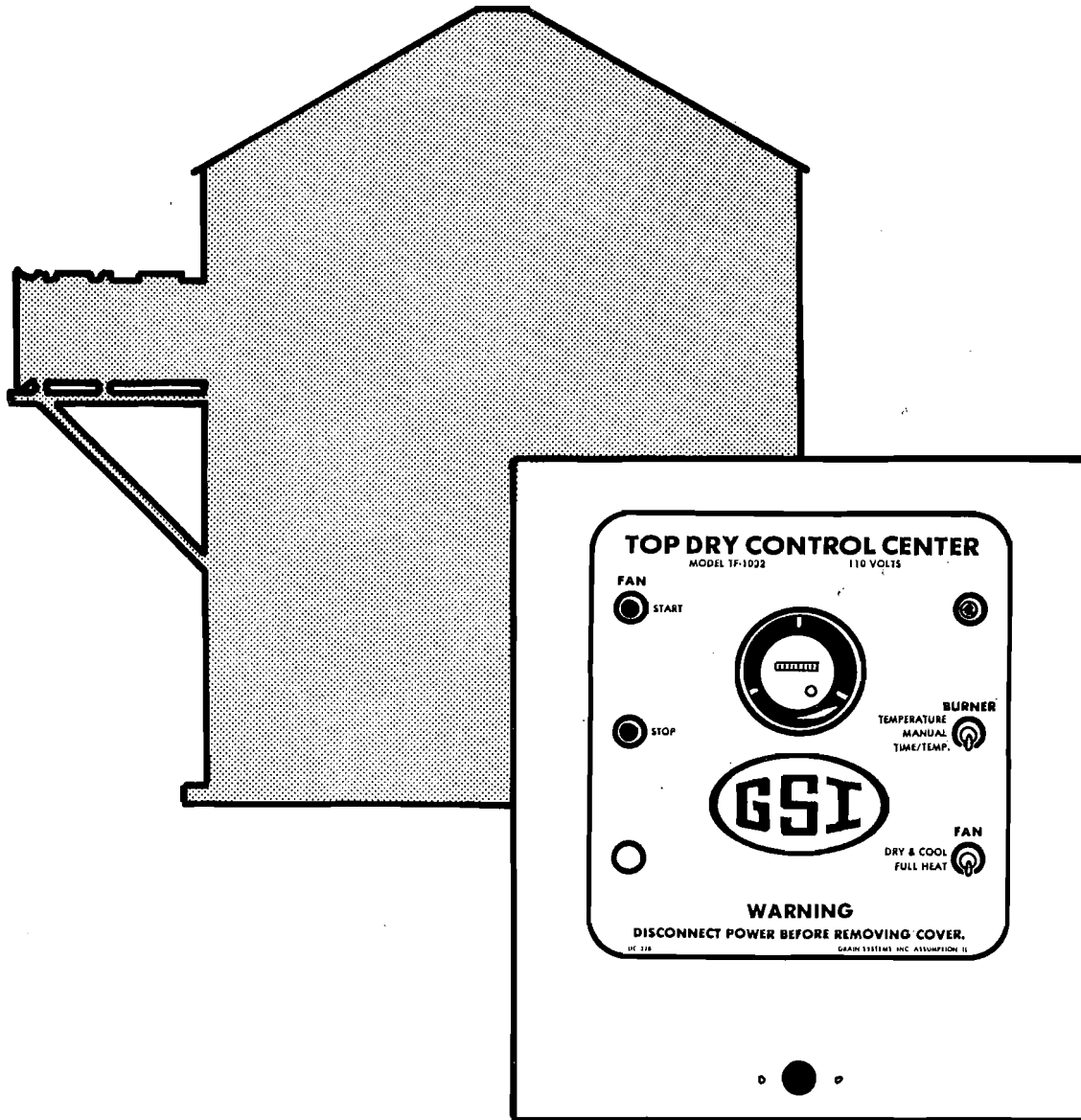


AIRSTREAM



TOP DRY CONTROL CENTER

MODEL NO. TF-1032

OWNERS MANUAL



Grain Systems
Incorporated

ASSUMPTION, ILLINOIS 62510 • 217/ 226-4421

WARRANTY

GRAIN SYSTEMS, INC. warrants all products manufactured by GRAIN SYSTEMS, INC. to be free of defects in materials and workmanship under usual and customary service. GRAIN SYSTEMS, INC. only obligation is to repair or replace products returned on a prepaid basis within 12 months after retail sale, and, in our opinion, found to be defective due to material of workmanship. If defective, the product will be repaired or replaced without charge, F.O.B. factory, this constituting and fulfilling our warranty obligation. Expenses incurred without authorization of GRAIN SYSTEMS, INC. shall be the sole responsibility of the bearer. Under no circumstances will GRAIN SYSTEMS, INC. be liable for any kind of special or consequential damages, nor will the liability ever exceed the selling price of the product.

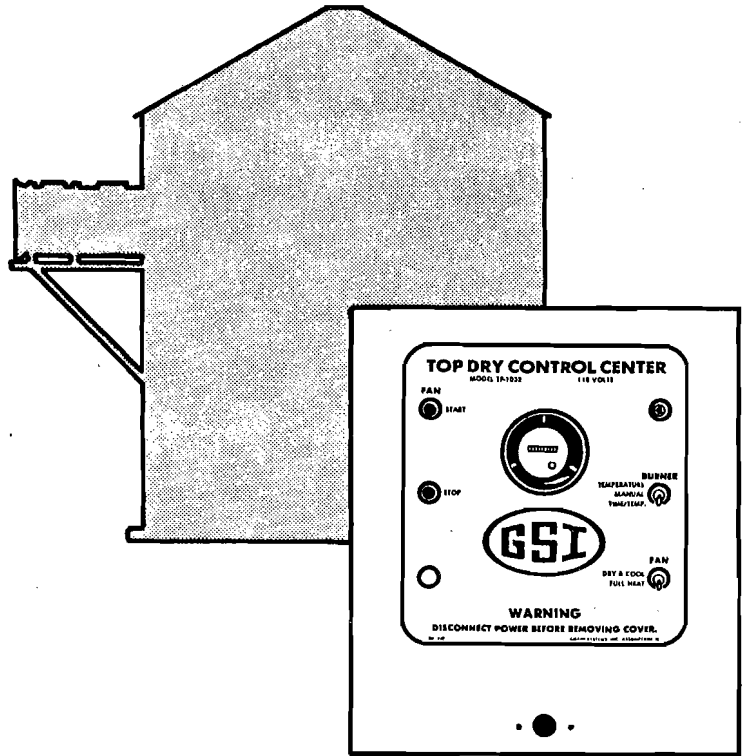
This warranty does not cover products or parts which have been damaged by negligent use, misuse, alteration or accident. All products supplied by outside manufacturers are warranted separately by the respective manufacturer. This warranty is exclusive and in lieu of all other warranties, expressed or implied. GRAIN SYSTEMS, INC. reserves the right to make design or specification changes at any time, without any contingent obligation to purchasers or products already sold.

