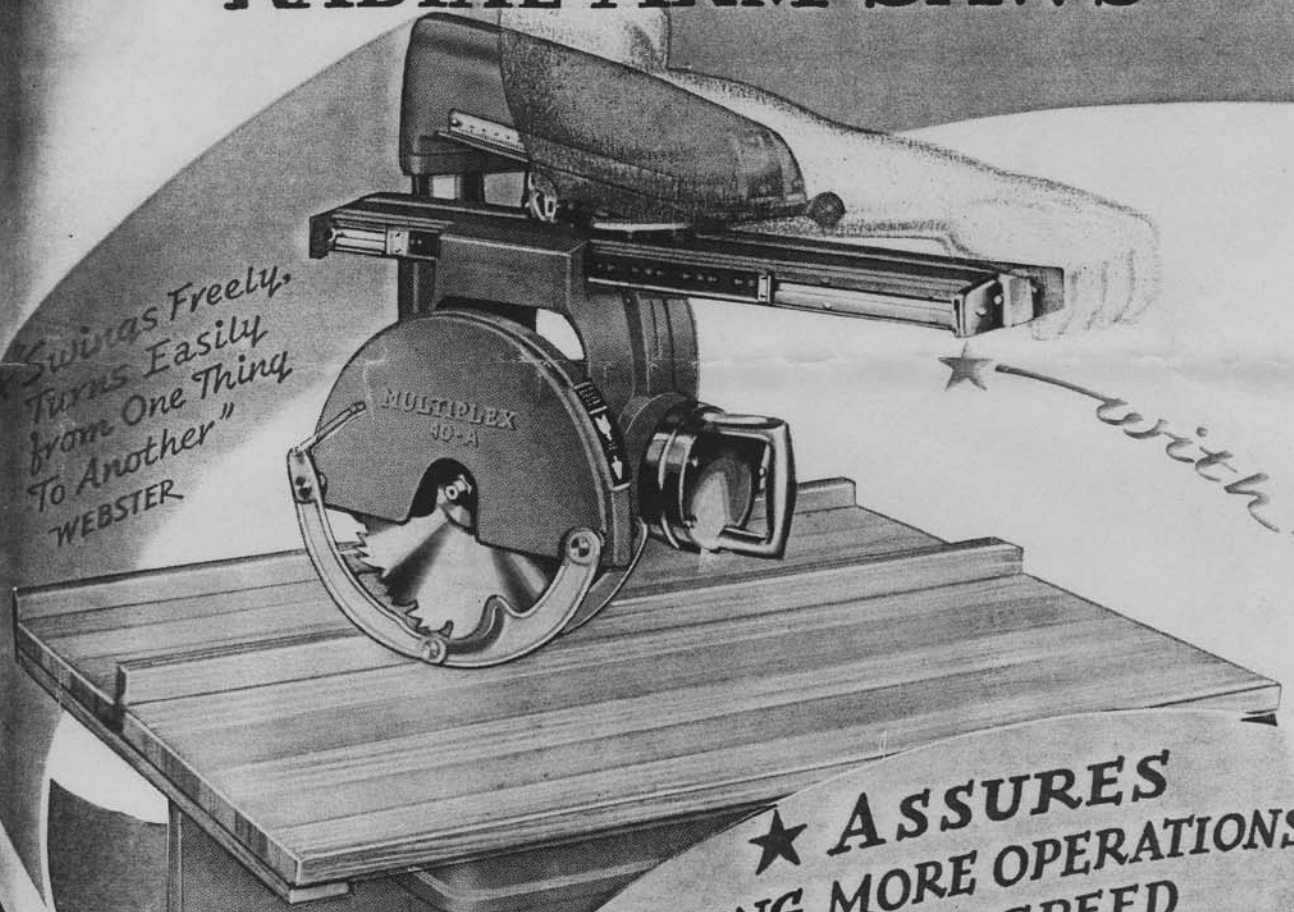
ODELS
A & 40A

MULTIPLEX

The ADVANCED RADIAL ARM SAWS

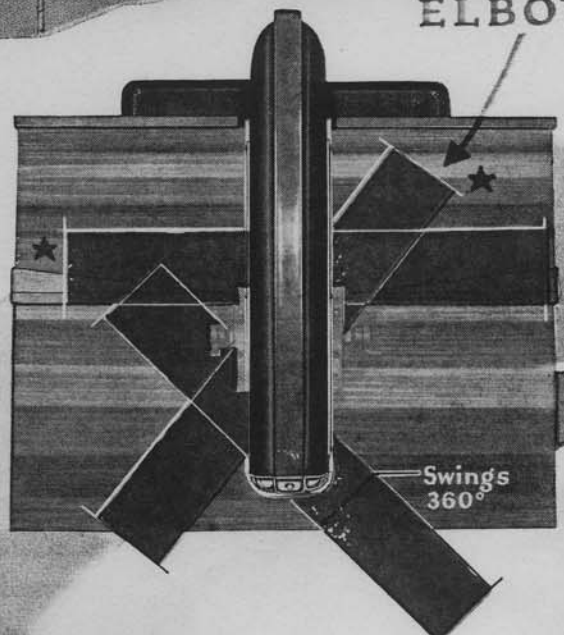


"Swivels Freely, Turns Easily from One Thing To Another" WEBSTER

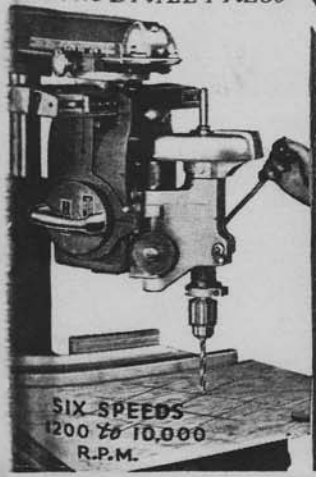
★ with the

★ ASSURES HANDLING MORE OPERATIONS WITH GREATER SPEED AND INCREASED SAVINGS

EXCLUSIVE ★ VERSATILE ELBOW



TIONAL
ONVERSION—
★ VERSATILE
ial Arm DRILL PRESS



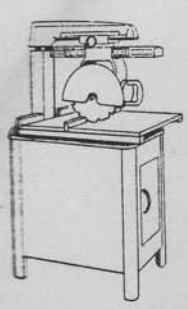
ELECTRICAL INSTALLATION INSTRUCTIONS

Pertaining to

MULTIPLEX RADIAL ARM SAWS

Models - 30A - 40A - 50A and B60

EQUIPPED WITH SINGLE-PHASE MOTORS



According to past experience we find that 95% of all reported cases of poor performance are due directly or indirectly to improper installation of the equipment. We therefore offer the following suggestions and specific information in order that you may be certain of obtaining satisfactory performance.

It is absolutely essential that ADEQUATE VOLTAGE be available to a motor when it is under load so that the motor can deliver its full power to the saw. This means that all lines and cables must be large enough so that the voltage drop, due to the flow of current when the motor is under load, will remain within acceptable limits. Voltage check should be made both with motor off and with motor running under load.

The voltage, when checked at the cable connector plug near the motor while the motor is running and sawing wood at its maximum capacity, should not drop more than 5 volts below normal. This test should be made on every installation and heavier lines installed if the tests indicate a voltage drop of more than 5 volts. Saws should not be expected to operate on voltages varying more than ± 10% of nominal 115 and 230 volts when under load.

All installations should be made under competent supervision and in accordance with local regulations governing such installations. This installation should be made and checked by a registered electrician.

The following table lists the recommended sizes of wire for use with the various single-phase motors used on Multiplex Saws:

RECOMMENDED SIZE OF WIRE

MOTOR H.P.	PHASE	LINE VOLTAGE	*TOTAL LENGTH OF LINES (in feet) 15	30	60	100	125	150
	1	115	14	14	14	12	10	10
3/4	1	230	16	16	14	14	12	12
	1	115	14	12	10	8	8	6
1-1/2	1	230	14	14	14	12	10	10
	1	115	12	10	8	6	6	4
3	1	230	14	12	10	8	8	6

* From motor to service entrance box

The above table has allowed for the high overload these motors will handle.

