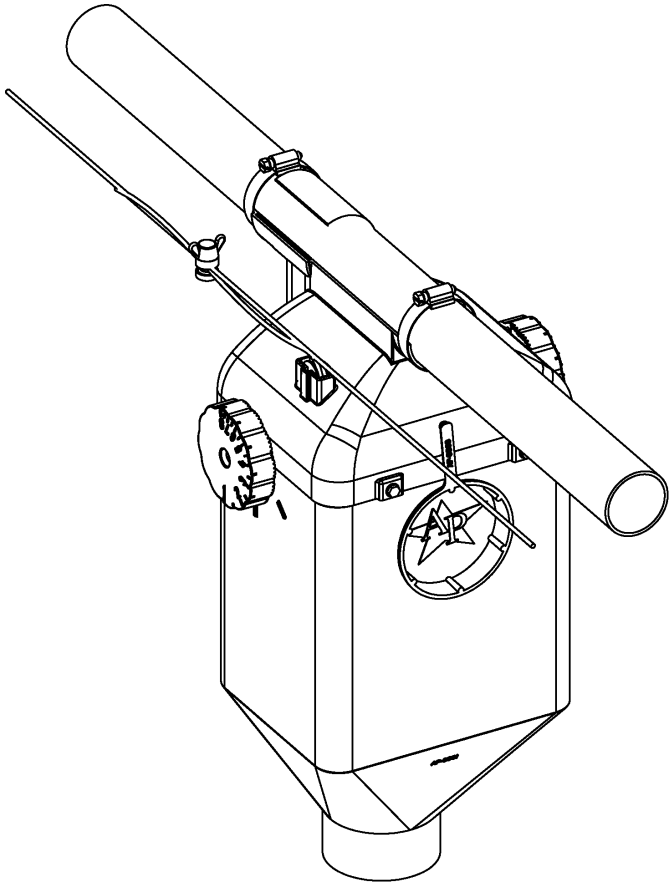

Installation and Operation of Ultra-Drop Feed Dispenser

Owner's Manual

PNEG-1718

Date: 01-22-10

PNEG-1718

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Safety Guidelines

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting ***personal safety*** and ***preventing equipment problems***. It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury or death.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE indicates information about the equipment that you should pay special attention.

DANGER! BE ALERT!

Personnel operating or working around electrical equipment should read this manual. This manual must be delivered with the equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

General Safety Statement

Our foremost concern is your safety and the safety of others associated with grain handling equipment. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, you are responsible to know what requirements, hazards and precautions exist and inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment, which may produce a very dangerous situation, where SERIOUS INJURY or DEATH may occur.

GSI Group recommends contacting the local power company and having a representative review the installation so that wiring will be compatible with their system and to ensure that adequate power will be supplied to the unit.

This product is intended for the use of feeding only. Any other use is a misuse of the product.

DANGER!

This product is used with rotating disks and augers. Serious injury may occur. Use precaution when operating or working on this product.

The *Figure 1A*, *Figure 1B* and *Figure 1C* shows the location of decals for this equipment. If a decal has been damaged or is missing, contact GSI Group for a free replacement.

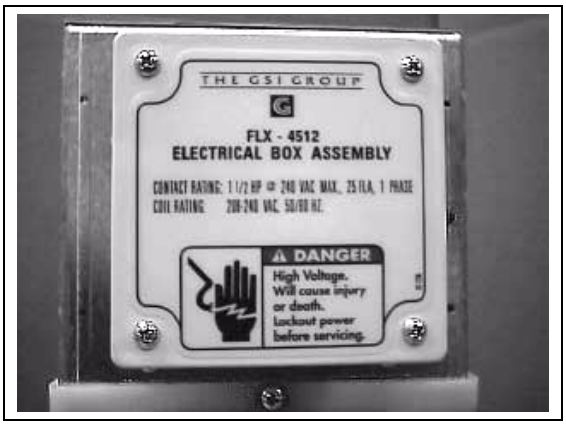


Figure 1A

Figure 1B

Figure 1C

Using the Manual

Read the entire manual prior to attempting any work on the equipment. This installation/owner's manual is to be used as a guide for the installation of the Ultra-Drop Feed Dispenser System. All instructions should be construed as recommendations only, as the actual installation may vary according to local conditions. Wiring diagrams can be found in this manual. *(See Pages 19-22.)* Instructions presented in this manual should only be carried out by a trained technician. It is essential that the technician have a sound understanding of technical matters and drawings in both mechanical and electrical areas.

Background

The Ultra-Drop Feed Dispenser System is specifically designed to hold and deliver feed to gestating sows within a swine facility. The capacity of each feed dispenser is 1 to 8 pounds. Capacity is based on a feed density of 40 lbs/ft^3. The delivery of feed can be controlled manually or automatically with the use of winches, trip levers, actuators, control units, timers and sensors.

Application

Typical Ultra-Drop Feed Dispenser applications are shown as follows:

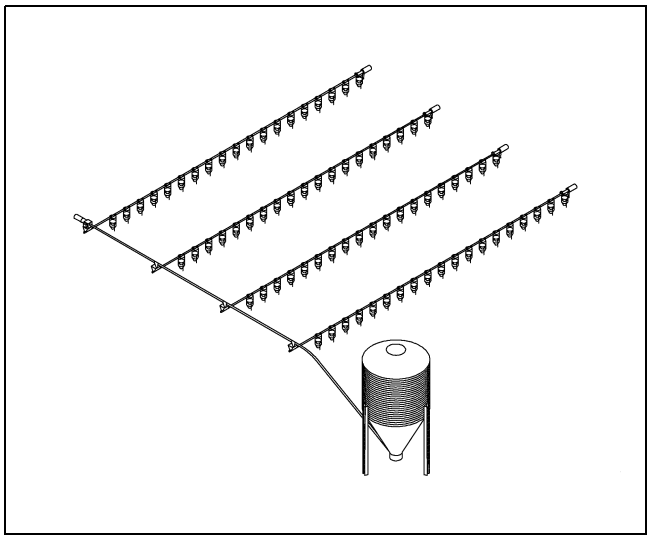


Figure 2A *Flex-Flo Applications*

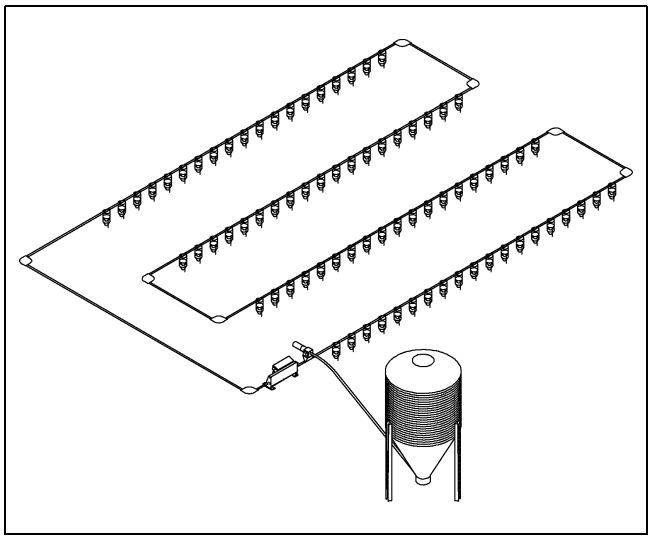


Figure 2B *Chain Disk Application*

In Flex-Flo applications, an Accu-Drop control unit with a proximity switch must be installed at the end of the line to turn the system ON and OFF. The control unit is designed to allow total drop-out of feed, thus preventing the build up of feed at the end of the line.

In chain disk applications, a tube mounted proximity switch is installed on the tube just beyond the last Ultra-Drop in the system, and is used to turn the system ON and OFF.

Specifications

Capacity	The capacity of the Ultra-Drop Feed Dispenser is 1 to 8 pounds. Capacity is based on a feed density of 40 lbs/ft^3.
Models	The Ultra-Drop Feeder is designed to fit the Model 220 Flex-Flo and the Model 236 chain disk using any of the following: 2" O.D. Chain disk w/ ribbed tubing, 2.2" O.D. Flex-Flo PVC tubing or 2.36" chain disk w/ PVC tubing.
Dimensions	The main body is 8" wide x 8-1/2' deep. The overall height range is 18". The installed height from the bottom of the system tubing to the bottom of the feed dispenser is 17".
Materials	The Ultra-Drop Feed Dispenser has been designed with the following materials: - Body: Transparent Polypropylene - Other plastic parts: Polypropylene - Hardware: Stainless Steel
Adjustment Method	To change the capacity of the Ultra-Drop, a rectractble wall inside the chute is adjusted up and down.
Feed Drop Method	To release the feed from the Ultra-Drop a ball is pulled vertically by a cord, which uncovers the hole in the bottom of the feeder.

Installation of Drop Tubes

The most common drop tube combination is to use the two-piece adjustable drop tube (AP-0476) attached to a built-in drop tube on the gestation stall. *(See Figure 3A.)* The adjustable drop tube simply slips over the end of the built-in drop tube. There are many other possible combinations that also use one or more of the drop tubes listed in the table of optional equipment.

> **CAUTION** ***With any combination of drop tubes, the Ultra-Drop must NOT be supported by or rigidly connected to the gestation stall.***

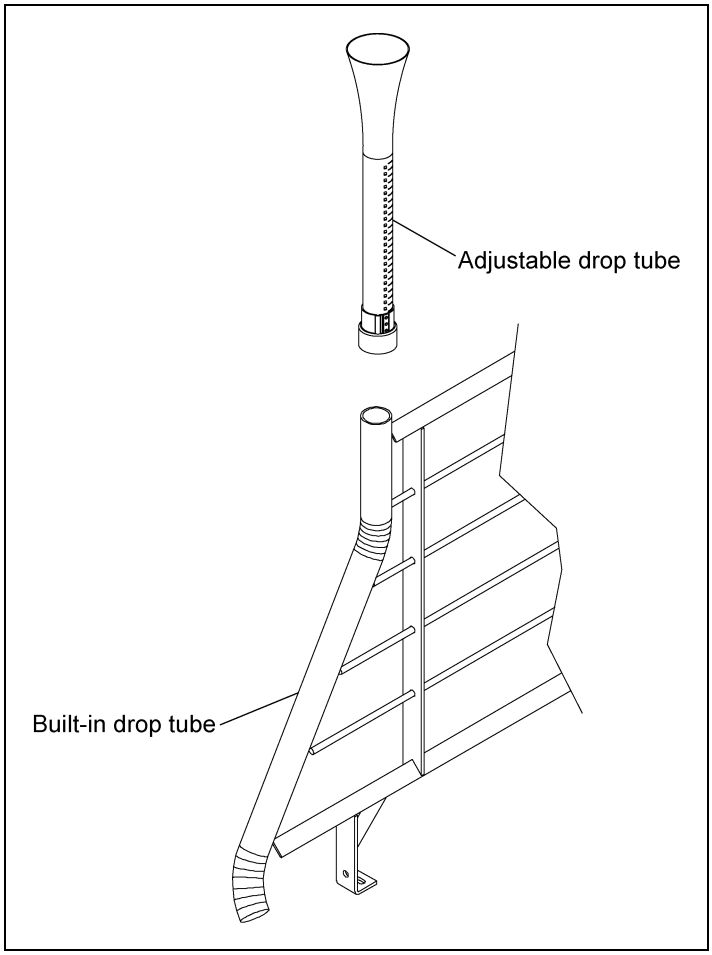


Figure 3A *Adjustable Drop Tube Installation*

Tubing Installation

Laying Out the Tubing

Refer to the chain disk feed system manual on how to layout the tubing for each respective system. These manuals also explain how to glue sections of tubing together.

Suggestion: To reduce the amount of work required when installing the feed dispenser, slide the hose clamps (provided with feed dispensers) over the tubing at each spot where there is to be a dispenser at the same time the tubing is laid out.

