

MaxPak Plus

ACCESSORY

INSTRUCTION MANUAL E-3852-2

FIELD CURRENT REGULATOR KITS

Model Numbers 23C92-23C95

Wiring Diagram 29931

Assembly Drawing 705394

The equipment described below should be installed only by qualified electrical personnel familiar with the construction and operation of the electrical equipment and the hazards involved.

DESCRIPTION

When powered from the standard MaxPak Plus controller, the d-c motor operates from zero to base speed with constant torque capability. It receives fixed potential shunt field excitation. Speed control is by means of controlled, adjustable armature voltage. Motor operation from the standard MaxPak Plus controller is described in further detail in Section 4 of the MaxPak Plus instruction manual, E-3817. Section 4 of Manual D-3851 provides similar information for regenerative applications.

Motor operation can be extended above base speed by delivering 100% rated voltage to the motor armature and reducing the shunt field strength by "field weakening" - reducing the value of current delivered to the motor shunt field. In this way, the motor may be operated above base speed in a "constant horsepower" mode of operation, in which motor shaft torque capability is inversely proportional to motor speed. When field weakened over a 2:1 range, for example, an 1150 RPM base speed d-c machine can run to 2300 RPM and, at 2300 RPM deliver up to 50% of its 1150 RPM torque capability.

The four field current regulator kits described in this manual allow the addition of field weakened operation to MaxPak Plus drives.

Each of the four kits provides a field regulator card (FCCA or FCCB) which converts the fixed potential output of the MaxPak Plus field supply into a controlled-current, adjustable voltage field supply, a tachometer loss and overspeed detector card (TLOA) to protect the drive motor, driven machinery and operating personnel against damaging and potentially dangerous motor overspeed occurring due to a failure in the field regulating circuitry, a card rack to mount these two cards, interconnecting cabling and all required mounting hardware. These kits are adaptable to MaxPak Plus controllers rated at 240 volt armature.

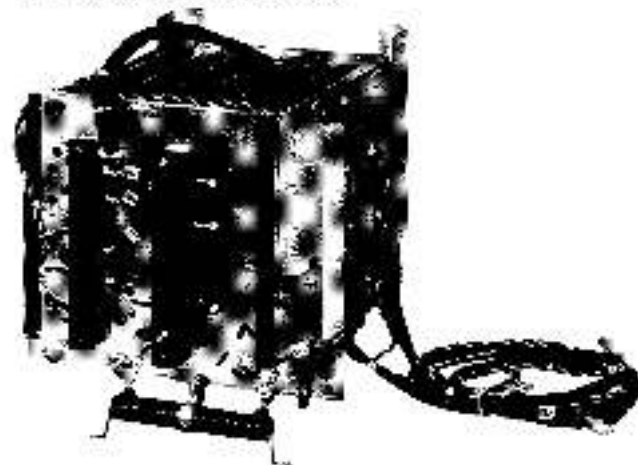
150 volt field and 500 volt armature, 300 volt field. Field regulators for addition to MaxPak Plus controllers rated at 500 volt armature are available as factory installed modifications only.

DRIVE REQUIREMENTS

- A tachometer **MUST** be added to the drive motor and the drive must be operated as a speed regulator.

ALTHOUGH EITHER AN A-C OR D-C TACHOMETER MAY BE USED WITH NON-REGENERATIVE MAXPAK PLUS CONTROLLERS, REGENERATIVE MAXPAK PLUS REQUIRES A TACHOMETER WITH A DIRECT CURRENT (D-C) OUTPUT. THE USE OF AN A-C TACHOMETER WITH REGENERATIVE MAXPAK PLUS POSES A SERIOUS RISK TO BOTH MACHINERY AND PERSONNEL PER THE TACHOMETER WARNING ON PAGE 11 OF I/M D-3851.

- The drive motor and driven machine **MUST** both be capable of operation to the desired field weakened speeds. The maximum speed capability of a Reliance Super RPM motor is specified on its nameplate. A motor nameplated 1750/2300 is capable of field weakening to 2300 RPM, while a motor nameplated 1750/1950 has very limited operating range (to 1950 RPM) above base speed.



WARNING

WHILE OFFERING A SIGNIFICANT DEGREE OF ADDED FLEXIBILITY TO THE STANDARD MAXPAK PLUS DRIVE, THE FIELD CURRENT REGULATOR KIT MUST BE APPLIED CAREFULLY, CONSIDERING THE MAXIMUM SAFE OPERATING SPEEDS OF THE MOTOR AND MACHINE.

