INSTRUCTION MANUAL

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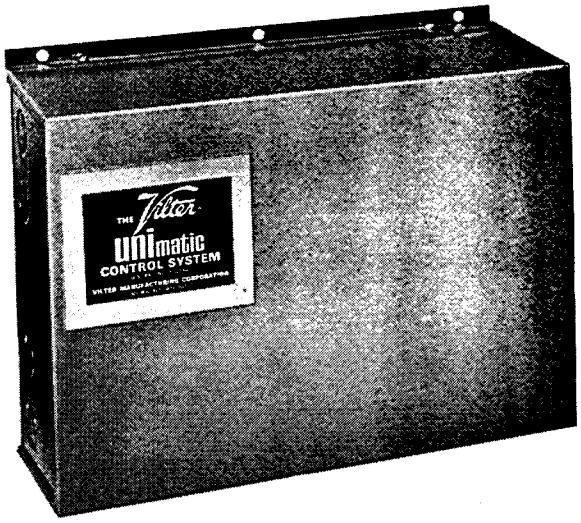

VILTER UNIMATIC CONTROL SYSTEM

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ISSUE DATE

VILTER MANUFACTURING CORPORATION

UNIMATIC CONTROL SYSTEM OPERATING INSTRUCTIONS

Floating Control and Proportional Control Models

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LIST OF ILLUSTRATIONS

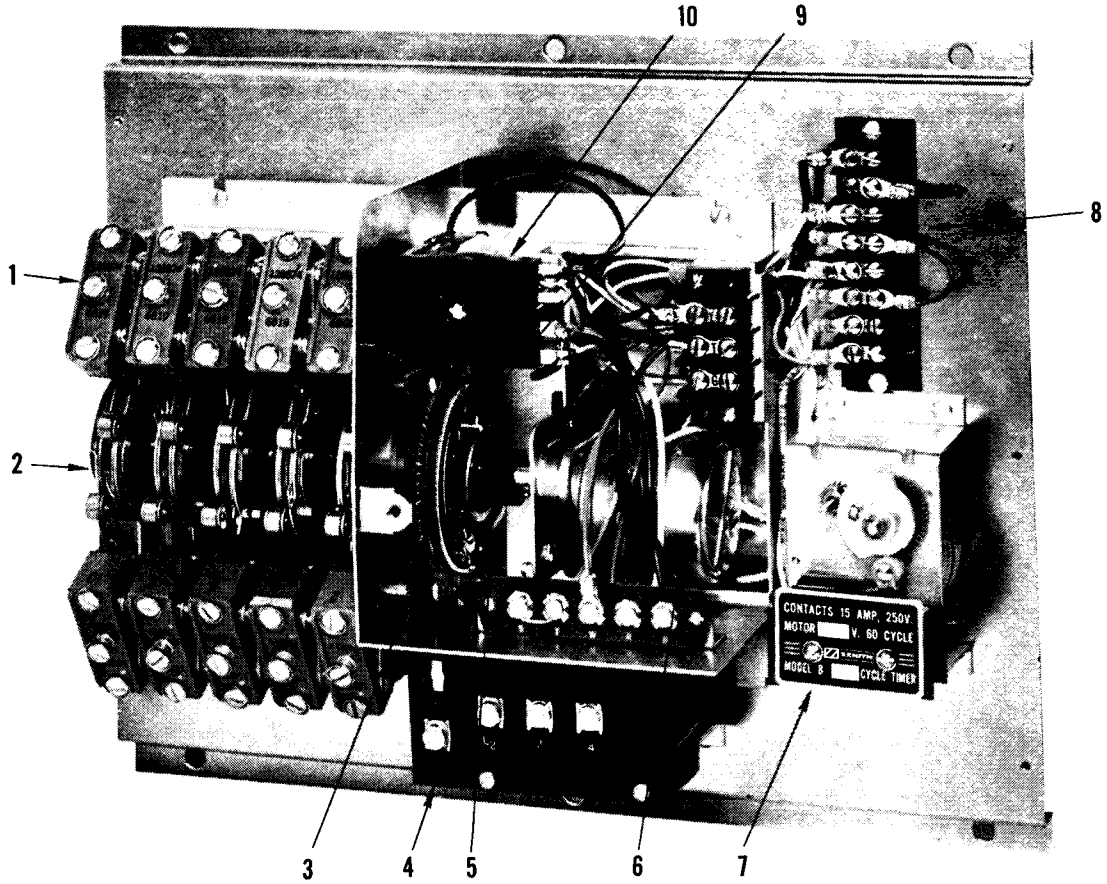
GENERAL DESCRIPTION

The purpose of the Vilter Unimatic Control System is to provide close control of multiple compressor installations. When more than one compressor is connected to a refrigeration load, it becomes increasingly difficult to set the pressure or temperature controls (which stop, start, load, and unload compressors) close enough to allow the system to operate within a small differential. This problem is compounded each time another compressor is added to the system.

The Vilter Unimatic Control System solves this problem by utilzing only one pressure or temperature control to govern the capacity of all of the compressors in the system. This is accomplished by having the control monitor the pressure or temperature and directing a motorized sequence control to stop, start, load, or unload compressors to balance the compressor capacity with the load requirements of the system.

The Vilter Unimatic Control System is available in either the floating (Figure 1) or proportional, (Figure 2) mode of control both of which can be supplied with either temperature or pressure actuation. The temperature option consists of a temperature control and remote sensing bulb which can be immerised in the fluid being cooled or inserted into a small float chamber which provides a source of saturated liquid at suction pressure.

The pressure option is furnished with a control which can be mounted directly on the suction line, sensing suction pressure to control the system. A control to monitor discharge pressure for control of fans and pumps on multiple evaporative condenser and air-cooled condenser systems can also be furnished. The pressure control is available for most types of refrigerants.



KEY:

1. Switch, Load (1785A)†	5. Switch, CCW Limit	7. Interrupter (1545C1B)†
2. Cam	6. Motor Assembly	8. Terminal Strip
3. Indicator, Cam Position	15 sec. cycle time (1786A)†	9. Switch, CW Limit
4. Transformer (1783A)†	90 sec. cycle time (1787B)†	10. Relay, Recycling (1784A)†

† These items are available as replacement parts, part numbers are listed in parentheses.

MOTORIZED SEQUENCE CONTROLLER ASSEMBLY
FLOATING CONTROL MODEL
FIGURE 1

GENERAL DESCRIPTION (Cont'd)

The Unimatic is available for operation on either 120V, 60/50HZ, 208V, 60HZ, or 240V, 60/50 HZ. The floating type control system is available with either 5 or 10 steps of capacity control. For systems requiring more than 10 steps, auxiliary units are available to give up to 30 control steps which is the practical upper limit. The proportional type sequence controller is available with 10 steps only. All load switches are single pole double throw rated 20 amps at 240V. The standard motor (15 RPH) provides a 90 second cycle time. This cycle time can be extended to any practical length desired by means of an adjustable interrupter (cycle timer). On special order faster motors (45 RPH and 90 RPH) can be provided to obtain a 45 and 15 second cycle time respectively. The sequence controllers are mounted on a metal base along with associated parts and can be obtained for Nema 1, 4, 7, 9 and 12 enclosures. It is also available open for customer mounting in a panel enclosure. All components, with the exception of the actual load contacts of the motorized sequence controller are factory wired to a terminal strip. The operation of each unit is individually checked at the factory before shipment.

The function of the interrupter in the system is to allow the sequence controller to operate at a speed which balances the load changes in the system to the speed at which the compressor capacity steps are changed. This is done so that the control system will not hunt or short cycle excessively on system load changes.

