

**ENDRESS**   
*Power Generators*



BOS CATALOGUE

**WHEN EVERY  
SECOND  
COUNTS.**







FEUERWEHR

ENDRESS

ENDRESS

ESE 1408

ECO

# WHEN EVERY SECOND COUNTS.

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## DUPLEX

### THE DUPLEX GENERATORS FROM ENDRESS

#### DUPLEX in a nutshell

##### ► Yesterday:

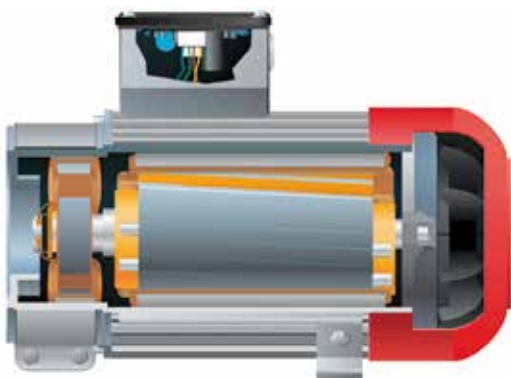
When no electronics were used with the units, asynchronous generators were needed to produce so-called "clean" current, and synchronous generators to handle the "hard starts".

##### ► Today:

With Duplex technology, the electronic controller unit regulates itself individually to each drive engine and reacts appropriately before the engine is overstrained. In this way, reserve output can be mobilized and the Duplex generator powers even the heaviest inductive appliances and protects sensitive appliances from damage. This is how the DUPLEX system combines all the advantages of asynchronous and synchronous generators, thereby ending the discussion as to which technology is better, synchronous or asynchronous.

#### Advantages at a glance:

- Combines and strengthens the advantages of asynchronous and synchronous generators
- VKS technology:  
V= wear-free K = contactless S = failure-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 asymmetric load in actual operation
- Voltage stability +/- 1% with 3- alternators
- Up to 4 times the starting current
- 100% short-circuit-proof
- Distortion factor  $\leq 5\%$



## ECOtronic

### ENVIRONMENTALLY FRIENDLY TECHNOLOGY WITH 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 an output is being used or not. The speed is significantly 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. Once power is needed again, such as when an electric tool is used, the ECOtronic makes the necessary power available — with no hesitation.

#### 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





## FULL USE OF ENGINE OUTPUT

### New development for maintaining the output level

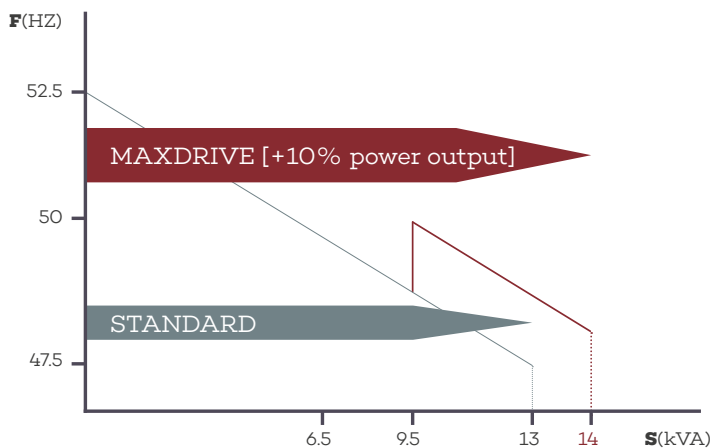
ENDRESS's new maxdrive power management module allows engines to be used without performance loss.

#### ► Here is how it works:

During heavy loads, such as starting current or impact loads, the drive engine's centrifugal governor quickly reaches its limit. 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 transfer in a fire engine.

All ENDRESS DIN generators with electric start can be fitted with FireCAN.

## 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
- Fuel level indicator – with warning where there is a reserve
- 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
- Oil pressure (A)
- Engine temperature (W)
- Fuel temperature (W)
- Ambient temperature (W) new
- Emergency Stop has been actuated

[A = switch off, W = warning]

# INTERESTING AND WORTH KNOWING

## 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.



#### 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:  $LWA\ 95\ \text{dB(A)} - 25 = Lp\ 70\ \text{dB(A)}$ .

ENDRESS:  $95\ \text{dB(A)} - 25 = 70\ \text{dB(A)}$  (distance 7m)  
Competition:  $95\ \text{dB(A)} - 28 = 67\ \text{dB(A)}$  (distance 10 m)

# 2

### Generator 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 output: Alternator output a max. of 0.65 kVA (65%)
- 1 kW engine 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.

# FUNCTIONAL, HIGH QUALITY EQUIPMENT FITTED AS STANDARD

► **Your advantage using ENDRESS DIN generators<sup>(1)</sup>:**

- 1** Insulation monitoring with an optical and acoustic fault reporting – resettable
- 2** 3-way fuel tap for third party fuelling
- 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** Large tank for long running times
- 8** All displays and controls at a glance
- 9** Easy access to perform maintenance work
- 10** Plastic-coated handles

<sup>(1)</sup> Prescribed in the DIN standard.







**ENDRESS** 



## 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, civil protection und auxiliary services. The requirements placed on mobile units is constantly increasing due to advanced modern and more efficient consumers. The customer and market requirements are the focus of our work during the development activities of ENDRESS. This is why we continue to develop our product lines, in order to meet today's and tomorrow's requirements.

