



## PERMANENT DEEP DRAW DRUM INSTRUCTIONS

### DESCRIPTION

The Deep Draw Drum is a self-cleaning permanent type magnetic separator that's designed and constructed specifically for very heavy duty applications. It separates small and large pieces of ferrous material from products such as solid waste ash, shredded automobiles, slag and crushed ore.

This large and powerful magnetic drum operates as a motor driven stainless steel shell revolving around an internal stationary magnet and shaft assembly. Material to be separated is fed against the shell that's protected by a heavy duty manganol steel wear cover, welded in place. Magnetics in the field are attracted to the shell, and held against it until reaching a discharge location. The separated magnetics are then automatically released.

The Deep Draw Drum is available from Dings as a drum only, or with a complete horizontal I-beam support frame that includes a drive motor, drive chain and a guard. Two shaft clamps and a magnet arc adjusting arm are included with the drum assembly in either case.

### CAUTION: STRONG MAGNET

Strong magnetic field may have an affect on pacemakers and other electrical devices. Please contact the device manufacturer for further information. Be careful with hand held tools near it, whether the drum is operating or not. Stay away from moving members when it is operating.

Always switch off the drive motor and magnet before adjusting any part on the drum, the drive or the support structure. A motor lockout system should be used during servicing — during any adjustments and during any maintenance.

The internal stationary magnet assembly projects a powerful magnetic field through the drum shell, and out into the space several inches away from the shell. Be cautious when handling or even carrying tools near the shell. If a tool that's made of magnetic metal (most steel alloys are) is brought within the magnetic range, it can be attracted suddenly and with great force towards the shell. The magnetic field is highly attractive, and is always present.

Magnetic performance may be affected by magnetic material in the field. This includes such items as i-beams, metal supports, hoppers, or splitters. These and other ferrous objects need to be kept out of the magnetic zone.

### OPERATING TEMPERATURE:

Ceramic magnets: -40°F through 250°F (-40°C through 120°C).

Rare earth magnets: 176°F (80°C) or less.

NOTE: Extreme temperatures may affect the performance of the magnet. Refer to Bulletin 1214T.

### IMPORTANT

This instruction bulletin has 2 sections. Section 1 covers the installation and operation of the Deep Draw Drum assembly only — supplied by Dings without a support frame. Section 2 covers additional instructions about installing and operating the drum when it's supplied by Dings with a support frame.

Read Section 1 before installing either a drum assembly or a drum assembly that has a Dings supplied horizontal support frame.



Figure 1

### IMPORTANT

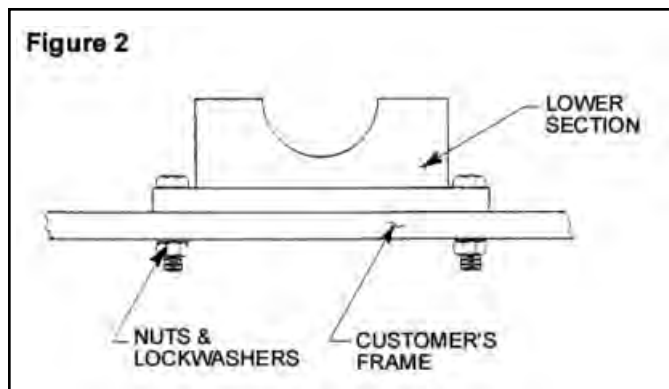
If the separator consists of a drum assembly only, it will be up to the installer or user to furnish mounting, framing and drive components. If a Dings horizontal support frame was supplied by Dings, read Section 2 after reading Section 1.

