GOPHER GENERAL

Operator's Manual - Model A5

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Protected Under USA Patent 8,567,113B2 and Canadian Patent 2,726,999

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QUICK START:

Before using this machine, you **must read thru this operator's manual thoroughly**. We do an extensive pre-delivery, including putting the machine on a stand to test the complete operation. There is a pre-delivery check list in the toolbox, which lists all the tests performed prior to releasing the machine for shipment. The machine is delivered field ready. After you've studied this manual, this check list gets you underway.

- Level the hitch, hook up the hydraulic hose pair, plug in electrical cable or direct connect to 12V DC.
- You do not need to connect the smaller, single hydraulic hose. It adjusts accumulator pressure.
- Set tractor hydraulic flow at about 3 or 4 gallons per minute.
- Test electrical operation, run the fan and the meter, with the machine stationary – Page 9
- Add inert test material to product tank, use switches to run fan and blow tablets – Page 9
- Watch the test material fall down the drop tube, into the air stream, and out the torpedo
- Moving forward at 2 – 3 mph, activate the tractor hydraulic, lowering disk and shank into the ground:
    - Check hydraulic sequencing and timing – Page 7
    - Check that torpedo runs level at working depth – Page 8
    - Visually inspect the tunnel to be well sealed, not collapsed, and remains open under ground.
    - Do the final field test PRIOR TO ADDING FUMIGANT – Page 10
    - Dump out the inert test material, and you're ready to start - Page 11
- Before adding fumigant, READ AND FOLLOW FUMIGANT LABEL DIRECTIONS

POCKET GOPHER TREATMENT:

- Soil temperature must be at least 45F, and a bit of moisture/humidity is required
- Treat fresh digging – the gas remains for a few days, so treat areas with fresh gopher mounds
- The tunnel must remain undisturbed for a few days for thorough fumigant distribution

TREATING THE ENTIRE FIELD – PASS SPACING AND TRAVEL SPEED

If you can almost step from one mound to the next, you need to treat the entire field. Your pass spacing and speed depends on how well the fumigant gas moves through your soil. Start by leveling all the mounds on a small area—say 10 acres. Then treat that 10 acres using passes 20' part at 3-4 mph. If there is fresh digging after 4 day days you haven't killed them all. It will show up the most between the passes. You need to figure out the spacing and speed for your soil. Travelling faster means less tablets per acre and may cause more ground disturbance.

SPOT TREATMENT

Once you have them under control, you need to patrol the field in spring and fall, treating areas of fresh digging. These are typically around the field boundaries, but occasionally one shows up in the middle of the field. Just drop the machine into the ground 10' before the area, and treat through it at 2-3 mph. You may need to make two parallel passes or make an X with two passes. On our farm we patrol any field before it is planted to alfalfa, and patrol the field after the alfalfa stand is terminated. We may never get them all, but the goal is a smooth field, faster travel speeds, and minimal dirt in the harvested crop. You can do this between cuts if needed.

That tunnel needs to remain open underground, but sealed to the air above, for at least a couple of days. PLEASE READ AND FOLLOW FUMIGANT LABEL DIRECTIONS. Please note that field fumigation can require a fumigation plan.

CONDITIONS REQUIRED FOR EXCELLENT GOPHER CONTROL

Treat Active Gophers (Fresh Digging)

The fumigant gas released from the tablets is only active for a few days. If the gopher isn't there, or isn't active you will be disappointed.
We have tried treating late in the spring when the mommas have gone to their burrows to birth and nurse babies. You control the males, but not enough of the females. This coincides with spring alfalfa growth of about 5" high.

Make A Well Sealed Cut Thru the Soil

The cut must be well sealed so the fumigant doesn't escape or is diluted with air from above. When our ground gets really dry, the soil fractures into hard dry lumps. Do not treat in these conditions. Really wet conditions are fine, as long as the cut remain sealed.

The Tunnel Must Remain Open

The sealed tunnel must remain open underground. Dig two holes about 10' apart in the tunnel and make sure you can see from hole to hole. The tunnel acts as a fumigant pipe as well as a gopher highway. The fumigant moves down the tunnel and sideways thru the soil. **Always Operate At Full Depth.** We have always got better gopher control running at least 10 inches deep.

Out (Tunnel Bottom) is 8.2 = 47F
In (Air Temp) is 16.8 = 62F
Alfalfa spring growth 1" high

Minimum Soil Temperature of 45F at Tunnel Floor Depth Required.

The warmer the temperature, the faster the fumigant gas is released. This quickly increases the gas concentration into the lethal range. If the temperature is too cold, the gas is released so slowly, it disperses too quickly thru the soil to be lethal. An indoor - outdoor thermometer, tied to a stake, with the temperature probe at the bottom of the tunnel is what we use. We have tried treating in early spring when the ground was too cool, and had disappointing gopher control. When treating in late fall, we quit treating when the soil temperature in the tunnel drops to 45 F.

Some Soil Moisture is Required

Soil Moisture is necessary to activate the tablets to release the fumigant gas. This soil moisture also helps with keeping the tunnel from collapsing and seals the cut. Some guys will run the pivot a bit after last cutting to get ideal conditions.

