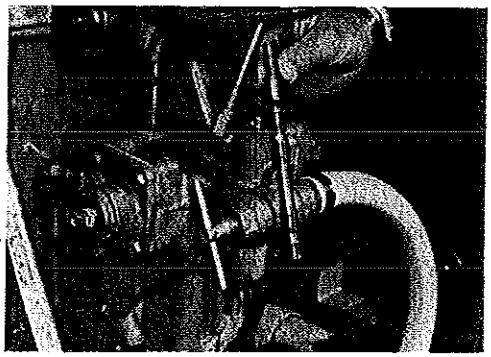
(a) Loosen locknut below the pilot valve control rod coupling and screw the coupling from the pilot valve. Remove locknut from the pilot valve.



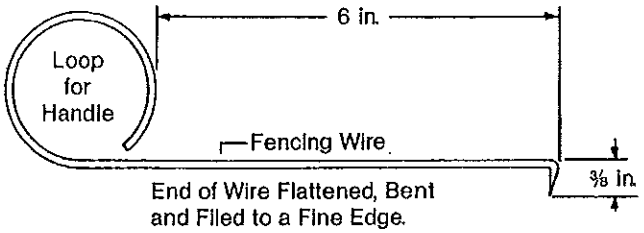
(b) Unscrew end cap from top of pilot valve housing.



(c) Unscrew end cap from bottom of pilot valve housing.



(d) Pull out the pilot valve.



(e) Using a tool, illustrated above, alternately remove from the top and bottom of the pilot valve housing, seals and lantern rings and the pilot valve spacer.

FITTING NEW PILOT VALVE SEALS (Cont')

CAUTION:

Seals can be damaged if they are pushed in straight, across ports in the bore. Push seals in at an angle and straighten them up, against lantern rings or spacer so edges do not travel across ports.

(f) Hold spacer at middle of the pilot valve housing.

(g) Fit a seal from the bottom of the housing, to support spacer.

(h) Fit a seal from the top of the housing.

(i) Against the seals, fit a lantern ring and seal, at top and bottom of the housing.

(j) Repeat (i) above, to fill housing.

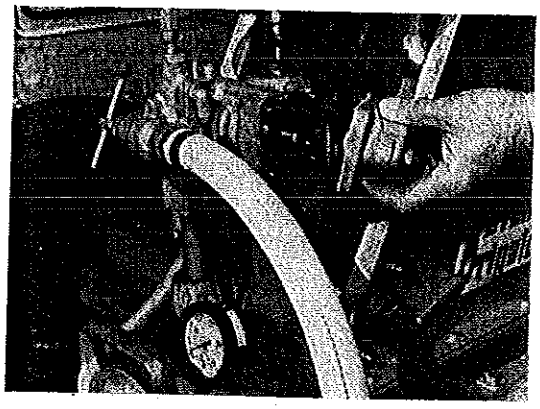
(k) Wet the pilot valve and insert it, through seals. (Screwed end uppermost).

(l) Screw end caps into housing at top and bottom.

(m) Refit locknuts, control rod and coupling.

BEFORE OPERATING IRRIGATOR RESET PILOT VALVE AND DRIVING ARMS.

FITTING NEW MAIN VALVE SEALS



(a) Remove main valve end caps.

(b) Push main valve out of housing.

(c) Using a tool as shown previously, withdraw seals and lantern rings from the housing.

(d) Locate one lantern ring centrally in the housing and fit a seal at each side of ring. Refer "CAUTION", in section "Fitting New Pilot Valve Seals".

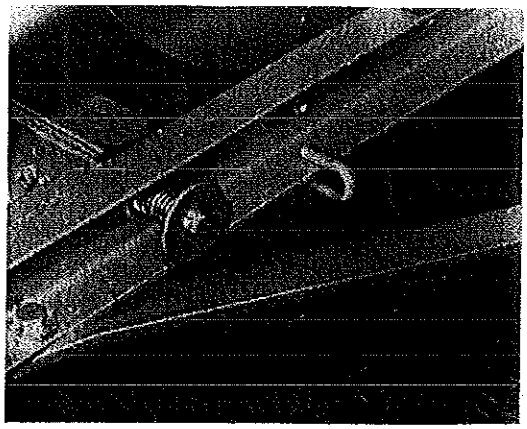
(e) Fit remaining lantern rings and seals, alternatively, from each end of the housing.

(f) Wet the main valve and slide it in through the seals.

(g) Refit end caps.

FITTING NEW STOPPING VALVE SEALS

(a) Pull stopping valve setting arm BACK, as far as it will go.



(b) Disconnect tubes from stopping valve body, and mark these so they will be reconnected correctly.

(c) Unscrew a set screw from one end of the stopping valve spindle.

(d) Withdraw the spindle.

(e) Remove stopping valve body.

(f) Remove end cap from body.

(g) Using a tool as shown previously lift out seals and lantern rings.

(h) Fit a seal into the bottom of the body. Refer "CAUTION" in Section, "Fitting New Pilot Valve Seals".

(i) Fit remaining lantern rings and seals, alternately.

(j) Fit the end cap to body.

(k) Place body in place but tighten setscrews to finger tightness only.

(l) Reconnect tubes to body.

(m) Wet the valve spindle and slide it into place. Make sure spring is in position under stopping valve setting plate.

(n) Refit washer and setscrew in end of spindle.

(o) Depress stopping plate and bring setting arm forward.

(p) Position body so notch in setting arm is around the spindle and does not bind.

(q) Tighten stopping valve body setscrews.

ADJUSTMENT OF DRIVING ARMS AND PILOT VALVE

NOTE: For illustration purposes, irrigator is shown less canopy.

DRIVING ARMS:

Adjustment to driving arms and pilot valve must be made before operating the irrigator, after the pilot valve or hydraulic motor has been dismantled.

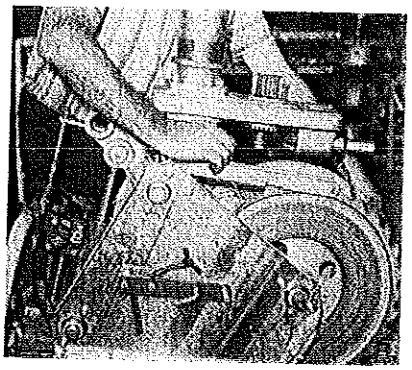
(a) Loosen nuts at each side of the pilot valve control rod coupling and screw nuts and coupling downwards.

(b) Unlock nuts at top of control rod and screw them right to the top of the control rod.

(c) Check that nuts on the plunger rod, above and below the plunger rod to rocker spindle are tight.

(d) Lift the pilot valve lever up, as far as it will go.

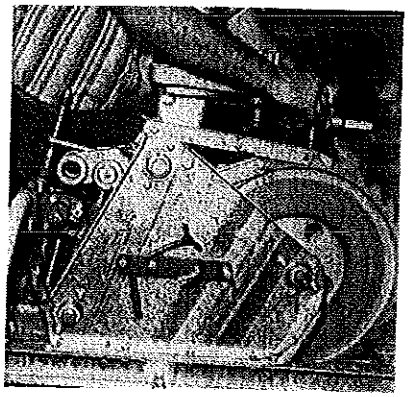
(e) Pull top of cable drum towards rear of irrigator so the top driving arm is firmly engaged in a tooth of the ratchet.



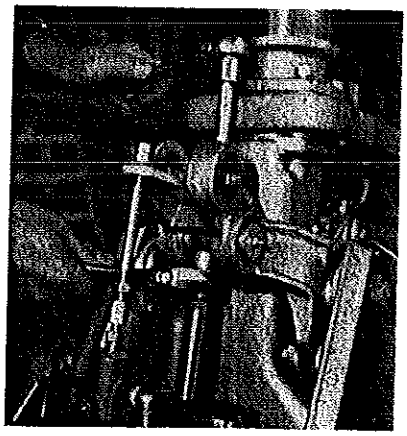
(f) Hold the cable drum and, using a 5/16 in. bolt as a gauge, adjust nuts on the plunger rod until the bolt just fits between the edge of a ratchet tooth and the bottom driving arm pin.

(g) Push pilot valve lever down, as far as it will go.

(h) Pull top of cable drum towards rear of irrigator so bottom driving arm is firmly engaged in a tooth of the ratchet.



(i) Hold, the cable drum, and check, using the bolt as a gauge, between the edge of a ratchet tooth and the pin of the top driving arm. When driving arms are correctly set, the measurement at top and bottom driving arms is the same.



(j) If there is any variation adjust nuts on the plunger rod, and recheck until the measurement is the same at both driving arms.

Make sure the pilot valve control rod is central in the pilot valve lever when the plunger rod nut is tightened.

IMPORTANT
DRIVING ARMS MUST BE SET CORRECTLY BEFORE ADJUSTING PILOT VALVE.

PILOT VALVE:

(a) Close gatevalve on motor and start pump.

(b) Pull pilot valve out and open gatevalve slightly to allow motor to operate to end of its inward stroke. Close gatevalve.

(c) Push pilot valve fully in and adjust nuts and coupling on lower end of the control rod, so there is 1/16 in. clearance between the nut and the pilot valve lever. Tighten nuts.

(d) Open gatevalve to allow motor to operate to the end of its outward stroke. Close gatevalve.

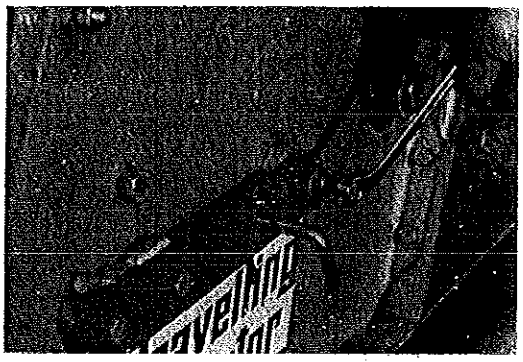
(e) Pull pilot valve out and adjust nuts at the top of the control rod so there is 1/16 in. clearance between the pilot valve lever and the lower locknut.

(f) Tighten nuts to lock them on the control rod.

(g) The irrigator is now ready to operate.

TO ADJUST CABLE DRUM BRAKE

(a) Screw cable drum brake release jack-screw anticlockwise, until loose.



(b) Loosen locknut on brake adjusting set-screw and screw in the setscrew until brake lever deflects.

(c) Drag on the brake should be sufficient that, when the cable is pulled out, the cable drum will stop, without any over-run of the cable.

(d) Tighten locknut on brake adjusting set-screw.

TO ADJUST WHEEL BRAKES

(a) Push handle down to the axle to release brake.

(b) Fit screwdriver into slot in the brake adjusting screw in the inner end of the brake lever.

(c) Loosen locknut on adjusting screw.

(d) Hold outer end of brake lever up and turn adjusting screw until the brake shoe is just clear of the tyre.

(e) Lock the nut on the adjusting screw.

TROUBLES AND THEIR REMEDIES

TROUBLE	CAUSE	REMEDY
Failure to Start	Stopping valve not set	Set stopping valve.
	Incorrectly set pilot valve	Refer Maintenance Section, Page 24.
	Stuck main valve	Remove plugs from main valve caps and push valve back and forth. **IMPORTANT:** Do not use wood or any material which may leave pieces in the valve chamber.
	Blocked filter	Remove filter retainer and clean filter segments.
	Pump failure	Check pressure at irrigator and pressure and output of pump.
	Disconnected hose, or main line coupling.	Check pressure at irrigator. Reconnect if necessary.
Slower Stroking Rate	Partially blocked filter	Remove filter retainer and clean filter segments.
	Worn piston seals	Refer Maintenance Section, Page 19.
	Leaking mainline	Check pressure at irrigator. Reconnect or repair mainline.
Stalling under load	Worn piston seals	Refer Maintenance Section, Page 19.
	Pump failure	Check pressure at irrigator and pressure and output of pump.
	Leaking mainline	Check pressure at irrigator. Reconnect or repair mainline.
Irrigator fails to Progress	Driving arms badly out of adjustment	Stop pump or operate stopping valve immediately. If allowed to continue, damage to irrigator may result. Refer Maintenance Section, Page 23.

WATER MOTOR HYDRAULIC CIRCUIT

This circuit has been included so that the manner of operation of the water motor can be understood and also so that logic can be applied in trouble shooting reasons for malfunction.

