



KONGSBERG

Operator Manual

MGC[®] COMPASS

Gyro Compass - R-series



Company shared



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Document history

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Rev. 1	November 2015	First issue.
Rev. 2	January 2017	MGC R2 product included in this manual.
Rev. 3	May 2019	Updated Operating instructions chapter. Added description of MGC-E-JB6 connection box.
Rev. 4	January 2021	Updated to correspond with renewed IMO type approval certificate and JB7 junction box.
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Rev. 6	March 2023	Added Switch Over Unit functionality and Changing operation mode for DP operations.
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Document information

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- Document: Operator Manual
- Document part number: MGC-D-104/408706
- Revision: 7/G

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Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.

Kongsberg Discovery disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Disclaimer

Kongsberg Discovery AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Support information

If you require maintenance or repair, contact Kongsberg Discovery's support organisation. You can contact us using the following address: support.seatex@kd.kongsberg.com. If you need information about our other products, visit <http://www.kongsberg.com/discovery>.

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About this manual

Purpose of manual

The purpose of this manual is to provide the descriptions and procedures required to allow for safe and efficient use of the MGC® COMPASS.

This manual is a reference book, and as such it is *not* intended for sequential reading. Use the table of content, the index, the search functionality as well as the interactive links to seek out the information you need when you need it.

Target audience

This publication is intended for navigators and other personnel working on the bridge.

License information

The MGC product requires an export license.

Software version

This manual and the IMO (International Maritime Organisation) type approval apply to the MGC JB7 Junction Box software version 1.00.xx, the MRU software version 5.06.xx and the MRC+ version 5.08.xx.

Registered trademarks

MGC® is a registered trademark in Norway and Europe.

Maintenance purposes

This publication is also intended as reference material for the maintenance personnel. Keep this publication for later use.

MGC® COMPASS

Topics

[System description, page 6](#)

[System diagram, page 7](#)

[Product restrictions, page 8](#)

[Network security, page 9](#)

[Support information, page 10](#)

System description

The MGC® COMPASS consists of the MGC Sensor Unit and the MGC JB7 Junction Box.

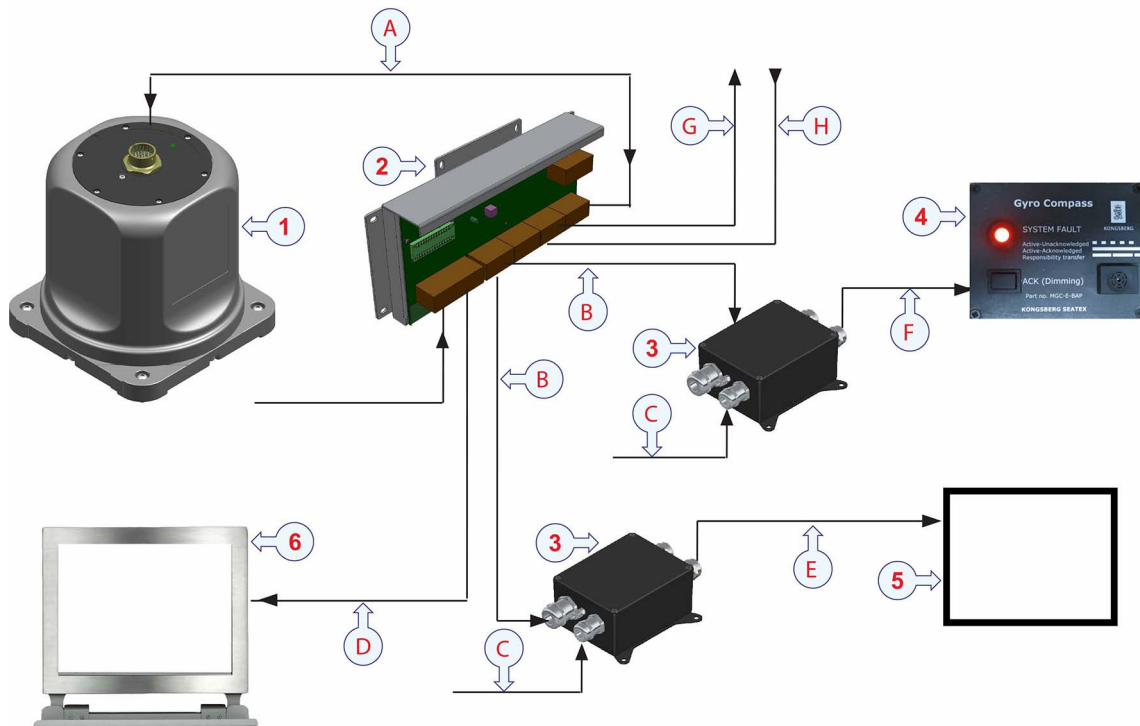
The MGC® COMPASS is type approved by IMO (International Maritime Organisation) as a gyro compass for navigation purposes. It can be used together with a heading and bearing repeater.

The MGC® COMPASS can also be operated as an inertial navigation system. Then it will output position and heading. Linear position and velocity measurements can be output in up to four different points on the vessel.

Special arrangements have been made with regard to mounting of the unit. This makes it easy to align the unit with the vessel axis.

System diagram

The system diagram identifies the main components of a basic MGC® COMPASS system.



Main units

- 1 MGC Sensor Unit
- 2 MGC JB7 Junction Box
- 3 MGC JB5 repeater Junction Box
- 4 Bridge Alert Panel
- 5 Data receivers: Heading and bearing repeaters
- 6 Computer with web and MRC+ configuration software

Cables

- A Sensor Unit cable (MRU-E-CS8)
- B Repeater data cable
- C Power cable (24 V DC)
- D Ethernet cable (shielded)
- E Data receiver data cable
- F Bridge Alert Panel data cable
- G Data output cable for NMEA messages
- H Data input cable for NMEA messages

Product restrictions

Topics

[Restrictions in export, page 8](#)

[Restrictions in guarantee, page 8](#)

Restrictions in export

Export of the MGC component requires an export license.

Important

Notice to customer/importer/end user.

The MGC specified here is shipped from Norway in accordance with the Ministry of Foreign Affairs' Official Notification on Export Control and U.S. Export Administration Regulations (EAR).

The MGC will be subject to restrictions if re-exported from your country, including but not limited to a re-export license from the US Government.

Restrictions in guarantee

Changes or modifications to the product not explicitly approved by Kongsberg Discovery AS will void the guarantee.

The liability of Kongsberg Discovery AS is limited to repair of this product only under the given terms and conditions stated in the sales documents. Consequential damages such as customer's loss of profit or damage to other systems traceable back to this product's malfunctions, are excluded.

The warranty does not cover malfunctions of the product resulting from the following conditions.

- The Sensor Unit is not shipped in the original transportation box.
- The Sensor Unit has been exposed to extreme shock and vibrations.
- The Sensor Unit housing has been opened by the customer.
- Incorrect power connection.

Network security

If the MGC® COMPASS product is connected to a local area network, data security is important.

Equipment manufactured by Kongsberg Discovery is often connected to a local area network (LAN). When you connect a computer to a local area network you will always expose the data on that computer. All the other computers connected to the same network may be able to access your data. Several threats are imminent:

- Remote computers can read your data.
- Remote computers can change your data.
- Remote computers can change the behavior of your computer, for example by installing unwanted software.

Usually, two parameters are used to define the threat level:

- 1 The likelihood that any remote computer will do any of the above.
- 2 The damage inflicted if a remote computer succeeds doing any of the above.

Kongsberg Discovery has no information about your complete system installation. Products provided by Kongsberg Discovery are always regarded as stand-alone offline systems. They are regarded as stand-alone even though they may be connected to a local area network for sensor interfaces or data distribution.

Note

No network safety applications are installed on Kongsberg Discovery computers. The computer is not protected against viruses, malware or unauthorized access by external users.

Securing the MGC® COMPASS system has no meaning unless you have established a policy that secures all the computers on the network. This policy must include physical access by trained and trusted users. The customer or end user of the MGC® COMPASS system is responsible for defining and implementing a security policy and providing the relevant network security applications.

Note

Kongsberg Discovery will not accept any responsibility for errors or damages caused by unauthorized use of or access to the MGC® COMPASS system.

Support information

If you need technical support for your product you must contact a Kongsberg Discovery office. A list of all our offices is available on our website.

- **Company name:** Kongsberg Discovery AS
- **Address:** Havnegata 9, N-7010 Trondheim, Norway
- **Telephone:** +47 33 03 41 00
- **Telephone, global 24h support:**
 - Europe, the Middle East and Africa: +47 33 03 24 07
 - Asia Pacific: +65 97 11 24 07
 - Americas: +15 04 303 5244
- **E-mail address:** support.seatex@kd.kongsberg.com
- **Website:** <http://www.kongsberg.com/discovery>

KM-Support App

Kongsberg Discovery support is also available in the KM-Support App. Our support application is available for free in the App Store and Google Play.