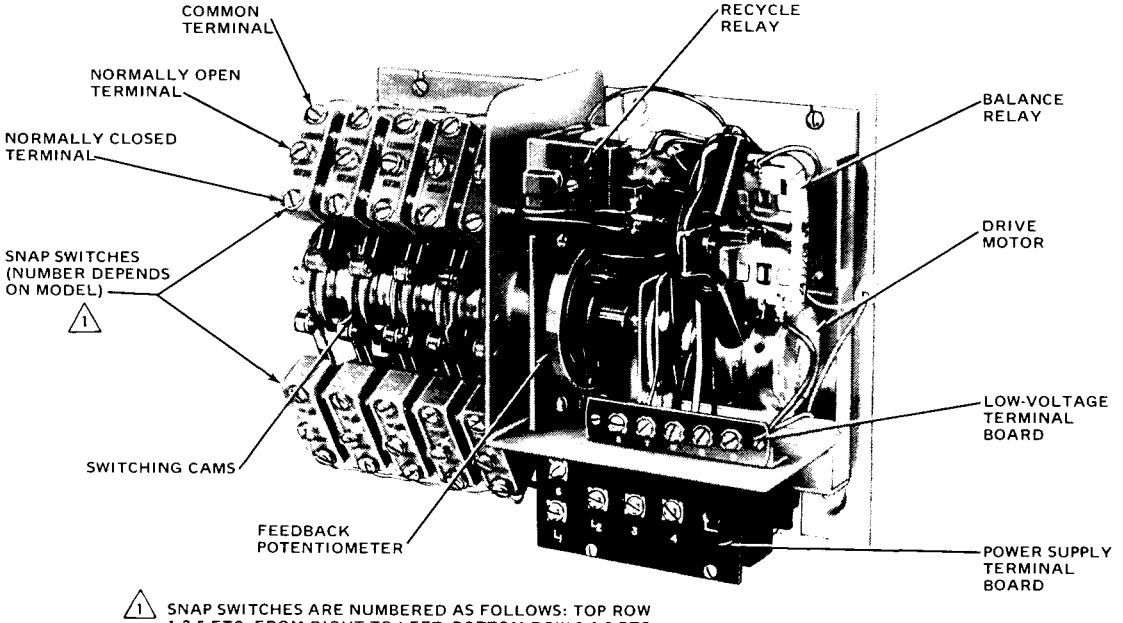
The recycling relay is furnished to cause the sequence controller to recycle to a minimum load position in the event of a power failure. This will allow the compressor(s) to restart unloaded and in sequence thereby preventing a high electrical drain on the power system when the power is restored.

OPERATION

Following is a description of the operating characteristics of the floating and proportional type Unimatic control system.

Floating Control

The schematic ladder diagram shown in Figure 3 shows the internal wiring of the standard Floating Control Unimatic. The diagram shows the Unimatic including the load switches, travel limit switches, interrupter, transformer, and recycling relay. The temperature or pressure control is of the floating type. This means that any time the control is dissatisfied, its floating contact will move either to one side or the other causing the Unimatic to run in a direction to call for more compressor capacity, or in the opposite direction to call for less compressor capacity. When the temperature or

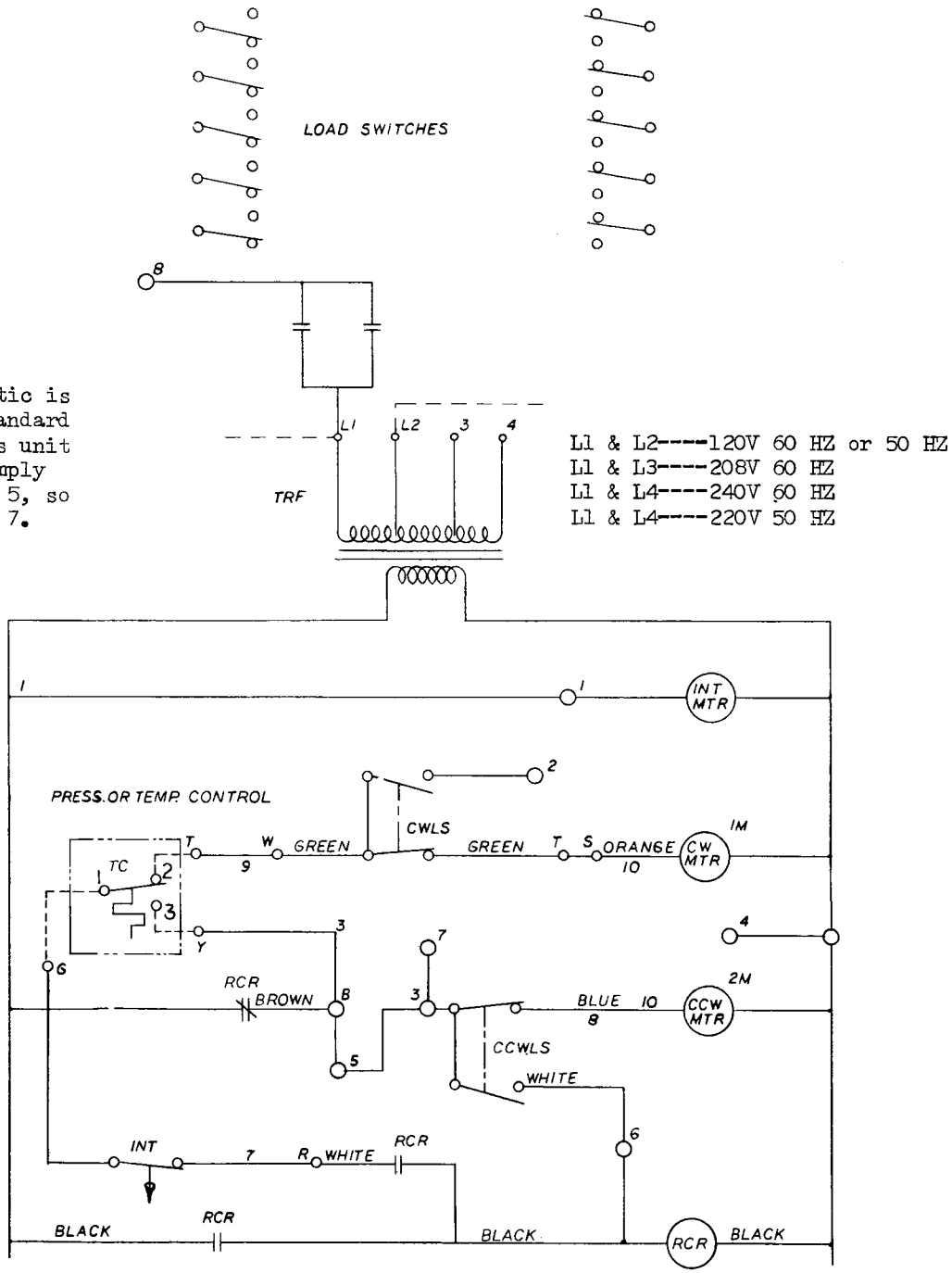


1 SNAP SWITCHES ARE NUMBERED AS FOLLOWS: TOP ROW 1,3,5 ETC. FROM RIGHT TO LEFT, BOTTOM ROW 2,4,6 ETC. FROM RIGHT TO LEFT.

TYPICAL MOTORIZED SEQUENCE CONTROLLER ASSEMBLY
PROPORTIONAL CONTROL MODEL
FIGURE 2

NOTE:

The 10 step Unimatic is factory wired as a standard unit. To convert this unit into a master unit simply reconnect jumper 3 to 5, so that it connects 3 to 7.