All instructions shall be construed as recommendations only; because the actual installation may vary according to local conditions and GRAIN SYSTEMS, INC. assumes no liability for results arising from the use of such recommendations.

GRAIN SYSTEMS, INC. assumes no responsibility for field modifications or erection defects which create structural or storage quality problems. If any field modifications are necessary which are not specifically covered by the contents of this manual, contact GRAIN SYSTEMS, INC. for recommendations and approval. Any unauthorized modification or erection defect which effects the structural integrity of the G.S.I. bin will be cause for immediate nullification of the G.S.I. bin warranty.

ROOF DAMAGE WARNING

GRAIN SYSTEMS, INC. cannot warrant any roof damages due to excessive vacuum or internal pressure caused by fans or other air moving systems. Adequate ventilation and/or "make-up air" devices should be provided for all powered air handling systems. GRAIN SYSTEMS, INC. does not recommend the use of downward flow systems (suction). Severe roof structural damage can result from any blockage of air passages. Running of fans during certain high humidity/cold weather conditions can cause freezing over of air exhaust or intake ports.



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TOP DRY CONTROL CENTER OWNERS MANUAL

The Model TF-1032 Top Dry Control Center is designed to automatically control the drying and cooling cycles of the Top Dry dryer. The control is an integral part of the Top Dry System. This control can be used in many different modes of operation as follows:

- Temperature Dry and Time Cool
- Time Dry and Time Cool
- Time/Temperature Dry and Time Cool
- Full Heat (no cooling)
- Manual Operation

DESCRIPTION OF PARTS

START SWITCH

The start switch is basically an auxilliary start switch for the Top Dry fan. It also starts the Top Dry Control Center operating.

STOP SWITCH

The stop switch shuts down the entire system in the event that something malfunctions or it is desired to stop the dying process.

NOTE: If the system is shut down the timers (both the cool and the dry will reset to there previous time.

HOUR METER

The hour meter records accumulated time that the system has been in use. The hour meter operates only in the time/temp mode or the temperature mode. It will not operate when the system is in the manual mode of operation.

INDICATOR LIGHT

The indicator light gives an indication that power is on to the control unit. It also indicates that the fan-heat unit(s) are running.

DRY TIMER

The dry timer is an automatically resetting timing device that times the drying cycle. This timer works only in the time/temp mode of operation. However the timer must be set off of zero in the temperature or manual mode for proper operation of the unit.

COOL TIMER

The cool timer is a similar unit to the dry timer. This timing device is used to time the cooling cycle whenever it is desired to cool the upper batch after drying. This timer is energized when the fan switch is in the dry & cool position only, however the timer must always be set off of zero for proper operation.

DRYING THERMOSTAT

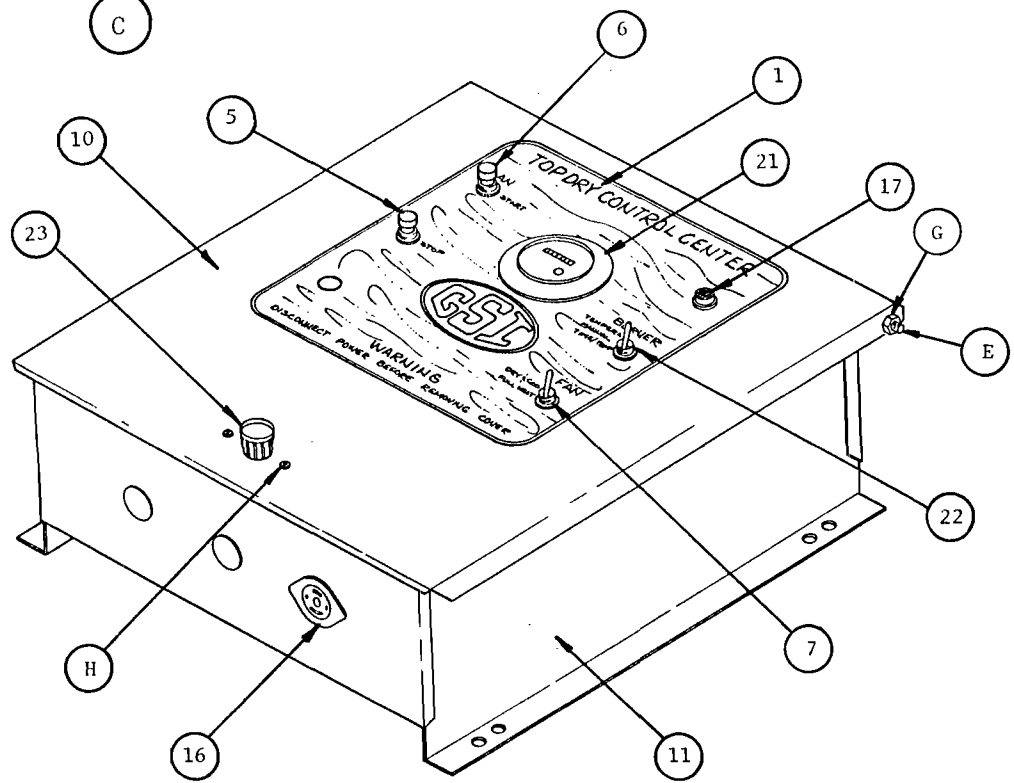
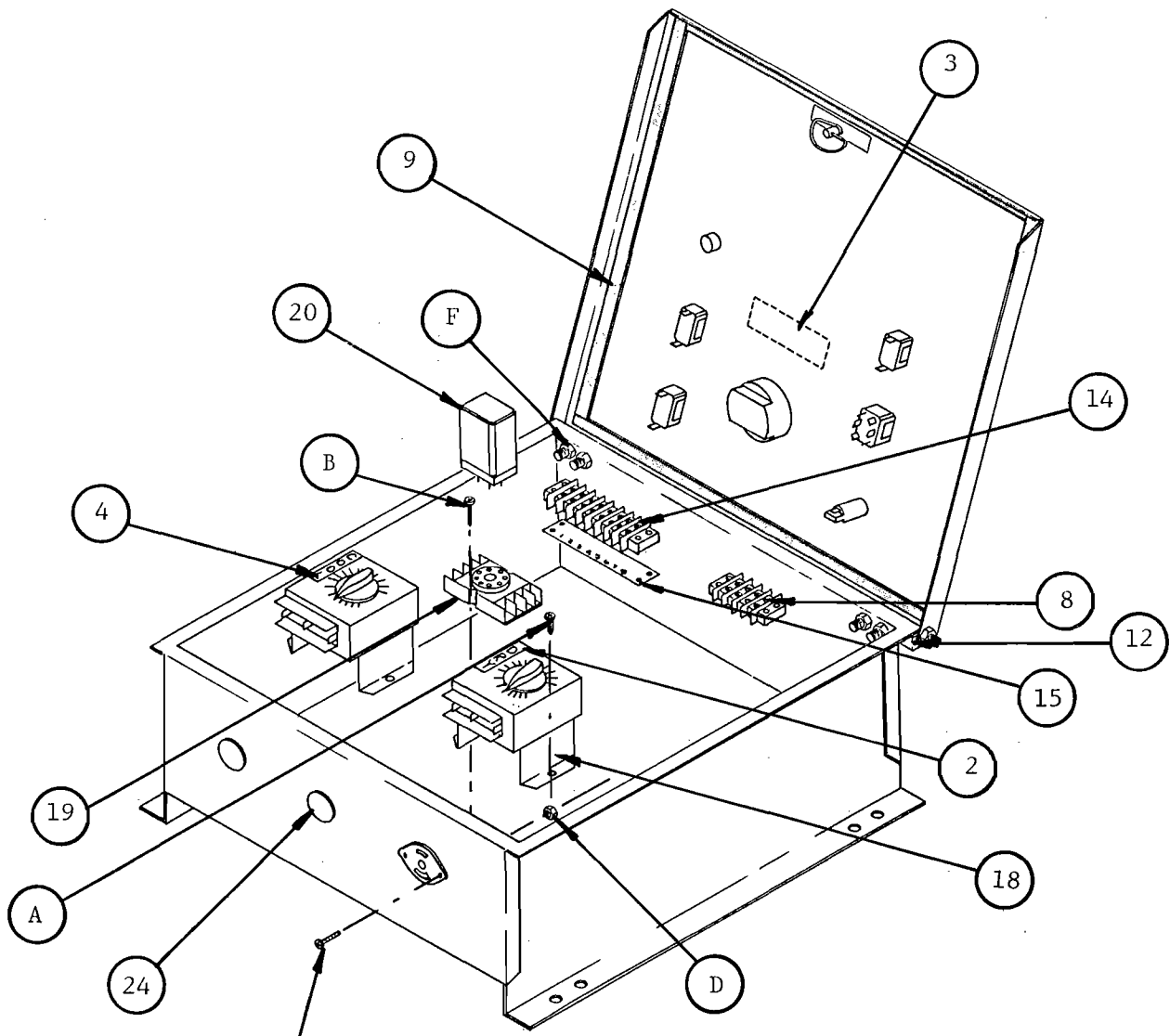
The drying thermostat is a separate control device that plugs into the bottom of the control center. Like the dry timer it is used to control the length of the dry cycle. It consists of a unit that mounts on the bin wall with a long capillary tube that goes into the grain chamber. The sensing portion of this tube senses when the grain gets to a predetermined temperature and stops the drying cycle. This unit works in the time/temp mode or in the temperature mode of operation.

