Fact Sheet | VLT® AutomationDrive FC 302

Protect the application and optimize performance with the Power Limit function

Prevent
blackouts in the event of a generator trip

A power limit function limits the power distributed to the motor. One of the most common use cases for a power limit functionality is on isolated grids in marine applications, such as winches and thrusters. However the functions also useful in many other types of applications.
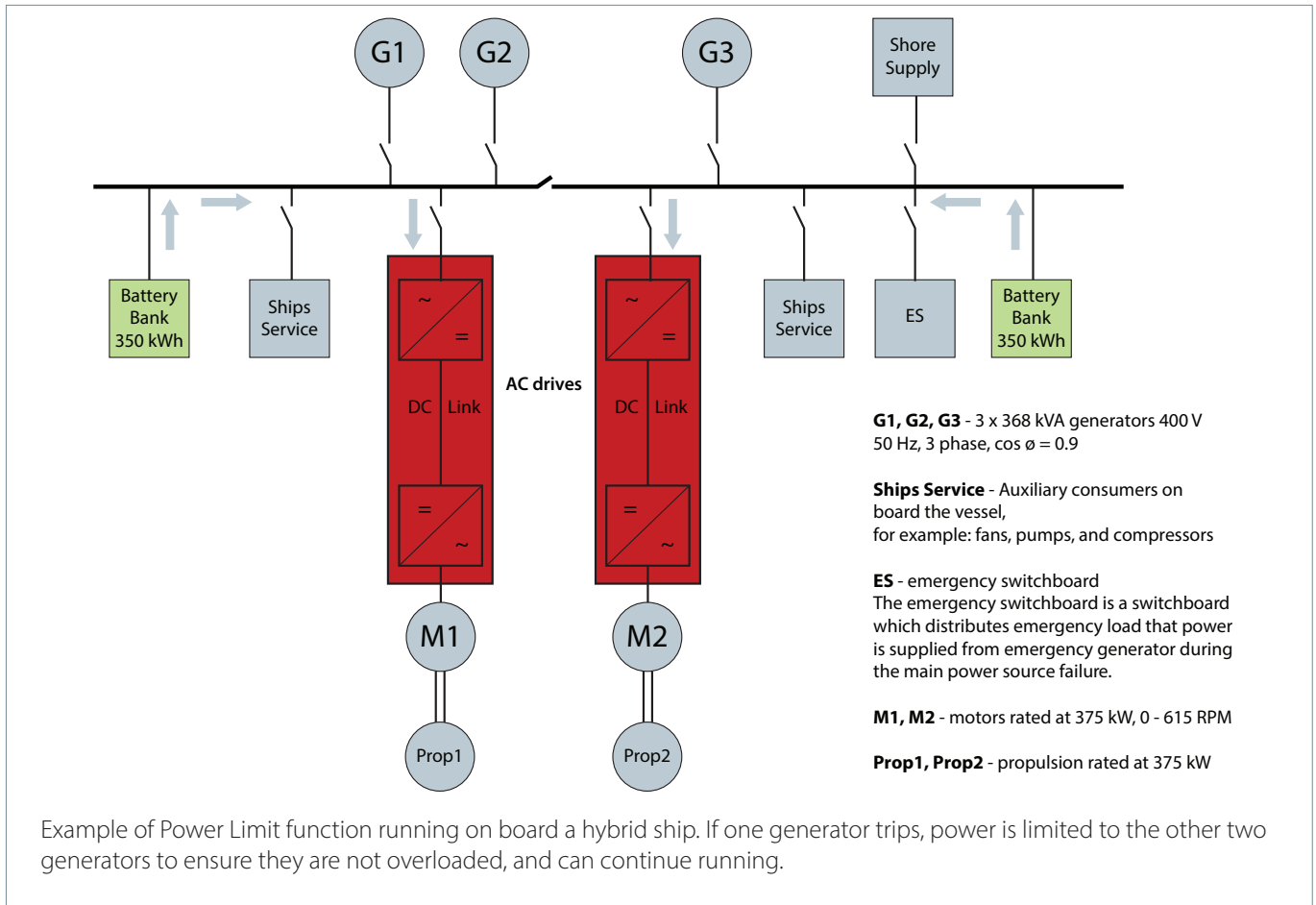
On board a ship at sea, the mains power is always supplied from a generator system. Often, several generators supply the total electrical load on the ship.

If one of these generators trips, the total power requirement can no longer be met.

To ensure availability of critical parts of the application, apply a limit to the power consumption. In the event of a generator trip this limit keeps the application running reliably, because the power level is constantly kept within the defined limits and prevents motors from exposure to instant overload.

Power limit function usage:

■ Typically for use on isolated grids, e.g. marine application

■ Triggered by power management systems

■ Avoid black-out: To avoid risk of overloading generators (motoric), the function reduces the speed to reduce the total load of generators

Example of Power Limit function running on board a hybrid ship. If one generator trips, power is limited to the other two generators to ensure they are not overloaded, and can continue running.

G1, G2, G3 - 3 x 368 kVA generators 400 V 50 Hz, 3 phase, cos ø = 0.9

Ships Service - Auxiliary consumers on board the vessel, for example: fans, pumps, and compressors

ES - emergency switchboard
The emergency switchboard is a switchboard which distributes emergency load that power is supplied from emergency generator during the main power source failure.

M1, M2 - motors rated at 375 kW, 0 - 615 RPM

Prop1, Prop2 - propulsion rated at 375 kW

How it works

VLT® drives feature the Power Limit function, to limit the motor power distributed to the motor when required (Power Limit Motor Mode) Generative power can be limited either as

- Power fed back in to the mains supply: Active Front-end (AFE), or
- Power fed to a brake resistor (Power Limit Generator Mode)

The general way to do this is to give a limiting signal from a primary system that activates the Power Limit function.

- Designed for Flux open loop or closed loop
- Can be used for all motor types with flux control core (ASM-PM)

- Can be used generatoric as well: In generator mode the motors, running generatoric, are allowed to run at faster speed, to limit the power feed-back to common DC-link or brake resistor. (e.g. winches)

Power limitation can be activated and used in the following modes:

- Power limit always active (enabled)
- Power limit only when activated

To activate the power limit, use Digital input or Fieldbus Control word.

To adjust the power limit level, use Analog input and/or Fieldbus PCD channel.

Torque [Nm]=Power [W] / Speed [rad/sec]

- Fixed Power $\longrightarrow$ variable torque
- Reduced power $\longrightarrow$ reduced speed (Motor mode)

Commissioning

The basic settings for the power that needs to be limited can be programmed via parameter settings. When Power Limit is active, P4-82 Power Limit Motor Mode and P4-83 Power Limit Generator Mode are used as limits. The drive then calculates the required torque levels to achieve a power limitation for motor/generator operation.