English

JOHANNES HÜBNER GIESSEN

ideas and solutions

Operating Instructions

AC-Synchronous Generators with permanent excitation

DSG P…

Read the Operating Instructions prior to assembly, starting installation and handling!
Keep for future reference

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Translation of the original Operating Instructions
ID-72065-R2

DSGP_MANUAL-en_R2(2025-05-27)ID72065.docx

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Directory

1 General

1.1 Information about the Operating and Assembly Instructions

These Operating and Assembly Instructions provide important instructions for working with the device. They must be carefully read prior to starting all tasks, and the instructions contained herein must be followed.

In addition, applicable local regulations for the prevention of industrial accidents and general safety regulations must be complied with.

1.2 Scope of delivery

Permanently excited synchronous generator from the DSG P series with agreed accessories, operating instructions.

1.3 Explanation of symbols

Warnings are indicated by symbols in these Operating and Assembly Instructions. The warnings are introduced by signal words that express the scope of the hazard.
The warnings must be strictly heeded; you must act prudently to prevent accidents, personal injury, and property damage.

WARNING!
Indicates a possibly dangerous situation that can result in death or serious injury if it is not avoided.

CAUTION!
Indicates a possibly dangerous situation that can result in minor injury if it is not avoided.

CAUTION!
Indicates a possibly dangerous situation that can result in material damage if it is not avoided.

NOTES!
Indicates useful tips and recommendations as well as information for efficient and trouble-free operation.

NOTES!
Do not use a hammer or similar tool when installing the device due to the risk of damage occurring to the bearings or coupling!

DANGER!
Life-threatening danger due to electric shock!
Indicates a life-threatening situation due to electric shock. If the safety instructions are not complied with there is danger of serious injury or death. The work that must be executed should only be performed by a qualified electrician.

1.4 Disclaimer

All information and instructions in these Operating and Assembly Instructions have been provided under due consideration of applicable guidelines, as well as our many years of experience.
The manufacturer assumes no liability for damages due to:

- Failure to follow the instructions in the Operating and Assembly Instructions
- Non-intended use
- Deployment of untrained personnel
- Opening of the device or conversions of the device

In all other aspects the obligations agreed in the delivery contract as well as the delivery conditions of the manufacturer apply.

1.5 Copyright

NOTES!
Content information, text, drawings, graphics, and other representations are protected by copyright and are subject to commercial property rights.
It is strictly forbidden to make copies of any kind or by any means for any purpose other than in conjunction with using the device without the prior written agreement of the manufacturer. Any copyright infringements will be prosecuted.

1.6 Guarantee terms

The guarantee terms are provided in the manufacturer´s terms and conditions.

1.7 Customer service

For technical information personnel is available that can be reached per telephone, fax or email. See manufacturer´s address on page 2.

1.8 Responsibility of the owner

The machine is used in commercial applications. Consequently, the owner of the machine is subject to the legal occupational safety obligations, and subject to the safety, accident prevention, and environmental protection regulations that are applicable for the machines area of implementation.

1.9 Intended use

The machine has been designed and constructed exclusively for the intended use described here.

Synchronous generators with permanent magnet excitation from the DSG-P range are designed to convert mechanical energy into electrical energy, for example, for feeding into the grid, charging batteries and applying electrical power to resistors (for example for heating purposes).

Claims of any type due to damage arising from non-intended use are excluded; the owner bears sole responsibility for non-intended use.

1.10 Improper use

- Do not use the machine in potentially explosive areas.
- The machine must not be subjected to mechanical loads in addition to its own weight and unavoidable vibration and shock loads that arise during normal operations.

  Examples for non-permitted mechanical loads (incomplete list):

  - Fastening transport or lifting tackle to the device, for example a crane hook to lift a motor.
  - Fastening packaging components to the machine, for example ratchet straps, tarpaulins etc.
  - Using the machine as a step, for example by people to climb onto a motor.
  - It is not permitted to use the machine in locations higher than 3000 m above sea level.

1.11 Personal protective equipment

Wear personal protective equipment such as safety shoes and safety clothing to minimize risks to health and safety when carrying out work such as installation, disassembly or commissioning. Adhere to all applicable statutory regulations as well as the rules and standards determined by the owner.

1.12 Personnel

Installation and commissioning as well as disassembly routines must be carried out by skilled technical staff only.

1.13 Special dangers

Residual risks that have been determined based on a risk analysis are cited below.

1.13.1 Electrical current

DANGER!

Life-threatening danger due to electrical shock!
There is an imminent life-threatening hazard if live parts are touched. Damage to insulation or to specific components can pose a life-threatening hazard.
Therefore:
Immediately switch off the device and have it repaired if there is damage to the insulation of the power supply.
De-energize the electrical equipment and ensure that all components are connected for all tasks on the electrical equipment.
Keep moisture away from live parts. Moisture can cause short circuits.

1.13.2 Rotating shafts / Hot surfaces

WARNING!

Danger of injury due to rotating shafts and hot surfaces!
Touching rotating shafts can cause serious injuries.
Therefore:
Do not reach into moving parts/shafts or handle moving parts/shafts during operation.
Close to protect from injury all access openings in flanges with the corresponding plug screw, and provided you exposed rotating components with protective covers.
Do not open covers during operation. Prior to opening the covers ensure that all parts have come to a standstill.
The encoder can become hot during prolonged use.
In case of contact risk of burns is existing.

1.13.3 Safeguarding against restart

DANGER!

Life-threatening danger if restarted without authorization!
When correcting faults there is danger of the power supply being switched on without authorization.
This poses a life-threatening hazard for persons in the danger zone.
Therefore:
Prior to starting work, switch off the system and safeguard it from being switched on again.

2 Technical Data

2.1 Type plate

Siemensstrasse 7 35394 Giessen Germany	JOHANNES HÜBNER GIESSEN CE				
3~Synchron-Generator / *3~ synchronous-generator*					
Typ	DSG P 112.XX-X				
○ S/N	123456		Y 2018		○
P_N 5,4 kW	S 123456		VDE 0530		
U_0 / U_N	150 V DC / 120 V		I_N	45 A	人
n	1000 rpm		Isol.Kl./*Cl.*	S1	
50 Hz	cosφ 1,0		IP	21	
ID	12345		Made in Germany		

The type plate and CE label are located on the side of the housing.

Type plate-information:

- Manufacturer
- Type / CE mark
- S/N = serial number
- Y = year of manufacture
- P_N = rated power output (effective power)
- S = operating mode
- VDE 0530 = standard
- U_0 / U_N = no-load voltage (interlinked) / rated voltage (interlinked).
- I_N = rated current
- 人 = star-connected winding
- n = rated speed
- Isol.Kl. / Cl. = insulation class
- frequency [Hz]
- cosφ = power factor
- IP = degree of protection

Electrical design to VDE 0530

Caution: The details on the nameplate apply exclusively to a purely resistive load. The details differ for inductive or capacitive loads (please consult the manufacturer).

