

# ENDRESS

## Power Generators



CATALOGUE BOS



**WHEN  
EVERY SECOND  
COUNTS.**





# WHEN EVERY SECOND COUNTS.

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## DUPLEX

### THE DUPLEX GENERATORS FROM ENDRESS

#### DUPLEX in a nutshell

##### ► Yesterday:

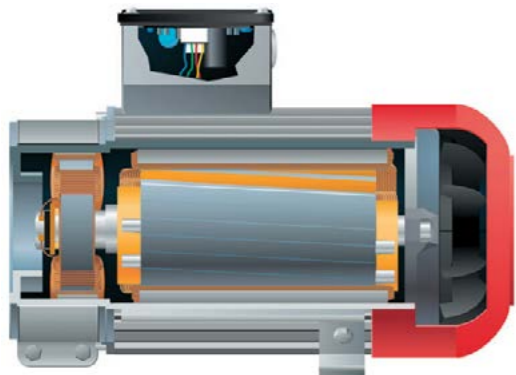
When there were still no electronics on units, one needed so-called asynchronous alternators in order to generate so-called "clean" current and synchronous generators to manage the "heavy starting".

##### ► Today:

In the case of DUPLEX equipment the electronic controller unit adapts itself individually to the respective drive motor and reacts appropriately before the engine is overloaded. In this way it is possible to mobilise power reserves and the DUPLEX generator hauls even the heaviest, inductive consumer upwards and protects the most sensitive consumer from getting damaged. Thus all of the advantages of asynchronous and synchronous alternators are combined together in the DUPLEX system and this brings an end to the discussion about which technology is better, synchronous or asynchronous.

#### Advantages at a glance:

- Combines and strengthens the advantages of asynchronous and synchronous alternators
- VKS technology:  
W = wear-free C = contact-free, T = trouble-free
- Simultaneous use by electronic and inductive appliances
- Brushless, electronically regulated synchronous alternator
- Brushless technology provides 20,000 operating hours
- IP54 protection class, therefore protected from dust and splashing water
- 200% suitable for an asymmetrical load in actual operation
- Voltage stability +/- 1% with 3~ alternators
- Up to 4 times the starting current
- 100% short-circuit-proof
- Distortion factor ≤ 5%



## ECOtronic

### ENVIRONMENTALLY FRIENDLY TECHNOLOGY, FOR LOWER OPERATING COSTS

#### What is ECOtronic?

The generation of current with a conventional petrol generator takes place at a high speed range of 3000 rpm. However, according to experience a generator often runs during use without load. From today's point of view this leads to wasteful use, such as when working with electric tools on construction sites as well as during repair or emergency use. In order to meet these requirements the ECOtronic system was developed by ENDRESS and is already used today as standard in the DUPLEXplus line.

#### ► Here is how it works:

ECOtronic is an eco-friendly alternative to conventional electricity generation. During use the ECOtronic system recognizes whether its power output is being drawn or not. If no power is being drawn the speed is clearly reduced significantly. This happens automatically, and the generator runs quietly and in a fuel saving mode but always remains at the ready. It is only when power is needed again, such as when an electric tool is used that the ECOtronic makes the necessary power available — without delay.

#### Advantages at a glance:

- Operating costs are lowered
- Reduction of the pollutant emissions
- Significantly reduced noise emissions
- Up to 30% less fuel consumption
- A longer engine service life



## maxdrive

### FULL USE OF ENGINE OUTPUT

#### New development for maintaining the output level

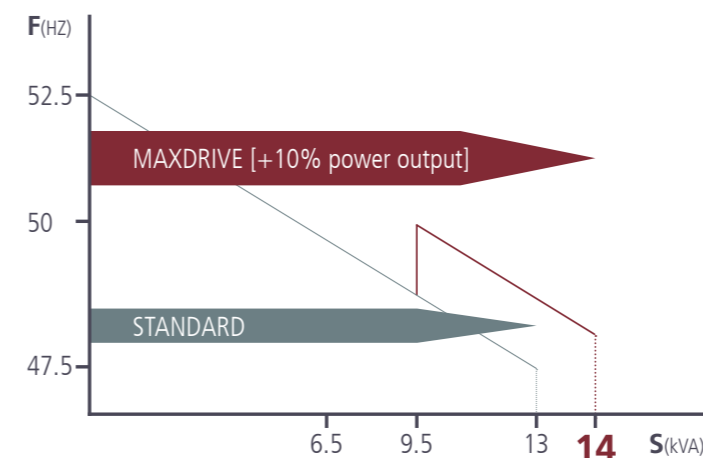
The newly developed power management module maxdrive from ENDRESS allows engines to be used with loss of power output.

#### ► Here is how it works:

For higher loading situations such as the start-up current required or shock loads, the centrifugal governor on the drive motor quickly reaches its limits. Before the power drops, the maxdrive power management module supports the engine regulator. The throttle opens all the way and this ensures that the engine's full power is available.

#### Advantages at a glance:

- An increase in the power output by 10%
- Rpm remains stable under heavy load
- A constant frequency, also in the upper rpm range



### THE NEW STANDARD

#### One standard for all

FireCAN is the standardized interface for uniform data transmission in a fire brigade vehicle. All ENDRESS DIN generators with electric start can be fitted with FireCAN.



### THE NEW MULTIFUNCTIONAL CONTROL DISPLAY EE-MCS 4.0

#### A system for optimal safety and a user-friendly system for everyday use.

The completely newly designed E-MCS 4.0 now delivers even more information about data and the status of units than the previous model E-MCS 3.0. The newly designed display makes reading off of data significantly easier since only the information required and relevant for operation can be seen. All other information such as warnings or switched-in systems remains hidden and is only displayed when it was triggered. The new EMCS 4.0 is already prepared for the new standard FireCAN, thus this system fulfils all of the requirements placed upon future-oriented equipment operating in the power generator and vehicle sector.

#### ► Displays in relevant operation

- Display of voltages for the individual phases 1–3
- Loading for the individual phases 1–3
- Total loading of the unit ► **NEW**
- Fuel level indicator – with warning where there is a reserve ► **NEW**
- Frequency indicator
- Operating hours counter

#### ► Display of warnings, switched-in systems

- Earthing line testing device
- Battery charge checking / charging function (W)
- Insulation error (W)
- Insulation error – optional (A)
- ECOtronic active – optional ► **NEW**
- Oil pressure (A)
- Engine temperature (W) ► **NEW**
- Fuel temperature (W) ► **NEW**
- Generator temperature (W) ► **NEW**
- Ambient temperature (W) ► **NEW**
- Emergency-Stop was actuated

## TWO IMPORTANT GUIDELINES FOR GENERATORS

1

## EU noise guideline 2000/14/EC



**Purpose:**  
Harmonisation of existing sound protection regulations and limit values in the EU member states.

The guideline 2000/14/EC states that the manufacturer is required to mark the power unit with the guaranteed noise level. The marking obligation includes declaration of the guaranteed value in dB, the LWA mark as well as an appropriate pictogramme.

LwA  
95 dB

**Measurement method and calculation**

Measurement of the noise levels takes place according to a precisely established testing procedure which must be observed by every manufacturer. There is only one binding and precise labelling of the noise level: LWA sound power level. Always pay attention to the LWA value; all other values are chosen freely by the manufacturer.

**►Attention!**

Many manufacturers advertise the so-called sound pressure level (LP), which does not represent data which conforms to the relevant standard. The LP value is freely determined by the manufacturer and is therefore not comparable! The LP value is calculated according to a formula that depends on a freely chosen distance from the power unit (see example).

**Data in the catalogue**

Endress provides two values.

**1. Sound power level (LWA)**

confirmed on the device next to an obligatory designation per 2000/14/EC.

**2. Sound pressure level (LPA)**

at a distance of 7 metres; this value is calculated as follows:  
LWA 95 db(A) - 25 = Lp 70 db(A).

**ENDRESS: 95 db(A) - 25 = 70 db(A) (distance 7m)**

**Competition: 95 db(A) - 28 = 67 db(A) (distance 10m)**

2

## Alternator output data

**Engine:**

Performance data for the engines is often quoted as the maximum power output without any load, normally at 3,600 rpm. However only 3,000 rpm are needed in the generator. If the comparison is to be correct and valid, the performance data must always be quoted for a speed of 3,000 rpm. All other comparisons are false!

