

Acrison[®]

Operating and Instruction Manual

**For Acrison
Model W-105 Series of
Volumetric Feeders
Models W-105 and W-105Z**



***Robustly built, high performance equipment
for dry solids metering and handling.***

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1.0 IMPORTANT SAFETY INSTRUCTIONS

Operator Safety

THIS EQUIPMENT CONTAINS ROTATING COMPONENTS. TO AVOID POSSIBLE BODILY INJURY, POWER TO THIS EQUIPMENT MUST ALWAYS BE DISCONNECTED BEFORE THE EQUIPMENT IS OPENED OR PRIOR TO PERFORMING ANY MAINTENANCE WHATSOEVER. DO NOT CLEAN WHILE OPERATING. NEVER PERMIT AN OPERATOR OR ANY PERSONNEL TO PLACE HANDS, FEET, APPAREL OR ANY OBJECT INSIDE OR NEAR THE INLET, OUTLET OR ANY FUNCTIONAL AREA OF THIS MACHINE WHILE POWER IS ON.

This equipment can be installed in a variety of configurations predicated on the overall process design and/or the physical equipment arrangement. It is the buyer's or user's sole responsibility to (1), define the need for and to subsequently ensure that any safety device(s) or associated safety device(s), other than that normally furnished by Acrison as standard, is provided in accordance with the specific installation and operational parameters of the equipment, and (2), define the need for and assure compliance with all applicable safety laws, rules and regulations.

If safety devices are not specifically included with the original equipment (based on the specifics of a given installation), Acrison can, at the user's expressed request only, provide whatever safety device(s) the buyer or user deems applicable. If Acrison is asked to make such recommendations prior to operation of the equipment, said recommendations are only advisory and do not impose any obligation or liability upon Acrison unless Acrison is expressly requested to provide the safety device(s), and does so.

It is the buyer's or user's sole responsibility to establish safety procedures and operational instructions to safeguard the operator(s) during maintenance, cleaning or any use of the equipment whatsoever and to subsequently ensure that the equipment is operated in conformance with all applicable safety procedures, laws, regulations and instructions. It is also the buyer's or user's sole responsibility to enforce all safety regulations and operational instructions and to maintain the equipment in a safe condition (guards in place, warning, caution and/or important labels affixed, electrical boxes secure, interlocks operational, etc.). In particular, all warning and caution labels must be maintained in a readable condition and, if necessary, replaced with new labels. These labels are available free of charge on request from Acrison Incorporated.

Because the nature of the equipment does not always make it possible to prevent operator access to rotating components, under no circumstances should maintenance or cleaning be performed on the equipment without first disconnecting all power.

WARNING



CAUTION



The above WARNING and CAUTION symbols, where displayed within this Manual, are intended to draw the attention of the user to a potential for risk of personal injury and/or damage to the equipment if the correct operating procedures are not followed.

IMPORTANT

The equipment is supplied for the specific duty for which it was originally sold and as stipulated on Acrison's Equipment Specification and Parts List Documents. It is not recommended to use this equipment for any other purpose without the expressed written consent of Acrison Incorporated.

2.0 INTRODUCTION

About This Manual

This Manual has been produced as a guide to the correct installation, operation and maintenance of the Acrison equipment to which it refers. It has been created to provide concise, yet comprehensive product information to enable the user to obtain long term maximum benefits from the equipment. If there are any details about this Manual, the equipment or any other activity of Acrison that require further explanation, please do not hesitate to contact Acrison's Customer Support.

Instructions relating to Acrison Dissolving Tanks and Wetting Cones, used with the Model W-105 Series of Volumetric Feeders, are furnished separately.

2.1 Models W-105 and W-105Z Volumetric Feeders

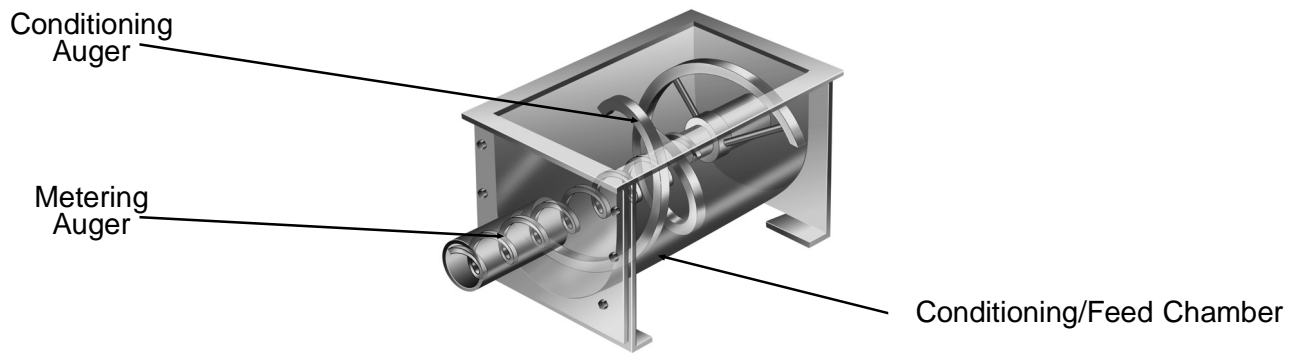
Acrison Models W-105 and W-105Z are auger type Volumetric Feeders, specifically designed for the accurate and dependable metering of the typical dry solid ingredients used in water and waste-water treatment processes. Frequently, these particular model feeders are used in conjunction with dissolving tanks, as illustrated below.

Metering is accomplished by the feeder's feed auger which produces a given volumetric output (volumetric displacement) for each revolution. Normally, the speed of the metering auger is adjustable over a specific speed range, and various size metering augers are available to provide a broad range of feed output capacities.

Introduced in 1964, Acrison's highly recognized Model W-105 Series of Volumetric Feeders have admirably survived the brutal test of time, with the unprecedented distinction of ranking highest in worldwide volumetric feeder user preference and recognition. Their uniquely versatile and extremely effective Double Concentric Auger feeding mechanism ensures accurate and reliable metering of an exceptionally wide variety of dry solid materials.



Model W-105 Volumetric Feeder
(Shown with an optional Dissolving Tank)



Illustration

As can be seen from the above illustration, a large helical “conditioning auger” (Intromitter) is concentrically mounted around a smaller (metering) auger. In operation, these augers rotate at a proportional, but dissimilar speed, imparting a unique inward and outward radial “interaction” to the material being fed. The inward action “conditions” the material, establishing constant and uniform product density, while simultaneously, **filling the metering auger from a full 360 degrees**. The outward action creates agitation within the feeder’s conditioning chamber, totally eliminating any possibility of starving the metering auger. And in order to best handle the countless number of dry solid ingredients efficiently and effectively, Acrison has designed and manufactures a variety of conditioning augers, the selection of which is determined by the specific handling characteristics of the material to be metered.

The Model W-105 utilizes a 6 inch diameter Intromitter (or conditioning auger), and the Model W-105Z is equipped with a 10 inch diameter conditioning auger. Feeder model selection is determined by the handling characteristics of the product or products to be fed in conjunction with the required feed rate. As standard, the double augers, including their respective drive shafts and seal components, are furnished in 304 stainless steel.

There is also a variety of metering auger sizes available for use with the Models W-105 and W-105Z Volumetric Feeders. Please refer to the Capacity Chart within Section 3.3 of this Manual for the feed output capacities produced by the various size metering augers available with these feeders.

As standard, the Models W-105 and W-105Z Volumetric Feeders are furnished with an integral supply hopper, the size of which is determined by the requirements of the specific application. And depending upon the feeder model, various optional accessories are also available with these hoppers. One popular option is as an Isolation Pad/Vibrator Assembly that is utilized for those materials that demonstrate difficult flow characteristics. The Isolation Pad isolates the feeder from the majority of the vibration produced by the vibrator. (It should be noted that only a minimal amount of vibration is usually required to produce reliable product flow, and the high frequency vibrator is adjustable.)

The Model W-105 is equipped with a 1/2 HP motor, and the Model W-105Z with a 1 HP motor. The standard motor is totally enclosed. Acrison offers both AC and DC variable speed drives for use with the Models W-105 and W-105Z Volumetric Feeders. Depending upon the type and model controller selected, either a 10:1, 20:1, 30:1 or 50:1 speed range is available. In addition, certain of these controllers are also available with an assortment of optional control functions, and capable of being furnished in various type enclosures to suit the specifics of a given application. Please refer to the selected variable speed controller Data Specifications for a detailed description. Specific instructions relating to a variable speed controller are furnished separately.

2.2 Glossary

AC Motor — An AC Motor is used to power the feeder. AC Motors may be operated at a constant speed, without variable speed control, or may be furnished with a variable frequency controller for variable speed control.

Conditioning (Feed) Chamber — The all-steel Conditioning Chamber houses the Double Concentric Metering Auger Mechanism. The supply hopper of the feeder attaches directly to the top flange of the Conditioning Chamber. Model W-105 and W-105Z Conditioning Chambers are designed without any type of convergence that could prove detrimental to product flow and/or feed.

DC Motor — DC Motors are frequently used to power the Model W-105 Series of Feeders for variable speed control.

Discharge Cylinder — The Discharge Cylinder is the discharge spout of the feeder, within which the metering auger rotates, and through which the metering auger discharges product.

Dissolving Tank (Optional) — Acrison's optional Dissolving Tank is used to produce a solution or slurry by efficiently mixing dry materials (chemicals) with water. An Acrison Volumetric Feeder is used to meter a dry chemical into a Dissolving Tank.

Drive Isolation (Magnetic) Clutch — The Drive Isolation Magnetic Clutch is a device mounted between the feeder's drive motor and gear-reducer that, when deactivated via a lockable switch, prevents the drive motor from powering the feeder's metering mechanism (typically used as a safety interlock).

Drive Motor — The Drive Motor is the motor (AC or DC) that powers the feeder.

Gearbox — The feeder's Gearbox contains the gearing mechanism that provides the desired ratio of speed differential between the smaller metering auger and the larger conditioning auger (Intromitter).

Gear-reducer — The Gear-reducer reduces the motor speed to the desired speed entering the gearbox. The Gear-reducer is available with one of several ratios, determined by product characteristics and application parameters, and establishes the maximum speed of the metering auger and thus, its maximum feed rate output capacity. The feeder's drive motor flange-attaches to the Gear-reducer, and the Gear-reducer flange-attaches to the feeder's gearbox.

Hopper Vibrator — When supplied, a Hopper Vibrator, typically mounted onto the lower backside of a hopper, will promote dependable product (chemical) flow out of the hopper and into the feeder's feed chamber beneath, thereby ensuring reliable and accurate metering. Normally, Hopper Vibrators operate intermittently, controlled by an adjustable cycle timer, with the time the Vibrator operates determined by several factors, but in particular, the physical handling characteristics of the product being metered and the feed rate requirements.

Isolation Pad — The Isolation Pad is an optional device that allows the feeder's supply hopper to vibrate effectively and uniformly in order to promote reliable product flow into the feeder's conditioning chamber beneath. The Isolation Pad consists of low durometer rubber vulcanized between and onto two stainless steel plates (one on each end). The supply hopper attaches to the top plate of the Isolation Pad and the conditioning chamber is secured to the bottom plate. The plates of the Isolation Pad are tapped for attachment; bolts do not penetrate the rubber isolation media. The Isolation Pad also eliminates the vast majority of vibration from being transmitted from the supply hopper to the feeder's conditioning chamber.

Intromitter (Conditioning Auger) — The Models W-105 and W-105Z Volumetric Feeders include Acrison's unique Double Concentric Auger Metering Mechanism, with the larger of the double augers called the Intromitter (or Conditioning Auger). The Conditioning Auger (or Intromitter) is normally a helically wound device but can also be provided in other configurations as well, based on the handling characteristics of the product(s) being handled.

The Conditioning Auger produces a bi-directional, opposing sliding movement of product within the confines of the Double Concentric Augers [produced by the speed differential between the Intromitter (Conditioning Auger) and the slower rotating metering auger] that gently conditions the material to a very consistent density while simultaneously, filling the centrally located and smaller metering auger from a full 360 degrees.

Metering Auger — The Metering Auger is a spiral type conveying device (with or without an integral center-shaft), centrally situated inside the larger conditioning auger (or Intramitter), that is utilized to volumetrically displace (meter) product out of the feeder's conditioning chamber and through the discharge cylinder. Many sizes and designs are available, the selection of which is determined by the feed rate and the physical characteristics of the product. Rotation of the Metering Auger, within the discharge cylinder, produces a specific volume of product discharge for each revolution.

Right Angle Downspout — Attached to the end of the feeder's discharge cylinder, a Right Angle Downspout provides an easy means for connecting the output of the feeder to auxiliary equipment, also providing the means for a simple, dust-tight connection.

SCR Controller — An SCR/DC Controller is a variable speed controller that electronically varies and regulates the speed of a DC motor in relation to a selected speed setting. Depending upon the selected model controller, variable speed SCR/DC motor controllers provide either a 30:1 or 50:1 speed range, and offer various optional capabilities to suit the specifics of a given application.

Seal Cap — The Seal Cap exerts pressure upon the seal packing (which is located within the cylindrical extension of the seal housing) to ensure a positive seal for the rotating drive shaft(s).

Seal Housing — The Seal Housing assembly attaches to the feeder's gearbox and to the conditioning chamber. It provides the housing through which the Double Concentric Auger drive shaft assembly exits the gearbox and enters the conditioning chamber, and includes the sealing means at the rear of the conditioning chamber so that product does not escape from (the conditioning chamber) around the primary (outer) conditioning auger drive shaft.

Seal Packing — The Seal Packing is the material (usually a synthetic braided material) that produces the seal for the two independent rotating drive shafts of the feeder. The metering auger drive shaft rotates within the conditioning auger drive shaft at a different (faster) speed. Packing that seals the metering auger drive shaft is compressed between the outside of the metering auger drive shaft and the inside of the conditioning auger drive shaft. Packing to seal the conditioning auger drive shaft is compressed between the outside of the conditioning auger drive shaft and the inside of the cylindrical extension of the seal housing.