Cutting Outlet Holes

With the sections of tubing still laid out and the placement of the Ultra-Drops already established, the next step is to mark each tube with the desired location of each Ultra-Drop. The outlet hole for the tube is 3-1/4" offset from the Ultra-Drop outlet. Once the tubes are marked, drill the 1-1/2" diameter holes for the feed dispenser as shown in *Figure 3B*. Be sure to remove any burrs after drilling so that the Ultra-Drop shut off slide can perform properly.

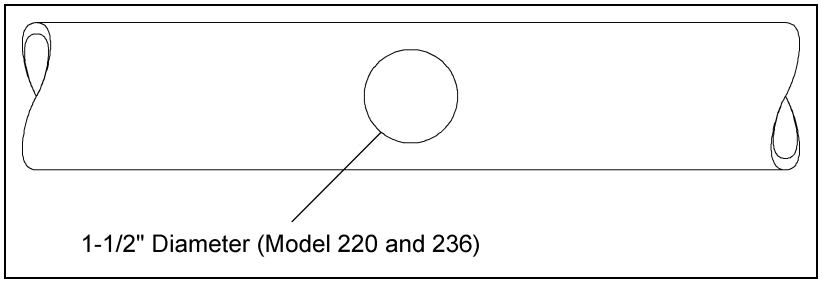


Figure 3B *Outlet Hole with Carry-Over*

Suspension of Tubing

Suspend the sections of tubing from the ceiling at least once every 4'. The height at which the tubing is installed must be determined based on the placement of the drop tube and the height of the Ultra-Drop. The Ultra-Drop measures 17" from the bottom of the tubing to the bottom of the Ultra-Drop. *Figure 3C* shows a typical application using two-piece adjustable drop tubes. **Remember that the Ultra-Drops must NOT be supported by or rigidly connected to the gestating stall.**

IMPORTANT: *Be sure to leave room between the tubing and the ceiling for other components such as chain disk drive units and Flex-Flo control units.*

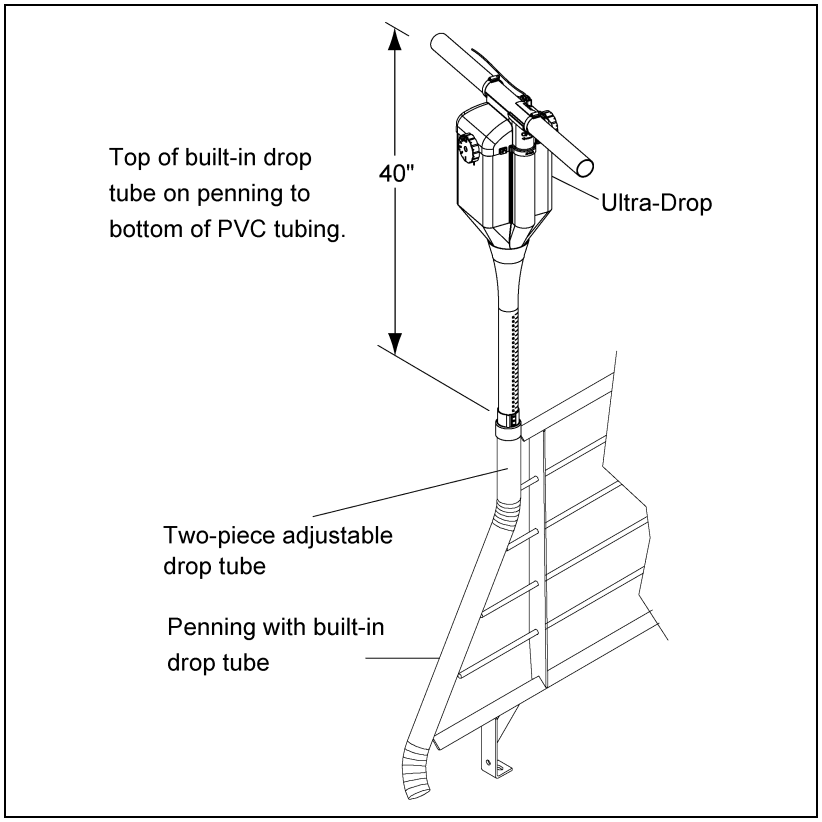


Figure 3C *Suspension of Tubing*

Ultra-Drop Feed Dispenser Installation

Accu-Drop Control Unit

Chain Disk Feed Systems

The next step for a chain disk system is to install the chain and disk (see the chain disk installation and operation manual) and finish connecting the sections of tubing together with couplers. The chain disk system does not require an Accu-Drop control unit. To turn the system ON and OFF, a tube mounted proximity switch must be used.

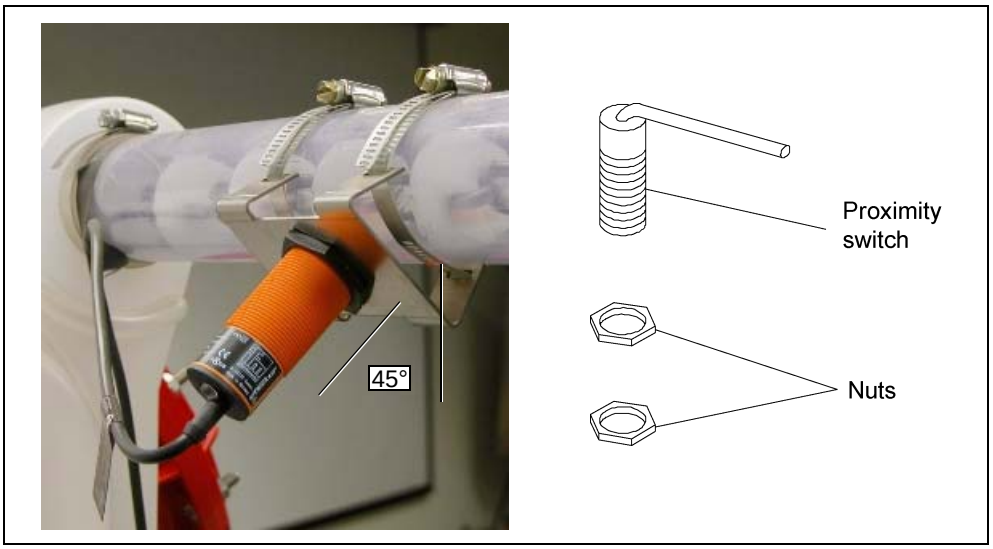


Figure 3D *Proximity Switch Installation*

Model 220 Flex-Flo Feed Systems

1. Bolt the Accu-Drop control unit to the Model 220 tube anchor plate weldment using four (4) 5/16" x 3/4" bolts, 5/16" washer and 5/16" nuts. *(See Figure 3E.)*

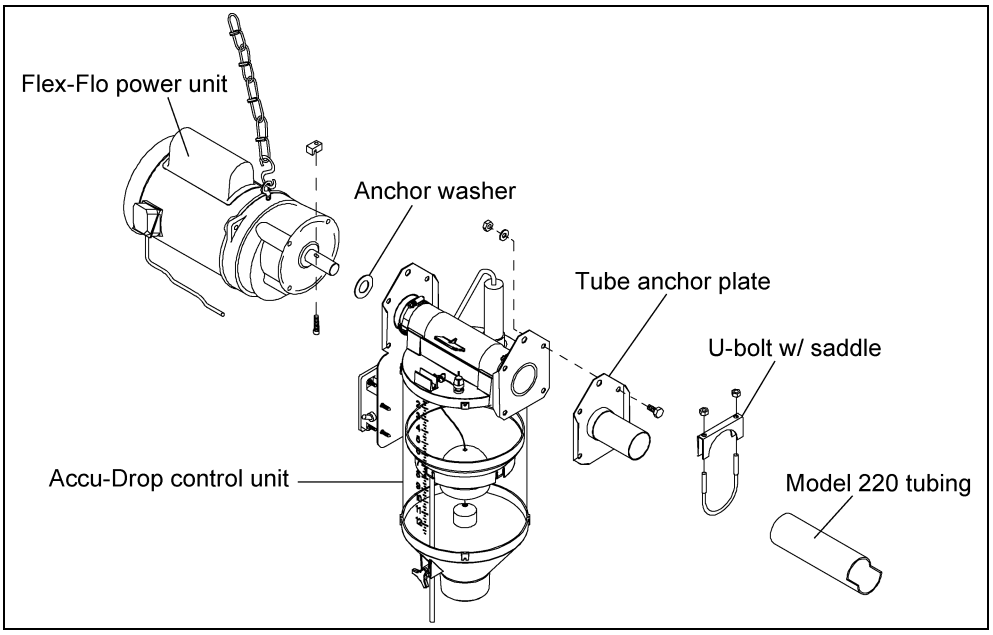


Figure 3E *Control Unit with Model 220 Tubing*

2. Slide end of straight section of Model 220 tubing over the tube anchor plate weldment and secure using 5/16" x 2-1/4" U-bolt with saddle.
3. Slide the anchor washer over the output shaft on the Flex-Flo power unit.
4. Install auger through the Flex-Flo tubing and fasten to the output shaft on the power unit using the auger lock and 1/4" x 1-1/4" socket head cap screw.
5. Connect the power unit to the Accu-Drop control using hardware provided with the power unit.
6. Support the power unit and Accu-Drop control unit with the chain and lag screws provided.

Standard Ultra-Drop (AP-3800) for Gestation Stalls

1. If the hose clamps have not already been placed onto the tubing, (see laying out the tubing section *on Page 8*) take apart each hose clamp. Place it over the tubing and put it back together loosely.
2. Snap the shut off slide over the top of the tubing and make sure it is not too tight and can be rotated back and forth.
3. Hold the Ultra-Drop up next to the tubing making sure the hole in the tubing is in the center of the Ultra-Drop inlet hole. *(See Figure 3F.)* Slide the hose clamps into the groove on each side of the top of the Ultra-Drop and tighten.