**Therefore: Only trust performance data based on 3.000 rpm.**

**How much does an alternator really output?**

The overall power output is dependent on the efficiency of the engine (a maximum of 75% to 80%) and the generator. In order to be doubly sure you can estimate the stated performance yourself using the rule of thumb:  
1 HP engine power output ► alternator output a max. of 0.65 kVA (65%)  
1 kW engine power output ► alternator output a max. of 0.85 kVA (85%)

**►Attention:**

Many competitors often only quote the engine output. This is not declaration of the power output of the generator!

ENDRESS quotes its power outputs according to the European and national standards. We guarantee, based on use of our checked and released measuring process, reliable and correct statement of power outputs of our generators.

**You can rely on this:**

ENDRESS generators meet all required standards and guidelines

The relevant standards for generators  
Noise guideline 2000/14/EC  
German Federal Immission Protection Act (BImSchG)  
DIN ISO 8528, DIN 6280.

**►Your advantage using ENDRESS DIN generators:**

- 1 Insulation monitoring with an optical and an acoustic error message – resettable
- 2 3-way fuel tap for third party fueling
- 3 Tank level indicator operating over the multifunctional control display E-MCS 4.0
- 4 Noise emissions of a maximum of 96 dB(A) according to the EU noise emission regulations 2000/14/EC

**►Your advantage using ENDRESS DIN generators:**

- 5 Innovative light construction technology through use of aluminium components
- 6 Safe fuelling through a higher filler tube
- 7 A large tank for long operation
- 8 All displays and controls at a glance
- 9 Easy access to perform maintenance work
- 10 Plastic-coated handles



## LEADING THROUGH NEW THINKING-KNOW-HOW

Based on the introduction of innovative technologies and the resulting new products, ENDRESS has developed to become the leading supplier of generators in Europe. With international specialist agencies and a dense dealer network ENDRESS has established itself as a strong partner for disaster management and services/BOS far beyond the borders of Germany.

Delivering quality is the central focus of everything we do - it has been the guiding principle of the company since it was founded in 1914. Also this central leading idea still guides everything ENDRESS does today. The large power range on offer allows ENDRESS to cover every possible requirement. Innovative and special purpose devices for fire brigades, emergency management and services and auxiliary services tested according to all standards as well as development of equipment and fulfilment of customer-specific requirements are also part of the product portfolio, as well as floodlights and generators for emergency power supply.

**What makes Endress so significant when it comes to generators:**

**ENDRESS is one of Europe's leading generator brands.**  
**ENDRESS has a seamless programme line for all requirement levels.**  
**ENDRESS has passed all relevant safety tests and has received awards.**  
**ENDRESS has a complete line of accessories and service, with warranties.**  
**ENDRESS offers its partners free professional advice on technological applications.**  
**ENDRESS has a seamless service network.**

## LEADING THROUGH NEW THINKING-KNOW-HOW

Endress DIN units with reliable DUPLEX technology are the safe and robust energy source for firefighting, emergency management and services und auxiliary services. As appliances become more modern and powerful, the demands on mobile units increase. The customer and market requirements are the focus of our work during the development activities of ENDRESS. For that reason, we constantly update our product lines to meet today's and tomorrow's demands.

**TECHNOLOGY THAT IS VERY CONVINCING:**

**DUPLEX**

**ECOtronic**

**FIRECAN**  
compatible with action

**Made in Germany**



ESE 304 BA



ESE 404 DBA



#### ► Standard equipment

##### ► All models:

- Industrial engines using OHV technology
- Lack of oil Auto Power Off
- Alternator overload protection
- Splashed water protected alternators in Protection Class IP54

##### ► Also only ESE 404 and 604:

- 4-in-1 display for V/Hz/h/lack of oil alarm

##### ► Also only ESE 604:

- DUPLEX generator IP54

#### ► Highlights at a glance:

- Performance data you can rely on
- Comprehensive functions, safe and simple operation
- DUPLEX - quality current with no compromise, with power to spare
- Asynchronous quality alternators for a clean current output



ESE 604 DEG

Model	ESE 304 BA	ESE 404 DBA	ESE 604 DEG
Order No	152 504	152 505	152 506
Alternator model	asynchronous	asynchronous	Duplex
Continuous output. [PRP] kVA/kW 3~	–	4.0 / 4.0	6.0 / 4.8
Continuous output. [PRP] kVA/kW 1~	2.5 / 2.5	1.6 / 1.6	4.0 / 3.6
Nominal voltage 3~	–	400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~	230 V 1~
Rated current 3~	–	5.8 A 3~	8.7 A 3~
Rated current 1~	9.6 A 1~	7,0 A 1~	16.0 A 1~
Power factor cos (phi)	1	1	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz
Protection Class for alternator	IP54	IP54	IP54
Voltage regulation	electronic	electronic	electronic
Engine type	Briggs & Stratton	Briggs & Stratton	Endress EPE 360
Number of cylinders in the engine	1	1	1
Displacement	205 ccm	305 ccm	357 ccm
Output at 3000 rpm	3,3 kW	4.8 kW	7.5 kW
Fuel	Petrol	Petrol	Petrol
Tank capacity (l)	3.1	5.30	6.70
Consumption l/h at a 75% load	1.1	1.60	2.10
Running time l/h at a 75% load	3	3	3
Starting system	Reversing start	Reversing start	Reversing start
Sound power level LWA db(A)	96	99	100
Sound pressure level (7 m) db(A)	71	74	75
Approx. weight (kg)	49	77	91
Dimensions L x W x H (mm)	550 x 440 x 400	700 x 440 x 580	700 x 440 x 580
Sockets	1 x 230V 16A	2 x 230V 16A, 1 x 400V CEE 16A	2 x 230V 16A, 1 x 400V CEE 16A





ESE 904 DBG ES DIN

Model	ESE 904 DBG ES DIN	ESE 1104 DBG ES DIN	ESE 1304 DBG ES DIN
Order No	151 013KI	151 015KI	151 016KI
Alternator model	Duplex	Duplex	Duplex
Continuous output. [PRP] kVA/kW 3~	9.0 / 7.2	11.0 / 8.8	13.2 / 10.6
Continuous output. [PRP] kVA/kW 1~	6.0 / 5.4	6.0 / 4.8	7.2 / 6.5
Nominal voltage 3~	400 V 3~	400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~	230 V 1~
Rated current 3~	12.9 A 3~	15.9 A 3~	19,1 A 3~
Rated current 1~	26.1 A 1~	26.1 A 1~	31.3 A 1~
Power factor cos (phi)	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz
Protection Class for alternator	IP54	IP54	IP54
Voltage regulation	electronic	electronic	electronic
Engine type	B&S Vanguard 16 HP	B&S Vanguard 20 HP	B&S Vanguard 23 HP
Number of cylinders in the engine	2	2	2
Displacement	480 ccm	627 ccm	627 ccm
Output at 3000 rpm	9.5 kW	13.0 kW	14.1 kW
Fuel	Petrol	Petrol	Petrol
Tank capacity (l)	12	12	12
Consumption l/h at a 75% load	2.4	3.4	3.4
Running time l/h at a 75% load	5	3.5	3.5
Starting system	Reversing start	Electric start	Electric start
Sound power level LWA db(A)	97	98	98
Sound pressure level (7 m) db(A)	72	73	73
Sound pressure level (7 m) with ECOtronic	62	62	62
Approx. weight (kg)	136	147	148
Dimensions L x W x H (mm)	820 x 440 x 580	820 x 440 x 580	820 x 440 x 580
Sockets	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 2 x 400V CEE 16ACEE 16A



For example instrument panel for DIN generators





ESE 1407 DBG ES DIN



#### ► Standard equipment

- Insulation monitoring – without shut-off
- 3-way fuel cock for external refueling
- Fuel level indicator over the E-MCS 4.0
- Earthing line testing device
- Multifunction control display E-MCS 4.0
- Lack of oil Auto Power Off
- Alternator overload protection
- Starter battery 12 V/18 A for E-Start models
- Folding handles
- Vehicle tool kit