OPERATION

— Outward Stroke

With the Auto/Stop valve in the "Run" position and the pilot valve in the innermost position, the operation occurs in the following sequence.

a. Inlet water enters the pilot valve and flows through the Auto/Stop valve to the right hand end (in diagram) of the Main Valve.

b. This water pressure on the end of the Main Valve forces the main valve across to the left as shown in diagram.

c. This movement of the main valve opens a port in the Main Valve which allows water pressure to flow to the lower side of the water motor piston.

d. The movement (b) of the main valve also causes the water which was at the left hand end of the main valve to be exhausted through small vent hole via the pilot valve.

e. Pressure on the lower side of the water motor piston causes the piston to move outwards because the water on the top side of the piston has now been vented to atmosphere via the main valve and exhaust nozzles.

— Inward Stroke

a. At the end of the outward stroke the pilot valve is tripped to the outward position and this then starts the following sequence.

b. Water pressure is then applied through the pilot valve to the left hand end (in diagram) of the main valve which causes the main valve to move to the right.

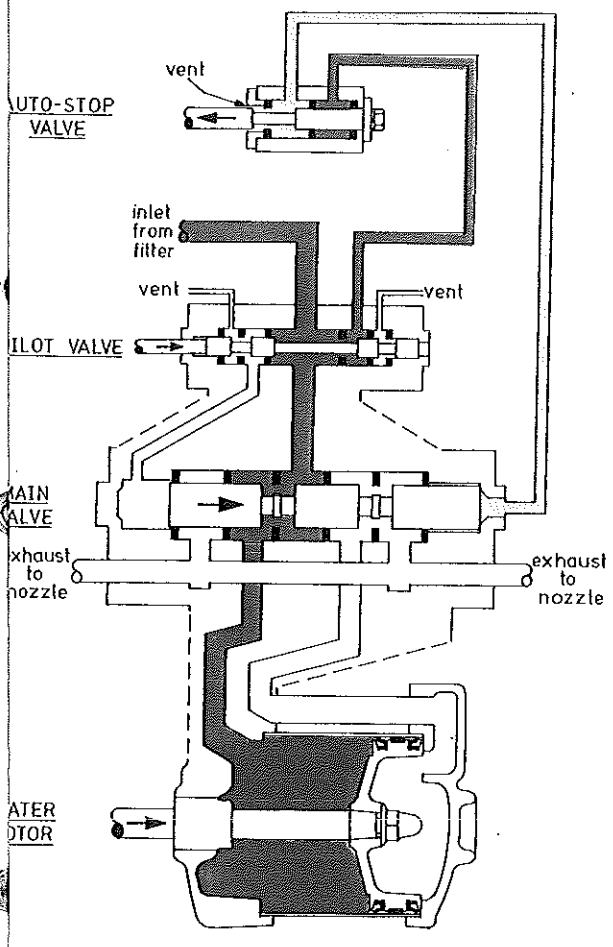
c. This movement of the main valve opens a port which admits water pressure to the top side of the water motor piston.

d. The movement (b) of the main valve also causes water which was at right hand end (in diagram) of the main valve to be exhausted to vent in pilot valve through the Auto/Stop Valve.

e. Pressure on the top side of the water motor piston causes the piston to move inwards because the water on the lower side of the piston has now been vented to atmosphere via the main valve and exhaust nozzle.

Stopped by Auto/Stop Valve

When the Auto/Stop Valve is actuated to the stop position, the stroking sequence continues until the water motor piston reaches the bottom of the stroke and at that position the main valve is prevented from changing over by the Auto/Stop Valve venting the main valve to atmosphere.



STOPPED BY AUTO-STOP

ss TC-D & TC-E Travelling Irrigators.

Hydraulic Circuit Diagram

Issue No.1 JULY '82

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (metric)

Hose Diam. 2½ inch and 3 inch
Run Length 200 metres

Hose Length 100 metres
Sprinkler Nelson P100 HD 21°

NOZZLE DIAM. INCHES	SPRINKLER PRESSURE METRES	FLOW RATE L/SEC.	METRES HEAD LOSS IN 100m HOSE		SPRINKLER WETTED WIDTH METRES	LANE SPACING		AREA IRRIGATED IN 200m RUN HECTARES	DEPTH OF WATER APPLIED IN mm				
			2½"	3"		WIND VELOCITY M.P.H.	METRES		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
.9	40	10.61	15.3	5.3	85.6	0 to 5 5 to 10 Over 10	59.9 51.4 42.8	1.2 1.03 .86	13 15 18	22 26 31	35 41 49	73 85 103	150 175 210
	50	12.5	21	7	91.9	0 to 5 5 to 10 Over 10	64.3 55.1 45.9	1.28 1.1 .92	14 16 20	24 29 34	38 45 54	80 94 113	164 192 230
	60	13.6	24.5	8.3	97.5	0 to 5 5 to 10 Over 10	68.2 58.5 48.7	1.36 1.17 .97	14 17 20	25 29 35	40 46 55	83 97 116	169 197 237
.8	40	8.75	11	3.7	81.2	0 to 5 5 to 10 Over 10	56.8 48.7 40.6	1.14 .97 .81	11 13 16	19 23 27	30 36 43	64 74 89	130 152 182
	50	9.83	13.8	4.6	87.3	0 to 5 5 to 10 Over 10	61.1 52.4 43.6	1.22 1.05 .87	12 14 16	20 24 28	32 37 45	67 78 93	136 159 191
	60	10.7	16.2	5.4	91.6	0 to 5 5 to 10 Over 10	64.1 54.9 45.8	1.28 1.1 .92	12 14 17	21 25 29	33 39 46	69 81 97	141 165 198
.7	40	6.73	6.8	2.3	75.3	0 to 5 5 to 10 Over 10	52.7 45.2 37.7	1.05 .9 .75	9 11 13	16 19 22	25 29 35	53 62 74	108 126 151
	50	7.61	8.6	2.8	81.5	0 to 5 5 to 10 Over 10	57.1 49 40.7	1.14 .98 .81	10 11 13	17 20 24	26 31 36	55 64 75	113 131 153
	60	8.29	9.9	3.3	85.7	0 to 5 5 to 10 Over 10	60 51.4 42.8	1.2 1.03 .85	10 12 14	17 20 24	27 32 38	57 67 80	117 136 164
.6	40	4.96	4	1.3	69.5	0 to 5 5 to 10 Over 10	48.6 41.7 34.7	.97 .83 .69	7 9 10	13 15 18	20 24 28	42 49 59	86 101 121
	50	5.58	5	1.7	74.1	0 to 5 5 to 10 Over 10	51.9 44.5 37	1.04 .89 .74	8 9 11	14 16 19	21 25 30	44 52 62	91 106 127
	60	6.12	5.7	1.9	78.3	0 to 5 5 to 10 Over 10	54.8 47 39.1	1.1 .94 .78	8 9 11	14 16 20	22 26 31	46 54 65	94 110 132
						WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			.7 l/sec	.4 l/sec	.25 l/sec	.12 l/sec	.06 l/sec

NOTES (1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (metric)

Hose Diam. 2½ inch or 3 inch
Run Length 200 metres
Hose Length 100 metres
Sprinkler S.X. Mark NSU

NOZZLE DIAM. INCHES	SPRINKLER PRESSURE METRES	FLOW RATE L/SEC.	METRES HEAD LOSS IN 100mHOSE		SPRINKLER WETTED WIDTH METRES	LANE SPACING		AREA IRRIGATED IN 200m RUN HECTARES	DEPTH OF WATER APPLIED IN mm				
			2½"	3"		WIND VELOCITY M.P.H.	METRES		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
5/8	40	4.9	4	1.3	60.9	0 to 5 5 to 10 Over 10	42.6 36.5 30.5	.85 .73 .61	8 10 12	14 17 20	23 27 32	47 56 67	97 114 136
	50	5.6	5	1.7	63.6	0 to 5 5 to 10 Over 10	44.5 38.2 31.8	.89 .76 .64	9 11 13	16 18 22	25 29 35	52 61 73	106 124 149
	60	6	5.6	1.9	66.1	0 to 5 5 to 10 Over 10	46.3 39.7 33.1	.93 .79 .66	9 11 13	16 19 23	26 30 36	54 63 75	110 128 153
9/16	40	4	2.7	.9	58.7	0 to 5 5 to 10 Over 10	41.1 35.2 29.4	.82 .7 .59	7 8 10	12 14 17	19 22 27	40 47 56	82 96 115
	50	4.6	3.4	1.1	61.6	0 to 5 5 to 10 Over 10	43.1 36.9 30.8	.86 .74 .62	8 9 11	13 16 19	21 25 29	44 51 62	90 105 126
	60	5	4	1.3	64.2	0 to 5 5 to 10 Over 10	44.9 38.5 32.1	.9 .77 .64	8 9 11	14 16 20	22 25 31	46 53 65	94 109 132
17/32	40	3.6	2.2	.8	56.9	0 to 5 5 to 10 Over 10	39.8 34.1 28.5	.64 .68 .57	6 8 9	11 13 16	18 21 25	37 44 52	76 89 107
	50	4	2.7	.9	59.8	0 to 5 5 to 10 Over 10	41.8 35.9 29.9	.84 .72 .6	7 8 10	12 14 17	19 22 26	40 46 55	81 94 113
	60	4.4	3.2	1.1	62.5	0 to 5 5 to 10 Over 10	43.7 37.5 31.3	.87 .75 .63	7 8 10	13 15 18	20 23 28	42 48 58	85 99 119
1/2	40	3.2	1.8	.7	54.7	0 to 5 5 to 10 Over 10	38.3 32.8 27.4	.76 .66 .55	6 7 8	11 12 15	17 19 23	35 40 48	71 82 99
	50	3.6	2.2	.8	57.6	0 to 5 5 to 10 Over 10	40.3 34.6 28.8	.81 .69 .58	6 7 9	11 13 16	18 21 25	37 43 52	76 88 106
	60	4	2.7	.9	60.4	0 to 5 5 to 10 Over 10	42.3 36.2 30.2	.85 .72 .6	7 8 10	12 14 17	19 22 26	39 45 55	80 93 112
						WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			.7 l/sec	.4 l/sec	.25 l/sec	.12 l/sec	.06 l/sec

NOTES (1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (metric)

Hose Diam. 2½ inch
Run Length 300 metres
Hose Length 150 metres
Sprinkler Nelson P100HD 21°

NOZZLE DIAM. INCHES	SPRINKLER PRESSURE METRES	FLOW RATE L/SEC.	HEAD LOSS IN 150m HOSE METRES	SPRINKLER WETTED WIDTH METRES	LANE SPACING		AREA IRRIGATED IN 300m RUN HECTARES	DEPTH OF WATER APPLIED IN mm				
					WIND VELOCITY M.P.H.	METRES		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
.9	40	10.6	23	85.6	0 to 5	59.9	1.8	8	15	23	49	100
					5 to 10	51.4	1.54	10	17	27	57	116
					Over 10	42.8	1.28	12	21	33	69	140
	50	12.5	31.5	91.9	0 to 5	64.3	1.93	9	16	26	54	110
					5 to 10	55.1	1.65	11	19	30	63	128
					Over 10	45.9	1.38	13	23	36	75	154
	60	13.6	37	97.5	0 to 5	68.2	2.05	9	17	26	55	112
					5 to 10	58.5	1.76	11	19	31	64	131
					Over 10	48.7	1.46	13	23	37	77	157
.8	40	8.8	16.5	81.2	0 to 5	56.8	1.7	7	13	20	43	87
					5 to 10	48.7	1.46	9	15	24	50	102
					Over 10	40.6	1.22	10	18	29	60	122
	50	9.83	20.7	87.3	0 to 5	61.1	1.83	8	13	21	45	91
					5 to 10	52.4	1.57	9	16	25	52	106
					Over 10	43.6	1.31	11	19	30	62	127
	60	10.7	24.3	91.6	0 to 5	64.1	1.92	8	14	22	46	94
					5 to 10	54.9	1.65	9	16	26	54	110
					Over 10	45.8	1.37	11	20	31	65	132
.7	40	6.7	10.2	75.3	0 to 5	52.7	1.58	6	11	17	35	72
					5 to 10	45.2	1.36	7	12	20	41	84
					Over 10	37.7	1.13	8	15	23	49	100
	50	7.6	12.9	81.5	0 to 5	57.1	1.71	6	11	18	37	75
					5 to 10	49	1.47	7	13	20	43	87
					Over 100	40.7	1.22	9	16	25	51	105
	60	8.3	14.9	85.7	0 to 5	60	1.8	7	12	18	38	78
					5 to 10	51.4	1.54	8	14	21	45	91
					Over 10	42.8	1.28	9	16	25	53	109
.6	40	5	6	69.5	0 to 5	48.6	1.46	5	9	14	28	58
					5 to 10	41.7	1.25	6	10	16	33	67
					Over 10	34.7	1.04	7	12	19	40	81
	50	5.6	7.5	74.1	0 to 5	51.9	1.56	5	9	14	30	61
					5 to 10	44.5	1.33	6	11	17	35	71
					Over 10	37	1.11	7	13	19	42	85
	60	6.1	8.5	78.3	0 to 5	54.8	1.64	5	9	15	31	63
					5 to 10	47	1.41	6	11	17	36	73
					Over 10	39.1	1.17	7	13	21	43	88
					WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			1 l/sec	.6 l/sec	.36 l/sec	.17 l/sec	.08 l/sec