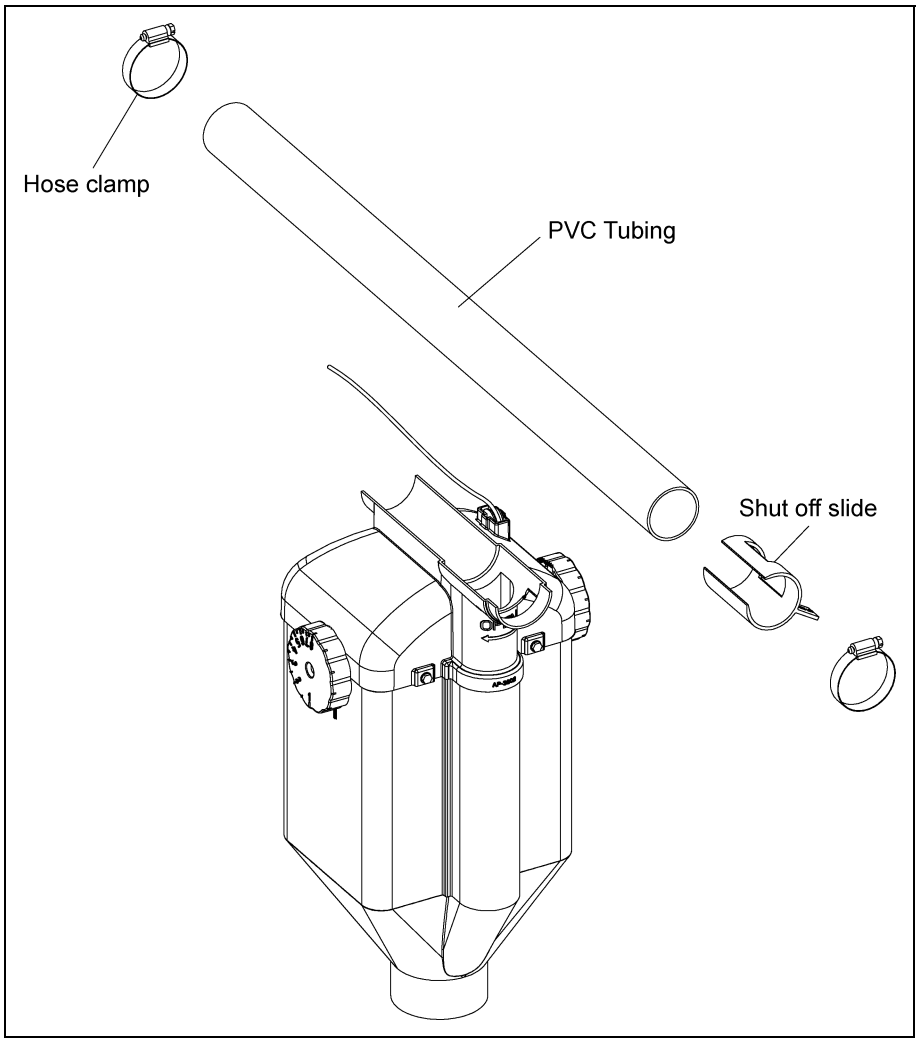


Figure 3F *Ultra-Drop Installation (Gestation)*

Shut Off Slide Operation

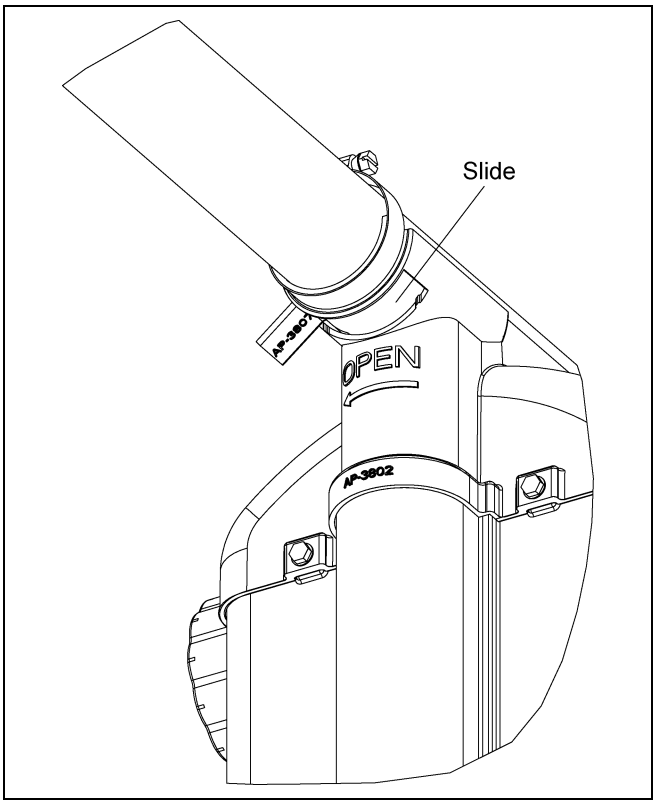


Figure 3G *Slide Open to Let Feed Flow*

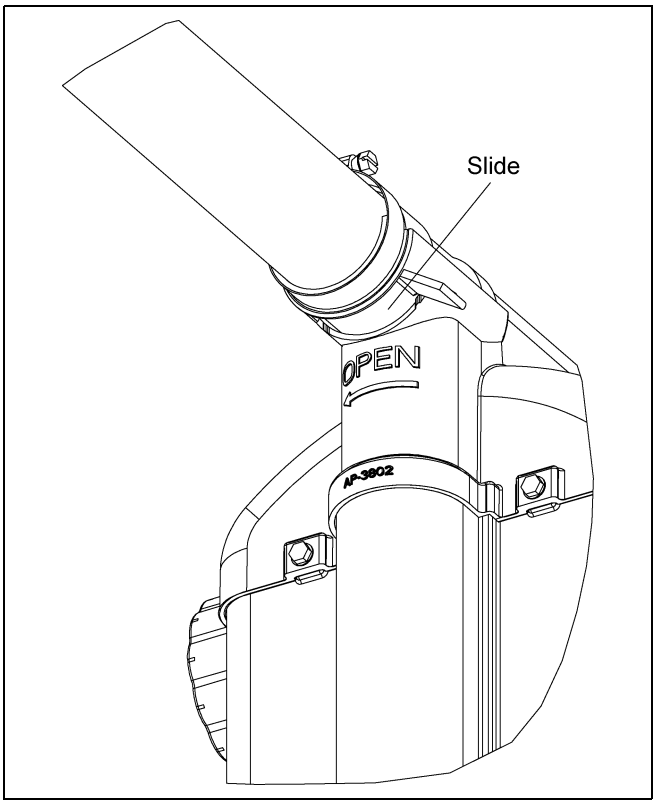
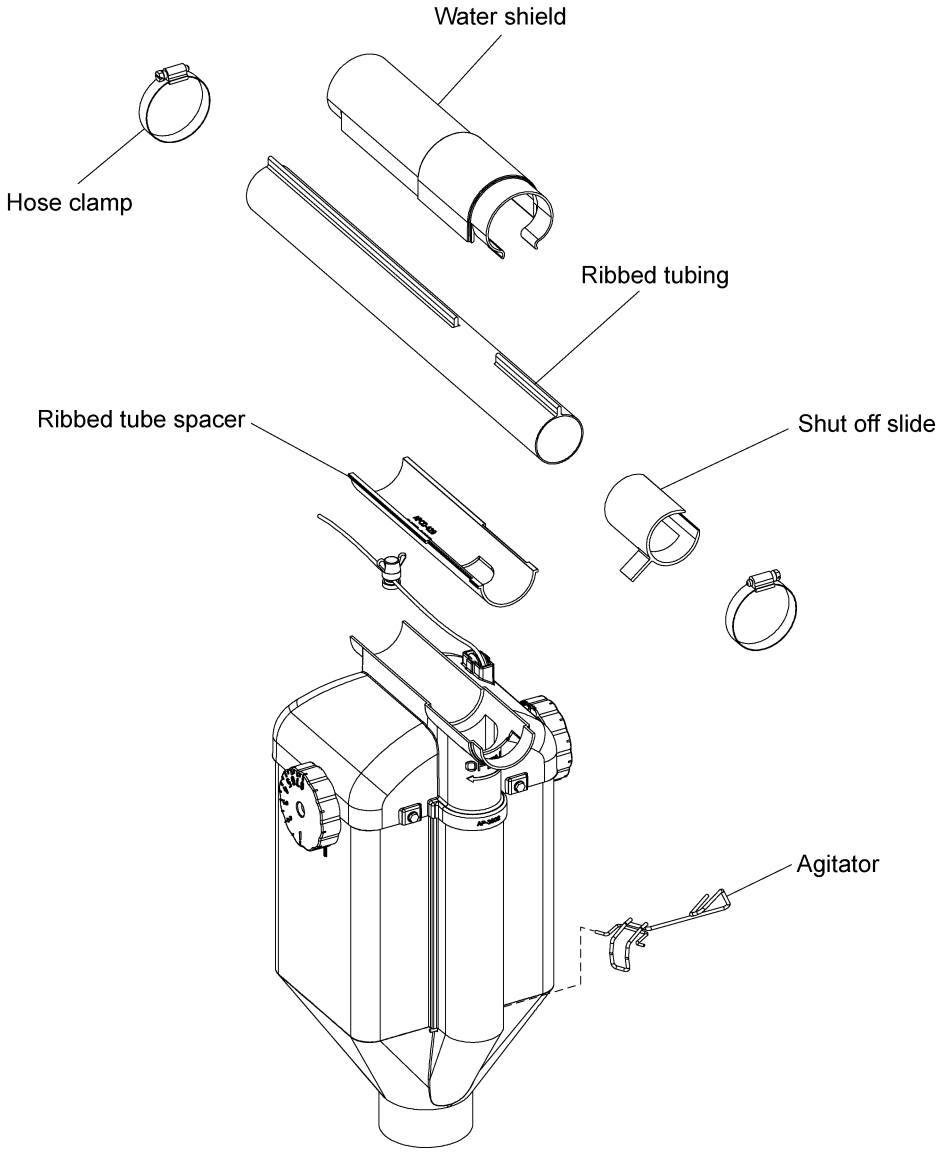


Figure 3H *Slide Closed to Cover Outlet Hole*

Standard Ultra-Drop (AP-3800A) for Farrowing Crates

1. If the hose clamps have not already been placed onto the tubing, (see laying out the tubing section *on Page 8*) take apart each hose clamp. Place it over the tubing and put it back together loosely.
2. Place ribbed tube spacer over ribbed tube if used. If PVC tube is used, disregard ribbed tube spacer.
3. Snap the shut off slide over the top of the tubing and make sure it is not too tight and can be rotated back and forth.
4. Place water shield over tube.
5. Hold the Ultra-Drop up next to the tubing, making sure the hole in the tubing is in the center of the Ultra-Drop. *(See Figure 3F on Page 11.)* Snap rain guard over the tubing as shown in *Figure 3I*. Slide the hose clamps into the groove on each side of the top of the Ultra-Drop and tighten.



NOTE: *Agitator comes pre-assembled in the Ultra-Drop.*

Figure 3I

Installation of Trip System

CAUTION

To minimize stretch in the trip system, use rod for all straight sections and use cable only when going around pulleys. Also, limit each run to 200' and 100 Ultra-Drops.

Rod Suspension

1. Unroll the bundle of rod. **NOTE**: *Use care. The rod was torsion straightened before rolled and therefore will have a tendency to unroll once the packaging bands are broken.*

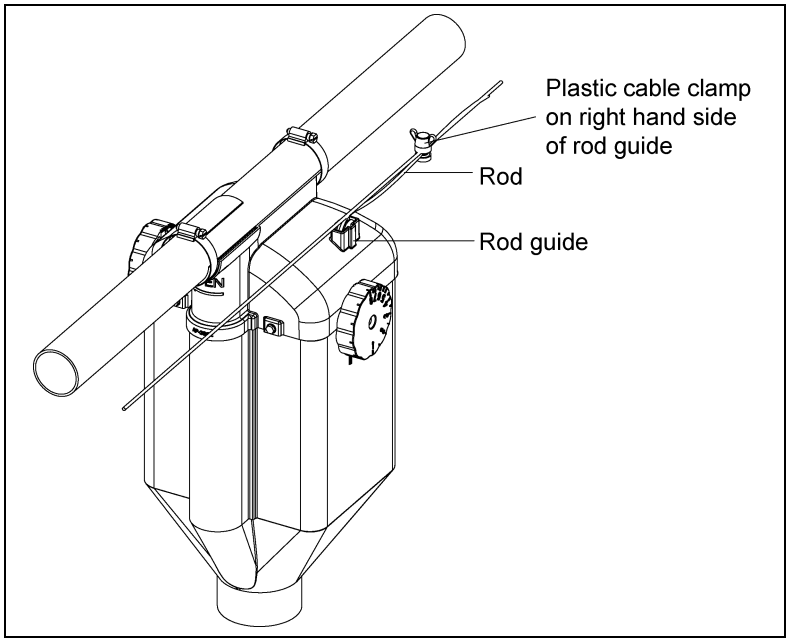


Figure 3J *Right Hand Actuation*

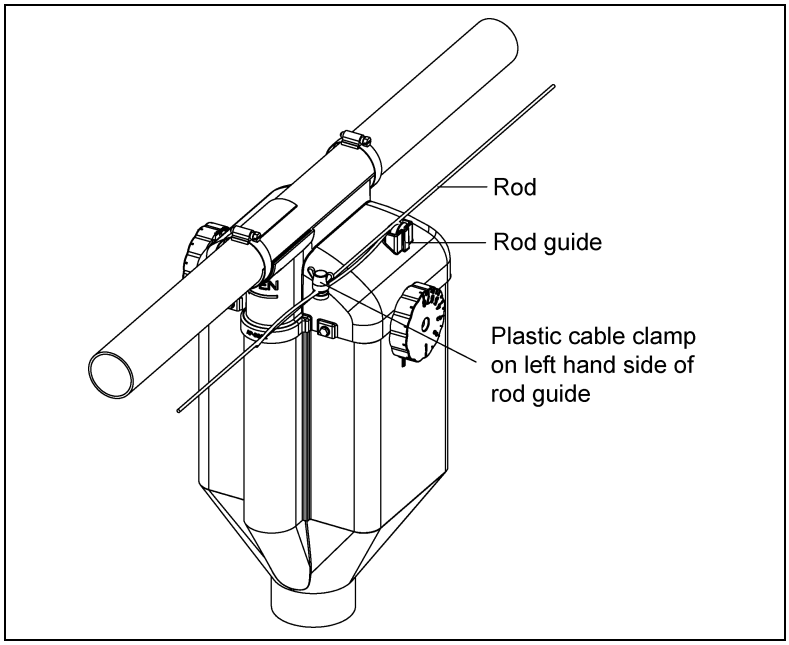


Figure 3K *Left Hand Actuation*

Installation of Trip Actuator

There are several actuators to choose from and many different configurations in which they can be used. These are the actuators available from the manufacturer and the maximum number of Ultra-Drops for each actuator.