This handful of sandy dirt just barely sticks together but doesn't run thru his fingers. When that picture was taken, the tunnel was close to collapsing, but still OK. The gopher control was fine.

As the soil dries out, the tunnel may collapse. In the picture on the right, the tunnel has collapsed. Expect reduced gopher control in this situation.

1. INTRODUCTION

1.1 Safety Precautions:

Always read and follow the Operator's Manual prior to using this or any farm machinery. Farm Machinery, including Tractors with drawn equipment, can be dangerous when operated in an unsafe manner. When using any form of pesticides, including any fumigant product, **ALWAYS READ AND FOLLOW LABEL DIRECTIONS**. This includes information on operator safety, application methods, product disposal methods, and environmental considerations.

Hydraulic Systems can store significant energy that can be released unexpectantly. This machine has a hydraulic accumulator, which is used to store hydraulic power. This hydraulic energy is used by the load cylinders on this machine to cushion impact and return equipment to original operating position. Always release the accumulator pressure prior to working on the disk, shank or packer wheel equipment. Hydraulic pressure is used to raise and lower the earth engaging parts of this machine. Never work under hydraulically raised equipment.

Leaks from hydraulic systems are a serious hazard. Rapid leaks (blown fittings or hoses) can cause rapid and unexpected movement of the equipment. Even fine jets of hydraulic fluid can pierce skin and cause serious injury. When inspecting hydraulic equipment, always wear long sleeves, heavy gloves, and safety glasses.

1.2 Transport:

Check with local authorities regarding transport on public roads and follow all applicable regulations and laws.

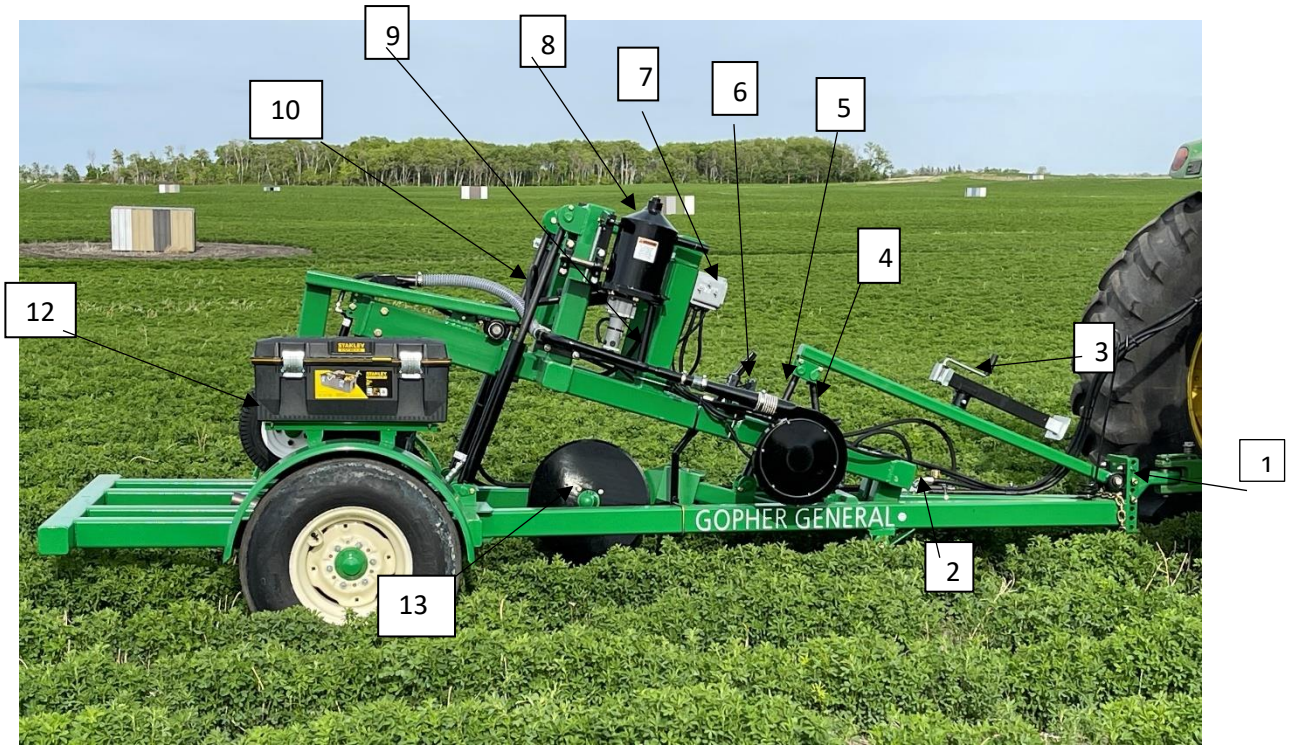
1.3 Overview of Machine Operation:

The Gopher General machine is designed to make a clean, sealed, artificial tunnel below the gopher's feeding tunnels. It distributes a slow release fumigant product in this tunnel to control burrowing rodents. The machine is drawn by a suitable sized tractor with adequate hydraulic and electrical power. The operator drives across a field looking for signs of gopher activity, usually indicated by fresh dirt mounds pushed up by the pocket gopher. Just prior to entering the gopher area, the operator activates the hydraulic to lower the machine. The disk enters the ground first, followed by the shank. As the disk begins to lower, an electrically operated fan starts, blowing an air stream past the tablet drop tube, down the back of the shank and out the end of the torpedo attached to the shank. When the torpedo reaches full working depth, the electrically driven meter starts metering the fumigant product from the product tank into the product air stream. Packer wheels pack and seal the slit in the ground from the shank, sealing the fumigant in the underground tunnel made by the torpedo. When exiting the area of gopher activity, the operator activates the hydraulic to raise the machine. The product metering stops immediately, the shank slowly raises, followed by the disk. The fan stops, with all of this controlled by a single hydraulic lever. Each time the shank is raised or lowered, earth sticking to the shank is automatically scraped away. The operator drives on, looking for another area of gopher activity. A well formed and well sealed tunnel containing slow release fumigant tablets remains in the ground. The fumigant is released over a period of time, filling the trunnel and penetrating the surrounding soil. The gophers discover and enter this tunnel when inspecting their own tunnels. The fumigant is not detected by the gophers, which quietly succumb to the toxic gas now present in the tunnel and surrounding soil.

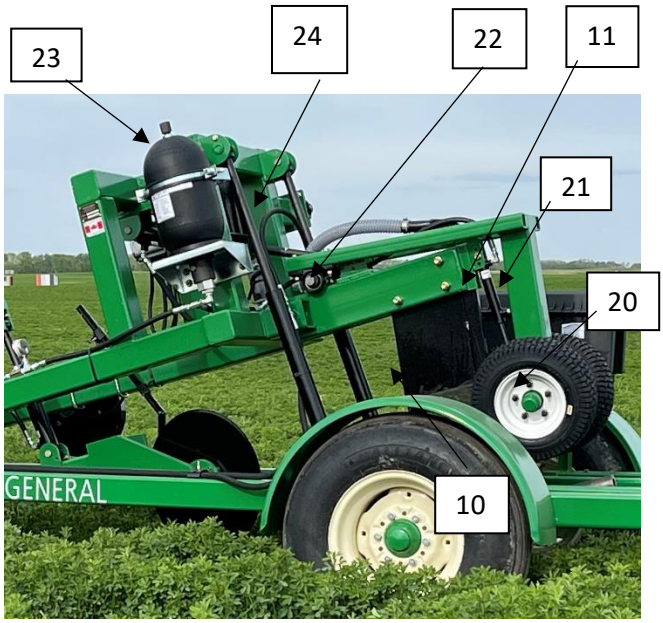
WARNING: This machine must travel forward in a straight line when the disk and torpedo are lowered into the ground. Backing up, or turning when this equipment is in the ground may result in severe damage and will void the warranty as outlined in Section 7.

1.4 Left and Right Sides - Pictorial Views

Right Hand Side of Machine



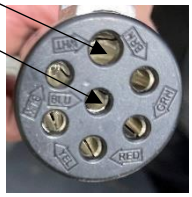
1 Hitch Leveling Bolts
2 Sequencing Flow Control Valves
3 Hitch Jack Storage
4 Disk Raise – Lower Cylinder
5 Disk Pressure Cylinder
6 Accumulator Pressure Gauge
7 Electrical Switch Box
8 Product Tank
9 Product Drop Tube
10 Shank / Torpedo Raise – Lower Cylinders
11 Shank
12 Product Storage Box
13 Coulter Disk – CNH Part# 44362AA1 20”



20 Packer Wheels
21 Packer Wheel Pressure Cylinder
22 Packer Wheel Pivot
23 Hydraulic Accumulator
24 Shank Pressure Cylinder

Left Hand Side of Machine

2. TRACTOR PREPARATION

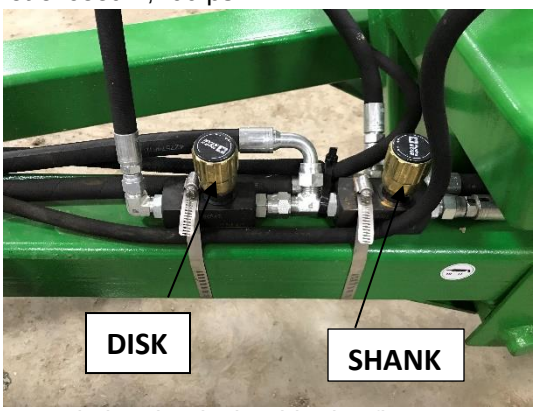


The Gopher General machine requires one hydraulic circuit and a standard implement electrical outlet with 35 amp capacity. If the tractor doesn't have this electrical connection, you can connect Gopher General directly to the battery using the supplied, fused, cable. The machine has a clevis hitch, with the clevis part easily removed provided the tractor has a clevis hitch. A hitch safety chain is included. The leveling bolts are used to set the main frame of the machine level when connected to the tractor. Storage for the hitch jack is provided on the disk arm.