Supply Hopper — When supplied, the feeder's Supply Hopper, which attaches directly to the flange of the conditioning chamber (or Isolation Pad), contains the feeder's supply of product. The Supply Hopper may be furnished with an Isolation Pad/Vibrator Assembly, if deemed appropriate, based on product handling characteristics (see Isolation Pad).

Tachometer — When included, an Optical or Magnetic Digital Tachometer provides very precise speed sensing to assist in producing the highest possible degree of DC motor speed regulation, linearity and repeatability. Acrison SCR controllers that provide a 50:1 drive turndown ratio, or those used in conjunction with Acrison weigh feeders, utilize a Tachometer for speed feedback data. The Tachometer may be directly connected to the output shaft of the DC motor, through a specially designed gear-reducer, or may be installed between the motor and gear-reducer.

Torque Limiter Coupling — An optional device mounted between the feeder's gear-reducer and gearbox to provide adjustable overload protection of the drive components.

Variable Frequency Controller/Drive (VFD) — A Variable Frequency Controller is a variable speed controller that electronically varies and regulates the speed of an AC motor in relation to a selected speed setting. Depending upon the selected model controller, variable frequency AC motor controllers provide either a 30:1 or 50:1 speed range, and offer various optional capabilities to suit the specifics of a given application.

Vibrator — See Hopper Vibrator.

Wetting Cone (Optional) — Operating in conjunction with an Acrison Volumetric Feeder, Acrison’s optional Wetting Cone has been specifically designed for “wetting” activated carbon, potassium permanganate and certain other dry chemicals.

3.0 INSTALLATION AND OPERATION

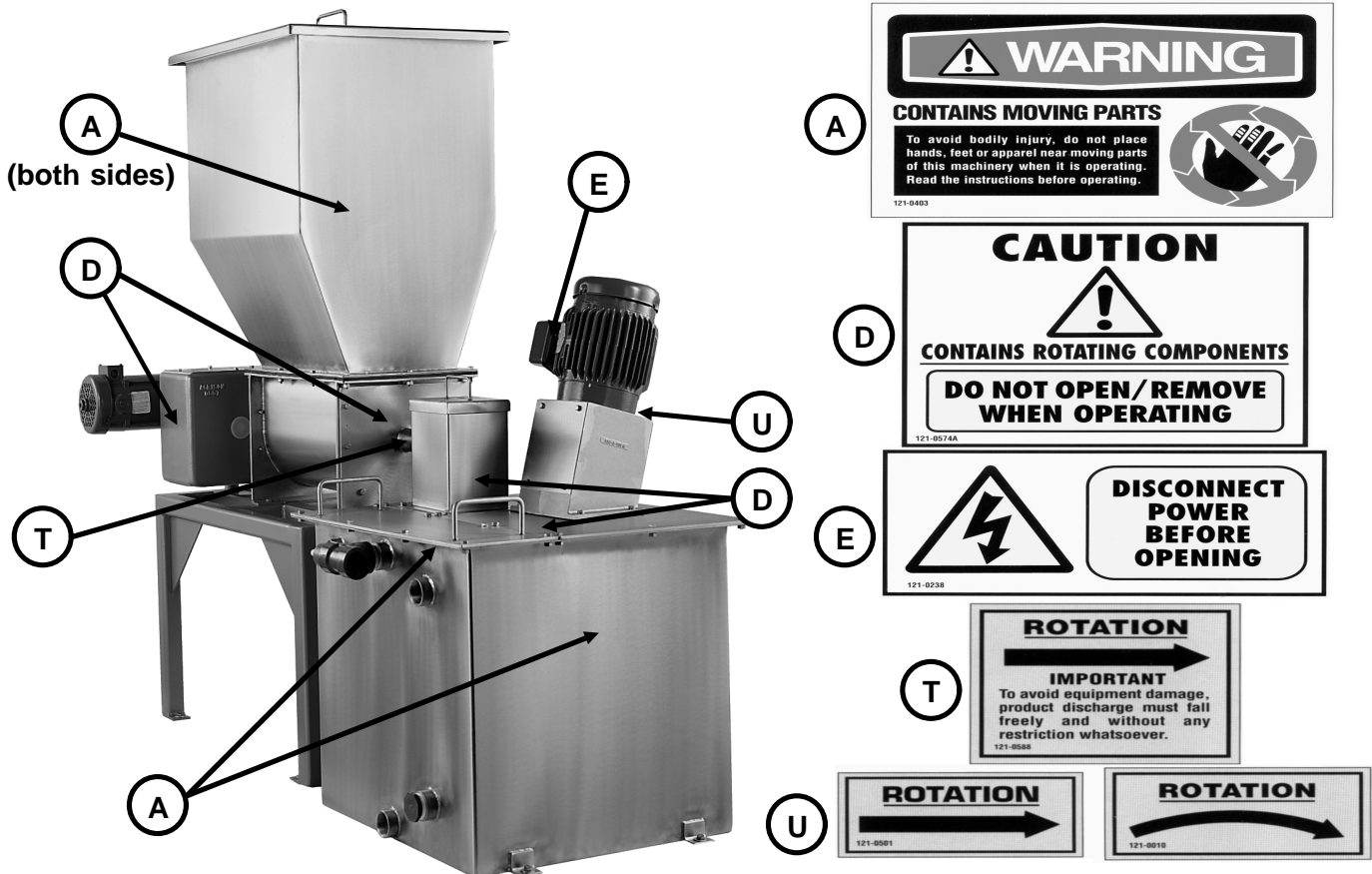


WARNING: *OBSERVE ALL WARNING AND/OR CAUTION LABELS. Do not approach any rotating object while the feeder is operating or connected to a power source.*

3.1 Installation

To install and operate, proceed as follows:

1. Open the shipping crate and unbolt the feeder from the skid by removing the four bolts (one in each corner) which secure it to the skid.
2. Check the feeder for signs of physical damage. If any physical damage is noticed, advise the shipper and Acrison immediately. Under such circumstances, do not install the equipment.
3. If warning or caution labels are not affixed to the feeder in accordance with the diagram below, contact Acrison at once.



Models W-105 and W-105Z Feeders
(A Model W-105Z shown with an optional Dissolving Tank)

4. When ready for installation, place the feeder in position on a relatively level surface and secure the feeder to its mounting using bolts sized to easily fit within the four mounting holes.
5. Connect the feeder/controller to the electrical supply, in accordance with the approved wiring diagrams.



WARNING: *All wiring to the equipment must be made by the user or purchaser. This includes all interconnections between the equipment and any Acrison supplied control panel(s) as well as any safety switch(es) and/or safety interlock(s) either required by law and/or the electrical standards of the user.*

6. The feeder is factory lubricated and ready for operation, although lubrication verification is recommended. Please refer to Section 6.0 (Maintenance), paragraphs 6.1, 6.2, 6.3 and 6.4.
7. Start the feeder and check the metering auger for proper rotation.

CAUTION: *When facing the open (discharge) end of the discharge cylinder, direction of rotation of the metering auger **MUST** be clockwise (CW). If rotation is not correct, resultant damage to the feeder may occur. In addition, product discharge out of the feeder must fall freely and without any restriction whatsoever.*



NOTE: *Operating the feeder in the incorrect direction (especially when filled with product) could cause the metering auger to detach from the threaded connection to its drive shaft. Should this occur (on a feeder which is filled with product), most likely, the feeder will need to be emptied in order to re-attach the metering auger.*

Also, if the feeder's Intromitter (or conditioning auger) is equipped with a threaded connection (optional), the same situation (as described for the metering auger) can occur.

8. Fill the feeder's supply hopper with product.

NOTE: *When in operation, product level in the feeder's supply hopper should be kept at least 4 inches above the top of the Intromitter (conditioning auger). Below this level, inaccurate feed may occur.*

9. Allow the feeder to operate for approximately one minute to allocate time for the feeder to properly "condition" the product and to ensure that the metering auger is operating with a complete supply of material.
10. While the feeder is operating, set the feed output at a given setting and collect a few samples for a predetermined timed interval. Weigh these samples and adjust the variable speed drive accordingly to obtain the desired feed rate.

3.2 Feed Output Adjustments

3.2.1 Variable Speed DC Drive

The discharge rate of any particular size metering auger may be adjusted over an infinitely variable 10:1, 20:1, 30:1 or 50:1 speed range (depending on the type motor and model SCR/DC controller) by adjusting the output speed of the variable speed drive. For complete information, please refer to the applicable SCR/DC controller instruction manual.

3.2.2 Variable Speed AC Drive

The discharge rate of any particular size metering auger may be adjusted over an infinitely variable 10:1, 20:1, 30:1 or 50:1 speed range (depending on the type motor and VFD controller) by adjusting the output of the variable speed drive. For complete information, please refer to the applicable variable speed AC controller instruction manual.

3.3 Operational Adjustments

3.3.1 The speed (ratio) between the smaller metering auger and the Intromitter (or conditioning auger) is preselected based on the characteristics of the specific material to be metered, factory preset for optimum performance. If any feed-related problems are encountered, Acrison should be consulted for assistance.

MODELS W-105 and W-105Z CAPACITY CHART					
(Capacities shown in cubic feet per hour)					
Metering Auger Size	Minimum Output Capacities				Maximum Output
	10:1 Speed Range	20:1 Speed Range	30:1 Speed Range	50:1 Speed Range	
A*	0.006	0.003	0.002	0.0012	0.06
B	0.015	0.0075	0.005	0.003	0.15
BC	0.038	0.019	0.0127	0.0076	0.38
BB	0.054	0.027	0.018	0.0108	0.54
C	0.09	0.045	0.03	0.018	0.9
CC	0.14	0.07	0.047	0.028	1.4
D	0.24	0.12	0.08	0.048	2.4
DD	0.42	0.21	0.14	0.084	4.2
E	0.6	0.3	0.2	0.12	6
EE	0.87	0.435	0.29	0.174	8.7
EF	1.14	0.57	0.38	0.23	11.4
F	1.4	0.7	0.47	0.28	14
FF	1.9	0.95	0.63	0.38	19
G*	2.9	1.45	0.97	0.58	29
GG*	4.2	2.1	1.4	0.84	42
H*	5.1	2.55	1.7	1.02	51
HH*	7.2	3.6	2.4	1.4	72
K**	9.6	4.8	3.2	1.9	96
KK**	12	5.9	3.9	2.4	118
M**	16	8	5.3	3.2	160
N**	20	10.1	6.7	4.0	202

*Available on the Model W-105 only.
 **Available on the Model W-105Z only.

NOTE: *The preceding Capacity Chart indicates the typical output range for each size metering auger available with the Model W-105 and W-105Z Feeders. However, since the physical properties of the actual product being metered may have an effect upon the exact output, the stated capacities could vary.*

3.3.2 For feed rates beyond the furnished metering auger capacity, larger or smaller metering auger/discharge cylinder sets may be available (which are only interchangeable on the individual models of the W-105 and W-105Z Feeders). The output capacities of the various size metering augers may be obtained from the following Capacity Chart.

4.0 MAINTENANCE—DISASSEMBLY/REASSEMBLY



WARNING: *Be sure to disconnect the feeder from all power sources before attempting to disassemble. Additionally, if a Drive Isolation (Magnetic) Clutch (81)—refer to Figure 5—is provided to isolate the Drive Motor (1) from the Gear-reducer (2), be certain that it has been disengaged (via its local On/Off switch) before beginning disassembly procedures.*

IMPORTANT NOTE

The Numerical Component designations contained within this Instruction Manual (and the following text) are strictly for reference purposes only and do not numerically coincide with the Part Numbers indicated in the Feeder Parts List from which spare and/or replacement parts should be ordered. Component names, however, are identical.

4.1 Metering Auger (10)

Please refer to Figure 2.

4.1.1 The Metering Auger (10), which contains a left-hand internally threaded hub, is fastened to its Drive Shaft (11) within the Conditioning Chamber (6).

4.1.2 To remove the Metering Auger (10), rotate CLOCKWISE (when facing the discharge end of the auger) until it is disengaged.

The Metering Auger (10) may be withdrawn through the Discharge Cylinder (12), or through the front of the Conditioning Chamber (6).

To reassemble, reverse the preceding procedure.

CAUTION: *Care must be taken when removing the Discharge Cylinder (12) if the Metering Auger (10) has not been removed, particularly, on those feeders equipped with an extended length metering auger, a solid flight type metering auger, or any extended length metering auger furnished with an end bearing support. As long as the Discharge Cylinder (12) is attached to the feeder, the Metering Auger (10) is adequately supported, even if its end bearing support is loosened or removed.*



However, if the discharge cylinder is removed with the metering auger still attached, a rigid type metering auger (solid flight type auger or any extended

length metering auger furnished with an end bearing support) can potentially damage its drive shaft (bend the shaft) if the unsupported auger is allowed to drop-down (due to its weight). Also, the Metering Auger Drive Shaft (11) can likewise be damaged if such an auger was physically moved about in a manner that could cause the threaded end of the drive shaft to bend (where it attaches to the metering auger).

If this occurs, most likely, a wobble of the Discharge Cylinder (12) will be noted and ultimately, the threaded end of the Metering Auger Drive Shaft (11) will fail (fatigue).

In addition, whenever exchanging or swapping components from one feeder to another (only possible with feeders of the same model designation), verification of proper alignment with respect to the metering auger and its end bearing support is essential to ensure that damage to the Metering Auger Drive Shaft (11) does not occur.

If, after reassembly of the Metering Auger (10), alignment appears improper when installing the metering auger's end bearing support (the end bearing may be piloted for exact positioning), Acrison should be consulted for assistance.

4.2 Discharge Cylinder (12)

Please refer to Figures 1 and 2.

