

NORTH STAR ENGINEERED PRODUCTS

OPERATION AND SERVICE MANUAL

FOR THE

FP-35

FOOD PROCESSING CENTRIFUGE



FP-35 CENTRIFUGE TEST RESULTS

S.O. # _____

CUSTOMER _____

SERIAL # _____

1. CYCLE TEST MACHINE 15 TIMES WITH MAXIMUM LOAD OF BASKET CAPACITY, INCLUSIVE SAFETY EVALUATION. CHECKED BY: _____

2. 5 OF THE 15 TEST CYCLES FILL BASKET WITH WATER AND CHECK FOR SEAM AND LID LEAKS. CHECKED BY: _____

3. 3 OF THE 15 TEST CYCLES RECORD CYCLE TIME.

___ MIN. & ___ SEC.

___ MIN. & ___ SEC.

___ MIN. & ___ SEC.

4. WELD COSMETICS: CHECKED BY: _____

5. WEIGHT CAPACITY OF BASKET. _____ LB.

6. COMMENTS ON MACHINE AND OPTIONS

7. INSPECTOR'S INITIALS _____

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SCOPE OF MANUAL

This manual is the operation and service manual for model FP-35 food processing centrifuge with pneumatic lid lock, automatic start and a digital timer. Lid cylinder updated starting with S/N FP35-130.

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6/23/05 Ver. 5.5

IMPORTANT POINTS

1. DO NOT RESTRICT OR REDUCE DRAIN IN ANY WAY. DO NOT CONNECT THE MACHINE ONTO THE SAME DRAIN LINE AS OTHER EQUIPMENT. FAILURE TO ADHERE TO THE FOREGOING MAY RESULT IN A BACK WASH.
2. IT IS ESSENTIAL TO MAINTAIN ALL SAFETY SYSTEMS. FAILURE TO ADHERE TO THE SAFETY MAINTENANCE STANDARDS MAY VOID THE WARRANTY OF THIS MACHINE.

PREPARATION FOR USE AND INSTALLATION INSTRUCTIONS

MODEL FP35

I. UNPACKING INSTRUCTIONS:

- A. INSPECT your packaged machine for shipping damage. Look for holes or tears in the packaging materials and any other outward signs of damage. REPORT ALL DAMAGE TO THE TRANSPORTATION COMPANY IMMEDIATELY.
- B. Remove packaging from around your machine.
- C. OPEN THE LID of your centrifuge.
- D. REMOVE THE BASKET from your centrifuge.
- E. INSPECT the interior of your machine for any signs of damage.
- F. REINSTALL THE BASKET into your centrifuge.

II. PREPARING YOUR MACHINE FOR INSTALLATION:

- A. MOVE MACHINE on pallet to desired location.
- B. REMOVE MACHINE FROM PALLET by removing the bolts through the feet of the machine and sliding the machine off the pallet.
- C. INSPECT the exterior of the machine for shipping damage. Look for dents or scratches in lid, curb assembly, skirt, or control box. REPORT ALL DAMAGE TO TRUCKING COMPANY IMMEDIATELY.

III. INSTALLATION:

- A. MOUNTING:
 - 1. MARK HOLES on floor by moving the machine into place and marking the hole locations through the holes in the legs. Make sure to allow adequate space behind the machine for servicing the rear control panel.
 - 2. DRILL MOUNTING HOLES. Use 2-1/2" X 1/2" lag bolts into lead anchors in a concrete floor. (Mounting hardware is not included.)
 - 3. BOLT machine into place. Do not tighten bolts.
 - 4. LEVEL MACHINE. Use metal shims under legs if necessary.
 - 5. TIGHTEN all mounting bolts.

MOUNTING PRECAUTIONS

- * NEVER USE RESILIENT PADS UNDER LEGS.
- * MOUNT MACHINE ON LEVEL SURFACE.
- * CHECK BOLTS PERIODICALLY FOR TIGHTNESS.

B. INSTALLING THE DRAIN:

1. The drain should pitch at least one inch per foot for proper flow.
2. The drain's flow should not be restricted or reduced.
3. The drain should dump into an open sump or be vented to prevent water backup.

C. PNEUMATIC CONNECTION:

1. Connect 60 - 80 PSI air to the regulator/filter on the machine.

D. ELECTRICAL CONNECTION:

1. INSPECT the data plate on the machine to confirm the required input voltage and amperage.
2. DISCONNECT BOX: The centrifuge should be connected to its own electrical disconnect box, which should be remotely mounted. DO NOT mount the disconnect box on or next to the machine. For proper fusing see SPECIFICATIONS on page 8.
3. NATIONAL ELECTRICAL CODE: All wiring, motor and circuit disconnecting devices must be installed in conformance with the National Electrical Code and applicable local codes.
4. CONNECTION OF CENTRIFUGE:
 - a. Wire the free end of the electrical cable into your junction box. The cable will have 2 or 3 power wires and a ground wire. A piece of sealtite flexible conduit is provided with the machine. Inspect the connection of the power wires into the disconnect box.
 - b. Depress the red STOP button.
 - c. Turn on incoming power.
 - d. Test the operation of your centrifuge.
 1. Set the timer to 3 minutes.
 2. Open the lid.
 3. Pull the STOP button out, and close the lid.

IV. SAFETY SYSTEM TEST:

- A. Make sure that the back panel is securely fastened to the control box.
- B. START THE MACHINE BY CLOSING THE LID
 - 1. Green light must be lit.
 - 2. Lid must lock.
- C. PUSH BUTTON TO STOP THE MACHINE:
 - 1. Machine should stop in 10 - 15 seconds.
 - 2. Light should go out after machine stops and lid opens.
- D. RE- START MACHINE:
 - 1. Close lid. If the timer has timed out, the lid must open then close to allow the machine to be restarted.
 - 2. Green run light should be on.
 - 3. The machine should re-start and run through its complete cycle. The machine should stop within 15 seconds of the end of its cycle.
 - 4. Green run light should go out after the machine has stopped.
 - 5. Lid may be opened at the end of the cycle.
 - 6. The basket should not be spinning when the lid is opened.

IF THE SAFETY SYSTEM IS NOT WORKING PROPERLY, TAKE THE CENTRIFUGE OUT OF SERVICE IMMEDIATELY.

CONSULT THE FACTORY AT (419) 726-2645 FOR ASSISTANCE WITH CORRECTING ANY SAFETY ISSUES.

SPECIFICATIONS

SPECIFICATIONS

MODEL FP35

BASKET CAPACITY	35 POUNDS
BASKET HEIGHT	23 INCHES
BASKET DIAMETER	18 INCHES INSIDE DIA
BASKET SPEED	800 RPM MAXIMUM
TIMER RANGE	0 -60 MINUTES (ADJUSTABLE)
DRIVE TYPE	INVERTER DRIVEN MOTOR
MOTOR SIZE	1 1/2 H.P.

ELECTRICAL SERVICE

208-230V / 60Hz / 1 or 3 PHASE	10 AMP SERVICE
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DIMENSIONS

HEIGHT TO LID TOP	40 INCHES
OVERALL HEIGHT	45 INCHES
DRAIN HEIGHT	11.5 INCHES
DRAIN SIZE	2 INCH O.D.
FLOOR AREA REQUIRED	26"W x 42"D
NET WEIGHT	550 POUNDS
SHIPPING WEIGHT	625 POUNDS

PNEUMATIC REQUIREMENTS

60 - 80 PSI (4 - 5.5 BARS)

OPERATING INSTRUCTIONS

A. Description of controls:

1. RUN LIGHT

Green light which is illuminated whenever the machine is running and the lid is locked.

2. SPEED SELECTOR SWITCH

The SPEED selector switch is a three position switch which controls the speed of the centrifuge. The three speeds are programmed into the inverter. These speeds may be changed by adjusting the parameters in the inverter. The three programmed speeds are: 400 RPM, 600 RPM, and 800 RPM.

3. STOP SWITCH:

The STOP switch is a maintained push button switch which may be used to stop the centrifuge in case of excessive vibration or other occurrence that requires immediate stopping of the centrifuge. It must be pulled out in order to restart the machine.

4. TIMER:

The TIMER determines the amount of time that the centrifuge runs before it begins to decelerate. The digital display in the timer will count down to indicate that it is running. After the cycle is complete, the timer will remain in a timed out condition until the lid is opened.

SETTING THE DIGITAL TIMER

1. Press the **SET** button. The display the present setting.
2. Press the arrow (**▲**) button beneath the digit to be changed until the correct setting is displayed.
3. After the correct setting is displayed, press the **ENT** button to store the new setting. The display will flash for a few seconds to indicate that the new value has been stored.

SETTING THE INTERNAL PRESSURE REGULATOR

The internal pressure regulator controls the pressure sent to the cylinders to lift the lid. Set it so that the lid just opens at the end of the drying cycle. Too much pressure will force the lid to open too rapidly, possibly damaging the machine. The lid may not open automatically if the regulator is set for too little pressure.

B. Loading Product:

1. Never load basket with more than the dry weight capacity or above the top.
2. Load evenly for a balanced load. Never allow anything to hang over the top of the basket.
3. Loads should remain several inches below the inside of the basket top. Do not load above the holes in the basket.

C. Operation:

1. The machine is equipped with a timer which has an adjustable range of 0 -60 minutes (longer times may be programmed by adjusting internal DIP switches). The timer is located on the side of the machine. Locate the timer and push the SET button to adjust the length of cycle.
2. Lift the lid and remove the basket from the machine. Load the basket evenly (no higher than the perforated holes in the basket sides). Place the basket into the machine. Pull out the STOP button (if it is depressed). Close the lid completely to start the machine.
3. The green run light will turn on, the lid will lock, and the machine will run for the time set on the timer. Do not attempt to open the lid while the RUN light is lit.
4. At the end of the cycle, the machine will automatically stop, then open after the RUN light turns off. After the basket has been refilled with wet product and placed back into the machine, close the lid to restart the machine.

D. Operation of Safeties:

1. The lid must be closed before the machine will start. A proximity sensor senses the closure of the lid. The sensor is located inside the control box. The lid must be firmly closed before the sensor will allow the machine to operate.
2. The run light is controlled by the inverter which runs the motor. When the motor is running, a signal from the inverter keeps the run light illuminated and the lid locked. When the rotation of the motor stops, the inverter turns the light off and opens the lid.
3. Failure of any safety switch or overload device will automatically cause the machine to come to a stop. The failure must be corrected before the machine will restart.

IF ANY OF THESE SAFETIES ARE NOT WORKING CORRECTLY, THE MACHINE SHOULD BE IMMEDIATELY TAKEN OUT OF SERVICE. CALL THE MANUFACTURER AT (419) 726-2645 FOR ASSISTANCE.