NOTES
(1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (metric)

Hose Diam. 2½ inch
Run Length 300 metres

Hose Length 150 metres
Sprinkler S.X. Mark NSU

NOZZLE DIAM. INCHES	SPRINKLER PRESSURE METRES	FLOW RATE L/SEC.	HEAD LOSS IN 150m HOSE METRES	SPRINKLER WETTED WIDTH METRES	LANE SPACING		AREA IRRIGATED IN 300m RUN HECTARES	DEPTH OF WATER APPLIED IN mm				
					WIND VELOCITY M.P.H.	METRES		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
5/8	40	4.9	6	60.9	0 to 5 5 to 10 Over 10	42.6 36.5 30.5	1.28 1.09 .91	5 6 8	10 11 14	15 18 21	32 37 45	65 76 91
	50	5.6	7.5	63.6	0 to 5 5 to 10 Over 10	44.5 38.2 31.8	1.34 1.15 .95	6 7 8	11 12 15	17 19 23	35 41 48	71 83 99
	60	6	8.4	66.1	0 to 5 5 to 10 Over 10	46.3 39.7 33.1	1.39 1.19 .99	6 7 9	11 13 15	17 20 24	36 42 50	73 85 102
9/16	40	4	4	58.7	0 to 5 5 to 10 Over 10	41.1 35.2 29.4	1.23 1.05 .88	5 5 7	8 9 11	13 15 18	27 31 38	55 64 77
	50	4.6	5.1	61.6	0 to 5 5 to 10 Over 10	43.1 36.9 30.8	1.29 1.11 .92	5 6 7	9 10 12	14 16 20	29 34 41	60 70 84
	60	5	6	64.2	0 to 5 5 to 10 Over 10	44.9 38.5 32.1	1.35 1.15 .96	5 6 7	9 11 13	15 17 21	31 36 43	63 73 88
17/32	40	3.6	3.3	56.9	0 to 5 5 to 10 Over 10	39.8 34.1 28.5	1.19 1.02 .85	4 5 6	8 9 11	12 14 17	25 29 35	51 60 71
	50	4	4	59.8	0 to 5 5 to 10 Over 10	41.8 35.9 29.9	1.25 1.08 .89	5 5 6	8 9 11	13 15 18	26 31 37	54 63 75
	60	4.4	4.8	62.5	0 to 5 5 to 10 Over 10	43.7 37.5 31.3	1.31 1.12 .94	5 6 7	8 10 12	13 15 18	28 32 39	57 66 79
1/2	40	3.2	2.7	54.7	0 to 5 0 to 5 Over 10	38.3 32.8 27.4	1.15 .98 .82	4 5 6	7 8 10	11 13 15	23 27 32	47 55 66
	50	3.6	3.3	57.6	0 to 5 5 to 10 Over 10	40.3 34.6 28.8	1.21 1.04 .86	4 5 6	7 9 10	12 14 16	24 29 34	50 59 70
	60	4	4	60.4	0 to 5 5 to 10 Over 10	42.3 36.2 30.2	1.27 1.08 .91	5 5 6	8 9 11	12 14 17	26 30 37	53 62 75
					WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			1 l/sec	.6 l/sec	.36 l/sec	.17 l/sec	.08 l/sec

NOTES (1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (imperial units)

Hose Diam. 2½ inch and 3 inch
Run Length 10 chains
Hose Length 5 chain
Sprinkler S.X. Mark NSU

NOZZLE DIAM. INCHES	PRESSURE AT SPRINKLER P.S.I.	FLOW RATE		FRICTION LOSS IN 330' HOSE, IRRIGATOR, ETC. P.S.I.		SPRINKLER WETTED WIDTH FEET	LANE SPACING		AREA IRRIGATED IN 10 CHAIN RUN ACRES	DEPTH OF WATER APPLIED IN INCHES				
		G.P.M.	G.P.H.	3"	2½"		WIND VELOCITY M.P.H.	FEET		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
5/8	60	67.3	4040	2	6	202	0 to 5 5 to 10 Over 10	141 121 101	2.14 1.83 1.53	.33 .39 .47	.59 .68 .81	.92 1.07 1.28	1.92 2.24 2.69	3.93 4.58 5.49
	70	73.1	4390	2.3	6.6	208	0 to 5 5 to 10 Over 10	146 125 104	2.21 1.89 1.58	.35 .41 .49	.62 .72 .86	.97 1.13 1.35	2.02 2.36 2.83	4.12 4.82 5.79
	80	78.4	4700	2.6	7.3	214	0 to 5 5 to 10 Over 10	150 128 107	2.27 1.94 1.62	.37 .43 .51	.64 .75 .90	1.01 1.18 1.41	2.11 2.47 2.95	4.31 5.05 6.04
	90	83.3	5000	2.8	8.3	220	0 to 5 5 to 10 Over 10	154 132 110	2.33 2.00 1.67	.38 .44 .53	.66 .78 .93	1.04 1.22 1.46	2.18 2.54 3.05	4.46 5.20 6.24
9/16	60	55.4	3320	1.4	4	195	0 to 5 5 to 10 Over 10	137 117 98	2.08 1.77 1.48	.28 .33 .40	.50 .58 .69	.78 .91 1.09	1.63 1.91 2.28	3.33 3.90 4.66
	70	60.2	3610	1.6	5	202	0 to 5 5 to 10 Over 10	141 121 101	2.14 1.83 1.53	.30 .35 .42	.52 .61 .73	.82 .96 1.15	1.72 2.01 2.40	3.52 4.10 4.91
	80	64.6	3880	1.8	5.3	208	0 to 5 5 to 10 Over 10	146 125 104	2.21 1.89 1.58	.31 .36 .44	.54 .64 .76	.85 1.00 1.20	1.78 2.08 2.50	3.64 4.26 5.12
	90	68.5	4110	2	6	213	0 to 5 5 to 10 Over 10	149 128 107	2.26 1.94 1.62	.32 .37 .45	.57 .66 .78	.89 1.03 1.23	1.85 2.16 2.58	3.79 4.41 5.27
17/32	60	49.0	2940	1.1	3.3	189	0 to 5 5 to 10 Over 10	132 113 95	2.00 1.71 1.44	.26 .31 .36	.46 .53 .63	.72 .84 .99	1.50 1.75 2.08	3.06 3.57 4.25
	70	52.9	3170	1.3	3.7	196	0 to 5 5 to 10 Over 10	137 118 98	2.08 1.79 1.48	.27 .31 .38	.47 .55 .66	.74 .86 1.04	1.56 1.81 2.18	3.18 3.69 4.45
	80	56.8	3410	1.4	4.3	202	0 to 5 5 to 10 Over 10	141 121 101	2.14 1.83 1.53	.28 .33 .39	.50 .57 .69	.78 .90 1.08	1.62 1.89 2.27	3.32 3.87 4.63
	90	60.3	3620	1.6	5	208	0 to 5 5 to 10 Over 10	146 125 104	2.21 1.89 1.58	.29 .34 .41	.51 .59 .71	.80 .93 1.12	1.67 1.95 2.34	3.40 3.97 4.78
1/2	60	44.2	2650	.9	2.7	182	0 to 5 5 to 10 Over 10	127 109 91	1.92 1.65 1.38	.24 .28 .34	.43 .50 .60	.67 .78 .94	1.40 1.64 1.96	2.87 3.34 4.0(
	70	47.9	2870	1	3.3	189	0 to 5 5 to 10 Over 10	132 113 95	2.00 1.71 1.44	.25 .30 .35	.45 .52 .62	.70 .82 .97	1.46 1.71 2.03	2.99 3.49 4.15
	80	51.3	3080	1.2	3.7	195	0 to 5 5 to 10 Over 10	137 117 98	2.08 1.77 1.48	.26 .31 .37	.46 .54 .64	.72 .85 1.01	1.51 1.77 2.11	3.08 3.61 4.31
	90	54.4	3260	1.4	4	201	0 to 5 5 to 10 Over 10	141 121 101	2.14 1.83 1.53	.27 .32 .38	.47 .55 .66	.74 .87 1.04	1.56 1.81 2.17	3.18 3.70 4.44
							WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			9.3 GPM	5.3 GPM	3.3 GPM	1.6 GPM	.8 GPM

NOTES (1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (imperial units)

Hose Diam. 2½ inch or 3 inch
Run Length 10 chain
Hose Length 5 chain
Sprinkler Nelson P100 HD 21°

NOZZLE DIAM. INCHES	PRESSURE AT SPRINKLER P.S.I.	FLOW RATE		FRICTION LOSS IN 330' HOSE, IRRIGATOR, ETC. P.S.I.		SPRINKLER WETTED WIDTH FEET	LANE SPACING		AREA IRRIGATED IN 10 CHAIN RUN ACRES	DEPTH OF WATER APPLIED IN INCHES				
		G.P.M.	G.P.H.	3"	2½"		WIND VELOCITY M.P.H.	FEET		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
.9	60	151.6	9100	9	27.0	286	0 to 5 5 to 10 Over 10	200 172 143	3.03 2.61 2.17	.53 .62 .74	.93 1.08 1.30	1.46 1.70 2.04	3.06 3.55 4.27	6.24 7.26 8.73
	70	164.1	9850	10	31.2	301	0 to 5 5 to 10 Over 10	211 181 150	3.20 2.74 2.27	.55 .64 .77	.95 1.11 1.34	1.50 1.75 2.11	3.14 3.66 4.41	6.41 7.47 9.01
.8	60	119.2	7150	6	17.0	272	0 to 5 5 to 10 Over 10	190 164 136	2.88 2.48 2.06	.44 .51 .61	.77 .89 1.08	1.21 1.40 1.69	2.53 2.93 3.53	5.17 5.99 7.22
	70	129.1	7750	6.5	20.0	286	0 to 5 5 to 10 Over 10	200 172 143	3.03 2.61 2.17	.45 .53 .63	.79 .92 1.11	1.24 1.45 1.74	2.60 3.03 3.64	5.32 6.18 7.44
	80	137.5	8250	7.2	22.5	296	0 to 5 5 to 10 Over 10	207 178 148	3.14 2.70 2.24	.47 .54 .65	.81 .95 1.14	1.28 1.49 1.79	2.68 3.11 3.75	5.47 6.36 7.65
	90	145.8	8750	8.6	25.0	306	0 to 5 5 to 10 Over 10	214 184 153	3.24 2.79 2.32	.48 .56 .67	.83 .97 1.17	1.31 1.53 1.84	2.75 3.20 3.84	5.61 6.53 7.85
.7	60	91.7	5500	3.4	10.3	252	0 to 5 5 to 10 Over 10	176 152 126	2.67 2.30 1.91	.37 .42 .51	.64 .74 .89	1.00 1.16 1.40	2.10 2.43 2.93	4.29 4.97 5.99
	70	100	6000	4	12.4	267	0 to 5 5 to 10 Over 10	187 161 133	2.83 2.44 2.02	.37 .44 .53	.66 .76 .92	1.03 1.20 1.45	2.16 2.50 3.03	4.40 5.12 6.19
	80	106.6	6400	4.5	13.8	276	0 to 5 5 to 10 Over 10	193 166 138	2.92 2.52 2.09	.39 .45 .54	.68 .79 .95	1.06 1.24 1.49	2.23 2.59 3.11	4.55 5.29 6.36
	90	112.5	6750	5	15.5	286	0 to 5 5 to 10 Over 10	200 172 143	3.03 2.61 2.17	.39 .46 .55	.69 .80 .97	1.08 1.26 1.52	2.27 2.64 3.17	4.63 5.39 6.48
.6	60	67.5	4050	2	5.8	233	0 to 5 5 to 10 Over 10	163 140 116	2.47 2.12 1.76	.29 .34 .41	.51 .59 .71	.80 .93 1.12	1.67 1.94 2.35	3.41 3.97 4.79
	70	73.3	4400	2.2	6.8	243	0 to 5 5 to 10 Over 10	170 146 121	2.58 2.21 1.83	.30 .35 .42	.53 .62 .74	.83 .97 1.17	1.74 2.02 2.44	3.55 4.14 4.99
	80	78.3	4700	2.6	7.9	252	0 to 5 5 to 10 Over 10	176 152 126	2.67 2.30 1.91	.31 .36 .44	.55 .63 .76	.86 .99 1.20	1.79 2.08 2.51	3.66 4.24 5.12
	90	83.3	5000	2.8	8.7	262	0 to 5 5 to 10 Over 10	183 158 131	2.77 2.39 1.98	.32 .37 .45	.56 .65 .78	.88 1.02 1.23	1.84 2.13 2.56	3.75 4.34 5.24
							WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			9.3 GPM	5.3 GPM	3.3 GPM	1.6 GPM	.8 GPM

