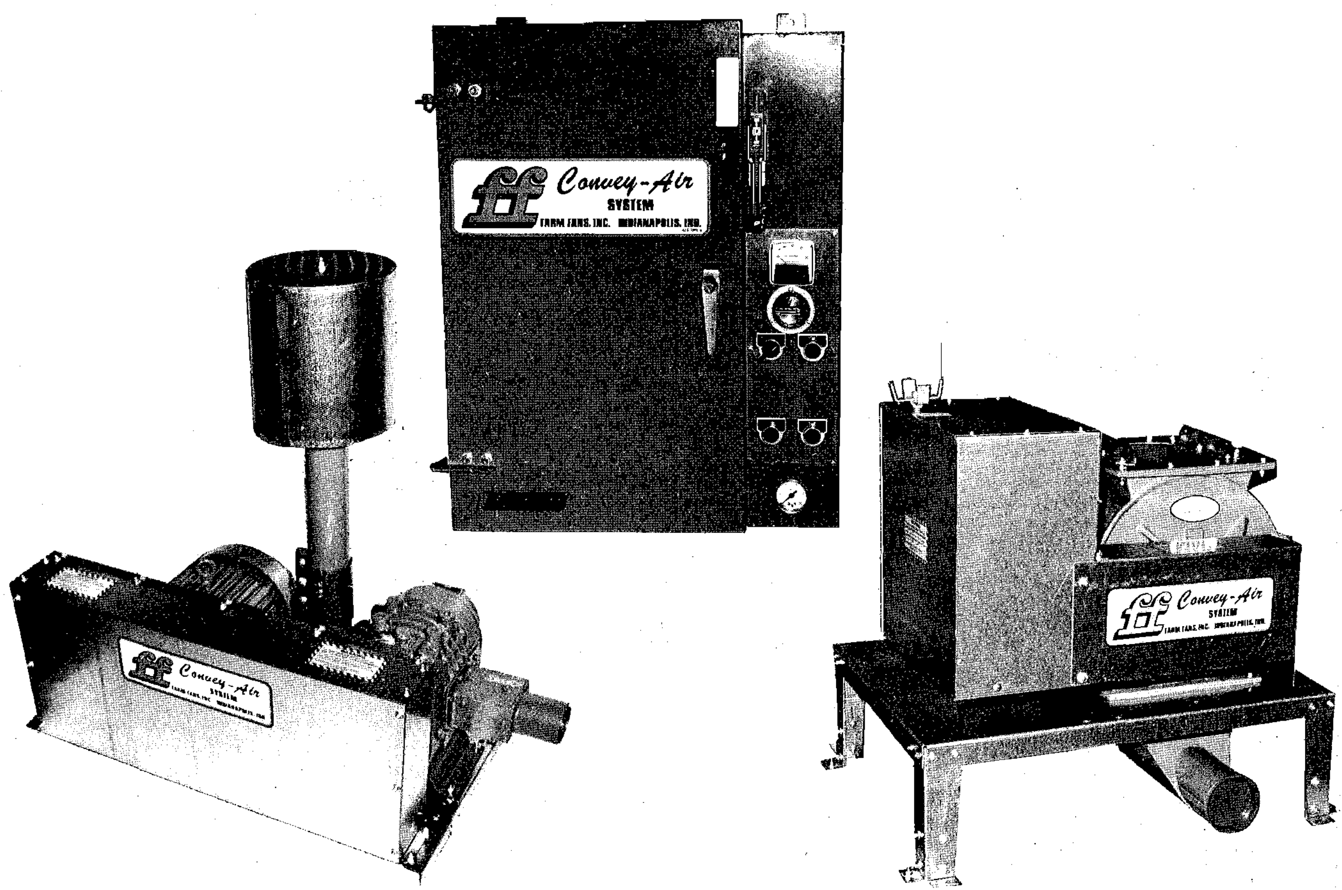
CA-02-2

INSTALLATION AND OPERATION MANUAL

Convey-Air

GRAIN HANDLING SYSTEM



FARM FANS, INC.
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Printed in U.S.A.

READ THESE INSTRUCTIONS BEFORE INSTALLATION AND OPERATION. SAVE FOR FUTURE REFERENCE.

We at Farm Fans, Inc. wish to thank you for your purchase of the Convey-Air pneumatic grain handling system which provides a modern, efficient method of meeting your grain handling needs. Trouble-free operation is naturally one of our primary objectives and this manual has been prepared with this goal in mind. These instructions pertain to the 3", 4", 5" and 6" Convey-Air systems and their standard power supplies. Read this manual and follow its recommended instructions to ensure successful operation and care.

USE CAUTION IN THE OPERATION OF THIS EQUIPMENT

The design and manufacture of this system is directed towards operator safety. However, the very nature of any system using high voltage electrical equipment and rotating parts presents hazards to personnel which cannot be completely safeguarded against without interfering with efficient operation and reasonable access to components.

Use extreme caution when working around rotating parts which may start without warning when the system is operating on "Automatic" control.

Continued safe, dependable operation of equipment relies, to a great degree, upon the operator. For a safe and dependable system, follow the recommendations within this manual...make it a practice to regularly inspect the operation of the system for any unsafe conditions, or developing problems.

TAKE SPECIAL NOTE OF THE OPERATING PRECAUTIONS LISTED ON PAGE 1, BEFORE ATTEMPTING TO OPERATE THE SYSTEM.

CAUTION: Guards, access doors and covers must be securely fastened before operating this equipment.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

Warranty

Farm Fans, Inc. warrants its products to be free of defects in material and workmanship. The only obligation of the manufacturer is to repair or replace products which have been submitted and found to be defective within 12 months after installation. If so found defective, the products will be repaired or replaced without charge, this constituting and entirely fulfilling the warranty obligation. Farm Fans, Inc. assumes no liability for expenses incurred without written authorization; in no event shall its liability include special or consequential damages, or exceed the selling price of the product.

This warranty does not cover products or parts which have been damaged by negligent use, misuse, alteration or accident. Electric motors, tires, and other components supplied by manufacturers are warranted separately by those suppliers. This warranty is exclusive and in lieu of all other warranties, expressed or implied. Farm Fans, Inc. reserves the right to make design or specification changes at any time, without any contingent obligation to purchasers of products already sold.

All instructions shall be construed as recommendations only; because of the many variable conditions in actual installation, Farm Fans, Inc. assumes no liability for results arising from the use of such recommendations.

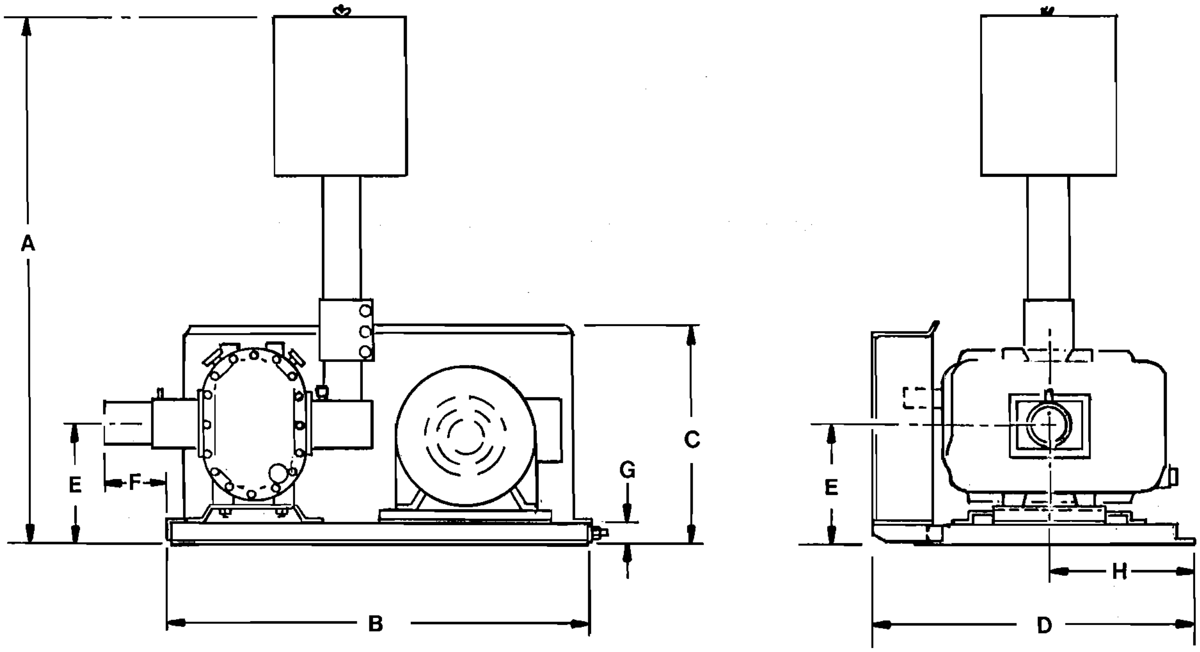
CONTENTS

OPERATING PRECAUTIONS

Look for this symbol to point out important safety precautions. It means – ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.

1. Read and understand the operation manual before attempting to operate the system.
2. Keep ALL guards, access doors, covers, safety decals and safety devices in place and securely fastened. DO NOT operate system with guards removed.
3. Keep visitors, children and all untrained personnel away from system components and control panel at all times. This automatically controlled equipment can start at any time.
4. DO NOT attempt to operate the system by jumping, or otherwise bypassing any safety devices.
5. Always open the main power supply disconnect switch and lock it in the open position with a padlock when performing any service, or maintenance work on the blower unit, airlock unit, or control panel.
6. Lock out power before removing guards, access doors and covers.
7. Keep hands, feet and clothing away from all rotating parts, chains and belts.
8. Electrical repairs should be performed by trained, qualified personnel only. Failure to follow safe electrical procedures can result in serious injury.
9. If it should become necessary to perform checks on system components, or high voltage tests with "live" circuits be extremely careful and follow all established safety practices.
10. Do not use plastic type tubing to convey material, as it may cause very high static electricity which could result in serious injury or grain dust explosion.

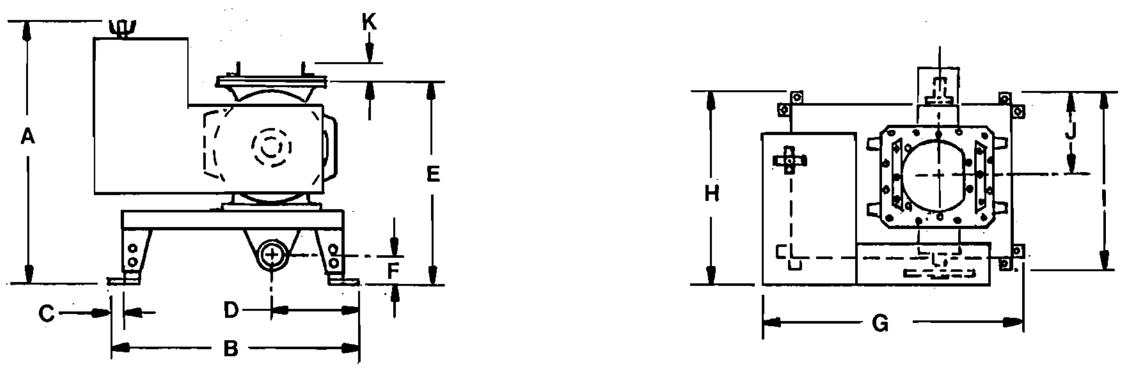
SPECIFICATIONS



BLOWER UNIT DIMENSIONS

BLOWER SIZE	DIMENSION *							
	A	B	C	D	E	F	G	H
All 3-Inch	47-1/2"	44-1/4"	21"	28"	11-1/2"	8"	2-3/8"	14-1/2"
All 4-Inch	50"	44-1/4"	21"	28"	11-1/2"	7-1/2"	2-3/8"	13-1/2"
All 5-Inch	57"	44-1/4"	21"	28"	11-3/8"	17"	2-3/8"	11-1/2"
All 6-Inch	58-3/4"	52-1/2"	21-1/4"	35"	11-1/4"	14"	2-1/2"	15-1/4"

* Note: All dimensions nominal and for reference only.



AIRLOCK UNIT DIMENSIONS

SIZE	DIMENSION *										
	A **	B	C	D	E **	F **	G	H	I	J	K
All 3-Inch	35-1/2"	33"	1-1/2"	9-1/2"	22-1/2"	3-1/4"	33-1/4"	25"	23-1/4"	11-1/2"	1-5/8"
All 4-Inch	35-1/2"	33"	1-1/2"	9-1/2"	26"	3-1/4"	33-1/4"	27"	23-1/4"	11-1/2"	1-5/8"
All 5-Inch	41"	43-1/4"	1-3/4"	14-3/4"	33-1/4"	5"	43-1/4"	38-1/4"	33-1/4"	17"	1-5/8"
All 6-Inch	43"	43-1/4"	1-3/4"	15 1/2"	37-1/4"	4-1/4"	44"	36-1/4"	33-1/4"	17"	1-5/8"

* Note: All dimensions nominal and for reference only.

** Dimensions listed are with adjustable legs fully retracted. Legs may be extended up to 2 inches to provide additional height.

FIG. 1- GENERAL DIMENSIONS

Model	Conveying Tube Diameter	Capacity (1) Bu./Hr.	Phase	Voltage	Blower Horsepower	Blower RPM	Airlock Horsepower	Airlock Motor RPM	Airlock Operating (2) RPM
CA-312	3"	400	1	230	10	2480	1/2	1750	19-31
CA-332	3"	400	3	230	10	2480	1/2	1750	19-31
CA-334	3"	400	3	460	10	2480	1/2	1750	19-31
CA-412	4"	700	1	230	15	2830	3/4	1750	19-31
CA-432	4"	700	3	230	15	2830	3/4	1750	19-31
CA-434	4"	700	3	460	15	2830	3/4	1750	19-31
CA-532	5"	1200	3	230	20	2940	3/4	1750	19-31
CA-534	5"	1200	3	460	20	2940	3/4	1750	19-31
CAH-532	5"	1500	3	230	30	2940	3/4	1750	19-31
CAH-534	5"	1500	3	460	30	2940	3/4	1750	19-31
CA-632	6	1800	3	230	40	3260	1	1750	14 to 22
CA-634	6	1800	3	460	40	3260	1	1750	14 to 22
CAH-632	6	2100	3	230	50	3260	1	1750	14 to 22
CAH-634	6	2100	3	460	50	3260	1	1750	14 to 22

(1) Capacities are manufacturers estimates for dried, shelled corn. Capacities will vary depending upon grain type, moisture content, conveying line length, number of elbows, and elevation.

(2) Operating RPM of airlock approximate and variable within range stated with motor at 1750 RPM and drive belt in good condition.

FIG. 2- OPERATING CHARACTERISTICS

	Model	CA-312	CA-332	CA-334	CA-412	CA-432	CA-434	CA-532	CA-534	CAH-532	CAH-534	CA-632	CA-634	CAH-632	CAH-634
	Phase/Voltage	1PH/230V	3PH/230V	3PH/460V	1PH/230V	3PH/230V	3PH/460V	3PH/230V	3PH/460V	3PH/230V	3PH/460V	3PH/230V	3PH/460V	3PH/230V	3PH/460V
Power Disconnect Breaker Rating - Amps.		100	60	60	100	100	60	100	60	100	60	150	100	150	100
Blower Motor Specs.	Horsepower	10	10	10	15	15	15	20	20	30	30	40	40	50	50
	Motor Speed - RPM	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	3500	3500	3500	3500
	Max. Current - Amps.	40	26	13	70	38	19	48	24	72	36	100	50	120	60
	Min. Wire Size (1) 100 Ft. Run	8	10	12	4	8	12	6	10	2	8	1	6	0	4
	200 Ft. Run	6	8	12	3	6	12	6	10	2	8	1	6	0	4
	300 Ft. Run	4	6	12	2	4	10	4	10	2	8	1	6	0	4
	Overload Relay Heater Element	56-099 E-72	56-098 E-67	56-098 E-57	56-103 E-79	56-098 E-73A	56-098 E-62	56-098 E-76	56-098 E-67	56-104 E-79	56-098 E-73	56-107* E-96	56-098 E-77	56-107* E-98	56-098 E-78
Airlock Motor Specs.	Horsepower	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4	3/4	3/4	1	1	1	1
	Motor Speed - RPM	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
	Max. Current - Amps.	3.9	2.0	1.0	5.3	3.0	1.5	3.0	1.5	3.0	1.5	3.4	1.7	3.4	1.7
	Overload Relay Heater Element	56-099 E-41	56-106 E-32	56-106 E-19	56-099 E-46	56-106 E-38	56-106 E-27	56-106 E-38	56-106 E-27	56-106 E-38	56-106 E-27	56-106 E-39	56-106 E-28	56-106 E-39	56-106 E-28
Aux. (3) Conv. Motor	Horsepower (3)	5 (5)	5 (10)	5 (10)	NA	5 (10)	5 (10)	5 (7½)	5 (10)	5 (5)	5 (10)	5 (5)	5 (10)	NA	5 (10)
	Max. Current - Amps. (3)	22	13 (26)	6.5 (13)	NA	13 (26)	6.5 (13)	13 (18)	6.5 (13)	13	6.5 (13)	13	6.5 (13)	NA	6.5 (13)
	Overload Relay (3) Heater Element	56-099 E-62	56-098 E-60	56-098 E-51	NA NA	56-098 E-60	56-098 E-51	56-098 E-60	56-098 E-51	56-098 E-60	56-098 E-51	56-098 E-60	56-098 E-51	NA NA	56-098 E-51
(4) Max. Running Load Convey-Air Only - Amps.		43.9	28.0	14.0	75.3	41.0	20.5	51.0	25.5	75.0	37.5	103.4	51.7	123.4	61.7
(4) Max. Running Load With Auxiliary Conveyor - Amps.		65.9	41.0 (54.0)	20.5 (27.0)	75.3	54.0 (67.0)	27.0 (33.5)	64.0 (69.0)	32.0 (38.5)	88.0	44.0 (50.5)	116.4	58.2 (64.7)	123.4	60.2 (74.7)

* Part No. 56-107 shown in chart is a combination contactor with overload relay.

(1) Listed sizes are for copper wire types R, T, and TW in cable, conduit, or earth.

(2) Horsepower, maximum full load current, and maximum running load based upon 5 HP auxiliary conveyor motor.

(3) Control panel is standard equipped with overload relay heater elements for 5 HP auxiliary motor for all models except CA-412 and CAH-632. The maximum HP which can be served directly from control panel is as shown in ( ) and requires change of auxiliary circuit overload relay heater elements when connecting these higher horsepower motors; larger auxiliary conveyer motors require separate contacts and overload protectors with coil circuits connected to Convey-Air control panel terminals for automatic operation.

(4) Maximum running load occurs with blower motor, airlock motor and auxiliary conveyor in operation.

FIG. 3- ELECTRICAL SPECIFICATIONS

INSTALLATION

Convey-Air pneumatic grain handling systems consist of a factory assembled blower unit, airlock unit and a pre-wired control panel to enable convenient field installation.

AIRLOCK UNIT - FIGURE 4

The airlock unit consists basically of a rotary metering airlock, an electric motor, and a speed-reducer drive mounted on a base plate (refer to "Component Description and Function" for additional information). The airlock meters the grain into the conveying tubes at a rate compatible with blower capacity (for conveying thru the system), while it also acts as a barrier to air flow from the blower to prevent "blow-back" into grain inlet side of airlock. (Airlock speed is adjustable...refer to "Specifications" and Operating Adjustments" for additional information.) The electric motor may be either single-phase, or three-phase (depending upon Convey-Air model) and drives the speed-reducer thru a variable speed pulley. The speed-reducer drives the airlock shaft thru a chain and sprocket arrangement. The assembly base plate is equipped with adjustable legs for height and leveling adjustment. Grain supply into airlock will affect and determine airlock positioning.

1. Position airlock unit in desired location while observing the following important points:

   A. Inlet side of airlock discharge transition (beneath base of unit) to be towards the blower unit...observe air flow arrows on discharge transition.

      INFORMATION: One end of airlock discharge transition is slanted to allow for smoother acceleration of grain...this end is positioned towards the sprocket drive end of airlock during factory assembly and should be towards the direction of grain flow. If desired for field installation purposes, the discharge transition may be removed and repositioned 180° (placing "slant end" away from drive sprocket) but still should be in direction of grain flow. Use a new gasket, if required, between flange of discharge transition and base plate...then tighten machine screws ALTERNATELY and EVENLY to secure.

   B. When selecting position of airlock, consider source of grain supply into airlock (refer to Step 6).

   C. Check that grain baffle within airlock inlet (bolted to transition) is positioned as illustrated.

      CAUTION: Keep hands clear of airlock rotor vanes.

