



# HEHR

# POWER SYSTEMS

## ***POWERLINE***

### HEAVY-DUTY ALTERNATORS

SERIES 25 ALTERNATOR

## TROUBLE SHOOTING GUIDE

A DIVISION OF HEHR INTERNATIONAL INC.

4616 Fairlane Avenue Fort Worth, Texas 76119

(817) 535-0284 • FAX (817) 531-2755

E-MAIL: [techsupport@hehrpowersystems.com](mailto:techsupport@hehrpowersystems.com)

OR VISIT OUR WEBSITE AT  
[www.hehrpowersystems.com](http://www.hehrpowersystems.com)

AN ISO 9001 COMPANY



Accredited by the  
RvA, Dutch Council  
for Accreditation

PERRY JOHNSON  
REGISTRARS, INC.

FORM 05079MJ/299 REV A

\$2.50

02/99

# INDEX

**PAGE 1**

MODEL NUMBERS, CONFIGURATION AND OUTPUT RATINGS

**PAGE 2- 3**

HOW TO TROUBLE SHOOT *INTERNALLY REGULATED* ALTERNATORS

**PAGE 4- 7**

FUNCTIONS: TERMINALS AND JUMPERS ON *INTERNALLY REGULATED* ALTERNATORS

**PAGE 8**

VOLTAGE CHECK POINTS FOR 10 -120 REGULATOR

**PAGE 9**

HOW TO FULL FIELD SERIES 25 ALTERNATOR WITH *INTERNAL REGULATOR*

**PAGE 11 - 21**

HOW TO TROUBLE SHOOT *EXTERNALLY REGULATED* ALTERNATORS

**PAGE 22 - 26**

HOW TO TROUBLE SHOOT *EXTERNALLY REGULATED, EXTERNALLY RECTIFIED*  
ALTERNATORS

**PAGE 27**

HOW TO FULL FIELD SERIES 25 ALTERNATOR WITH *EXTERNAL REGULATOR*

**PAGE 28**

HOW TO TEST EXTERNAL RECTIFIER PACK

**PAGE 29**

FINDING ALTERNATOR PULLEY RATIO

**PAGE 30 - 35**

POWER CURVES

**PAGE 36**

TEST BENCH PROCEDURE

**PAGE 37**

TEST FOR AMPERAGE LOAD ON VEHICLE

# SERIES 25 ALTERNATORS

MODEL #		CONFIGURATION	AMPS	VOLTS
25-6	OBSOLETE-USE 25-43	EXTERNAL REGULATOR, EXTERNAL RECTIFIER	200	12
25-10	24 DIODES	INTERNAL ADJUSTABLE REGULATOR	200	12
25-11	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR	200	12
25-12		EXTERNAL ADJUSTABLE REGULATOR	190	12
25-14		EXTERNAL ADJUSTABLE REGULATOR	160	12
25-16	12 DIODES	EXTERNAL ADJUSTABLE REGULATOR	100	24
25-19		INTERNAL ADJUSTABLE REGULATOR	100	24
25-20		INTERNAL ADJUSTABLE REGULATOR	160	12
25-26		INTERNAL ADJUSTABLE REGULATOR	190	12
25-30	NO AC TURN-ON	INTERNAL NON-ADJUSTABLE REGULATOR	160	12
25-32	OBSOLETE-NO REPLACE	INTERNAL NON-ADJUSTABLE REGULATOR	165	12
25-34	NO AC TURN-ON	INTERNAL NON-ADJUSTABLE REGULATOR	190	12
25-35	NO AC TURN-ON	INTERNAL NON-ADJUSTABLE REGULATOR	200	12
25-37	24 DIODES	INTERNAL ADJUSTABLE REGULATOR	250	12
25-38	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR	250	12
25-39		INTERNAL NON-ADJUSTABLE REGULATOR	160	12
25-40	OBSOLETE-USE 25-44	EXTERNAL REGULATOR, EXTERNAL RECTIFIER	250	12
25-41	NO AC TURN-ON	INTERNAL NON-ADJUSTABLE REGULATOR	250	12
25-42		EXTERNAL REGULATOR, EXTERNAL RECTIFIER	250	12
25-43		EXTERNAL REGULATOR, EXTERNAL RECTIFIER	200	12
25-44		EXTERNAL REGULATOR, EXTERNAL RECTIFIER	250	12
25-45	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR	160	24
25-46	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR	100	24
25-50	24 DIODES	INTERNAL ADJUSTABLE REGULATOR - T-MOUNT	160	12
25-51	24 DIODES	INTERNAL ADJUSTABLE REGULATOR - T-MOUNT	200	12
25-52	24 DIODES	INTERNAL ADJUSTABLE REGULATOR - T-MOUNT	250	12
25-53	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR - T-MOUNT	160	12
25-54	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR - T-MOUNT	200	12
25-55	24 DIODES	EXTERNAL ADJUSTABLE REGULATOR - T-MOUNT	250	12

# ON VEHICLE TROUBLE SHOOTING GUIDE

## PRELIMINARY PROCEDURES

### ***POWERLINE* 25 SERIES ALTERNATORS**

ALL 12 VOLT MODELS WITH **INTERNAL** REGULATORS

- 1.) CHECK ALTERNATOR DRIVE BELT (S) AND BELT TENSION.
- 2.) CHECK ALTERNATOR POSITIVE AND NEGATIVE CABLE CONNECTIONS.
- 3.) CHECK FOR PROPERLY SIZED CABLES FROM ALTERNATOR TO BATTERY (S), BOTH POSITIVE AND NEGATIVE. **2/0 CABLE MINIMUM.**
- 4.) CHECK NEGATIVE CABLE CONNECTIONS TO FRAME RAILS WHEN USED FOR GROUND CIRCUIT, FOR CLEAN TIGHT CONNECTIONS. **2/0 CABLE MINIMUM**
- 5.) CHECK CABLE CONNECTIONS **ON** BATTERY FOR CLEAN TIGHT CONNECTION.
- 6.) CHECK BATTERY (S) CONDITION, 12.6 VOLT - 100%, 12.4 VOLT - 75%, 12.2 VOLT - 50% STATE OF CHARGE. TRUE BATTERY VOLTAGE IS OBTAINED **AFTER** REMOVING ANY SURFACE CHARGE FROM BATTERY. IF BATTERY VOLTAGE IS **LESS THAN 12.4 VOLTS**, REPLACE OR RECHARGE BATTERY AND RETEST. IF BATTERY VOLTAGE IS **EQUAL TO OR HIGHER THAN 12.4 VOLTS**, CONTINUE TEST.
- 7.) IDENTIFY MODEL OF ALTERNATOR.
- 8-) IDENTIFY MODEL OF REGULATOR.
- 9.) DETERMINE IF VEHICLE IS ISOLATOR EQUIPPED.
- 1 0.) LOCATE IN MANUAL THE CORRECT TERMINAL REFERENCE DRAWING FOR THE ALTERNATOR ON VEHICLE.

# ALTERNATOR ELECTRICAL CONDITION (POSSIBLE CAUSES)

## LOW VOLTAGE OUTPUT

- 1.) LOOSE DRIVE BELT(S).
- 2.) WIRING PROBLEM ON POSITIVE OR NEGATIVE OR BOTH CABLES. POOR CONNECTIONS OR IMPROPERLY SIZED WIRE FOR THE ALTERNATOR SIZE OR LENGTH OF CABLES.
- 3.) CURRENT LOAD ON SYSTEM GREATER THAN ALTERNATOR CAN PRODUCE AT THAT SPEED.
- 4.) WRONG PULLEY RATIO (P.R.) FOR APPLICATION. O.D. OF CRANKSHAFT PULLEY DIVIDED BY O.D. OF ALTERNATOR PULLEY DETERMINES P.R. MOST HEAVY DUTY APPLICATIONS REQUIRE A P.R. OF 2.5 OR HIGHER.
- 5.) LOW REGULATOR SET POINT.
- 6.) JUMPER "E" ON 190 - 160 OR JUMPER "E" ON 200 - 250 MISSING.
- 7.) DEFECTIVE REGULATOR.
- 8.) DEFECTIVE ALTERNATOR.

## HIGH VOLTAGE OUTPUT

- 1.) HIGH REGULATOR SET POINT.
- 2.) SENSE TERMINAL CONNECTED AT WRONG POINT, BAD CONNECTION, OR NOT SENSING TRUE BATTERY VOLTAGE.
- 3.) DEFECTIVE ISOLATOR. (IF IN SYSTEM)
- 4.) DEFECTIVE REGULATOR.
- 5.) RADIO FREQUENCY INTERFERENCE (RFI). IF HIGH VOLTAGE IS AN INTERMITTENT CONDITION, CAN YOU TIE IT TO USING A POWERFUL RADIO? IF YES, CALL 1-800-443-9394 FOR TECHNICAL ASSISTANCE.

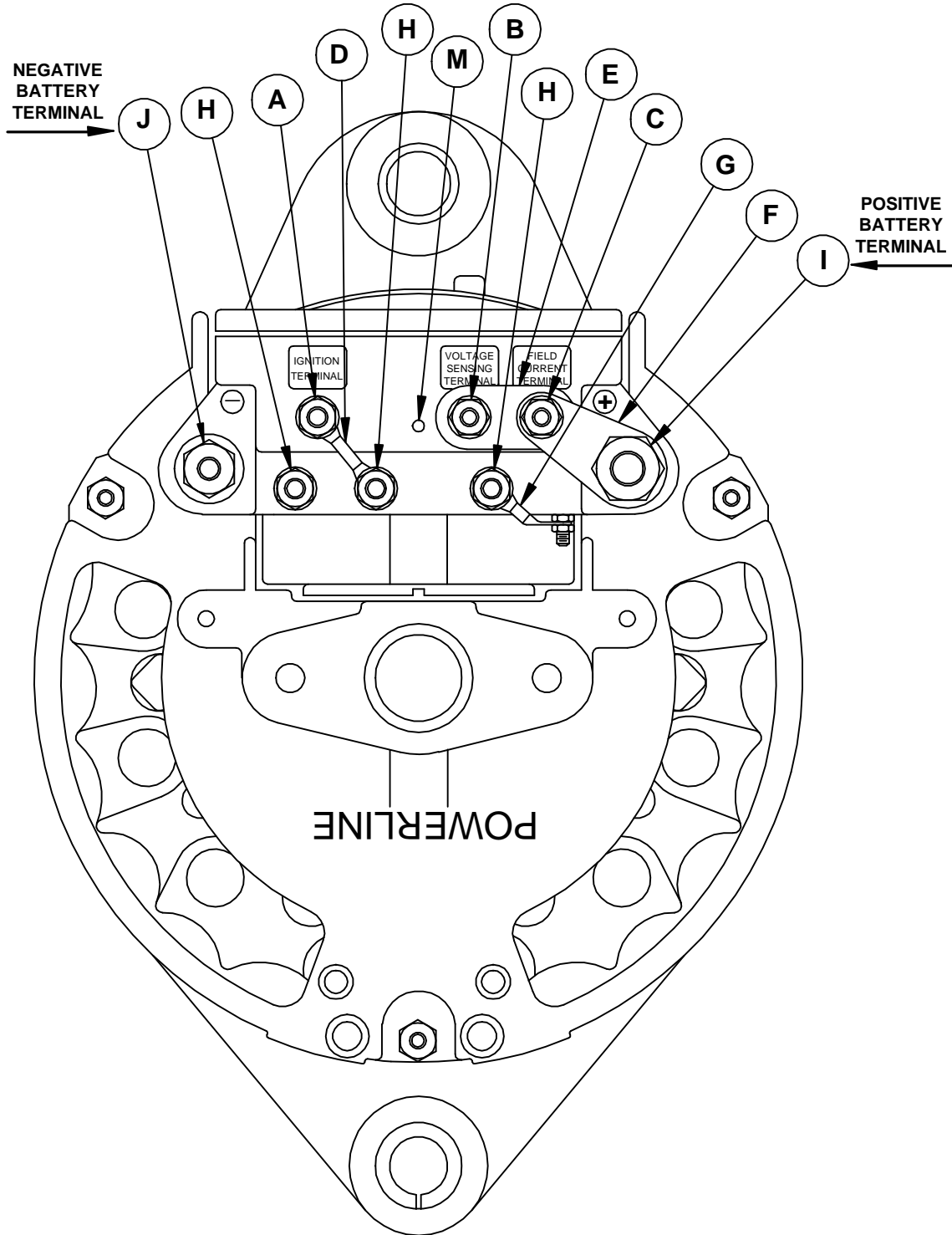
## NO VOLTAGE OUTPUT

- 1.) NO DRIVE BELT.
- 2.) NO VOLTAGE / CURRENT AT FIELD CURRENT TERMINAL ON BRUSH HOUSING. MEANS NO POWER TO 10-120 INTERNAL REGULATOR.
- 3.) NO VOLTAGE AT IGNITION TERMINAL, AC TURN ON JUMPER MISSING, WIRE FROM IGNITION SWITCH DOES NOT HAVE VOLTAGE WITH KEY ON. MEANS NO TURN ON SIGNAL TO INTERNAL REGULATOR.
- 4.) IGNITION TERMINAL HAS BOTH AC TURN ON JUMPER AND BATTERY KEY SWITCHED WIRE ON IT. **CAN ONLY FUNCTION IF ONE IS USED.**
- 5.) NO GROUND CABLE ON ISOLATED GROUND SYSTEM.
- 6.) ALTERNATOR USES JUMPER BETWEEN VOLTAGE SENSE, FIELD CURRENT AND POSITIVE OUTPUT TERMINAL AND NO VOLTAGE ON POSITIVE TERMINAL. THIS CAN OCCUR WITH AN ISOLATOR. IDENTIFY TYPE OF SYSTEM, IS IT EQUIPPED **WITH** OR **WITHOUT** A BATTERY ISOLATOR. THIS WILL DETERMINE HOW THE SYSTEM IS WIRED.
- 7.) ALTERNATOR MAY HAVE LOST ITS MAGNETISM IN THE ROTOR AND WILL NOT START WITH AC TURN ON. TO RE-ESTABLISH MAGNETISM, FULL FIELD THE ALTERNATOR. SEE HOW TO FULL FIELD A SERIES 25 ALTERNATOR WITH INTERNAL REGULATOR. **PAGE 9**
- 8.) DEFECTIVE REGULATOR. DO ON VEHICLE VOLTAGE TESTS. **PAGE 8**
- 9.) DEFECTIVE ALTERNATOR. MOMENTARILY FULL FIELDING ALTERNATOR WILL DETERMINE IF IT IS GOOD OR BAD. **PAGE 9**