NOTES (1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (imperial units)

Hose Diam. 2½ inch
Run Length 15 chain

Hose Length 7½ chain
Sprinkler Nelson P100 HD 21°

NOZZLE DIAM. INCHES	PRESSURE AT SPRINKLER P.S.I.	FLOW RATE		FRICTION LOSS IN 495' HOSE, IRRIGATOR ETC. P.S.I.	SPRINKLER WETTED WIDTH FEET	LANE SPACING		AREA IRRIGATED IN 15 CHAIN RUN ACRES	DEPTH OF WATER APPLIED IN INCHES				
		G.P.M.	G.P.H.			WIND VELOCITY M.P.H.	FEET		4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
.9	60	151.6	9100	40.5	286	0 to 5 5 to 10 Over 10	200 172 143	4.6 3.9 3.3	.35 .41 .5	.62 .72 .87	.97 1.13 1.36	2.03 2.36 2.84	4.17 4.85 5.84
.8	60	119.2	7150	25.5	272	0 to 5 5 to 10 Over 10	190 164 136	4.3 3.7 3.1	.29 .34 .41	.51 .59 .72	.81 .93 1.13	1.68 1.95 2.35	3.45 4.00 4.83
	70	129.1	7750	30	286	0 to 5 5 to 10 Over 10	200 172 143	4.6 3.9 3.3	.30 .35 .42	.53 .61 .74	.83 .96 1.16	1.73 2.01 2.42	3.55 4.13 4.97
	80	137.5	8250	34	296	0 to 5 5 to 10 Over 10	207 178 148	4.7 4.1 3.4	.31 .36 .43	.54 .63 .76	.85 .99 1.19	1.78 2.07 2.49	3.66 4.25 5.12
.7	60	91.7	5500	15.5	252	0 to 5 5 to 10 Over 10	176 152 126	4.0 3.5 2.9	.24 .28 .34	.43 .49 .6	.67 .78 .94	1.39 1.61 1.95	2.87 3.32 4.01
	70	100	6000	18.6	267	0 to 5 5 to 10 Over 10	187 161 133	4.3 3.7 3.0	.25 .29 .35	.44 .51 .62	.69 .80 .97	1.43 1.66 2.01	2.94 3.42 4.14
	80	106.6	6400	21	276	0 to 5 5 to 10 Over 10	193 166 138	4.4 3.8 3.1	.26 .30 .36	.45 .53 .63	.71 .83 .99	1.48 1.72 2.07	3.04 3.54 4.25
	90	112.5	6750	23	286	0 to 5 5 to 10 Over 10	200 172 143	4.6 3.9 3.3	.26 .31 .37	.46 .54 .64	.72 .84 1.01	1.51 1.75 2.11	3.10 3.60 4.33
.6	60	67.5	4050	8.7	233	0 to 5 5 to 10 Over 10	163 140 116	3.7 3.2 2.6	.19 .23 .27	.34 .39 .48	.53 .62 .75	1.11 1.29 1.56	2.28 2.66 3.20
	70	73.3	4400	10.2	243	0 to 5 5 to 10 Over 10	170 146 121	3.9 3.3 2.8	.2 .23 .28	.35 .41 .49	.55 .65 .78	1.15 1.34 1.62	2.37 2.76 3.34
	80	78.3	4700	12	252	0 to 5 5 to 10 Over 10	176 152 126	4.0 3.5 2.9	.21 .24 .29	.36 .42 .51	.57 .66 .80	1.19 1.38 1.66	2.45 2.84 3.42
	90	83.3	5000	13	262	0 to 5 5 to 10 Over 10	183 158 131	4.2 3.6 3.0	.21 .25 .3	.37 .43 .52	.58 .68 .82	1.22 1.41 1.70	2.51 2.90 3.50
						WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			13.2 GPM	7.9 GPM	4.7 GPM	2.2 GPM	1.1 GPM

NOTES
(1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

MODEL TCD 2000 IRRIGATOR PERFORMANCE TABLE (imperial units)

Hose Diam. 2½ inch
Run Length 15 chain
Hose Length 7½ chain
Sprinkler S.X. Mark NSU

NOZZLE DIAM. INCHES	PRESSURE AT SPRINKLER P.S.I.	FLOW RATE G.P.M.	FLOW RATE G.P.H.	FRICTION LOSS IN 495' HOSE, IRRIGATOR ETC. P.S.I.	SPRINKLER WETTED WIDTH FEET	LANE SPACING WIND VELOCITY M.P.H.	LANE SPACING FEET	AREA IRRIGATED IN 15 CHAIN RUN ACRES	DEPTH OF WATER APPLIED IN INCHES 4 HOUR RUN	7 HOUR RUN	11 HOUR RUN	23 HOUR RUN	47 HOUR RUN
5/8	60	67.3	4040	8.6	202	0 to 5 5 to 10 Over 10	141 121 101	3.2 2.8 2.3	.22 .26 .31	.39 .46 .55	.61 .71 .86	1.28 1.49 1.78	2.63 3.06 3.67
	70	73.1	4390	10	208	0 to 5 5 to 10 Over 10	146 125 104	3.3 2.8 2.4	.23 .27 .33	.41 .48 .57	.64 .75 .90	1.34 1.57 1.88	2.76 3.22 3.87
	80	78.4	4700	11	214	0 to 5 5 to 10 Over 10	150 128 107	3.4 2.9 2.4	.24 .28 .34	.43 .5 .6	.67 .79 .94	1.40 1.64 1.96	2.88 3.37 4.03
	90	83.3	5000	12.4	220	0 to 5 5 to 10 Over 10	154 132 110	3.5 3.0 2.5	.25 .29 .35	.44 .52 .62	.70 .81 .97	1.45 1.69 2.03	2.98 3.48 4.17
9/16	60	55.4	3320	6	195	0 to 5 5 to 10 Over 10	137 117 98	3.1 2.7 2.2	.19 .22 .26	.33 .39 .46	.52 .61 .73	1.08 1.27 1.51	2.23 2.61 3.11
	70	60.2	3610	7.5	202	0 to 5 5 to 10 Over 10	141 121 101	3.2 2.8 2.3	.2 .23 .28	.35 .41 .49	.55 .64 .77	1.14 1.33 1.60	2.35 2.74 3.28
	80	64.6	3880	8	208	0 to 5 5 to 10 Over 10	146 125 104	3.3 2.8 2.4	.21 .24 .29	.36 .42 .51	.57 .66 .80	1.18 1.38 1.66	2.44 2.85 3.42
	90	68.5	4110	9	213	0 to 5 5 to 10 Over 10	149 128 107	3.4 2.9 2.4	.21 .25 .3	.37 .44 .53	.59 .69 .82	1.23 1.43 1.71	2.53 2.95 3.53
17/32	60	49.0	2940	5	189	0 to 5 5 to 10 Over 10	132 113 95	3.0 2.6 2.2	.17 .20 .24	.3 .36 .42	.48 .56 .66	.99 1.16 1.38	2.04 2.39 2.84
	70	52.9	3170	5.6	196	0 to 5 5 to 10 Over 10	137 118 98	3.1 2.7 2.2	.18 .21 .25	.32 .37 .44	.50 .58 .69	1.03 1.20 1.45	2.13 2.47 2.97
	80	56.8	3410	6.4	202	0 to 5 5 to 10 Over 10	141 121 101	3.2 2.8 2.3	.19 .22 .26	.33 .39 .46	.52 .60 .72	1.08 1.26 1.51	2.22 2.59 3.10
	90	60.3	3620	7.5	208	0 to 5 5 to 10 Over 10	146 125 104	3.3 2.8 2.4	.19 .22 .27	.34 .4 .47	.53 .62 .75	1.11 1.29 1.55	2.27 2.66 3.19
1/2	60	44.2	2650	4	182	0 to 5 5 to 10 Over 10	127 109 91	2.9 2.5 2.1	.16 .19 .23	.29 .33 .4	.45 .52 .62	.93 1.09 1.30	1.92 2.23 2.67
	70	47.9	2870	4.9	189	0 to 5 5 to 10 Over 10	132 113 95	3.0 2.6 2.2	.17 .2 .24	.3 .35 .41	.47 .54 .65	.97 1.13 1.35	2.00 2.33 2.78
	80	51.3	3080	5.5	195	0 to 5 5 to 10 Over 10	137 117 98	3.1 2.7 2.2	.17 .2 .24	.31 .36 .43	.48 .56 .67	1.00 1.17 1.40	2.06 2.41 2.88
	90	54.4	3260	6	201	0 to 5 5 to 10 Over 10	141 121 101	3.2 2.8 2.3	.18 .21 .25	.32 .37 .44	.50 .58 .69	1.03 1.20 1.44	2.12 2.48 2.97
						WATER MOTOR USES WATER AT FOLLOWING RATES (MOTOR IN FRONT ROCKER ARM HOLE)			13.2 GPM	7.9 GPM	4.7 GPM	2.2 GPM	1.1 GPM

NOTES (1) When calculating total system head include sprinkler height above ground – e.g. 2.2 metres (7.2 feet).
(2) Flow rate shown is for sprinkler discharge only. For total system flow rate add water motor discharge at selected travel rate.
(3) Friction head loss for hose includes hose coupling losses.

PARTS LISTS

REPLACEMENT PARTS

When ordering Replacement Parts, please quote **Serial Number of Irrigator** (branded on the rear end of the chassis, beneath the gatevalve) and **Symbol Number and Name of Part** from the Parts List.