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3455 VEGA AVE., CLEVELAND 13, OHIO

This allowance for overload is extremely important because it is the man who overloads his machine that needs and must have this protection. Remember that every user of this type of equipment may and usually does overload his motor. The slight additional cost of extra heavy lines and cables is the cheapest form of insurance.

By insisting that installations are made by competent electricians acting under the foregoing instructions and in accordance with your local electrical codes, you will have enabled the motor to produce to its maximum capacity and you will be thoroughly satisfied with its performance.

Our single-phase motors are all furnished for use on either 115 or 230 volt lines. They will work equally well on either voltage providing they are actually getting it when fully loaded. For several reasons it is recommended that 230 volt current be used whenever possible. In most modern residential areas and practically all industrial areas, 230 volt current is available at the service entrance box. Particularly in residential areas, such lines will give a more constant source of power at full voltage coming into the service entrance box and allow the user to obtain the maximum benefit of correctly sized lines installed within the building.

Regardless of the voltage used, it is good practice to install a separate fused circuit direct from the service entrance to the power-driven equipment which gives the opportunity of correctly sizing the line for such equipment without affecting the other circuits.

IN ALL CORRESPONDENCE REGARDING OUR PRODUCTS ALWAYS GIVE MODEL NUMBER, SERIAL NUMBER, AND DATE OF PURCHASE. Your dealer is equipped to handle your inquiries and furnish additional tools for use with your machine. He can help you get the most out of your machine by suggesting new methods and new attachments for your particular problems.

OPERATION AND SERVICE INSTRUCTIONS

In order that you may have a complete understanding of the motors themselves we are enclosing diagrams #3716-1, #3716-2, #3722 and #5741 applicable to the motors as noted thereon. Be sure your electrician has these diagrams at his disposal when servicing your machine.

Attempting to operate this type of motor at abnormally low voltages, due to use of too small a cable, may cause serious damage to the motor. Therefore, we believe a brief review of the theory of operation and a few suggestions are in order which will aid you in detecting such conditions.

In general these motors employ two main windings which furnish the power under normal speeds. These two windings are connected in parallel for 115 volt operation and in series for 230 volt operation. The voltage impressed across each of the two main windings is, therefore, 115 volts regardless of whether the motor is connected to 115 or 230 volt lines.

The torque, or force causing rotation, necessary to start these motors and bring them up to speed is caused by momentarily introducing a third winding into the circuit. This third winding is usually called the phase or starting winding and is used only for a few seconds while the motor is coming up to normal speed. Except in the case of a capacitor start-capacitor run motor (see diagram #5741), this phase winding is not designed to withstand continuous operation, and if left in the circuit any length of time would cause the motor to overheat and possibly short out the entire motor.

In all capacitor start-induction run motors (see diagrams #3722, #3716-1, #3716-2) this phase winding is connected and disconnected automatically either by a centrifugal switch or by a relay, depending upon the design of the motor. Since the operation of the centrifugal switch type can be easily understood by merely examining such a motor, we will confine the discussion to the relay type of starting mechanism. The symptoms indicating improper operation are the same in both cases.

In the relay type of starting circuit, the relay is actuated by the current going to the main windings and, therefore, closes when the motor switch is turned on. When the relay closes it connects the phase or starting winding and the motor starts to turn at a constantly increasing rate of speed. At a predetermined speed (about 2600 RPM) a sufficient voltage is induced in a fourth winding called the exciter winding, which in effect cancels out the original voltage which first caused the relay to close. The relay, therefore, has no further power and the spring tension on the points causes them to open and the phase or starting winding is disconnected. The motor is then close enough to synchronous speed (3600 RPM) so that the two main windings keep the motor running and furnish the power actually used for sawing wood.

A condenser or capacitor is used in the circuit of the starting or phase winding for the purpose of causing this current to be out of phase with respect to the current in the two main windings. This out of phase condition is manifested by the motor's ability to develop torque from a standing start and thereby bring itself up to normal operating speed.