Automatic actuator	Maximum of 300 Ultra-Drops
Split drum winch	Maximum of 200 Ultra-Drops
Shelby winch	Maximum of 150 Ultra-Drops
Trip lever	Maximum of 30 Ultra-Drops

Figure 3L shows a typical application using a shelby winch mounted to the end wall. An automatic actuator or a split drum winch could also be used in a setup such as this.

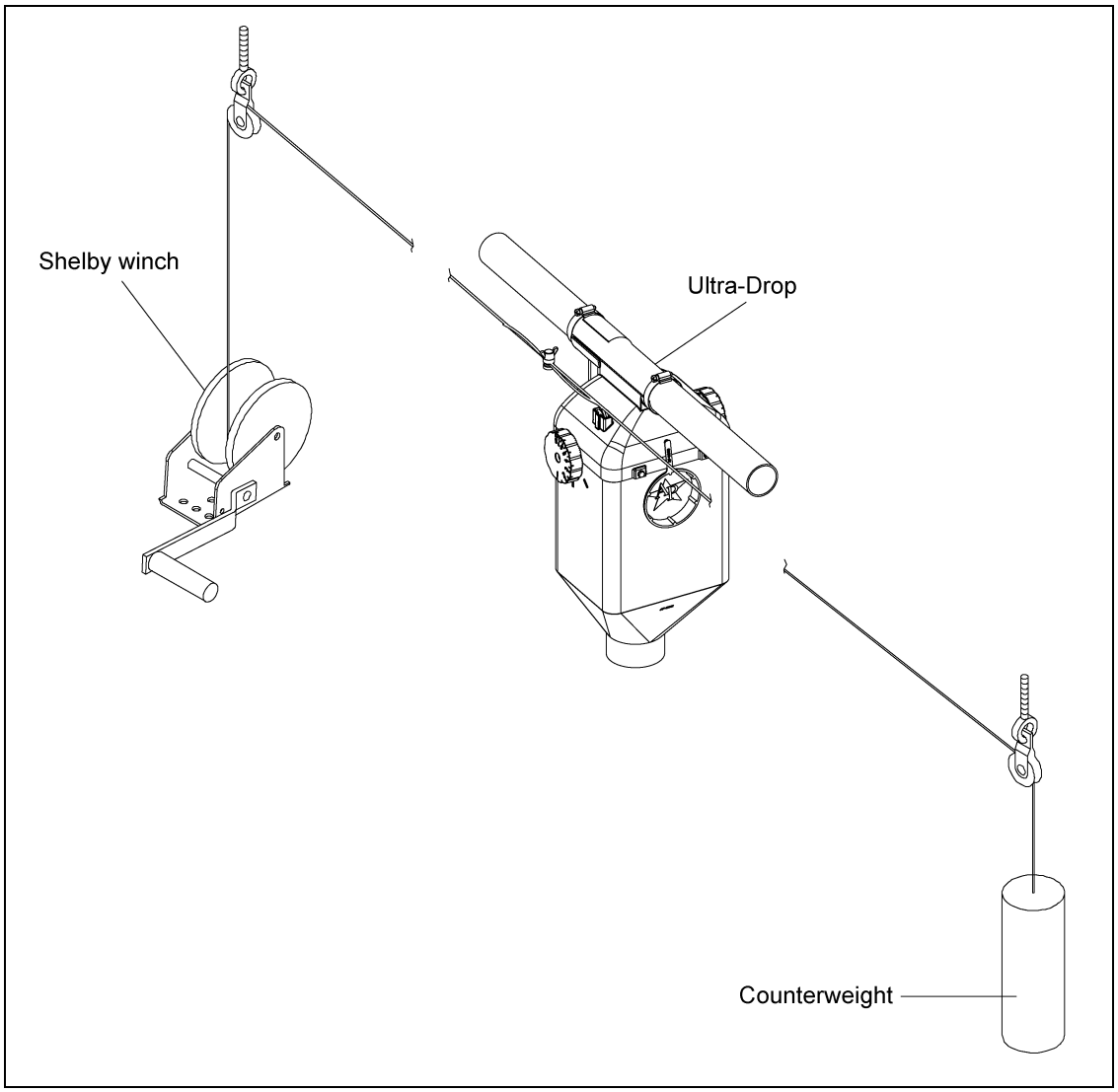


Figure 3L *Trip System with Shelby Winch*

If a trip lever is used, it should be installed as shown in *Figure 3M*. The Ultra-Drops need about 12" of travel from the trip system and with this configuration the rod cable assembly running across the top of the Ultra-Drops will travel twice as far as the cable connected to the trip lever.

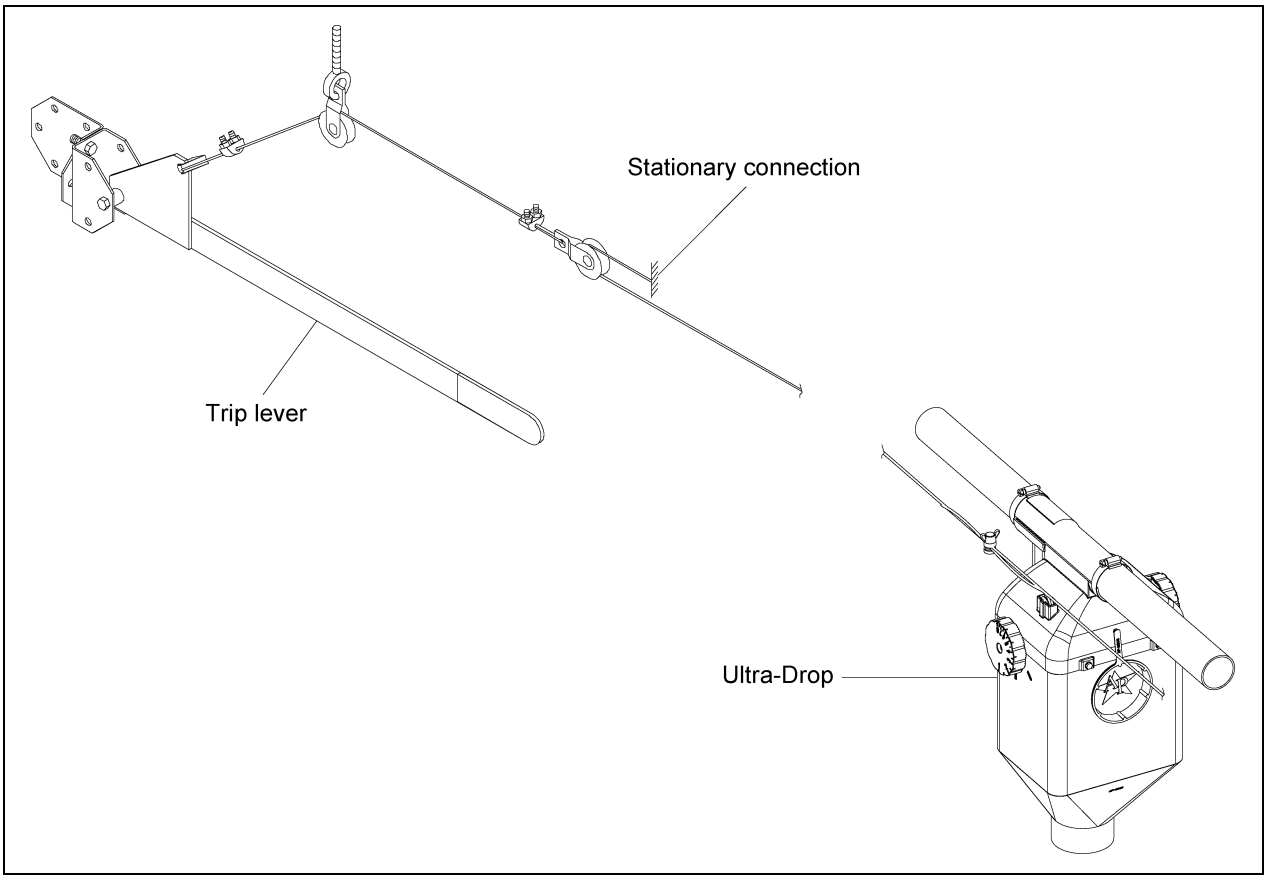


Figure 3M *Trip System with Trip Lever*

Cable and Rod Connections

It is very important to make sure all connections are secure. *Figure 3N* shows the correct way to make a cable-to-cable or a cable-to-rod connection. When making a loop at the end of a rod, use something round like a screw driver to help form the radius of the loop. *Figure 3O* shows the correct way to make a rod-to-rod connection to ensure there is no slipping.

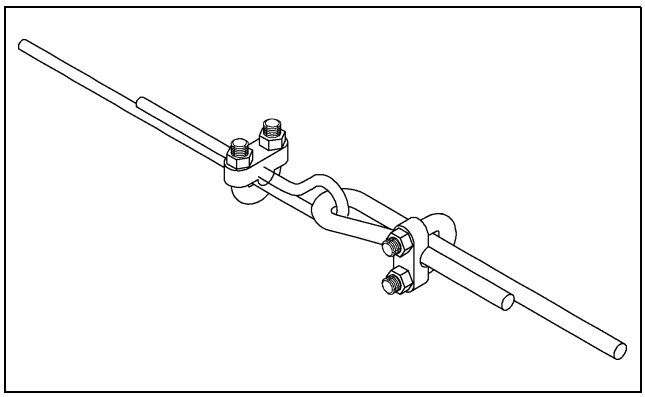


Figure 3N *Cable-to-Cable or Cable-to-Rod Connections*

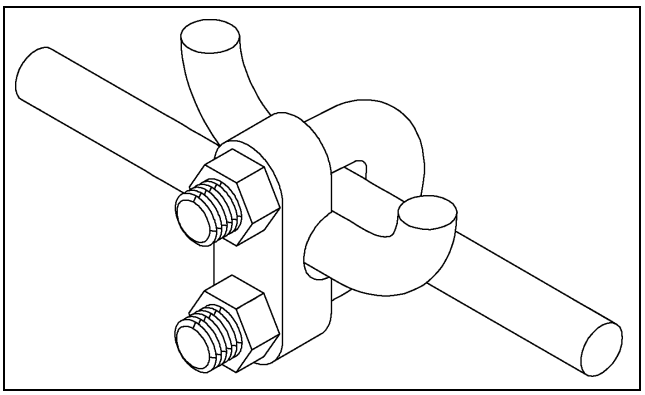


Figure 3O *Rod-to-Rod Connections*

Connection and Initial Adjustment of Ball Assemblies

1. Position the actuator and trip system so that it is in the pulled position. A few of the actuators may need to be tied or blocked to stay pulled.
2. Starting with the Ultra-Drop closest to the actuator, pull the ball until they hit the top of the Ultra-Drop. *(See Figure 3P.)*
3. Connect the cable to the rod using the plastic cable clamp, making sure there is at least 12" between the plastic cable clamp and rod guide to allow the ball to drop completely.