IT MUST ALSO BE PROPERLY INSTALLED AND ADJUSTED. MISWIRING OR MISADJUSTMENT CAN CAUSE POTENTIAL MOTOR OVERSPEED AND DAMAGE. MOTOR OVERSPEED COULD LEAD TO PORTIONS OF THE MOTOR BEING EJECTED AT HIGH SPEED FROM THE MOTOR ENCLOSURE AND POSE A HAZARD TO PERSONNEL. AS SUCH, THE PURCHASE PRICE OF THE FIELD CURRENT REGULATOR KIT INCLUDES THE SERVICES OF A RELIANCE FIELD SERVICE ENGINEER TO PERFORM THE

INITIAL START UP AND ADJUSTMENT OF THIS KIT. THE USER SHOULD INSTALL THE KIT PER THE INSTALLATION INSTRUCTIONS OF THIS MANUAL AND CONTACT THE NEAREST RELIANCE SALES OFFICE TO ARRANGE FOR A RESIDENT SERVICE ENGINEER TO PERFORM INITIAL START UP AND ADJUSTMENT.

SPECIFYING THE FIELD CURRENT REGULATOR KIT

Four field current regulator kits are available for use with the MaxPak Plus. Proper kit selection is a function of motor field voltage and current. Table 1 provides a cross reference for kit selection. Field current regulators for 550 volt drive ratings are available only as factory ordered modifications.

TABLE 1
FIELD CURRENT REGULATOR KIT SPECIFICATIONS

Kit Model Number	Motor Field Voltage	Hot Field Current	Drawing Reference	
			Wiring Diagram	Assembly Drawing
23C92	150 VDC	0.7 to 2.7 Amperes	28931-R	705394-R
23C93	150 VDC	2.0 to 8.0 Amperes	28951-S	705394-S
23C94	300 VDC	0.7 to 2.7 Amperes	28931-T	705394-T
23C95	300 VDC	2.0 to 8.0 Amperes	28951-V	705394-V

INSTALLATION NOTE: When a 23C92 or 23C94 field current regulator kit is installed in non-regenerative MaxPak Plus controllers with either basic features or basic features plus dynamic braking, space exists on the drive auxiliary panel for mounting of the field current feedback signal resistor supplied as a part of the field current regulator kit. Adequate space does not exist for this resistor on the auxiliary panel of non-regenerative MaxPak Plus controllers equipped with the armature reversing feature or any regenerative MaxPak Plus. Nor is there space on the auxiliary panel of any MaxPak Plus controller for mounting the current feedback resistor supplied with either the 23C93 or 23C95 field regulator kit. When specifying any field current regulator kit for installation into a drive with armature reversing or when specifying either the 23C93 or 23C95 kits for installation into any MaxPak Plus, a contactor cover kit or input circuit breaker kit must also be ordered and installed to provide mounting surface for this resistor.

INSTALLATION

NOTE 1:

COMPLETELY INSTALL AND START UP THE MAXPAK PLUS CONTROLLER AS A SPEED REGULATED DRIVE PER THE INSTRUCTIONS OF SECTIONS 2 AND 3 OF APPLICABLE I/M D-3817 or D-3851 BEFORE INSTALLING THIS KIT. PROPER OPERA-

TION OF THE MAXPAK PLUS DRIVE AS A SPEED REGULATOR WITHOUT THE FIELD CURRENT REGULATOR MODIFICATION MUST BE VERIFIED BEFORE THE FIELD CURRENT REGULATOR IS ADDED.

NOTE 2:

ALTHOUGH THIS KIT MAY BE INSTALLED BY QUALIFIED USER PERSONNEL, INITIAL START UP AND ADJUSTMENT MUST BE PERFORMED BY A RELIANCE SERVICE ENGINEER PER THE WARNING NOTE OF PAGE 1. AS SUCH, INITIAL START UP AND ADJUSTMENT BY A RELIANCE SERVICE ENGINEER HAS BEEN INCLUDED IN THE PURCHASE PRICE OF THIS KIT. CONTACT YOUR NEAREST RELIANCE SALES OFFICE TO ARRANGE AN APPOINTMENT WITH A RESIDENT FIELD SERVICE ENGINEER.

WARNING

BEFORE INSTALLING THIS MAXPAK PLUS MODIFICATION KIT, DISCONNECT AND LOCK OUT ALL SOURCES OF INCOMING POWER TO THE CONTROLLER CABINET.

1. Install the MaxPak Plus drive, including the motor driven tachometer, per Section 2 of the applicable I/M (D-3817 or D-3851).