#### ► Highlights at a glance:

- Fitted according to DIN 14685-1
- Performance data you can rely on
- Comprehensive functions, safe and simple operation
- DUPLEX - quality current with no compromise, with power to spare
- Multifunctional control display E-MCS 4.0 - a clear system
- Innovative light construction technology through use of aluminium components
- ECOtronic, maxdrive and FireCAN - technologies for the future
- A large tank for long operation – with re-fuelling
- Special equipment and accessories, available for many requirements
- Power in the smallest space - up to 9 kVA (absolute) in 5 series DIN frame

Special-purpose equipment not retrofittable	Order No.	Available accessories	Order No.
FireCAN*	163 140	Exhaust hose	163 120
Remote start device*	163 150	90° adapter for exhaust hose	163 130
Beos charging current socket*	163 080	Refuelling system	163 110
Charging current socket DIN 14690*	163 010	Transport carriage for a 5 series DIN frame	163 100
Charging current socket MagCode*	163 018	Transport carriage for a 8 series DIN frame	163 101
External start Nato socket*	163 000	Special colours on request	
Insulation monitoring with shut-off	163 071		
ECOtronic system	163 020		
Colour red RAL 3000	163 180		

\*Models with E-Start

Model	ESE 607 DBG DIN	ESE 607 DBG DIN	ESE 957 DBG DIN	ESE 907 DBG DIN	ESE 907 DBG ES DIN	ESE 1107 DBG ES DIN	ESE 1307 DBG ES DIN	ESE 1407 DBG ES DIN
Order No	156 202	151 202	156 214	156 203	151 213	156 215	156 216	156 219
Alternator model	Duplex	Duplex	Duplex	Duplex	Duplex	Duplex	Duplex	Duplex
Continuous output. [PRP] kVA/kW 3~	6.5 / 5.2	6.5 / 5.2	9.0 / 7.2	9.0 / 7.2	9.0 / 7.2	11.0 / 8.8	13.2 / 10.6	13.7 / 10.9
Continuous output. [PRP] kVA/kW 1~	5.0 / 4.0	5.0 / 4.0	6.0 / 5.4	6.0 / 5.4	6.0 / 5.4	6.0 / 4.8	7.2 / 6.5	7.5 / 6.7
Nominal voltage 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~
Rated current 3~	8.7 A 3~	8.7 A 3~	12.9 A 3~	12.9 A 3~	12.9 A 3~	15.9 A 3~	19.1 A 3~	19.8 A 3~
Rated current 1~	14.7 A 1~	14.7 A 1~	26.1 A 1~	26.1 A 1~	26.1 A 1~	26.1 A 1~	31.3 A 1~	32.6 A 1~
Power factor cos (phi)	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
Protection Class for alternator	IP54	IP54	IP54	IP54	IP54	IP54	IP54	IP54
Voltage regulation	electronic	electronic	electronic	electronic	electronic	electronic	electronic	electronic
Engine type	B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 20 HP	B&S Vanguard 23 HP	B&S Vanguard 23 HP
Number of cylinders in the engine	2	2	2	2	2	2	2	2
Displacement	480 ccm	480 ccm	480 ccm	480 ccm	480 ccm	627 ccm	627 ccm	627 ccm
Output at 3000 rpm	9.5 kW	9.5 kW	9.5 kW	9.5 kW	9.5 kW	13.0 kW	15.0 kW	15.0 kW
Fuel	Petrol	Petrol	Petrol	Petrol	Petrol	Petrol	Petrol	Petrol
Tank capacity (l)	15	15	15	22	22	22	22	22
Consumption l/h at a 75% load	2.4	2.4	2.4	2.4	2,4	3.4	3.4	3.4
Running time l/h at a 75% load	6	6	6	9	9	6.5	6.5	6.5
Starting system	Reversing start	Electric start	Electric start	Reversing start	Electric start	Electric start	Electric start	Electric start
Sound power level LWA db(A)	90	90	91	90	90	95	95	95
Sound pressure level (7 m) db(A)	65	65	66	65	65	70	70	70
Sound pressure level (7 m) with ECOtronic	59	59	59	58	58	58	58	58
Approx. weight (kg)	120	135	127	130	145	145	145	150
Dimensions L x W x H (mm)	700 x 440 x 580	700 x 440 x 580	700 x 440 x 580	820 x 440 x 580	820 x 440 x 580	820 x 440 x 580	820 x 440 x 580	820 x 440 x 580
Sockets	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 2 x 400V CEE 16A	3 x 230V 16A, 2 x 400V CEE 16A



ESE 1308 DBG ES DIN



ESE 608 DHG ES DI DIN Silent

**DUPLEX**

**ECOtronic**



#### ► Standard equipment

- Insulation monitoring – without shut-off
- 3-way fuel cock for external refueling
- Fuel level indicator over the E-MCS 4.0
- Earthing line testing device
- Multifunction control display E-MCS 4.0
- Lack of oil Auto Power Off
- Alternator overload protection
- Starter battery 12 V/18 A
- Folding handles
- Vehicle tool kit
- ECOtronic (only ESE 1408)
- LED instrument panel illumination LED (only ESE 1408)

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FireCAN*	163 140	Exhaust hose	163 120
Remote start device*	163 150	90° adapter for exhaust hose	163 130
Beos charging current socket*	163 080	Refuelling system	163 110
Charging current socket DIN 14690*	163 010	Transport carriage for a 5 series DIN frame	163 100
Charging current socket MagCode*	163 018	Transport carriage for a 8 series DIN frame	163 101
External start Nato socket*	163 000	Special colours on request	
Insulation monitoring with shut-off	163 071		
ECOtronic system	163 020		
Colour red RAL 3000	163 180		

\*Models with E-Start

Model	ESE 608 DHG ES DI DIN Super Silent Plus	ESE 908 DBG ES DIN Super Silent Plus	ESE 1308 DBG ES DIN Super Silent Plus	ESE 1408 DBG ES DIN Super Silent Plus
Order No	156 312	156 413	156 416	156 519
Alternator model	Duplex	Duplex	Duplex	Duplex
Continuous output. [PRP] kVA/kW 3~	6.0 / 4.8	9.0 / 7.2	13.2 / 10.6	13.7 / 10.9
Continuous output. [PRP] kVA/kW 1~	4.0 / 3.6	6.0 / 5.4	7.2 / 6.5	7.5 / 6.7
Nominal voltage 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~
Rated current 3~	8.7 A 3~	12.9 A 3~	19.1 A 3~	19.8 A 3~
Rated current 1~	17.4 A 1~	26.1 A 1~	31.3 A 1~	32.6 A 1~
Power factor cos (phi)	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz	50 Hz
Protection Class for alternator	IP54	IP54	IP54	IP54
Voltage regulation	electronic	electronic	electronic	electronic
Engine type	Hatz 1B 50	B&S Vanguard 16 HP	B&S Vanguard 23 HP	B&S Vanguard 23 HP
Number of cylinders in the engine	1	2	2	2
Displacement	517 ccm	480 ccm	627 ccm	627 ccm
Output at 3000 rpm	7.6 kW	9.5 kW	15.0 kW	15.0 kW
Fuel	Diesel	Petrol	Petrol	Petrol
Tank capacity (l)	6	12	12	12
Consumption l/h at a 75% load	1.3	2.4	3.4	3.4
Running time l/h at a 75% load	4.5	5	3.5	3.5
Starting system	Electric start	Electric start	Electric start	Electric start
Sound power level LWA db(A)	94	89	92	96
Sound pressure level (7 m) db(A)	69	65	67	71
Sound pressure level (7 m) with ECOtronic	–	56	56	58
Approx. weight (kg)	155	132	144	144
Dimensions L x W x H (mm)	700 x 440 x 580	820 x 440 x 580	820 x 440 x 580	820 x 440 x 580
Sockets	3 x 230V 16A, 1 x 400V CEE 16A	3 x 230V 16A, 2 x 400V CEE 16A	3 x 230V 16A, 2 x 400V CEE 16A	3 x 230V 16A, 2 x 400V CEE 16A