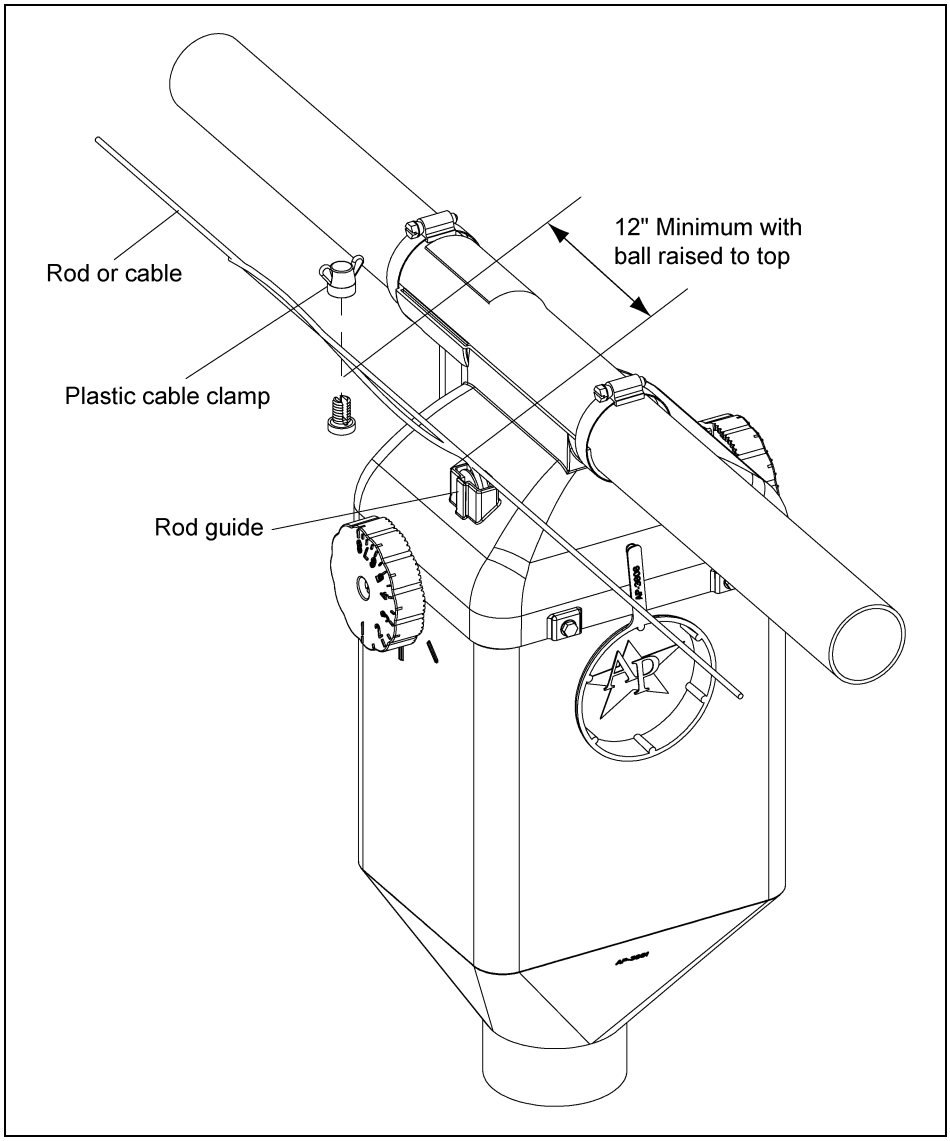


Figure 3P *Connection of Ball to Trip System*

Wiring Instructions

Warning

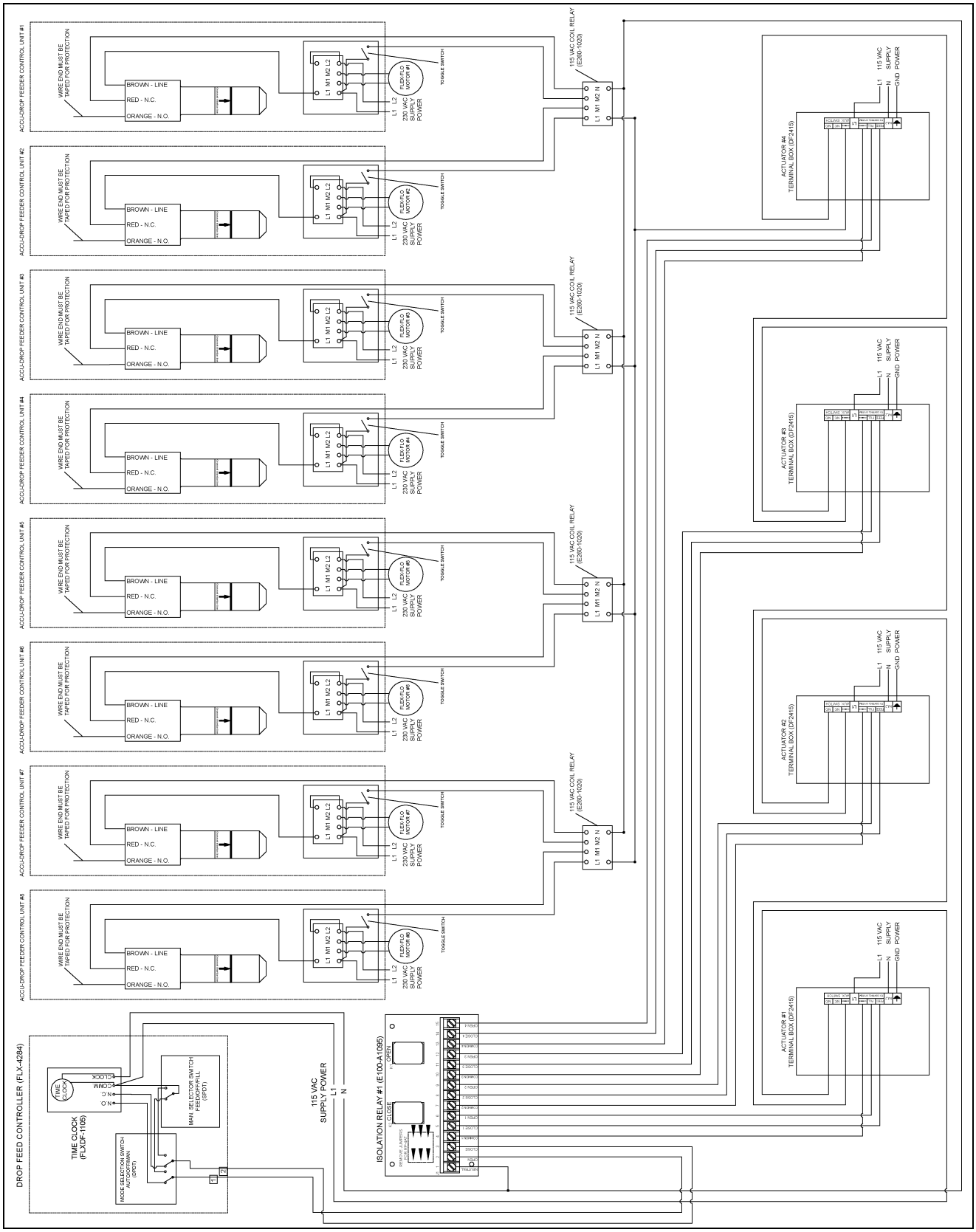
1. Disconnect all electrical power before inspecting or servicing equipment unless maintenance instructions specifically state otherwise.
2. Keep hands and tools away from exposed chain disks or auger.
3. Do not operate equipment without covers and guards properly positioned. Failure to do so may cause personal injury or damage to the equipment.

Safety Regulations

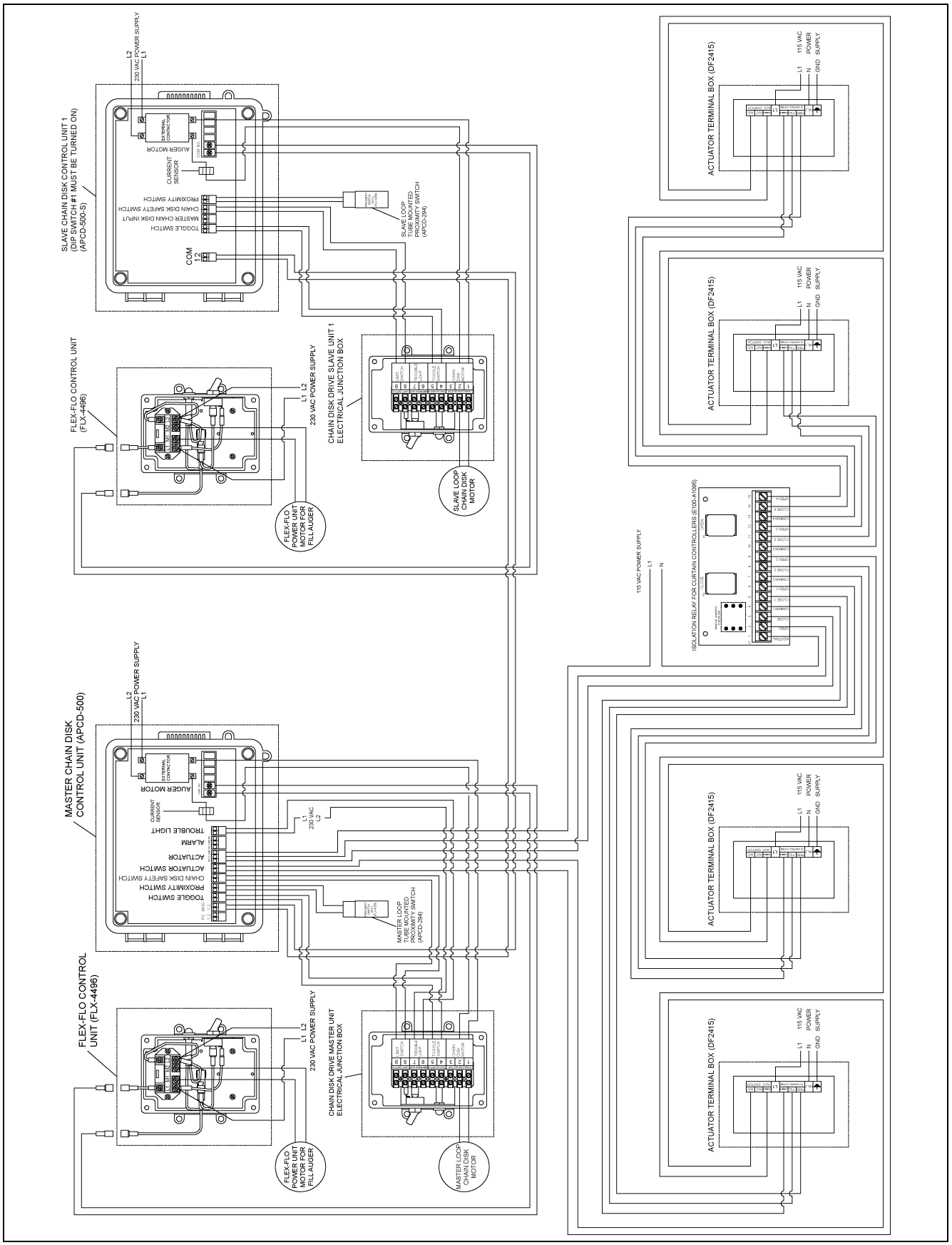
1. All wiring should be done by a qualified electrician in accordance with local and National Electrical Codes.
2. Ground all electrical equipment for safety.
3. Use proper size wire according to the National Electric Codes or other applicable regulations to wire all systems.