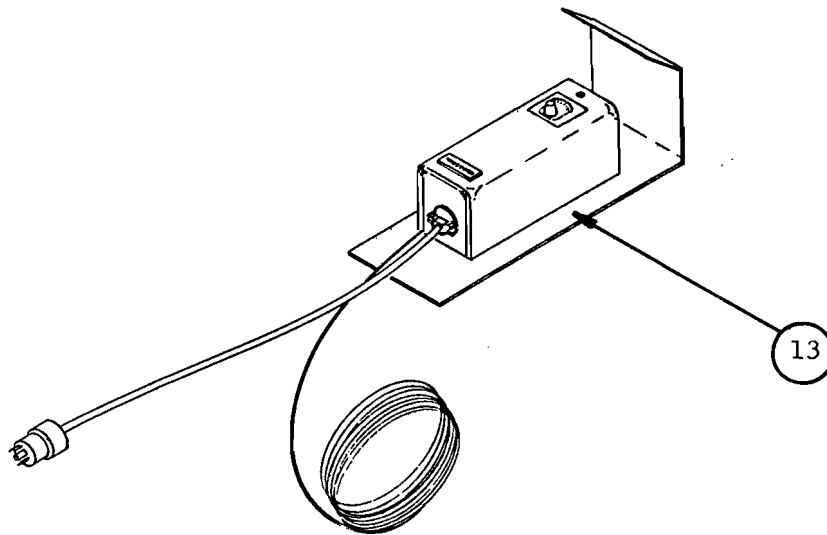
BURNER SWITCH

The burner switch has three operating positions- temperature, time/temp and manual. When the switch is in the temperature mode the heaters are controlled by the drying thermostat only. When the switch is in the time/temp mode the heaters are controlled by the dry timer along with the drying thermostat. The first control to activate shuts the heaters off. When the switch is in the manual mode the heaters must be turned on and off manually.

FAN SWITCH

The fan switch has two operating positions dry and cool or full heat. When the switch is in the full heat position the fans will shut off simultaneously with the heater. In the dry and cool position after the heaters shut off the fans will continue to run until the cool timer times down.





TOP DRY CONTROL CENTER PARTS

ITEM	PART NO.	DESCRIPTION	QUANTITY
1	DC-328	TOP DRY CONTROL CENTER DECAL.	1
2	DC-343	DRY DECAL	1
3	DC-345	WIRING DIAGRAM DECAL.	1
4	DC-346	COOL DECAL.	1
5	FH-1000	STOP SWITCH	1
6	FH-999	START SWITCH.	1
7	HH-1442	SPST TOGGLE SWITCH.	1
8	HH-1994	4 CONDUCTOR TERMINAL BLOCK.	1
9	S-2052	WEATHER STRIPPING	AR
10	TF-1057	CONTROL CENTER LID.	1
11	TF-1059	CONTROL CENTER BOX WELDMENT	1
12	TF-1094	HINGE BRACKETS.	2
13	TF-1130	GRAIN THERMOSTAT ASSEMBLY	1
14	TFH-2013	8 CONDUCTOR TERMINAL STRIP.	1
15	TFH-2052	8 CONDUCTOR TERMINAL STRIP MARKER	1
16	TFH-2014	THERMOSTAT RECEPTACLE	1
17	TFH-2021	RED INDICATOR LIGHT	1
18	TFH-2040	12 HOUR TIMER	2
19	TFH-2042	8 PIN RELAY BASE.	1
20	TFH-2043	DPDT CONTROL RELAY.	1
21	TFH-2044	HOUR METER.	1
22	TFH-2025	DPDT TOGGLE SWITCH.	1
23	TFH-2046	SPRING LATCH.	1
24	TFH-2048	7/8" HOLE PLUG.	1
STANDARD HARDWARE ITEMS (PURCHASE LOCALLY)			
A	S-1040	8-32 X 1/4" SHEET METAL SCREW	4
B	FH-2609	8-32 X 5/8" SHEET METAL SCREW	6
C	HH-1505	5-40 X 1/2" PAN HD MACH SCREW	5
D	HH-1506	5-40 NUT.	5
E	S-4336	5/16" X 1" RD. HD. BOLT	6
F	S-3611	5/16" FLANGED NUT	4
G	S-4763	5/16" LOCK NUT.	2
H	S-4752	6-32 X 3/4" SHEET METAL SCREW	4