- 4.2.1** The Discharge Cylinder (12) may be removed by unbolting the screws fastening the flange of the cylinder to the face of the Conditioning Chamber (6). If a Model W-105 or W-105Z Feeder is an integral component of an Acrison Model 500, 512 or 515 polymer processing Module, the Discharge Cylinder (12) will be furnished with either an atomizing tee adapter assembly (Model 500) or a slam gate arrangement (Models 512 and 515). In either case, additional disassembly will be required before the Discharge Cylinder (12) can be removed from the feeder's Conditioning Chamber (6). **See the CAUTION note following Metering Auger, paragraph 4.1.2.**

To reassemble, reverse the preceding procedure.

4.3 Intromitter (Conditioning Auger) (8)

Please refer to Figure 2.

- 4.3.1** With the Discharge Cylinder (12) and Metering Auger (10) removed, the Conditioning Auger (8) may be disengaged. Loosen and remove the three cap screws which fasten the Conditioning Auger (8) to its drive shaft flange. The Intromitter (or conditioning auger) may now be withdrawn through the front of the Conditioning Chamber (6) or through the top (inlet) of the feeder, if accessible. For feeders furnished with a threaded conditioning auger hub (instead of a flanged hub), remove the conditioning auger in a manner similar to that of the metering auger. In such instances, the Intromitter (or conditioning auger) is equipped with a left-hand internally threaded hub to fasten it to its Drive Shaft (9) within the Conditioning Chamber (6). To remove, rotate CLOCKWISE (when facing the discharge end of the feeder) until it is disengaged. The conditioning auger may now be removed through the front of the conditioning chamber or through the top (inlet) of the feeder, if accessible.

To reassemble, reverse the preceding procedure.

4.4 Conditioning Chamber (6)

Please refer to Figures 1 and 2.

- 4.4.1 Remove the Discharge Cylinder (12), the Intromitter or Conditioning Auger (8) and the Metering Auger (10).

Install a temporary chock beneath the front side (feeder side) of the Gearbox (3), between the gearbox and the Feeder Mounting Base (4), to provide support once the Conditioning Chamber (6) is removed. Then, unbolt the Conditioning Chamber (6) from the Seal Housing Assembly (5).

Unbolt the Conditioning Chamber (6) from the Feeder Mounting Base (4) and then remove.

NOTE: *The Conditioning Chamber (6) with the Seal Housing Assembly (5) and Gearbox (3), including the Variable Speed Drive (1 and 2), may be removed as an assembly from the Feeder Mounting Base (4), if so desired.*

To reassemble, reverse the preceding procedure.

4.5 Seal Housing and Gearbox Assembly—Type PB (5 and 3)

Please refer to Figures 2 and 4.

- 4.5.1 The Seal Housing (5) and Gearbox (3) may be separated from the Conditioning Chamber (6) as an assembly by removing the bolts that fasten the Seal Housing (5) to the rear plate of the Conditioning Chamber (6).

NOTE 1: *It will be necessary to first remove the Metering Auger (10) and the Intromitter or Conditioning Auger (8) before the Conditioning Chamber (6) can be separated from the Seal Housing (5) and Gearbox (3) assembly.*

NOTE 2: *Model W-105 and W-105Z Volumetric Feeders include machined gearbox assemblies which include specially designed (piloted) two bolt flange bearings with Type PB Gearboxes. In order to maintain the accuracy of this assembly, replacement bearings must be identical to the original, and therefore, the Serial Number of the feeder must always be given should replacement parts for the Gearbox (3) be ordered.*

NOTE 3: *Feeders furnished with a Torque Limiting Coupling (80) require removal of the torque limiting coupling before disassembly of the Gearbox (3), as outlined in the preceding, is possible. The torque limiting coupling is located between the Gearbox (3) and the attachment flange of Gear-reducer (2) that attaches the gear-reducer to the Gearbox (3).*

- 4.5.2 Replacing Gears can be accomplished without removing the Gearbox (3) from the feeder assembly (see Figure 2). First, remove the Metering Auger (10) and the Intromitter or Conditioning Auger (8). Then, remove the Drive Assembly (1 and 2) by loosening the two set screws on the hollow-shaft of the Gear-reducer (2)—when applicable—and removing the four mounting bolts which secure the Gear-reducer (2) onto the Gearbox (3). If the Gearbox (3) must be removed, remove the bolts fastening the Seal Housing Assembly (5) to the Conditioning Chamber (6) and the single bolt fastening the Gearbox (3) to the Feeder Base (4).

- 4.5.3 To remove Gear (22), loosen the two set screws on this gear and the two set screws on the adjacent Metering Auger Drive Shaft Bearing (37). Loosen the Metering Auger Drive Shaft Seal Cap (14) and then, pull the Metering Auger Drive Shaft (11) out through the back of the Gearbox (3), or alternately, into the Conditioning Chamber (6) as far as necessary to permit removal of the gear (see the two NOTES following paragraph 4.5.6). Only after this has been done can Gear (25) also be removed.

4.5.4 To remove Gears (23) and/or Gear (24), loosen the two set screws on each adjacent Countershaft Bearing (31) and the two set screws on each of the gears. Slip Countershaft (28) out through the back of the Gearbox (3) far enough to remove the gear or gears.

4.5.5 To remove Gear (25), follow the procedure outlined in the preceding paragraph 4.5.3 for removing Gear (22). Then, loosen the two set screws on Gear (25) and on the adjacent Conditioning Auger Drive Shaft Bearings (38). Unthread the Conditioning Auger Drive Shaft Seal Cap (15) and then, pull the Intromitter (or Conditioning Auger) Drive Shaft (9) into the Conditioning Chamber (6) far enough to allow removal of Gear (25).

Reverse this procedure for reassembly. Be certain all set screws are tightened well and that all keys have been replaced properly. It is suggested to deburr all keys before reassembly to eliminate any possibility of binding.

4.5.6 To remove the Metering Auger Drive Shaft (11), first remove the Metering Auger (10) and Gear-reducer (2); please refer to paragraph 4.8. Then, loosen the set screws on Bearing (37) and on Drive Gear (22). Remove Snap Rings (40)—when applicable. After this has been done, slide the Metering Auger Drive Shaft (11) forward or backward to remove.

NOTE: *Loosening the Metering Auger Drive Shaft Seal Cap (14) will facilitate disassembly and reassembly.*

To reassemble, reverse the preceding procedure. Verify that the seal Packing (16) has not been damaged. Replace if necessary.

NOTE: *Certain Model W-105 and W-105Z Feeders include Type PB Gearbox (3) assemblies which include a Metering Auger Drive Shaft (11) with “Snap Ring” retainers (40) on the drive end to prevent this shaft from moving under abnormal stress. Please note that it is not necessary to remove the snap rings on the Metering Auger Drive Shaft (11) when removing this shaft through the rear (drive side) of the gearbox. If the metering auger drive shaft has been removed, during reassembly, be certain that the first snap ring is flush against Bearing (37) before tightening the set screws on this bearing.*

4.5.7 The Intromitter (or Conditioning Auger) Drive Shaft (9) must be removed as an assembly with the Metering Auger Drive Shaft (11). First, remove the Metering Auger (10), the Conditioning Auger (8) and the Discharge Cylinder (12). Then, remove the Motor (1) and Gear-reducer (2) as an assembly from the Gearbox (3) by loosening the set screws on the hollow-shaft of Gear-reducer (2)—when applicable—and then, removing the four bolts which secure the Gear-reducer (2) onto the Gearbox (3). Remove Snap Rings (40)—when applicable—on the Metering Auger Drive Shaft (11).

After this has been done, loosen the set screws on Gear (22) and on Bearing (37). Then, loosen the set screws on Gear (25), remove Snap Rings (41)—when applicable—on the Intromitter (or Conditioning Auger) Drive Shaft (9), and loosen the set screws on Bearings (38). Once this has been done, the Intromitter (or Conditioning Auger) Drive Shaft (9), with the Metering Auger Drive Shaft (11) attached, can be pulled into the Conditioning Chamber (6) and removed.

To reassemble, reverse the preceding procedure. When properly positioned, the flange of the Conditioning Auger Drive Shaft (9) [against which the Conditioning Auger (8) seats] should be about 3/16 to 1/4 inch away from the Seal Cap (15).

NOTE: *Snap Rings (41) may be included on the Intromitter (or Conditioning Auger) Drive Shaft (9) to likewise ensure that this shaft does not move under abnormal stress (see Figure 2). When removing the Intromitter (or Conditioning Auger) Drive Shaft (9), the snap rings on this shaft must first be removed. A snap ring tool is required to remove and install snap rings.*

- 4.5.8** If the Gearbox (3) must be removed, remove the bolts fastening the Seal Housing (5) to the Conditioning Chamber (6) and the bolt fastening the Gearbox (3) to the Feeder Mounting Base (4). Remove the Gearbox (3), Seal Housing (5) and Gear-reducer (2), with or without Motor (1), as an assembly. Remove the Gear-reducer (2) and Motor (1) from the Gearbox (3), if necessary, as previously outlined.
- 4.5.9** To replace any of the bearings within the Type PB Gearbox (3), follow the basic procedures as outlined in the preceding in order to gain access to the applicable bearing(s). The bearings are piloted to ensure proper and automatic realignment. Be certain to re-tighten all set screws and to properly deburr and replace any keys and/or shafts which may have been removed.

4.6 Replacing Seal Packing (16 and 17)

Please refer to Figures 2 and 4.

- 4.6.1 To replace Packing (16) for the Metering Auger Drive Shaft (11)**, first remove the Metering Auger (10) and then, unthread the Metering Auger Drive Shaft Seal Cap (14). Remove the packing with a small screwdriver or needle-nose pliers and then, remove Spring (18). Once this has been done, clean the inside of the hollow Intromitter (or Conditioning Auger) Drive Shaft (9) and the outside surface of the Metering Auger Drive Shaft (11) where the Packing (16) seals against the Metering Auger Drive Shaft (11). Carefully examine the Metering Auger Drive Shaft (11) for wear and/or scoring; replace if worn or scored.

NOTE: *In order to best examine the Metering Auger Drive Shaft (11), the shaft should be moved forward. Please refer to paragraph 4.5.6.*

To reassemble, first re-install the Spring (18) and then, carefully replace the packing, one ring at a time. Make sure the packing is clean and has not picked-up any dirt in handling. Seat the individual rings of packing firmly, making certain that the joints of successive rings are staggered and kept at least 90 degrees apart (see Figure 4 and refer to NOTE 1 following paragraph 4.6.2). Also, certain seal assemblies include a Synthetic Washer (20) at each end of Spring (18), which must be installed as illustrated in Figure 4. After the packing has been replaced, install Seal Cap (14).

- 4.6.2 To replace Packing (17) for the Intromitter (or Conditioning Auger) Drive Shaft (9)**, the Conditioning Auger (8), along with the Metering Auger (10), must first be removed. Then, follow the disassembly procedures detailed in paragraph 4.5.7 to loosen and pull-back the Intromitter (or Conditioning Auger) Drive Shaft (9), away from its Seal Cap (15), far enough to allow access to the Packing (17). After this has been done, unthread the Intromitter (or Conditioning Auger) Drive Shaft Seal Cap (15) and remove the packing with a small screwdriver or needle-nose pliers; remove Spring (19). Once this has been completed, clean the inside surface of the Seal Housing (5) and then, clean the outside surface of the Intromitter (or Conditioning Auger) Drive Shaft (9). Carefully examine the exterior of the Intromitter (or Conditioning Auger) Drive Shaft (9) for wear and/or scoring; replace if worn or scored. Also, check the Front and Rear Bushings (42) [internal to the Intromitter (or Conditioning Auger) Drive Shaft (9)] in which the Metering Auger Drive Shaft (11) rotates. If these bushings show wear, they must be replaced. [Bushings are worn if the Metering Auger Drive Shaft (11) has excessive radial movement within the bushings.]

To reassemble, first re-install Spring (19) and then, carefully replace the packing, one ring at a time. Make sure the packing is clean and has not picked-up any dirt in handling. Seat the individual rings of packing firmly, making certain that the joints of successive rings are staggered and kept at least 90 degrees apart (see Figure 4 and refer to NOTE 1 below). Also, certain Seal Assemblies include a Synthetic Washer (21) at each end of Spring (19), which must be installed as illustrated in Figure 4. After the packing has been replaced, install Seal Cap (15) and then, re-position the Intromitter (or Conditioning Auger) Drive Shaft (9) and secure.

NOTE 1: *The ends of each ring of packing are cut at a 45 degree angle. Make certain that when installed, the packing ends meet as depicted in Detail "A" of Figure 4. Failure to do so could result in premature seal failure.*

NOTE 2: *To remove either the Metering Auger Drive Shaft (11) or the Intromitter (or Conditioning Auger) Drive Shaft (9) from within Type PB Gearboxes (3), please refer to the Seal Housing and Gearbox Assembly, paragraphs 4.5.6 and 4.5.7 respectively.*

4.7 Universal Gearbox (3)

Please refer to Figure 3.

Later model Gearboxes (3), those which include the numbers 0607 or 0196 embossed in the gearbox casting, are entirely metric in design, with the exception of the threads on the Metering Auger Drive Shaft (11) associated with Gearbox (3). These particular Gearboxes (3) have the numbers 0196 (for the Model W-105) and 0607 (for the Model W-105Z) embossed into their castings.

4.7.1 To remove the Metering Auger Drive Shaft (11) and/or Gear (22), first remove the Motor (1) and Gear-reducer (2). Remove Snap Rings (40) and Retaining Ring (90) and then, slide the Metering Auger Drive Shaft Bearing (37) backward and remove from the Gearbox (3). After this has been done, slide Spacer (S1) and the shaft key from Gear (22) backward and off the Metering Auger Drive Shaft (11). Then, slide the Metering Auger Drive Shaft (11) forward or backward to remove, while also removing Gear (22) and Spacer (S1) as the Drive Shaft (11) is withdrawn.

4.7.2 To remove the Intromitter (or Conditioning Auger) Drive Shaft (9) and/or Gear (25), first follow the steps outlined in the preceding paragraph 4.7.1 for removal of the Metering Auger Drive Shaft (11) and Gear (22). Then, remove Snap Ring(s) (41) and slide Gear (25), along with its shaft key and Spacer (S5), backward and off the Intromitter (or Conditioning Auger) Drive Shaft (9). Once this has been completed, slide the Intromitter (or Conditioning Auger) Drive Shaft (9) forward and remove.