If a motor is operating on subnormal voltage it is very probable that the motor will not develop sufficient torque to bring itself up to speed. The starting winding therefore remains in the circuit and the motor runs quite noisily at about two thirds normal speed and tends to overheat. No power will be available and eventually the Klixon or other overload protecting device will shut off the current. Continued attempts to use the motor under such conditions may result in burned out windings, condenser failure, or both. NEVER OPERATE MOTORS OF THIS TYPE UNDER ANY CONDITIONS RESULTING IN CONTINUOUS USE OF THE STARTING WINDINGS FOR MORE THAN 10 SECONDS.

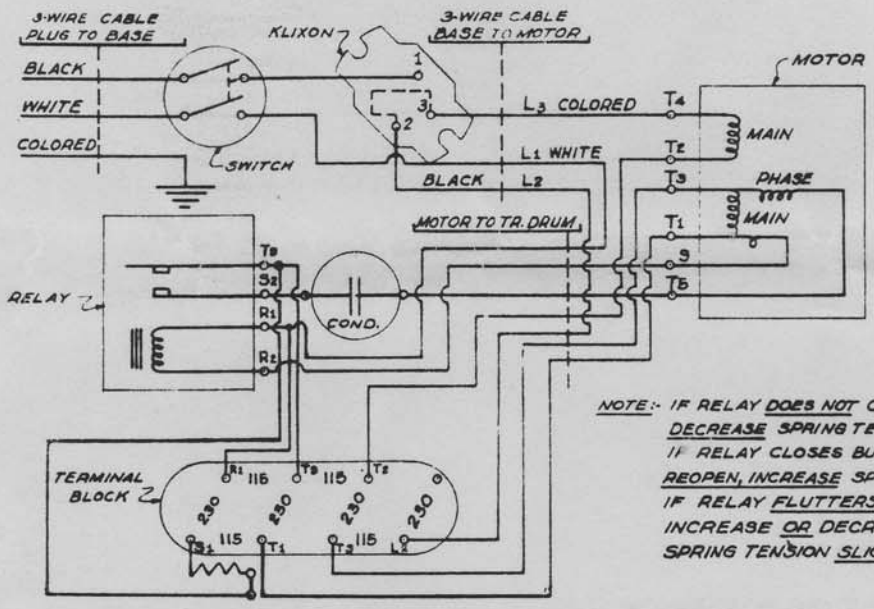
If the motor does get up to speed, runs smoothly, but lacks power, the same condition exists but to a lesser degree. Any attempt to cut wood will result in slowing down the motor to the point where the starting windings are again connected in the circuit. Continued attempts to use the motor may then result in the same ultimate damage to the motor as previously noted.

A motor which gets up to normal speed but runs noisily, overheats and eventually causes the overload protecting device to shut off the motor, is running with the starting windings still in the circuit. Motor may become permanently damaged unless the condition is corrected. See Diagram #3716-1 and #3716-2 for necessary adjustments.

It is unfortunately common practice to always blame the motor for failure to perform satisfactorily. As a result, by the time a qualified person is called in, the motor may have been damaged or disassembled by those who fail to realize the seriousness and prevalence of low voltage conditions which actually were responsible for the poor performance in the first place. Only by correcting the original cause can you expect good performance after repairs are made. Remember, 95% of the original causes for complaints are poor installations and not the fault of the motor. Insist on good installations made by a competent electrician.

Nº 3716-1 SCHEMATIC WIRING DIAGRAM FOR ¾ H.P. & 1½ H.P. SINGLE PHASE 115/230 VOLT CAPACITOR START-INDUCTION RUN MOTORS USING RELAY CIRCUIT. (SERIAL Nº 30A-A100 & UP & 40A-A100 & UP)

NOTE: ON THESE MOTORS THE STARTING SWITCH IS IN THE BASE OF THE MACHINE.



