



Power mode synchronization upgrade

A software upgrade for synchronous operation of propulsion drives in rough sea mode

Synchronizing software upgrade

“Rough sea mode” is a unique power control mode of GE Power Conversion drives and is used to avoid power variations due to torque variation of the propeller during bad weather conditions. Depending on the vessel design this power control mode will automatically be activated in any of the drives and the same mode will be activated in all other drives consecutively and then it will be de-activated when the drives fulfill a reset condition. The information will be displayed on the HMI workstation.

Measurements taken to activate the rough sea mode during bad weather conditions could be also slightly different. Hence one side (port side) may be more sensitive than the other (starboard side). This may create recurrence of this mode and delay the deactivation. Thus, it may affect the synchronized operation of propulsion drives. GE’s **Power mode synchronization upgrade** could avoid the recurrence and synchronize both shaft lines automatically.

Example conditions to get into rough sea mode

- The frequency of power variation is significant.
- The speed reference has not been modified for 3mins.
- The propulsion speed is greater than 60%.

Example reset conditions

- Speed variation on one shaft lines or propulsion speed is lower of 50%

Benefits

- Ensure the power mode is well synchronized between both shaft line.
- Improve the stability of the main network in case of bad weather.

11/28/16 11:19:27	PORT HD2	SPEED	Boat Rough sea mode	Rough sea mode deactivated on Port	Log 0
11/28/16 11:19:27	PORT HD1	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:21:34	PORT HD2	SPEED	Boat Rough sea mode	Rough sea mode activated after 2 minutes Port	Log 1
11/28/16 11:21:34	PORT HD1	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:21:49	PORT HD2	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:21:50	PORT HD1	SPEED	Boat Rough sea mode	All Rough sea mode deactivated - both lever moved	Log 0
11/28/16 11:22:00	STBD HD2	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:22:01	STBD HD1	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:34:48	PORT HD1	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:34:50	STBD HD2	SPEED	Boat Rough sea mode	All Rough sea mode activated at the same time, detected by Port HD1	Log 1
11/28/16 11:34:50	STBD HD1	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:34:50	PORT HD2	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:35:00	STBD HD2	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:35:09	STBD HD1	SPEED	Boat Rough sea mode	Rough sea mode deactivated on Stbd	Log 0
11/28/16 11:37:12	STBD HD2	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:37:14	STBD HD1	SPEED	Boat Rough sea mode	Rough sea mode activated after 2 minutes Stbd	Log 1
11/28/16 11:37:26	STBD HD2	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:37:26	PORT HD2	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:37:27	STBD HD1	SPEED	Boat Rough sea mode	All Rough sea mode deactivated - both lever moved	Log 0
11/28/16 11:37:27	PORT HD1	SPEED	Boat Rough sea mode		Log 0
11/28/16 11:39:55	STBD HD1	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:39:56	PORT HD2	SPEED	Boat Rough sea mode		Log 1
11/28/16 11:39:58	STBD HD2	SPEED	Boat Rough sea mode	All Rough sea mode activated at the same time, detected by Stbd HD1	Log 1
11/28/16 11:39:58	PORT HD1	SPEED	Boat Rough sea mode		Log 1

Portside is more sensitive than starboard side, hence recurring of rough sea mode happens

11/30/16 07:25:46	AMC PLS	PLS	circuit breaker Generator 7 closed		Log 1
11/30/16 08:09:57	AMC PLS	PLS	circuit breaker Generator 4 closed		Log 1
11/30/16 09:53:56	PORT HD1	SPEED	circuit breaker Generator 2 closed		Log 1
11/30/16 09:53:57	PORT HD2	SPEED	Boat Rough sea mode	Rough sea mode activated on all drives - detected by Port HD1	Log 1
11/30/16 09:53:59	STBD HD1	SPEED	Boat Rough sea mode		Log 1
11/30/16 09:54:00	STBD HD2	SPEED	Boat Rough sea mode		Log 1

11/30/16 18:25:13	STBD HD2	SPEED	Boat Rough sea mode		Log 0
11/30/16 18:25:14	PORT HD2	SPEED	Boat Rough sea mode	All rough sea mode deactivated	Log 0
11/30/16 18:25:17	PORT HD1	SPEED	Boat Rough sea mode		Log 0
11/30/16 18:25:17	STBD HD1	SPEED	Boat Rough sea mode		Log 0
11/30/16 19:42:46	PORT HD2	SPEED	Boat Rough sea mode		Log 1
11/30/16 19:42:49	STBD HD2	SPEED	Boat Rough sea mode		Log 1
11/30/16 19:42:49	STBD HD1	SPEED	Boat Rough sea mode	All rough sea mode activated at the same time, detected by Port HD2	Log 1
11/30/16 19:42:49	PORT HD1	SPEED	Boat Rough sea mode		Log 1
12/01/16 00:21:50	PORT HD2	SPEED	Boat Rough sea mode		Log 0
12/01/16 00:21:51	STBD HD1	SPEED	Boat Rough sea mode		Log 0
12/01/16 00:21:52	STBD HD2	SPEED	Boat Rough sea mode	All rough sea mode deactivated	Log 0
12/01/16 00:21:52	PORT HD1	SPEED	Boat Rough sea mode		Log 0
12/01/16 00:25:20	AMC PLS	PLS	circuit breaker Generator 5 closed		Log 0

Synchronized operation of both shaft lines (port & starboard) after software upgrade

Salient points

- It is applicable to all drives that do not have this function already implemented.
- Field Service Engineer (FSE) completion time at site will be appx 1 FSE for 2 days / vessel depending on site conditions.
- GE recommends to implement this improvement during the next drydock.

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GE offers bespoke service support in the form of spares and replacement parts, onsite and remote technical support, maintenance services, upgrades, customized trainings and service agreements aimed at supporting customers based on their unique needs.

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