SEQUENCE OF OPERATION MODEL FP35

I. STARTING SEQUENCE:

- A. **STARTING THE MACHINE** The closing of the lid activates the lid closed proximity switch which in turn energizes the lid closed relay, CR1. CR1 energizes the START relay, CR2. CR2 energizes the RUN relay, CR3. CR3 is held on through the lid closed relay, CR1. CR3 also allows power to be applied to the TIMER, which provides a contact closure to the inverter run terminals if the STOP button is pulled out and the pressure switch is engaged. The inverter turns the green RUN light on whenever the machine is running.

II. STOPPING SEQUENCE:

- A. Elapsed time, per the pre-set timer cycle, expires (or the STOP button is pushed).
- B. The inverter begins to slow the machine at a predetermined rate. After the machine stops (approximately 10 seconds) the 'motor running' contacts of the inverter will open, releasing CR2. The green RUN light will turn off and the lid solenoid will release, opening the lid. When the lid opens, CR1 and CR3 release, resetting the timer.

TROUBLE SHOOTING GUIDE MODEL FP35

<u>Problem and possible cause</u>	<u>Potential correction</u>
<p>1. Machine fails to start No power to machine</p> <p>Lid not completely closed</p> <p>Motor doesn't start Timer is counting down.</p> <p>Motor doesn't start Green 'run' light is off. Timer display is off.</p> <p>Motor doesn't start Green 'run' light is on. (Analog timer) Timer display is off. (Digital timer)</p> <p>Motor starts – machine doesn't turn</p>	<p>Main breaker off or internal circuit breaker or fuse tripped or off.</p> <p>Close lid - the lid closed proximity sensor must sense a lid closed position for the machine to start. A light on the sensor illuminates when the lid is closed. Defective sensor.</p> <p>STOP button is depressed. No air pressure. Defective timer or corrosion in timer base. Defective inverter.</p> <p>Defective start relay. See 'lid not closed' above.</p> <p>Defective timer. Defective 'run' relay</p> <p>Broken drive belt</p>
<p>2. Machine keeps running Incorrect timer setting</p> <p>Timer has failed</p>	<p>See 'Setting the digital timer' under Operating Instructions. Defective timer</p>
<p>3. Excessive vibration Machine is improperly loaded Motor mount rubber is worn Motor hanger cap is loose</p>	<p>Stop the machine and rearrange the load. Replace motor mount rubbers. Tighten the caps - The rubbers must be tight.</p>

**SCHEDULED MAINTENANCE PROGRAM
MODEL FP-35**

- * Read thoroughly before operating your centrifuge.
- * Your NSEP centrifuge requires scheduled maintenance.
- * Always disconnect power before working on any part of the centrifuge.
- * Do not attempt to load or unload if the basket is spinning.
- * Always instruct end users on all operational and safety procedures prior to their operation of the centrifuge.

I. WEEKLY / MONTHLY PROCEDURES

- A. After each 40 hours of usage, add approximately 13 grams (6-7 pumps with a typical grease gun) of grease to the grease fitting located at the top of the drive shaft. The recommended grease is Chevron SRI No.2 or equivalent.

II. MONTHLY PROCEDURES

- A. Inspect the drive belt(s).
- B. Inspect and test the SAFETY SYSTEM:
 1. VISUAL INSPECTION:
 - a. Verify that the back panel is securely fastened to the control box.
 2. START THE MACHINE:
 - a. The lid should be closed before the machine will operate.
 - b. The run light should be illuminated and the lid should be locked.
 3. STOP THE MACHINE:
 - a. Depress the stop button.
 - b. Machine should stop in 10 to 15 seconds.
 - c. The machine run light should turn off and the lid should open.
 4. RESTART THE MACHINE:
 - a. Pull out the stop button.
 - b. Close the lid.
 - c. The machine should run a complete cycle and stop within 10 to 15 seconds after the completion of the cycle.
 - d. The machine run light should be on during the entire cycle and should turn off after the motor has stopped spinning.
 - e. The basket should be stopped when the run light turns off and the lid opens.

**IF THE SAFETY SYSTEM IS NOT WORKING PROPERLY,
IMMEDIATELY REMOVE THE MACHINE FROM SERVICE AND CALL
THE FACTORY AT (419) 726-2645.**

III. SEMIANNUAL PROCEDURES

- A. Remove the stainless steel CURB. Inspect motor mounting rubbers. Replace mounting rubbers if the motor is loose.
- B. Perform weekly and monthly procedures as described above.

SPARE PARTS

Some of these parts may vary depending upon the machine control voltage . Make sure that you verify the input and control voltage before ordering.

QUANTITY	P/N	DESCRIPTION
1	38098	120 VOLT DIGITAL CYCLE TIMER
3	28130	120 VOLT CONTROL RELAY
1	28800	TRANSFORMER (230V-460V OPERATION)
1	37955	REGULATOR (LID OPEN)
2	38123	LID CYLINDER
2	38124	ROD CLEVIS
2	38125	PIVOT BRACKET
1	34010	TRANSFORMER (380V OPERATION)
4	34950	BALL STUDS
1	37949	120 VOLT SOLENOID VALVE
1	215-005	OIL SEAL
2	B-64	V-BELT
1	FP35-066	N. C. CONTACT BLOCK
1	FP35-086	AC INVERTER (230V OPERATION)
1	FP35-087	PROXIMITY SENSOR
1	FP35-088	CIRCUIT BREAKER
1	FP35-101	MOTOR
1	FP35-118	BRAKING RESISTOR (230V OPERATION)
1	FP35-150	DRIVE UNIT BEARING (Double Row}
1	FP35-162	AC INVERTER (380V-460V OPERATION)
1	FP35-163	BRAKING RESISTOR (380V-460V OPERATION)
1	FP35-244	DRIVE UNIT BEARING (Single Row}
1	36040	AIR FILTER MINIATURE F/R UNIT

FP-35 INVERTER INITIALIZATION PROCEDURE

Programming Procedures

With the inverter in a stop condition, press and hold the **SHIFT** key, then press the **PROG** key. The **PRG** indicator will turn on.

Press the **UP/DOWN** arrow keys to access the desired parameter. The parameter number will be displayed in the upper left corner of the digital display.

Press the **SHIFT** key to allow the Data Code to be changed. **PRG** will start to blink.

Press the **UP/DOWN** arrows to select the new Data Code.

Press the **ENTER** key to store the new Data Code. The display shows **STO**red for one second.

If accidentally changing the wrong parameter, press the **SHIFT** button to prevent storing incorrect data.

When finished with each parameter, press the **PROG** key to exit the Program mode or the **UP/DOWN** arrows to select a new parameter.

To Calculate Frequency for a Desired Speed

The formula to calculate the frequency for a machine with a standard 6.4 inch motor pulley and a 9.4 inch drive pulley is as follows:

$$\text{FREQUENCY} = \text{DESIRED SPEED} \times 0.0505$$

The use of this formula eliminates the need to calculate using pulley sizes or ratios because they are already taken into consideration.

For example, to calculate the frequency required for a speed of 600 RPM, simply multiply 600 times 0.0505 for a frequency of 30.30 Hertz.

To Adjust Speed Only

Set the three position speed select switch on the front of the machine to position 2.

Press the **UP/DOWN** arrows on the inverter to select the new desired frequency for speed 2.

Press the **ENTER** key to store the new Data Code. The display shows **STO**red for one second.

With the inverter in a stop condition, press and hold the **SHIFT** key, then press the **PROG** key. The **PRG** indicator will turn on.

Press the **UP/DOWN** arrow keys to access parameter number 33 (Speed number 1). The parameter number will be displayed in the upper left corner of the digital display.

Press the **SHIFT** key to allow the Data Code to be changed. **PRG** will start to blink.

Press the **UP/DOWN** arrows to select the new frequency for speed 1.

Press the **ENTER** key to store the new Data Code. The display shows **STO**red for one second.

Press the **UP/DOWN** arrow keys to access parameter number 34 (Speed number 3). The parameter number will be displayed in the upper left corner of the digital display.

Press the **SHIFT** key to allow the Data Code to be changed. **PRG** will start to blink.

Press the **UP/DOWN** arrows to select the new frequency for speed 3.

Press the **ENTER** key to store the new Data Code. The display shows **STO**red for one second.

Press the **PROG** key to exit the Program mode.

To Adjust all Parameters

Set the three position speed select switch on the front of the machine to position 2.

Press the **UP/DOWN** arrows for a setting of 30.30. (Speed 2)

Press the **ENTER** key to store the new Data Code. The display shows **STO**red for one second.

With the inverter in a stop condition, press and hold the **SHIFT** key, then press the **PROG** key. The **PRG** indicator will turn on.

Using the above procedures to access the desired parameter, set the following:

Set parameter number 21 to 2. (Input mode)

Set parameter number 32 to 45.5. (Maximum Frequency)

Set parameter number 33 to 20.20. (Speed 1)

Set parameter number 34 to 40.40. (Speed 3)

Set parameter number 42 to 30. (Acceleration time)

Set parameter number 43 to 8. (Deceleration time)

Set parameter number 47 to 4.0. (DC brake time)

Set parameter number 48 to 10. (DC brake voltage %)

Set parameter number 68 to 4. (Trip Restart Number)

Set parameter number 69 to 2.00. (Restart Time Delay)

Set parameter number 75 to 5. (Auxiliary relay output)

Press the **PROG** key to exit the Program mode.

INVERTER FAULT CODES

FAULT	CAUSE	REMEDY
F01	Inverter malfunction	Press stop key for longer than 1 second to reset. Consult factory if problem persists.
F03	Bus current error	Press stop key to reset. Consult factory if problem persists.
F04	Power supply overload	Check for problem on V+ line.
F05	No DC bus voltage	Check power resistor for short. Consult factory if problem persists.
F06	Output short circuit	Check motor wiring. Remove motor wires & recheck.
F07	External fault	Not used
F11	Ground fault	Check motor wiring. Remove motor wires and recheck.
F13	Overvoltage on DC bus	Verify correct line voltage. Increase deceleration ramp time.
F16	Acceleration overcurrent	Mechanical overload on motor. Check motor wiring. Increase acceleration ramp time.
F17	Deceleration overcurrent	Increase deceleration ramp time.
F18	Running overcurrent	Mechanical overload on motor. (Bad bearing?)
F19	Heat sink over temperature	Check for excessive overload on drive.