2.2 Type key

DSG	P	180	25	4
Drehstrom Synchron Generator (German for three-phase synchronous generator)				
Permanently excited				
Hight to center 180 ≙ 180 mm				
Overall length inside 25 ≙ 250 mm				
Number of poles				

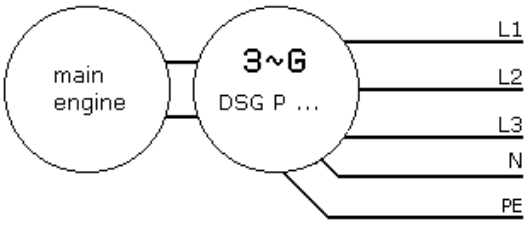
2.3 Connected loads and -values

2.3.1 Dimensions, connected loads, environment

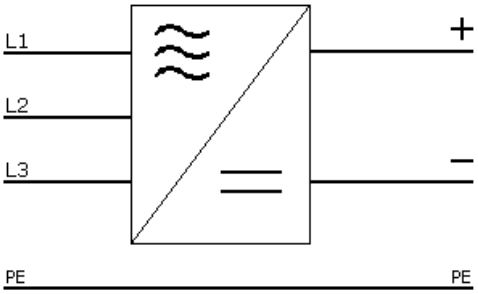
Specification	Value	Unit
Weight	Please see Chapter 11.2 Dimensional drawings/mechanical details	kg
Dimensions	Please see Chapter 11.2 Dimensional drawings/mechanical details	mm
No-load voltage (interlinked)	Please see nameplate	V AC
Rated voltage under load (interlinked)	Please see nameplate	V AC
Rated current	Please see nameplate	A AC
Machine temperature range	- 20 to + 40	°C
Max. shaft load, shaft	Please see Chapter 11.2 Dimensional drawings/mechanical details	kN
Speed	Please see nameplate	

3 Construction and Funktion

3.1 Block diagram



Block diagram



Optional rectifier for DC voltage output

3.2 Short description

The permanently excited synchronous generator DSG P consists of a stator and a rotor fitted with permanent magnets. By rotating in the stator, the rotor generates a voltage proportional to the speed and a frequency proportional to the speed. The max. speed-specific voltage is achieved when the generator is being driven at a constant speed in a load-free operation; the voltage decreases with increasing load, whereas the frequency remains constant.

3.3 Connections

The terminal box is fitted with cable glands. The proper cables are an important factor in maintaining the degree of protection. Please observe the wiring diagrams (Chapter11.1).

4 Transport, packaging and storage

4.1 Safety information concerning transport

CAUTION!
Material damage caused by improper transport!
Observe the symbols and information on the packaging:

- Do not throw - risk of breakage
- Keep dry
- Do not expose to heat above 40 °C or direct sunlight.

4.2 Goods inward inspection

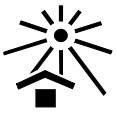
Check the delivery immediately upon receipt for transit damage or short delivery.
Inform the carrier immediately on receipt if you determine that damage has occurred during transit (take photos as proof).
Do not transport or store the generators on their cooling fan cowls. When transporting, use the eye bolts on the generators and suitable lifting tackle
Caution! The eye bolts are not designed to lift the generators with additional attachments such as base plates, drives and so forth still attached!
Use suitably dimensioned transport and lifting equipment to lift a generator together with a fully mounted drive unit.
If the eye bolts are removed following installation, the threaded bores must be sealed off in a manner that maintains the degree of protection.
Secure the generator in such a manner that it is protected against mechanical damage.
Ensure when transporting that no foreign objects can enter into the cooling-fan cowl.

4.3 Packaging (disposal)

The packaging is not taken back; dispose of according to the respective valid statutory provisions and local regulations.

4.4 Storing packages

Keep dry
Keep packages dry and free from dust; protect from moisture.



Protect against heat
Protect packages from heat above 40 °C and direct sunlight.

If you intend to store the machine for a longer period of time (> 6 months) we recommend you use protective packaging (with desiccant).

NOTES!
Turn the shaft of the machine every 6 month to prevent the bearing grease solidifying!

5 Safety instructions

Personnel
Installation and commissioning must be carried out by skilled technical staff only.

NOTES!

Observe the safety instructions contained in Chapter 1.13 when installing or working on the device!

DANGER!

Life-threatening danger due to electrical shock!
There is an imminent life-threatening hazard if live parts are touched. Damage to insulation or to specific components can pose a life-threatening hazard.
Therefore:
- Immediately switch off the device and have it repaired if there is damage to the insulation of the power supply.
- De-energize the electrical equipment and ensure that all components are connected for all tasks on the electrical equipment.
- Keep moisture away from live parts. Moisture can cause short circuits.

The work to be carried out may only be performed by a qualified electrician.

WARNING!

Risk of injury from rotating shafts!
- Do not tinker with moving parts or work on moving parts or rotating shafts.
- Do not open covers when in operation. Ensure no parts are moving before opening any covers.
- Ensure that there are no foreign objects in the fan impeller (in particular before initial commissioning). There is a risk of injury if foreign objects are propelled out by the rotating fan impeller.

WARNING!

Danger of injury due to hot surfaces!
- When the generator is operated in line with design specifications the surface can reach temperatures above 100 °C. If the generators are installed in openly accessible areas, you must prevent humans and animals from coming into contact with the surfaces.

6 Installation and commissioning

6.1 Place of installation

- Installation height ≤ 1000 m above sea level. Consult the manufacturer if the installation height is > 1000 m (possible derating)
- Permissible ambient temperature - 20° C up to + 40° C
- Machines must only be operated in accordance with the details on the nameplate (ratings, protection class and so forth).
- Adhere to the minimum clearances detailed in the dimensioned drawings. Cooling air must be allowed to circulate without hindrance. Ensure that exhaust air from the machine and neighboring units cannot be drawn back into the machine.
- Do not attach or lean temperature sensitive components onto or against the machine; do not position such components in the immediate vicinity of the machine.
- Ensure sufficient space is available for maintenance work (see chapter 8.3 inspection schedule).
- We recommend installing a canopy for model designs and shaft ends facing downwards; if the shaft end faces upwards place a cover over the machine that prevents foreign objects from falling into the cooling fan.
- The owner must ensure that no system resonance or vibration arise from interaction between the machine and plant that could result in damage to the machine or the entire plant or accelerate the aging process (for example of the bearings).

  The owner must disclose to the manufacturer prior to ordering, whether the engine is driven through a coupling or a belt.
- It is the owner's responsibility to undertake suitable measures at the place of installation that ensure that the devices and plant in their totality fulfil the relevant standards applicable to electromagnetic compatibility.

6.2 Installation work

6.2.1 Machine version for flange mount type (B5) or foot mount type (B3) or combination (B35)

1. Use zero-play coupling.
2. Ensure precisely centred mounting, in particular for foot mount type B3.
3. Secure machine via flange or foot.

Ensure the machine is mounted securely without distortion and not subject to vibration. Securely fasten the feet or flange using standard screws and washers in all of the through holes. It is important to ensure the correct property class, size and length of engagement on the fastening side so that the entire system remains securely and reliably mounted under all operating statuses. The details given in Appendix 11.3 apply (screw tightening torque, material characteristics) when mounting the machine horizontally (foot at bottom, mounting types B3 and B35) without additional attachments.