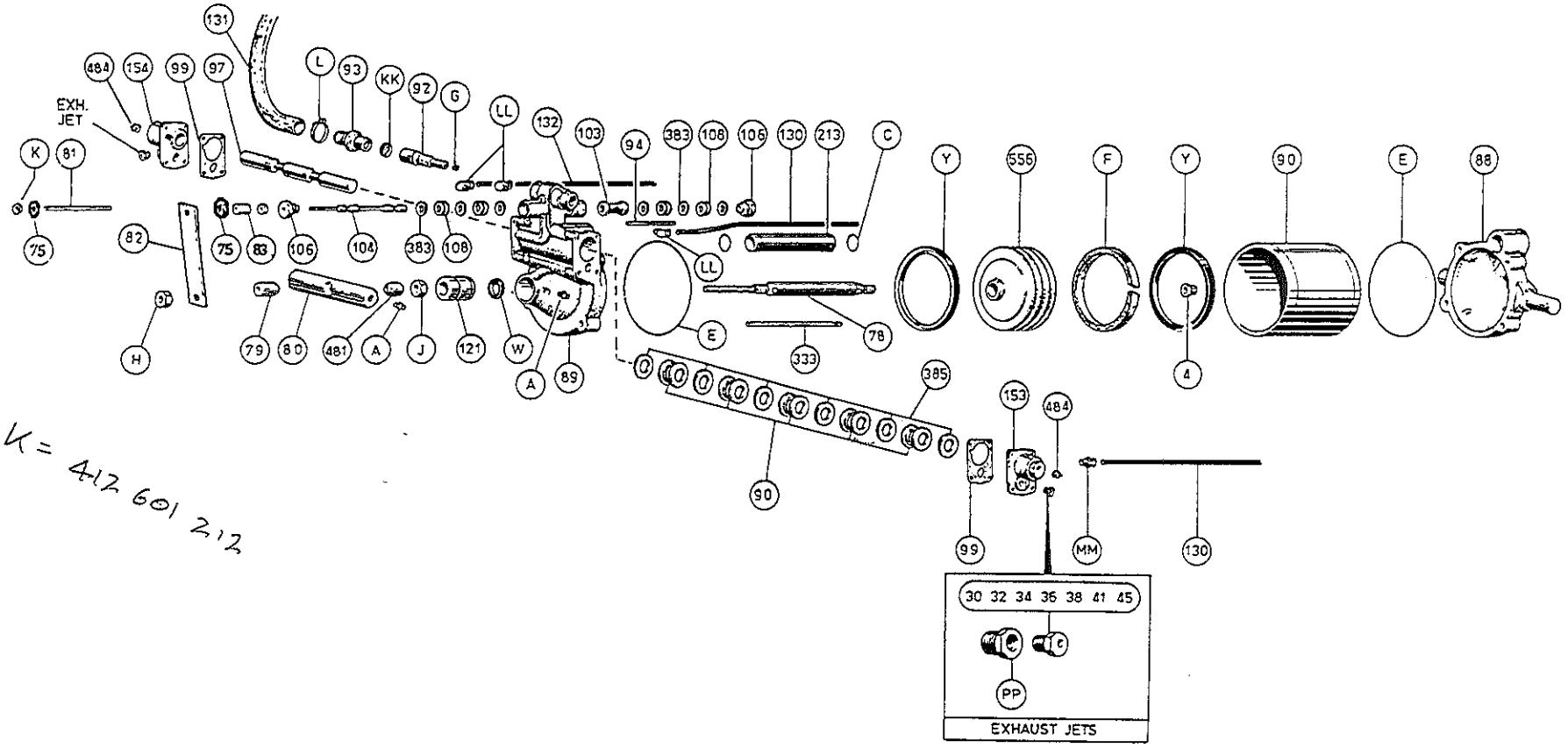
IRRIGATOR

No. Per Unit	Symbol Number	Name of Part
1	TCD1	Chassis
1	NRB11	Stopping Valve Spring
1	TCD12	Chassis Side Plate — Right Hand
1	TCD13	Chassis Side Plate — Left Hand
2	TCD14	Chassis Side Plate Reinforcing Plate
2	TCD18	Retaining Cup
2	TCD19	Axle Brace
1	TCE20	Axle — 60 inch
2	TCD24	Tyre
1	TCD25	Pressure Gauge
1	TCD26	Standpipe
1	TCD27	Standpipe Spacer
4	TCD28	Standpipe Stud
1	TCD32	Tailshaft Cradle
1	TCD44	Drive Shaft Bearing Adjusting Collar
1	TCD45	Drive Shaft End
2	PCL51	Wheel Bearing Felt Seal
1	TCD60	Stopping Rod
2	PCQ70	Wheel Hub
1	TCD71	Rocker Arm
2	LHF72	Wheel Hub Dust Cover
2	TCD73B	Bottom Driving Arm
2	TCD74B	Top Driving Arm
5	TCD75	Driving Arm Bush
1	TCD97	Cable Rewind Handle
1	TCD100	Cable Drum
1	TCD102	Stopping Valve End Washer
1	TCD126	Cable — 300m
2	TCD135	Hose Connection Retainer
4	TCD146	Rocker Arm Bush
1	TCD155	Filter Retainer
1	TCD161	Bevel Pinion Bearing Spacer
1	TCD162	Hose Reel Drive Gear Mounting Plate
As Req.	TCD164	Bevel Pinion Shim
1	TCD165	Hose Reel Drive Bevel Pinion and Shaft
1	TCD166	Hose Reel Drive Bevel Gear
1	TCD168	Hose Reel Pinion Retaining Washer
1	TCD169	Hose Reel Pinion
4	TCD170	Bevel Gear Shim
1	TCD171	Bevel Gear Bearing Spicer
4	TCD172	Bevel Gear Bearing Shim
1	TCD184	Canopy Brace — Rear

No. Per Unit	Symbol Number	Name of Part
1	TCD186B	Canopy
2	TCD187B	Driving Arm Pin Bush
1	TCD192	Hose Reel Gear
2	TCD247B	Canopy Brace — Front
1	TCD260	Stopping Valve Setting Arm
1	TCD263	Stopping Valve Setting Plate
1	TCD271	Tool Box Insert
38	TCD308	Filter Segment
1	PCH313	Filter Hose Connector
1	TCD376	Cable Drum Brake Pad
6	TCD380	Side Plate Bearing Housing
6	TCD381	Side Plate Bearing Inner Ring
8	TCD382	Driving Arm Bush Washer
1	TCD383	Cable Drum Brake Guide Collar (not illustrated)
1	PCE390	Cable Drum Brake Lever
2	PCE396	Cable Drum Brake Release Spring Collar
1	TCD397	Cable Drum Brake Spindle
1	TCD398B	Cable Drum Brake Guide (not illustrated)
1	PCE398	Cable Drum Brake Lever Locking Plate
1	PCE399	Cable Drum Brake Release Jack Screw
2	TCD418	Stub Axle
1	TCD444	Cable Clamp Washer
1	TCD453	Stopping Valve Line Cover
2		Stopping Valve Hose Clamping Saddle — (25 mm Conduit Saddle)
1		Tailshaft — (N2AG — 1634/79 1/4 Tailshaft — PCE/M)
2	AB	Rocker Arm Grease Nipple — (⅛ in. B.S.P. 90° Grease Nipple)
2	B	Wheel Seal — (oil Seal PR9064)
3	D	Inlet Bend O-Gasket — (Lurene AN6230-16 O-Gasket)
14		Canopy to Drive Gear Mounting Bolt (6) Canopy Mounting Bolt (8) — (3/4 in. x 5/16 in. — 18 UNC H.T. Bolt without Nut)
10		Stopping Valve to Chassis Bolt (2) Valve End Cap to Water Motor Bolt (8) — (1 in. x 5/16 in. — 18 UNC H.T. Bolt without Nut)
1		Hose Guide Retaining Collar BOlt — (2 in. x 5/16 in. — 18 UNC H.T. Bolt without Nut)
2		Mud Scraper Bolt — (3/4 in. x 3/8 in. — 16 UNC H.T. Bolt without Nut)
36 As Ord.		Deck to Hose Reel Bolt — (2½ in. Hose Only) — (3/4 in. x 3/8 in. — 16 UNC H.T. Bolt without Nut)
48 As Ord.		Deck to Hose Reel Bolt — (3 in. Hose Only) — (3/4 in. x 3/8 in. — 16 UNC H.T. Bolt without Nut)
6		Stopping Vavle Rod Bolt (1) Chassis Brace Bar to Side Plate Bolt (4) Tailshaft Cradle to Side Plate (1) — (1 in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)

No. Per Unit	Symbol Number	Name of Part
15		Chassis Rail to Side Plate Bolt (10) Filter Retaining Bolt (3)
3		Hose Guide Carrier Frame (2) — (1½ in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
6		Cable Drum Brake Mounting Bolt (2) Cable Drum Brake Adjusting Bolt (1) — (1¾ in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
5		Internal Gear Mounting Bolt — (2 in. x ⅜ in. — 16 UNC H.T. Setscrew)
3		Top Driving Arm Bolt (3) Bottom Driving Arm Bolt (2) — (2¼ in. x. ⅜ in. — 20 UNF H.T. Bolt without Nut)
7		Cable Guide Bar Bolt — (2¾ in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
1		Standpipe to Side Plate Bolt — (1 in. x ½ in. — 13 UNC H.T. Setscrew)
7		Bevel Gear Bolt — (1¼ in. x ½ in. — 13 UNC H.T. Setscrew)
1		Axle Brace to Chassis Bolt (4) Chassis to Axle Bolt (2) Hose Guide Arm Adjusting Rod Mounting Bolt (1) — (1½ in. x ½ in. — 13 UNC H.T. Bolt without Nut)
4		Cable Guide Roller Mounting Bolt — (1¾ in. x ½ in. — 13 UNC H.T. Bolt without Nut)
1		Stub Axle to Axle Bolt — (1¾ in. x ½ in. — 13 UNC H.T. Bolt without Nut)
1		Stopping Rod Friction Bolt — (2½ in. x. ½ in. — 13 UNC H.T. Bolt without Nut)
1		Standpipe to Side Plate Bolt — (3 in. x. ½ in. — 13 UNC H.T. Bolt without Nut)
7	G	Hose Guide Arm Mounting Bolt — (3½ in. x. ½ in. — 13 UNC H.T. Bolt without Nut) Flange Bearing Setscrew (6) Bevel Pinion Bearing Adjusting Collar (1) — (5/16 in. x 5/16 in. — 18 UNC S.S. Cup Point Socket Setscrew)
10		Wheel Stud — (Ajax Wheel Stud — 80130050)
10		Wheel Nut — (7/16 in. — 20 UNF 45 Degree Chamfer Wheel Nut)
2		Stopping Valve Hose to Chassis Nut — (¼ in. — 20 UNC Nut)
5		Top Driving Arm Bolt Nut (3) Bottom Driving Arm Bolt Nut (2) — (⅜ in. — 24 UNF Nut)
9		1 Off each 5/16 in. Bolt — (5/16 in. — 18 UNC Nut)
25		1 Off each ⅜ in. Bolt — (⅜ in. — 16 UNC Nut)
14		1 Off each ½ in. Bolt — (½ in. — 13 UNC Nut)
2		Stopping Valve Hose to Chassis Spring Washer — (¼ in. Spring Washer)

No. Per Unit	Symbol Number	Name of Part
19		1 Off each 5/16 in. Bolt — (5/16 in. Spring Washer)
40		1 Off each ⅜ in. Bolt — (⅜ in. Spring Washer)
23		1 Off each ½ in. Bolt — (½ in. Spring Washer)
6	N	Side Plate Flange Bearing 4771096084 — (SKF 6008 — 2RS Ball Bearing)
6	W	Side Plate Bearing Seal — (Forsheda V Ring V — 60S)
2	Q	Rear Wheel Bearing — Outer — (Timken LM11949/11910 Roller Bearing)
2	R	Hose Reel Rewind Bearing — (Timken L44600LA/44610 Taper Roller Bearing)
2	S	Hose Reel Rewind Bearing — (Timken LM67000LA/67010 Taper Roller Bearing)
2	T	Rear Wheel Bearing — Inner — (Timken LM67048/67010 Roller Bearing)
2		Wheel — (5J x 14 in. Holden Road Wheel)
2	V	Inlet Bend Plug — (32 NB (1¼ in.) Hollow Galv. Malleable Pipe Plug)
1	X	Inlet U-Cup Packing — (Lurene No. 40 U-Cup Packing)
1	GG	Hose Reel Pinion Drive Key — (1¾ in. x ¼ in. x ¼ in. Plain Parallel Key)
1	SS	Stopping Rod Pin — (1 in. x ¼ in. Vogelsang Tension Pin)



