

CREATORS OF ELECTRICAL  
POWER SUPPLY SYSTEMS



**POWER SYSTEMS**  
A MORRISON-KNUDSEN DIVISION

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February 10, 1982

Nuclear Regulatory Commission  
Region II Office  
101 Marietta St., N.W.  
Suite 3100  
Atlanta, GA 30333

Attention: J.D. O'Reilly, Regional Director

Reference: Defect Reportable Under 10CFR21  
General Motors EMD Model 645E4 Diesels  
Used as Emergency Power Supplies  
Air Start Motor Defect

Gentlemen:

We have been verbally informed by the EMD Division of General Motors of a possible defect in some air motors used to crank and start the diesel engine. Our understanding of the nature of this defect is outlined in the attached report #M-DE-0-0052.

It is our understanding that the EMD Division of General Motors has made a report to the NRC and will issue a formal statement shortly.

We believe we have identified all the suspect motors supplied by EMD to Power Systems, and we will notify the recipients of the motors. To our knowledge, none of the suspect motors are in service at this time. This is in the process of being verified.

Very truly yours,

POWER SYSTEMS  
A MORRISON-KNUDSEN DIVISION

Harry W. Falter, P.E.  
Division Engineer

HWF:pmj

Attachment

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SUBJECT: Air Start motors for the EMD (General Motors) Model 645 Diesel Engines.

PROBLEM: Refer to Figure 1.

The location of the exhaust port of the control air from the engaging piston section changed such that it was moved approximately 1/8" further away from the control air intake port. There is a possibility that this dimensional change may retard the action of the starting motor engagement with the engine turning gear so that the engine cranking may be delayed a few seconds or may inhibit engine cranking. In start systems that have a recycle feature, this delay may cause the system to recycle and thereby affect the starting capability.

RESOLUTION:

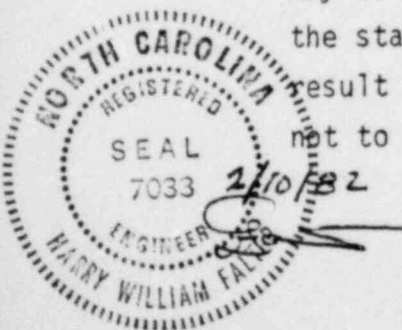
All starting motors shipped from EMD from May 1981 to February 1982 are suspect and have to be inspected. Start motors with the reject dimension shall be replaced.

DISCUSSION:

Refer to Figure 1 and Figure 2.