2. Start up and verify proper operation of the MaxPak Plus drive **as a speed regulator** using a motor-mounted tachometer for speed feedback **before beginning the installation of this kit.**
3. If a blower motor starter kit (models 2340-23C46) is installed on the lower portion of the auxiliary panel, it should be relocated to another available blower motor starter mounting position. See I/M D-3821, Table 3. **Note that the blower motor starter cannot be installed in standard non-regenerative low horsepower controllers with armature reversing if a field current regulator is also specified as mounting space for both is not available. If both a blower motor starter and field current regulator are required with a reversing controller in this horsepower range, they can be supplied on a factory built controller mounted in a larger-than-standard enclosure.**
4. Remove all hardware from the packing carton and compare all parts against the bill of material and illustrations of assembly drawing 705394. This assembly drawing has been packed as a part of the kit.
5. Field output terminals from the MaxPak Plus controller are located on a terminal board mounted in the lower portion of the auxiliary panel. Remove this terminal board (indicated as <8 on sheet 3 of the assembly drawing) and its marking strip from the panel, retaining the mounting screws for use in step 10.
6. The field output cable connecting to this terminal board is fastened into a coil with a large tyrap. Cut this tyrap (indicated as <5 on sheet 3 of the assembly drawing) and fully extend the cable.
7. If a contactor auxiliary contact kit (model 23C100-103) has been installed, the disconnect-type terminal board supplied as part of this kit is also mounted on the auxiliary panel just below the field output terminals referenced in step 5. Remove this terminal board and its marking strip, retaining its mounting screws for later use. Remove any tyrap used to dress the auxiliary contact cable (yellow wire cable) and extend this cable to its full length.
8. Fasten the bracket (bill of material item 8) to the controller auxiliary panel using two #10-32 x 1½" self tapping screws. Position the bracket as shown on sheet 3 of the assembly drawing.
9. Locate the card rack assembly. The field regulator card (FCCA or FCCB) and tachometer loss and overspeed detector card (TLOA) should be firmly mounted and secured into the rack.
10. Before mounting the rack to the auxiliary panel, locate the loose ends of wires 451 and 471. If the field regulator is being installed into a low horsepower non-regenerative controller (from 5 through 20 hp at 230 volts a-c input or from 5 through 40 hp at 460 volts a-c input), remove the faston terminals from the ends of these wires and add ring lugs, item 36 or 37 provided in the kit. If the regulator is being installed in a non-regenerative controller with a horsepower rating in excess of those listed above or any regenerative controller, leave the fastons in place.
11. With terminals 451 and 471 prepared per step 10 above, connect them to the armature output of the controller.
 - If the fastons have been removed for installation into a low horsepower non-regenerative controller, connect the lugged wires to the armature output terminal strip. Connect 451 to terminal A2. Connect 471 to A1.
 - If the regulator is being installed into a medium horsepower non-regenerative controller, or any regenerative MaxPak Plus, connect the 451 and 471 fastons to the male faston lugs riveted to the A1 and A2 busbar just to the right of where the field current regulator rack will mount. Connect 451 to the A2 busbar. Connect 471 to the A1 busbar.
12. Locate the short wire harness (bill of material item 18) already connected to the left hand side of the field regulator backplane. The free end must be connected to the matching pins on the right hand side of the controller regulator backplane. **Connect this cable per the illustrations of sheet 3 of the assembly drawing, taking extreme care to orient both connectors to matching terminal numbers. Be certain that the wire numbers match the numbered pins to which they attach.**

NOTE: These connectors mechanically lock into place once installed. They are released by pulling the connector housing. Attempting to remove the connectors by pulling on the wires will not release the locking mechanism, and may damage the connectors or wiring.
13. Slip the lower feet of the rack into the bracket installed in step 8 and secure the rack into place with two 1/4-20 x 1/4" machine screws (bill of material item 10) and washers (bill of material item 11).
14. Remount the field output terminal board and its marking strip (which was removed from the auxiliary panel in step 5) to the mounting bracket along the right side of the field regulator card rack assembly using two #6-32x¾" self tapping screws.
15. If an auxiliary contact terminal board was removed per the instructions of step 7, it should be remounted onto the card rack mounting bracket.
16. If the field current regulator kit is being installed into a controller requiring either a contactor cover kit or an input circuit breaker kit either to satisfy the INSTALLATION NOTE of page 2 or for customer

convenience, the circuit breaker or contactor cover kits should be installed at this time.

17. Dress the field terminal cable (and auxiliary contact cable, if present) to the field regulator card rack using tyraps provided in the kit.
18. Mount the field current feedback signal resistor (bill of material item 14) to the auxiliary panel or onto the cover plate installed in step 16. Mounting should be accomplished using two mounting brackets (bill of material item 15) and two 8-32 x 1/2" type 1 screws (bill of material item 17). A nomex insulator intended to prevent resistor terminals from touching the mounting panel is included with kits 23C92 and 23C94. Place the nomex insulator under the resistor. It mounts to the panel with the same screws that mount the resistor.
19. Referring to "detail A" on sheet 4 of assembly drawing, mount the slider (bill of material item 16) to the field current feedback signal resistor using a #8-32 x 1/2" machine screw (bill of material item number 27). This operation may have already been done at the factory.
20. Disconnect the lead labeled "F2" from the terminal board referenced in steps 5 and 14 above and reconnect it to terminal 1831 on the field regulator card (FCCA or FCCB).
21. Locate the wire harness (bill of material 19) and route it as shown on sheet 3 of the assembly drawing. This cable connects the field current regulator card rack to controller terminals 186, 189, 281 and 282 located on the fuse panel in the upper portion of the power unit assembly, it wires lead number 144 to the blank terminal just below terminal 188 on the left hand terminal board of the drive controller regulator assembly (1TB), and connects to the field current feedback signal resistor mounted in step 18. Connections to this resistor (which may have been made at the factory) should be as shown in "detail A" on sheet 4 of the assembly drawing using hardware items 23, 24, 25 and 26. Male/female faston adaptors have been included with the kit to provide extra termination space on terminals 281 and 282 required on heavily modified drives.
22. Check for the connection of wire numbers F1 from the outgoing cable onto the F1 terminal on the right side terminal board of the field current regulator rack. Likewise, check for the connection of wire numbered 235 from the outgoing cable to terminal F2 of this terminal strip.
23. One of the wires from the drive "stop" pushbutton terminates on terminal 183 of terminal board 1TB. Locate this wire, remove it from terminal 188 and reconnect it to the blank terminal directly below terminal 183 on 1TB. This will connect the "stop"