Operation

Topics

[Turning on the MGC® COMPASS system, page 11](#)

[Turning off the MGC® COMPASS system, page 12](#)

[Operating modes, page 13](#)

[System alerts, page 14](#)

[Bridge Alert Panel alert modes, page 15](#)

[Operating procedures, page 15](#)

Turning on the MGC® COMPASS system

Turn on the MGC® COMPASS system in order to start using the system for operational purposes.

Prerequisites

You have installed the unit according to the procedures in the *MGC COMPASS Installation Manual*.

The latitude must be known to the unit at start-up.

Context

The system is turned on when the MGC JB7 Junction Box is connected to a power source. The system will start automatically after power has been applied.

After the initialization phase the heading accuracy is normally approximately 0.5 degrees. Assuming correct latitude and velocity input. The MGC then enters the alignment phase. After approximately 8 to 30 minutes full accuracy is achieved, depending on MGC Sensor Unit model.

Note

Settling to optimal heading accuracy can take longer than the specified time if the unit is exposed to high accelerations at start-up. For a fast settling of heading, start-up in harbour is recommended. However, under most conditions the heading accuracy will be within 1 degree during five to ten minutes from power-on.

Procedure

- 1 Make sure that the Sensor Unit cable is connected between the MGC JB7 Junction Box and the Sensor Unit.
- 2 Apply power to the MGC JB7 Junction Box.
The Sensor Unit receives power through the MGC JB7 Junction Box. The unit starts automatically when it receives power and it will remain in operation as long as it is powered.
- 3 Observe that the LED on top of the Sensor Unit flashes green and that the unit generates a humming sound.
- 4 Make sure that the latitude is known to the Sensor Unit at start-up. Either by GNSS (Global Navigation Satellite System) latitude input, for example NMEA (National Marine Electronics Association) GLL or GGA, or by an accurate manual configuration of the latitude.
- 5 From start-up and until the Sensor Unit reaches full accuracy, the unit goes through three phases:
 - **Initialization:** This phase lasts for four to ten minutes. Normally four to five minutes.
 - **Alignment:** This phase lasts for approximately 8 to 30 minutes from power-on, depending on the MGC model.
 - **Fully operational:** This is the normal state.
- 6 Leave the unit with power on.
Once the unit is installed, there is no need for manual intervention during operation.

Turning off the MGC® COMPASS system

The system is normally left running after it has been started. Should the system units be in need of maintenance, they must be turned off.

Context

If the power to the system is interrupted, the system will stop automatically in a controlled way. The configuration for the Sensor Unit and the MGC JB7 Junction Box will be stored on the MGC JB7 Junction Box while the system does not receive power.

Procedure

- To turn off the system, disconnect the power to the MGC JB7 Junction Box.

Operating modes

The MGC product can operate in two modes.

AHRS mode

The gyrocompass calculates the IMO (International Maritime Organisation) certified heading output by the AHRS (Attitude and Heading Reference System) mode algorithm. In this mode input of speed and latitude are required to obtain full accuracy. For speed input NMEA (National Marine Electronics Association) VTG or VBW can be used. For position input NMEA GLL or GGA can be used. External time input is also required (NMEA ZDA) in order to correctly time tag alerts from the gyro compass. In AHRS mode the product will output accurate heading, roll, pitch and heave.

If operating at a constant latitude, and GNSS (Global Navigation Satellite System) latitude is unavailable, a (accurate) manual configuration of the latitude can be used.

Inertial navigation mode

In this mode input of latitude, longitude, height and time from a GNSS (Global Navigation Satellite System) receiver is required. Input of NMEA (National Marine Electronics Association) VTG, GGA and ZDA is required at a rate of 1 Hz. In this mode the MGC operates as an inertial navigation system. This mode requires that the MGC is time synchronized with the external input source by a PPS (pulse-per-second) signal from the GNSS receiver or by using an NTP server. In addition, velocity input (NMEA VTG or VBW) is required for the IMO (International Maritime Organisation) certified heading output provided by the gyro compass.

Note

The inertial navigation mode algorithm runs in addition to the gyro compass algorithm (AHRS mode). The inertial navigation mode orientation solution is available from the MGC as the roll, pitch and yaw variables.

Related topics

[Configuration changes, page 32](#)

System alerts

The MGC® COMPASS alerts are according to the IEC 62923:1 and IEC 62923:2 standards. According to these standards a gyro compass can issue a single alert, which is a warning.

Warning identifier 3062 System fault description

- **Alert category:** B
- **Alert priority:** W
- **Alert identifier:** 3062
- **Alert title:** System fault

Multicast group description

The MGC JB7 Junction Box can handle the following multicast groups for alerts and IEC 61162-450 data communication.

The MGC JB7 Junction Box can also be controlled by serial interface COM 4.

- **SADT 239.192.0.2/60003:** Used for Heading-updates (THS and HDT) messages.
- **BAM1 239.192.0.17/60017:** Used for alert communication to CAM. Installer may configure BAM1 or BAM2.
- **BAM2 239.192.0.18/60018:** Used for alert communication to CAM. Installer may configure BAM1 or BAM2.
- **CAM1 239.192.0.19/60019:** Used for alert communication from CAM. Installer may configure CAM1 or CAM2.
- **CAM2 239.192.0.20/60020:** Used for alert communication to CAM. Installer may configure CAM1 or CAM2.
- **SRP 239.192.0.56/60056:** Used for reporting the MAC address of the equipment.

Related topics

[Acknowledging alerts, page 18](#)

Bridge Alert Panel alert modes

Alerts are sent to the CAM (Central Management System) either by serial line or network connection.

The Bridge Alert Panel has the following alert modes:

- **No error/cleared alert:** No visual indication and no sound.
- **Active alert:** The lamp will start to flash and two beeps will sound. If the alert is not acknowledged within one minute, the beeps will be repeated.
- **Acknowledged active alert:** No sound. The lamp will be constantly lit.
- **Unacknowledged active alert:** No sound. The lamp will be constantly lit.
- **Responsibility transfer:** Intermittent steady light.

The CAM could issue a silence command. This will delay any pending acoustic signals for up to 30 seconds.

Related topics

[Setting light intensity on Bridge Alert Panel lamp, page 19](#)

Operating procedures

Topics

[About system operation, page 15](#)

[Connecting to the web interface, page 16](#)

[Changing operation mode for DP operations, page 17](#)

[Acknowledging alerts, page 18](#)

[Setting light intensity on Bridge Alert Panel lamp, page 19](#)

About system operation

The MGC® COMPASS does not require a lot of operation from the operator. Turn it on and leave it running. The system will output data on serial and/or LAN according to the default configuration or the configuration settings you have made to suit your operation.

Changes to the configuration is done through the MGC JB7 Junction Box web interface.

Related topics

[Connecting to the web interface, page 16](#)

Connecting to the web interface

You must set up certain parameters in order to get a working MGC® COMPASS system. The configuration of the Sensor Unit is done through the MGC JB7 Junction Box web interface on an external computer.

Prerequisites

An external computer. Make sure that the external computer is in the same network range as the junction box.

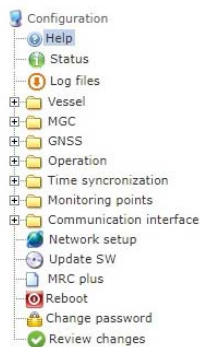
Set up the external computer to use local area connection.

Context

The default IP address for the MGC JB7 Junction Box is: 172.21.35.220. The external computer must be set up with an IP address in the range 172.21.35.xxx, where xxx may be 100. The network mask is 255.255.255.0.

The network settings in this procedure is for a Windows 10 operating system.

JB7 Configuration - (none)



Procedure

- 1 Connect an Ethernet cable between the external computer and LAN 1 on the junction box.
- 2 On the external computer, select **Control Panel** → **Network & Internet** → **Network Sharing Centre**
- 3 Under active networks, select the active network under **Connections** and select **Properties** in the network Status dialog box.
- 4 Select **Internet Protocol Version 4 (TCP/IPv4)** → **Properties**.
- 5 Select **Use the following IP address** and type an IP address in the same range as the junction box, for example 172.21.35.100.
- 6 Type the subnet mask: 255.255.255.0
- 7 Select **OK** and exit network settings.
- 8 Open a browser and type the default IP address of the junction box in the address bar.

- 9 Type the default login credentials for **User**: j**b**7.
- 10 Type the default login credentials for **Password**: 1234.
- 11 Select **OK**.

The web interface with the configuration menu appears in the display.

Related topics

[About system operation, page 15](#)

[Changing operation mode for DP operations, page 17](#)

[About Switch Over Unit functionality, page 20](#)

[Updating the system software, page 45](#)

[Creating a backup of the system configuration, page 46](#)

[Inspecting the system status, page 47](#)

[Replacing the MGC JB7 Junction Box, page 49](#)

Changing operation mode for DP operations

When the MGC® COMPASS is used at the same time as DP operations are ongoing, it is recommended to disable automatic input of speed and latitude from GNSS and to change the MGC operation mode from *AHRS* to *Manual* mode.

Prerequisites

This procedure is done in the MGC JB7 Junction Box web interface.

Context

In *Manual* mode the speed is set to zero and the latitude is set to the region in which you operate.