2. Level the airlock unit with the adjustable legs (bolted to the base). After positioning is obtained, it may be desirable to secure airlock base in its mounting area.

3. Remove shipping plugs and check inlet and discharge transitions for foreign objects. Manually rotate airlock by turning variable speed drive pulley and visually check for freedom of vane travel.

   CAUTION: Keep hands clear of airlock rotor vanes.

4. Check drive chain for looseness. (If necessary, adjust per instructions under "Service".) Make sure drive belt is installed in grooves of both pulleys.

5. Make certain all safety shields are secured.

6. Connect grain supply to airlock inlet transition.

   A. If grain is to be supplied from dryer, position dryer discharge extension between attaching brackets on airlock inlet transition...making sure that transition opening is completely enclosed by dryer discharge. Push attaching brackets inward and use them as a guide to drill into dryer discharge extension and install self-tapping screws to secure position.

   B. If grain is to be supplied by an auxiliary "feed" auger, refer to "Accessories" for other parts available to connect the inlet transition assembly to desired grain supply. If grain contains an appreciable amount of chaff or fines, it may be necessary to install the accessory vented tube inlet onto the standard inlet transition plate.

      INFORMATION: It may be desirable to install an accessory cut-off gate kit onto airlock inlet transition that may be used as a temporary shut-off for grain into airlock. This will assist in preventing excessive blower overload when restarting system with conveying tubes full, as well as facilitate repairs.

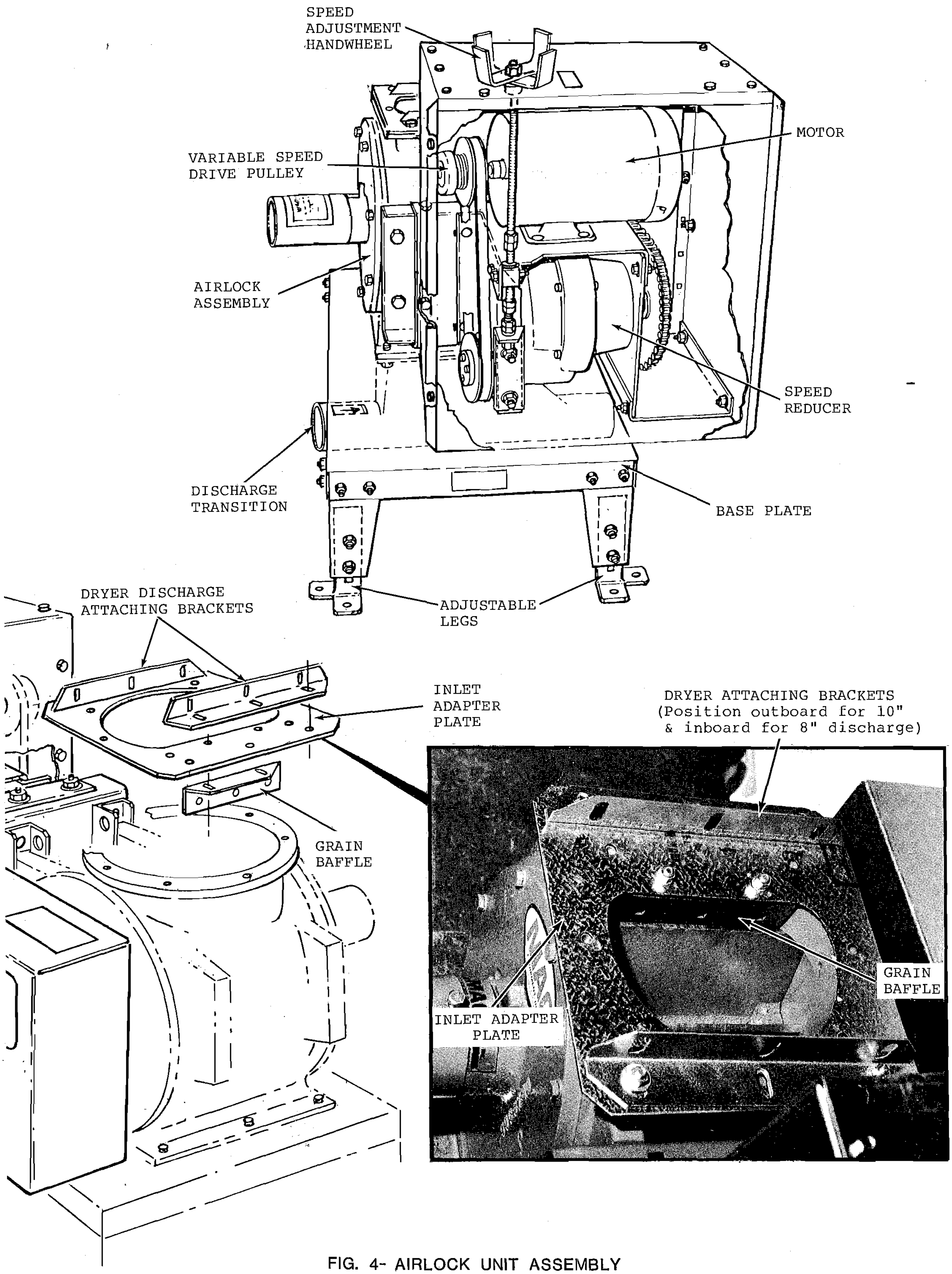


FIG. 4- AIRLOCK UNIT ASSEMBLY

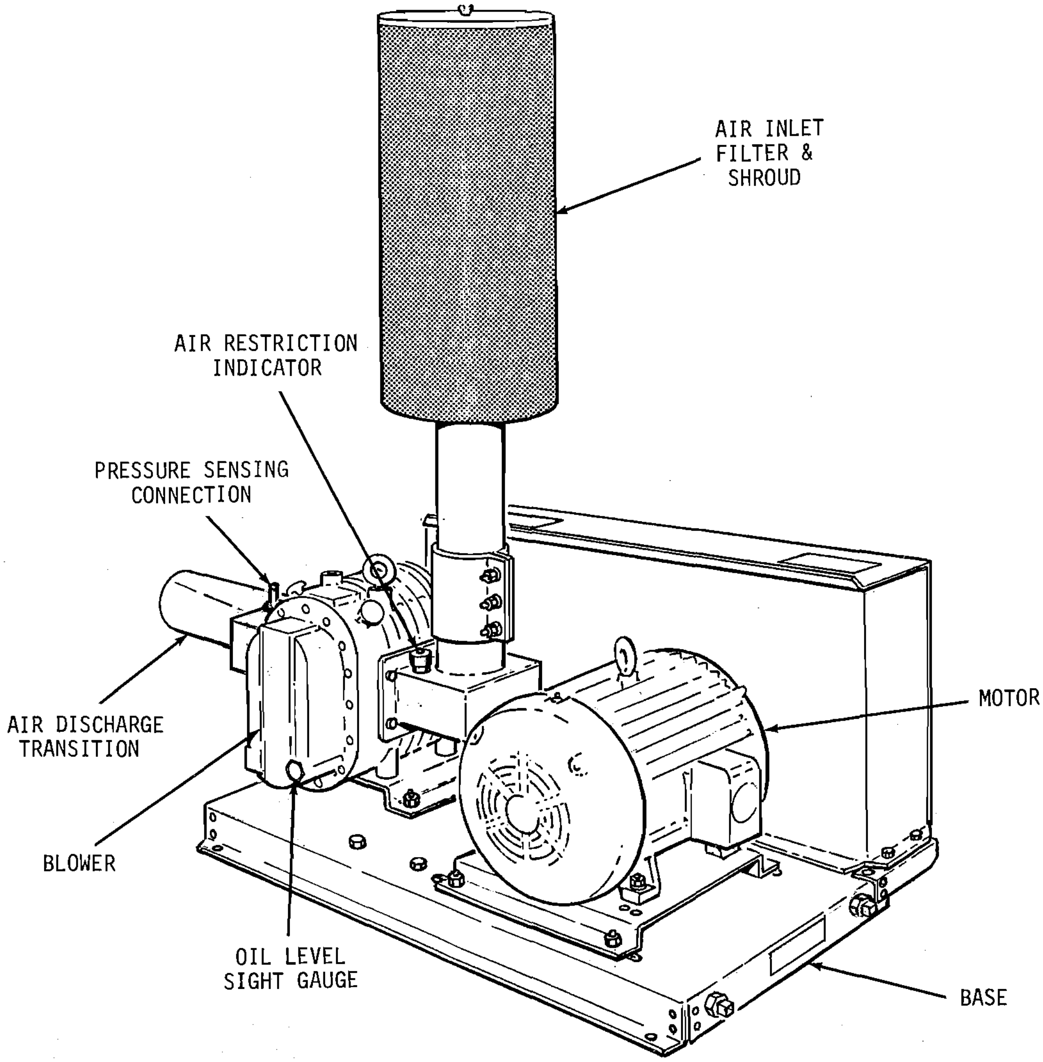


FIG. 5– BLOWER UNIT ASSEMBLY

BLOWER UNIT - FIGURE 5

The blower unit consists basically of a positive displacement rotary blower and an electric motor mounted to a common base (refer to "Component Description and Function" for additional information). The blower provides the air flow necessary for grain movement thru the conveying tubes and is belt driven by its electric motor. The blower motor may be either single-phase, or three-phase (depending upon Convey-Air model) and imposes the greatest electrical load on the system. This should be taken into consideration when determining position of blower to power supply so as to minimize long wiring runs.

1. Position blower unit in desired location, with discharge transition towards the air "in" side of airlock discharge transition...observe airflow arrows. Remove plastic shipping plug from air outlet.

2. Level the blower unit. (After positioning is obtained, it may be desirable to secure the blower unit base.)

3. Check that oil level in blower is midway of sight gauge and breathers are not plugged.

   NOTE: Do not overfill. See "Maintenance/Lubrication" section of manual for instructions.

4. Make certain inlet filter and shroud are installed and secure.

5. Check drive belts for tightness. (If necessary, adjust per instructions under "Service".)

6. Make certain all safety shields are secured.

COMPRESSION COUPLINGS

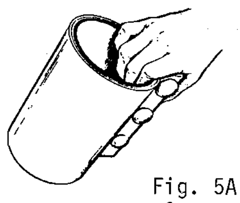


Fig. 5A
Grasp
As Shown

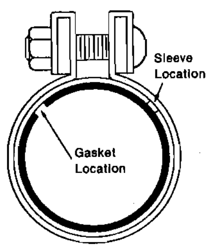


Fig. 5B - Coupling
Ready to Install

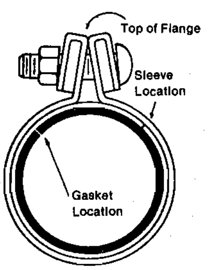


Fig. 5C - Coupling
Fully Tightened

A. HOW TO HANDLE COUPLINGS - Couplings are shipped ready-to-install...do not disassemble. To prevent gasket from slipping out of proper position always grasp coupling as shown in Figure 5A. This will save time by maintaining proper position of gasket and sleeve in relation to shell and flange.

B. INSTALLING COUPLINGS...

1. Confirm pipe O.D. size you intend joining. Each compression coupling has been factory inspected for proper O.D. size before shipment.

2. Be sure outside surface of pipe is dry, and free of dirt, grease or external burrs. (Burrs & jagged pipe ends can cut gasket; dirt & grease can cause coupling slippage.)

3. Grasp coupling as shown in Figure 5A to keep gasket and sleeve (and gasket protector when used) in separate quadrants, as shown in Figure 5B. Be sure gasket teeth mesh and do not overlap.

4. Slide coupling over one pipe past end then butt pipe ends (a small gap 1/16 maximum at butt joint will not reduce coupling performance). Slide coupling back until coupling (and gasket protector when used) is centered over joint. Use care when sliding coupling into place...avoid wrinkling or overlapping gasket (or gasket protector when used).

5. When static electricity bleed path is required, then a grounding strip should be used.

6. Partially tighten bolts uniformly to insure proper seating of inner sleeve and gasket.

7. Then tighten bolts evenly as follows:

   5/16 bolt size - 12 ft. lbs. torque
   1/2 bolt size - 45 ft. lbs. torque
   5/8 bolt size - 65 ft. lbs. torque
   3/4 bolt size - 95 ft. lbs. torque

   (Where SAE GR 5 5/8 bolts are specified tighten to 95 ft.-lbs.) For couplings with aluminum shell and inner sleeve do not exceed 40 ft. lbs.)

8. When properly and evenly tightened to the recommended torque the coupling installation is complete. The top edges of the flanges will touch and flanges appear as a vee when viewed from the end, as shown in Figure 5C...do not attempt tightening bolts to flatten flange faces together, as this exceeds recommended limits.

CONVEYING TUBE CONNECTIONS

Conveying tubing, pre-formed elbows, flexible hose, couplers and other related parts available to complete system installation are listed in "Accessories" section of this manual.

CAUTION: Do not use plastic tubing as it may cause high voltage static electricity which could result in serious injury or dust explosion.

The lightweight conveying tubes and pre-formed elbows are connected by "compression-type" couplings. Conveying tube diameters are matched to the systems recommended operating capacity...the tubes may be installed above, or below ground and are to be cut to lengths necessary for installation. The compression couplers are of the bolted-type and use "rubber" sleeve inserts. Use the longer bolted type compression couplers for greater strength where longer spans are encountered. The pre-formed elbows are available in 45° and 90° long radius sizes to provide for directional changes of conveying tubes. The cam lock type coupler is threaded to accept a pipe nipple (of conveying tube diameter)...the pipe nipple is to be welded onto the inlet end of the conveying tubes leading to the final destination point. The female cam lock coupler is compression-type for insertion into the material handling flex hose...clamps are used to secure flexible hose to the female cam lock and to the conveying tube. The adjustable discharge spout (accessory item) may be clamped to tubing at termination end. All of the cyclone accessory units are connected to the end of the conveying tube by an adapter.

CAUTION: All conveying tubes must be adequately supported and couplers securely tightened to prevent separation when pressurized.

1. Check blower discharge transition for foreign objects. A flexible connection should be installed between the blower transition and the main steel tubing. This flexible connection will also minimize the transmission of mechanical noise from the blower to the piping.

2. Connect blower discharge to airlock, using conveying tubing and couplers (with gaskets)...observe airflow arrows. To prevent static electricity build-up within conveying system tubes, use grounding strips within compression couplers. Also, in system layouts where flexible hose is installed, it is advisable to provide a ground wire to act as a bleed path.

3. Connect grain conveying tubing to airlock discharge, using couplers (with gaskets).

   INFORMATION: Grain conveying line should be straight for at least the first 45 inches on 3" systems; 60 inches on 4" systems; 75 inches on 5" systems; and 90" on 6" systems. This will allow grain to accelerate and ensure good clean-out of airlock discharge.

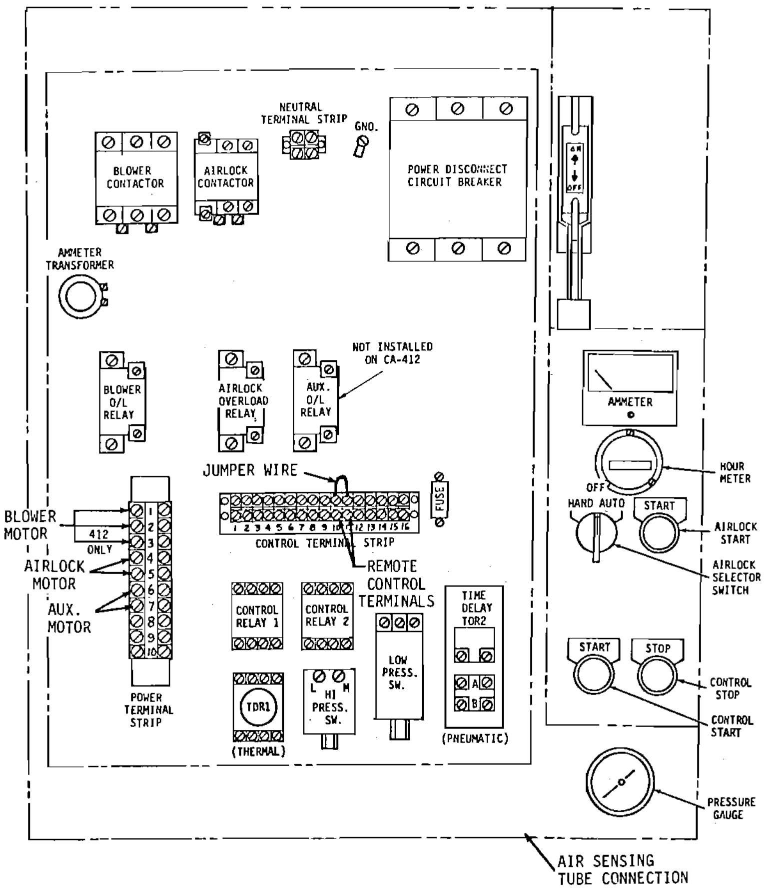


FIG. 6- SINGLE PHASE CONTROL PANEL LAYOUT

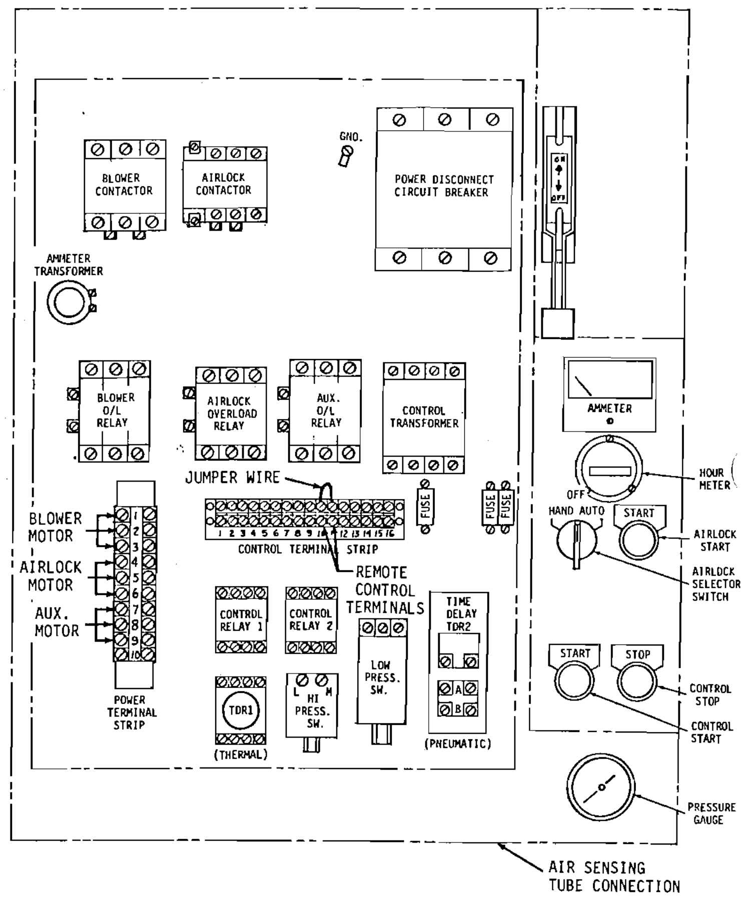


FIG. 7- THREE PHASE CONTROL PANEL LAYOUT

CONTROL PANEL - FIGURES 6 & 7

The control panel contains the necessary electrical and electro/pneumatic components for motor operation, overload protection, blower shut-down delay, high operating pressure shut-down protection, low pressure sensing and system monitoring (electrical and pneumatic).

1. Mount control panel in desired location.

2. Connect one end of air pressure sensing tubing to the fitting on blower discharge transition... connect other end of sensing tube to bottom of control panel.

3. Have qualified personnel connect wiring between airlock motor, blower motor, auxiliary conveyor motor (if used) and control panel terminals according to schematic wiring diagrams...also make any connections to remote control terminals necessary for automatic operation of system (refer to "Connecting for Automatic/Remote Operation" for additional information). Provide dependable equipment grounds to components. Observe all local, state, or provincial electrical codes.

4. Connect power supply to control panel following recommendations under heading "Electrical Power Supply", then test system to ensure that motors are providing correct rotation of components (blower and airlock).

   NOTE: On three-phase motors, it is important to check direction of rotation. To reverse direction of rotation on 3-PH. motors, it is only necessary to interchange any two power leads.

   While airlock is being test operated, set speed adjustment handwheel to the extreme DECREASE position, then back away approximately 4 or 5 turns from that point.

ELECTRICAL POWER SUPPLY

1. An adequate power supply and proper wiring are important factors for maximum performance and long life of the system. Electrical service must be of adequate size to prevent low voltage damage to motors and control circuits. Power supply for single phase models must include a neutral wire. All Convey-Air system electrical components should be field provided with a dependable equipment ground. Electrical power supply should conform to local, state, or provincial codes.

