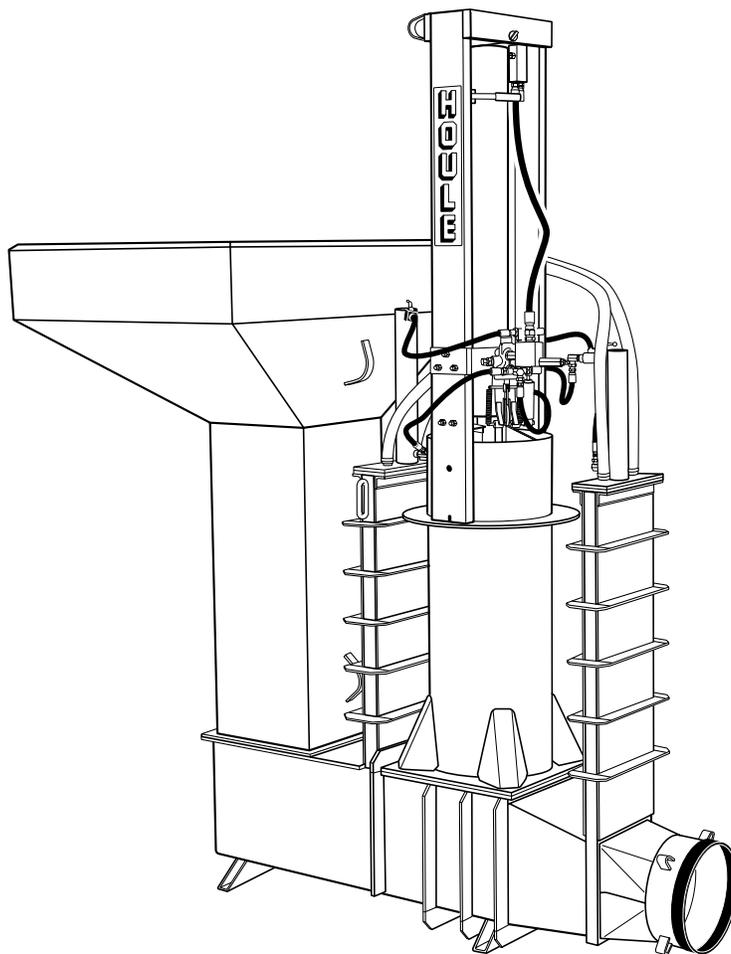


# MAGNUM

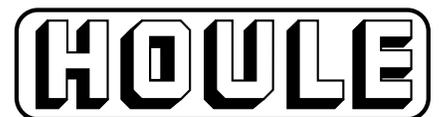
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## UNDERGROUND MANURE PUMP



### OWNER'S MANUAL

February  
2005



J. Houle & Fils Inc.

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## WARNING

**BEFORE INSTALLING OR USING THE MAGNUM, YOU MUST STUDY THE OWNER'S MANUAL AND BECOME FAMILIAR WITH THE OPERATING PROCEDURES.**



**THIS SYMBOL IDENTIFIES IMPORTANT SAFETY INFORMATION THROUGHOUT THIS MANUAL**



**FAILURE TO FOLLOW THIS WARNING COULD RESULT IN DAMAGES TO EQUIPMENT AND/OR SERIOUS INJURIES**

### **INSTALLATION OF A MANUAL SAFETY GUILLOTINE ?**

When the top of the manure reservoir is higher than the top of the outlet guillotine of the Magnum, it is mandatory to install a manual safety guillotine to prevent sloppy manure from flowing back in the barn if a guillotine has to be removed for maintenance.

## WARNING AGAINST DRY MANURE

Dry manure containing sawdust, fine chopped straw, sand or any other matter may be siphoned "without plugging" during the siphoning cycle and be pushed in the evacuation line without plugging during the evacuation cycle. However, once in the evacuation line, the dry matter may expand due to wet environment and plug the evacuation line. When an evacuation line plugs up in these conditions, it may become unpluggable and you may have to replace it.

## SAFETY

1. A safety ramp must be installed around the Magnum site to prevent any person or child from falling in accidentally.
2. Never push manure with your foot in the Magnum hopper. The manure could suddenly go down making you fall in the hopper.
3. Stop Magnum motor before proceeding to lubrication or maintenance.
4. Ensure nobody is standing near moving parts before starting the Magnum.

# Warranty

The company *J. Houle & Fils Inc.* guarantees original buyer all equipment sold under the trademark *Houle* for a period of twelve months from the date of original purchase. This written warranty has priority over any other publications made by *J. Houle & Fils Inc.* The company, through its dealers, reserves the right to either repair or replace all equipment deemed defective under the following conditions :

1. the equipment be installed and maintained as per the company directives ;
2. the buyer uses the equipment for the purpose which the equipment was manufactured and as per operating instructions ;
3. the original buyer notifies his dealer without delay of any defect of equipment, or in default of the dealer, the buyer must notify the company of such defect ; in both cases this notification must be made within the twelve months following the date of original purchase ;
4. defective equipment or parts should be returned "prepaid" to *J. Houle & Fils Inc.*;
5. that the buyer does not modify, nor try to repair the equipment or parts without authorization.  
All transportable equipment will be repaired or replaced at the dealer's shop.  
Installed equipment will be repaired or replaced on site.  
The liability of the company *J. Houle & Fils Inc.* and its dealers, in pursuance of this warranty consists only in repairing or replacing the defective equipment or part, and in any case *J. Houle & Fils Inc.* and its dealers cannot be held responsible for indirect cost, damages or loss of production, freight expenses and any other expenses that may arise.

## Warranty against corrosion of the steel evacuation line

The steel evacuation line sold by *J. Houle & Fils Inc.* is protected by a **5 year prorated** warranty against perforation caused by corrosion. This **prorated** warranty can be extended to **15 years** on condition that **sacrificial anodes** are installed as per instructions on pages 43 to 45.

With or without sacrificial anodes, the Magnum and the evacuation line must be surrounded by at least 6" of compacted sand. The trench for the installation of the Magnum and the evacuation line must be dug 6" deeper than required to allow spreading of a 6" fine sand bed at bottom of trench before installing the Magnum and the evacuation line.

For a PVC evacuation line, the risk of rocks piercing the pipes are prevented if the Magnum and the evacuation line are buried in compacted sand.

## Modality of claim

If a claim is made before the warranty expires, a customer who will replace the steel evacuation line by another *Houle* steel evacuation line will be indemnified directly by *J. Houle & Fils Inc.* as follow, and this after the steel evacuation line has been returned to the company "prepaid":

### ***If sacrificial anodes had NOT been installed to protect the steel evacuation line:***

1/5 (one fifth) of the steel evacuation line list price for each full year remaining before expiration of warranty, according to the price effective when the claim is made.

### ***If sacrificial anodes had been installed to protect the steel evacuation line:***

1/15 (one fifteenth) of the steel evacuation line list price for each full year remaining before expiration of warranty, according to the price effective when the claim is made.

**NOTE:** Concrete, excavation, labor and any other indirect costs are not covered by this warranty.

## Magnum working specifications

1. The Magnum must be installed in a room where temperature is kept higher than **40° Fahrenheit** or **5° Celsius**.
  2. The Magnum must be installed with an evacuation line of **16" diameter minimum**.
  3. The maximum distance of evacuation varies according to the manure consistency and the type of bedding used which are factors difficult to verify for *J. Houle & Fils Inc.* To help estimate if the evacuation distance required is acceptable for the Magnum, here are 2 examples of evacuation distance to use as a guide :
- Ex. 1 : Manure from a tie stall barn whose cows stay permanently in the barn, evacuated once a day only and containing a maximum of 1 bale of straw – 40 lbs or less – per day per 10 cows may be evacuated on a maximum distance of 200 ft.
- Ex. 2 : Semi-liquid manure from a free stall barn containing almost no bedding may be evacuated on a maximum distance of 350 ft

## Warranty exclusion

1. Damages caused by a lack of lubrication.
2. System non-installed as per company directives.
3. Use of abrasive material for bedding (sand).
4. Evacuation line plugged.
5. Failure (damages) caused by :
  - an excessive use of bedding ;
  - introduction of frozen manure in the Magnum ;
  - pipes of the evacuation line plugged or a manure pile completely frozen at the discharge of the evacuation line.

**NOTE :** If there is less than the equivalent of 30 day of manure accumulated above the evacuation line discharge at beginning of winter, a severe cold can completely freeze the manure pile and stop the Magnum.

*J. Houle & Fils Inc.* reserves the right to improve, change or modify the construction of equipment or any part thereof without incurring any obligation to make same changes on *Houle* equipment previously sold.

# First start procedure

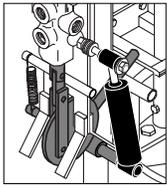


fig. 1

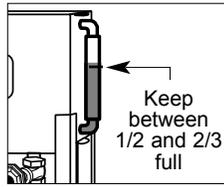


fig. 2

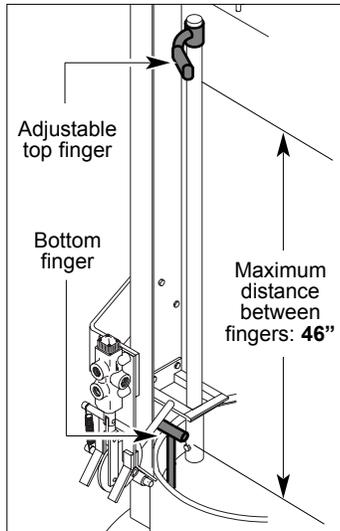


fig. 3

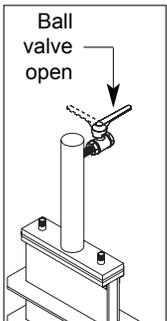


fig. 4

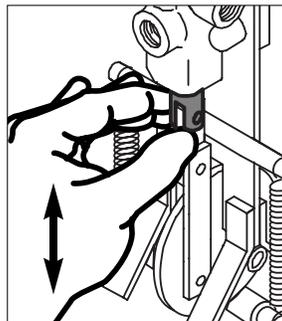


fig. 5

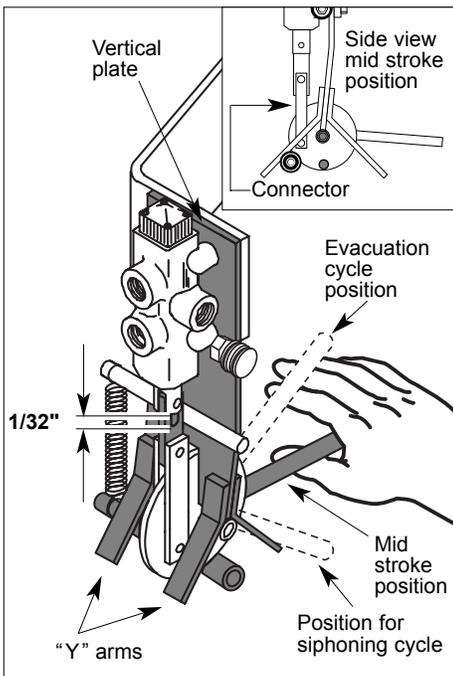


fig. 6

## Verification and lubrication before start

1. Clean the top of the piston and pour 2" of used diesel motor oil.
2. Lubricate the reversing mechanism with fine oil — *fig. 1 in gray*.
3. Ensure the hydraulic power unit is kept between 1/2 and 2/3 full of hydraulic oil — *fig. 2*.

**Hydraulic oil required** — see *lubrication page 5*.

4. Ensure the distance between the adjustable top finger and the bottom finger of the reversing mechanism does not exceed 46" — *fig. 3*.

## Starting

5. Ensure both valves under the hydraulic power unit are opened.
6. Open the ball valves of the guillotine cylinders — *fig. 4*.
7. Start Magnum until the piston has stroked 12" downward and stop the motor.

## Verification of the reversing mechanism

8. **A** Ensure the reversing mechanism is cleaned.
- B** Check by hand if the spool of the reversing valve moves up and down easily — *fig. 5*. If not, it may be scratched or the 4 bolts at the back of the valve may be too tight.
- C** Gradually push the trigger of the reversing mechanism downward until it has slightly exceeded its mid stroke — *fig. 6*. From thereon, springs must complete the stroke. If not, recheck the spool of the reversing valve — see *instruction 8 B*. Clean and lubricate the reversing mechanism — see *instruction 2*.
- D** Ensure the vertical plate of the reversing mechanism is slightly bent so the bolt of the reversing valve spool and the lower bolt of them connector are vertically aligned when the trigger is manually kept on mid stroke position. — *fig. 6 side view*.
- E** Ensure the "Y" arms of the reverse are properly bent to allow a play of 1/32" between the groove of the connector and the connector bolts — *fig. 6*.

## Piston seals gradual lubrication

9. Ensure the trigger is at the siphoning cycle position — *fig. 6*. Start the Magnum to bring the piston up and let it automatically reverse and go down on a distance of 24". Then, manually push the trigger down to bring the piston up and let it automatically reverse and go down again on a distance of 36". Then, manually push the trigger down to bring the piston up. This time, let the Magnum do a few full strokes by itself.
10. Stop the piston once it has stroked 6" upward from bottom reversing level. Fill the hopper 3/4 full with semi-liquid manure containing almost no bedding. Start the Magnum and keep filling the hopper with semi-liquid manure containing almost no bedding until the evacuation line is full.

**Important:** Do not fill the Magnum with manure containing straw or dry manure to avoid:

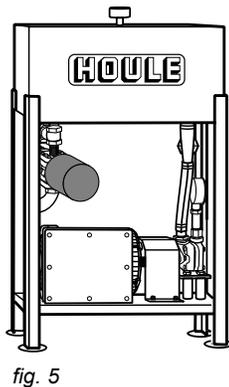
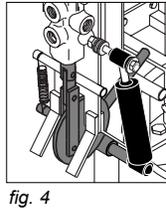
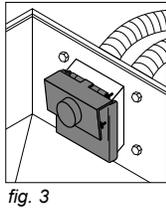
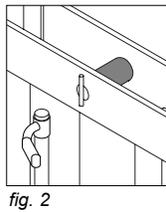
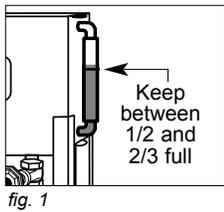
- plugging the bottom of the hopper:
- lost of suction through the evacuation line.



## **WARNING - Stopping of Magnum**

Always stop the Magnum with the piston halfway in the down stroke (evacuation cycle) and close the ball valve of the hopper guillotine to maintain it closed under hydraulic pressure and prevent manure from coming back into the barn.

# Lubrication and maintenance



## Before each use

1. There must always be 2" of used diesel motor oil on top of the piston to lubricate the seals. When this oil is dirty, clean up the top of the piston and pour 2" of used diesel motor oil on piston.
2. Ensure the hydraulic power unit is kept between 1/2 and 2/3 full of hydraulic oil — *fig. 1*.

### Hydraulic oil required (or equivalent):

- Petro-Canada AW 32
- Exxon Nuto H32
- Shell Tellus 32
- Mobil AW Hydraulic Oil 32

## Once a month

1. Grease the top holding bolt of the piston cylinder — *fig. 2 in gray*.
2. Clean and lubricate the drain hoses door inside the hopper — *fig. 3 in gray*.
3. Clean and pour fine oil on all moving parts of the reversing mechanism. — *fig. 4 in gray*.

## Once a year

1. Open the guillotine cover to clean the grooves inside the guillotine chamber — *see procedures page 38*.
2. Ensure the drain hoses door is free to work — *fig. 3 in gray*.
3. Clean the reversing mechanism with solvent before lubricating — *fig. 4 in gray*.
4. Change the oil filter under the hydraulic power unit — *fig. 5 in gray*.
5. Clean the Magnum with a high pressure washer.

# Operation of Magnum

	<b>DANGER</b>	
<b>Ensure nobody is standing near moving parts before starting the Magnum.</b>		

## Starting the Magnum

1. Open the ball valve of the hopper guillotine.
2. Start the Magnum.

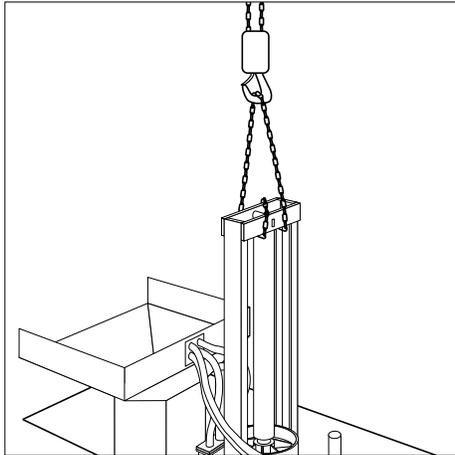


### WARNING - Stopping of Magnum

3. Always stop the Magnum with the piston halfway in the down stroke (evacuation cycle) and close the ball valve of hopper guillotine to maintain it closed under hydraulic pressure and prevent manure from coming back into the barn.
4. To make the manure slide easier along the hopper side during the next use, rinse the hopper with water after each cleaning cycle.

<b>WARNING</b>		
	<p><b>Even if a large quantity of water is added, never evacuate straw chopped or not, hay, sawdust, silage or bulk stall manure without mixing it first with cow manure.</b></p> <p>To make these matters suitable for evacuation by the Magnum, the operator must spread them moderately in the barn cleaner gutter behind the cows for 24 hours. After 24 hours, if the manure is a little too dry yet, continuously add water in the loaded gutter at 15 ft from the hopper when the barn cleaner and the Magnum are running to make manure heavier before falling in the hopper.</p>	

# Handling of Magnum







**Handling of Magnum must always be done from the top of the pumping tube.**

**The weight of the Magnum varies between 3600 and 4600 lbs.**

**Use equipment powerful enough to safely lift and install the Magnum.**

## Positioning of Magnum Hopper “ A ” to “ H ”

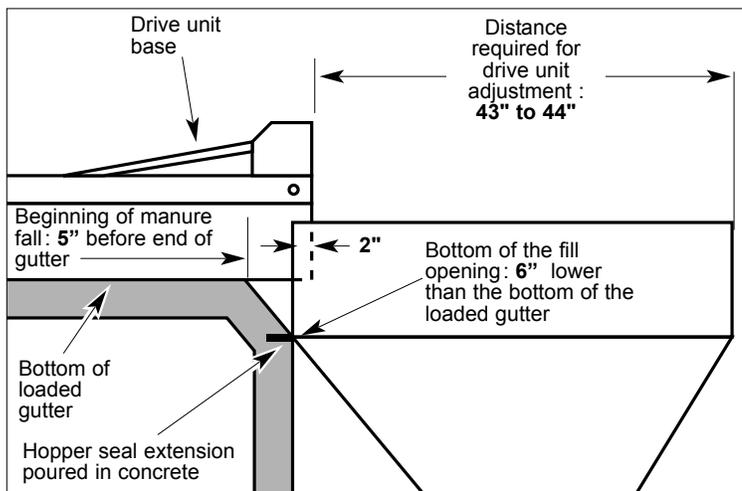


fig. 1

To improve manure falling in the hopper and let enough space to adjust the barn cleaner drive unit:

1. Set the Magnum so the fill opening of the hopper is 6" lower than the bottom of the barn cleaner gutter — *fig. 1*.
2. Pour the end of the loaded gutter sloped downward so the manure starts falling in the hopper 5" before reaching the end of the gutter — *fig. 1*.
3. Set the base of the drive unit at roughly 43" or 44" from the opposite side of the hopper — *fig. 1*.

## Positioning of Magnum Hopper “ J ” to “ L ”

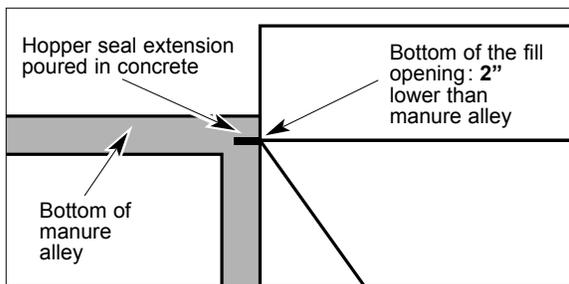


fig. 2

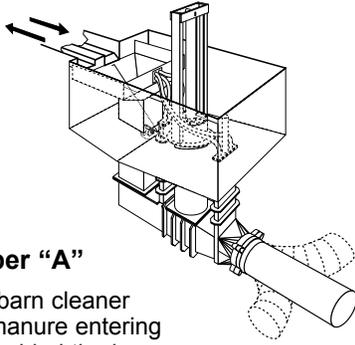
Set the Magnum so the fill opening of the hopper is 2" lower than the manure alley to make sure that tractor blade cannot catch on hopper side or the optional grill — *fig. 2*.

## In ground setting of Magnum

**IMPORTANT:** The Magnum and the evacuation line must be buried in compacted fine sand to avoid scratching any painted system components. The same burying measure is applied to a P.V.C. evacuation line to prevent rocks from piercing through the P.V.C. pipes.

The trench for the installation of the Magnum and the evacuation line must be dug 6" deeper than required to allow spreading of a 6" fine sand bed at the bottom of trench before installing the Magnum and the evacuation line.

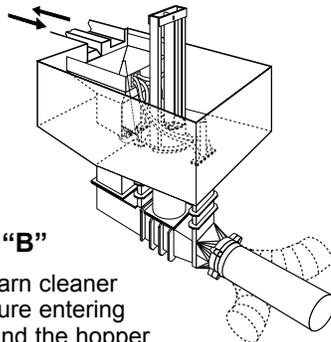
# Installation index of Magnum



## Hopper "A"

C.W. barn cleaner with manure entering from behind the hopper

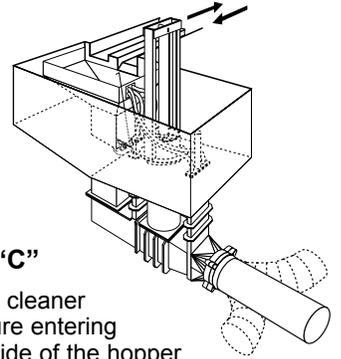
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## Hopper "B"

C.C.W. barn cleaner with manure entering from behind the hopper

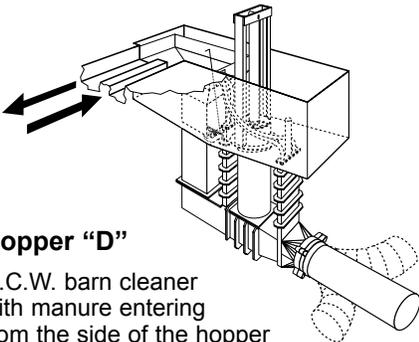
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## Hopper "C"

C.W. barn cleaner with manure entering from the side of the hopper

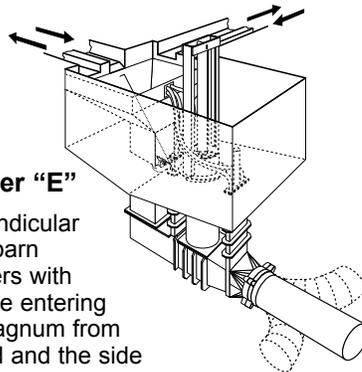
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## Hopper "D"

C.C.W. barn cleaner with manure entering from the side of the hopper

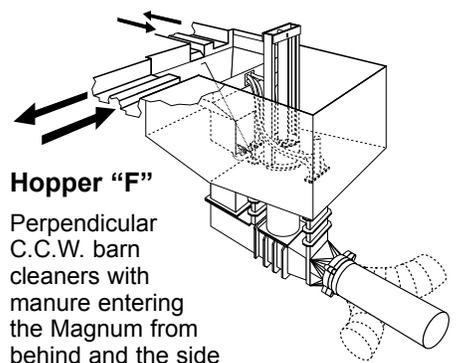
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## Hopper "E"

Perpendicular C.W. barn cleaners with manure entering the Magnum from behind and the side

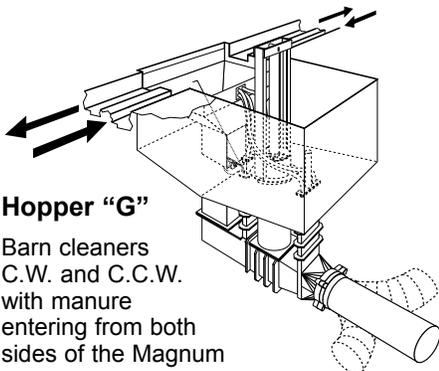
page ..... 12



## Hopper "F"

Perpendicular C.C.W. barn cleaners with manure entering the Magnum from behind and the side

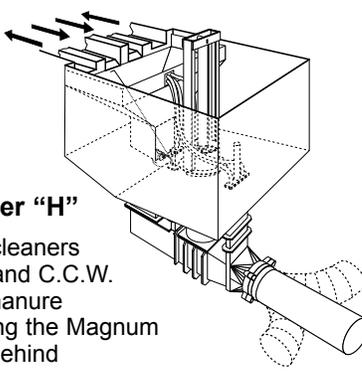
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## Hopper "G"

