INSTALLATION and PARTS MANUAL

(MODEL)

DUAL ▫▫▫▫ METIC

CONDENSING UNITS

THIS REFRIGERATOR CONFORMS TO THE
COMMERCIAL REFRIGERATOR MANUFACTURERS ASSOCIATION
HEALTH AND SANITATION STANDARD
CRS-S1-67

KYSOR | WARREN // SHERER
DIVISION OF KYSOR INDUSTRIAL CORPORATION

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THE WARREN/SHERER "DUAL METIC SYSTEM"

The advantages of parallel refrigeration systems are well known and accepted in the industry for their past performances. The simplicity and compactness of design make the addition of hot gas defrost, and/or heat reclaim a simple and economical feature. The most important point in planning an installation of the Warren/Sherer Dual Metic system is the total load required by the system.

If the total design load of any given system is 100,000 BTU, it must be kept in mind that under normal operating condtions, at least one circuit will be in defrost at any given time, other circuits will be at design temperature, and therefore throttled down, and others will be calling for refrigeration. It can be seen therefore, that you could easily over power the system, and be using energy that is not needed. The selection of compressor sizes is based along these lines with the thought that should one compressor fail, the other is capable of holding the product temperature until the defective compressor is replaced.

The selection and design of the system is therefore based on the needs of the individual customer. This information must be passed on to the design engineer and must be complete and accurate. Due to the individuality of each customer and his needs it is therefore impossible to categorize into Models the Dual Metic System. The customer must make his needs known to the sales engineer, and he in turn must be sure that this information is passed on to the design engineer who will in turn design the system.

In operation, the Warren/Sherer Dual Metic System will have one compressor designated as the main, or lead compressor and will for all practical purposes run continually; the second compressor will start and stop as the load of the system demands.

Component parts have been selected for their dependability and availability to keep service problems to a minimum. Simplicity of design has also made the Warren/Sherer Dual Metic one of the easiest as far as servicing is concerned.

In the following pages will be found explanations of system components, wiring and piping diagrams, control settings, and operational guides. Any additional information may be gotten by calling the Sales Engineer in your area, or contacting the Warren/Sherer plant in either Marshall, Michigan or Atlanta, Georgia.

DUAL METIC CONSTRUCTION

The basic construction of the Dual Metic System is made up of carefully selected over the counter items that can be readily obtained at refrigeration wholesalers. As previously mentioned, each system is custom designed to meet the needs of each customer. The following is a description of a Dual Metic System containing all of the components available.

ELECTRICAL - All solenoids, contactors, controls, timeclocks, and crank case heaters are installed and wired at the factory. Electrical connections to the Dual Metic System include main three phase power, and control circuits. These are made in the control panel. The control panel is located above and to the rear of the compressors and is serviced from the front of the system.

PIPING - All piping leaving the unit is equipped with a hand shut off valve with the exception of the heat reclaim line, this can be added at the customer's request. The system is sealed and leak tested before leaving the factory, and is shipped with a holding charge.

COMPRESSORS - The compressors are solid mounted using the Warren/Sherer oil system, or floating when using the AC & R pressurized system. All lines to the compressor are equipped with vibration absorbers. Crankcase heaters are installed and wired. Compressor cooling fans are installed and wired. High/Lo and oil failure controls are installed and wired. Liquid and suction filters are installed along with one oil separator per system.

OIL SYSTEMS - The Warren/Sherer oil system is comprised of vent lines from the suction header to each crankcase, an oil supply line from the oil separator to each crankcase, and an equalizing line. The AC & R oil system is comprised of an oil float on each crankcase, a common resevoir with high and low indicators, and the vent lines. The oil from the separator is stored in the resevoir under pressure, and is fed into the individual compressor by the float when needed. This is an option.

HOT GAS DEFROST - All controls, valves, and piping come factory installed. Cases are equipped when ordered.

HEAT RECLAIM - The valving comes factory installed. Piping and wiring from the controls, and the heat reclaim coil are field installed. Warren/Sherer requirements for piping are shown on Page (5) and are at the customer's choosing.

UNIT DESIGNATION - Units come numbered, and circuits are designated including condenser and heat reclaim coils.

HOT GAS DEFROST

Due to the compactness of the Dual Metic System, and the availability of hot gas at the unit, hot gas defrost can be readily incorporated into the total system design. The hot gas header is installed between the liquid and suction headers at the rear of the unit and each circuit is piped into the suction line. Hand and solenoid valves are installed and wired; refer to Page (6) diagram. The hot gas line is piped into the suction line downstream of the EPR Valve.

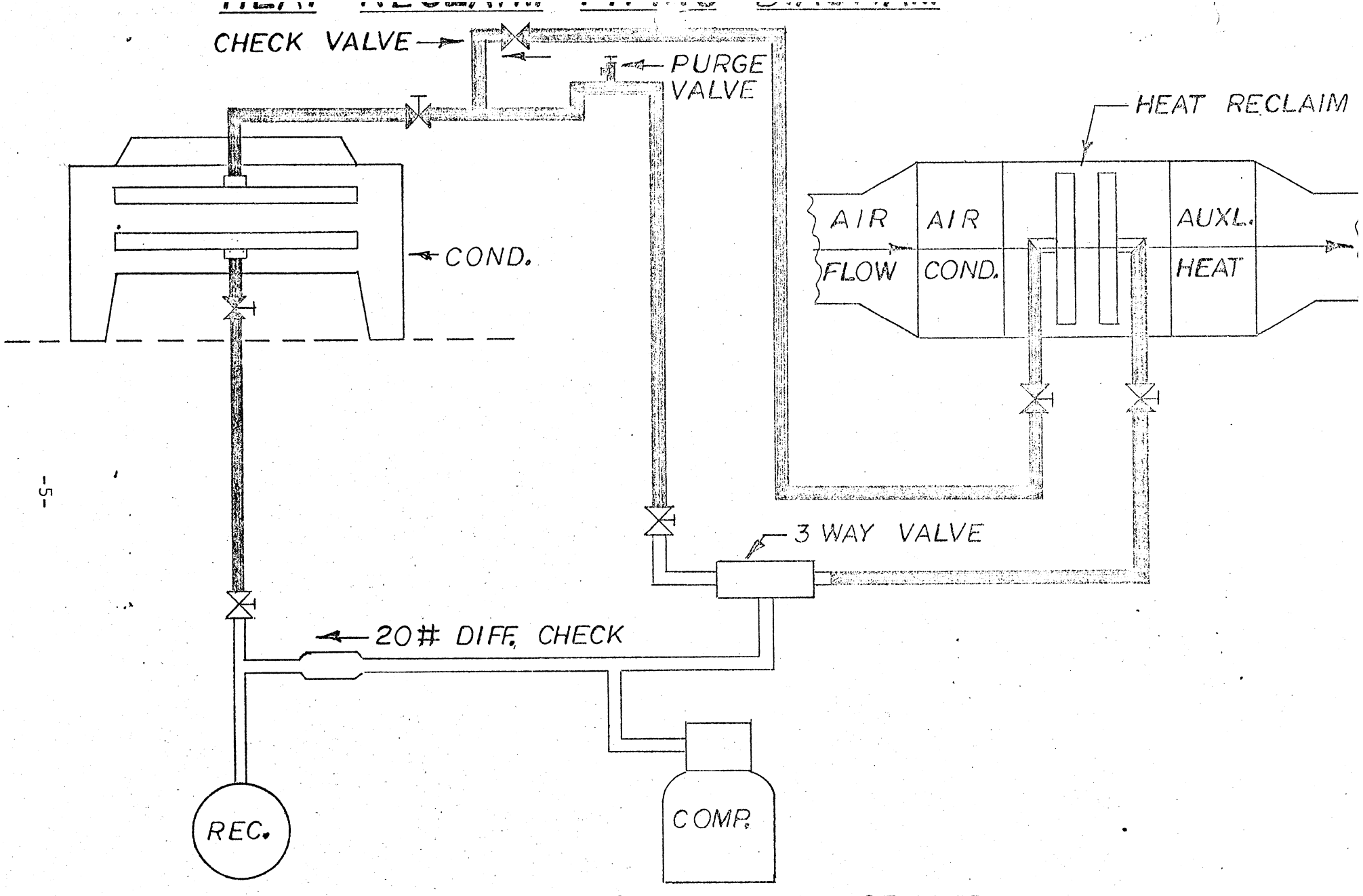
When defrost is initiated by the timeclock, the main liquid line solenoid is energized on defrost. Circuit liquid line solenoid and suction stop are de-energized. The hot gas enters the suction line and travels to the evaporator; (Reverse Cycle). As the hot gas condenses in the evaporator, it travels around the expansion valve thru a built-in check valve, and back the liquid line to the liquid line header. The liquid by-passes the solenoid through a check valve piped in parallel with the solenoid. This returning liquid in turn feeds the circuits still calling for refrigeration. Should the returning liquid not be adequate for the demand, the pressure in the liquid header will start to drop. When a difference of twenty (20), pounds between the liquid header and main liquid line pressures occur, a twenty pound differential check valve piped in parallel with the main liquid line will open and supply the demand.

HEAT RECLAMATION AND ENVIRONMENTAL CONTROL

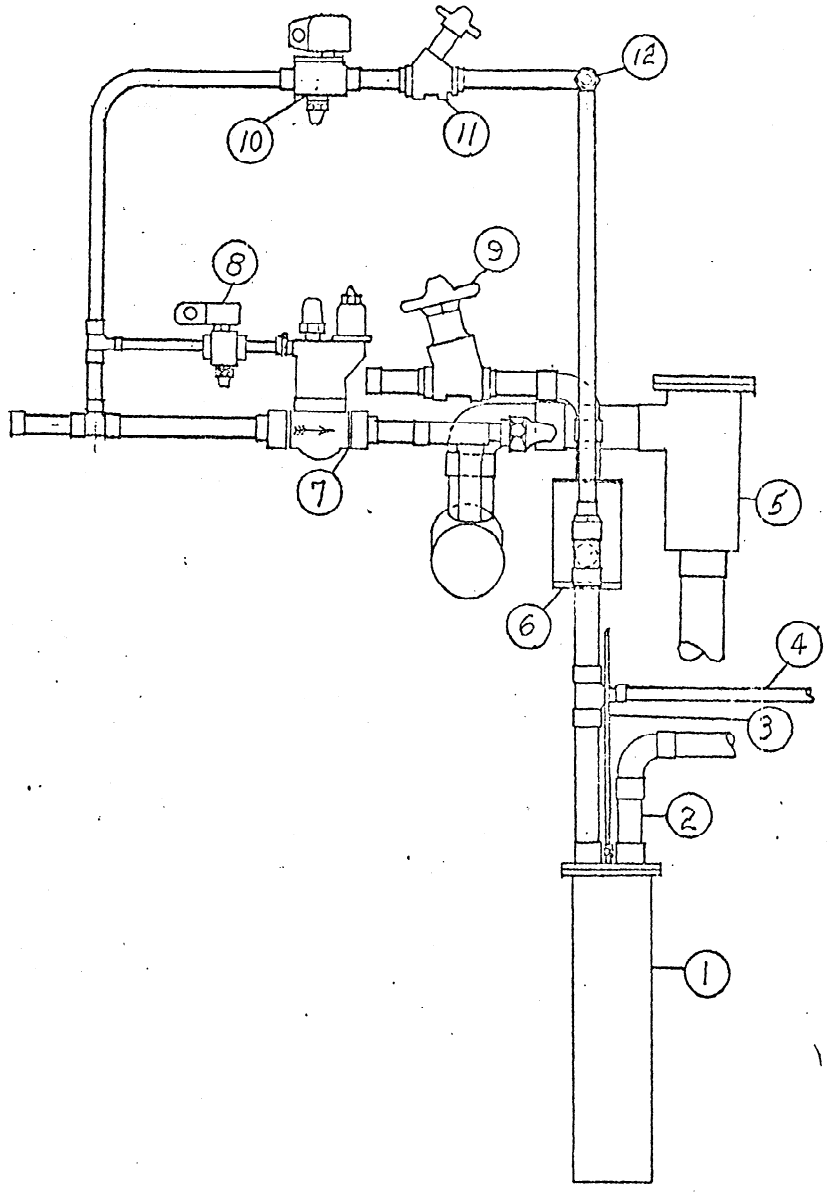
The basic concept of refrigeration is to transfer heat from one place to the other. Heat is removed from the case and its contents, and transfered to the outside, or ambient air. The heat was thus totally wasted. By incorporating a multi circuited coil into the air handling system of the store, this heat can be re-used to heat the store proper.