# SERIES 25

14 VOLT 160 / 190 AMP

## 25-20, 25-26, 25-30, 25-34



## TERMINALS AND JUMPERS - 25 SERIES 160 AMP / 190 AMP

- TERMINAL "A" IF **NO** WIRE IS ATTACHED FROM IGNITION TO THIS TERMINAL, THEN JUMPER "D" MUST BE IN PLACE. IF THERE IS A WIRE FROM IGNITION SWITCH TO TERMINAL "A", THEN JUMPER "D" **MUST BE REMOVED**. WHEN WIRE FROM IGNITION SWITCH IS ATTACHED, IT **MUST** GO ON AND OFF WITH IGNITION AND HAVE 12 VOLTS WHEN **ON**. THE ALTERNATOR WILL NOT OPERATE WITH BOTH A JUMPER AND THE IGNITION WIRE ATTACHED TO TERMINAL "A". ONE OR THE OTHER **MUST BE REMOVED**.
- TERMINAL "B" FOR FLAT CURVE, IT MUST HAVE A WIRE FROM BATTERY + TO IT OR JUMPER "E" MUST BE IN PLACE. FOR TEMPERATURE COMPENSATED CURVE, REMOVE JUMPER "E" AND LEAVE TERMINAL OPEN.
- CAUTION:** OPEN SENSE MODE IS MEANT FOR OVER THE ROAD TRUCKS, **DO NOT USE ON EMERGENCY VEHICLES**, OUTPUT VOLTAGE WILL DROP TO 13 VOLTS WHEN HOT.
- TERMINAL "C" **MUST** HAVE A WIRE FROM BATTERY TO IT **OR** JUMPER "F" MUST BE IN PLACE. **THERE CAN NOT BE BOTH.**
- TERMINAL "J" **MUST** HAVE GOOD GROUND TO BATTERY – **2/0 CABLE MINIMUM.**
- TERMINAL "I" **MUST** HAVE A GOOD POSITIVE BATTERY CONNECTION - **2/0 CABLE MINIMUM.**
- TERMINALS "H" AC TERMINALS- USED FOR TACHOMETER CONNECTION, AC TURN-ON OF ALTERNATOR, CHARGE INDICATOR LIGHT CONTROL.
- JUMPER "G" **MUST BE IN PLACE AT ALL TIMES FOR ALTERNATOR TO OPERATE.**

### ISOLATOR EQUIPPED VEHICLES

- TERMINAL "B" MUST HAVE A WIRE RUN TO POSITIVE POST OF MAIN BATTERY AND JUMPER "E" REMOVED. TERMINAL "B" MUST HAVE 12 VOLTS AT ALL TIMES.
- TERMINAL "C" MUST HAVE A WIRE RUN TO POSITIVE POST OF MAIN BATTERY AND JUMPER "F" REMOVED. TERMINAL "C" MUST HAVE 12 VOLTS AT ALL TIMES.
- TERMINAL "I" WILL NOT HAVE VOLTAGE ON IT WITH ENGINE NOT RUNNING. WITH ENGINE RUNNING, VOLTAGE SHOULD BE .8 TO 1 VOLT HIGHER THAN VOLTAGE AT BATTERY.

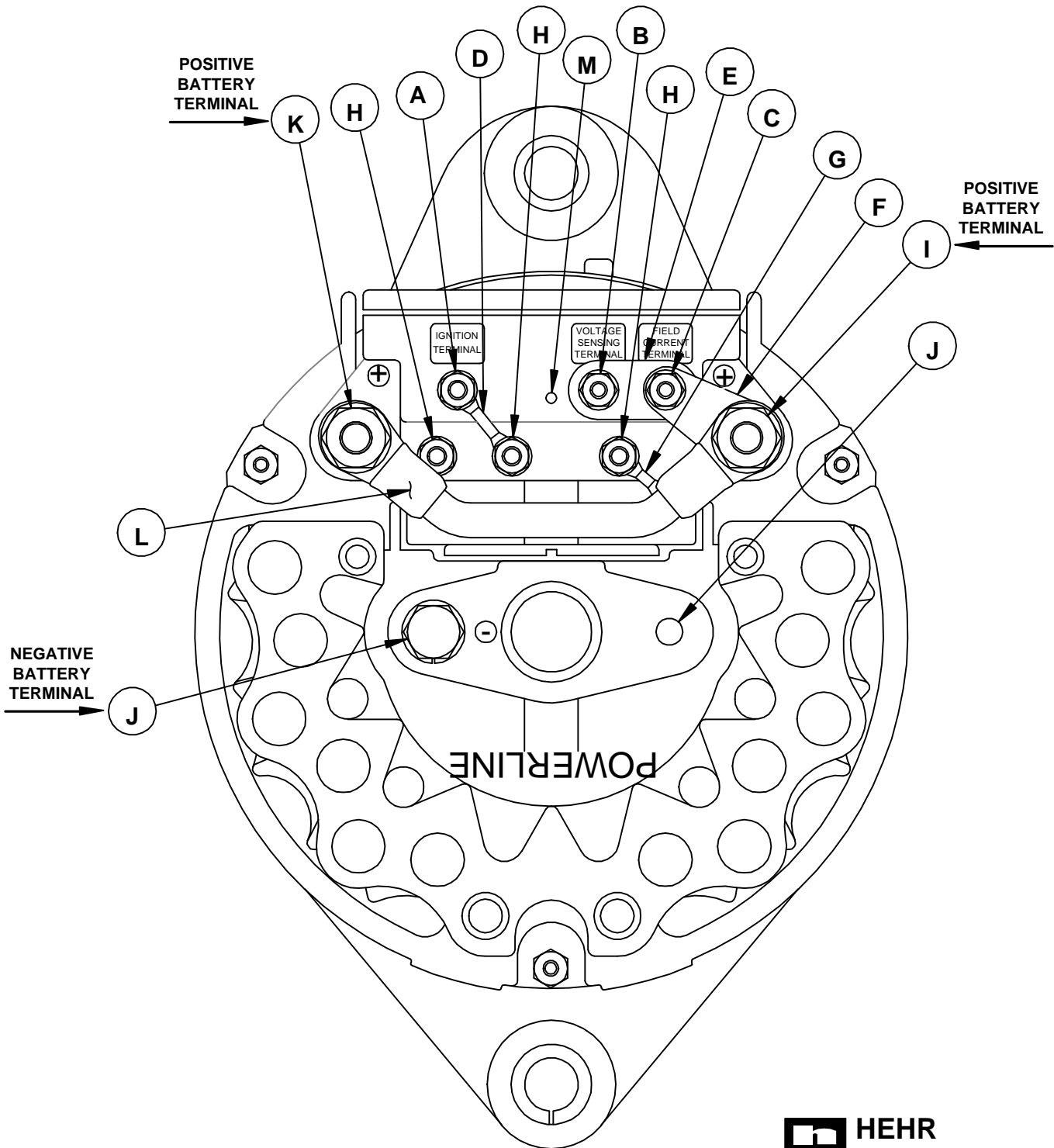
APPROXIMATE VOLTAGE AT BATTERY SHOULD BE 13.8 TO 14.2 VOLTS AND 14.8 TO 15.2 VOLTS AT ALTERNATOR OUTPUT POST (TERMINAL "I").

# SERIES 25

14 VOLT 200 / 250 AMP

J-180 MODELS: 25-10, 25-35, 25-37, 25-41

T-MOUNT MODELS: 25-50, 25-51, 25-52



## TERMINALS AND JUMPERS - 25 SERIES 200 AMP / 250 AMP

- TERMINAL "A" IF **NO** WIRE IS ATTACHED FROM IGNITION TO THIS TERMINAL, THEN JUMPER "P" MUST BE IN PLACE. IF THERE IS A WIRE FROM IGNITION SWITCH TO TERMINAL "A", THEN JUMPER "D" **MUST BE REMOVED**. WHEN WIRE FROM IGNITION SWITCH IS ATTACHED, IT **MUST GO** ON AND OFF WITH IGNITION AND HAVE 12 VOLTS WHEN ON. THE ALTERNATOR WILL NOT OPERATE WITH BOTH A JUMPER AND THE IGNITION WIRE ATTACHED TO TERMINAL "A". ONE OR THE **OTHER MUST BE REMOVED**.
- TERMINAL "B" FOR FLAT CURVE, IT MUST HAVE A WIRE FROM BATTERY + TO IT OR JUMPER "E" MUST BE IN PLACE. FOR TEMPERATURE COMPENSATED CURVE, REMOVE JUMPER "E" AND LEAVE TERMINAL OPEN. **CAUTION:** OPEN SENSE MODE IS MEANT FOR OVERTHE-ROAD TRUCKS, **DO NOT USE ON EMERGENCY VEHICLES!** OUTPUT VOLTAGE WILL DROP TO 13 VOLTS WHEN HOT.
- TERMINAL "C" MUST HAVE A WIRE FROM BATTERY TO IT **OR** JUMPER "F" MUST BE IN PLACE. **THERE CAN NOT BE BOTH**.
- JUMPER "G" **MUST BE IN PLACE AT ALL TIMES FOR ALTERNATOR TO OPERATE**.
- BOLT HOLE "J" IN REAR HOUSING NEXT TO REAR BEARING USED FOR GROUND CABLE CONNECTION. EITHER SIDE MAY BE USED. USE **2/0 CABLE MINIMUM** FROM "J" TO A GOOD BATTERY GROUND.
- TERMINAL "I"  
TERMINAL "K" POSITIVE OUTPUT TERMINALS. JUMPER CABLE "L" MUST BE ATTACHED BETWEEN THE TWO (2) TERMINALS AND NOT BE REMOVED. THE POSITIVE OUTPUT CABLE MAY BE ATTACHED TO EITHER "I" OR "K" TERMINAL. USE **2/0 CABLE MINIMUM** AND CONNECT TO GOOD POSITIVE BATTERY CONNECTION.
- TERMINALS "H" AC TERMINALS USED FOR TACHOMETER CONNECTION, AC TURN-ON OF ALTERNATOR CHARGE INDICATOR LIGHT CONTROL.

### ISOLATOR EQUIPPED VEHICLES

- TERMINAL "B" MUST HAVE A WIRE RUN TO POSITIVE POST OF MAIN BATTERY AND JUMPER "E" REMOVED. TERMINAL "B" MUST HAVE 12 VOLTS AT ALL TIMES.
- TERMINAL "C" MUST HAVE A WIRE RUN TO POSITIVE POST OF MAIN BATTERY AND JUMPER "E" REMOVED. TERMINAL "C" MUST HAVE 12 VOLTS AT ALL TIMES.
- TERMINAL "I"  
TERMINAL "K" WILL NOT HAVE VOLTAGE ON IT WITH ENGINE NOT RUNNING. WITH ENGINE RUNNING, VOLTAGE SHOULD BE .8 TO 1 VOLT HIGHER THAN VOLTAGE AT BATTERY.
- APPROXIMATE VOLTAGE AT BATTERY SHOULD BE, 13.8 TO 14.2 VOLTS AND 14.8 TO 15.2 VOLTS AT ALTERNATOR OUTPUT POST (TERMINAL "I" & "K").

**ON VEHICLE TROUBLE SHOOTING GUIDE**  
**VOLTAGE CHECK POINTS**  
**POWERLINE 25 SERIES ALTERNATORS WITH INTERNAL 10-120 REGULATOR**

**WITH BATTERY ISOLATOR IN SYSTEM**

REGULATOR AND ALTERNATOR TERMINALS	IGNITION OFF	IGNITION ON - ENGINE NOT RUNNING		ENGINE RUNNING	
		KEY SWITCHED IGNITION	SELF EXCITED IGNITION	KEY SWITCHED IGNITION	SELF EXCITED IGNITION
		TERMINAL A	0 VOLTS	12 VDC OR 0 VDC	
TERMINAL B	12.6 VOLTS	12.6 VOLTS		14 VOLTS	
TERMINAL C	12.6 VOLTS	12.6 VOLTS		14 VOLTS	
TERMINALS I OR K	0 VOLTS	0 VOLTS		15 VOLTS	
TERMINALS H	0 VOLTS	0 VOLTS		7 VOLTS AC	

MEASUREMENTS TAKEN FROM ALTERNATOR GROUND "J" TO EACH TERMINAL

**WITHOUT BATTERY ISOLATOR IN SYSTEM**

REGULATOR AND ALTERNATOR TERMINALS	IGNITION OFF	IGNITION ON - ENGINE NOT RUNNING		ENGINE RUNNING	
		KEY SWITCHED IGNITION	SELF EXCITED IGNITION	KEY SWITCHED IGNITION	SELF EXCITED IGNITION
		TERMINAL A	0 VOLTS	12 VDC OR 0 VDC	
TERMINAL B	12.6 VOLTS	12.6 VOLTS		14 VOLTS	
TERMINAL C	12.6 VOLTS	12.6 VOLTS		14 VOLTS	
TERMINAL I OR K	12.6 VOLTS	12.6 VOLTS		14 VOLTS	
TERMINALS H	0 VOLTS	0 VOLTS		7 VOLTS AC	

MEASUREMENTS TAKEN FROM ALTERNATOR GROUND "J" TO EACH TERMINAL

## HOW TO:

### FULL FIELD 25 SERIES WITH BUILT - IN REGULATOR

#### (WITHOUT BATTERY ISOLATOR)

HOLE "M"      INSERT A SMALL PIN INTO HOLE SHOWN ON DRAWING. ATTACH A JUMPER LEAD FROM PIN TO POSITIVE POST "I" OR "K" ON ALTERNATOR. WITH ENGINE RUNNING AT 800 TO 1000 RPM, ALTERNATOR VOLTAGE SHOULD INCREASE TO 15 TO 16 VOLTS. (IT WILL BE NECESSARY TO HOLD PIN IN HOLE AND PUSH IN TO BE SURE CONTACT IS MADE)

#### (WITH BATTERY ISOLATOR)

WITH A BATTERY ISOLATOR IN THE SYSTEM, ATTACH A JUMPER LEAD FROM THE PIN TO THE FIELD CURRENT TERMINAL "C" ON THE ALTERNATOR WITH ENGINE RUNNING AT 800 TO 1000 RPM, ALTERNATOR VOLTAGE SHOULD INCREASE TO 15 TO 16 VOLTS.