Systems with more than one MGC® COMPASS installed

Vessels which have more than one MGC COMPASS interfaced to the DP system, need to reconfigure all MGC COMPASS units to *Manual* mode before they enter into the DP zone.

For a gyro system with two or three MGC COMPASS units connected through the Switch Over Unit functionality, it is sufficient to change the configuration on the **Master** gyro to *Manual* mode before entering into the DP zone. The other MGC COMPASS products in the gyro system will automatically be reconfigured to the changed configuration of the **Master** gyro.

See [Changing operation mode, page 39](#) on how the mode can be changed by use of the MGC SOU display.

Important

When you leave the DP zone and for transit, the MGC COMPASS unit(s) must be set back to **Mode 0** (*AHRS* mode) or **Mode 1** (*INS* mode). The same procedure applies.

Procedure

- 1 Enter the **Configuration** menu → **Operation** → **Operation**.
- 2 Type **3** in the **Mode** box.
- 3 Type the latitude in degrees for the operating region in the **LATITUDE** box.
There must be 8 decimals after the decimal point (dot).

- 4 Select **Review changes** and **Apply changes** to save your settings.

Note

The latitude in degrees is converted to radians before it is downloaded to the MGC Sensor Unit.

The MGC Sensor Unit will now restart. It will take a few minutes before the heading is accurate.

Related topics

[Connecting to the web interface, page 16](#)

[Changing operation mode, page 39](#)

Acknowledging alerts

Alerts are sent to the CAM (Central Alert Management) either by serial line or network connection.

Context

If the alert condition is corrected, the alert changes from an active state to a cleared state. There are three ways an alert can be acknowledged in this system.

Procedure

- 1 The CAM (Central Alert Management) system issues a command to acknowledge an alert.
- 2 Press the **ACK** button on the Bridge Alert Panel to acknowledge an alert.
- 3 Press the **BUS** button in the MGC JB7 Junction Box to acknowledge an alert.

Related topics

[System alerts, page 14](#)

Setting light intensity on Bridge Alert Panel lamp

Context

You can adjust the light intensity of the alert lamp on the Bridge Alert Panel.

The light intensity level for each light mode can be adjusted in the MGC JB7 Junction Box.

Procedure

- 1 Press and hold the **ACK (Dimming)** button on the Bridge Alert Panel for more than three seconds.
The light will be turned on and start to alternate between day, dusk and night mode.
- 2 Release the button when the wanted light intensity level is reached.
If there is an alert, the lamp will light up with the intensity level you set.



Related topics

[Bridge Alert Panel alert modes, page 15](#)

Switch Over Unit functionality

Topics

[About Switch Over Unit functionality, page 20](#)

[Gyro modes and states, page 23](#)

[User interface, page 24](#)

[Operating procedures, page 15](#)

[User preference procedures, page 40](#)

[Troubleshooting SOU, page 43](#)

About Switch Over Unit functionality

You can have several gyros connected to your system. One of those gyros will be the Master gyro and the others Slave gyros. If the Master gyro for some reason should fail, the Switch Over Unit functionality will cause the system to switch over to the next Slave gyro, which then will become the Master gyro. Thus, the system output will not stop if one gyro should fail and you are guaranteed continuous operation.

The Switch Over Unit functionality is implemented to increase the heading availability through adding redundancy. When two or more Motion Sensor and Gyro Compass (MGC) units are set up with the Switch Over Unit functionality, they are regarded as one gyro system.

If all gyros in the system fails, a BAM alert is generated. Only warnings can be generated.

The Switch Over Unit functionality is hosted in the JB7 Junction Box. Each MGC has a JB7 Junction Box connected. The MGC and the JB7 Junction Box are referred to as one gyro.

The MGC Sensor Unit is connected to the JB7 Junction Box via LAN through the Sensor Unit cable from the MGC. Each JB7 Junction Box is interconnected. This connection is essential for the SOU functionality.

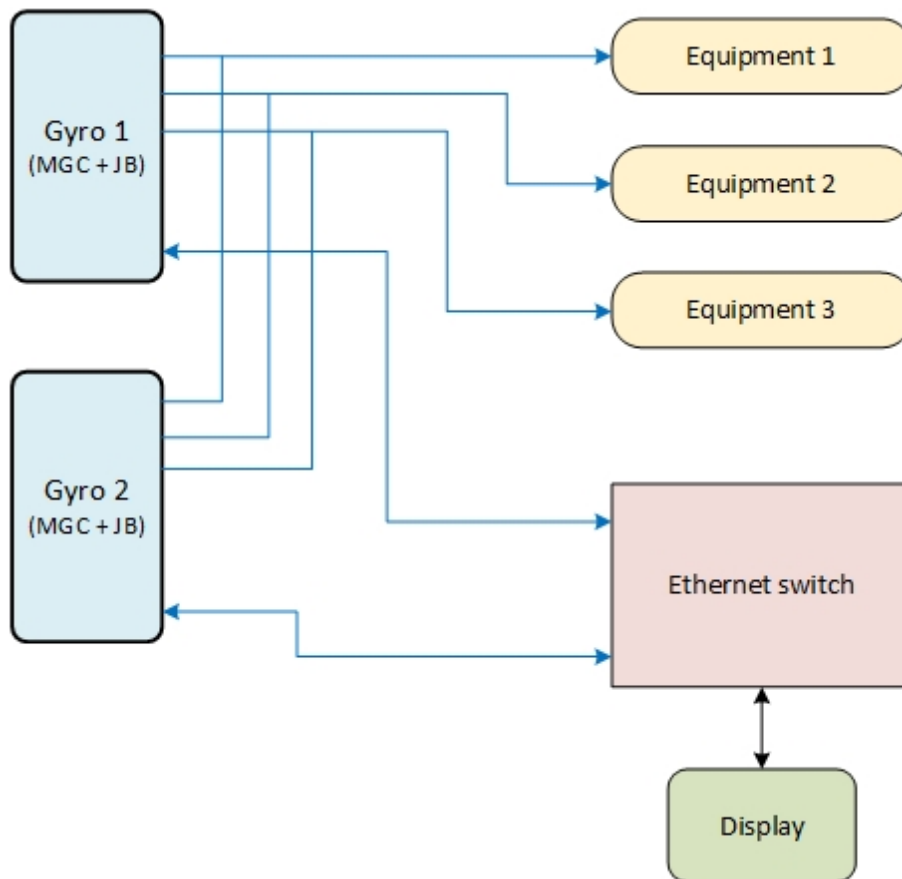
The JB7 Junction Box has a web interface. When connecting to the web interface, the web browser automatically receives information on the IP (internet protocol) addresses to the other JB7 Junction Boxes in the system.

You can monitor the status of the MGC from the web interface. The web interface can be displayed in the 7" Multi Function Display (MFD) or another system in the same IP range.

The default IP addresses for the JB7 Junction Box and how you connect to the web interface, can be found in this document.

The IP address for the JB7 Junction Box configuration is: [IP address]/JB7.

The IP address for the Switch Over Unit operation is: [IP address]/SOU.

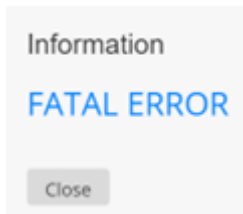


Failing gyros

If one gyro should fail, for example due to missing power, another gyro will take over. In this example GYRO 1, which was the Master, has failed. GYRO 2 has taken over and will now become the Master gyro. This is indicated with a blue rectangle.

Unit	HDG (°)	ROT (°/min)	Info
GYRO 1	009.0	1.8	
GYRO 2	205.3	1.6	
GYRO 3	176.6	-0.3	

An **Info** symbol will be displayed for GYRO 1. You can select this symbol to see more information about the error situation for GYRO 1.



If both GYRO 1 and GYRO 2 should fail, GYRO 3 will become the Master gyro. No alert indication is given until GYRO 3 should fail.

Unit	HDG (°)	ROT (°/min)	Info
GYRO 1	173.6	1.6	
GYRO 2	065.8	-0.1	
GYRO 3	044.7	-0.5	

Related topics

[Connecting to the web interface, page 16](#)

Gyro modes and states

The gyros (MGC and JB7 Junction Box) can be in two different modes.

Auto mode

In **Auto** mode the gyros have two states, **Master** and **Slave**.

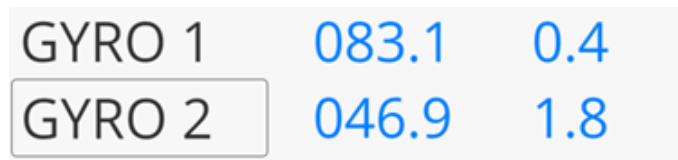
The **Master** gyro distributes data to clients. For example heading repeaters and displays. In **Auto** mode the **Master** gyro is indicated with a blue rectangle. Other connected gyros are **Slaves**. The **Slaves** do not distribute data to clients.



Unit	HDG (°)	ROT (°/min)	Info
GYRO 1	005.0	0.9	
GYRO 2	225.4	1.9	
GYRO 3	104.0	1.3	

Manual mode

In **Manual** mode data are distributed by the manually selected gyro. Other gyros are in this case disabled. In **Manual** mode the gyro is surrounded by a line.