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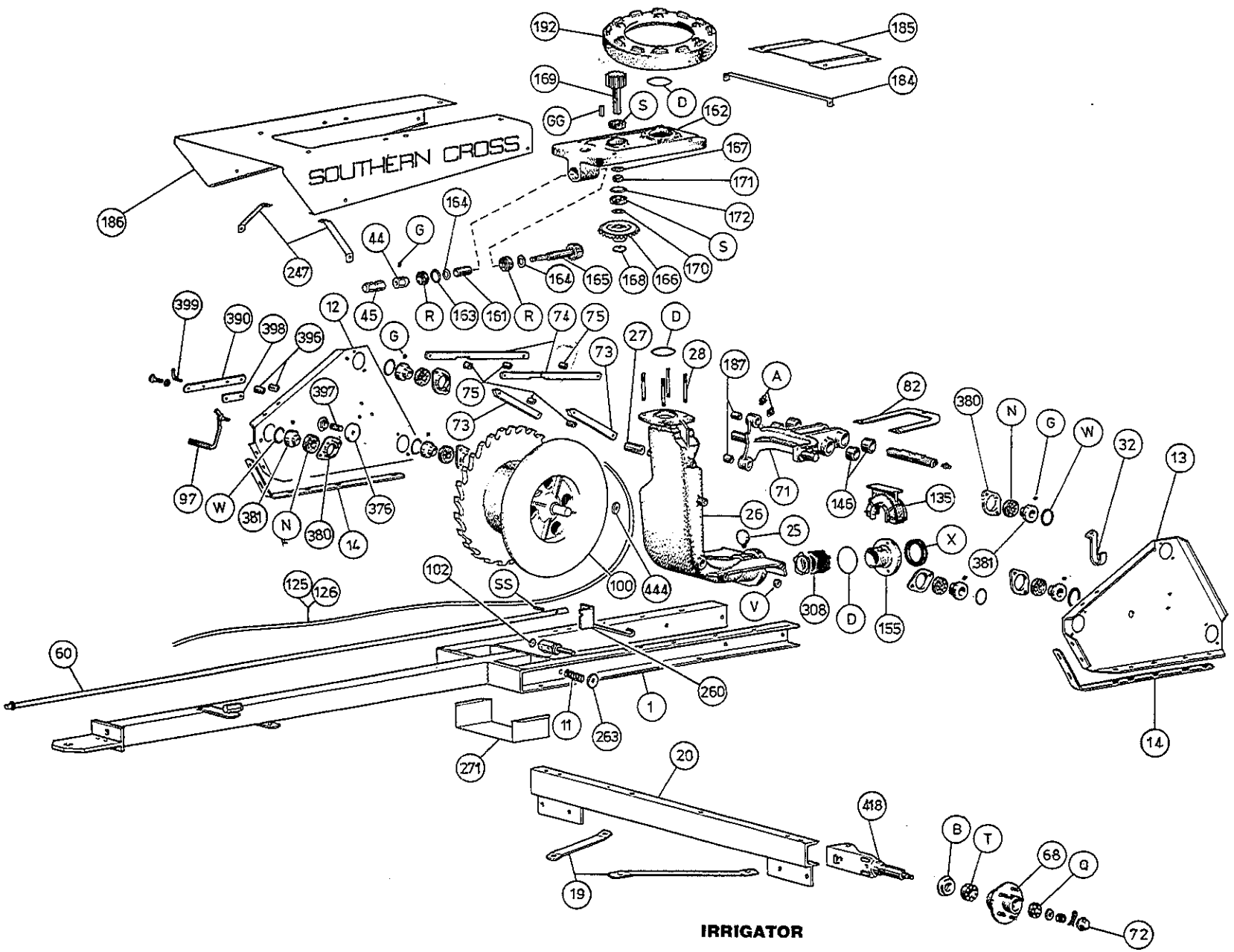
HYDRAULIC MOTOR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IRRIGATOR

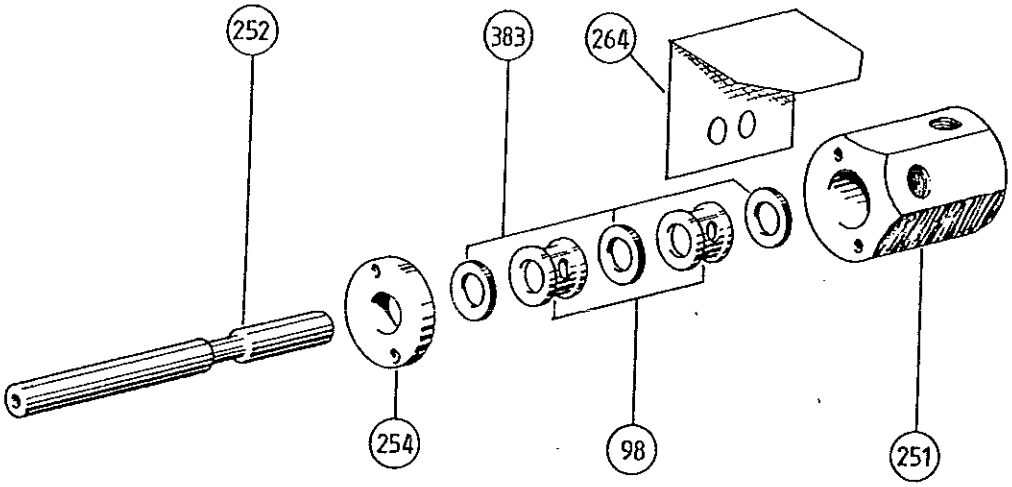
HYDRAULIC MOTOR

No. Per Unit	Symbol Number	Name of Part
1	RFE4	Hydraulic Motor Piston Nut
2	NSB30	1/16 in. Exhaust Jet
2	NSB32	3/32 in. Exhaust Jet
2	NSB34	⅛ in. Exhaust Jet
2	NSH36	5/32 in. Exhaust Jet
2	NSW38	3/16 in. Exhaust Jet
2	NSW41	¼ in. Exhaust Jet
2	NSW45	⅜ in. Exhaust Jet
2	LHW75	Pilot Valve Adjusting Nut
1	TCD78	Plunger Rod
1	TCD79	Plunger Rod to Rocker Arm Retaining Collar
1	TCD80B	Plunger Rod to Rocker Arm Connecting Spindle
1	TCD81	Pilot Valve Control Rod
1	TCD82B	Pilot Valve Lever
1	TCD83	Pilot Valve Rod Coupling
1	TCD88	Hydraulic Motor Bottom Cap
1	TCD89	Hydraulic Motor Top Cap
5	PCL90	Valve Body Lantern Ring
1	TCD90	Hydraulic Motor Barrel
1	TCD92B	Gate Valve Spindle
1	TCD93	Gate Valve Seat — Hose Fitting
1	TCD94	Gate Valve Handle
1	PCK97	Main Spool Valve
2	PCL99	Main Valve End Cap Gasket
1	PCL103	Pilot Valve Spacer Tube
1	TCD104	Pilot Valve Spindle
2	TCD106	Pilot Valve End Cap
4	PCK108	Lantern Ring — Pilot Valve
1	TCD121	Plunger Rod Bearing
2	TCD130	Hydraulic Motor to Stopping Valve Tube
1	TCD131	Hydraulic Motor to Filter Hose
2	TCD132	Pilot Valve Exhaust Tube
1	TCD153	Valve End Cap — Left Hand
1	TCD154	Valve End Cap — Right Hand
1	TCD213	Return Tube
4	TCD333	Hydraulic Motor Stud
6	PCK383	Valve Seal — Pilot Valve
6	PCK385	Main Valve Seal
1	TCD481	Plunger Rod to Rocker Arm Adjusting Collar
2	PCD484	Main Valve End Cap Plug
1	TCD556	Hydraulic Motor Piston
2	A	Water Motor Top Cap Grease Nipple (1) Rocker Spindle Grease Nipple (1) — (⅛ in. BSP Straight Grease Nipple — L29)
2	C	Return Tube O-Gasket 383001522 — (Lurene BS022 O-Gasket)
2	E	Hydraulic Motor Barrel to End Cap Seal 383002037 — (Lurene AN6230-37 O-Gasket)
1	F	Hydraulic Motor Piston Wear Ring 381203300 — (Ludowici 600 WR Wear Ring)

No. Per Unit	Symbol Number	Name of Part
1		Gate Valve Handle to Gate Valve Spindle — (5/16 in. x 5/16 in. — 18 UNC S.S. Cup Point Socket Setscrew)
1	H	Plunger Rod Adjusting Nut — Top — (½ in. — 13 UNC Nyloc Nut)
1	J	Plunger Rod Adjusting Nut — Bottom — (⅝ in. — 18 UNF Nut)
2	K	Pilot Valve Rod Nut — (⅜ in. — 16 UNC Brass Nut)
2	L	Water Motor Clip — (Utilux H4041 S.S. Hose Clip)
1	U	Water Motor Bottom Cap Plug — (20 NB (¾ in.) Hollow Galv. Malleable Pipe Plug)
1	W	Plunger Rod Sealing Ring 491 100 003 — (Lurene No. 20 U-Cup Packing)
2	Y	Hydraulic Motor Piston Sealing Ring 491100008 — (Lurene No. S1307 U-Cup Packing)
1	KK	Gate Valve Seal — (Lurene AN6227-15 "O" Ring) 363001015
3	LL	Hydraulic Motor to Stopping Valve Tube Fitting (1) Pilot Valve Exhaust Tube Fitting (2) — (BMEA-8-8 90° Compression Fitting)
2	PP	Exhaust Jet Reducing Bush — (⅜ in. x ⅛ in. Brass Reducing Bush)
1	MM	Hydraulic Motor to Stopping Valve Tube Fitting — (BMA-8-8 Straight Compression Fitting)
1		Gate Valve Handle — (2 in. x ¼ in. Tension Pin)

STOPPING VALVE

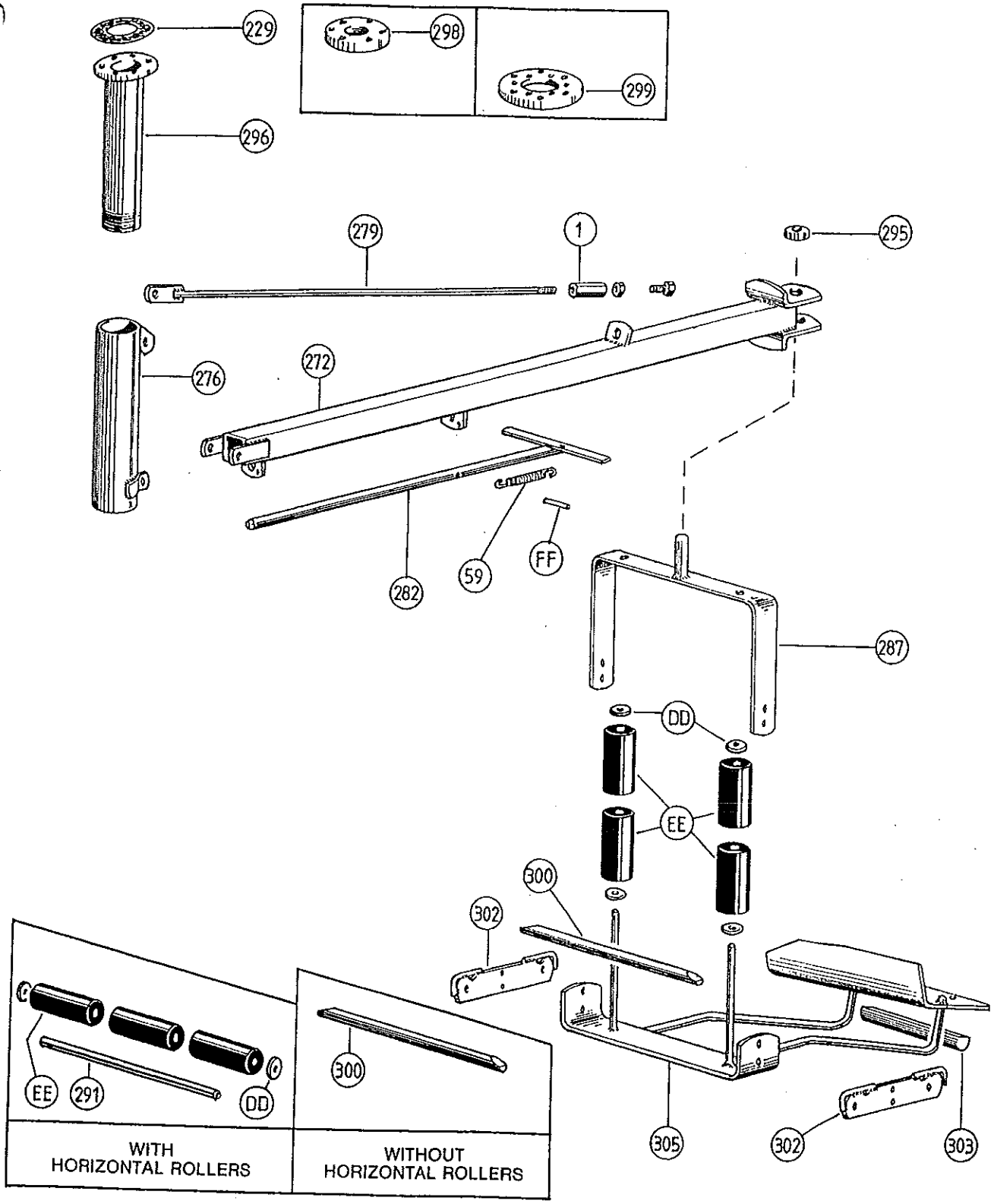
No. Per Unit	Symbol Number	Name of Part
2	PCC98	Lantern Ring
1	TCD251	Stopping Valve Body
1	TCD252	Stopping Valve Spindle
1	TCD254	Stopping Valve End Cap
1	TCD264	Stopping Valve Canopy
3	PCK383	Valve Seal — Stopping Valve