<b>Model</b>	<b>ESE 2000 T Silent</b>
<b>Order No.</b>	110 00.01
<b>Generator</b>	synchronous
<b>Continuous power kVA/kW<sup>1</sup></b>	1.35/1.35
<b>Nominal voltage</b>	230 V 1~ / 12 V =
<b>Nominal current</b>	5.8 A 1~ / 8.3 A =
<b>Power factor cos</b>	1
<b>Frequency/Protection Class</b>	50 Hz / IP 23
<b>Voltage regulation</b>	Electronic

<b>Engine type</b>	<b>ROBIN EH 09 / 3 HP</b>
<b>Design</b>	1-cylinder 4-stroke OHV
<b>Displacement</b>	86 cm <sup>3</sup>
<b>Output 3000 rpm<sup>1</sup></b>	1.6 kW
<b>Fuel/tank capacity (litres)</b>	Petrol / 4
<b>Consumption/running time<sup>2</sup></b>	0.7 l / 6 h
<b>Starting system</b>	Reversing starter
<b>Sound-power level LWA</b>	90 dB(A)
<b>Sound pressure level LPA</b>	65 dB(A)
<b>Weight in kg</b>	21
<b>Dimensions L x B x H in mm</b>	490 x 295 x 445
<b>Equipment</b>	1 x 230 V / 16 A

Protective contact socket

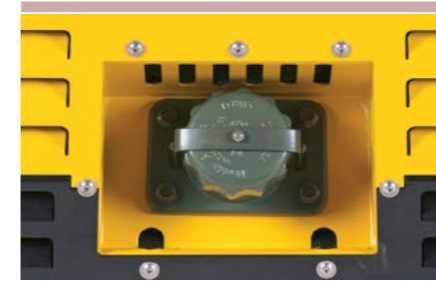
Alternator overload protection  
Lack of oil Auto Power Off

## SOUND-INSULATED PETROL GENERATORS WITH INVERTER TECHNOLOGY

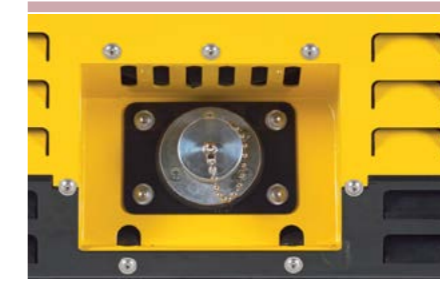
- ▶ Consistent power output
- ▶ Operating hours counter
- ▶ Protective contact socket IP68
- ▶ 12 V for battery charging
- ▶ Economical due to a load-dependent engine rpm

1 Information on performance and noise data as well as measurement methods and calculations can be found on page 6.

2 Consumption in litres per hour, running time in hours. These data are based on approximate values at 3/4 load and are therefore not binding.



**External start (Nato) socket**  
Only generators with electric start for direct operation with the 12 V vehicle battery.



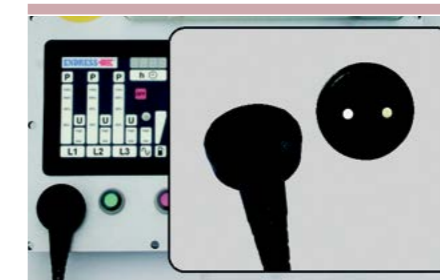
**Charging current socket A DIN 14690**  
Battery charge retention set with charging socket to maintain the charge of the battery.



**BEOS charging current socket**  
Battery charge maintenance set with with charging socket to maintain the charge of the battery. 3-peg flange coupling, temperature sensor for battery monitoring. Only for use with a BEOS charger



**Remote start device**  
Allows the power generator to be started and stopped from an external location. For preserving the battery charge over the main power supply, there are appropriate contacts on the industrial plug connector.



**MagCode charging current socket**  
Battery charge maintenance set with water-tight flat contacts for preserving the battery charge. The magnetic system is extremely compact and self-releasing.



**FireCAN**  
The standardized interface provides uniform data transfer in the fire engine.



**3-way fuel tap**  
For direct connection to a fuelling system.



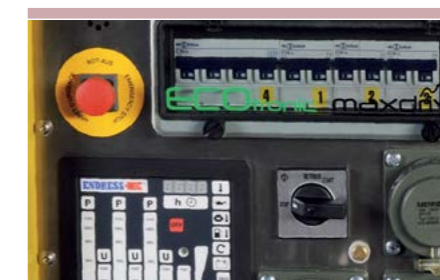
**Refuelling system**  
Included in the delivery: 20 l petrol canister with fuel drawing device.



**Exhaust hose**  
Flexible metal hose (1.5 m) for diverting fumes. Not suitable for enclosed spaces.



**Insulation monitoring**  
Insulation monitoring is standard without shut-off; shut-off can be provided upon request. As a result the individual protection for each socket is no longer required.



**ECotronic**  
A system for reducing the sound level, fuel consumption and pollutant emissions.



**Transport carriage**  
Appropriate for DIN generators. Fitted with two swivel castors with a locking device.



FEUERWEHR

MAN

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MAGIRUS

MAGIRUS

ESE 1408

ENDRESS

FEUERWEHR

ENDRESS

Model	ESE 1408 DBG ES DIN Super Silent Plus
Order No	156 519
Alternator model	Duplex
Continuous output. [PRP] kVA/kW 3~	13.7 / 10.9
Continuous output. [PRP] kVA/kW 1~	7.5 / 6.7
Nominal voltage 3~	400 V 3~
Nominal voltage 1~	230 V 1~
Rated current 3~	19.8 A 3~
Rated current 1~	32.6 A 1~
Power factor cos (phi)	0.8 / 0.9
Frequency	50 Hz
Protection Class for alternator	IP54
Voltage regulation	electronic
Engine type	B&S Vanguard 23 HP
Number of cylinders in the engine	2
Displacement	627 ccm
Output at 3000 rpm	15.0 kW
Fuel	Petrol
Tank capacity (l)	12
Consumption l/h at a 75% load	3.4
Running time l/h at a 75% load	3.5
Starting system	Electrical start
Sound power level LWA db(A)	96
Sound pressure level (7 m) db(A)	71
Sound pressure level (7 m) with ECOtronic	58
Approx. weight (kg)	144
Dimensions L x W x H (mm)	820 x 440 x 580
Sockets	3 x 230V 16A, 2 x 400V CEE 16A



### THE NEW MULTIFUNCTIONAL CONTROL DISPLAY E-MCS 4.0

A system for optimal safety and a user-friendly system for everyday use.

The completely newly designed E-MCS 4.0 now delivers even more information about data and the status of units than the previous model E-MCS 3.0. The newly designed display makes reading off of data significantly easier since only the information required and relevant for operation can be seen. All other information such as warnings or switched in systems remains hidden and is only displayed when it was triggered. The new EMCS 4.0 is already prepared for the new standard FireCAN, thus this system fulfils all of the requirements placed upon future-oriented equipment operating in the power generator and vehicle sector.

#### ► Displays in relevant operation

Display of voltages for the individual phases 1–3

Loading for the individual phases 1–3

Total loading of the unit ► **NEW**

Fuel level indicator – with warning where there is a reserve ► **NEW**

Frequency indicator

Operating hours counter

#### ► Display of warnings, switched in systems

Earthing line testing device

Battery charge checking/charging function (W)

Insulation error (W)

Insulation error – optional (A)

ECOtronic active – optional ► **NEW**

Oil pressure (A)

Engine temperature (W) ► **NEW**

Fuel temperature (W) ► **NEW**

Generator temperature (W) ► **NEW**

Ambient temperature (W) ► **NEW**

Emergency stop has been actuated



www.MagirusGroup.com

ESE 1408

SUPER SILENT

ECOtronic

ENDRESS

## THE SEA SERIES IS ALIGNED WITH THE NEEDS AND REQUIREMENTS OF THE RELIEF ORGANISATIONS IN EMERGENCY MANAGEMENT AND SERVICES.

The activities in emergency management and services and the relief organisations are subject to the industrial safety regulations. The equipment must be in accordance with generally recognised regulations and current state of the art technology. Non-observance of the required protection levels may save on costs but can, however, rapidly lead to fatal cases.

For some association levels own guide lines were enacted by the HiOrgs which again regulate these requirements in a binding manner. Thus, amongst other things, for some DRK regional associations, the technical service regulation (TD01) Power Supply is used which provides the exact specifications in this area, for example SEA Protection Class IP54 for the alternator, IP68 for the sockets and IP44 on the instrument panels as minimum requirements.