2. The Convey-Air control panel is equipped with a power disconnect circuit breaker which permits total power shut down before opening the control panel cover, as may be required for inspection or service.

3. Contact the service representative of the power supplier to advise of the additional load to be placed on the line. Check KVA rating of transformers while considering total horsepower load. The power supply wiring and transformers must be capable of providing adequate motor starting and operating voltage. Refer to motor nameplate and Fig. 3; Electrical Specifications.

4. Figure 3 indicates the electrical load in horsepower and full load current for the two motors used in the Convey-Air system, and for an auxiliary auger motor which may be connected directly to the control panel.

5. Overload relays are identified in Figs. 6 and 7; part numbers are reflected in Fig. 3.

6. See wiring schematics and Figs. 6 and 7 for control panel connection terminals that may be used to connect an auxiliary conveyor motor. Refer to Fig. 3; Electrical Specifications chart for maximum horsepower, current, and load. Also, refer to sub-heading "Connecting Auxiliary Motors".

CONNECTING FOR AUTO/REMOTE OPERATION - FIGURES 6 & 7

The Convey-Air control panel is designed to allow either automatic, or manual control of the complete grain conveying operation.

If automatic/remote operation is desired, the "controlling" switches that will signal the Convey-Air system to operate (such as pressure switches in a surge bin, or interlock contacts on unload control of a dryer) must be connected to the Convey-Air control panel. Connection is to be made at control strip terminals #10 and #11...jumper wire (between these two terminals) is to be removed for automatic remote operation.

If automatic remote operation of Convey-Air system is from a dryer, be certain to connect Convey-Air control circuit to dryer safety circuit in order to shut down dryer in the event of a conveying malfunction. On 1982 and later models, use control strip terminals No. 1 and 2; however, with the Convey-Air circuit connected into the dryer safety circuit, the Convey-Air control circuit must be energized before the dryer will operate.

IMPORTANT: When operating the Convey-Air system with a grain dryer, the airlock selector switch MUST be set in the AUTO. position when the dryer is operating. Failure to do this could result in the dryer discharging grain with the airlock not operating!

CONNECTING AUXILIARY MOTORS - FIGURES 6 & 7

The Convey-Air control panel is equipped to supply power to an auxiliary conveying auger motor of specific horsepower rating. The auxiliary motor may be connected directly to the control panel power terminal strip and will operate simultaneously with the airlock. The MAXIMUM horsepower (and amperage load) which can be served directly from the control panel is listed between the parenthesis ( ) in Fig. 3; Electrical Specifications. However, the control panel is standard equipped with overload relay heater elements for 5 horsepower auxiliary motors which must be changed when connecting these higher horsepower motors.

Auxiliary motors LARGER THAN MAXIMUM horsepower listed (between ( ) in Fig. 3) require separate contactors and overload protectors with coil circuits connected to Convey-Air control panel terminals. If 230 volt coil circuit, connect to POWER terminal strip #4 and #5. If 115 volt coil circuit, connect to CONTROL terminal strip #10 and one of the "white" wire control terminal connections.

INFORMATION: When using an auxiliary auger to "feed" grain into airlock, the auxiliary auger must be balanced to the airlock capacity...refer to "Operating Adjustments" for additional information.

COMPONENT DESCRIPTION AND FUNCTION

Convey-Air positive pressure, pneumatic grain handling systems are designed with reliable, long-life, low maintenance components. The system consists of a factory assembled blower unit, a factory assembled air-lock unit and a pre-wired control panel. The blower unit provides the air flow necessary for grain movement thru the conveying tubes; the airlock unit meters the grain into the conveying tubes at a rate compatible with blower capacity and also acts to block air flow into the grain inlet side of airlock; the control panel contains the components necessary for complete control, protection, and monitoring of the system and its components. Convey-Air systems are designed to be versatile in application and allow custom-tailoring to readily adapt to individual requirements by providing light weight conveying tubes, pre-formed elbows and other accessories to complete the basic system (refer to "Accessories" for additional information).

BLOWER UNIT - FIGURE 8

The blower unit consists basically of a rotary type blower and an electric motor with shielded belt drive and mounted to a common base.

BLOWER ASSEMBLY - FIGURE 8

The blower assembly is a positive displacement, two lobed rotary air pump of closed end configuration. The blower utilizes helical timing gears and splined rotor shafts at timing gear ends. The blower air inlet port is protected by a serviceable filter element. Its discharge transition (air outlet) contains a check valve assembly to prevent entry of grain into the pump...this discharge transition is provided with a connector to supply "sensing air" to electro/pneumatic relays (located in control panel) for blower protection (refer to "Control Panel Assembly" for additional information).

BLOWER MOTOR

The electric motor which drives the blower assembly may be either single-phase, 10 HP, 15 HP, or three-phase, 10 HP, 15 HP, 20 HP, 30 HP, 40 HP or 50 HP, depending upon Convey-Air model. All motors, except for 6" blower models, operate at 1750 RPM (refer to Figure 3 - "Electrical Specifications", and motor nameplate for additional information).

> INFORMATION: All blower motor housings are of totally enclosed construction, except the 15 HP, single-phase motor which is of open, drip proof construction.

AIR RESTRICTION INDICATOR

The air inlet transition of the blower is fitted with an air restriction indicator to assure peak blower operating efficiency. The device will visually indicate a RED COLOR to signal the operator when the air cleaner requires servicing.

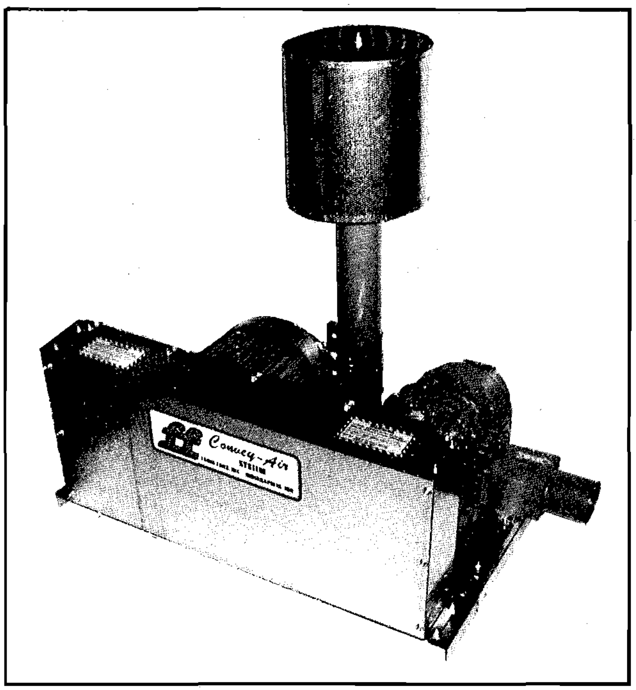


FIG. 8- BLOWER UNIT ASSEMBLY

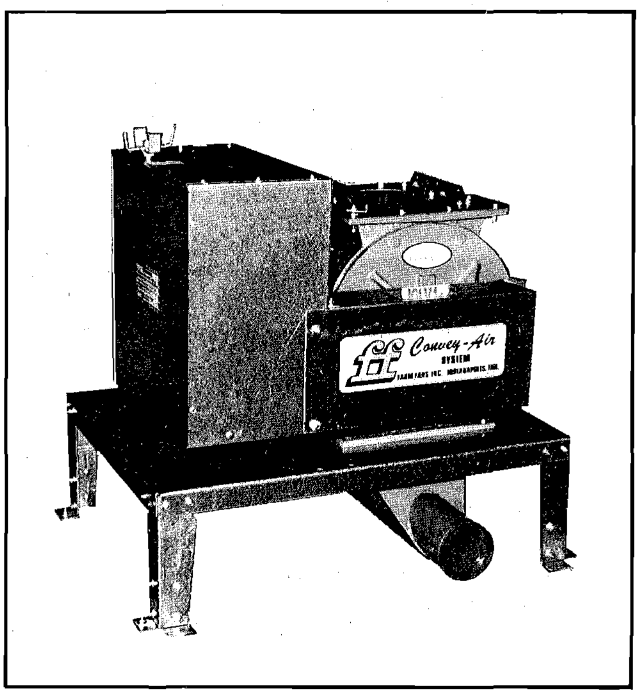


FIG. 9- AIRLOCK UNIT ASSEMBLY

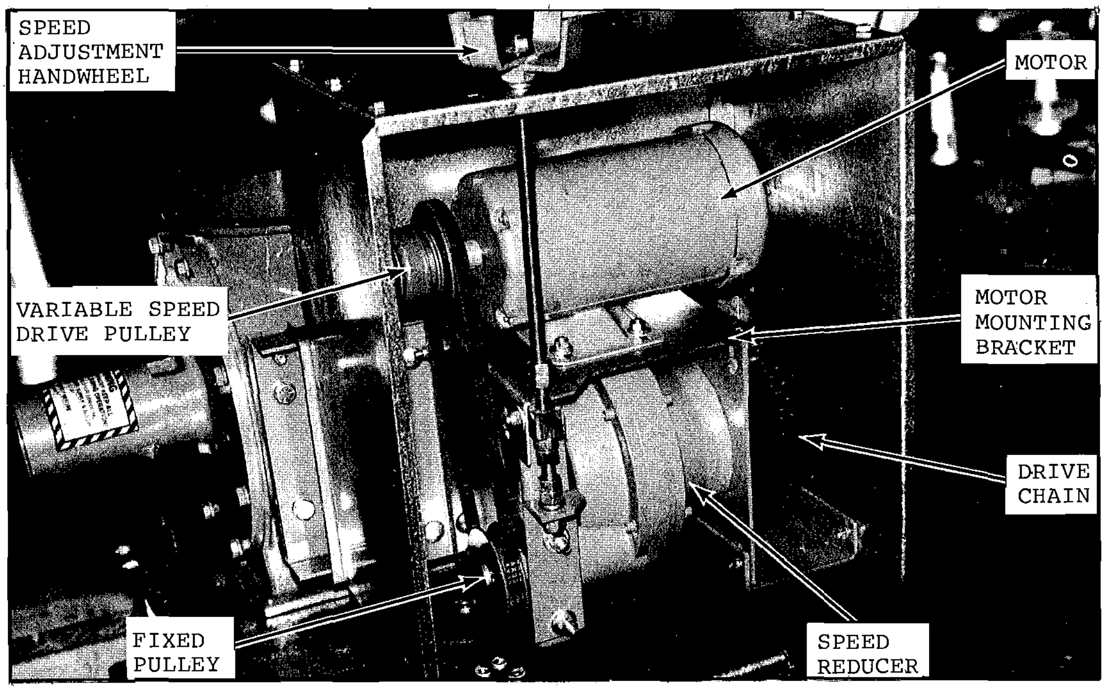


FIG. 10- AIRLOCK DRIVE MECHANISM (TYPICAL)

AIRLOCK UNIT - FIGURE 9

The airlock unit consists basically of a rotary metering airlock, an electric motor, and a speed-reducer drive arrangement mounted to a common base plate with shielded driving pulleys and sprockets for personal protection.

AIRLOCK ASSEMBLY

The airlock is a positive displacement, rotary vane type assembly which acts as a "revolving door" to meter grain into the conveying tubes at a desired rate (adjustable; see "SPECIFICATIONS" for adjustment range) while also acting as a barrier to prevent airflow into the grain inlet side of the airlock. The fabricated rotor vanes revolve in a close tolerance to the cast housing, between cast end plates. The rotor shaft is sealed to the cast end plates by "zerk" lubricated, lip type seals and is carried by sealed bearings installed in both cast end plates.

AIRLOCK MOTOR - FIGURE 10

The electric motor which powers the airlock (thru the speed reducer) may be either single-phase, 1/2 HP or 3/4 HP...or three-phase, 1/2 HP, 3/4 HP, or 1 HP, depending upon Convey-Air model. All airlock motors are totally enclosed, fan cooled and operate at 1750 RPM (refer to Figure 3 for additional electrical information).

A variable speed drive pulley mounts on motor shaft and drives the speed reducer.

SPEED REDUCER - FIGURE 10

The speed reducer is a planetary type gear box assembly which drives the airlock at a 60:1 ratio to input RPM (from variable speed drive). The speed reducer was factory filled with lubricant and requires no additional attention to lubrication.

CONTROL PANEL ASSEMBLY - FIGURES 11 & 12

The control panel assembly contains the necessary electrical and electro/pneumatic components for motor operation, overload protection, blower shut-down delay, high and low operating pressure shut-down protection, air pressure sensing and system monitoring (electrical and pneumatic). The standard components of the Convey-Air control panel assembly are identified in Fig. 11 (single-phase) and Fig. 12 (three-phase). Their function is reflected in the following descriptive paragraphs (also refer to Fig. 3 for additional electrical information and to parts listings for model application).

POWER DISCONNECT CIRCUIT BREAKER

The power disconnect circuit breaker permits total power shut-down and may be rated either at 60 amps, 100 amps, or 150 amps, depending upon Convey-Air model. This circuit breaker assembly is manually reset and is operated mechanically by the external latch handle which must be moved to "Off" position before opening control panel door. (The door is also equipped with a key lock handle for added safety.)

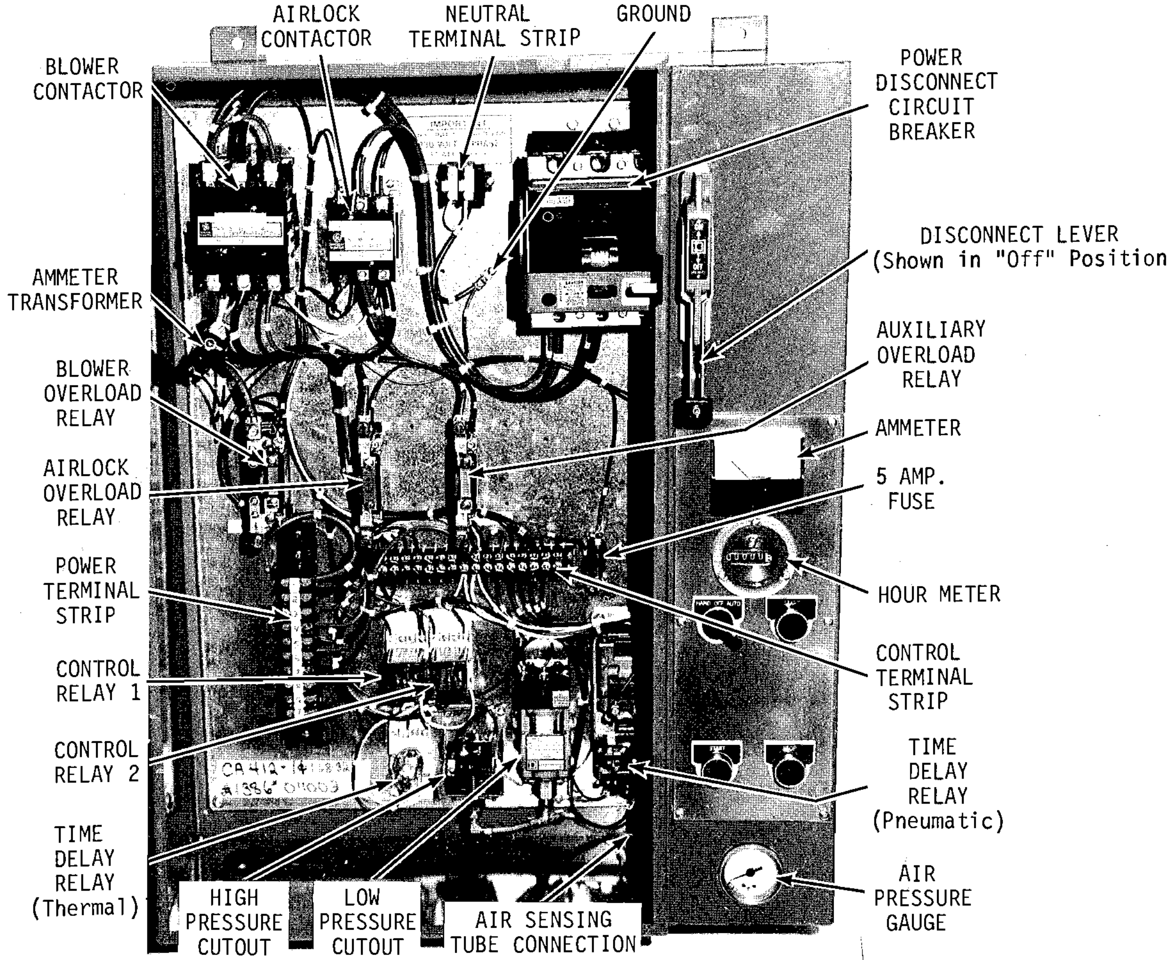


FIG. 11- SINGLE PHASE CONTROL PANEL COMPONENTS (TYPICAL)

BLOWER AND AIRLOCK MOTOR CONTACTORS

Motor contactors are located as shown in Figs. 11 and 12, with physical appearance depending upon Convey-Air model. (Refer to parts listings for contactors used in specific models.)

OVERLOAD RELAYS

Motor overload relays are located approximately as shown in Figs. 11 and 12, with physical appearance depending upon Convey-Air model. (Refer to parts listings for overloads used in specific models, and to Fig. 3 for relay heater element part numbers.) These overload relays are all set in the manual mode at the factory...if overload trips to open position, it must be manually reset.

CONTROL TRANSFORMER

The control transformer is used on all three-phase control panels to step down the supply voltage to 115 volt control circuit voltage. Transformer wiring is shown in the wiring diagrams and is also illustrated by the graphic instructions shown on transformer.

TIME DELAY RELAY (PNEUMATIC)

This adjustable time delay relay is used to allow additional blower operation (for cleaning out conveying system) after the airlock "feeding" system stops putting grain into the tubes. This relay is adjustable between 1/5 to 180 seconds and is factory set to "time out" at approximately 15 seconds. It may be reset within range stated by turning adjustment screw clockwise to increase (or counterclockwise to decrease) the time interval between airlock and blower shut down...as may be necessary to insure good clean-out of conveying tubes after airlock "feeding" stops. Refer to "Operating Adjustments" for instructions.

HIGH PRESSURE "CUT-OUT" SWITCH

Pneumatically operated switch, factory set to open at 10 psi (system gauge pressure). This switch is used to shut-down the Convey-Air system when air pressure at blower outlet reaches 10 psi...protecting blower and blower motor if system becomes plugged, or an overload condition occurs.

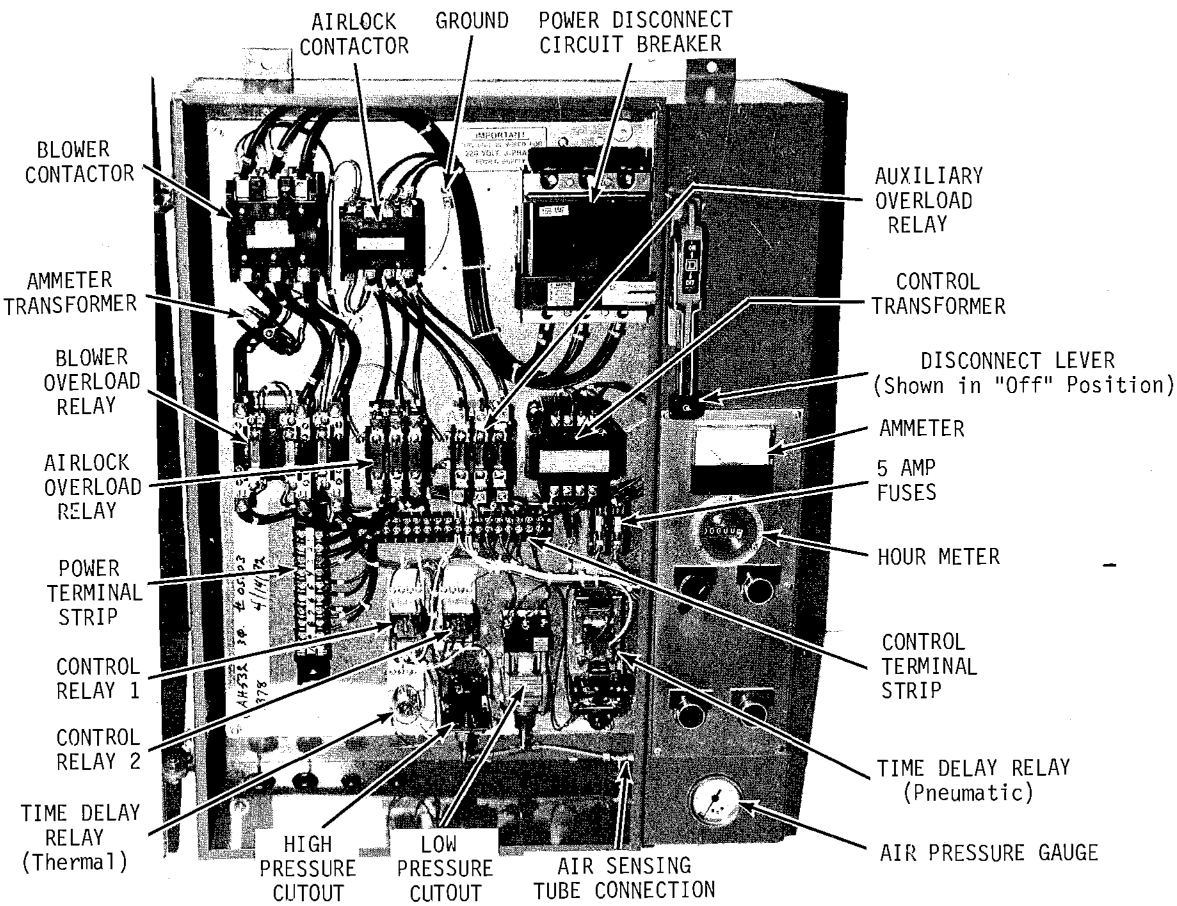


FIG. 12- THREE PHASE CONTROL PANEL COMPONENTS (TYPICAL)

LOW PRESSURE "CUT-OUT" SWITCH

Pneumatically operated switch, factory set to open at 0.5 psi. This switch is used in conjunction with the thermal time delay relay to shut-down the Convey-Air system if air pressure (at blower outlet) does not rise to normal operating pressure (2-6 psi, depending upon feed rate and line length) within reasonable interval determined by thermal time delay. (No grain entering system, or blower failure would be most probable causes of malfunction and cause switch to remain closed.)

TIME DELAY RELAY (THERMAL)

The thermal time delay relay (115C30) is used in conjunction with the low pressure "cut-out" switch and de-energizes the control circuit if system pressure does not rise above 0.5 psi within approximately 30 seconds after blower starts (e.g., low pressure "cut-out" switch remains closed for approx. 30 seconds).

CONTROL RELAY 1 (CR1)

This DPDT (double pole, double throw) relay with 110 volt coil maintains the control circuit during normal system operation. This relay will shut off system motors if conveying tube air pressure is high, or low...and/or if blower overload, or power failure occurs.

CONTROL RELAY 2 (CR2)

This DPDT (double pole, double throw) relay with 110 volt coil acts as a safety device in the event of motor overload of either the airlock or the auxiliary conveyor. If either of these motors overload, both will automatically de-energize and the dryer will shut-down, if the dryer safety circuit is connected to control terminals No. 1 and No. 2 within the Convey-Air control box. The blower, however, would continue to operate for its normal time delay interval.

CONTROL TERMINAL STRIP

This 16 position terminal strip provides convenient connections to the control circuits.

POWER TERMINAL STRIP

This 10 position terminal strip provides convenient connection of motors into the power supply circuit.

AMMETER AND CURRENT TRANSFORMER

The ammeter indicates blower motor amperes (induced upon the current transformer).

CONTROL START BUTTON (GREEN/LIGHTED) - FIGURE 13

This normally open, momentary contact switch is used to energize the control circuit and is illuminated (green) to indicate that the circuit is energized.

CONTROL STOP BUTTON (RED) - FIGURE 13

This normally closed, momentary contact switch is used to de-energize the control circuit instantaneously... stopping blower and airlock (plus auxiliary motor, if used) without allowing the normal delay interval (between airlock and blower shut-down).

AIRLOCK SELECTOR SWITCH - FIGURE 13

This SPDT (single pole, double throw) lever actuated switch is used to set the desired operating mode of the airlock "feeding" system. Switch positions are as follows:

A. "OFF" (Center Position) - Blower and airlock cannot operate.

B. "HAND" (Counterclockwise Position) - Starts blower and will allow continuous operation of airlock until manually moved to "Off" position.

C. "AUTO" (Clockwise Position) - Permits a remote control switch to start and stop...both blower and airlock.

> IMPORTANT: When operating the Convey-Air system with a grain dryer, the airlock selector switch MUST be set in the AUTO. position when the dryer is operating. Failure to do this could result in the dryer discharging grain with the airlock not operating!

AIRLOCK START BUTTON (BLACK) - FIGURE 13

This normally open, momentary contact switch is used to "energize" the airlock (plus auxiliary motor, if used) and "feed" the conveying system AFTER control circuit is energized (and if selector switch is in "Hand" position).

PRESSURE GAUGE - FIGURE 13

This 0-15 psi air pressure gauge is used to indicate the air pressure within the conveying tubes (at blower air discharge transition).

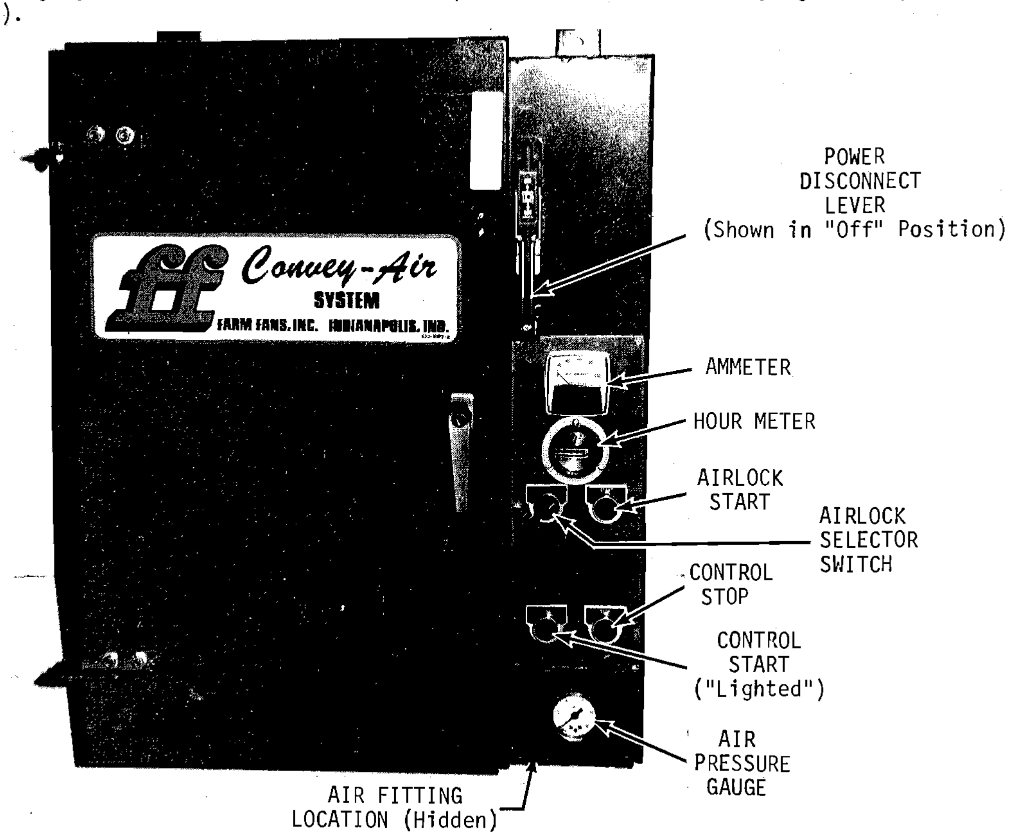


FIG. 13- CONTROL PANEL ASSEMBLY (TYPICAL)

OPERATION

Convey-Air systems are designed to be versatile in application to readily adapt to individual needs, and will allow either "Automatic" or "Manual" control of the complete grain conveying operation. The entire system is electrically and pneumatically monitored to minimize component damage, or grain loss. Complete control of the system is obtained by the control panel, which houses the necessary electrical and electro/pneumatic devices for protection and monitoring, plus an ammeter and air pressure gauge to indicate system operating conditions.

SYSTEM OPERATING CHARACTERISTICS – FIGURE 13

Normal operating characteristics of Convey-Air systems are as described in the following paragraphs (refer to heading "Operating Procedures" for specific instructions).

REMOTE OPERATIONAL CONTROL

The automatic discharge system of a dryer, or pressure switches may be connected to the Convey-Air control panel for remote operational control of the system; remote control switch will automatically determine the time at which conveying action will occur. (Selector switch must be in "Auto" position.)

AUXILIARY CONVEYING AUGER

An auxiliary conveying auger motor (of specific horsepower ratings) may be connected directly to Convey-Air control panel to provide simultaneous operation of auxiliary auger with airlock operation to "force feed" system. (Refer to Fig. 3 and "Installation Instructions" for additional information.)

AUTOMATIC OPERATING MODE

This operating mode is selected by placing the control panel selector switch in "Auto" position and is used when a remote control switch is to AUTOMATICALLY determine the time at which the conveying action is to occur (e.g., the automatic discharge system of a dryer, or pressure switches in a surge bin, etc.)

When operating in "Auto" mode, the blower and airlock will start simultaneously.

MANUAL OPERATING MODE

This operating mode is selected by placing control panel selector switch in "Hand" position and is used when it is desired to MANUALLY determine the time at which grain may enter the conveying system (e.g., being "fed" by an auxiliary conveying auger). The selector switch is placed in "Off" position to stop conveying action.

When operating in "Hand" (manual) mode, the blower should be started first, then start the airlock (plus auxiliary conveyor auger, if used).

NORMAL SHUT-DOWN SEQUENCE

When the Convey-Air system shuts down during normal operation, the airlock (plus auxiliary conveyor auger, if used) stops first, then approximately 15 seconds later (depending upon the setting of the adjustable time delay relay) the blower shuts down. This normal shut-down sequence allows grain to be cleared from the conveying tubes AFTER the airlock has stopped allowing entry of grain into the system.

HIGH PRESSURE OVERLOAD AND AIR LOSS PROTECTION SHUT-DOWN

Air pressure within the Convey-Air system is constantly being monitored by the control panel (high and low pressure cut-out switches). The system air pressure is indicated by the air pressure gauge on the control panel. Normal operating pressure is usually between 2-6 psi, depending upon feed rate and line length.

Should an overload condition, or air loss occur (which causes conveying air pressure to rise to 10 psi, or decrease to 0.5 psi) it will be "sensed" and the system will automatically shut-down to prevent component damage, or unnecessary grain loss.

If operating in "Automatic" mode and PROPERLY connected to the remote control system circuits (such as the automatic discharge system of a dryer) this overload, or air loss signal should also be transmitted to the "feeding" system (such as dryer safety circuit; refer to dryer operation manual for safety circuit wiring information). If wiring is NOT properly completed, possible equipment damage may occur when the Convey-Air system is shut down due to overload, or air loss, and the system "feeding" the airlock is still trying to force grain into the conveying system.

FIG. 14- CONTROL SWITCH LOCATION (TYPICAL)

ELECTRICAL OVERLOAD

Current flow to the blower unit is indicated by the control panel ammeter. The control panel also contains the necessary electrical overload relays to protect the Convey-Air system motors, plus an auxiliary conveying auger of specific horsepower rating (refer to Fig. 3 for additional information).

EMERGENCY STOP

The control stop button provides immediate shut-down of blower and airlock (plus auxiliary conveying auger, if used) without the delaying action of the normal shut-down sequence.

If an emergency stop is made during the normal conveying of grain, care must be taken when restarting system in the event a "plugging" condition has occurred (refer to "Starting After an Emergency Stop").

OPERATING PROCEDURES — FIGURE 14

It is recommended that the Convey-Air system operating characteristics be read and understood in order to become familiar with normal (and abnormal) conditions that may be encountered before attempting to operate the system. Also, refer to "Operating Adjustments" that may be performed to ensure maximum conveying efficiency.

CONTROL SWITCHES - FIGURE 14

The Convey-Air control panel contains an ammeter, an hour meter, an air pressure gauge, and the following manually operated switches:

1. Power Disconnect Circuit Breaker - Manual (lever actuated) reset circuit breaker operated mechanically by the visible external latch handle which must be moved to "Off" position before opening control panel door.

2. Control Stop Button - This switch is used to shut down the system immediately when pressed, without allowing the delaying action of the normal shut-down sequence.

3. Airlock Selector Switch - This three position switch sets the desired operating mode of the system. In "Off" position (center position) the blower and airlock does not operate. In "Hand" position (to left of center) blower and airlock can be started and will run continuously until manually placed in "Off" position. In "Auto" position (to right of center) both blower and airlock may be started and stopped by a remote control switch.

4. Control Start Button - This illuminated switch energizes the control circuit when pressed and allows the system to be started.

5. Airlock Start Button - This switch starts the airlock after control start button has been pressed and selector switch has been placed in "Hand" position.

NORMAL MANUAL OPERATION - FIGURE 14

To start system and operate manual mode ("Hand" position on selector switch) proceed as follows:

1. With power disconnect lever in "On" position and airlock selector switch in "Off" position, start system as follows:

   A. Press "green" control start button; button should "light" to indicate that control circuit is energized.

   B. Rotate airlock selector switch to "Hand" position; blower should start.

   C. Press airlock "Start" switch; airlock should start. If an auxiliary conveying auger is connected to control panel, auxiliary auger motor and airlock should start simultaneously.

2. To shut-down system, proceed as follows:

   A. Rotate airlock selector switch to "Off" position; airlock (and auxiliary conveying auger, if connected) should stop immediately; blower should stop within 1/5 to 180 seconds (depending upon the setting of the adjustable time delay relay which has been factory set at approximately 15 seconds, but which may be reset to ensure good clean-out of conveying tubes).

   B. The "green" light on control start button will remain on to indicate that control circuit is energized.

   C. If it is desired to shut-off power supply (which is recommended when system is not in use), press "red" control stop button (after blower has shut-down automatically), then pull the power disconnect lever to "Off" position.

AUTOMATIC OPERATION - FIGURE 14

NOTE: The desired remote control switch must be connected to the Convey-Air remote control terminals in the control panel to operate in "Automatic" mode.

1. With power disconnect lever in "On" position and airlock selector switch in "Off" position, start system as follows:

   A. Press "green" control start button; button should "light" to indicate that control circuit is energized.

   B. Rotate airlock selector switch to "Auto." position. When the remote control switch closes (to start conveying action) the blower AND the airlock should start simultaneously; conveying will continue until the remote control switch opens to shut down the system.

      IMPORTANT: When operating the Convey-Air system with a grain dryer, the airlock selector switch MUST be set in the AUTO. position when the dryer is operating. Failure to do this could result in the dryer discharging grain with the airlock not operating!

2. When operating in "Automatic" mode, the following will occur when the conveying system shuts down:

   A. When remote control switch "signals" the Convey-Air system to shut down, the airlock will stop immediately.

   B. The blower should stop within 1/5 to 180 seconds (depending upon setting of the adjustable time delay relay which has been factory set at approximately 15 seconds, but which may be reset to ensure good clean-out of conveying tubes).

   C. The "green" light on the control start button will remain on to indicate that control circuit is energized and ready to receive the next starting "signal" from the remote control switch.

3. If it is desired to shut-off power supply (recommended if system is not in use), and AFTER blower has automatically shut-down -

   A. Press the control "Stop" button; "green" light on control "Start" button will go out.

   B. Pull the power disconnect lever to "Off" position.

BLOWER ONLY OPERATION - FIGURE 14

NOTE: When operating blower only, the pneumatically activated low pressure "cut-out" switch and the thermal time delay relay will de-energize control circuit and shut-down blower if system pressure does not rise to 0.5 psi within approximately 30 seconds of blower operation.

1. With power disconnect lever in "On" position and airlock selector switch in "Off" position, start blower as follows:

   A. Press "green" control start button; button should "light" to indicate that control circuit is energized.

   B. Rotate airlock selector switch to "Hand" position; blower should start.

2. To stop blower:

   A. Rotate airlock selector switch to "Off" position; blower should stop within time setting on adjustable time delay, but "green" light on control start button will remain on to indicate control circuit is energized.

   B. If it is desired to shut-off power supply (recommended when system is not in use), press "red" control stop button ("green" light on control start button will go out), then pull the power disconnect lever to "Off" position.

OPERATING TO UNPLUG SYSTEM - FIGURE 14

If the conveying tubes become plugged, causing the high pressure cut-out switch to shut down the system, a momentary blower only procedure may be used to unplug the system.

1. With power disconnect lever in "On" position and airlock selector switch in "Off" position, proceed as follows:

   A. Rotate airlock selector lever to "Hand" position.

   B. Press "green" control start button and HOLD DEPRESSED FOR A MAXIMUM OF 10 SECONDS*, then release. Blower should run while the control start button is held depressed (high pressure cut-out switch is temporarily bypassed). After plug "clears", blower should continue to run when control start button is released.

      * Release control "Start" button after holding depressed for a maximum of 10 seconds, then wait a minimum of three minutes (to avoid overheating blower and motor) before again depressing and holding control start button. Procedure may be repeated, but if system does not clear after a few attempts, it may be necessary to use another method of unplugging conveying tube (such as disconnecting plugged area of tube and physically clearing).

NORMAL SHUT-DOWN AFTER USE - FIGURE 14

Blower operation will stop automatically after the conveying tubes have been cleared of grain. It is recommended that the control panel be shut down when the system is no longer in use (e.g., at end of day and no further conveying is required, etc.).

1. After blower has stopped automatically, press the "red" control stop button. Green light on control start button should go out.

2. Pull the power disconnect lever to "Off" position and install padlock to secure in "Off" position. Check to make sure that control panel door handle is locked against entry.

EMERGENCY STOP - FIGURE 14

If it becomes necessary to shut-down the system immediately (without the normal delaying shut down occurrences between airlock and blower), push the "red" control stop button; blower and airlock should stop immediately.

NOTE: If an emergency stop is made while grain is being conveyed, care must be taken when restarting the system as a plugging condition may have occurred. Refer to "Restarting After Emergency Stop".

RESTARTING AFTER EMERGENCY STOP - FIGURE 14

If the control stop button has been pressed while grain was being conveyed thru the system, proceed as follows during restart:

1. Check that power disconnect lever is in "On" position.

2. Rotate airlock selector switch to "Hand" position.

3. Press "green" control start button and observe air pressure gauge; button should "light" and gauge reading should rise to normal operating range.

   A. If system pressure rises to 10 psi, the blower should shut down to indicate a plugged, or overloaded condition (refer to "Operating to Unplug System" for instructions on clearing tubes).

   B. If system pressure does not rise to 0.5 psi within 30 seconds of blower start, the blower will shut-down to indicate that no grain is entering system. (This shut down is due to the combined actions of the thermal time delay relay and the pneumatically activated low pressure "cut-out" switch.)

4. If no adverse conditions are observed, continue with normal operation of system (manual, or automatic mode).

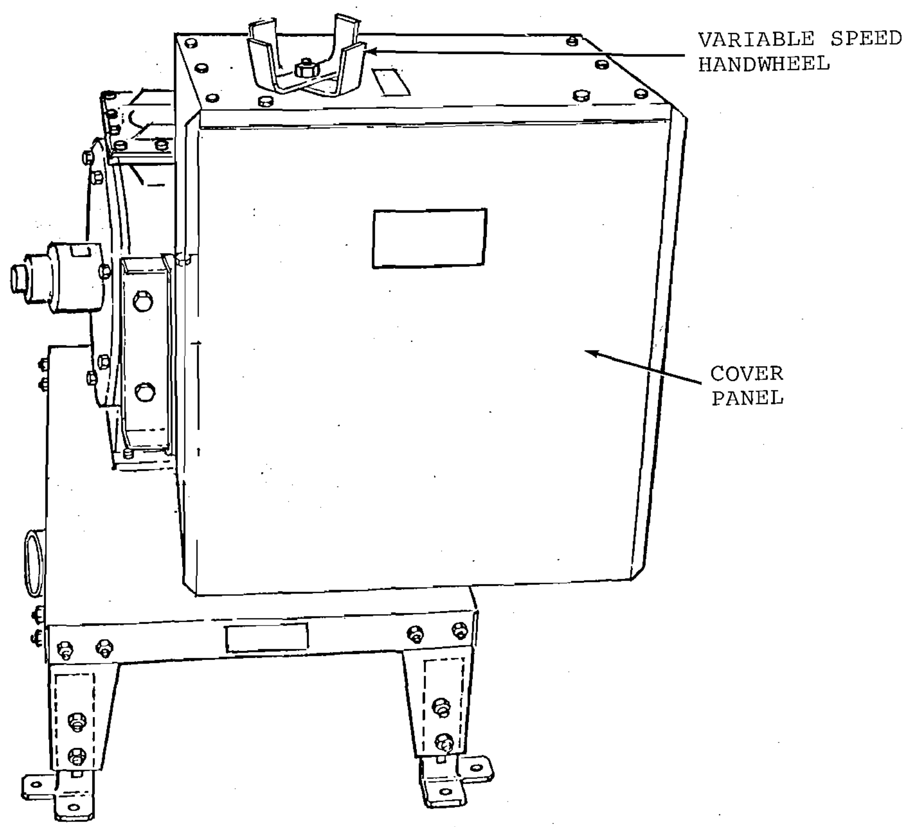


FIG. 15- AIRLOCK VARIABLE SPEED CONTROL

OPERATING ADJUSTMENTS - FIGURE 15

The following adjustments are to be performed with the system in normal operating condition. Refer to "Operating Procedures" for instructions pertaining to operating system control panel.