## SECTION 1

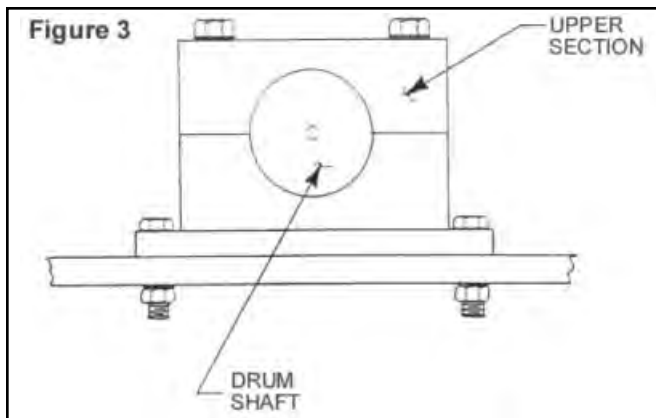
### MOUNTING - DRUM ONLY

Check all packaged material for shortage of parts and possible damage. Report shortages or damage to the delivering carrier. The drum assembly is usually shipped banded to a wood skid.

The Deep Draw Drum is shipped assembled and ready to mount on a support structure provided by the installer or user at the work site. Bolt the lower sections of the 2 split shaft clamps that were included with the drum shipment to the support structure as shown in Figure 2. Slotted holes are recommended in the support structure to allow lateral adjustment of the drum. Any vertical adjustment that might later be needed can be handled with shims (not provided by Dings).

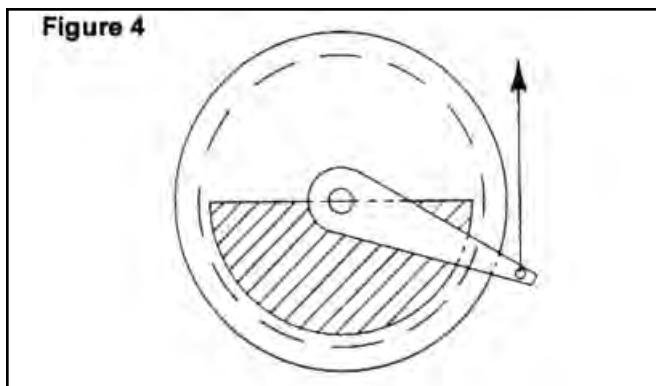


Tighten the lower sections of the shaft clamps, and then slowly lower the drum into them. When the shaft is supported in the lower sections, bolt the upper sections loosely in place as show in Figure 3. Do not tighten the upper sections at this time, because they must be loose to rotate the shaft while adjusting the magnet arc, as explained next.



### ADJUST MAGNET ARC - DRUM ONLY

The Deep Draw Drum is shipped with the internal magnet assembly in the lowest or resting position as shown in Figure 4. After the drum is mounted, the position of the internal magnet must be adjusted to set the external magnetic arc in a correct operating position.



Several possible arc positions are shown in Figures 5, 6 and 7. A selected position for your application was predetermined before shipment. It was based on the location of your feeder, and on other application factors. Be sure you know which arc position was determined for you installation, before adjusting the internal magnet as explained next.

Follow these steps when adjusting the magnet arc the first time:

- 1) Check bolts holding the upper sections on both shaft clamps. The upper sections should be loose, but don't remove the bolts.
- 2) Mount the adjusting arm that was packed with the drum, on either end of the drum shaft, in a horizontal or slightly below horizontal position.
- 3) Use a come-along, winch or crane as shown in Figure 4 to raise the adjusting arm to a magnet position that was predetermined for your installation. An arrow is stamped on each end of the drum shaft. It indicates the center of the magnet arc. The center is magnetically the strongest location across the drum surface.

- 4) When the magnet position is correct, tighten bolts in the upper sections on both shaft clamps while the adjusting arm is held in position by the come-along or crane. If more adjustment is needed, repeat steps 1 through 4.
- 5) After a magnet position is set, remove the come-along or crane, and also the adjusting arm.

It may be necessary later to reposition the arc slightly for peak performance after material is run on the drum. Repeat the 5 adjusting steps for peak performance, but during Step 3, check if the adjusting arm should be moved down slightly instead of up.

After the arc is finally set, consider leaving the adjusting arm on the shaft, and welding a steel plate on the drum support structure to act as a rest. This will prevent the internal magnet assembly from slipping out of position, if the shaft clamp bolts accidentally loosen from vibration.