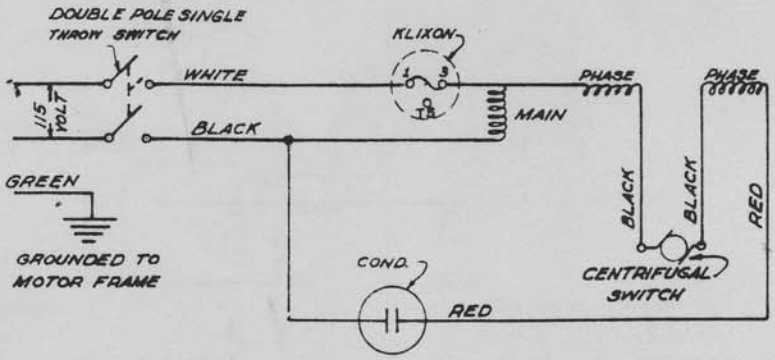
NOTE:- IF RELAY DOES NOT CLOSE, DECREASE SPRING TENSION. IF RELAY CLOSES BUT DOES NOT REOPEN, INCREASE SPRING TENSION IF RELAY FLUTTERS, EITHER INCREASE OR DECREASE SPRING TENSION SLIGHTLY.

PERMANENTLY CONNECTED	115 VOLTS CONNECT	230 VOLTS CONNECT
L1 to R1	R1 & T2 to T9	R1 to S1
L3 to T4	T1 to S1	T2 to T3
S2 to COND.	T3 to L2	T1 to T9
T5 to COND.		
R2 to 9		

WIRE PLUGS AS FOLLOWS:-
GREEN TO GROUND
BLACK TO COPPER
WHITE TO BRASS

Nº 3722 SCHEMATIC WIRING DIAGRAM FOR ¾ H.P. SINGLE PHASE - 115 VOLT CAPACITOR START-INDUCTION RUN MOTORS USING CENTRIFUGAL SWITCH (SERIAL Nº 30A-1 & UP).

NOTE:- ON THESE MOTORS THE STARTING SWITCH IS IN THE TRUNNION DRUM NEAR THE SAW CONTROL HANDLE.



NOTE:- IF CENTRIFUGAL SWITCH FAILS TO OPERATE AND MOTOR WILL NOT START BLOW OUT MOTOR WITH COMPRESSED AIR THRU OPENINGS IN REAR END BELL.