Barn cleaners C.W. and C.C.W. with manure entering from both sides of the Magnum

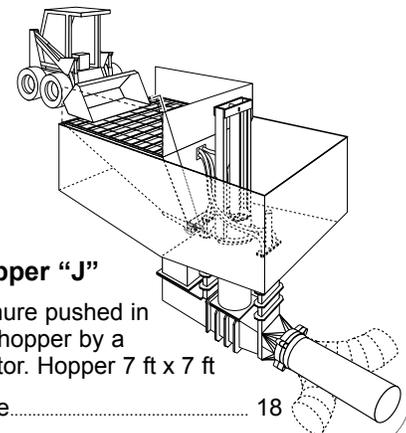
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## Hopper "H"

Barn cleaners C.W. and C.C.W. with manure entering the Magnum from behind

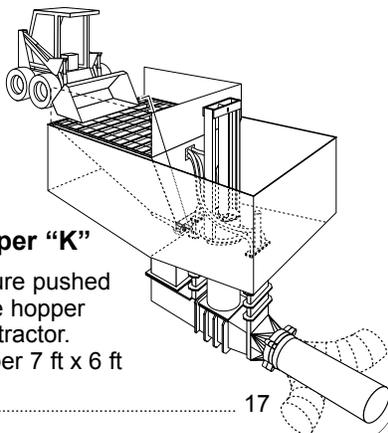
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## Hopper "J"

Manure pushed in the hopper by a tractor. Hopper 7 ft x 7 ft

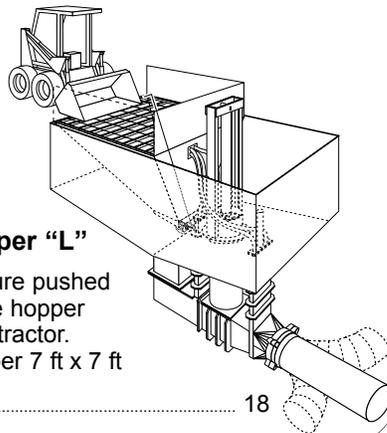
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## Hopper "K"

Manure pushed in the hopper by a tractor. Hopper 7 ft x 6 ft

page ..... 17



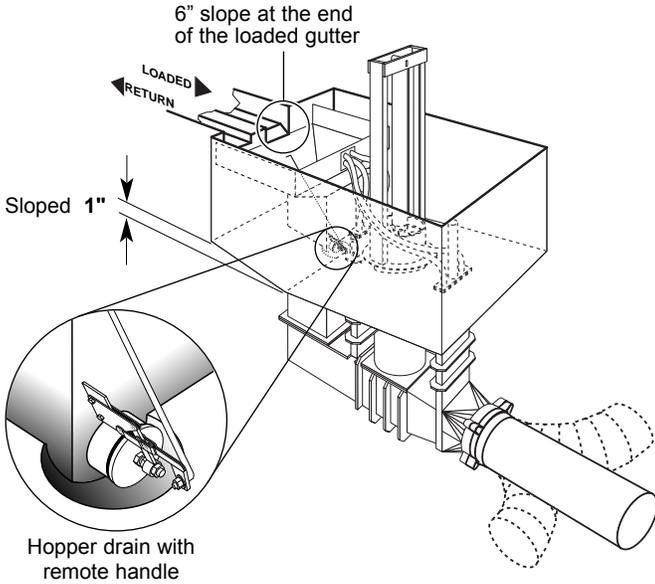
## Hopper "L"

Manure pushed in the hopper by a tractor. Hopper 7 ft x 7 ft

page ..... 18

# Installation dimensions with hopper "A"

C.W. barn cleaner



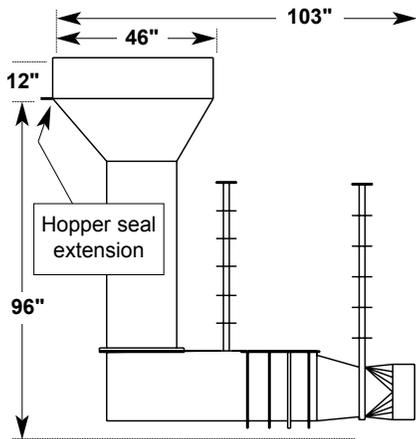
**IMPORTANT :** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "A"

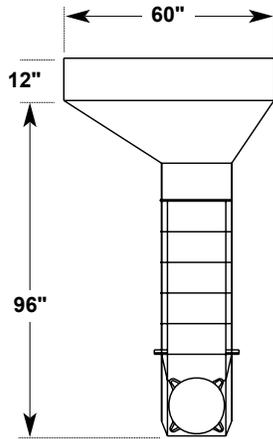
The illustration shows the 6" slope at the end of the loaded gutter, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT :** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "A"



## Front view of Magnum with hopper "A"



## Specifications

Dimensions of hopper:

**46" x 60"**

Hopper capacity: **169 imp/gal**

**203 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **96"**

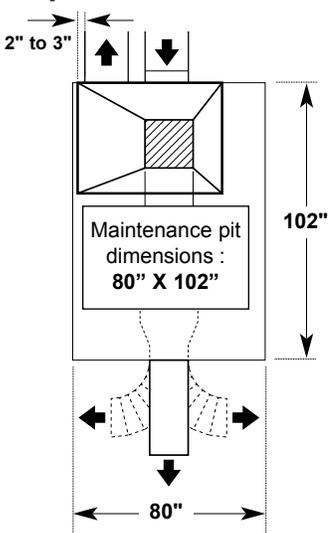
Evacuation line: **16 Ø min.**

## Depth of installation

From bottom of gutter: **102"**

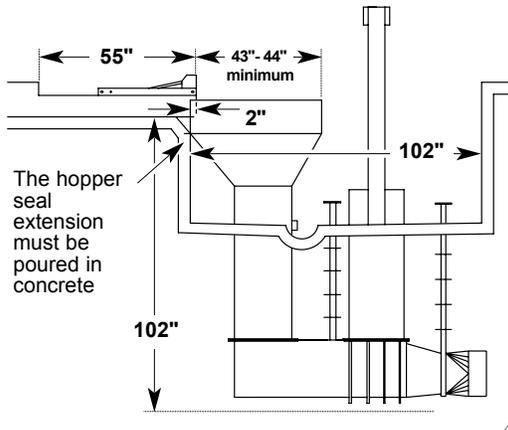
Installation trench depth: **108"**

## Top view



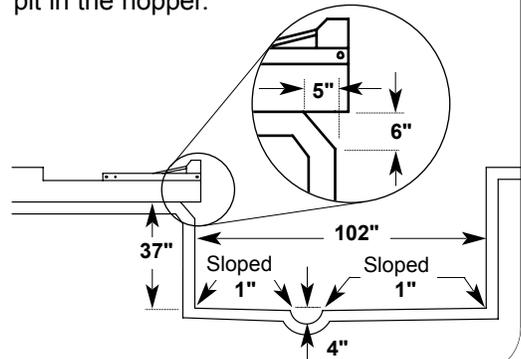
## Side view

Magnum in the maintenance pit with dimensions for the drive unit base — see page 6.



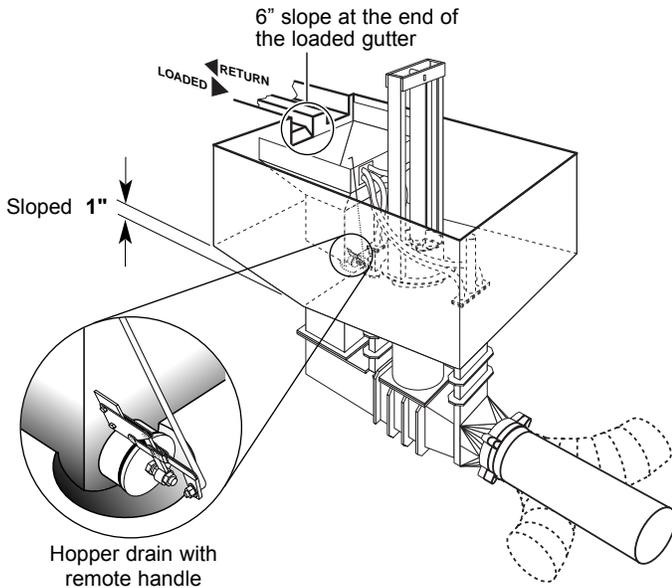
## Side view

Dimensions of maintenance pit and 6" slope at the end of the loaded gutter. The return gutter (not illustrated) does not require a slope at its end. The recess under the valve drains the maintenance pit in the hopper.



# Installation dimensions with hopper "B"

C.C.W. barn cleaner



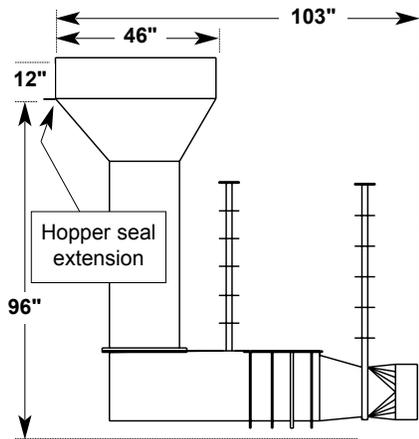
**IMPORTANT :** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "B"

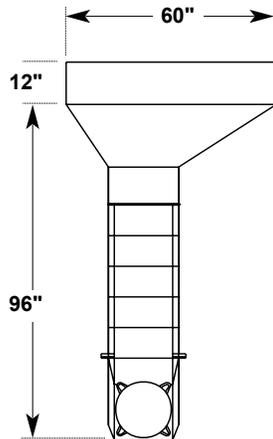
The illustration shows the 6" slope at the end of the loaded gutter, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT :** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "B"



## Front view of Magnum with hopper "B"



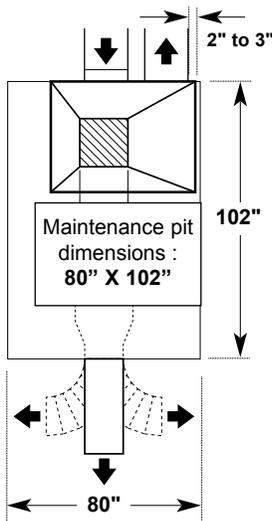
## Specifications

- Dimensions of hopper: **46" x 60"**
- Hopper capacity: **169 imp/gal**  
**203 U.S./gal**
- Distance between hopper fill opening and bottom of Magnum: **96"**
- Evacuation line: **16 Ø min.**

## Depth of installation

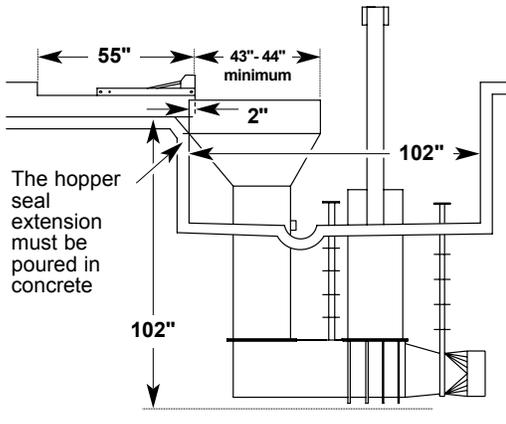
- From bottom of gutter: **102"**
- Installation trench depth: **108"**

## Top view



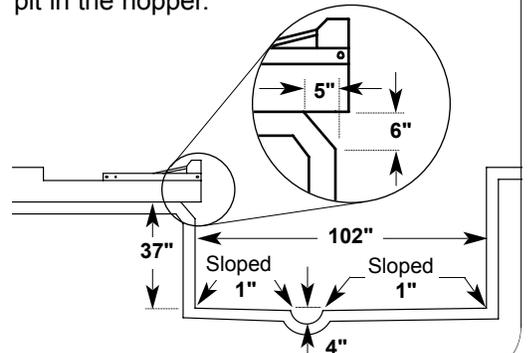
## Side view

Magnum in the maintenance pit with dimensions for the drive unit base — see page 6.



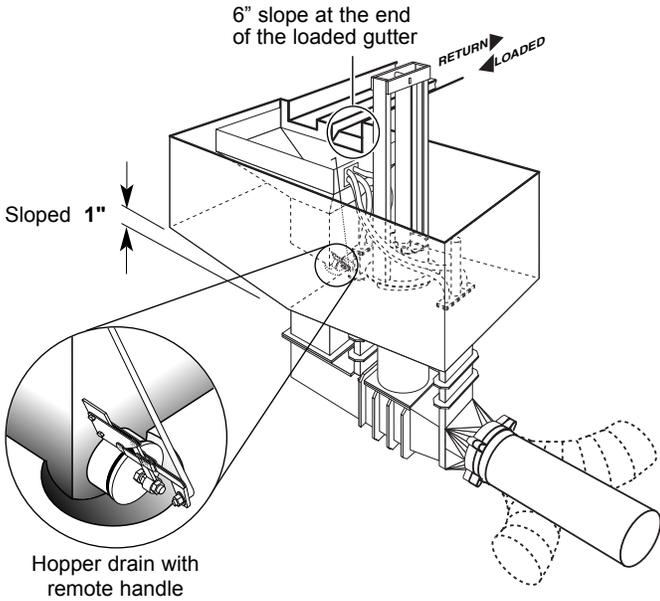
## Side view

Dimensions of maintenance pit and 6" slope at the end of the loaded gutter. The return gutter (not illustrated) does not require a slope at its end. The recess under the valve drains the maintenance pit in the hopper.



# Installation dimensions with hopper "C"

C.W. barn cleaner



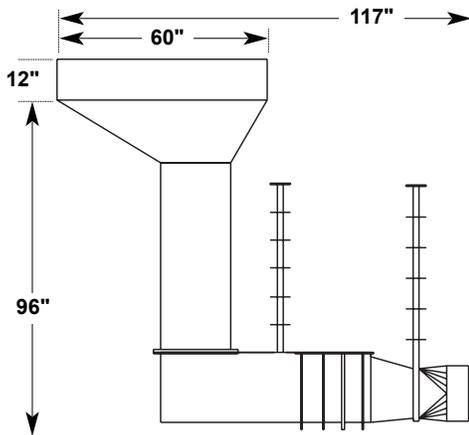
**IMPORTANT:** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "C"

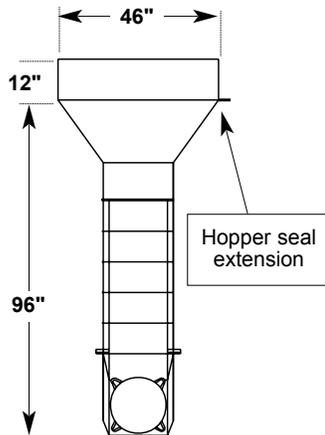
The illustration shows the 6" slope at the end of the loaded gutter, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "C"



## Front view of Magnum with hopper "C"



## Specifications

Dimensions of hopper:

**60" x 46"**

Hopper capacity: **169 imp/gal**

**203 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **96"**

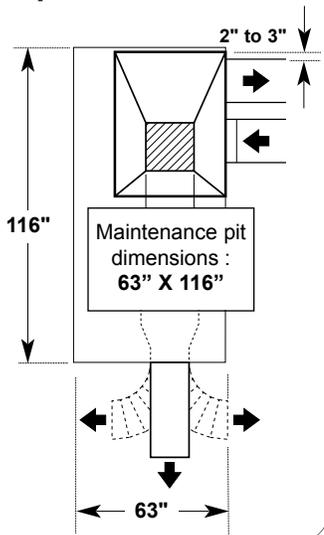
Evacuation line: **16 Ø min.**

## Depth of installation

From bottom of gutter: **102"**

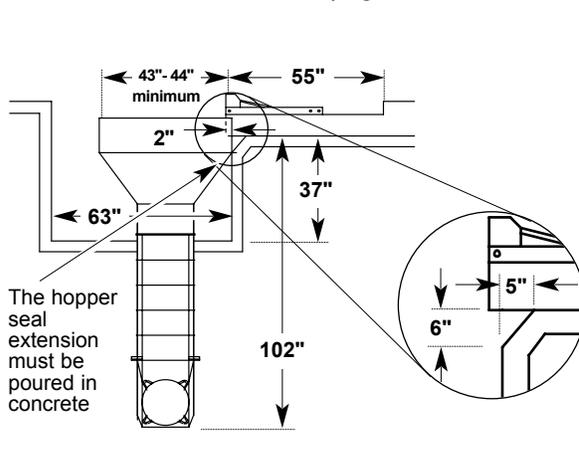
Installation trench depth: **108"**

## Top view



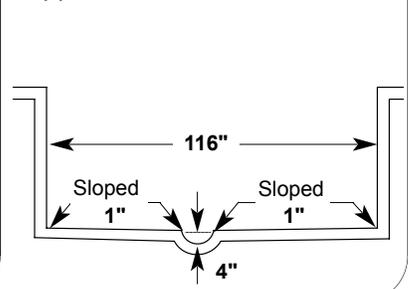
## Front view

Magnum in the maintenance pit with dimensions for the drive unit base — see page 6.



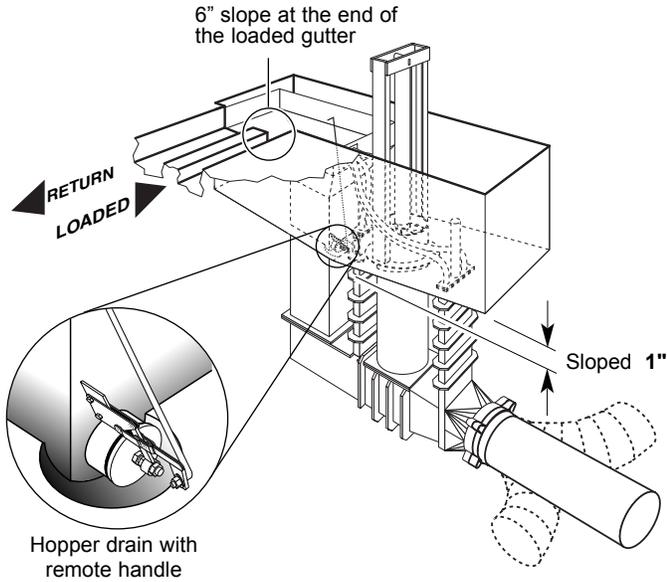
## Side view

Dimensions of maintenance pit and 6" slope at the end of the loaded gutter. The return gutter (not illustrated) does not require a slope at its end. The recess under the valve drains the maintenance pit in the hopper.



# Installation dimensions with hopper "D"

C.C.W. barn cleaner



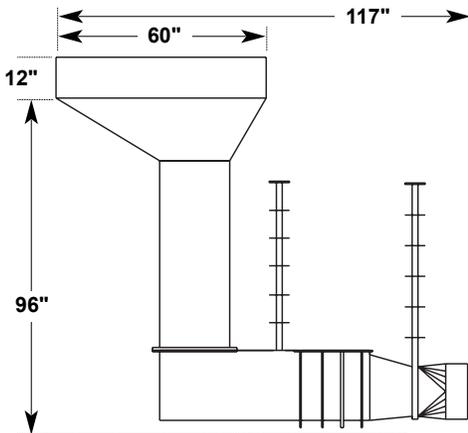
**IMPORTANT:** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "D"

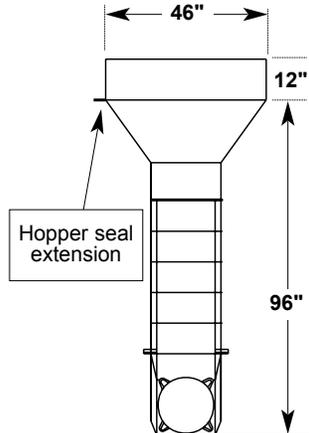
The illustration shows the 6" slope at the end of the loaded gutter, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "D"



## Front view of Magnum with hopper "D"



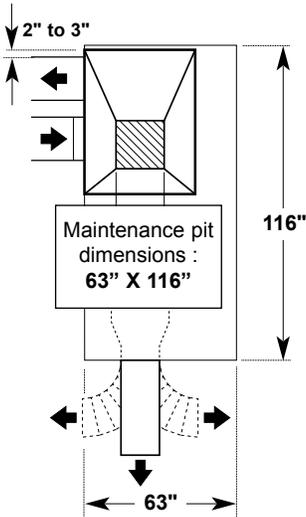
## Specifications

- Dimensions of hopper: **60"x 46"**
- Hopper capacity: **169 imp/gal**  
**203 U.S./gal**
- Distance between hopper fill opening and bottom of Magnum: **96"**
- Evacuation line: **16 Ø min.**

## Depth of installation

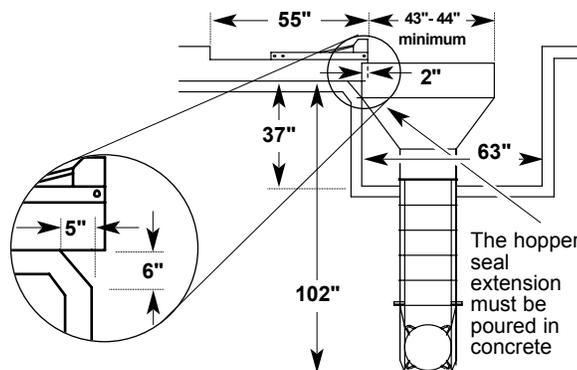
- From bottom of gutter: **102"**
- Installation trench depth: **108"**

## Top view



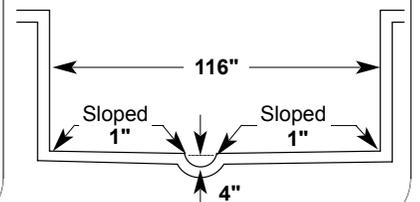
## Front view

Magnum in the maintenance pit with dimensions for the drive unit base — see page 6.



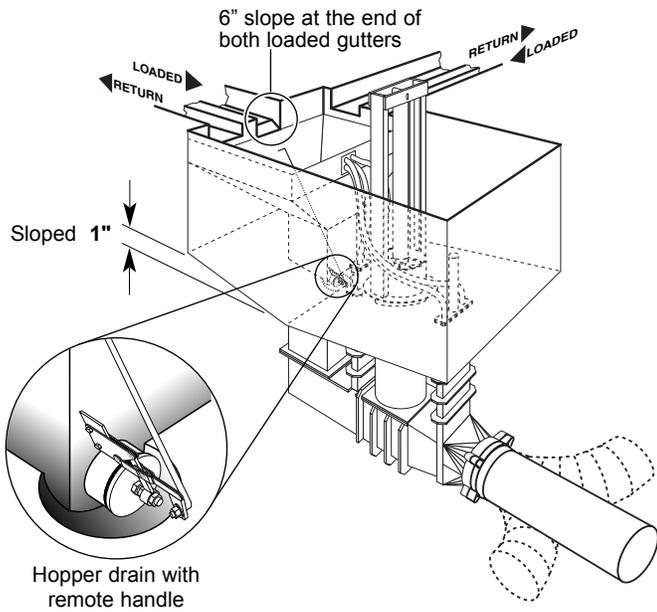
## Side view

Dimensions of maintenance pit and 6" slope at the end of the loaded gutter. The return gutter (not illustrated) does not require a slope at its end. The recess under the valve drains the maintenance pit in the hopper.