Simply speaking, a diverting valve is installed in the discharge line of the compressor, and is piped to the normal condenser, and the heat reclaim coil. This valve is equipped with an electric solenoid that is activated by the environmental control panel. On units that are to be used for heat reclaim and hot gas defrost, there is an additional constant pressure valve installed on the discharge line from the compressor, Item #7 on Page 7. It should be noted that this valve is after the supply to the hot gas header, and maintains a constant pressure to the hot gas header. The hot gas needed for defrosting is more critical than the reheating should it call for both at the same time. Warren/Sherer incorporates the series system of piping in heat reclaim; the gas passed from the heat reclaim coil to the condenser and back to the receiver. On Page #8, it will be noticed that there is a twenty pound differential check valve installed between the compressor discharge line and the condenser return line to the receiver. Should the receiver pressure start to drop during heat reclaim, at a difference of twenty pounds, this check valve will open to keep the pressure on the liquid receiver.

The Warren/Sherer environmental control panel works in the following manner. The panel has six stages that it will move through. Generally this is two stages of cooling, three stages of heat reclaim, and one stage of auxilliary heat. When the store temperature is at the set point of the thermostat, the panel will not call for either cooling or heating. When the store temperature begins to drop below the set point of the thermostat, it will call for heat reclaim, and supplementary heat by stages. The reverse will stage in the air conditioning. A humidistat located in the store senses the humidity and will also energize the panel to over-ride the heat and bring in the air conditioning to dry out the air. When the humidistat is satisfied it will return the panel to normal operation.



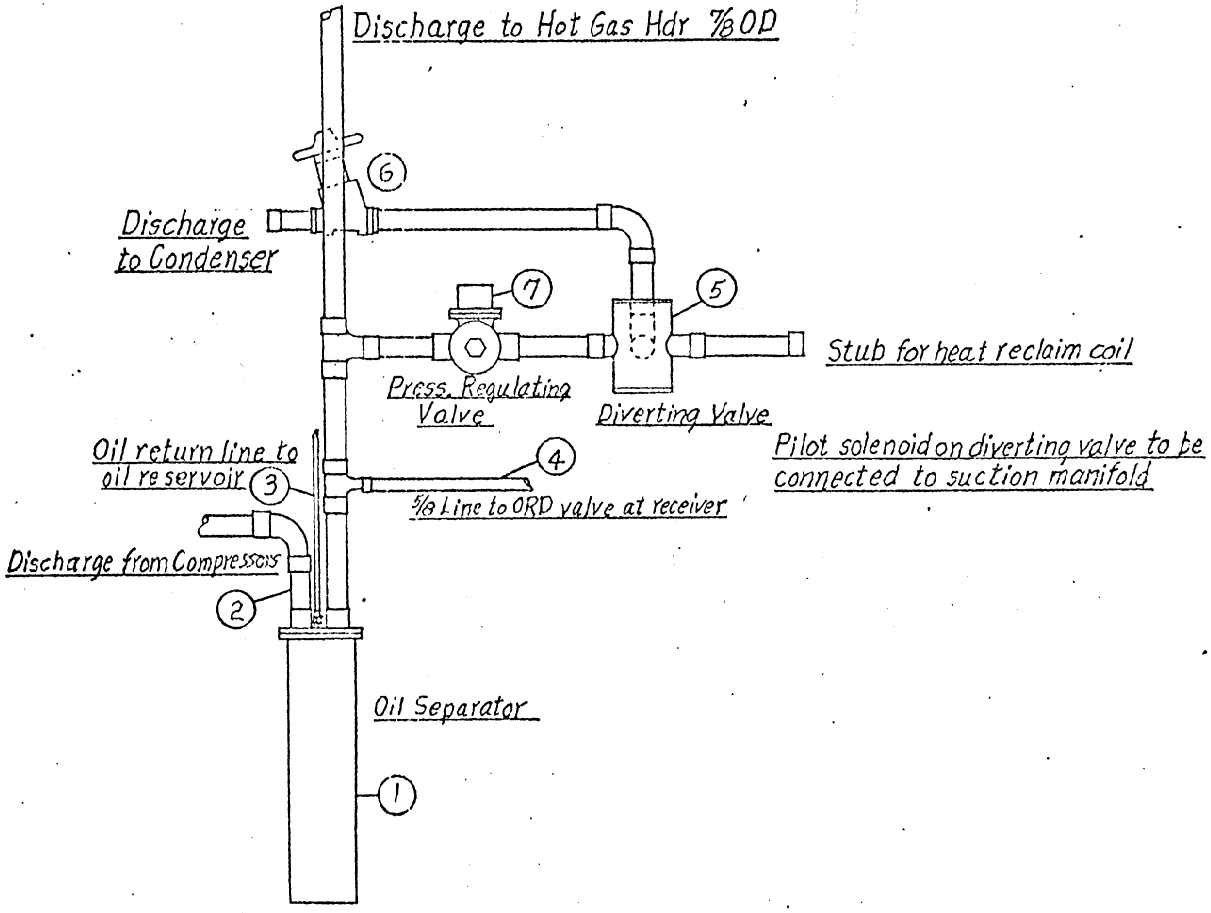
ALL SHADED PIPING AND VALVES ARE FIELD INSTALLED AS PER THE CUSTOMERS SPECIFICATIONS



1. Oil separator
2. Discharge line from compressor
3. Oil return to oil reservoir
4. To ORD valve at receiver inlet
5. Suction filter
6. Diverting valve
7. EPR valve
8. Suction Stop solenoid
9. Discharge line SOV
10. Hot gas solenoid
11. Hot gas branch SOV
12. Hot gas manifold ⅞" O.D.

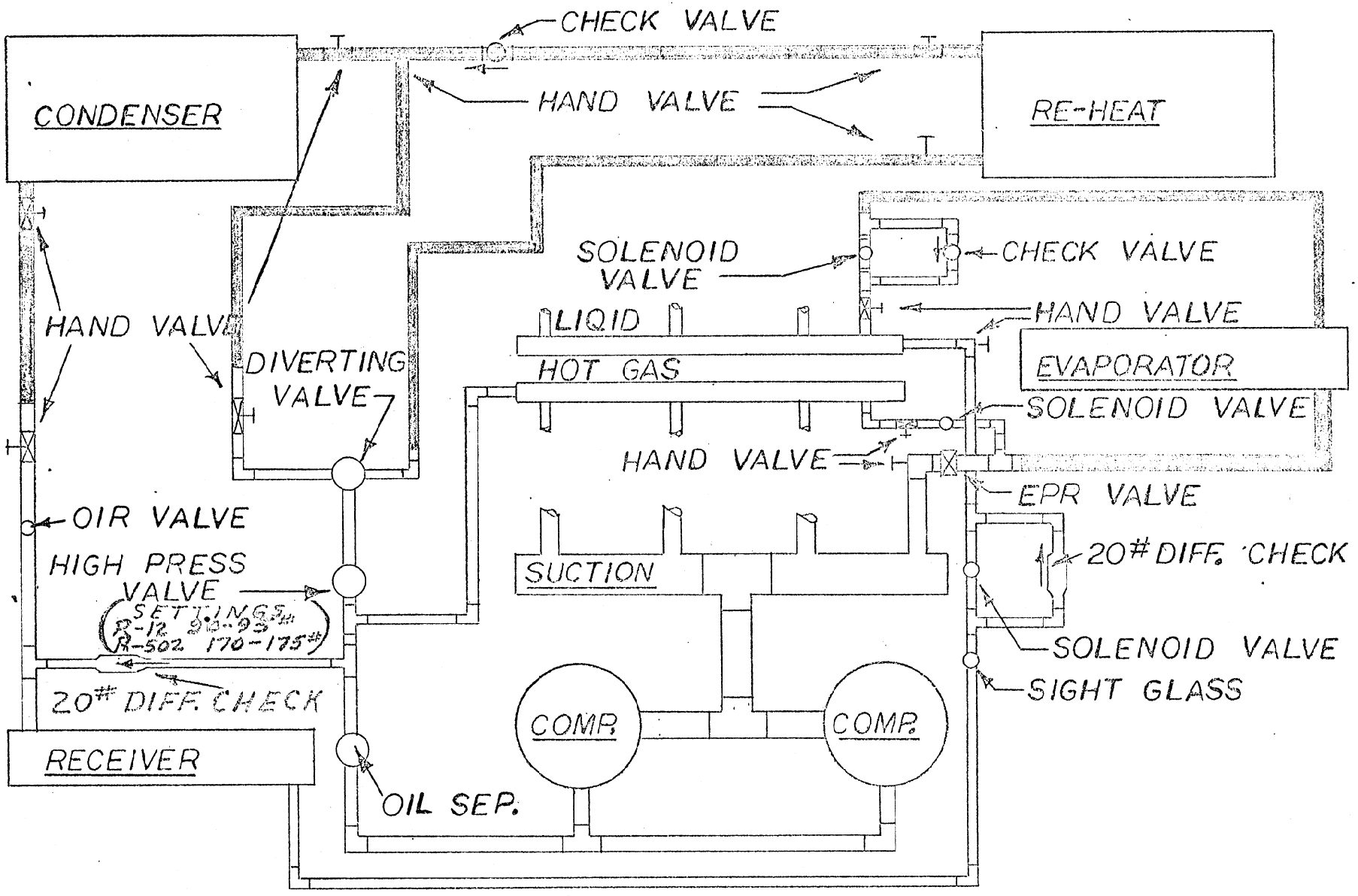
With Hot Gas Defrost

① Oil Separator
② Discharge from compressor
③ Oil return to oil reservoir
④ To ORD valve at receiver inlet
⑤ Diverting valve
⑥ Discharge SOV
⑦ Press. regulating valve

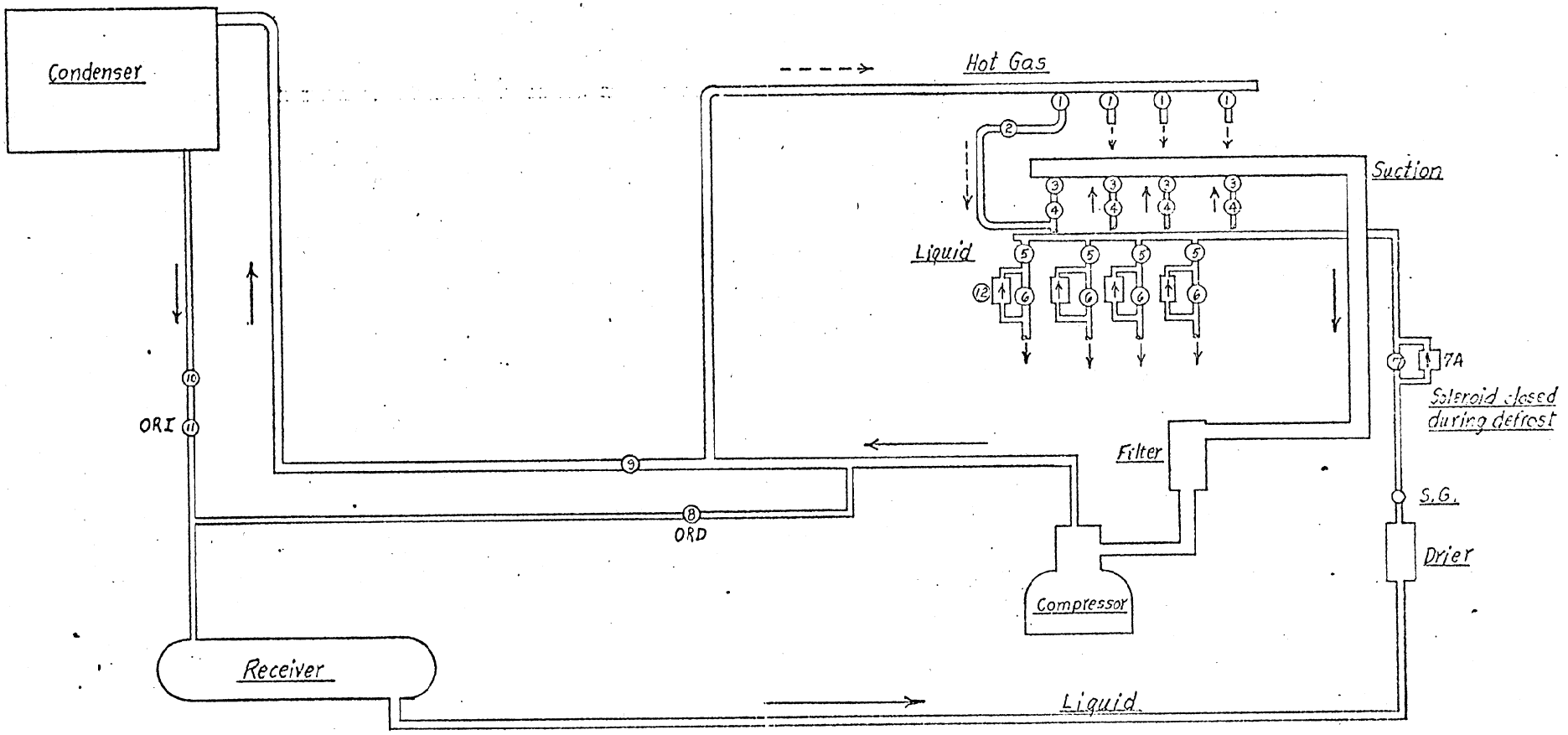


With Hot Gas Defrost & Heat Reclaim

AT'L–	FINISH–	CABINET	ELECTRICAL	REFRIGERATION	TRIM	GLAZING	SHIPPING	STOCKROOM
		REV'S		PART NAME			DRAWING NO.	DSG-BY
				Manifold Piping				DRN-BY
							DATE 1-31-94	DEPT.

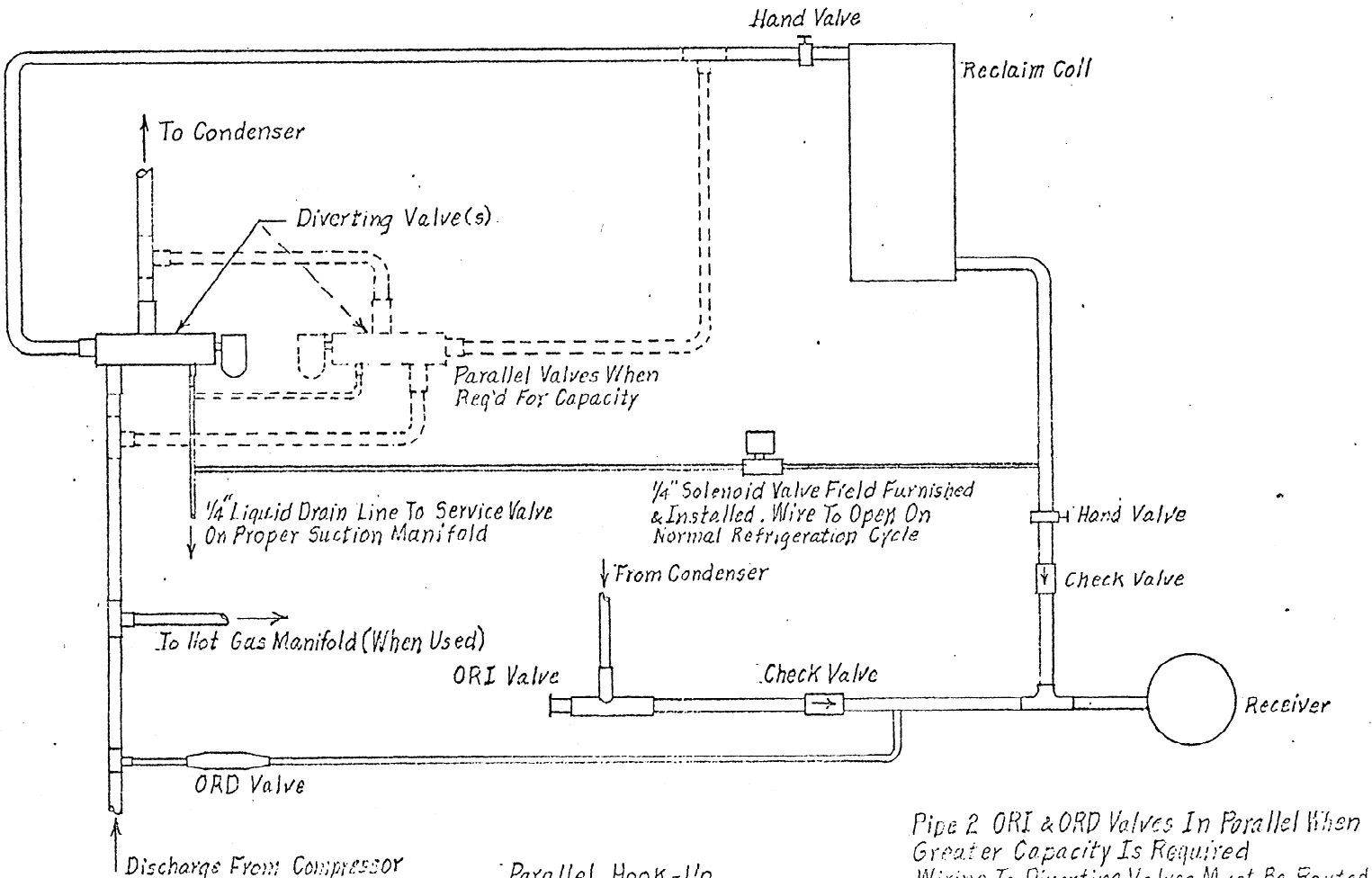


ALL SHADED PIPING AND VALVES ARE FIELD INSTALLED AS PER THE CUSTOMERS SPECIFICATIONS



① Hot Gas SOV
② Hot Gas Solenoid Valve
③ Suction SOV
④ EPR Valve With Suction Stop
⑤ Liquid SOV
⑥ Liquid Line Solenoid Valves
⑦ Master Liquid Line Solenoid Valve
⑭ ORD-4-20-5/8 Check Valve
⑳ ORD-4-20-3/8 Check Valve
㉑ Discharge SOV
⑩ Condensate Return SOV
⑪ ORI-10-100/225-1 3/8 Head Pressure Valve
⑫ MS-10 Check Valves

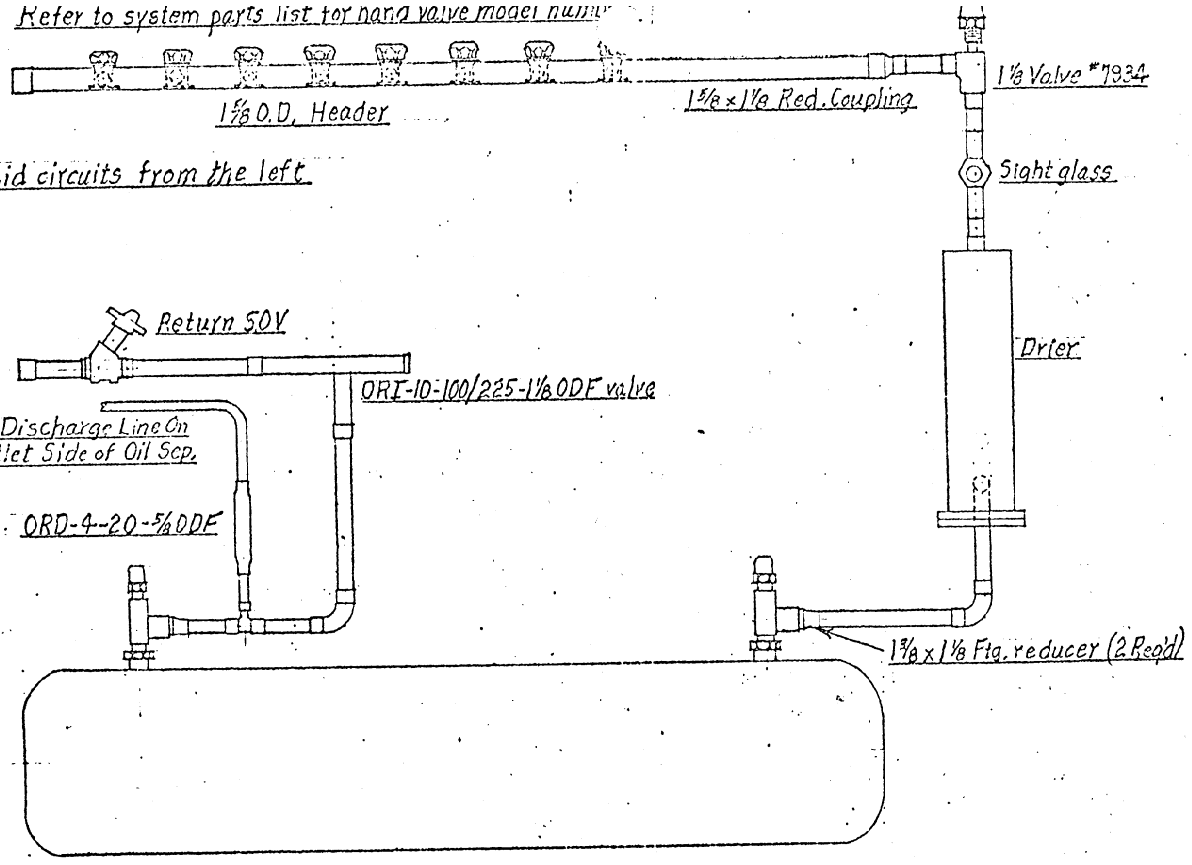
MAT'L–	FINISH–	CABINET	ELECTRICAL	REFRIGERATION	TRIM	GLAZING	SHIPPING	STOCKROOM	
		REV'S		PART NAME			DRAWING NO.	DSG-BY	ORDER NO
				Schematic Piping for Hot Gas Defrost				DRN-BY	
							DATE 1-15-74	DEPT.	