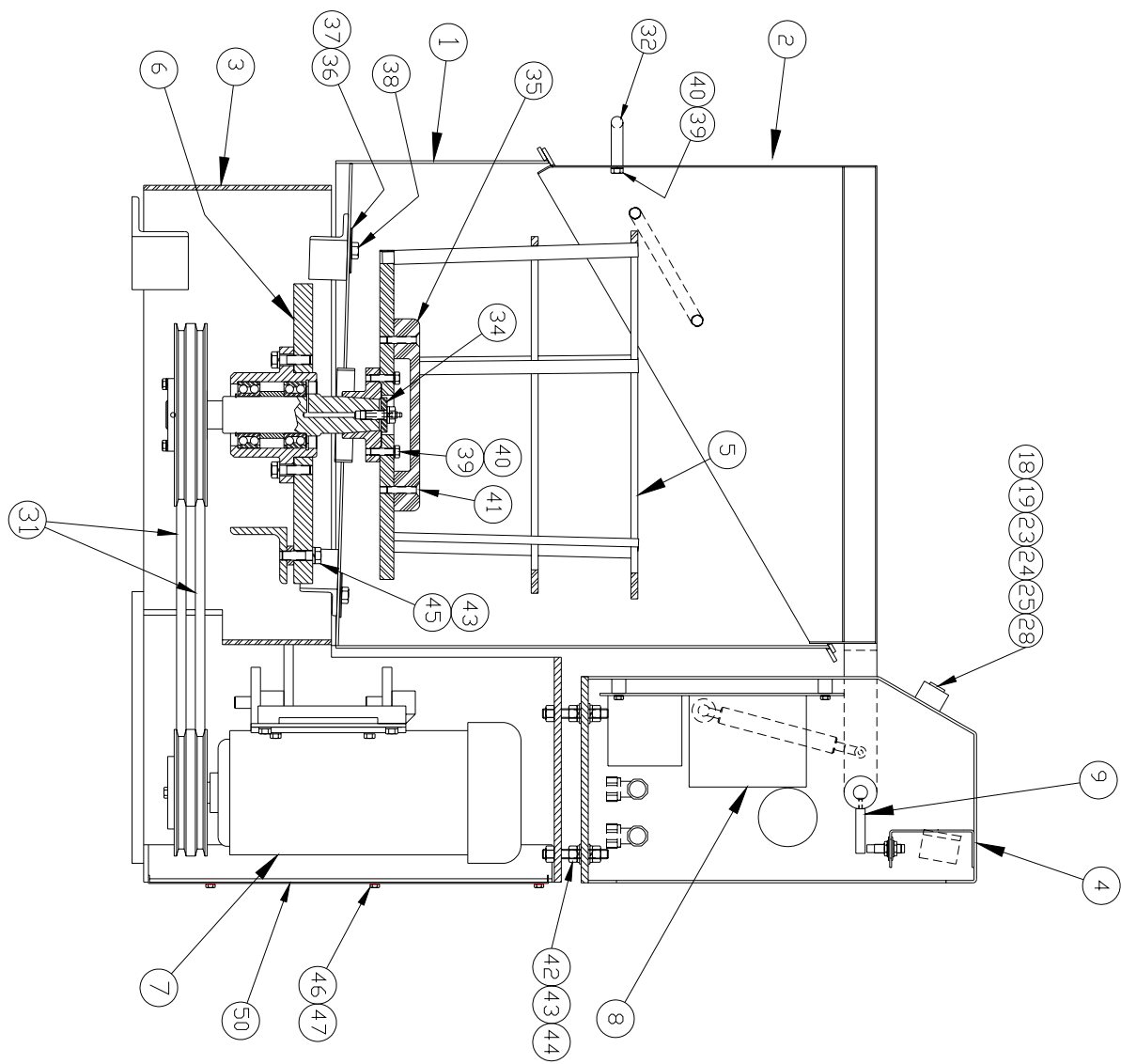


Figure 1
Main Assembly, Sheet 1

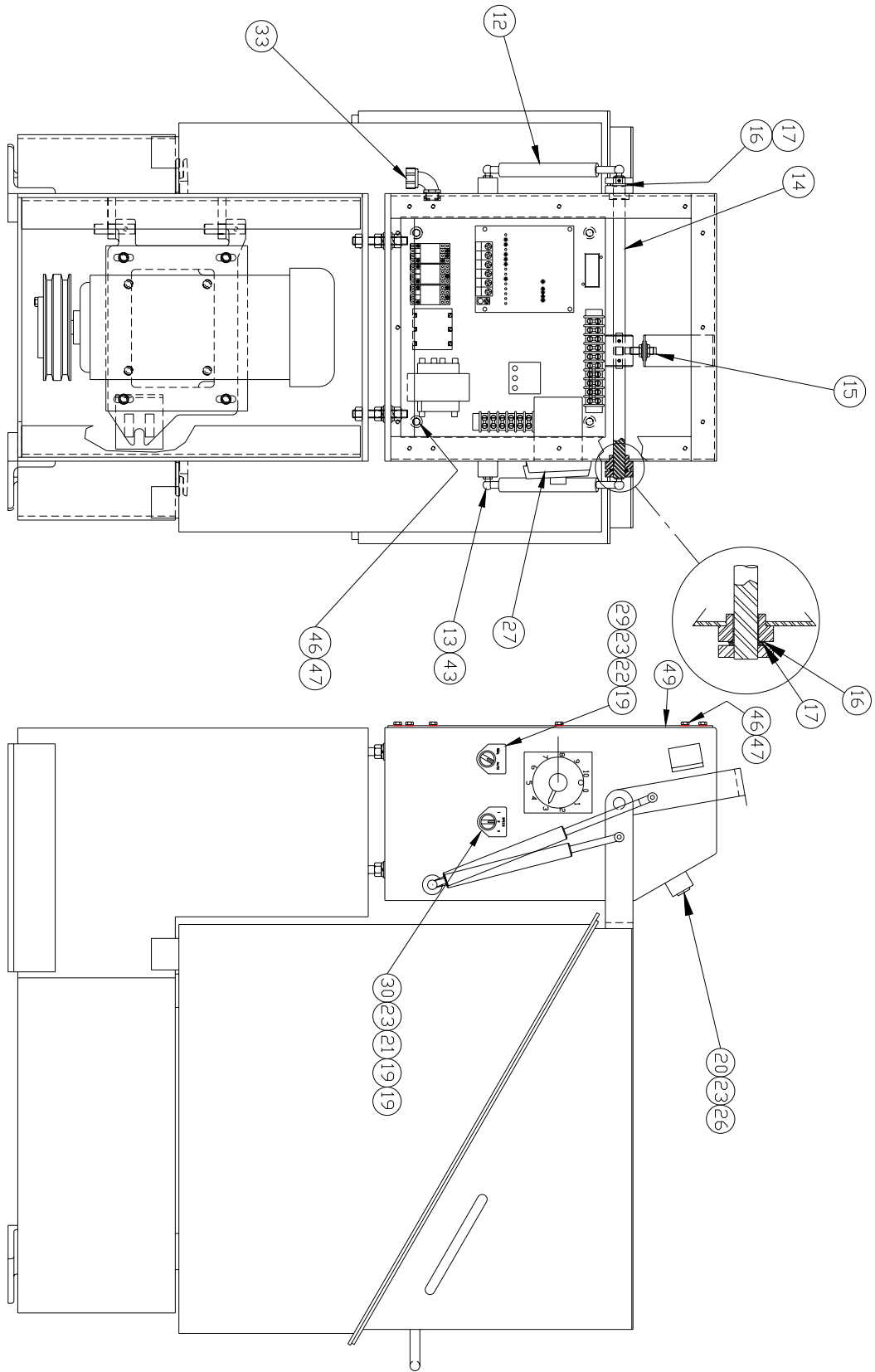


Figure 2
Main Assembly Sheet 2

MATERIAL LIST	
ITEM QTY	NUMBER DESCRIPTION
1	1 FP35-420 CURB ASSEMBLY
2	1 FP35-419 LID ASSEMBLY
3	1 FP35-426 SKIRT WELDMENT
4	1 FP35-425 E-BOX ASSEMBLY
5	1 FP35-416 BASKET CAGE ASSEMBLY
6	1 FP35-415 DRIVE UNIT ASSEMBLY
7	1 SEE TABLE BRAKE MOTOR ASSEMBLY
8	1 SEE TABLE ELECTRICAL PANEL ASSEMBLY
9	1 FP35-427 PROXIMITY TARGET
10	1 2167 BELT TENSION BOLT
11	1 2168 TENSION BOLT BRACKET
12	2 LID CYLINDER
13	4 34950 BALL STUD
14	1 FP35-243 LID SHAFT
15	2 FP35-087 SENSOR, PROXIMITY
16	2 31320 NYLON BUSHING (3/4 SHAFT)
17	2 FP35-084 FLAT WASHER, NYLON
18	1 FP35-063 BUTTON, GREEN
19	4 FP35-065 N.D. CONTACT BLOCK
20	1 FP35-066 N.C. CONTACT BLOCK
21	1 FP35-067 3 POSITION SELECTOR
22	
23	4 FP35-069 ASSEMBLY CLIP
24	1 FP35-070 LAMP HOLDER MODULE
25	1 FP35-071 LAMP, INCANDESCENT
26	1 FP35-072 STOP BUTTON
27	1 38098 TIMER
28	
29	
30	1 FP35-078 NAME PLATE (SPEED SELECT)
31	2 ? DRIVE "V" BELT
32	3 36860 HANDLE
33	2 23930 90° ELBOW, 1/2 SEALTITE
34	1 FP35-120 RETAINER WASHER
35	1 FP35-037 BASKET GUIDE
36	4 31690 CURB MOUNT WASHER
37	4 2400-149-G CURB MOUNT GASKET
38	4 FP35-139 1/2-13 x 1" HEX HEAD CAP SCREW
39	6 FP35-106 3/8-16 x 1" HEX HEAD CAP SCREW
40	6 FP35-107 3/8 DIA. LOCK WASHER
41	5 FP35-122 3/8-16 x 1 3/4" FLAT HEAD CAP SCREW
42	8 FP35-117 1/2-13 HEX. NUT
43	15 FP35-125 1/2 DIA. LOCK WASHER
44	12 FP35-124 1/2 DIA. PLAIN WASHER
45	3 FP35-215 1/2-13 x 2" HEX HEAD CAP SCREW
46	24 FP35-129 1/4-20 x 1/2 LONG HEX HEAD CAP SCREW
47	24 FP35-057 WASHER, LOCK (1/4 DIA.)
48	1 FP35-407 CENTRIFUGE BASKET (NOT SHOWN)
49	1 FP35-165 ELECT. BOX BACK PANEL
50	1 FP35-164 MOTOR COVER PANEL

