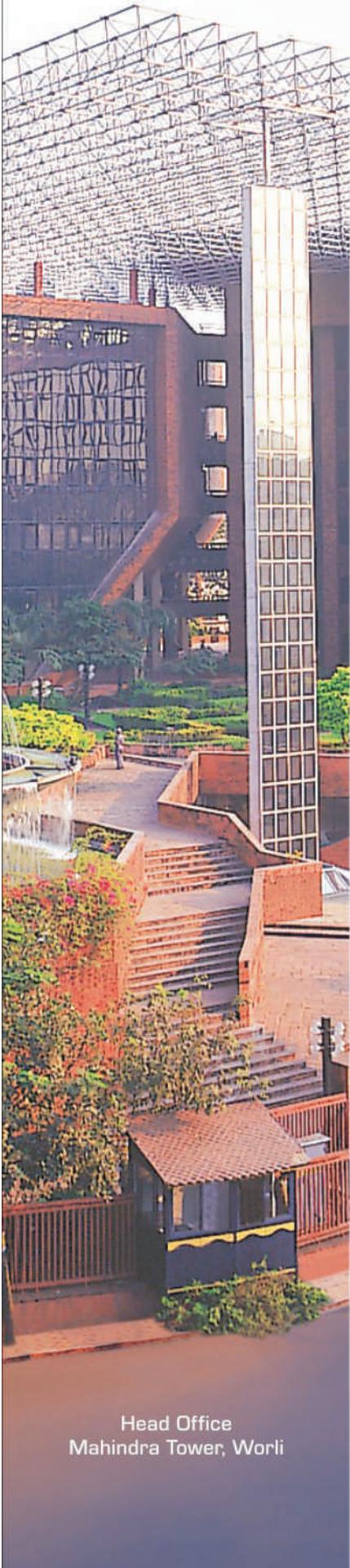


powerol
by Mahindra



Mahindra



Group Overview

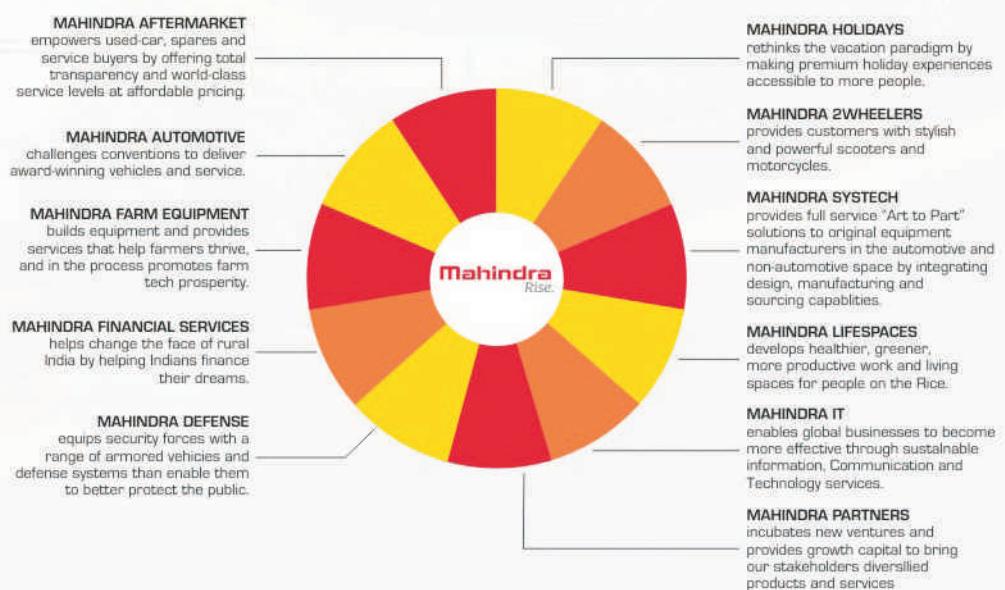
Founded in 1945 as a steel trading company, we entered automotive manufacturing in 1947 to bring the iconic Willys Jeep onto Indian roads. Over the years, we've diversified into many new businesses in order to better meet the needs of our customers. We follow a unique business model of creating empowered companies that enjoy the best of entrepreneurial independence and Group-wide synergies. This principle has led our growth into a US \$16.2 billion multinational group with more than 155,000 employees in over 100 countries across the globe.

Today, our operations span 18 key industries that form the foundation of every modern economy: aerospace, aftermarket, agribusiness, automotive, components, construction equipment, consulting services, defense, energy, farm equipment, finance and insurance, industrial equipment, information technology, leisure and hospitality, logistics, real estate, retail, and two wheelers.