### TECHNOLOGY THAT IS VERY CONVINCING:

# DUPLEX

## ECOtronic

**FIRECAN**  
compatible with action







► ESE 304 HG DIN

# DUPLEX

## ECOtronic



► ESE 954 DBG DIN



Model	ESE 304 HG DIN	ESE 604 DHG DIN	ESE 604 DHG ES DIN	ESE 604 DBG DIN
Item Code	156 000	156 001KI	156 011KI	151 002KI
Alternator model	Duplex	Duplex	Duplex	Duplex
Continuous output [PRP] kVA/kW 3~	–	6.0 / 4.8	6.0 / 4.8	6.5 / 5.2
Continuous output [PRP] kVA/kW 1~	3.0 / 2.4	4.0 / 3.6	4.0 / 3.6	5.0 / 4.0
Nominal voltage 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~	8.7 A 3~	8.7 A 3~
Rated current 1~	13.0 A 1~	17.4 A 1~	17.4 A 1~	21.7 A 1~
Power factor cos φ	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 the generator	IP54	IP54	IP54	IP54
Voltage regulation	Condenser	electronic	electronic	Electronic
Engine type	Honda GX200	HONDA GX 390	HONDA GX 390	B&S Vanguard 16 HP
Number of cylinders in the engine	1	1	1	2
Displacement	196 ccm	389 ccm	389 ccm	480 ccm
Output at 3000 rpm	4.1 kW	6.4 kW	6.4 kW	9.5 kW
Fuel	Petrol	Petrol	Petrol	Petrol
Tank capacity (l)	3.1	6.5	6.5	8.5
Consumption l/h at a 75% load	1.5	2.1	2.1	2.4
Running time l/h at a 75% load	2	3.1	3.1	3.5
Starting system	Recoil starter	Recoil starter	E Start / recoil starter	Recoil starter
Sound power level LWA db(A)	95	97	97	97
Sound pressure level (7 m) db(A)	70	72	72	72
Sound pressure level (7 m) with ECOtronic	–	–	–	63
Approx. weight (kg)	54	95	110	105
Dimensions L x W x H (mm)	550 x 440 x 400	700 x 440 x 580	700 x 440 x 580	700 x 440 x 580
Sockets	2 x 230V 16A	3 x 230V 16A 1 x 400V CEE 16A	3 x 230 V 16A 1 x 400V CEE 16A	3 x 230V 16A, 1 x 400V CEE 16A





Duplex



IP54



Distortion



E-MCS 4.0



HONDA, B&amp;S

### Standard equipment

- ▶ Insulation monitoring – without shut-off
- ▶ 3-way fuel cock for external refuelling
- ▶ Fuel indicator
- ▶ Multifunction Control Display E-MCS 4.0 <sup>(1)</sup>
- ▶ Lack of oil automatic switch-off
- ▶ Alternator overload protection
- ▶ Starter battery 12 V/20 A for E-Start models
- ▶ Folding handles
- ▶ Vehicle tool kit
- ▶ Warning signal package (temperature monitoring of air, engine and fuel)

<sup>(1)</sup> External ESE 304 HG DIN.

### Highlights at a glance:

- ▶ Fitted in accordance with DIN 14685-1 und 14685-2
- ▶ 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 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 in the 5 series DIN frame
- ▶ Emergency start function over the recoil starter

### Special equipment <sup>(2)</sup>

Special equipment <sup>(1)</sup>	Item Code
FireCAN <sup>(1)</sup>	163 140
Remote start device <sup>1</sup>	163 150
Beos charging current socket <sup>1</sup>	163 080
Charging current socket DIN 14690 <sup>(1)</sup>	163 010
MagCode charging current socket <sup>1</sup>	163 018
External start Nato socket <sup>(1)</sup>	163 000
Insulation monitoring – with switching off	163 071
ECOtronic System	163 020
Colour red RAL 3000	163 180
Automatic choke <sup>(1)</sup>	163 030

<sup>(1)</sup> Models with E-Start.

<sup>(2)</sup> Not upgradable.

### Available accessories

Available accessories	Item Code
Exhaust hose	163 120
Exhaust gas hose ESE 304	163 122
90° adapter for exhaust hose	163 130
Refuelling system	163 110
Hose for refuelling without a canister	E 100 592
Transport carriage for the 5 series DIN frame	163 101
Transport carriage for the 8 series DIN frame	163 100
Wheel Kit for the 5 and 8 series DIN frame	163 102
Special colours	on request
Maintenance kit	on request

### ESE 604 DBG ES DIN

### ESE 954 DBG DIN

### ESE 954 DBG ES DIN

### ESE 904 DBG DIN

151 012KI	151 004KI	151 014KI	151 003KI
Duplex	Duplex	Duplex	Duplex
6.5 / 5.2	9.0 / 7.2	9.0 / 7.2	9.0 / 7.2
5.0 / 4.0	6.0 / 5.4	6.0 / 5.4	6.0 / 5.4
400 V 3~	400 V 3~	400 V 3~	400 V 3~
230 V 1~	230 V 1~	230 V 1~	230 V 1~
8.7 A 3~	12.9 A 3~	12.9 A 3~	12.9 A 3~
21.7 A 1~	26.1 A 1~	26.1 A 1~	26.1 A 1~
0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
50 Hz	50 Hz	50 Hz	50 Hz
IP54	IP54	IP54	IP54
Electronic	Electronic	Electronic	Electronic
B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 16 HP
2	2	2	2
480 ccm	480 ccm	480 ccm	480 ccm
9.5 kW	9.5 kW	9.5 kW	9.5 kW
Petrol	Petrol	Petrol	Petrol
8.5	8.5	8.5	12
2.4	2.4	2.4	2.4
3.5	3.5	3.5	5
E Start / recoil starter	Recoil starter	E Start / recoil starter	Recoil starter
97	97	97	97
72	72	72	72
63	63	63	62
117	110	110	124
700 × 440 × 580	700 × 440 × 580	700 × 440 × 580	820 × 440 × 580
3 × 230V 16A, 1 × 400V CEE 16A	3 × 230V 16A, 1 × 400V CEE 16A	3 × 230V 16A, 1 × 400V CEE 16A	3 × 230V 16A, 1 × 400V CEE 16A





► ESE 904 DBG ES DIN

Model	ESE 904 DBG ES DIN	ESE 1104 DBG ES DIN	ESE 1304 DBG ES DIN
Item Code	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	7.0 / 6.3	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~	30 A 1~	31.3 A 1~
Power factor cos $\varphi$	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz
Protection Class for the generator	IP54	IP54	IP54
Voltage regulation	Electronic	Electronic	Electronic
Engine type	B&S Vanguard 16 HP	B&S Vanguard 21 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	15 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	E Start / recoil starter	E Start / recoil starter	E Start / recoil starter
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 × W × H (mm)	820×440×580	820×440×580	820×440×580
Sockets	3 × 230V 16A, 1 × 400V CEE 16A	3 × 230V 16A, 1 × 400V CEE 16A	3 × 230V 16A, 2 × 400V CEE 16A

► **Instrument panel for DIN generators:**

- 1 START-STOP switch
- 2 Insulation monitoring
- 3 Schuko socket 230V / ~
- 4 Multifunction control display E-MCS 4.0



► **Multifunction control display E-MCS 4.0:**



Total loading of the unit

Operating hours counter

Fuel indicator

Frequency

Insulation monitoring

Protective earthing conductor test

Loading for phases 1-3

Voltage indicator for the phases 1-3

Warning signal package:

- Oil pressure monitor
- Temperature monitor (engine, fuel and generator)
- Battery voltage monitor



## DIN SUPER SILENT



► ESE 1407 DBG ES DIN

Model	ESE 607 DBG DIN	ESE 607 DBG ES DIN	ESE 957 DBG ES DIN
Item Code	156 202	156 212	156 214
Alternator model	Duplex	Duplex	Duplex
Continuous output [PRP] kVA/kW 3~	6.5 / 5.2	6.5 / 5.2	9.0 / 7.2
Continuous output [PRP] kVA/kW 1~	5.0 / 4.0	5.0 / 4.0	6.0 / 5.4
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~	8.7 A 3~	8.7 A 3~	12.9 A 3~
Rated current 1~	21.7 A 1~	21.7 A 1~	26.1 A 1~
Power factor cos φ	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz	50 Hz
Protection Class for the generator	IP54	IP54	IP54
Voltage regulation	Electronic	Electronic	Electronic
Engine type	B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 16 HP
Number of cylinders in the engine	2	2	2
Displacement	480 ccm	480 ccm	480 ccm
Output at 3000 rpm	9.5 kW	9.5 kW	9.5 kW
Fuel	Petrol	Petrol	Petrol
Tank capacity (l)	15	15	15
Consumption l/h at a 75% load	2.4	2.4	2.4
Running time l/h at a 75% load	6	6	6
Starting system	Recoil starter	E Start / recoil starter	E Start / recoil starter
Sound power level LWA db(A)	90	90	91
Sound pressure level (7 m) db(A)	65	65	66
Sound pressure level (7 m) with ECOtronic	59	59	59
Approx. weight (kg)	120	135	127
Dimensions L × W × H (mm)	700×440×580	700×440×580	700×440×580
Sockets	3 × 230V 16A 1 × 400V CEE 16A	3 × 230V 16A 1 × 400V CEE 16A	3 × 230V 16A 1 × 400V CEE 16A



DUPLEx



IP54



Distortion



E-MCS 4.0



Maxdrive



Sound protection



ISO



Large tank



B&amp;S



Folding handles

### Standard equipment

- ▶ Insulation monitoring – without shut-off
- ▶ 3-way fuel cock for external refuelling
- ▶ Fuel level indicator over the E-MCS 4.0
- ▶ Multifunction control display E-MCS 4.0
- ▶ Lack of oil automatic switch-off
- ▶ Alternator overload protection
- ▶ Starter battery 12V/20A for E-Start models
- ▶ Folding handles
- ▶ Vehicle tool kit
- ▶ Warning signal package (temperature monitoring of air, engine and fuel)

### Highlights at a glance:

- ▶ Fitted according to DIN 14685-1
- ▶ 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 in the 5 series DIN frame
- ▶ Emergency start function over the recoil starter

### Special equipment <sup>(2)</sup>

Special equipment <sup>(2)</sup>	Item Code
FireCAN <sup>(1)</sup>	163 140
Remote start device <sup>1</sup>	163 150
Beos charging current socket <sup>1</sup>	163 080
Charging current socket DIN 14690 <sup>(1)</sup>	163 010
MagCode charging current socket <sup>1</sup>	163 018
External start (Nato) socket <sup>(1)</sup>	163 000
Insulation monitoring – with switching off	163 071
ECOtronic System	163 020
Colour red RAL 3000	163 180
Automatic choke <sup>(1)</sup>	163 030
IT/TN supplying power to a building for ESE 1307 and ESE 1407	IT/TN
Exhaust exit on control panel side for ESE 907, ESE 1107, ESE 1307, ESE 1407	163 905

### Available accessories

Available accessories	Item Code
Exhaust hose	163 120
90° adapter for exhaust hose	163 130
Refuelling system	163 110
Hose for refuelling without a canister	E 100 592
Transport carriage for the 5 series DIN frame	163 101
Transport carriage for the 8 series DIN frame	163 100
Wheel Kit for the 5 and 8 series DIN frame	163 102
Special colours	on request
Maintenance kit	on request

<sup>(1)</sup> Models with E-Start.

<sup>(2)</sup> Not upgradable.

ESE 907 DBG DIN	ESE 907 DBG ES DIN	ESE 1107 DBG ES DIN	ESE 1307 DBG ES DIN	ESE 1407 DBG ES DIN
156 203	156 213	156 215	156 216	156 219
Duplex	Duplex	Duplex	Duplex	Duplex
9.0 / 7.2	9.0 / 7.2	11.0 / 8.8	13.2 / 10.6	13.7 / 10.9
6.0 / 5.4	6.0 / 5.4	7.0 / 6.3	7.2 / 6.5	7.5 / 6.7
400 V 3~	400 V 3~	400 V 3~	400 V 3~	400 V 3~
230 V 1~	230 V 1~	230 V 1~	230 V 1~	230 V 1~
12.9 A 3~	12.9 A 3~	15.9 A 3~	19.1 A 3~	19.8 A 3~
26.1 A 1~	26.1 A 1~	30.0 A 1~	31.3 A 1~	32.6 A 1~
0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9	0.8 / 0.9
50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
IP54	IP54	IP54	IP54	IP54
Electronic	Electronic	Electronic	Electronic	Electronic
B&S Vanguard 16 HP	B&S Vanguard 16 HP	B&S Vanguard 21 HP	B&S Vanguard 23 HP	B&S Vanguard 23 HP
2	2	2	2	2
480 ccm	480 ccm	627 ccm	627 ccm	627 ccm
9.5 kW	9.5 kW	13.0 kW	15.0 kW	15.0 kW
Petrol	Petrol	Petrol	Petrol	Petrol
22	22	22	22	22
2.4	2.4	3.4	3.4	3.4
9	9	6.5	6.5	6.5
Recoil starter	E Start / recoil starter	E Start / recoil starter	E Start / recoil starter	E Start / recoil starter
90	90	95	95	95
65	65	70	70	70
58	58	58	58	58
130	145	145	145	150
820×440×580	820×440×580	820×440×580	820×440×580	820×440×580
3 × 230V 16A	3 × 230V 16A	3 × 230V 16A	3 × 230V 16A	3 × 230V 16A
1 × 400V CEE 16A	1 × 400V CEE 16A	1 × 400V CEE 16A	2 × 400V CEE 16A	2 × 400V CEE 16A