**Figure 3
Main Assembly, Sheet 3**

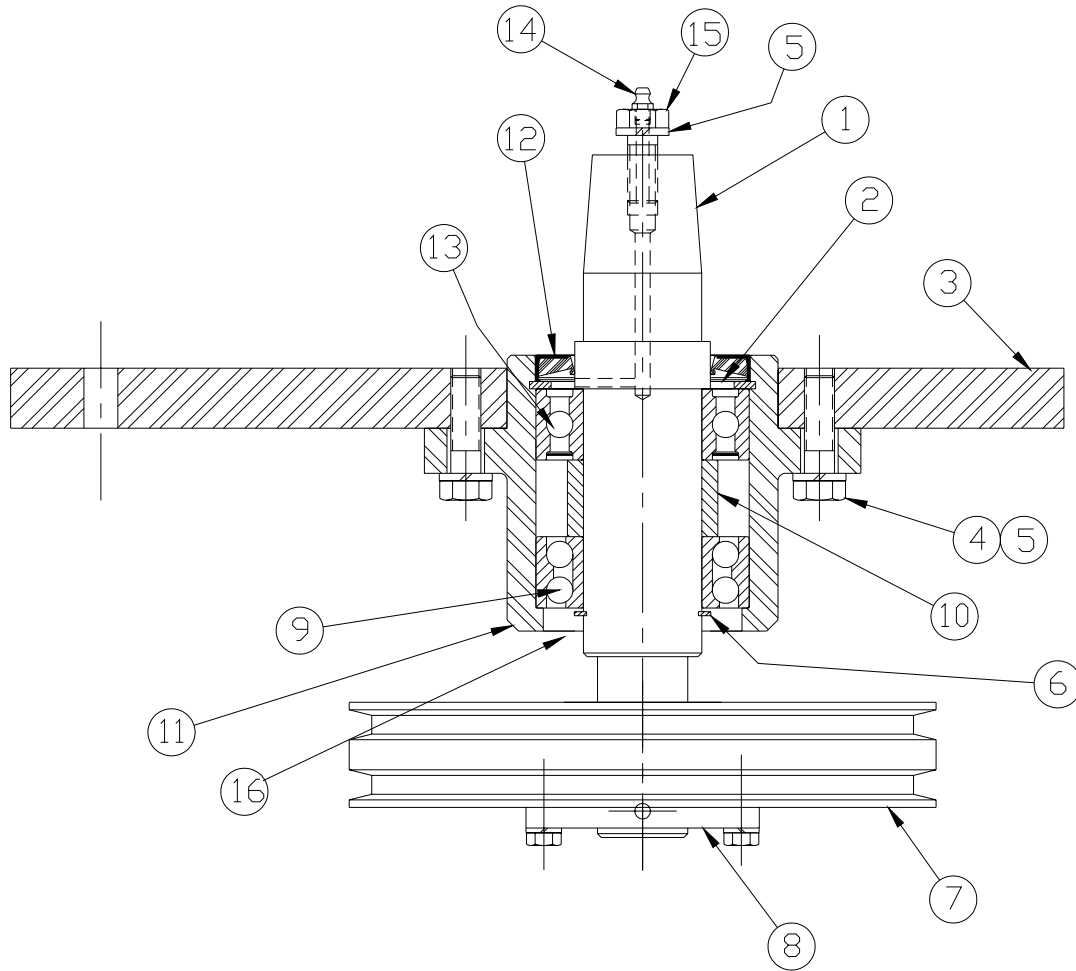


Figure 4
Drive Unit Assembly

ITEM	NUMBER	DESCRIPTION
1	FP35-177	DRIVE SHAFT
2	FP35-182	RETAINING RING (INTERNAL)
3	FP35-180	DRIVE UNIT MOUNTING PLATE
4	FP35-181	CAP SCREW, HEX HEAD (1/2-13 x 1-3/4")
5	FP35-125	LOCK WASHER, 1/2" DIA.
6	FP35-183	RETAINING RING, EXTERNAL
7	37890	Q. D. SHEAVE (9" DIA)
8	FP35-051	Q. D. PULLEY BUSHING (1-1/2" BORE)
9	FP35-150	BEARING, DOUBLE ROW BALL
10	FP35-179	BEARING SPACER
11	FP35-178	BEARING HOUSING
12	215-005	OIL SEAL
13	FP35-244	BEARING, SINGLE ROW BALL
14	23680	GREASE FITTING (1/4-28 THREAD)
16	215-015	OIL SEAL
15	FP35-246	RETAINER SCREW

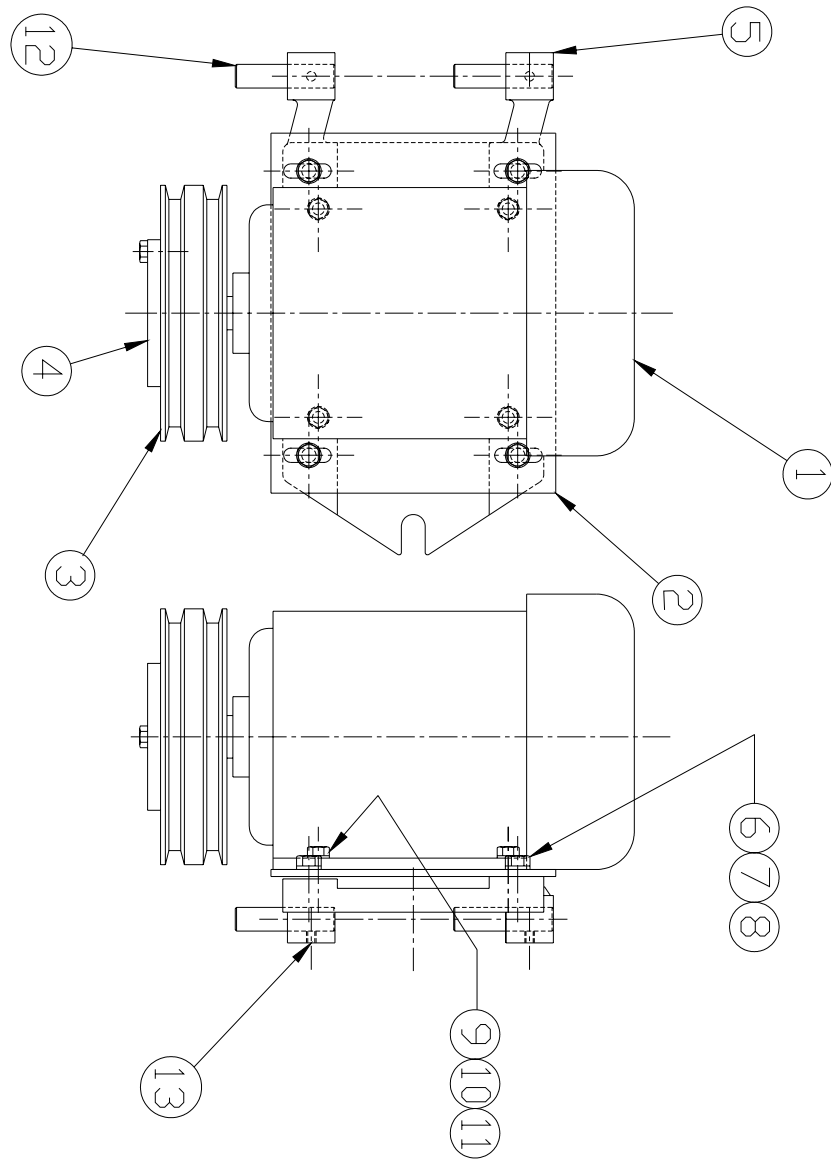


Figure 5
Drive Motor Assembly

ITEM	PART NUMBER	DESCRIPTION
1	FP35-101	DRIVE MOTOR
2	FP35-248	DRIVE MOTOR PLATE
3	FP35-160	Q. D. SHEAVE
4	FP35-161	Q. D. BUSHING (FOR 7/8 DIA SHAFT)
5	FP35-247	MOTOR HANGER
6	FP35-106	CAP SCREW, HEX HD., 3/8 - 16 x 7/8" LONG
7	FP35-107	LOCK WASHER, HELICAL SPRING, 3/8ø
8	FP35-108	FLAT WASHER 3/8ø
9	FP35-109	CAP SCREW, HEX HD., 5/16 - 18 x 5/8" LONG
10	FP35-060	LOCK WASHER, HELICAL SPRING, 5/16ø
11	FP35-110	FLAT WASHER 5/16ø
12	FP35-112	HANGER PIVOT PIN
13	FP35-113	SET SCREW, CUP POINT, 1/4 - 20 x 3/8" LONG