GYRO 1	083.1	0.4
GYRO 2	046.9	1.8

The gyro mode is also indicated on the **BUS** button in the Junction Box. This button also functions as a lamp which shows the gyro's state and mode.



BUS lamp colour	Indication	Mode
Constantly lit green	Master	Auto
Flashing green (alternating green/not lit)	Slave	Auto
Long green flash (short period unlit)	Selected	Manual
Unlit	Disabled	Manual
Red	Error	

User interface

Topics

Display organisation, page 24

Top bar description, page 25

SOU Status page, page 27

SOU Control page, page 28

Heading page, page 29

Internal Status page, page 30

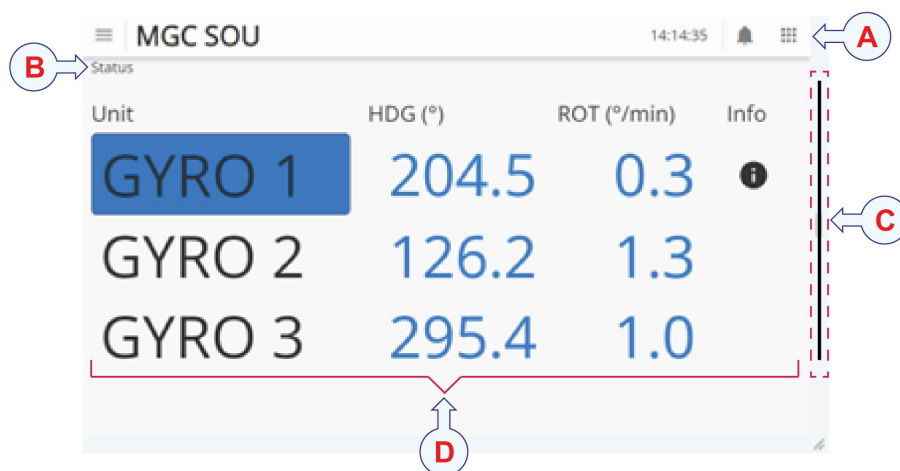
External Status page, page 31

Configuration changes, page 32

Bridge Alert Management (BAM) alert symbols, page 33

Display organisation

The display has a top bar which is always visible. The display has five pages. The **SOU Status** page, the **SOU Control** page, the **Heading** page, the **Internal Status** page and the **External Status** page. Which page you are on, is indicated in the top left of the display. The centre area of the display shows status information about the gyros connected to the system. The right edge of the display holds the brightness slider.





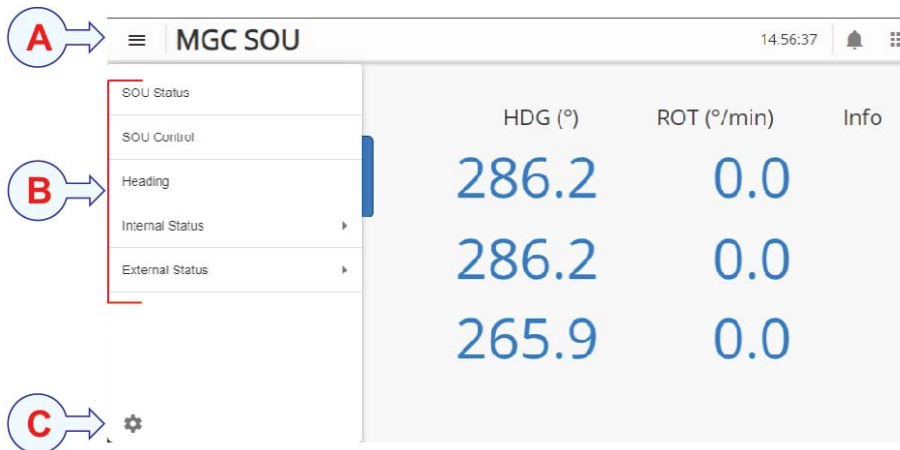
A Top bar

B Page indication

C Brightness slider

D Gyro status information area

The menu symbol, , on the top bar holds the page selection and the Configuration change symbol, . Select the Configuration change symbol to enter the display configuration.



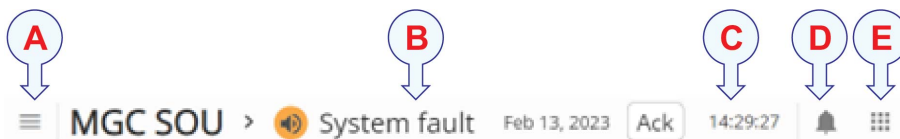
- A *Menu symbol*
- B *Pages*
- C *Configuration change symbol*

Related topics

[Top bar description, page 25](#)


Top bar description


The top bar is located at the top of the display. It is always visible.



- A *Menu symbol*
- B *BAM alert*
- C *Time indicator*
- D *Alert symbol*
- E *Palette selection*

Menu symbol

The display has five pages. **SOU Status**, **SOU Control**, **Heading**, **Internal Status** and **External Status**. Select the menu symbol, , to switch between the pages.


The menu symbol also holds the Configuration change symbol, . Selecting this symbol allows you to change the configuration of a specific gyro. Only gyros in **Slave** state can be selected.

Time indication

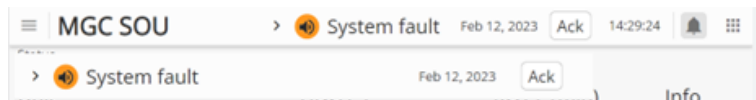
The time indicator in the top bar is used as an "alive" signal. The clock is synchronised towards the JB7 Junction Box using Network Time Protocol (NTP). The Junction Box uses input from GPS (Global Positioning System), ZDA message, to establish the NTP server.

The time is used in the Bridge Alert Management (BAM).

Alert symbol and alert list

If the last gyro fails the **System fault** alert symbol will flash, indicating that there is a Warning (alert). Select the Alert symbol , to show a list of alerts.

The top bar will show the BAM alert with the highest severity. The Switch Over Unit (SOU) functionality only generates a warning.



Palette

The **Palette** function provides colour schemes for the display presentation. You can select a colour scheme for the display which suits your current light conditions.



Related topics

[Display organisation, page 24](#)

[Selecting colour palette for display, page 40](#)

[SOU Status page, page 27](#)

[SOU Control page, page 28](#)

[Heading page, page 29](#)

[Internal Status page, page 30](#)


[External Status page, page 31](#)

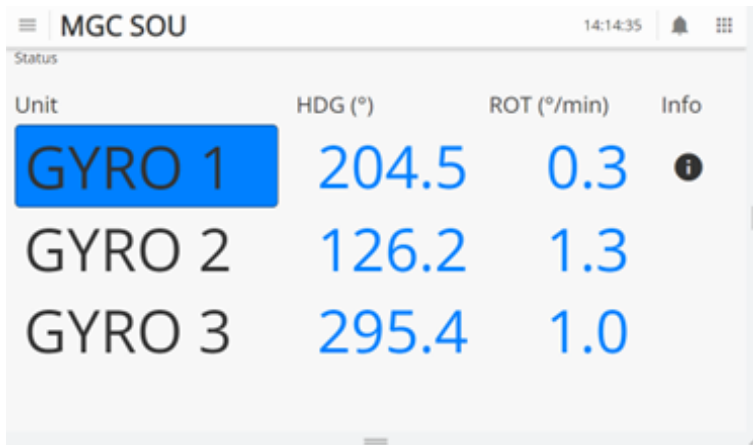
[Configuration changes, page 32](#)


SOU Status page

The **Status** page shows the normal output from the gyros. This page is the default page in the display.

How to open

To open the **Status** page, select the menu symbol,  on the top bar.



Unit	HDG (°)	ROT (°/min)	Info
GYRO 1	204.5	0.3	
GYRO 2	126.2	1.3	
GYRO 3	295.4	1.0	

Details

Status

Status indicates that you are on the **Status** page.

Unit

Unit shows a list of the connected gyros.

HDG (°)

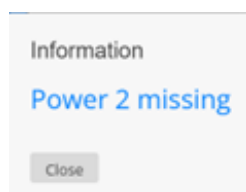
HDG shows the vessel heading in degrees. (Range 0 - 359.9).

ROT (°/min)

ROT shows the vessel rate-of-turn in degrees/minutes.

Info

The **Info** symbol holds information about the gyro error conditions. Select the symbol to open the **Information** window. Observe the error message. Select **Close** to close the window.