## DIN SUPER SILENT PLUS



► ESE 1308 DBG ES DIN

# DUPLEX

# ECOtronic



► ESE 608 DHG ES DI DIN Silent

Model	ESE 608 DHG ES DI DIN Super Silent Plus	ESE 908 DBG ES DIN Super Silent Plus
Item Code	156 312	156 413
Alternator model	Duplex	Duplex
Continuous output [PRP] kVA/kW 3~	6.0 / 4.8	9.0 / 7.2
Continuous output [PRP] kVA/kW 1~	4.0 / 3.6	6.0 / 5.4
Nominal voltage 3~	400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~
Rated current 3~	8.7 A 3~	12.9 A 3~
Rated current 1~	21.7 A 1~	26.1 A 1~
Power factor cos φ	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz
Protection Class for the generator	IP54	IP54
Voltage regulation	Electronic	Electronic
Engine type	Hatz 1B 50	B&S Vanguard 16 HP
Number of cylinders in the engine	1	2
Displacement	517 ccm	480 ccm
Output at 3000 rpm	7.6 kW	9.5 kW
Fuel	Diesel	Petrol
Tank capacity (l)	6	12
Consumption l/h at a 75% load	1.3	2.4
Running time l/h at a 75% load	4.5	5
Starting system	E-Start/recoil starter	E-Start/recoil starter
Sound power level LWA db(A)	94	89
Sound pressure level (7 m) db(A)	69	64
Sound pressure level (7 m) with ECOtronic	-	56
Approx. weight (kg)	155	132
Dimensions L × W × H (mm)	700×440×580	820×440×580
Sockets	3 × 230 V 16 A 1 × 400V CEE 16A	3 × 230 V 16 A 2 × 400V CEE 16A



DUPLEX



IP54



Distortion



E-MCS 4.0



Maxdrive



Sound protection



ISO



Large tank



Folding handles

### Standard equipment

- ▶ Insulation monitoring – without shut-off
- ▶ 3-way fuel cock for external refuelling
- ▶ Fuel level indicator over the E-MCS 4.0
- ▶ Multifunction control display E-MCS 4.0
- ▶ Lack of oil automatic switch-off
- ▶ Alternator overload protection
- ▶ Starter battery 12V/20A
- ▶ Folding handles
- ▶ Vehicle tool kit
- ▶ ECOtronic (only ESE 1408)
- ▶ LED instrument panel illumination (only ESE 1408)
- ▶ Warning signal package (temperature monitoring of air, engine and fuel)

### Highlights at a glance:

- ▶ Fitted according to DIN 14685-1
- ▶ 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 in the 5 series DIN frame
- ▶ Emergency start function over the recoil starter

### Special equipment <sup>(2)</sup>

Special equipment <sup>(2)</sup>	Item Code
FireCAN <sup>(1)(3)</sup>	163 140
Remote start device <sup>1</sup>	163 150
Beos charging current socket <sup>1</sup>	163 080
Charging current socket DIN 14690 <sup>(1)(3)</sup>	163 010
MagCode charging current socket <sup>1</sup>	163 018
External start Nato socket <sup>(1)(3)</sup>	163 000
Insulation monitoring – with switching off	163 071
ECOtronic System <sup>(3)</sup>	163 020
Colour red RAL 3000	163 180
Automatic choke <sup>(1)(3)</sup>	163 030

<sup>(1)</sup> Models with E-Start.

<sup>(2)</sup> Not upgradable.

<sup>(3)</sup> Except model ESE 608

### Available accessories

Available accessories	Item Code
Exhaust hose	163 120
90° adapter for exhaust hose	163 130
Refuelling system	163 110
Hose for refuelling without a canister	E 100 592
Transport carriage for the 5 series DIN frame	163 101
Transport carriage for the 8 series DIN frame	163 100
Wheel Kit for the 5 and 8 series DIN frame	163 102
Special colours	on request
Maintenance kit	on request

### ESE 1308 DBG ES DIN Super Silent Plus

156 416
Duplex
13.2 / 10.6
7.2 / 6.5
400 V 3~
230 V 1~
19.1 A 3~
31.3 A 1~
0.8 / 0.9
50 Hz
IP54
Electronic
B&S Vanguard 23 HP
2
627 ccm
15.0 kW
Petrol
12
3.4
3.5
E-Start/recoil starter
92
67
56
144
820×440×580
3 × 230 V 16 A
2 × 400V CEE 16A

### ESE 1408 DBG ES DIN Super Silent Plus

156 519
Duplex
13.7 / 10.9
7.5 / 6.7
400 V 3~
230 V 1~
19.8 A 3~
32.6 A 1~
0.8 / 0.9
50 Hz
IP54
Electronic
B&S Vanguard 23 HP
2
627 ccm
15.0 kW
Petrol
12
3.4
3.5
E-Start/recoil starter
96
71
58
144
820×440×580
3 × 230 V 16 A
2 × 400V CEE 16A





► ESE 2000i Silent

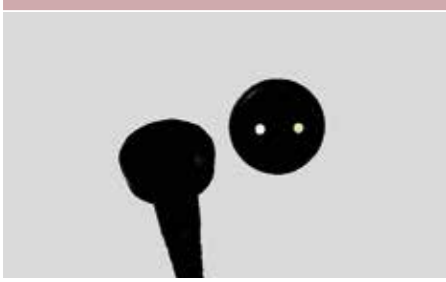
Model	ESE 2000i Silent
Item Code	110 005.01
Alternator model	Synchronous
Continuous power [PRP] kVA/kW	1.6/1.6
Rated voltage	230 V 1~ / 12 V =
Rated current	8,7 A 1~ / 8,3 A =
Power factor $\cos \varphi$	1
Frequency/protection class	50 Hz / IP67
Voltage regulation	Electronic
Engine type	YAMAHA MZ80 / 3.5 HP
Design	1-cylinder 4-stroke OHV
Displacement	79 cm <sup>3</sup>
Output at 3000 rpm	1.8 kW
Fuel/tank capacity (litres)	Petrol / 4
Consumption/running time at ¾ load	0.71 / 6 h
Starting system	Recoil starter
Sound power level LWA	94 dB(A)
Sound pressure level (LPA)	69 dB(A)
Weight (kg)	20
Dimensions L × W × H (mm)	540×330×505
Equipment	1 × 230 V / 16 A
Protective contact socket IP67	1 × 12 V Alternator overload protection Lack of oil automatic switch-off

## SOUND-INSULATED PETROL GENERATORS WITH INVERTER TECHNOLOGY

- Consistent power output
- Operating hours counter
- Protective contact socket IP67
- 12V for battery charging
- Economical due to a load-dependent engine rpm
- Parallel operation possible - required accessories contained as standard in the scope of delivery
- Fuel indicator

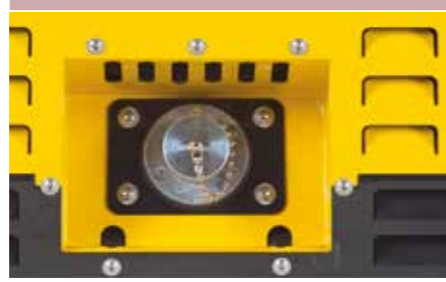






**MagCode charging current socket**

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



**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 retention set 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 generator to be started and stopped from an external site. Incl. charge maintenance and automatic choke.