STOPPING VALVE

HOSE GUIDE AND ARM ASSEMBLY

No. Per Unit	Symbol Number	Name of Part
1	CCD1	Hose Guide Brace Coupling
1	PCC59	Hose Guide Locking Spring
1	TCD229	Standpipe Flange Gasket
1	TCD272	Hose Guide Arm
1	TCD276	Hose Guide Pivot Tube
1	TCD279	Hose Guide Brace
1	TCD282	Hose Guide Lock
1	TCD287	Hose Guide Carrier
1 As Req.	TCD291	Hose Guide Horizontal Roller Spindle
1	TCD295	Hose Guide Retaining Collar
1	TCD296	Standpipe Extension
1 As Req.	TCD298	Sprinkler Adaptor Flange — (to suit NSU and P100 Sprinkler)
1 As Req.	TCD299	Sprinkler Adaptor Flange — (to suit P150 Sprinkler)
1	TCD300	Hose Guide Horizontal Bar
1 As Req.	TCD300	Hose Guide Horizontal Bar
2	TCD302	Horizontal Spindle Mounting Plate
1	PCE303	Front Scraper Bar
1	TCD305	Hose Guide Frame
2		Horizontal Roller Mounting Bolt — (1 in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
As Req.	DD	Vertical Roller Adjustment Shims — (⅝ in. Plain Washer)
2		Horizontal Roller Mounting Bolt Washer — (⅜ in. Spring Washer)
4	EE	Vertical Rollers 492002 220 — (2¾ in x 4½ in. Long Bilge Rollers — Bushed ⅝ in. I/D)
3 As Req.	EE	Horizontal Rollers — (2¾ in. dia x 4½ in. Long Bilge Rollers — Bushed ⅝ in. I/D)
1	FF	Hose Guide Lock Retaining Pin — (1¼ in. x ¼ in. Vogelsang Tension Pin)
1		Hose Guide Arm Stay Adjusting Setscrew — (2½ in. x ½ in. Whit Setscrew)
1		Hose Guide Arm Stay Adjusting Locknut — (½ in. Whit Nut)



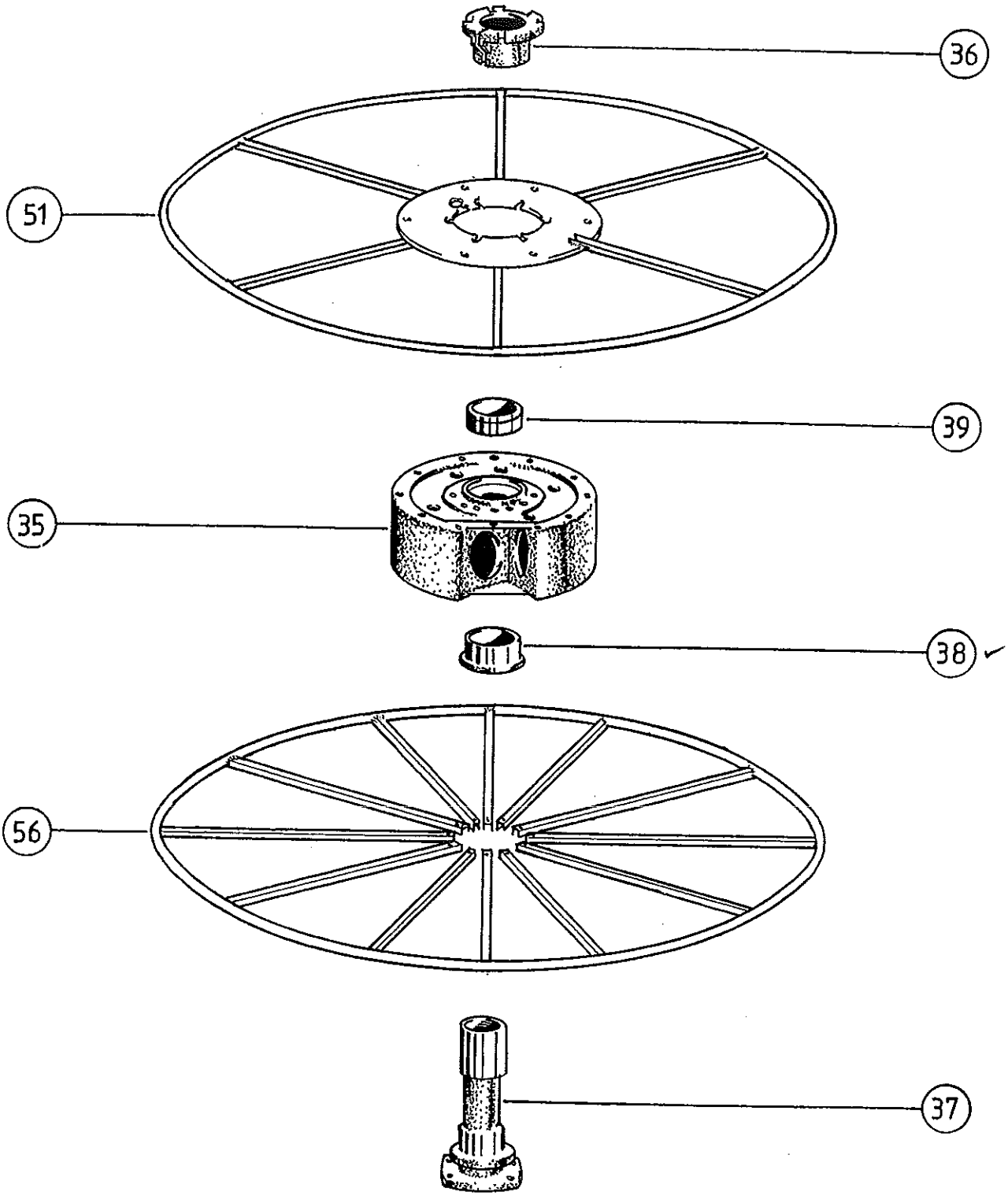
HOSE GUIDE AND HOSE GUIDE ARM ASSEMBLY

HOSEREEL — 2½ x 300

No. Per Unit	Symbol Number	Name of Part
1	TCD35	Hose Reel Hub
1	TCD36	Hose Reel Hub Retainer
1	TCD37	Hose Reel Standpipe
1	TCD38	Hose Reel Hub Bottom Bearing
1	TCD39	Hose Reel Hub Top Bearing
12	TCD49	Spoke Reinforcing Plate
1	TCD51	Hose Reel Top Deck
1	TCE56	Hose Reel Bottom Deck
36		Deck to Hose Reel Bolt — (¾ in. x ⅜ in. — 16 UNC H.T. Setscrew)
24		Deck to Hose Reel Bolt — (1 in. x ⅜ in. — 16 UNC H.T. Setscrew)
1		Hose Reel Hub Retainer Bolt — (3½ in. x ⅝ in. — 11 UNC H.T. Bolt without Nut)
1		Hose Reel Hub Retainer Bolt Nut — (⅝ in. — 11 UNC Nut)

HOSEREEL — 3 x 200

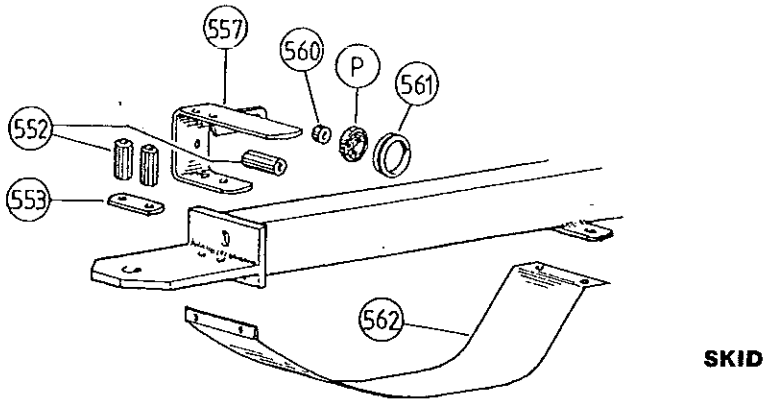
No. Per Unit	Symbol Number	Name of Part
1	TCD35	Hose Reel Hub
1	TCD36	Hose Reel Hub Retainer
1	TCD37	Hose Reel Standpipe
1	TCD38	Hose Reel Hub Bottom Bearing
1	TCD39	Hose Reel Hub Top Bearing
12	TCD49	Spoke Reinforcing Plate
1	TCD51	Hose Reel Top Deck
1	TCE56	Hose Reel Bottom Deck
36		Deck to Hose Reel Bolt — (¾ in. x ⅜ in. — 16 UNC H.T. Setscrew)
24		Deck to Hose Reel Bolt — (1 in. x ⅜ in. — 16 UNC H.T. Setscrew)
1		Hose Reel Hub Retainer Bolt — (3½ in. x ⅝ in. — 11 UNC H.T. Bolt without Nut)
1		Hose Reel Hub Retainer Bolt Nut — (⅝ in. — 11 UNC Nut)



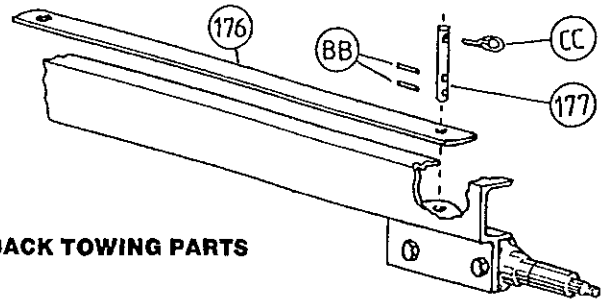
HOSE REEL

SKID AND BACK TOWING PARTS

No. Per Unit	Symbol Number	Name of Part
2	TCD176	Back Towing Link — 60 in. Axle
2	TCD177	Back Towing Pin
3	TCD552	Cable Guide Bar
1	TCD553	Cable Guide End Plate
1	TCD557	Cable Guide Mounting
1	TCD560	Cable Guide Roller Bush
1	TCD561	Cable Guide Roller Rim
1	TCD562	Skid Plate
2		Cable Guide Roller Bolt — (3 in. x ⅜ in. — 16 UNC H.T. Bolt — without Nut)
4		Skid Mounting Bolt — (1 in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
2		Cable Guide Frame Mounting Bolt — (1¼ in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
8		Skid Mounting Bolt Nut (4) Cable Guide Roller Bolt Nut (2) Cable Guide Frame Mounting Bolt Nut (2) — (⅜ in. — 16 UNC Nut)
8		Skid Mounting Bolt Washer (4) Cable Guide Roller Bolt Washer (2) Cable Guide Frame Mounting Bolt Washer (2) — (⅜ in. Spring Washer)
4	BB	Back Towing Pin — (1 in. x 3/16 in. Vogelsang Tension Pin)
2	CC	Back Towing Lynch Pin — (¼ in. Lynch Pin)
1	P	Cable Roller Bearing — (SKF 6204-2RS Ball Bearing)