# Installation dimensions with hopper "E"

Two perpendicular C.W. barn cleaners



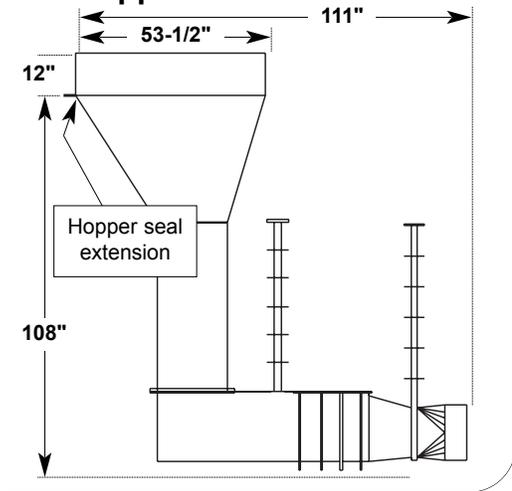
**IMPORTANT:** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "E"

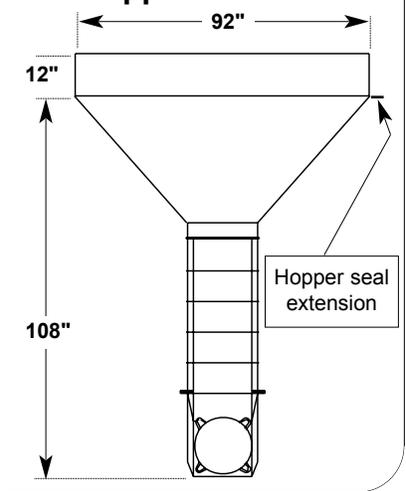
The illustration shows the 6" slope at the end of both loaded gutters, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

### Side view of Magnum with hopper "E"



### Front view of Magnum with hopper "E"



### Specifications

Dimensions of hopper:  
**53-1/2" x 92"**

Hopper capacity: **362 imp/gal**  
**435 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **108"**

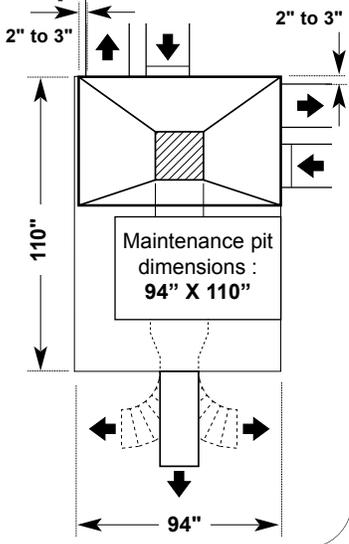
Evacuation line: **16 Ø min.**

### Depth of installation

From bottom of gutter:  
**114"**

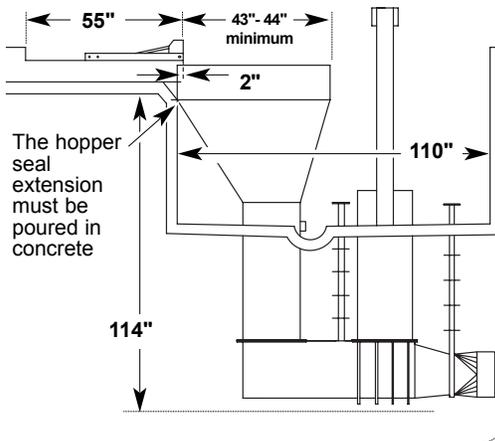
Installation trench depth:  
**120"**

### Top view



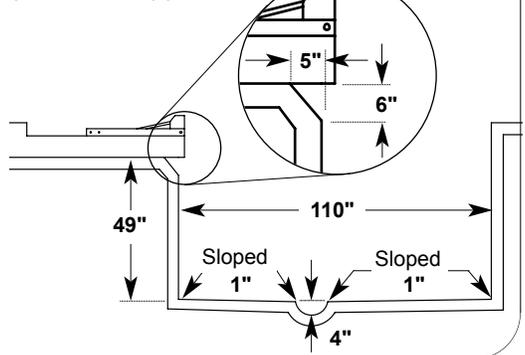
### Side view

Magnum in the maintenance pit with dimensions for the drive unit base — see page 6.



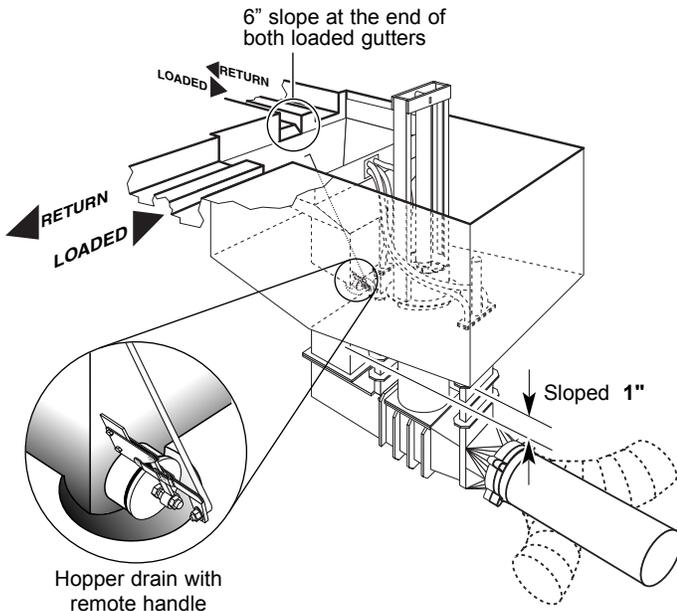
### Side view

Dimensions of maintenance pit and 6" slope at the end of the loaded gutter. The return gutter (not illustrated) does not require a slope at its end. The recess under the valve drains the maintenance pit in the hopper.



# Installation dimensions with hopper "F"

Two perpendicular C.C.W. barn cleaners



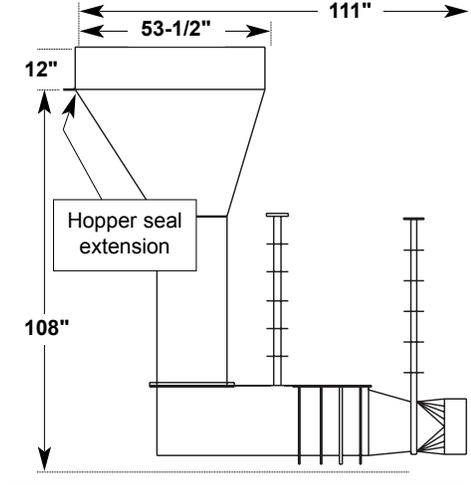
**IMPORTANT:** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "F"

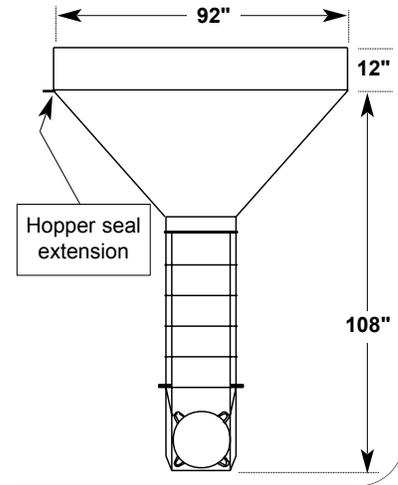
The illustration shows the 6" slope at the end of both loaded gutters, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "F"



## Front view of Magnum with hopper "F"



## Specifications

Dimensions of hopper:  
**53-1/2" x 92"**

Hopper capacity: **362 imp/gal**  
**435 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **108"**

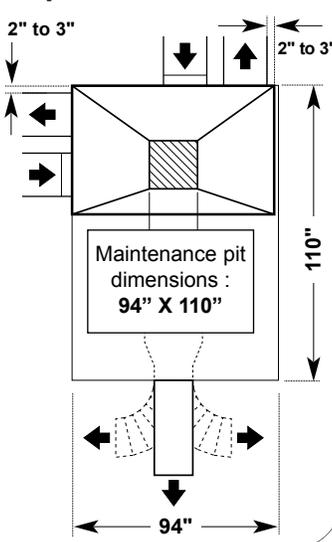
Evacuation line: **16 Ø min.**

## Depth of installation

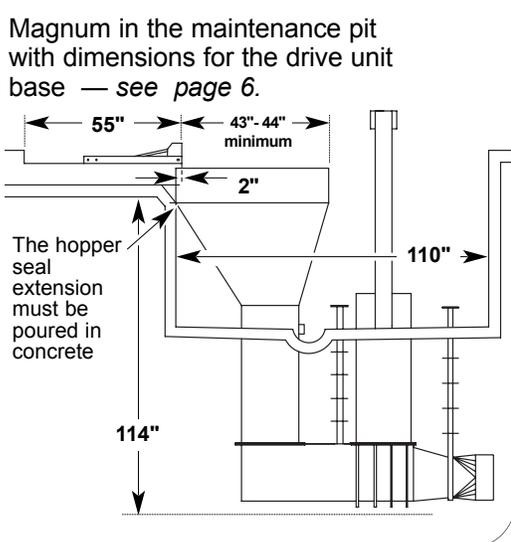
From bottom of gutter:  
**114"**

Installation trench depth:  
**120"**

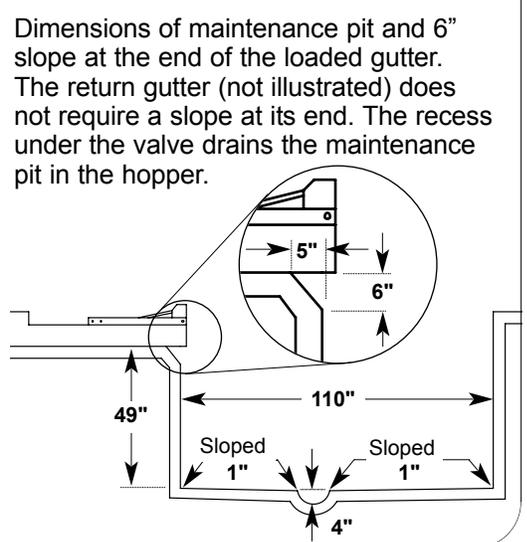
## Top view



## Side view

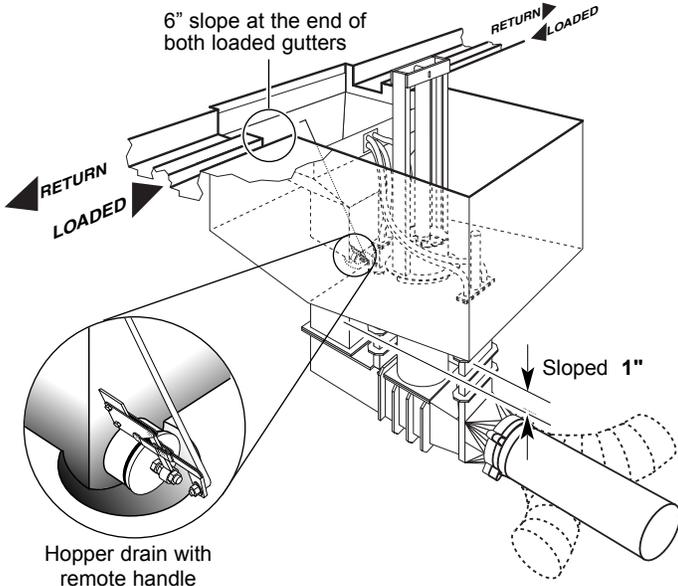


## Side view



# Installation dimensions with hopper "G"

C.W. and C.C.W. barn cleaners face to face



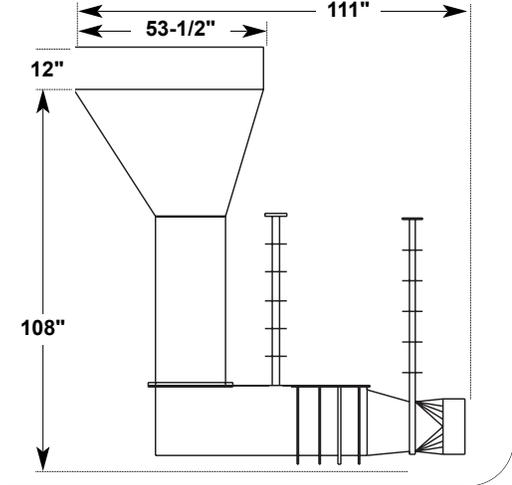
**IMPORTANT:** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "G"

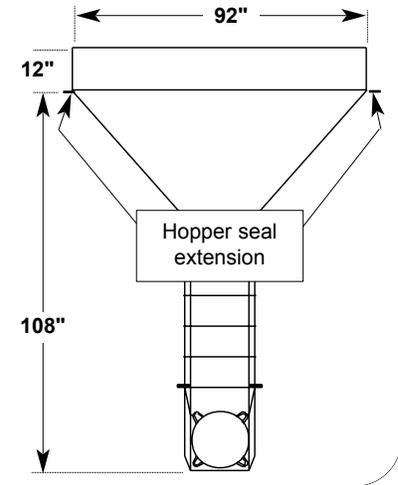
The illustration shows the 6" slope at the end of both loaded gutters, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

### Side view of Magnum with hopper "G"



### Front view of Magnum with hopper "G"



### Specifications

Dimensions of hopper:  
**53-1/2" x 92"**

Hopper capacity: **362 imp/gal**  
**435 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **108"**

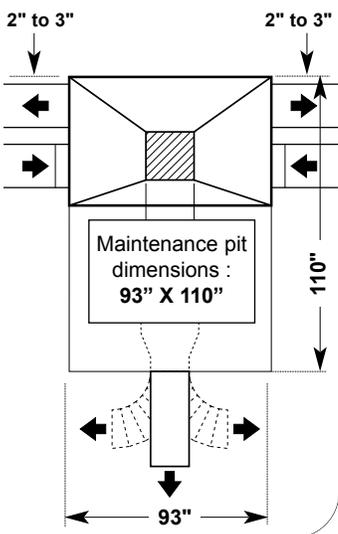
Evacuation line: **16 Ø min.**

### Depth of installation

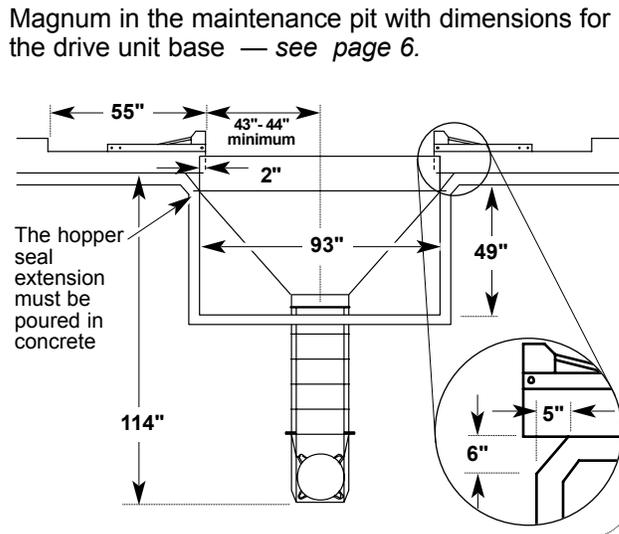
From bottom of gutter:  
**114"**

Installation trench depth:  
**120"**

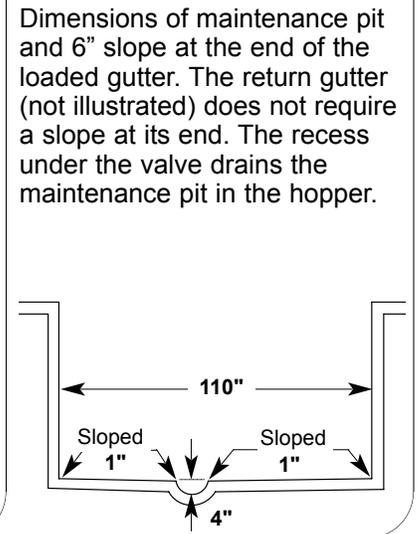
### Top view



### Front view

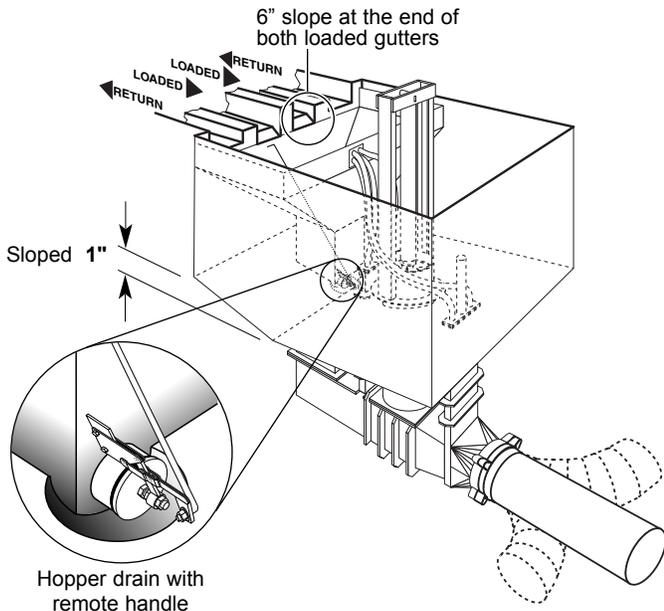


### Side view



# Installation dimensions with hopper "H"

C.W. and C.C.W. parallel barn cleaners



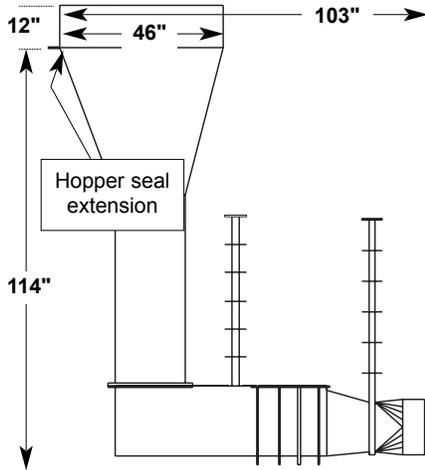
**IMPORTANT:** Magnum must be installed with fill opening of hopper 6" lower than bottom of barn cleaner gutter — see page 6.

## View of Magnum installed with a hopper "H"

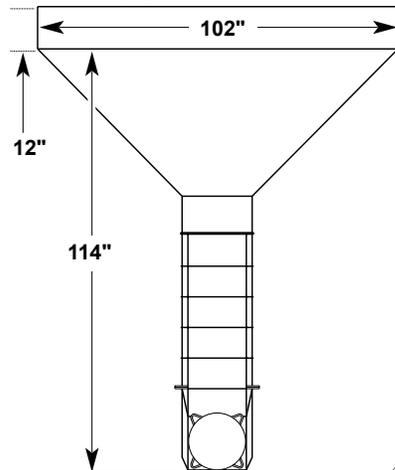
The illustration shows the 6" slope at the end of both loaded gutters, the 1" slope towards the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "H"



## Front view of Magnum with hopper "H"



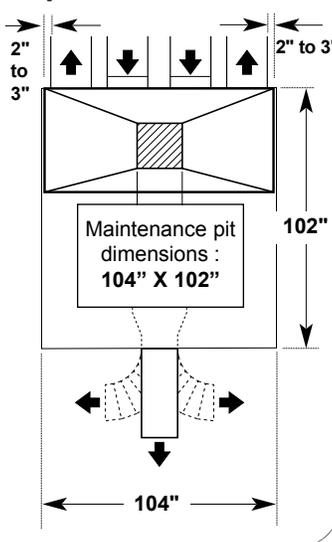
## Specifications

- Dimensions of hopper: **46" x 102"**
- Hopper capacity: **401 imp/gal**  
**481 U.S./gal**
- Distance between hopper fill opening and bottom of Magnum: **114"**
- Evacuation line: **16 Ø min.**

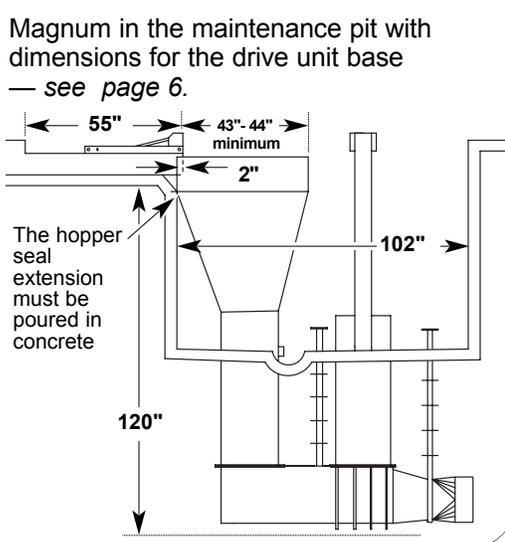
## Depth of installation

- From bottom of gutter: **120"**
- Installation trench depth: **126"**

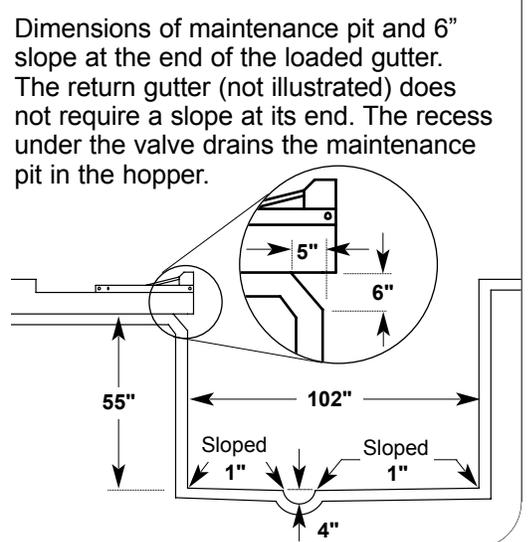
## Top view



## Side view

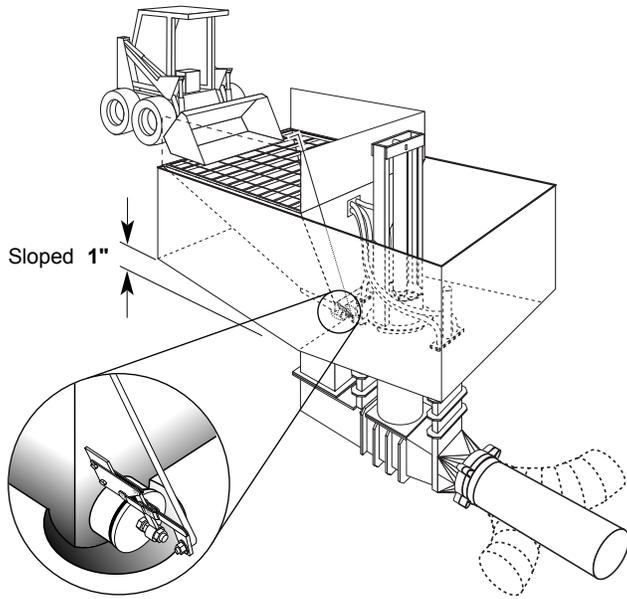


## Side view



# Installation dimensions with hopper "J"

Hopper 6 ft long x 7 ft wide for tractor



Hopper drain with remote handle

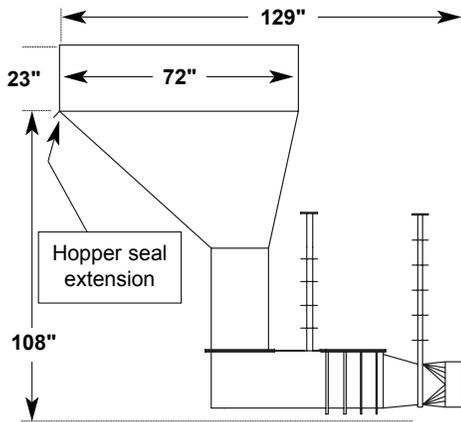
**IMPORTANT:** Magnum must be installed with fill opening of hopper 2" lower than the manure alley — see page 6.

## View of Magnum installed with a hopper "J"

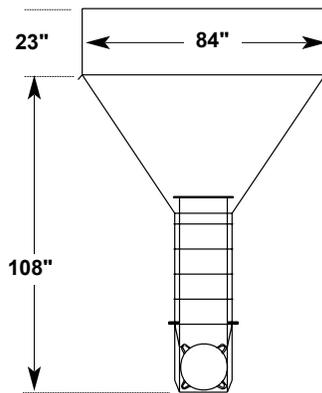
The illustration shows a tractor bringing manure to the Magnum, the 1" slope to the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "J"



## Front view of Magnum with hopper "J"



## Specifications

Dimensions of hopper:  
**72" x 84"**

Hopper capacity: **514 imp/gal**  
**617 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **108"**

Evacuation line: **16 Ø min.**

## Depth of installation

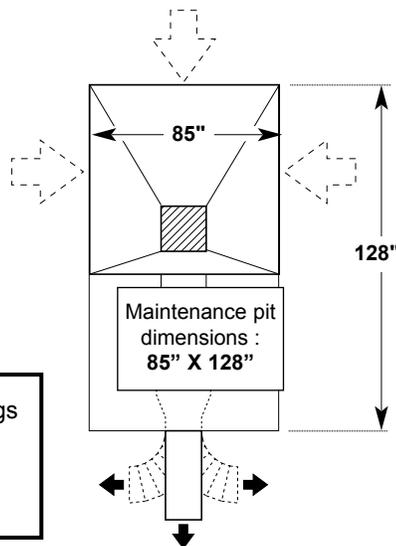
From manure alley level:  
**110"**

Installation trench depth:  
**116"**

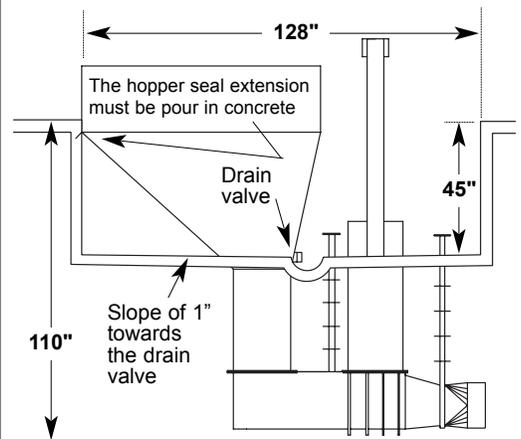
## Top view

The Magnum with hopper "J" can be made to receive semi-liquid manure from behind, right side, left side or a combination of those three possibilities.

**IN OPTION:** A grill covering the hopper is available to screen manure chunks too large, dry or frozen away from the Magnum.