**External start (Nato) socket**

Only generators with electric start for direct operation with the 12V vehicle battery.



**FireCAN**

The standardized interface provides uniform data transfer in the fire engine. Incl. charge maintenance, remote start and automatic choke.



**3-way fuel tap**

For direct connection of a refuelling system.



**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.



**Refuelling system**

Included in the delivery: 20 l fuel can with a fuel drawing device.



**Exhaust hose**

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



**Transport carriage / Wheel Kit**

Appropriate for DIN generators. The Transport carriage is fitted with two swivel castors with a locking device.





Model	<b>ESE 1408 DBG ES DIN Super Silent Plus</b>
Item Code	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 $\varphi$	0.8 / 0.9
Frequency	50 Hz
Protection Class for the generator	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	E-Start/recoil starter
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



New DIN 14685-1 implemented in a new design

- ▶ Multifunction control display E-MCS 4.0
- ▶ All controls are arranged on one side
- ▶ 12 V LED control panel illumination can be switched on
- ▶ Easily accessible Emergency Stop button
- ▶ ECOtronic und maxdrive as standard
- ▶ 100 % Fire CAN capable
- ▶ low-lying large tank with a recessed petrol pump nozzle and front-side mounted 3-way fuel valve
- ▶ a large handy tank cover which is easy to open while wearing gloves
- ▶ large service openings in the starter battery, oil filter and fuel filter
- ▶ reciprocal exhaust system with few hand grips; the exhaust outlet from the rear side to the front side and vice versa
- ▶ A robust, corrosion-resistant powder-coated aluminium construction
- ▶ A compartment for example for operating instructions and tools
- ▶ An Emergency Stop function installed as standard:











2

## SEA POWER GENERATOR FOR RELIEF ORGANISATIONS





## The SEA model series is designed to meet the needs and requirements of aid organisations in civil protection.

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 no electronics were used with the units, asynchronous generators were needed to produce so-called “clean” current, and synchronous generators to handle the “hard starts”.

#### ► Today:

With Duplex technology, the electronic controller unit regulates itself individually to each drive engine and reacts appropriately before the engine is overstrained. Reserve output can be mobilized and the DUPLEX generator powers even the heaviest inductive appliances and

protects the most sensitive consumers from getting damaged. This is how the DUPLEX system combines all the advantages of asynchronous and synchronous generators, thereby ending the discussion as to 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 in all phases independently from each other

## ECOtronic

#### ► Here is how it works:

ECOtronic is an eco-friendly alternative to conventional electricity generation. During use, the ECOtronic system recognizes whether an output is being used or not. The speed is significantly 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.

### 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 Line 2.5 – 13.0 kVA



► SEA 13



► SEA 6

Similar to illustration

## Model series SEA 6 – 13

- Protective contact socket IP68
- Folding handles
- Lack of oil automatic switch-off
- Alternator overload protection

## OPEN CONSTRUCTION

Model	SEA 6	SEA 13
Item Code	151 745	151 647
Alternator model	Duplex	Duplex
Continuous output [PRP] kVA/kW 3~	6.0 / 4.8	13.2 / 10.6
Continuous output [PRP] kVA/kW 1~	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~
Rated current 3~	8.7 A 3~	19.1 A 3~
Rated current 1~	17.4 A 1~	31.3 A 1~
Power factor cos $\varphi$	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz
Protection Class for the generator	IP54	IP54
Voltage regulation	Electronic	Electronic
Engine type	Honda GX390	Subaru EH 65
Number of cylinders in the engine	1	2
Displacement	389 ccm	653 ccm
Output at 3000 rpm	6.4 kW	14.5 kW
Fuel	Petrol	Petrol
Tank capacity (l)	33	30
Consumption l/h at a 75% load	2.1	3.4
Running time l/h at a 75% load	15.5	8.5
Starting system	Recoil starter	E-Start/recoil starter
Sound power level LWA db(A)	97	97
Sound pressure level (7 m) db(A) <sup>(1)</sup>	60	67
Approx. weight (kg)	104	151
Dimensions L × W × H (mm)	780×550×595	850×650×575
Sockets	2 × 230V 16A IP68 1 × 400V CEE 16A IP68	2 × 230V 16A IP68 1 × 400V CEE 16A IP68 1 × 400V CEE 32A IP68

(1) ECOTronic active





▶ SEA 13 S

## 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
Item Code	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 φ	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz
Protection Class for the generator	IP54	IP54
Voltage regulation	Electronic	Electronic
Engine type	B&S Vanguard 23HP	HATZ 1 B 50
Number of cylinders in the engine	2	1
Displacement	627 ccm	517 ccm
Output at 3000 rpm	15 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	E-Start/recoil starter	E-Start/recoil starter
Sound power level LWA db(A)	92	94
Sound pressure level (7 m) db(A)	67	69
Approx. weight (kg)	144	155
Dimensions L × W × H (mm)	820×440×580	700×440×580
Sockets	3 × 230V 16A IP68 2 × 400V CEE 16A IP68	3 × 230V 16A IP68 1 × 400V CEE 16A IP68







## LEADING DUETO THE 'THINK OUTSIDE THE BOX' APPROACH

**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 a permanent supply of electricity is a matter of course today.**

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.





