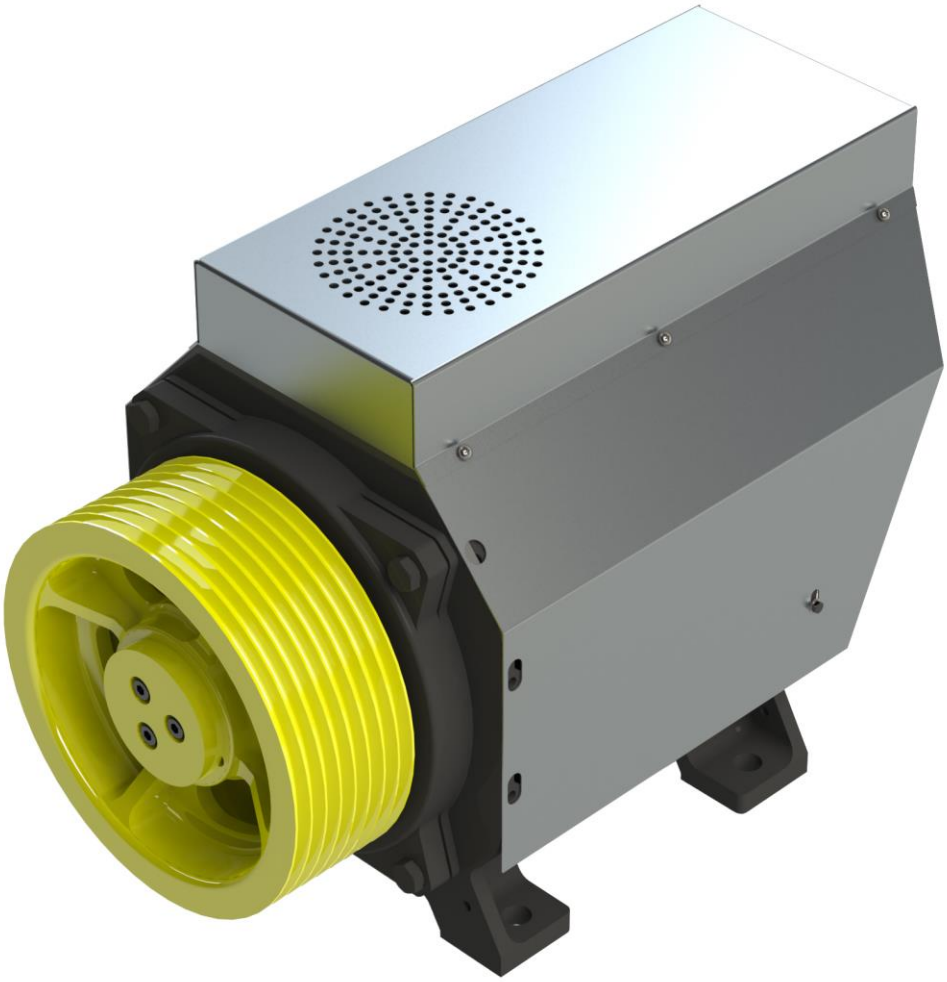
PERMAGSA

GREENSTAR CANTIELEVER



User Guide

V7 - English

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1- GENERAL INFORMATION

1.2 OBJECTIVE

The target of this users guide is provide a little guide with the characteristics of the GREENSTAR and its main components (brake and encoder). This catalogue includes also a guide of mounting, installation and maintenance.

This manual should be read by the people in charge of mounting, installation and maintenance. PERMAGSA takes no responsibility caused by passive attitude on this manual.

1.3 COPYRIGHT

1.4 SAFETY

The mounting, installation, and maintenance of the GREENSTAR machines is only allowed to be done by qualified personnel, following the safety at work regulations and general recommendations.

1.5 CODES AND STANDARDS

These machines are designed to comply European Lift Standards. The motors are designed with insulation class F minimum.

1.6 GREENSTAR

GREENSTAR, the latest generation of synchronous permanent magnet machines for the lift industry, are designed, developed and manufactured under the highest quality standards by Permanent Magnets S.A., known in the market as Permagsa.

GREENSTAR is made using the modular technology. This kind of technology provides the best advantajes at the time of mounting, higth efficiency, cost effective, among others.