3. MACHINE PREPARATION

3.1 Hydraulic Accumulator Pressure

The accumulator pressure should be set initially to 700 – 800 psi as shown on the gauge. To change this pressure, connect the single line from the accumulator to the tractor hydraulic circuit. Moving the tractor hydraulic lever, and opening the accumulator valve will change the pressure in the accumulator. If the tractor pressures the line, the accumulator pressure will increase, and if the tractor relieves the pressure, oil will flow from the accumulator to the tractor and the pressure will drop. You can remove all pressure from the accumulator system in this manner. The accumulator supplies pressure to the disk, the shank and the packer wheels. You want to have enough pressure to keep the shank and torpedo running level, unless an obstacle in encountered. If the torpedo, disk or packer wheels encounter an obstacle they trip upward, sending hydraulic oil back into the accumulator. When the obstacle is cleared, the oil flows back from the accumulator, automatically resetting the machine to normal operating position. This eliminates any shear pins or manual reset. If the shank/torpedo constantly trips a bit under normal operation, the accumulator pressure needs to be increased a bit. The accumulator pressure should not exceed 1,200 psi.



3.2 Sequencing Ground Engagement Hydraulics:

The machine requires one tractor hydraulic circuit to lower and raise the machine. Flow control valves are used to get proper sequencing of the disk and shank/torpedo. First set the tractor to about 3 gallons per minute, or about 30% of maximum flow. When moving forward at 2 -3 mph, activate the hydraulics to lower the machine. The disk should lower quickly first to cut debris, roots, etc., so this material does not wrap around the shank. After the disk is fully engaging the ground, the shank lowers into the ground. When raising the machine out of the ground, the shank should raise first, followed by the disk. **Set the tractor flow first** so the entire lower or raise operation is completed in 2 – 3 seconds. Both flow control valves are normally set about ¼ of a turn open.

Watch the video on www.gophergeneral.com. You will see what happens, and how long it takes to lower or raise the machine. Speed is governed by the tractor flow rate. Sequencing the disk and shank is set by the flow control valves. Closing the flow control valve furthest from the tractor increases the delay in lowering the shank. Closing the flow control valve closest to the tractor slows the speed of raising the disk. The disk will lower at the tractor flow rate, while the shank will raise at the tractor flow rate.

3.3 Coulter Disk Depth Adjustment

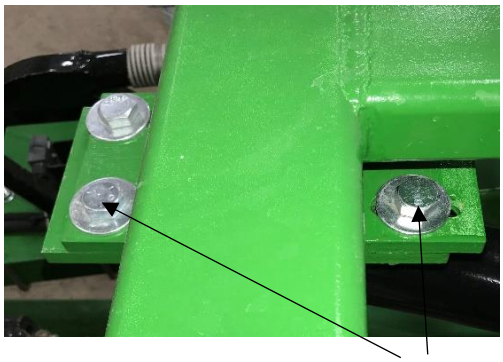
The working depth of the coulter disk can be adjusted with hydraulic cylinder stops on the raise-lower cylinder. Add or remove if needed. The disk will ride over obstacles by pushing the hydraulic pressure cylinder closed, forcing oil back into the accumulator. It automatically returns to working depth. The stops on the disk swivel are set so it will swivel about 30 degrees each way off center.

NO BACKING UP IN THE GROUND

3.4 Torpedo Depth Hydraulic Cylinder stops

The running depth of the torpedo is set by using equal size hydraulic cylinder stops on each of the main lift cylinders. You want to get the torpedo deep enough to ensure the tunnel is well sealed and doesn't cave in. Most of the farmers with these machines run either full depth or with one of the hydraulic cylinder blocks on each cylinder.

3.5 Torpedo Leveling



The torpedo must run level. After you get the hitch level on your tractor and the depth set, you need to make sure the torpedo is running level in the ground under load. If the rear end of the torpedo is tipped up, the tunnel sealing is compromised. If the rear of the torpedo is lower than the point, the underside of the torpedo will be worn thru. **The torpedo is parallel to the 2" x 6" bars that hold the shank.**

Level adjustment is accomplished by loosening 4 bolts, which allow the barrel end of the shank pressure cylinder to move and rotate the shank.

For major adjustments, you can move the rod of the cylinder to the alternate hole on the shank rotation frame. **Make sure to check for correct limit switch operation if the working depth is changed. (Section 3.8)**

3.6 Torpedo Point retained by a ½" diameter x 2.5" long roll pin, as the hole diameter in the point is slightly larger – Replacement points on Page 14

