

Sveriges Kompassjusterareförbund, SKJF
Swedish Compass Adjusters Association

Maintenance on Compasses

Certification & Adjusting (swing), brief information as a helper for masters, owners, agents etc. when ordering maintenance.

Nils Möllerström
2019-01-05

There are mainly two types of maintenance carried out with regular intervals on magnetic compasses intended for ship's navigation. They are **Certification** and **Adjustment**.

Even if it's all about the same compass these two types are *completely different*.

Certification is done with the ship's compass brought ashore to a specially equipped workshop. The ship is then normally prevented from moving without its compass during this time.

Adjustment, on the other hand, is done onboard and under way with the compass in its place as this is done to find out the ship's magnetic status at the place for the compass.

1. Certification:

Carried out in a workshop, usually with a 2-year interval or a 1-year interval on small fast boats or when otherwise needed.

The *compass with its gimbals and pick-up sensor*, is removed and brought to a specially equipped workshop where the compass is subject to overhaul, if needed, and then checked.

The following preparations should be done by the ship's crew before the compass is fetched by the workshop (or the compass is brought to the workshop by the crew);

- Tarpaulin, manholes etc are removed.
- Check that the binnacles helmet, access doors and openings are easily opened for access.
- