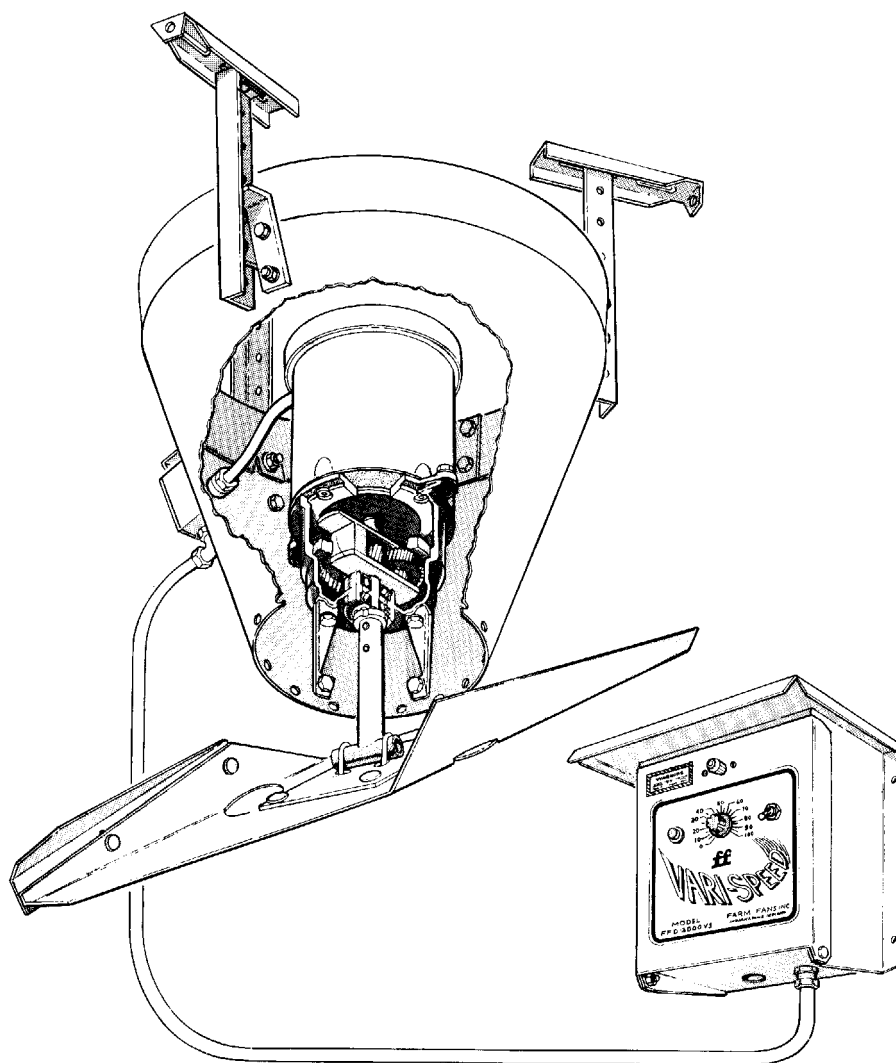


# INSTALLATION and OPERATION MANUAL

## Model FFD-3000VS SCATTERGRAIN



**ff** **FARM FANS**  
Division of ffi Corporation

5900 Elmwood Avenue • Indianapolis, Indiana  
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Thank you for choosing the Farm Fans FFD-3000VS Scattergrain. This unit is one of the finest grain spreaders ever built; designed to give you excellent operating performance and service for many years.

Operation should not be attempted before reading this manual; these instructions include information necessary for successful operation and care of the unit.

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## USE CAUTION IN THE OPERATION OF THIS EQUIPMENT

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS INJURIES EACH YEAR. THAT RULE IS: STOP MACHINE TO ADJUST, LUBRICATE, SERVICE, CLEAN OR MOVE.

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## 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 unit.
  2. Stop unit before attempting to adjust, service, clean or move.
  3. Keep visitors, children and untrained personnel away from unit at all times.
  4. Always open the main power supply disconnect switch and lock it in the open position using a padlock before performing any service or maintenance work. It is highly recommended that each worker have his own lock and key.
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## WARRANTY

Farm Fans, a division of ffi Corporation, 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 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 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 assumes no liability for results arising from the use of such recommendations.

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## DESCRIPTION

The Model FFD-3000VS Scattergrain is a high performance, variable speed grain spreader, designed to provide optimum spreading for a wide range of different type grains and bin size applications.

The Scattergrain has a grain capacity of up to 3,000 bushels per hour, depending upon the type of grain and the moisture content.

The unit has a totally enclosed 3/4 horsepower DC motor which is mounted directly onto an enclosed, 11 to 1 ratio gearbox assembly. The gearbox is permanently lubricated and sealed. The main output shaft of the unit is supported with sealed tapered roller type bearings to assure long life and trouble-free operation.

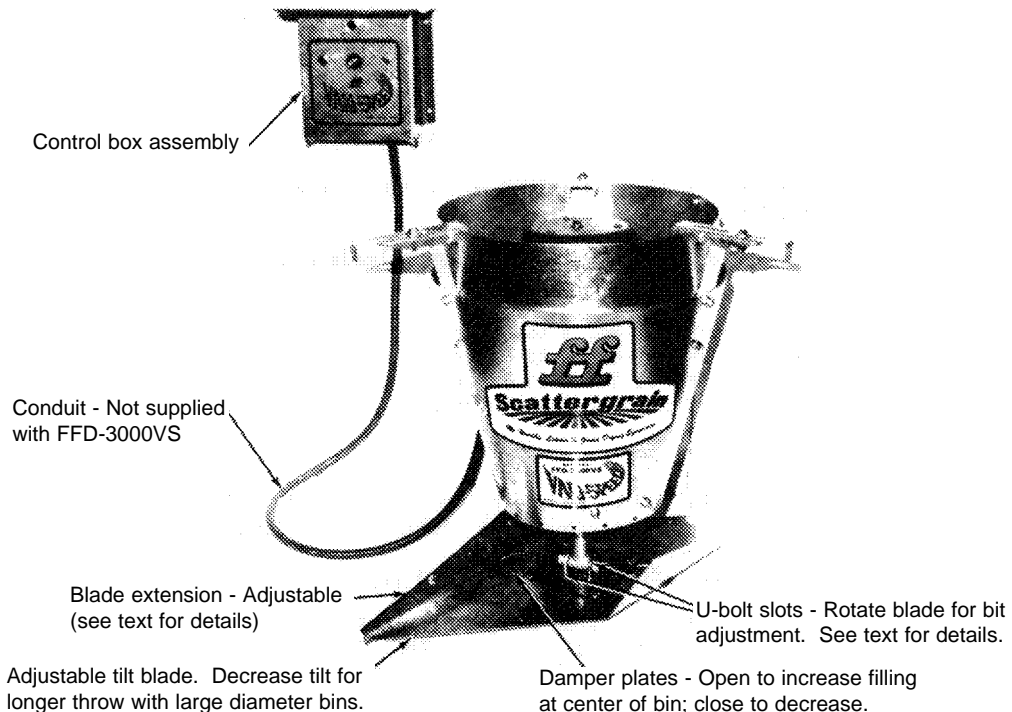
The speed of the Scattergrain is variable between 0 to 100% and is controlled by an electronic SCR (silicon controlled rectifier) control within the control box assembly.

The unit is equipped with a patented two-way, variable pitch grain thrower blade. With this arrangement, the blade may be tilted, as required, to suit the roof angle, and in addition, may be rotated within the U-bolt slots at the "T" drive, to provide limited tilt in the second plane. This compound angle allows the thrower blade to have a variable bite on the grain. The adjustable center openings provide for controlled center filling. The blade extension is adjustable to allow the grain throw to be varied.

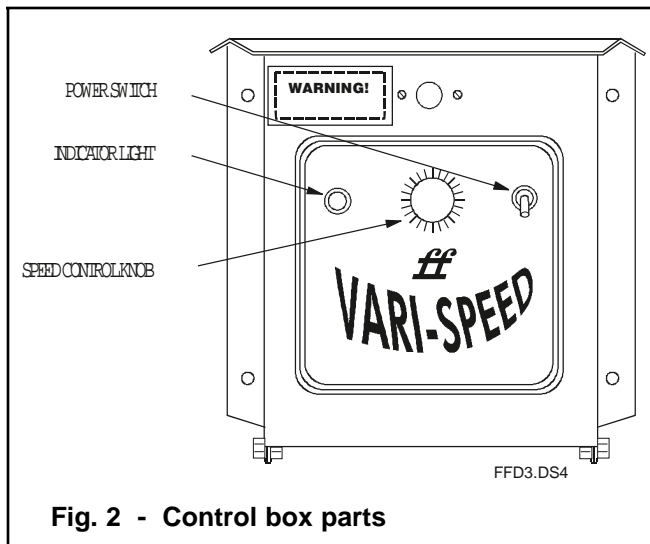
The standard hangers supplied with the unit will adjust to roof openings of 21 to 30 inches. For larger openings up to 40 inches, order the optional FFD-120X extension bracket kit.

For roof openings of 40" to 60", order optional Model 4060 bin adapter.

An optional A17-123 Flow Diverter Kit is available for use with the Scattergrain unit. The kit is helpful in providing improved grain leveling for low capacity systems and for special operating conditions where it is difficult to properly center the grain flow into the unit.



**Fig. 1 - FFD-3000VS Scattergrain assembly**



**Fig. 2 - Control box parts**

## INSTALLATION AND CONNECTION

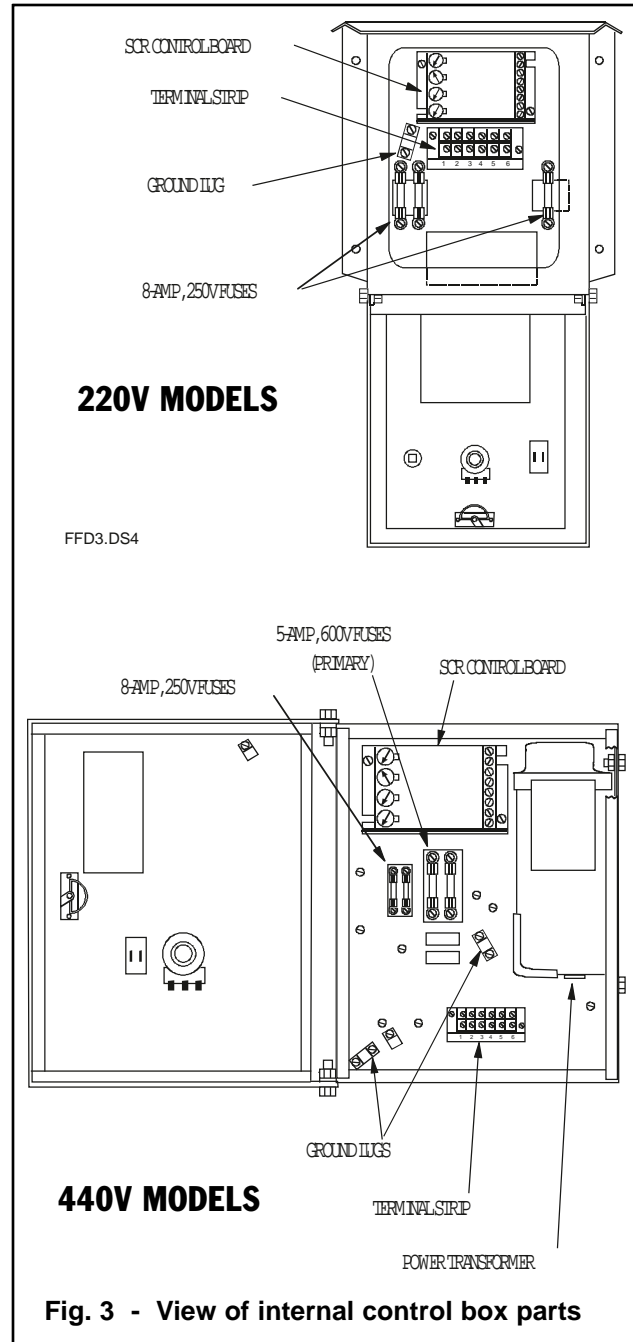
1. Mount the control box at an accessible location onto the outside of the bin or some other surface.
2. Refer to OPERATION heading and pre-adjust the blade assembly for the bin size application.
3. Adjust the hanger extensions to fit the roof opening and install the Scattergrain unit. Holes are provided in the ends of the hangers to bolt unit to the hatch collar. After unit is in place, check to make sure it is level. If required, add spacer washers to level the unit. Then bolt hanger brackets to the collar to prevent them from moving or becoming unhooked.
4. Rotate blade by hand to make sure it is not obstructed.
5. Determine the length of electrical conduit and wires required to connect motor to control box.

NOTE: Wire sizes should be 14 gauge MINIMUM. Consult an electrician for wire size on long runs.

6. Connect the four electrical wires between the numbered motor leads and the numbered control box terminals as listed. See Fig. 3 and wiring diagrams.
  - A. Control Box Terminal No. 3 to Motor Lead F1
  - B. Control Box Terminal No. 4 to Motor Lead A1
  - C. Control Box Terminal No. 5 to Motor Lead F4
  - D. Control Box Terminal No. 6 to Motor Lead A2
7. Connect the POWER SUPPLY as listed:
  - A. **220V models:** Connect wires L1 and L2 to control box terminal numbers 1 and 2.
  - B. **440V models:** Connect wires L1 and L2 to the primary fuses.
  - B. Connect ground wire to ground lug within control box.
8. Recheck all wires to ensure they are properly connected and tightened.



**CAUTION:** Improper installation of this control may cause injury to personnel or control failure. THE CONTROL BOX MUST BE



**Fig. 3 - View of internal control box parts**

INSTALLED AND GROUNDED IN ACCORDANCE WITH LOCAL STATE AND NATIONAL SAFETY CODES.

Accidental grounds on any of the motor leads may damage the unit when power is applied.

9. Turn ON main power supply and test operate the Scattergrain throughout the full speed range. The blade must rotate clockwise as viewed when looking up from inside the bin. If motor rotation is incorrect, turn OFF main power supply and reverse the motor lead wires at terminal Nos. 4 and 6 on the terminal strip.

## OPERATION

The following information will be helpful when adjusting and operating the Scattergrain unit. See Figs. 1 and 2.

## 1. Blade Adjustment Information

**SMALL BINS - 24' DIAMETER OR LESS** - The blade extension should be removed for small diameter bins. For these bins, **INCREASE THE TILT**, as required, so most of the grain clears the roof angle and adjust blade for **MINIMUM BITE** on the grain. To obtain minimum bite, loosen U-bolts and rotate blade fully counterclockwise (as viewed from above) within the slots at the "T" drive. Fully tighten U-bolts.

Adjust the two damper discs so the center openings within the blade are almost fully open, to provide increased filling at center of bin.

**INTERMEDIATE BINS - 36' DIAMETER** - For bin diameters of 36' and over, it is advisable to have the blade extension installed and positioned so that it is fully **RETRACTED**. With the extension re-traced, it will allow additional grain to spill over and provide increased filling at intermediate diameters.

For these size bins, the blade should normally be set for the greatest possible throw. This is achieved by **DECREASING** the tilt of the blade so most of the grain clears the roof angle, and adjusting the blade to provide **MAXIMUM BITE** on the grain. To increase the bite, loosen the U-bolts and rotate the blade to its fully clockwise position within the slots at the "T" drive, as viewed when looking down on the blade. Tighten U-bolts securely.

Adjust the two damper discs so the center openings within the blade are nearly closed, to prevent over-filling center of bin.

**LARGE BINS - 50' DIAMETER OR OVER** - For large bins, adjust blade extension so it is **FULLY EXTENDED** and set blade for maximum throw. See procedure as described under previous **INTERMEDIATE BINS** heading.

**NOTE:** The information within the previous headings describe the pre-adjustments required for extremes of bin sizes. For in-between sizes, start with intermediate adjustments, then vary settings slightly, if required.

## 2. Motor Control Information

To start the Scattergrain, set power switch to **ON** position and rotate the speed control knob to provide the desired blade RPM.

3. Regardless of bin size or grain type, the grain stream must be centered directly within the Scattergrain cone to prevent high and low grain surface areas from one side of the bin to the other. When starting to fill the bin, adjust the speed control high enough so grain strikes the bin wall slightly above grain level in bin. Increase setting as required when filling progresses. **DO NOT OVERSPEED THE SCATTERGRAIN.**

## SERVICE

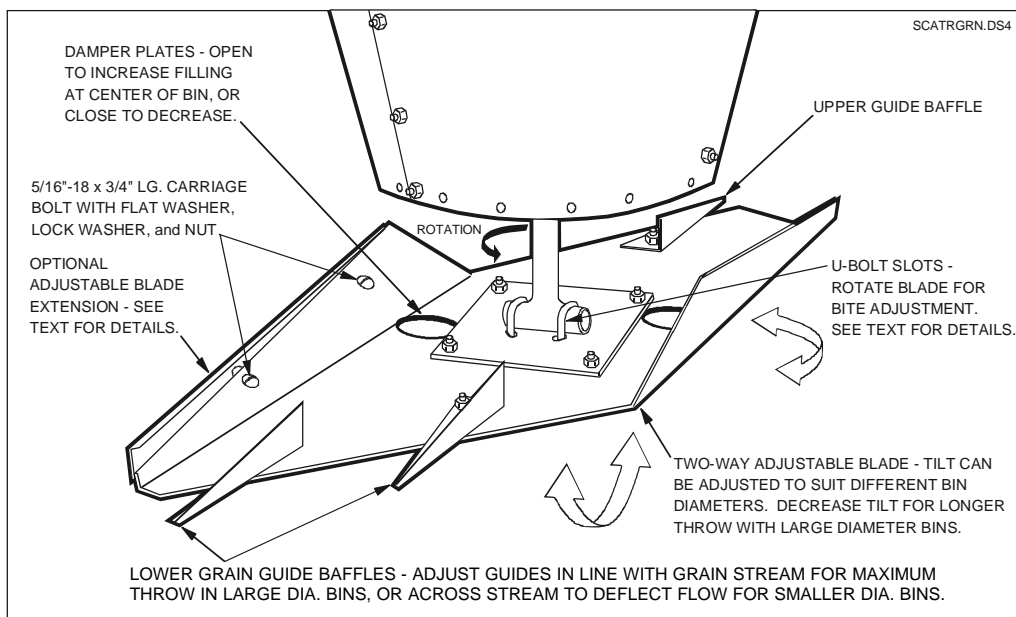


**CAUTION:** Disconnect power supply before attempting any type of servicing.

The gear box assembly is permanently lubricated with a special grease at the time of manufacture, and no further lubrication is required, unless seal leakage occurs.

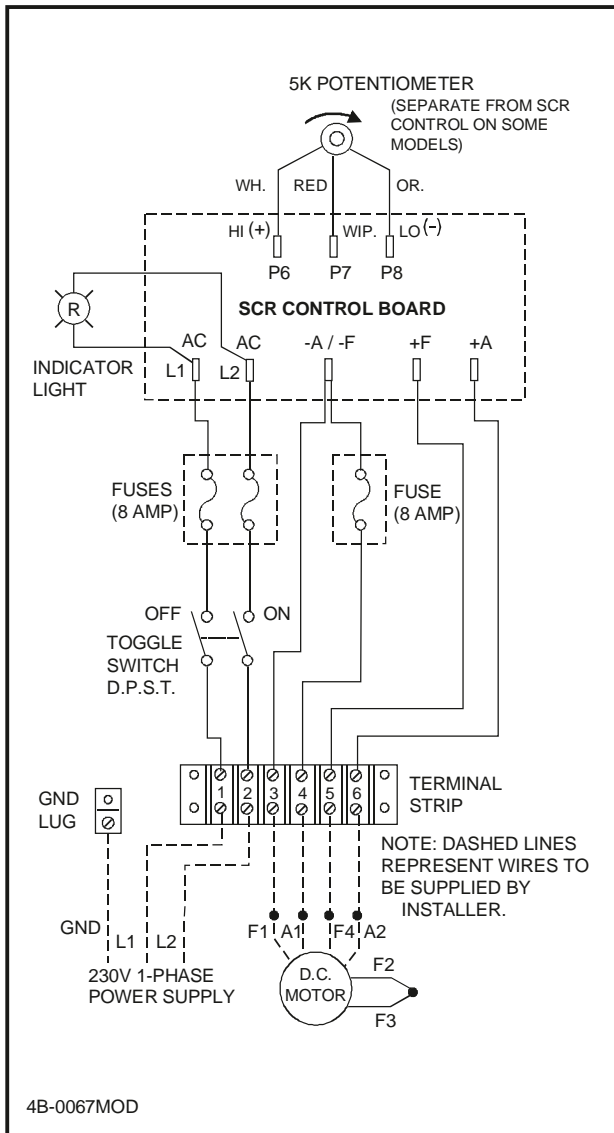
It is advisable to inspect seals and check bearings annually for tightness. A bearing take-up nut is provided externally on the output shaft to keep the tapered bearings and seals snug. In the event the motor fails to start, check unit for freedom of rotation and make certain that power is being supplied to motor. Check for blown fuses in control box.

**IMPORTANT:** If fuse replacement becomes necessary, use only fuses of the same rating as those supplied with

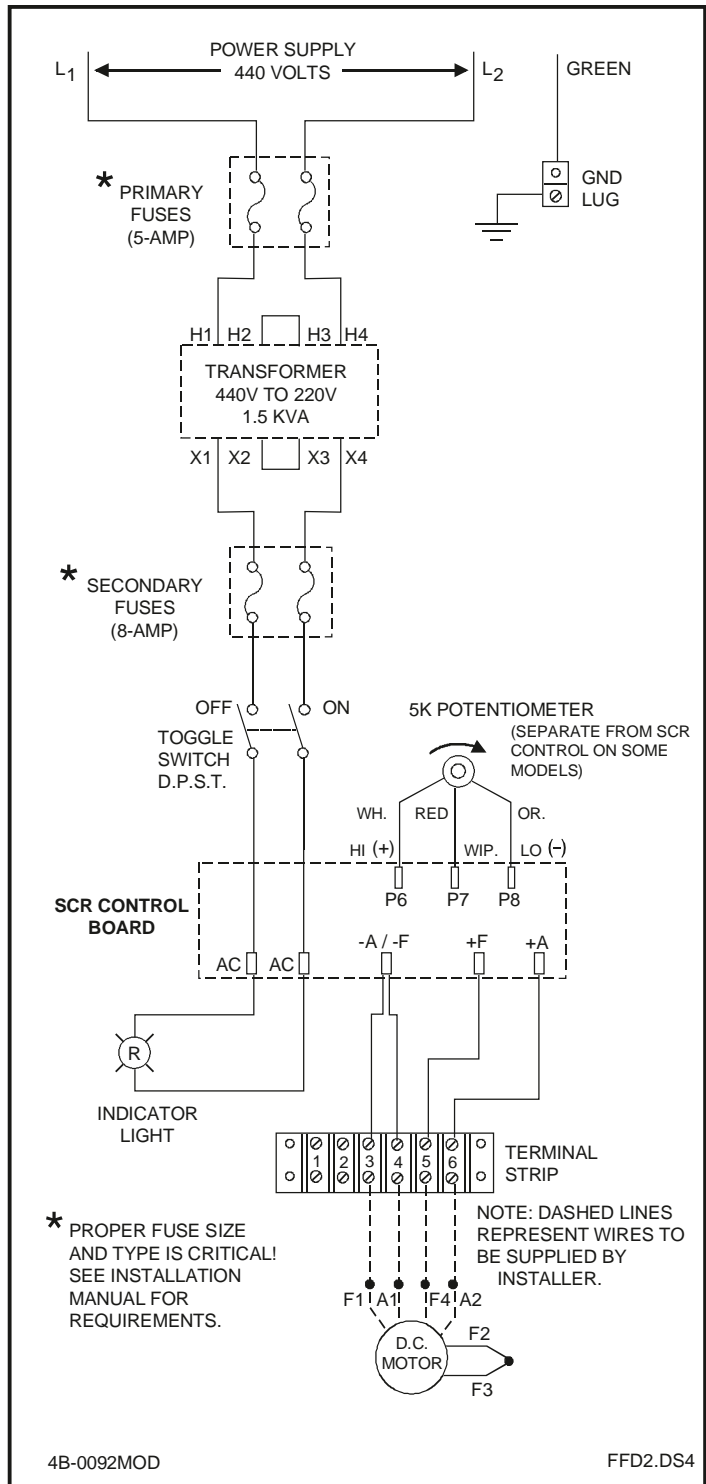


the control. The use of higher amperage fuses will void control warranty.

If motor pinion requires removal for any reason, it must be properly installed and located, as shown in the parts illustration.



220V 1-ph. and 3-ph. power circuit wiring diagram



440V power circuit wiring diagram

## TROUBLE ANALYSIS PROCEDURE



**WARNING:** Turn off power at disconnect and lock it off before entering the bin to work on or near the Scattergrain. Stay clear of rotating blade when power is on!

<b>TROUBLE</b>	<b>CHECKOUT PROCEDURE &amp; INFORMATION</b>
Motor does not run; indicator light out.	<ol style="list-style-type: none"><li>1. POWER SWITCH IN OFF POSITION - Move switch to ON position.</li><li>2. INCORRECT OR NO POWER SUPPLIED - Check for 230 VAC between terminals 1 and 2 on terminal strip in Vari-speed control box; if correct or no voltage, check disconnect. Also check for loose wiring connections.</li><li>3. POWER SWITCH INOPERATIVE - With switch in ON position check for 230 VAC between bottom two terminals on double fuse holder.</li><li>4. BLOWN FUSE - With switch in ON position check for 230 VAC between top two terminals on double fuse holder; if incorrect or no voltage, remove the fuses and check with a continuity tester. If one or both fuses are blown, replace with fuses of same rating.</li><li>5. LOOSE OR BROKEN WIRE - With switch in ON position check for 230 VAC between two terminals marked AC (or L1 and L2) on SCR control. DO NOT let test probes come in contact with anything except the terminals on the ends of the wires.</li></ol>
Motor does not run; indicator light ON.	<ol style="list-style-type: none"><li>1. SPEED CONTROL SET AT ZERO - Turn knob CW to start motor.</li><li>2. OVERLOAD CONDITION - Turn OFF power at disconnect and lock it OFF; check for freedom of rotation of thrower blade.</li><li>3. FAULTY SCR CONTROL; LOOSE OR BROKEN WIRE - With speed control knob at (100) dial setting check DC voltage between field terminals marked +F and -F on SCR control and between terminals 3 and 5 on terminal strip in control box; voltage should be 200 VDC; check DC voltage between armature terminals marked +A and -A on SCR control and between terminals 4 and 6 on terminal strip in control box; voltage should be 180 VDC.</li><li>4. BLOWN FUSE - In the previous check, if there is 180 VDC between armature terminals marked +A and -A on SCR control, but not the same voltage between terminals 4 and 6 on terminal strip, remove the single fuse and check it with a continuity tester; if fuse is blown, replace it with one of the same rating.</li><li>5. FAULTY SPEED CONTROL (POTENTIOMETER) - Move speed control knob to (0) dial setting. Connect DC voltmeter between armature terminals marked +A and -A on SCR control. Turn speed control knob CW; needle on voltmeter should increase and be at 180 VDC when speed control knob reaches (100) dial setting. If voltmeter does not increase at a rate in relation to the turning of the speed control knob, the potentiometer may be faulty and the SCR control will need to be replaced. In some cases, just the potentiometer can be replaced if it is separate from rest of SCR control.</li><li>6. LOOSE WIRING CONNECTIONS - Check that all wire connections are secure in Vari-speed control box and motor connection box on outside of Scattergrain cone.</li><li>7. WORN BRUSHES IN MOTOR - Have them replaced by a qualified serviceman or motor repair shop.</li><li>8. DEFECTIVE MOTOR - Remove motor and have it checked by a qualified serviceman or motor repair shop.</li></ol>

**TROUBLE****CHECKOUT PROCEDURE & INFORMATION**

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Motor stalls or runs at very low speed with speed control turned on to full CW (100) dial setting.

1. LOW VOLTAGE - Check input voltage between terminals 1 and 2 on terminal strip in Vari-speed control box; voltage should not be below 218 VAC; increase voltage to 230 VAC.
2. OVERLOAD CONDITION - Turn OFF power at disconnect and lock it OFF; check for freedom of rotation of thrower blade.
3. FAULTY SPEED CONTROL (POTENTIOMETER) - Move speed control knob to (0) dial setting. Connect DC voltmeter between armature terminals marked +A and -A on SCR control. Turn speed control knob CW; needle on voltmeter should increase and be at 180 VDC when speed control knob reaches (100) dial setting. If voltmeter does not increase at a rate in relation to the turning of the speed control knob, the potentiometer may be faulty and the SCR control will need to be replaced. In some cases, just the potentiometer can be replaced if it is separate from rest of SCR control.
4. LOOSE WIRING CONNECTIONS - Check that all wire connections are secure in vari-speed control box and motor connection box on outside of Scattergrain cone.
5. WORN BRUSHES IN MOTOR - Have them replaced by a qualified serviceman or motor repair shop.
6. DEFECTIVE MOTOR - Remove motor and have it checked by a qualified serviceman or motor repair shop.

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Motor runs at high speed and cannot be controlled.

1. SHORTED POWER SEMI-CONDUCTORS - Replace SCR control.
2. FAULTY SPEED CONTROL (POTENTIOMETER) - Move speed control knob to (0) dial setting. Connect DC voltmeter between armature terminals marked +A and -A on SCR control. Turn speed control knob CW; needle on voltmeter should increase and be at 180 VDC when speed control knob reaches (100) dial setting. If voltmeter does not increase at a rate in relation to the turning of the speed control knob, the potentiometer may be faulty and the SCR control will need to be replaced. In some cases, just the potentiometer can be replaced if it is separate from rest of SCR control.

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Repeated fuse blowing

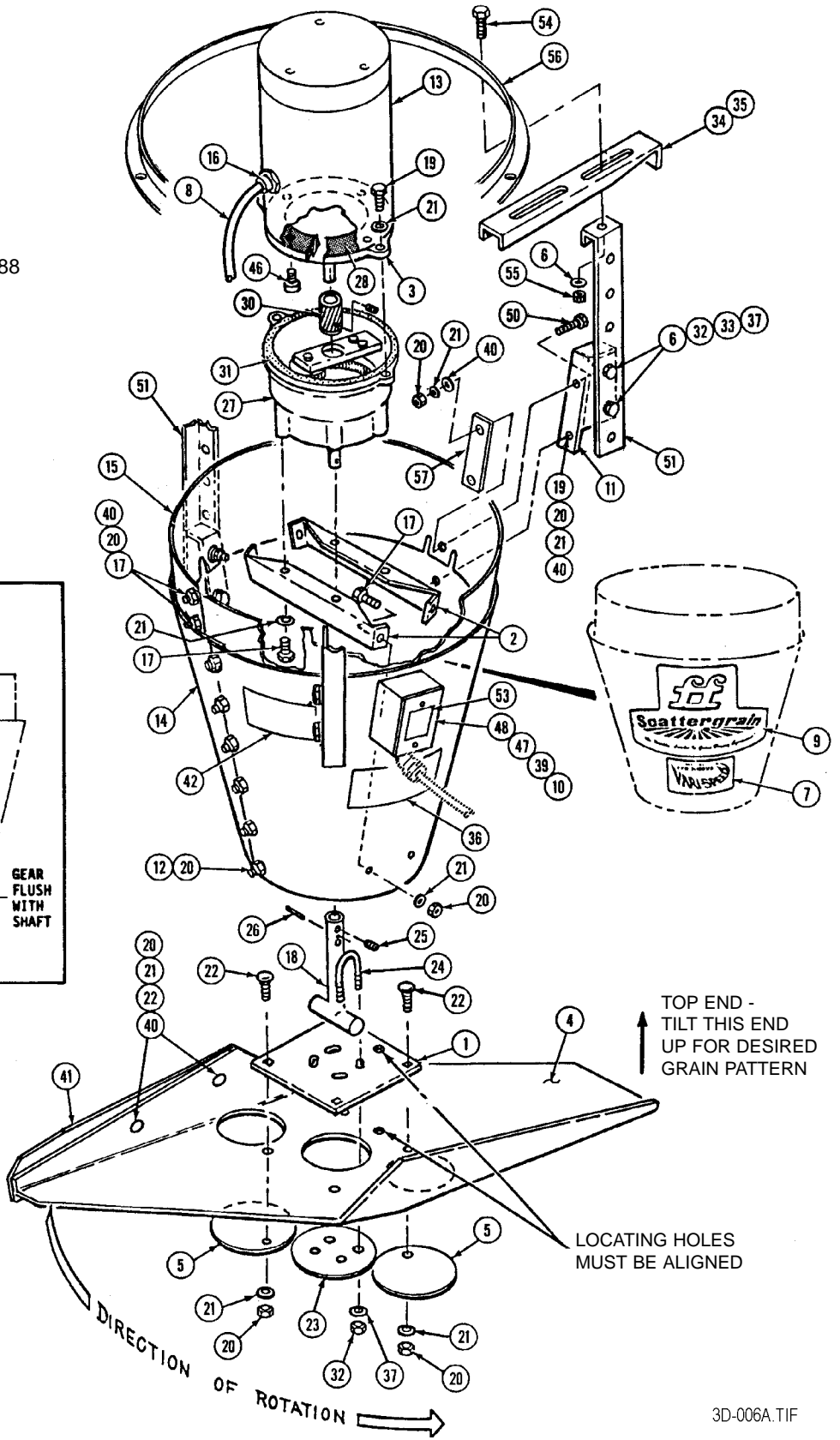
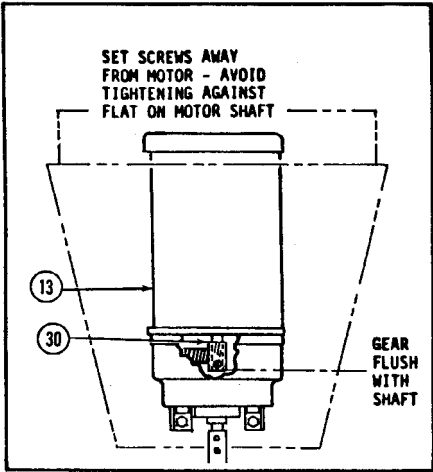
1. LOW VOLTAGE - Check input voltage between terminals 1 and 2 on terminal strip in Vari-speed control box; voltage should not be below 218 VAC; increase voltage to 230 VAC.
2. OVERLOAD CONDITION - Turn OFF power at disconnect and lock it OFF; check for freedom of rotation of thrower blade.
3. LOOSE WIRING CONNECTIONS - Check that all wire connections are secure in vari-speed control box and motor connection box on outside of Scattergrain cone.
4. WORN BRUSHES IN MOTOR - Have them replaced by a qualified serviceman or motor repair shop.
5. DEFECTIVE MOTOR BEARING - Have them checked and replaced by a qualified serviceman or motor repair shop.
6. DEFECTIVE ELECTRICAL COMPONENTS - Replace SCR control.
7. DEFECTIVE MOTOR - Remove motor and have it checked by a qualified serviceman or motor repair shop.

# FFD-3000VS SCATTERGRAIN PARTS

Replacement parts can be obtained from the local Farm Fans dealer or by contacting Farm Fan at 5900 Elmwood Ave., Indianapolis, IN 46203. Phone 317 787-6341. SPECIFY COMPLETE MODEL NUMBER and SERIAL NUMBER, WITH THE PART NUMBER.

Any parts or equipment sent to the factory must be shipped freight prepaid and be accompanied with form RMF-03-5 fully completed.