Related topics

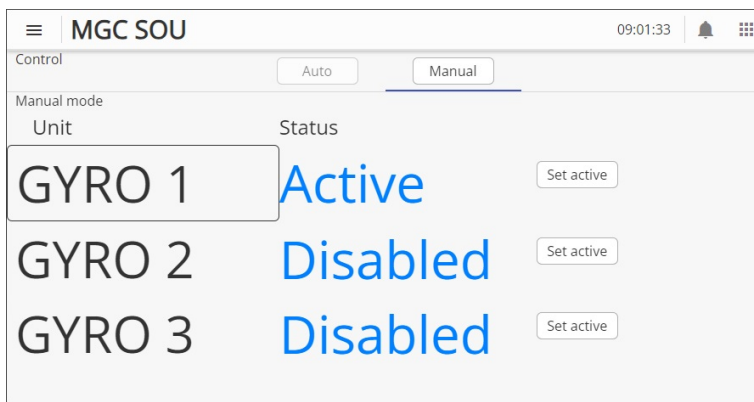
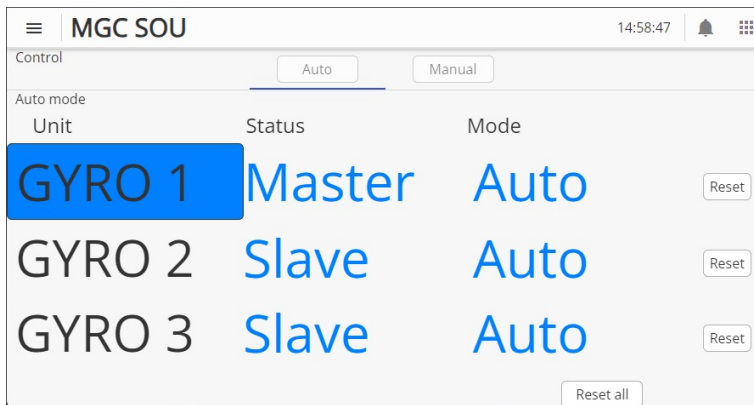
[Top bar description, page 25](#)

SOU Control page

The **SOU Control** page allows you to switch gyro mode from **Auto** to **Manual**. The selected mode is indicated by a blue line. It also allows you to reset the gyro state.

How to open

To open the **SOU Control** page, select the menu symbol, , on the top bar.



Description

In *Manual* mode, the status of the gyro can be **Active**, **Disabled** or **Error**. In *Auto* mode the status of the gyro can be **Master**, **Slave** or **Error**.

Details

Control

Control indicates that you are on the **Control** page.

Auto Auto mode

Select **Auto** to switch to *Auto* mode. The gyro system automatically selects which gyro should be the Master gyro.

Manual Manual mode

Select **Manual** to switch to *Manual* mode. In this mode you select the active gyro manually.

Unit

Unit shows a list of the connected gyros.

Status (in Manual mode)

This is the manually selected gyro mode. The **Manual** gyro is the selected gyro which distributes data to the clients. If a gyro is **Disabled**, it does not distribute data to the clients.

Mode (in Auto mode)

The system selects the **Master** gyro automatically.

Reset (in Auto mode)

The **Reset** button will select GYRO and set it as **Slave**.

Reset all (in Auto mode)

The **Reset all** button will reset the whole system. This must be done in a controlled manner when the vessel is in harbour.

Set active (in Manual mode)

With the **Set active** button you select the active gyro in *Manual* mode. This is the gyro which distributes data to the clients.

Related topics

[Top bar description, page 25](#)

[Resetting the gyro state, page 35](#)

[Selecting gyro manually, page 36](#)


[Switching between gyros in Manual mode, page 37](#)

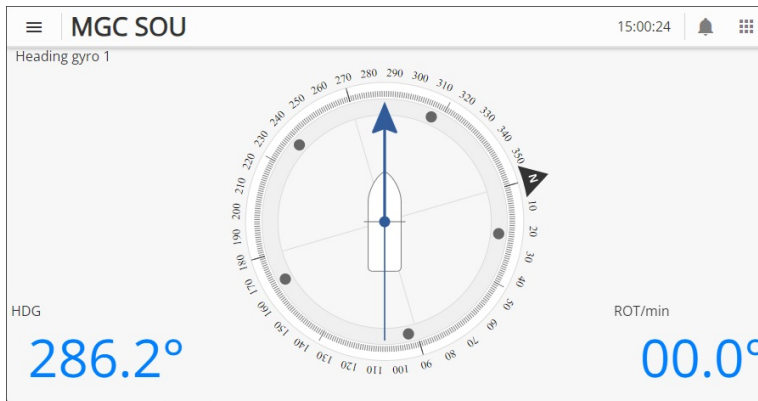
[Switching from Manual to Auto mode, page 38](#)

Heading page

The **Heading** page shows the heading in a compass rose. It shows values for heading and rate-of-turn.

How to open

To open the **Heading** page, select the menu symbol,  on the top bar.



Details

Heading gyro 1

Heading gyro 1 indicates that you are on the **Heading** page for Gyro 1.

HDG (°)

HDG shows the vessel heading in degrees.

ROT (°/min)

ROT shows the vessel rate-of-turn in degrees/minutes.


Related topics

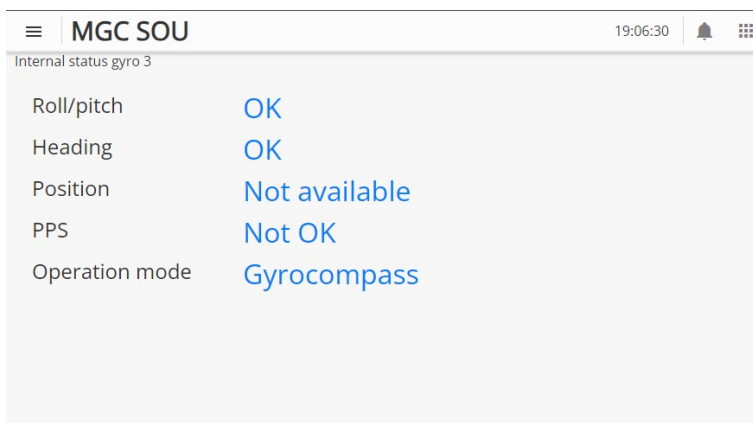
[Top bar description, page 25](#)

Internal Status page

The **Internal Status** page shows status for roll/pitch, heading, position, PPS and mode for the selected gyro.

How to open

To open the **Internal Status** page, select the menu symbol,  on the top bar.



Details

Internal status gyro 3

Internal status gyro 1 indicates that you are on the internal status page for Gyro 3.

Roll/pitch

Roll/pitch is the status of the roll and pitch data quality.

Heading

Heading is the status of the heading quality.

Position

Position is the status of the position data quality.

PPS

PPS is the status of the PPS signal data quality.

Operation mode

Operation mode shows the selected operation mode.


Related topics

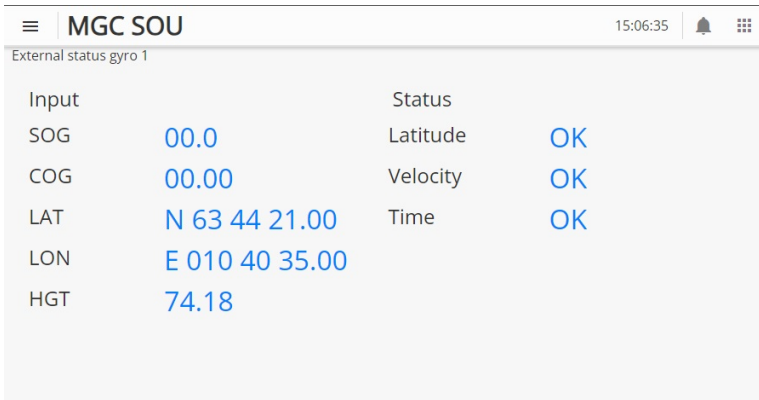
[Top bar description, page 25](#)

External Status page

The **External Status** page shows input values for Speed Over Ground (SOG), Course Over Ground (COG), Latitude (LAT), Longitude (LON) and Height (HGT). It also show the status of the input signals for Latitude, Velocity and Time for the selected gyro.

How to open

To open the **External Status** page, select the menu symbol,  on the top bar.



Input	Value	Status	Parameter
SOG	00.0	OK	Latitude
COG	00.00	OK	Velocity
LAT	N 63 44 21.00	OK	Time
LON	E 010 40 35.00		
HGT	74.18		

Details

External status gyro 1

External status gyro 1 indicates that you are on the status page for Gyro 1.

SOG

SOG shows the measured speed over ground.

COG

COG shows the value of the course over ground input signal.

LAT

LAT shows the position of the latitude input signal.

LON

LON shows the position of the longitude input signal.

HGT

HGT show the height of the input signal.

Latitude

Latitude shows the status fo the latitude input signal.

Velocity

Velocity shows the status of the velocity input signal.

Time

Time shows the status of the time input signal.



Related topics

[Top bar description, page 25](#)

Configuration changes

You can change the configuration of a specific gyro. Only gyros in **Slave** state can be selected.

How to open

To enter the gyro configuration changes, select the menu symbol,  on the top bar and then the Configuration changes symbol,  .



Description

Note

The changes to the gyro configuration which you do here, will only be temporary changes. You will only reset the MGC JB7 Junction Box. A reset of the junction box takes less than a minute compared to a full reset of the whole system. A full reset takes approximately 20 minutes.

The available configurations are **Mode** and **Installation configuration**.



Details

Mode

Select **Mode** to make changes to the operation mode. The operation modes available are **Gyrocompass**, **Int Nav pos/vel aid**, **Int Nav pos aid** and **Manual**.