AIRLOCK OPERATING METHODS AND ADJUSTMENTS

1. AIRLOCK FED BY GRAVITY FLOW AND USED AS CONTROLLED METERING DEVICE:

    NOTE: The system must be operating when making adjustments with the variable speed handwheel.

    A. When the conveying system is being started for the first time, it is recommended that the airlock speed be set near its minimum to prevent over-feeding and possible plugging.

    B. Adjust airlock speed to maintain optimum conveying capacity within the full load amperage range of the blower motor.

        NOTE: When using airlock as a metering device, material flow will be more uniform over a wider range of conditions and the flutes will be nearly full. The grain baffle inside the airlock will wipe excess grain from the rotor blades and prevent pressure feeding of the flutes where they enter the housing. However, on grains or materials with poor flow characteristics such as unhulled peanuts, etc., some cracking may occur. Flutes should not be full. Under these conditions, use one of the following methods of feeding.

2. AIRLOCK FED BY GRAVITY FLOW, SURGE OR STORAGE BIN:

    A. Install an adjustable flow cut-off gate (refer to "ACCESSORIES" heading) onto airlock entry and set in CLOSED position.

    B. Adjust airlock speed to near its maximum so flutes will only partially fill (approximately 70%).

    C. With system operating, slowly OPEN gate until approximately 90% full load amperage of blower motor is reached. Some reserve should remain to handle grain flow variations sometimes experienced through a fixed opening.

3. AIRLOCK FED BY CONTROLLED FLOW CONVEYOR OR ADJUSTABLE METERING OF CONTINUOUS FLOW DRYER:

    A. Adjust airlock speed to near its maximum so flutes will only partially fill (approximately 70%).

    B. With system operating, slow regulate (by gate type adjustment of surge bin or conveyor speed) flow of grain into conveyor or adjust metering system of dryer not to exceed the full load amps. of blower motor.

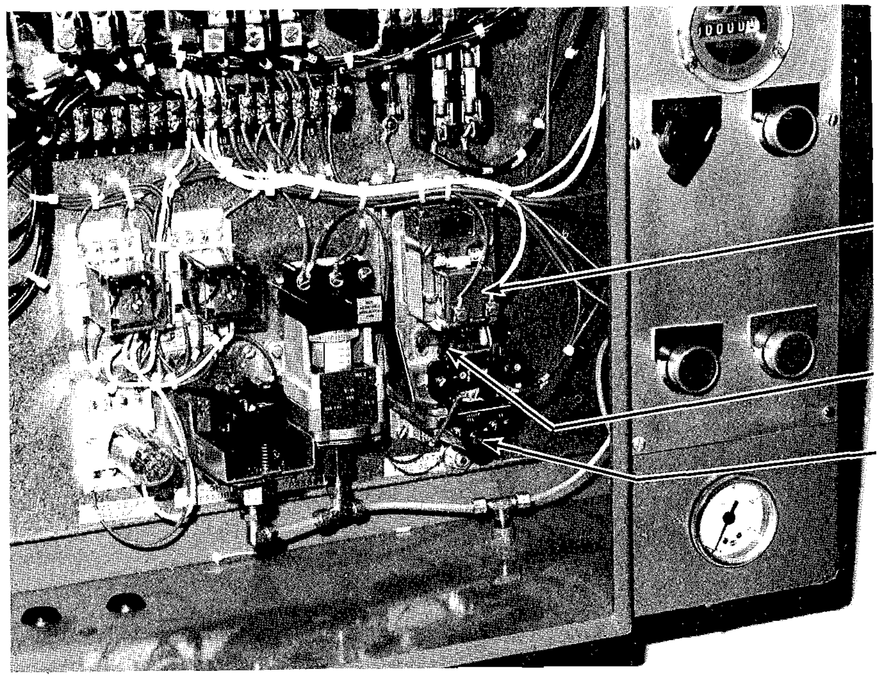


FIG. 16- PNEUMATIC TIME DELAY RELAY (TYPICAL LOCATION)

ADJUSTING PNEUMATIC TIME DELAY RELAY - FIGURE 16

This adjustable time delay relay is used to allow additional blower operation in order to "clean-out" conveying tubes AFTER airlock has stopped "feeding" grain into the system. This relay is adjustable between 1/5 to 180 seconds and is factory set to "time-out" at approximately 15 seconds. If it is desired to reset this time delay to either increase, or decrease the time interval between blower and airlock shut down, proceed as follows:

> NOTE: To prevent an overloading, or plugging condition, it is important that blower operation after airlock shut down be adequate to ensure good clean-out of conveying tubes.

1. With power disconnect lever "Off" and control panel door open, turn adjustment screw fully clockwise to extreme "F" (fast) position.
2. Turn adjustment screw counterclockwise three (3) full turns towards "S" (slow) position.
3. Manually depress solenoid plunger by actuating timing stem lever, while timing interval between contact opening and closing.
4. Continue to turn adjustment screw toward "S" (slow) position until the desired interval setting is obtained, checking occasionally while turning adjustment screw. If desired setting is passed, turn adjustment screw one full turn back toward "F" (fast) position, then turn toward "S" (slow) position in small increments until desired setting is obtained.

   > NOTE: When approaching final adjustment setting, always turn adjusting screw in small increments, frequently checking interval between contact opening and closing. The rate of change of timing in relationship to the adjusting screw position is greater for long time delays than for short time delays. It will be noted that considerably greater adjustment is required at the "F" (fast) end than is required at the "S" (slow) end to produce an equal effect.

5. After adjustment is completed, close and lock control panel door. If system is to be used, place power disconnect lever in "On" position.

SERVICE

Convey-Air pneumatic grain handling systems have been designed to require a minimum of regular maintenance. Periodic routine inspection of system operation for any developing problems, or unsafe conditions will help continue dependable operation.

CAUTION: Lock out power before removing guards, access doors and covers. Refer to "Operating Precautions" on page 1 of this manual and practice all safety procedures at all times.

MAINTENANCE / LUBRICATION

It is recommended that a visual inspection of blower and airlock units be performed daily (prior to operating system) to ensure maximum performance and component reliability.

Observe air restriction indicator on blower daily. If indicator shows a RED color signal, it indicates that air filter requires servicing.

BLOWER - FIGURE 17

Blower servicing should be limited to inlet air filter change (or cleaning), blower case breather/vent cleaning, maintaining proper case oil level, periodic changing of oil, inspecting condition of drive belts (tightening, if necessary) and checking operation of the discharge check valve (within the discharge transition).

NOTE: The blower contains highly precision made parts and field servicing is not recommended.

1. Inlet Air Filter (Fig. 18) - Clean, or change; a clogged filter will result in poor performance, overheating, and internal wear of precision made parts.

   NOTE: When operating under severe conditions, it is advisable to check filter condition daily and clean often.

   A. Remove wing nut, washer and lift shroud upward from intake stack. Clean shroud.

   B. Lift filter element upward from intake stack; clean filter (or replace, if necessary) by tapping sides and top of canister to remove heavy build-up. Use compressed air to GENTLY blow fines from filter, directing air from inside of filter (blowing dust outward) and using care not to damage "paper" cartridge element.

   C. Install clean (or new) filter element onto intake stack and position around gasket surface. Install shroud over filter and secure with flat washer and wing nut.

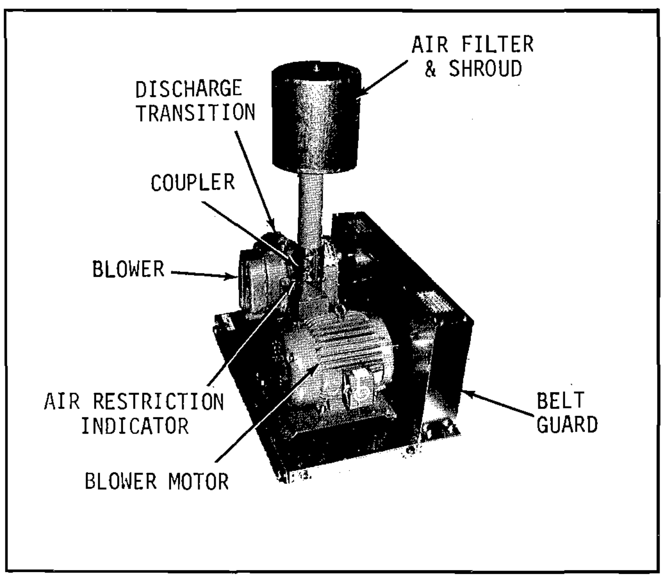


FIG. 17- BLOWER UNIT ASSEMBLY

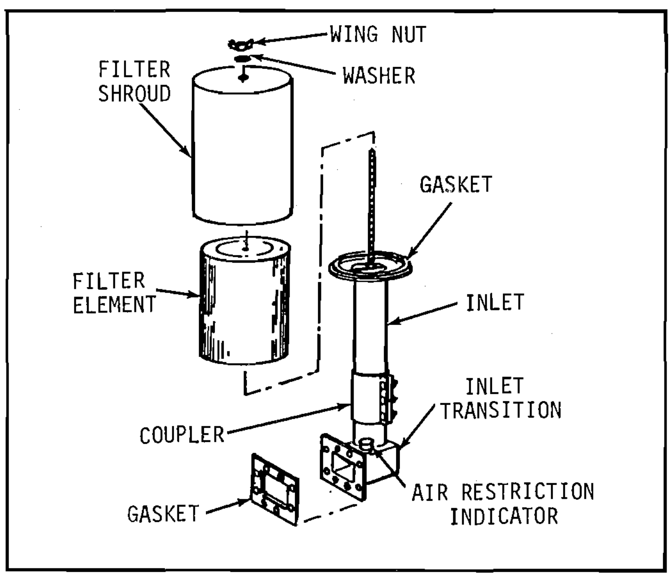


FIG. 18- BLOWER INLET AIR FILTER PARTS

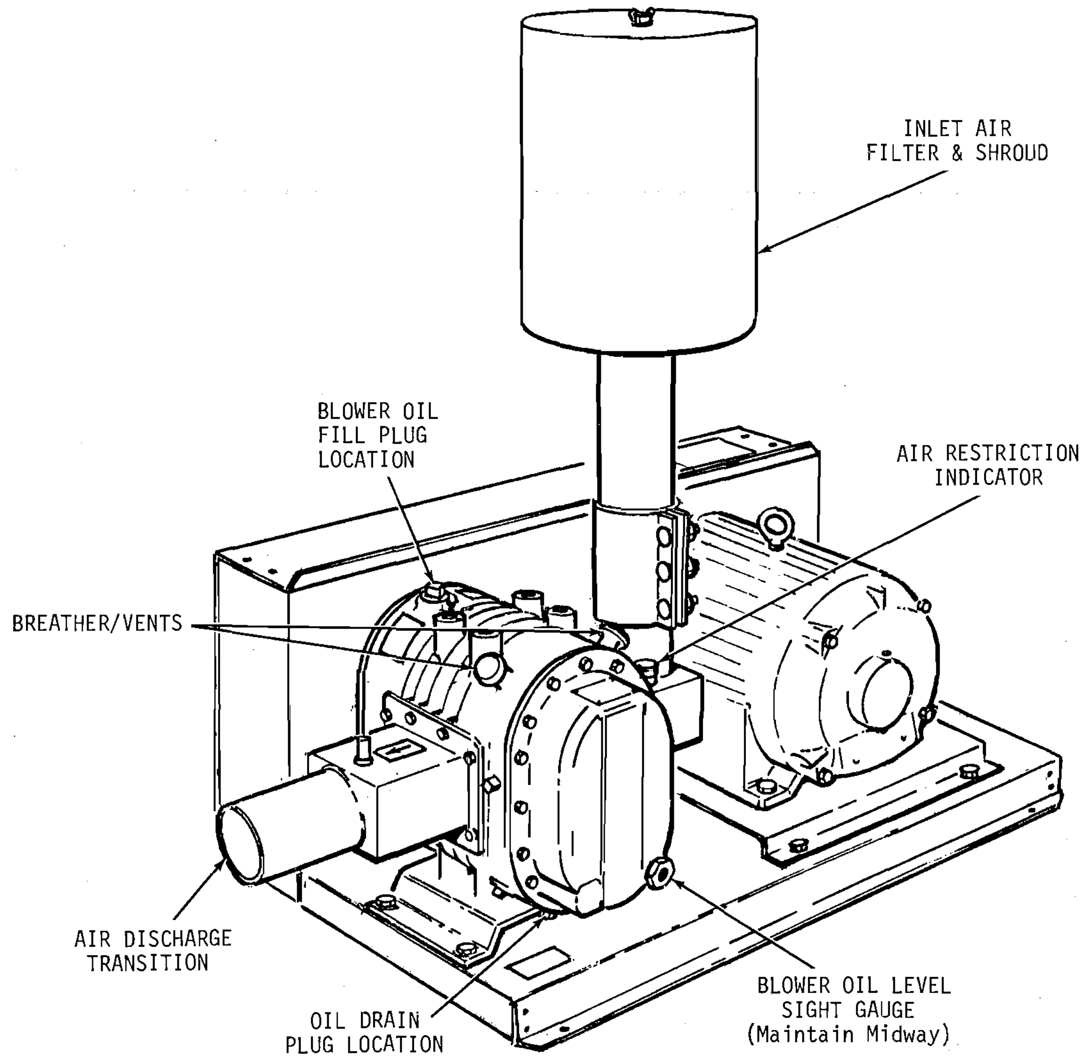


FIG. 19 - BLOWER UNIT ASSEMBLY SERVICE POINTS (TYPICAL)

2. Blower Oil Level (Fig. 19) - Check daily and change oil after every 500 hours of operation, or six month intervals (change more often under SEVERE operating conditions).

   NOTE: Blower gears and bearings are splash lubricated and correct oil level must always be maintained to prevent overheating and internal wear. Level is to be taken with blower NOT OPERATING...wait at least 3 minutes after shut-down of system before checking oil level. DO NOT OVERFILL! Check that blower case breather/vents are not plugged.

   A. Maintain oil level midway in oil gauge sight plug, using a high quality motor oil for lubricant. Oil must meet or exceed the requirements of SAE specifications SE and CC. 10W40 viscosity is recommended for all ordinary operating conditions.

   B. To change blower oil, remove bottom drain plug and allow oil to drain completely; reinstall drain plug and tighten securely. Add recommended oil thru oil fill opening (at top of front case) until oil level is midway in oil gauge sight plug (proper level capacity is approximately 30 oz. - 0.9L).

3. Blower Case Breather/Vent Plugs (Fig. 19) - Clean every 200 hours of operation.

   NOTE: Case breather/vents prevent "airlock" of lubrication chambers (and subsequent wear due to lack of lubrication) by venting oil pump pressure. When operating under very dirty conditions, check and clean vents often.

   A. Remove breather/vents to clean. Use a suitable commercial cleaning solvent and blow dry with compressed air. Install cleaned breather/vents securely.

4. Drive Belts (Fig. 20) - Visually check for signs of stretching, slippage, cracks, and other evidence of failure.

   NOTE: Drive belts should be replaced as matched sets only.

   A. To replace belts, remove safety shield (belt guard), then loosen the drive motor mounting bolts slightly and turn the belt tension adjustment bolts to fully loosen the drive belts. Install new belts in matched sets only and EVENLY tighten the belt tension adjustment bolts until the correct belt tension is obtained. Tighten the drive motor mounting bolts and reinstall the belt safety shield.

   B. To adjust belt tension, turn the adjustment bolts so that rails adjust evenly to obtain the correct belt tension. Be sure that drive motor mounting bolts are securely tightened after adjustment and belt safety shield is installed properly.

   NOTE: Belt tension should be carefully adjusted and belts tightened enough to prevent slippage. Under tightening results in belt slippage and overheating with premature failure. Over tightening leads to heavy bearing loads.

5. Discharge Check Valve - The discharge check valve is located within the discharge transition and is used to prevent entry of grain into blower, which would be possible under certain shut-down, or stoppage conditions. Check valve must hinge freely to assure proper operation.

   A. Discharge check valve is located in discharge transition and is accessible after removal of transition from blower. Valve may be checked, if necessary, by disconnecting tube from discharge transition and reaching into opening.

   CAUTION: Make certain that system is completely shut-down and power supply is locked out before attempting to reach into opening.

6. Belt Pulleys - Refer to "Removal/Installation of Pulleys and Sprockets" for instructions.

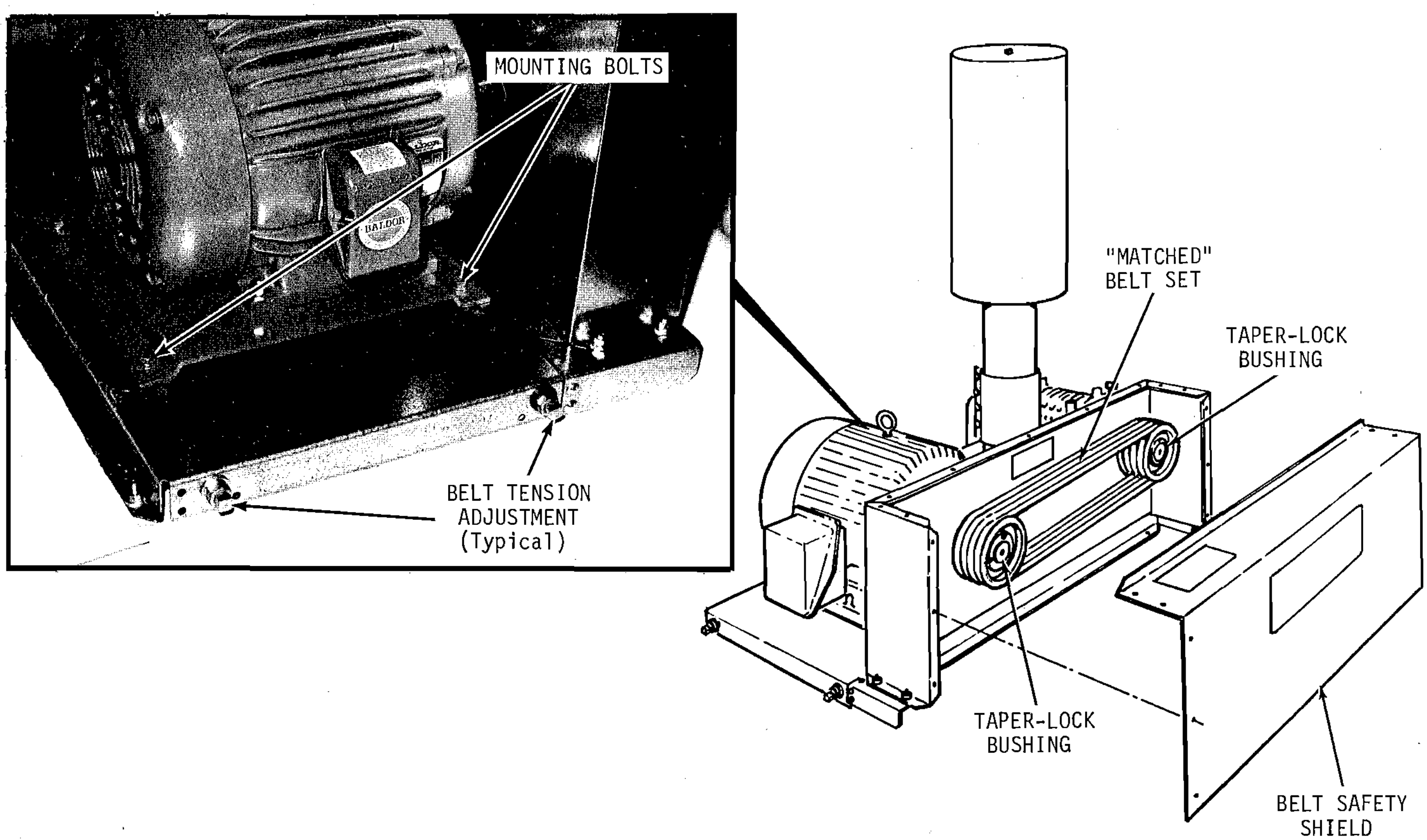


FIG. 20- BLOWER DRIVE BELTS (TYPICAL)

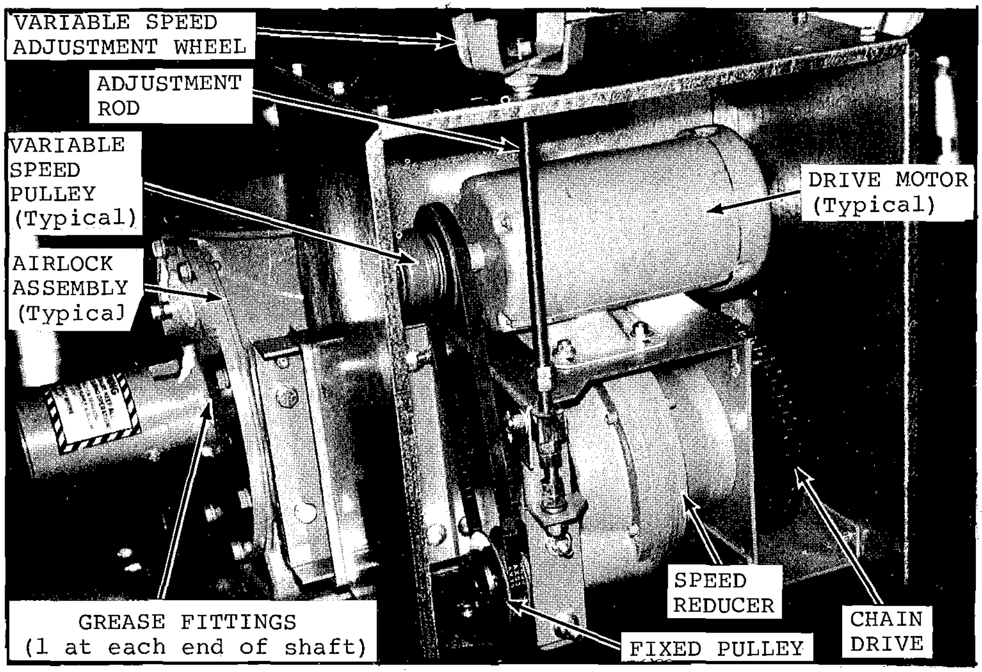


FIG. 21 - AIRLOCK AND DRIVE MECHANISM (COVER PANEL REMOVED) -TYPICAL

AIRLOCK AND SPEED REDUCER - FIGURE 21

Airlock and speed reducer maintenance should be limited to lubricating airlock shaft seals, checking for excessive air loss past shaft seal and rotor vanes, variable speed belt drive mechanism, and airlock chain drive.

