

application data
for

**GENERAL MOTORS SERIES 645
STATIONARY DIESEL
GENERATING UNITS
POWER TAKE-OFF UNITS**

8-12-16 CYLINDER ROOTS-BLOWN SCAVENGED

575 KW TO 1400 KW

800 HP TO 1950 HP

8-12-16-20 CYLINDER TURBOCHARGED

860 KW TO 2600 KW

1200 HP TO 3600 HP

April, 1974

**Electro-Motive Division
La Grange, Illinois 60525**



MARK OF EXCELLENCE

INDEX

<u>Section</u>	<u>Page</u>
1. GENERAL INFORMATION	
Model Designations	1-1
Metric Conversion Factors	1-2
Model Ratings	1-3
Rating Conditions	1-4
Altitude Derating	1-4
Overload Ratings	1-4
Minimum Load Restriction - Turbocharged Engines	1-4
Temperature Derating	1-4
Anti-Freeze Derating	1-4
Tests	1-5
Drawings	1-5
Customer Approval of Plans	1-5
Torsional Analysis	1-5
Customer Responsibility	1-6
Customer Connections Required	1-6
Engine Rating at Elevated Temperature - °F (Graph)	1-7
Engine Rating at Elevated Temperature - °C (Graph)	1-8
Estimated S8E4 Altitude Derating Schedule	1-9
Estimated S12E4 Altitude Derating Schedule	1-10
Estimated S16E4 Altitude Derating Schedule	1-11
Estimated S20E4 Altitude Derating Schedule	1-12
2. BASIC MODEL STATIONARY GENERATING UNIT	2-1
Manuals	2-4
Standard Extras	2-5
Special Engine Tools	2-7
3. OPERATING DATA - 645 SERIES ENGINE	
General Engine Specifications	3-1
Roots-Blown Scavenged Engines (645E1)	3-2
BHP - Torque Curves (lb - ft)	3-3
Roots-Blown Scavenged Engines (645E1) - Metric	3-4
BCV - Torque Curves (kg - m)	3-5
Turbocharged Engines (645E4)	3-6
BHP - Torque Curves (lb - ft)	3-7
Turbocharged Engines (645E4) - Metric	3-8
BCV - Torque Curves (kg - m)	3-9
Emergency Standby Duty	3-10
Heat Radiation Data	3-10
Heat Rejection to Cooling Water	3-10
Pitch and Roll Limits	3-10
Normal Manual Control Sequence	3-11
Inertial Data	3-12
4. AC GENERATOR AND EXCITER	4-1
EMD AC Synchronous Generators	4-2
Synchronous Generator Data	4-3
Typical Characteristic Curves	4-4
Reactive Capability Curves	4-8
Motor Starting Data	4-12

INDEX

<u>Section</u>	<u>Page</u>
5. 645 SERIES DIESEL ENGINE	5-1
Engine Description	5-3
Engine Starting System	5-15
Exhaust System	5-15
6. MOUNTING SUBBASE	6-1
7. SUPPORTING SYSTEMS	
Fuel	7-1
Lubricating Oil Cooler	7-1
Cooling	7-3
Protective	7-3
Air Intake	7-8
8. UNIT DIMENSIONS	8-1
UNIT WEIGHTS - SUPPLIES	8-2
9. CUSTOMER CONNECTIONS	9-1
10. RECOMMENDATIONS	
Fuel	10-1
Lubricating Oil	10-3
Engine Coolants	10-4
11. EMD REPLACEMENT PARTS	11-1
12. EMD UNIT EXCHANGE SERVICE	12-1
13. DRAWINGS	13
Exhaust Silencers	13-1
Flexible Water Connection	13-2
Exhaust Manifold Flexible Metal Hose	13-3
Connections for Remote Air Intake	13-4
Exhaust Outlet Adapters	13-5
Single Bearing Generator Clearance Diagram	13-7
Unit Installations	13-9
	13-11