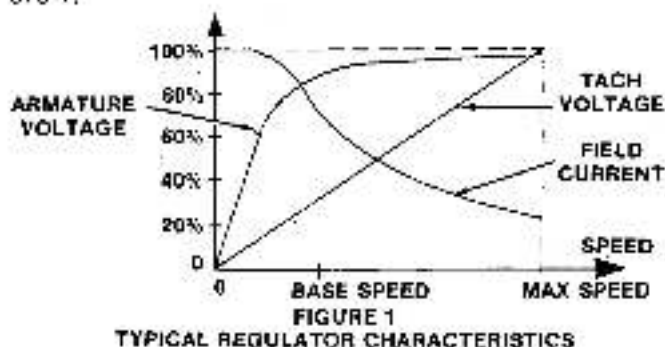
pushbutton wire to wire 144 installed in step 21. **Warning: If this connection is not made, the over-speed stop interlock will not function when calibrated and tested in Start Up steps 7 and 12. See sheet 1 of wiring diagram 29931 board as part of this manual.**

24. Dress the wiring from the cable installed in step 21 to the top of the drive regulator card rack and field current regulator card rack using tyraps provided in the kit.
25. Check all wiring per W/D 29931 board as part of this manual.

STOP: You have now completed the installation of this kit. Initial start up and adjustment must be performed by a Reliance field service engineer per the warning note of page 1. Contact your nearest Reliance sales office for an appointment. As such, initial start up and adjustment by a Reliance field service engineer has been included in the purchase price of this kit. Contact your nearest Reliance sales office to arrange for a visit from the resident field service engineer.

START UP, ADJUSTMENT AND SAFETY CHECK

The set up of the field controller kit is done in conjunction with the armature regulator, with the motor operating. The armature speed regulator is a normal speed regulator up to the point where the armature voltage reaches approximately 80% of rated voltage. The field controller then begins to weaken the field as the armature voltage increases further. The armature voltage therefore increases more gradually as speed is increased, approaching full voltage as the drive reaches its maximum speed (fully field weakened) point. Typical speed, field current, tachometer voltage and armature voltage characteristics are shown in figure 1.



1. Verify tachometer feedback connections to controller terminals 419 and 519 and proper tachometer scaling per applicable drive instruction manual (D-3817 or D-3851).

IMPROPER CONNECTION OR CALIBRATION OF TACHOMETER MAY CAUSE THE DRIVE TO OVER

SPEED, WITH CONSEQUENT MACHINE AND DRIVE DAMAGE OR INJURY TO OPERATING PERSONNEL. WHEN FIRST START UP OCCURS, BE PREPARED TO STOP THE DRIVE IMMEDIATELY IF UNCONTROLLED ACCELERATION SHOULD RESULT DUE TO IMPROPER INSTALLATION OR SET UP.

2. Make the following adjustments to faceplate controls on both the controller and field current regulator cards.

**TABLE 2
INITIAL ADJUSTMENTS**

Adjustment	Pointer Setting
Current Rate	0
Current Gain	0
Current Limit(s)	7.5
Stability	3
IR Compensation (non-motor only)	0
Maximum Speed	0
Minimum Speed	0
Acceleration Rate	0
Deceleration Rate	0
Field Controller Stability	Fully CCW
Field Controller Maximum Armature Volts	Fully CCW

3. Connect the following meters:
 - A. Ammeter to monitor field current.
 - B. Voltmeter to monitor armature voltage.
4. Adjust the field current feedback resistor slider to achieve zero ohms between terminals 135 and 235.

WARNING

HIGH VOLTAGE IS ALWAYS PRESENT ON THE FIELD CURRENT FEEDBACK RESISTOR WHEN LINE POWER IS CONNECTED. ALWAYS ADJUST SLIDER WITH THE LINE POWER OFF. ADJUST THE SLIDER IN SMALL INCREMENTS UNTIL THE CORRECT ADJUSTMENT IS OBTAINED.