## THE ALTERNATOR

### DUPLEX in a nutshell

#### ► Yesterday:

When there were still no electronics on units, one needed so-called asynchronous alternators in order to generate so-called "clean" current and synchronous generators to manage the "heavy starting".

#### ► Today:

In the case of DUPLEX equipment the electronic controller unit adapts itself individually to the respective drive motor and reacts appropriately before the engine is overloaded. In this way it is possible to mobilise power reserves and the DUPLEX generator hauls even the heaviest, inductive consumer upwards and protects the most sensitive consumer from getting damaged. Thus all of the advantages of asynchronous and synchronous alternators are combined together in the DUPLEX system and this brings an end to the discussion about which technology is better, synchronous or asynchronous.

### The advantages at a glance

- High voltage stability
- Protected from dust and splashing water
- Up to 4 times the starting current
- Suitable for an asymmetric load in actual operation
- Electronic voltage regulation on all phases independently from each other



## ECOtronic

### ► Here is how it works:

ECOtronic is an eco-friendly alternative to conventional electricity generation. The ECOtronic system recognizes during use whether output is being used or not. If no power is being drawn the speed is clearly reduced. This occurs automatically and the generator continues to run quietly and in fuel saving manner but always remains at the ready. It is only once power is needed again, such as when an electric tool is used, the ECOtronic makes the necessary power available without delay.

### The advantages at a glance

- Operating costs are lowered
- Up to 30% less fuel consumption
- Significantly reduced noise emissions
- Reduction of the pollutant emissions



## SEA SERIES 3 - 13

- ▶ Protective contact socket IP68
- ▶ Folding handles
- ▶ Lack of oil Auto Power Off
- ▶ Alternator overload protection

## OPEN CONSTRUCTION

Model	SEA 3	SEA 6	SEA 13
Order No	151 644	151 645	151 647
Alternator model	Duplex	Duplex	Duplex
Continuous output. [PRP] kVA/kW 3~		6.0 / 4.8	13.2 / 10.6
Continuous output. [PRP] kVA/kW 1~	2.5 / 2.5	4.0 / 3.6	7.2 / 6.5
Nominal voltage 3~		400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~	230 V 1~
Rated current 3~		8.7 A 3~	19.1 A 3~
Rated current 1~	10.9 A 1~	17.4 A 1~	31.3 A 1~
Power factor cos (phi)	1	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz
Protection Class for alternator	IP54	IP54	IP54
Voltage regulation	electronic	electronic	electronic
Engine type	Honda GX200	Honda GX390	Subaru EH 65
Number of cylinders in the engine	1	1	2
Displacement	163 ccm	389 ccm	653 ccm
Output at 3000 rpm	2.5 kW	6.0 kW	14.5 kW
Fuel	Petrol	Petrol	Petrol
Tank capacity (l)	15	25	30
Consumption l/h at a 75% load	1.1	2.1	3.4
Running time l/h at a 75% load	13.5	12	8.5
Starting system	Reversing start	Reversing start	Electric start
Sound power level LWA db(A)	96	97	97
Sound pressure level (7 m) db(A)	63	60	67
Approx. weight (kg)	60	96	151
Dimensions L x W x H (mm)	635 x 540 x 490	750 x 610 x 585	850 x 650 x 575
Sockets	1 x 230V 16A IP68, 1 x 230V CEE 16A IP68	2 x 230V 16A IP68, 1 x 400V CEE 16A IP68	2 x 230V 16A IP68, 1 x 400V CEE 16A IP68, 1 x 400V CEE 32A IP68



## SEA SERIES SEA 13 S / 6 DS

- ▶ Protective contact socket IP68
- ▶ Connection for external fuelling
- ▶ Folding handles
- ▶ Alternator overload protection

## SUPER SILENT CONSTRUCTION

Model	SEA 13S	SEA 6 DS
Order No	151 648	151 649
Alternator model	Duplex	Duplex
Continuous output. [PRP] kVA/kW 3~	13.2 / 10.6	6.0 / 4.8
Continuous output. [PRP] kVA/kW 1~	7.2 / 6.5	4.0 / 3.6
Nominal voltage 3~	400 V 3~	400 V 1~
Nominal voltage 1~	230 V 1~	230 V 1~
Rated current 3~	19.1 A 3~	8.7 A 3~
Rated current 1~	31.3 A 1~	17.4 A 1~
Power factor cos (phi)	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz
Protection Class for alternator	IP54	IP54
Voltage regulation	electronic	electronic
Engine type	B&S Vanguard 22HP	Hatz 1 B 50
Number of cylinders in the engine	2	1
Displacement	627 ccm	517 ccm
Output at 3000 rpm	14.1 kW	7.6 kW
Fuel	Petrol	Diesel
Tank capacity (l)	12	6
Consumption l/h at a 75% load	3.4	1.3
Running time l/h at a 75% load	3.5	4.5
Starting system	Electric start	Electric start
Sound power level LWA db(A)	92	94
Sound pressure level (7 m) db(A)	67	69
Approx. weight (kg)	144	155
Dimensions L x W x H (mm)	820 x 440 x 580	700 x 440 x 580
Sockets	3 x 230V 16A IP68, 2 x 400V CEE 16A IP68	3 x 230V 16A IP68, 1 x 400V CEE 16A IP68



## EMERGENCY POWER SUPPLY / FEEDING OF POWER INTO BUILDINGS

### LEADING THROUGH NEW THINKING-KNOW-HOW

**Power cuts occur more often than one assumes – caused by natural catastrophes, snow chaos or aged supply networks. Whole locations “sit” in the dark even though, today, permanent supply with electricity should be self-evident.**

One quickly forgets how dependent one is when the power supply fails unexpectedly. Alarm messages do not function anymore, electrically driven exit points do not open automatically anymore, electrical devices which should simplify everyday work do not run anymore.

ENDRESS has developed special plant for the BOS area with which the emergency power supply can be maintained from the control centres or a building can continue to be supplied when there is a power cut over large areas.



## EMERGENCY POWER SUPPLY WITH IT/TN OPERATIONAL SWITCHOVER



### ► Standard equipment

- Sound attenuation cover
- Multifunction display E-MCS 6.5
- Operating hour counter
- 4-pin main fuse
- Acoustic alarm
- EMERGENCY-STOP button
- Insulation monitoring (warning <46k or switching off <23k)
- Changeover switch with leading N-conductor
- Remote start socket
- Instrument panel illumination (LED)
- Preparations for E-RMA remote monitoring

### ► Optional accessories

- Chassis according to StVZO with fixed and height adjustable drawbar
- E-RMA remote monitoring