#### CAUTION.

IN THE EVENT THE ROTOR IS SHORTED TO GROUND, THE PIN CAN GET HOT ENOUGH TO BURN FINGERS. WE SUGGEST THAT YOU MAKE THE JUMPER WITH A 10 AMP IN LINE FUSE INSTALLED TO PREVENT THIS FROM HAPPENING.

IF THE ALTERNATOR VOLTAGE INCREASES, THE REGULATOR IS BAD OR NOT CONNECTED CORRECTLY. DOUBLE CHECK WIRING ON REAR OF ALTERNATOR FOR CORRECT HOOKUP BEFORE REPLACING REGULATOR.

IF THE ALTERNATOR FAILS TO WORK, THE ALTERNATOR ITSELF IS BAD AND SHOULD BE DIAGNOSED FOR REPAIR. IT IS RARELY NECESSARY TO REPLACE AN ALTERNATOR.

# ON VEHICLE TROUBLE SHOOTING GUIDE PRELIMINARY PROCEDURES

## ***POWERLINE*** 25 SERIES ALTERNATORS

ALL 12 VOLT MODELS WITH **EXTERNAL** REGULATORS

- 1.) CHECK ALTERNATOR DRIVE BELT(S) AND BELT TENSION.
- 2.) CHECK ALTERNATOR POSITIVE AND NEGATIVE CABLE CONNECTIONS.
- 3.) CHECK FOR PROPERLY SIZED CABLES FROM ALTERNATOR TO BATTERY(S), BOTH POSITIVE AND NEGATIVE.
- 4.) CHECK NEGATIVE CABLE CONNECTIONS TO FRAME RAILS WHEN USED FOR GROUND CIRCUIT, FOR CLEAN TIGHT CONNECTIONS.
- 5.) CHECK CABLE CONNECTIONS ON BATTERY FOR CLEAN TIGHT CONNECTIONS.
- 6.) CHECK WIRING HARNESS CONNECTIONS ON REGULATOR, ALTERNATOR AND BATTERY FOR CLEAN TIGHT CONNECTIONS.
- 7.) CHECK FUSES ON WIRING HARNESS AND REGULATOR.
- 8.) CHECK BATTERY(S) CONDITION-. 12.6 VOLT - 100%, 12.4 VOLT - 75%, 12.2 VOLT - 50% STATE OF CHARGE. TRUE BATTERY VOLTAGE IS OBTAINED **AFTER** REMOVING ANY SURFACE CHARGE FROM BATTERY(S). IF BATTERY VOLTAGE IS **LESS THAN 12.4 VOLTS**, REPLACE OR RECHARGE BATTERY(S) AND RETEST. IF BATTERY VOLTAGE IS **EQUAL TO OR HIGHER THAN 12.4 VOLTS**, CONTINUE TEST.
- 9.) IDENTIFY MODEL OF ALTERNATOR.
- 10.) IDENTIFY MODEL OF REGULATOR.
- 11.) DETERMINE IF VEHICLE IS ISOLATOR EQUIPPED.
- 12.) LOCATE IN MANUAL THE CORRECT TERMINAL REFERENCE DRAWING FOR THE ALTERNATOR AND REGULATOR ON VEHICLE.

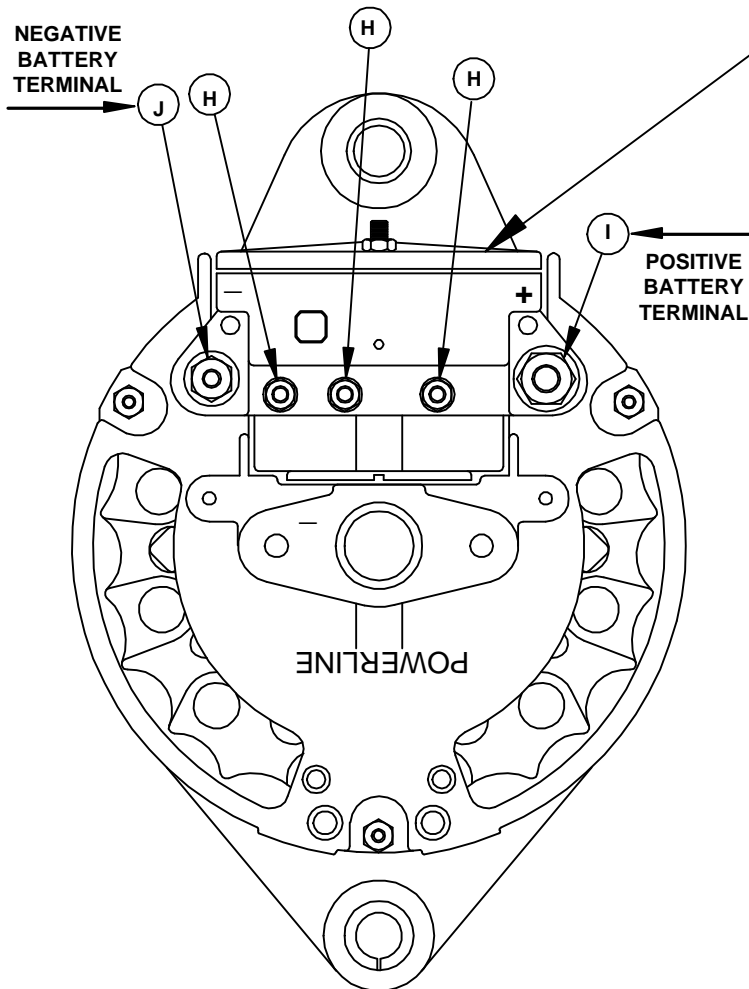
# TROUBLESHOOTING A NO VOLTAGE CONDITION

## (REGULATOR TERMINAL CHECK POINTS)

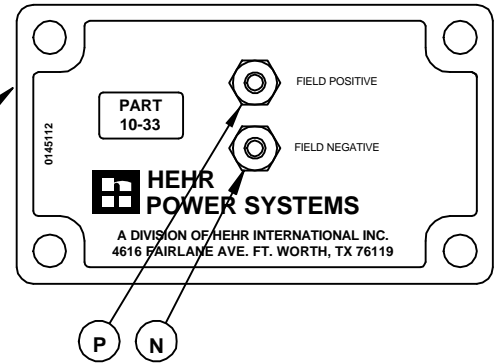
- 1.) "I" TERMINAL NO VOLTAGE: CHECK WHERE SPLICED IN WIRING, BLOWN FUSE OR IGNITION SWITCH PROBLEM.
- 2.) "A" TERMINAL NO VOLTAGE: CHECK FOR BLOWN FUSE OR BAD LEAD CONNECTION AT BATTERY SOURCE.  
(RED WIRE OF HARNESS)
- 3.) "F" TERMINAL NO VOLTAGE: CHECK FOR BLOWN FUSE IN "A" TERMINAL LEAD OR "S1" LEAD, BAD REGULATOR GROUND, CORRODED TERMINALS ON REGULATOR CONNECTION, GROUNDED FIELD LEAD TO ALTERNATOR, GROUNDED ROTOR IN ALTERNATOR OR HARNESS PLUG NOT FULLY PLUGGED IN.
- 4.) "S1 " TERMINAL NO VOLTAGE: CHECK FOR BLOWN FUSE, CHECK LEAD FOR BAD CONNECTION AT BATTERY SOURCE.  
(RED/WHITE WIRE)
- 5.) "S2" TERMINAL NO VOLTAGE: CHECK FOR BLOWN FUSE, CHECK LEAD FOR BAD CONNECTION AT BATTERY SOURCE.  
(RED/YELLOW WIRE)
- 6.) GROUND TERMINAL: THE CONNECTION ON THIS LEAD MUST BE CLEAN AND GOOD ON BOTH THE REGULATOR AND ALTERNATOR CONNECTIONS. A BAD CONNECTION ON HIS LEAD WILL GIVE YOU A NO FIELDVOLTAGE CONDITION.

**NOTE: THE REGULATOR HAS A CIRCUIT IN IT THAT WILL PUT THE REGULATOR TO SLEEP IF THERE IS A SHORTED FIELD, OR GROUNDED ROTOR IN THE ALTERNATOR. WHEN THE PROBLEM IS REPAIRED, THE REGULATOR WILL OPERATE NORMALLY WITHOUT DAMAGE TO IT.**

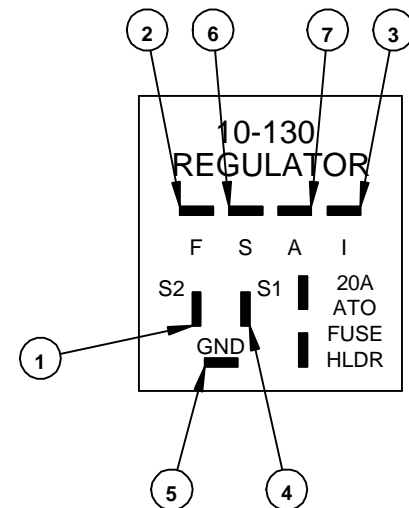
# 25-12, 25-14, 25-16



## FIELD COVER



## 10-129 & 10-130



### ALTERNATOR WIRING CONNECTIONS SERIES 25 160 & 190 AMP EXTERNALLY REGULATED

- "P" CONNECTS TO #2
- "N" CONNECTS TO #5 & "J"
- "I" CONNECTS TO BATTERY POSITIVE (2/0 CABLE MINIMUM)
- 1 CONNECTS TO BATTERY #2 POSITIVE (IF 2 BAT. SYSTEM)
- 3 CONNECTS TO IGNITION SWITCH
- 4 CONNECTS TO BATTERY POSITIVE
- 6 CONNECTS TO "H" (ANY ONE)
- 7 CONNECTS TO BATTERY POSITIVE

### REGULATOR PIN FUNCTION

- 1 (S2) = REMOTE SENSE FOR THE AUXILLARY BATTERY
- 2 (F) = REGULATOR OUTPUT - DRIVES FIELD WINDING
- 3 (I) = TURNS REGULATOR ON (4 WIRE HOOK UP)
- 4 (S1) = REMOTE SENSE FOR THE MAIN BATTERY
- 5 (GND) = CIRCUIT GROUNDING FOR THE REGULATOR
- 6 (S) = 3 WIRE HOOK - UP: TURNS REGULATOR ON.
- 6 (S) = 4 WIRE HOOK - UP: TURNS WARNING LIGHT OFF (IF SYSTEM IS WORKING)
- 7 (A) = POWER SUPPLY TO REGULATOR & FIELD

## FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS									
IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A	I	S1	S2	F	STA				
7	3	4	1	2	S								
1. DC TURN ON Single Battery System				OFF	OFF	0	NO	12/24	0	12/24	0	0	0
				OFF	OFF	0	YES	12/24	0	12/24	0	0	0
				ON	NOT	0	NO	12/24	12/24	12/24	0	10-20	0
				DC	RUNNING	0	YES	12/24	4-Jan	12/24	0	10-20	0
				ON	ON	1000	NO	14/28	14/28	14/28	0	*	6/12
				DC		1000	YES	14/28	14/28	14/28	0	*	6/12

1. DC TURN ON Multiple Battery System With Isolator				OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0
							YES	12/24	0	12/24	12/24	0	0
				ON	NOT	0	NO	12/24	12/24	12/24	12/24	10-20	0
				DC	RUNNING		YES	12/24	1-4	12/24	12/24	10-20	0
				ON	ON	1000	NO	14/28	14/28	14/28	14/28	*	6/12
				DC	ON	1000	YES	14/28	14/28	14/28	14/28	*	6/12

FULL FIELD VOLTAGE INCREASES AS LOAD INCREASES

LL (LIGHT LOAD)

ML (MEDIUM LOAD)

HL (HEAVY LOAD)