INSTALLATION

1. Mount the Top Dry Control Center about eye level positioned on the bin in a way that enables you to see the fan and heater unit start up. The control box is punched to match either a 2.66" corrugation or a 4" corrugation. Find the appropriate holes to use and mark the sidewall for drilling. Drill the 4 holes and attach the box using (4) 5/16" bin bolts and nuts.
2. Mount the grain thermostat within a few feet of the Top Dry Control Center. Plug the thermostat into the bottom of the Top Dry Control Center. Unroll the thermostat capillary tube being careful not to crimp or damage it.

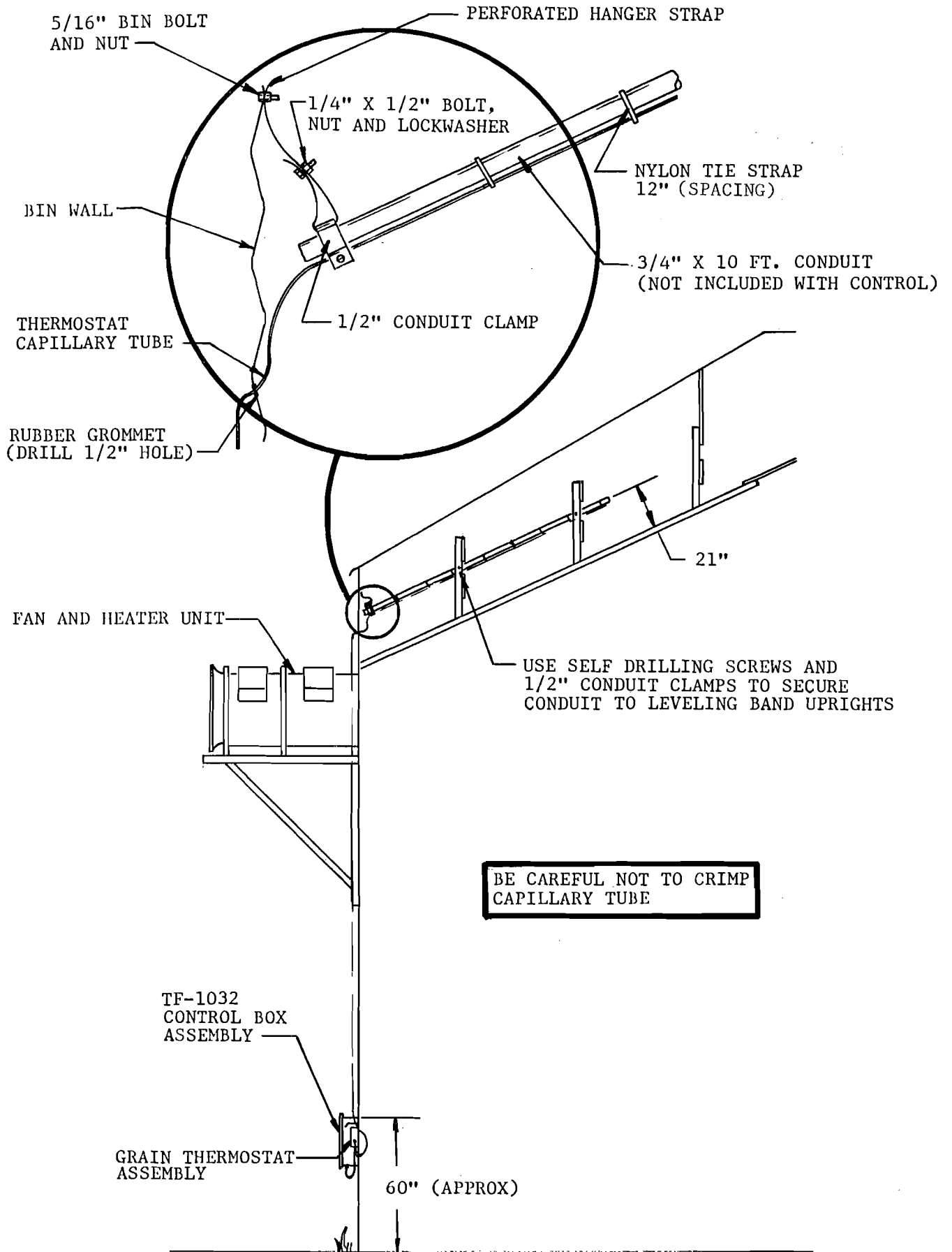
NOTE: Be sure to mount the thermostat and control box directly under the desired entrance location for the grain thermostat.

Mount the sensing portion of the capillary tube in the grain chamber as shown in the illustration on page 7.

3. Run (6) 18 ga. wires (either in conduit or use a 6 lead power cord) from the Top Dry Control Center to the Top Dry fan. Connect the wires to terminals 1,2,3,4,5, and 6 In the Top Dry Control Center.
4. Remove the jumper wires between terminals 2 and 3, and 4 and 5 located on the 8 position terminal strip inside the Top Dry fan control box.
5. Connect the wires in the fan box so that the wire from terminal 1 in the Top Dry Control Center goes to terminal 1 in the fan box, 2 goes to 2 and so on.

This completes the installation for one fan and heater unit. If installing multiple fan and heater units refer to instructions along with wiring diagrams in the back of the manual.

For installing fans other than Airstream Top Dry fans refer to wiring diagram in back of manual.



All operating instructions given for different methods of drying should be construed as recommendations only. The instructions should be used as a guide when first starting up your dryer. With so many different ways to operate this unit, it would be impossible to describe them all. After the first few batches you will get a better feel for how the system works. You will then be able to adapt the system to work the best way for your particular application.

OPERATION

OPERATING IN THE TEMPERATURE MODE

This mode of operation is suggested for drying grain with an initial moisture content that is medium to high (25 to 35%). Grain at this moisture content undergoes temperature changes during the drying process that are easily detected with the grain thermostat.