Wiring Diagrams

Auto Feed Ultra-Drop System for Model 220 Flex-Flo

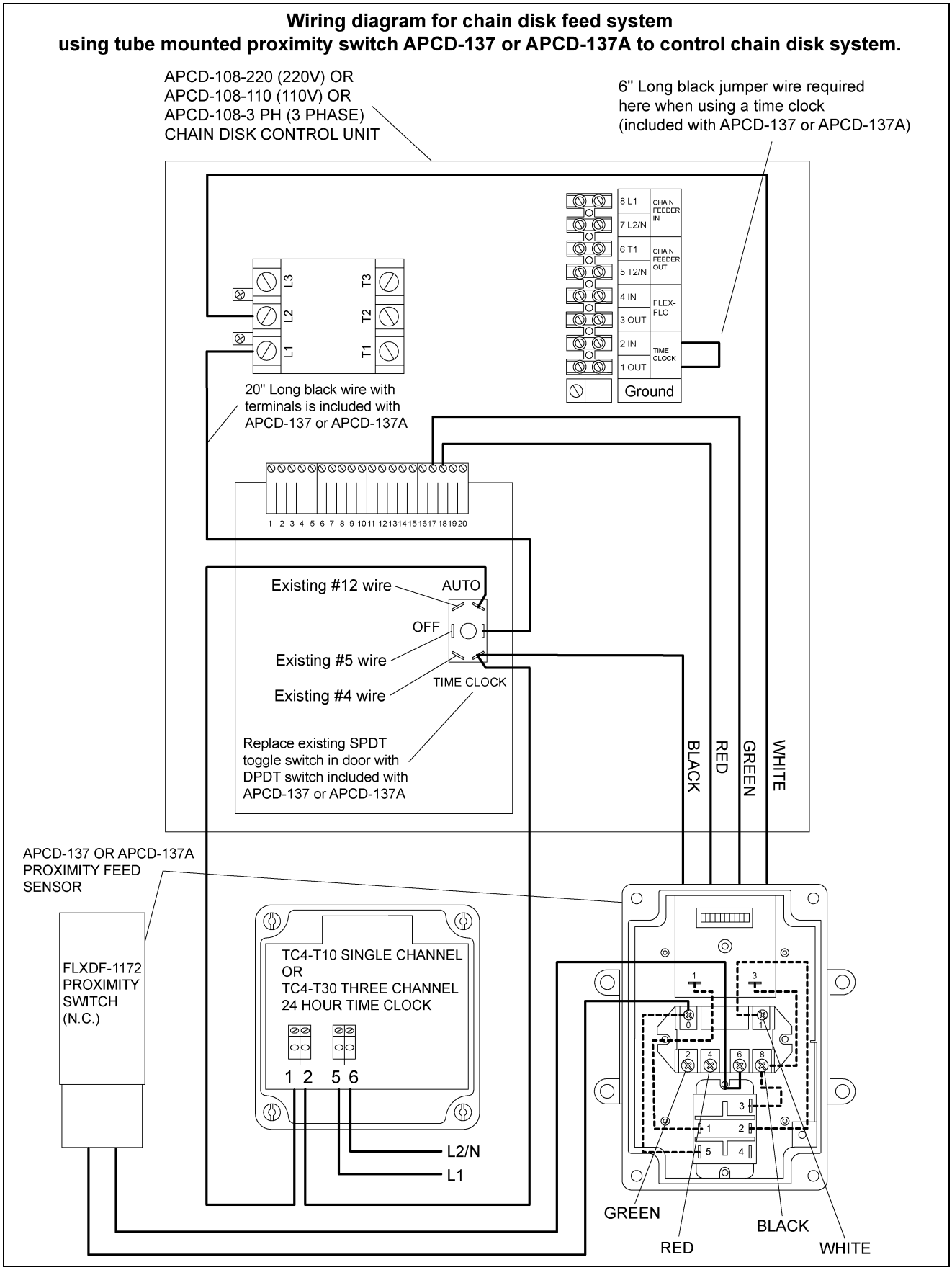


Auto Feed Drop System for Model 236 Chain Disk

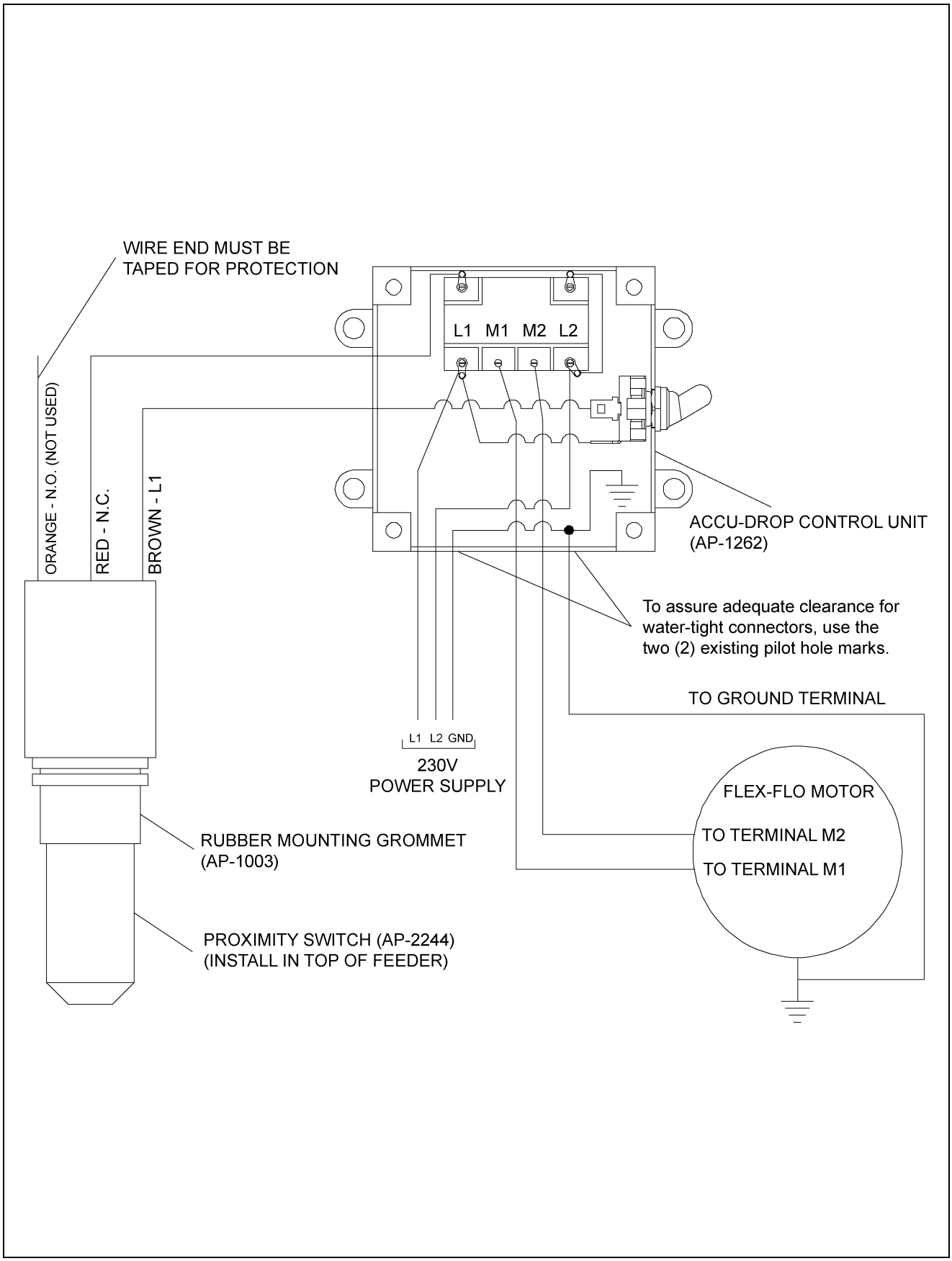


Tube Mounted Proximity Switch APCD-137 or APCD-137A

Wiring diagram for chain disk feed system
using tube mounted proximity switch APCD-137 or APCD-137A to control chain disk system.



Accu-Drop Control Unit



Initial Start-up

Test Control Switches

1. Test the toggle switch, on the electrical box and on the Accu-Drop control unit. When the switch is turned to ON, the motor should turn ON. If the motor does not turn ON, refer to troubleshooting guide *on Page 34* of the feed system manual.
2. Test the proximity switch by placing the hand in front of it while the motor is running. If the motor does not stop, refer to troubleshooting guide *on Page 34* or to the instruction sheet for the proximity switch.

Test Operation of Actuator

Refer to installation and operation manual for the actuator on how to start it up.

Maintenance

Ball Assembly Adjustment

After the ball assemblies have been pulled a few times, the cable/rod connections and the rod itself may stretch slightly. To ensure that all the balls are raised high enough to release the feed, some ball assemblies may need to be re-adjusted, particularly those toward the end of the trip system.

Connections and Pulleys Inspection

Check all connections once a month to make sure they are not slipping and causing the trip system not to work properly. Also check to make sure all pulleys stay properly secured and that they are free to rotate.

Actuator

Refer to actuator operations manual for the proper maintenance required on the actuator.