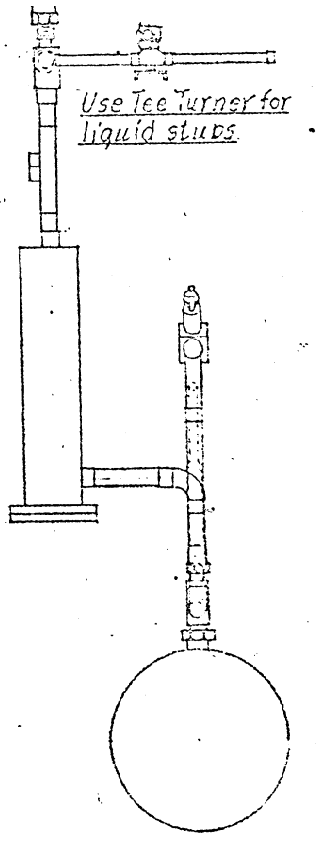


Parallel Hook-Up

Pipe 2 ORI & ORD Valves In Parallel When Greater Capacity Is Required
Wiring To Diverting Valves Must Be Routed Through Defrost Timer So They Will Be De-Energized During Defrost

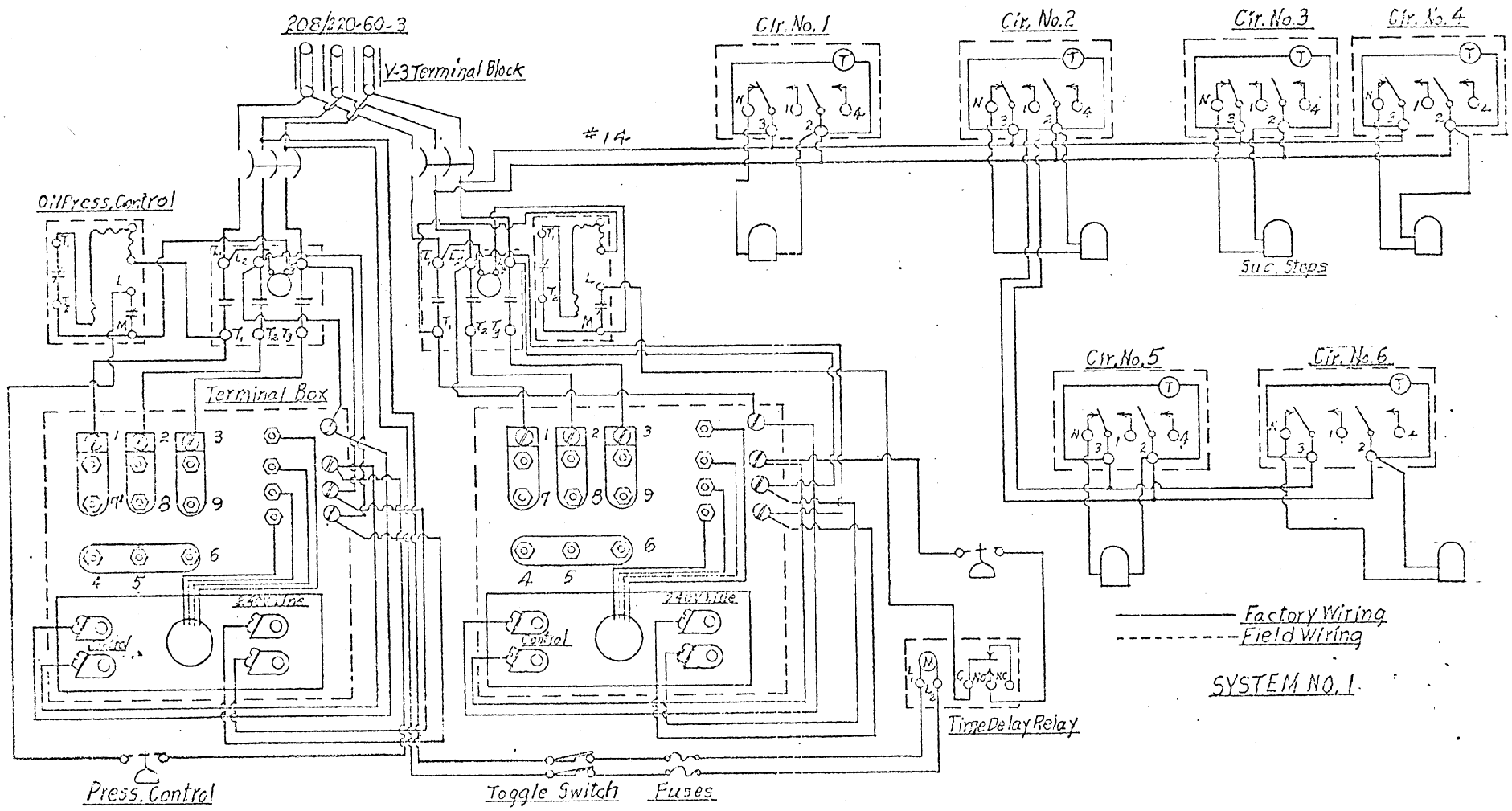
MAT'L–	FINISH–	CABINET	ELECTRICAL	REFRIGERATION	TRIM	GLAZING	SHIPPING	STOCKROOM	
		REV'S		PART NAME: Heat Reclamation Field Piping			DRAWING NO.	DSG-BY	ORDER N
								DRN-BY	
							DATE 3-19-73	DEPT.	





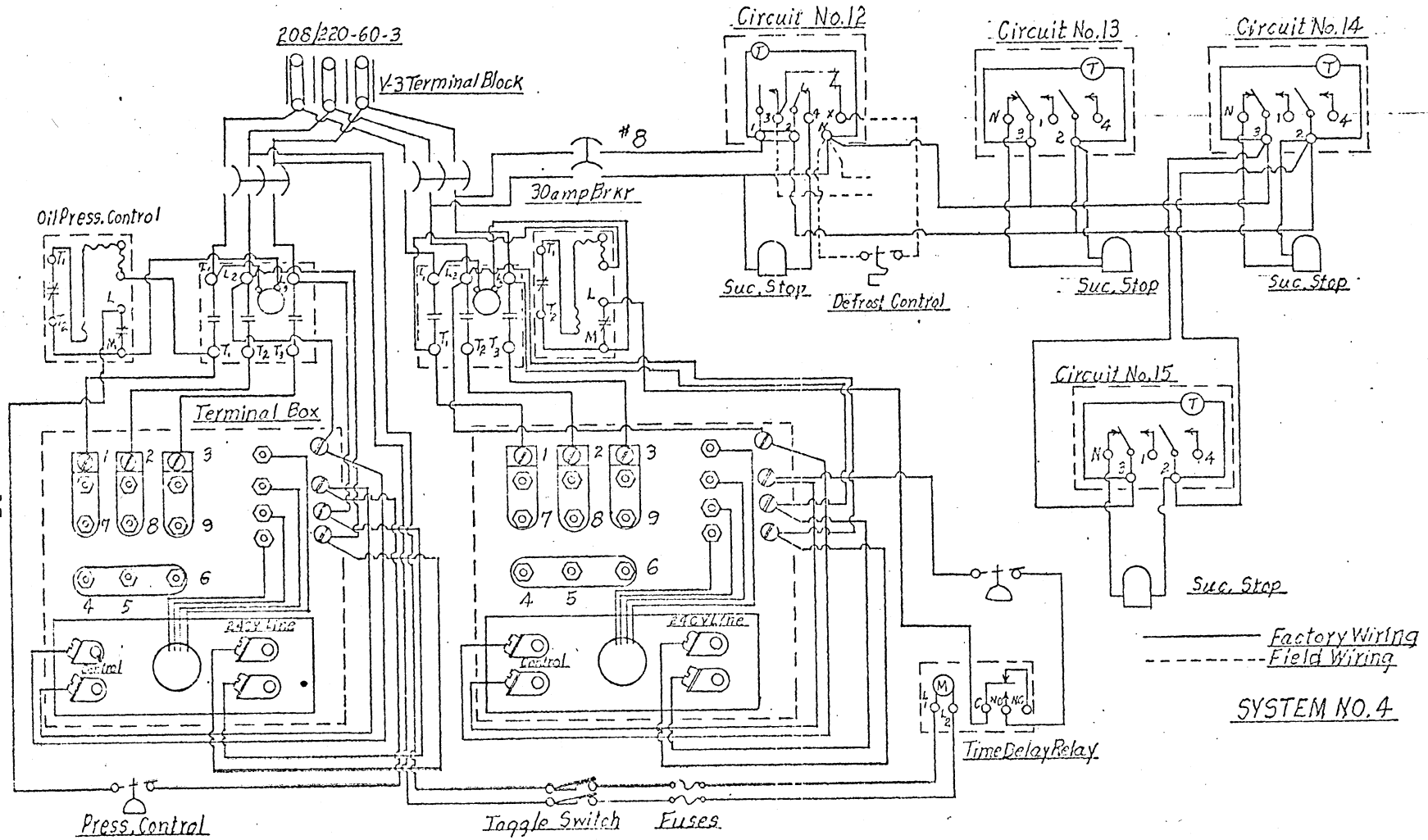
-11-

I'L–	FINISH–	CABINET	ELECTRICAL	REFRIGERATION	TRIM	GLAZING	SHIPPING	STOCKROOM	
		REV'S		PART NAME			DRAWING NO.	DSG-BY	ORDER NO.
				Liquid Manifold				DRN-BY	
							DATE 9-21-73	DEPT.	



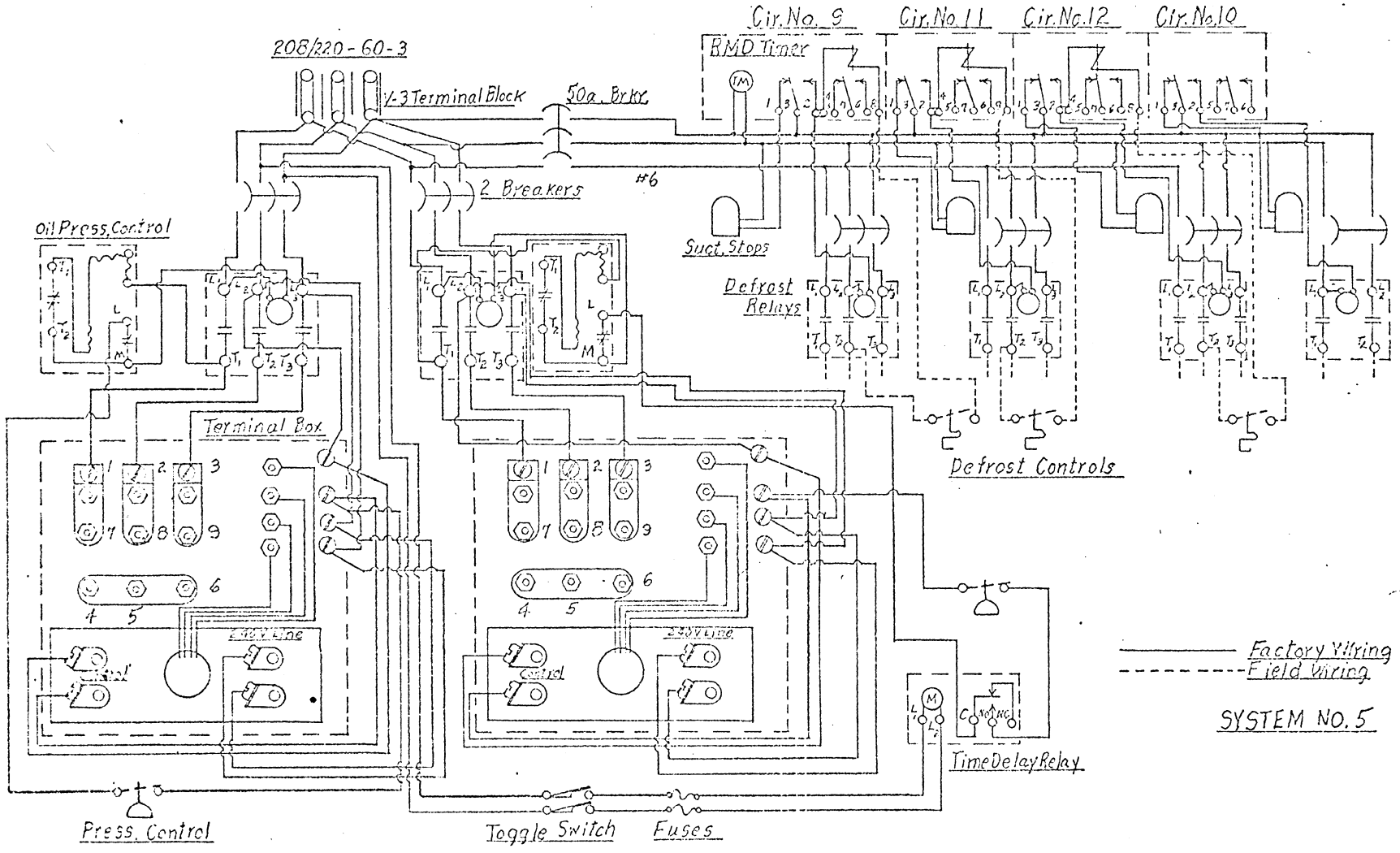
AT'L-	FINISH-	WIEDEMATIC	FOAM	COOLER	CABINET	ELECT.	REFRIG.	CEL. REFRIG.	TRIM	CEL. TRIM	MILL	STOCK ROOM	SHIPPING
		REV'S.				PART NAME			DRAWING NO.		DSG-BY		ORDER NO.
											DRN-BY		
									DATE		DEPT.		