The control for this mode of drying is the grain thermostat, which has a sensing tube that goes in the grain drying chamber. When the grain gets up to the temperature that you have the thermostat set for it shuts off the heaters and continues to run the fans, if you have the fan switch set in the dry & cool position. If the fan switch is in the full heat position the fans shut off also.

Use the following steps to set your controls and operate in the temperature mode.

STEP 1

Take samples of the grain in the initial batch to determine the initial moisture content of the first batch.

STEP 2

Refer to the Top Dry drying tables on page 16 or on the back of the Top Dry literature and find the estimated drying time for your particular dryer.

NOTE: Ambient conditions will affect these drying times. If the ambient conditions are different than those listed on the on the back of the literature, that should be taken into consideration.

STEP 3

Set the Top Dry Control Center switches as follows:

1. Set the burner switch to the temperature position.
2. Set the fan switch to the full heat position.
3. Set both the dry and the cool timers off of zero to insure proper operation.
4. Set the grain thermostat to a very high setting.

STEP 4

Start drying cycle. Allow grain to dry the amount of time that was found in step 2. It may be desired to go 10% under that time if there is a variance in ambient conditions, just to be sure the grain is not over dried. After the time has elapsed, slowly turn the thermostat back until the fans shut-off.

STEP 5

Cool this batch either with the Top Dry fans on top or by dumping the batch and cooling in the bottom. After the batch is cooled, obtain samples. If moisture content is within a point of what is desired, then control should not be adjusted. If moisture content is too high or too low adjust the time on the next batch and recalibrate the drying thermostat.

OPERATING IN THE TIME/TEMP MODE

This mode of operation works well on a large range of grains and moisture contents of grain as long as the drying time is not over 12 hours.

There are 2 controls when using this method of drying. The first is the drying thermostat. The drying thermostat is calibrated just as if drying in the temperature mode. The second control is the dry timer. The dry timer should be set for the maximum anticipated drying time from the drying chart on the literature.

The system allows the drying thermostat to decrease drying times where needed, while the dry timer never lets the drying time exceed the maximum.

Use the following steps to set your controls and operate in the time/temp mode.

STEP 1

Take samples of the grain in the initial batch to determine the initial moisture content of the first batch.

STEP 2

Refer to the Top Dry drying tables on the page 16 or on the back of the Top Dry literature and find the estimated drying time for your particular dryer.

NOTE: Ambient conditions will affect these drying times. If ambient conditions are different than those listed on the back of the literature, that should be taken into consideration.

STEP 3

Set the Top Dry Control Center Switches as follows:

1. Set the burner switch to the time/temp position.
2. Set the fan switch to the full heat position.
3. Set the dry timer for the maximum drying time that was found in step 2.
4. Set the cool timer off of zero to insure proper operation.
5. Set the grain thermostat as described in the temperature drying section.

STEP 4

Start the drying cycle. After the dryer is shut off, either by the dry timer or the grain thermostat, cool the entire batch. If the batch is within 1% then all the controls are adjusted correctly. If moisture content is too high or too low, adjust the timer and/or grain thermostat accordingly.

OPERATING IN THE MANUAL MODE

In this mode of operation all the automatic features of the control center are bypassed. The drying cycle must be controlled by the operator. It is not recommended to operate in this mode unless the dryer will be closely monitored.

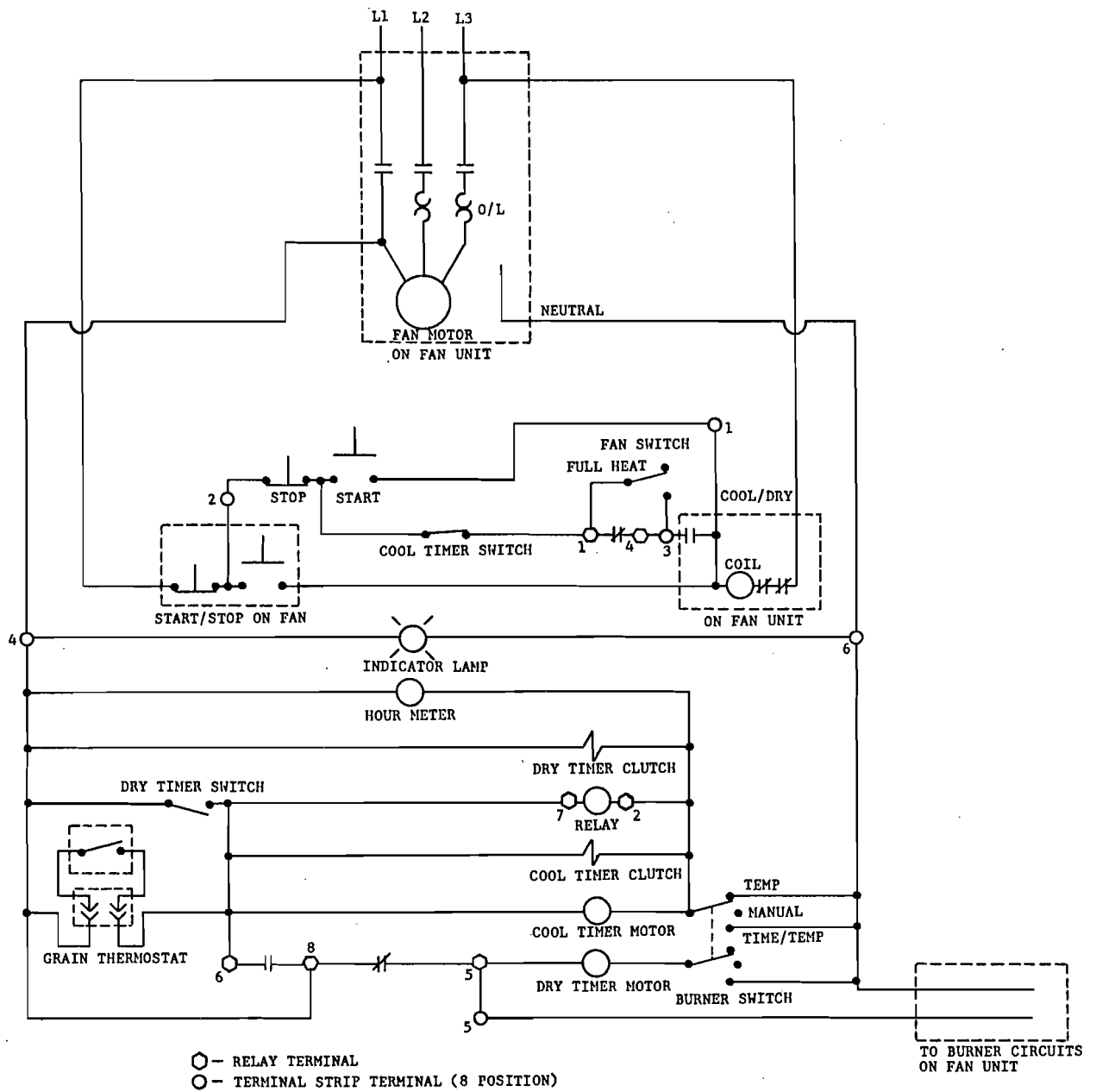
The fan or fans may still be started from the control center or from the fan, but the heater must be turned on and off from the heater control box.