4.7.3 To remove Countershaft (28), Gear (23) and/or Gear (24), first remove Motor (1). Then, remove Snap Ring (39) on the front end (feeder side) of Countershaft (28). Once completed, slide the Countershaft (28) to the rear (motor side) of the Gearbox (3). Spacer (S3), Gears (23 and 24), along with their respective shaft keys and Spacer (S2), will release from the Countershaft (28) as the countershaft is withdrawn.

4.7.4 To reassemble, reverse the preceding procedure.

NOTES: *Gears must be replaced in the same orientation in which they were removed.*

Spacers are not interchangeable, except Spacers (S1 and S2) which are identical.

Loosening of the Seal Cap (14) for the Metering Auger Drive Shaft (11) and the Seal Cap Pressure Plate (91) for the Intromitter (or Conditioning Auger) Drive Shaft (9) will relieve pressure on these shafts (generated by the packing material) facilitating removal (and replacement).

Replacing Packing (16)

4.7.5 Remove both the Intromitter (or Conditioning Auger) (8) and Metering Auger (10). Then, loosen (unthread) the Seal Cap (14) and remove. Remove the Packing (16) with a small screwdriver or needle-nose pliers and then, remove Spring (18). Once this has been done, clean the inside of the hollow Intromitter (or Conditioning Auger) Drive Shaft (9) and the outside surface of the Metering Auger Drive Shaft (11) where the Packing (16) seals against the Metering Auger

Drive Shaft (11). Carefully examine the Metering Auger Drive Shaft (11) for wear and/or scoring; replace if worn or scored.

NOTE: *In order to best examine the Metering Auger Drive Shaft (11), the shaft may need to be moved forward. To accomplish this, please follow the procedure outlined in paragraph 4.7.1.*

4.7.6 To reassemble, reverse the preceding procedure.

First, install the Metering Auger Drive Shaft (11) if it was removed (please refer to paragraph 4.7.1). Then, install Spring (18) and carefully replace the packing, one ring at a time. Make sure the packing is clean and has not picked-up any dirt in handling. Seat the individual rings of packing firmly, making certain that the joints of successive rings are staggered and kept at least 90 degrees apart (see Figure 4 for reference and NOTE 1 following paragraph 4.6.2). After the Packing (16) has been replaced, install Seal Cap (14).

Replacing Packing (17)

4.7.7 Remove both the Intromitter (or Conditioning Auger) (8) and the Metering Auger (10). Then, loosen and remove the two nuts that secure the Seal Cap Pressure Plate (91). Slide the Seal Cap Pressure Plate (91) and Seal Cap (92) backward to gain access to the Packing (17). Once completed, remove the Packing (17) with a small screwdriver or needle-nose pliers. Examine the Intromitter (or Conditioning Auger) Drive Shaft (9) for wear and/or scoring; replace if worn or scored.

NOTE: *In order to best examine the Intromitter (or Conditioning Auger) Drive Shaft (9), the shaft may need to be moved forward. To accomplish this, please follow the procedure outlined in paragraph 4.7.2.*

4.7.8 To reassemble, reverse the preceding procedure.

First, install the Intromitter (or Conditioning Auger) Drive Shaft (9) if it was removed (please refer to paragraph 4.7.2). Then, carefully replace the packing, one ring at a time. Make sure the packing is clean and has not picked-up any dirt in handling. Seat the individual rings of Packing (17) firmly, making certain that the joints of successive rings are staggered and kept at least 90 degrees apart (see Figure 4 for reference and NOTE 1 following paragraph 4.6.2). After the Packing (17) has been replaced, install the Seal Cap (92) and Seal Cap Pressure Plate (91) and tighten until a small amount of pressure is exerted upon the packing.

NOTE: *This adjustment should again be made after the first several hours of operation to ensure that a proper seal exists. Adjust as required.*

4.8 Drive Motor and Gear-reducer (1 and 2)

Please refer to Figures 2 and 5.

4.8.1 Standard Models W-105 and W-105Z Feeders are furnished with a hollow-shaft Gear-reducer (2) drive which is directly flange-attached to the Gearbox (3). The entire Gearbox (3) assembly, including where the Gear-reducer (2) attaches, is machined for a totally precision package. The Gear-reducer (2) is secured to the Gearbox (3) with four bolts, and is furnished with a "C" flange for direct attachment of the Motor (1).

When a Torque Limiter Coupling (80) is furnished, the Gear-reducer (2) is spaced-off the Gearbox (3) to both allocate the additional area required to accommodate the Torque Limiter Coupling (80) and also, to provide access for adjustment of the torque limiter coupling. In such instances, the Metering Auger Drive Shaft (11) is split where the Torque Limiter Coupling (80) is installed. To

obtain full access to the Torque Limiter Coupling (80), the Gear-reducer (2) must be removed. Instructions relating to the torque limiter coupling are furnished separately with this Manual.

4.9 Tachometer Assemblies (DC Drives)

Please refer to Figures 5, 6, 7 and 8.

As an option, all of Acrison's various model volumetric feeders are available with precision SCR/DC variable speed drives employing tachometer feedback for precise speed control and regulation. However, when Acrison volumetric feeders equipped with variable speed DC drives are utilized as the metering mechanism of an Acrison weigh feeder, the weigh feeder control scheme includes tachometer feedback as a standard feature.

Two different type digital tachometers are furnished by Acrison... an Optical Tachometer (45) and a Magnetic Tachometer (99). The Optical Tachometer (45) couples directly to the high speed shaft extension of the Gear-reducer (2), as shown in Figures 5 and 6. The Magnetic Tachometer (99) installs between the Gear-reducer (2) and its drive Motor (1), as shown in Figures 5, 7 and 8.

Optical Tachometer — Figures 5 and 6

NOTE: *Optical Tachometers generally apply to Acrison equipment produced prior to 2001.*

4.9.1 When an Acrison volumetric feeder is equipped with a variable speed DC drive including an Optical Tachometer (45), a specially designed Gear-reducer (2), equipped with a high speed extension shaft, is utilized to drive the tachometer. This high speed shaft is basically an extension of the motor input shaft of the gear-reducer that extends out of the Gear-reducer (2), directly opposite the DC motor, to drive the tachometer at the same speed as the motor. The appropriate tachometer housing, dust-tight, water-tight or explosion-proof, attached to the Gear-reducer (2), encloses the high speed extension shaft and the tachometer to which the gear-reducer's high speed shaft couples.

NOTE: *Due to the very small gauge (thickness) of digital tachometer wires, all connections to the tachometer must be soldered to ensure proper operation.*

4.9.2 Figure 6, Assembly "A" illustrates Acrison's optical tachometer mounting arrangement in a dust-tight or water-tight enclosure. A stainless steel Spring Coupling (47) has been selected to connect the Tachometer (45) to the High Speed Extension Shaft (48) of Gear-reducer (2) because of the negligible amount of radial force such a coupling applies to the shaft of the tachometer, plus the fact that these particular tachometers only require an extremely small amount of torque to rotate. The Spring Coupling (47) slips over the flat surfaces machined onto both the High Speed Extension Shaft (48) of Gear-reducer (2) and the tachometer shaft. Tachometer housings are normally manufactured of aluminum, and the standard assembly is dust-tight.

To remove the Tachometer (45), first remove the Cover (44) of the Tachometer Housing (43). [Please note that dust-tight and water-tight tachometer housing covers are bolted-on as shown in the illustration, Assembly "A." An Explosion-Proof Tachometer Housing (54), as illustrated in Assembly "B," includes a threaded cover.] Once the Tachometer Housing Cover (44) has been removed, remove the Tachometer Mounting Plate (46) onto which the Tachometer (45) attaches. The Spring Coupling (47) will simply slide off either the tachometer shaft or the High Speed Extension Shaft (48) of Gear-reducer (2). The Tachometer (45) is secured onto its Mounting Plate (46) with several small screws.

To reassemble, reverse the preceding procedure. During reassembly, be certain to properly align the flats on both ends of the Spring Coupling (47) onto the flats of each shaft to which it

attaches. Tachometer wiring information is included within the instruction manual for the specific model SCR/DC controller being utilized.

4.9.3 Figure 6, Assembly “B” illustrates an explosion-proof optical tachometer mounting arrangement. A stainless steel Spring Coupling (47) is used to connect the High Speed Extension Shaft (48) of Gear-reducer (2) to the Tachometer (45) through an intermediary Adapter Shaft Assembly (49). A spring coupling has been selected for use because of the negligible amount of radial force such a coupling applies to the shaft of the Tachometer (45), plus the fact that these particular tachometers only require an extremely small amount of torque to rotate. The Spring Coupling (47) slips over the flat surfaces machined onto both the High Speed Adapter Shaft (53) and the tachometer shaft. The Adapter Shaft Assembly (49) is threaded into the base of the Explosion-Proof Tachometer Housing (54), and its shaft connects to the Gear-reducer’s High Speed Extension Shaft (48) with a Jaw Coupling (50). This jaw coupling is enclosed in a steel Housing (51) which connects the Explosion-Proof Tachometer Housing (54) to the Gear-reducer (2).

To remove the Tachometer (45), first remove the threaded Tachometer Housing Cover (55) of the Explosion-Proof Tachometer Housing (54) and then, unbolt the Tachometer Mounting Plate (46), onto which the Tachometer (45) attaches, by removing the screws which hold the Mounting Plate (46) onto its four Mounting Studs (52). The Spring Coupling (47) will simply slide off either the tachometer shaft or the High Speed Adapter Shaft (53). The Tachometer (45) is secured onto Mounting Plate (46) with several small screws.

To reassemble, reverse the preceding procedure. During reassembly, be certain to properly align the flats on both ends of the Spring Coupling (47) onto the flats of each shaft to which it attaches. Tachometer wiring information is included within the instruction manual for the specific model SCR/DC controller being utilized.

Magnetic Tachometer — Figure 7

IMPORTANT: *Does not apply to the Model MPT 700 Series of Magnetic Tachometers.*

4.9.4 When an Acrison feeder is equipped with a variable speed DC drive which includes a Magnetic Tachometer (99), the tachometer assembly installs between the Gear-reducer (2) and its drive Motor (1).

The Magnetic Tachometer (99) consists of a machined aluminum ring with a factory installed stainless steel sensor, an integral conduit box, a sensing gear and a shaft spacer/adaptor.

To assemble, slide the disc spacer onto the Motor (1) shaft, followed by the sensing gear. (**Note:** The center hub of the gear should face away from the motor.) The sensing gear has a keyway to slide over the key of the Motor (1) shaft. Place the aluminum ring assembly firmly against the machined “C” face of the motor and center the sensing gear between the shaft spacer and the inside surface of the aluminum ring, leaving approximately one-sixteenth of an inch (0.060”) on either side of the gear. Tighten the set screw on the gear’s hub, locking it in position against the shaft key. Spin the Motor (1) shaft to ensure that the sensing gear does not rub against the spacer or the aluminum ring. (Please reference NOTE 1 following this paragraph.) The Motor (1) and Tachometer Assembly (99) can now be attached to the input flange of the Gear-reducer (2).

Place the key into the motor shaft keyway; then align the motor shaft to the input bore of the reducer and slide together tightly. Secure with the four bolts, lock washers and nuts.

To disassemble, reverse the above referenced procedure.

NOTE 1: *For proper operation, the center line printed on the sensor housing must be perpendicular to the gear teeth as shown in Figure 7. Also, please note that the center of the gear must be in-line with the center of the magnetic sensor, which is located in the aluminum ring, and that the clearance between the teeth of the gear and the sensor should be 0.008 to 0.012 inches. If these parameters are not correct, adjust accordingly. After adjustment, be careful not to over tighten the sensor's locking set screw. Improper line-up and/or sensor adjustment will cause tachometer malfunction.*

NOTE 2: *An explosion-proof magnetic tachometer is mechanically identical to the standard dust-tight/water-tight magnetic tachometer. Electrically, however, its power supply and all applicable electrical components are provided in an enclosure suitable for the hazardous area classification(s).*

Magnetic Tachometer — Figure 8

IMPORTANT: *Only applies to Model MPT 700 Series Magnetic Tachometers.*

4.9.5 Model MPT 700 Series Magnetic (Pulse) Tachometers (99) consist of a machined aluminum sensor ring housing with a factory installed, non-adjustable, stainless steel sensor assembly, an integral conduit box, a sensing gear and a shaft spacer/adaptor—when applicable.

To assemble, slide the disc spacer/adaptor onto the motor shaft—when applicable—followed by the sensing gear. (**Note:** The center hub of the gear should face away from the motor.) The sensing gear has a keyway to slide over the key of the motor shaft. Place the aluminum ring spacer/adaptor tightly against the machined face of the motor (56C and 145TC frame motors only), then mount the sensing gear on the motor shaft and position as indicated on the referenced illustration (note the applicable motor frame size on the chart) in Figure 8. When positioning the sensing gear, insure that the motor shaft key extends through the gear and is flush with the end of the motor shaft. Tighten the sensing gear set screw(s) on the gear hub, locking it in position against the shaft key. Then mount the tachometer housing onto the motor and verify that the sensing gear is properly “centered” beneath the permanently installed sensor within +/- 0.015 inch and that the indicated fixed air gap between the sensor is proper as also indicated in Figure 8. The motor and tachometer assembly can now be attached to the input flange of the gear-reducer and secured with the four bolts.

To disassemble, reverse the above referenced procedure.