KEY

CCWLS----Counterclockwise Limit Switch	INT------Interupter
CCWMTR---Counterclockwise Motor	INTMTR---Interupter Motor
CWLS-----Clockwise Limit Switch	RCR------Recycling Relay
CWMTR----Clockwise Motor	TC-------Temperature Control
	TRF------Transformer

Note: Diagram applies to standard 5 or 10 step controller.

TYPICAL SCHEMATIC DIAGRAM-FLOATING CONTROL UNIMATIC
FIGURE 3

Floating Control (Cont'd)

pressure control is satisfied, the floating contact will be in the center between the two stationary contacts and the Unimatic will be at rest.

When the pressure or temperature at the control rises, indicating a call for more capacity, the floating contact on the control ("TC") moves to the "TC2" stationary contact. This closes the circuit through Terminal "TC1" and then through the normally closed contact of limit switch "CWLS" to the motor "1M". Motor "1M" turns in a clockwise direction. With the Unimatic in the minimum load position (full counter clockwise position) the load switches are made from the common terminal to the normally closed terminal. The normal or no load position of the load switches is with the switch lever released. As the motor turns in the clockwise direction, as viewed from the motor end, facing the cam position indicator, the cams are set to push the micro-switch lever up towards the switch. This activates the selected switch causing the compressor to start or the unloader solenoids to be de-energized, loading the compressor. When applying the Vilter Unimatic control to compressors of a make other than Vilter, it may be necessary to connect the unloader solenoids to the "N.O." contact of the load switch. The motor "1M" will continue to drive in this clockwise direction, until either the control has been satisfied and the floating contact once again moves away from stationary contact "2" or until the motor has made its full travel, and opens its limit switch "CWLS" breaking the circuit. Conversely, if the temperature or the pressure at the control "TC" drops below the setting, the floating contact moves toward Terminal "TC3". This closes the circuit through Terminal "TC3" on the Unimatic through the normally closed limit switch "CCWLS" energizing motor "2M". As the motor "2M" turns in the counter clockwise direction, the cams will release the switch levers, allowing it to move away from the load switch, deactivating it. The contacts then revert to the normal or no load position. This energizes the unloader solenoid valves causing the compressor to have less capacity or opens the circuit stopping the compressor. The motor "2M" will continue driving in the counter clockwise direction until the pressure or temperature at the control is satisfied and the floating contact moves into the floating position or until it is stopped by its end switch "CCWLS".

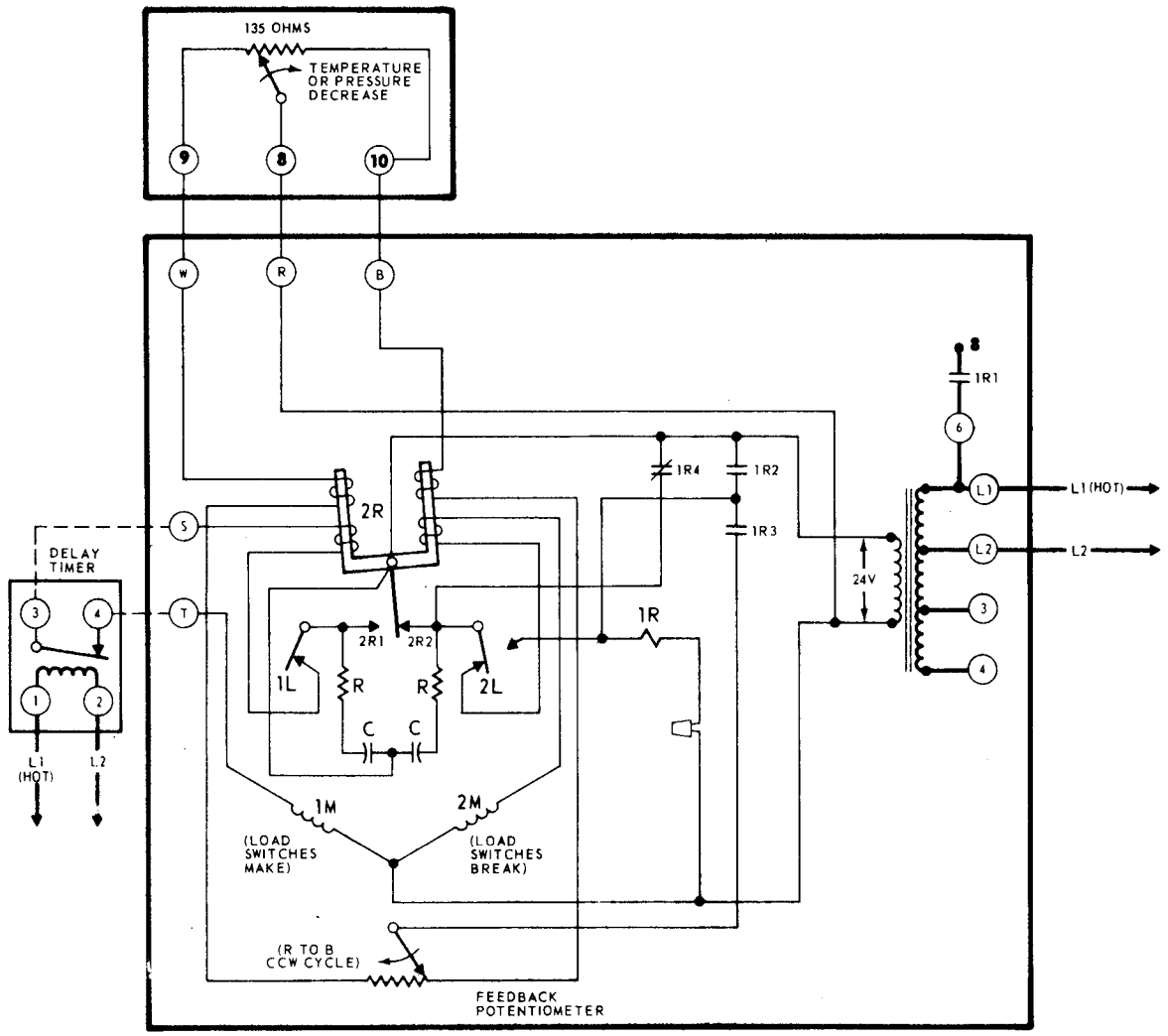
Proportional Control

The schematic ladder diagram shown in Figure 4 shows the internal wiring of the standard Proportional Control Unimatic. The diagram shows the Unimatic including the load switches, travel limit switches, interrupter, transformer, recycling relay, and balancing relay. The additional parts used on the proportional model include the feedback potentiometer and balancing relay. This type of control is different from the floating type in that for each pressure or temperature there is a definite position for the Unimatic. That is to say with a pressure control having a throttling range of 5 Lb. and a Unimatic travel of 160° for a 1 Lb. rise above setpoint the Unimatic will move in the load direction (1/5) x (160°) = 32°. For a $2\frac{1}{2}$ Lb. rise the Unimatic will be at 80°. And finally for a 5 Lb. rise will be at 160° or fully loaded. This type of control does not attempt to bring the pressure or temperature back to the setpoint but keeps the control variable (pressure or temperature) within the throttling range limits. The amount of deviation from setpoint is called "offset". This is an inherent disadvantage of proportional control however there are many systems that proportional control would be a better selection than floating control.