The thread engagement, its stability and strength on the fastening side must be guaranteed at all times.

The details given in the Appendix 11.3 apply only to the calculated steady-state and dynamic forces and moments produced by the machine; these do not take into consideration any additional external forces and moments that may act on the machine or the fastenings. Consult the manufacturer in all cases where installation situations deviate.

The screws must be tightened to the torque appropriate for the property class and thread; they must not become loose when the machine is in operation or at a standstill. Use a torque wrench. Regularly check that the fastening screws are seated correctly in accordance with the inspection and maintenance schedule (Chap. 8.3). Use only flexible couplings; align and adjust the generator carefully.

Exercise due care and attention when mounting coupling components, the belt pulley and gear wheels. Support the opposite end of the shaft (blows can damage the bearings).

Observe specifications and the manufacturer's calculation programs when sizing the drive belt. When mounting, observe the belt manufacturer's specifications exactly when pre-tensioning the belt. Caution: Ensure the belt tension or belt pretension does not exceed the permissible radial force acting on the shaft end of the generator as detailed in our specifications. If a second shaft end is not in use you must secure the key on a permanent basis to ensure it cannot be flung out of the keyway.

4. Making connections in the terminal box
(*Appendix* 11.1, *Wiring diagrams*).

The generator terminal voltage given on the nameplate must be coordinated with the load. **Caution:** Take account of surge protectors for downstream devices, if these are connected to the output voltage of the generator. The output voltage of the generator increases linearly in line with the speed. The upper speed of the generator during no-load operations must be restricted to ensure that the maximum permissible input voltage of the connected devices is not exceeded. The connected devices will be destroyed if the input voltage is too high.

- Connect according to wiring diagram (please refer to wiring diagram, Appendix 11.1).

The machine winding must be and is connected in a star configuration by the manufacturer.

- The machine must not be operated in a delta connection (results in short-circuit currents of the third harmonic oscillation).
- The machine must not be operated as a motor; that means no separate external voltage must be applied to the electrical connections in the terminal box.
- To guarantee a safe electrical connection the cross-section of the conductors must be sized in accordance with the rated current as detailed on the nameplate.
- Ensure any unused cable glands and the terminal box are sealed dust and water-tight.
- Create a safe earth connection!

Before closing the terminal box, you must ensure that

- The connections have been terminated according to the wiring diagram.
- All connections in the terminal box have been securely tightened.
- All minimum clearance values have been maintained (> 8 mm up to 500 V, > 10 mm up to 750 V, > 14 mm up to 1000 V).
- The inside of the terminal box is clean.
- Unused cable glands are sealed and that the screw plugs including the seals are securely screwed tight.
- The seal in the lid of the terminal box is clean and properly glued and that all surfaces of the seals are in a proper condition to guarantee the degree of protection is maintained.
- The rating data match the data given on the nameplate. Voltage deviation tolerances of +/-5% are permissible (to EN 60034).

5. Check and ensure the flow of cooling air (room temperature max. 40 °C).

   Do not allow ventilation openings to be blocked; maintain the minimum clearances behind the cooling fan cowl (size 63-80 = min. 20 mm and size112-200 = min. 40 mm) to ensure the flow of cooling air is not hindered.
   Ensure the exhaust air of generator or from neighbouring units is not drawn (back) into the generator.
6. Remove transport locks before beginning commissioning procedures.
7. Check fan impeller for foreign objects; remove foreign objects before beginning commissioning procedures.

Caution:

It is the owner's responsibility to ensure that all moving parts are safeguarded to protect personnel and ensure that the machine is safe to operate!

6.3 Dismantling

Observe and adhere to safety information (8.1)!

- Shut down and ensure the machine cannot be restarted.
- Turn off and isolate the power supply; turn off and isolate the power supply to any additional or auxiliary circuits.
- Ensure adjacent live components are insulated and safeguarded.
- Examine components for damage and broken edges (for example risk of cuts from broken off foot).
- Exercise due care and attention when removing coupling parts and gear wheels support the opposite end of the shaft (damage to bearings from blows). Coat the shaft with a thin layer of oil and seal with screw cap. Ensure the terminal box and cable glands are sealed dust and water-tight; ensure the degree of protection (see nameplate) is achieved and guaranteed for transport.
- Observe and adhere to transport information (chapter 4)!
- Ensure that the packaging (carton + palette) used to transport the machine is correctly sized and that the machine is secured by the packaging in such a manner that forces resulting from the weight of the machine during transport cannot cause any damage to the machine, to neighboring parts or injure personnel! Use transport locks to reduce the load acting on the bearings.

7 Faults

Please contact the manufacturer if faults occur that cannot be rectified using the following information; please refer to the service address on page 2.

The work required to rectify any faults must be carried out by skilled technical staff only.

7.1 Safety

The work required to rectify any faults must be carried out by skilled technical staff only.

WARNING!

There is a risk of injury and material damage if faults are rectified improperly!

Ensure that any components that have been removed are refitted correctly; refit all mounting elements and adhere to the correct screw tightening torques!

WARNING!

Danger of injury due to rotating shafts!
Touching rotating shafts can cause serious injuries.
Therefore:
Do not reach into moving parts/shafts or handle moving parts/shafts during operation.
Close to protect from injury all access openings in flanges with the corresponding plug screw, and provided you exposed rotating components with protective covers.
Do not open covers during operation. Prior to opening the covers ensure that all parts have come to a standstill.
The encoder can become hot during prolonged use.
In case of contact risk of burns is existing.

DANGER!

Life-threatening danger if restarted without authorization!
When correcting faults there is danger of the power supply being switched on without authorization.
This poses a life-threatening hazard for persons in the danger zone.
Therefore:
Prior to starting work, switch off the system and safeguard it from being switched on again.

DANGER!

Life-threatening danger due to electrical shock!
There is an imminent life-threatening hazard if live parts are touched. Damage to insulation or to specific components can pose a life-threatening hazard.
Therefore:
Immediately switch off the device and have it repaired if there is damage to the insulation of the power supply.
De-energize the electrical equipment and ensure that all components are connected for all tasks on the electrical equipment.
Keep moisture away from live parts. Moisture can cause short circuits.