NOTES

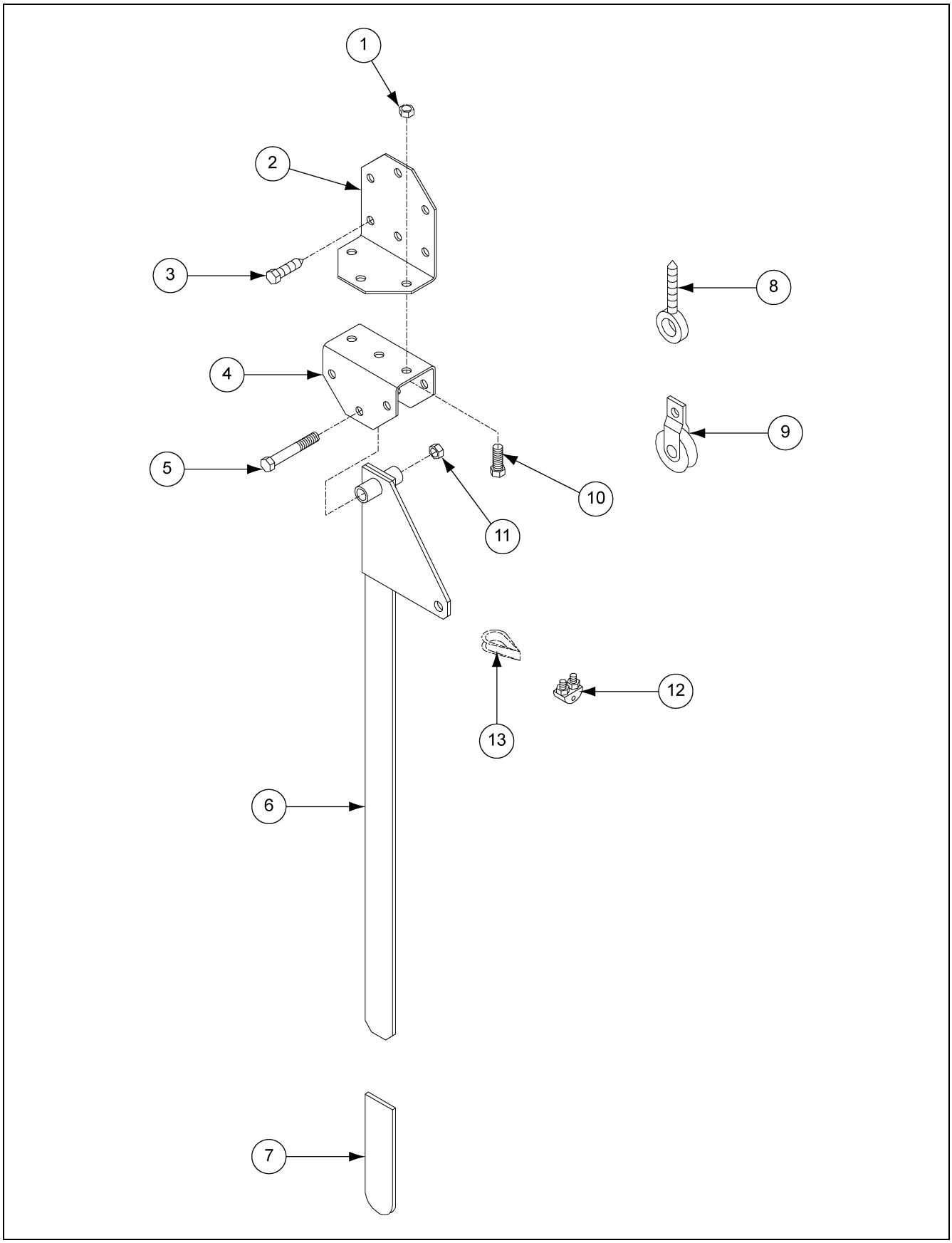
1. Manual Trip Level

2. Model 220/236 Ultra-Drop Feeder for Gestation Stalls (AP-3800)

3. Model 220/236 Ultra-Drop Feeder w/ Agitator for Farrowing Crates (AP-3800A)

4. Accu-Drop Feed Dispenser Control Unit - Model 220 Flex-Flo Tubing

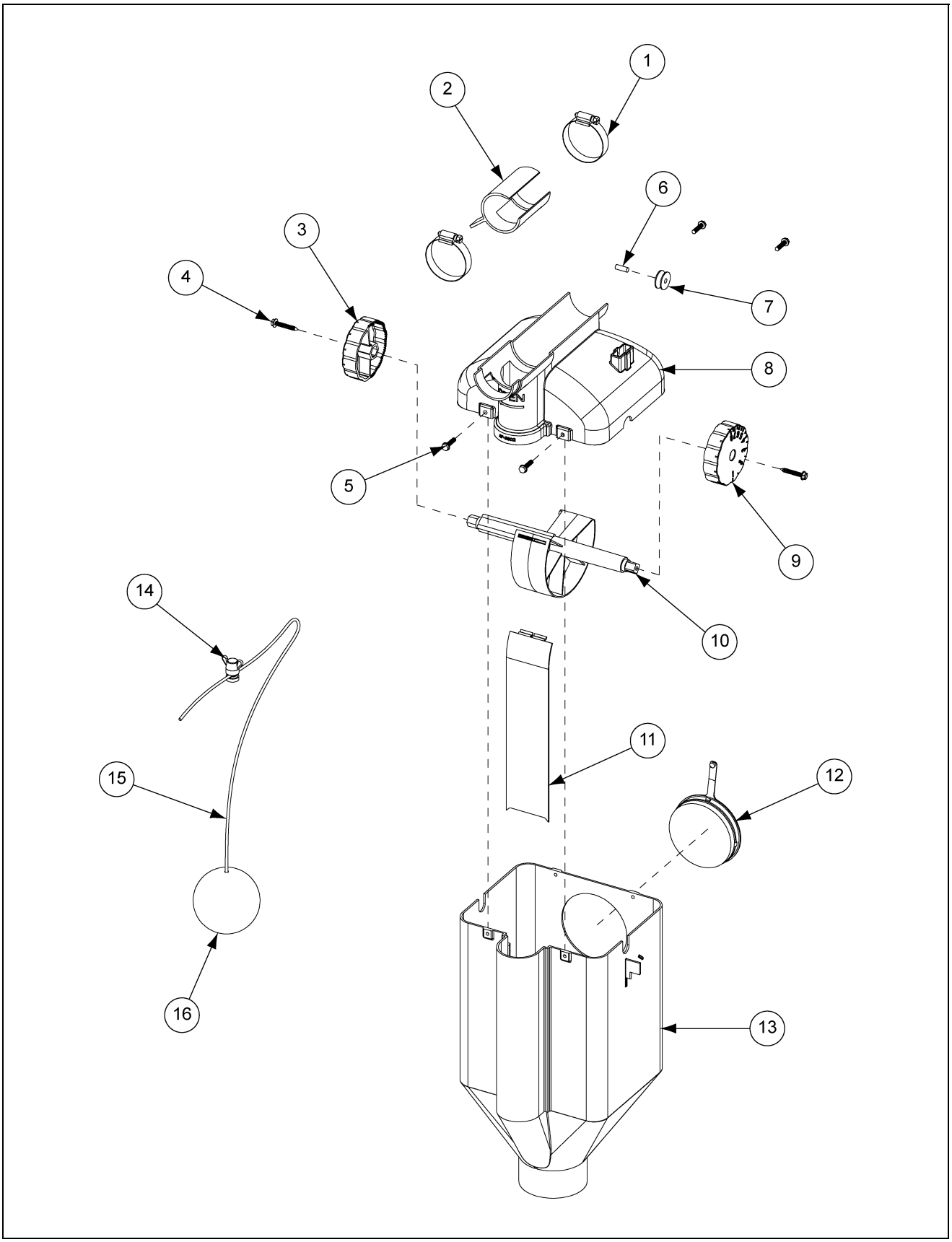
Manual Trip Level



Manual Trip Level Parts List

Ref #	Part #	Description	Qty
	FLXDF-1027	**Manual Trip Level**	
1	S-456	3/8" Nut	2
2	FLXDF-1054	Angle Bracket	1
3	S-2313	3/8" x 1-1/2" Hex Head Lag Screw	2
4	FLXDF-1053	Channel Bracket	1
5	S-6762	3/8"-16 x 2-1/2" Bolt	1
6	FLXDF-1056	Trip Lever Weldment	1
7	FLXDF-1193	0.188" x 1-1/2" x 5-1/4" Plastic Grip	1
8	S-6438	5/16" Lagged Thread Eye Bolt	3
9	07100512	1-7/8" Nylon w/ Steel Strap Pulley	3
10	S-7927	3/8"-16 x 1" Bolt	2
11	S-4663	3/8" Deformed Treads Nut	1
12	60041	3/16" Wire Rope Clamp	1
13	G3230A1	Cable 1/4" Zinc Plated Ferrule	1

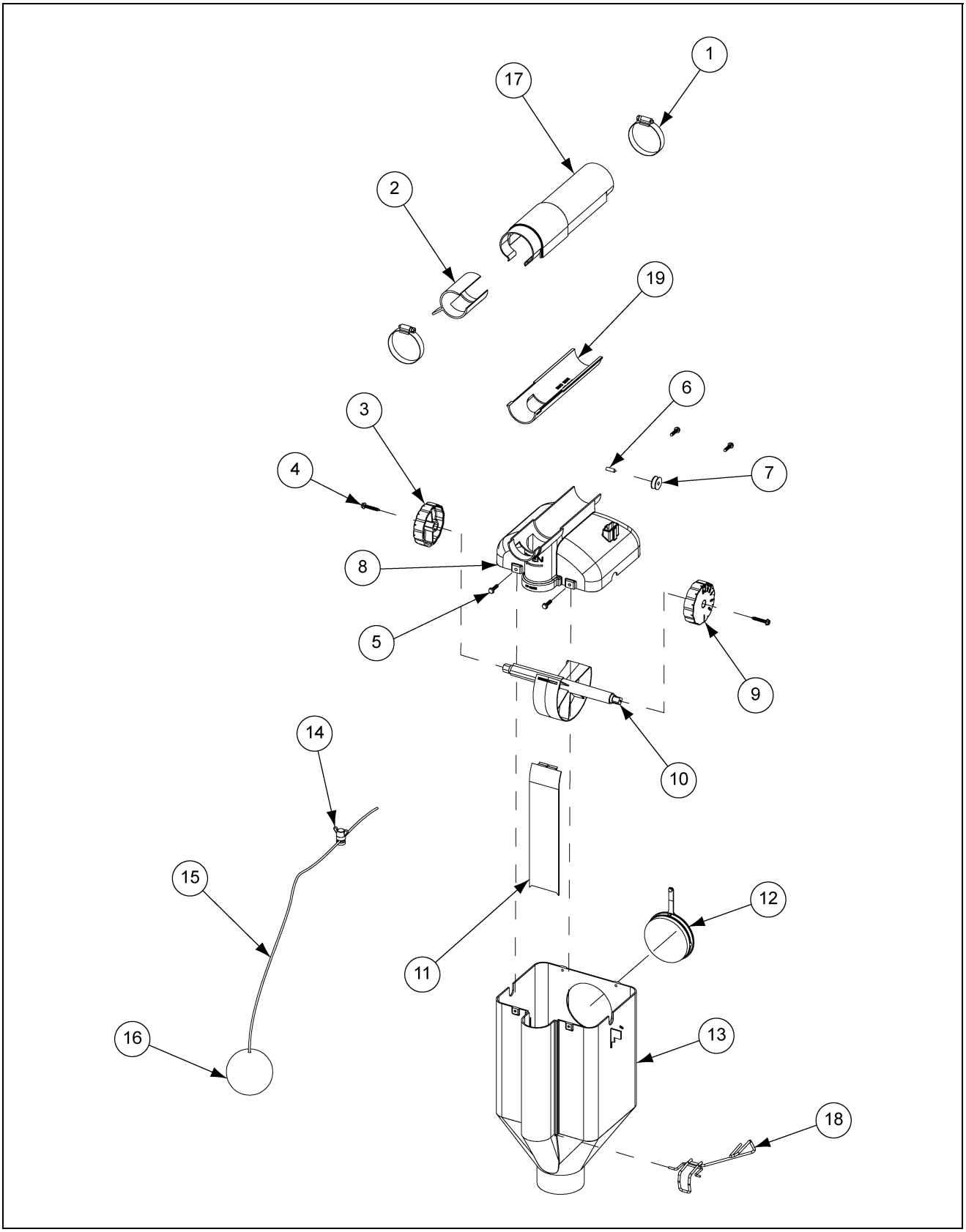
Model 220/236 Ultra-Drop Feeder for Gestation Stalls (AP-3800)



Model 220/236 Ultra-Drop Feeder for Gestation Stalls (AP-3800) Parts List

Ref #	Part #	Description	Qty
1	AP-0583	Clamp, Hose, SAE 36 - Stainless Steel	2
2	AP-3807	Slide, Ultra-Drop Feeder Shut Off	1
3	AP-3804	Knob, Ultra-Drop Feeder L.H.	1
4	S-9346	Screw, SMSA #10 x 1-1/4" HWH SS	2
5	S-8045	Screw, SDS #10 x 3/4" HWH	4
6	AP-3865	Pin, Ultra-Drop Feeder Pulley	1
7	35-0030S	Pulley, 7/8", Nylon	1
8	AP-3802	Top, Ultra-Drop Feeder	1
9	AP-3805	Knob, Ultra-Drop Feeder R.H.	1
10	AP-3803	Drum, Ultra-Drop Feeder	1
11	AP-3806	Slide, Ultra-Drop Feeder Adjustor	1
12	AP-3808	Cap, Ultra-Drop Feeder Hole	1
13	AP-3801	Housing, Ultra-Drop Feeder Bottom	1
14	35-0018	Bolt, Plastic Azuma Nut	1
15	AP-3866	Cord #4 Solid Braid 1/8" Whit 3'	1
16	AP-1248	Ball, 3-3/16" Diameter Solid Black Plastic	1