General Operating Characteristics - Both Controllers

All Unimatic control systems include an interrupter cycle timer. The interrupter is included so that the cycle time may be lengthened to meet varying load conditions. The interrupter makes one rotation every 15 seconds. The power circuit for the motors "1M" and "2M" is wired through the normally open contact on the interrupter. By opening the cams wide, the interrupter will open the circuit 50% of the time. With this setting the length of the operating cycle for full travel would be 3 minutes for the standard 90 second motor. For even longer cycles the wire on the interrupter would have to be moved from the normally open to the normally closed contact. This would allow a time cycle as long as 1/2 hour with the cams in the almost closed position. The interrupter is utilized to balance the speed at which the Unimatic will take corrective action with the rate at which the load on the plant changes necessitating this corrective action.

A recycling relay is included on the Unimatic for the purpose of causing the entire system to recycle to the completely unloaded, or minimum capacity position before restarting. This is particularly advantagious in the event of a power failure. Normally, on the resumption of power, all controls would be calling for full load and if there were multiple compressors on the job, this would mean that they would start simultaneously. However, with Unimatic and its integral recycling relay, this can not happen. When the power is interrupted to the system, the recycling relay is de-energized and its power contacts between terminals "L1 and 8" are opened. On resumption of power, motor "2M" (counter clockwise motor) is connected across the transformer and is forced to drive to the minimum load position. When it reaches this position, its end switch "CCWLS" is closed energizing the coil on the recycling relay. As soon as the coil on recycling relay is energized, the control on Unimatic is once again returned to the pressure or temperature controller. The



KEY

C -0.1 MFD CAPACITORS
1L -CW LIMIT SWITCH
2L -CCW LIMIT SWITCH
1M -CW MOTOR WINDING
2M -CCW MOTOR WINDING
R -150 OHM RESISTORS
1R -RECYCLE RELAY
2R -BALANCE RELAY

Note: Diagram applies to standard 5 or 10 step controller.

TYPICAL SCHEMATIC DIAGRAM-PROPORTIONAL CONTROL UNIMATIC
FIGURE 4

General Operating Characteristics - Both Controllers (Cont'd)

power contacts between terminals "L1 and 8" are also closed. The pressure or temperature control will then position the Unimatic to give whatever capacity is needed to balance the load. In order to cause a recycling to be carried out at the maximum speed of the Unimatic, the interrupter is bypassed while the Unimatic is recycling. To take advantage of this recycling feature after a power failure, the automatic sides of the compressor "Hand-Off-Auto" selector switches must be connected through the recycling relay contacts between "L1 and terminal 8".

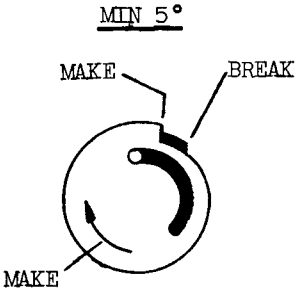
SETTING AND ADJUSTING SEQUENCE CONTROLLER

General Description

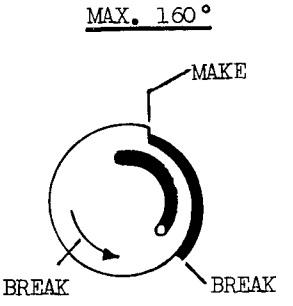
The load switches on the Motorized Sequence Control can be set to operate at any point within the 160° angular rotation of the shaft. The limit switches "CWLS" and "CCWLS" are adjusted to limit the shaft rotation to 160 angular degrees. Limit switch "CWLS" will open the circuit to motor "1M" to stop the clockwise rotation as a call for more capacity is required. Limit switch "CCWLS" will stop the counter clockwise rotation as less capacity is called for by opening the circuit to motor "2M".

A cam position indicator is provided to show the relative rotation of the shaft. The angular rotation is indicated from 0 to 160°. The full counter clockwise rotation at which "CWLS" opens is 0°; this is minimum load. The full clockwise rotation at which "CWLS" opens is 160°; this is maximum load. All switch settings and differentials are given in degrees as indicated by the cam position indicator.

The load switches may be set with a differential of from 5° to 160° maximum. The differential between the make or break points of any two load switches must not be less than 5°. This is so no more than one switch operates at a time to prevent overloading the motor.



CAM SET AT MINIMUM POSITION
FIGURE 5

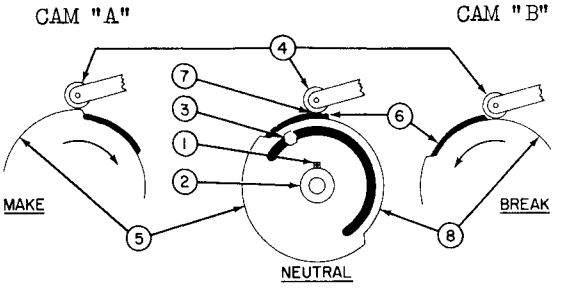


CAM SET AT MAXIMUM POSITION
FIGURE 6

The differential between the make and break point of each switch may be set from 5° minimum to 160° maximum, corresponding to the full cam shaft rotation. Figure 5 shows a 5° differential setting and Figure 6 shows a 160° setting. See Figure 7, on a call for more capacity the leading edge of cam "A" will trip the selected load switch. On a call for less capacity the Unimatic motor will reverse the rotation of the cams. The load switch will remain tripped in the on position until the switch roller drops off cam "B".

Due to the foregoing arrangement, compressor start circuits are connected to "N.O." contacts, as they close when the Unimatic turns clockwise. Unloader valves are connected to "N.C." contacts, because they are open in the clockwise direction.

Figure 7 shows the cams opened wide for a maximum of 99° differential. On a call for more capacity, cam "A" will rotate the toggle to depress the switch lever. On a call for less capacity, cam "B" will rotate the toggle to release the switch lever. With the foregoing arrangement, on a call for more capacity, the single pole double throw load switches are closed from "C." to "N.O.". This action starts the compressors and de-energizes the capacity control solenoid valves. For this reason, compressor starter circuits are connected to the "N.O." terminals and unloader valves to "N.C." terminals.



CAMS SET AT MAXIMUM 99° DIFFERENTIAL POSITIONS
FIGURE 7

General Description (Cont'd)

Before attempting to adjust the cams, the proper settings for the desired sequence of starting, loading, unloading and stopping should be determined. To aid in this step, a cam chart should be used. Two typical charts are shown in Figures 8 and 9. Both are set up for 3 compressors, each having two steps of capacity reduction, for a total of nine steps. See Example 1 - Figure 8. The switches are adjusted so the sequences on a call for more capacity is as follows:

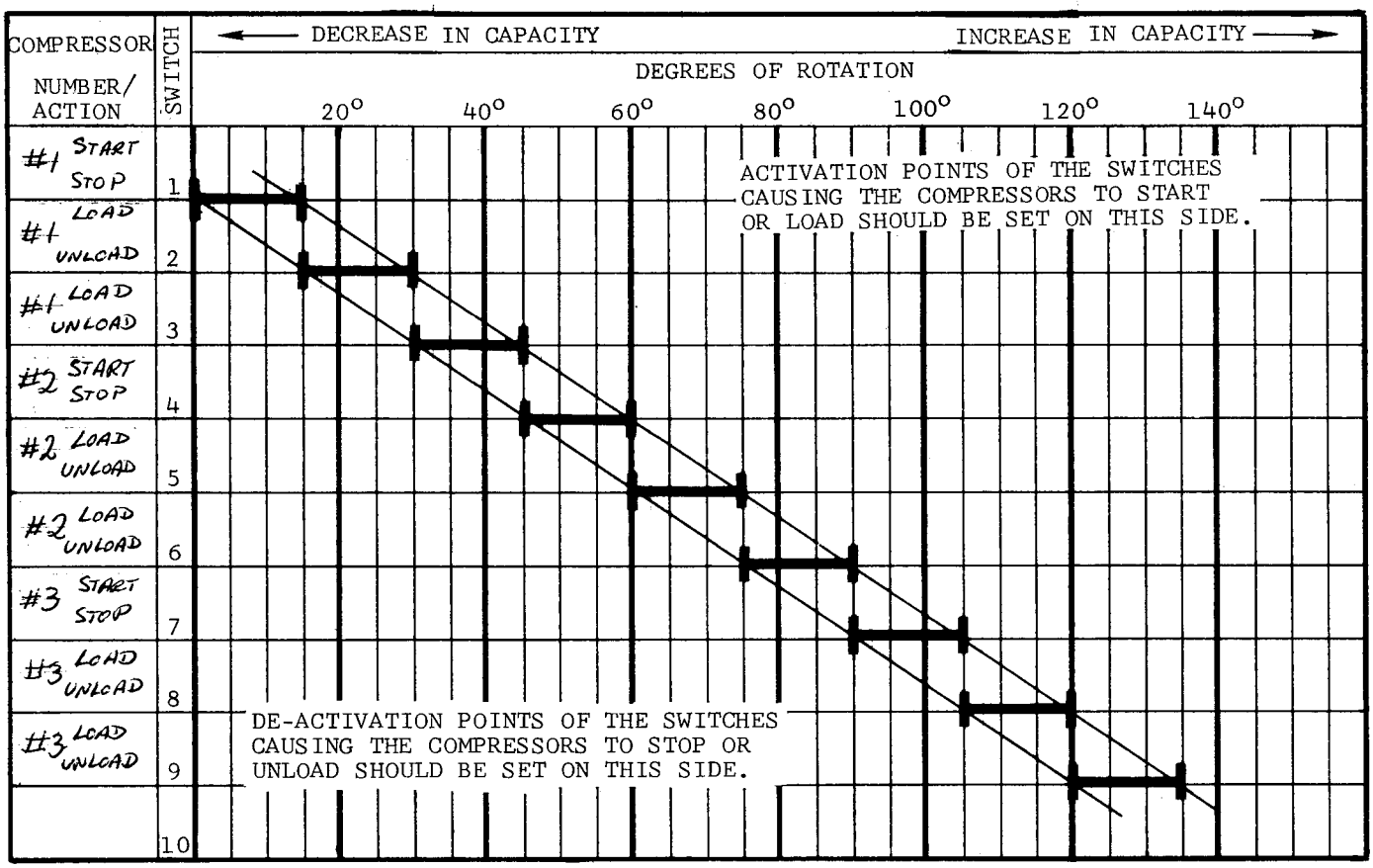
Start No. 1, Load No. 1, Load No. 1, Start No. 2, Load No. 2, Load No. 2, Start No. 3, Load No. 3, Load No. 3.

On a call for less capacity, the sequence is reversed:

No. 3 Unloads, No. 3 Unloads, No. 3 Stops,
No. 2 Unloads, No. 2 Unloads, No. 2 Stops,
No. 1 Unloads, No. 1 Unloads, No. 1 Stops.

From this chart, it can be seen that the starting or loading points are on the right side of the chart and the stopping or unloading points are on the left side. The switch differential can be set at the 5° minimum.

UNIMATIC CONTROL SYSTEM CAM SEQUENCE CHART



TYPICAL COMPLETED CAM CHART - EXAMPLE 1
FIGURE 8

General Description (Cont'd)

Figure 9 (Example 2) shows a different chart for the same compressors with an overlapping sequence. The starting and loading sequence on a call for more cooling is the same as the first one; however, the stopping or unloading sequence on a call for less has been altered as follows:

No. 3 Unloads, No. 3 Unloads, No. 2 Unloads, No. 2 Unloads, Stop No. 3, No. 1 Unloads, No. 1 Unloads, Stop No. 2, Stop No. 1.

In the first example, if the load should be such that the load requirements fell between Switch 3 and Switch 4, the second compressor would short cycle to hold the load. In the second example, the second compressor would stay running while the first machine would unload. If the load increased, the first compressor would load again before the second compressor.

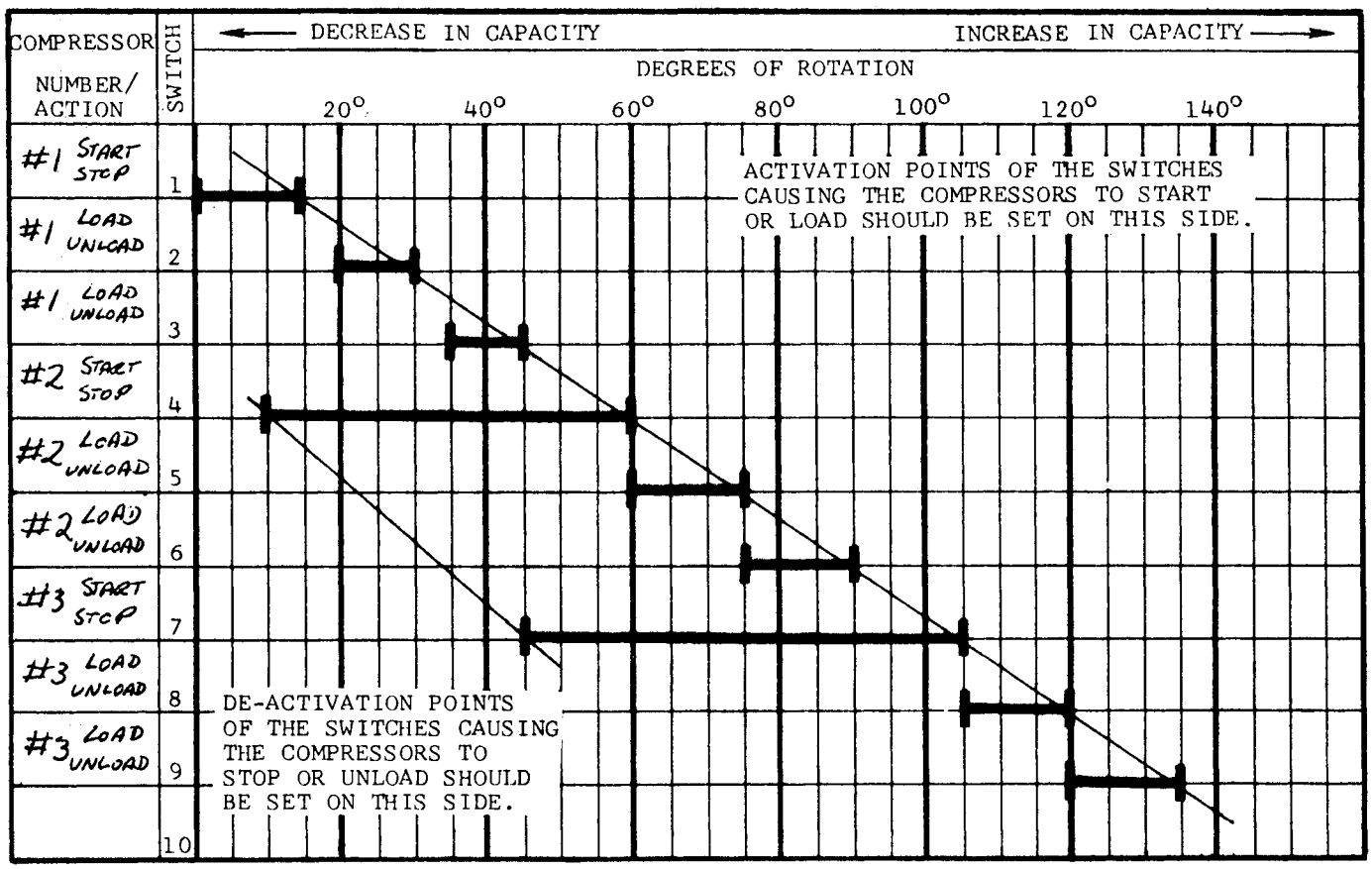
As starting and stopping compressors repeatedly causes more wear than continuous operation, the overlapping sequence is generally preferred. Local conditions, such as plant load, power company requirements and personal preferences will dictate the final sequence. The two methods shown are examples of what can be done with this versatile control.