Installation configuration

Select **Installation configuration** to make changes to the installation configuration. The following configuration settings are available: **Mount Angles**, **MGC Location**, **Heave**, **ROT filter**, **Simulation**, **SOU**, **COM**, **UDP**, **Analog**, **Replica**, **Network**, **Heading Deviation** and **Mount Wizard**.

Refer to the *MGC Installation Manual* for more details on the configuration input.

Related topics



[Operating modes, page 13](#)




[Top bar description, page 25](#)

[Changing operation mode, page 39](#)

Bridge Alert Management (BAM) alert symbols

The Bridge Alert Management (BAM) generates, manages and presents system alerts on the bridge. The BAM symbols appear on the top bar of the display.

Symbol	Description	Cause
	BAM alert. The display symbol is flashing. The display buzzer beeps twice. The beeps are repeated when warning escalates.	System fault.
	BAM acknowledged. The display shows a non-flashing symbol. No audible signal.	Warning acknowledged.

Symbol	Description	Cause
	Transfer of responsibility to the Central Alert Management (CAM). The display symbol is not flashing. No audible signal.	Transfer of responsibility to CAM.
	The warning condition is cleared before the warning is acknowledged. The display symbol is flashing. No audible signal.	Cleared unacknowledged warning.
	The gyro has received a silence command while in active, unacknowledged state from CAM. The display symbol is flashing. No audible signal.	Received silence command from CAM.

Related topics

[Acknowledging alerts, page 34](#)

Operating procedures

Topics

[Acknowledging alerts, page 34](#)

[Resetting the gyro state, page 35](#)

[Selecting gyro manually, page 36](#)

[Switching between gyros in Manual mode, page 37](#)

[Switching from Manual to Auto mode, page 38](#)

[Changing operation mode, page 39](#)

Acknowledging alerts

Situations may occur which trigger an alert in the system. You can acknowledge an alert from the display or in the JB7 Junction Box.

Context


If the last gyro fails, an alert (warning) will be indicated on the top bar of the display. The gyro's **Master** indication, a blue rectangle, will be removed.

Unit	Value 1	Value 2	Info
GYRO 1	248.6	1.9	Info
GYRO 2	145.0	0.6	Info
GYRO 3	115.0	2.2	Info

An alert is also indicated on the BAM LED on the JB7 Junction Box. If the LED is flashing, it indicates a warning. If the LED is constantly lit (no flash), it indicates an active acknowledged warning.



Procedure

- 1 On the display:
 - a Select the Alert symbol, , to show the warning.
 - b Select the **Info** symbol to show details about the error situation.
 - c Select **Ack** to acknowledge the warning.
- 2 In the Junction Box:
 - a Press the **BUS** button to acknowledge the warning.

Related topics

[Bridge Alert Management \(BAM\) alert symbols, page 33](#)

Resetting the gyro state

In case GYRO 2 or GYRO 3 is Master and you want to make GYRO 1 the Master again, you can reset the sequence.

Prerequisites

You must be on the **Control** page to do this procedure.

Context

The blue line under **Auto** indicates that the Switch Over Unit (SOU) functionality is in *Auto* mode. This is the default mode.

You can re-initiate the SOU functionality on all JB7 Junction Boxes. For example, if GYRO 2 was the Master before the reset, GYRO 1 will be the Master after the reset. If there are no error conditions.

The screenshot shows the 'MGC SOU' control interface. At the top, there is a header with a menu icon, the title 'MGC SOU', the time '14:58:47', and notification icons. Below the header, there are two tabs: 'Auto' (which is selected and highlighted with a blue underline) and 'Manual'. Underneath the tabs, there is a section labeled 'Auto mode' containing a table with three columns: 'Unit', 'Status', and 'Mode'. The table lists three gyros: GYRO 1 (Master, Auto), GYRO 2 (Slave, Auto), and GYRO 3 (Slave, Auto). Each row has a 'Reset' button to its right. At the bottom of the table, there is a 'Reset all' button.

Unit	Status	Mode	
GYRO 1	Master	Auto	Reset
GYRO 2	Slave	Auto	Reset
GYRO 3	Slave	Auto	Reset

Procedure

- 1 Select the **Control** page.
- 2 Make sure that you are in *Auto* mode.
- 3 Select **Reset** to make the gyro reset.
- 4 Verify if the sequence resets.

Related topics

[SOU Control page, page 28](#)

Selecting gyro manually

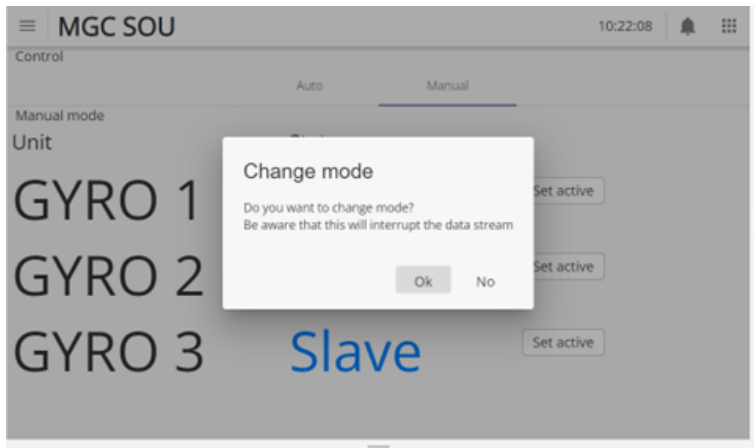
You can disable the **Auto** mode and manually select the gyro which shall output data to clients.

Prerequisites

You must be on the **Control** page to do this procedure.

Context

The **BUS** lamp on the JB7 Junction Box will have a long green flash with a short unlit period on the manually selected gyro.



Procedure

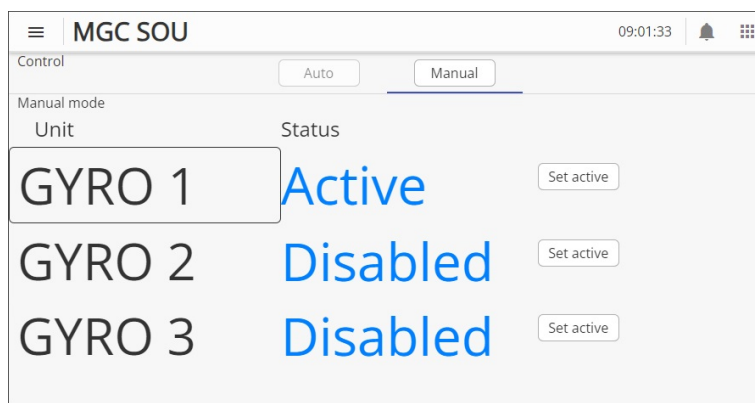
- 1 Select the **Control** page.
- 2 Select **Manual**.

The message **Do you want to change mode**, appears.

- 3 Select **OK**.

After a few seconds the gyro **Status** will change from **Master** to **Manual**. The other gyros will change status from **Slave** to **Disabled**.

The active gyro has status **Manual** and is surrounded by a rectangle.



Related topics

[SOU Control page, page 28](#)

Switching between gyros in Manual mode

When you are in **Manual** mode, you can select a disabled gyro so that it becomes active.

Prerequisites

You must be on the **Control** page to do this procedure.

Procedure

- 1 Select the **Control** page.
- 2 Select **Manual**.
The message **Do you want to change mode**, appears.
- 3 Select **OK**.
- 4 Select the wanted **Disabled** gyro and select **Set active**.
The message **Do you want to change active sensor?**, appears.
- 5 Select **OK**.
The **Status** page appears and the selected gyro is now **Active**.

Related topics

[SOU Control page, page 28](#)

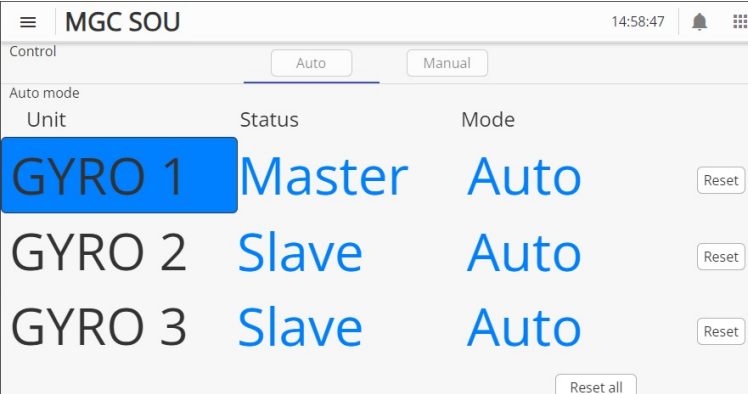
Switching from Manual to Auto mode

Switch to auto if you want the system to be in **Auto** mode. The system will then handle the redundancy automatically. If the **Master** gyro fails, the **Slave** will become the **Master**.

Prerequisites

You must be on the **Control** page to do this procedure.