Model	ESE 15 YW/IT-TN	ESE 20 YW/IT-TN	ESE 35 YW/IT-TN	ESE 50 YW/IT-TN	ESE 67 PW/IT-TN	ESE 95 PW/IT-TN
Order No	334 255	334 256	334 257	334 259	334 261	334 263
<b>GENERATOR</b>						
Continuous power PRP kVA/kW	13.0 / 10.4	17.6 / 14.0	30.5 / 24.4	44.0 / 35.2	55,0 / 44.0	69.0 / 55,2
Alternator model	MeccAlte	MeccAlte	MeccAlte	MeccAlte	MeccAlte	MeccAlte
Design / insulation	synchronous / Class H	synchronous / Class H	synchronous / Class H	synchronous / Class H	synchronous / Class H	synchronous / Class H
Rated voltage	400V 3~ / 230V 1~	400V 3~ / 230V 1~	400V 3~ / 230V 1~	400V 3~ / 230V 1~	400V 3~ / 230V 1~	400V 3~ / 230V 1~
Nominal current / cos φ	19A 3~ / 0.8	25.4A 3~ / 0.8	44.0A 3~ / 0.8	63A 3~ / 0.8	79A 3~ / 0.8	121A 3~ / 0.8
Frequency / voltage regulation	50 Hz / electronic	50 Hz / electronic	50 Hz / electronic	50 Hz / electronic	50 Hz / electronic	50 Hz / electronic
<b>ENGINE</b>						
Engine type	YANMAR 3TNV88	YANMAR 4TNV88	YANMAR 4TNV98	YANMAR 4TNV98T	PERKINS 1104D-44TG3	PERKINS 1104D-E44TAG1
Design	3-cylinder 4-stroke	4-cylinder 4-stroke	4-cylinder 4-stroke	4-cylinder 4-stroke / Turbo	4-cylinder 4-stroke / Turbo	4-cylinder 4-stroke / Turbo
Cooling system	water-cooled	water-cooled	water-cooled	water-cooled	water-cooled	water-cooled
Displacement	1,642 cm <sup>3</sup>	2,190 cm <sup>3</sup>	3,319 cm <sup>3</sup>	3,119 cm <sup>3</sup>	4,400 cm <sup>3</sup>	4,400 cm <sup>3</sup>
Engine output [PRP]	12.7 kW	16.9 kW	32.9 kW	41.4 kW	56.6 kW	76.6 kW
Rotational speed in rpm	1,500	1,500	1,500	1,500	1,500	1,500
Engine regulation	mechanical	mechanical	mechanical	electrical	mechanical	electrical
Fuel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Tank capacity	51 litre	51 litre	68 litre	68 litre	209 litre	209 litre
Consumption at a 75% load	2.8 l/h	3.7h	5.9 l/h	8.3 l/h	12 l/h	16.9 l/h
Running time	18 h	14 h	11.5 h	8 h	17 h	12 h
Starting system	E-Start 12V	E-Start 12V	E-Start 12V	E-Start 12V	E-Start 12V	E-Start 12V
Sound power level	93 db(A)	93 db(A)	95 db(A)	92 db(A)	92 db(A)	96 db(A)
Sound pressure level (7 m)	64 db(A)	64 db(A)	66 db(A)	67 db(A)	67 db(A)	71 db(A)
Weight kg	480	560	773	829	1.150	1.490
Dimensions L x B x H mm	1,646 x 885 x 1,061	1,646 x 885 x 1,061	2,005 x 948 x 1308	2,005 x 948 x 1308	2,294 x 1,007 x 1,465	2,414 x 1,087 x 1,863
<b>SOCKET COMBINATION</b>						
Feed mode	CEE 400V / 32A IP67	CEE 400V / 32A IP67	CEE 400V / 63A IP67	CEE 400V / 63A IP67	CEE 400V / 125A IP67	CEE 400V / 125A IP67
Incident scenes operation	CEE 400V / 32A IP67 CEE 400V / 16A IP67 1 x 230V / 16A IP68	CEE 400V / 32A IP67 CEE 400V / 16A IP67 1 x 230V / 16A IP68	CEE 400V / 63A IP67 CEE 400V / 16A IP67 1 x 230V / 16A IP68	CEE 400V / 63A IP67 CEE 400V / 16A IP67 1 x 230V / 16A IP68	CEE 400V / 125A IP67 CEE 400V / 63A IP67 1 x 230V / 16A IP68	CEE 400V / 125A IP67 CEE 400V / 63A IP67 1 x 230V / 16A IP68

## INSTRUMENT PANEL



### ► Instrument panel legend

- 1 Supply socket secured over a power supply circuit breaker. Power take-off only possible in feed mode
- 2 For mobile use the socket strip is fused over an insulation monitoring system
- 3 Control module E-MCS 6.5 for secure operation, monitoring of the engine and alternator



**LEADING THROUGH ALWAYS REMAINING INNOVATIVE**

**Numerous incidents are dependent on light, since it is not possible to work without light. It does not matter one is dealing with a rescue incident, on motorway and airport building sites, in building construction and civil engineering or for mining: A reliable supply of light is decisive.**

ENDRESS offers compactly designed mobile light masts mounted on a trailer chassis. They are uncomplicated and precisely placeable and therefore allow efficient work to be done at every desired location.



## MOBILE FLOODLIGHTS FOR EMERGENCY POWER SUPPLY WITH IT/TN OPERATIONAL SWITCHOVER

TO THE  
PRODUCT VIDEO ▶



### ► Standard equipment

- Fully galvanised chassis according to StVZO with a height adjustable drawbar
- High quality generator according to emission class EU Stage 3A
- Liquid collecting tray
- Three-way fuel tap for external fueling
- Main battery switch
- The battery charger is integrated in the generator with an external charging socket
- Oil drain pump
- Leakage sensor
- Storage boxes for items up to 100 kg in weight



### ► Optional accessories

- Dummy load for motor-protecting load take-off for floodlight operation
- Rear warning system with a flashing blue light
- An super compact light mast for a passage height of 2.20 metres
- Headlight package mixed light (2 x halogen, 2 x HQI, 2 x HMI)
- Ambient lighting (LED)
- E-RMA remote monitoring



### Technical data

Light mast	Pneumatic
Light mounting height max.	9.0 metre
Extension time to the max. light mounting height	about 2:15 minutes
Control of the light mast / headlight	Cable remote control
Headlight	2 x halogen 2 x HQI
Dimensions incl. trailer L x B x H	4500 x 2000 x 2700 mm
Storage boxes for loading	2 pieces max. 100 kg
<b>Socket combination</b>	
Feed mode	CEE 400V / 63A IP67 (7 h)
<b>Incident scenes operation</b>	
	CEE 400V / 63A IP67 CEE 400V / 16A IP67 230V / 16A IP67

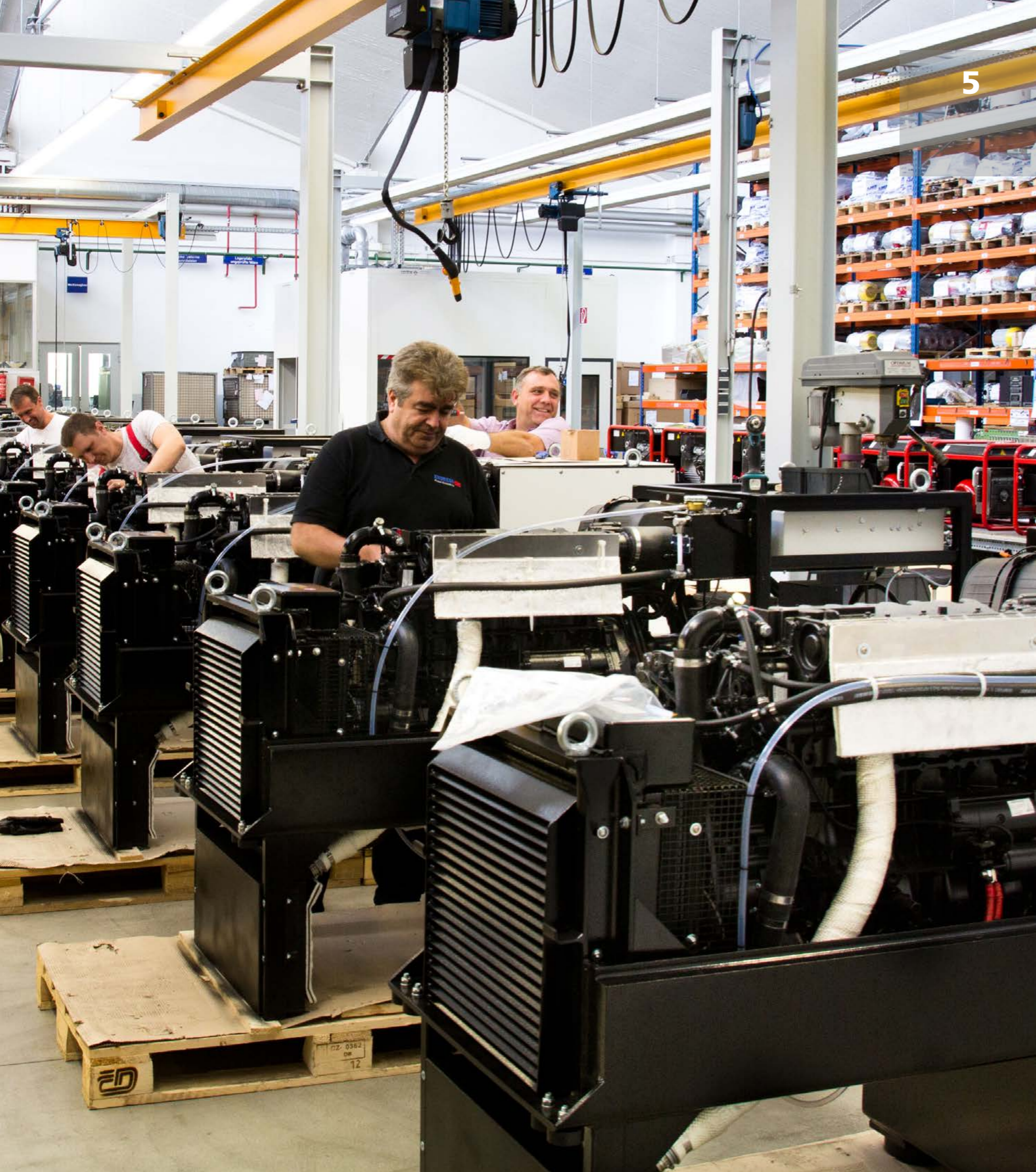
Version	LiMa 900/50	LiMa 900/67
Order No.	8500103	8500102
generator	ESE 50 YW/IT-TN	ESE 67 PW/IT-TN
Cont. power output PRP kVA/kW	44.0 / 35.2	55.0 / 44.0
Rated voltage	400V 3~ / 230V 1~	400V 3~ / 230V 1~
Total weight fully fueled	approx. 2000 kg	approx. 2200 kg