Our federated structure enables each business to chart its own future and simultaneously leverage synergies across the entire Group's competencies. In this way, the diversity of our expertise allows us to bring our customers the best in many fields.

The Mahindra Group is organized into 11 business segments

**WE ARE MANY COMPANIES,
WITH JUST ONE PURPOSE.**



Head Office
Mahindra Tower, Worli

About Mahindra Powerol

Mahindra & Mahindra Ltd. entered the field of Power Generation in 2002.

Today, Mahindra engines under the brand name of Mahindra Powerol are powering Diesel Generators up to a rating of 500kVA Worldwide. These Diesel Generators incorporate the latest technology and offer several advantages - they respond faster to sudden loading and unloading conditions, they vibrate less, have lower noise levels, offer low maintenance costs, control voltage fluctuations and are designed to assure hassle-free operations for over 10,000 hours.

Mahindra Powerol Diesel Generators are manufactured at three state-of-the-art factories located in India at Pune, Chennai & Delhi and also complies to the most stringent noise pollution norms laid down by the Central Pollution Control Board, India making them ready to meet any environmental challenge in the industry.

Mahindra Powerol has sold over 240,000 Diesel Generators, and in the process, became a forerunner in the Indian Power Generation industry and the 1st choice of Indian Telecom majors. Mahindra Powerol has also won the Frost & Sullivan's "Voice of Customer" award for the most preferred brand in the telecom cell-sites segment.

Today, Mahindra Powerol is a significant player in the global power generation industry and has made inroads in Latin America, Africa, Middle East, South East Asia and SAARC countries. The focus on International markets has enabled Mahindra Powerol to cater to various segments like Telecom, Government & Defence organizations, Banking Industry, Retail Chains, Household Utility, Healthcare, Hospitality, Infrastructure, Construction and Manufacturing.





Advantages & features of Mahindra Powerol Diesel Generators

Advantages

1. Fuel efficient engines running on Diesel Efficiency Technology.
2. Robust engine (AVL Austria Design) with proven performance ensuring reliability & longer product life.
3. Better weight to power ratio resulting in compact engine size.
4. Low cost of ownership.
5. Less vibrations & low sound levels.
6. Suitable for various segments as Telecom, Construction, Service, Manufacturing, Industries etc.
7. Ready availability of spare parts.
8. Effective after sales service in all countries of operation.

Features

1. 100% testing of units manufactured at Mahindra Powerol.
2. Aesthetically superior, low foot print, high quality sound enclosures providing optimum cooling for engine & alternator.
3. Diesel engine & Diesel Generator control system at par in its class.
4. Designed to meet the latest environmental norms.



Additional Features:

- Adequate visual indications provided for enhanced worker safety.
- Fire retardant foam and inside heat resistant Rockwool insulation for better sound attenuation.
- Residential Silencer placed inside hot chamber area within enclosure for further noise reduction. Hot chamber area isolated from rest of generator component which improves the working life of components.
- Top air discharge provision for better sound reduction.
- Remote monitoring options available.
- Diesel fill cap located inside enclosure to prevent diesel theft.

Scope of supply

Engine

- 1500 rpm, four-stroke cycle, direct injection, in-line construction, Water cooled diesel engine with radiator upto 500 kVA.
- Generator set steel base skid mounted with anti vibration mounts between Engine-Alternator set and base frame.
- Mechanical compliant with ISO 3046 Class A1 and ISO 8528 pt.5, Class G2 governing.
- Dry type Air filter with restriction indicator having filtration efficiency of 99.9%.
- Full flow spin on type lube oil filter.
- Upto 125 kVA, 12V electrical starter & battery charging alternator. For range from 125 kVA to 500 kVA, 24V electrical starter & battery charging alternator for gensets.
- Stop solenoid for mechanical & ECU for electronic safety shutdown.
- Engines suitable to perform in hot, humid & dusty conditions.

Canopy

- Generator set supplied with Sound Attenuation Canopy limiting noise level to 75 dBA at 1 meter.
- Strongly built metallic canopy suitable for outdoor use.
- Zinc passivated or stainless steel fasteners to withstand corrosive conditions.
- Emergency stop button mounted on canopy exterior.
- Fuel fill and battery can only be reached via lockable access doors.
- Provision for lifting through hooks on the base frame, central lifting also available.
- Canopy equipped with internal lights.