Due to the compact desing, the GREENSTAR has the best characteristics for the market:

- Ecofriendly
- Low weight
- Little dimension
- Lowest noise

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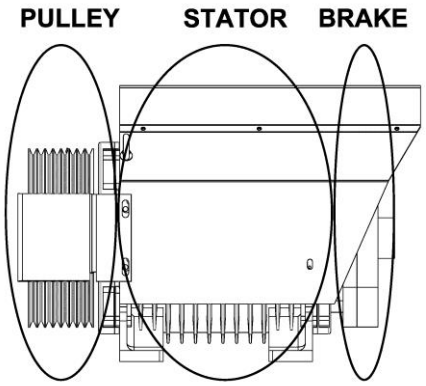
This characteristics together with the high security of the brakes, make the GREENSTAR the ideal machine for elevators without machine room.

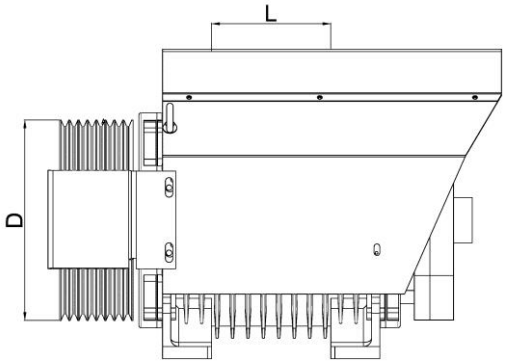
1.7 NOMENCLATURE

To understand the nomenclature of each model of machine, is important to know the structure of PERMAGSA machines (except Home elevator) that is shown in the following picture:



The name of each machine is composed by Gc or GcH letters followed by three numbers and the structure is the following:

Gc-L-W-D



“Gc” Letters:

These letters mean: GREENSTAR CANTILEVER (the general name of the machines). Machine starting with Gc will be 12 pole machine, machine starting GcH, will be 18 pole machine.

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Number "L":

As is shown in the picture, "L" is the length in mm of the stator.

Following PERMAGSA catalogue, L could have these values: 75mm / 150mm / 225 mm / 300mm.

This variable affects proportionally to the nominal torque of the machine.

Number "W":

This number refers to the type of winding of the machines. The value of W is the same as the maximun speed, in r.p.m., that the machine can work.

Number "D":

As is shown in the picture, D is the diameter in mm of the traction pulley.

So for the model GC150-225-210:

Lenght of the stator: 150mm
Máximun speed: 225 r.p.m.
Diameter of the traction pulley: 210mm

Once the name of GREENSTAR CANTILEVER machines is explained, is important to know that all the models of machines (except Home Elevator) have the same distribution, and due to the modular technology that is applied in the construction of the GREENSTAR CANTILEVER machines, the difference between models is the length of the stator.

1.8 FUNCTIONING DESCRIPTION

The objective of the machine is to move and stop the elevator as per the users indications.

The traction pulley and braking system are directly linked to the machine shaft, so that, there is no intermediate union.

The traction method is through the friction between the cables and the grooves of the pulley.

The machine works through a frequency inverter with closed loop that controls aceleration, deceleration and travel speed.

The braking system is a electromagnetic disk brake with two individual coils, NORMAL and EMERGENCY one, acting with compression springs.

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Following the ASME 17.1 regulation, this brake has a NORMAL acting brake, which works in normal operation and EMERGENCY brake, which acts when a emergency stop is required.

1.9 STATIC LOAD

The admissible static load of the machines depends on the length of the machine, as each lengh has specific bearings:

- Stator length $\leq$ 150mm = 1.700kg
- 150 $\leq$ Stator length $\leq$ 225mm = 2.700kg
- 225 $\leq$ Stator length $\leq$ 300mm = 3.500kg
- GcH = 5.000kg

1.10 ENERGY SOURCES

The machine works through a frequency inverter so, the supply voltage will depend on the configuration of the frequency inverter. The rated consumption of the machine is marked in the name plate, so that the frequency inverter should be sized correctly.

The braking system will be feed by voltage of 220 Vdc. For this, it is neccesary to provide an appropriate energy source. See Annex A to find connections scheme. Fan also at 207 Vac.

The cooling system is made by a fan that it is activated through a thermal switch that is activated at 60 ºC.

1.11 OPERATING CONDITIONS

- The drive must be installed in a cabinet or a closed hoistway.
- Be aware of the recommendations explained in this manual.
- Do not operate the machine in an explosive atmosphere.
- The temperature may be within 0ºC and +40ºC
- Maximum permissible humidity 85%.

1.12 CONTRAINDICATIONS TO USE

The machine is designed for use in the conditions explained in the previous points, any other use or working conditions that are not specified in this manual are not allowed, so that the manufacturer will decline any responsibility.