5. Apply input line power to the drive and allow it to remain in the "standby" mode (line power applied but WITHOUT pressing the "start" pushbutton) for approximately 30 minutes to allow the motor field to heat. **DO NOT LEAVE THE DRIVE UNATTENDED DURING THIS PERIOD.**
6. After allowing the 30 minute field warmup period, set the field current feedback resistor slider until the hot field amperes just start to decrease.
NOTE: Voltage across the feedback resistor (terminals 135-235) should be approximately 2 volts when this adjustment is correct.
7. Adjust the TLOA tachometer calibration as follows:
 - A. Select the proper tachometer voltage range corresponding to the tachometer voltage at maximum (fully field weakened) motor speed. See Table 3. Following the instructions of this table,

either verify the presence of the 267K resistor from terminal 919 to terminal 1919 on the terminal strip along the bottom edge of the field current regulator card rack, or verify the presence of a shorting jumper between these two terminal points.

**TABLE 3
TACHOMETER VOLTAGE RANGE SELECTION**

Input Range	Circuit Configuration	Tachometer Voltage At Maximum Speed (Fully Field Weakened)
"HI" Range	267K Resistor From Terminal 919 to Terminal 1919	80 to 250 Volts
"LO" Range	Jumper From Terminal 919 To Terminal 1919	40 to 85 Volts

- B. Remove the 2.0K resistor from terminals 119 and 2119 on this same terminal strip.
- C. Remove the jumper from terminals 519 and 619 of the TLOA faceplate.
- D. Turn the "tach calibration" control fully clockwise.
- E. Set the operator's speed control potentiometer fully CCW and start the drive. Slowly increase drive speed to 50% of maximum (fully field weakened) speed using a hand tach or other calibrated speed indicator.
- F. Turn the "tach calibration" control slowly CCW until the drive stops and the "overspeed" indicator lights.
NOTE: Adjusting the tach calibration control may affect the speed slightly. If this occurs, trim the speed control to maintain 50% fully field weakened speed as the tach calibration control is adjusted.
- G. Recheck this adjustment by restarting the drive and slowly increasing speed. The drive should stop and the overspeed indicator should light when speed reaches 50% of the drive maximum (fully field weakened) speed rating.
- H. Replace the 2.0K resistor and jumper which were removed in steps 7B and 7C above.
- I. Overspeed is now calibrated to trip at 110% of the drive fully field weakened speed rating.
8. Start the drive and slowly increase the operator's speed control until it is fully CW. The drive should be unloaded. Monitor the actual operating speed using a hand tach or other calibrated speed indicator.

WARNING

MAKE SURE NO MACHINE DAMAGE WILL RESULT. DO NOT EXCEED THE MAXIMUM SPEED RATING OF THE DRIVE MOTOR.

9. Turn the maximum speed control slowly CW until the drive is operating at its maximum (fully field weakened) speed rating.
10. With the drive still operating at maximum speed, adjust the maximum armature volts control CW until the armature voltage is 95% of its rating (475 volts d-c for 500 volt drives, 228 volts d-c for 240 volt drives).
11. Check speed regulation by resetting the speed control to 50% and 25% of maximum. Operating speed should be linear with speed setting.

NOTE: The drive should operate at rated armature voltage ($\pm 5\%$) in the field weakened region when loaded to full load. Recheck the adjustment procedure if the armature voltage is outside this limit.

12. Test the tach loss function as follows:

- A. Remove the resistor or jumper from terminals 919 and 1919.
- B. Start the drive and slowly increase speed setting. Drive should stop as speed reaches 40-50% of maximum speed. The tach loss indicator should light.
- C. Reconnect the resistor or jumper removed in step 12A.

TROUBLESHOOTING

Table 4 provides a listing of proper circuit voltages found within the field current regulator for troubleshooting purposes.

TABLE 4
VOLTMETER TESTS

Typical circuit voltage readings are indicated in the following table. These tests may be made with a voltmeter having a sensitivity of 20,000 OHMS/Volt (Such as Simpson Model 260, Triplet Model 230, or similar) by making connection to the appropriate terminal. All measurements are made with respect to terminal 57 (0V) on the power unit regulator rack. These circuits may also be observed with an Oscilloscope.					
Test Number	Circuit Terminal	Note	Scale	Function	Typical Indication
1	TLOA Term. 56	5	15V	TLOA Power Supply	-12V
2	TLOA Term. 2119	5	6V	Isolated Voltage Feedback	0 to -2V
3	TLOA Term. 5	6	15V	5% Speed Comparator	0 or +12V
4	TLOA Term. 6	6	15V	110% Speed Comparator	0 or +12V
5	TLOA Term. 7	6	15V	30% Voltage Comparator	0 or +12V
6	TLOA Term. 519		15V	Tach. Calibration AMP Output	0 to +7V
7	TLOA Term. 919	6	150V	Tach Filter Output	0 to -125V
8	Field Cont. Term. 5	7	15V	Gate Pulses	0 to +6V
9	Field Cont. Term. 9	7	15V	Field Controller Driver Signal	0 to +12V
10	Field Cont. Term. 10	7	15V	Field Weakening Ref.	0 to -8V
11	Field Cont. Term. 119	7	8V	Isolated Voltage Feedback	0 to -4V

