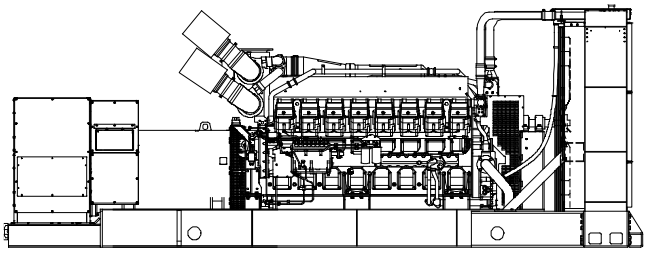
Industrial Generator Set - 1600REOZMD

380-4160 V **Diesel**

Tier 2 EPA-Certified for Stationary Emergency Applications

Ratings Range

		60 Hz
Standby:	**kW**	1160-1600
	kVA	1450-2000
Prime:	**kW**	1050-1450
	kVA	1313-1813



Standard Features

- Rehlko provides one-source responsibility for the generating system and accessories.
- Approved for use with certified renewable Hydrotreated Vegetable Oil (HVO)/Renewable Diesel (RD) fuels compliant with EN15940/ASTM D975.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A standard one-year limited warranty covers all generator set systems and components. Two- , five-, and ten-year extended limited warranties are also available.
- Alternator features:
  - The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
  - Additional alternator voltages are available including 12.47 kV, 13.2 kV, and 13.8 kV medium voltages. Contact your local distributor for more detailed information.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Rehlko designed controllers for one-source system integration and remote communication. See Controllers on page 3.
  - The low coolant level shutdown prevents overheating (standard on radiator models only).
  - An electronic, isochronous governor delivers precise frequency regulation.
  - Multiple circuit breaker configurations.

Generator Set Ratings

				150°C Rise Standby Rating		130°C Rise Standby Rating		125°C Rise Prime Rating		105°C Rise Prime Rating	
Alternator	**Voltage**	**Ph**	**Hz**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**
	220/380	3	60	1160/1450	2203	1160/1450	2203	1050/1313	1994	1050/1313	1994
7M4050	240/416	3	60	1410/1763	2446	1370/1713	2377	1340/1675	2325	1270/1588	2203
	277/480	3	60	1520/1900	2285	1500/1875	2255	1450/1813	2180	1430/1788	2150
	220/380	3	60	1480/1850	2811	1480/1850	2811	1340/1675	2545	1340/1675	2545
7M4052	240/416	3	60	1600/2000	2776	1600/2000	2776	1450/1813	2515	1450/1813	2515
	277/480	3	60	1600/2000	2406	1600/2000	2406	1450/1813	2180	1450/1813	2180
	220/380	3	60	1590/1988	3020	1590/1988	3020	1450/1813	2754	1450/1813	2754
7M4054	240/416	3	60	1600/2000	2776	1600/2000	2776	1450/1813	2515	1450/1813	2515
	277/480	3	60	1600/2000	2406	1600/2000	2406	1450/1813	2180	1450/1813	2180
7M4174	220/380	3	60	1600/2000	3039	1600/2000	3039	1450/1813	2754	1450/1813	2754
7M4176	220/380	3	60	1600/2000	3039	1600/2000	3039	1450/1813	2754	1450/1813	2754
7M4290	347/600	3	60	1600/2000	1925	1600/2000	1925	1450/1813	1744	1450/1813	1744
7M4368	2400/4160	3	60	1600/2000	278	1600/2000	278	1450/1813	252	1450/1813	252
7M4370	2400/4160	3	60	1600/2000	278	1600/2000	278	1450/1813	252	1450/1813	252

RATINGS: All three-phase units are rated at 0.8 power factor. Standby Ratings: The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Prime Power Ratings: At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory. Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

Discovery Energy, LLC
200 Twin Oaks Road, Kohler, WI 53044 USA
For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444 - powersystems.rehlko.com

Alternator Specifications

Specifications		Alternator
Type		4-Pole, Rotating-Field
Exciter type		Brushless, Permanent-Magnet Pilot Exciter
Voltage regulator		Solid State, Volts/Hz
Insulation:		NEMA MG1
Material		Class H, Synthetic, Nonhygroscopic
Temperature rise		130°C, 150°C Standby
Bearing: quantity, type		1, Sealed
Coupling		Flexible Disc
Amortisseur windings		Full
Rotor balancing		125%
Voltage regulation, no-load to full-load		Controller Dependent
One-step load acceptance at 60 Hz		100% of Rating
Unbalanced load capability		100% of Rated Standby Current
Peak motor starting kVA:		(35% dip for voltages below)
480 V	7M4050 (4 bus bar)	4500
480 V	7M4052 (4 bus bar)	5500
480 V	7M4054 (4 bus bar)	7000
380 V	7M4174 (4 bus bar)	4200
380 V	7M4176 (4 bus bar)	5400
600 V	7M4290 (4 bus bar)	5700
4160 V	7M4368 (6 lead)	4900
4160 V	7M4370 (6 lead)	5500

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.
- Digital solid-state, volts-per-hertz voltage regulator with ±0.25% no-load to full-load regulation.
- Brushless alternator with brushless pilot exciter for excellent load response.