EXCO 1964 M 3-76 87701

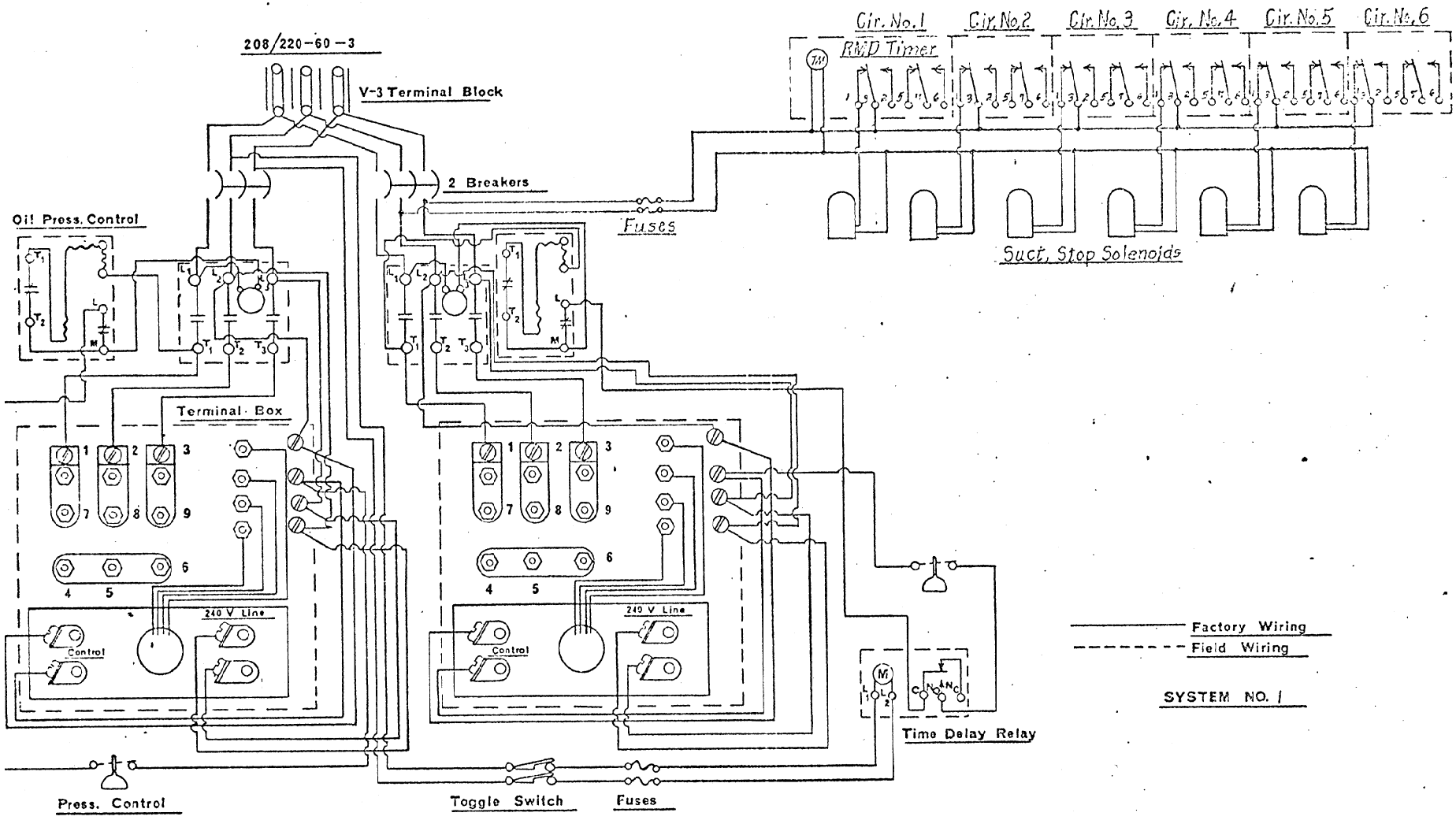


MAT'L-	FINISH-	WIEDEMATIC	FOAM	COOLER	CABINET	ELECT.	REFRIG.	CEL. REFRIG.	TRIM	CEL. TRIM	MILL	STOCK ROOM	SHIPPING
		REV'S.				PART NAME				DRAWING NO.	DSG-BY		ORDER NO
											DRN-BY		
										DATE	DEPT.		

LOCO• 1M-M 3-74 57781

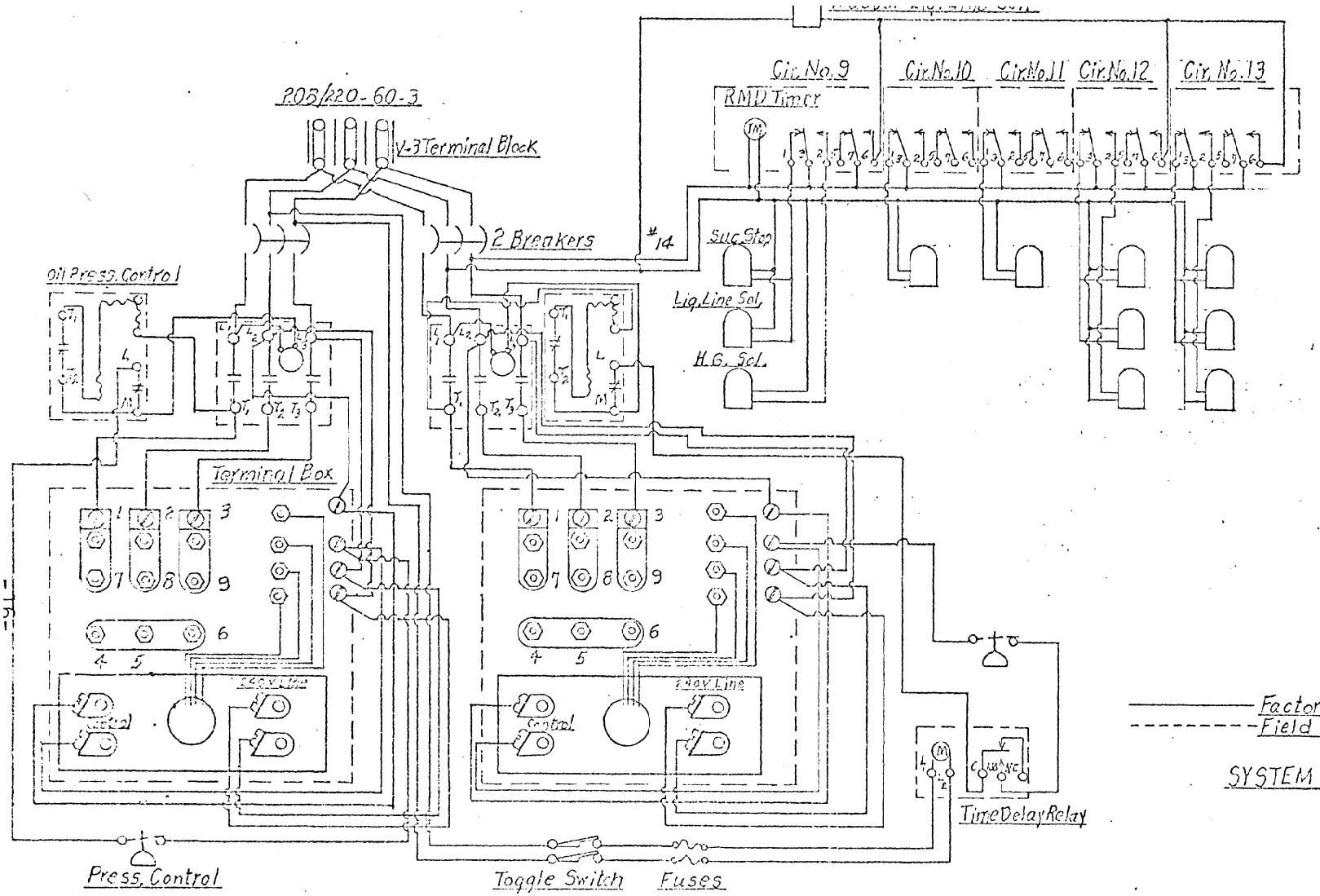


ATT'L-	FINISH-	WIEDEMATIC	FOAM	COOLER	CABINET	ELECT.	REFRIG.	CEL. REFRIG.	TRIM	CEL. TRIM	MILL	STOCK ROOM	SHIPPING
		REV'S.				PART NAME			DRAWING NO.		DSG-BY		ORDER NO.
											DRN-BY		
									DATE		DEPT.		