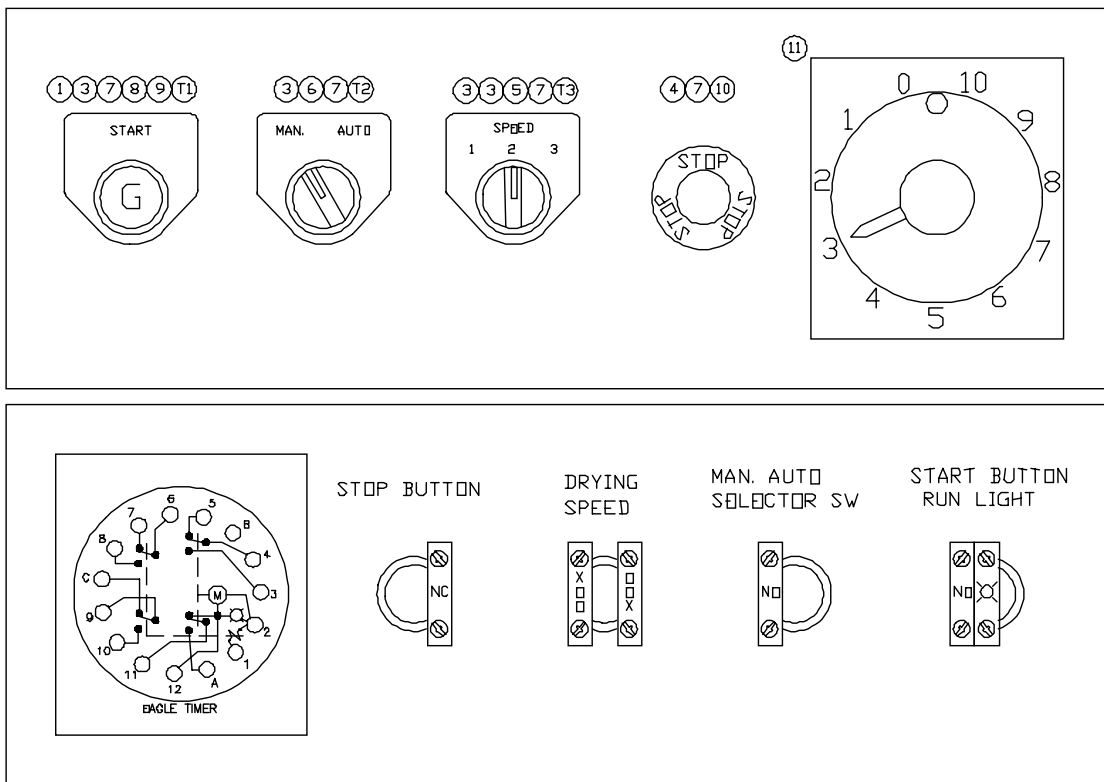
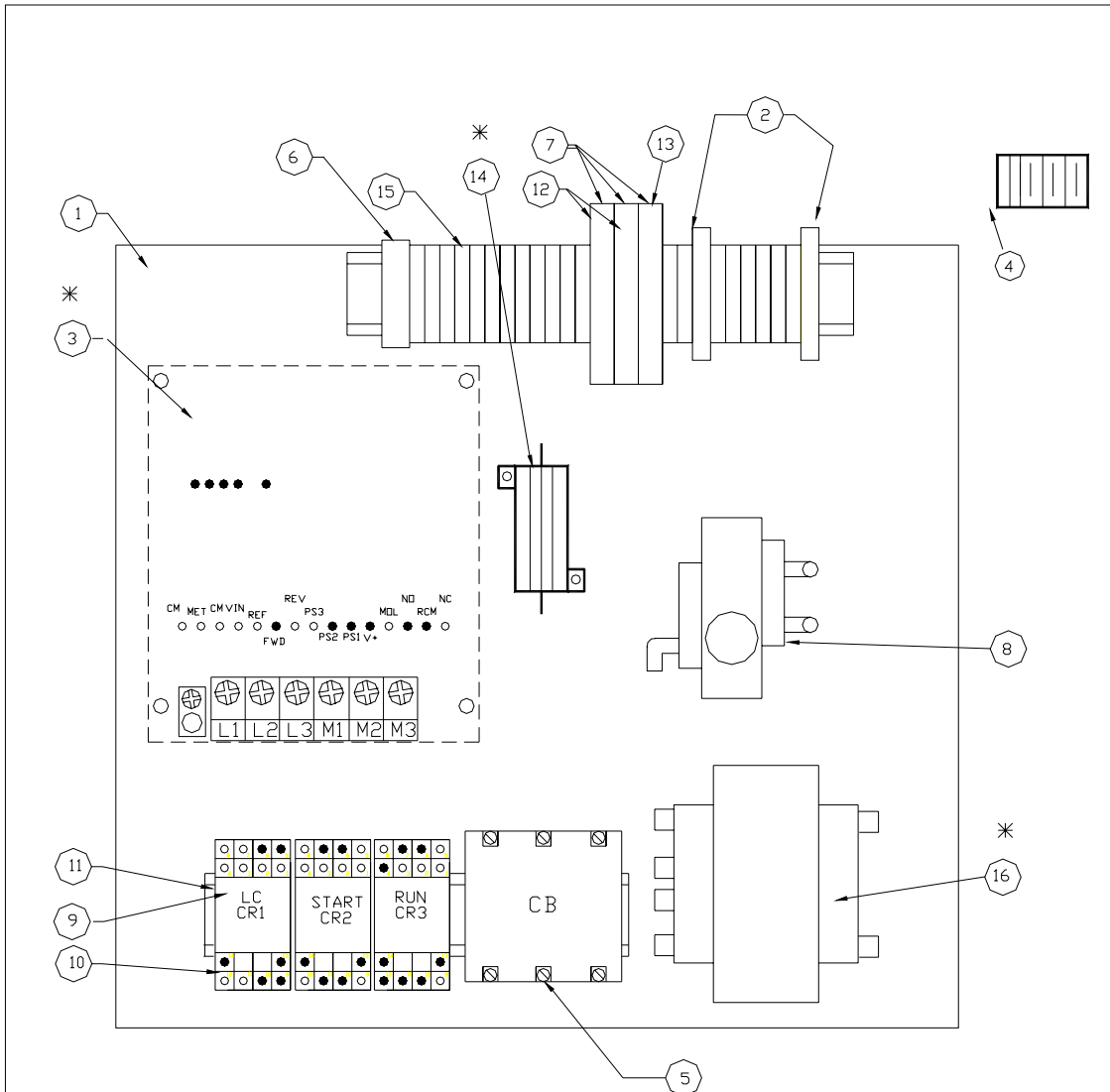


Figure 6
Control Panel Assembly

REF NUMBER	PART NUMBER	DESCRIPTION
1	FP35-063	GREEN PUSH BUTTON
3	FP35-065	N.O. CONTACT BLOCK
4	FP35-066	N.C. CONTACT BLOCK
5	FP35-067	3 POSITION SELECTOR
6	FP35-068	2 POSITION SELECTOR
7	FP35-069	ASSEMBLY CLIP
8	FP35-070	LAMP HOLDER MODULE
9	FP35-071	LAMP, INCANDESCENT
10	FP35-072	STOP BUTTON
11	24470	ANALOG TIMER
11	38098	DIGITAL TIMER
T1	FP35-076	NAME PLATE (START)
T2	FP35-077	NAME PLATE (MAN. AUTO)
T3	FP35-078	NAME PLATE (SPEED SELECT)

NOTE: START button and MAN-AUTO switch not installed after 1999. Green light continues as 'run' light. Timer located on side of machine.



* - THESE PARTS VARY DEPENDING UPON APPLIED VOLTAGE

BILL OF MATERIALS				BILL OF MATERIALS			
REF	QTY	DESCRIPTION	PART NUMBER	REF	QTY	DESCRIPTION	PART NUMBER
1	1	PANEL	FP35-033	9	3	RELAY	28130
2	2	GROUND TERMINAL	37958	10	3	SOCKET	28140
3	1	INVERTER	FP35-086	11	16"	DIN RAIL	28150
4	1	PROXIMITY SENSOR (REF)	FP35-087	12	2	FUSE	37951
5	1	CIRCUIT BREAKER	FP35-088	13	1	FUSE	37952
6	1	END CLAMP	37960	14	1	RESISTOR	FP35-118
7	3	FUSE DISCONNECT TERMINAL	37961	15	18	TERMINAL	37956
8	1	SOLENOID VALVE	37978	16	1	TRANSFORMER	28800