Alternator

- Leroy Somer make, 3 phase, 4 wire, 415 V and 50 Hz brushless alternator.
- IP 23 protection.
- Self excited, AVR (Automatic voltage regulator) controlled and screen protected. 1.0% rated voltage regulation.
- Isochronous under varying load from no load to 100% full load. Random frequency variation shall not exceed $\pm 0.4\%$ of its mean value for constant loads - no load to full load.
- Total harmonic distortion less than 5% at full load AC waveform.
- Class H insulation with temperature rise of 125°C over ambient of 40°C .
- Self cooled through fan mounted on shaft.

Controller

- Microprocessor based high reliability Deep Sea controller.

The following will be supplied with each set:

- Operation & Maintenance Manual for Generating Set.
- Electrical diagrams.



Service



Training

As an Original Equipment Manufacturer we are committed to provide Customised Training for group or individuals on our product. Either through Classroom sessions or on-site, a team of skilled Trainers are readily available. Full fledged training centres across locations are available for enhancing technical Capabilities these Training Centres are equipped with cut sections of various engine components & driven with key modules, such as Global Capability Development Program



Spares Management

Easy availability of Genuine and high quality spare parts through our self serviced Distributor Network worldwide. We Stock and dispatch parts directly to all the Distributor locations through our centralised Spare Parts Division.



Service Offerings

We provide standard as well as customised Annual Maintenance Contracts, Comprehensive Annual Maintenance Contracts, service packages based on needs of Customers. This enables us to have routine monitoring of equipment health, thus enhancing performance, reducing downtime and extended Product life.



Globe Connect

A key IT tool to be in close contact with our Distributors & Customers Worldwide. Some of the important features of Globe Connect are- Spares & Inventory Management, Installation & Commissioning tracking, Preventive Maintenance tracking, Customer Complaint logging, Product updates, Technical literature etc.

Global Capability Development Program

Through our constant endeavour to serve our customers better, Mahindra Powerol has introduced a unique service module- The Global Capability Development Program (GCDP). The Global Capability Development Program aims to transform Powerol's channel partners into world class organizations by enhancing their customer centric capabilities and thereby establishing an overall connect with brand Mahindra Powerol. Every member of the channel partner's team is given a special training on handling a wide range of complex situations that may inadvertently occur on the field. The training is conducted to help them improve their workmanship level and boost their confidence in handling technical issues with ease.

For a complete understanding of the services and benefits of the Global Capability Development Program, please refer the chart below:

Mahindra Powerol Global Capability Development Program for its Channel Partners & Customers	DIRECT BENEFITS	LEVEL 1 INDIRECT BENEFITS	LEVEL 2 INDIRECT BENEFITS
	Emphasis on Annual Maintenance Contract	Improved uptime of Mahindra Powerol DGs	Satisfied Customers
First time right Solution	Enhanced Skill Level of Distributor Manpower	Trained Distributor-Manpower inturn trains rest of the team	Reduction in Travel Costs
Remote Resolution of problems		Less visits per site	Saving in operation & Maintenance Cost
Prompt Resolution of field problems		Multiple Site handling by a Service Engineer	Efficient Utilisation of available resources
Reduction in fault count	Real time performance monitoring through IT enabled System		Longer Life of Product
Leveraging IT (e-portal)	Customer Relationship Management		Increased Level of Confidence of Service Team
		Increased Customer Confidence in product	