### LEADING THROUGH FULFILMENT OF CUSTOMER-SPECIFIC REQUIREMENTS

**In some cases standardised solutions are not adequate to cover certain operations. With its own development capability and production facilities ENDRESS has the optimal prerequisites to react to your special case.**

It does not matter whether it is a matter of modification of existing systems or a completely new development according to your requirements – on the topic energy supply, ENDRESS is the preferred partner for emergency management and services.



## JUST SOME OF MANY CUSTOMER-SPECIFIC SOLUTIONS – DEVELOPED BY ENDRESS.

### MOBILE DENTAL PRACTICE

#### ► Reliable and clean power supply

This project concerned manufacture of a reliable power supply for mobile dental practices which are used in the Middle East. The clean and reliable power supply could be secured using ENDRESS generators.

Robust processing and a maintenance-free generator system allow a longer service life together with lower operating costs. The almost already legendary control characteristics of the ENDRESS Duplex generators allows secure and problem-free operation of sensitive plants. In order to minimise the vibrations arising during operation of the medical unit, the unit can be "removed" over a track system from the vehicle.



### REFUGEE AID IN SYRIA

#### ► Removal and replacement of the electricity network and improvement of the electricity generation

ENDRESS is always a reliable and quicker partner for improvement of the supply situation in disaster areas. So, for example, the emergency power supply was created for aid camps in Syria after the electrical and electronic engineering equipment was mostly destroyed in the strongly endangered areas through air raids. The electricity network was damaged at countless locations. Furthermore the public power supply system was completely turned off phase by phase in the affected regions.

In a difficult invitation to tender with very high requirements ENDRESS could win the contract thanks to the German quality it delivers and its long and good contact to the aid organisations and could deliver a number of 30 KVA sound-insulated generators for delivery for the DRK (in Arabic States The Red Crescent).



In further projects numerous emergency power systems were delivered to aid organisations globally to meet different requirements. In this way ENDRESS is, every day, securing one more piece of a reliable power supply on all continents.



### THW BITBURG

#### ► Safeguarding industrial plant

The ESE 420 VW/AS generator with a continuous power output of 383 kVA to safeguard industrial plant in the case of a power failure in the region of Bitburg. The plant is fitted with equipment to provide an automatic emergency power supply and is usable, at the same time, as a mobile unit for major incidents.



### THAI AIRLINES

#### ► Hybrid generators

Development of a hybrid generator for airport apron vehicles. Challenge: Minimisation of the charging times for batteries on electric vehicles. The problem: The vehicles are used in all climatic zones: Moscow Airport, Bangkok Airport, Jeddah Airport (Saudi-Arabia).

#### The solution:

Development of a charging current generator which can recharge the batteries while moving. Advantage: The downtime of the vehicle has been reduced to a minimum. The system developed by us can be used in all climate zones and can even master hard tropical conditions and extreme cold situations.



**COMPLEX RELATIONSHIPS EXPLAINED IN SIMPLE TERMS**

**There is more than an engine and an alternator in a generator of the newest generation. What was good earlier is not bad today – however ENDRESS is challenging itself to remain innovative and to create added value for the user by providing extensive extras.**

In order to assist you in not losing the overview may we present you with the most important terminology covering everything to do with power supply.

#### ► CHARGING SOCKET

In order to maintain the battery charge level of the generator the battery can be charged using a charging current socket. ENDRESS currently offers the following systems for maintaining the battery charge level: BEOS, MagCode, charging current in accordance with DIN 14690. Maintenance of the battery charge level is also already integrated in as standard over the options remote start device and FireCAN.

#### ► DUMMY LOAD

When using light masts there is often only little power output needed since the light output is between 4–8 kW. In order to ensure that the diesel engines of a generator do not run in low-load conditions a dummy load is switched in automatically which requires a higher power output from the generator. In this way the diesel engine will reach its operating temperature quicker which is needed for a long service life and clean operation.

#### ► E-MCS 4.0

The ENDRESS Monitoring Control System is installed as standard in every ENDRESS DIN generator. All statuses of the units of the generators can be seen at a glance and therefore critical situations are avoided early on. The E-MCS 4.0 also operates with the FireCAN Standard and transfers all information to the control centre of the vehicle. *See also page 5.*

#### ► E-MCS 6.5

The ENDRESS Monitoring Control System 6.5 is installed as standard in every ENDRESS DIN generator, which is provided for power feed and IT/TN operational switchover. The E-MCS 6.5 controls and monitors the power unit. It is prepared as standard to receive the remote monitoring system E-RMA.

#### ► E-RMA

The ENDRESS Remote Monitoring Application allows you to maintain an overview of the power supply achieved. E-RMA is compatible with all generators for feeding of power into buildings or a light mast trailer. The data are transferred to any mobile peripheral device such as a smartphone, tablet or control centre PC.

#### ► EARTHING

Earthing is required if the generator is designed in a TN network. An electrician is needed to commission it who will check for proper and appropriate earthing. Mobile DIN generators do not need to be earthed since these are designed in the network configuration IT.

#### ► ECOtronic

The generation of current with a conventional petrol generator takes place at a high speed range of 3,000 rpm. However, according to experience a generator often runs during use without load. From today's point of view, this leads to wasteful use, such as during work with electric tools on construction sites or in repair or emergency use. The ECOtronic system was developed by ENDRESS to meet the requirements.

#### Here is how it works:

ECOtronic is an environmentally friendly alternative to conventional power generation. The ECOtronic system recognizes during use whether output is being used or not. The speed is clearly reduced, if no power is being drawn. This happens automatically and the generator keeps running quietly and economically, however thereby always remains in stand-by. It is only once power is needed again, such as when an electric tool is used, that the ECOtronic system immediately makes the full power available again — without delay.

#### ► FEEDING OF POWER

The network configurations of mobile generators and buildings usually differ and therefore the power feeds are not compatible. Feeding of power into buildings may only be undertaken using specially equipped generators. *See also IT/TN switchover.*

#### ► FI PROTECTION SWITCH

The residual current circuit breaker is a protective device which interrupts the power line if residual current is detected. Residual currents arise if a certain part of the current (usually 30 mA) flows over the earthing line

past the residual current circuit breaker in the event of a fault occurring (for example naked cable is rubbing on a metal housing) (in this case: over the metal housing). In order to achieve effective protection a generator must be earthed using an FI protection switch. FI protection switches are primarily used in the network configuration TN. An electrician is needed for proper and appropriate operation who will check for correct earthing. DIN generators are not fitted with an FI protection switch but rather with insulation monitoring and therefore do not need earthing.

#### ► FIRECAN

FireCAN is the standardized interface for uniform data transfer in a fire engine. All ENDRESS DIN generators with electric start can be fitted with FireCAN.