NOTE: *An explosion-proof magnetic tachometer is mechanically identical to the standard dust-tight/water-tight magnetic tachometer. Electrically, however, its power supply and all applicable electrical components are provided in an enclosure suitable for the hazardous area classification(s).*

4.10 Feeders with Quick-Clamp Construction

Model W-105 and W-105Z Volumetric Feeders which include Quick-Clamp Construction are designed for the rapid removal and cleaning of all major components without the need for tools. Disassembly and reassembly is basic and obvious in the utilization of quick-clamps and knurled knobs and therefore, specific instructions relating to disassembly/reassembly (of the major components) are not provided. All other design/functional parameters of the equipment, however, are identical. Sanitary feeders include Quick-Clamp Construction as a standard feature.

4.11 Feeders with a Hopper Isolation Pad Assembly (642)

Please refer to Figure 1.

Model W-105 and W-105Z Volumetric Feeders are available with Supply Hoppers (13) that include an Isolation Pad Assembly (642) beneath. In such applications, the Supply Hopper (13) includes an adjustable, high frequency vibrator as a part of the package. In effect, the Isolation Pad (642) is an isolation mounting device for the feeder's Supply Hopper (13) that allows the hopper to vibrate effectively and uniformly for the promotion of reliable flow of product from within and into the feeder's Conditioning Chamber (6). The Isolation Pad (642) consists of a low durometer (soft) rubber (or synthetic material) vulcanized between (and onto) two stainless steel plates.

The bottom plate of the Isolation Pad (642) attaches to the feeder's Conditioning Chamber (6); the top plate attaches to the feeder's Supply Hopper (13). The plates of the Isolation Pad (642) are tapped for attachment; the attachment bolts do not penetrate the rubber (isolation) media that, as standard, is a white, food-grade, Buna-N material.

The Isolation Pad (642) also eliminates the vast majority of vibration from being transmitted from the feeder's Supply Hopper (13) to the Conditioning Chamber (6). The Isolation Pad (642) does not require maintenance.

5.0 SAFETY INTERLOCKS

Certain feeders may include a safety interlock (or interlocks).

If a single interlock to prohibit mechanical operation is provided, the interlock may be a magnetic clutch installed between the motor and gear-reducer that powers the feeder's mechanism. By removing power to the clutch, accomplished by a lockable switch, the operating mechanism of the feeder will not function, even if the motor was somehow energized. Please refer to Figure 5.

If a number of individual interlocks are provided, each applicable component of the feeder (typically those which can be opened and/or removed via quick-clamps or threaded knobs) and which, when opened or removed exposes the operator to potential danger, includes an interlock switch, any of which disconnects power to the feeder's motor driven mechanism. Various types of interlocks are available, the selection of which is usually determined by application parameters or user preference.

6.0 HOPPER VIBRATORS

Depending upon application and equipment design parameters, the hoppers of certain Acrison feeders are equipped with Vibrators, typically to ensure reliable product flow and/or feed. The design of such hoppers is usually conical or rectangular with sloped walls.

Normally, Acrison utilizes electrically operated Hopper Vibrators; however, on occasion, pneumatically operated Vibrators are used (e.g., usually for certain hazardous area applications). The Vibrators used as 'standard' by Acrison are motor-driven (electric), adjustable, and permanently lubricated. The motor is TENV, operating voltage is 115/1/60 or 230/1/60, and the unit is silent when operating.

Also, to transmit vibration uniformly throughout a hopper equipped with a Vibrator, and to confine the vast majority of vibration to the hopper, certain model Acrison feeders may be equipped with an Acrison innovated "Isolation Pad" (patented), mounted between the bottom of the feeder's hopper and the top (inlet) of the feed chamber.

Acrison Model W-105 Series of Feeders are often equipped with Hopper Vibrators. When the hopper of a Model W-105 or W-105Z Feeder is equipped with Acrison's standard Vibrator, an adjustable cycle timer, typically located in the Acrison supplied control panel, operates the Vibrator on an intermittent basis. The length of time a Vibrator operates is normally factory set for the specific application. For wiring and other electrical information regarding the implementation of the electrically operated Vibrator, please reference the electrical drawings relating to the specific feeder.

NOTE: *Due to the variable nature (physical characteristics) of different materials, and although a feeder hopper may include a Vibrator, product may flow out of the hopper without the need for the Vibrator. If this is the case, do not use the Vibrator; shut it off.*

Recommended Vibrator Cycle Time Settings for Model W-105 Series Feeders			
<u>Metering Auger Size</u>	<u>Hopper Size</u> (Cubic Feet)	<u>Cycle Time</u>	
		<u>Seconds ON</u>	<u>Minutes OFF</u>
A – C	1 or 2	5	60 – 90
D – DD	1 or 2	5	30 – 45
D – DD	3 or 4	5	40 – 60
D – DD	5 or 6	5	90 – 120
E – EF	3 or 4	5	20 – 30
E – EF	5 or 6	5	45 – 60
F – FF	3 or 4	5	20 – 30
F – FF	5 or 6	5	30 – 45
G – GG	5 or 6	5	15 - 20

The above Chart is intended for use as a *guide* for establishing typical cycle time settings for electrically operated Vibrators, normally supplied for specific applications/materials with Acrison Model W-105 Series of Feeders. The effectiveness of a Vibrator to ensure reliable product flow out of a hopper is directly related to the design of the hopper, the physical properties of the material/chemical being fed, the length of time the Vibrator operates, the amount of force produced by the Vibrator (adjustable), and the size of the feeder's metering auger (feed rate output). However during the initial start-up/checkout of a Model W-105 Series Feeder furnished with a hopper equipped with a Vibrator, the effectiveness of the Vibrator to ensure proper product flow requires verification by the Acrison Field Service Representative. Typically, a Vibrator is factory set for a nominal amount of vibration (mid-range setting).

Normally, Acrison utilizes a Model 2P-275 totally enclosed Vibrator manufactured by Vibco, Inc. The Vibrator's motor operates at a constant speed; vibration is produced by eccentric weights located at each end of the motor (the motor has shaft extensions on both ends); the eccentric weights are located beneath a bolt-on cover on each end of the Vibrator. Adjustment is made by varying the position of the eccentric weights, which has three settings... 1, 2 and 3, with setting 3 providing maximum force. By removing the locking screw on the eccentric weights, adjustment can be made. ***The eccentric weights are marked accordingly for adjustment (1, 2 and 3), which adjustment must be made identically on both sides of the Vibrator.*** After adjustment, be certain to reinstall and tighten the locking screw.

The Vibrator is bolted onto a specially designed Vibrator Mounting Pad usually located on the back side sloping wall of a supply hopper by four high strength bolts equipped with self-locking nuts. ***Verification of***

the tightness of these bolts must be made prior to operating. If these bolts are not tight, damage to the Vibrator, and very possibly the hopper, will result.

CAUTION: *A Hopper Vibrator must not be operated when the hopper is empty.*



Please refer to the Instruction Manual provided by the manufacturer of the Vibrator for additional information. Should any operational difficulties be experienced with the Vibrator or feeder, or if any additional information is required, please contact Acrison for assistance.

7.0 MAINTENANCE—General



WARNING: *Disconnect the feeder from all power sources prior to performing any maintenance whatsoever.*

Acrison's Models W-105 and W-105Z Volumetric Feeders have been designed to eliminate as much maintenance as possible; however, the following normal preventative procedures should be observed:

71 Bearings

All bearings furnished with grease fittings are factory lubricated but should be periodically inspected and greased to maintain a slight leakage at the seals. The suggested lubrication schedule is once every six months when operating twenty-four hours per day. The grease should be of high quality and medium consistency. Permanently lubricated bearings do not require any lubrication and are designed for a minimum of five years of operation under normal operating conditions.

7.2 Gearbox (3)

Gear lubrication for the Gearboxes (3) of Models W-105 and W-105Z Feeders should be checked at least once every six months when operating continuously, or at intervals found to be appropriate (based on equipment usage) to ensure that an adequate coating of grease exists on the gears at all times. Manual lubrication is accomplished by applying a heavy-duty gear grease (such as Keystone Moly 29 or equivalent) to the gears with a brush, with volume and frequency determined by periodic inspection. It is important to maintain adequate grease on the gears to avoid undue wear.

Whenever the cover of the gearbox is removed, it is important to ensure that its gasket is properly replaced to prohibit dust from entering. It is also important to reinstall all of the bolts in the cover, likewise to ensure a dust-tight assembly.

7.3 DC Variable Speed Drive (1 and 2)

Lubrication should be in accordance with the manufacturer's instructions as shown on the gear reduction portion of the drive or in the instructions enclosed with this Manual (generally, a high grade SAE 140 gear oil is recommended). Certain Gear-reducers (2) are permanently lubricated and are labeled as such.

Variable speed DC motors are equipped with two carbon brushes that should be first checked for wear after about one year of operation. When approximately 3/8 to 1/2 of an inch of a brush remains, it should be replaced to avoid potential damage to the motor's armature and/or improper motor performance.

Brush life is dependent upon the duty and severity of operation for a given application. The DC motor is furnished with permanently lubricated bearings. Refer to the separate instruction manual for information relating to the specific SCR/DC controller.

7.4 AC Variable Speed Drive (1 and 2)

Lubrication should be in accordance with the manufacturer's instructions as shown on the gear reduction portion of the drive or in the instructions enclosed with this Manual (generally, a high grade SAE 140 gear oil is recommended). Certain Gear-reducers (2) are permanently lubricated and are labeled as such.

Variable speed AC motors are virtually maintenance-free and include permanently lubricated bearings.

7.5 Seal Assembly (5)

The seals have been designed and constructed to eliminate any necessity for lubrication. Should any material manage to penetrate the Synthetic Packing (17), it would be evidenced by a leakage deposit beneath the Seal Housing Assembly (5), which is located between the rear wall of the Conditioning Chamber (6) and Gearbox (3). Should material manage to penetrate the Synthetic Packing (16), it would be evidenced by a leakage deposit within the Gearbox (3), as product not sealed by the packing progresses through the hollow Intromitter (or Conditioning Auger) Drive Shaft (9) and into the Gearbox (3), where the Intromitter (or Conditioning Auger) Drive Shaft (9) terminates.

Should product leakage be noticed on either the Metering Auger Drive Shaft (11) or the Intromitter (or Conditioning Auger) Drive Shaft (9), the Packing (16 or 17) must be replaced. Both seals (and their related packing) are spring-loaded to maintain constant pressure upon the packing material, with further adjustment not possible.

7.6 Cleaning

Once power to the feeder has been disconnected, the Models W-105 and W-105Z Volumetric Feeders may be cleaned in a number of ways, depending upon how well this task must be performed.

After the feeder has been emptied of the product contained within (accomplished manually or by permitting the feeder to run until empty), basic cleaning of a standard feeder can be achieved via a vacuum device (without the need to remove any components). More thorough cleaning is possible by removing the Intromitter (or conditioning auger), metering auger and discharge cylinder (as necessary and as described within this Manual), thereby allowing better accessibility to internal areas.

These particular model feeders are also capable of a water wash-down (hot or cold) of all internal areas using non-acidic detergents, if desired. Mild solvents, if approved by the factory, may also be utilized to wipe-down internal areas of the feeder, typically to remove stains caused by certain type products.

In applications where a "wet" washdown is necessary, care should be taken to thoroughly dry the shaft seal areas before introducing new product. Removal and possible replacement of seal packing may be necessary, depending upon the extent of the wet washdown. Please refer to paragraphs 4.6 or 4.7.

Quick-Disconnect and Sanitary Construction includes provisions for quickly and easily removing major components of the feeder for complete and thorough internal and external cleaning, usually for sanitation purposes. Such feeders may likewise be cleaned with water (hot or cold), with certain units also designed for sanitation with steam.

Fumigation may be a preferred method of sanitization when frequent cleaning is required, particularly when complete disassembly of the feeder is not practical.

Exterior surfaces of the feeder may be washed-down with water as well; however, only those units designed accordingly, or those which include Sanitary Construction, are suitable for heavy water wash-down of the drive motor.

In all instances, once the cleaning process has been completed, the interior surfaces of the feeder (which contact product) must be dried thoroughly in order to avoid possible operational difficulties.

7.7 General

Periodic cleaning of the entire feeder is recommended, especially when metering adhesive, cohesive or hygroscopic products.

8.0 RECOMMENDED SPARE PARTS

Since the Models W-105 and W-105Z Volumetric Feeders are basically simple and extremely reliable devices, Acrison does not recommend that any specific component or components be maintained in a user's inventory, except possibly, the Metering Auger (10) when helical in design. However, in more crucial processes, a user may elect to maintain additional components in inventory. The critical operational components are as follows:

<u>Item</u>	<u>Figure(s)</u>	<u>Quantity</u>	<u>Description</u>
1	1, 2 and 5	1	Motor
2	1, 2, 5 and 6	1	Gear-reducer
3	1, 2 or 3 and 5	1	Gearbox (complete with seal housing assembly and all components thereof)
8	2	1	Conditioning Auger
10	2	1	Metering Auger
22	2 or 3	1	"A" Drive Gear
23	2 or 3	1	"A" Driven Gear
24	2 or 3	1	"B" Drive Gear
25	2 or 3	1	"B" Driven Gear
45 or 99	2, 5, 7 or 8	1	Tachometer (optional—used with volumetric feeders furnished with certain model SCR/DC controllers and with all Acrison weigh feeders equipped with variable speed DC drives)

NOTE 1: See the separate Parts List for a complete listing of all items.