12 V

1-4 V

5-9 V

10-14 V

24 V

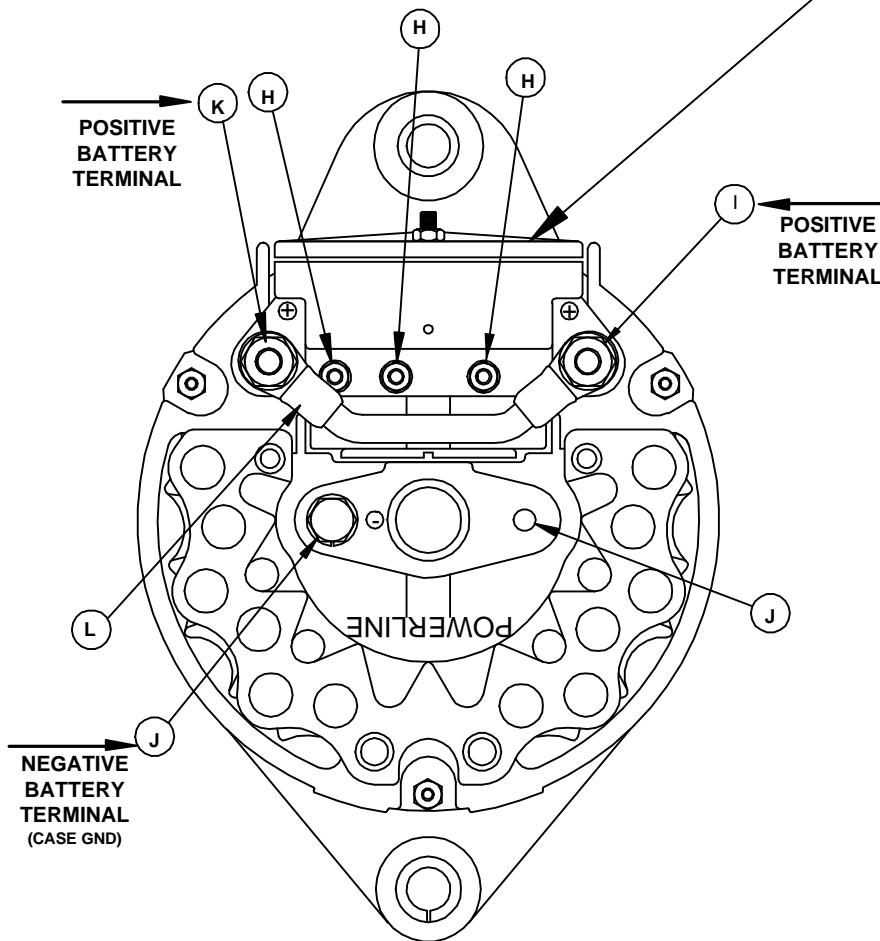
2-8 V

10-18 V

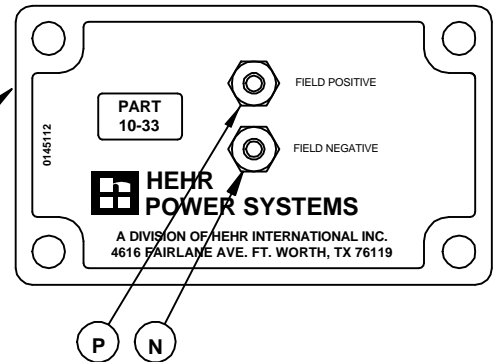
20-28 V

# 25-11, 25-38, 25-45

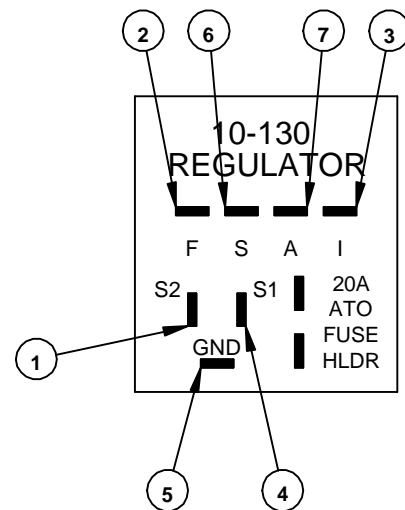
(160 AMP 28 VOLT)



## FIELD COVER



## 10-129 & 10-130



## ALTERNATOR WIRING CONNECTIONS SERIES 25 200 & 250 AMP EXTERNALLY REGULATED

- "P" CONNECTS TO #2
- "N" CONNECTS TO #5 & "J"
- "I" CONNECTS TO BATTERY POSITIVE (2/0 CABLE MINIMUM)
- 1 CONNECTS TO BATTERY #2 POSITIVE (IF 2 BAT. SYSTEM)
- 3 CONNECTS TO IGNITION SWITCH
- 4 CONNECTS TO BATTERY POSITIVE
- 6 CONNECTS TO "H" (ANY ONE)
- 7 CONNECTS TO BATTERY POSITIVE

## REGULATOR PIN FUNCTION

- 1 (S2) = REMOTE SENSE FOR THE AUXILLARY BATTERY
- 2 (F) = REGULATOR OUTPUT - DRIVES FIELD WINDING
- 3 (I) = TURNS REGULATOR ON (4 WIRE HOOK UP)
- 4 (S1) = REMOTE SENSE FOR THE MAIN BATTERY
- 5 (GND) = CIRCUIT GROUNDING FOR THE REGULATOR
- 6 (S) = 3 WIRE HOOK - UP: TURNS REGULATOR ON.
- 6 (S) = 4 WIRE HOOK - UP: TURNS WARNING LIGHT OFF (IF SYSTEM IS WORKING;
- 7 (A) = POWER SUPPLY TO REGULATOR & FIELD

## FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

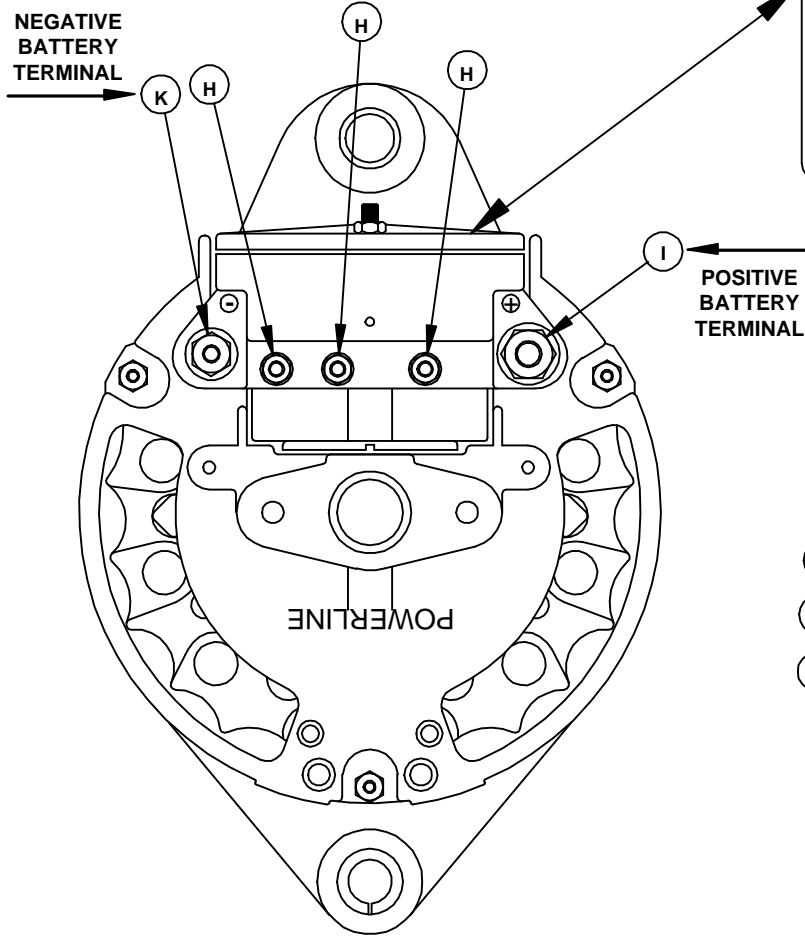
With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS									
IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A	I	S1	S2	F	STA				
7	3	4	1	2	S								
1. DC TURN ON Single Battery System				OFF	OFF	0	NO	12/24	0	12/24	0	0	0
				OFF	OFF	0	YES	12/24	0	12/24	0	0	0
				ON	NOT	0	NO	12/24	12/24	12/24	0	10-20	0
				DC	RUNNING	0	YES	12/24	4-Jan	12/24	0	10-20	0
				ON	ON	1000	NO	14/28	14/28	14/28	0	*	6/12
				DC		1000	YES	14/28	14/28	14/28	0	*	6/12

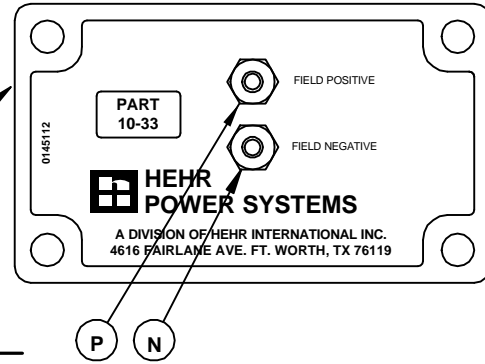
1. DC TURN ON Multiple Battery System With Isolator				OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0
							YES	12/24	0	12/24	12/24	0	0
				ON	NOT	0	NO	12/24	12/24	12/24	12/24	10-20	0
				DC	RUNNING		YES	12/24	1-4	12/24	12/24	10-20	0
				ON	ON	1000	NO	14/28	14/28	14/28	14/28	*	6/12
				DC	ON	1000	YES	14/28	14/28	14/28	14/28	*	6/12

FULL FIELD VOLTAGE INCREASES AS LOAD INCREASES	12 V	24 V
LL (LIGHT LOAD)	1-4 V	2-8 V
ML (MEDIUM LOAD)	5-9 V	10-18 V
HL (HEAVY LOAD)	10-14 V	20-28 V

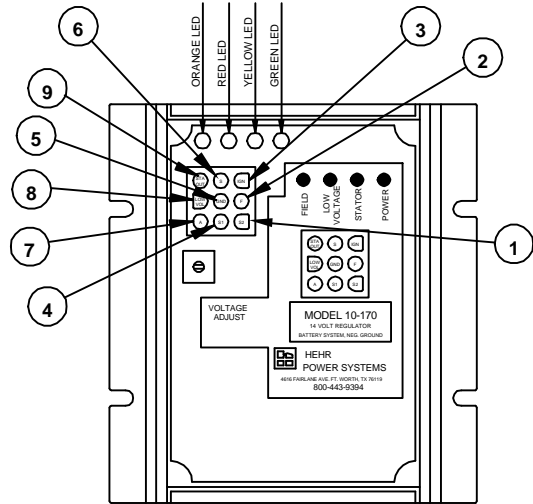
# 25-12, 25-14, 25-16



## FIELD COVER



## 10-170 & 10-172



### ALTERNATOR WIRING CONNECTIONS SERIES 25 160 & 190 AMP EXTERNALLY REGULATED

- "P" CONNECTS TO #2
- "N" CONNECTS TO #5 & "J"
- "I" CONNECTS TO BATTERY POSITIVE (2/0 CABLE MINIMUM)
- "L" JUMPER CABLE MUST BE IN PLACE. DO NOT REMOVE
- 1 CONNECTS TO BATTERY #2 POSITIVE (IF 2 BAT. SYSTEM)
- 3 CONNECTS TO IGNITION SWITCH
- 4 CONNECTS TO BATTERY POSITIVE
- 6 CONNECTS TO "H" (ANY ONE)
- 7 CONNECTS TO BATTERY POSITIVE

### REGULATOR PIN FUNCTION

- 1 (S2) = REMOTE SENSE FOR THE AUXILLARY BATTERY
- 2 (F) = REGULATOR OUTPUT - DRIVES FIELD WINDING
- 3 (I) = TURNS REGULATOR ON (4 WIRE HOOK UP)
- 4 (S1) = REMOTE SENSE FOR THE MAIN BATTERY
- 5 (GND) = CIRCUIT GROUNDING FOR THE REGULATOR
- 6 (S) = 4 WIRE HOOK - UP: TURNS WARNING LIGHT OFF (IF SYSTEM IS WORKING)
- 7 (A) = POWER SUPPLY TO REGULATOR & FIELD
- 8 (REMOTE LED) = LOW VOLTAGE
- 9 (REMOTE LED) = STATOR ON

FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage or green LED with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

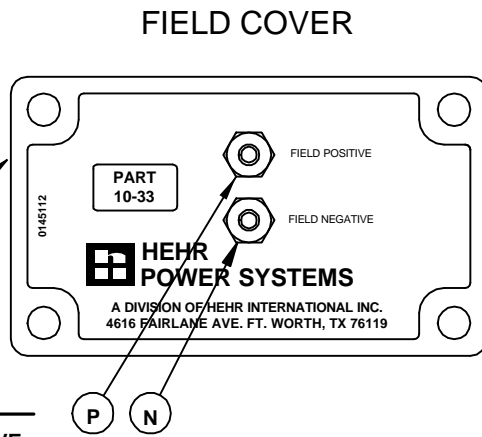
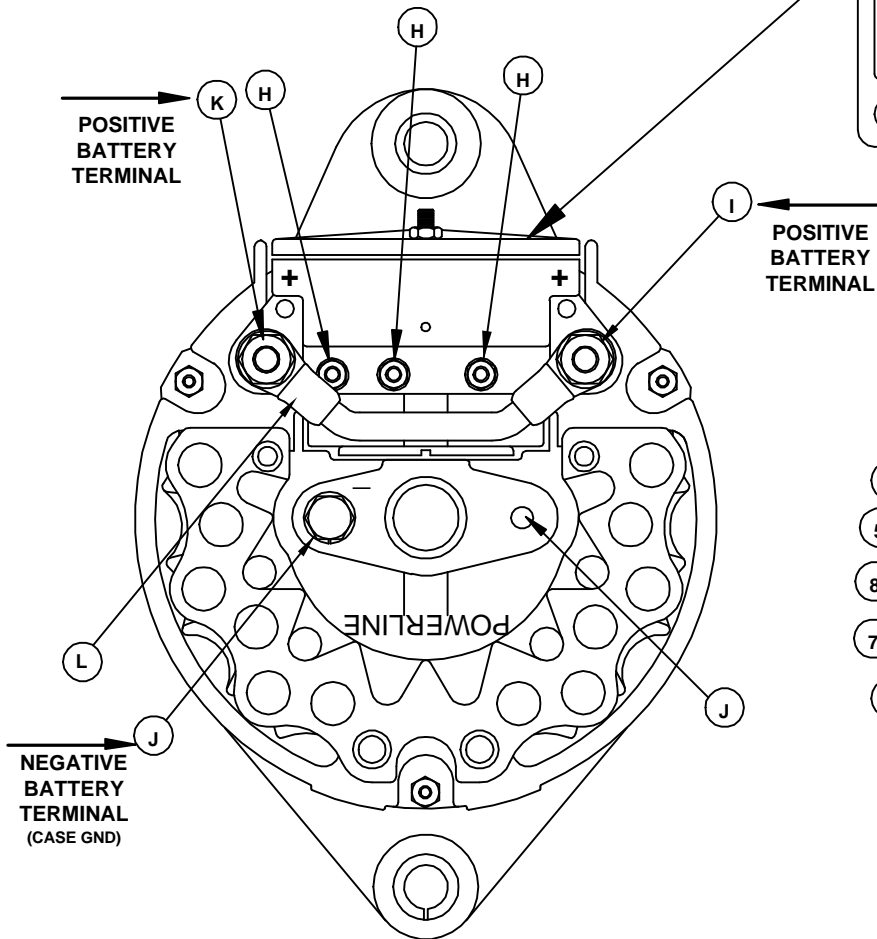
	VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS						REGULATOR LED'S			
	IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A PIN 7	I PIN 3	S1 PIN 4	S2 PIN 1	F PIN 2	STA PIN 6	GREEN IGNITION	ORG. FIELD	YEL STATOR	RED LOW VLT
1. DC TURN ON Single Battery System	OFF	OFF	0	NO	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	OFF	OFF	0	YES	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	DC	RUNNING	0	YES	12/24	1.5-3	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	ON	ON	1000	NO	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
	DC		1000	YES	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	—	12/24	0	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING		USED										
	ON	ON	1000	NOT	14/28		14/28	0	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														
1. DC TURN ON Multiple Battery System With Isolator	OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
				YES	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	DC	RUNNING		YES	12/24	3/3	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	ON	ON	1000	NO	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	DC	ON	1000	YES	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING	0	USED										
	ON	ON	1000	NOT	14/28	0	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														