### FEED TO DRUM

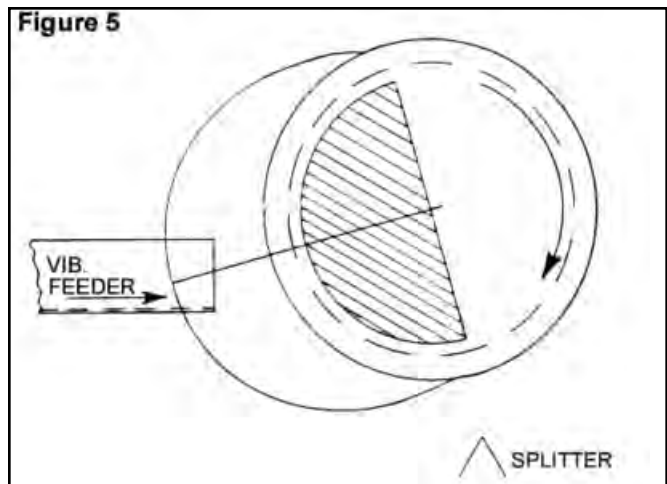
Peak performance depends not only on the position of the magnet arc. It also depends on these features: size of feed materials; distance or gap between the feeder and drum surface; rate of feed; how constant the rate is kept; and whether the feeder trough is made of a nonmagnetic type metal.

The feeder trough or plate must be made of a nonmagnetic metal such as Series 300 stainless steel. If instead it's made of common carbon steel, the portion that is situated within the magnetic field (inside the arc) will become magnetized. When this happens, efficiency of magnetic separation goes down.

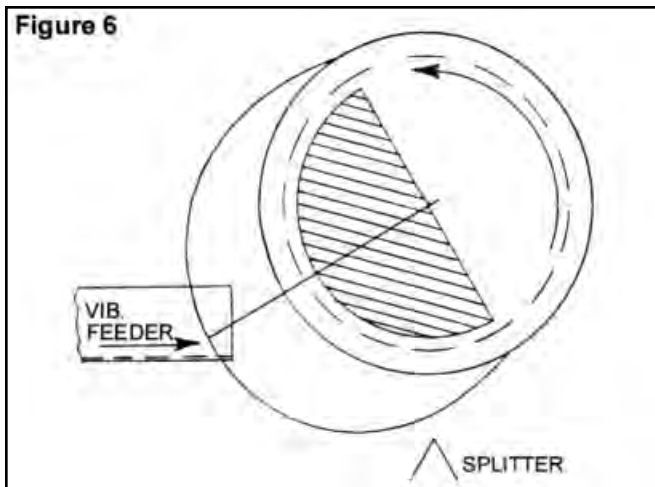
If your drum will be fed as in Figures 5 or 6, the gap between the discharge edge of the feeder and the drum shell is important. It must be wide enough to allow all nonmagnetics in the feed to fall through while the drum is operating. It must not be too wide which can cause a loss of magnetic material.

The maximum width of the gap depends on the magnetic strength of the drum which is a function of diameter. No specific gap dimension is included in this bulletin. The gap for your installation was predetermined at the time of drum selection. Be sure you know what the determination was.

If your drum will be fed as in Figure 7, the distance between the discharge edge of the feeder trough or plate, and the shell below, should be as short as possible. Feed material must not be allowed to drop more than a few inches against the shell, to avoid denting the shell. A dent can damage the internal magnet assembly. If the feeder has to be higher above the drum, install a nonmagnetic stainless steel chute at an angle that will allow the feed to slide down to the shell.



**Figure 6**



Maximum magnetic separation occurs when the peripheral speed of the drum is between 200 and 250 fpm. The corresponding rotational speeds are:

- 32 to 40 RPM for a 24" diameter drum
- 25 to 32 RPM for a 30" diameter drum
- 21 to 26 RPM for a 36" diameter drum
- 18 to 23 RPM for a 42" diameter drum
- 16 to 20 RPM for a 48" diameter drum
- 13 to 16 RPM for a 60" diameter drum

## MAINTENANCE

The Deep Draw Drum does not require extensive maintenance other than periodic greasing of bearings, and inspection of the wear cover.