Context



The screenshot shows the MGC SOU Control page. At the top, there is a header with a menu icon, the text 'MGC SOU', the time '14:58:47', a bell icon, and a grid icon. Below the header, there are two tabs: 'Auto' (selected) and 'Manual'. The main content area is titled 'Auto mode' and contains a table with three columns: 'Unit', 'Status', and 'Mode'. The table has three rows of data. The first row is highlighted with a blue background. Each row has a 'Reset' button to its right. At the bottom of the table, there is a 'Reset all' button.

Unit	Status	Mode	
GYRO 1	Master	Auto	Reset
GYRO 2	Slave	Auto	Reset
GYRO 3	Slave	Auto	Reset

Procedure

- 1 Select the **Control** page.
- 2 Select **Auto**.
- 3 Select **OK**.
After a few seconds the gyro which is the **Master** will be indicated. This will normally be GYRO 1.

Related topics

[SOU Control page, page 28](#)

Changing operation mode

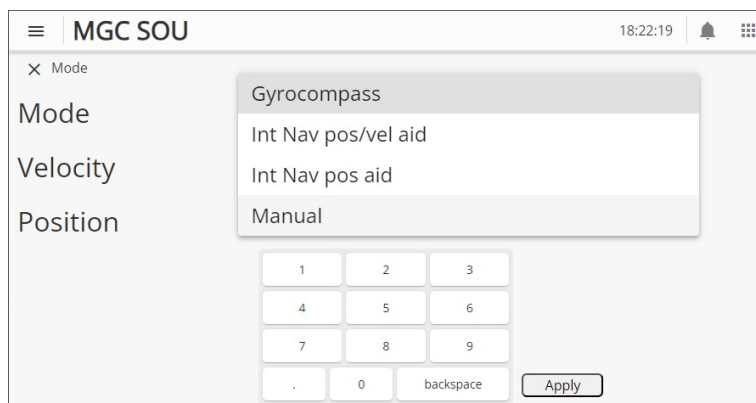
Some vessel operations require a change of operation mode. For example, a vessel with a dynamic positioning (DP) system which enters the DP zone, must have gyro compasses which operate in *Manual* mode.


Context

You can select between the following operation modes: **Gyrocompass**, **Int Nav pos/vel aid**, **Int Nav pos aid** and **Manual**.

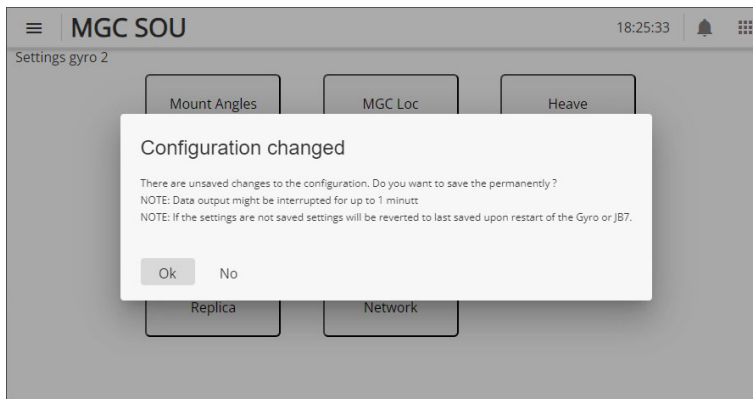
In *Manual* mode the speed is set to 0 (zero) and the latitude is set to the region in which you operate.

Use the keyboard to type the wanted valued.

**Procedure**

- 1 Select the menu symbol on the top bar.
- 2 Select the Configuration change symbol, .
- 3 Select the gyro for which you want to change the operation mode, Gyro 1, 2 or 3.
- 4 Select **Mode** → **Manual**.
- 5 For **Velocity**, type 0 (zero) knots.
- 6 For **Position**, type the latitude in degrees, minutes and seconds for the operating region.

7 Select **Apply**.



8 Select **Ok** to save the changes permanently, also after a restart. Select **No** for temporary changes.

Related topics

[Changing operation mode for DP operations, page 17](#)

[Configuration changes, page 32](#)

User preference procedures

Topics

[Selecting colour palette for display, page 40](#)

[Adjusting brightness with the brightness slider, page 41](#)

Selecting colour palette for display


You can select a colour scheme for the display which suits your current light conditions.

Context

The **Palette** function provides colour schemes for the display presentation. Four palettes are available. Night, Dusk, Day and Bright.



Procedure

- 1 Select the Palette symbol on the top bar,  .

- 2 Under **Palette**, select the colour scheme you want to use.
- 3 Select the Palette symbol again to close the selection.

Related topics

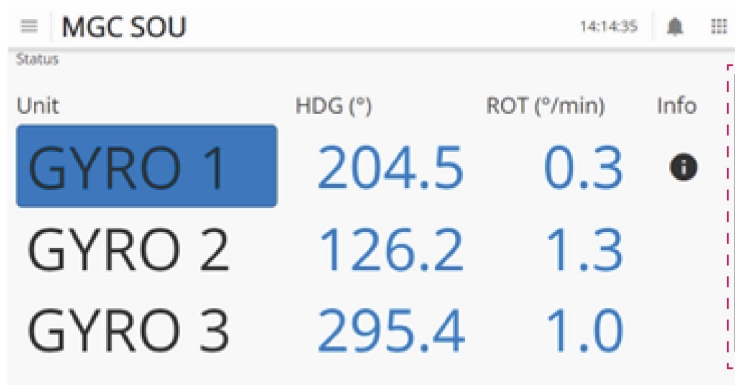
[Top bar description, page 25](#)

Adjusting brightness with the brightness slider

You can adjust the brightness of the display to suit your current light conditions.

Context

The brightness slider is located to the right of the display. It is indicated with a red dotted rectangle.



The screenshot shows a mobile application interface for 'MGC SOU'. At the top, there is a status bar with the time '14:14:35', a bell icon, and a grid icon. Below the status bar is a 'Status' section with a table of data. The table has four columns: 'Unit', 'HDG (°)', 'ROT (°/min)', and 'Info'. The first row is highlighted in blue and contains 'GYRO 1', '204.5', '0.3', and an information icon. The second row contains 'GYRO 2', '126.2', '1.3', and an information icon. The third row contains 'GYRO 3', '295.4', '1.0', and an information icon. To the right of the table, there is a vertical slider control, which is highlighted with a red dotted rectangle.

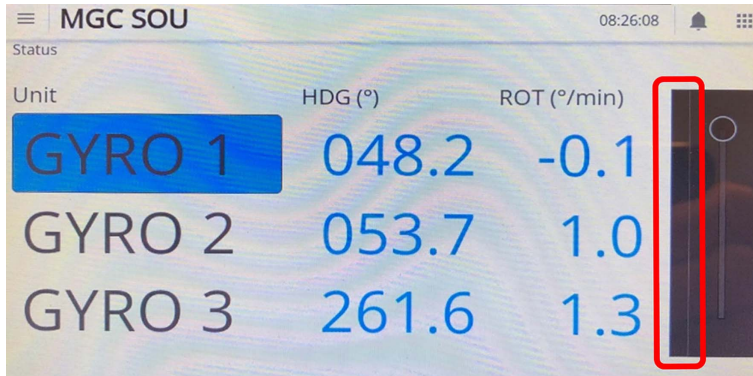
Unit	HDG (°)	ROT (°/min)	Info
GYRO 1	204.5	0.3	i
GYRO 2	126.2	1.3	i
GYRO 3	295.4	1.0	i

If you release the slider in a lower position, the display may turn too dark. If you are not able to see the slider, press anywhere on the display and hold. The brightness level will increase.

Procedure

- 1 Press the vertical button on the right side of the display to open the brightness slider.
- 2 Drag the slider up and down to adjust the brightness.

- 3 Press the vertical button to the left (red rectangle) of the slider to close the brightness slider.



Troubleshooting SOU

Topics

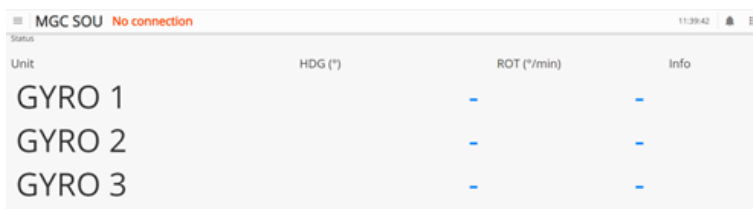
[Investigating "No connection" message, page 43](#)

[Investigating "Error" status for all gyros, page 44](#)

Investigating "No connection" message

The **No connection** message appears in the top bar if there is no network connection between the Switch Over Unit user interface and the gyro (MGC and JB7 Junction Box).