NOTES: \* Orange LED may be dimly lit or flickering

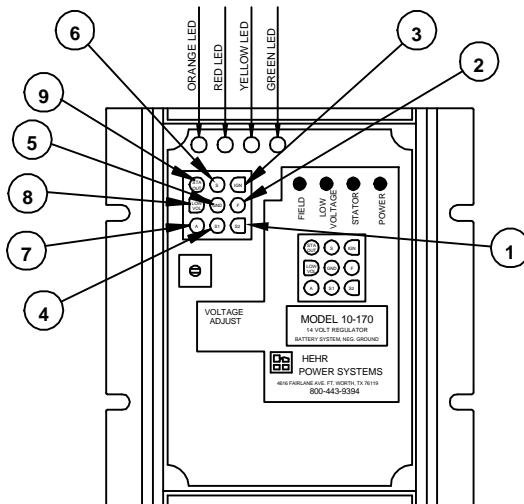
(1) Red LED may be on if battery voltage is below 12.8 VDC

# 25-11, 25-38, 25-45

(160 AMP 28 VOLT)



## 10-170 & 10-172



### ALTERNATOR WIRING CONNECTIONS SERIES 25 200 & 250 AMP EXTERNALLY REGULATED

- "P" CONNECTS TO #2
- "N" CONNECTS TO #5 & "J"
- "I" CONNECTS TO BATTERY POSITIVE (2/0 CABLE MINIMUM)
- "L" JUMPER CABLE MUST BE IN PLACE. DO NOT REMOVE
- 1 CONNECTS TO BATTERY #2 POSITIVE (IF 2 BAT. SYSTEM)
- 3 CONNECTS TO IGNITION SWITCH
- 4 CONNECTS TO BATTERY POSITIVE
- 6 CONNECTS TO "H" (ANY ONE)
- 7 CONNECTS TO BATTERY POSITIVE

### REGULATOR PIN FUNCTION

- 1 (S2) = REMOTE SENSE FOR THE AUXILLARY BATTERY
- 2 (F) = REGULATOR OUTPUT - DRIVES FIELD WINDING
- 3 (I) = TURNS REGULATOR ON (4 WIRE HOOK UP)
- 4 (S1) = REMOTE SENSE FOR THE MAIN BATTERY
- 5 (GND) = CIRCUIT GROUNDING FOR THE REGULATOR
- 6 (S) = 4 WIRE HOOK - UP: TURNS WARNING LIGHT OFF (IF SYSTEM IS WORKING)
- 7 (A) = POWER SUPPLY TO REGULATOR & FIELD
- 8 (REMOTE LED) = LOW VOLTAGE
- 9 (REMOTE LED) = STATOR ON

FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage or green LED with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

	VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS						REGULATOR LED'S			
	IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A PIN 7	I PIN 3	S1 PIN 4	S2 PIN 1	F PIN 2	STA PIN 6	GREEN IGNITION	ORG. FIELD	YEL STATOR	RED LOW VLT
1. DC TURN ON Single Battery System	OFF	OFF	0	NO	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	OFF	OFF	0	YES	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	DC	RUNNING	0	YES	12/24	1.5-3	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	ON	ON	1000	NO	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
	DC		1000	YES	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	—	12/24	0	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING		USED										
	ON	ON	1000	NOT	14/28		14/28	0	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														
1. DC TURN ON Multiple Battery System With Isolator	OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
				YES	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	DC	RUNNING		YES	12/24	3/3	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	ON	ON	1000	NO	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	DC	ON	1000	YES	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING	0	USED										
	ON	ON	1000	NOT	14/28	0	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														

NOTES: \* Orange LED may be dimly lit or flickering

(1) Red LED may be on if battery voltage is below 12.8 VDC



FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage or green LED with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

	VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS						REGULATOR LED'S			
	IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A PIN 7	I PIN 3	S1 PIN 4	S2 PIN 1	F PIN 2	STA PIN 6	GREEN IGNITION	ORG. FIELD	YEL STATOR	RED LOW VLT
1. DC TURN ON Single Battery System	OFF	OFF	0	NO	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	OFF	OFF	0	YES	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	DC	RUNNING	0	YES	12/24	1.5-3	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	ON	ON	1000	NO	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
	DC		1000	YES	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	—	12/24	0	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING		USED										
	ON	ON	1000	NOT	14/28		14/28	0	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														
1. DC TURN ON Multiple Battery System With Isolator	OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
				YES	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	DC	RUNNING		YES	12/24	3/3	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	ON	ON	1000	NO	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	DC	ON	1000	YES	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING	0	USED										
	ON	ON	1000	NOT	14/28	0	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														

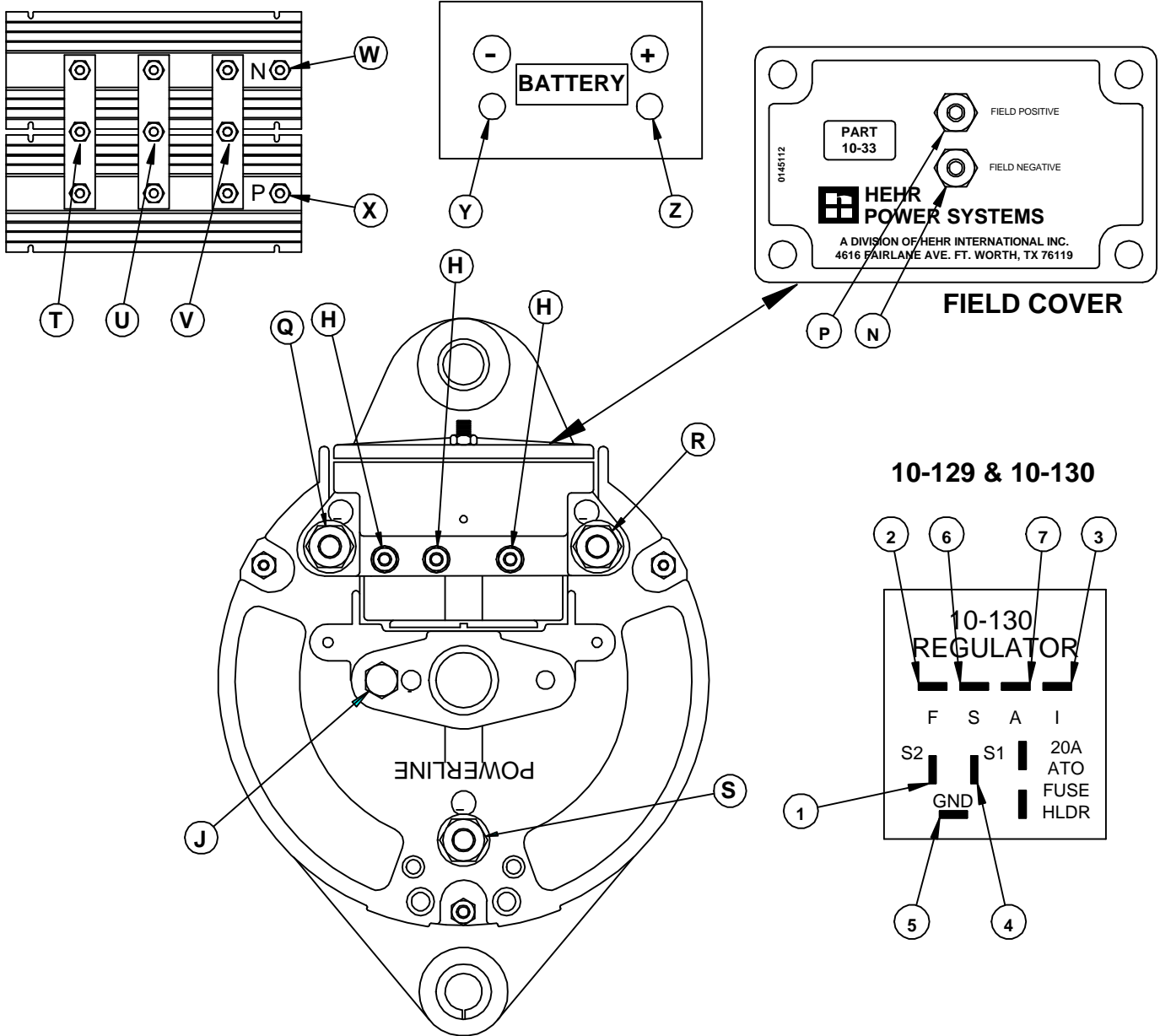
NOTES: \* Orange LED may be dimly lit or flickering

(1) Red LED may be on if battery voltage is below 12.8 VDC

# SERIES 25

(12 VOLT 200 / 250 AMP)

## EXTERNAL 10-130 REGULATOR AND RECTIFIER PACK



### ALTERNATOR / REGULATOR WIRING CONNECTIONS

- "P" CONNECTS TO #2
- "N" CONNECTS TO #5 & "J"
- "X" CONNECTS TO "Z" 2/0 CABLE MINIMUM
- "W" CONNECTS TO "Y" 2/0 CABLE MINIMUM
- "Q" "R" "S" CONNECTS TO "T" "U" "V"
- 1 CONNECTS TO BATTERY #2 POSITIVE (IF 2 BAT. SYSTEM)
- 3 CONNECTS TO IGNITION SWITCH
- 4 CONNECTS TO BATTERY POSITIVE
- 6 CONNECTS TO "H" (ANY ONE)
- 7 CONNECTS TO BATTERY POSITIVE

### REGULATOR PIN FUNCTION

- 1 (S2) = REMOTE SENSE FOR THE AUXILLARY BATTERY
- 2 (F) = REGULATOR OUTPUT - DRIVES FIELD WINDING
- 3 (I) = TURNS REGULATOR ON (4 WIRE HOOK UP)
- 4 (S1) = REMOTE SENSE FOR THE MAIN BATTERY
- 5 (GND) = CIRCUIT GROUNDING FOR THE REGULATOR
- 6 (S) = 3 WIRE HOOK - UP: TURNS REGULATOR ON.
- 6 (S) = 4 WIRE HOOK - UP: TURNS WARNING LIGHT OFF (IF SYSTEM IS WORKING)
- 7 (A) = POWER SUPPLY TO REGULATOR & FIELD

## FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS									
IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A	I	S1	S2	F	STA				
7	3	4	1	2	S								
1. DC TURN ON Single Battery System				OFF	OFF	0	NO	12/24	0	12/24	0	0	0
				OFF	OFF	0	YES	12/24	0	12/24	0	0	0
				ON	NOT	0	NO	12/24	12/24	12/24	0	10-20	0
				DC	RUNNING	0	YES	12/24	4-Jan	12/24	0	10-20	0
				ON	ON	1000	NO	14/28	14/28	14/28	0	*	6/12
				DC		1000	YES	14/28	14/28	14/28	0	*	6/12

1. DC TURN ON Multiple Battery System With Isolator				OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0
							YES	12/24	0	12/24	12/24	0	0
				ON	NOT	0	NO	12/24	12/24	12/24	12/24	10-20	0
				DC	RUNNING		YES	12/24	1-4	12/24	12/24	10-20	0
				ON	ON	1000	NO	14/28	14/28	14/28	14/28	*	6/12
				DC	ON	1000	YES	14/28	14/28	14/28	14/28	*	6/12

FULL FIELD VOLTAGE INCREASES AS LOAD INCREASES

LL (LIGHT LOAD)

ML (MEDIUM LOAD)

HL (HEAVY LOAD)