COOLING IN THE BATCH SECTION OF THE TOP DRY

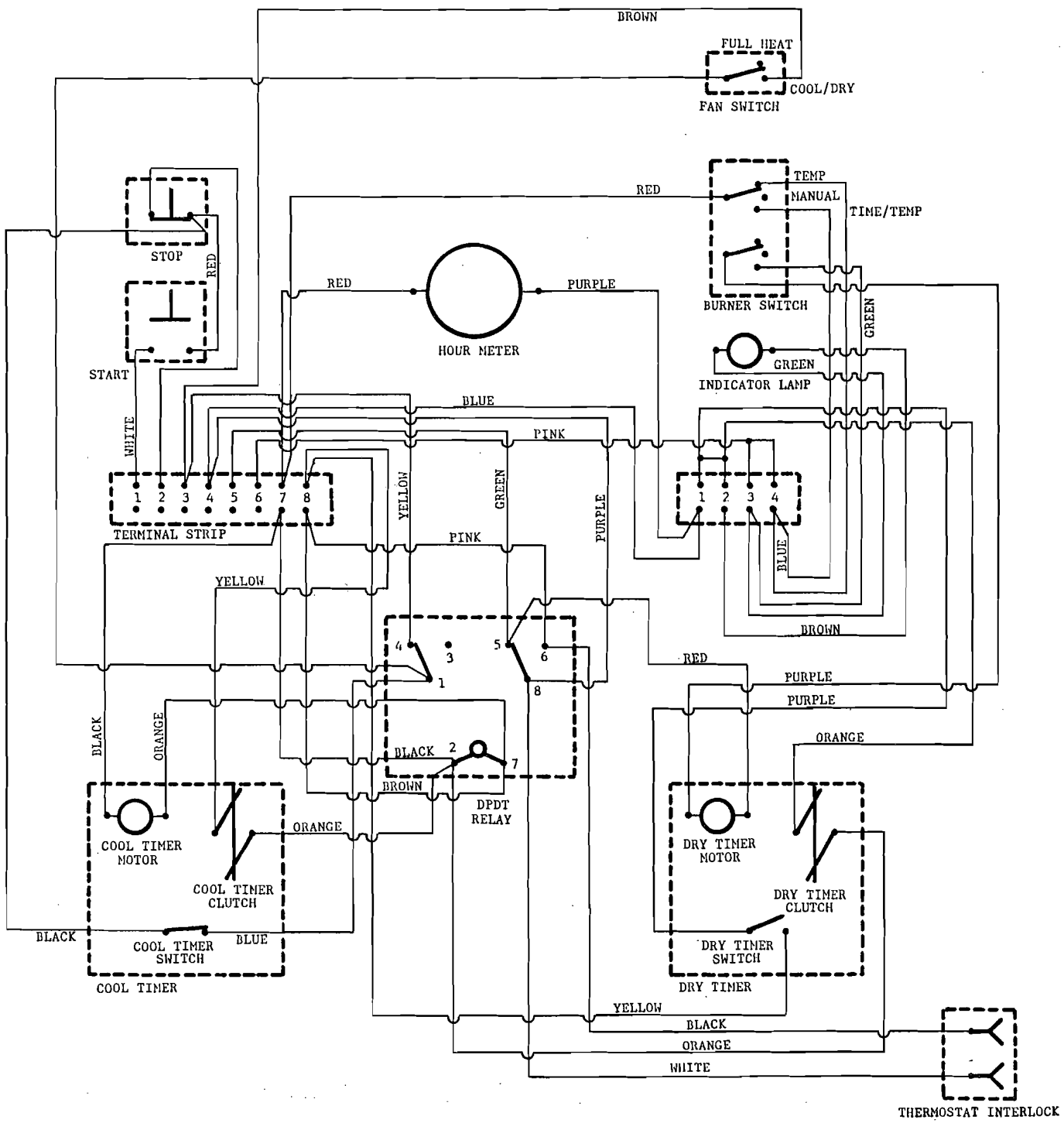
When the fan switch is set in the dry and cool position the fans will automatically continue to run when the drying cycle is over. This method is recommended only when rapid cooling of the grain is desired. Normally cooling of the grain is done in the bottom of the Top Dry bin for more efficient drying and higher quality grain.

The cooling cycle (when the fan switch is in the dry & cool position) is controlled by the cool timer. When the fan switch is in the full heat position the cool timer is deactivated and the fans shut off along with the burners.

NOTE: The cool timer should always be set off of zero for proper operation of the system.