Context



The screenshot shows the MGC SOU user interface. At the top, there is a status bar with the text "MGC SOU No connection" and a timestamp "11:39:42". Below the status bar is a table with the following columns: "Unit", "HDG (°)", "ROT (°/min)", and "Info". The table contains three rows of data for gyroscopes:

Unit	HDG (°)	ROT (°/min)	Info
GYRO 1		-	-
GYRO 2		-	-
GYRO 3		-	-

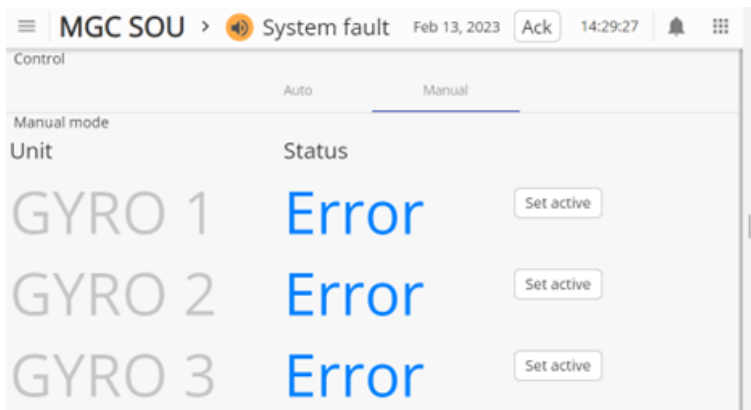
Procedure

- 1 If the message appears during start-up or restart, it should disappear in a few seconds.
- 2 Make sure that the network cable is properly connected.
- 3 Make sure that the equipment is turned on.

Investigating "Error" status for all gyros

If you get a **System fault** warning in the top bar, an error condition may have occurred with the gyros.

Context



Procedure

- 1 Select the **Control** page → **Manual**.
- 2 Observe the **Status** for the gyros.
If all gyros have status **Error**, this indicates a critical error.
- 3 Reboot the entire system by resetting the power to the units.

Maintenance

Topics

[Checking the product version, page 45](#)

[Updating the system software, page 45](#)

[Creating a backup of the system configuration, page 46](#)

[Troubleshooting, page 47](#)

[Repairs and parts replacement, page 48](#)

Checking the product version

For software updates, or contact with customer support, it is useful to know the product version of this product.

Context

This procedure is done in the MGC JB7 Junction Box web interface.

Procedure

- 1 Enter the **Configuration** menu → **Update SW**.
- 2 Observe the **JB7 SW version**.

Updating the system software

We recommend that you keep your product updated with the latest software version.

Kongsberg Discovery AS will offer regular software updates for the MGC® COMPASS with improvements and new functionalities. It is up to you to decide whether you want to update your product with the new software.

The new software is installed on the MGC JB7 Junction Box. The software update procedure is described in the Release Note for the specific software. These updates are done by connecting an external computer to the junction box and using the MGC JB7 Junction Box web interface.

Related topics

[Connecting to the web interface, page 16](#)

Creating a backup of the system configuration

The setup files are stored in the MGC JB7 Junction Box. It can be useful to make a copy of the system configuration if you should need it later.

Prerequisites

An external computer. Make sure that the external computer is in the same network range as the junction box.

Context

This procedure is done in the MGC JB7 Junction Box web interface.

Procedure

- 1 Connect the external computer to an Ethernet port on the MGC JB7 Junction Box and connect to the junction box web interface.
- 2 Enter the **Configuration** menu → **Update SW**.
- 3 Under **Get backup of setup**, select **Download setup files**.
- 4 Store the setup files in a folder of your choice on the external computer.
- 5 Disconnect the external computer from the junction box.

Related topics

[Connecting to the web interface, page 16](#)

[Replacing the MGC JB7 Junction Box, page 49](#)

Troubleshooting

Topics

[Inspecting the system status, page 47](#)

[Investigating no signal to external equipment, page 48](#)

Inspecting the system status

Events which have occurred can be observed in the **Status** page of the MGC JB7 Junction Box web interface.

Context

This procedure is done in the MGC JB7 Junction Box web interface.

[Refresh](#)

Sensor status

T173113

% System Status report for Seatex MGC series instrument

Written : Wed Nov 9 14:19:16 2022

Serial number : 50649 MAC 00:05:be:04:c5:d9 1 28 0

Instrument type : MGC R5-OEM.v OEM

Install date : Mon Sep 5 14:07:48 2022

System prog : MruV 5.06.10 2022-09-07

Config annot : MGC COMPASS JB7 default configuration

Calibration : vers 6 R5.v, 50649 calibrated 2022-09-07 ~+

System state : Normal

Startups : 292

Acc.time (hours) : 4953

Status : 0x00041831 => Tsync,Csync,HeadRed,NavMode,

Warning : 0x00000002 0x00000d2e

Event log :

event 1: Startup OK Tue Oct 11 11:27:00 2022 289 0001 Normal

event 3: Last stop Tue Oct 11 11:21:08 2022 291 0000

event 1: Startup OK Thu Sep 15 12:28:52 2022 288 0001 Normal

event 3: Last stop Thu Sep 15 12:28:42 2022 290 0000

event 8: Clock set Mon Sep 12 10:45:24 2022 6 0009 RTC chg 9s

event 4: Parse error Mon Sep 12 10:44:23 2022 119 008a UDP0 Bad msg

event 10: Info Mon Sep 12 10:44:21 2022 186 0003 New config

event 1: Startup OK Mon Sep 12 10:44:21 2022 287 0041 Normal,warm

event 4: Parse error Mon Sep 12 10:44:16 2022 118 008a UDP0 Bad msg

event 3: Last stop Mon Sep 12 10:44:16 2022 289 0000

event 1: Startup OK Mon Sep 12 10:44:14 2022 286 0001 Normal

event 2: Startup OK Mon Sep 12 10:44:14 2022 288 0000

Procedure

- 1 Enter the **Configuration** menu → **Status**.
- 2 Observe the **System prog**, **Calibration**, **System state** and **Status** parameters.
- 3 Observe the **Event log** with a list of recorded events.

Related topics

[Connecting to the web interface, page 16](#)

Investigating no signal to external equipment

If the external equipment does not receive any signal from the MGC® COMPASS, you must do a visual inspection of the junction boxes and the Sensor Unit.

Context

If the problem persists after this procedure has been followed, please contact Kongsberg Discovery AS customer support.

Procedure

- 1 Make sure that the Sensor Unit receives power.
- 2 Make sure that the power LEDs in the JB7 Junction Box are lit.
If the LEDs are not lit, the junction box does not receive power.
- 3 Make sure that the BUS LED in the JB7 Junction Box is lit.
If the BUS LED is not lit, the junction box does not receive power.
- 4 Make sure that the JB5 Junction Box receives power.
- 5 Make sure that the cable wires have not loosened from the terminals in the JB7 Junction Box and/or the JB5 Junction Box.

Repairs and parts replacement

Topics

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Repairing the Sensor Unit

The Sensor Unit is not designed for repair in the field. All repairs and modifications of the unit, except for installation of new software versions and system setup, must be done by qualified personnel. A failed unit should be shipped back to Kongsberg Discovery AS or other agreed service point for repair.

Caution

Opening the Sensor Unit housing will result in permanent damage to the unit. You should under no circumstance make any attempt to do so.

Replacing the Sensor Unit

If the unit fails, it can be replaced by a spare unit. Local repair is not possible.

Prerequisites

Turn off all power to the system.

Context

The Sensor Unit configuration is stored in the MGC JB7 Junction Box. This configuration will automatically be transferred to the spare unit when the unit is connected to the junction box.

Procedure

- 1 Disconnect the connector on the cable to the MGC JB7 Junction Box from the unit.
- 2 Unscrew the four M6 screws which are used to fasten the Sensor Unit to the base plate.
- 3 Remove the unit from the base plate.
- 4 Place the spare unit onto the base plate in the same direction as the failed unit.
The **Forward** arrow at the top of the unit shall point in the bow direction.
- 5 Tighten the screws to fasten the unit.
- 6 Insert the connector on the MGC Junction Box cable into the Sensor Unit.
The unit will now start and the configuration, which is stored in the MGC JB7 Junction Box, will automatically be transferred to the unit.

Replacing the MGC JB7 Junction Box

If an unexpected failure should occur with the junction box, you can replace the box.

Prerequisites

You need an external computer to store the configuration files, or you have already created a backup of the system configuration on an external computer.

Turn off all power to the system.

Procedure

- 1 Create a backup of the system configuration, if you have not done this previously.

- 2 Disconnect the junction box cable from the Sensor Unit.
- 3 Disconnect all other connections to the junction box terminals.
- 4 Dismount the failed junction box from its foundation.
- 5 Mount the spare junction box in the same foundation as the failed box.
- 6 Connect the junction box cable to the Sensor Unit.
- 7 Connect all other connections to the correct terminals inside the box.
- 8 Make sure that the junction box receives power.
- 9 Connect the external computer with the copied system configuration to the junction box.
- 10 Enter the **Configuration** menu → **Update SW**.
- 11 Under **Restore setup to backed up version**, select **Select file**.
- 12 Select the backup files you have stored in a folder on the external computer.
- 13 Select **Upload**.

The junction box shall now restart automatically.

- 14 If the junction box does not restart, enter the **Configuration** menu → **Reboot**. Select **Restart JB7**.

The MGC JB7 Junction Box and the Sensor Unit are now up and running.

Related topics

[Creating a backup of the system configuration, page 46](#)

[Connecting to the web interface, page 16](#)

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