7.2 Faults diagnosis table

Faults	Possible cause	Remedial action
Voltage too low	Insufficient input speed	Measure speed, adjust if necessary
	Overload	Reduce drive-end load.
	Overtemperature	Check flow of cooling air, improve if necessary. Clean the machine if dirty (as described in 8.2 Inspection and maintenance schedule)
Insufficient power.	Phase missing	Test voltage (L1, L2, L3-N). Check if cable connections are interrupted. Check winding
Rotor turns with difficulty	Magnets defective	Decouple the machine, re-check; Please contact the manufacturer if mechanical stiffness remains.
Grinding noises	Rotating parts rubbing	Shut down the machine. Determine cause of rubbing. If possible! remove foreign objects - otherwise please contact the manufacturer.
Machine has difficulty starting up without output load.	Interturn fault	Check voltages (L1, L2, L3).
Humming noise when starting up and during operations	Interturn fault	Check winding and insulation resistance; in the event of an error, please contact the manufacturer.
Bearing noise or bearings freeze up. **<u>Caution:</u>** Bearings must be replaced by the manufacturer only.	Mounting errors/ coupling problems	Check mounting accuracy.
	Bearings corroded	Bearings must be replaced by manufacturer only.
	Insufficient lubrication	Contact the manufacturer
	Too little/much bearing play	Replace bearings, by manufacturer only.
	Grind marks in the bearing track, scoring	Replace bearings; by manufacturer only
	Bearing tilted or distorted	Check bearing bore Contact the manufacturer

Faults	Possible cause	Remedial action
Bearings becoming too hot	Rotating parts rubbing; changes to foundations/plant	Determine cause, remove foreign objects, re-align machine.
	Too much grease in the bearing; coolant temperature above 40 °C.	Please contact the manufacturer.
Bearing becoming too hot	V-seal or gamma ring rubbing	Replace V-seal or gamma ring. Please contact the manufacturer
	Insufficient lubrication	Please contact the manufacturer
	Bearing corroded	Please contact the manufacturer.
	Too little bearing play	Please contact the manufacturer
	Coupling pushes or pulls	Re-align machine
	Belt tensioned too tightly	Adjust belt pulley in line with specifications.
	Bearing tilted or distorted	Contact the manufacturer
	Bearing corroded	Please contact the manufacturer.
Heavy vibration	Rotor imbalance, rotor not round, shaft distorted	Shut down the machine Please contact the manufacturer
	Incorrect alignment	Align set of machines; check coupling.
	Imbalance with the coupled prime mover	Rebalance the coupled prime mover
	Shocks from coupled prime mover	Check prime mover
	Resonance in the foundations	Strengthen foundations following consultation with the manufacturer
	Changes in the foundation	Following consultation with the manufacturer determine the cause, eliminate error and realign the machine.

Faults	Possible cause	Remedial action
Surface temperature too high (>100 °C)	Insufficient flow of cooling air due to unsuitable machine installation location or insufficient ventilation	Check installation location and change if necessary
	Cooling air flow reduced due to soiling	Blow-clean the machine with water and oil-free compressed air (focus on: spaces between ribs and ventilation openings.
	Rotating parts rubbing	Determine the cause, remove foreign objects if possible; otherwise please contact the manufacturer.
Other faults		Please contact the manufacturer.

8 Inspections

8.1 Safety instructions

WARNING!

There is a risk of injury and material damage if inspection work is carried out improperly!

Ensure that any components that have been removed are refitted correctly; refit all mounting elements and adhere to the correct screw tightening torques!

DANGER!

Danger of death from unauthorized reconnection of the power supply!

Turn off and isolate all power supplies to the machine and equipment concerned before commencing work. Ensure no power supply can be reconnected.

DANGER!

Danger of death from electricity!

If the insulation is damaged turn off and isolate the power supply immediately; ensure the insulation is repaired.

Before commencing any work, turn off the electrical installation and isolate the power supply to the installation.

Ensure that live components do not come into contact with moisture or conductive objects. Otherwise, this can lead to a short-circuit.

Please note that you must observe and adhere to all operating and owner-relevant accident prevention regulations, laws regarding the safeguarding of machinery and plant as well as application and country-specific regulations, laws and standards.

8.2 Maintenance information

To guarantee optimum fault-free operations we recommend that you carry out the following inspections.

8.3 Inspection schedule

NOTES!
No further actions are required on the machine in addition to the following cyclical inspections described in this inspection schedule. Any attempt to tamper with the machine will result in the warranty being declared null and void!

Interval	Inspections	To be carried out by
Regularly	Check the fastening screws are seated correctly	Skilled personnel
After approx. 20000 operating hours	Check deep groove ball bearings are running smoothly and listen for running noises	Bearings must be replaced by the manufacturer only
All 48 month	Check deep groove ball bearings are running smoothly and listen for running noises	Bearings must be replaced by the manufacturer only
Regularly (depending on degree of soiling)	Cleaning: Blow-clean the generator using water and oil-free compressed air (focus on: spaces between ribs and ventilation openings). Do not use flammable cleaning agents or substances that will damage the coating/paintwork (see information above) – (awareness of explosion prevention and protection).	Skilled personnel
Regularly	Drain condensate: At installation locations at which it can be assumed that dew will result in condensate forming. Drain at the lowest point of the end shield; ensure you reclose the drainage opening point.	Skilled personnel
Regularly	Check coating/paintwork. If protective coating is sufficiently damaged, repainting must be carried out by the manufacturer only due to risk of corrosion.	Skilled personnel
If the machine has not been in use for a long time (more than 6 months)	Check the insulation resistance of the windings (greater approx. 1-5 mega-ohm). To measure the insulation resistance, disconnect all outgoing lines from the machine. Contact the manufacturer if the resistance reading is less than 1 mega-ohm.	Skilled personnel

8.4 Relubrication device (option)

Maintenance of rolling bearings with relubrication device (optional equipment).
The exact details of the individual lubrication intervals, the type of grease used and the quantity of grease required can be found on the relubrication plate.
The roller bearings are generally relubricated on both sides via grease nipples while the machine is running.
The old grease displaced during relubrication is collected in the grease chamber of the outer bearing cover.
After around five relubrication processes, the collected grease must be removed - ideally as part of scheduled maintenance - and disposed of properly in accordance with the applicable environmental regulations.

9 Disposal

9.1 Disposal procedure

The manufacturer is not obligated to take back electronics waste.

The device consists of hybrid components, and in part must be disposed of as special waste (electronic scrap) according to country-specific legislation.

Local municipal authorities or specialized disposal companies provide information on environmentally responsible disposal.

10 Spare parts

The spare parts contained in the following list can be obtained as required from the service address given on page 2.

Spare part	Remark
Cooling fan cowl	Cover for shaft end and fan impeller
Fan impeller	Machine self-ventilation
Terminal board	For terminating conductors and winding
Terminal box parts	Enclosure Terminal board
Key way feather	Indicate shaft or key dimensions
Other parts	Available from the manufacturer on request

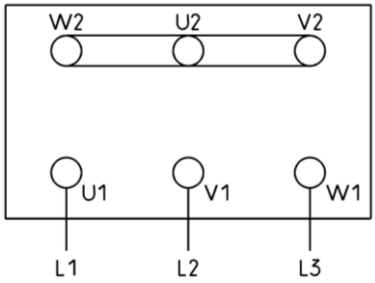
INFORMATION!
Always indicate the serial number of the device when ordering spare parts!