#### ► FRAME SIZE IN ACCORDANCE WITH DIN

The frame sizes differ in the length of the dimensions. The dimensions are established in DIN 14685. The width and height of both frame sizes is identical. The 5 series size has a length of 700 mm. The 8 series size has a length of 820 mm.

#### ► INVERT TECHNOLOGY

Inverter = converter  
The alternator does not generate electricity at a usual constant frequency of 50/60Hz but instead at a frequency which varies according to the drive speed. In this way the rotational speed of the engine is adapted to the power requirements. An inverter in a generator ensures electronically that the generated frequency is held constant at the usual 50/60Hz. The advantage of inverter generators lies in the variable rotational speed which is adapted to the power output. Disadvantage: There are no high start-up currents as can occur with our DUPLEX generator.

#### ► ISOLATED OPERATION

One speaks of isolated operation if a network-independent power supply occurs over a single generator or multiple interconnected generators. One is therefore independent of a fixed supply network.

#### ► IT / TN NETWORK SWITCHOVER

IT = an unearthed neutral point (Isolé Terre) – also known as II  
TN = earthed neutral point (Terre Neutre)

In order to feed power into a building the mobile generator must be switched over to the network configuration TN since buildings are normally designed for this network configuration. Mobile DIN generators are usually designed in the network configuration IT. Switchover for special generators allows both mobile operation and operation to feed power into a building. During switchover the safety measure is adapted to the respective application.

#### ► INSULATION MONITORING

In DIN 14685 insulation monitoring is required which cannot be switched off if a fault occurs on the consumer or it is disconnected from the power network. The insulation monitoring monitors the active conductors (phases) of the generator and the attached consumers and the potential equalisation conductor (earthing line). If an insulation fault arises (for example naked cable is rubbing on a metal housing), this is immediately recognised by the insulation monitoring. An acoustic and optical warning is issued if an insulation fault arises. We offer the option to have insulation monitoring which arranges for the consumer to be separated from the power network if an insulation fault arises (insulation monitoring switching off). An insulation monitoring system is usually used in the network configuration IT. Earthing as opposed to the FI protection switch is not necessary.

#### ► LIGHT OUTPUT IN LUMENS

The lumen is the designation of a unit of light which, for example, is generated and emitted by a lamp. The number of lumens determines the illuminating power of a light source. A lumen should not be mixed up with the lux. *See also "Light output in luxes".*

#### ► LIGHT OUTPUT IN LUXES

Under lux one understands the light output which is available per illuminated m<sup>2</sup>. When the area to illuminated is sizeable the number of

luxes is significantly lower than that for spotlight type illumination (for the same light source).

#### ► LINE CIRCUIT BREAKER

In order to protect the alternator from an overload, all sockets are individually fitted with a thermal-magnetic circuit breaker. This circuit breaker switches off the sockets in the case of an overload and a short-circuit. ENDRESS uses special circuit breakers which are matched to the properties of DUPLEX generators. Commercially available line circuit breaker are not usually suitable for use.

#### ► NETWORK SYNCHRONISATION

In order to increase the selective power requirements a number of power sources (the public mains network, mobile generators, permanently installed emergency power units) can be operated in parallel. For parallel switching (and the desired increase in power output) the power sources must be synchronised. This occurs by means of specially designed synchronisation equipment (these are already provided in a generator from ENDRESS). This measures the network parameters of all power sources involved (voltage, frequency, phase sequence) and synchronises them with each other. The power sources are switched in parallel as soon as the parameters are matched with each other and now operate together.

#### ► NEUTRAL EARTHING

With neutral earthing the neutral conductor of a generator is connected with earth and the earthing line. *See also "Earthing"*

#### ► NOISE LEVEL CALCULATION

Two parameters are used for noise level calculation:

##### • Sound pressure level LPA in dB(A):

The so-called hemisphere measurement procedure is used to measure the sound pressure level which means that established measuring points are passed over to take the measurement at the side of and above the generator using a special measuring microphone.

##### • Sound power level LWA in dB(A):

The sound power level LWA is a calculated value which results from the measured sound pressure level LPA in that this is corrected with a factor which is independent of the measuring distance. A larger measuring distance = a larger factor, a smaller measuring distance = a smaller factor. ENDRESS always quotes the measurement data LPA based on a measuring distance of 7 m.

#### ► PE TEST SOCKET

The PE test equipment is used to determine whether a continuous PE conductor connection is present. The couplings ends on the protective conductor are checked for an inserted cable drum. For this checking each ENDRESS DIN generator is delivered with a special probe.

#### ► POLE REVERSING SWITCH.

The pole reversing switch can be used to change the rotating field of an alternator. This is, for example, necessary if the phase sequence was switched around when installing an extension line. Example: A fan is turning in the wrong direction.

#### ► POWER FACTOR COS (PHI)

The power factor is the ratio of effective power to apparent power. The ratio of effective power / apparent power is usually quoted with a value of 0.8 for 3~ systems and 0.9/1.0 for 1~ systems. *See also "Power output definition kVA/kW"*

#### ► POWER OUTPUT – CONTINUOUS POWER OUTPUT/MAXIMUM POWER OUTPUT

Under continuous power output one understands the power output which can be delivered for an unlimited period of time. The maximum power output is the power output of a generator which can be delivered for a short period of time in order, for example, to provide special reserves in critical situations.

#### ► POWER OUTPUT DEFINITION KVA/KW

kVA = Kilo Volt Ampere (apparent power), kW = Kilo Watt (effective power)  
Under effective power one understands the actual power output of an alternator which is converted into heat or mechanical energy (for example during operation of an electric motor or similar equipment). Many consumers such as electric motors or transformers also need a reactive power in addition to magnetisation which must be generated by the alternator to drive this consumer. Apparent power is the sum of the effective power and the reactive power, that is the whole power output which an alternator can provide. The ratio of effective power / apparent power is usually quoted with a value of 0.8 for 3~ systems and 0.9/1.0 for 1~ systems.

#### ► PROTECTION CLASSES IP (EXPLANATION OF THE INDIVIDUAL NUMBERS)

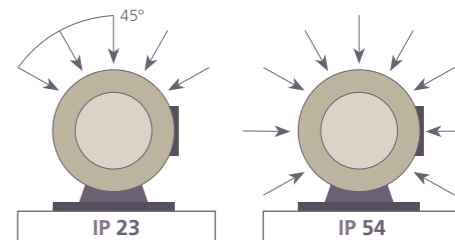
The IP Code (International Protection in accordance with DIN 40050) consists of a two-digit number combination which denote the respective protection class. The first digit indicates the protection class for touch and foreign object protection, and the second indicates water and moisture protection.

##### 1. Digit

- 0 unprotected
- 1 Foreign body > 50 mm
- 2 Foreign body > 12 mm
- 3 Foreign body > 2.5 mm
- 4 Foreign body > 1.0 mm
- 5 Dust-proof

##### 2. Digit

- 0 unprotected
- 1 Dripping water, vertical
- 2 Dripping water, diagonal to 15° to the vertical
- 3 Spray water diagonal up to 60° to the vertical
- 4 Splashed water, from all directions
- 5 Water jet, from all directions



#### ► PROTECTION LEVEL INCREASE USING A PRCD S

A PRCD S is an additional protective measure which can be switched between a power supply and a consumer. Due to its construction a PRCD S cannot be operated on a DIN generator. You are already optimally protected against insulation faults using an ENDRESS DIN generator.

#### ► PROTECTIVE SEPARATION WITH POTENTIAL EQUALISATION

Under potential equalisation one understands that all conductive parts of the generator and the attached consumers are connected with each other over an earthing line. In this way it is not possible for any dangerous contact voltages to arise between consumers and generator.

#### ► REMOTE MONITORING *See E-RMA.*

#### ► REMOTE START

The generator can be started and stopped over the remote start device. In this case the signals come from a control panel integrated on the vehicle. The remote start occurs over a special plug connection on the generator or is contained as standard in the option FireCAN.

#### ► ROTATING FIELD:

An electrical field arises through movement of a magnet. The magnet is attached to the rotor of the alternator. A rotating magnetic field is generated in the stator by rotating the rotor. In this way a voltage is generated in the stator windings. The rotating field, that is the direction of rotation of the rotor, is clockwise. *See also "Pole reversing switch".*





**ENDRESS** 

**Power Generators**

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