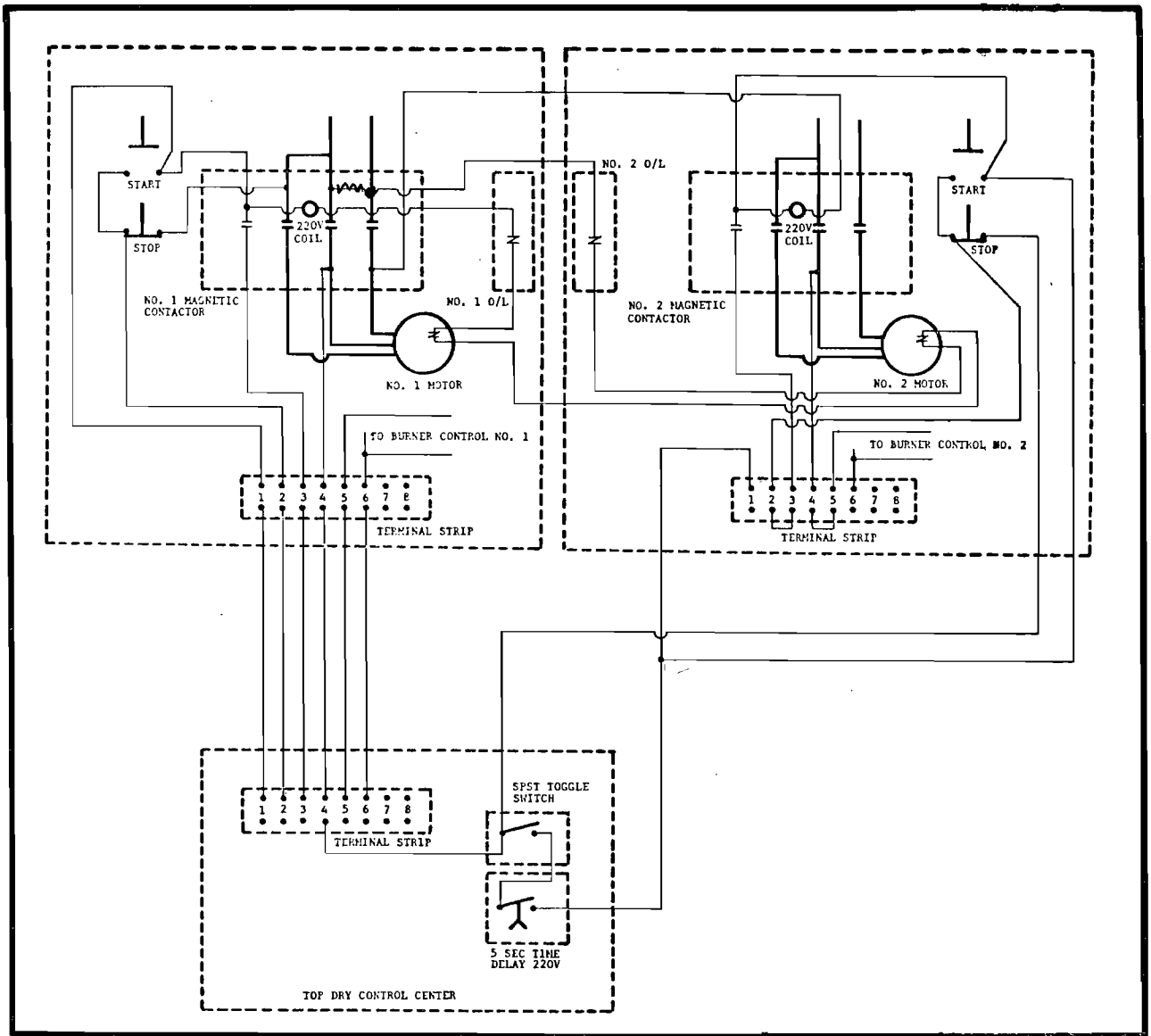


TOP DRY CONTROL CENTER SCHEMATIC DIAGRAM



TOP DRY CONTROL CENTER WIRING DIAGRAM

DC-345



INSTALLING 2 FANS

Multiple fan start kit (TF-1127) is required to complete 2 fan wiring.

STEP 1

Install SPST toggle switch in 1/2" hole that is plugged in the front panel of the Top Dry Control Center.

STEP 2

Install 5 second time delay relay by drilling 1/8" hole in the back panel of the Top Dry Control Center and using the 8-32 x 1-1/4" self tapping screw. (Be careful not to overtighten)

STEP 3

Run (2) 16 ga wires from Top Dry Control Center to fan no. 2.

STEP 4

Run a 16 ga wire from terminal no. 4 in the Top Dry Control Center to the SPST toggle switch. Connect one of the wires going to fan no. 2 in with this wire.

STEP 5

Run a 16 ga wire from the other terminal on the SPST toggle switch to the terminal marked input on the time delay.

STEP 6

Connect the other wire going to fan no. 2 to the terminal marked load on the time delay.

STEP 7

The other end of the wire connected in step 6 should be connected to terminal 1 on fan no. 2.

STEP 8

Remove the wire that goes from the stop switch in fan no. 2 to the magnetic contactor. Connect the other wire running from the Top Dry Control Center to fan no. 2 to the stop switch where wire was removed previously.

STEP 9

Run (3) 16 ga wires from fan no. 1 to fan no. 2

STEP 10

The fan control circuits must be wired as shown in the diagram. All the overload circuits are wired in series with the coil on fan no. 1. The coil on fan no. 2 should be be wired as shown so that it gets power only after fan no. 1 is started. (Fan controls shown are 10-16 HP 1 phase consult Top Dry Fan Owners Manual for fan wiring diagrams)

OPERATION

STEP 1

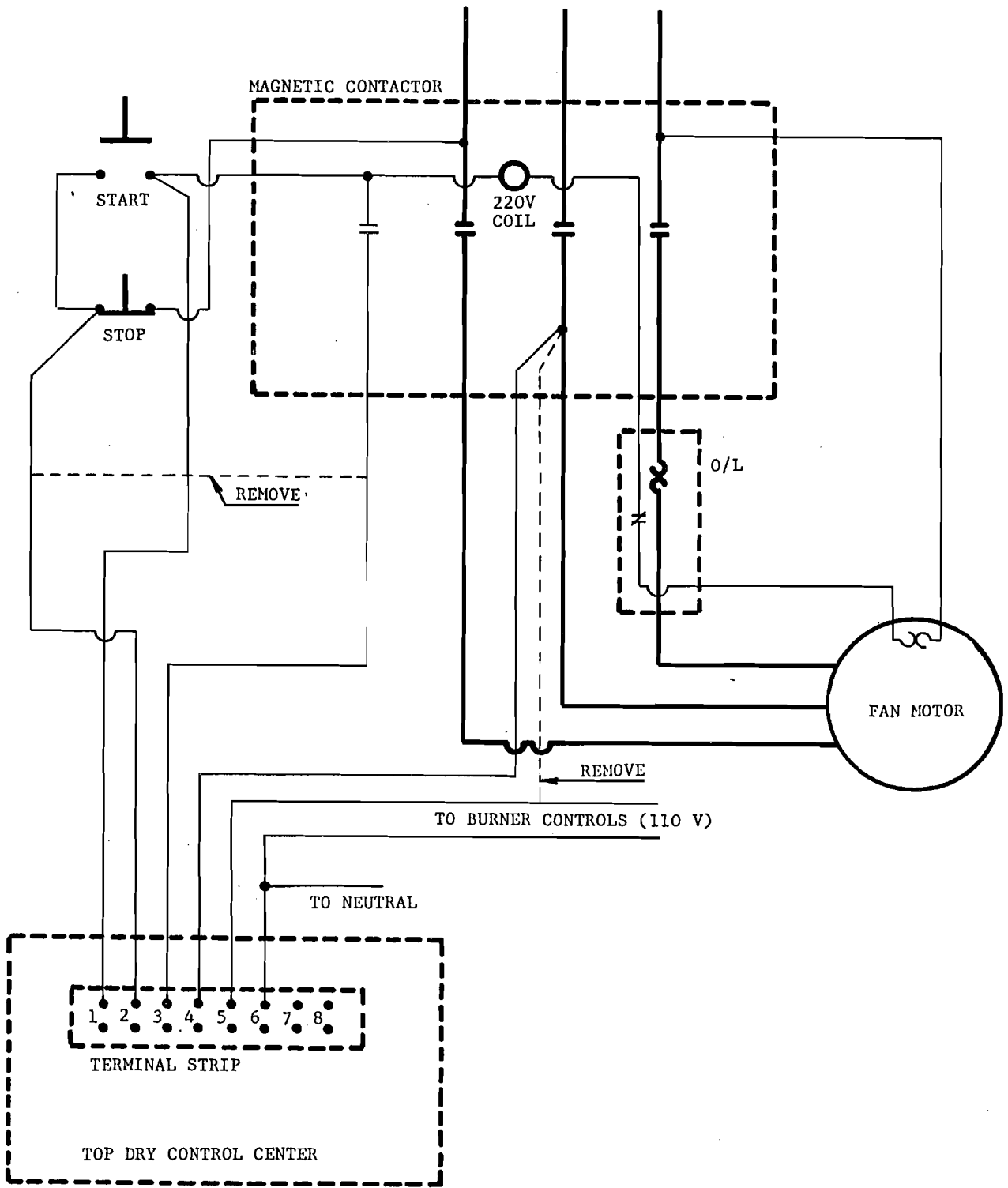
Place SPST switch into the on position.