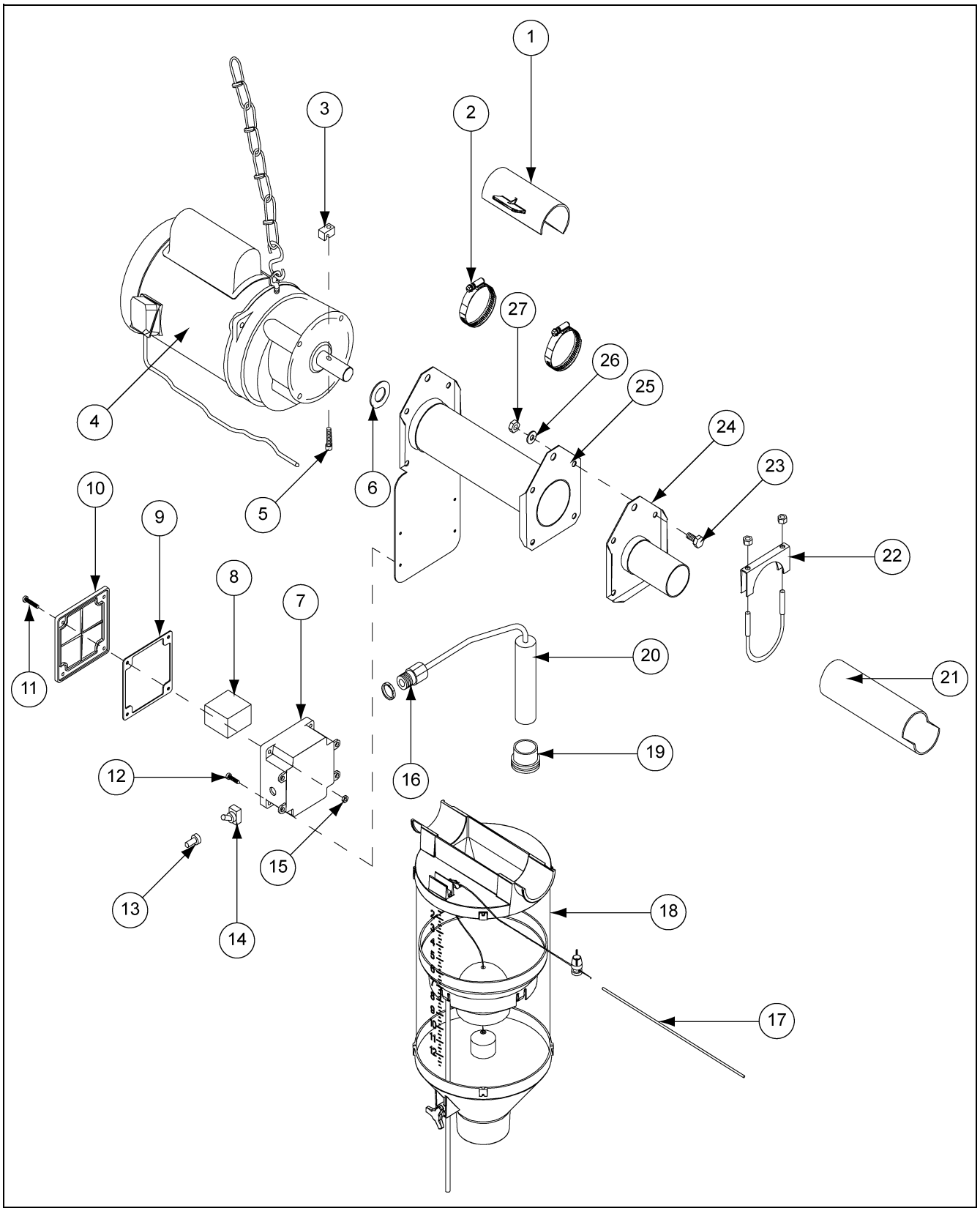
Model 220/236 Ultra-Drop Feeder w/ Agitator for Farrowing Crates (AP-3800A)



Model 220/236 Ultra-Drop Feeder w/ Agitator for Farrowing Crates (AP-3800A) Parts List

Ref #	Part #	Description	Qty
1	AP-0583	Clamp, Hose, SAE 36 - Stainless Steel	2
2	AP-3807	Shield, Ultra-Drop Feeder Shut Off	1
3	AP-3804	Knob, Ultra-Drop Feeder L.H.	1
4	S-9346	Screw, SMSA #10 x 1-1/4" HWH SS	2
5	S-8045	Screw, SDS #10 x 3/4" HWH	4
6	AP-3865	Pin, Ultra-Drop Feeder Pulley	1
7	35-0030S	Pulley, 7/8", Nylon	1
8	AP-3802	Top, Ultra-Drop Feeder	1
9	AP-3805	Knob, Ultra-Drop Feeder R.H.	1
10	AP-3803	Drum, Ultra-Drop Feeder	1
11	AP-3806	Slide, Ultra-Drop Feeder Adjustor	1
12	AP-3808	Cap, Ultra-Drop Feeder Hole	1
13	AP-3801	Housing, Ultra-Drop Feeder Bottom	1
14	35-0018	Bolt, Plastic Azuma Nut	1
15	AP-3866	Cord #4 Solid Braid 1/8" Whit 3'	1
16	AP-1248	Ball, 3-3/16" Diameter Solid Black Plastic	1
17	AP-3812	Guard, Ultra-Drop Feeder Water	1
18	AP-4292	Link, Ultra-Drop Agitator Assembly	1
19	APCD-429	Ribbed Tube Spacer	1

Accu-Drop Feed Dispenser Control Unit - Model 220
Flex-Flo Tubing



Accu-Drop Feed Dispenser Control Unit - Model 220 Flex-Flo Tubing Parts List

Ref #	Part #	Description	Qty
	AP-1262	**Accu-Drop Feed Dispenser Control Unit - 220V**	
	AP-1263	**Accu-Drop Feed Dispenser Control Unit - 110V**	
	FLX-2699	**Model 220 DD Driver and Tube Anchor**	
1	AP-1246	Slide, Model 300	1
2	AP-0584	Clamp, Hose, 3"-4" - Stainless Steel	2
3	FLX-4543	Auger Lock	1
4		Flex-Flo Power Unit	1
5	S-8039	1/2"-20 x 1/4" Socket Head Cap Screw Bolt	1
6	FLX-2685	Anchor Washer	1
7	FLX-2688	Electrical Box Bottom	1
8	E260-1020	REL 2PST 25A G7L-2A-BUB-CB-110	1
8	E260-1021	REL 2PST 25A G7L-2A-BUB-CB-220	1
9	FLX-2690	4 x 4 x 0.90 PVC Lid Gasket	1
10	FLX-2689	Electrical Box Lid	1
11	S-7377	#10-24 x 1" Phil RD HD MS Screw	1
12	S-7466	#10-16 x 3/4" Hardware Self-drilling Screw	1
13	70-0129	Switch Weather Proof Boot	1
14	20-5060	SPST 15A ON/OFF Toggle Switch	1
15	S-849	Hex Nut #10-24 Finish	1
16	S-7906	1/2" Cord Connector	1
17	AP-1282	Rod 1" Diameter S.S. 400' Roll	
18	AP-1285	Model 300 Accu-Drop Feed Dispenser w/ Hardware	1
19	AP-1004	36-1/2 mm x 4 mm Groove Grommet	1
20	AP-1001	Proximity Switch 110V N.O. or N.C. 1 Sec. to 5 Min. Time Delay	1
20	AP-1002	Proximity Switch 220V N.O. or N.C. 1 Sec. to 5 Min. Time Delay	1
21	PVC-1004	Model 220 10' Straight Flex-Flo Tube	
22	S-4490	5/16" x 3/4" U-Bolt	1
23	S-4275	5/16" x 3/4" Bolt	4
24	FLX-2316	Model 220 Tube Anchor Plate Assembly	1
25	AP-1258	Accu-Drop Feed Dispenser Adapter	1
26	S-845	5/16" Washer	4
27	S-396	5/16" Nut	4

Troubleshooting Guide

Problem	Possible Cause	Corrective Action
Feed system motor does not run.	No power to system.	Check circuits, fuses and ON-OFF switches on equipment.
	Motor thermal overload switch activated.	Refer to motor overload problem.
	Proximity switch not adjusted properly.	Position the switch so that it extends into the Ultra-Drop 2-3/4".
	Proximity switch time delay not expired.	Refer to instruction sheet on proximity switch. Refer to chain disk manual for adjustment of time delay switch inside of control unit.
	Feed stuck on end of proximity switch.	Clean off end of proximity switch.
	Sensitivity of proximity switch not set properly.	Refer to instruction sheet on proximity switch.
Motor overloads after running briefly.	Low voltage (motor runs slow and overheats).	Check line voltage at motor; use adequate wire size.
	Foreign object caught in system.	Check system for any foreign objects and remove them.
	Wet feed being conveyed or allowed to stand in system.	Clean the system; avoid conveying wet feed or empty line after each feeding.
	Defective motor.	Replace motor.
Feed system turns ON while trip system is operating.	Proximity switch time delay not set properly.	Set time delay for a longer period of time than it takes to pull the balls.
		Refer to instruction sheet on proximity switch.
		Refer to chain disk manual for adjustment of time delay switch inside control unit.
Pigs agitate Ultra-Drop causing feed to sift out.	Ultra-Drops are supported by or rigidly connected to the gestation stall.	Install the Ultra-Drops so they are not supported by or rigidly connected to the gestation stall.
Trip system pulls only a portion of the balls.	Ball assemblies are not properly adjusted.	Re-adjust ball assemblies. *(See Ball Assemblies on Page 17.)*
	Too many Ultra-Drops per section of rod.	Limit number of Ultra-Drops to 200 per section of rod.
Trip system does not pull any balls.	Rod and/or cable has been broken.	Fix cable or rod.
	Too many Ultra-Drops per trip system.	Limit number of Ultra-Drops to recommended quantity. (Refer to installation of trip actuator *on Page 15*.)
	Cable wedged in pulley.	Make sure cable moves freely over pulleys.
	Automatic trip system control unit malfunctioning.	Refer to section on automatic trip system.

Conversion Table

Fractions to Millimeters

Fractions	Decimals	Millimeters	Fractions	Decimals	Millimeters
1/64	0.0156	0.3969	33/64	0.5156	13.0969
1/32	0.0313	0.07938	17/32	0.5313	13.4938
3/64	0.0469	1.1906	35/64	0.5469	13.8906
1/16	0.0625	1.5875	9/16	0.5625	14.2875
5/64	0.0781	1.9844	37/64	0.5781	14.6844
3/32	0.0938	2.3813	19/32	0.5938	15.0813
7/64	0.1094	2.7781	39/64	0.6094	15.4781
1/8	0.125	3.1750	5/8	0.625	15.8750
9/64	0.1406	3.5719	41/64	0.6406	16.2719
5/32	0.1563	3.9688	21/32	0.6563	16.6688
11/64	0.1719	4.3656	43/64	0.6719	17.0656
3/16	1.875	4.7625	11/16	0.6875	17.4625
13/64	0.2031	5.1594	45/64	0.7031	17.8594
7/32	0.2188	5.5563	23/32	0.7188	18.2563
15/64	0.2344	5.9531	47/64	0.7344	18.6531
1/4	0.250	6.3500	3/4	0.750	19.0500
17/64	0.2656	6.7469	49/64	0.7656	19.4469
9/32	0.2813	7.1438	25/32	0.7813	19.8438
19/64	0.2969	7.5406	51/64	0.7969	20.2406
5/16	0.3125	7.9375	13/16	0.8125	20.6375
21/64	0.3281	8.3344	53/64	0.8281	21.0344
11/32	0.3438	8.7313	27/32	0.8438	21.4313
23/64	0.3594	9.1281	55/64	0.8594	21.8281
3/8	0.375	9.5250	7/8	0.875	22.2250
25/64	0.3906	9.9219	57/64	0.8906	22.6219
13/32	0.4063	10.3188	29/32	0.9063	23.0188
27/64	0.4219	10.7156	59/64	0.9219	23.4156
7/16	0.4375	11.1125	15/16	0.9375	23.8125
29/64	0.4531	11.5094	61/64	0.9531	24.2094
15/32	0.4688	11.9063	31/32	0.9688	24.6063
31/64	0.4844	12.3031	63/64	0.9844	25.0031
1/2	0.500	12.7000	1	1.000	25.4000

NOTES

GSI Group, LLC Limited Warranty

The GSI Group, LLC ("GSI") warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user's sole remedy (and GSI's only obligation) is to repair or replace, at GSI's option and expense, products that in GSI's judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

Warranty Extensions:

The Limited Warranty period is extended for the following products:

	Product	Warranty Period
AP Fans and Flooring	Performer Series Direct Drive Fan Motor	3 Years
	All Fiberglass Housings	Lifetime
	All Fiberglass Propellers	Lifetime
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **
	Feed Tubes (1-3/4" and 2.00")	10 Years *
	Centerless Augers	10 Years *
	Watering Nipples	10 Years *
Grain Systems	Grain Bin Structural Design	5 Years
Grain Systems Farm Fans Zimmerman	Portable and Tower Dryers	2 Years
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years

* Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 25%
5 to 7 years - end-user pays 50%
7 to 10 years - end-user pays 75%

** Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 50%

† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth (12^{th}) month from the date of purchase and continuing until the sixtieth (60^{th}) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

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This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

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