12 V

1-4 V

5-9 V

10-14 V

24 V

2-8 V

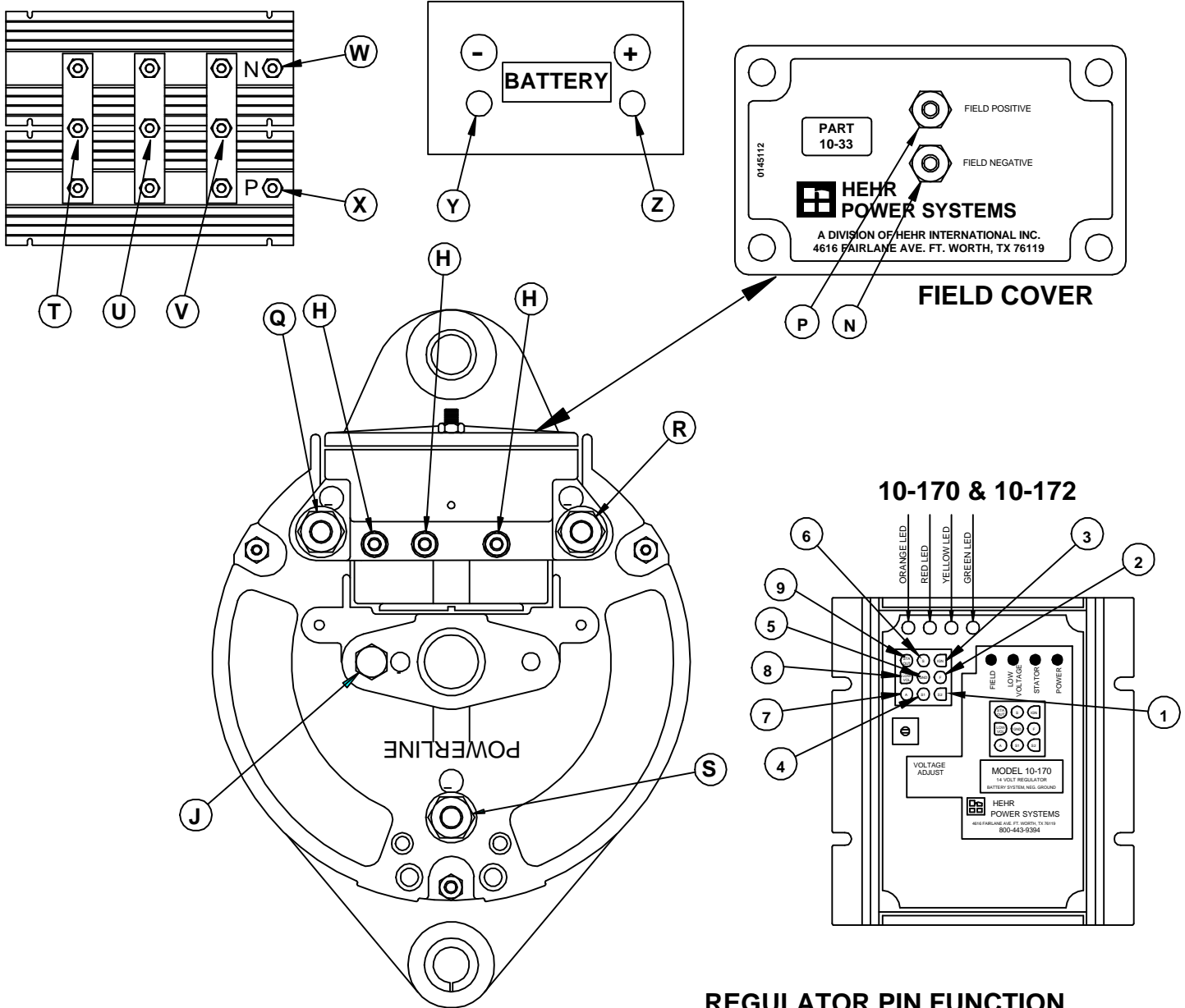
10-18 V

20-28 V

# SERIES 25

(12 VOLT 200 / 250 AMP)

## EXTERNAL 10-130 REGULATOR AND RECTIFIER PACK



### ALTERNATOR / REGULATOR WIRING CONNECTIONS

- "P" CONNECTS TO #2
- "N" CONNECTS TO #5 & "J"
- "X" CONNECTS TO "Z" (2/0 CABLE MINIMUM)
- "W" CONNECTS TO "Y" (2/0 CABLE MINIMUM)
- "Q" "R" "S" CONNECTS TO "T" "U" "V"
- 1 CONNECTS TO BATTERY #2 POSITIVE (IF 2 BAT. SYSTEM)
- 3 CONNECTS TO IGNITION SWITCH
- 4 CONNECTS TO BATTERY POSITIVE
- 6 CONNECTS TO "H" (ANY ONE)
- 7 CONNECTS TO BATTERY POSITIVE

### REGULATOR PIN FUNCTION

- 1 (S2) = REMOTE SENSE FOR THE AUXILLARY BATTERY
- 2 (F) = REGULATOR OUTPUT - DRIVES FIELD WINDING
- 3 (I) = TURNS REGULATOR ON (4 WIRE HOOK UP)
- 4 (S1) = REMOTE SENSE FOR THE MAIN BATTERY
- 5 (GND) = CIRCUIT GROUNDING FOR THE REGULATOR
- 6 (S) = 4 WIRE HOOK - UP: TURNS WARNING LIGHT OFF (IF SYSTEM IS WORKING)
- 7 (A) = POWER SUPPLY TO REGULATOR & FIELD
- 8 (REMOTE LED) = LOW VOLTAGE
- 9 (REMOTE LED) = STATOR ON

FIGURE 9 - ON VEHICLE VOLTMETER TESTING / TROUBLESHOOTING GUIDE

With all wiring connections in place and power applied, make voltage measurements (relative to Ground) at the locations shown for the conditions shown. Typical good values are shown in the table for 12/24 volt systems. IF you do not get these values, investigate the "links". Example: No F voltage or green LED with both A terminal and I terminal voltage present means a bad regulator. IF I terminal voltage is missing, problem is in wiring/lamp/ or IGN switch. DO THESE TESTS WITH ALL NON-ESSENTIAL VEHICLE LOADS OFF (light load condition). Voltages shown are approximate/ no tolerance intended.

	VEHICLE CONDITIONS				VOLTAGE AT REGULATOR/ ALTERNATOR TERMINALS						REGULATOR LED'S			
	IGNITION SWITCH	ENGINE CONDITION	ENGINE RPM	DASH LAMP	A PIN 7	I PIN 3	S1 PIN 4	S2 PIN 1	F PIN 2	STA PIN 6	GREEN IGNITION	ORG. FIELD	YEL STATOR	RED LOW VLT
1. DC TURN ON Single Battery System	OFF	OFF	0	NO	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	OFF	OFF	0	YES	12/24	0	12/24	0	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	DC	RUNNING	0	YES	12/24	1.5-3	12/24	0	.8/2.4	0	ON	ON *	OFF	OFF (1)
	ON	ON	1000	NO	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
	DC		1000	YES	14/28	14/28	14/28	0	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	—	12/24	0	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING		USED										
	ON	ON	1000	NOT	14/28		14/28	0	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														
1. DC TURN ON Multiple Battery System With Isolator	OFF	OFF	0	NO	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
				YES	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	ON	NOT	0	NO	12/24	12/24	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	DC	RUNNING		YES	12/24	3/3	12/24	12/24	.8/2.4	0	ON	ON *	OFF	OFF
	ON	ON	1000	NO	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	DC	ON	1000	YES	14/28	14/28	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
2. AC TURN ON	ON	NOT	0	NOT	12/24	0	12/24	12/24	0	0	OFF	OFF	OFF	OFF
	AC	RUNNING	0	USED										
	ON	ON	1000	NOT	14/28	0	14/28	14/28	3/4	6/12	ON	ON	ON	OFF
	AC			USED										
<b>APPLY ELECTRICAL LOADS. AT THE POINT WHERE LOAD EXCEEDS ALTERNATOR OUTPUT AND SYSTEM VOLTAGE DROPS TO 12.6/24 VOLTS, THE RED LED SHOULD COME ON.</b>														

NOTES: \* Orange LED may be dimly lit or flickering

(1) Red LED may be on if battery voltage is below 12.8 VDC

## ***POWERLINE 25 SERIES ALTERNATORS***

### **ALL 12 VOLT MODELS WITH EXTERNAL REGULATORS AND RECTIFIERS**

- 1.) TO TEST ALTERNATOR, REMOVE CABLES FROM AC TERMINALS "Q", "R" AND "S". DISCONNECT FIELD POSITIVE AND NEGATIVE FROM TERMINALS "P" AND "N".
- 2.) CONNECT A JUMPER FROM FIELD NEGATIVE (TERMINAL "N") TO A GOOD GROUND. CONNECT A JUMPER FROM FIELD POSITIVE (TERMINAL P) TO 12 VOLT BATTERY SOURCE. START ENGINE.
- 3.) ENGINE SHOULD BE RUNNING FAST ENOUGH TO ALLOW THE ALTERNATOR TO TURN 2000 RPM.
- 4.) USING AN AC VOLTMETER, CONNECT LEADS BETWEEN TERMINALS "Q" AND "R", THEN BETWEEN TERMINALS "R" AND "S", THEN BETWEEN TERMINALS "Q" AND "S". THE AC VOLTAGE BETWEEN THE AC TERMINALS SHOULD READ 26 VOLTS AC PLUS OR MINUS .5 VOLTS. A DIFFERENCE 1 VOLT OR MORE BETWEEN ANY OF THE TERMINALS WILL INDICATE A DEFECTIVE STATOR.
- 5.) THERE SHOULD NOT BE ANY VOLTAGE READING FROM TERMINALS "Q", "R" AND "S" TO GROUND, "J".
- 6.) FIELD CURRENT DRAW SHOULD BE 5 TO 5.5 AMPS.

## HOW TO:

### FULL FIELD 25 SERIES WITH EXTERNAL REGULATOR (AT ALTERNATOR)

DISCONNECT WIRE FROM POST "P" (FIELD POSITIVE) ON FIELD COVER AND WRAP WITH TAPE. ATTACH A JUMPER LEAD FROM POST "P" TO POSITIVE POST "I" ON ALTERNATOR. WITH ENGINE RUNNING AT 800 TO 1000 RPM, ALTERNATOR VOLTAGE SHOULD INCREASE TO 15 TO 16 VOLTS.

**CAUTION:** IN THE EVENT THE ROTOR IS SHORTED TO GROUND, THE WIRE CAN GET HOT ENOUGH TO BURN FINGERS. WE SUGGEST THAT YOU MAKE THE JUMPER WITH A 10 AMP IN LINE FUSE INSTALLED TO PREVENT THIS FROM HAPPENING.

IF THE ALTERNATOR VOLTAGE INCREASES, THE REGULATOR OR WIRING HARNESS IS BAD OR NOT CONNECTED CORRECTLY. DOUBLE-CHECK THE WIRING ON REAR OF ALTERNATOR FOR CORRECT HOOKUP BEFORE REPLACING REGULATOR.

IF THE ALTERNATOR FAILS TO WORK, THE ALTERNATOR ITSELF IS BAD.

### FULL FIELD 25 SERIES WITH EXTERNAL REGULATOR (AT REGULATOR)

REMOVE THE 4 TERMINAL (OR 9 TERMINAL) PLASTIC PLUG FROM THE REGULATOR. USING A WIRE, JUMP FROM THE "A" TERMINAL (RED WIRE) TO THE "F" TERMINAL (BLUE WIRE). WITH ENGINE RUNNING AT 800 TO 1000 RPM, ALTERNATOR VOLTAGE SHOULD INCREASE TO 15 TO 16 VOLTS.

**CAUTION:** IN THE EVENT THE ROTOR IS SHORTED TO GROUND, THE WIRE CAN GET HOT ENOUGH TO BURN FINGERS. WE SUGGEST THAT YOU MAKE THE JUMPER WITH A 10 AMP IN LINE FUSE INSTALLED TO PREVENT THIS FROM HAPPENING.

IF THE ALTERNATOR VOLTAGE INCREASES, THE REGULATOR IS BAD OR NOT CONNECTED CORRECTLY. DOUBLE-CHECK THE WIRING ON REAR OF ALTERNATOR FOR CORRECT HOOKUP, THEN TRY FULL FIELDING AT THE ALTERNATOR BEFORE REPLACING REGULATOR.

IF THE ALTERNATOR WORKS WHEN FULL FIELDING AT THE BACK OF THE ALTERNATOR BUT FAILS TO WORK WHEN FULL FIELDING AT THE REGULATOR END OF THE HARNESS, THE WIRING HARNESS IS BAD. IF THE ALTERNATOR FAILS TO WORK IN ANY OF THE ABOVE TESTS, THE ALTERNATOR ITSELF IS BAD.

# TROUBLE SHOOT EXTERNAL RECTIFIER PACK

REFER TO DRAWING ON PAGE 22

**TOOLS NEEDED:** 12 VOLT TEST LITE  
12 VOLT VEHICLE BATTERY  
VOLT/OHM METER

STEP 1: DISCONNECT ALL WIRES FROM RECTIFIER PACK.

STEP 2: ATTACH GROUND OF TEST LITE TO BATTERY GROUND. **(Y)**

STEP 3: ATTACH JUMPER CABLE FROM BATTERY POSITIVE **(Z)** TO POSITIVE BATTERY POST ON RECTIFIER PACK. **(X)**

STEP 4: TOUCH TEST LITE TO ALL THREE AC POSTS **(Q, R, S)** ONE AT A TIME. TEST LITE **SHOULD NOT LITE** ON ANY POST.

STEP 5: ATTACH JUMPER CABLE FROM BATTERY POSITIVE **(Z)** TO NEGATIVE BATTERY POST ON RECTIFIER PACK. **(W)**

STEP 6: TOUCH TEST LITE TO ALL THREE AC POSTS **(Q, R, S)** ONE AT A TIME. TEST LITE **SHOULD LITE** ON ALL 3 POSTS.

STEP 7: ATTACH JUMPER CABLE FROM BATTERY POSITIVE TO ALL OF THE THREE PHASE BOLTS **(T, U, V)** ON RECTIFIER PACK, ONE AT A TIME. TEST LITE **SHOULD LITE** WHEN TOUCHED TO POSITIVE BATTERY POST ON RECTIFIER PACK **(X)** FOR ALL THREE PHASES

STEP 8: REPEAT STEP 7, BUT TOUCH TEST LITE TO NEGATIVE BATTERY POST ON RECTIFIER PACK **(W)**. TEST LITE **SHOULD NOT LITE** WHEN TOUCHED TO NEGATIVE BATTERY POST ON RECTIFIER PACK FOR ALL THREE PHASES.