1. Airlock Rotor Shaft Seals - Lubricate seals every 40 hours of operation with a good grade of general purpose gun grease (grease fittings are located at shaft seal area of both end plates).

   NOTE: If air leakage past seals occurs, seals should be replaced.

2. Airlock Rotor Excessive Air Loss - If detrimental to system operation, have airlock reconditioned or replaced.

   NOTE: Airlock is designed for minimum clearance between rotor tips and housing, and between end plates and rotor vanes. A certain amount of "blow-by" can be expected due to normal running clearances. However, if excessively abrasive material is being conveyed, "blow-by" may gradually increase to the point where it can be detrimental to system operation.

3. Airlock Rotor Shaft Bearings - These are sealed type bearings, pressed into end plate castings and no further lubrication is required. A locking collar is used to secure bearing to shaft. (Bearings may be replaced by competent service personnel, when necessary.)

4. Speed Reducer - This sealed assembly was filled with lubricant at the factory and no further maintenance should be required.

5. Speed Reducer Belt Drive - Visually check for evidence of belt failure (slippage, cracks, etc.) and check variable speed pulley operation.

   NOTE: Adjustment rod is used to change airlock RPM by causing drive belt to move deeper into, or out of variable speed motor pulley. Speed adjustment should be made only with pulleys rotating. Refer to "Removal/Installation of Pulleys and Sprockets" for instructions relating to fixed pulley.

   A. Belt may be changed by grasping midpoint of belt span and pulling belt deeper into variable speed pulley groove, maneuvering belt from fixed pulley then pulling free of variable speed pulley. New belt may be installed by reversing this removal sequence.

   B. Belt center distances are established to obtain maximum ratio change. Any desired speed change to system should be made by changing size of roller sprockets. Contact Farm Fans for available sizes.

6. Airlock Chain Drive (Fig. 22) - Visually check for wear, "stretching", and looseness (also check alignment of sprockets).

   NOTE: If sprockets are to be removed and/or installed, refer to "Removal/Installation of Pulleys and Sprockets" for instructions.

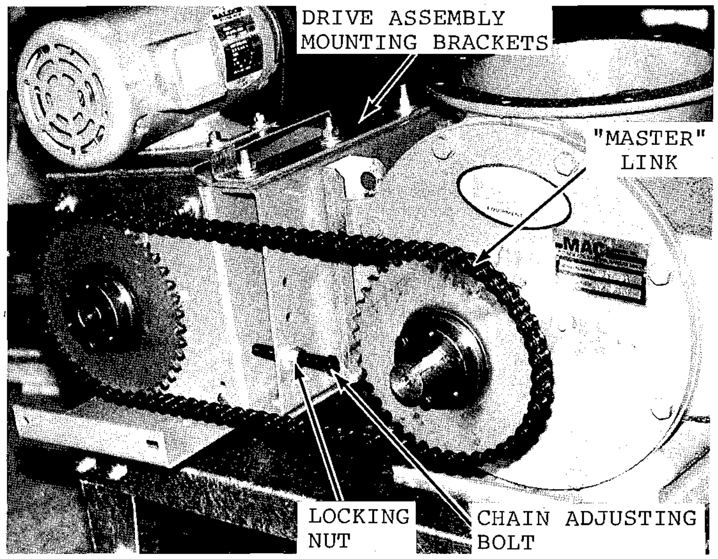


FIG. 22 - AIRLOCK CHAIN DRIVE ARRANGEMENT

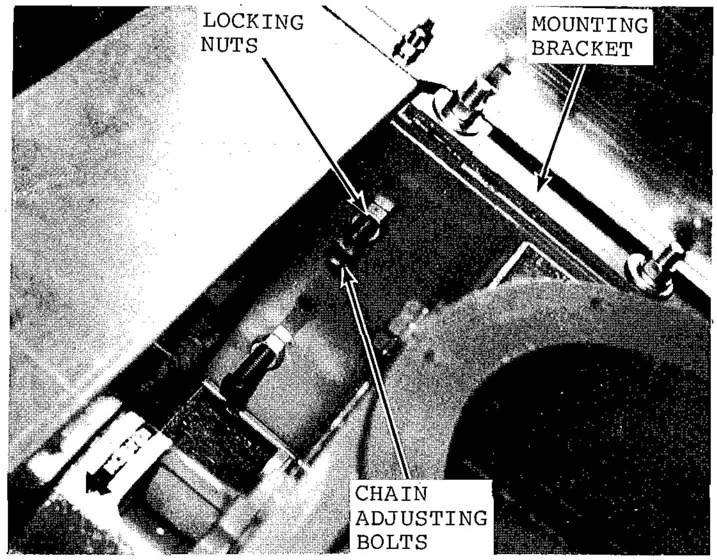


FIG. 23 - AIRLOCK CHAIN ADJUSTMENT BOLTS

A. To remove chain, loosen the drive assembly mounting bolts and the locking nut on both chain adjusting bolts. Back-out both chain adjusting bolts then remove "master" chain link. Re-install chain by reversing removal sequence.

B. To adjust chain tightness (Fig. 23) - Slightly loosen the drive assembly mounting bracket bolts and the locking nuts on both chain adjusting bolts. Turn both chain adjusting bolts evenly to obtain correct chain "slack", then lock in position with locking nuts. Tighten all drive assembly mounting bracket bolts securely.

REMOVAL / INSTALLATION OF PULLEYS AND SPROCKETS

Fixed belt pulleys and drive sprockets are secured to their respective shafts by a taper-lock bushing, shaft key, setscrew and capscrews. These taper-lock bushings also contain threaded holes to be used for disassembly of parts from their shafts. Figure 24 illustrates the typical arrangement of parts.

CAUTION: The capscrews used to secure parts to their respective shafts MUST be inserted thru the NON-THREADED holes in bushing and INTO the threaded holes of pulley, or sprocket to allow parts to be locked securely on shaft. THE THREADED HOLES THRU BUSHING ARE USED FOR DISASSEMBLY ONLY and must not be used for installation as they will not allow parts to be correctly secure, creating a hazardous condition.

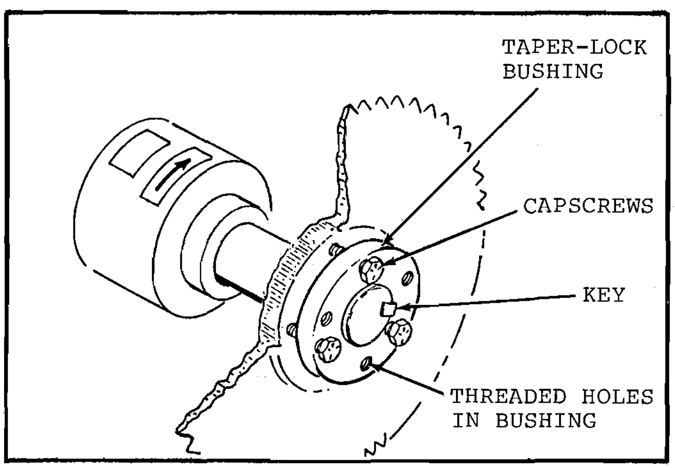
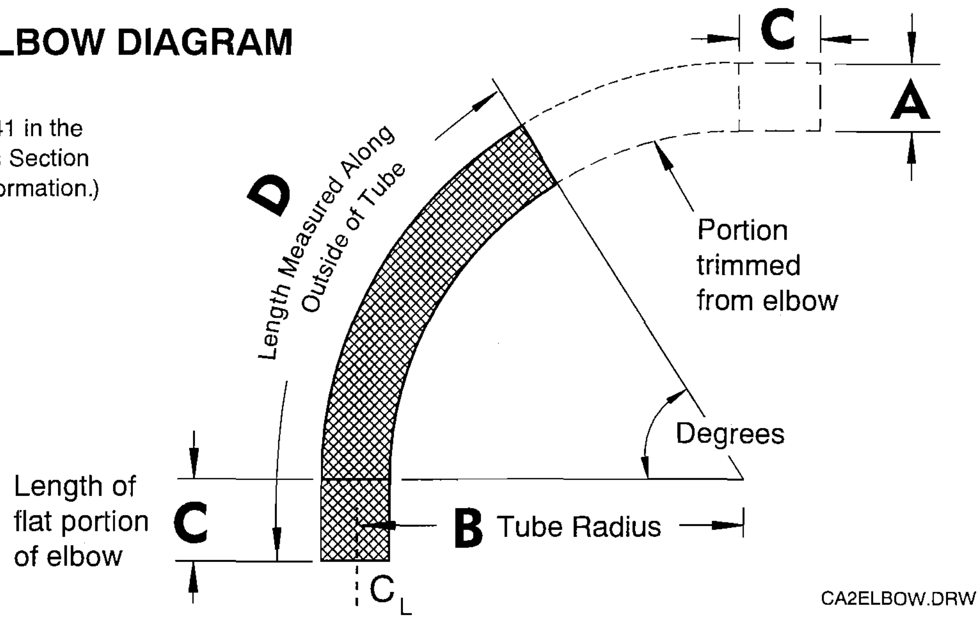


FIG. 24 - TYPICAL INSTALLATION OF TAPER-LOCK BUSHING

TUBE ELBOW DIAGRAM

(See page 41 in the Accessories Section for more information.)



ELBOW RADIUS CHART									
A Tube OD	**B** Tube Radius	Degree of Tube Form							Length Formula
		C	15°	30°	45°	60°	75°	90°	
3"	48"	7.5"	20.5	33.4	46.4	59.3	72.3	85.3	7.5 + (.864 x deg.)
4"	48"	8.5"	21.6	34.7	47.8	60.9	74.0	87	8.5 + (.873 x deg.)
5"	60"	10"	26.4	42.7	59.1	75.5	91.8	108.2	10 + (1.091 x deg.)
6"	60"	12"	28.5	45	61.5	78	94.5	111	12 + (1.100 x deg.)
			D Length Measured Along Outside of Tube - Inches						

ELBOW RADIUS DIAGRAM and SPECS

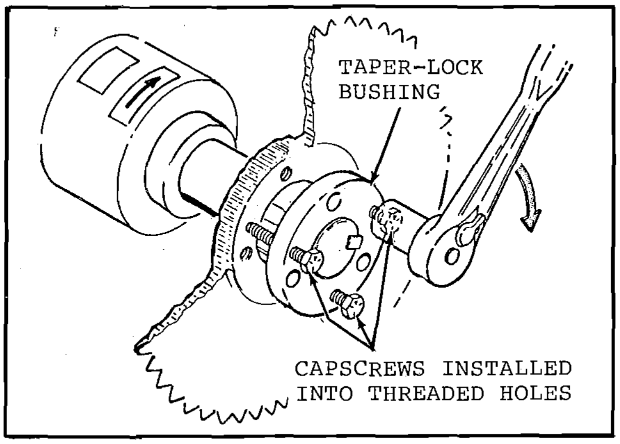


FIG. 25 - CAPSCREW ARRANGEMENT FOR DISASSEMBLY OF BUSHING

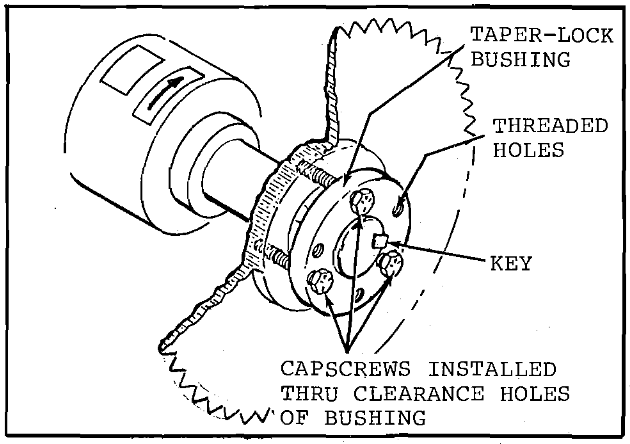


FIG. 26 - CAPSCREW ARRANGEMENT FOR REASSEMBLY OF BUSHING

1. To remove pulley, or sprocket from its respective shaft (Fig. 25) -

   A. Lock out power supply and remove guard necessary to gain access to pulley, or sprocket.

      CAUTION: Make sure power supply is locked out.

   B. Remove the capscrews from taper-lock bushing. Also, loosen the bushing setscrew over the key.

   C. Install Grade 5 capscrews into the THREADED HOLES thru bushing and against front surface of pulley, or sprocket.

      NOTE: Use Grade 5 (or higher strength) capscrews for removal; low strength (unmarked) capscrews may break.

   D. GRADUALLY and EVENLY tighten the capscrews until pulley, or sprocket breaks free, then remove bushing and pulley, or sprocket from shaft.

2. To install pulley, or sprocket onto its respective shaft (Fig. 26) -

      CAUTION: Make sure power supply is locked out.

   A. Carefully clean shaft, key and pulley, or sprocket. Also, thoroughly clean the cone surface and inner bore of bushing.

   B. LOOSELY preassemble bushing to pulley, or sprocket, using the capscrews (with lockwashers) inserted thru the NON-THREADED clearance holes in bushing and into the threaded holes of pulley, or sprocket.

   C. Slide the LOOSELY preassembled bushing (and pulley, or sprocket) over its respective shaft, aligning keyway thru bore of bushing with keyway on shaft, then insert key to maintain alignment and push key inward until it is flush with outer edge of shaft.

   D. Align the LOOSELY preassembled pulley or sprocket to its respective mating pulley, or sprocket and tighten setscrew over key to hold in aligned position.

   E. Use an INCH-POUND torque wrench to GRADUALLY and evenly tighten the capscrews in a PROGRESSIVE manner until the final torque is obtained. Tighten 95 to 108 inch-lbs. for 1/4" capscrews and 180 to 190 inch-lbs. for 5/16" capscrews.

      NOTE: The sheave (or sprocket) should not be drawn into contact against the flanged surface of the bushing. If extreme tightening torques are applied when installing bushing, bursting pressures may be created in the hub of the pulley, or sprocket which can cause it to crack. (Tightening forces on the mounting capscrews are multiplied many times by the wedging "action" of the tapered surface of the bushing which compresses it for a secure fit on the shaft.)

CONVEYING TUBES

Once installed, joints properly made with couplers fully secured and conveying tubes adequately supported normally require no further attention (other than insuring tight joints to prevent unnecessary air and grain loss). The main wear points are normally at the elbows.

PNEUMATIC TIME DELAY RELAY

The pneumatic time delay relay has been factory set to "time out" at 15 seconds, but may be reset within the adjustment range of 1/5 to 180 seconds to insure good clean-out of conveying tubes within the minimum time interval necessary. Refer to "Operating Adjustments" for instructions.

END OF SEASON MAINTENANCE

Although Convey-Air systems have been designed to require a minimum of regular maintenance, it is recommended that the following procedures be practiced in preparation of off-season "storage".

1. Clean grain dust, etc. from all components and touch up all painted surfaces which are chipped or scratched.

2. Make sure of adequate drainage to prevent ANY parts from becoming submerged in water.

3. Protect the internal air box surfaces of the blower and airlock to prevent rusting and possible seizure of parts. The following information may be helpful.

   A. Use a rust preventative such as CRC-Stor & Lube (or another equivalent type product).

   B. Use spraying equipment, if available, and apply the rust preventative as a fine spray to "fog coat" the internal surfaces.

   C. Rotate parts by hand and repeat spraying application, as required, to coat all surfaces.

   D. For access to the blower surfaces, disconnect the flexible hose from the air discharge transition. Then hold the check valve within the transition OPEN (using a length of stiff wire or other suitable tool) and spray through the opening. Avoid removing either the inlet or oulet transition from the blower.

   For access to the inside of the airlock, work through the inlet opening.

4. Make certain that all safety shields are secured.

5. Operate system to run blower and airlock BRIEFLY approximately once a month when not in use, to keep internal parts and bearings coated with lubricant.

PLACING INTO SERVICE AT START OF SEASON

It is recommended that the following checks be performed at the beginning of the season and PRIOR TO STARTING SYSTEM OPERATION. These checks will help to eliminate possible failures and assure dependable operation.

1. Control Panel -

   A. With electrical power supply "Off" (power disconnect lever in "Off" position), open the control panel door and inspect for moisture, rodent damage, accumulated foreign material and loose terminal connections. Make necessary repairs.

2. Blower - Refer to "Maintenance/Lubrication" for DETAILED instructions.

   A. Check that blower oil level is midway of oil gauge sight plug.

   B. Check condition of inlet air filter.

   C. Make sure blower case breather/vents are not plugged.

   D. Visually check condition of drive belts and belt tension. Also, check drive belt alignment.

   E. Manually rotate blower to ensure that there is no binding.

3. Airlock - Refer to "Maintenance/Lubrication" for DETAILED instructions

   A. Check condition of airlock rotor shaft seals and lubricate seals.

   B. Inspect speed reducer belt drive mechanism and belt condition.

   C. Inspect chain and drive sprockets for looseness and wear.

   D. Inspect airlock inlet for foreign material.

   CAUTION: Keep hands clear of airlock rotor vanes.

   E. Manually rotate airlock, turning variable speed drive pulley, and check freedom of vane travel.

4. Make certain that ALL SAFETY SHIELDS ARE SECURE.

5. Briefly start system to check for correct rotation of blower and airlock.

   NOTE: On three phase motors, it is especially important to check direction of motor rotation. To reverse the rotation of the 3 PH. motors, it is only necessary to interchange any two power leads.

6. Operate system under a NO LOAD condition for approximately 15 minutes and check blower for hot spots on case, noise, or other indications of interference. Also, observe the general running condition of blower and airlock units. Shut-down system...after waiting a minimum of three minutes, recheck blower oil level.

7. Operate system under load condition and monitor system operation for the first hour, frequently checking air pressure gauge and ammeter load reading.

TROUBLE-SHOOTING

CAUTION: Lock main power disconnect lever in "Off" position before attempting any corrective measures. When making checks, or high voltage tests with "live" circuits, be extremely careful and follow established safety practices.