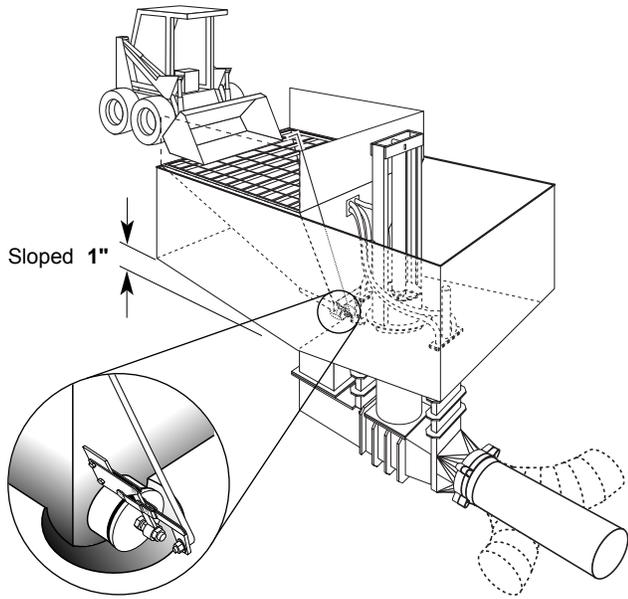
## Side view



**DANGER:** Grill openings are too wide to prevent animals, children or adults from falling in.

# Installation dimensions with hopper "K"

Hopper 7 ft long x 6 ft wide for tractor



Hopper drain with remote handle

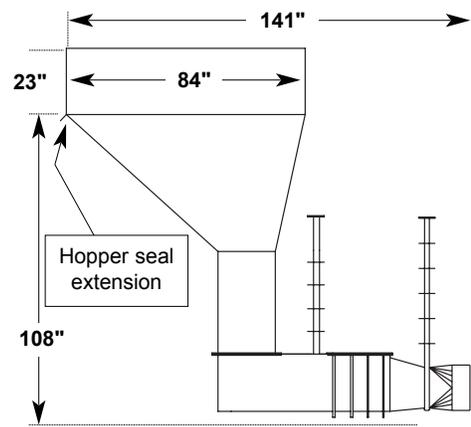
**IMPORTANT:** Magnum must be installed with fill opening of hopper 2" lower than the manure alley — see page 6.

## View of Magnum installed with a hopper "K"

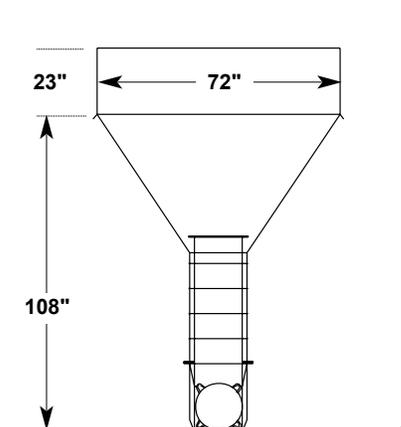
The illustration shows a tractor bringing manure to the Magnum, the 1" slope to the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "K"



## Front view of Magnum with hopper "K"



## Specifications

- Dimensions of hopper: **84"x 72"**
- Hopper capacity: **514 imp/gal**  
**617 U.S./gal**
- Distance between hopper fill opening and bottom of Magnum: **108"**
- Evacuation line: **16 Ø min.**

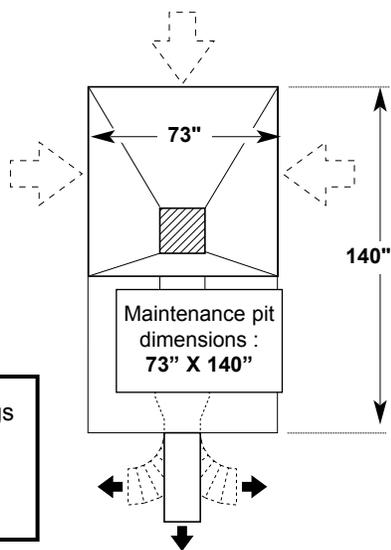
## Depth of installation

- From manure alley level: **110"**
- Installation trench depth: **116"**

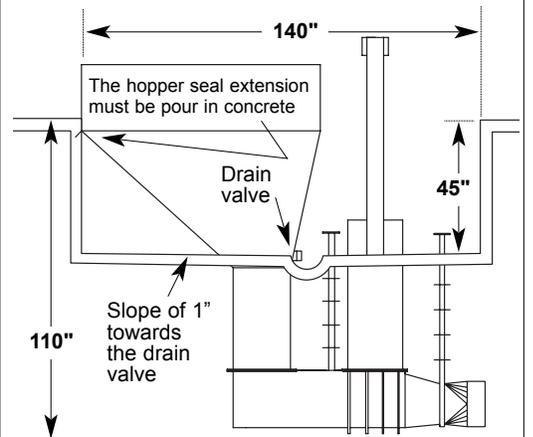
## Top view

The Magnum with hopper "K" can be made to receive semi-liquid manure from behind, right side, left side or a combination of those three possibilities.

**IN OPTION:** A grill covering the hopper is available to screen manure chunks too large, dry or frozen away from the Magnum.



## Side view

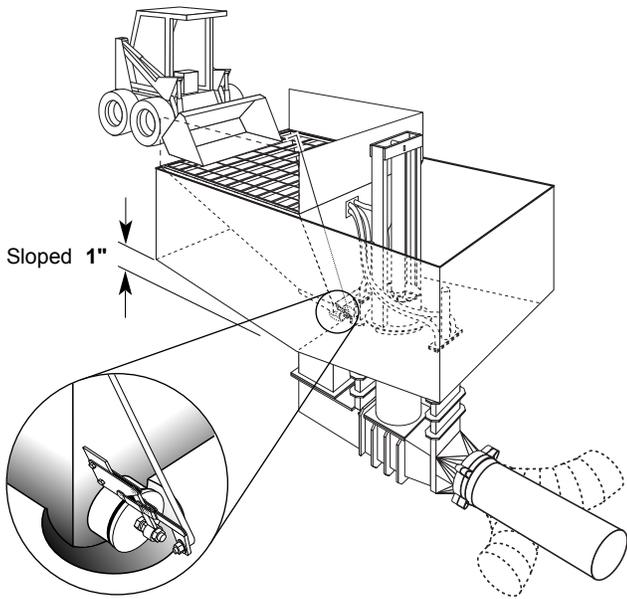


**DANGER :** Grill openings are too wide to prevent animals, children or adults from falling in.

# Installation dimensions with hopper "L"

Hopper 7 ft long x 7 ft wide for tractor

**IMPORTANT:** Magnum must be installed with fill opening of hopper 2" lower than the manure alley — see page 6.



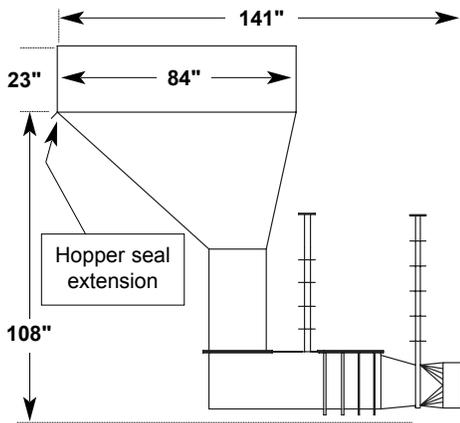
Hopper drain with remote handle

## View of Magnum installed with a hopper "L"

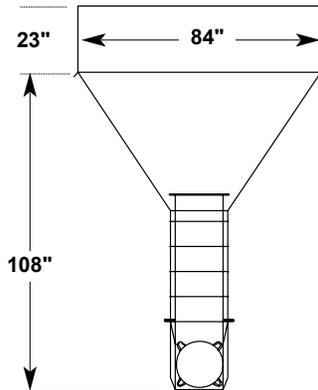
The illustration shows a tractor bringing manure to the Magnum, the 1" slope to the hopper drain valve and a close-up view of the drain valve. The evacuation line can be installed straight or at an angle up to 90° with the end of the Magnum.

**IMPORTANT:** The evacuation line must be installed at the same time as the Magnum. Construction of the shallow maintenance pit is made after installation of Magnum.

## Side view of Magnum with hopper "L"



## Front view of Magnum with hopper "L"



## Specifications

Dimensions of hopper:  
**84" x 84"**

Hopper capacity: **578 imp/gal**  
**695 U.S./gal**

Distance between hopper fill opening and bottom of Magnum: **108"**

Evacuation line: **16 Ø min.**

## Depth of installation

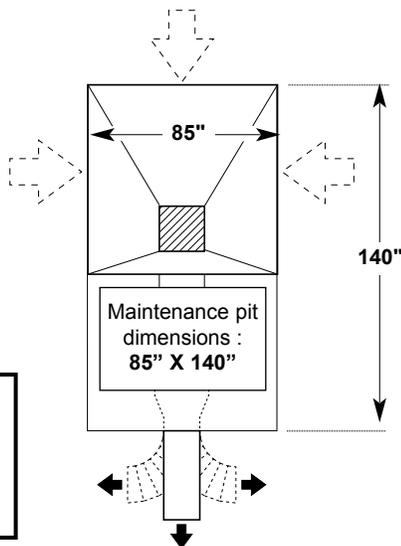
From manure alley level: **110"**

Installation trench depth: **116"**

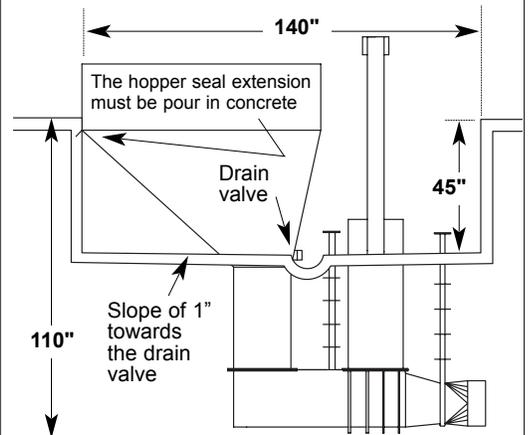
## Top view

The Magnum with hopper "L" can be made to receive semi-liquid manure from behind, right side, left side or a combination of those three possibilities.

**IN OPTION:** A grill covering the hopper is available to screen manure chunks too large, dry or frozen away from the Magnum.



## Side view

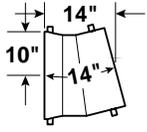


**DANGER:** Grill openings are too wide to prevent animals, children or adults from falling in.

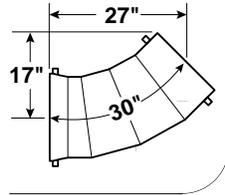
# Steel elbows dimensions

Evacuation line 16" diameter

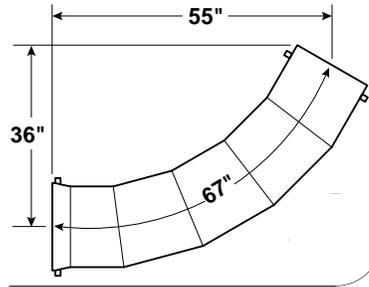
## Elbow 15°



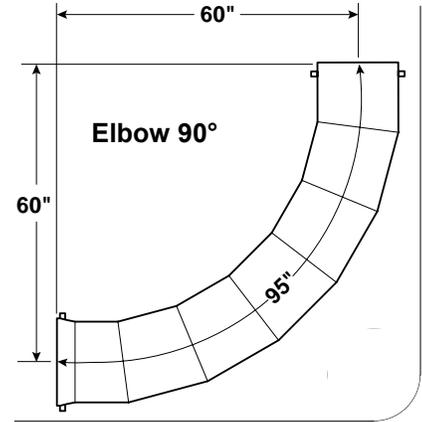
## Elbow 45°



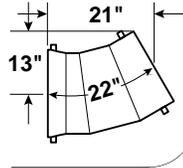
## Elbow 60°



## Elbow 90°

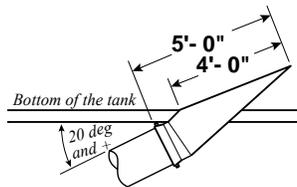


## Elbow 30°

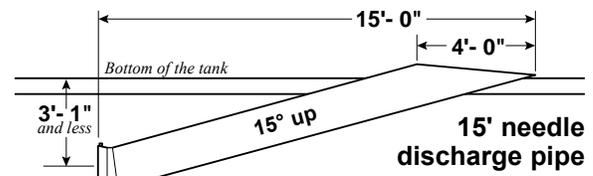


# Installation dimensions of the needle discharge pipe

## 5' needle discharge pipe

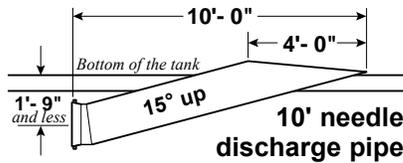


Use only when preceding pipe must raise at more than 20°.



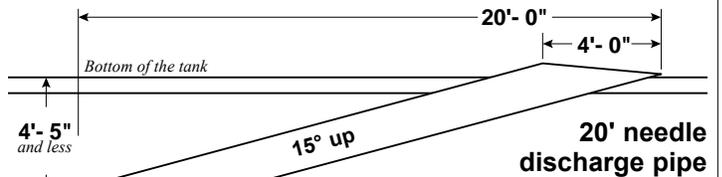
## 15' needle discharge pipe

Installation depth of the evacuation line under the bottom of the manure tank : 3'- 1" and less.



## 10' needle discharge pipe

Installation depth of the evacuation line under the bottom of the manure tank : 1'- 9" and less.

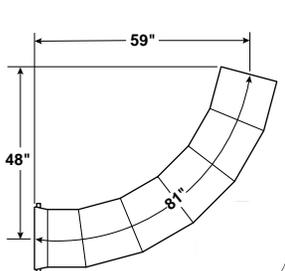


## 20' needle discharge pipe

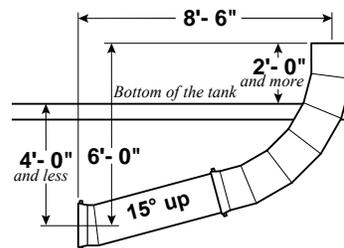
Installation depth of the evacuation line under the bottom of the manure tank : 4'- 5" and less.

# Installation dimensions of 75° long radius discharge elbow

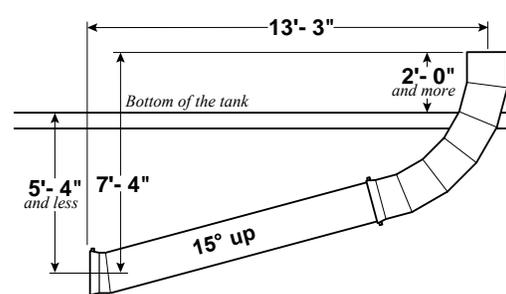
## 75° long radius discharge elbow alone



## 75° long radius discharge elbow with rising pipe 15° x 5' long



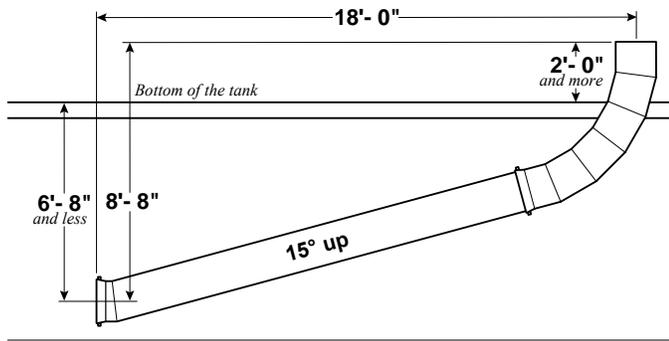
Installation depth of the evacuation line under the bottom of the manure tank : 4'- 0" and less.



## 75° long radius discharge elbow with rising pipe 15° x 10' long

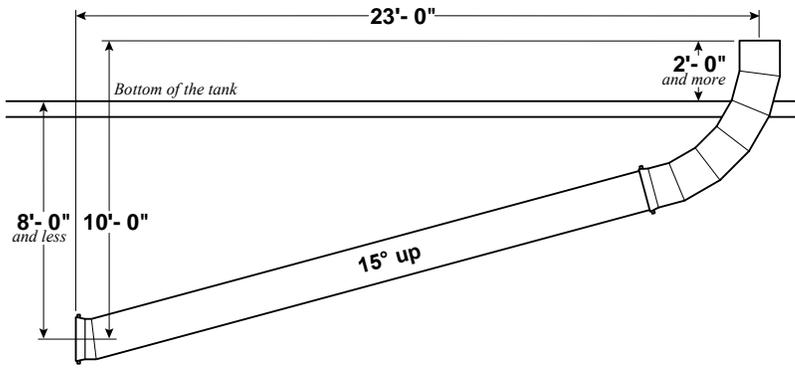
Installation depth of the evacuation line under the bottom of the manure tank : 5'- 4" and less.

# Installation dimensions of 75° long radius discharge elbow



**75° long radius discharge elbow with rising pipe 15° x 15' long**

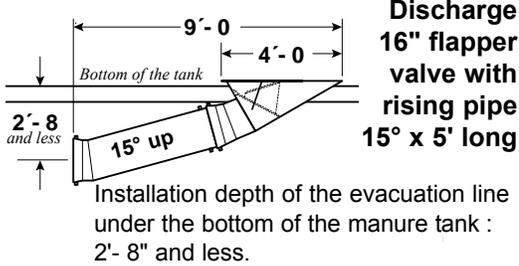
Installation depth of the evacuation line under the bottom of the manure tank : 6'- 8" and less.



**75° long radius discharge elbow with rising pipe 15° x 20' long**

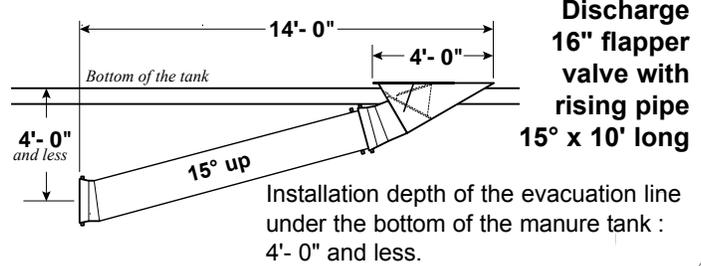
Installation depth of the evacuation line under the bottom of the manure tank : 8'- 0" and less.

# Installation dimensions of discharge with 16" flapper valve



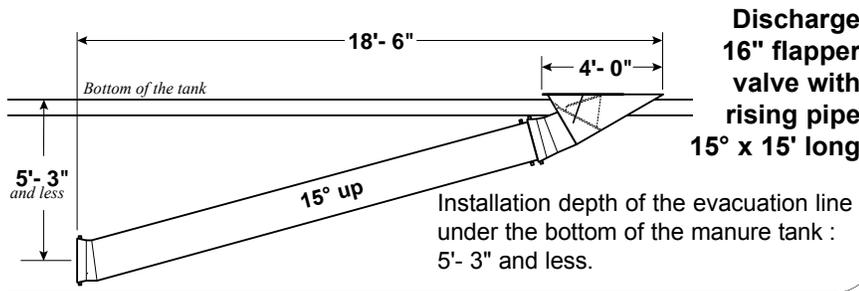
**Discharge 16" flapper valve with rising pipe 15° x 5' long**

Installation depth of the evacuation line under the bottom of the manure tank : 2'- 8" and less.



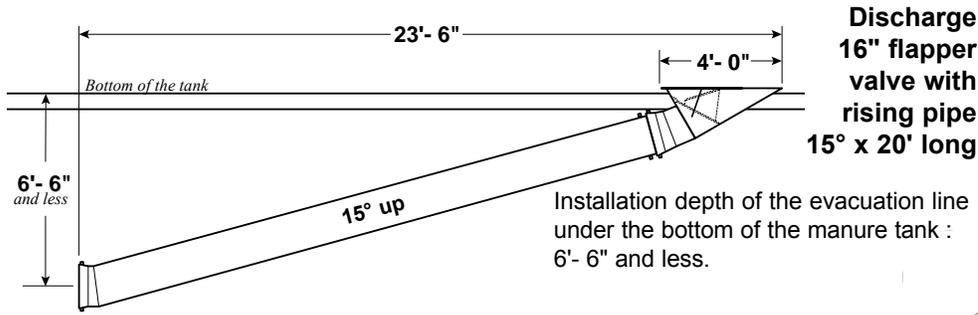
**Discharge 16" flapper valve with rising pipe 15° x 10' long**

Installation depth of the evacuation line under the bottom of the manure tank : 4'- 0" and less.



**Discharge 16" flapper valve with rising pipe 15° x 15' long**

Installation depth of the evacuation line under the bottom of the manure tank : 5'- 3" and less.



**Discharge 16" flapper valve with rising pipe 15° x 20' long**

Installation depth of the evacuation line under the bottom of the manure tank : 6'- 6" and less.

# Installation of standard Houle steel evacuation pipes

## Steel pipe visual inspection before installation

Installer must ensure that the steel pipe seal joints were not damaged on the freight and also that the ends of the pipes are not out of shape. If some ends are out of shape, it must be corrected by using an hydraulic jack — *fig. 1*.

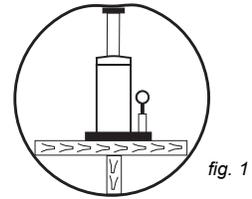


fig. 1

## Installation of Magnum with steel evacuation line



### IMPORTANT

Both, Magnum and evacuation line, must lay and be surrounded by a 6" thick layer of compacted fine sand to avoid scratching any painted components.



### WARNING

When the top of the manure reservoir is higher than the top of the outlet guillotine of the Magnum, it is mandatory to install a manual safety guillotine valve to prevent sloppy manure from flowing back in the barn if a guillotine has to be removed for maintenance.

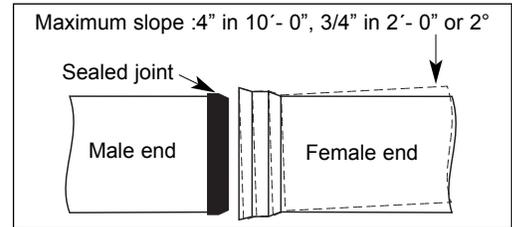


fig. 2

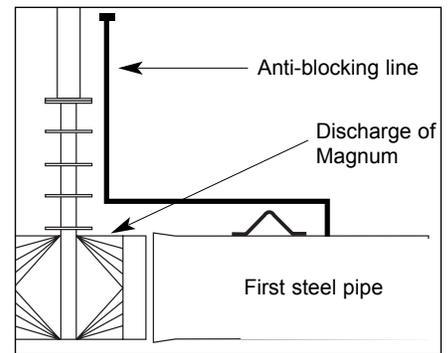
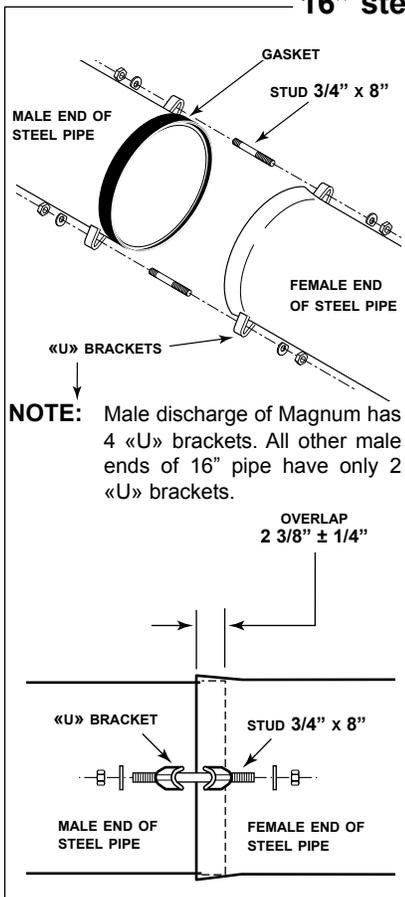


fig. 3

## 16" steel pipe — Male steel pipe to female steel pipe



1. Start digging the trench from barn towards manure reservoir as per the trench depth specification — see *letter on hopper and refer to page 7*. Add 6" of fine compacted sand before beginning installation of Magnum. The installation depth of the evacuation line may gradually rise towards the manure reservoir but must remain under freezing level;
2. Manipulate the Magnum as per instructions — see *page 6*;
3. Install Magnum according to hopper letter design style instructions — see *letter on hopper and refer to page 7*;
4. Coat the interior of the female end with vegetable grease;
5. Push the female end of the pipe to install over the male end of the preceding pipe;

**IMPORTANT:** The maximum slope allowed by the pipe sealed joint is 4" in 10' - 0", 3/4" in 2' - 0" or 2 degrees — *fig.2*.