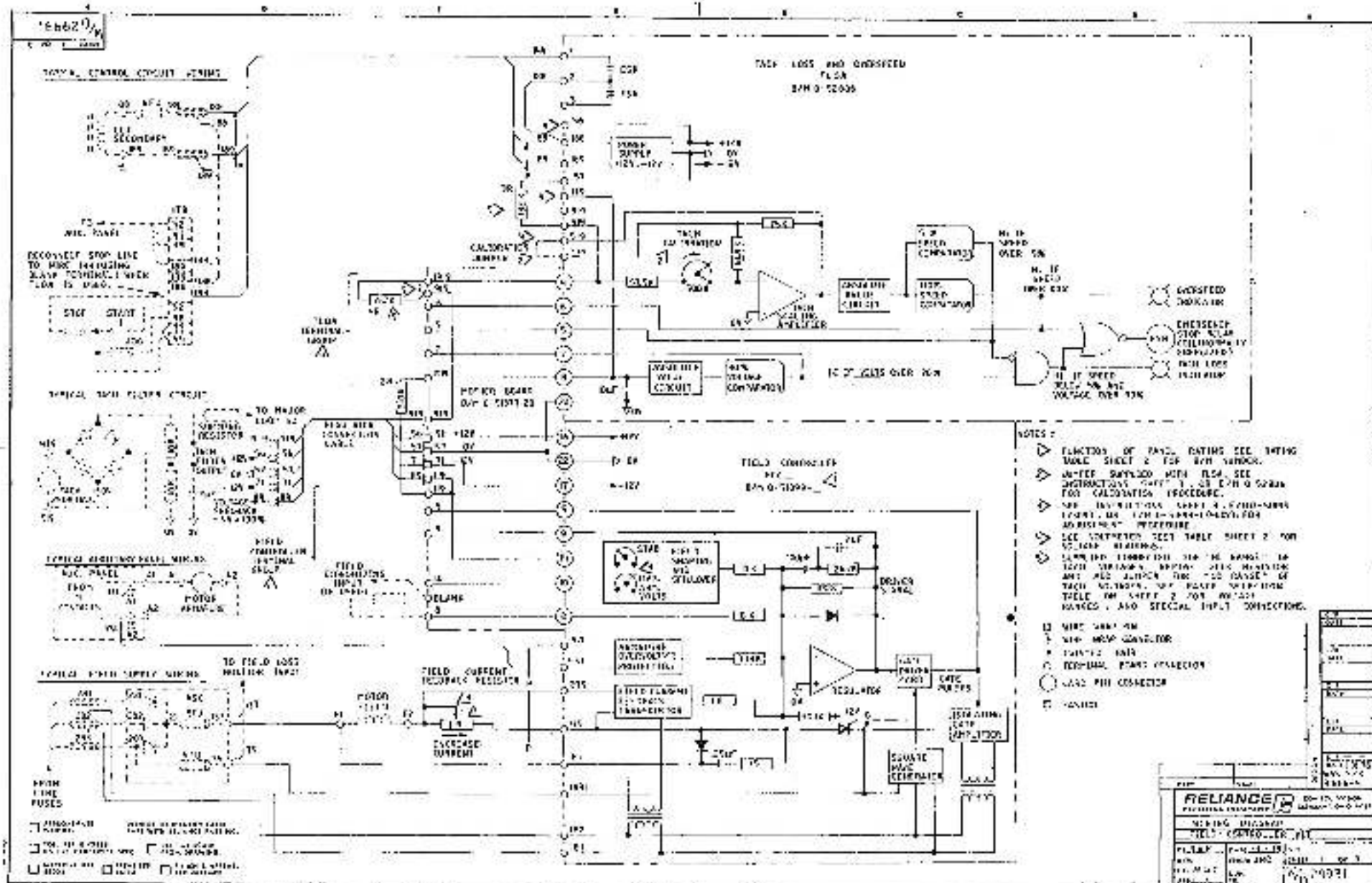
REPAIR PARTS

A complete parts list is provided on sheet 1 of assembly drawing 705394 packed as a part of the field

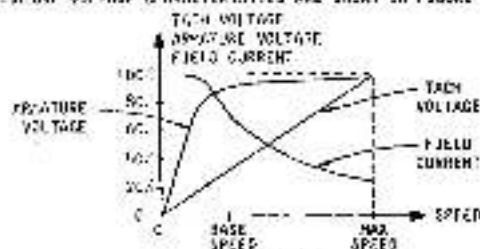
current regulator kit. The table 5 provides a condensed parts listing, indicating electronic components only, for reference.