## DIN SUPER SILENT



FITTED WITH A MAINS SUPPLY SOCKET FOR EMERGENCY POWER SUPPLY (IT/TN NETWORKS). INCL. MATING CONNECTOR FOR THE POWER SUPPLY SOCKET INSTALLED ON THE POWER GENERATOR



DUPLEX



IP54



E-MCS 4.0



Sound protection



ISO



Large tank



B&amp;S



Folding handles

### Standard equipment

- ▶ Insulation monitoring – without shut-off
- ▶ 3-way fuel cock for external refuelling
- ▶ Fuel level indicator over the E-MCS 4.0
- ▶ Multifunction control display E-MCS 4.0
- ▶ Lack of oil automatic switch-off
- ▶ Alternator overload protection
- ▶ Starter battery 12 V/20 A for E-Start models
- ▶ Folding handles
- ▶ Vehicle tool kit
- ▶ Warning signal package (temperature monitoring of air, engine and fuel)

### Highlights at a glance:

- ▶ Fitted according to DIN 14685-1
- ▶ 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
- ▶ Emergency start function over the recoil starter

Model	ESE 1307 DBG ES	ESE 1407 DBG ES
	DIN IT-TN	DIN IT-TN
Alternator model	Duplex	Duplex
Continuous output [PRP] kVA/ kW 3~	13.2 / 10.6	13.7 / 10.9
Continuous output [PRP] kVA/ kW 1~	7.2 / 6.5	7.5 / 6.7
Nominal voltage 3~	400 V 3~	400 V 3~
Nominal voltage 1~	230 V 1~	230 V 1~
Rated current 3~	19.1 A 3~	19.8 A 3~
Rated current 1~	31.3 A 1~	32.6 A 1~
Power factor cos φ	0.8 / 0.9	0.8 / 0.9
Frequency	50 Hz	50 Hz
Protection Class for the gen- erator	IP54	IP54
Voltage regulation	Electronic	Electronic
Engine type	B&S Vanguard 23 HP	B&S Vanguard 23 HP
Number of cylinders in the engine	2	2
Displacement	627 ccm	627 ccm
Output at 3000 rpm	15.0 kW	15.0 kW
Fuel	Petrol	Petrol
Tank capacity (l)	22	22
Consumption l/h at a 75% load	3.4	3.4
Running time l/h at a 75% load	6.5	6.5
Starting system	E Start / recoil starter	E Start / recoil starter
Sound power level LWA db(A)	95	95
Sound pressure level (7 m) db(A)	70	70
Sound pressure level (7 m) with ECOtronic	58	58
Approx. weight (kg)	145	150
Dimensions L × W × H (mm)	820×440×580	820 x 440 x 580
Sockets	3 × 230V 16A, 1 × CEE 400V/16A, 1x 400V/16A 7h Mains supply socket	3 × 230V 16A, 1 × CEE 400V/16A, 1x 400V/16A 7h Mains supply socket

Special equipment <sup>(1)</sup>	Item Code
FireCAN	on request
Remote start device	on request
Beos charging current socket	on request
Charging current socket DIN 14690	on request
MagCode charging current socket	on request
External start (Nato) socket	on request
Insulation monitoring – with switching off	on request
ECOtronic System	on request
Colour red RAL 3000	on request
Automatic choke	on request

<sup>(1)</sup> Not upgradable.

Available accessories	Item Code
Exhaust hose	163 120
90° adapter for exhaust hose	163 130
Refuelling system	163 110
Hose for refuelling without a canister	E 100 592
Transport carriage for the 8 series DIN frame	163 100
Special colours	on request
Maintenance kit	on request
Feed distributor E-NEV 3-16	162 303



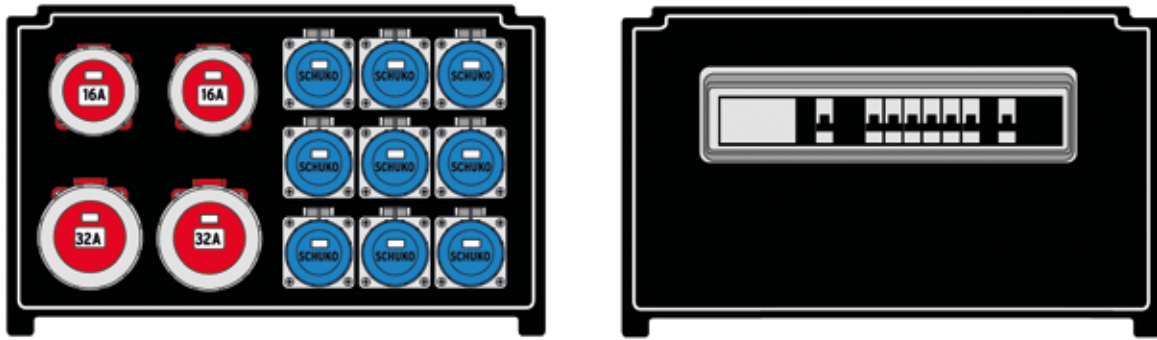


Figure similar



Integrated carrying handle



Light and handy



Stackable



Water jet protected



Socket connection

### Equipment:

- ▶ An impact-resistant & stable plastic housing in RAL 9017 (black)
- ▶ Spray water protected
- ▶ Very light and handy
- ▶ Stackable
- ▶ Weather and ageing resistant
- ▶ Sockets on the front side and built-in devices on the rear side (FI and LS switches)
- ▶ Installed protected, in Protection Class IP65
- ▶ All plug connectors in Protection Class IP 67/68

### General points:

- ▶ Plug distributors - stackable, robust, safe and in an appropriate design

### Application:

- ▶ A portable, mobile and light energy distributor for your events, building site, civil protection such as DRK and THW. A weight advantage compared to other distributors of 20%

### Power distributor model "H38-1129"

Income:	CEE 125A/400V connector
Output:	1 CEE 63A/400 V socket 1 CEE 32A/400 V socket 2 CEE 16A/400 V sockets 9 16A/230 V Schuko socket
Fuses:	1 × C63A line circuit breaker, 3 pin 1 × FI protection switch 63A/0.03A 1 × C32A line circuit breaker, 3 pin 1 × FI protection switch 40A/0.03A 2 × C16A line circuit breaker, 3 pin 2 × FI protection switch 25A/0.03A 1 × C63A line circuit breaker 9 × FI/LS C16A/0.03A
Protection Class (All plug connectors)	IP67/68
Dimensions L × W × H (mm)	400×600×545