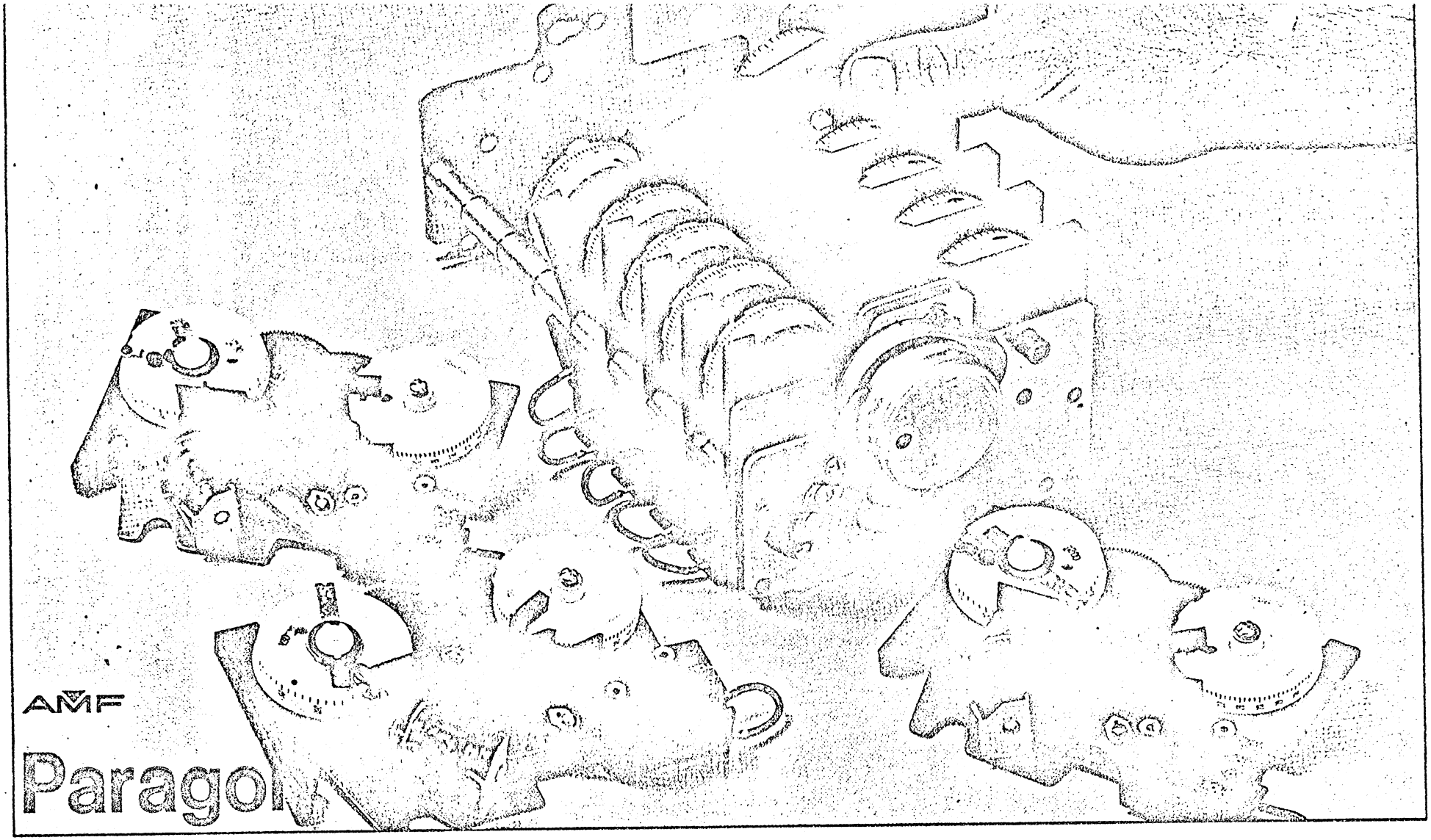
PLANNED FOR

Parts



AT'L-	FINISH-	WIEDEMATIC	FOAM	COOLER	CABINET	ELECT.	REFRIG.	CEL. REFRIG.	TRIM	CEL. TRIM	MILL	STOCK ROOM	SHIPPING
		REV'S.				PART NAME			DRAWING NO.		DSG-BY		ORDER NO.
											DRN-BY		
									DATE		DEPT.		

EDISON 1944 M 3-74 87761



RM Series

Installation Instructions

I. Installing to Panel

1. Drill holes in panel to accept #12 screws. Follow the dimensional diagram enclosed. (See back page.)

2. Install all brackets to panel with #12 screws. Arrow on side of bracket must point upward on a vertical panel surface.

3. Hang non-slotted frame rod of Master Unit (unit with motor module) on upper hooks of first two brackets.

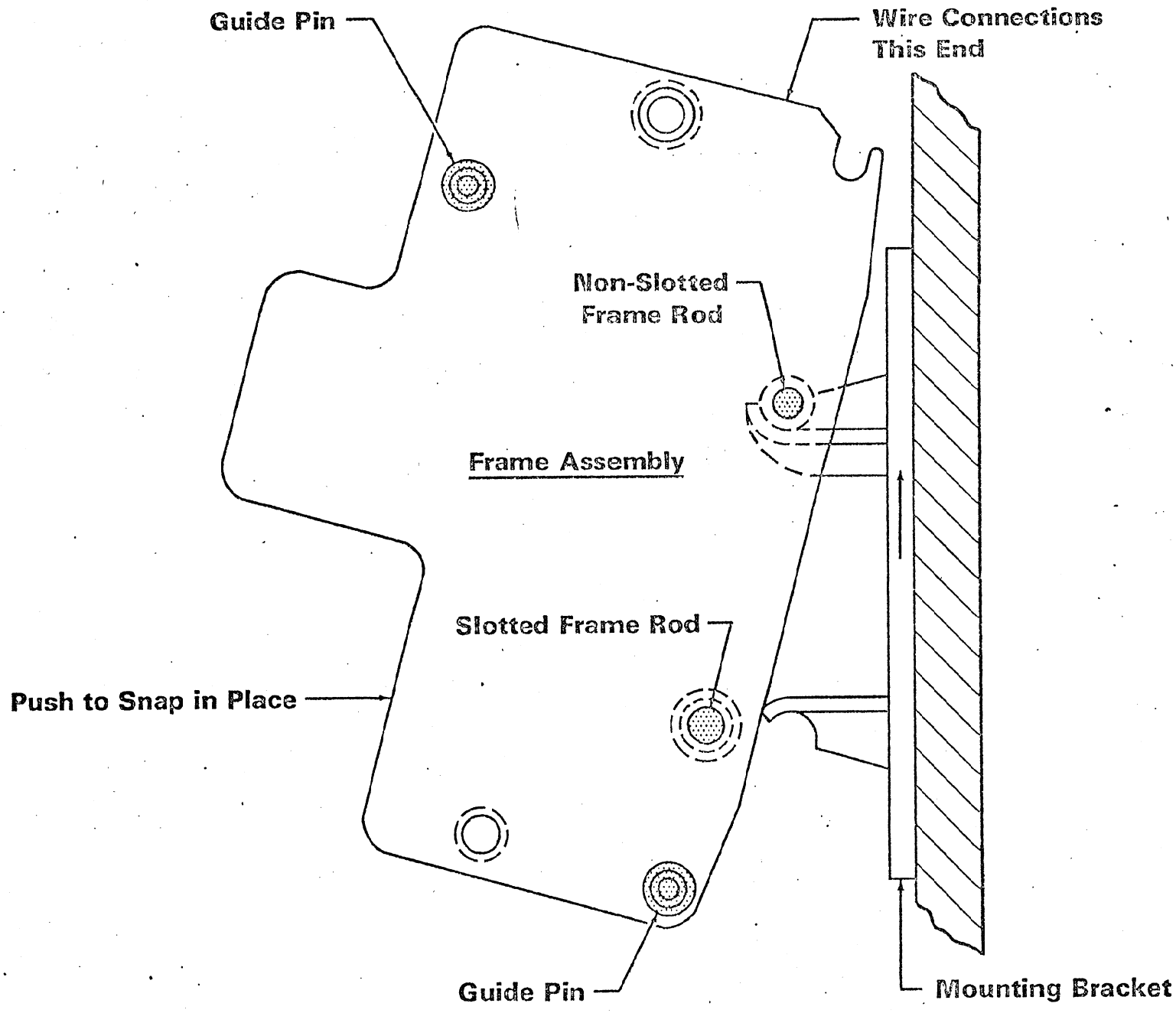
4. If Slave Units are to be used, install coupling on circuit #8 of Master Unit.

5. Position non-slotted frame rod of Slave Unit on upper hooks of brackets. Be sure Slave Unit guide pins engage slots on the Master Unit. Be sure the tongue on Slave Circuit #1 engages the groove on the coupling. Be sure the black numbers on the 24-hour dials line up on both units. (See Instructions on Alignment of Program Modules, page 6.)

6. Push down evenly on all frames and snap the slotted frame rods over the lower bracket hooks.

7. Check entire unit for operation by rotating the black reduction gear on the Motor Module. (See page 7.) Be sure all Module dials turn together when this gear is turned by hand.

FRAME AND BRACKET



II. Wiring

1. Each Program Module is equipped with two SPDT snap switches. Units equipped with integral solenoids have two additional terminals for the solenoid, one of which is factory-bridged to the Normally Open contact on one of the switches.

2. Wire line voltage to the Motor Module terminal block. (See page 6.)

3. Wire line voltage to Common terminals of all switches.

4. Wire loads to N.O. or N.C. switch contacts in accordance with the Cabinet Manufacturer's wiring diagrams.

5. On solenoid-terminated units, wire the cycle limit switch for each Program Module in accordance with the Cabinet Manufacturer's wiring diagrams.

III. Programming

1. For each circuit (Program Module) insert black trippers into the slots in the 24-hour dial at the times of day (indicated by the black numbers) when a defrost cycle is to accur.

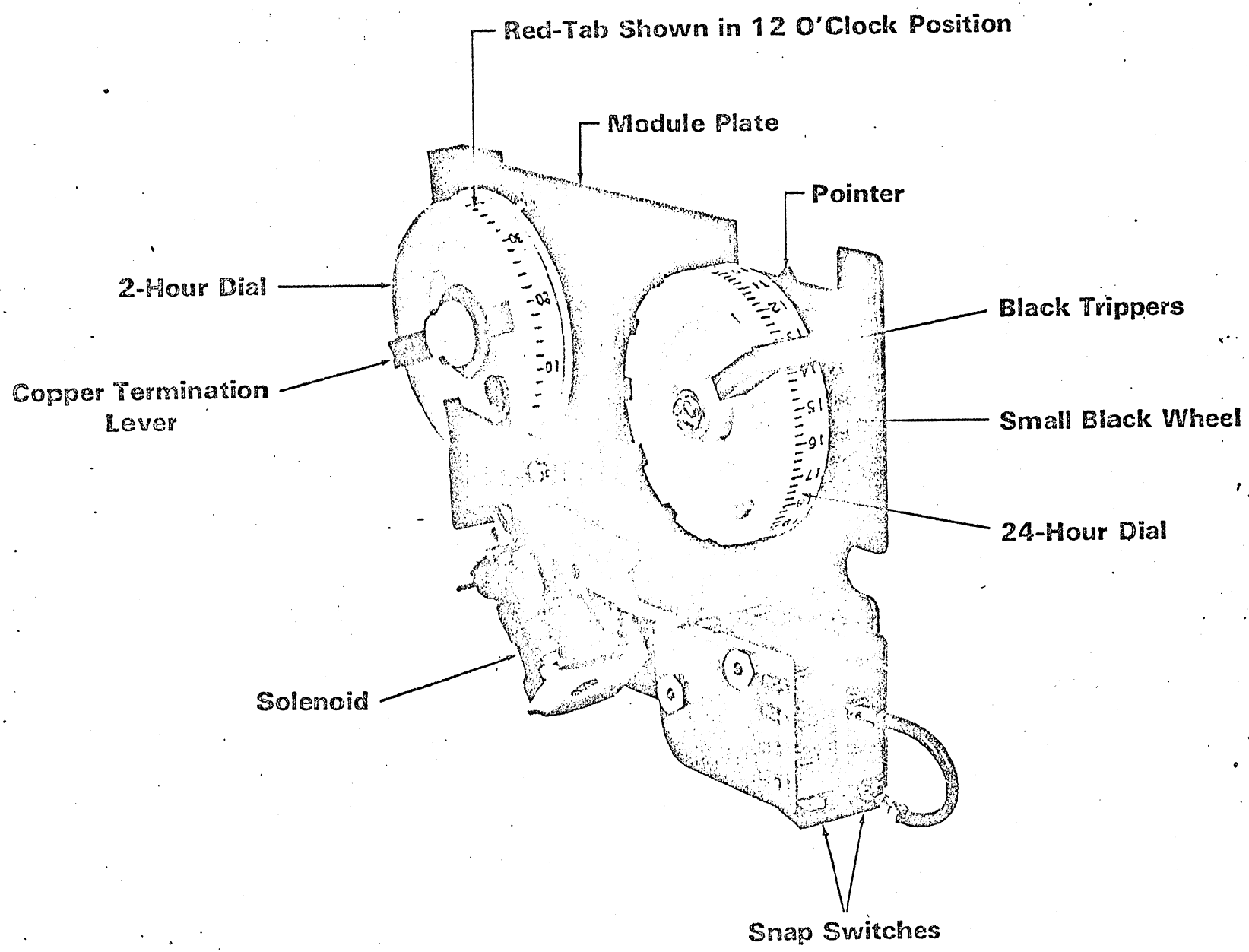
2. For each circuit, rotate the copper termination lever around the 2-hour dial to set the duration of each defrost cycle. NOTE: To rotate the terminating lever counter-clockwise, it must be pulled slightly away from the dial teeth with finger pressure. Do not bend the lever away from the teeth any farther than is necessary to disengage it from the dial teeth.