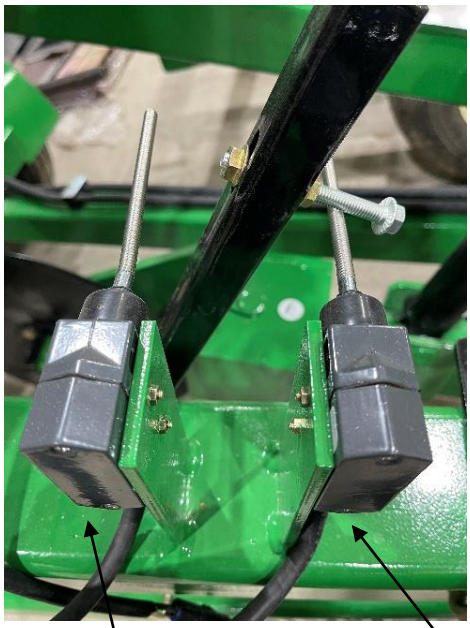
The point on the torpedo is loosely held in place with a roll pin. The roll pin needs to fit tight in either the torpedo or the point, but must not fit tight in both. Two points are supplied with the machine. When the point and bottom of the point become worn, the point should be removed and replaced. If the point becomes seized in the tube, you must first remove the product tube from the back of the shank by cutting the weld tacks. Lift this tube from the torpedo, then insert a long shaft into the rear of the torpedo and use it to drive the point forward. The point needs to be a bit larger diameter than the torpedo to minimize wear on the torpedo body. A spare point is included in the tool box. To keep the point from seizing in the torpedo, the shank part of the point should be **COATED LIGHTLY WITH GREASE** before replacing.

3.7 Shank Scraper

Each time the shank is raised or lowered, adjustable steel plates scrap the sides of the shank to remove any wet dirt buildup. If the shank builds up with mud, the slit in the ground becomes a rut, the tunnel collapses and the fumigant gas is lost. Adjust the scraper blades to within 1/8" of the shank on each side. The shank needs to stay polished like a plow shear. At the end of the season, a little **grease or vegetable oil on the shank** makes next season's start a lot easier.

3.8 Fan and Meter Operation

The master switch on the control box activates the electrical system. It must be on (up) for the system to work. The fan switch will turn on the fan for testing or will run the fan continuous if needed. Normally the fan only operates when the machine is in the ground. The meter switch will run the meter for testing. **NORMAL OPERATION IS THE MASTER SWITCH ON (UP), AND THE FAN AND METER SWITCHES TURNED OFF**. For a final test of the air system, put some of the bubble gum supplied in the product hopper. Turn the fan on, then turn the meter on. The bubble gum will fall down the pipe from the hopper into the air stream. It should be blown out the back of the torpedo at considerable velocity. This tests the meter system BEFORE you introduce a fumigant product. **FAN MUST BE RUNNING BEFORE METERING.**



Limit Switches: There are two limit switches that operate the fan and the meter under normal field operation.

The upper switch activates the fan as soon as the shank frame starts to lower. It gets good air movement from the meter to the outlet at the rear of the torpedo prior to metering product.

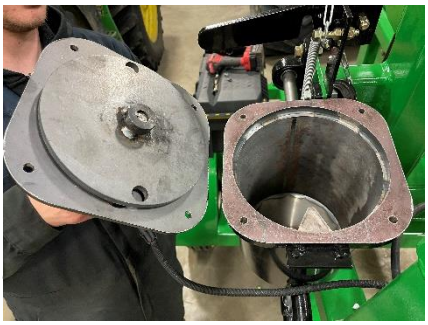
The lower limit switch starts the meter dispensing product when the shank reached full working depth. This is to ensure product is only metered when the torpedo is fully under ground.

As soon as the machine starts to raise, the lower limit switch stops metering product. The fan stops when the machine is completely raised. This is to allow time for metered product to clear the system while underground.

The bolts that contact the switch arms to activate the fan and meter may need to be repositioned to get correct timing if the depth of the shank is changed. They are easily slid up and down on the supporting tube.

Meter Switch **Fan Switch**

3.9 Product Tank and Metering Disk



The product tank holds the fumigant tablets and the metering mechanism. At the bottom of the product tank is a disk with two holes, each sized to fit a single fumigant tablet. As the disk turns, a tablet falls into each hole in the disk. As it turns, the hole is momentarily open to the product drop tube, so the tablet falls down the tube into the air stream. At the same time the hole is covered from above so that only one tablet can drop. You can see this by looking in the tank when empty and running the meter. You can flip the tank and motor upside down, and easily remove the motor, base and disk from the product tank as shown.

3.10 Packer Wheels

These wheels are designed to pinch the slit in the ground and pack the dirt over the torpedo, so that an open tunnel remains after the machine moves ahead. The downward pressure for both packing and rock protection is provided by a hydraulic cylinder pressurized by the hydraulic accumulator. The position of this cylinder may need to be reset depending on depth, soil conditions and the resulting tunnel. This does not increase packing pressure, which is governed by the accumulator pressure.

3.11 Field Test Prior to Filling the Product Tank with Fumigant

Operator safety requires all the above steps completed prior to normal field operation. Best practise requires you have the machine operating 100% properly before putting a fumigant in the product tank. At this point you can make a few test runs with the inert test material provided in the hopper to ensure:

- The disk and shank sequencing are correct.
- The torpedo working depth is correct.
- The torpedo is running level without any “tripping” movement.
- The fan starts up as soon as the machine enters the ground, and stops when raised
- The meter starts up when the shank reaches full depth and stops when the shank starts to raise
- The tunnel in the ground is well packed, remains open underground, but sealed to the surface.