Application Data

Engine

Engine Specifications	
Manufacturer	Mitsubishi
Engine model	S16R-Y2PTAW-1
Engine type	4-Cycle, Turbocharged
Cylinder arrangement	16 V
Displacement, L (cu. in.)	65.4 (3989)
Bore and stroke, mm (in.)	170 x 180 (6.69 x 7.09)
Compression ratio	14.5:1
Piston speed, m/min. (ft./min.)	648 (2126)
Main bearings: quantity, type	9, Precision Half-Shell
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	1750 (2346)
Cylinder head material	Cast Iron
Crankshaft material	Forged Steel
Governor type	Electronic
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m^3/min. (cfm)	443 (15642)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	505 (940)
Maximum allowable back pressure, kPa (in. Hg)	5.9 (1.7)
Exhaust outlet size at engine hookup, mm (in.)	See ADV drawing

Engine Electrical

Engine Electrical System	
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	24
Ampere rating	30
Starter motor rated voltage (DC)	Dual, 24
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating each	Four, 1150
Battery voltage (DC)	12

Fuel

Fuel System	
Fuel supply line, min. ID, mm (in.)	19 (0.75)
Fuel return line, min. ID, mm (in.)	19 (0.75)
Max. fuel flow, Lph (gph)	560 (148)
Max. fuel pump restriction, kPa (in. Hg)	10 (3.0)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel filter: quantity, type	4, Secondary
Recommended fuel	#2 Diesel/HVO/RD

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.) §	200 (211)
Oil pan capacity with filter, L (qt.) §	230 (243)
Oil filter: quantity, type §	4, Cartridge
Oil cooler	Water-Cooled

§ Rehlko recommends the use of Rehlko Genuine oil and filters.

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Application Data

Cooling

Radiator System	
Ambient temperature, °C (°F)*	40 (104)
Engine jacket water capacity, L (gal.)	170 (44.9)
Radiator system capacity, including engine, L (gal.)	367 (96.9)
Engine jacket water flow, Lpm (gpm)	1850 (489)
Charge cooler water flow, Lpm (gpm)	920 (243)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	635 (36167)
Heat rejected to charge cooler water at rated kW, dry exhaust, kW (Btu/min.)	635 (36167)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	2057 (81)
Fan kWm (HP)	81 (109)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)

High Ambient Radiator System	
Ambient temperature, °C (°F)*	50 (122)
Engine water capacity, L (gal.)	170 (44.9)
Radiator system capacity, including engine, L (gal.)	386 (102)
Engine jacket water flow, Lpm (gpm)	1850 (489)
Charge cooler water flow, Lpm (gpm)	920 (243)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	635 (36167)
Heat rejected to charge cooler water at rated kW, dry exhaust, kW (Btu/min.)	635 (36167)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	2057 (81)
Fan kWm (HP)	81 (109)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)

∗ Enclosure with internal silencer reduces ambient temperature capability by 5°C (9°F).

Remote Radiator System†	
Exhaust manifold type	Dry
Connection sizes:	
Jacket water engine inlet, mm (in.)	95 (3.75)
Jacket water engine outlet, mm (in.)	95 (3.75)
Intercooler water engine inlet, mm (in.)	83 (3.25)
Intercooler water engine outlet, mm (in.)	83 (3.25)
Static head allowable Above engine, kPa (ft. H_2O)	98 (32.8)

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

Operation Requirements

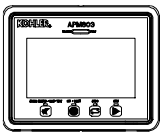
Air Requirements	
Radiator-cooled cooling air, m^3/min. (scfm) ‡	2237 (79000)
High ambient radiator-cooled cooling air, m^3/min. (scfm) ‡	2095 (74000)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise, m^3/min. (cfm)‡	818 (28900)
Combustion air, m^3/min. (cfm)	168 (5932)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	146 (8346)
Alternator, kW (Btu/min.)	82 (4663)

‡ Air density = 1.20 kg/m3 (0.075 lbm/ft3)

Fuel Consumption**	
Diesel, Lph (gph) at % load	**Standby Rating**
100%	487 (128.6)
75%	356 (93.9)
50%	241 (63.8)
25%	133 (35.2)
Diesel, Lph (gph) at % load	**Prime Rating**
100%	468 (115.1)
75%	324 (85.5)
50%	219 (57.8)
25%	126 (33.3)