UPDATED JAN. 1988  
& MAY 1997



## FFD-3000VS PARTS LIST

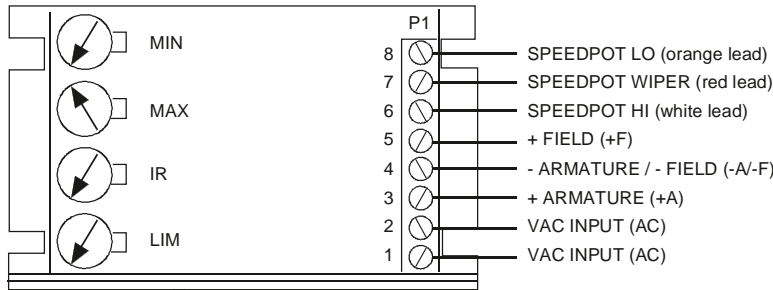
<u>ITEM</u>	<u>PART NO.</u>	<u>EARLY FF NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	306-1168-5	A06-068	SCATTER PLATE BACK-UP	.1
2	306-1169-3	A06-066	GEAR BOX MOUNTING BRACKET	.2
(1) 3	317-1114-6	A17-074	ADAPTER PLATE - 48N FRAME - 56C FRAME	.REF
4	306-1167-7	A06-067	SCATTER BLADE	.1
5	306-1043-0	A06-016	DAMPER PLATE - 4" DIA	.2
6	092-1011-3	----	FLAT WASHER 3/8"	.3
7	420-1088-4	----	DECAL - FFD3000VS	.1
8	406-1726-8	----	SEALTITE CONDUIT 3/8 x S	.1
9	420-1082-7	----	DECAL - SCATTERGRAIN	.1
10	053-1012-3	53-002-2	WIRE NUT CONNECTOR-YELLOW	.5
11	410-1234-5	----	EXTENSION ADAPTOR BRACKET	.3
12	090-1347-5	----	HHCS 5/16-18 x 1/2 GR#5	.6
13	002-1237-3	02-007-14EE-2	MOTOR 3/4HP 1-PH 2400RPM	.1
14	401-1032-2	----	CONE SEGMENT	.1
15	401-1343-3	----	CONE EXTENSION	.1
16	067-1042-0	67-002-04	SEALTITE CONNECTOR 3/8"	.2
17	090-1070-3	----	HHCS 5/16-18 x 3/4 GR#5	.9
18	306-1037-2	A06-014	HOPPER DRIVE SHAFT	.1
19	090-1072-9	----	HHCS 5/16-18 x 1 GR#5	.5
20	091-1037-0	----	HEX NUT 5/16-18	.23
21	092-1027-9	----	SPLIT LOCK WASHER 5/16"	.22
22	090-1291-5	----	CARRIAGE BOLT 5/16-18 x 3/4 GR#5	.6
23	306-1075-2	A06-027	BACK-UP PLATE	.1
24	311-1024-0	A11-015	U-BOLT 3/8-16 x 1 x 2-1/4	.2
25	090-1140-4	----	SKCP 5/16-18 x 1/4	.2
26	093-1003-8	----	ROLL PIN 1/4 x 1 BLACK	.1
27	308-1021-2	A08-021	GEAR BOX	.1
28	420-2012-3	----	GASKET 6-1/2 x 4-17/32	.1
(1) 30	017-1534-1	----	MOTOR PINION SLEEVE	.REF
31	321-1001-7	A21-002	GASKET	.1
32	091-1040-4	----	HEX NUT 3/8-16	.10
33	090-1086-9	----	HHCS 3/8-16 x 1 GR#5	.6
34	306-1035-6	A06-012	HANGER EXTENSION - UP TO 31-3/4" DIA.	.3AR
35	306-1044-8	A06-017	HANGER EXTENSION - 31-3/4" TO 40" DIA.	.3AR
36	420-1081-9	----	DECAL - CAUTION	.1
37	092-1028-7	----	SPLIT LOCK WASHER 3/8"	.13
39	420-2002-4	67-026	UNILET BOX - DOUBLE OUTLET	.1
40	092-1008-9	----	FLAT WASHER 5/16"	.6
41	401-1152-8	----	SCATTER BLADE EXTENSION	.1
42	420-1079-3	----	DECAL - WARNING	.1
46	090-1150-3	----	HEX SOCKET HEAD 3/8-16 x 3/4	.4
47	006-1110-3	67-028	UNILET BOX GASKET	.1
48	067-1110-8	67-029	UNILET BOX COVER	.1
50	090-1340-0	----	HHCS 5/16-18 x 1-1/4	.3
51	401-1581-8	----	VERTICAL EXTENSION RANGER	.3
53	420-1216-1	----	DECAL - MOTOR WIRING	.1
54	090-1029-9	----	HHCS 3/8-16 x 1-1/4	.3
55	091-1055-2	----	ESNA LOCKNUT 3/8-16	.3
*56	406-1837-3	----	ANGLE RING	.1
*57	401-3602-0	----	BACK-UP PLATE	.3

(1) These items are repair parts for A08-021 Gear Box.

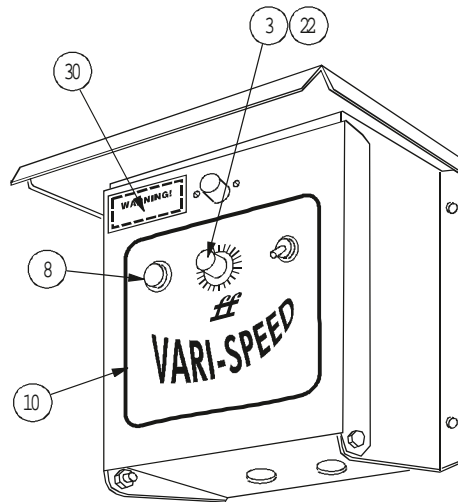
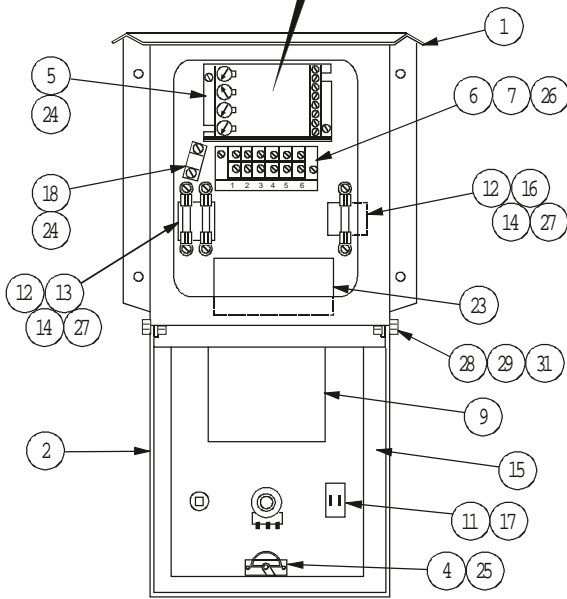
\* Items 56 and 57 were added Jan. 1988.

Items 29 and 30 were updated to the lifetime lubricated style gearbox May, 1997.

### SCR CONTROL BOARD HOOK-UP



## 220V MODELS

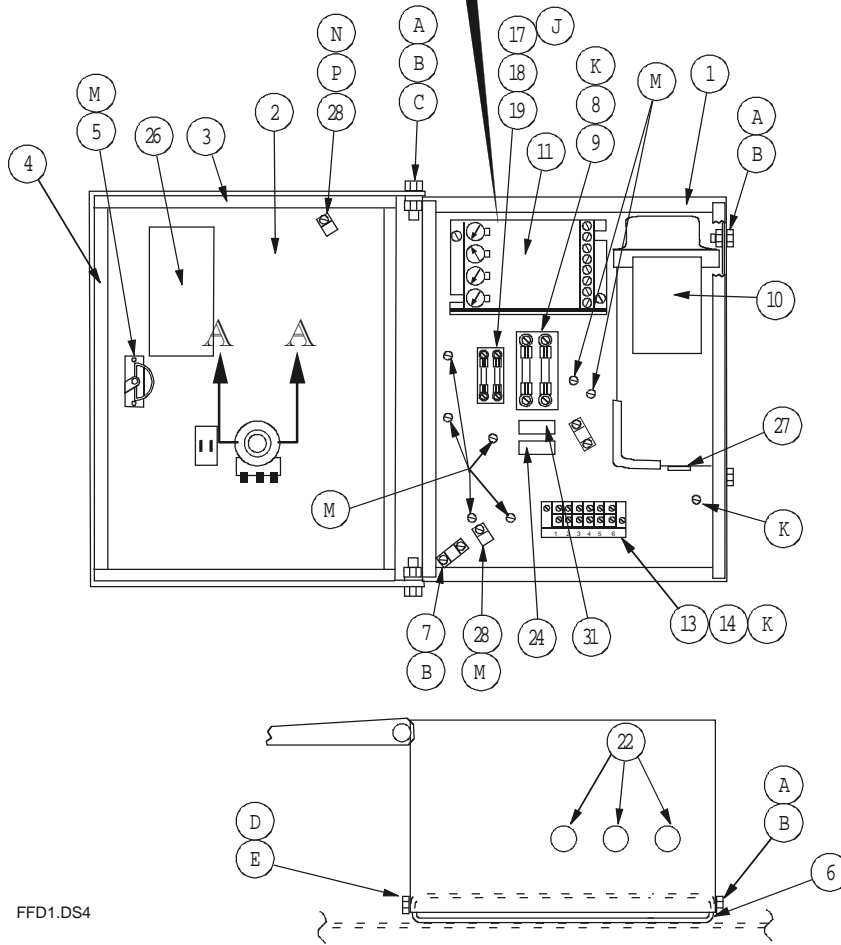
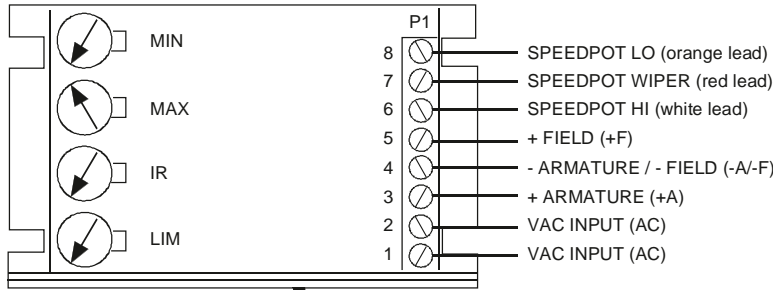