A blank cam chart is included in the back of this book for use in arriving at proper sequence. When setting up the sequence, remember that the activating or deactivating points between two switches should be kept at least 8° apart and that the minimum switch differential is 5°.

The full 160° of travel of the Motorized Sequence Controller should be used when setting up the switches. If it is desired to use less than 160°, the end switch "CWLS" will have to be reset to stop the rotation at some point less than 160°.

When comparing Figures 8 and 9 it can be seen that if the overlapping sequence is used, the first switch should be activated at about 24°. Anything less than this will result in difficulties in trying to get a smooth sequence.

UNIMATIC CONTROL SYSTEM CAM SEQUENCE CHART



TYPICAL COMPLETED CAM CHART - EXAMPLE 2
FIGURE 9

Cam Adjustment

Listed below is the terminology used for describing the switch action.

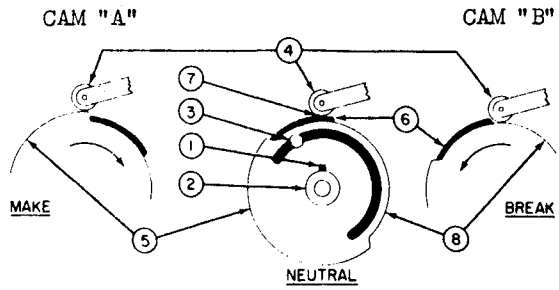
Activation Point: The point at which the switch performs its function on a call for more capacity, closing to start a compressor, or opening to load a compressor.

De-Activation Point: The point at which the switch performs its function on a call for less capacity, opening to stop a compressor, or closing to unload a compressor.

Switch Differential: The differential in degrees between the activation and de-activation points of the switch.

These Step Controllers are shipped from the factory with all switches in the open or break position. The cam position indicator is completely "ccw" as viewed from the motor end of the controller. (All references to direction are as viewed from the motor or dial end of the controller.) To adjust operating points and differentials, see Figures 5, 6, 7 and 10.

NOTE: If all switches are to be set, the simplest method is to adjust all operating points in one direction of motor drive first. Then reverse the motor direction and adjust the switch differentials. Operating points are the "make" points of the load switches. Release points are the "break" points of the load switches. Use the cam position indicator as an approximate indicator for adjustments (angular displacement scale is mounted on the cam position indicator back plate).



KEY

Item	Description	Item	Description
1	Setscrew	5	Cam (Make Surface)
2	Bushing	6	Cam, Differential
3	Screw, Hexagon	7	Roller
4	Roller Assembly	8	Cam (Break Surface)

CAM ADJUSTING DIAGRAM
FIGURE 10

TOOLS NEEDED: A. For setscrews - 1/16 inch hexagon key.
B. For hexagon screws - 3/16 inch open-end wrench.
C. For operation - jumper wire with clips.

(1.) Loosen all the setscrews, item 1, in the bushings, item 2, and the hexagon screws, item 3, in the cams. If the setscrews are not accessible from the top of the unit, operate the motor to rotate the cams and bushings. Short terminal "G" and "Y" for "ccw" rotation and terminals "G" and "T" for "cw" rotation.

(2.) Apply power to the motor. Remove the power and then restore power. This allows the recycle feature to return the motor to the start position. Jumper terminals "G" and "T" to run the motor cam-shaft to the desired position for operating the first switch. Stop the motor in this position by removing the "R-W" jumper. This position may be an angular setting (use the cam position indicator as an approximate indicator), or a time interval. For instance, 160 angular degrees of rotation takes approximately 1-1/2 minutes or 15 seconds, depending on which model you are adjusting. If five stages are evenly divided on a 1-1/2 minute unit, each stage would be set to operate at 18 seconds.

(3.) Starting with the first switch, turn the cam, item 5, "cw", until the switch "makes". Example: depress the lever of the roller assembly, item 4, toward the switch body, you should hear an audible "click". This action should occur as the roller moves up the cam rise to high cam level. This is the operating point, lock the setscrew, item 1, in the bushing, item 2. Set the operating point of each of the other switches as mentioned above.

(4.) Set the switch differential by reversing the motor (short terminals "G" and "Y") and running it to the desired "break" point. Stop the motor at this point by removing the "G-Y" short. Start with the last switch first and progress to switch number one.

(a) Move the differential cam, item 6, "cw" so the roller is on the high part of the cam item 6. Make certain that the switch is in the "make" position (manually lift the roller assembly to "make" switch). Reverse the differential cam, item 6, "ccw" until the roller drops to the low level of the cam, item 8, at this point the switch should "break".

(b) Lock the hexagon screw.

Cam Adjustment (Cont'd)

(5.) After completing the above operations (adjustment of the "make" and "break" points), momentarily remove the power to the unit, allowing the recycle feature to run the Step Controller to the start position. Short "G" and "T" to run the controller "cw" through the "make" of each switch. Reverse the motor, short "G" to "Y", and run the controller "ccw" through the "break" of each switch. This verifies the switching sequence and insures proper operation.

MASTER AND AUXILIARY UNITS (FLOATING CONTROL ONLY)

As previously stated, the standard units are available in 5 or 10 steps. In order to control installations with more than 10 steps of capacity, master and auxiliary Unimatic can be combined to furnish up to 30 steps of control. Theoretically we can go higher than 30 steps. However, for practical purposes, a limit has been set at 30 steps as it is doubtful whether many systems would have more than this number of steps of capacity. Auxiliary Unimatics are available in 5 or 10 step models. A master and one or more auxiliary units must always be combined in order to furnish more than 10 steps.

The master Unimatic has mounted on it the load switches, recycling relay, transformer, interrupter, terminal strip, and the clockwise and counterclockwise motors. The auxiliary Unimatic has mounted on it the load switches, terminal strip and motors. The master and auxiliary units have separate bases.

The operation for the master and auxiliary Unimatics is the same as for the standard. On a call for an increase in capacity, the motor "1M" will rotate the master Unimatic through all 10 steps, activating the load switches. The end switch "CWLS" will then reverse its contacts, stopping motor "1M" and transfer control to the auxiliary Unimatic. Motor "1M" on the auxiliary will then rotate through its required steps. At the end of its travel, the limit switch "CWLS" will open its contacts stopping the motor. If two auxiliary Unimatics are used, the second one will go through the same cycle.

On a call for less capacity, the motor "2M" on the auxiliary Unimatic will rotate through its required range until it is stopped by its limit switch "CCWLS". The limit switch then transfers the circuit back to the master Unimatic. The motor of the master Unimatic then rotates back through its sequence, de-activating the load switches, until stopped by its limit switch "CCWLS". On a recycle, the action is exactly the same as for the standard units. If everything is calling for full load and there is a power interruption or a cause for recycle, the compressor will shut off. When power is restored the compressors will not start-up until the auxiliary and master units have returned to their home positions. The Unimatic will immediately recycle and start-up the compressors in sequence.