6. Install the studs linking the «U» brackets of the male end to the «U» brackets of the female end;
  7. Tighten the nuts until you feel the female end is well set over the male end;
- NOTE:** After installation of each joint, do a physical inspection to ensure the joint is well set and will not leak. A simple way to check the seal is to take a hacksaw blade and try to slide it between the seal and the female end at different spots around the pipe joint. If the blade cannot slide through, the joint is well set.
8. Install the anti-blocking line on the first steel pipe — *fig. 3*;
  9. Install the second pipe following the instructions 4, 5, 6 and 7;
  10. Install all other steel pipes following the instructions 4, 5, 6 and 7.

# Installation of standard Houle steel evacuation pipes

## For 24" of diameter steel pipes only

**IMPORTANT:** For installation of the 24" steel pipes, the instructions are the same as those of the 16" steel pipes (see page 21) except for the slope of the sealed joint which must follow these instructions below.

In order not to exceed the maximum slope — see *instruction 5 at page 21*, an easy-to-use ruler is supplied with the 24" diameter pipes so the installer can check the slope of each joint during installation.

The ruler has 3 props on both sides. The center prop must always rest on the male part of the pipe joint and against the female part of the pipe joint. The maximum slope allowed is reached when all 3 ruler props touch both pipes — *fig. 1*. The ruler has an arrow on its side which must point toward the manure reservoir. Also, the ruler has a second arrow at its very end which must point in the direction the pipe must be aimed.

- **Angling up** — *fig. 1*.
- **Angling down** — *fig. 2*.
- **Turning right** — *fig. 3*.
- **Turning left** — *fig. 4*.

## Discharge elbow location in manure reservoir

The discharge must exit near the center ( $\pm 10'$ ) of the manure reservoir.

## Installation of evacuation line discharge (75° discharge elbow, 16" flapper valve or needle)

To install:

- The **75° long discharge elbow** — see *fig. 5 and pages 19, 20*.
- The **discharge with 16" flapper valve** — see *fig. 6 and page 20*.
- The **needle discharge** — see *fig. 7 and page 19*.

## Steel pipes must be buried in compacted sand

Surround the steel pipes with a 6" thick layer of compacted fine sand to avoid scratching any painted components. To do so, you can use a piece of wood to push and compact the sand — *fig. 8*. After that, use the soil from the trench to finish the burying.

**NOTE:** If the sand is not well packed around the steel pipes, unequal ground pressure will affect proper sealing of pipe joints.

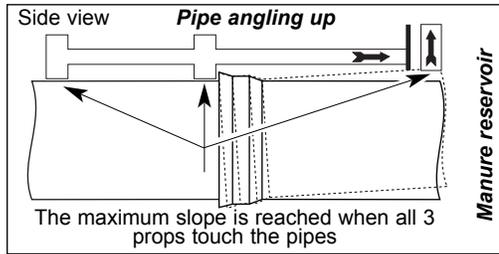


fig. 1

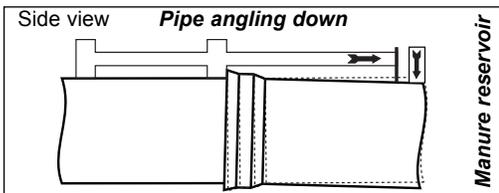


fig. 2

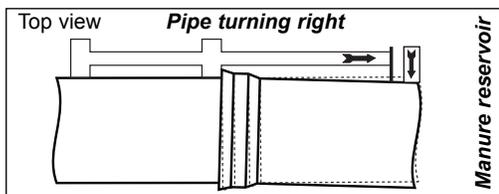


fig. 3

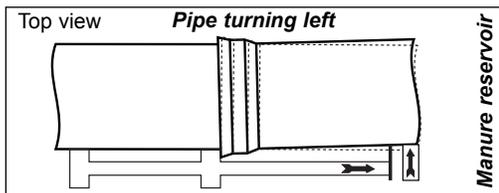


fig. 4

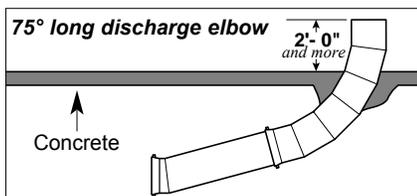


fig. 5

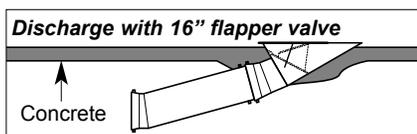


fig. 6

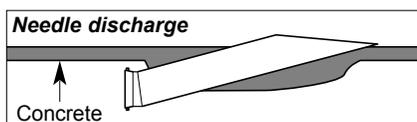


fig. 7

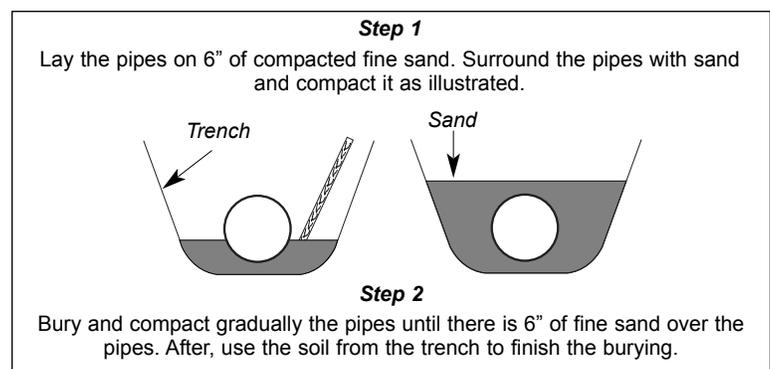


fig. 8

# Installation of combined steel / P.V.C. evacuation pipes

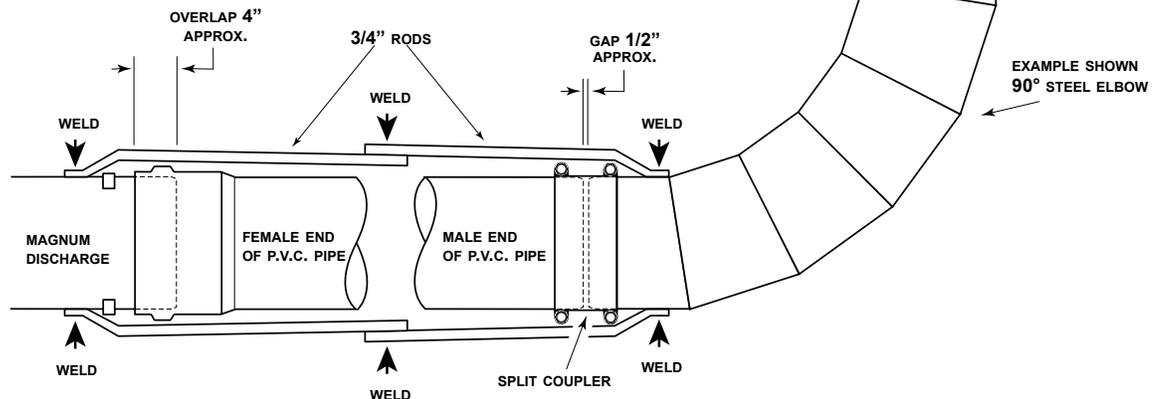
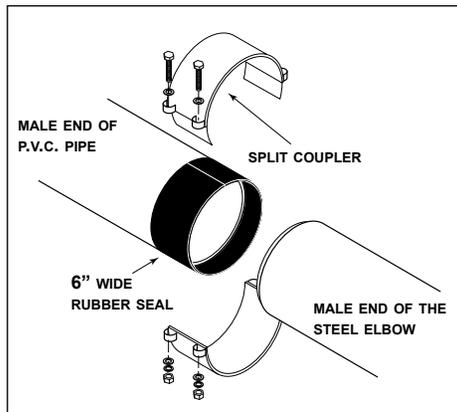
## Instructions to secure the evacuation pipe joints in groups

The main function of the joints of the evacuation line is to seal the junction of two pipes. They also have a second function which is to prevent the joints from dislocating in case of increased manure transfer pressure due to accumulation or excess of bedding in the evacuation line.

There are different ways of securing the joints of an underground evacuation line. You will find below and on pages 24 and 25 the different combinations of pipe joints you may encounter with the different ways to secure them.

### Steel pipe to P.V.C. pipe to steel pipe with two 3/4" rods

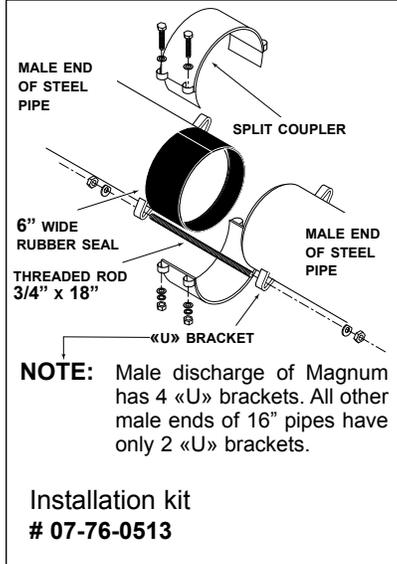
1. Align the female end of the P.V.C. pipe to install with the Magnum discharge;
2. Coat the interior of the female end with vegetable grease;
3. Push the female end over the male end. (follow the P.V.C. pipe manufacturer instructions);
4. Weld two 3/4" steel rods on each side of the Magnum discharge (or steel elbow);
5. Align the next female P.V.C. pipe to install with the preceding P.V.C. pipe;
6. Coat the interior of the female end with vegetable grease;
7. Push the female end over the male end. (follow the P.V.C. pipe manufacturer instructions);
8. Weld two 3/4" rods to the preceding 3/4" rods;
9. Repeat instructions 5 to 9 for all other P.V.C. pipe to install;
10. Align the male end of the steel elbow with the male end of the preceding P.V.C. pipe. Leave a gap of 1/2" between the pipes;
11. Coat the extremities of the two male ends with vegetable grease;
12. Wrap the rubber seal centered over the gap and around the pipes;
13. Coat the outside of the rubber seal with vegetable grease;
14. Install the split coupler on the rubber seal;
15. Weld the 3/4" rods on each side of the steel elbow.



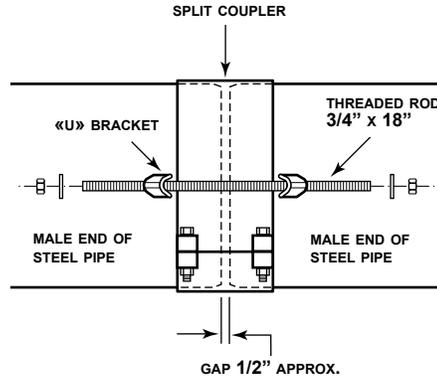
# Installation of combined steel / P.V.C. evacuation pipes

Instructions to secure the evacuation pipe joints individually

## Male steel pipe to male steel pipe

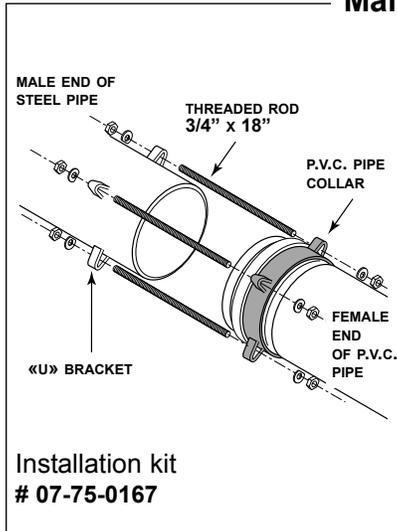


1. Align the male end of the pipe to install with the male end of the preceding pipe and leave a gap of 1/2\" between them;

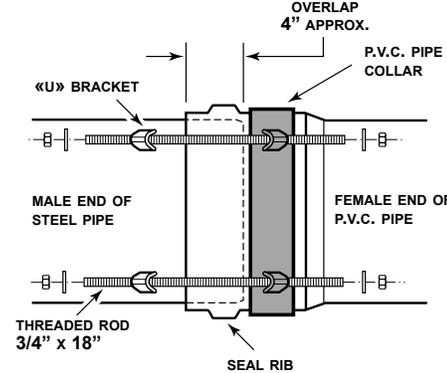


2. Coat the extremities of the two male ends with vegetable grease;
3. Wrap the rubber seal centered over the gap and around the pipes;
4. Coat the outside of the rubber seal with vegetable grease;
5. Install the split coupler on the rubber seal;
6. Install the threaded rods linking the «U» brackets of the two male ends;
7. Do not overtighten the nuts. The threaded rods function is to prevent the joint from dislocating, not to pull the pipes together.

## Male steel pipe to female P.V.C. pipe with collar

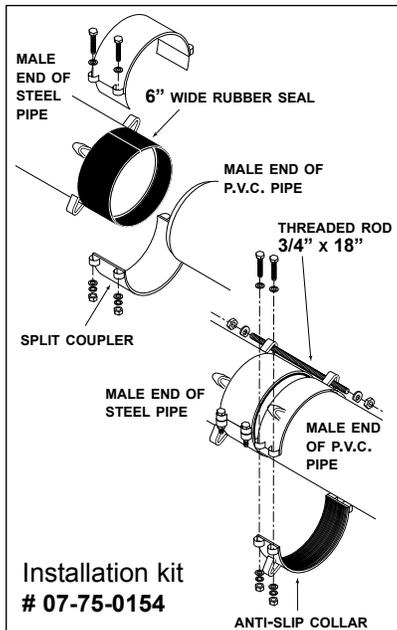


1. Align the female end of the pipe to install with the male end of the preceding pipe;

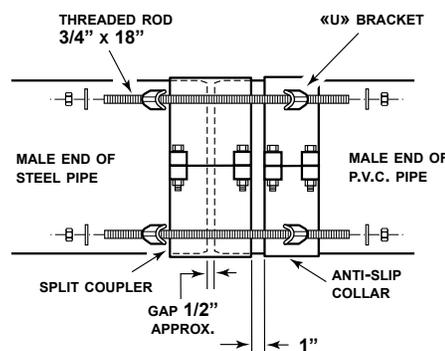


2. Slide the P.V.C. pipe collar from the male end up against the seal rib of the female end;
3. Coat the interior of the female end with vegetable grease;
4. Push the female end over the male end. (follow the P.V.C. pipe manufacturer instructions);
5. Install the threaded rods linking the «U» brackets of the male end to the «U» brackets of the P.V.C. pipe collar;
6. Do not overtighten the screws. The threaded rods function is to prevent the joint from dislocating, not to pull the pipes together.

## Male steel pipe to male P.V.C. pipe



1. Align the male end of the pipe to install with the male end of the preceding pipe and leave a gap of 1/2\" between them;

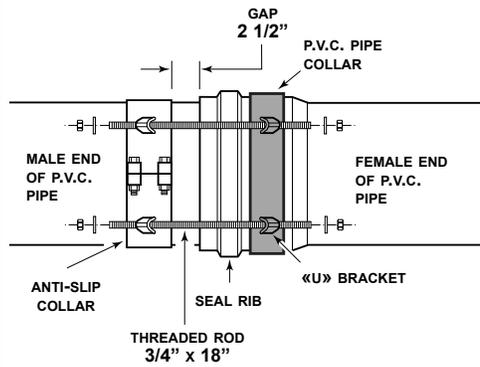
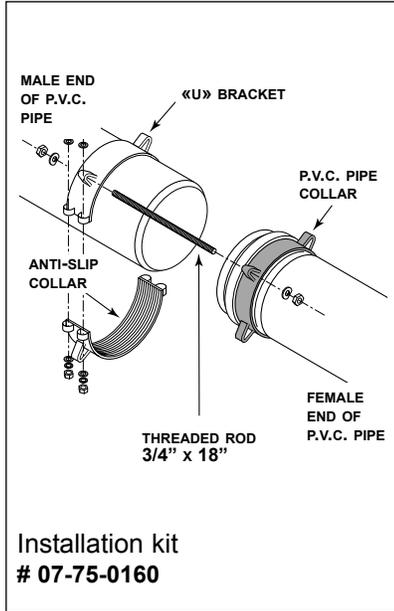


3. Wrap the rubber seal centered over the gap and around the pipes;
4. Coat the outside of the rubber seal with vegetable grease;
5. Install the split coupler on the rubber seal;
6. Install the anti-slip collar on the male end of the P.V.C. pipe at 1\" from the split coupler;
7. Install the threaded rods linking the «U» bracket of the steel pipe to the «U» bracket of the anti-slip collar;
8. Do not overtighten the screws. The threaded rods function is to prevent the joint from dislocating, not to pull the pipes together.

# Installation of P.V.C. evacuation pipes

Instructions to secure the evacuation pipe joints individually

## Male P.V.C. pipe to female P.V.C. pipe

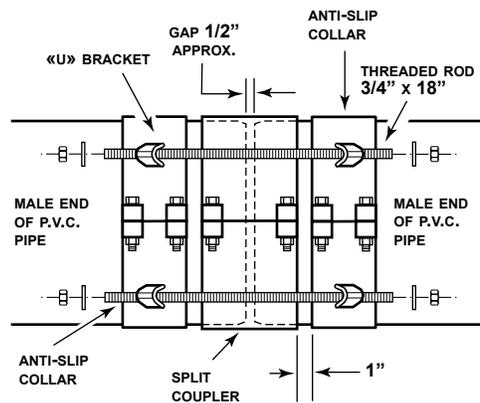
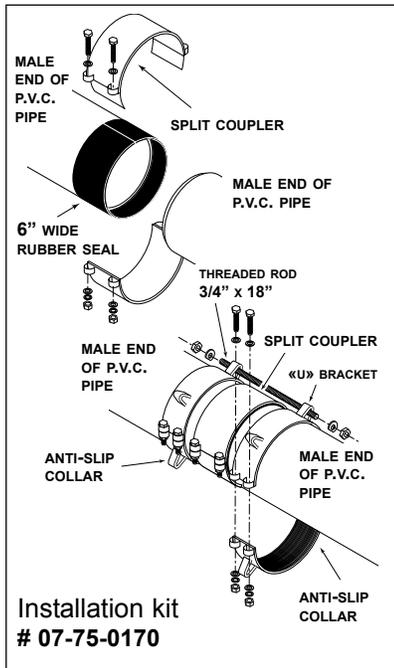


1. Align the female end of the P.V.C. pipe to install with the male end of the preceding P.V.C. pipe;
2. Slide the P.V.C. pipe collar from the male end up against the seal rib of the female end;

3. Coat the interior of the female end with vegetable grease;
4. Push the female end over the male end. (follow the P.V.C. pipe manufacturer instructions);
5. Install the anti-slip collar 2 1/2" from the female end;
6. Install the threaded rods linking the «U» brackets of the anti-slip collar to the «U» brackets of the P.V.C. pipe collar;
7. Do not overtighten the screws. The threaded rods function is to prevent the joint from dislocating, not to pull the pipes together.

Installation kit  
# 07-75-0160

## Male P.V.C. pipe to male P.V.C. pipe

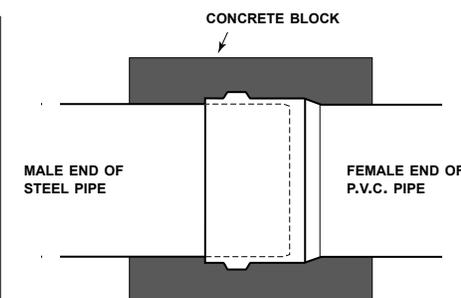
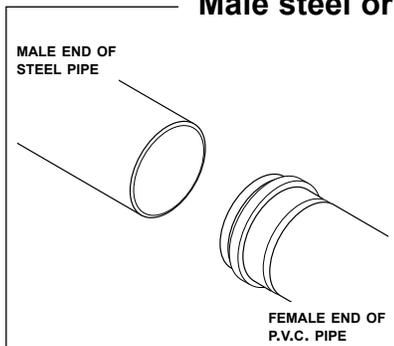


1. Align the male end of the P.V.C. pipe to install with the male end of the preceding P.V.C. pipe, and leave a gap of 1/2" between the pipes;
2. Coat the extremities of the two male ends with vegetable grease;

3. Wrap the rubber seal centered over the gap and around the two pipes;
4. Coat the outside of the rubber seal with vegetable grease;
5. Install the split coupler on the rubber seal;
6. Install the anti-slip collar on both male ends at 1" each side of the split coupler. Tighten securely each bolt;
7. Install the threaded rods linking the «U» brackets of the two anti-slip collars;
8. Do not overtighten the screws. The threaded rods function is to prevent the joint from dislocating, not to pull the pipes together.

Installation kit  
# 07-75-0170

## Male steel or P.V.C. pipe to female P.V.C. pipe with concrete block



### IMPORTANT

The installer who choose to pour concrete blocks around the P.V.C. pipe joints to secure them against dislocation must refer to local authorities (engineer) for the size, the orientation and the spacing between the concrete blocks.

# Troubleshooting

## Problems related to the evacuation cycle — down stroke piston

Problems	Possible causes	Solutions
Manure returns in hopper:	Sequence valve must be readjusted:	Adjust according to the procedure — see page 28 or 31.
	Hopper guillotine remains opened:	The guillotine must be cleaned — see pages 38 to 40.
	Hopper guillotine remains opened because too much abrasive is used for bedding:	The guillotine must be cleaned — see pages 38 to 40.
Piston lowers partially, then waits for guillotines to reach the end of their stroke before resuming down stroke:	Sequence valve must be readjusted:	Adjust according to the procedure — see page 28 or 31.
	Spring of the sequence valve is broken:	Change the spring of the sequence valve. Contact dealer.
	Piston of sequence valve is jammed opened:	Change the sequence valve. Contact dealer.
Piston lowers partially, then stops without killing the electric motor:	Reversing valve bypass is adjusted too weak and allow the pressure to return straight to the hydraulic unit:	Adjust according to the procedure — see page 33.
	Reversing mechanism must be readjusted:	Adjust according to the verification of the reversing mechanism procedure — see page 4.
Piston lowers rapidly to the bottom of its stroke:	Hopper is plugged creating a vacuum under the piston:	Unplug the hopper according to the procedure — see page 37.
	Hopper guillotine remains closed creating a vacuum under the piston:	The guillotine must be cleaned — see pages 38 to 40.
	Hopper guillotine remains closed because too much abrasive is used for bedding creating a vacuum under the piston:	The guillotine must be cleaned — see pages 38 to 40.
Motor runs but Magnum stops at the end of its stroke:	Reversing mechanism must be readjusted:	Adjust according to the verification of the reversing mechanism procedure — see page 4.
	Stopper washer of reversing valve is broken:	Change the washer according to the procedure — see page 33.
	Spool of reversing valve is too stiff and stops in neutral position:	Use the instruction to change the seal of the reversing valve to clean the spool and the inside of the valve — see page 33.
Motor stalls while piston is stroking downward:	Evacuation line is plugged:	Unplug according to the procedure — see page 36 or 41 and 42.
	Manure pile frozen at the discharge of the evacuation line:	Crack the frozen manure pile at the discharge of the evacuation line.
	Outlet guillotine remains closed:	The guillotine must be cleaned — see pages 38 to 40.
	Piston of sequence valve is jammed closed:	Change the sequence valve. Contact dealer.

**NOTE:**

Sudden stop of motor = problem near the Magnum

Gradual stop of motor = problem away from Magnum

# Troubleshooting

## Problems related to the siphoning cycle — upstroke piston

Problems	Possible causes	Solutions
<b>First time start</b> Manure stays in the hopper during the siphoning cycle:	Manure is hard to siphon and the Magnum loses its vacuum through the evacuation line:	Empty hopper and redo first start procedure — <i>see page 4.</i>
Manure stays in the hopper during the siphoning cycle and piston lowers rapidly to the bottom of its stroke at the time of the reversing to the evacuation cycle:	Manure in hopper is frozen, too dry or contains too much bedding:	Unplug according to the procedure — <i>see page 37.</i>
	Hopper guillotine remains closed creating a vacuum under the piston:	The guillotine must be cleaned — <i>see pages 38 to 40.</i>
	Hopper guillotine remains closed creating a vacuum under the piston because too much abrasive material is used for bedding:	The guillotine must be cleaned — <i>see pages 38 to 40.</i>
Piston siphons a fraction of its capacity and does not fall rapidly to the bottom of its stroke at the time of the reversing to the evacuation cycle:	Drain hoses are burst and let air passing or drain hose door seal is broken or dirty:	Clean or replace the drain hoses or the drain door seal. Contact dealer.
	Outlet guillotine remains opened:	The guillotine must be cleaned — <i>see pages 38 to 40.</i>
	The hopper drain valve is opened:	Close the hopper drain valve.
Piston is moving slowly during the upstroke:	Reversing valve bypass is adjusted too weak and allow the pressure to return straight to the hydraulic unit:	Adjust according to the procedure — <i>see page 33.</i>
	Reversing mechanism must be readjusted:	Adjust according to the verification of the reversing mechanism procedure — <i>see page 4.</i>
Piston engage upstroke before the guillotines do their stroke:	Spring of pilot check valve is weak or broken:	Change the spring of the pilot check valve. Contact dealer.
Motor works hard once Magnum is warmed up:	Piston seal of the pilot check valve is broken:	Change the pilot check valve. Contact dealer.
Motor runs but the Magnum stops at the end of its stroke:	Reversing mechanism must be readjusted:	Adjust according to the verification of the reversing mechanism procedure — <i>see page 4.</i>
	Stopper washer of reversing valve is broken:	Change the washer according to the procedure — <i>see page 33.</i>
	Spool of reversing valve is too stiff and stops in neutral position:	Use the instructions to change the seals of the reverse valve to clean the spool and the inside of the valve — <i>see page 33.</i>
The motor stalls at the bottom of the stroke just after reversing occurs:	Hydraulic pressure in pilot check valve is too high:	The pressure in the pilot check valve must be released by the drain valve of the pilot check valve.