TABLE 5
ELECTRONIC REPAIR PARTS

KH Model Number	Replacement Parts					
	Tach Loss And Overspeed Card	Field Controller Card	Feedback Resistor 1R	2R	Resistors 3R	4R
23C92	TLOA B/M Q-52808	FOCA B/M Q-51893	63461-2C 3 ohms 50 Watt	63803-13BP, 2K, 1%	63803-13DR, 182K, 1%	63803-13DV, 267K, 1%
23C93			63461-6A 1 ohm 200 Watt			
23C94		FOCB B/M Q-51893-1	63461-2C 3 ohms 50 Watt			
23C95			63461-6A 1 ohm 200 Watt			



SPRING UP THE FIELD CONTROLLER KIT IS DONE IN CONJUNCTION WITH THE ARMATURE REGULATOR, WITH THE MOTOR OPERATING. THE ARMATURE SPEED REGULATOR IS A MECHANICAL SPEED REGULATOR UP TO THE POINT WHERE THE ARMATURE VOLTAGE REACHES APPROXIMATELY 80% OF RATED VOLTAGE. THERE, THE FIELD CONTROLLER TAKES OVER TO INCREASE THE FIELD AS THE LOAD AND TAGG INCREASES FURTHER. THE ARMATURE VOLTAGE THEREFORE INCREASES MORE GRADUALLY AS SPEED IS INCREASED, APPROACHING FULL VOLTAGE AS THE CROWN REACHES ITS MAX SPEED POINT. TYPICAL SPEED, FIELD CURRENT, TAGG VOLTAGE AND ARMATURE VOLTAGE CHARACTERISTICS ARE SHOWN IN FIGURE 3.



THEORY: REGULATING CHARACTERISTICS

STRICTLY TWO-WAYER FEEDBACK CONNECTIONS AND POSITIVELY
 BEFORE OPERATING DRIVE. THEREFORE COMPLICATING OF
 TRANSMITTER MAY CAUSE DRIVE TO OVERSPEED, WITH
 CONSEQUENT MACHINE DAMAGE AS TENDS TO OPERATING
 FREQUENCIES. WHEN FIRST START-UP BEGINS, BE PREPARED
 TO STOP DRIVE IMMEDIATELY IF UNEXPECTEDLY ACCEL-
 ERATION SHOULD RESULT FROM IMPROPER OR FAULTY WINDING.

1. BASE THE FOLLOWING INITIAL ADJUSTMENTS BEFORE APPLYING PAPER

- | | | |
|-----|--|------------|
| 4. | MAX. SPEED = | FULLY OPEN |
| 5. | MIN. SPEED = | FULLY OPEN |
| 6. | NOCT. RATE = | FULLY OPEN |
| 7. | FIELD CONTROLLER STABILITY = | FULLY OPEN |
| 8. | FIELD CONTROLLER MAX. GAIN, VOLTS = | FULLY OPEN |
| 9. | IN CASE SHOULD BE DISCONNECTED AND TURNED | FULLY OPEN |
| 10. | (IN JR CASE IS USED WITH SPEED REGULATORS) | |

2. CORRECT THE FOLLOWING METEKS:

- A. AMPERES TO MAGNETOR FIELD CURRENT
B. VOLTMETER TO MAGNETOR ANODIAL VOLTAGE.

3. HAVE A HARD THERMISTOR OR OTHER CALIBRATED SPEED INDICATOR AVAILABLE FOR SUCH CALIBRATION ADJUSTMENTS.

4. STANDBY HIGH VOLTAGE IS ALWAYS PRESENT ON THE FIELD CURRENT FEEDBACK RESISTOR WHEN LINE POWER IS CONNECTED, ALWAYS ADJUST SLIDER WITH THE LINE POWER OFF, ADJUST THE SLIDER IN SMALL INCREMENTS UNTIL THE CORRECT ADJUSTMENT IS OBTAINED. APPLY AC POWER, AND WITH THE DRIVE IN STANDBY, SET THE FIELD CURRENT FEEDBACK RESISTOR (VR) SLIDER UNTIL THE HOT FET BLOCKS JUST STARTS TO DECREASE.

NOTE: VOLTAGE ACROSS THE FEEDBACK RESISTOR (10K-20K)
SHOULD BE APPROXIMATELY 2 VOLTS WHEN THIS ADJUSTMENT
IS CORRECT.

5. SET UP THE CURRENT ADJUST LOOP AND CURRENT LIMIT ACCORDING TO INSTRUCTIONS SUPPLIED WITH DAINE. (ADJUST ONLY IF REQUIRED).
6. SET UP THE ADJUST LOOP STABILITY ACCORDING TO INSTRUCTIONS SUPPLIED WITH DAINE (ADJUST ONLY IF REQUIRED).
7. ADJUST THE TIA TACH CALIBRATION ACCORDING TO THE FOLLOWING PROCEDURE.