3. Set each Program Module per #1 and #2 above.

4. Use the black reduction gear on the Motor Module, see page 6, to rotate the entire assembly until the current time of day (indicated on the smaller black wheel behind each 24-hour dial) lines up with the pointer stamped behind it as part of the Module Plate.

5. The unit is now ready for application of line voltage to the Motor terminal block.

RM MODULE


Red-Tab Shown in 12 O'Clock Position
Module Plate
Pointer
2-Hour Dial
Black Trippers
Copper Termination Lever
Small Black Wheel
24-Hour Dial
Solenoid
Snap Switches

IV. Removal and/or Installation and Alignment of Individual Program Modules

1. To remove a Program Module, rotate the black reduction gear on the Motor Module until the Red Tabs on all the 2-hour Program Dials come to the 12 o'clock position. Then pull out and up on the bottom of the Module latching lever, disengage and point Module up from frame to remove.

2. To re-install a Program Module, follow #1 above, and rotate the trailing Modules by hand until all Red Tabs are at 12 o'clock position. Check to be sure that the black numbers on all the 24-Hour dials are lined up. Rotate 2-Hour dial sections until this line up is obtained. Rotate the 2-Hour dial of the Module to be installed until the Red Tab comes to the 12 o'clock position, and the black numbers on the 24-Hour dial are in the same position as those on Modules already in the frame. Then fit the Module cut out (located above the switches) into the slotted frame rod, align the tongue/groove on either side of the Module, and snap the Module down over the non-slotted frame rod. Check to be sure all Red Tabs line up and all 24-Hour dial numbers line up.

V. Installation/Removal of Drive Module

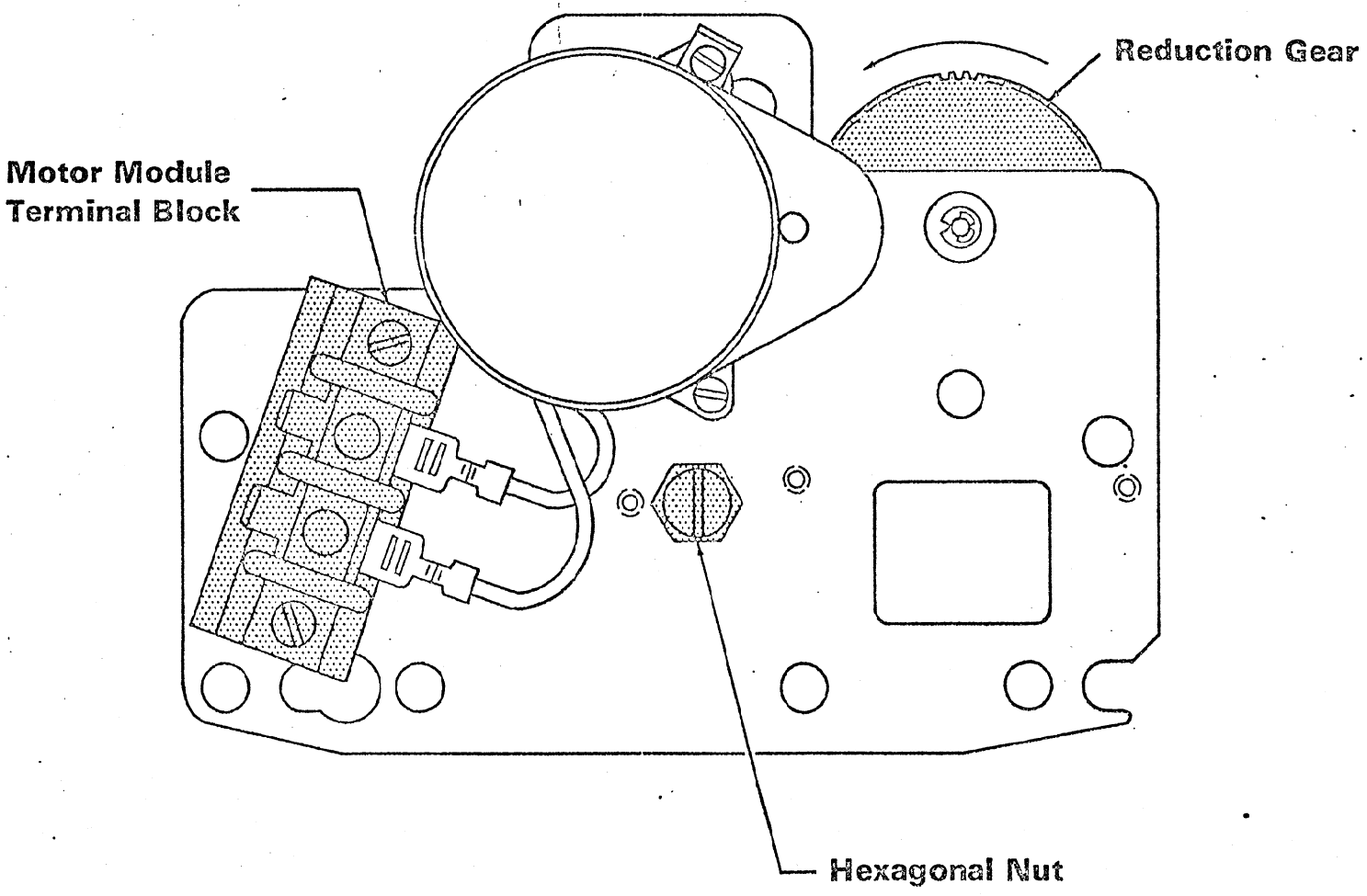
1. To remove Drive Module, rotate black reduction gear until tongue/groove with Program Module #1 is parallel to mounting surface.

2. Loosen hex nut fully.

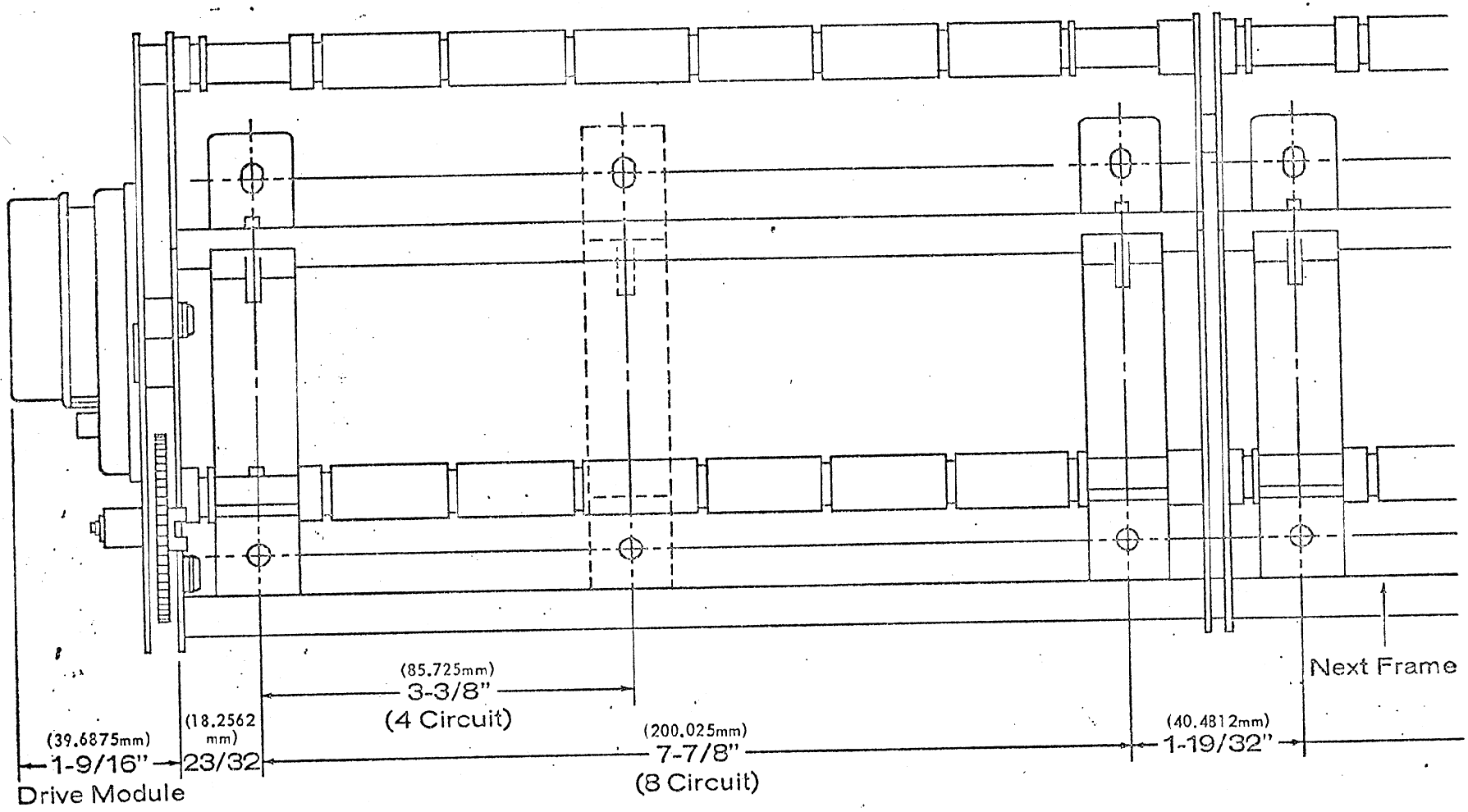
3. Slide complete Motor Module parallel to mounting surface and toward the 24-Hour Dials until the three locator studs clear their keyslots, then remove the Module.