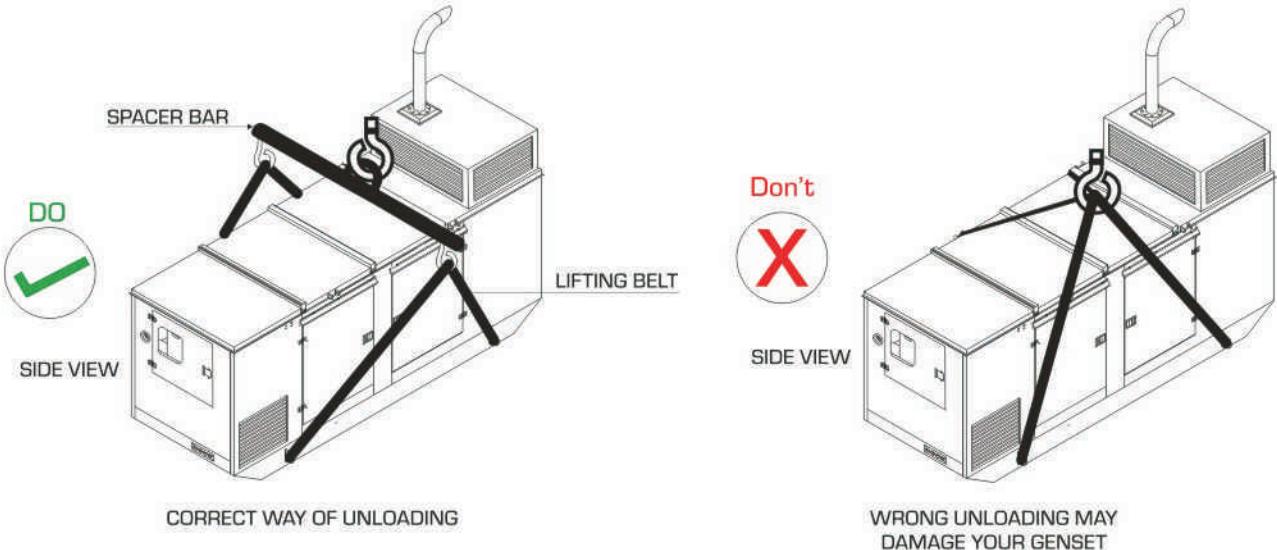
Technical Specifications

Generator Set Specifications																			
Standby Power Rating, kVAe (kWe)	8 (6.6)	11 (8.8)	17 (13.2)	22 (17.6)	28 (22)	33 (26.4)	44 (35.2)	55 (44)	69 (55.2)	82.5 (66)									
Prime Power Rating, kVAe (kWe)	7.5 (6.6)	10 (8)	15 (12)	20 (10)	25 (20)	30 (24)	40 (32)	50 (40)	62.5 (50)	75 (60)									
Maximum Load, Amperes	11	15	23	31	38	46	61	77	96	92									
Rated Load, Amperes	10	14	21	28	35	42	56	70	87	84									
Power Factor	0.8																		
Engine Specifications																			
Manufacturer	Mahindra & Mahindra Ltd.																		
Engine Model	2185 GM	2185 GM	3255 GM	3305 GM	4375 GM	4445 TC GM	4575 TCI GM	4725 GM	4905 GM	41035 GM									
No. of Cylinders	2	2	3	3	4	4	4	4	4	4									
Aspiration	Naturally Aspirated				Turbo Charged														
Cooling System	Water Cooled with Radiator																		
Displacement, litres	1.36	1.36	1.89	2.05	2.73	2.73	2.73	3.19	3.53	3.54									
Bore, mm	88.9	88.9	88.9	88.9	88.9	88.9	94	96	96	96									
Stroke, mm	110	110	101.6	110	110	110	110	122	135	122									
Rated rpm	1500																		
Max. Engine Power, hp @ rated rpm	18	18	25	30	37	44	57	72	90	103.5									
Rated Engine Power, hp @ rated rpm	16	16	23	27	33	40	51	65	81	94									
Governor Type, Class of Governing	Mechanical-A1 Class/Electronic Optional																		
Air Cleaner Type	Dry Type																		
Lube Oil Specifications	SAE, CF4 15W40																		
Starting System, volts	12V, Electrical																		
Battery Capacity, Ah	120Ah																		
Fuel	High Speed Diesel																		
Overload Capacity	Provision of 10% overloading is applicable as per ISO 8528-1:2005 (E)																		
Alternator Specifications																			
Make	Mahindra /Leroy Somer																		
Type	Brushless, Single bearing, Self-exciting																		
Voltage, volts	230 (1 Phase)/415 (3 Phase)	415 (3 Phase)																	
Rpm/Frequency, hz	1500 / 50																		
Voltage Regulation	±1%																		
Enclosure Type	IP 23																		
Class of Insulation	H Class																		
Control Panel	Standard Manual Control Panel with Digital Controller (AMF Panel - as per specific requirement / application)																		
Acoustics Specifications																			
Acoustics Enclosure (Canopy)	Made from specially procured CRCA sheet using CNC machines for precision fit & finish, powder coated																		
Noise level, dB	75dBA @ 1 meter distance (as per the stringent testing guidelines of Central Pollution Control Board, India)																		
Exhaust Silencer	Inside Canopy				Outside Canopy														
Length, mm	1800	2150	2500	2500	3495	3000													
Width, mm	900	1030	1030	1030	1150	1150													
Height, mm	1405	1350	1400	1400	1450	1650													
Weight, kg	750	800	850	900	1050	1100	1200	1250	-										
Standby Power: Standby power is defined as the maximum power available during a variable electric power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 500 hours of operation per year under average of 70% load. Overloading is not permissible.																			
Prime Power: Prime power is defined as being the maximum power which the generating set is capable of delivering continuously whilst supplying a constant electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with maintenance intervals and procedures being carried out as prescribed by the manufacturer																			
Notes : • All outputs stated are based at NTP in accordance with ISO 8528 standards. Please contact Mahindra Distributor to assess if any derate is required • Engine Governing is as per IS 10000 standards • Fuel Consumption is @ 75% load and based on diesel having specific gravity of 0.85 and conforming to IS 1460 standards • Fuel consumption tolerance is +5% • All information given in this leaflet is intended for general purpose only. Due to continuous improvement policy, Mahindra reserves the right to amend details and specifications without prior notice & liability • Illustrations do not necessarily show the product in its standard form																			