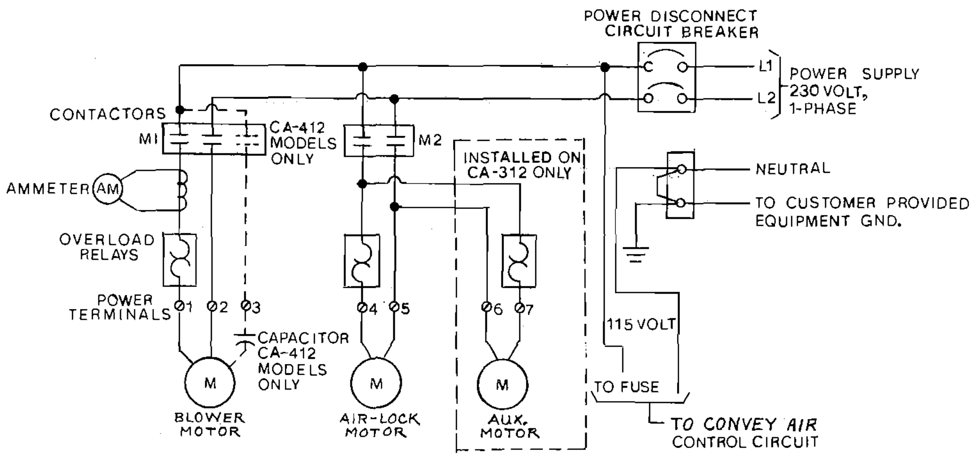
BLOWER	
Blower Does Not Operate	1. Control panel electrical problem; check for electrical problem. 2. High operating pressure has caused system to shut down; check for plugged, or overload condition (refer to "Operating to Unplug System" under "Operating Procedures").
Blower Noisy	1. Loose attaching hardware; belt guard, mounting brackets, etc. - with electrical power "locked out", check and tighten all mounting hardware. 2. Drive belt "flutter"; drive belts worn, or stretched - replace belts. 3. Drive belts misaligned; align drive sheaves. 4. Air leakage; loose conveying tube joints - tighten. 5. Insufficient, contaminated, or wrong type oil in air pump; correct per "Maintenance/Lubrication" section of manual. 6. Malfunctioning high pressure cut-out switch; replace switch.
Overheating	1. Dirty, or clogged inlet filter; replace filter element. 2. Slipping drive belts; replace worn belts. 3. Too slow motor speed; check motor condition per "Electrical Analysis Chart".
Leaking Oil	1. Oil foaming; blower overfilled, or wrong type oil in system; correct per "Maintenance/Lubrication" section of manual. 2. Failed oil seals; have seals replaced by authorized service repairman.

BLOWER (Cont'd.)	
Poor Performance	1. Restricted inlet due to dirty, or clogged filter; change filter element. 2. Wrong pressure indicated on gauge; check pressure gauge and/or connections. 3. Air leakage due to loose conveying tube connections; seal and tighten connections. 4. Slipping drive belts; replace worn belts. 5. Too slow motor speed; check motor condition per "Electrical Analysis Chart". 6. Insufficient airlock speed; see "Airlock Analysis Chart". 7. Material "caking" at airlock discharge; moisture content of material too high. 8. Restriction downstream of airlock; clear restriction and make sure conveying tubes are recommended size and length (see "Installation" section of manual). 9. Malfunctioning high pressure cut-out switch; replace switch. 10. Blown gasket at air pump discharge port; replace gasket.
AIRLOCK	
Airlock Does Not Operate	1. Control panel electrical problem; check for electrical problem. 2. Motor inoperative; see "Electrical" analysis chart. 3. Belt drive (between motor and speed reducer) worn, or broken; replace drive belt. 4. Drive chain broken, or damaged - Replace drive chain. Check condition of drive sprockets; make sure they are secure to their shafts. 5. Foreign object wedging rotor inside its housing; remove object and check condition of rotor. 6. Speed reducer malfunction; check and repair. 7. Airlock rotor blades corroded, or binding against housing; free rotor blades and check condition. 8. Rotor shaft bearings worn, or damaged; replace bearings.
Airlock Vibrates	1. Rotor turning in wrong direction; reverse electrical connections to drive motor as required (3-phase). 2. Loose drive chain; tighten, or replace worn chain. 3. Rotor blades obstructed; check for and remove obstruction. 4. Rotor shaft damaged, or bearings worn; replace shaft, seals and bearings. 5. Speed reducer malfunction; check and repair.
Airlock Squeaks	1. Drives rubbing against guard; check and correct. 2. Sealed bearings worn, or damaged; replace bearings.
Airlock Excessive Air Leakage	1. Rotor blades worn, or damaged; replace rotor blade assembly (also seals and bearings). 2. Rotor shaft seals worn, or damaged; replace seals. 3. Main housing worn or fractured; repair fracture, or replace housing.
Airlock Too Slow	1. Refer to "Operating Adjustments" and adjust airlock speed as instructed. 2. Too slow motor speed; see "Electrical" analysis chart. 3. Motor to speed reducer drive belt slipping; replace belt.

ELECTRICAL	
Motor(s) (Air Pump and Airlock) Fail to Start	1. Main power disconnect switch in "Off" position. 2. Blown fuse in control panel; install correct replacement fuse. 3. Tripped overload; check for cause of overload condition and reset. 4. Improper current supply; power supply to agree with motor nameplate and load factors. 5. Wrong line connections; wires to be connected per wiring diagrams. 6. Defective capacitor(s); check for short circuit, grounded, or open capacitor, or connection. 7. Motor malfunction; open circuit in winding or starting switch; short circuited stator poor stator coil connection; defective rotor; one phase of three phase motor open (if three phase); repair motor as necessary.
Motor(s) Stall	1. If airlock motor, airlock rotor obstruction; remove obstruction. 2. If airlock motor, speed reducer drive malfunction; check and repair. 3. Wrong size overloads; install correct heater strip per motor nameplate voltage (also see " Electrical Specifications"). 4. Low motor voltage; make sure nameplate voltage is maintained; check connections. 5. Open circuit; check overload relay and stator. 6. Wrong size motor; make sure correct replacement motor is installed.
Motor Speed Too Slow	1. Voltage too low at motor terminals; check voltage with tester and correct per nameplate. 2. Excessive loading; reduce load.
Motor Runs Backwards	1. Wrong sequence of phases; reverse connections at motor, or in control panel (three phase motors only).
Motor Overheats	1. Excessive loading; reduce overload. 2. Frame or bracket vents clogged; open vent holes. 3. If three phase motor, one phase may be open; check and tighten connections. 4. High, or low voltage supply; check voltage at motor terminals and correct per nameplate 5. Grounded coil; locate and repair. 6. Unbalanced terminal voltage; check for faulty wires, connections and transformer.

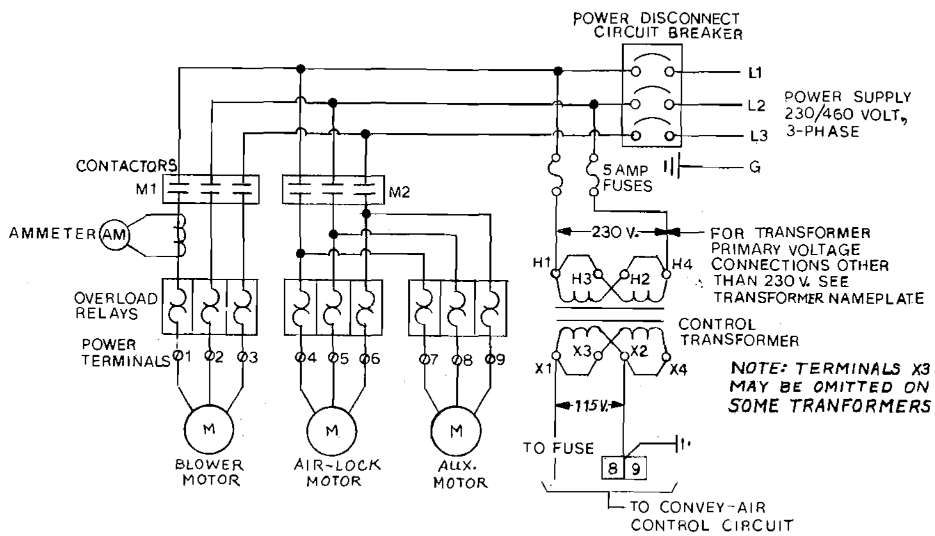
WIRING DIAGRAMS

ALL SINGLE PHASE - 230 VOLT MODELS



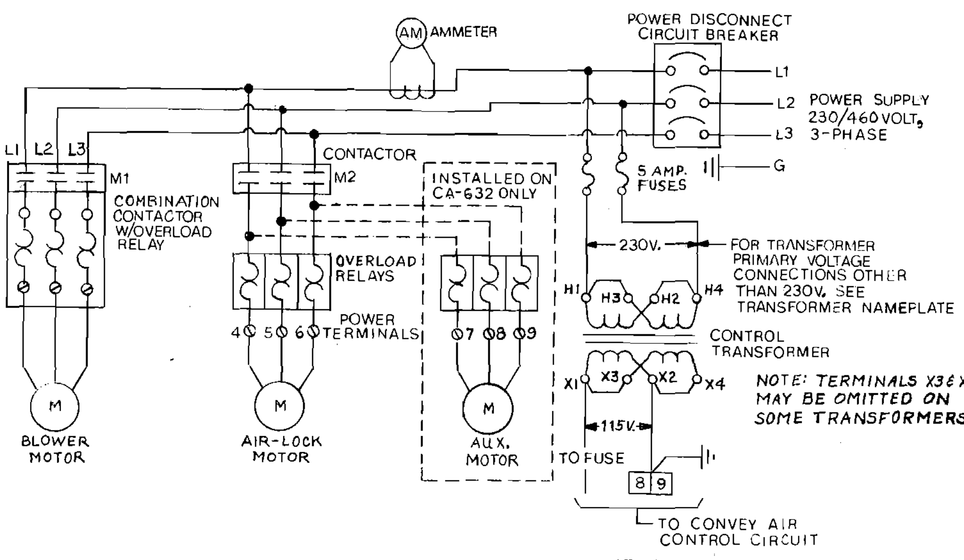
PART NO. 420-1115-5

THREE PHASE 230/460 V. - ALL MODELS EXCEPT CA-632 AND CAH-632



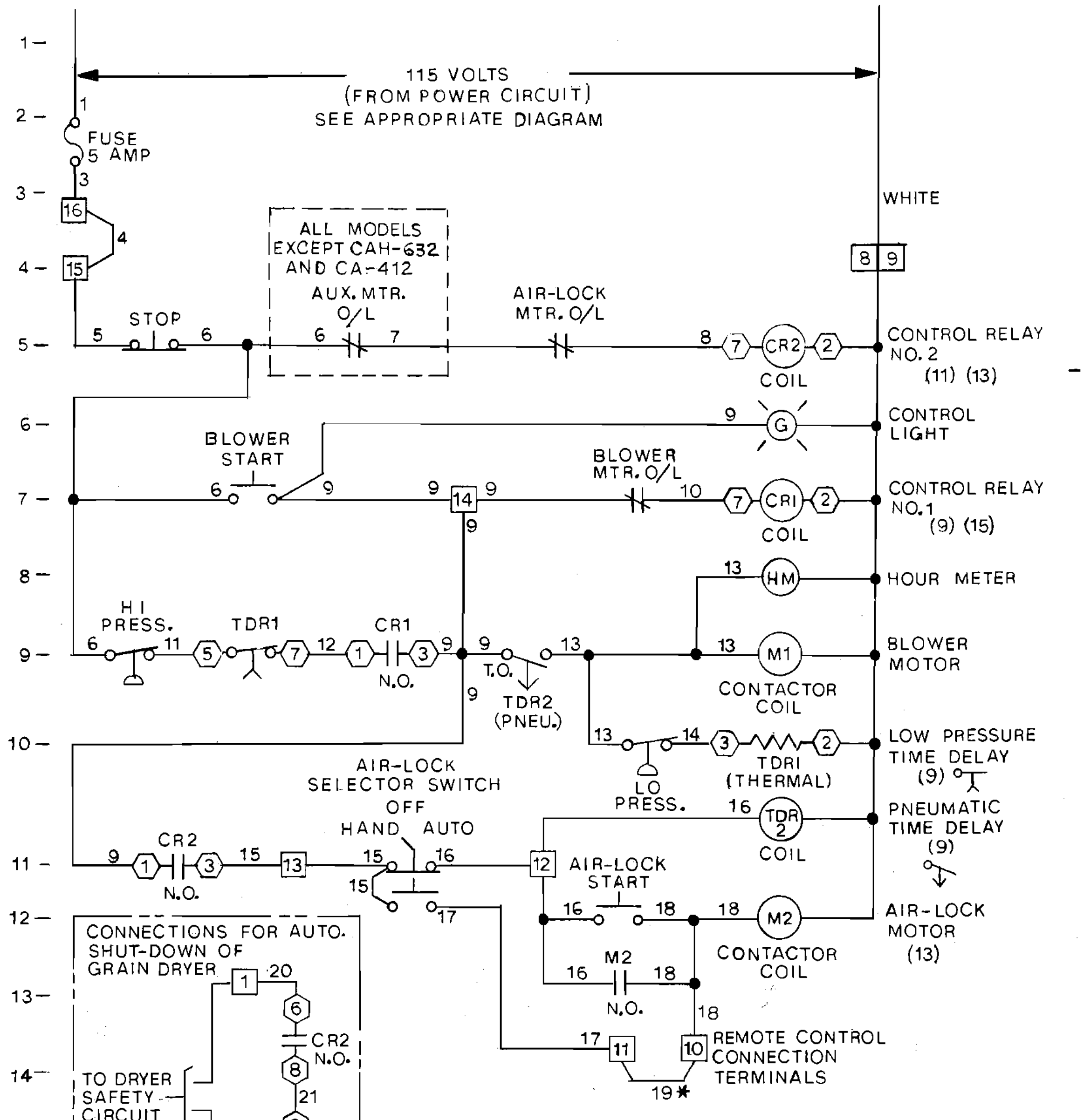
PART NO. 420-1116-3

THREE PHASE 230/460 V. - CA-632 AND CAH-632 MODELS ONLY



PART NO. 420-1117-1

CONVEY-AIR CONTROL CIRCUIT - ALL MODELS



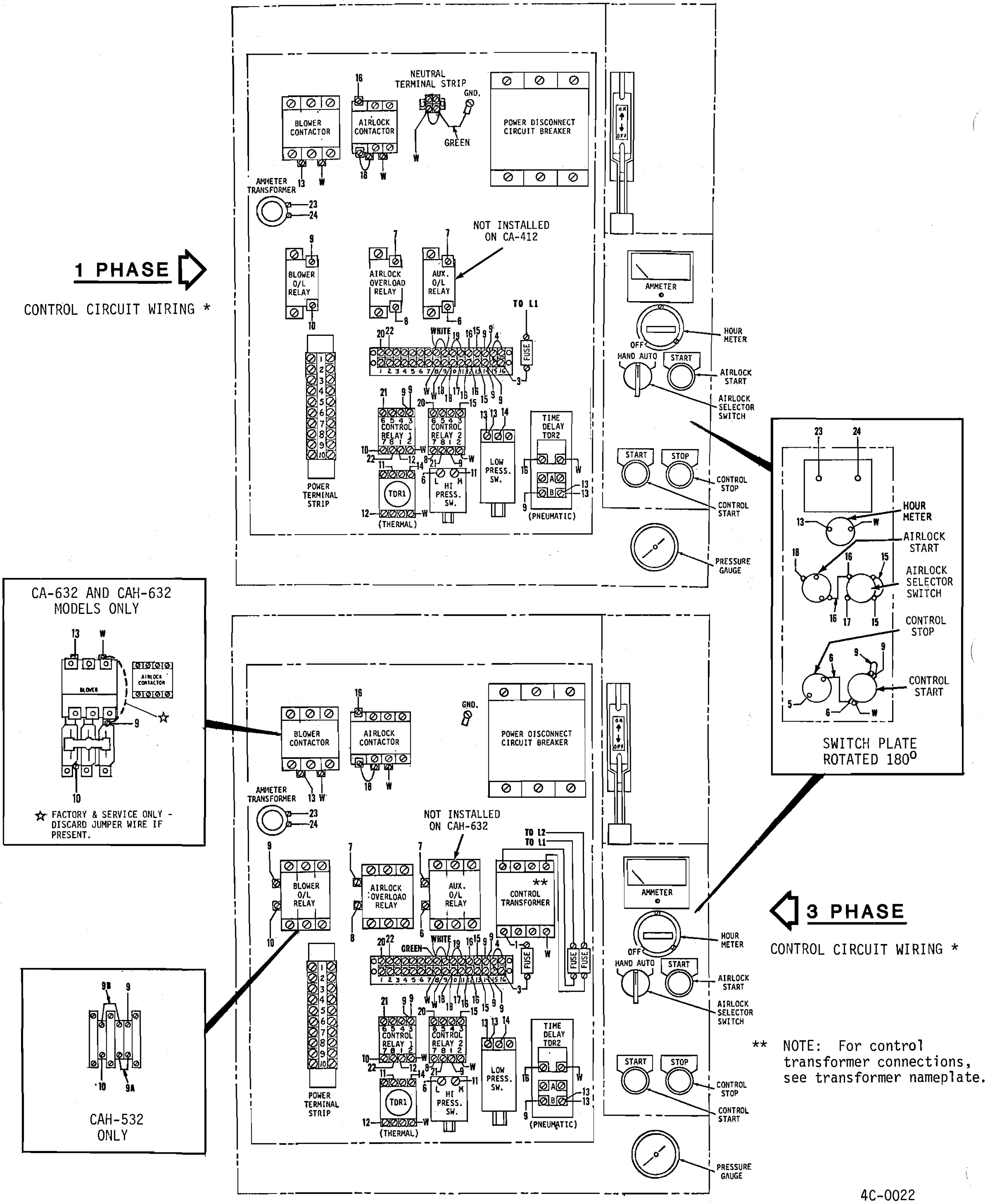
NOTE:
* IF REMOTE CONTROL OF SYSTEM IS DESIRED, REMOVE JUMPER WIRE AND CONNECT CONTROL DEVICE INTO CIRCUIT AT TERMINALS 10 AND 11.

DUE TO PRODUCT IMPROVEMENTS THE WIRE NUMBERS SHOWN MAY NOT ALWAYS AGREE WITH THE NUMBERS ON THE WIRES.

LEGEND

18	WIRE NUMBERS	⊣⊢	NORMALLY OPEN CONTACTS
□	CONTROL TERMINAL	⊣/⊢	NORMALLY CLOSED CONTACTS
⬡	RELAY TERMINAL	(9)	NUMBERS IN PARENTHESIS AT RIGHT REFER TO LINE NUMBERS AT LEFT TO AID IN LOCATING CONTACT ACTION. A LINE UNDER THE NUMBER SIGNIFIES NORMALLY CLOSED (N.C.) CONTACTS.
	NORMALLY OPEN PUSHBUTTON SWITCH		
	NORMALLY CLOSED PUSHBUTTON SWITCH		

PART NO. 420-1118-9



CONTROL CIRCUIT WIRING * - TYPICAL CONTROL PANEL LAYOUT

* NOTE: Due to product improvements the wire numbers shown may not always agree with numbers on all wires.

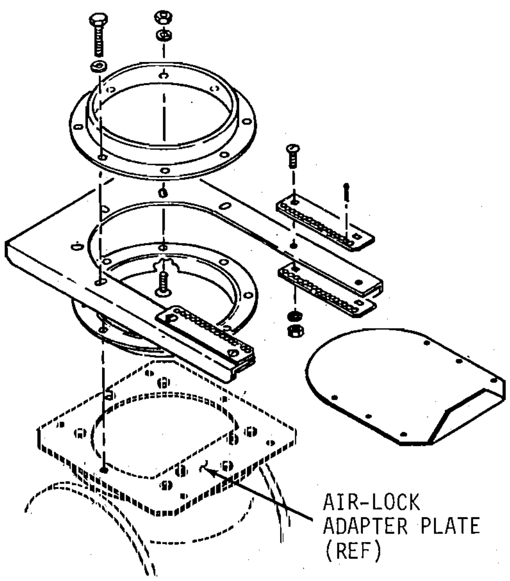
CUT-OFF GATES

These gates are designed to regulate the flow of grain into the air lock. It is suggested they be used on systems fed by gravity flow for metering material to permit only partial filling of airlock flutes. The gates may be locked at 1/4" increments. Flange rings are included to connect to grain handling system.