You can dig the tunnel out, and inspect that it is open in both directions. Proper tunnel formation and sealing to the surface are important for the fumigant to control the gophers.

Occasionally we will drag a chain behind the machine to tidy up the field a bit. Whatever you do, make sure you don’t collapse the tunnel after it has been formed by the torpedo and packer wheels.

4. FIELD OPERATION

4.1 Fumigant Product Storage:

The storage box on the machine is sized to hold the fumigant containers. This box is both waterproof, and lockable if the machine and fumigant bottles are left unattended. Remember when using any product, **ALWAYS READ AND FOLLOW LABEL DIRECTIONS**.

4.2 Filling and Emptying the Product Tank:

Remove the threaded cap from the product tank, and simply pour in product from the fumigant container. One container of product is sufficient until the operator is comfortable with all aspects of the machine. Always remember to wear appropriate safety protection, and **ALWAYS READ AND FOLLOW LABEL DIRECTIONS**.

Replace the cap, ensure the master switch is on, and you are ready to go. Never put more product in the product tank than you expect to use.

Any product left in the product tank at the end of the day MUST be removed. If not, that product will continue gassing off and create a **DEADLY** safety hazard. Thread the cap off the product tank, unlatch the tank lock, and rotate the tank so you can pour the product from the tank. There will be fumigant residue in and on the machine, so leave it outside for a couple of days

ALWAYS FOLLOW LABEL DIRECTIONS FOR CORRECT PRODUCT DISPOSAL.

4.3 Tractor Operation with Machine Operating:

Drive the field looking for signs of gopher activity. When approaching an area of fresh dirt mounds, activate the tractor hydraulic to lower the machine fully in the ground. The fan starts, the meter starts and product is being metered into the tunnel. A bit of dust and the dropping product is visible in the slot in the metering pipe. This tells the operator that product is being metered and is a visible sign when the product runs out. When out of the gopher area, raise the machine, which shuts off the meter, then the fan. **DON'T TURN and DON'T BACK UP when the shank/torpedo is in the ground.**

4.4 Changing Application Rate:

The faster you drive, the less tablets dropped per 100 feet of tunnel. In rocky conditions we typically run in the ground at about 3 mph. If you are treating the field in continuous passes for a very high gopher population, you can go up to 6 mph, provided you continue to make a clean, well sealed tunnel. In fields with high gopher populations, start by making passes about 20' apart at 3-4 mph. There should be an absence of fresh digging within 2 days. If you need to travel slowly and want to use less product, plug one of the holes in the disk as shown in 3.9.

5. WEARING PARTS:

Support Ring

5.1 Disk:

The smooth coulter disk is 20" in diameter, has 4 of 1/2" diameter G8, fine thread, bolts on a 5" circle. The pilot hole is 3.67" diameter. It is a common size, and some part numbers are: Case/IH # 443626A1; JD PM33502042; Shoup # SH71178; CFC # P20197MLOL; and Bourgault 6717-99. These are 20" disks, but the machine will take a 22" disk as well. You may need to restrict the disk working depth on the large diameter disk – Page 8. There are support rings between the ring and the hub, and on the outside of the disk, that can be used to reposition the disk slightly.

5.2 Points: The Gopher General points are manufactured by RH Machine, located in Caldwell Idaho (800-321-6568). They will sell direct to machine owners

RH-944-LC: The point on the left has excellent wear characteristics, and lasts quite well in rock-free soil. This is the best and least expensive choice if you don't hit anything.

RH944-GG-MN/CR: The point on the right is the RH Machine Chrome Cap point. Lasts pretty good and is hard to break. We use this on our machine in the rocks.
RAISE THE SHANK OCCASIONALLY AND MAKE SURE THE POINT IS STILL THERE. RUNNING A TORPEDO WITH NO POINT WILL RESULT IN A VERY EXPENSIVE REPAIR

RH-944-LC **RH944-GG-MN/CR**

5.3 Shank Leading Edge:

The leading edge of the shank is a reversible and replaceable part available from RH Machine. Just cut the tack welds to reverse or replace it.

6. WARRANTY

Gopher General warrants its products to the original owner for a period of one year from the date of purchase. Warranty does not cover normal wear, or damage caused by lack of maintenance or misuse. Rubber tires and tubes are warrantied by the manufacturer of these components.

This warranty covers all non-wearing parts which includes everything except the point and the torpedo for one year from the date of purchase. The warranty does not cover any failure due to misuse, lack of maintenance, or incorrect operational settings, as prescribed in this manual. The warranty covers parts only. Labor for repairs is not covered. Please provide the machine model and serial number when calling for warranty or parts. For operating and settings, please call 306-745-2412.

WARNING: This machine must travel in a straight line when the disk and torpedo are lowered into the ground. Turning when this equipment is in the ground may result in severe damage and will void the warranty. Pulling anything with the Gopher General voids the warranty.