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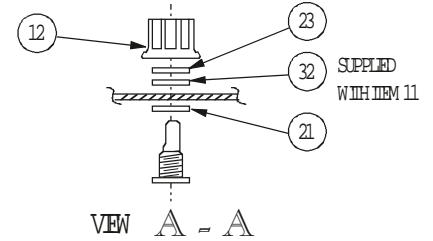
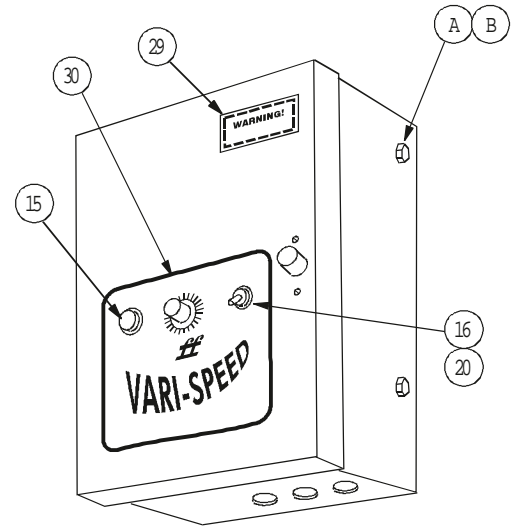
### FFD-3000VS CONTROL BOX ASSY., 1-PH & 3-PH. 220V

Item	Part No.	Description	X	Item	Part No.	Description	X
1	410-1180-0	Control box weldment	1	15	22-018-7-1/2	Cover gasket	4
2	401-1334-2	Control box cover	1	16	344-21-37	Fuse block, single	1
3	23-007	Knob	1	17	53-011	Boot	1
4	23-023	Spring latch	1	18	53-007	Ground lug	1
5	044-1102-1	Motor control board	1	22	22-022	O ring	1
6	45-016	Terminal strip	1	23	29-083	Decal	1
7	45-016-1	Terminal strip marker	1	24	---	#8x3/8 pan hd. screw B	3
8	35-005	Indicator light, 250V red	1	25	---	#6x3/8 pan hd. screw B	2
9	420-1089-2	Decal, wiring diagram	1	26	---	#6x1/2 pan hd. screw B	2
10	420-1086-8	Decal, FFD-3000VS	1	27	---	#6x5/8 pan hd. screw B	3
11	26-075	Toggle switch DPST	1	28	---	1/4-20x3/4 hex head screw	2
12	37-008	Fuse block spacer	2	29	---	1/4-20 hex head nut ESNA	2
13	47-001	Fuse block, double	1	30	420-2019-8	Decal, warning	1
14	50-004	Fuse, 8A 250V	2	31	---	1/4 Flat washer	2

**SCR CONTROL BOARD HOOK-UP**



**440V MODELS**



FFD1.DS4

**FFD-3000VS CONTROL BOX ASSY., 3-PH 440V**

Item	Part No.	Description	X	Item	Part No.	Description	X
1	36-094	Control box weldment	1	22	48-013-3	Plastic plug	1
2	401-1663-4	Control box cover	1	23	22-022	O ring	1
3	22-018	Gasket, PVC foam	2	24	---	Decal, 440V	1
4	22-018	Gasket, PVC foam	2	25	53-002-2	Wire nut, yellow	4
5	23-019	Spring latch	1	26	420-1136-1	Decal, wiring diagram	1
6	25-056	Control box mounting brkt.	1	27	16-002	Rubber gromet	1
7	53-007	Ground lug	1	28	54-005-3	Insulated clamp	3
8	47-011	Double fuse holder	1	29	420-2019-8	Decal, warning	1
9	50-007s	Fuse, 5A 600V	2	30	420-1086-8	Decal, FFD-3000VS	1
10	43-006	Transformer, 1.5KVA	1	31	420-1135-3	Decal, L1 & L2	1
11	044-1102-1	Motor control board	1	P	---	#10-32 Hex nut	1
12	23-007	Knob	1	N	---	#10-32 x 1/2 lg RHMS	1
13	45-016	Terminal strip	1	M	---	#8 x 3/8 lg Pan hd self tap B	12
14	45-016-1	Terminal strip marker	1	K	---	#6 x 3 1/2 lg Pan hd self tap B	2
15	35-005	Indicator light, 250V red	1	J	---	#6 x 5/8 lg Round hd screw F	2
16	26-075	Toggle switch DPST	1	F	---	#10 x 1/2 lg Pan hd self tap A	1
17	37-008	Fuse block spacer	2	E	---	5/16 Flat washer	4
18	47-001	Fuse block, double	1	D	---	5/16 x 3/4 lg. Type A hex head	4
19	50-004	Fuse, 8A 250V	2	C	---	1/4 Flat washer	2
20	53-011	Boot	1	B	---	1/4 -20 ESNA hex nut	5
21	067-1112-1	O ring	1	A	---	1/4-20 x 3/4 hex head screw	5