# Hydraulic circuit

## Evacuation cycle of manure — down stroke piston

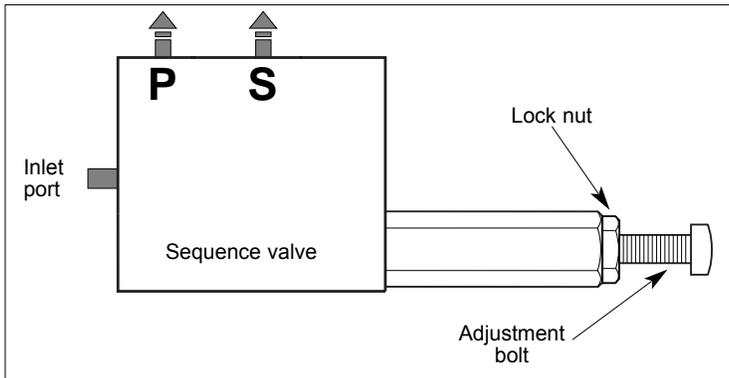


fig. 1

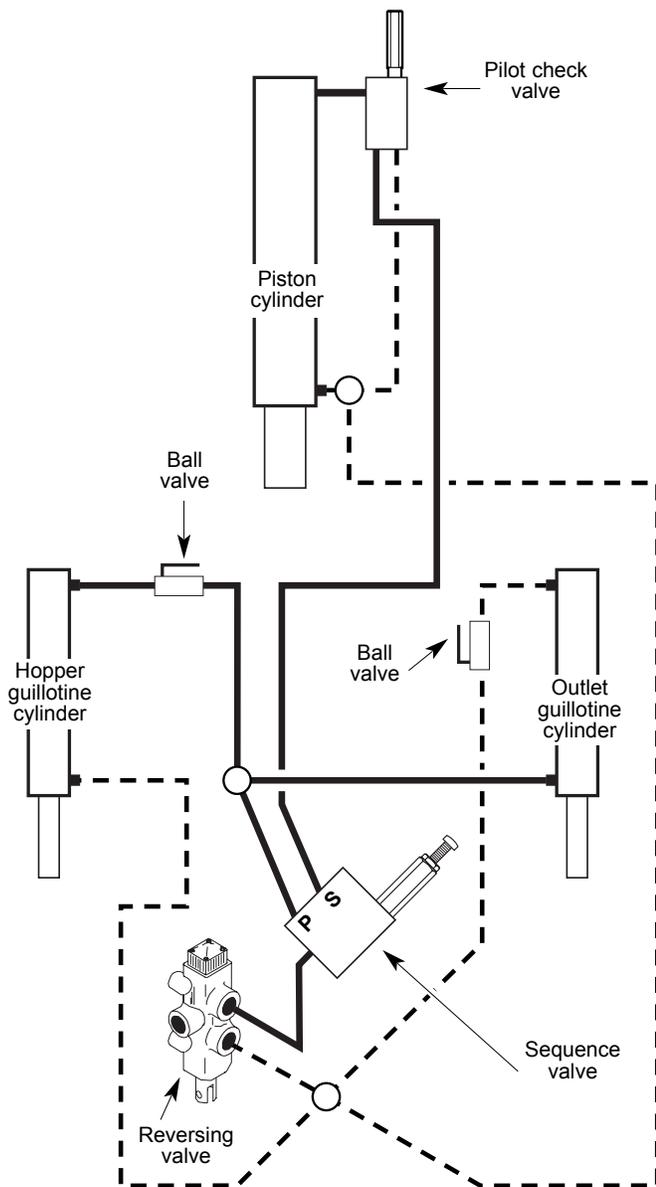
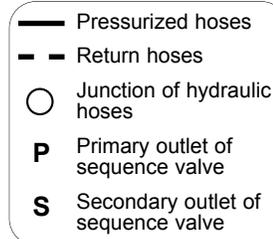


fig. 2

### Adjustment of the sequence valve

For proper functioning of the guillotine valves, the sequence valve must be adjusted at 700 PSI.

1. Unscrew the lock nut of the sequence valve — *fig. 1*;
2. Start the Magnum (without manure in the hopper nor the pumping tube);
3. Note the pressure on the pressure gauge of the power unit during the down stroke of the piston;
4. If the pressure is higher than 700 PSI, unscrew the adjustment bolt of the sequence valve to get a pressure of 700 PSI (*during down stroke*) — *fig. 1*;
5. If the pressure is lower than 700 PSI, screw the adjustment bolt of the sequence valve to get a pressure of 700 PSI (*during down stroke*) — *fig. 1*;
6. Once the sequence valve adjusted, tighten the lock nut — *fig. 1*.



### Direction of the hydraulic flow when evacuating

**Step 1:** The pressure coming from the hydraulic power unit (not shown) goes through the reversing valve which diverts it to the sequence valve — *fig. 2*.

**Step 2:** Once in the sequence valve, the hydraulic pressure must first exit via the primary outlet to close the hopper guillotine cylinder and to open the outlet guillotine cylinder — *fig. 2*.

**Step 3:** Once both guillotine cylinders have reached the end of their stroke, the hydraulic pressure pushes on the piston ball to open the secondary outlet which leads to the evacuation cycle inlet port of the pilot check valve— *fig. 2*.

**Step 4:** Once in the pilot check valve, the pressure lifts the check ball upward allowing the pressure to access the upper part of the piston cylinder to evacuate manure — *fig. 2*.

## Inside view of the sequence valve mechanism during step 2

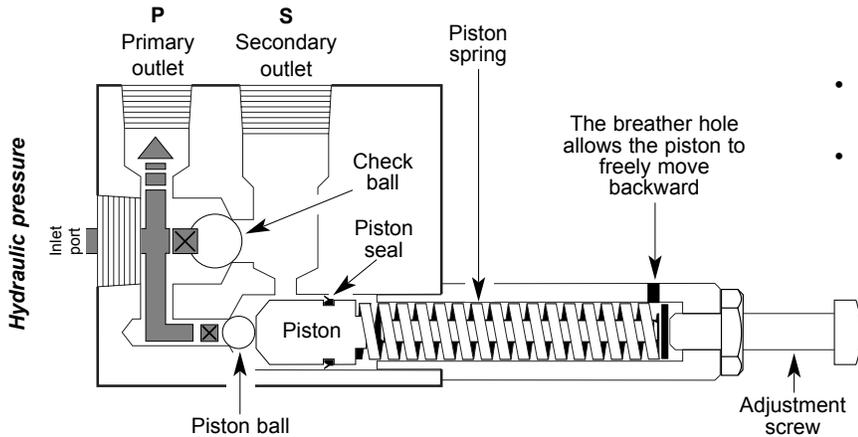


fig. 3

The hydraulic pressure entering the sequence valve:

- 1 Pushes the check ball to close the direct passage between the primary and the secondary outlets — fig. 3.
- 2 Is diverted to the primary outlet to operate both guillotine cylinders — fig. 3.
- 3 Must wait until both guillotine cylinders have reached the end of their stroke to accumulate enough pressure and then push on the piston ball and get access to the secondary outlet — fig. 3.

## Inside view of the sequence valve mechanism during step 3

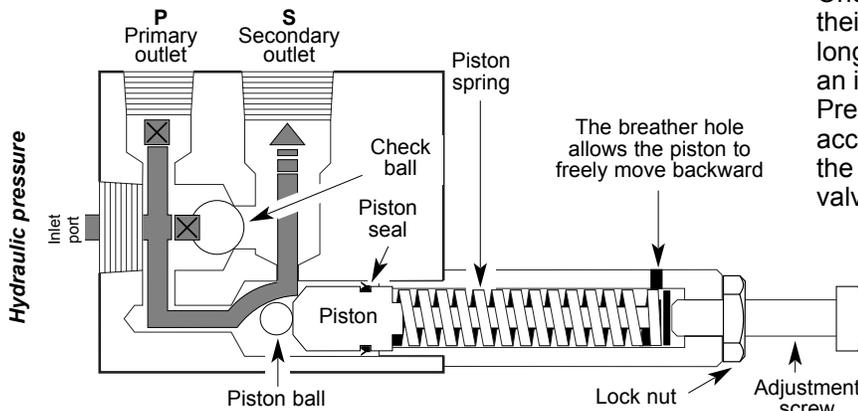


fig. 4

Once both cylinders have reached the end of their stroke, the hydraulic pressure can no longer exit via the primary outlet which creates an increase of pressure in the sequence valve. Pressure can then push the piston ball to get access to the secondary outlet which leads to the evacuation cycle inlet port of the pilot check valve — fig. 4.

## Inside view of the pilot check valve mechanism during step 4

**NOTE:** Pilot check valve has no function when evacuating manure on down stroke.

The hydraulic pressure entering the evacuation cycle inlet port lifts the check ball upward to access the piston cylinder and engage the evacuation cycle — fig. 5.

As the main piston cylinder reaches the bottom of its stroke evacuating manure, pressure increases in the main piston cylinder. When the piston stops at the bottom of its stroke at the time of the reversing to begin the siphoning cycle, the pilot check ball locks this accumulation of hydraulic pressure in the main piston cylinder until both guillotine cylinders have reached the end of their stroke in the position to siphon the manure — fig. 5.

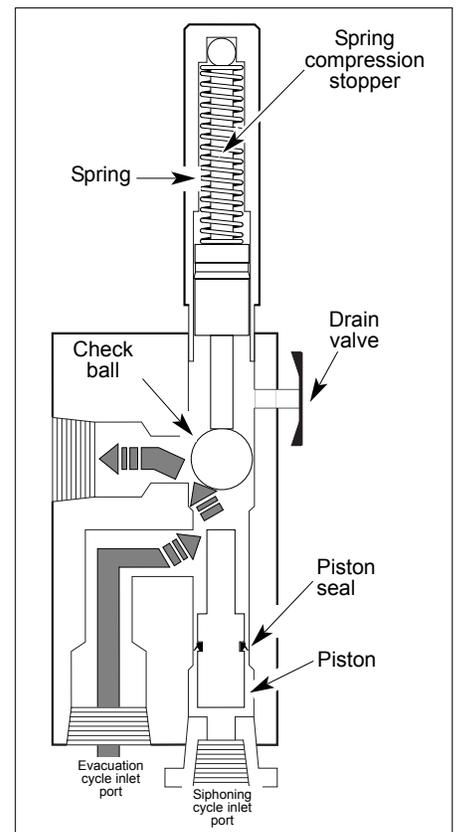


fig. 5

# Hydraulic circuit

## Siphoning cycle of manure — upstroke piston

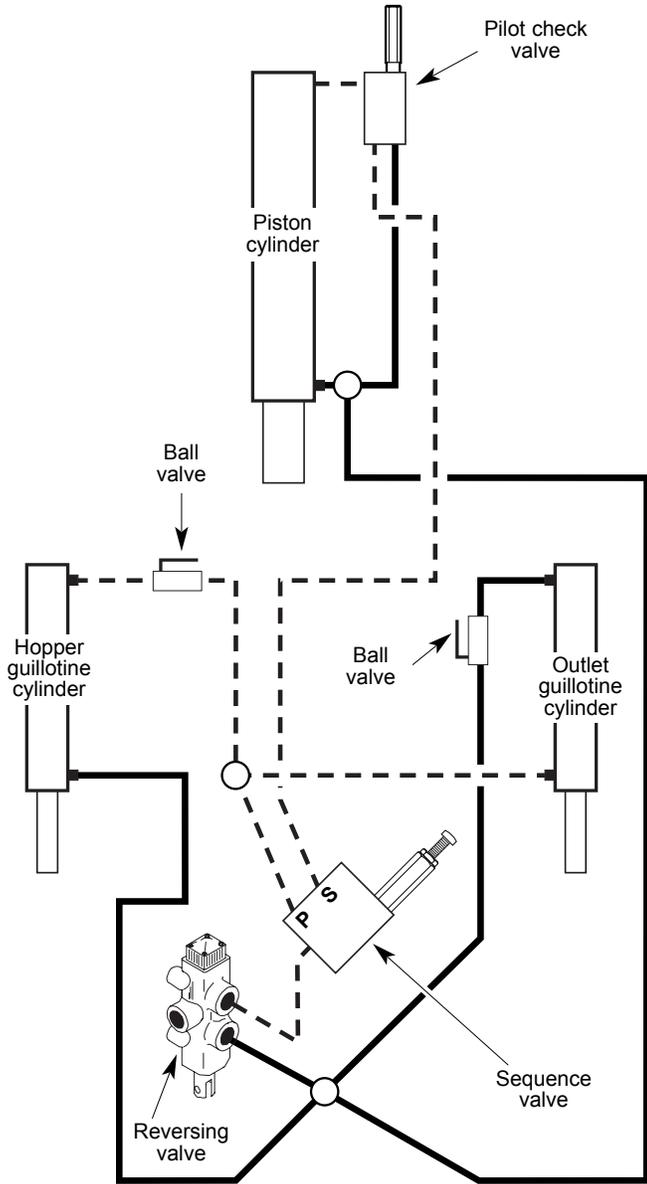


fig. 6

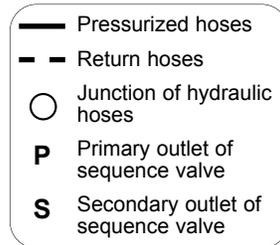
### Direction of the hydraulic flow when siphoning

**Step 1:** The pressure coming from the hydraulic power unit (not shown) goes through the reversing valve which diverts it to:

- The upper part of the outlet guillotine cylinder to close it — *fig. 6*.
- The bottom part of the hopper guillotine cylinder to open it — *fig. 6*.
- The siphoning cycle inlet port of the pilot check valve which unlocks the pressure in the upper part of the main piston cylinder allowing it to stroke upward — *fig. 6*.
- The bottom part of the piston cylinder to lift the piston — *fig. 6*.

**Step 2:** Since the siphoning cycle inlet port of the pilot check valve needs more pressure to unlock than both guillotine cylinders need to operate, the hydraulic pressure will first close the outlet guillotine and open the hopper guillotine — *fig. 6*.

**Step 3:** Once both guillotine cylinders have reached the end of their stroke, the hydraulic pressure increases and enters in the siphoning cycle inlet port of the pilot check valve to lift the check ball which allows the oil contained in the upper part of the piston cylinder to return to the hydraulic power unit — *fig. 6*.



### Inside view of the sequence valve mechanism during step 3

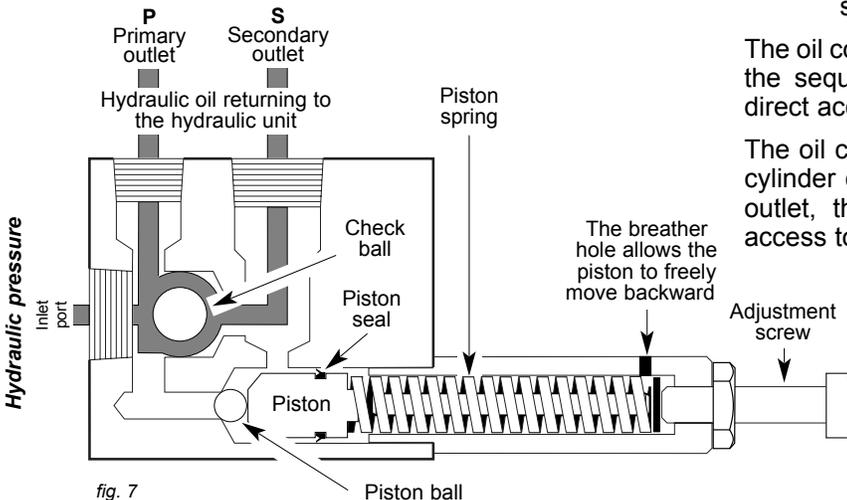


fig. 7

**NOTE:** Sequence valve has no function when siphoning manure on up stroke.

The oil coming back from the guillotine cylinders enters the sequence valve via the primary inlet allowing a direct access to the reversing valve — *fig. 7*.

The oil coming back from the upper part of the piston cylinder enters the sequence valve via the secondary outlet, then pushes the check ball leftward to get access to the reversing valve — *fig. 7*.

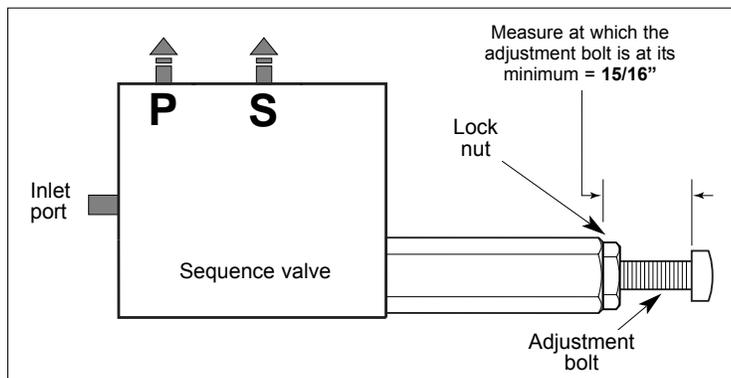
### Inside view of the pilot check valve mechanism during step 3

The hydraulic pressure enters the siphoning cycle inlet port of the pilot check valve lifting the piston upward which pushes the check ball allowing the hydraulic oil contained in the upper part of the piston cylinder to return to the hydraulic power unit — *fig. 8*.

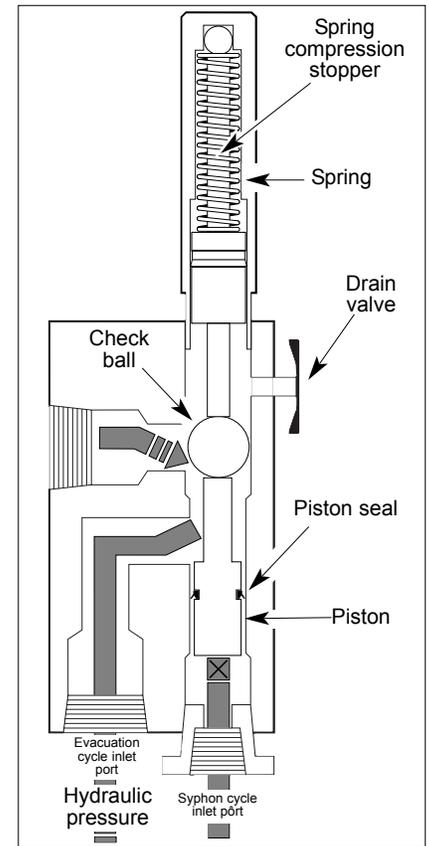
## Hydraulic circuit with “sand” option

### Adjustment of the sequence valves

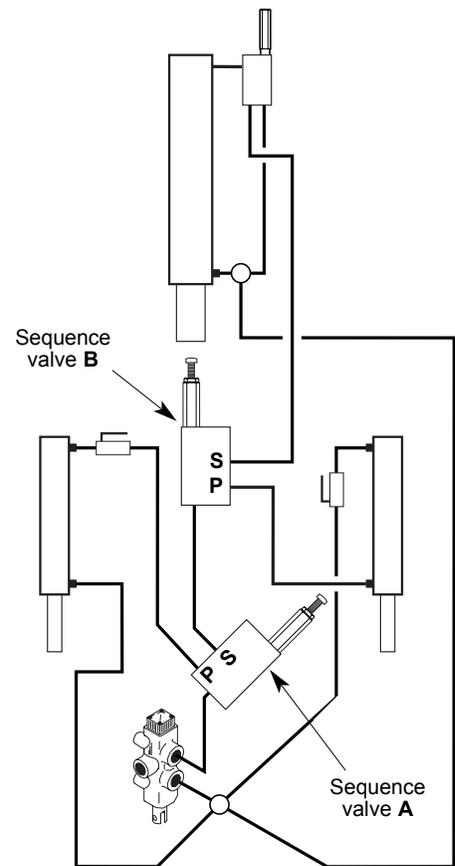
1. Unscrew the lock nuts of both **A** and **B** sequence valves — *fig. 1*;
2. Start the Magnum (without manure in the hopper nor the pumping tube);
3. Unscrew at their minimum the adjustment bolts of sequence valves **A** and **B**; — *fig. 1*;
4. Note the pressure on the pressure gauge of the power unit during the down stroke of the piston;
5. Screw the adjustment bolt of the sequence valve **A** until the pressure on the gauge increases to 25 PSI higher than the pressure noted at instruction 4;
6. Screw the adjustment bolt of the sequence valve **B** until the pressure on the gauge increases to 25 PSI higher than the pressure noted at the instruction 5;
7. Once the sequence valves adjusted, tighten the lock nuts of both **A** and **B** sequence valves.



*fig. 1*



*fig. 8*



*fig. 2*



# Maintenance of reversing valve

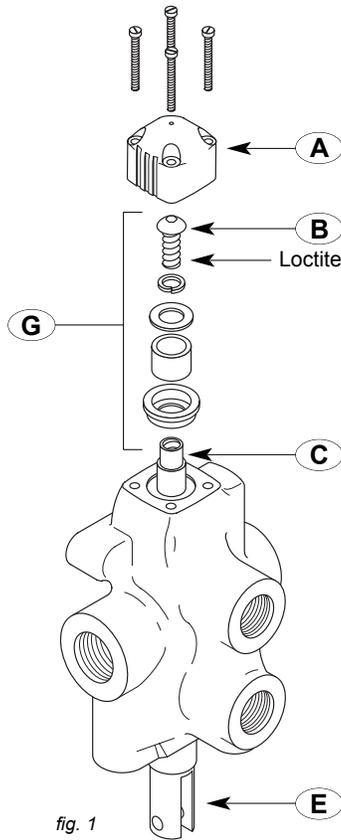


fig. 1

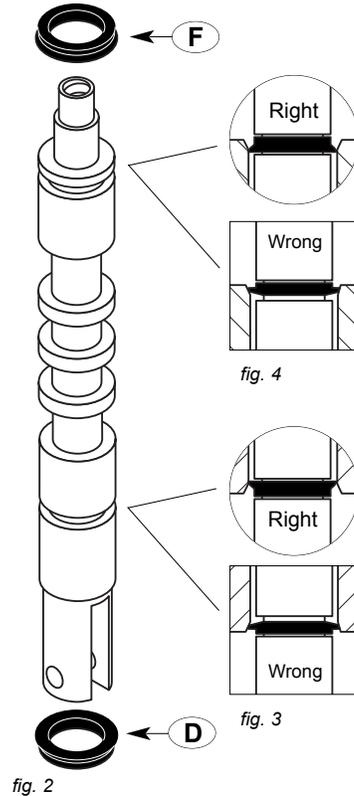


fig. 2

## Changing the spool seals of the reversing valve

1. Remove the cap of the reversing valve — *fig. 1 detail A*.
2. Unscrew the spool end screw — *fig. 1 detail B*.
3. Slide the spool out via the top of the valve — *fig. 1 detail C*.
4. Remove both seals of the spool.
5. Install the first new seal at the bottom of the spool — *fig. 2 detail D*.
6. Reinsert the shaft via the bottom of the valve up to the first seal — *fig. 1 detail E*.
7. With a small flat screwdriver, insert the flared out part of the seal in the valve body so it does not turn over — *fig. 3*.
8. Push the shaft upward until the groove of the second seal shows up at the valve top.
9. Install the second new seal at the top of the spool — *fig. 2 detail F*.
10. With a small flat screwdriver, insert the flared out part of the seal in the valve body so it does not turn over — *fig. 4*.
11. Install the stopping elements of the spool top end and put "Loctite blue 235" glue on the screw before screwing it — *fig. 1 detail G*.
12. Install the cap — *fig. 1 detail A*.