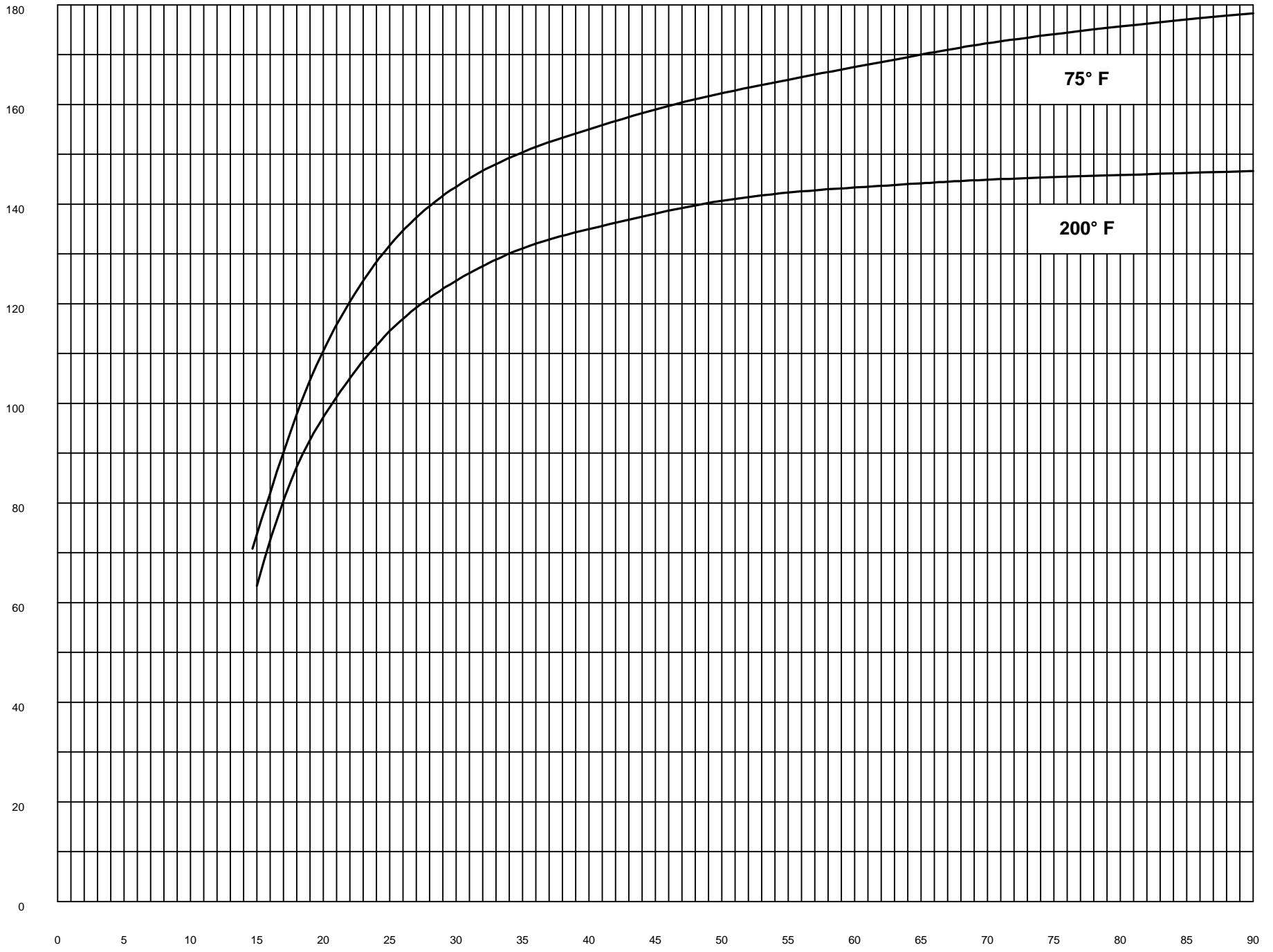
STEP 9: WITH METER ON CONTINUITY SETTING, CHECK BETWEEN THE BATTERY BOLT AND THE CASE ON BOTH THE POSITIVE AND NEGATIVE SIDES OF THE RECTIFIER PACK. **THERE SHOULD BE NO READING.**

ANY DIFFERENCE IN RESULTS OF TESTS COULD INDICATE A FAULTY PRODUCT. CALL FOR TECHNICAL ASSISTANCE AT 1-800-443-9394.

## FINDING PULLEY RATIO

THE CORRECT PULLEY RATIO IS VERY IMPORTANT FOR CORRECT ALTERNATOR PERFORMANCE.

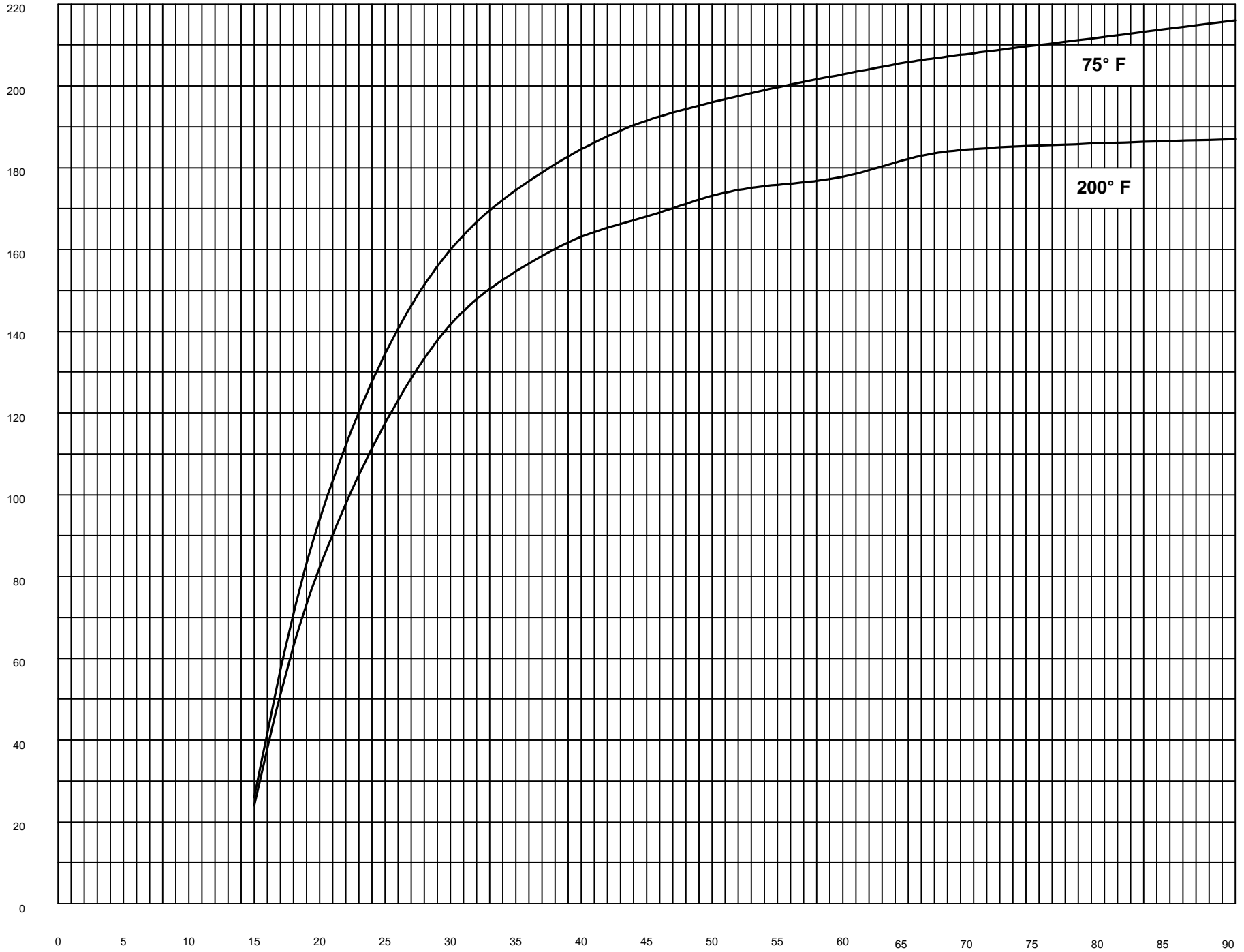
1. A PULLEY RATIO OF 3 TO 1 IS PREFERRED, OR A RATIO AS CLOSE TO 3 TO 1 AS POSSIBLE. RECOMMEND NOT USING A RATIO LESS THAN 2.5 TO 1.
2. TO FIND THE PULLEY RATIO: MEASURE THE DIAMETER OF THE CRANKSHAFT PULLEY AND THE ALTERNATOR PULLEY.
3. DIVIDE THE DIAMETER OF THE CRANKSHAFT PULLEY BY THE DIAMETER OF THE ALTERNATOR PULLEY. THIS WILL GIVE YOU THE PULLEY RATIO. **NOTE: MEASURE V-BELT PULLEYS ON TOTAL OUTSIDE DIAMETER, MEASURE SERPENTINE BELT PULLEYS ACROSS THE GROOVES THE BELT RIDES ON.**
4. ON ENGINES WITH THE ALTERNATOR DRIVEN OFF AN ACCESSORY DRIVE IT IS NECESSARY TO USE PHOTO TACHOMETER TO FIGURE THE RATIOS.
5. TO FIND THE RATIOS USING A PHOTOTACHOMETER: MEASURE SPEED OF CRANKSHAFT PULLEY, MEASURE SPEED OF ALTERNATOR PULLEY. DIVIDE ALTERNATOR SPEED BY CRANKSHAFT SPEED.
6. TO FIND ALTERNATOR CURRENT OUTPUT CURRENT CAPABILITY AT ANY GIVEN RPM, REFER TO THE ALTERNATOR POWER CURVES IN THIS BOOK.