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2- INSTALLATION

2.1 FIXING

Fixing: The fixing of the machine to the lift estructure must be made by four 8.8 class M16 bolts. In order to ensure not to be loosen, LOCTITE 242 must be aplied in the junction between bolt and nut.

Position: It should always be installed in horizontal position. It can be installed, at the top or at the bottom of the elevator shaft.

In the design of the structure of the lift, the load of the machine should be taken into account to ensure a rigid set.

Perpendicularity: The perpendicularity between the motor shaft and the ropes should be maintained in a way that the fleet angle does not exceed 3º, i.e 90º+- 3º. Otherwise, the bearings will suffer big efforts, reducings its lifetime.

Nominal load: Each machine is calculated to move and stop a particular weight, taking into account the duty cycle and the starts per hour. The load is calculated using the following formula, but it is important to know that the duty cycle and the starts per hour must be smaller than the values shown in the name plate:

$$Q = \frac{2 \times T}{9{,}8 \times r \times eff}$$

Where:

Q= Load

T= Nominal torque machine (available in our catalog).

eff= Shaft efficiency

r = Pulley radius

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Speed: The machine is ready to operate the lift in the terms that marks the MIE-AEM.

2.2 WIRING

The electrical connections must be made taking into account the North American Requirements (for the machine, for the brake and for dimensioning of the cables wires).

In Annex A you will find the scheme to make the connections.

In order to avoid any problem due to dV/dt it is required to put the shortest possible cables within the inverter and the machine.

2.3 BRAKE

Brake consists in 2 coils and 2 plates. One of them is used for regular braking and the other one for emergency brake.

In the situation of absence of current the springs push the plate against the disk avoiding the turning of it. As the sheave is united to the brake disk by the shaft, it will remain stopped as well.

When the power supply is connected, the magnetic field generated in the coil attracts the plate, liberating the friction disk.

The displacement of the plates can be monitored employing micro switches.

In Annex A you will find the scheme to make the connections.

See Annex D for brake manufacturers manual.

2.4 ENCODER

These machines are supplied with Heidenhain ECN1313 Endat absolute encoder. The sine/cosine incremental resolution is 2048 pulses per revolution.

See Annex F for mounting instructions.

2.5 SETTINGS

The encoder is the only element that needs to be setup. A electric pole position search must be done, using the magnetic pole as reference. This setup is known as autotunning. For this operation an inverter is needed.

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3- MAINTENANCE

3.1 GENERAL NOTES

- Observe the safety at work regulations.
- The machine is allowed to be opened only by qualified personnel who have been especially trained with regard to this machine.
- Take note of abnormal operating noise.
- The bearings have a lifetime lubrication. There is no possibility to relubricate. Maintenance is not necessary for the bearings.
- Never use a high-pressure cleaner for cleaning the machine.

3.2 SCREW TIGHTENING

At every machine revision, screw tightening must be examined. For that purpose, it must be checked that every screws mark is in its place.

If the mark is not in its place, the screws must completely released. Then LOCTITE 242 must be aplied to them, and finally will be tighened acordding to next table:

LOCATION	SCREW	TORQUE (Nm)
Pulley lock plate	M8 8.8	18.2
Brake	M10 8.8	36
Covers	M12 8.8	62
Machine to base plate	M16 8.8	173

3.3 INSPECTION INTERVALS

It will be biannual and includes the following points:

- Check machine general status, and look if the paint is in good condition, (it has not oxide etc.)
- Check the status of electrical connections, wires should be in good condition, without blows or damaged.
- Check the status of the pulley, look if the wear of the grooves is not excessive.

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- Check the bolts that fix the machine to the base plate, and the base plate with the chassis of the elevator are tight enough (see table in 3.2).

4- TROUBLE SHOOTING

Fault	Causes	Solution
Running noise or vibration	Bearing defective	Contact Permagsa
	Wrong VVVF settings	Check VVVF settings
	Bad grounding	Check that ground is good
	Bad encoder feedbacks	Check encoder wire / Check grounding and shielding
	Defective encoder	Replace the encoder
Excessive temperature	Fan wrong settings	Check fan settings
	Wrong VVVF settings	Check VVVF settings
Machine will not start	Machine phases incorretly connected	Check machine connection
	Wrong VVVF settings	Check VVVF settings
	Defective VVVF	Check VVVF
	Incorrect encoder wiring	Check encoder wire
	Loose encoder mounting	Tighten encoder screws
	Brake doesn`t work	See brake faults
Electrical shocks	Bad grounding	Check that ground is solid
	Broken cable insulation	Replace cable
Brake does not release	Brake control defective	Check brake settings
	Brake coil defective	Contact Permagsa