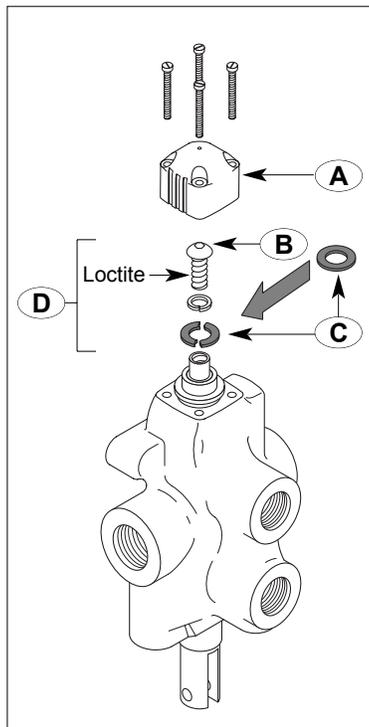


fig. 5

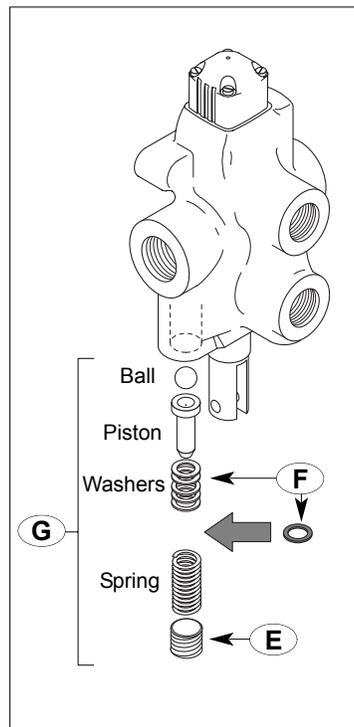


fig. 6

## Changing the stopper washer of the reversing valve

1. Remove the cap of the reversing valve — *fig. 5 detail A*.
2. Unscrew the spool end screw — *fig. 5 detail B*.
3. Install a new washer — *fig. 5 detail C*.
4. Put "Loctite 235" glue on the screw before screwing it — *fig. 5 detail D*.
5. Install the cap — *fig. 5 detail A*.

## Adjustment of the reversing valve bypass

1. Remove the bottom set screw of the bypass — *fig. 6 detail E*.

**NOTE:** Attention not to lose the components of the bypass when removing the set screw.

2. Add another washer like those already in there — *fig. 6 detail F*.
3. Reinsert the components of the bypass and rescrew the set screw — *fig. 6 detail G*.

# Installation and adjustment of the piston seals

Since 1995

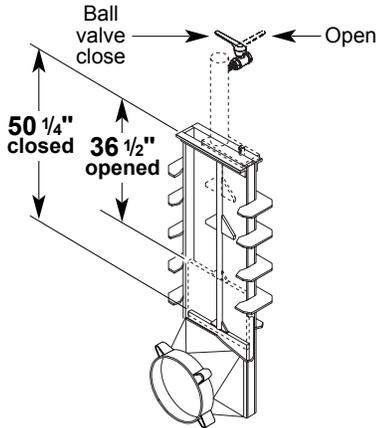


fig. 1

The piston of the pumping tube has two seals. The upper seal allows to siphon the manure from the hopper without losing vacuum during the siphoning cycle. The lower seal allows to evacuate the manure without losing pressure during the evacuation cycle.

The piston seals are kept pressurized against the inner side of the pumping tube by a spacer located inside the seal perimeter, between the upper plate and the lower part of the piston.

## Instructions to lift the piston partly out of the pumping tube

The piston being fairly heavy, *J. Houle & Fils Inc.* recommends to use the following instructions to partially lift the piston out of the pumping tube. To do so, you need a winch and 2 wood pieces about 3/4" x 3" x 12" long.

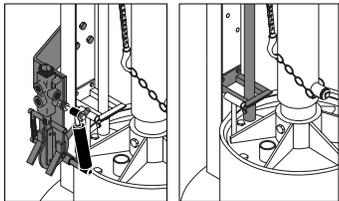


fig. 2

fig. 3

1. Start the Magnum and stop it once the piston is half way on its up stroke.
2. Ensure the outlet guillotine door is properly closed to prevent the manure from the evacuation line to flow back in the Magnum. After, close the ball valve of the outlet guillotine cylinder — *fig. 1*.

**IMPORTANT:** In order for the guillotine door to be properly closed, there must be a distance of about 50-1/4" between the top of the guillotine and the drain hose adaptor — *fig. 1*.

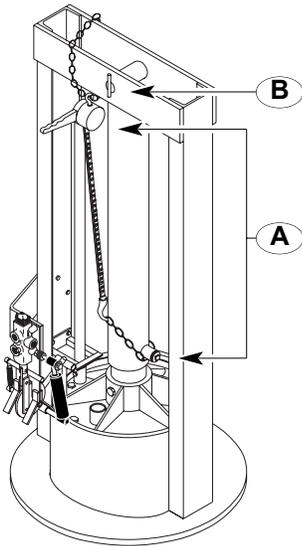


fig. 4

3. Start the Magnum and stop it once the piston have reached the top of its stroke.
4. Disconnect the hydraulic hoses of the piston cylinder and install plugs on the cylinder hydraulic connections to lock it in its closed position.
5. Unbolt the reversing mechanism from the pumping tube — *fig. 2*.
6. Remove the anti-rotation guide and the 1-1/4" x 54" long tube — *fig. 3*.
7. Hook the winch at the top of the pumping tube and attach the chain around the bottom of the cylinder envelope, then crank the winch a little to take the weight of the cylinder off the pin at the top of the pumping tube — *fig. 4 detail A*.

**NOTE:** Never attach the chain around the chromed cylinder rod.

8. Remove the pin at the top of the pumping tube cylinder — *fig. 4 detail B*.
9. Crank the winch to lift the piston until the seals are about 4" out of the pumping tube — *fig. 5*.
10. Place the wood pieces 3/4" x 3" x 12" under the edge of the piston — *fig. 5 detail C*.
11. Crank the winch to lower the piston on the wood pieces, remove the bolt at the bottom of the cylinder and lift it out of the way to work freely — *fig. 5 detail D*.
12. Unscrew the 6 bolts and remove the upper plate of the piston, then wipe clean all the old grease.

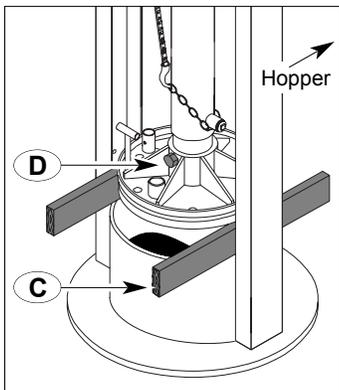


fig. 5

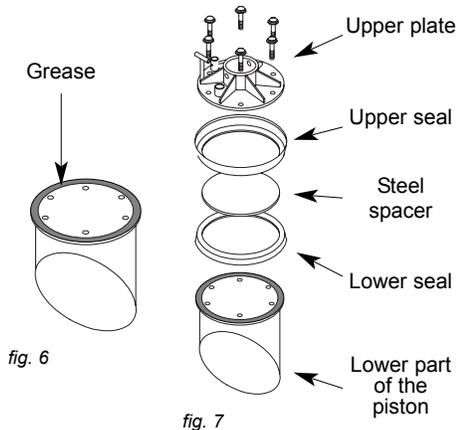


fig. 6

fig. 7

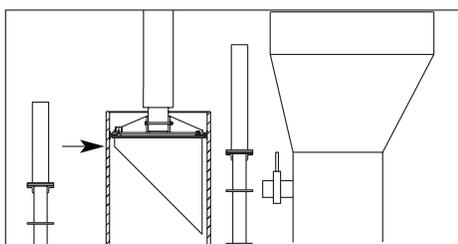


fig. 8

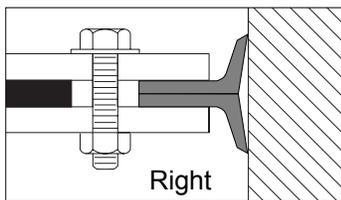


fig. 9

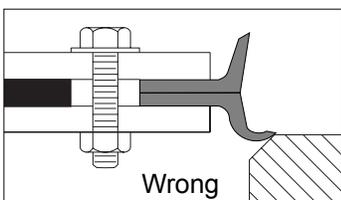


fig. 10

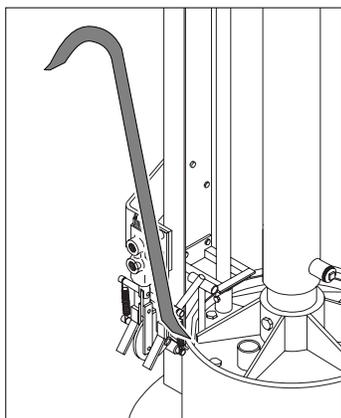


fig. 11

## Piston lubrication

13. Spread a thin coat of grease of about 1-1/2" wide on the edge of the lower part of the piston — *fig. 6*.
14. Place the seals on the lower part of the piston — *fig. 7*.
15. Set the steel spacer on the lower part of the piston — *fig. 7*.
16. Spread a thin coat of grease of about 1-1/2" on the edge of the upper plate of the piston — *fig. 6*.
17. Set the upper plate on the lower part of the piston and turn it so the pushing finger faces the trigger of the reversing mechanism and install the 6 bolts without tightening them — *fig. 7*.

**NOTE:** The bolts must be tighten only when the 2 seals are completely in the pumping tube.

## Instructions to reinstall a piston that has been completely taken out of the pumping tube

The lower part of the piston have a biased point which must face the outlet guillotine of the Magnum — *fig. 8*. Before beginning assembly of the piston, place this lower part of the piston in the pumping tube on the wood pieces — *fig. 5 page 38*.

## Instructions to reinsert the piston in the pumping tube

18. Crank the winch to lower the cylinder and install the bolt which connect it to the upper plate of the piston.
19. Crank the winch to lift the piston and remove the wood pieces.
20. Crank the winch to gradually lower the piston in the pumping tube and ensure the seals go in properly — *fig. 9 and 10*. Use a flat screwdriver to engage the lower seal lip in the pumping tube.
21. Install the pin at the top of the pumping tube.
22. Remove the winch.
23. Connect the hydraulic hoses, install the reversing mechanism, the anti-rotation guide and the 1-1/4" x 54" long tube.
24. With a crow bar, pry the piston sideways to center it with the seals — *fig. 11*. Be careful not to damage the pumping tube.
25. Gradually tight the bolts clock wise.

## Gradual running in, lubrication and testing of the new seals

26. Clean the top of the piston seal and pour 2" of used diesel oil. Make the piston go down on a distance of about 12" and operate the reverse manually to make the piston go up. After, do the same on a distance of about 24" and then on a distance of about 36". The fourth time, the piston will have reached the bottom of its stroke and will no longer need manual reversing.

# Unplugging the evacuation line

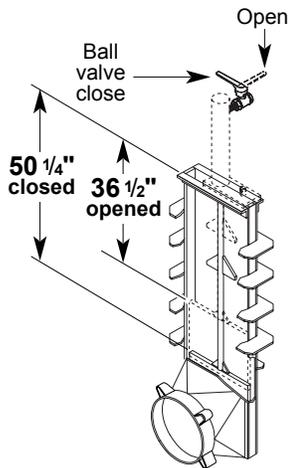


fig. 1

**IMPORTANT:** Plugged evacuation line and/or Magnum damages due to a plugged evacuation line are not guaranteed.

## Instructions to unplug an evacuation line

Before beginning the unplugging instructions, ensure that no other factors are simulating a plugged evacuation line. It is imperative that the hydraulic unit motor gradually stalls during the evacuation cycle (down stroke) to consider that it is plugged. Also, the hydraulic unit motor must stall only during the evacuation cycle. If it is not the case, return to page 26 and 27 (trouble shooting) to find the problem.

The other factors that can simulate a plugged evacuation line are:

- A frozen pile of manure at the discharge of the evacuation line — see pages 26 and 27.
- An outlet guillotine door not working properly — see pages 26 and 27.

1. If Magnum piston can still stroke upward, make sure the reversing mechanism is at the siphoning cycle position, start the Magnum and stop it before it has reached the top of its stroke and ensure the outlet guillotine is completely closed by measuring the distance between the guillotine door and the drain hose adaptor. The distance, when the guillotine door is fully closed, is about 50-1/4" — fig. 1.

**NOTE:** If the piston stopped at the top of its stroke (beginning of evacuation cycle) and cannot go down due to hydraulic motor stalling and that the outlet guillotine door is opened, proceed with the following instructions. Otherwise go to instruction 2.

- Unbolt the reversing mechanism from the pumping tube — fig. 2 (do not disconnect the hydraulic hoses).
  - Manually flip the reversing mechanism into the siphoning cycle position — fig. 3.
  - Do not reinstall the reversing mechanism to the pumping tube right away and start the Magnum to close the outlet guillotine door. Be ready to stop the Magnum as soon as the hydraulic unit motor is working hard.
  - Ensure the outlet guillotine door is completely closed by measuring the distance between the guillotine door and the drain hose adaptor. The distance, when the guillotine door is fully closed is about 50-1/4" — fig. 1.
2. Close the ball valve of the outlet guillotine door — fig. 1.
  3. Pressurize water in the evacuation line via the anti-blocking tubes. Depending of G.P.M. capacity of the pump used to pressurize water in the evacuation line, unplugging process may take several hours.

**IMPORTANT:** Maximum pressure allowable to unplug an evacuation line depends on type of evacuation pipes installed. With *Houle* steel pipes, the line can be pressurized up to 200 P.S.I. For P.V.C. pipes, refer to the pipes manufacturer to find the maximum allowable P.S.I.

4. Ensure manure in hopper is sloppy and contains very little bedding. If manure contains too much bedding and/or is too dry, follow the instructions "Unplugging the hopper" — see page 37.
5. Bolt the reversing mechanism back to the pumping tube.
6. Open the outlet guillotine ball valve. Evacuate using sloppy manure until working hydraulic pressure during the evacuation cycle is back down to approximately 600 P.S.I.

**NOTE:** If problem persists, contact your dealer.

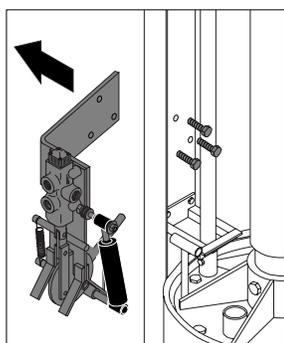


fig. 2

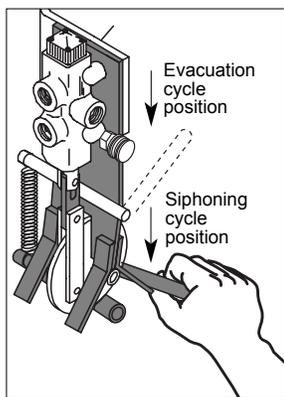


fig. 3

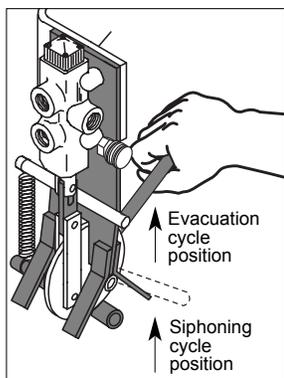


fig. 4

# Unplugging the hopper

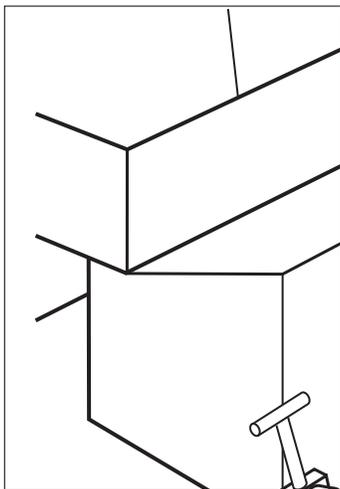


fig. 1

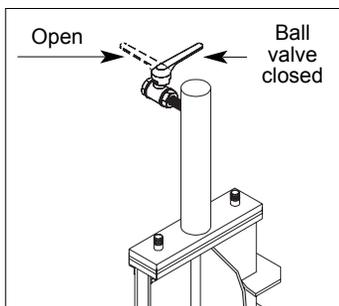


fig. 2

## Instructions to unplug the hopper

If too much bedding and/or dry manure is introduced in the hopper, the most likely place for the hopper to plug is at the transition of the angled top sides and the vertical square throat. To unplug the hopper you must:

1. Remove all manure contained in the angled top sides of the hopper.

### **WARNING**

Work under surveillance and be careful not to fall in the hopper.

2. Open the maintenance pit 3" drain valve — *fig. 1*.
3. Start the Magnum and stop it near the top of its up stroke just before reversing occurs to go down.
4. Close both ball valves of the guillotine doors — *fig. 2*.
5. With a hose fill the bottom of the hopper via the maintenance pit 3" drain valve (the pumping tube will partly fill at the same time) — *fig. 1*.
6. Close the drain valve — *fig. 1*.
7. Start the Magnum (leaving the guillotine door ball valves closed) so the piston pushes the water back up into the hopper loosening up whatever manure was left in the hopper square throat. Stop the Magnum at the bottom of its stroke.
8. Remove the manure that was pushed up in the angled top sides of the hopper.
9. Repeat instructions 3 - 5 - 6 - 7 and 8 until no manure is left in the hopper.
10. Open both guillotine door ball valves and start Magnum using sloppier manure or containing less bedding.

## **WARNING AGAINST DRY MANURE**

Dry manure containing sawdust, fine chopped straw, sand or any other matter may be siphoned "without plugging" during the siphoning cycle and be pushed in the evacuation line without plugging during the evacuation cycle. However, once in the evacuation line, the dry matter may expand due to wet environment and plug the evacuation line. When an evacuation line plugs up in these conditions, it may become unpluggable and you may have to replace it.

# Cleaning and dismantling the guillotines

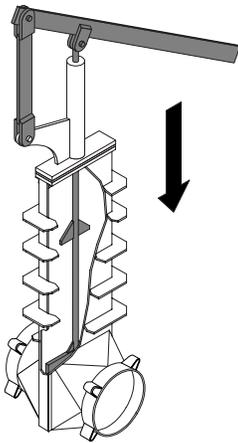


fig. 1

**IMPORTANT:** If there is a manual safety guillotine on the evacuation line, you must first close it — *fig. 1*. If not, always ensure the other guillotine is properly closed.

To dismantle the hopper guillotine, ensure the outlet guillotine or the manual safety guillotine is properly closed — *fig. 1 or 4*.

To dismantle the outlet guillotine, ensure the hopper guillotine or the manual safety guillotine is properly closed — *fig. 1 or 3*.

## **WARNING**

If the manure level in the manure reservoir is higher than the top of the outlet guillotine chamber and the manure is sloppy enough, manure may flow back by the outlet guillotine chamber when the door will be removed. If an outlet guillotine is dismantle in these conditions and it is impossible to close the manual safety guillotine, be ready, with the help from someone else to seal the guillotine chamber with a wood board and “C” clamps after the door has been removed — *fig. 2*.

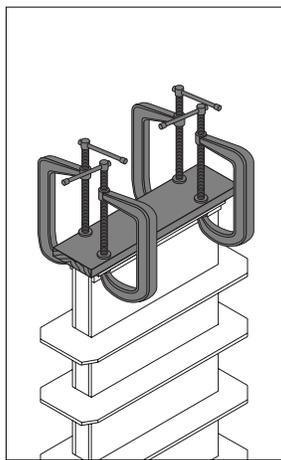


fig. 2

## **Instructions to ensure a guillotine is properly closed**

1. Close the oil filter valve under the hydraulic power unit to avoid oil from leaking through the reversing valve after disconnection of the hydraulic hoses.
2. Disconnect the hydraulic hoses from the guillotine to close.
3. Install a hydraulic hose at the bottom of the guillotine door cylinder to close and insert the other end of the hose in a container to avoid being splashed when the cylinder will close the guillotine at instruction 7.
4. Ensure the cylinder upper hydraulic connection of the guillotine to close has a 1/2” ball valve. If the valve is missing, install one.
5. Disconnect the 1/2” pressure hose of the reverse valve (the one coming from the hydraulic power unit).
6. Connect the 1/2” pressure hose to the ball valve at top of the cylinder of the guillotine to close.
7. Start the hydraulic power unit very briefly ( $\pm 1$  second) and stop it a few seconds to gradually close the guillotine door and allow time to the electric motor to stop turning.
8. Repeat instruction 7 until the motor can't start, which means that the guillotine to close is properly closed and can't go down any further.
9. Close the ball valve of the cylinder of the guillotine to close.
10. To ensure the guillotine is properly closed, remove a drain hose and measure the distance between the top of the guillotine door and the top of the guillotine chamber — *fig. 3 or 4*.

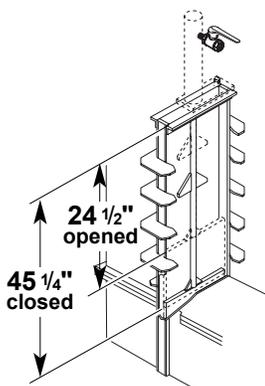


fig. 3

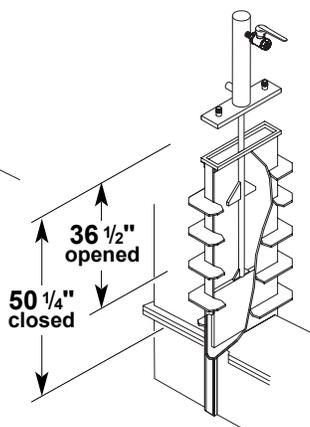


fig. 4

## Instructions to clean a guillotine plugged with manure

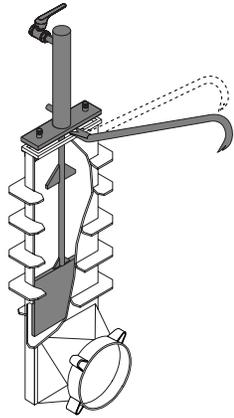


fig. 1

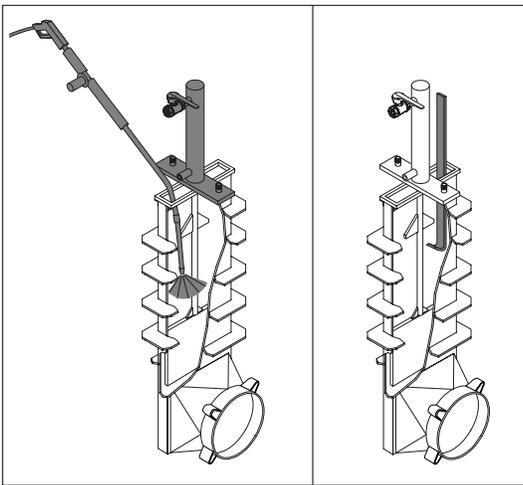


fig. 2

fig. 3

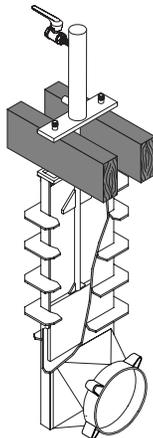


fig. 4

1. Follow all **Instructions to ensure a guillotine is properly closed**.
2. Disconnect the hydraulic hoses from the cylinder of the guillotine door to remove.
3. Unbolt the cylinder, use a crow bar to lift it a little and rotate it to inspect inside the guillotine chamber — *fig. 1*.
4. Use in turn a high pressure water pump (3000 P.S.I. with a high concentrated nozzle) — *fig. 2*, a drill with a long bit and a flat bar 1-1/4" wide curved at one end to remove the dry manure chunks inside the guillotine chamber as they break up — *fig. 3*. Remove maximum of dry manure inside the guillotine chamber before doing the next instruction.
5. Put wood blocks of same height between the cylinder and the top of the guillotine chamber — *fig. 4*.
6. Install a hydraulic hose at top of the guillotine door cylinder to remove and insert the other end of the hose in a container to avoid being splashed when the cylinder will lift the door at instruction 8.
7. Connect the 1/2" pressure hose (coming from the hydraulic power unit) at bottom of the cylinder of the guillotine door to remove.
8. Start the hydraulic power unit very briefly ( $\pm 1$  second) and stop it a few seconds to gradually lift the guillotine door and allow time to the electric motor to stop turning.
9. Repeat instruction 8 until the cylinder is completely closed or the manure remaining in the guillotine chamber is lifted up under the wood blocks.
10. With a crow bar, lift the cylinder to remove the blocks.
11. Use in turn a high pressure water pump (3000 P.S.I. with a high concentrated nozzle) — *fig. 2*, a drill with a long bit and a flat bar 1-1/4" wide curved at one end to remove the dry manure chunks inside the guillotine chamber as they break up — *fig. 3*. Remove maximum of dry manure inside the guillotine chamber before doing the next instruction.
12. Put higher blocks between the cylinder and the top of the guillotine chamber.
13. Repeat instructions 8 - 9 - 10 - 11 - 12 and 13 until the guillotine door is free and can be removed.