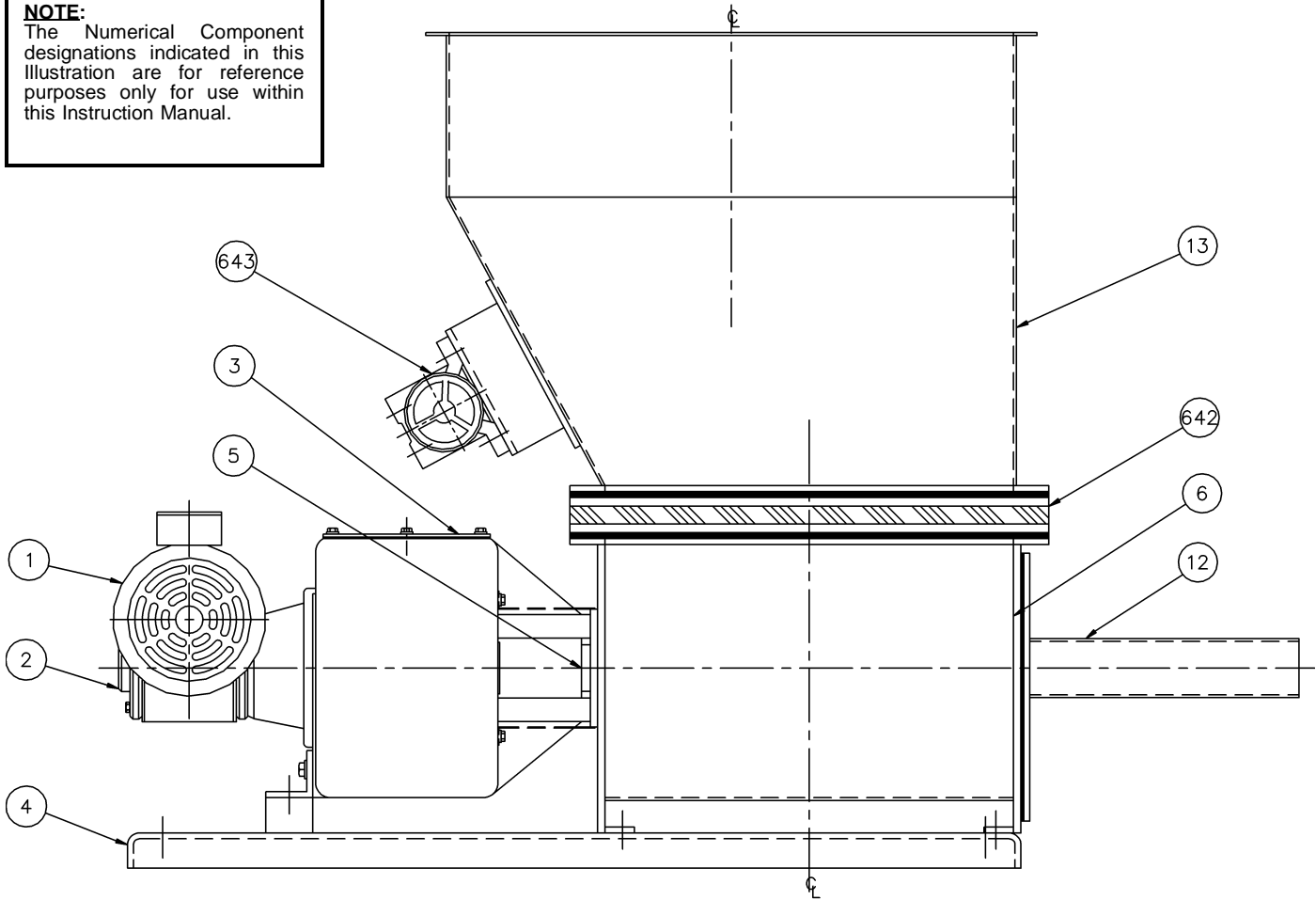
NOTE 2: When ordering parts, please include the Serial Number pertaining to the feeder for which the parts apply. Without proper feeder identification, Acrison may experience difficulty in furnishing the correct components. Also, please use the feeder Parts List when ordering parts. The feeder Serial Number can be found on the nametag affixed to the Gearbox (3) and also, stamped onto the actual gearbox casting.

NOTE 3: Acrison maintains a complete stock of all standard items used in the manufacture of this or any feeder and therefore, any standard component can usually be shipped anywhere immediately.

NOTE 4: Replacement **WARNING, CAUTION, IMPORTANT and DIRECTIONAL Labels** are available free of charge. Please contact Acrison's Parts Department for assistance.

NOTE:

The Numerical Component designations indicated in this Illustration are for reference purposes only for use within this Instruction Manual.

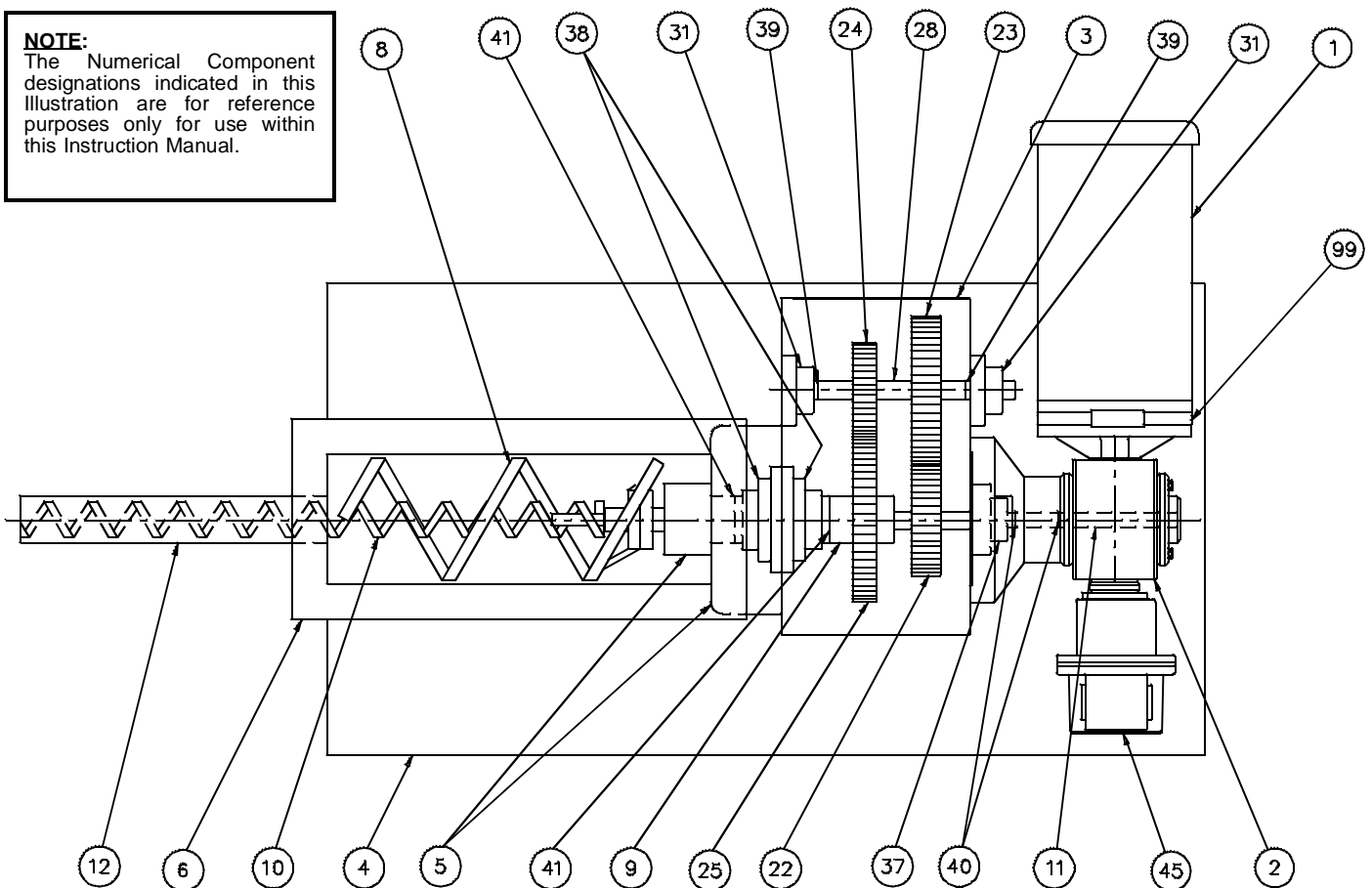


BASIC FEEDER OUTLINE

- | | |
|--------------------------|--------------------------------------|
| 1. Motor | 6. Conditioning Chamber |
| 2. Gear-reducer | 12. Discharge Cylinder |
| 3. Gearbox | 13. Supply Hopper |
| 4. Feeder Mounting Base | 642. Hopper Isolation Pad (Optional) |
| 5. Seal Housing Assembly | 643. Hopper Vibrator (Optional) |

FIGURE 1

NOTE:
The Numerical Component designations indicated in this Illustration are for reference purposes only for use within this Instruction Manual.

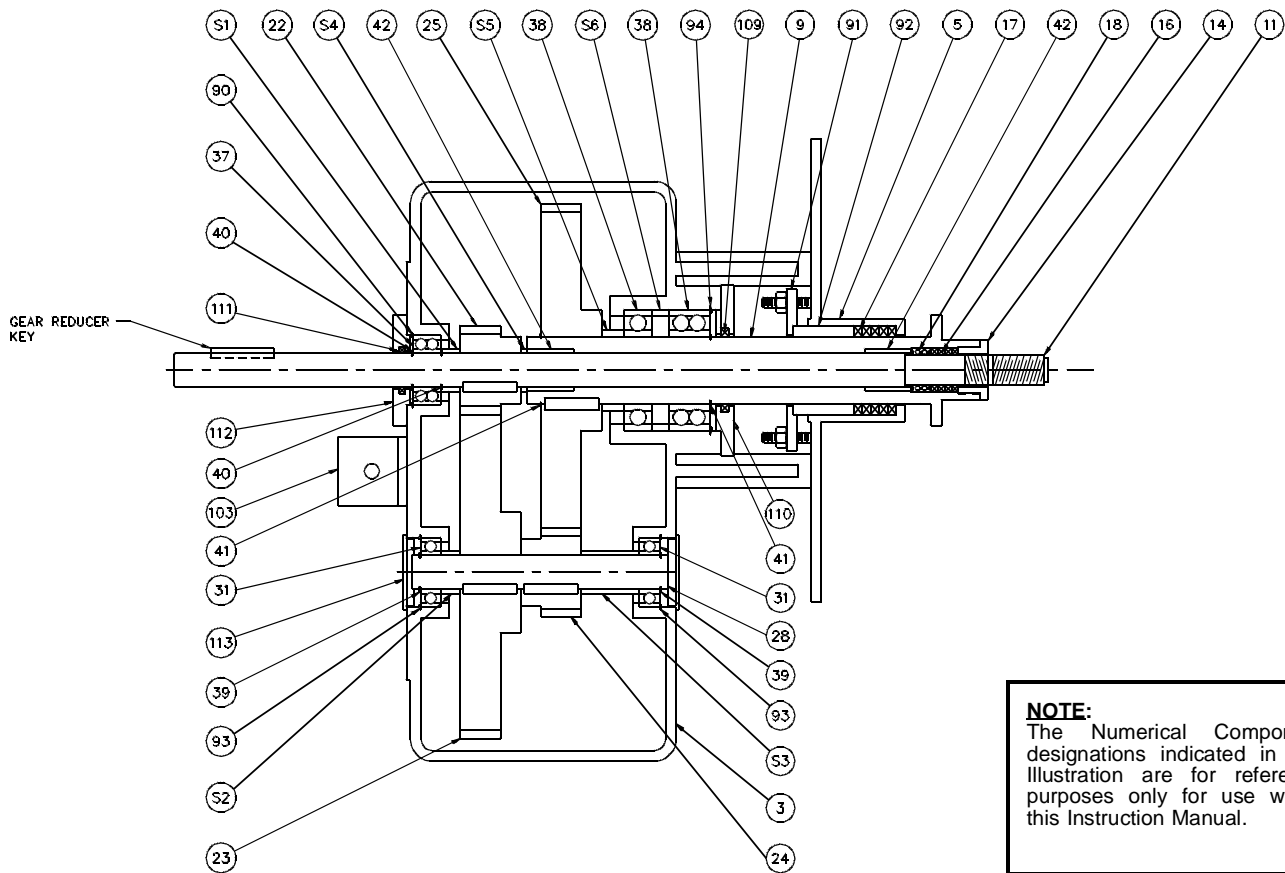


**DOUBLE CONCENTRIC AUGER DRIVE
Type PB Gearbox**

- | | |
|-----------------------------------|---|
| 1. Motor | 25. "B" Driven Gear with key |
| 2. Gear-reducer | 28. Countershaft |
| 3. Gearbox | 31. Bearings (Countershaft) |
| 4. Feeder Mounting Base | 37. Bearing (Metering Auger Drive Shaft) |
| 5. Seal Housing Assembly | 38. Bearings (Conditioning Auger Drive Shaft) |
| 6. Conditioning Chamber | 39. Snap Rings (Countershaft) |
| 8. Conditioning Auger (Intruder) | 40. Snap Rings (Metering Auger Drive Shaft) |
| 9. Conditioning Auger Drive Shaft | 41. Snap Rings (Conditioning Auger Drive Shaft) |
| 10. Metering Auger | 45. Tachometer (Optical)—Optional |
| 11. Metering Auger Drive Shaft | 99. Tachometer (Magnetic)—Optional |
| 12. Discharge Cylinder | |
| 22. "A" Drive Gear with key | |
| 23. "A" Driven Gear with key | |
| 24. "B" Drive Gear with key | |

NOTE: Only one Tachometer (45 or 99) is furnished (when a variable speed DC drive is used).