Figure 7
Typical Electrical Panel Assembly

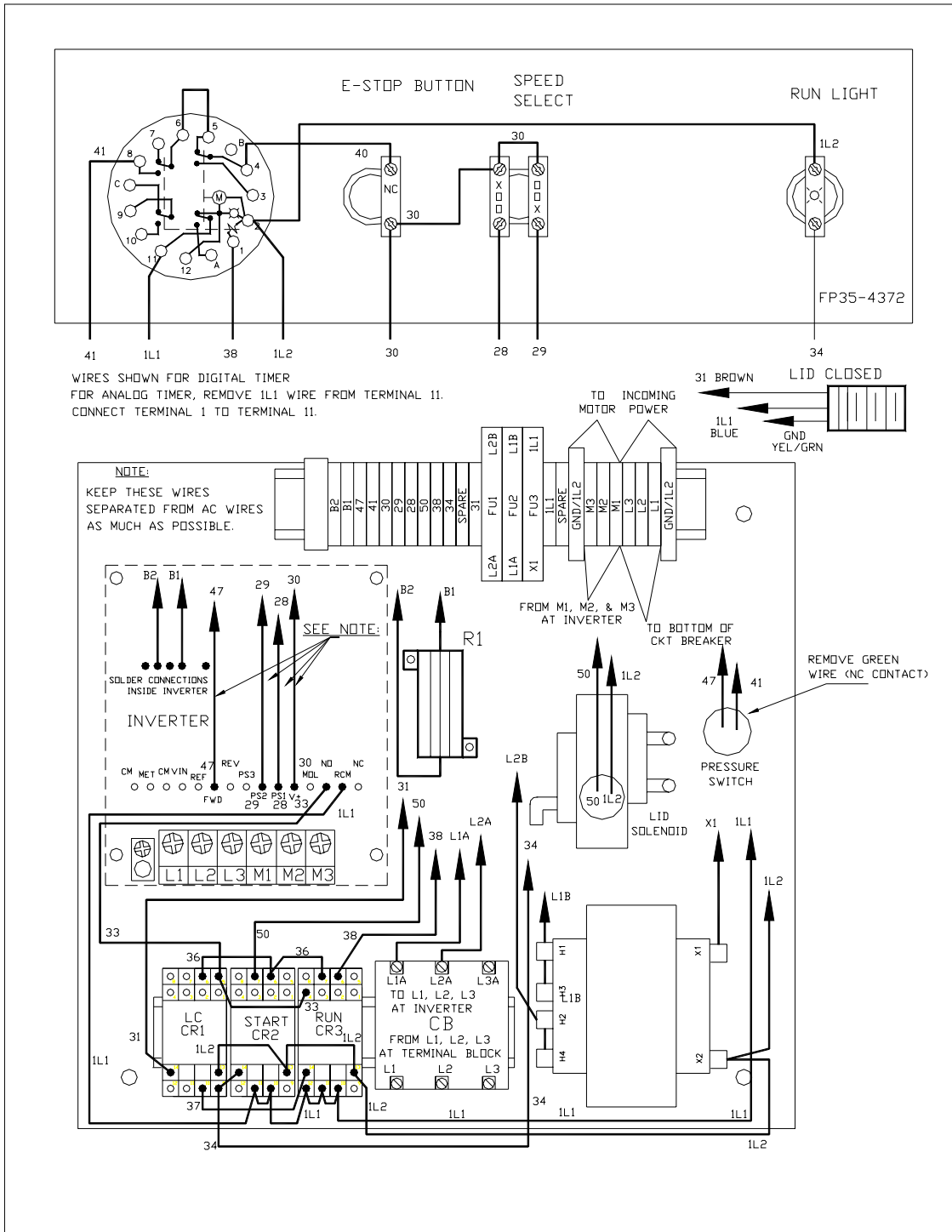


Figure 8
Typical Wiring Diagram – Digital Timer Version

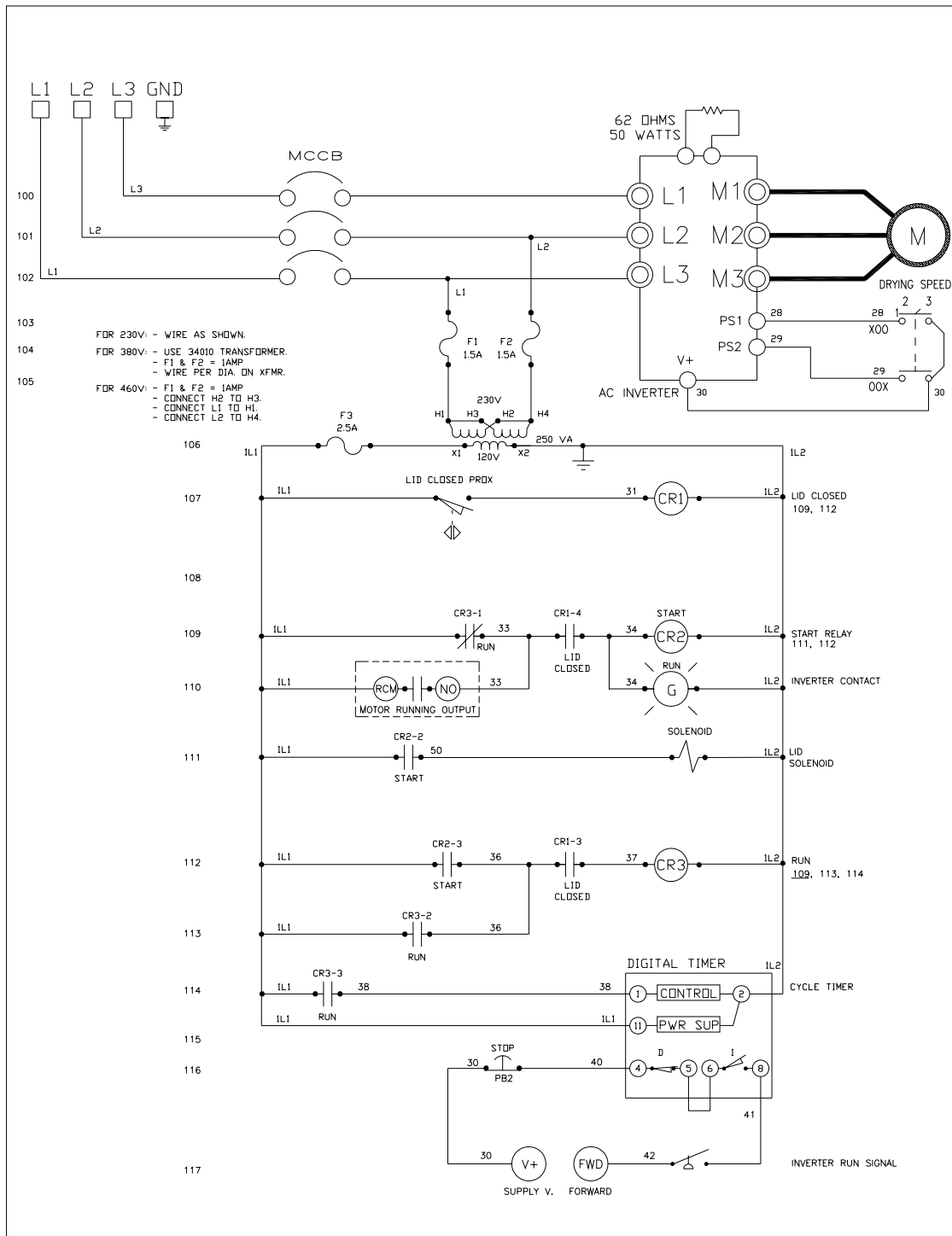


Figure 9
Schematic Diagram – Digital Timer Version

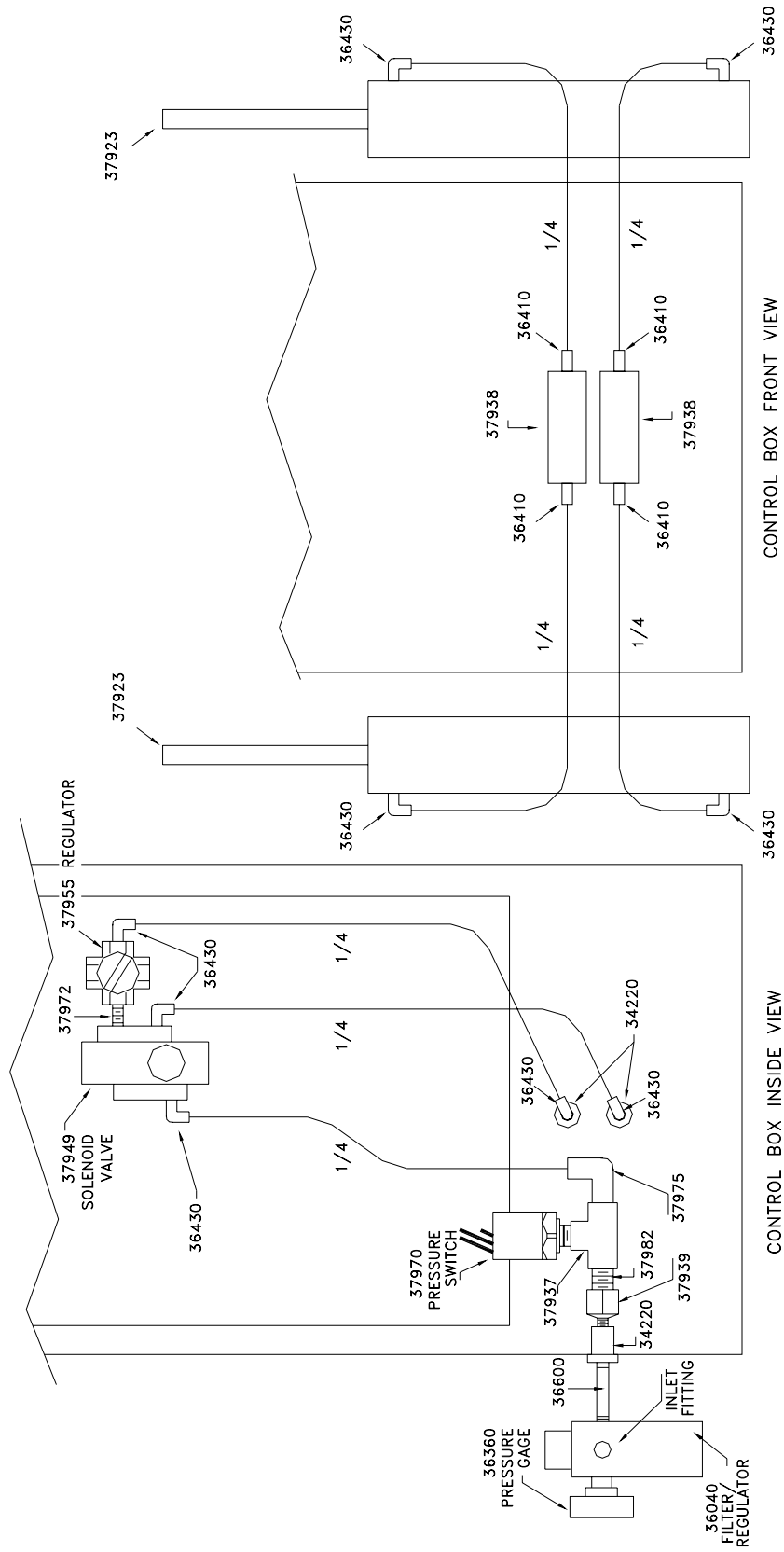


Figure 10
Pneumatic Diagram

MANUAL ADDENDUM

FOR THE

FP-35

FOOD PROCESSING CENTRIFUGE

USING MODEL EF1 INVERTER

**MANUAL ADDENDUM CONTAINS INFORMATION FOR USE WITH THE WOODS
MODEL EF1 INVERTER**

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FP-35 EF1 INVERTER

INITIALIZATION PROCEDURE

Programming Procedures

With the inverter in a stop condition, press and hold the **SHIFT** key, then press the **PROG** key. The **PRG** indicator will turn on.

Press the **UP/DOWN** arrow keys to access the desired parameter. The parameter number will be displayed in the upper left corner of the digital display.

Press the **SHIFT** key to allow the Data Code to be changed. **PRG** will start to blink.

Press the **UP/DOWN** arrows to select the new Data Code.

Press the **ENTER** key to store the new Data Code. The display shows **STOred** for one second.

If accidentally changing the wrong parameter, press the **STOP** button to prevent storing incorrect data.

When finished with each parameter, press the **PROG** key to exit the Program mode or the **UP/DOWN** arrows to select a new parameter.

To Calculate Frequency for a Desired Speed

The formula to calculate the frequency for a machine with a standard 6.4 inch motor pulley and a 9.4 inch drive pulley is as follows:

$$\text{FREQUENCY} = \text{DESIRED SPEED} \times 0.0505$$

The use of this formula eliminates the need to calculate using pulley sizes or ratios because they are already taken into consideration.

For example, to calculate the frequency required for a speed of 600 RPM, simply multiply 600 times 0.0505 for a frequency of 30.30 Hertz.

To Adjust Speed Only

Set the three position speed select switch on the front of the machine to position 2.

Press the **UP/DOWN** arrows on the inverter to select the new desired frequency for speed 2.

Press the **ENTER** key to store the new Data Code. The display shows **STOred** for one second.

With the inverter in a stop condition, press and hold the **SHIFT** key, then press the **PROG** key. The **PRG** indicator will turn on.

Press the **UP/DOWN** arrow keys to access parameter number 303 (Speed number 1). The parameter number will be displayed in the upper left corner of the digital display.

Press the **SHIFT** key to allow the Data Code to be changed. **PRG** will start to blink.

Press the **UP/DOWN** arrows to select the new frequency for speed 1.

Press the **ENTER** key to store the new Data Code. The display shows **STOred** for one second.

Press the **UP/DOWN** arrow keys to access parameter number 304 (Speed number 3). The parameter number will be displayed in the upper left corner of the digital display.

Press the **SHIFT** key to allow the Data Code to be changed. **PRG** will start to blink.

Press the **UP/DOWN** arrows to select the new frequency for speed 3.

Press the **ENTER** key to store the new Data Code. The display shows **STORed** for one second.

Press the **PROG** key to exit the Program mode.

To Adjust all Parameters

Set the three position speed select switch on the front of the machine to position 2.

Press the **UP/DOWN** arrows for a setting of 30.30. (Speed 2 = 600 RPM)

Press the **ENTER** key to store the new Data Code. The display shows **STORed** for one second.

With the inverter in a stop condition, press and hold the **SHIFT** key, then press the **PROG** key. The **PRG** indicator will turn on.