Technical Specifications

Generator Sets Specifications						
Standby Power Rating, kVA (kWe)	91 (72.6)	138 (110)	154 (123)	176 (141)	198 (158)	220 (176)
Prime Power Rating, kVAe (kWe)	82.5 (66)	125 (100)	140 (112)	160 (128)	180 (144)	200 (160)
Maximum Load, Amperes	127	193	215	245	275	306
Rated Load, Amperes	115	175	195	224	250	278
Power Factor	0.8	0.8	0.8	0.8	0.8	0.8
Engine Specifications						
Manufacturer						
Engine Model	4.12 TCA	S12-III	S12-II	S12-I	SE12-I	6.12 TCE
No. of Cylinders	4			6		
Aspiration	TA	TA	TA	TA	TA	TCA
Cooling System				Water Cooled with radiator		
Displacement (liters)	4.8			7.2		
Bore (mm)				105		
Stroke (mm)				137		
Rated (rpm)				1500		
Max. Engine Power, hp @ rated rpm	116	170.6	190.1	217.5	242	265
Rated Engine Power, hp @ rated rpm	105	156	174	199	221.2	241
Governor Type, Class of Governing	Mechanical			Mechanical (3-5%)	Isochronous	(ECU controlled) Isochronous
Air Cleaner Type				Dry Type		
Lube Oil Specification				SAE CH4/C14 15W40		
Starting System (volts)	12 V			24V, Electrical		
Battery Capacity (Ah)	120 AH			2x120Ah / 2x150Ah		
Fuel				High Speed Diesel		
Overload Capacity				Provision of 10% overloading is applicable as per ISO 8528-1:2005 (E)		
Alternator Specifications						
Make				Leroy Somer		
Type				Brushless, Single bearing, Self Exciting		
Voltage (volts)				415 (3 Phase)		
RPM / Frequency (Hz)				1500/50		
Voltage Regulation				5%		
Enclosure Type				IP 23		
Class of Insulation				H Class		
Control Panel				Standard Manual Control Panel with Digital Controller (AMF Panel as per specific requirement./Application)		
Acoustics Specifications						
Acoustics Enclosure (Canopy)				Made from specially produced CRCA sheet using CNC machines for precision fit & finish, powder coated.		
Noise Level (dBA)				75 dBA @ 1 meter distance		
Exhaust Silencer				Inside		
Length (mm)	3200	3750	3750	3750	4500	4500
Width (mm)	1300	1300	1300	1300	1500	1500
Height (mm)	1750	1875	1875	1875	2420	2420

Genset Loading/Unloading Instruction



World Wide Presence



- Bahrain ▪ Bangladesh ▪ Burkina Faso ▪ Congo B ▪ DR Congo ▪ Gabon
- Ghana ▪ Kenya ▪ Madagascar ▪ Nepal ▪ Niger ▪ Nigeria ▪ Oman
- Qatar ▪ Rwanda ▪ Sierra Leone ▪ South Africa ▪ Sri Lanka
- India ▪ Swaziland ▪ Tanzania ▪ Malawi ▪ UAE
- Uganda ▪ Kingdom of Saudi Arabia
- Kuwait ▪ Zambia

IT DELIVERS EFFICIENCY, IT INSPIRES LOYALTY, IT LASTS A LIFETIME.

Presenting Mahindra Powerol DG sets equipped with DET.

Mahindra is one of India's leading business houses, and the top exporter of Utility Vehicles in the country. With a 60 year reputation for frugal and reliable engineering, you can expect a lot when you buy a Mahindra. That's why Mahindra was on the Forbes' Top 200 list of the world's most reputable companies, 2009; as well as the Credit Suisse 2009-10 study 'Great Brands of Tomorrow'.

The new Mahindra Powerol DG Sets are low-noise and are built with high grade materials. So they deliver high levels of performance, safety, durability, reliability. This has made Mahindra Powerol the fastest growing brand in the demanding Telecom Sector. Now equipped with Diesel Efficiency Technology, Mahindra Powerol DG sets have arrived in Africa, to bring high efficiency and low cost of ownership to you.

Low vibration & sound levels | Fuel efficient, long life engines

2010 Frost & Sullivan India – Best Bang for the Buck Award & Most Preferred Brand in Telecom Segment





Mahindra & Mahindra Ltd.

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