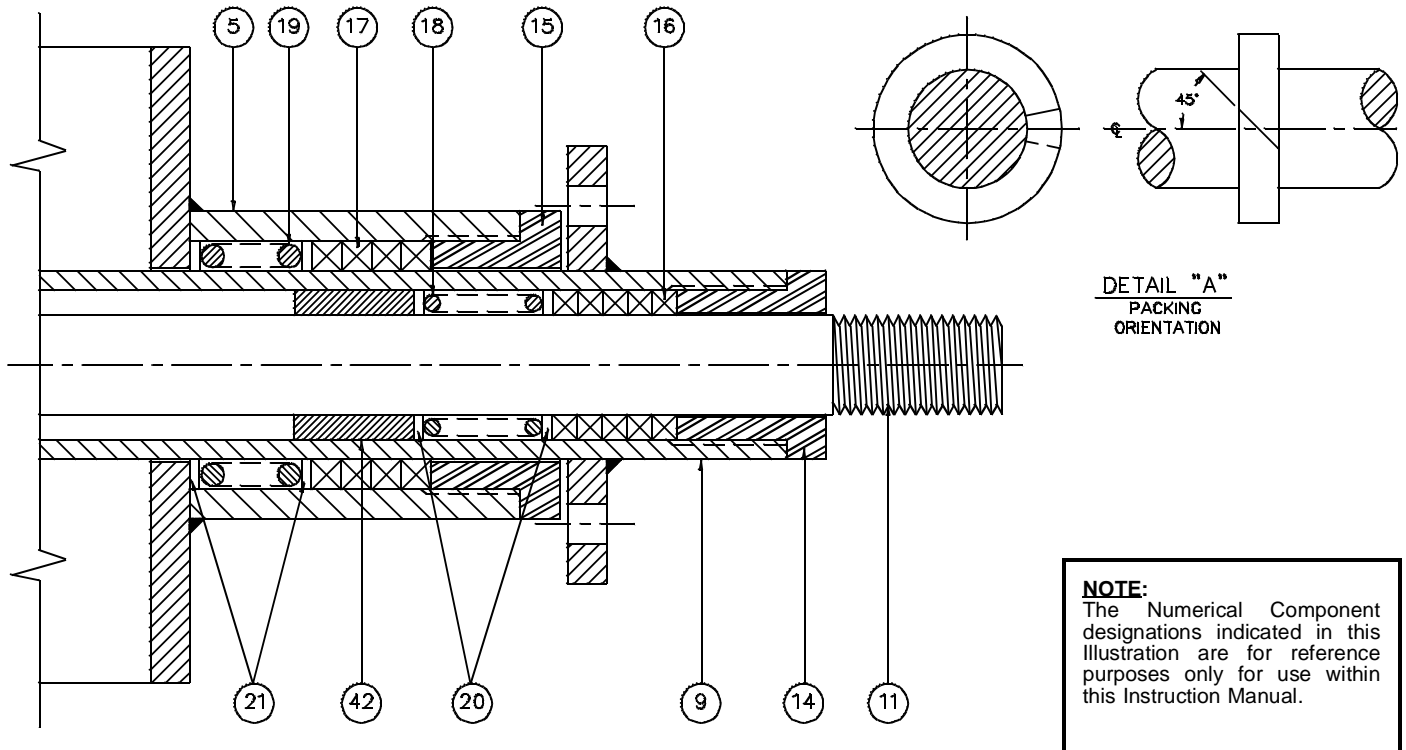
FIGURE 2



DOUBLE CONCENTRIC AUGER DRIVE Universal Gearbox

- | | |
|---|---|
| 3. Gearbox | 91. Seal Cap Pressure Plate |
| 5. Seal Housing Assembly | 92. Split Seal Bushing
(Conditioning Auger Drive Shaft) |
| 9. Conditioning Auger Drive Shaft | 93. Retaining Ring (Countershaft Bearing) |
| 11. Metering Auger Drive Shaft | 94. Retaining Ring
(Conditioning Auger Drive Shaft Bearing) |
| 14. Seal Cap (Metering Auger Drive Shaft) | 103. Gearbox Support Bracket |
| 16. Braided Synthetic Packing
(Metering Auger Drive Shaft) | 109. Dust Seal Packing (Optional)
(Conditioning Auger Drive Shaft Bearing) |
| 17. Braided Synthetic Packing
(Conditioning Auger Drive Shaft) | 110. Dust Seal Plate (Optional)
(Conditioning Auger Drive Shaft Bearing) |
| 18. Seal Spring (Metering Auger Drive Shaft) | 111. Dust Seal Packing (Optional)
(Metering Auger Drive Shaft Bearing) |
| 22. "A" Drive Gear | 112. Dust Seal Plate (Optional)
(Metering Auger Drive Shaft Bearing) |
| 23. "A" Driven Gear | 113. Dust Cap (Countershaft) |
| 24. "B" Drive Gear | S1. Spacer (Metering Auger Drive Shaft) |
| 25. "B" Driven Gear | S2. Spacer (Countershaft) |
| 28. Countershaft | S3. Spacer (Countershaft) |
| 31. Bearings (Countershaft) | S4. Spacer (Metering Auger Drive Shaft) |
| 37. Bearing (Metering Auger Drive Shaft) | S5. Spacer (Conditioning Auger Drive Shaft) |
| 38. Bearings (Conditioning Auger Drive Shaft) | S6. Spacer (Conditioning Auger Drive Shaft
Bearings) |
| 39. Snap Rings (Countershaft) | |
| 40. Snap Rings (Metering Auger Drive Shaft) | |
| 41. Snap Rings (Conditioning Auger Drive Shaft) | |
| 42. Front/Rear Bushings | |
| 90. Retaining Ring
(Metering Auger Drive Shaft Bearing) | |

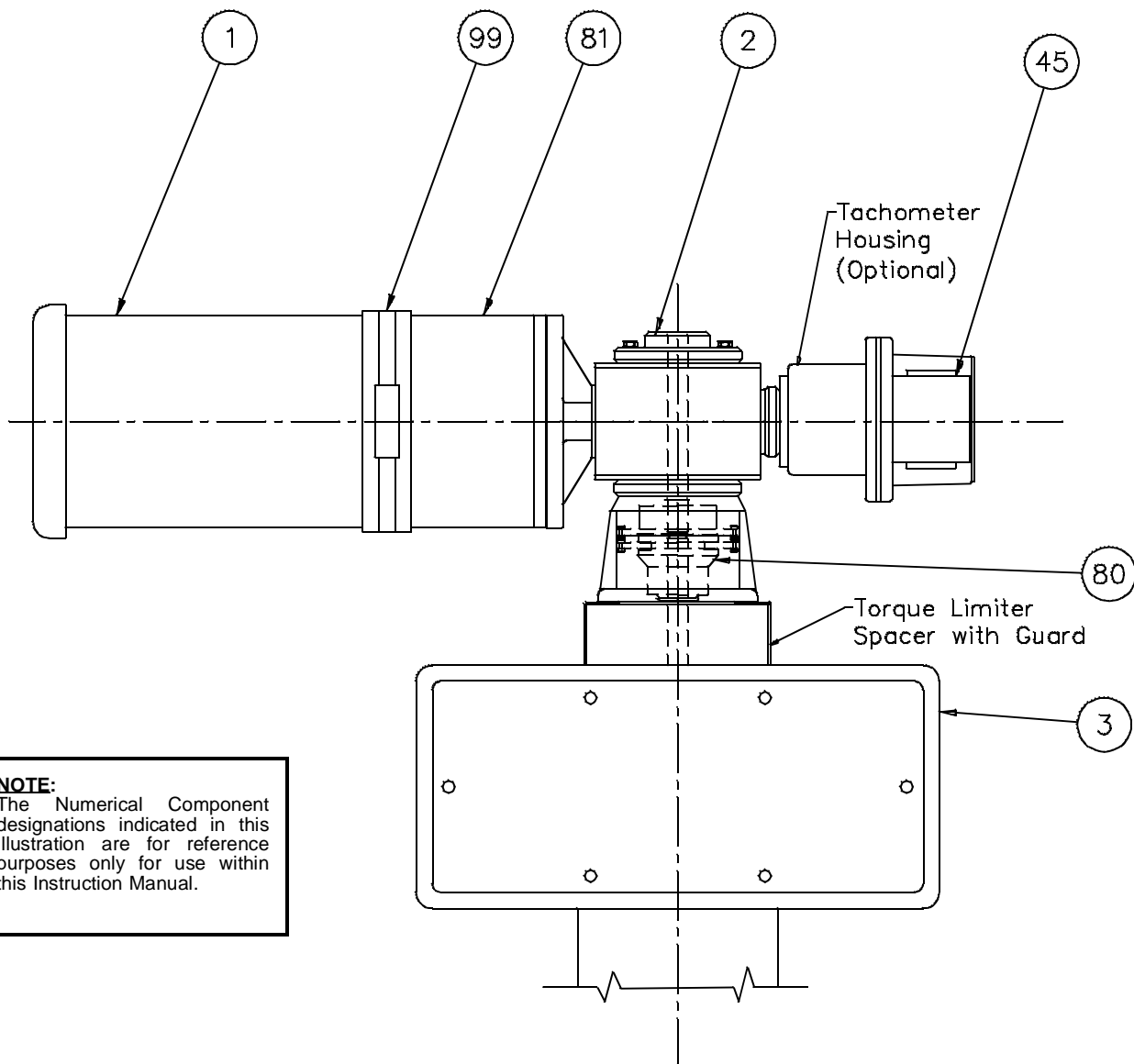
FIGURE 3



DOUBLE CONCENTRIC AUGER DRIVE (used with Type PB Gearboxes)

- | | |
|--|--|
| <ul style="list-style-type: none"> 5. Seal Housing Assembly 9. Conditioning Auger Drive Shaft
— Flanged is standard
— Threaded is optional 11. Metering Auger Drive Shaft 14. Seal Cap (Metering Auger Drive Shaft) 15. Seal Cap
(Conditioning Auger Drive Shaft) 16. Braided Synthetic Packing
(Metering Auger Drive Shaft) | <ul style="list-style-type: none"> 17. Braided Synthetic Packing
(Conditioning Auger Drive Shaft) 18. Seal Spring (Metering Auger Drive Shaft) 19. Seal Spring (Conditioning Auger Drive Shaft) 20. Seal Spring Washers (Optional)
(Metering Auger Drive Shaft) 21. Seal Spring Washers (Optional)
(Conditioning Auger Drive Shaft) 42. Front/Rear Bushings
(Rear Bushing not shown) |
|--|--|

FIGURE 4



NOTE:
 The Numerical Component designations indicated in this Illustration are for reference purposes only for use within this Instruction Manual.

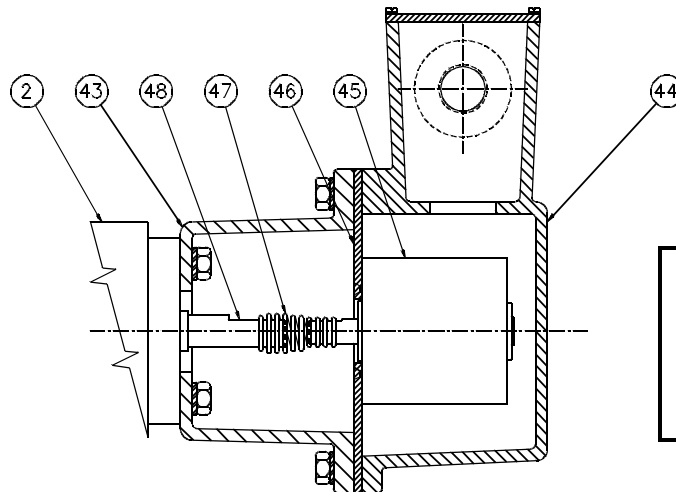
DRIVE ASSEMBLY with OPTIONS

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Motor 2. Gear-reducer 3. Gearbox 45. Optical Tachometer Housing (Optional) | <ul style="list-style-type: none"> 80. Torque Limiter Coupling (Optional) 81. Magnetic Clutch (Optional) 99. Magnetic Tachometer (Optional) |
|--|--|

NOTE: Only one Tachometer (45 or 99) is furnished (when a variable speed DC drive is used).

FIGURE 5

OPTICAL TACHOMETER ASSEMBLIES for DC Variable Speed Drives

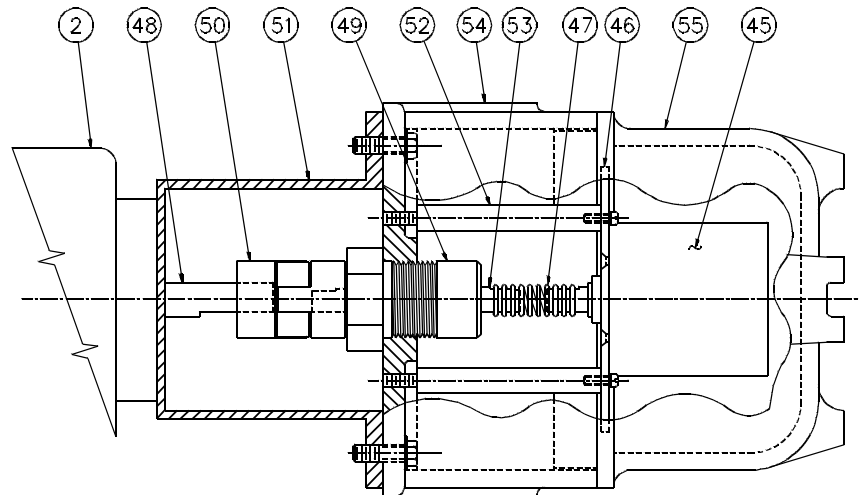


NOTE:

The Numerical Component designations indicated in this Illustration are for reference purposes only for use within this Instruction Manual.