7. WATCHING THE METERING – AM I OUT OF FUMIGANT?

When you are treating, occasionally glance at the slot in the drop tube. You can see the tablets dropping from the product tank down the drop tube into the air stream. You can tell when you've run out of product, or if something is not working correctly. Here are a couple of "do-it-yourself" options to consider.

Camera: We have a small camera mounted on the Camera Arm, looking at the drop tube. The 8" square steel plate on the back of the drop tube makes sure the camera only sees the black steel, and doesn't see light behind the drop tube. Then a small TV screen in the tractor displays the tablets dropping. This saves the operator's neck, and keeps the operator looking ahead for the next gopher area.

Light: Another simple idea is to mount a small 12v LED light to the camera mount, to light up the drop tube. Connect the light into the tablet meter motor circuit and the light shines when the meter runs.

8. LEVELING THE GOPHER MOUNDS:

We all want to level the gopher mounds as we treat the field. You can tidy up the top of the rut, but **YOU CAN'T COLLAPSE THE TUNNEL FOR A FEW DAYS.** Some people drag a chain. Some will pull a chain mesh mat similar to those used to clean the mud off your boots. Some people will pull a couple of sections of flexible harrows. I'm sure some creative Gopher General owner is pulling 40' of harrows. The frame on the Gopher General is built from ¼" wall 4" square tubing. It is capable of pulling quite a bit. The key is not being aggressive on top of the tunnel. And remember – **THE WARRANTY IS VOID WHEN YOU START PULLING SOMETHING WITH THE GOPHER GENERAL.**

9. KNOW YOUR ENEMY:

The Gopher General is designed to control pocket gophers, it does not control ground squirrels. It has provided growers with excellent pocket gopher control in more than 15 USA states and in Western Canada.

Prior to developing this control method, we tried everything else, including trapping 1,000's of them. We learned much about their life cycle. When we would start trapping in early spring, we would catch 50% males and 50% females. By the time the alfalfa was 4" to 6" high, we caught nearly 100% males. Why? The females were home having babies, so we took the traps home. After all, trapping is hard work and it doesn't take many males to keep the females having babies.

We also found that fumigation treatment wasn't as effective when the female gophers were less active. About 10 weeks later, the digging starts again. The pocket gopher is a territorial animal, and the momma has just told the babies "Get out of here kids – sink or swim". So those babies need to find a new territory before something else finds them. From this point until the ground gets too cold, trapping and fumigation are much more effective. Finally, there are not as many gophers in an area as you think there are. The gopher is territorial, and constantly checks, and tries to expand, its territory. We often only trapped one gopher in areas with numerous mounds.

10. TROUBLE SHOOTING

10.1 General Problem Trouble Shooting

The adjustments and discussion of how the machine works, and how it is to be operated have been covered in the previous sections. These are some common problems with possible solutions.

Problem:	Possible Cause	Possible Solution
Shank Doesn't Stay Level	Shank is "Tripping" under Load	Increase Accumulator Pressure
	Level Adjustment Bolts Slipping	Tighten Bolts
Tunnel Doesn't Stay Open	Shank Doesn't Stay Clean	Polish Shank, adjust scrapers
	Soil Conditions too dry	Irrigate or wait for rain
	Shank Wrapped with Material	Make sure Disk Lowers First
	Packer Pressure Wrong	Raise or Lower Packer Cylinder
Continued Gopher Activity Following Treatment	Poor , Collapsed, Unsealed Tunnel	Check disk, shank, packers,
	Soil Too Dry	Some Humidity/Moisture Necessary
	Soil Too Cold	Tunnel Needs to be 43F or more
	Gopher Moving In	An Additional Treatment Needed
Fan Doesn't Run	Fuse Blown	Check Fuse and Replace
	Something in fan	Remove cover, check free rotation
	No Power to Fan	Check Power to System
	Limit Switch Malfunction	Check Limit Switch Operation
Meter Doesn't Run	Blown Fuse	Check Fuse and Replace
	No Power to Meter	Check Power to System
	Limit Switch Malfunction	Check Limit Switch Operation
	Meter disk jammed	Remove Meter Tank to Inspect
Meter runs but nothing drops	Product Tank Nearly Empty	Add Product to Tank
	Meter Disk Plugged	Clean meter disk - see Item 3.9
Tablets Don't Blow Out	Water in the Fan	Remove Fan Cover, Blow Out Water
	Fan Turning Backward	Swap Electrical Leads to Fan
	Air system Plugged	Inspect and Clean Air System

10.2 Disk, Shank or Packer pressure cylinders retracting under load. The accumulator hydraulic oil pressure cushions the cylinders on the shank, disk and packer wheels. This allows for controlled release and reset of these parts, if they encounter an obstacle. If any of these cylinders is not fully extended, it can suddenly release without warning. The shank and torpedo can jamb above the scraper resulting in this condition. This can happen if the shank trips over a big rock, and the operator raises the shank frame at the same time. If this happens, simply drain the accumulator oil back into the tractor so the pressure gauge goes to zero. The shank pressure cylinder will retract, and the shank can be raised up with minimal force. It will return to its normal position, and the accumulator can be recharged to operating pressure.