# Cleaning and dismantling the guillotines

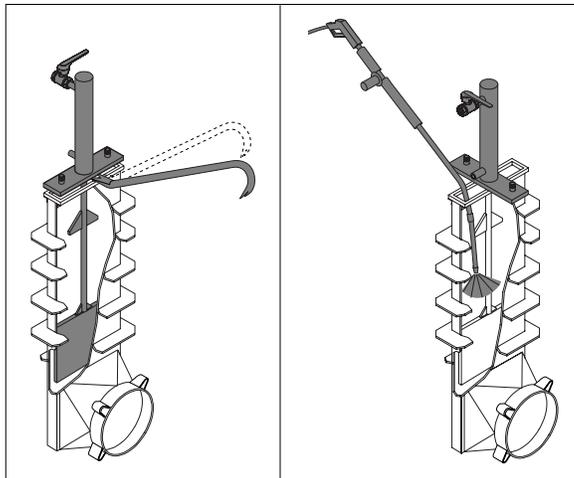


fig. 1

fig. 2

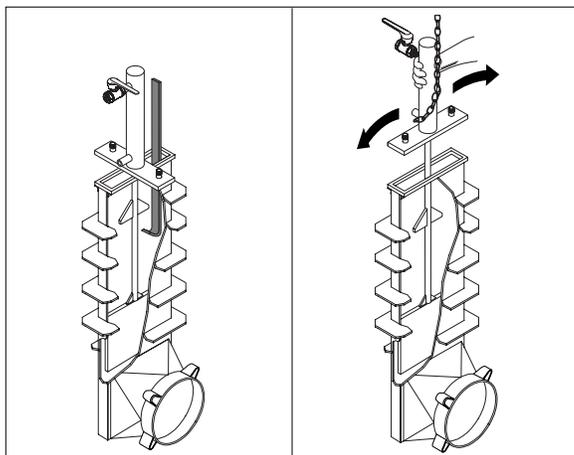


fig. 3

fig. 4

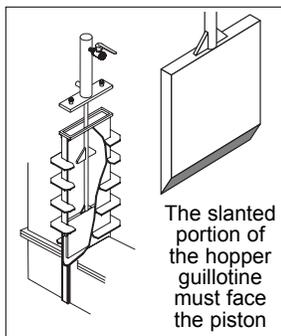


fig. 5

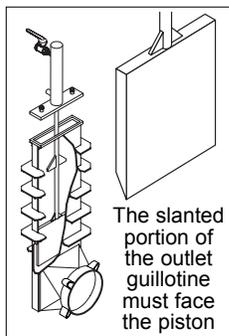


fig. 6

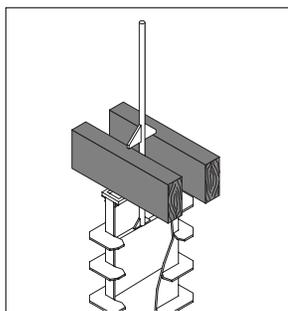


fig. 7

## Instructions to clean a guillotine plugged with hard water residues

1. Follow all **Instructions to ensure a guillotine is properly closed**.
2. Close the 1/2" hydraulic hose valve under the hydraulic power unit to avoid oil from leaking through the reversing valve after disconnection of the hydraulic hoses.
3. Disconnect the hydraulic hoses from the guillotine door to remove.
4. Install a hydraulic hose at the top of the cylinder of the guillotine door to remove and insert the other end of the hose in a container to avoid being splashed when the cylinder will be pulled by the winch during instruction 8.
5. Unbolt the cylinder, use a crow bar to lift it a little and rotate it to inspect inside the guillotine chamber — *fig. 1*.
6. Use in turn a high pressure water pump (3000 P.S.I. with a high concentrated nozzle) — *fig. 2*, a drill with a long bit and a flat bar 1-1/4" wide curved at one end to remove the dry manure and hard water residues inside the guillotine chamber as they break up — *fig. 3*. Remove maximum of dry manure and hard water residues inside the guillotine chamber before doing the next instruction.
7. Install a winch to lift the cylinder and the guillotine door — *fig. 4*.
8. Lift the guillotine door until it begins to jam against the pile of hard water residues and release the tension of the winch by about 1", the door will remain jammed in the hard water residues.
9. By hand, push sideways on the cylinder until the top of the guillotine door breaks the portion of hard water residues in which it's jammed. Once the hard water residues got broken, the guillotine door will drop suspended by the winch chain — *fig. 4*.

**NOTE:** The process to break the hard water residues is very long and can take hours. Expect to repeat the instructions 8 - 9 and 10 dozen and dozen of times.

10. Repeat instructions 8 - 9 and 10 until the guillotine door is free and can be removed.

## Instructions to reinsert the door in the guillotine

1. Before bringing down the blade, ensure the slant is facing in the proper direction — *fig. 5 and 6*. Lower the door partially and put wood pieces on each side of the door rod, under the anchors, to maintain the top of the door rod over the guillotine chamber — *fig. 7*.
2. Join the cylinder rod to the door rod using the 2 bolts.
3. With the winch, lift slightly the cylinder and the guillotine door to remove the blocks and lower the door completely.
4. Bolt the cylinder to the guillotine and connect the drain hoses.
5. Reconnect all hydraulic hoses, open the valves under the hydraulic unit and open the ball valves of the guillotines cylinders.
6. Open the manual safety guillotine of the evacuation line.

# Air flush option

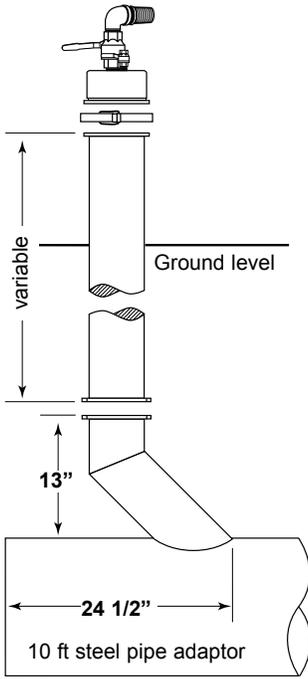


Fig.1

The air flush system consist of a vertical 6" riser steel pipe welded on the 10 ft steel pipe adaptor of the Magnum evacuation line -fig. 1 and one air tank whose pressure supply can come from the milking parlor air compressor. It allows daily injection of air pressure to purge the evacuation line from excess of sand sedimentation.

Once a week, a small amount of straw is introduced in the 6" riser before flushing, the straw acts like a piston between the air pressure and the manure to wipe the sand from the evacuation line.



Before removing the 6" cap, it is mandatory to release any pressure in the evacuation line by opening the pressure release valve -fig.5. Failure to follow this warning could result in serious injuries.

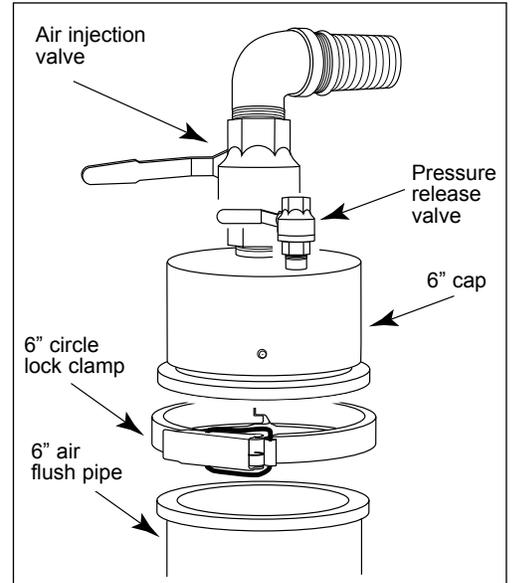


Fig.2

## Standard air flush instructions

### When top of manure reservoir is lower than top of air flush pipe.

J. Houle & Fils Inc. recommends to flush the evacuation line every day with air pressure only and every week with air and straw.

To flush the evacuation line with air pressure only, use instructions 1, 2, 9 and 10.

To flush with air and straw, use all instructions.

1. Stop the Magnum;
2. Close the safety guillotine valve to ensure that the material in the evacuation line is pushed towards the manure reservoir -fig.4;
3. Open the pressure release valve -fig.5;
4. Close the pressure release valve after complete evacuation of air pressure -fig.5;



### WARNING

5. Before removing the 6" circle lock clamp - fig.2, it is mandatory to release any pressure in the evacuation line by opening the pressure release valve -fig.5. Failure to follow this warning could result in serious injuries.
6. Remove the 6" cap of the air flush pipe -fig.2;
7. Put about 2 ft of straw in the 6" air flush pipe without packing it;
8. Reinstall the 6" cap and the circle lock clamp -fig.2;
9. Open the air injection valve -fig.5;
10. Close the air injection valve once the air compressor is empty;
11. Open the safety guillotine valve -fig.4.

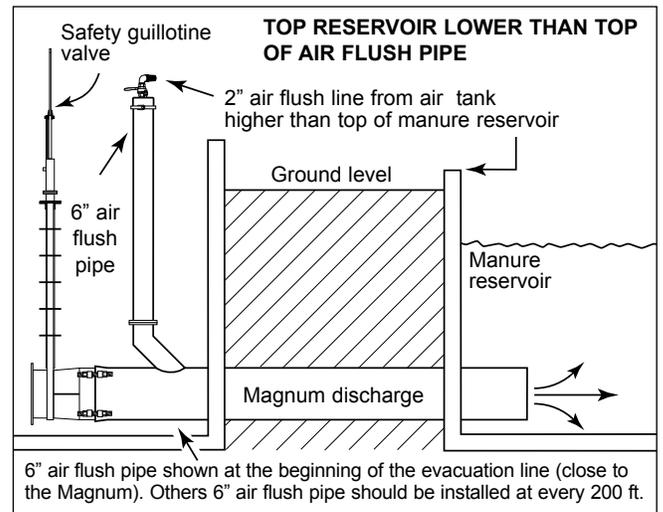


Fig.3

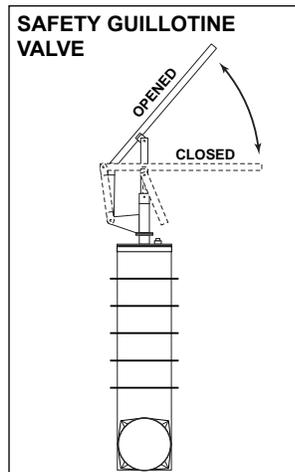


Fig.4

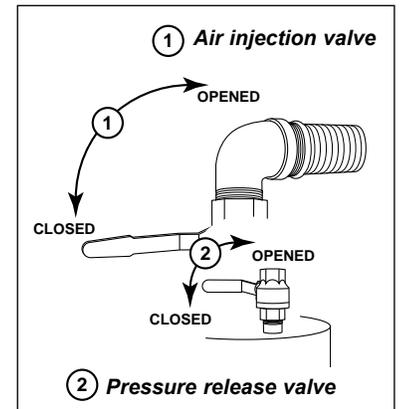


Fig.5

## Size of air flush tank in US gallon required to flush a 16" O.D. evacuation line.

Pressure in air flush tank	Length in feet of the evacuation line										
	50	80	110	140	170	200	230	260	290	320	350
	Size of the air tank in US gallons										
150 PSI	174	279	383	487	592	696	801	905	1010	1114	1219
125 PSI	209	334	460	585	710	836	961	1086	1212		
100 PSI	261	418	574	731	888	1044	1201				
75 PSI	348	557	766	975	1184						

## Air flush instructions with 6" gate valve

### When top of manure reservoir is higher than top of air flush pipe

When the manure reservoir is higher than the top of air flush pipe, it is mandatory to install a 6" gate valve to prevent liquid from flowing back when the cap is removed -fig.6. J. Houle & Fils Inc. recommends to flush the evacuation line every day with air pressure only and every week with air and straw.

To flush the evacuation line with air pressure only, use instructions 1, 2, 10, 11, 12 and 13.

To flush with air and straw, use all instructions.

1. Stop the Magnum;
2. Close the safety guillotine valve to ensure that the material in the evacuation line is pushed towards the manure reservoir -fig.4;
3. Close the 6" gate valve -fig.6;
4. Open the pressure release valve -fig.5;
5. Close the pressure release valve after complete evacuation of air pressure -fig.5;

### WARNING

6. Before removing the 6" circle lock clamp -fig.2, it is mandatory to release any pressure in the evacuation line by opening the pressure release valve -fig.5. Failure to follow this warning could result in serious injuries.
7. Remove the cap of the air flush pipe -fig.2;
8. Put about 2 ft of straw in the 6" air flush pipe without packing it;
9. Reinstall the 6" cap and the circle lock clamp -fig.2;
10. Open the 6" gate valve -fig.6;
11. Open the air injection valve -fig.5;
12. Close the air injection valve once the air compressor is empty;
13. Close the 6" gate valve -fig.6;
14. Open the safety guillotine valve -fig.4.

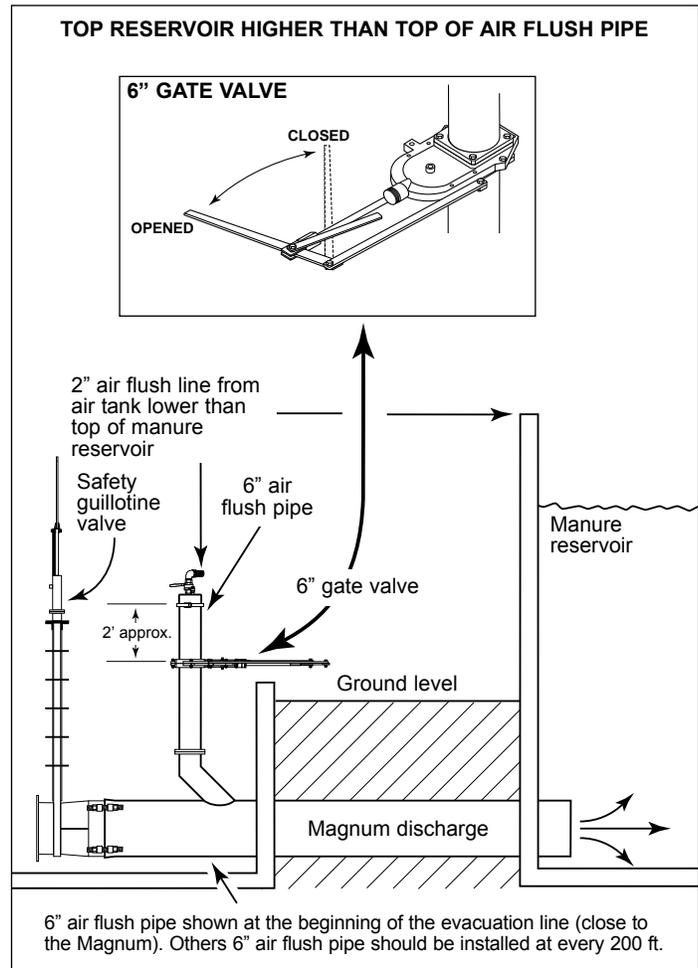


Fig.6

# Protection against corrosion of the steel evacuation line

## Underground corrosion

Very low voltage of electricity travels through the ground. The amount of electricity that can be carried by the ground depends on the type of soil. For example, damp hard clay soil has a high conductivity potential and dry coarse sand has virtually no conductivity potential.

As electricity travels through the ground, if it finds a steel evacuation line, it will use it for whatever distance suits it. Then, where the electricity leaves the steel evacuation line, a chemical reaction occurs. This chemical reaction is the underground corrosion, which can be fast or slow depending on the type of soil in the area.

## How to delay underground corrosion

### 1. Each steel pipe must be free of scratches on its coating:

Scratches greatly amplify the corrosion process since the electricity concentrates on the scratches to leave the steel pipe creating hot spots that corrode fast. Scratches must be coated with tar.

### 2. It is mandatory to bury the whole steel evacuation line in sand:

Sand is the best material to prevent making scratches on the steel pipes coating at the time of installation. It is also the least conductive material for electricity.

### 3. Installation of sacrificial anodes:

**PART # 07-80-0737 32 Lbs Sacrificial Anode**

Sacrificial anodes are made of lesser quality material than the evacuation line. When using anodes to let the electricity leave the evacuation line, they gradually corrode away over many years instead of the evacuation line. Once corroded away, if the anodes are not replaced, the corrosion will start its process on the evacuation line.

QUANTITY OF ANODES REQUIRED TO PROTECT A MAGNUM SYSTEM	
<i>Component Protected</i>	<i>Quantity of Anodes</i>
Magnum	1
Evacuation line up to 120 feet	1
Evacuation line up to 240 feet	2
Evacuation line up to 360 feet	3

### 4. Insure fully dedicated protection from the sacrificial anodes:

To get the longest life out of the anodes, it is imperative that they only protect the underground manure pump and its evacuation line. At the time of installation, you must insure that no ground wire is attached directly or indirectly to the buried equipment we wish to protect.

For example, if the concrete floor wire mesh, the stalls and the buried equipment are linked together to the ground wire, the sacrificial anodes will have to protect a much larger mass of steel and will also corrode much faster. Properly installed, sacrificial anodes may last up to 20 years.

## Magnum sacrificial anode

When manoeuvring the Magnum, inspect and coat with tar all coating scratches around it. The sacrificial anode must be installed vertically and at 18" from the Magnum.

It is preferably installed to the back bracket of the Magnum, but it may also be installed to the front bracket to accommodate digging purpose.

## Evacuation line sacrificial anode

1. When manoeuvring each steel pipe, inspect and coat with tar all coating scratches around them;
2. The sacrificial anode must be set parallel and at 18" from the component it protects. The anode can be installed above or beside the evacuation line;

### IMPORTANT:

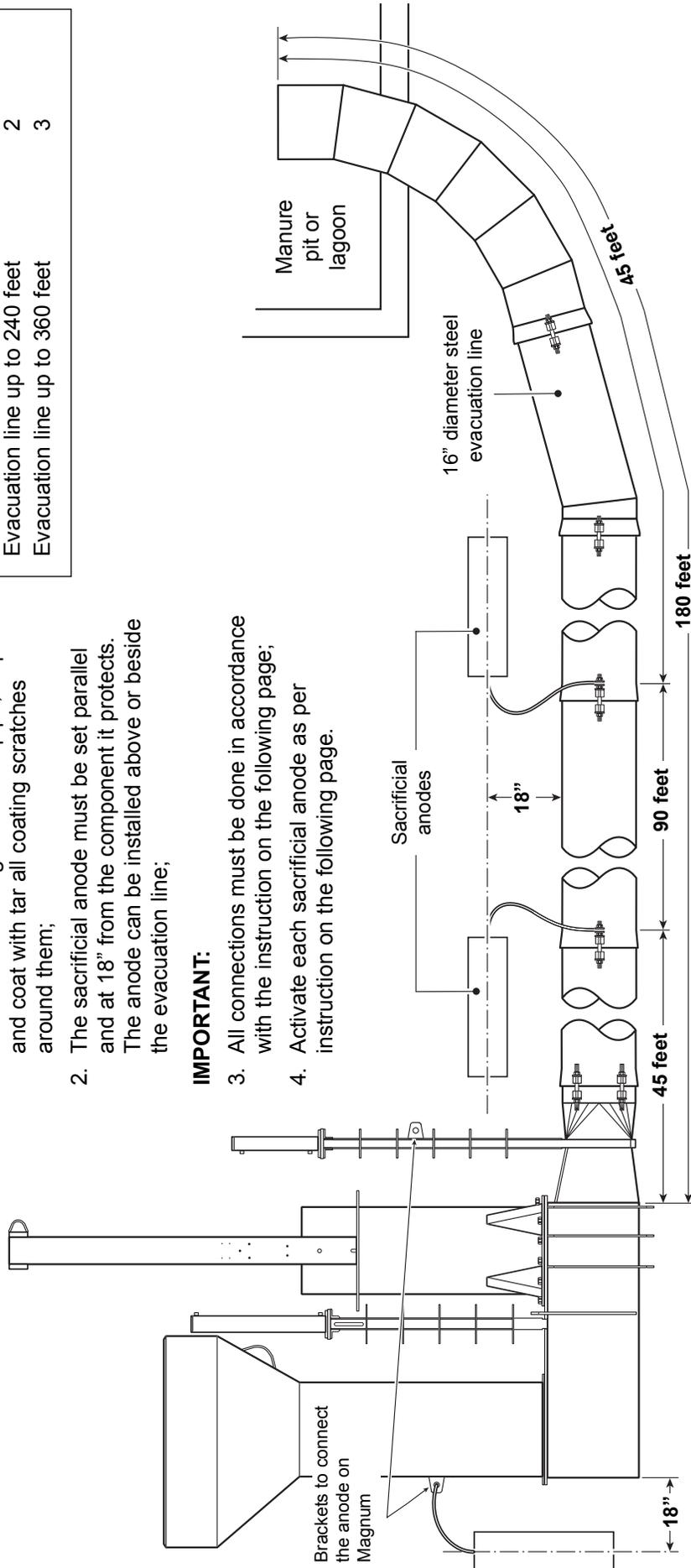
3. All connections must be done in accordance with the instruction on the following page;
4. Activate each sacrificial anode as per instruction on the following page.

### Mandatory

The Magnum and the evacuation line must be buried in sand to minimize conductivity.

The sand must be well compacted all around the equipment and the anodes to avoid later soil movement that could break the copper wire.

QUANTITY OF ANODES REQUIRED TO PROTECT A MAGNUM SYSTEM	
Component Protected	Quantity of Anodes
Magnum	1
Evacuation line up to 120 feet	1
Evacuation line up to 240 feet	2
Evacuation line up to 360 feet	3

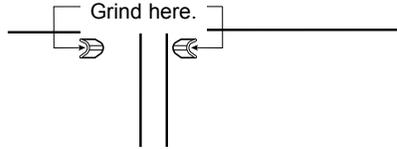


# Protection against corrosion of the steel evacuation line

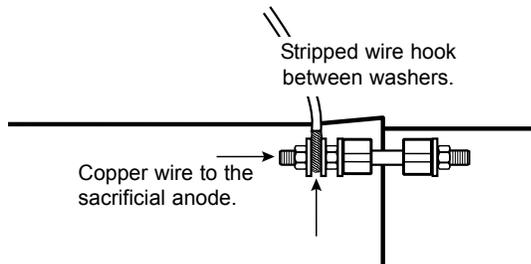
## Connection of the sacrificial anode

**HARDWARE SUPPLIED WITH EACH SACRIFICIAL ANODE:** 1 X 3/4-10NC Bolt 2" (required for connection on Magnum bracket only) ; 2 X 3/4" Washers ; 1 X 3/4-10NC Nut

1. Grind joint bracket sides on both pipes to remove coating;

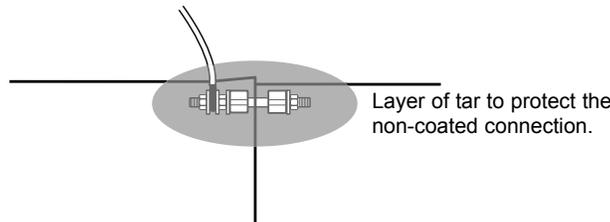


2. Strip the length of wire required to make a single loop around the equipment bolt;
3. Hook the stripped wire to the equipment bolt between 3/4" washers. Do not overlap the wire since it may cut itself when tightening the nut;



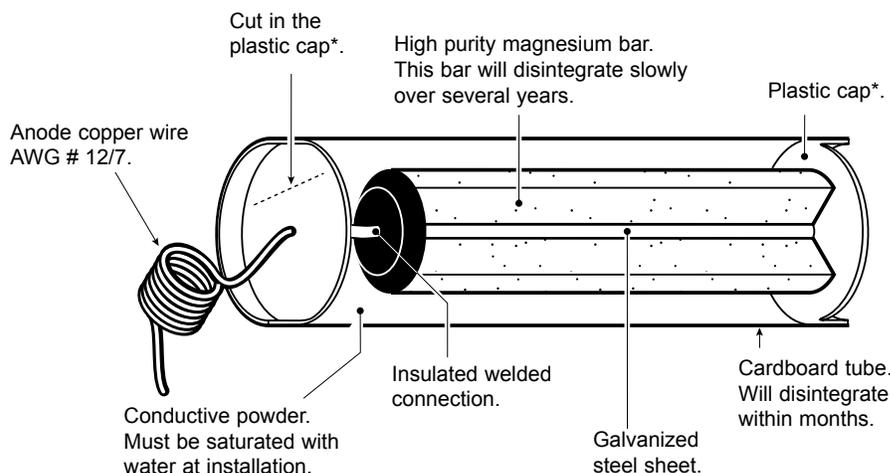
### 4. IMPORTANT:

Remove any plastic film that may have been wrapped around the anode cardboard tube for handling. **Do not uncap the cardboard tube.** Cover each steel pipe connection bolt with a thick layer of tar to fully protect the non-coated connection;



## Activation of the sacrificial anode

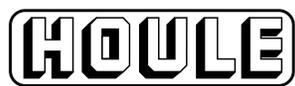
The dry conductive powder in the cardboard tube must be saturated with water before burying the sacrificial anode. With a knife, make a cut in the plastic cap and soak the tube with water. The cardboard will disintegrate and the natural moisture of the soil will keep this conductive powder humidified through the years.



**\*DO NOT REMOVE THE PLASTIC CAPS FROM THE CARDBOARD TUBE.**







**J. Houle & Fils Inc.**