Using the above procedures to access the desired parameter, set the following:

Set parameter number 201 to 2. (Input mode)

Set parameter number 302 to 45.50. (Maximum Frequency)

Set parameter number 303 to 20.20. (Speed 1 = 400 RPM)

Set parameter number 304 to 40.40. (Speed 3 = 800 RPM)

Set parameter number 42 to 30.00. (Acceleration time)

Set parameter number 403 to 8.00. (Deceleration time)

Set parameter number 407 to 3.00. (DC brake time)

Set parameter number 408 to 15.00%. (DC brake voltage)

Set parameter number 608 to 4. (Trip restart number)

Set parameter number 609 to 2.00. (Restart delay time)

Set parameter number 705 to 5. (Auxiliary relay output)

Set parameter number 801 to 2. (Store parameters)

Press the **PROG** key to exit the Program mode.

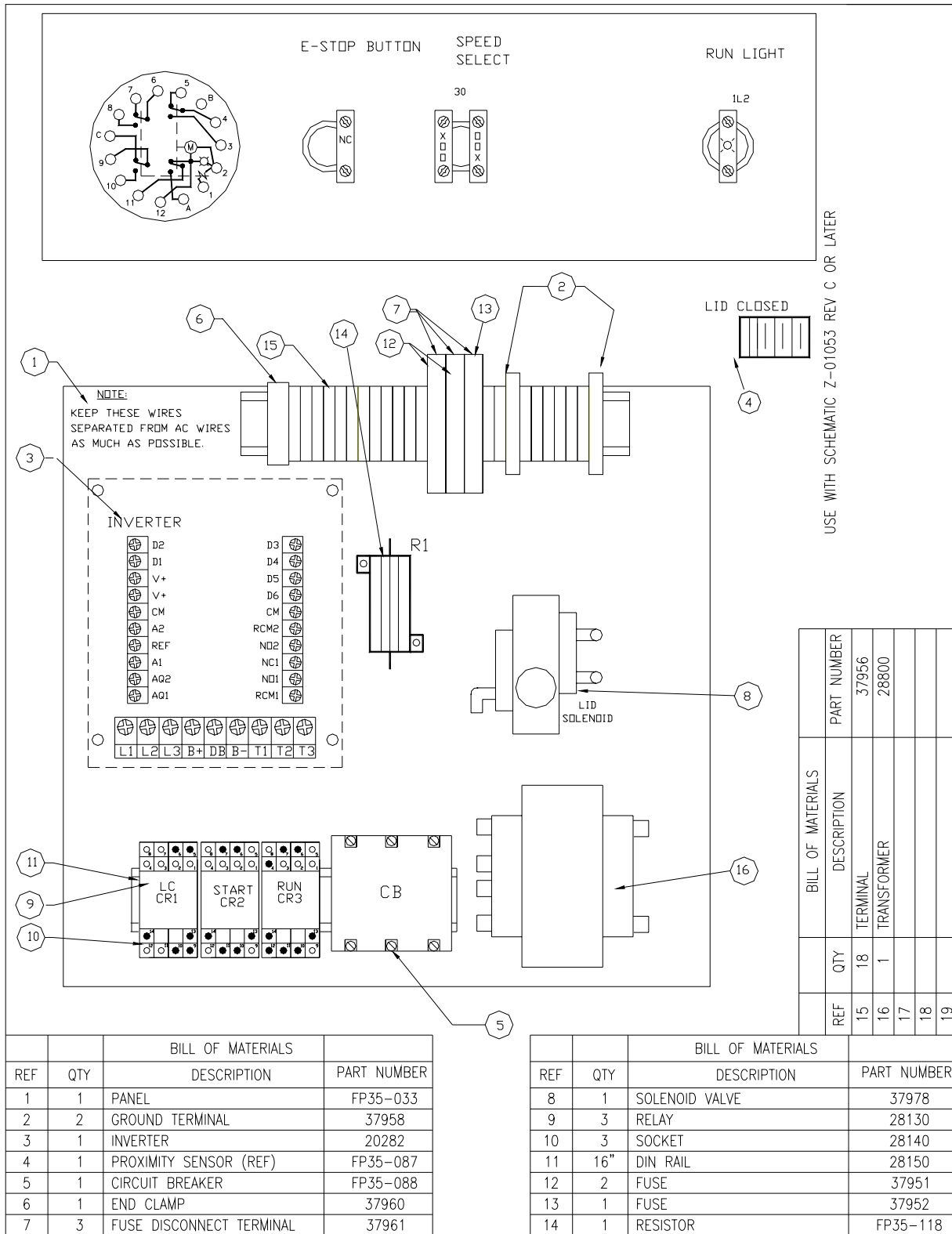


Figure 1
Typical Electrical Panel Assembly

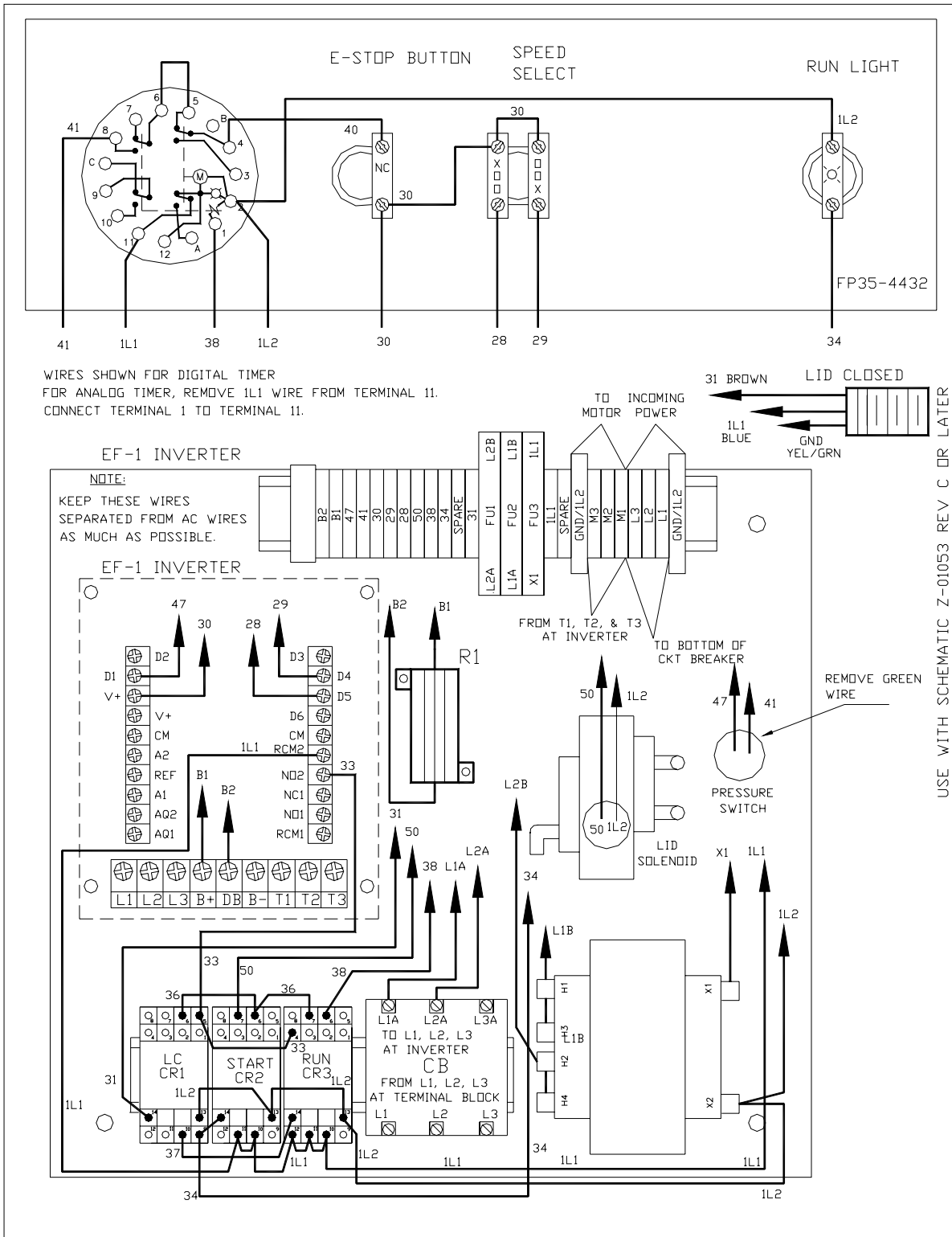


Figure 2
 Typical Electrical Panel Wiring

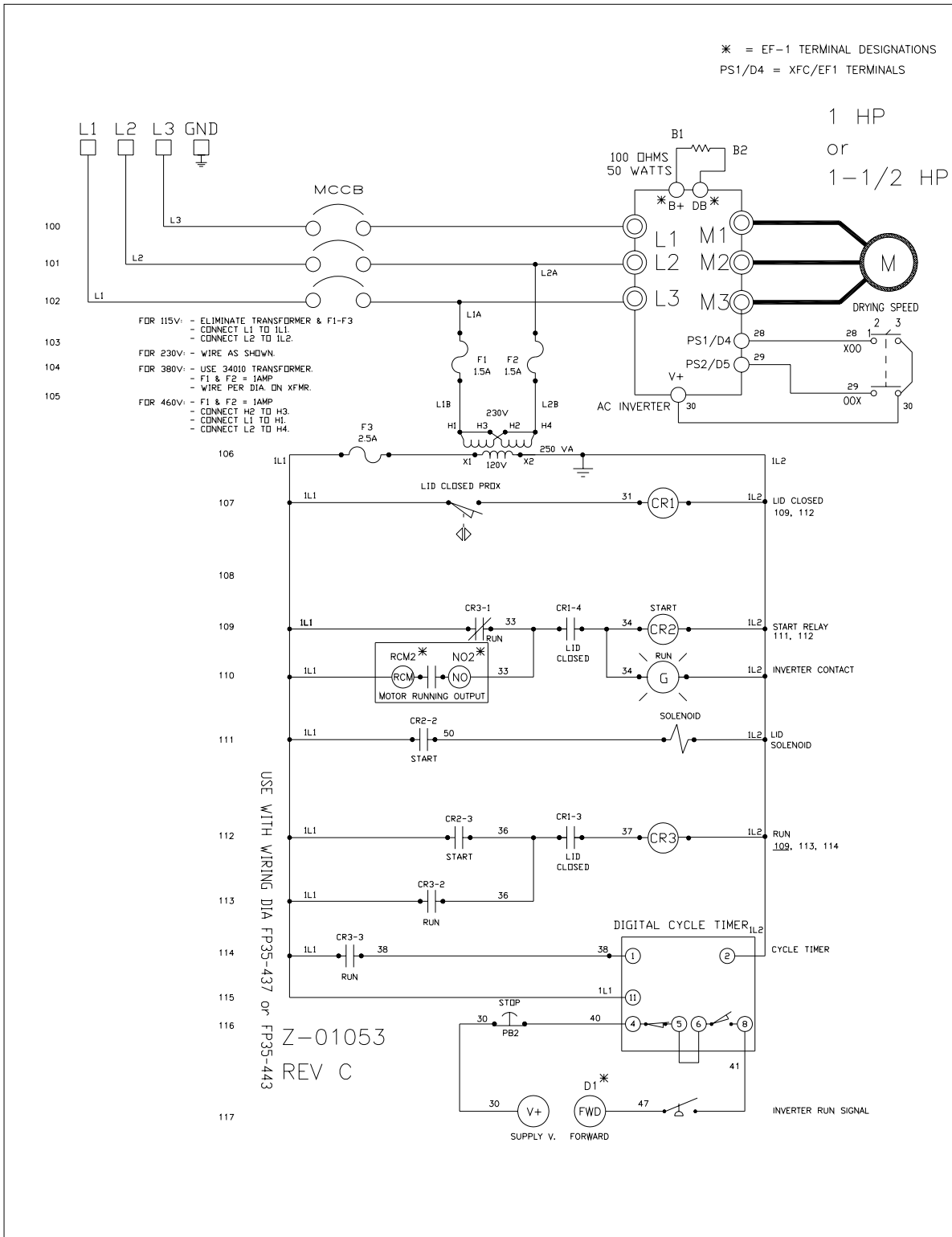


Figure 3
Electrical Schematic

GENERAL TERMS AND CONDITIONS OF SALE

This agreement sets forth general terms and conditions of sale. The quotation and sales contract may incorporate additional and more specific commercial and technical requirements of sale. The following general terms and conditions are mutually agreed between BUYER and GLASSLINE to be a part of the sales and purchase order documents.