**SERIES 25, 160 AMP, 12 V**

**ROTOR RPM X 100**



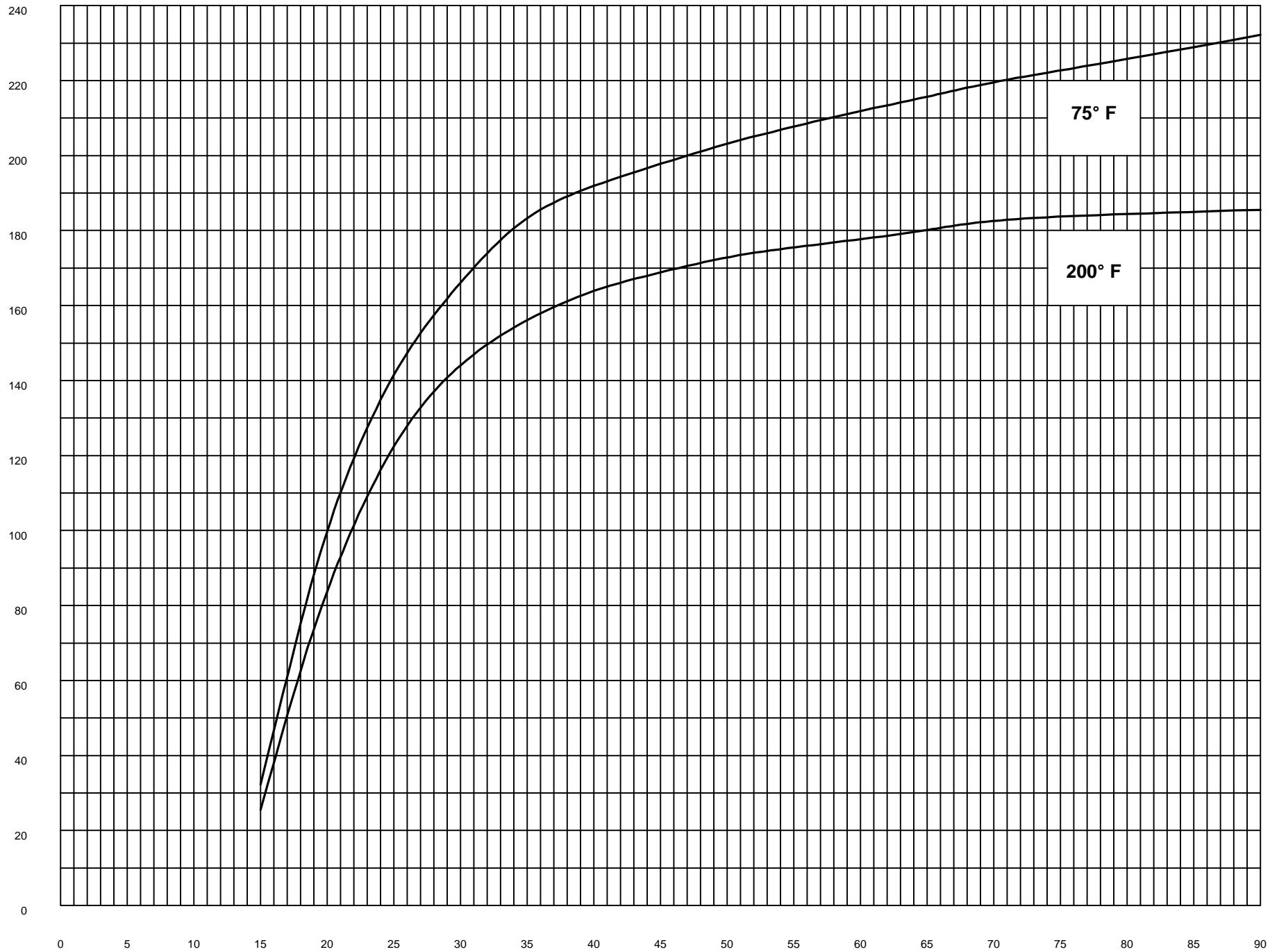


**SERIES 25, 190 AMP, 12V**

ROTOR RPM X 100



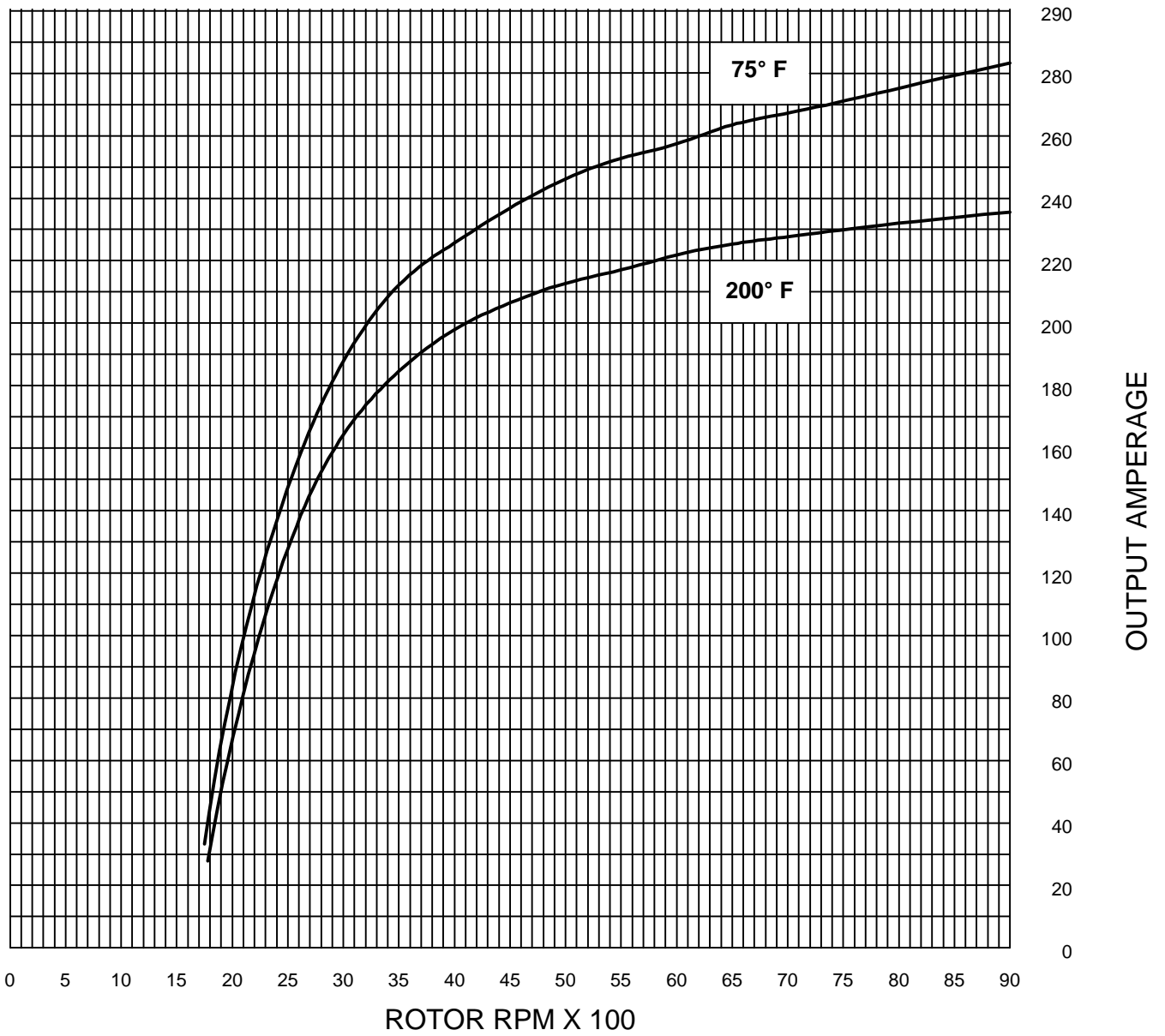
OUTPUT AMPERAGE



**SERIES 25, 200 AMP, 12V**

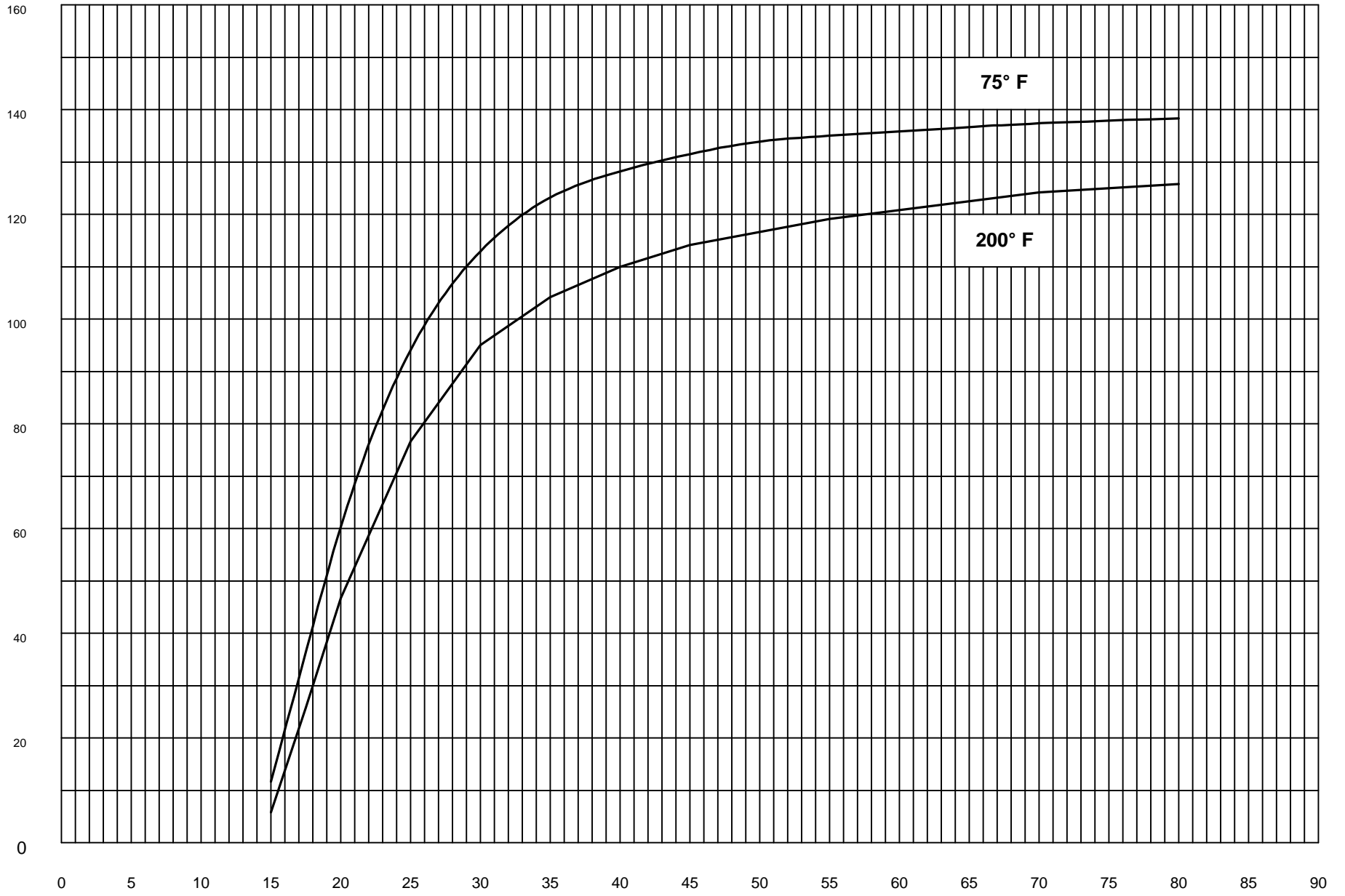
ROTOR RPM X 100





**SERIES 25, 250 AMP, 12 VOLT**

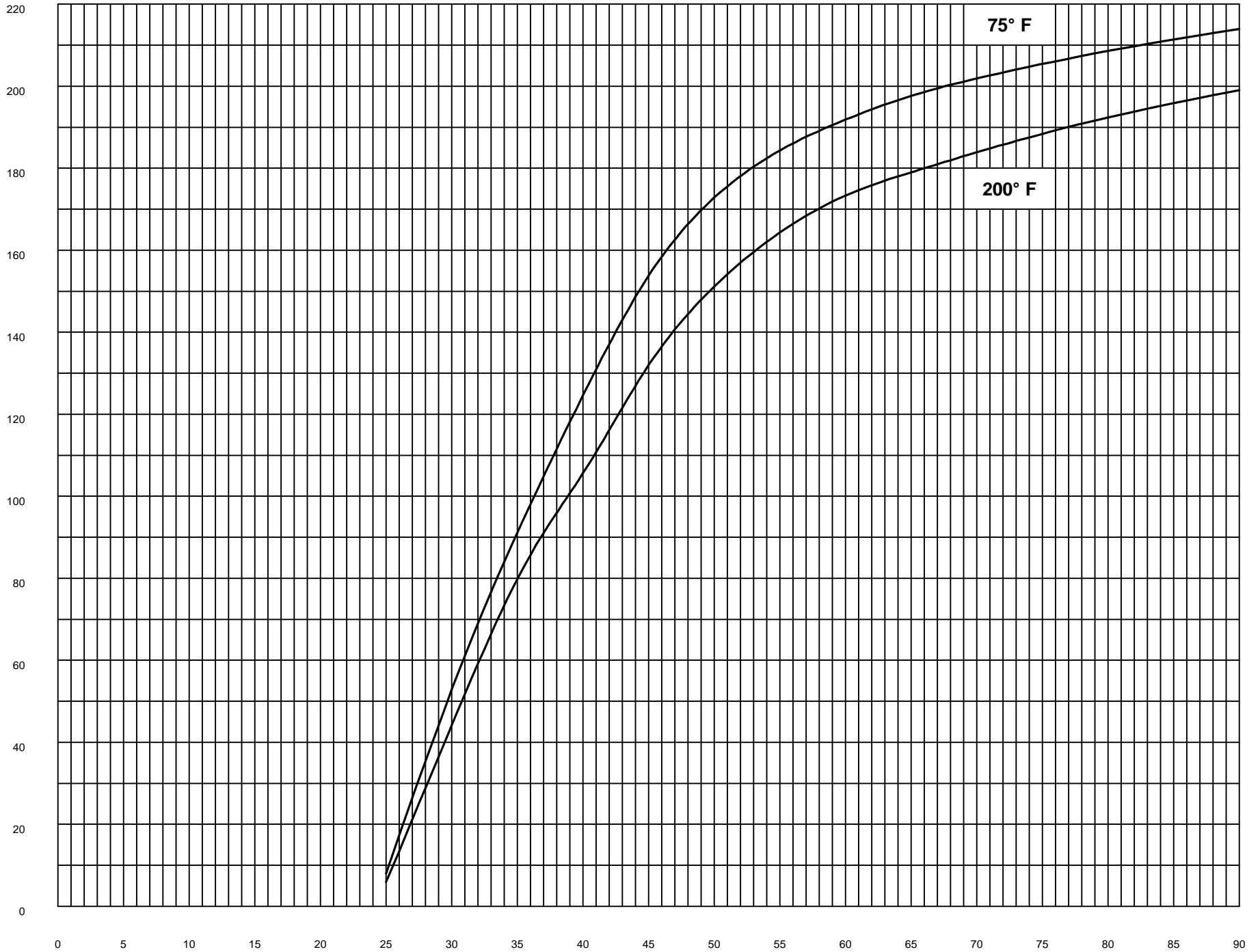




ROTOR RPM X 100

**SERIES 25, 100 AMP, 24V**





## POWERLINE ALTERNATOR SERIES 25 BENCH TEST PROCEDURES

### A. Items Needed for Test

1. Variable speed test bench with enough horsepower to turn alternator at least 8500 rpm; we recommend at least a 20 horsepower drive motor.
2. Heavy duty clamp-on amp meter.
3. Heavy duty volt meter.

### B. Procedures

1. Install alternator on test stand.
2. Connect required leads or jumpers to Ignition terminal, Voltage sense terminal, and Current terminal. All of these terminals MUST HAVE VOLTAGE to them for the alternator to work.
3. Connect voltmeter to positive and negative terminals at alternator.
4. Clamp amp meter around POSITIVE cable at alternator.
5. Start test stand and stabilize at 2,000 rpm.
6. Check voltage, and if it is not at least 14.0 adjust the regulator (preferably to 14-2).
7. If unable to adjust or alternator does not function, FULL FIELD alternator to determine if the regulator or alternator is not functioning.

### C. Test Run

1. Run alternator at various speeds and apply loads at various levels against power curves; MAINTAIN VOLTAGE AT APPROXIMATELY 14.0.
2. If unable to get output within 5% of Output curve while maintaining the desired voltage, check the FIELD VOLTAGE.
3. To check field voltage insert a pin or small wire in rear of brush holder and attach a voltmeter to the pin or wire. Compare the voltage registered here with the voltage which is read across the positive and negative terminals (this step applies ONLY when the sense lead is connected to battery voltage--the FLAT CURVE REGULATOR MODE). At a FULL LOAD CONDITION the field voltage should read within .5 volts of what is read across the positive and negative terminals of the alternator. This test must be made ONLY UNDER FULL LOAD CONDITIONS. Less than full load conditions will give you a greater drop in field voltage and a FAULTY READING. A .5 volt drop shows the regulator to be operating correctly.
4. If field voltage is low it is possible that you have a regulator that will not allow enough field voltage to the rotor and thus a drop in alternator output.
5. If you find Step 4, you then must full field the alternator by inserting a pin or small wire in the brush holder. The pin or wire must then be connected by jumper to the positive terminal of the ALTERNATOR. Results should be an increase in BOTH voltage and amperage output.
6. If no increase is realized, there is quite possibly a problem inside the alternator and it should be opened to determine the nature of the problem.
7. If an increase is realized that indicates a problem with the regulator and it should be replaced.

## **EQUIPMENT REQUIRED TO TEST ALTERNATORS**

1. Battery Charger
2. Battery Tester
3. Clamp on Ammeter
4. Voltmeter
5. Photo Electric Tachometer
6. Battery Post Cleaner
7. Jumper Lead with Clips

## **TEST FOR AMP LOAD ON VEHICLE**

1. Connect voltmeter across positive and negative battery terminals.
2. Clamp a clamp-on ammeter over positive battery cable at battery.
3. Turn on every load possible with engine not running and record amp draw and voltage. Post measure each cable's amp draw and record. Then add all current draw to get total amp draw on vehicle.
4. Start Engine: Connect voltmeter on positive and negative post of alternator.
5. Clamp a clamp-on ammeter to positive cable at alternator, record voltage and amps.
6. Turn all loads on and record voltage and amps at rear of alternator.
7. If amp load measured at batteries with engine off exceeds amperage coming out of alternator increase engine speed until alternator amperage meets or exceeds the total load that was measured.
8. If engine speed is too high, the problem may be with pulley ratio or the alternator is sized too small for the load.
9. To correct the problem either change pulley on alternator to improve ratio or change both alternator and pulley to provide more amps and a better pulley ratio.

**THANK YOU FOR CHOOSING**

***POWERLINE***