8-INCH GRAIN CUT-OFF GATE KIT

FOR CA-300 SYSTEMS

PART NO. 415-1311-0

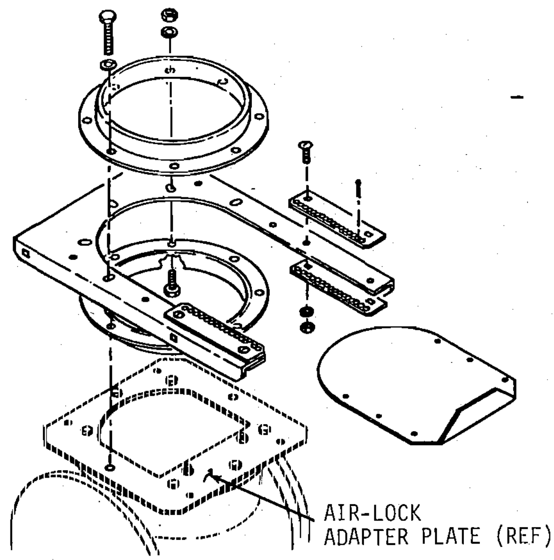


8-INCH CUT-OFF GATE FOR 3 INCH SYSTEM

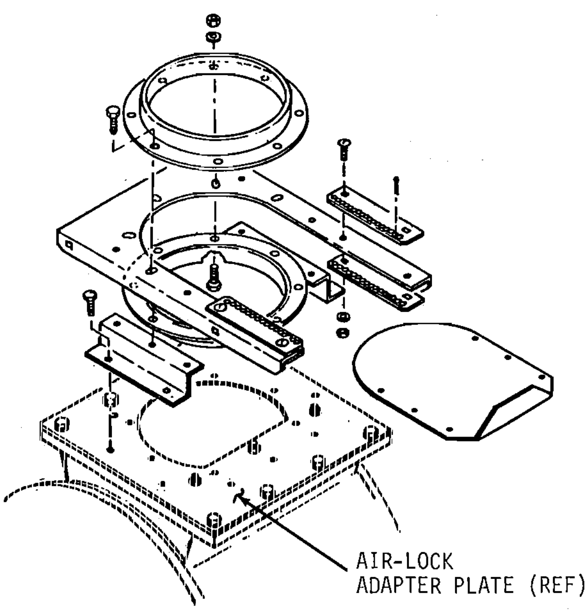
10-INCH GRAIN CUT-OFF GATE KIT

FOR CA-400, CA-500 AND CA-600 SYSTEM

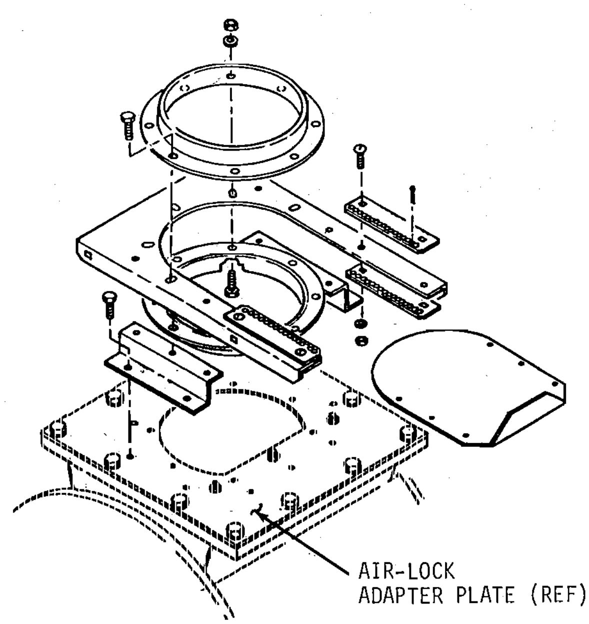
PART NO. 415-1312-8



10-INCH CUT-OFF GATE FOR 4 INCH SYSTEM



10-INCH CUT-OFF GATE FOR 5 INCH SYSTEM



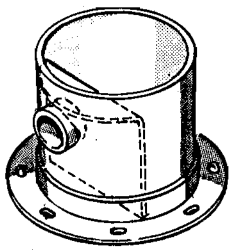
10-INCH CUT-OFF GATE FOR 6 INCH SYSTEM

VENTED TUBE INLET ADAPTER

This inlet adapter is intended for use when conveying very light grains, or grain containing an appreciable amount of chaff or fines. The vented tube transition mounts on top of the standard inlet transition or grain cut-off gate and acts to bleed off any air build-up to avoid feeding difficulties.

The vented tube may be used in conjunction with other round tube to act as either a receiving hopper when being fed with an auger, or when connecting to the discharge outlet of a surge bin.

NOTE: The accessory tube transition should be positioned so the vent is located opposite the grain baffle (wiper plate) on the standard transition.



8-INCH VENTED TUBE ADAPTER

FOR CA-300 SYSTEMS

PART NO. 410-1153-7

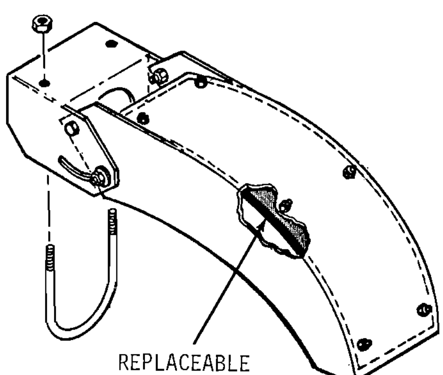
10-INCH VENTED TUBE ADAPTER

FOR CA-400, CA-500 AND CA-600 SYSTEMS

PART NO. 410-1154-5

ADJUSTABLE DISCHARGE SPOUT

The adjustable discharge spout provides an economical method of directing the flow of grain into storage or trucks. The grain velocity is not slowed down as when using Cyclones, but for many grain systems, the spout is all that is required. The spout is designed with a replaceable wear liner within the chute to provide long operating life.



SIZE	PART NO.
3"	410-1155-2
4"	410-1176-8
5"	410-1177-6
6"	410-1202-2

CYCLONES

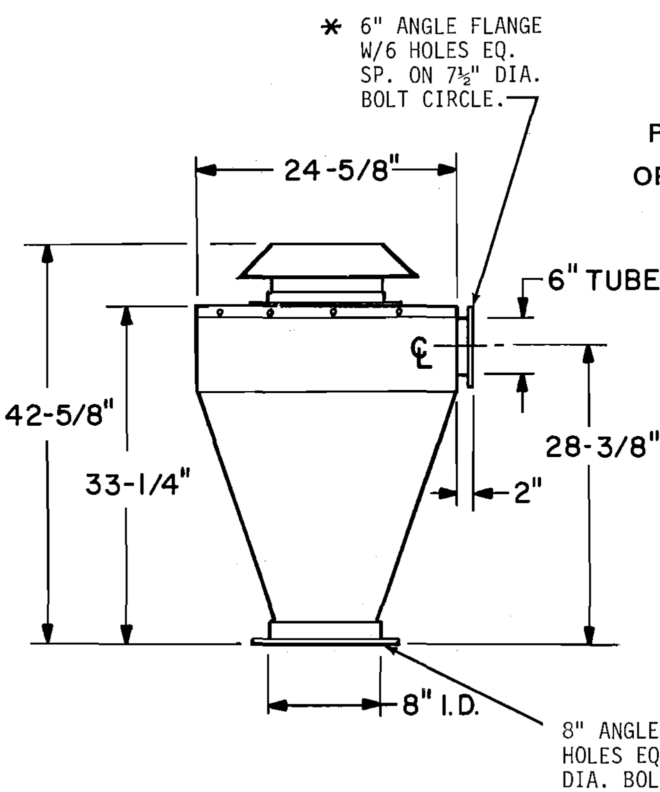
The purpose of a CYCLONE in a pneumatic handling system is to decelerate the grain and separate it from the air stream. Although the CYCLONES are more costly than open discharge chutes, they do provide gentler handling.

Two types of CYCLONE are available, the UNDER-ROOF and ABOVE ROOF. Both are equipped with a 6" flange ring on the inlet tube. TUBE ADAPTERS MUST BE ORDERED SEPARATELY and are available to adapt cyclones to 3", 4", 5" and 6" lines.

The ABOVE ROOF CYCLONE is weather tight and is equipped with a rain-hood for outside use.

The UNDER ROOF CYCLONE is not weather tight and should not be used outside. This CYCLONE is available in two forms. (1) As a kit that installs on top of a Farm Fans FFD-120 SCATTERGRAIN, thus creating a CYCLONE/SCATTER combination or (2) as a compact CYCLONE without scattering capabilities.

Both are equipped with adjustable hanger systems that permit hanging in roof opening. Also, both have an opening in their top that permits filling bin through them (as from leg down spout, etc.) without removing.



ABOVE ROOF CYCLONE

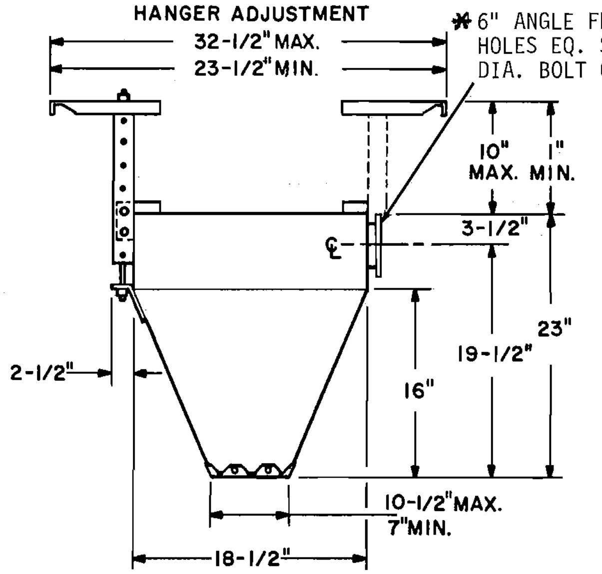
FOR 3-INCH THRU 6-INCH SYSTEMS,

ORDER PROPER ADAPTER SEPARATELY.

PART NO. 410-1180-0

*1. ORDER TUBE ADAPTER SEPARATELY TO ADAPT TO 3", 4", 5" or 6" LINES.

2. FLEX SPIRAL HOSE RECOMMENDED WHEN CONNECTING SYSTEM TO CYCLONE. ORDER HOSE AND CLAMPS SEPARATELY.



DIMENSION INFORMATION

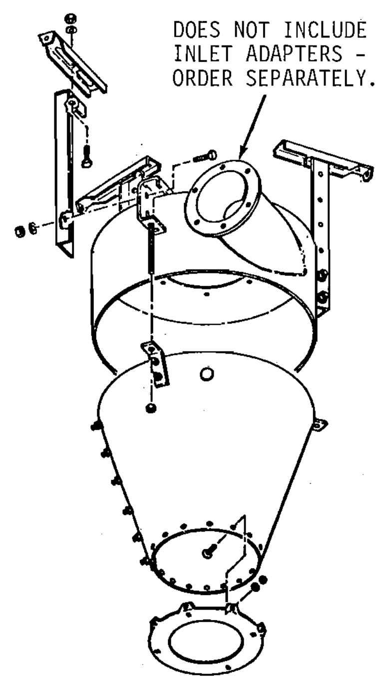
FOR UNDER ROOF CYCLONE AND FFD-120 SCATTER CYCLONE KIT.

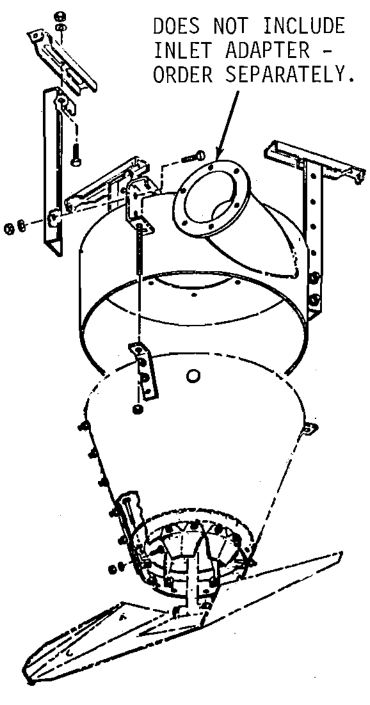
* 1. ORDER TUBE ADAPTERS SEPARATELY TO ADAPT TO 3", 4", 5" or 6" LINES.
2. FLEX SPIRAL HOSE RECOMMENDED WHEN CONNECTING SYSTEM TO CYCLONE. ORDER HOSE AND CLAMPS SEPARATELY.

UNDER ROOF CYCLONE

FOR 3-INCH THRU 6-INCH SYSTEMS, ORDER PROPER ADAPTERS SEPARATELY.

PART NO. 415-1313-6





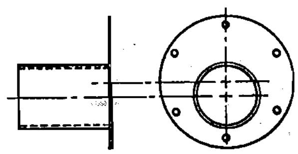
FFD-120 SCATTER CYCLONE KIT

FOR 3-INCH THRU 6-INCH SYSTEMS, ORDER PROPER ADAPTER SEPARATELY.

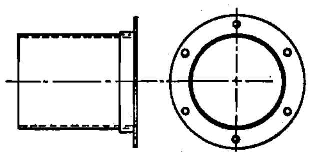
PART NO. 415-1314-4

CYCLONE TUBE ADAPTER

In order to reduce inventory requirements, all CYCLONES are equipped with a common 6" flange ring. The adapters are required to connect the various line sizes to the flange ring. Flex spiral type hose is recommended at CYCLONE connections.



3-INCH THRU 5-INCH WITH OFF-SET



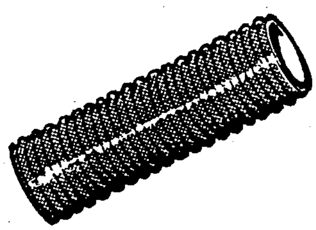
6-INCH STRAIGHT THRU

ADAPTER	PART NO.
3" Tube	410-1214-7
4" Tube	410-1178-4
5" Tube	410-1179-2
6" Tube	410-1213-9

FLEXIBLE HOSE

Two different styles of hose are available: (1) One style has a smooth, cloth reinforced, outer covering with an abrasion resistant heavy rubber inner liner. This hose is somewhat more flexible and is recommended for general use, especially for connections at cam-lock fittings to permit easy moving from one manifold to another. (2) The other style is flex spiral reinforced hose, made from wear resistant polymers. It can be used anywhere in the system, but is especially recommended for connections to CYCLONES and other points on the ends of runs where line pressures are relieved and hose stability is required.

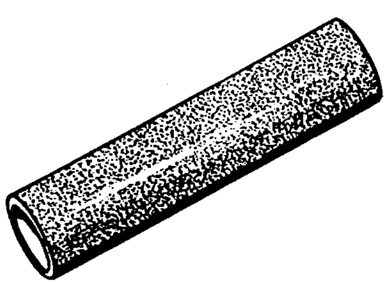
Max length available is 100'. Specify length on order.



FLEX SPIRAL

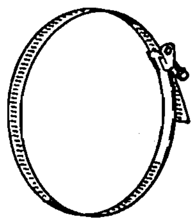
HOSE	PART NO.
3" DIA. x 1' x QTY.	406-1205-3
4" DIA. x 1' x QTY.	406-1206-1
5" DIA. x 1' x QTY.	406-1207-9
6" DIA. x 1' x QTY.	406-1208-7

STANDARD SMOOTH TYPE



HOSE	PART NO.
3" DIA. x 1' x QTY.	406-1119-6
4" DIA. x 1' x QTY.	406-1123-8
5" DIA. x 1' x QTY.	406-1127-9
6" DIA. x 1' x QTY.	406-1176-6

HOSE CLAMP



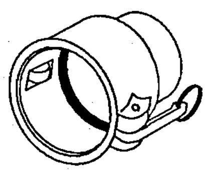
Stainless steel construction with fast release feature. One size fits all hose to 8". Trim excess at installation. For added safety, use two clamps for each connection.

PART NO. 415-1226-8

CAMLOCK COUPLERS

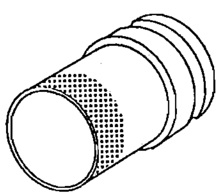
The male and female camlock couplers allow grain flow to be redirected from one bin to another, fast and easy. The couplers are normally used with flexible hose, on the hose end which requires frequent disconnection and reconnection. The female half is intended for installation on the hose end, with the male half connected to the pipe, usually by an accessory male threaded pipe end.

FEMALE COMPRESSION COUPLER



SIZE	PART NO.
3"	410-1301-2
4"	410-1302-0
5"	410-1303-8
6"	410-1304-6

MALE THREADED COUPLER

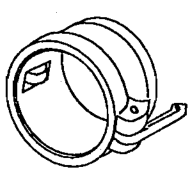


SIZE	PART NO.
3"	410-1297-2
4"	410-1298-0
5"	410-1299-8
6"	410-1300-4

END CAPS AND END PLUGS

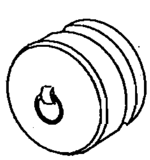
The end caps and plugs are used with the male and female camlock couplers to seal the coupler openings when they are not connected.

END CAPS



SIZE	PART NO.
3"	415-1263-3
4"	415-1264-1
5"	415-1265-8
6"	415-1308-6

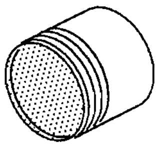
END PLUGS



SIZE	PART NO.
3"	415-1260-9
4"	415-1261-7
5"	415-1262-5
6"	415-1307-8

THREADED PIPE ENDS

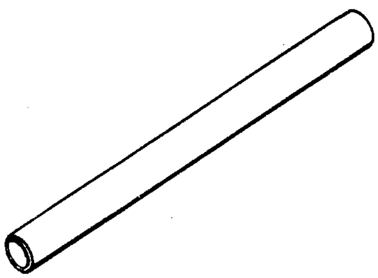
In order to install the MALE THREADED CAM-LOCK COUPLERS into the system, it is necessary to weld a threaded pipe end to the steel tubing to connect them. The following are available.



SIZE	PART NO.
3" NPT	406-1144-4
4" NPT	406-1145-1
5" NPT	406-1146-9
6" NPT	406-1193-1

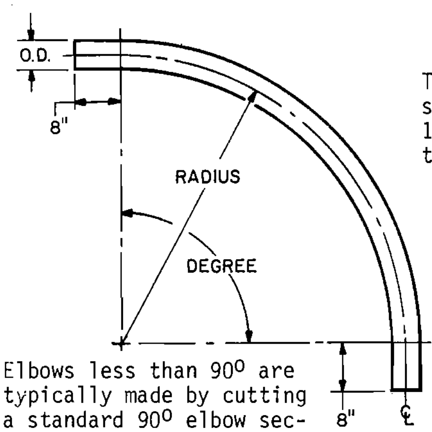
TUBING - RIGID STEEL

The majority of line runs in pneumatic grain handling systems are made up of rigid steel tubing. The following 14 GA. welded, galvanized tubing are available in sizes shown.



SIZE	PART NO.
3" DIA. x 10'	406-1113-9
3" DIA. x 20'	406-1114-7
4" DIA. x 10'	406-1115-4
4" DIA. x 20'	406-1116-2
5" DIA. x 10'	406-1117-0
5" DIA. x 20'	406-1118-8
6" DIA. x 10'	406-1174-1
6" DIA. x 20'	406-1175-8

METAL ELBOWS



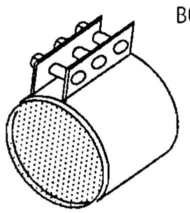
Elbows less than 90° are typically made by cutting a standard 90° elbow section, as required.

The 45° and 90° elbows allow the direction of grain flow within the system to be changed, as desired. Both elbows are constructed from 11 GA. welded steel tubing and have a long, smooth radius to maintain conveying velocity and prevent grain damage. See chart for dim.

ELBOW	PART NO.	RADIUS
3" x 45°	406-1134-5	48"
3" x 90°	406-1131-1	48"
4" x 45°	406-1135-2	48"
4" x 90°	406-1132-9	48"
5" x 45°	406-1136-0	60"
5" x 90°	406-1133-7	60"
6" x 45°	406-1192-3	60"
6" x 90°	406-1191-5	60"

COUPLERS FOR RIGID STEEL TUBING

Couplers are offered in two lengths and four tubing sizes. Use long couplers in areas where long spans occur for greater strength.



BOLTED COMPRESSION COUPLERS -

SIZE	PART NO.
3"-3 Bolt	415-1229-4
4"-3 Bolt	415-1232-8
4"-4 Bolt	415-1319-3
5"-3 Bolt	415-1235-1
5"-4 Bolt	415-1320-1
6"-4 Bolt	415-1304-5
6"-5 Bolt	415-1321-9

TEE HANDLE COMPRESSION COUPLERS - Available for 3" and 4" systems on special order only.

FARM FANS

Division of ffi CORPORATION
5900 ELMWOOD AVE. • INDIANAPOLIS, IN 46203