The electrical connections are made from one unit to the other. External jumper on master terminal strip must be moved from 3 to 5 and connected 3 to 7 for auxiliary operation. Please refer to Figures 11 and 12 for details.

As with the standard units, a cam chart should be used to set up the sequence of the switching. After the cam switches of the master controller are used, the switches on the auxiliary controller should be set so that the same percentage progression, as used on the master, is kept. That is, if there is approximately 16° between the making of

TABLE 1. TYPICAL SYSTEM OPERATION

Condition	Effect
A. Control system de-energized.	1. All load stages de-energized. 2. Load contacts open in recycle relay.
B. Control system energized after power interruption.	1. Camshaft rotates "ccw" until all step switches are open. 2. Load contacts close in recycle relay. 3. Camshaft rotates "cw" to position called for by primary controller closing required step switches and energizing corresponding load stages.
C. Control system energized and operating through step controller.	1. Load switches energize load stages according to requirements of primary controller or panel. 2. Delay timer (if used) slows down camshaft rotation on the "ccw" and "cw" cycle but allows camshaft to rotate "ccw" at full motor timing when recycling. Dampening action of delay timer provides smooth system operation and prevents short cycling of individual load stages.

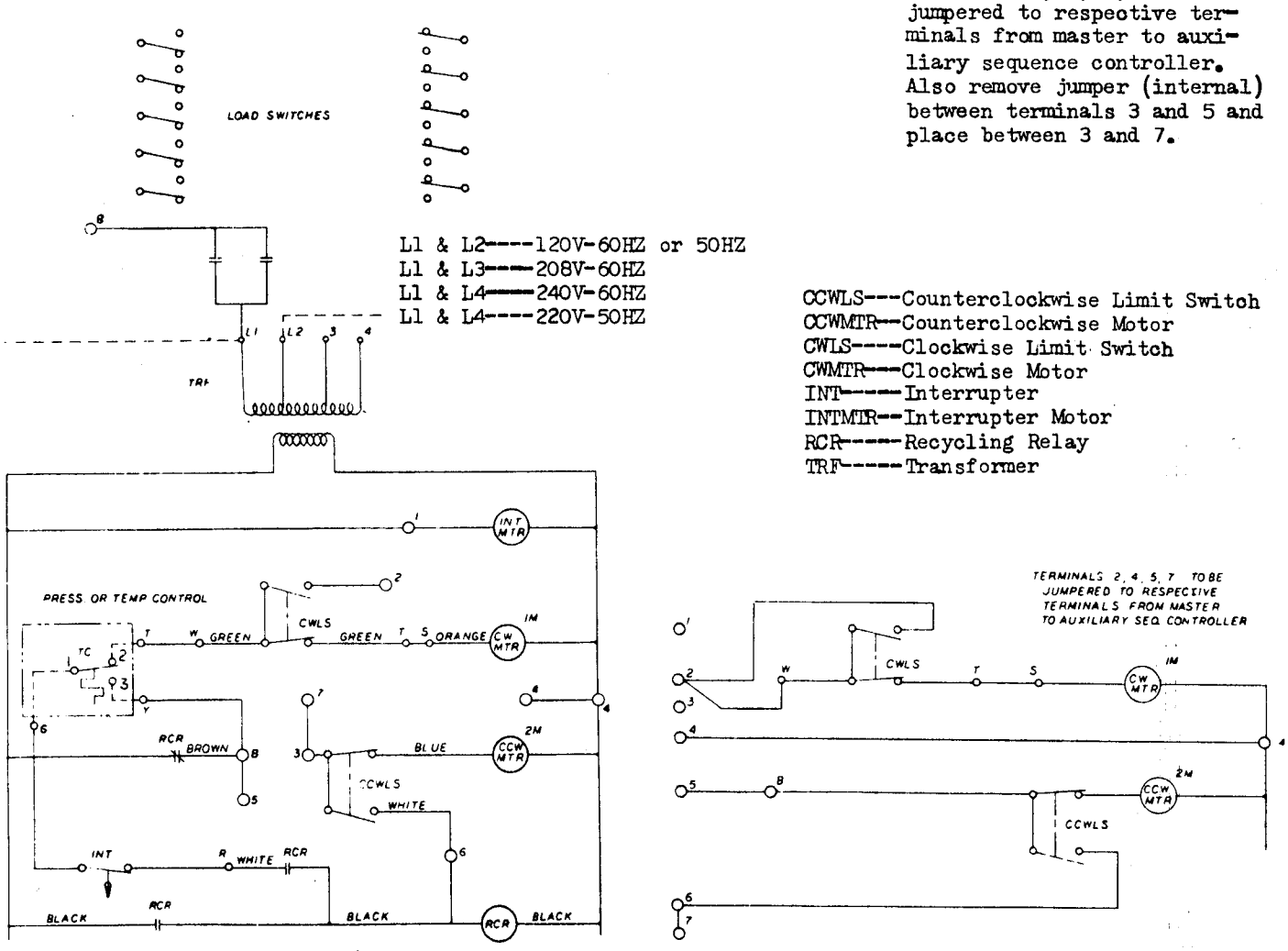
MASTER AND AUXILIARY UNITS (FLOATING CONTROL ONLY) (Cont'd)

each of the switches on the master control, there should be 16° between the making of each of the switches on the auxiliary control. This will insure a smooth operating system. When this procedure is followed, there will be times when only a small percentage of the total rotation of the auxiliary unit will be used if only three load switches are used out of 5 or 10. If this happens, the end switch "CWLS" on the auxiliary unit should be adjusted to stop the rotation of the clockwise motor approximately 8° after the last switch is activated. If this is not done, a dead spot in the control will exist.

If the controller keeps calling for more capacity after the last capacity step is activated, the Unimatic will keep on rotating even though there are no more capacity steps. On a call for less capacity, the Unimatic will then rotate back through this dead area once again before the last capacity step is reached. Figure 13 is the ladder diagram for the Unimatic controller and refrigeration system which includes two compressors with 3 steps of capacity reduction per compressor.