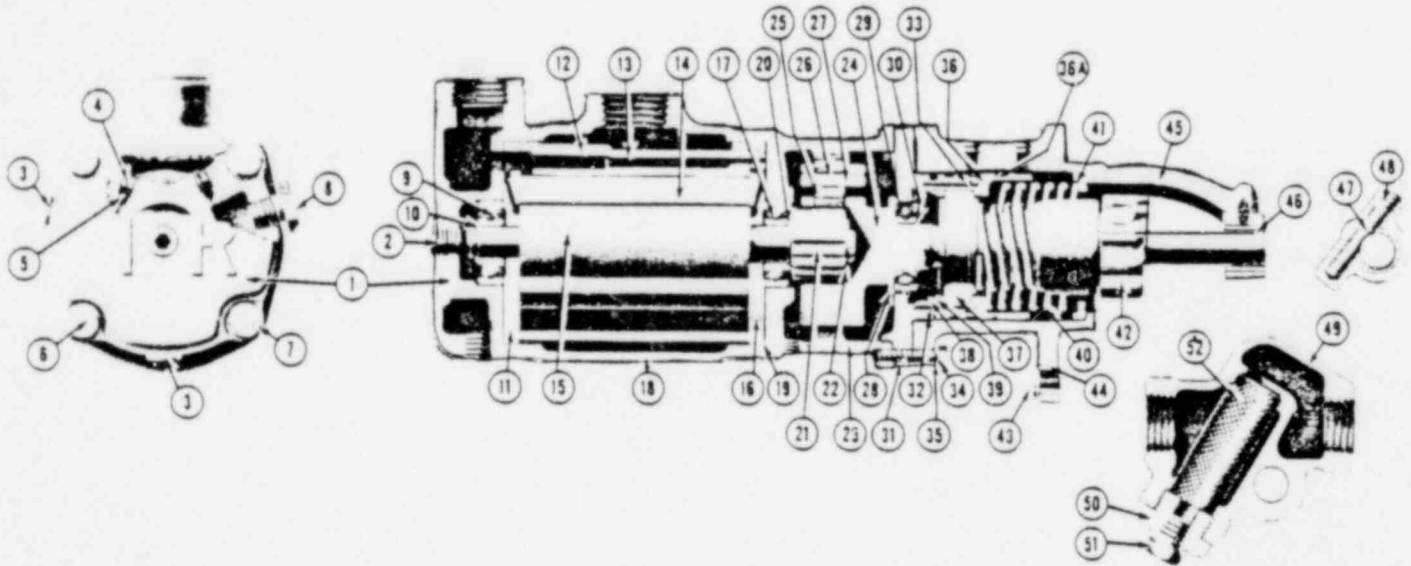
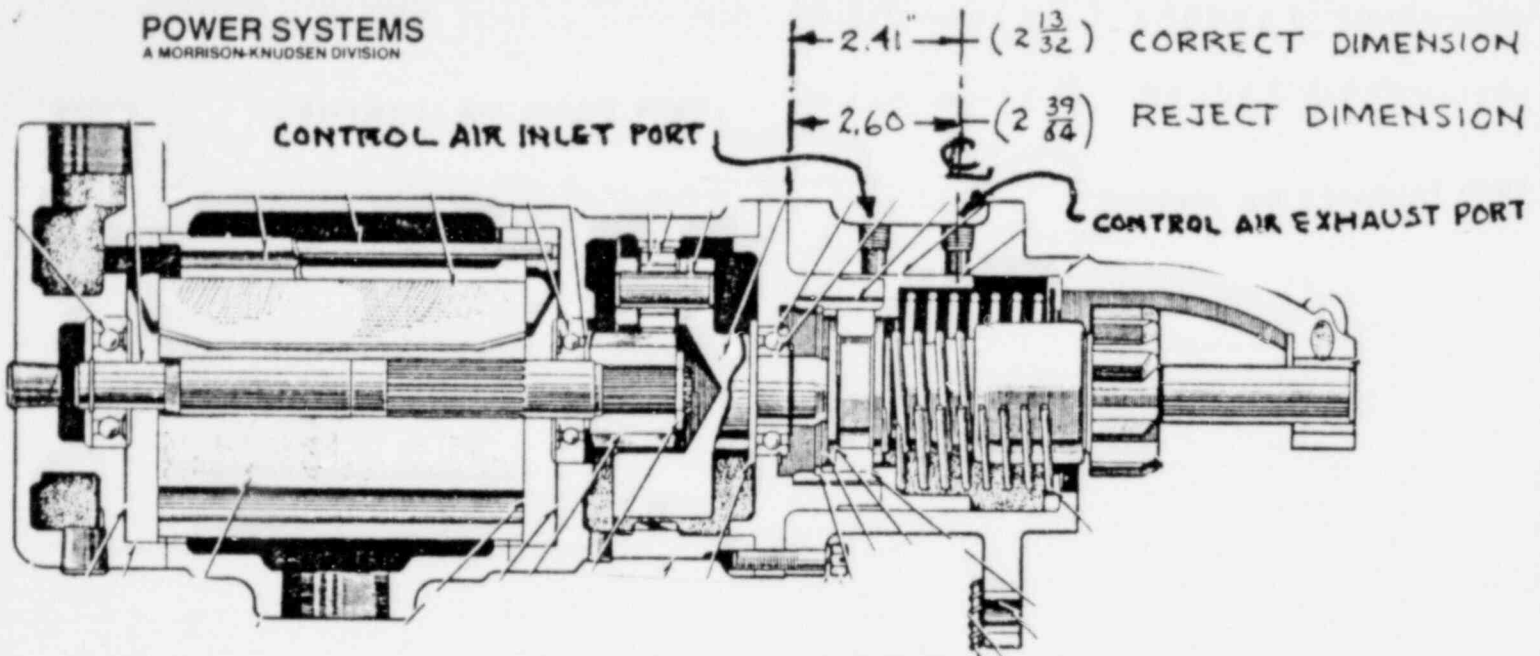
A control solenoid valve supplies air to the inlet connection and drives the engaging piston #36 forward to engage the Bendix starter drivegear with the engine turning gear. The first motor must engage before the second motor can engage.

Motors with the reject dimension restrict the flow of air to the 2nd (upper) motor because Piston Seal #33 is now in the exhaust port area. When start motor #2 engages, it further restricts the flow of air for the same reason. Air exhausting from Motor #2 flows to a relay air valve which then is activated by the air from motor #2 to admit the main flow of air to the air start motor for cranking. This restriction of air flow may not prevent cranking but would retard the action time. Start systems with the recycle feature may be affected dependent upon the recycle time settings. In addition to the restriction to the air flow, the piston seal may be positioned such that a portion of the air flow will exhaust out to the start motor gear instead of flowing to the air relay valve. This could result in inadequate air pressure at the relay air valve causing that valve not to operate and, therefore, void the engine crank function.