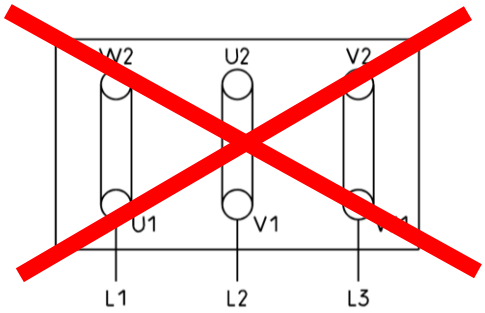
11 Appendix

11.1 Connection diagram

Wiring diagram

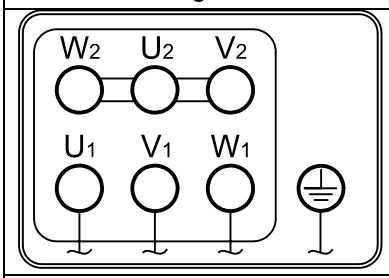
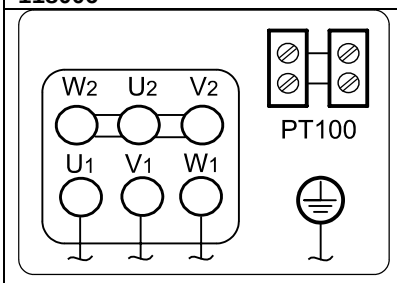
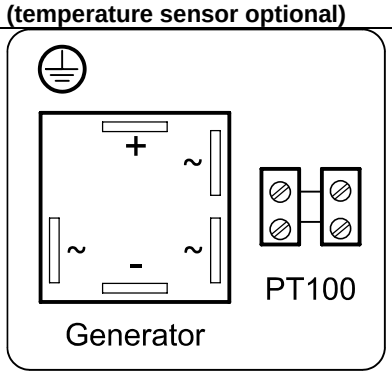
DSG P …
Terminal board (terminal box):





Allowed

Forbidden!

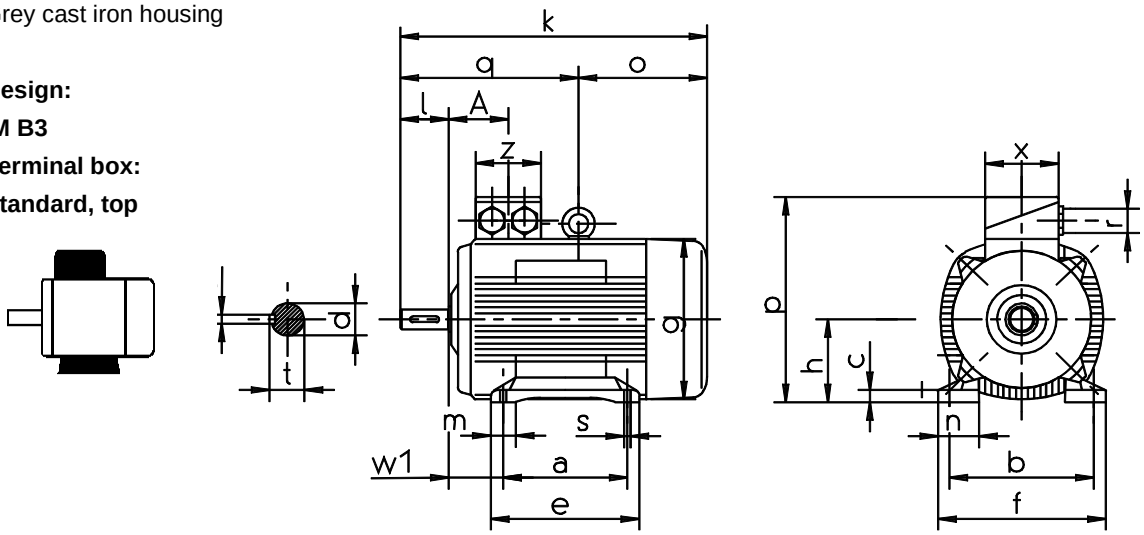
Connection diagram AP-114901 (Standard)	
	
Connection diagram with temperature sensor AP-118006	**Connection diagram with rectifier AP-117963 (temperature sensor optional)**
	

11.2 Dimension drawings / mechanical data

Dimensioned drawing B3

Three-phase synchronous generator with permanent excitation
Grey cast iron housing

Design:
IM B3
Terminal box:
Standard, top



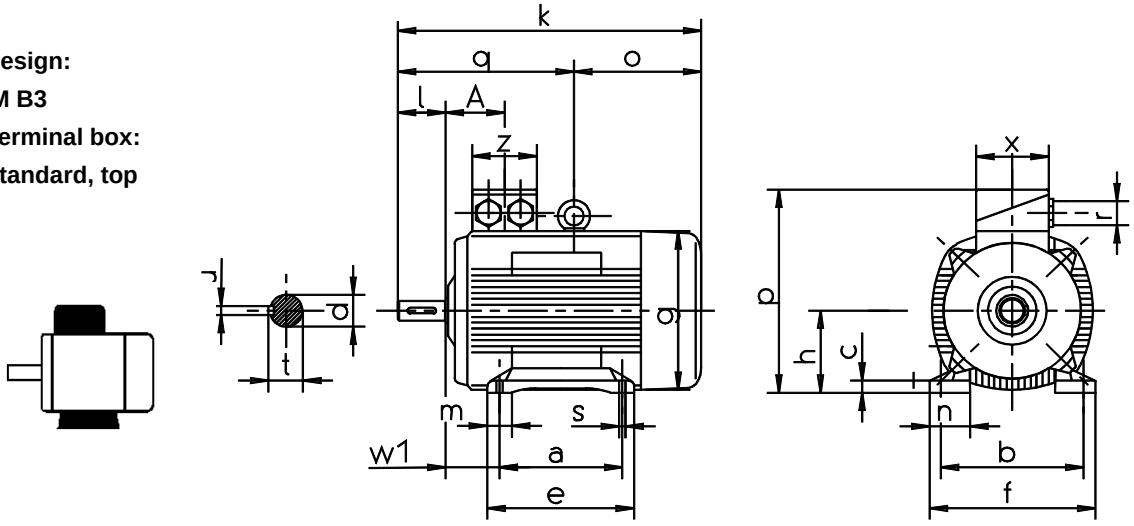
DSG P - Series

Machine type	Dimension	71.07-0.8	71.07-8	80.10-8	112.14-10	112.17-10
Total length	**k**	242	242	297	357	391
Total height with terminal box	**p**	140	140	200	249	249
Shaft length	**l**	30	30	50	60	60
Shaft diameter	**d**	14	14	22	28	28
Max. shaft width with key	**t**	16.1	16.1	24.5	31	31
Width of key	**u**	5	5	6	8	8
Length of foot	**e**	108	108	147	180	180
Distance between foot bores	**a**	90	90	100	140	140
Diameter of foot bores	**s**	7	7	10	12	12
Distance foot bore - shaft collar	**w1**	45	45	50	70	70
Width of foot	**f**	140	140	152	224	224
Distance between foot bores	**b**	112	112	125	190	190
Fan cowl diameter	**g**	138	138	157	196	196
Height to centre	**h**	71	71	80	112	112
Max. axial force	**F_a**	0.145 kN	0.145 kN	0.44 kN	0.52 kN	0.52 kN
Max. radial force (½ shaft length)	**F_r**	0.29 kN	0.29 kN	0.77 kN	0.98 kN	0.98 kN
Mass moment of inertia [kgm²]	**J**	0.00073	0.00073	0.00375	0.01225	0.0139
Mass	**m**	6.5 kg	6.5 kg	18 kg	37 kg	39 kg