# EMERGENCY POWER SUPPLY WITH IT/TN OPERATIONAL SWITCHOVER



► ESE 50 YW IT-TN with optional Chassis



Model		<b>ESE 15 YW/IT-TN</b>	<b>ESE 20 YW/IT-TN</b>
Item Code		334 255	334 256
Alternator	Continuous output [PRP] kVA/kW	13.2 / 10.5	17.9 / 14.3
	Alternator model	MeccAlte	MeccAlte
	Design / insulation	Synchronous / Class H	Synchronous / Class H
	Rated voltage	400V 3~ / 230V 1~	400V 3~ / 230V 1~
	Nominal current / Cos φ	19A 3~ / 0.8	25.8A 3~ / 0.8
	Frequency / voltage regulation	50Hz / electronic	50Hz / electronic
	Engine	Engine type	YANMAR 3TNV88
Design		3-cylinder 4-stroke	4-cylinder 4-stroke
Cooling system		Water-cooled	Water-cooled
Displacement		1,642 cm <sup>3</sup>	2,190 cm <sup>3</sup>
Engine output (PRP)		12.7 kW	16.9 kW
Rotational speed in rpm		1,500	1,500
Engine regulation		Mechanical	Mechanical
Fuel		Diesel	Diesel
Tank capacity (l)		51	51
Consumption l/h at a 75% load		2.8	3.7
Running time l/h at a 75% load		18	14
Starting system		E-Start 12V	E-Start 12V
Sound power level LWA db(A)		94	92
Sound pressure level (7 m) db(A)		65	63
Approx. weight (kg)		580	670
Dimensions L × W × H (mm)		1,805×884×1,261	1,805×884×1,261
Socket combination	Feed mode	CEE 400V / 32A IP67	CEE 400V / 32A IP67
	Incident scenes operation	CEE 400V / 32A IP67	CEE 400V / 32A IP67
		CEE 400V / 16A IP67	CEE 400V / 16A IP67
		1 × 230V / 16A IP68	1 × 230V / 16A IP68



## Standard equipment

- ▶ Sound attenuation cover
- ▶ Multifunction display E-MCS 6.5
- ▶ Operating hours 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)
- ▶ Mains supply socket



## ▶ Instrument panel legend

- 1** Mains supply socket fused by means of a line 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.
- 4** IT-TN changeover device to change between supplying power to a building and incident scenes operation.

## Accessories and special equipment for emergency power supply plant IT/TN

Name	Item Code	Compatibility
FG 135 ST chassis, rigid	341 102	for ESE 15 - ESE 50
FG 180 ST chassis, rigid	341 106	for ESE 67
FG 2500 ST chassis, rigid	341 110	for ESE 95
FG 135 HV chassis, height adjustable	341 103	for ESE 15 - ESE 50
FG 180 HV chassis, height adjustable	341 107	for ESE 67
FG 2500 HV chassis, height adjustable	341 111	for ESE 95
Extension of the chassis approval from 80 km/h to 100km/h	341 138	for all models
E-RMA SIM remote monitoring	342 220	for all models
Special colour for the emergency power supply plant	on request	for all models
6 kg ABC fire extinguisher incl. holder	342 509	for all models
Dummy Load	342 507	for all models
Rear warning system	342 506	for all models
Ambient lighting, LED	342 504	for all models
Charge socket	163 019	for all models

ESE 35 YW/IT-TN	ESE 50 YW/IT-TN	ESE 67 PW/IT-TN	ESE 95 PW/IT-TN
334 257	334 259	334 261	334 263
30.5 / 24.4	44.0 / 35.2	55.0 / 44.0	86.5 / 69.2
MeccAlte	MeccAlte	MeccAlte	MeccAlte
Synchronous / Class H	Synchronous / Class H	Synchronous / Class H	Synchronous / Class H
400V 3~ / 230V 1~	400V 3~ / 230V 1~	400V 3~ / 230V 1~	400V 3~ / 230V 1~
44.0A 3~ / 0.8	63.5A 3~ / 0.8	79A 3~ / 0.8	125A 3~ / 0.8
50Hz / electronic	50Hz / electronic	50Hz / electronic	50Hz / electronic
YANMAR 4TNV98	YANMAR 4TNV98T	PERKINS 1104D-44TG3	PERKINS 1104D-E44TAG1
4-cylinder 4-stroke	4-cylinder 4-stroke / Turbo	4-cylinder 4-stroke / Turbo	4-cylinder 4-stroke / Turbo
Water-cooled	Water-cooled	Water-cooled	Water-cooled
3,319 cm <sup>3</sup>	3,119 cm <sup>3</sup>	4,400 cm <sup>3</sup>	4,400 cm <sup>3</sup>
32.9 kW	41.4 kW	56.6 kW	76.6 kW
1,500	1,500	1,500	1,500
Electrical	Electrical	Mechanical	Electrical
Diesel	Diesel	Diesel	Diesel
68	68	209	209
5.9	8.3	12	16.9
11.5	8	17	12
E-Start 12V	E-Start 12V	E-Start 12V	E-Start 12V
95	95	92	96
66	66	67	71
773	839	1,150	1,490
2,005×948×1308	2,005×948×1308	2,294×1,007×1,465	2,414×1,087×1,863
CEE 400V / 63A IP67	CEE 400V / 63A IP67	CEE 400V / 125A IP67	CEE 400V / 125A IP67
CEE 400V / 63A IP67	CEE 400V / 63A IP67	CEE 400V / 125A IP67	CEE 400V / 125A IP67
CEE 400V / 16A IP67	CEE 400V / 16A IP67	CEE 400V / 16A IP67	CEE 400V / 16A IP67
1 × 230V / 16A IP68	1 × 230V / 16A IP68	1 × 230V / 16A IP68	1 × 230V / 16A IP68



FEUERWEHR



**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 FLOODLIGHT INSTALLATIONS FOR POWER SUPPLY WITH IT/TN OPERATIONAL SWITCHOVER



Regarding the product video:



## Model

## LiMa 900/50

Item Code		8500 103
Alternator	Continuous output [PRP] kVA/kW	44.0 / 35.2
	Alternator model	MeccAlte
	Design / insulation	Synchronous / Class H
	Rated voltage	400V 3~ / 230V 1~
	Nominal current / Cos φ	63.5A 3~ / 0.8
	Frequency / voltage regulation	50Hz / electronic
Engine	Engine type	YANMAR 4TNV98T
	Design	4-cylinder 4-stroke / Turbo
	Cooling system	Water-cooled
	Displacement	3,119 cm <sup>3</sup>
	Engine output (PRP)	41.4 kW
	Rotational speed in rpm	1,500
	Engine regulation	Electrical
	Fuel	Diesel
	Tank capacity (l)	68
	Consumption l/h at a 75% load	8.3
	Running time l/h at a 75% load	8
	Starting system	E-Start 12V
	Sound power level LWA db(A)	95
	Sound pressure level (7 m) db(A)	66
	Approx. weight (kg)	1,900
	Dimensions L × W × H (mm)	4,500×2,000×2,700
Socket combination	Feed mode	CEE 400V / 63A IP67
	Incident scenes operation	CEE 400V / 63A IP67
		CEE 400V / 32A IP67
		CEE 400V / 16A IP67
		2 × 230V / 16A IP68