** Volumetric Fuel consumption is up to 4% higher when using HVO/RD than #2 ULSD.

Controllers



APM603 Controller

Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- 7-inch graphic display with touch screen and menu control provides easy local data access
- Measurements are selectable in metric or English units
- Paralleling capability to control up to 8 generators on an isolated bus with first-on logic, synchronizer, kW and kVAR load sharing, and protective relays
  Note: Parallel with other APM603 controllers only
- Generator management to turn paralleled generators off and on as required by load demand
- Load management to connect and disconnect loads as required
- Controller supports Modbus® protocol
- Controller supports Modbus® RTU, Modbus® TCP, SNMP and BACnet®
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- UL-listed overcurrent protective device
- NFPA 110 Level 1 capability

Refer to G6-162 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.
BACnet® is a registered trademark of ASHRAE.

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Standard Features

- Alternator Protection
- Alternator Strip Heater (standard on 3300 volt and above)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature
- Radiator Core Guard

Available Options

Circuit Breakers Type

- ❑ Magnetic Trip
- ❑ Thermal Magnetic Trip
- ❑ Electronic Trip (LI)
- ❑ Electronic Trip with Short Time (LSI)

Rating

- ❑ 80%
- ❑ 100%

Operation

- ❑ Manual
- ❑ Electrically Operated (for paralleling)

Circuit Breaker Mounting

- ❑ Generator Mounted
- ❑ Remote Mounted
- ❑ Bus Bar (for remote mounted breakers)

Approvals and Listings

- ❑ CSA Certified
- ❑ HCAI Pre-Approval
- ❑ IBC Seismic Certification
- ❑ UL 2200 Listing

Enclosed Unit

- ❑ Sound Enclosure/Fuel Tank Packages
- ❑ Weather Enclosure/Fuel Tank Packages

Open Unit

- ❑ Exhaust Silencer, Hospital (kit: PA-361626)
- ❑ Exhaust silencer, Critical (kit: PA-361625)
- ❑ Flexible Exhaust Connector, Stainless Steel

Fuel System

- ❑ Flexible Fuel Lines
- ❑ Fuel Pressure Gauge
- ❑ Fuel/Water Separator

Controller

- ❑ Common Failure Relay
- ❑ Communication Products and PC Software
- ❑ Input/Output, Digital (included with paralleling kit)
- ❑ Lockable Emergency Stop Switch
- ❑ Manual Key Switch
- ❑ Remote Emergency Stop Switch
- ❑ Remote Mounting Cable
- ❑ Remote Serial Annunciator Panel
- ❑ Run Relay

Cooling System

- ❑ Block Heater; 9000 W, 208 V, 1 Ph
- ❑ Block Heater; 9000 W, 240 V, (Select 1 Ph or 3 Ph)
- ❑ Block Heater; 9000 W, 380 V, 3 Ph
- ❑ Block Heater, 9000 W, 480 V, (Select 1 Ph or 3Ph) Required for Ambient Temperatures Below 0°C (32°F)
- ❑ High Ambient Radiator
- ❑ Remote Radiator Cooling Setup

Electrical System

- ❑ Alternator Strip Heater (available up to 600 volt)
- ❑ Battery
- ❑ Battery Charger, Equalize/Float Type
- ❑ Battery Heater
- ❑ Battery Rack and Cables

Miscellaneous

- ❑ Air Cleaner, Heavy Duty
- ❑ Air Cleaner Restriction Indicator
- ❑ Air Intake Transit Cap
- ❑ Crankcase Emissions Canister
- ❑ Engine Fluids (oil and coolant) Added
- ❑ Oil Temperature Gauge
- ❑ Rated Power Factor Testing
- ❑ Spring Isolators

Literature

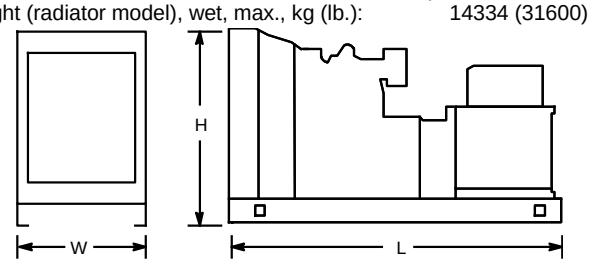
- ❑ General Maintenance
- ❑ NFPA 110
- ❑ Overhaul
- ❑ Production

Warranty

- ❑ 2-Year Basic Limited Warranty
- ❑ 2-Year Prime Limited Warranty
- ❑ 5-Year Basic Limited Warranty
- ❑ 5-Year Comprehensive Limited Warranty
- ❑ 10-Year Major Components Limited Warranty

Dimensions and Weights

Overall Size, L x W x H, max., mm (in.):	6897 x 2232 x 2590 (271.5 x 87.9 x 102)
Weight (radiator model), wet, max., kg (lb.):	14334 (31600)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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