Dimensioned drawing B3

Three-phase synchronous generator with permanent excitation
Grey cast iron housing

Design:
IM B3
Terminal box:
Standard, top



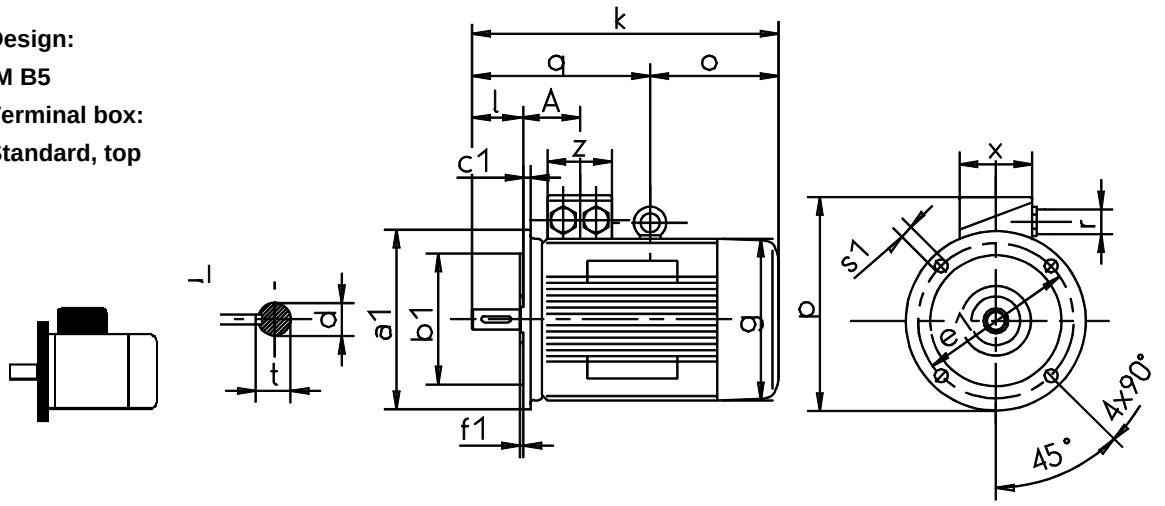
DSG P - Series

Machine type	Dimension	112.16-10	132.15-10	132.20-10	160.20-10	200.25-10
Total length	**k**	479	481	529	609	757
Total height with terminal box	**p**	290	331	331	402	500
Shaft length	**l**	80	80	80	110	140
Shaft diameter	**d**	32	38	38	48	60
Max. shaft width with key	**t**	35	41	41	51.5	64
Width of key	**u**	10	10	10	14	18
Length of foot	**e**	172	180	218	257	322
Distance between foot bores	**a**	140	140	178	210	267
Diameter of foot bores	**s**	12	12	12	15	19
Distance foot bore - shaft collar	**w1**	70	89	89	108	133
Width of foot	**f**	226	256	256	296	372
Distance between foot bores	**b**	190	216	216	254	318
Fan cowl diameter	**g**	217	258	258	313	390
Height to centre	**h**	112	132	132	160	200
Max. axial force	**F_a**	1.4 kN	1.1 kN	1.1 kN	2.5 kN	4.3 kN
Max. radial force (½ shaft length)	**F_r**	1.7 kN	2.6 kN	2.6 kN	3.8 kN	5.6 kN
Mass moment of inertia [kgm²]	**J**	0.023	0.043	0.053	0.145	0.440
Mass	**m**	53 kg	70 kg	86 kg	136 kg	265 kg

Dimensioned drawing B5

Three-phase synchronous generator with permanent excitation
Grey cast iron housing

Design:
IM B5
Terminal box:
Standard, top



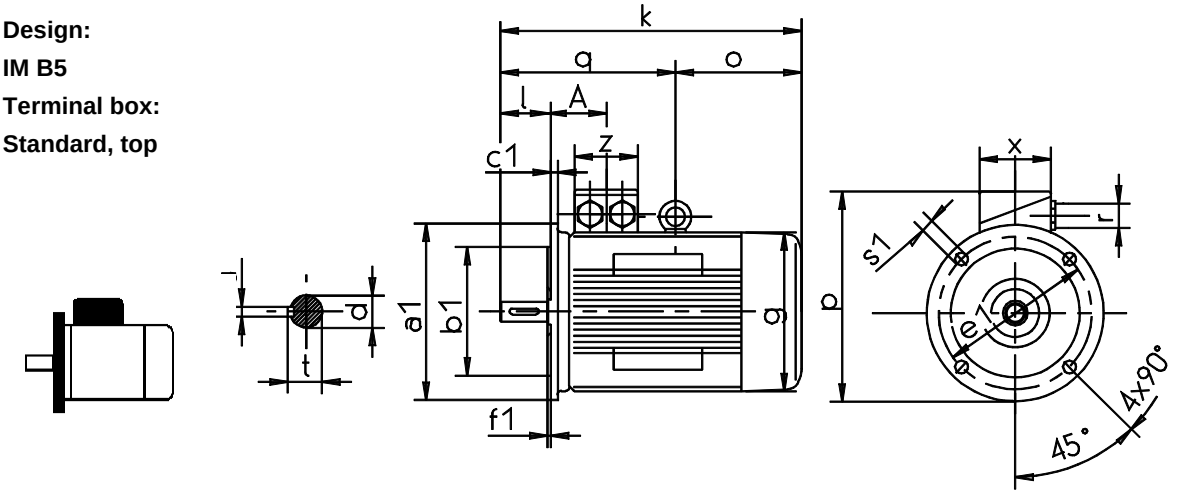
DSG P - Series

Machine type	Dimension	71.07-0.8	71.07-8	80.10-8	112.14-10	112.17-10
Total length	**k**	242	242	297	357	391
Total height with terminal box	**p**	201.5	201.5	220	262	262
Shaft length	**l**	30	30	50	60	60
Shaft diameter	**d**	14	14	22	28	28
Max. shaft width with key	**t**	16.1	16.1	24.5	31	31
Width of key	**u**	5	5	6	8	8
Fan cowl diameter	**g**	138	138	157	196	196
Flange diameter	**a1**	160	160	200	250	250
Diameter of through-hole circle	**e1**	130	130	165	215	215
Centering seat diameter	**b1**	110	110	130	180	180
Distance centering seat - end shield	**f1**	3.5	3.5	3.5	4	4
Width of end shield	**c1**	10.3	10.3	10	11	11
Flange bore diameter	**s1**	9	9	11	14	14
Max. axial force	**F_a**	0.145 kN	0.145 kN	0.44 kN	0.52 kN	0.52 kN
Max. radial force (½ shaft length)	**F_r**	0.29 kN	0.29 kN	0.77 kN	0.98 kN	0.98 kN
Mass moment of inertia [kgm²]	**J**	0.00073	0.00073	0.00375	0.01225	0.0139
Mass	**m**	6.5 kg	6.5 kg	18 kg	37 kg	39 kg

Dimensioned drawing B5

Three-phase synchronous generator with permanent excitation
Grey cast iron housing