LOOP TACS CALIBRATION ADJUSTMENT

SELECT THE PROPER TACH VOLTAGE RANGE CORRESPONDING TO THE TACH OUTPUT VOLTAGE AT MAX. SPEED RATION. SEE TACH VOLTAGE SELECTION TABLE ON SHEET 2.

REPORT 2-06-0151508 FROM TERMINALS 119 AND 2119.

REMOVE JUMPER FROM TERMINALS 519 AND 619 OF TLOA
FACEPLATE.

INITIALLY TUGH 1/2" COLLOIDATED CONCRETE, FINELY FINISHED.

START DRIVE AND INCREASE SPEED TO 50% OF MAX. SPEED
RATING OF DRIVE, AS INDICATED BY NAME TAG OR OTHER
CALIBRATED SPEED INDICATOR.

TURN TACH CALIBRATION CONTROL. SLOWLY COW UNTIL
DRIVE STOPS AND CHANGING INDICATION LIGHTS.

NOTE: ADJUSTING THE TACH CALIBRATION CONTROL MAY AFFECT THE SPEED SLIGHTLY. IF THIS OCCURS, TIRM THE SPEED CONTROL TO MAINTAIN 3000 SPEED AS THE TACH CALIBRATION CONTROL IS ADJUSTED.

THROTTLE ADJUSTMENT BY RESISTING DRIVE AND SLOWLY INCREASING SPEED. DRIVE SHOULD STOP AND OVERSPEED INDICATOR SHOULD LIGHT WHEN SPEED REACHES 30% OF DRIVE MAX. SPEED RATING.

REPLACE 7.0K RESISTOR AND JUMPER IN ORIGINAL LOCATIONS.

WARRANTED IS NOW CALCULATED TO HALF AT 100% OF MAX. SPEED RATCHES.

5. START THE URINE AND SLOWLY INCREASE THE SPEED CONTROL UNTIL IT COMPLETELY DRIES. THE URINE SHOULD BE UNLOADED. MONITOR THE ACTUAL OPERATING SPEED USING A HAND TACH OR OTHER CALIBRATED SPEED INDICATOR.

WARNING) MAKE SURE NO MODERATE DAMAGE WILL RESULT.
DO NOT EXCEED THE MAXIMUM SPEED RATING OF THE GROVE.

9. TURN THE "VOLT. SPEED CONTROL" SLOWLY CW UNTIL THE DRIVE IS OPERATING AT ITS MAXIMUM SPEED RATING.

10. WITH THE DRIVE STILL OPERATING AT MAXIMUM SPEED, ADJUST THE MAX. AMPL. CONTROL ON UNTIL THE APPROXIMATE VOLTAGE IS 90% OF ITS RATING (475V FOR 500V RATING; 245V FOR 260V RATING).

11. CHECK SPEED REGULATION BY RESETTING THE SPEED CONTROL TO 50% AND 25% OF FULLY ON. OPERATING SPEED SHOULD BE LINEAR WITH SPEED CONTROL.

NOTE: THE DRIVE SHOULD OPERATE AT RATED ARMATURE VOLTAGE ($\pm 5\%$) IN THE FIELD WEAKENED REGION WHEN LOADED TO FULL LOAD. RECHECK THE ADJUSTMENT PROCEDURE IF THE ARMATURE VOLTAGE IS OUTSIDE THIS LIMIT.


12. TEST TERN LOSS FUNCTION AS FOLLOWS:

- A. REMOVE RESISTOR OR JUMPER FROM TERMINALS 919 AND 919. IF SPECIAL UNIT IS USED, DISCONNECT TWO SIGNAL FROM TERMINAL 919 OF A15 (E.T.O. EXCEPT).

3. START DRIVE AND SLOWLY INCREASE SPEED, DRIVE SHOULD STOP AS SPEED REACHES 400-500 OF CAR SPEED RATING. TACH LOSS INDICATOR SHOULD LIGHT.

2. REDUCED RESISTOR OR JUMPER (ON IAC-SIGNAL) IS MECHANICAL LOCATION.

C/R
DATE
C/R
DATE ...
C/R
DATE
C/R
DATE
C/R - - -
DATE - - -
ANS S/R
2166-4

RELIANCE 

CENTRAL DIVISION
OYLAND BLD. #4127

WIRING DIAGRAM

FIELD CONTROLLER SET

DR. C. L. L.	DATE 1-10-75	S.O.
B/M	ENG. B. AND	SHEET 3 OF 1
CV. 117	DUP.	
APP. 10	TR.	2/6 20931

Reliance Electric Company / 24701 Euclid Avenue / Cleveland, Ohio 44117

RELIANCE ELECTRIC 