4. To reinstall, reverse steps above.

MOTOR MODULE



DIMENSIONAL DIAGRAM



Paragon

606 Parkway Blvd., Two Rivers, Wisconsin 54241 U.S.A.

EXPORT SALES OFFICE: Two Rivers, Wisconsin 54241 U.S.A.
Cable: PECO Telex 26-3450 PARAGON TWOR

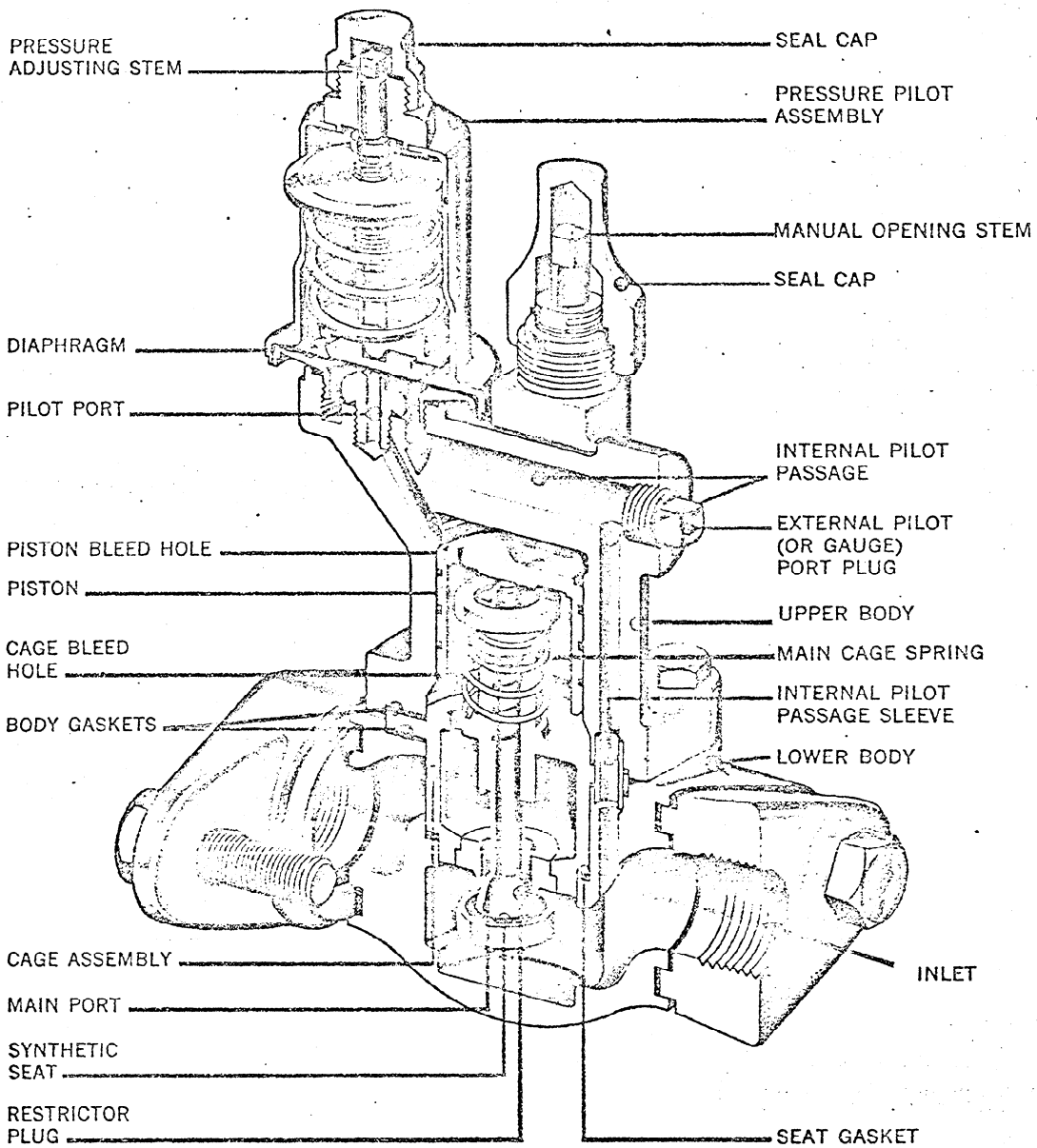
IN CANADA: PARAGON ELECTRIC P.O. Box 1030 Guelph, Ontario
Division of AMF CANADA LIMITED

Part No. 2[illegible]-10-73

Printed U.S.A.

OPERATION OF UPSTREAM REGULATORS

February 1970



The illustration above shows the basic internal components common to the EPR series and its many pilot combinations. While other models may vary somewhat in construction and pilot configuration, they all operate on a similar principle.

The upstream or inlet pressure signal is transmitted through the internal pilot passage to the area below the pressure pilot diaphragm. Above the diaphragm is an adjustable springload. When the inlet pressure signal increases to exceed the spring setting, the diaphragm deflects to open the pilot port. This permits the pilot pressure signal to exert a pressure on top of the piston. The pressure exerted on the top of the piston drives the cage stem down and opens the main port, thus permitting flow through the valves. The cage, bleed hole is sized to provide dash pot action.

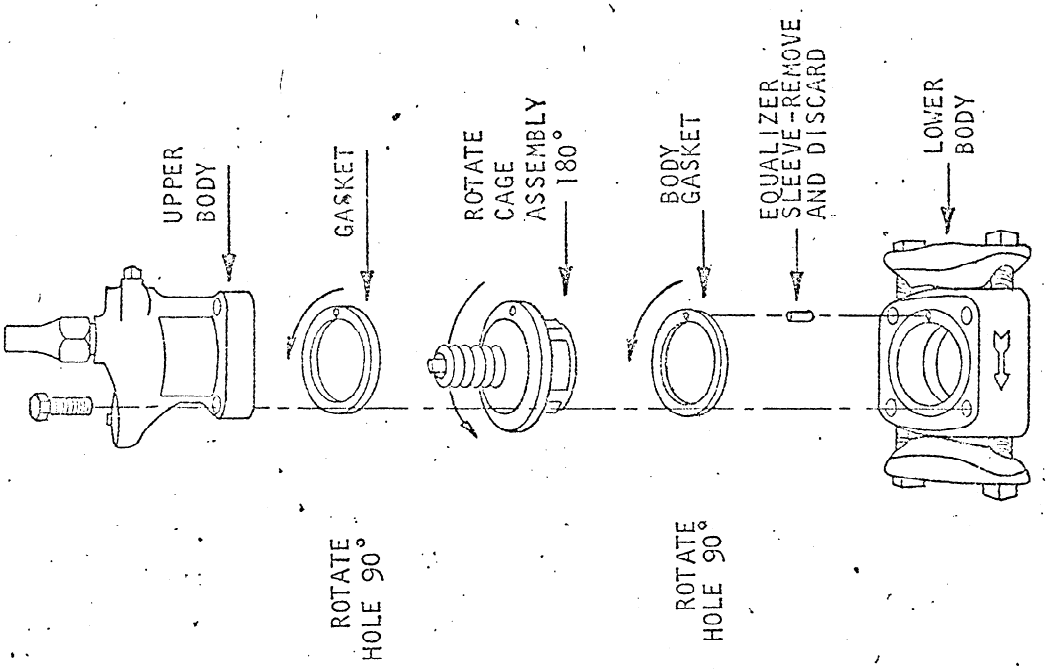
Should the inlet pressure signal decrease to the spring set point, the pilot port closes, and the pressure on top of the piston bleeds off through the piston bleed hole. The main cage spring closes the main port.

In operation, the pilot diaphragm, piston and cage port may assume intermediate or throttling positions depending on load. Characterized parabolic restrictor plugs or vee ports are standard features which provide smooth modulation without hunting or chatter.

Increasing the pressure pilot spring tension raises the set point; decreasing the tension lowers the set point. The installation of an access fitting or gauge valve in the external pilot port connection permits pressure readings for easy adjustment.

All EPR models are easily converted to external pilot connection by rotating parts to block the internal pilot passage and connecting the external pilot port to the remote pressure signal source.

All models are equipped with a manual opening stem to permit full port manual operation.


UPPER BODY
GASKET
ROTATE CAGE ASSEMBLY 180°
BODY GASKET
EQUALIZER SLEEVE-REMOVE AND DISCARD
LOWER BODY
ROTATE HOLE 90°
ROTATE HOLE 90°

K Y S O R / W A R R E N - S H E R E R

***INITIAL CONTROL SETTINGS

FEB. 1975

	FIXTURE	REFRIGERANT	DEFROST TIME MINUTES OFFCYCLE	ELEC.	HOTGAS	APPROXIMATE FAILSAFE SETTING OFFCYCLE	ELEC.	HOTGAS	DEFROST PER DAY	*E.P.R. SETTING	DISCHARGE AIR TEMPERATURE	APPROXIMATE PRESSURE CONTROL SETTINGS CUT-OUT	CUT-IN
MEAT and DELI	ZM, ZMSR, ZCI, HZM	12 502	45	20	14	50	24	18	2 - 4	13-17 39-45	24° to 26°	11# 35#	27# 63#
	SJM, JM	12 502	--	15	10	--	18	14	6	TPR	23° to 25°	11# 35#	27# 63#
	ZT, ZTS, 7900 (Deli)	12 502	75	--	--	75	--	--	1	15-19 43-48	34° to 38°	15# 42#	28# 65#
	JQXD, JRQXD +15 Evap (Deli)	12 502	35	20	10	40	24	14	4	15-19 43-48	28° to 34°	16# 42#	27# 65#
DAIRY	7600	12 502	30	26	10	34	30	14	6	15-19 43-48	26° to 28°	12# 40#	28# 63#
	JQD, JRQD BQD, BRQD	12 502	35	20	10	40	24	14	4	18-22 47-54	30° to 34°	20# 52#	30# 60#
PRO-DUCE	HZV, ZV, TZP, HZP	12 502	30	--	--	32	--	--	2 - 4	14-18 43-48	38° to 42°	20# 52#	35# 68#
REACH - - INS	HLG (FROZEN FOOD)	502	--	20	--	--	30	--	4	--	0° to -10°	12#	23#
	HLGI (ICE CREAM)	502	--	20	--	--	30	--	4	--	-6° to -16°	9#	20#
	SG, HG (BEVERAGE)	12	26	--	--	26	--	--	4	--	33° to 36°	--	--
	WHRD	12 502	35 35	-- --	-- --	35	--	--	2	17-20 45-51	32° to 38°	15# 43#	27# 63#
	WHRL (FROZEN FOOD)	502	--	32	16	--	36	18	2	12-16	0° to 4°	10#	17#
	WHRLI (ICE CREAM)	502	--	36	16	--	40	18	2	4-8	-8° to -12°	2#	8#
FROZEN FOOD	XL, IL, WIL, L, ZCL, WTL, EWTL, EBIL	502	--	35	16	--	40	18	1-2	10-14	-10° to -15°	9#	16#
	7400, 8000, 8200	502	--	24	14	--	30	18	4	12-16	-5° to -10°	10#	17#
ICE CREAM	XL, IL, WILI, L, WTLI, EWTLI, EBILI	502	--	35	18	--	40	20	1-2	4-8	-15° to -20°	2#	8#
	7400H	502	--	30	14	--	34	18	6	4-8	-15° to -20°	5#	12#

NOTE: *E.P.R. Settings are to be used when fixtures are on a DUALMETIC SYSTEM.

**These settings are used when fixtures are on a MASTERMETIC UNIT.

***These settings are approximate setting and may have to be changed after 24 hours of operation for desired temperatures and defrost cycles.

	FIXTURE	REFRIGERANT	DEFROST TIME MINUTES OFFCYCLE	ELEC.	HOTGAS	APPROXIMATE FAILSAFE SETTING OFFCYCLE	ELEC.	HOTGAS	DEFROST PER DAY	*E.P.R. SETTING	DISCHARGE AIR TEMPERATURE	**APPROXIMATE PRESSURE CONTROL SETTINGS CUT-OUT	CUT-IN
WALK - - - - INS	30° Meat	12 502	--	30	15	--	3½	18	2-4	19-23 48-56	28° to 32°	20# 51#	28# 65#
	35° Dairy & Produce	12 502	60	--	--	60	--	--	2	22-26 54-61	35° to 39°	20# 51#	28# 65#
	Poultry & Deli	12	60	--	--	60	--	--	2	21-25	33° to 38°	18#	28#
	Meat Prep Cutting Room	12	60	--	--	60	--	--	1	24-29	45° to 50°	--	--
	Frozen Food Storage	12 502	--	30	15	--	3½	18	2-4	0-4 15-18	-5° to -10°	--	--
	Ice Cream Storage	502	--	30	15	--	3½	18	2-4	10-12	-10° to -15°	--	--

NOTE: *E.P.R. Settings are to be used when fixtures are on a DUALMETIC SYSTEM.

**These settings are used when fixtures are on a MASTERMETIC UNIT.

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