Design:
IM B5
Terminal box:
Standard, top

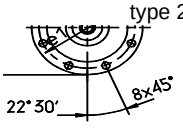


DSG P - Series

Machine type	Dimension	112.16-10	132.15-10	132.20-10	160.20-10	200.25-10
Total length	**k**	479	481	529	609	757
Total height with terminal box	**p**	328	374	374	417	525
Shaft length	**l**	80	80	80	110	140
Shaft diameter	**d**	32	38	38	48	60
Max. shaft width with key	**t**	35	41	41	51.5	64
Width of key	**u**	10	10	10	14	18
Fan cowl diameter	**g**	217	258	258	313	390
Flange diameter	**a1**	300	350	350	350	450
Diameter of through-hole circle	**e1**	265	300	300	300	400
Centering seat diameter	**b1**	230	250	250	250	350
Distance centering seat - end shield	**f1**	4	5	5	5	5
Width of end shield	**c1**	12	13	13	13	16
Flange bore diameter	**s1**	14	18	18	18	18
Max. axial force	**F_a**	1.4 kN	1.1 kN	1.1 kN	2.5 kN	4.3 kN
Max. radial force (½ shaft length)	**F_r**	1.7 kN	2.6 kN	2.6 kN	3.8 kN	5.6 kN
Mass moment of inertia [kgm²]	**J**	0.023	0.043	0.053	0.145	0.440
Mass	**m**	53 kg	70 kg	86 kg	136 kg	265 kg

8 flange bores

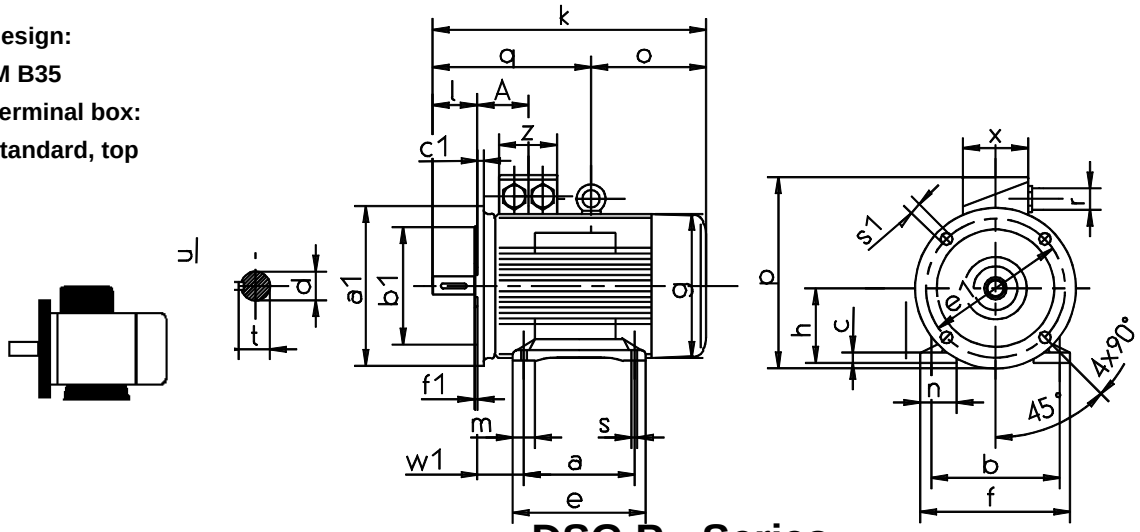
type 200.25-10



Dimensioned drawing B35

Three-phase synchronous generator with permanent excitation
Grey cast iron housing

Design:
IM B35
Terminal box:
Standard, top



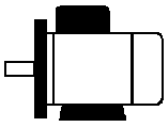
DSG P - Series

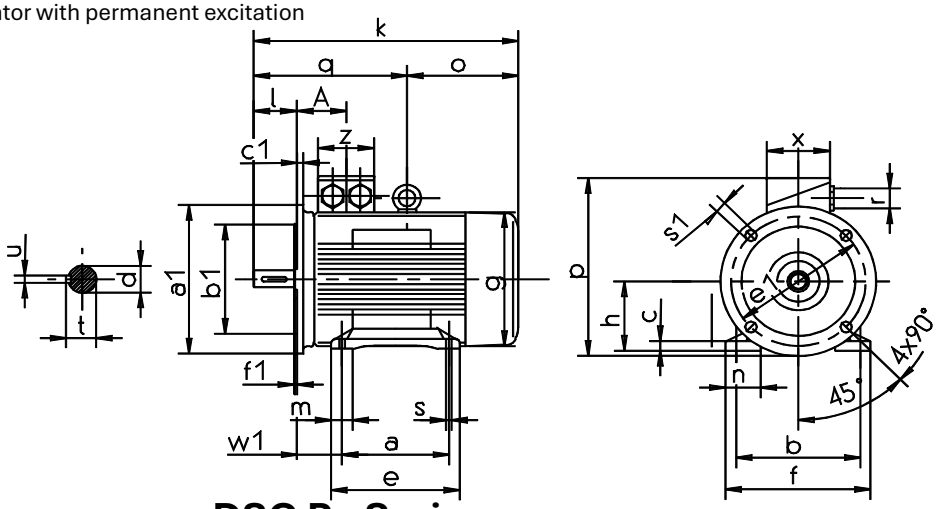
Machine type	Dimension	71.07-0.8	71.07-8	80.10-8	112.14-10	112.17-10
Total length	**k**	242	242	297	357	391
Total height with terminal box	**p**	140	140	200	249	249
Shaft length	**l**	30	30	50	60	60
Shaft diameter	**d**	14	14	22	28	28
Max. shaft width with key	**t**	16.1	16.1	24.5	31	31
Width of key	**u**	5	5	6	8	8
Length of foot	**e**	108	108	147	180	180
Distance between foot bores	**a**	90	90	100	140	140
Diameter of foot bores	**s**	7	7	10	12	12
Distance foot bore - shaft collar	**w1**	45	45	50	70	70
Width of foot	**f**	140	140	152	224	224
Distance between foot bores	**b**	112	112	125	190	190
Fan cowl diameter	**g**	138	138	157	196	196
Height to centre	**h**	71	71	80	112	112
Flange diameter	**a1**	160	160	200	250	250
Diameter of through-hole circle	**e1**	130	130	165	215	215
Centering seat diameter	**b1**	110	110	130	180	180
Distance centering seat - end shield	**f1**	3.5	3.5	3.5	4	4
Width of end shield	**c1**	10.3	10.3	10	11	11
Flange bore diameter	**s1**	9	9	11	14	14
Max. axial force	**F_a**	0.145 kN	0.145 kN	0.44 kN	0.52 kN	0.52 kN
Max. radial force (½ shaft length)	**F_r**	0.29 kN	0.29 kN	0.77 kN	0.98 kN	0.98 kN
Mass moment of inertia [kgm²]	**J**	0.00073	0.00073	0.00375	0.01225	0.0139
Mass	**m**	6.5 kg	6.5 kg	18 kg	37 kg	39 kg

Dimensioned drawing B35

Three-phase synchronous generator with permanent excitation
Grey cast iron housing