### Standard equipment

- ▶ Fully galvanised chassis according to StVZO with a height adjustable trailer drawbar
- ▶ High quality generator according to emission class EU Stage 3A
- ▶ Liquid collecting tray
- ▶ Three-way fuel tap for external refuelling
- ▶ The main battery switch
- ▶ The battery charger is integrated in the generator with an external charging socket
- ▶ Oil drain pump
- ▶ Leakage sensor
- ▶ Mains supply socket



### Optional accessories

- ▶ Dummy load for motor-protecting load take-off for floodlight operation
- ▶ Rear warning system with a flashing blue light
- ▶ An extra compact light mast for a clearance of 2.20 metres (not available for LiMa 900/95)
- ▶ A headlight package, mixed light (2 × halogen, 2 × HQI, 2 × HMI)
- ▶ Ambient lighting (LED)
- ▶ E-RMA remote monitoring
- ▶ Storage boxes for items up to 100 kg in weight



### The special equipment - light masts

Name	Order No.
Dummy Load <sup>(1)</sup>	342 500
Rear warning system <sup>(1)</sup>	342 501
Extra compact light mast <sup>(1)</sup>	342 502
A headlight package, mixed light 6 headlights <sup>(1)</sup>	342 503
LED headlight package, 4 headlights	342 510
Ambient lighting, LED <sup>(1)</sup>	342 504
Storage boxes, at the side on the right and left <sup>(1)</sup>	342 505
Special colour for the emergency power supply plant	on request
6 kg ABC fire extinguisher incl. holder	342 509
Extension of the chassis approval from 80 km/h to 100km/h	341 138

<sup>(1)</sup> Option cannot be retrofitted.

### Technical specifications

Light mast	Pneumatic
Light mounting height max.	9.0 metre
Extension time to the maximum light mounting height	about 2:15 minutes
Control of the light mast / headlight	Cable remote control
Headlight	2 halogen, 2 HQI
Dimensions incl. trailer L × W × H (mm)	4500×2000×2700
Storage boxes for loading	2 pieces max. 100 kg
Dimensions of the storage boxes:	Length: 2000 mm
	Width: 240 mm
	Height: 300 mm
	Load per storage box: 50 kg

### LiMa 900/67

8500 104
55.0 / 44.0
MeccAlte
Synchronous / Class H
400V 3~ / 230V 1~
79A 3~ / 0.8
50Hz / electronic
PERKINS 1104D-44TG3
4-cylinder 4-stroke / Turbo
Water-cooled
4,400 cm <sup>3</sup>
56.6 kW
1,500
Mechanical
Diesel
209
12
17
E-Start 12V
92
67
2,200
4,500×2,000×2,700
CEE 400V / 125A IP67
CEE 400V / 63A IP67
CEE 400V / 32A IP67
CEE 400V / 16A IP67
2 × 230V / 16A IP68

### LiMa 900/95

8500 106
86.5 / 69.2
MeccAlte
Synchronous / Class H
400V 3~ / 230V 1~
125A 3~ / 0.8
50Hz / electronic
PERKINS 1104D-E44TAG1
4-cylinder 4-stroke / Turbo
Water-cooled
4,400 cm <sup>3</sup>
76.6 kW
1,500
Electrical
Diesel
209
16.9
12
E-Start 12V
96
71
2,700
4,500×2,020×2,700
CEE 400V / 125A IP67
CEE 400V / 63A IP67
CEE 400V / 32A IP67
CEE 400V / 16A IP67
2 × 230V / 16A IP68





## 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.

The 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.



### FEDERAL MINISTRY OF THE INTERIOR

#### ► Power supply in the case of catastrophes

Every infrastructure which is needed for emergency power supply to the population must, in the case of an incident, be able to operate autonomously and thus to secure the safety of the population - ENDRESS offers DIN generators in various performance classes to secure the power supply for the THW.



## HARTMANN SPEZIALKAROSSE-RIEN GMBH

### ► Fusing of the power supply

The ESE 608 HG ES DI Duplex Silent generator with a continuous power output of 6.0 kVA installed on special vehicles was built for the company Hartmann Spezialkarosserie GmbH which specialises in the building and development of vehicles according to customer requirements. The generators are to provide security of power supply in the case of power cuts in Algeria.



## 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.



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# Innovate

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## **COMPLICATED INTERRELATIONSHIPS SIMPLY EXPLAINED**

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.

### ► 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".

### ► 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.

### ► 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 eco-friendly alternative to conventional electricity generation. The ECOtronic system recognizes during use whether an output is being used or not. The speed is significantly 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.

### ► 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 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.

### ► 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.

### ► Remote monitoring

See E-RMA.

### ► 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.

### ► 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.

### ► Charge 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.



### ► 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.

### ► 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.

### ► 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 factor $\cos \varphi$

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"

### ► 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  $m^2$ . 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).

### ► 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.

### ► 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.

### ► 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.

### ► Noise level calculation

Two parameters are used for noise level calculation:

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

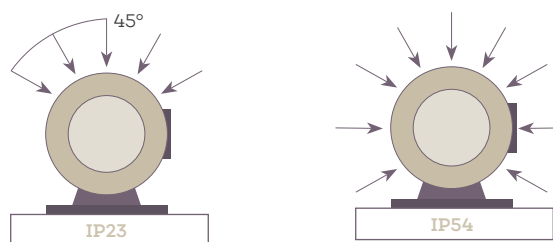
The so-called hemisphere measurement procedure is used to measure the sound pressure level which means that established measuring points are passed over to take the measurement at the side of and above the generator using a special measuring microphone.

#### ► 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.

### ► 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	2. Digit
0 Unprotected	0 Unprotected
1 Foreign objects > 50 mm	1 Dripping water, vertical
2 Foreign objects > 12 mm	2 Dripping water, diagonal to 15° from the vertical
3 Foreign objects > 2.5 mm	3 Spray water diagonally up to 60° of the vertical
4 Foreign objects > 1.0 mm	4 Splashed water, from all directions
5 Dust protected	5 Water jet, from all directions

### ► 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.

### ► 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.

### ► Neutral earthing

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





**ENDRESS** 

**Power Generators**

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