OPTICAL TACHOMETER (ASSEMBLY "A") Dust-Tight/Water-Tight

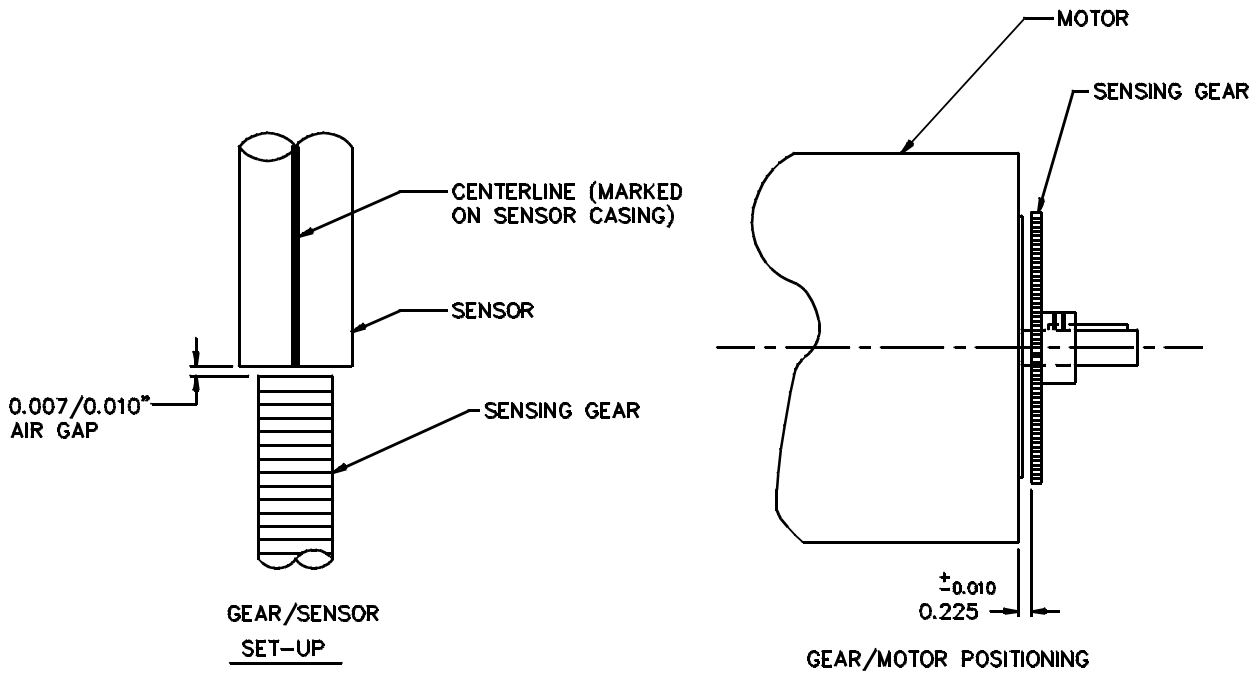
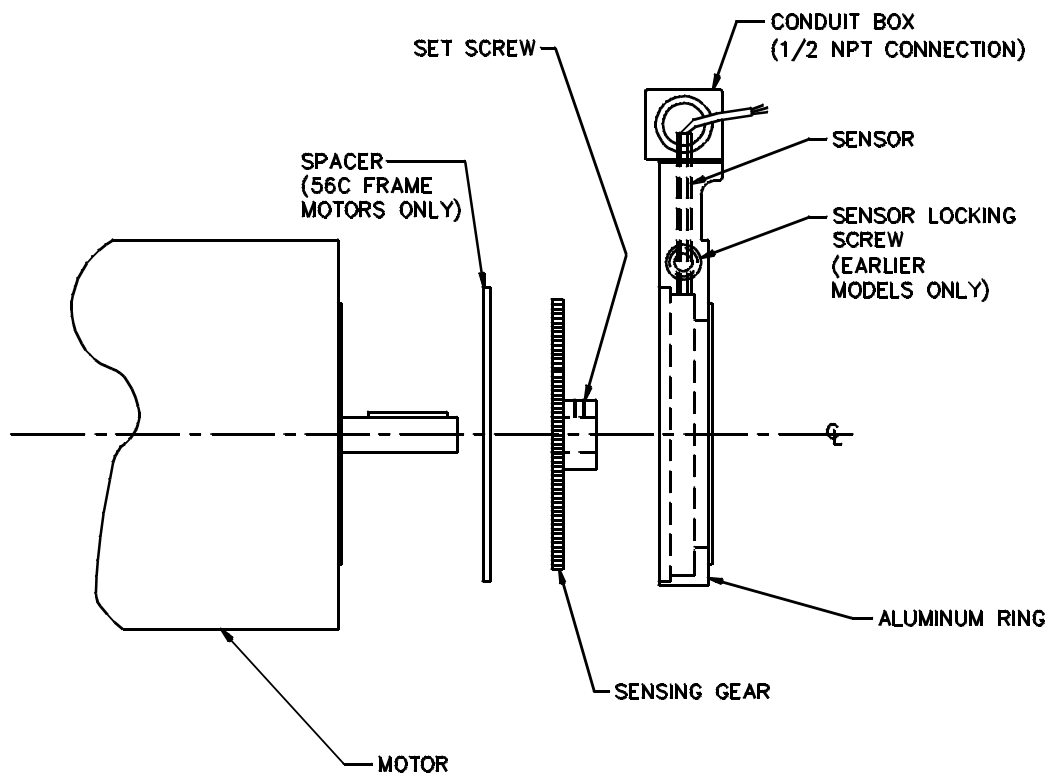
- | | |
|------------------------------|---|
| 2. Gear-reducer | 46. Tachometer Mounting Plate |
| 43. Tachometer Housing | 47. Spring Coupling |
| 44. Tachometer Housing Cover | 48. Gear-reducer's High Speed Shaft Extension Shaft |
| 45. Tachometer | |



OPTICAL TACHOMETER (ASSEMBLY "B") Explosion-Proof

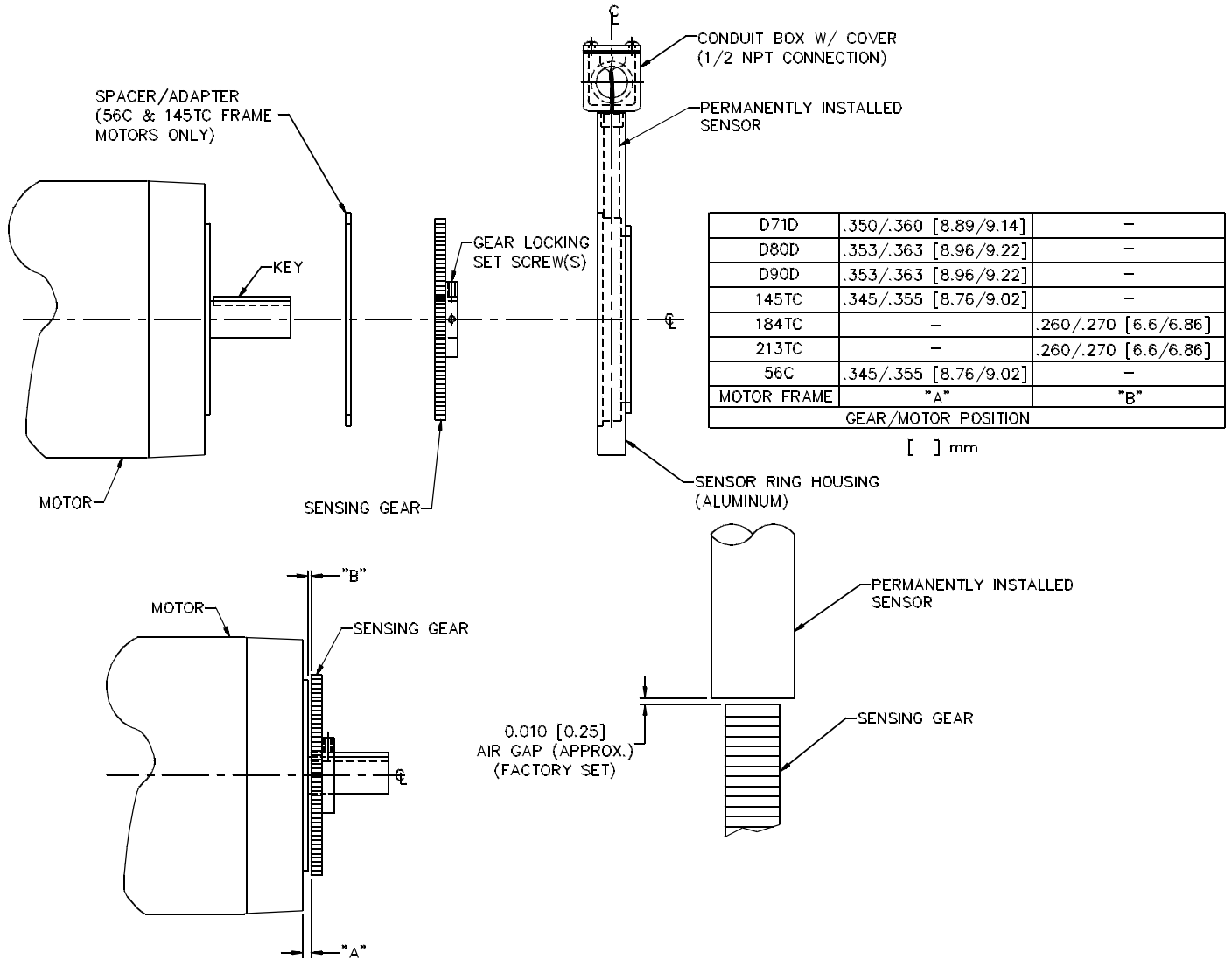
- | | |
|---|------------------------------------|
| 2. Gear-reducer | 50. Jaw Coupling |
| 45. Tachometer | 51. Adapter Shaft Coupling Housing |
| 46. Tachometer Mounting Plate | 52. Mounting Studs |
| 47. Spring Coupling | 53. High Speed Adapter Shaft |
| 48. Gear-reducer High Speed Shaft Extension Shaft | 54. Tachometer Housing |
| 49. Adapter Shaft Assembly | 55. Tachometer Housing Cover |

FIGURE 6



MAGNETIC TACHOMETER (99) ASSEMBLY
for DC Variable Speed Drives
Excluding Model MPT 700 Series Tachometers

FIGURE 7



MAGNETIC TACHOMETER (99) ASSEMBLY
for DC Variable Speed Drives
For Model MPT 700 Series Tachometers Only

FIGURE 8

NOTES

WARRANTY

ACRISON, INC., (hereinafter referred to as ACRISON) warrants the equipment (complete new equipment) to be free from defects in material and workmanship for a period of one (1) year [five (5) years for the entire weighing mechanism of an Acrison Weigh Feeder] from the date of shipment to or for the buyer. The obligation of ACRISON under this warranty is expressly limited to the repairing or replacing of any part or parts that are proved to the satisfaction of ACRISON to have failed prematurely or because of a fault in workmanship or materials. All such replacement parts shall be shipped F.O.B., ACRISON'S factory; this warranty does not include the installation or freight charges of such replacement part(s). The new equipment warranty is not transferable and applies only to the original buyer of the equipment.

Parts replaced under ACRISON'S new equipment warranty automatically fall into the new equipment warranty period for that of the original (new) equipment which is one (1) year from the date of shipment of the original (new) equipment... not the shipment date of replacement parts covered under ACRISON'S new equipment warranty.

ACRISON warrants spare and replacement parts (not parts replaced under its new equipment warranty) for a period of ninety (90) days from the date of shipment of the parts, whether or not such parts are shipped with the original (new) equipment.

ACRISON warrants repaired parts (not parts replaced under its new equipment warranty) for a period of thirty (30) days from the date of shipment of such repaired parts.

ACRISON shall not be liable for any inconvenience, loss of use, or any other consequential loss, damage or injury arising from any cause whatsoever associated with the equipment. Back-charges of any nature relative to work performed on the equipment at any time by the buyer, user, or a contractor authorized by the buyer or user will not, under any circumstances, be accepted without the prior written consent of ACRISON.

ACRISON warrants that all the equipment being shipped herewith has been manufactured in accordance with all applicable federal laws, rules and regulations. In addition, ACRISON reserves the right to correct and/or modify any area of design or construction which is considered not to be in accordance with any specific safety ordinance unbeknown to ACRISON within sixty (60) days of notification in writing by the user, with any costs for such work at the user's expense.

ACRISON shall have no obligation under this warranty for any equipment or parts which have not received proper maintenance service, or which have been subject to any misuse, abuse, negligence, accident, improper installation, deterioration by chemical action, act of God, repair or alteration in any way, so as in the final judgment of ACRISON, to adversely affect the performance or reliability of the equipment or parts.

NOTE: In order for precision weighing equipment to operate properly, the supporting structure for same must be designed and constructed in accordance with sound engineering practices and be sufficiently rigid to not only adequately support the equipment, but also, to ensure that the effects of rotating or vibrating machinery, operating in close proximity to the weighing equipment, remain within tolerable levels so as not to adversely affect performance.

No employee, agent or representative of ACRISON shall have any right or authority to vary or alter the terms of this warranty.

This warranty does not include any representation that the equipment shipped herewith is fit for the particular purpose intended by the buyer, unless ACRISON agrees in writing that, (a) the equipment is based on the recommendation of ACRISON for a specific particular purpose, (b) the buyer is relying on the expertise of ACRISON in making the recommendation and, (c) the equipment is, in fact, used for the specified purpose, in which event, ACRISON warrants that the equipment is fit for that specified particular purpose.

EQUIPMENT SAFETY: With respect to operation of ACRISON equipment, it is the buyer's or user's responsibility to define and provide any safety device(s) or associated safety device(s)...(other than that which is furnished by ACRISON as standard)...which may be necessary and/or required, and to establish safety procedures and operational instructions to safeguard the operator(s) during maintenance, cleaning, or any use of the equipment whatsoever, and to subsequently ensure that the equipment is operated in conformance with all applicable safety procedures, laws, regulations and instructions. It is also the buyer's or user's responsibility to enforce all safety regulations and operational instructions and to maintain the equipment in a safe condition (guards in place, warning, caution and/or important labels affixed, electrical boxes secure, interlocks operational, etc.). In particular, all warning, caution and/or important labels must be maintained in a readable condition, and if necessary, replaced with new labels. Additionally, and because the nature of the equipment does not always make it possible to fully prevent operator access from rotating components, maintenance or cleaning of any nature must not be performed on the equipment without first disconnecting all power.

OPERATOR SAFETY: Buyer or user warrants and agrees that because it has sole control over the equipment, it shall be solely responsible for safety compliance. Operator access and use of equipment, and full compliance with all provisions of the Operator Safety section of ACRISON'S Instruction Manuals are essential and the user's responsibility, the provisions of that section being incorporated herein expressly.

CLAIMS: Buyer or user shall defend, indemnify and hold ACRISON and/or seller harmless from all product liability claims involving the equipment, unless such liability is proven to be due solely to negligence on the part of ACRISON.

Acrison[®]

Acrison... "a point of difference"

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