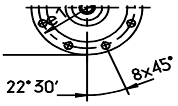
Design:
IM B35
Terminal box:
Standard, top





DSG P - Series

Machine type	Dimension	112.16-10	132.15-10	132.20-10	160.20-10	200.25-10
Total length	**k**	479	481	529	609	757
Total height with terminal box	**p**	290	331	331	402	500
Shaft length	**l**	80	80	80	110	140
Shaft diameter	**d**	32	38	38	48	60
Max. shaft width with key	**t**	35	41	41	51.5	64
Width of key	**u**	10	10	10	14	18
Length of foot	**e**	172	180	218	257	322
Distance between foot bores	**a**	140	140	178	210	267
Diameter of foot bores	**s**	12	12	12	15	19
Distance foot bore - shaft collar	**w1**	70	89	89	108	133
Width of foot	**f**	226	256	256	296	372
Distance between foot bores	**b**	190	216	216	254	318
Fan cowl diameter	**g**	217	258	258	313	390
Height to centre	**h**	112	132	132	160	200
Flange diameter	**a1**	300	350	350	350	450
Diameter of through-hole circle	**e1**	265	300	300	300	400
Centering seat diameter	**b1**	230	250	250	250	350
Distance centering seat - end shield	**f1**	4	5	5	5	5
Width of end shield	**c1**	12	13	13	13	16
Flange bore diameter	**s1**	14	18	18	18	18
Max. axial force	F_a	1.4 kN	1.1 kN	1.1 kN	2.5 kN	4.3 kN
Max. radial force (½ shaft length)	F_r	1.7 kN	2.6 kN	2.6 kN	3.8 kN	5.6 kN
Mass moment of inertia [kgm^2]	**J**	0.023	0.043	0.053	0.145	0.440
Mass	**m**	53 kg	70 kg	86 kg	136 kg	265 kg



8 flange bores

type 200.25-10

11.3 Screw tightening torques / material characteristics

Screws utilized to mount the machine (screw material, the material pairings to be fastened and the length of thread engagement) are to be calculated to VDI 2230 (Page 1). The materials used and the construction to which the generator is to be fastened must guarantee a permanently secure and reliable joint. The owner is obliged to inspect and ensure that all specifications are met.

The details given in the table below apply only to horizontal mounting without additional attachments (foot at bottom, mounting types B3 and B35).

Screw tightening torques / material characteristics

for generator series DSG P ...

DSG P ...		63	71	80	112	132	160	180	200	225	250
Housing	Housing material (stator / stator)	GG 15	AL	GG 15	GG 15	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20
Fastening, external (to existing plant): Foot + Flange-type end shield	Material: foot / flange	GG 20	AL	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20
	Material (screw)	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
	Screw: foot mounting	M6	M6	M8	M10	M10	M12	M16	M16	M16	M20
	Thread engagement [mm]	12	12	16	20	20	32	32	32	32	40
	Dimensions of washer	12.5 x 6.4 x 1.6	12.5 x 6.4 x 1.6	17 x 8.4 x 1.6	21 x 10.5 x 2	21 x 10.5 x 2	24 x 13 x 2.5	30 x 17 x 3	30 x 17 x 3	30 x 17 x 3	37 x 21 x 3
	TM [Nm]	15	15	36	71	71	123	302	302	302	592
	Screw flange mounting	M8	M8	M10	M12	M16	M16	M16	M16	M16	M16
	Thread engagement [mm]	16	16	20	24	32	32	32	32	32	32
	Dimensions of washer [mm]	17 x 8.4 x 1.6	17 x 8.4 x 1.6	21 x 10.5 x 2	24 x 13 x 2.5	30 x 17 x 3	30 x 17 x 3	30 x 17 x 3	30 x 17 x 3	30 x 17 x 3	30 x 17 x 3
	TM [Nm]	36	36	71	123	302	302	302	302	302	302
Fastening (machine, internal): Flange-type end shield + Standard end shield adjacent cams **3)** non-adjacent cams: half MA value	Flange material	GG 20	AL	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20
	Screw size [mm]	M4	M4	M5	M8	M8	M10	M12	M12	M16	M16
	Material	8.8	8.8	8.8	8.8	10.9	10.9	10.9	10.9	10.9	10.9
	TM [Nm] [3)]	2	2	4	15	25	45	75	75	170	170
Fastening, internal: Foot	Foot material	GG 20	AL	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20	GG 20
	Screw size	M5	M6	M6	M8	M10	M12	M12	M16	M16	M20
	Material	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
	TM [Nm]	4	8	8	15	45	75	75	170	170	320
Fan	Screw size	-	-	-	-	M6	M8	M8	M10	M10	M12
	Material	-	-	-	-	8.8	8.8	8.8	8.8	8.8	8.8
	TM [Nm]	-	-	-	-	10	18	25	30	35	40
Cooling fan cowl	Screw size	M4	M4	M4	M5	M6	M6	M6	M6	M8	M8
	Material	4.8	4.8	4.8	4.8	8.8	8.8	8.8	8.8	8.8	8.8
	TM [Nm]	2	2	2	2	8	8	8	8	15	15
Eye bolt	Screw size	-	-	-	M8	M10	M12	M16	M16	M20	M24
	Material	-	-	-	C15E	C15	C15	C15	C15	C15	C15
	TM [Nm]	-	-	-	10	20	40	80	80	160	280
1) D-end **2)** ND end bearing cap	Screw size	- -	- -	- -	- -	- -	- -	- -	1) M6 2) M6	1) M6 2) M6	1) M8 2) M6	1) M10 2) M8	1) M10 2) M10	1) M10 2) M10
	Material	- -	- -	- -	- -	- -	- -	- -	8.8 8.8	8.8 8.8	8.8 8.8	8.8 8.8	8.8 8.8	8.8 8.8
	TM [Nm]	- -	- -	- -	- -	- -	- -	- -	8 8	8 8	15 8	20 15	20 20	20 20

Terminal box	Screw size	M4	M4	M4	M4	M6	M6	M6	M8	M8	M10
	Material	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
	TM [Nm]	2.5	2.5	2.5	2.5	4	4	4	7.5	7.5	12.5
Terminal box lid	Screw size	M5	M5	M5	M5	M6	M6	M6	M8	M8	M10
	Material	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	TM [Nm]	1	1	1	1	4	4	4	7.5	7.5	12.5
Terminal mounting	Screw size	M4	M4	M4	M4	M6	M6	M6	M8	M8	M10
	Material	4.8	4.8	4.8	4.8	8.8	8.8	8.8	8.8	8.8	8.8
	TM [Nm]	1.5	1.5	1.5	1.5	4	4	4	7.5	7.5	12.5
Terminal mounting nuts	Screw size	M4	M4	M4	M4	M5	M6	M6	M8	M8	M10
	Material	St	St	St	St	Sm, St	Sm, St	Sm, St	Sm, St	Sm, St	Sm, St
	TM [Nm]	1.8	1.8	1.8	1.8	2.5	4	4	7.5	7.5	12.5

Tolerance for all screw tightening torques: + 10 %.