Limits on Fractions + or — .010 Dec. + or — .005 Unless Otherwise Stated

Change Record

CHG.	DATE	BY

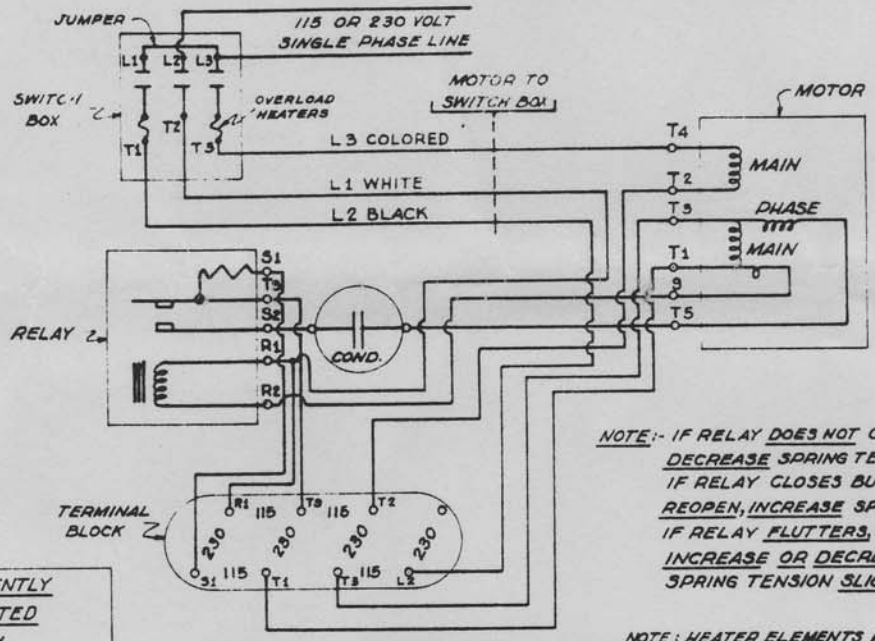
RED STAR PRODUCTS, INC.
CLEVELAND, OHIO

PRODUCT NAME MULTIPLEX
PART NAME SCHEMATIC WIRING DIAGRAMS

SCALE NONE	DWN. BY AK	CHKD. BY	APPVD. BY
DATE ISSUED 8-8-46	DWG. NO. B-3723		

Nº 3716-2 SCHEMATIC WIRING DIAGRAM FOR 3 HP. SINGLE PHASE - 115/230 VOLT CAPACITOR START-INDUCTION RUN MOTORS USING RELAY CIRCUIT (SERIES "AC" OR "MB" SERIAL Nºs).

NOTE: RELAY AND CAPACITOR MOUNTED IN BOX ON TOP OF MOTOR.



NOTE:- IF RELAY DOES NOT CLOSE, DECREASE SPRING TENSION. IF RELAY CLOSES BUT DOES NOT REOPEN, INCREASE SPRING TENSION. IF RELAY FLUTTERS, EITHER INCREASE OR DECREASE SPRING TENSION SLIGHTLY.

PERMANENTLY CONNECTED
L1 to R1
L3 to T4
S2 to COND.
T5 to COND.
R2 to 9
L3 to T3 of SWITCH
L1 to T2 of SWITCH
L2 to T1 of SWITCH

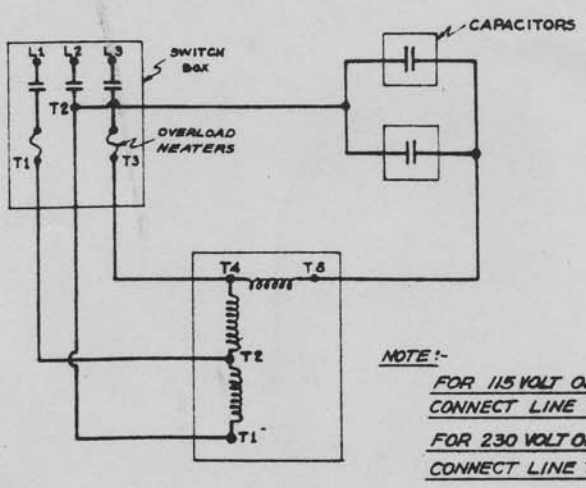
115 VOLTS CONNECT	230 VOLTS CONNECT	WIRE PLUGS AS FOLLOWS
R1 & T2 to T3	R1 to S1	GREEN to GROUND
T1 to S1	T2 to T3	BLACK to COPPER
T3 to L2.	T1 to T3	WHITE to BRASS

NOTE: HEATER ELEMENTS MUST BE SELECTED ON BASIS OF 230 V. OPERATION REGARDLESS OF LINE VOLTAGE.

ALL CHANGES FOR 115 V. OR 230 V. OPERATION MUST BE MADE IN BOX MOUNTED ON TOP OF MOTOR.

Nº 5741 SCHEMATIC WIRING DIAGRAM FOR 3 HP. SINGLE PHASE - 115/230 VOLT CAPACITOR START-CAPACITOR RUN MOTORS. (SERIES "CL"-"CY"-"MY" & "MA" SERIAL NUMBERS.)

NOTE:- CAPACITORS LOCATED IN BOX AT REAR OF MACHINE.



NOTE:-
FOR 115 VOLT OPERATION CONNECT LINE TO L1 & L2
FOR 230 VOLT OPERATION CONNECT LINE TO L2 & L3

Limits on Fractions + or — .010 Dec. + or — .005 Unless Otherwise Stated

Change Record

CHG.	DATE	BY

RED STAR PRODUCTS, INC.
CLEVELAND, OHIO

PRODUCT NAME MULTIPLEX
PART NAME SCHEMATIC WIRING DIAGRAMS-J.H.M.

SCALE	DWN. BY	CHKD. BY	APPVD. BY
NONE	RL		

DATE ISSUED 3-8-46

DWG. NO. B-5742