*Harry W. Falter*  
 Harry W. Falter, P.E.

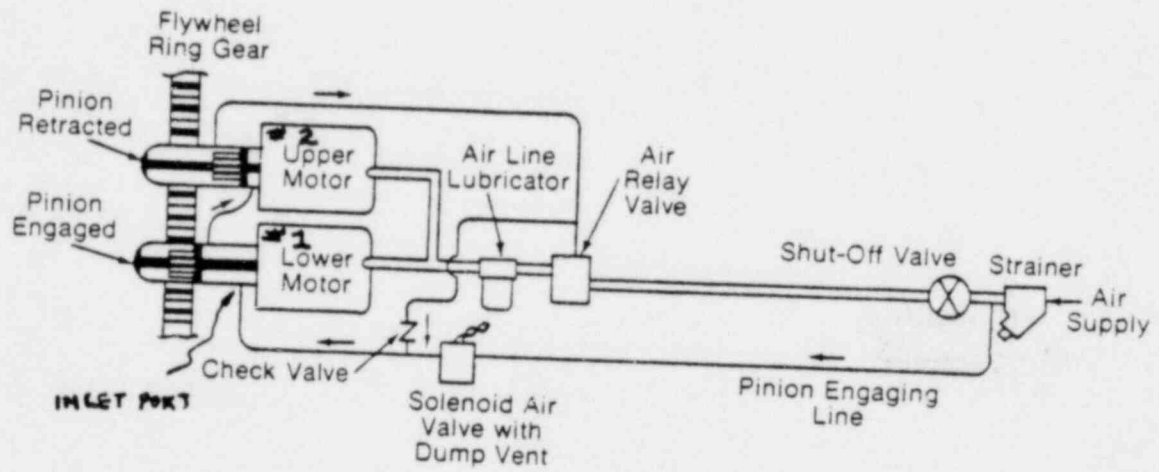
**POWER SYSTEMS**  
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- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>1. Motor Housing Cover Assembly</li> <li>2. Housing Cover End Plug</li> <li>3. Drain Oil Plug (2)</li> <li>4. Oil Adjusting Screw (2)</li> <li>5. Oiler Felt (2)</li> <li>6. Motor Housing Cover Cap Screw (4)</li> <li>7. Cover Cap Screw Lockwasher (4)</li> <li>8. Oil Filler Plug</li> <li>9. Rear Rotor Bearing</li> <li>10. Rear Rotor Bearing Retainer</li> <li>11. Rear End Plate</li> <li>12. Cylinder</li> <li>13. Cylinder Dowel</li> <li>14. Vane (5)</li> <li>15. Rotor</li> <li>16. Front End Plate</li> <li>17. Front Rotor Bearing</li> <li>18. Motor Housing</li> </ul> | <ul style="list-style-type: none"> <li>19. Gear Case Gasket</li> <li>20. Rotor Pinion Spacer</li> <li>21. Rotor Pinion</li> <li>22. Rotor Pinion Retainer</li> <li>23. Gear Case</li> <li>24. Planet Gear Frame</li> <li>25. Planet Gear Assembly (3)</li> <li>26. Planet Gear Bearing (3)</li> <li>27. Planet Gear Shaft</li> <li>28. Planet Gear Frame Thrust Ring</li> <li>29. Planet Gear Frame Bearing</li> <li>30. Planet Gear Frame Retaining Ring</li> <li>31. Gear Case Cover Assembly</li> <li>32. Gear Case Cover Seal</li> <li>33. Piston Seal</li> <li>34. Drive Housing Cap Screw (12)</li> <li>35. Drive Housing Cap Screw Lockwasher</li> </ul> | <ul style="list-style-type: none"> <li>36. Piston Assembly</li> <li>36A. Piston Ring</li> <li>37. Shift Ring</li> <li>38. Shift Ring Retainer</li> <li>39. Shift Ring Spacer</li> <li>40. Piston Return Spring</li> <li>41. Return Spring Seat</li> <li>42. Bendix Starter Drive</li> <li>43. 3/8" Mounting Bolt Lockwasher (3)</li> <li>44. 3/8" Mounting Bolt Bushing (3)</li> <li>45. Drive Housing Assembly</li> <li>46. Drive Housing Bushing</li> <li>47. Bushing Oiler</li> <li>48. Bushing Oiler Plug</li> <li>49. Air Strainer Assembly</li> <li>50. Air Strainer Cap</li> <li>51. Air Strainer Plug</li> <li>52. Air Strainer Screen</li> </ul> |
|---|---|---|

- Typical Air Starting Motor

**FIG - 1**



**FIG.- 2** EMD Supplied Starter Motor  
Air Circuit —