* * *

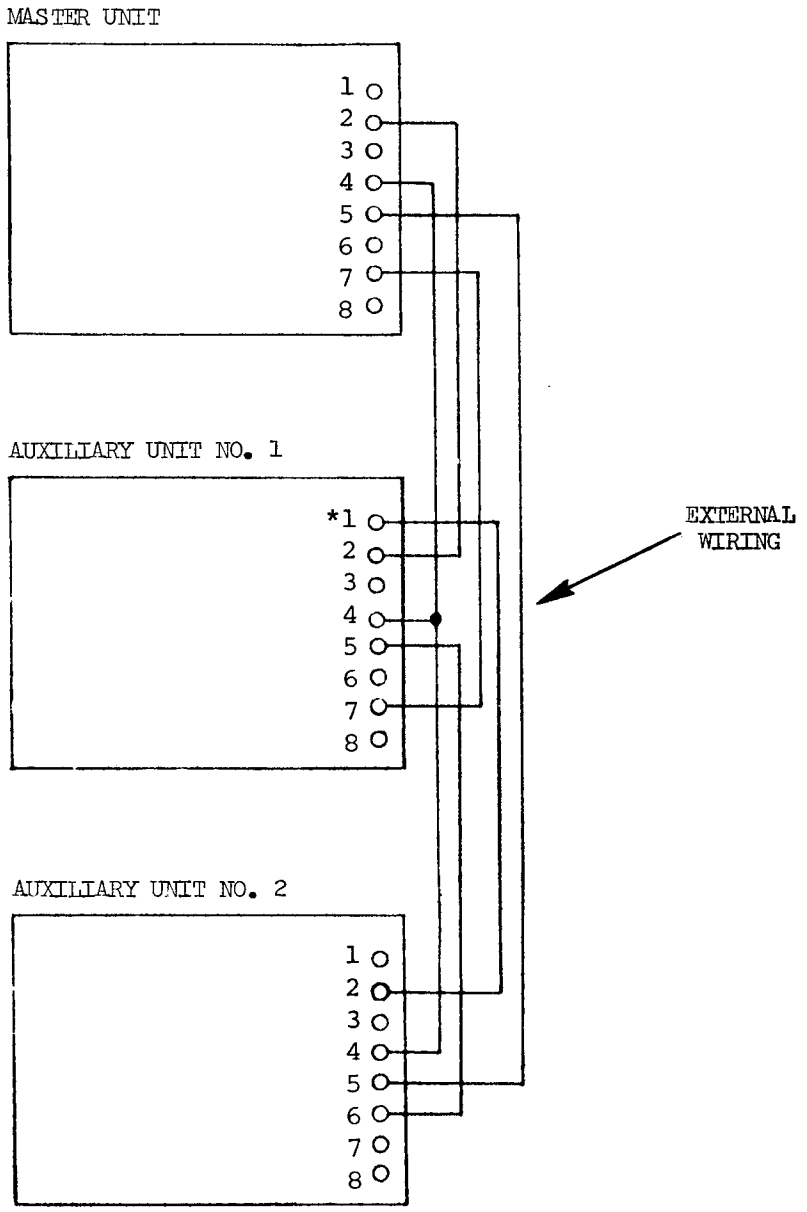
NOTE:
Terminals 2, 4, 5, 7 to be jumpered to respective terminals from master to auxiliary sequence controller. Also remove jumper (internal) between terminals 3 and 5 and place between 3 and 7.



Master Unit

Auxiliary Unit

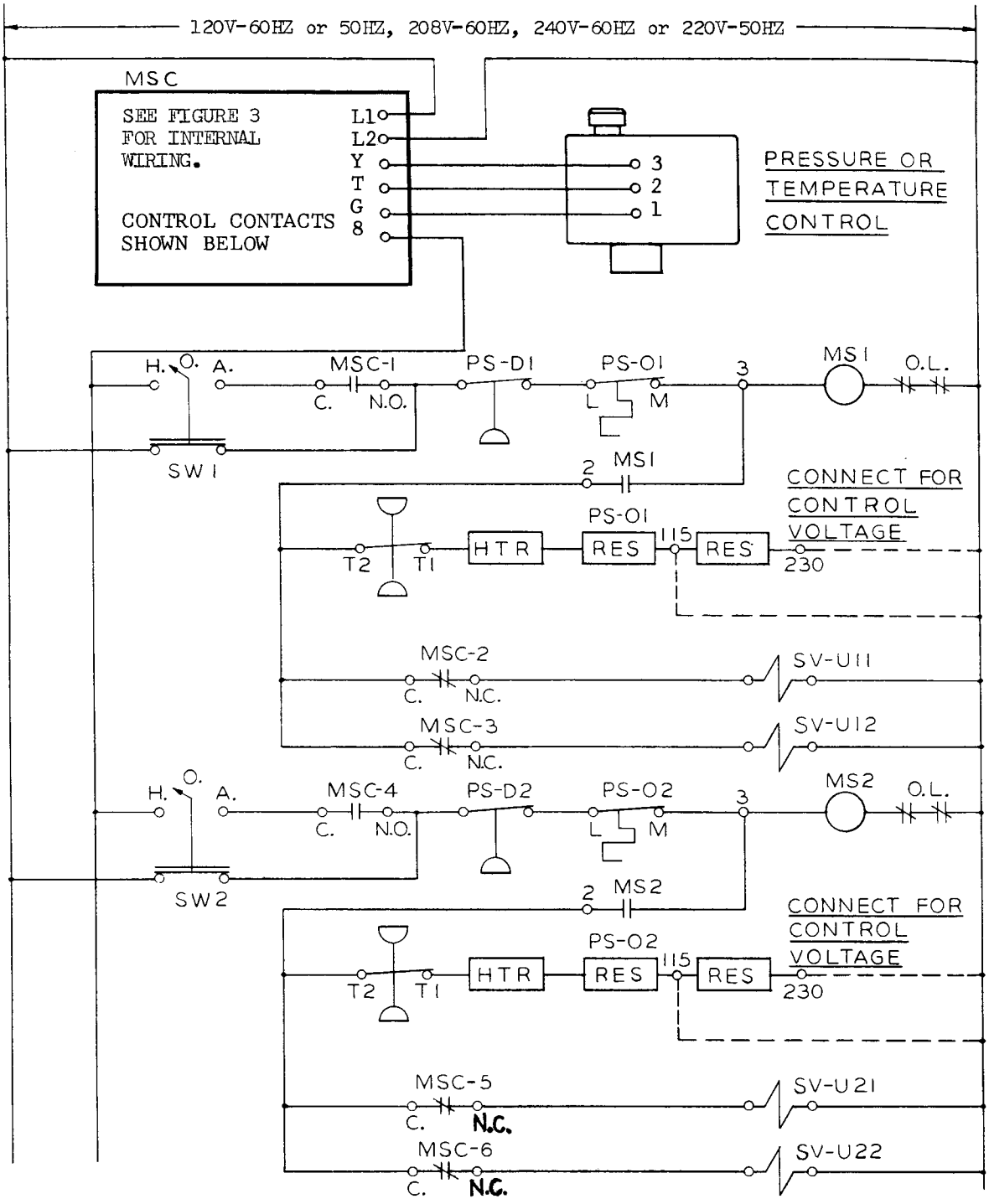
MASTER AND AUXILIARY FLOATING CONTROL UNIMATIC
TYPICAL SCHEMATIC INTERNAL WIRING DIAGRAMS
FIGURE 11



*NOTE

Please refer to Auxiliary Unit internal wiring diagram Figure 11, Page 12. Internal wiring in auxiliary unit No. "1" must be changed by removing internal wire on terminal No. "2" which comes from the "N.O." contact on "CWLS" and place this wire on terminal No. "1" which is not used.

MASTER AND AUXILIARY FLOATING CONTROL UNIMATIC
TYPICAL SCHEMATIC EXTERNAL WIRING DIAGRAM
FIGURE 12



KEY

MS-----Magnetic Starter	PS-D----Dual Pressure Switch
MSC----Motorized Sequence Controller	PS-O----Oil Pressure Switch
OL-----Overload	SV-U----Unloader Solenoid Valve
	SW-----"Hand-Off-Auto" Switch

TYPICAL SYSTEM USING FLOATING CONTROL
SCHEMATIC WIRING DIAGRAM
FIGURE 13

UNIMATIC CONTROL SYSTEM CAM SEQUENCE CHART

COMPRESSOR NUMBER/ ACTION	SWITCH	← DECREASE IN CAPACITY — INCREASE IN CAPACITY → DEGREES OF ROTATION 20° 40° 60° 80° 100° 120° 140°
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

UNIMATIC CONTROL SYSTEM CAM SEQUENCE CHART

COMPRESSOR NUMBER/ ACTION	SWITCH	← DECREASE IN CAPACITY — INCREASE IN CAPACITY → DEGREES OF ROTATION 20° 40° 60° 80° 100° 120° 140°
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

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