11. LUBRICATION AND MAINTENANCE

The Greasing Schedule is every **10 Hours:**
2 grease fittings on main frame pivot
1 grease fitting on disk arm pivot
1 grease fitting on disk swivel
2 grease fittings on shank pivot frame

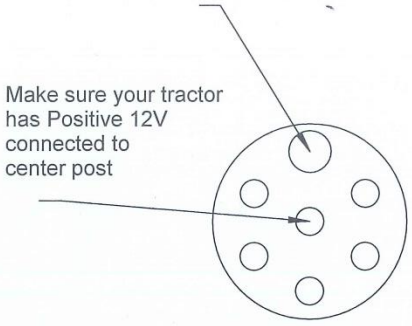
Yearly
Grease fittings on each end of 6 hydraulic cylinders – 12 fittings total.
Grease fittings on 4 self aligning bearings – 4 fittings total.
Grease wheel hubs and disk hubs as required.

End of season Coat shank and torpedo with light film of grease or oil to prevent rusting
Tire Pressure: Transport Tires – 25 psi; Packer Tires – 15 to 25 psi

12. WIRING DIAGRAM:

For Serial Numbers 24-111 and Higher

Make sure your tractor has Negative 12V connect to big post



Tractor Plug

If the plug on the back of your tractor isn't wired as shown, you can either:
- Connect our extension cable to the tractor battery, or
- Change the wires in the plug on the end of our cable

If the Gopher General blows the fuse in your tractor, the easiest thing is just use the extension cable hooked to your tractor battery

Limit Switch Operation:

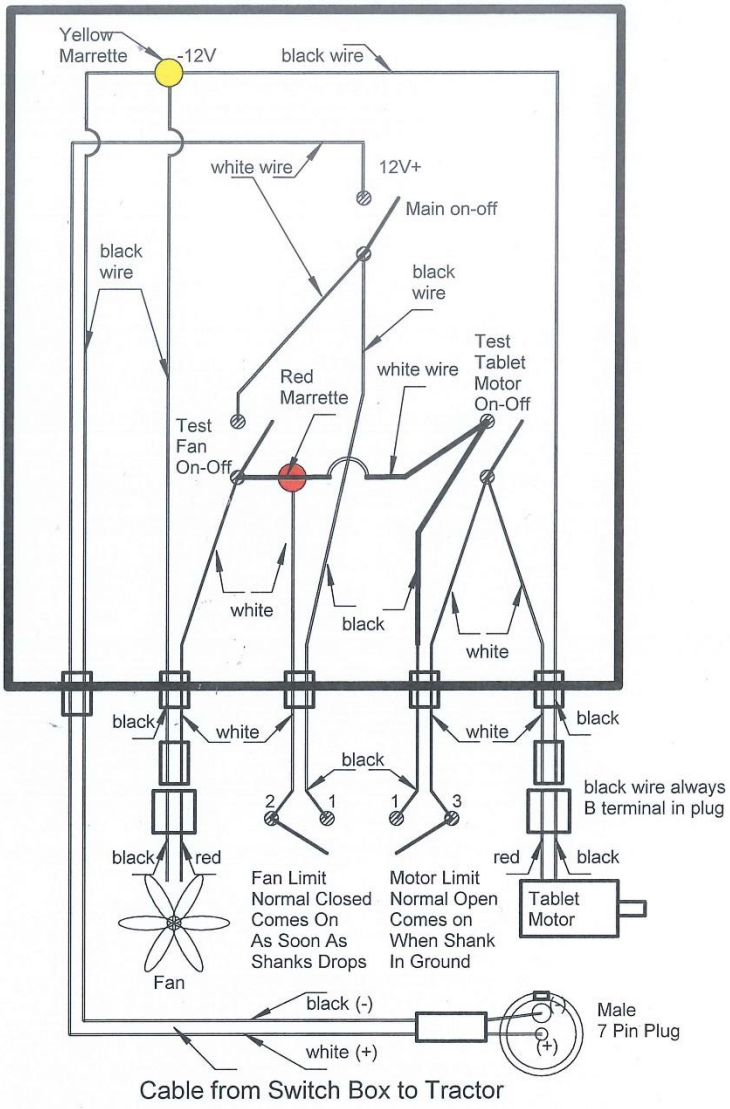
Releasing fan switch to neutral starts fan

Pushing motor switch out of neutral position starts tablet motor

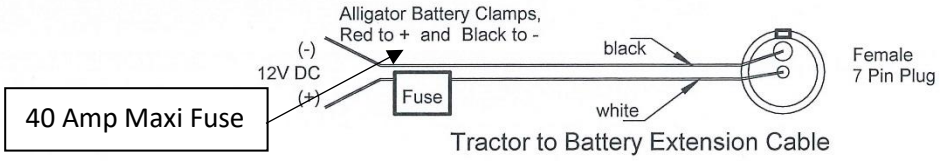
Black wires in B terminal; white wires in A terminal on plugs

Fan must be running for Tablet motor to run

Switch Box connections



Cable from Switch Box to Tractor



40 Amp Maxi Fuse

Tractor to Battery Extension Cable

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