1. DEFINITIONS AND GENERAL TERMS AND CONDITIONS

- A. The term GLASSLINE shall refer to Glassline Corporation and all of its affiliated divisions.
- B. The term EQUIPMENT shall refer to any machine, part, product or service sold by GLASSLINE, including subcontracted/purchased items/options.
- C. The term BUYER shall refer to the buying company and, where applicable, its subcontractors.
- D. The terms and conditions set forth in this agreement are effective at the receipt of order by BUYER and are subject to change by GLASSLINE without notice before receipt of order by Buyer.
- E. Quotations are valid for 30 days, unless noted otherwise.
- F. No terms, conditions, understandings, usage of trade, dealings or agreements, purporting to vary, modify, explain or supplement this agreement shall be binding, unless and until hereinafter made in writing and signed by BUYER and GLASSLINE.
- G. This agreement, and its interpretation, shall be governed by the laws of the State of Ohio. If any provision or term of this agreement is held to be invalid, void or unenforceable, the remaining provisions and terms of the agreement shall remain in force and effect, and shall in no way be affected, impaired or invalidated thereby. In all cases, the rights and duties of the parties in a dispute arising out of this transaction shall be governed by the laws of the State of Ohio.
- H. The delegation or assignment by BUYER of any or all of its duties or rights under this agreement without the prior written consent of GLASSLINE shall be void.
- I. Any information, suggestions or ideas transmitted by BUYER or GLASSLINE, or any of their respective representatives, in connection with the performance under this agreement are not to be regarded as secret or submitted in confidence, except as may be otherwise provided specifically in a document signed by a duly authorized representative of GLASSLINE.
- J. This agreement supersedes all previous agreements, written or verbal, and contains the entire agreement between the parties.

2. TERMS AND CONDITIONS OF BUYER

Should BUYER have standard terms of acceptance that it wishes to make a part of this agreement, such terms must be provided at the time a quotation is requested and agreed to in writing by GLASSLINE, so that the costs of compliance to such terms as GLASSLINE may agree, if any, may be added to the bid. GLASSLINE reserves the right to quote these compliance features separately and above their standard quotation.

3. DELIVERY AND CLAIMS

- A. The quoted shipment schedule is non-binding. The shipment schedule will be set at time of order, and is contingent upon BUYER supplying a clear scope of supply, all technical information, and any required downpayment. A new delivery date may be required, depending on any technical or scope changes requested after the order date, or delays in receiving payments according to agreed dates.
- B. GLASSLINE shall not be liable for delays in delivery caused by any reason beyond GLASSLINE's control, including, but not limited to, force majeure, supplier failure, any interruption of GLASSLINE facilities, or any act of any government, or licensing authority.
- C. Unless otherwise noted in the quotation, all shipments are ex-works GLASSLINE Perrysburg, Ohio plant. BUYER bears all risks of loss or damage to the EQUIPMENT from the time the EQUIPMENT has been placed at the disposal of Buyer at GLASSLINE, whether shipping is arranged by BUYER or on behalf of BUYER by GLASSLINE. In any case, shipments shall be made strictly according to Incoterms 2000.
- D. After the EQUIPMENT is placed at the required transfer point for BUYER, GLASSLINE neither assumes responsibility for nor authorizes any expenses, including electrical work, plumbing, compressed air supply, millwright work, extensions/additions, or materials necessary for the set up and operation of the EQUIPMENT in BUYER's plant or elsewhere. It remains the BUYER's responsibility to meet all federal, state and local codes and regulations.
- E. Claims for shipping damage, concealed or otherwise, are the responsibility of BUYER and should be taken up with the delivering carrier within the stated time allowed for claims. Claims for shipping shortages will not be allowed, unless reported to GLASSLINE within 10 days of shipment.

4. TITLE

- A. Title to the EQUIPMENT, thus delivered, shall remain with GLASSLINE; until the full purchase price has been received.
- B. BUYER shall keep the EQUIPMENT fully insured, with GLASSLINE named as loss payee until the purchase price is paid. Neither BUYER nor GLASSLINE shall assign the applicable insurance contact without prior written consent of the other.
- C. Monthly interest, at the rate of 1-1/2% per month on the total unpaid value of the EQUIPMENT will be charged if delivery is delayed at BUYER's request for more than thirty (30) days after buy-off, or if final payment is delayed beyond thirty days (30) after shipment. BUYER shall execute and deliver to GLASSLINE such documents and financial statements as may be necessary to perfect the lien or security interest of GLASSLINE to protect the unpaid balance of the purchase price.

- D. All tools, materials, software, programs, designs, or any technology created for the purpose of producing the EQUIPMENT are the sole property of GLASSLINE, unless furnished by BUYER with the order. All intellectual property created by GLASSLINE shall remain property of GLASSLINE.

5. WARRANTY

- A. GLASSLINE warrants against defects in material and workmanship. Items manufactured by others but installed in or affixed to GLASSLINE EQUIPMENT are not warranted by GLASSLINE, but bear only such express warranties, if any, of the manufacturer thereof. GLASSLINE shall replace or repair at its choosing, (ex-works GLASSLINE Perrysburg, Ohio plant) any defective manufactured parts without charge to BUYER. The warranty does not apply to any labor charges for removal and/or replacement, or to any part thereof which has a life, under normal usage, inherently shorter than the warranty period. The warranty will be active for a period of:
 - 1) Machinery: 12 months from date of shipping.
 - 2) Replacement/Repaired parts: 6 months from date of shipping.
- B. Warranty shall be deemed waived by BUYER if:
 - 1) The EQUIPMENT is not properly installed by BUYER, according to GLASSLINE installation instructions.
 - 2) The EQUIPMENT has been subjected to misapplication or misuse, neglect, damaging conditions, or is modified in any way without written approval by GLASSLINE.
 - 3) The production or use of the EQUIPMENT for which it was not intended, or on products out of specification.
- C. The warranty set forth herein is in lieu of all other warranties, whether express, implied or statutory, including those of merchantability and fitness of any product for a particular purpose, and of any other obligation or liability on GLASSLINE's part of any kind or nature whatsoever.
- D. The warranty granted herein is non-transferable, and is granted only to the original BUYER.
- E. No employee, agent or other representative has any authority to waive, alter, vary or add to the terms hereof without prior approval in writing, signed by an officer of GLASSLINE.

6. LIMITATION OF LIABILITY

- A. It is expressly understood that GLASSLINE's liability for any damages arising out of or related to this transaction, or for its EQUIPMENT, whether in contract or in tort, is limited to the repair or replacement of the parts thereof as stipulated in the warranty, and is not to exceed the contract price in respect to which the claim is made.
- B. BUYER is solely responsible for ensuring the safety of all personnel who may be in close proximity to the EQUIPMENT.
- C. GLASSLINE will not be liable for any other injury, loss, damage or expense, whether direct, incidental or consequential, including but not limited to labor, loss of use, downtime, loss of material, products income, profit or production, or increased cost of operation, or spoilage of damage to material, arising in connection with the sale, installation, use of, or inability to use, or the repair or replacement of, or late delivery of, GLASSLINE EQUIPMENT.
- D. BUYER shall indemnify, defend and hold harmless GLASSLINE and its directors, officers, agents and employees, against any and all demands, claims, actions, damages, liabilities, costs, expenses (including reasonable attorney fees and expenses) and other losses of any kind whatsoever, whether based upon theories of contract, tort, negligence, strict liability, warranty, indemnification, contribution, statute or otherwise, for personal injury or property damage caused by BUYER or by any of its directors, officers, agents, employees or subcontractors, arising out of or relating to the Equipment Buyer shall give GLASSLINE prompt written notice of any such matters and the full opportunity to defend itself against them. This indemnity of BUYER shall survive the termination of this agreement.
- E. The remedies and limitations set forth in this agreement are the exclusive remedies for claims based upon any defect in or failure of EQUIPMENT, whether products or services, whether such claims are presented in contract or in tort (including negligence) and however and wherever instituted. Upon the expiration of the warranty period, all such liability shall terminate.

7. ORDER ACCEPTANCE

GLASSLINE reserves the right to refuse any order. An order shall be deemed accepted and a binding contract formed when the initial payment has been received and the order is acknowledged in writing by GLASSLINE.

8. CANCELLATION BY BUYER

BUYER may cancel the order for all or any EQUIPMENT by written notice prior to shipment. GLASSLINE will stop work on the order as soon as possible after receipt of written cancellation. BUYER agrees to pay GLASSLINE for all costs incurred by GLASSLINE and/or other suppliers attributed to the order, including but not limited to components, work-in-process, labor, burden and overhead. Such payment will not transfer title to BUYER.

9. ARBITRATION AGREEMENT

Any controversy or claim arising out of or relating to this agreement, or the breach thereof, shall be settled by arbitration in accordance with the rules of the American Arbitration Association and the statutes of the State of Ohio. All hearings held in connection with any such arbitration shall be held in Toledo, Ohio (unless the parties agree otherwise in writing), the award of the arbitrator(s) shall be final and binding upon the parties, and the judgment upon and the award rendered by the arbitrator(s) may be entered in any court having jurisdiction thereof.