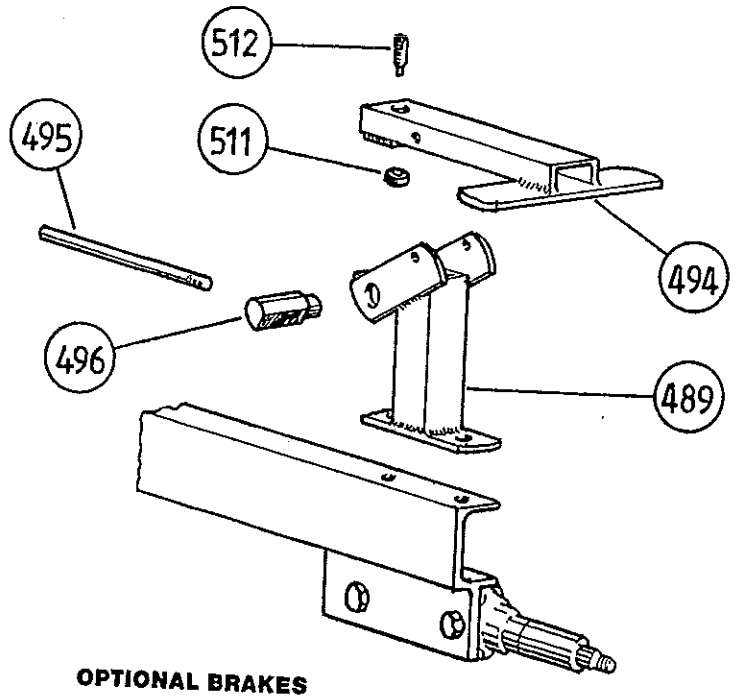
SKID



BACK TOWING PARTS

OPTIONAL BRAKES

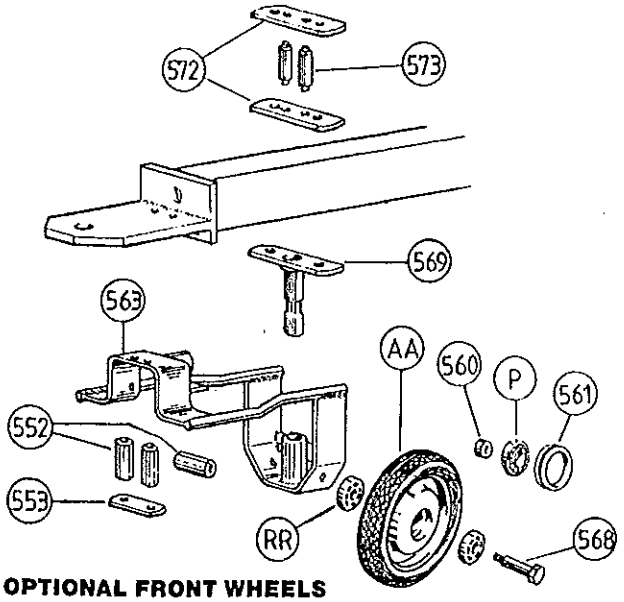
No. Per Unit	Symbol Number	Name of Part
2	TCD489	Brake Mount
2	TCD494	Brake Lever
2	TCD495	Brake Handle
2	TCD496	Brake Lever Cam
2	TCD511	Brake Adjusting Screw Cap
2	TCD512	Brake Adjusting Screw
2		Pivot Bolt — (2½ in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
4		Brake Mounting Bolt — (1½ in. x ½ in. — 13 UNC H.T. Bolt without Nut)
2		Brake Adjusting Setscrew — (1¼ in. x ½ in. — 13 UNC H.T. Setscrew)
4		Brake Mounting Bolt Nut — (½ in. — 13 UNC Nut)
2	Z	Brake Adjusting Setscrew Locknut — (½ in. — 13 UNC Locknut)
4		Brake Mounting Bolt Taper Washer — (½ in. Galv. Malleable Taper Washer)
4		Pivot Bolt Washer — (⅜ in. M.S. Plain Washer)
4		Brake Mounting Bolt Spring Washer — (½ in. Spring Washer)
2		Pivot Bolt Nut — (⅜ in. 'Nyloc' Nut)



OPTIONAL BRAKES

OPTIONAL FRONT WHEELS

No. Per Unit	Symbol Number	Name of Part
3	TCD552	Cable Guide Bar
1	TCD553	Cable Guide End Plate
1	TCD560	Cable Guide Roller Bush
1	TCD561	Cable Guide Roller Rim
1	TCD563	Front Wheel Carrier
2	TCD568	Front Wheel Stub Axle
1	TCD569	Front Wheel Pivot Spindle
2	TCD572	Front Wheel Mounting — Top Clamp
2	TCD573	Cable Guide Fixed Bars
2		Wheel Mounting Frame Bolt — (6½ in. x ⅜ in. — 16 UNC H.T. Bolt without Nut)
2		Wheel Mounting Bolt — (3 in. x ½ in. UNC H.T. Bolt without Nut)
2		Wheel Mounting Frame Bolt Nut — (⅜ in. — 16 UNC Nut)
2		Wheel Mounting Bolt Nut — (½ in. — 13 UNC Nut)
2		Wheel Mounting Frame Bolt Washer — (⅜ in. Spring Washer)
2		Wheel Mounting Bolt Washer — (½ in. Spring Washer)
1		Front Wheels Assembly Pin — (40 mm x 6.3 mm M.S. Cotter Pin)
4	RR	Front Wheel Bearing — (SKF 6003 Single Row Ball Bearing)
1	P	Cable Roller Bearing — (SKF 6204-2RS Ball Bearing)
2	AA	Front Wheels 4840010005 — (KT9/201 — 250 x 6 Tyre, Tube, and Wheel Assembly)



OPTIONAL FRONT WHEELS

PARTS FOR ANCHOR

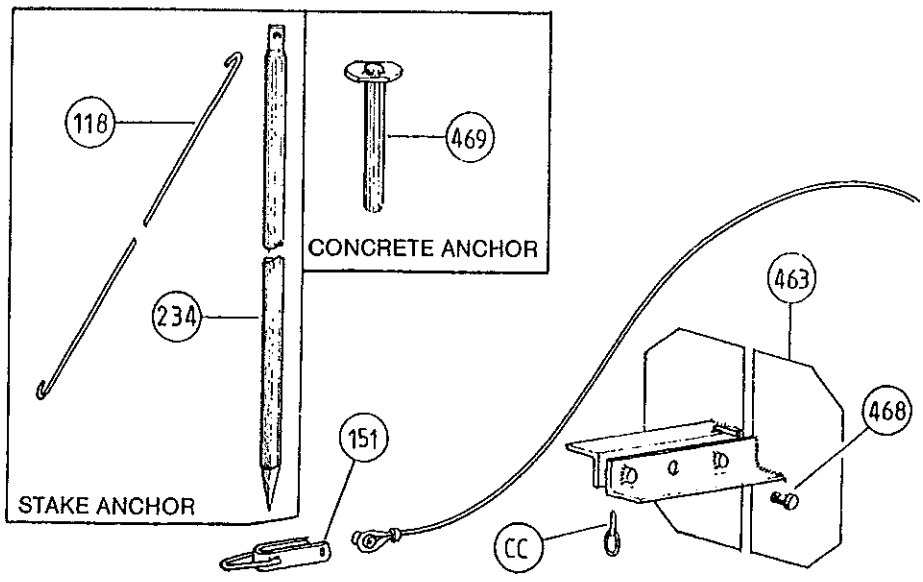
No. Per Unit	Symbol Number	Name of Part
1	TCD151	Cable Eye
1	TCD463	Stopping Plate
1	TCD468	Stopping Plate Loose Pin
1	CC	Stopping Plate Lynch Pin — (¼ in. Lynch Pin)

ADDITIONAL PARTS FOR STAKE ANCHOR

No. Per Unit	Symbol Number	Name of Part
1	PCC118	Anchor Post Link
1	PCD234	Anchor Post

ADDITIONAL PARTS FOR CONCRETE ANCHOR

No. Per Unit	Symbol Number	Name of Part
1	TCD469	Cable Anchor Bar



HOSE CONNECTOR — 2½ in. (Angus Hose) L160

No. Per Unit	Symbol Number	Name of Part
1	TCD216	Hose Sleeve — 2½ in. (Angus Hose)
1	TCD460B	Hose Tail — 2½ in.

HOSE CONNECTOR — 2½ in. (P.V.C. Hose)

No. Per Unit	Symbol Number	Name of Part
1	TCD215	Hose Sleeve — 2½ in. (P.V.C. Hose)
1	TCD460B	Hose Tail — 2½ in.

HOSE CONNECTOR — 3 in. (Angus Hose) (L162)

No. Per Unit	Symbol Number	Name of Part
1	TCD136B	Hose Tail
1	TCD603	Hose Sleeve — 3 in. (Angus Hose)

HOSE CONNECTOR — 3 in. (P.V.C. Hose)

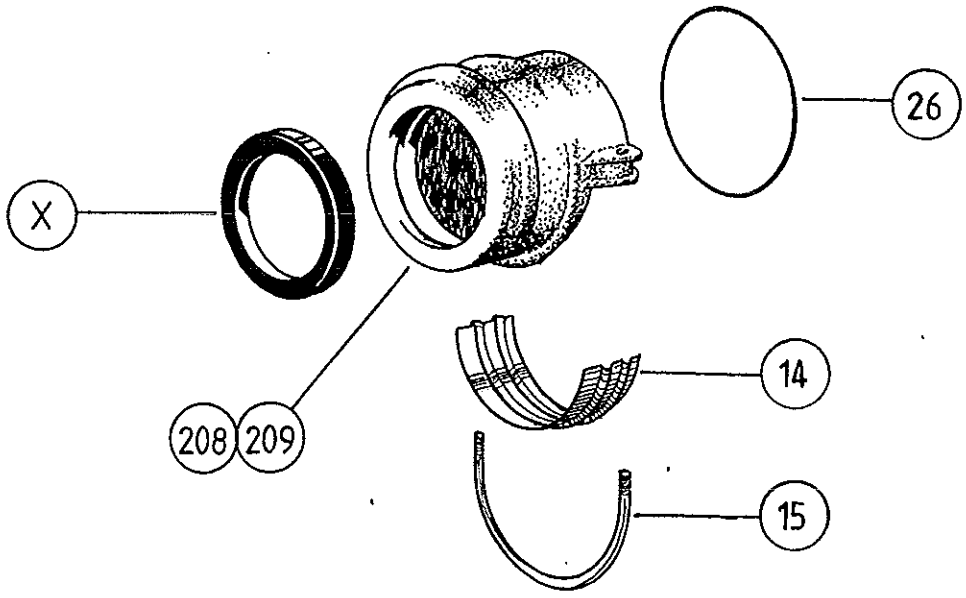
No. Per Unit	Symbol Number	Name of Part
1	TCD136B	Hose Tail
1	TCD604	Hose Sleeve — 3 in. (P.V.C. Hose)

MAINLINE CONNECTOR — 3 in. L170

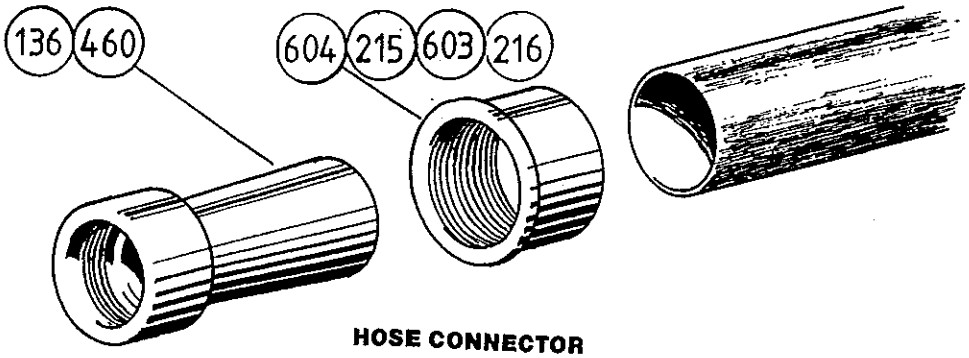
No. Per Unit	Symbol Number	Name of Part
1	KLC14	Connector to Pipe Clamp Plate
1	KLC15	Connector Pipe Clamp U-Bolt
1	KBC26	Pipe Sealing Ring
1	TCD208	3 in. Mainline Connector
2		Connector to Pipe U-Bolt Washer — (5/16 in. Plain Washer)
2		Connector to Pipe U-Bolt Nut — (5/16 in. Whit. Nut)
1	X	Connector U-Packing — (Lurene No. 40 U-Cup Packing)

MAINLINE CONNECTOR — 4 in. L171

No. Per Unit	Symbol Number	Name of Part
1	KLD14	Connector to Pipe Clamp Plate
1	KLD15	Connector to Pipe Clamp U-Bolt
1	KBD26	Pipe Sealing Ring
1	TCD209	4 in. Mainline Connector
2		Connector to Pipe Clamp U-Bolt Nut — (5/16 in. Whit Nut)
2		Connector to Pipe Clamp U-Bolt Washer — (5/16 in. Spring Washer)
1	X	Connector U-Packing — (Lurene No. 40 'U'-Cup Packing)



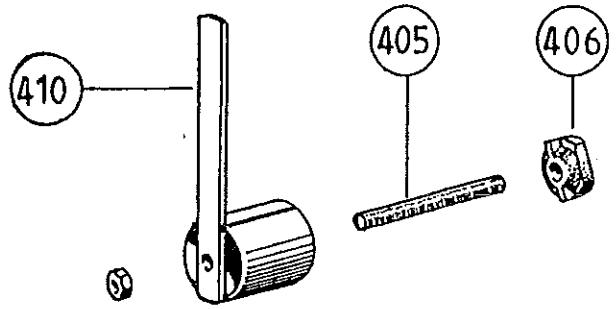
MAINLINE CONNECTOR



HOSE CONNECTOR

HOSE FITTING TOOL

No. Per Unit	Symbol Number	Name of Part
1	TCD405B	Fitting Tool Stud
1	TCD406B	Fitting Tool Insert
1	TCD410B	Fitting Tool — 2½ in. Hose — 3 in. Hose
1		Hose Fitting Tool Nut — (⅝ in. — 18 UNF Nut)



HOSE FITTING TOOL