STEP 2

Press start on Top Dry Control Center. Fan no. 1 should start immediately after 5 sec delay fan no. 2 should start.

When SPST switch is in the off position fan no. 2 may be started from the fan control panel, but only after fan no. 1 is started.

CAUTION: When SPST switch is in the on position stop switch on fan no. 2 is disabled. Fan must be stopped by stopping fan no. 1. If stop switch on fan no. 2 is pressed then fan no. 2 will be deenergized for 5 seconds and will then restart.



INSTALLING FANS OTHER THAN TOP DRY

DRYING RATE FOR SHELLED CORN

FAN & HEATER UNIT(S)	PLENUM TEMPERATURE (FAHRENHEIT)	INITIAL MOISTURE CONTENT WET BASIS	18' DIA. 1-FAN		24' DIA. 1-FAN		30' DIA. 1-FAN		30' DIA. 2-FANS		36' DIA. 1-FAN		36' DIA. 2-FANS	
			BU/HR	BATCH TIME HOURS	BU/HR	BATCH TIME HOURS	BU/HR	BATCH TIME HOURS	BU/HR	BATCH TIME HOURS	BU/HR	BATCH TIME HOURS	BU/HR	BATCH TIME HOURS
TF-2024 24" FAN 9.75 H.P. THF-4024 2 MILLION BTU/HR	120	20%	192	2.8	212	4.7								
		25%	100	5.4	111	9.0								
		30%	68	7.9	75	13.2								
	140	20%	257	2.1	285	3.5								
		25%	135	4.0	149	6.7								
		30%	91	5.9	102	9.8								
	160	20%	317	1.7	344	2.9								
		25%	163	3.3	181	5.5								
		30%	112	4.8	125	8.0								
TF-2028 28" FAN 10-15 H.P. THF-4028 3 MILLION BTU/HR	120	20%	216	2.5	256	3.9								
		25%	112	4.8	133	7.5								
		30%	77	7.0	90	11.0								
	140	20%	284	1.9	344	2.9								
		25%	154	3.5	178	5.6								
		30%	103	5.2	121	8.2								
	160	20%	360	1.5	416	2.4								
		25%	186	2.9	217	4.6								
		30%	128	4.2	149	6.7								
TF-2036 36" FAN 10-16 H.P. THF-4036 4 MILLION BTU/HR	120	20%			344	2.9	375	4.0	625	2.4	378	5.7	696	3.1
		25%			181	5.5	194	7.7	326	4.6	200	10.8	366	5.9
		30%			123	8.1	132	11.3	220	6.8	135	15.9	251	8.6
	140	20%			454	2.2	500	3.0	833	1.8	514	4.2	939	2.3
		25%			243	4.1	258	5.8	428	3.5	266	8.1	490	4.4
		30%			166	6.0	178	8.4	294	5.1	181	11.9	337	6.4
	160	20%			555	1.8	600	2.5	1000	1.5	617	3.5	1136	1.9
		25%			294	3.4	319	4.7	535	2.8	327	6.6	600	3.6
		30%			204	4.9	217	6.9	365	4.1	222	9.7	407	5.3
	180	20%			666	1.5			1153	1.3			1350	1.6
		25%			357	2.8			625	2.4			720	3.0
		30%			243	4.1			428	3.5			490	4.4
TF-2042 42" FAN 10-16 H.P. THF-4042 6 MILLION BTU/HR	120	20%			400	2.5	483	3.1			502	4.3	830	2.6
		25%			212	4.7	245	6.1			266	8.1	440	4.9
		30%			144	6.9	168	8.9			181	11.9	300	7.2
	140	20%			555	1.8	641	2.3			675	3.2	1136	1.9
		25%			285	3.5	333	4.5			354	6.1	583	3.7
		30%			196	5.1	227	6.6			295	7.3	400	5.4
	160	20%			666	1.5	786	1.9			830	2.6	1350	1.9
		25%			344	2.9	408	3.7			432	5.0	720	3.0
		30%			238	4.2	278	5.4			295	7.3	490	4.4
	180	20%			769	1.3	939	1.6			981	2.2	1661	1.3
		25%			416	2.4	488	3.1			514	4.2	864	2.5
		30%			285	3.5	332	4.5			354	6.1	583	3.7
TF-2042-33 42" FAN 30 H.P. THF-4042 6 MILLION BTU/HR	140	20%					750	2.0			800	2.7	1350	1.6
		25%					405	3.7			423	5.1	744	2.9
		30%					272	5.5			288	7.5	502	4.3
	160	20%					937	1.6			981	2.2	1661	1.3
		25%					483	3.1			514	4.2	900	2.4
		30%					333	4.5			354	6.1	617	3.5
	180	20%											1963	1.1
		25%											1080	2.0
		30%											744	2.9

1. DRYING RATES ARE ESTIMATED USING 45 DEGREE F AND 85% R.H. AMBIENT AIR CONDITIONS.
2. GRAIN DRIED TO 15% FINAL MOISTURE.
3. 1/5 CFM PER BUSHEL AERATION SYSTEM RECOMMENDED.
4. DRYING CHARTS ARE FOR SHELLED CORN. CHARTS ARE TO BE USED ONLY AS A GUIDE SINCE AMBIENT CONDITIONS WILL VARY.