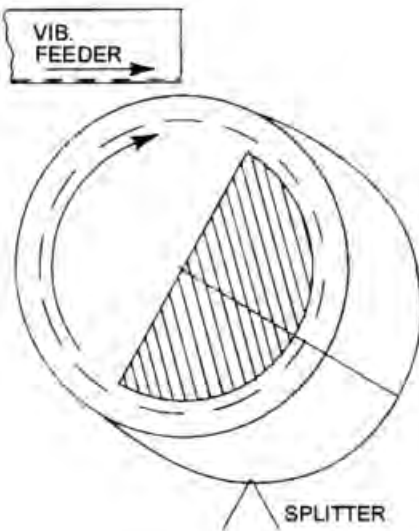
Two external bearings on the drum heads have alemite grease fittings. Lubricate them in your normal lubrication schedule, with grease conforming to NLGI Grade 2. However, if conditions are very dirty, lubricate at least every 2 weeks.

Watch for excessive wear on the manganese steel wear cover. Although extremely resistant to wear, it can be dented by large heavy pieces falling on it. Severe dents can cause damage to the internal magnet assembly.

Replacement wear covers, complete with pre-welded cleats, are available from Dings. They're furnished as 2 semicircular half-covers that must be tack welded in place. Follow these steps to replace a wear cover:

- 1) Grind off all welds holding the worn cover - the welds along both seams that cross the face, and the welds on the sides where the wear cover butts against the drum heads.
- 2) Put replacement cover on drum shell, temporarily banding it in place.
- 3) Rotate drum shell so that all welding will be done on the side opposite the magnetic field (magnet arc).
- 4) Weld replacement cover in place with a 304 SS or chrome manganese rod, using maximum 3" to 4" long welds along both seams, every 10". Tack weld at several points where the cover butts against the drum heads.

**Figure 7**



## SPLITTER

A splitter plate (not supplied by Dings) should be installed below your drum as shown. It's an aid to keeping the nonmagnetic product separate from the magnetic product, after these products are discharged from the drum.

The splitter should be made of nonmagnetic metal, and it should be at least as wide as the drum shell. Make it adjustable vertically and horizontally. Adjust it when material is running over the drum, for maximum separation of the discharged products.

## DRUM DRIVE

The Deep Draw Drum is usually furnished by Dings without a motor and drive. However, the drum is always furnished with a split sprocket bolted to one side. A matching drive sprocket and roller chain must be used to drive the drum.

See your certified print of a Dings drawing for more details about the sprocket. Sheave and belt-driven drums are available as options at time of order. The certified print has more details about this.

## TROUBLE SHOOTING

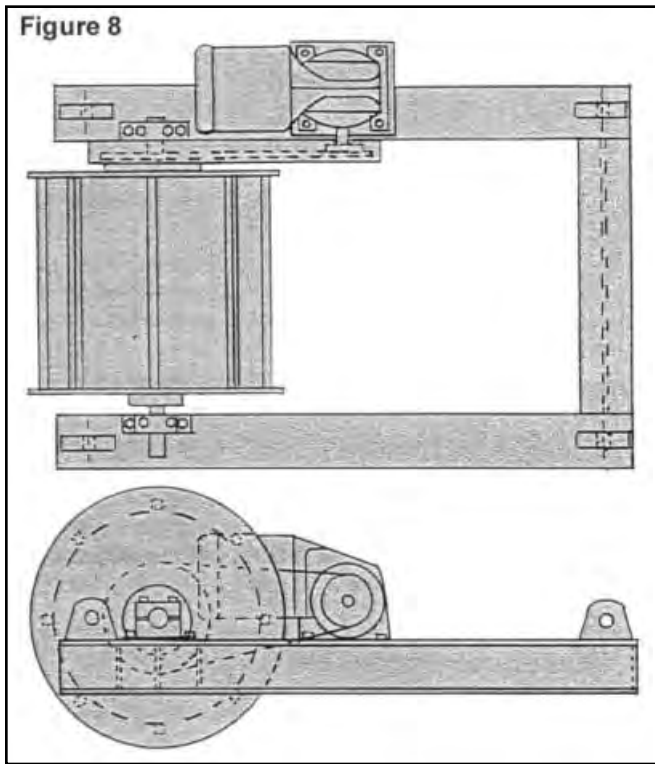
If there is a sudden and excessive drop in the amount of magnetics separated, it is possible that the internal magnet assembly slipped out of position. This would cause the magnet arc to be in the wrong position. Check the magnet arc position according to instructions in earlier paragraphs.

If the drum shell does not revolve freely, or there is noise when the shell revolves, there is internal interference between the shell and the magnet assembly. A slight ticking sound at one point that does not interfere with rotation is not serious. The cause will wear away. However, any loud noise or internal rubbing that does impede rotation should be reported to Dings.

## SECTION 2

### IMPORTANT

This section covers additional instructions that should be followed to install and operate the Deep Draw Drum when it is supplied by Dings with a *horizontal* support frame as shown in Figure 8. Read Section 1 before Section 2.



### MOUNTING — DRUM SUPPLIED WITH FRAME

The Deep Draw Drum and frame are shipped assembled, ready to mount on a support structure or by suspension from an overhead support structure. A support structure at the work site is provided by the installer or the user. Four support lugs are furnished on the frame for a suspended installation.

Install the drum/frame assembly with the frame level. If the assembly will be suspended, use 4 parallel wire rope or chain slings with turn-buckles for easy vertical adjustment.

### ADJUST MAGNET ARC

Follow instructions in Section 1.

### FEED TO DRUM

Follow instructions in Section 1.

### SPLITTER

Follow instructions in Section 1.

### DRUM DRIVE — MOTOR, WIRING, CHAIN

A gearmotor is furnished with the drum/frame assembly. It was sized to suit the drum diameter and expected loading. The *standard* motor is a TEFC parallel shaft gearmotor that operates on 230/460 volt 3ph 60Hz.

Motor speed, drum sprocket and motor sprocket were matched at the Dings factory to produce the correct rotational speed for the drum diameter. An instruction booklet cover the gearmotor was attached to the motor when shipped from Dings. If the booklet is missing, call the Dings sales department for a copy.

Follow the wire connection diagram on the motor nameplate. Be sure to provide overload protection. After the motor is connected to a power supply, jog the motor on and off to see if the drum shell rotates in the correct direction. If the direction is wrong, reverse any 2 wire connections.

The separator was shipped from Dings with the correct amount of tension on the drive chain. However, the motor mounting bolts could have loosened during transit. Check chain tension before operating the drum. The chain should be taut. If it needs tightening, loosen bolts holding the motor in place, slide motor as needed to tighten chain, and tighten bolts securely. Remember to remount the chain guard after adjusting the motor base. Be sure the chain doesn't hit the guard when the drum is in motion.

### ORDERING PARTS

Replacement parts can be order by mail, or by phoning a local Dings representative, or the Dings factory. All parts are shipped from the factory. Please provide a serial number from the nameplate on the Deep Draw Drum whenever possible.

You can call the factory in Milwaukee, Wisconsin at 414-672-7830 between 8:00 AM and 4:30 PM central time, Monday through Friday. Tell our operator that you want to speak to someone about parts for a magnetic separator.

### DECOMMISSIONING

If the separator will be taken out of service and decommissioned, care must be taken in the disposal of component items. The drive system (motor, gearbox, etc.) should be disposed of as you would any electric motor. Frame components are carbon steel and can be processed by a qualified recycler. The drum itself contains strong permanently magnetized ceramic magnets. The magnetic field is always present and projects out into the space several inches away from the shell. Proper care must be taken in handling and transporting the equipment. If the drum will be recycled, the recycling operator must be made aware of the magnetic properties of the separator.



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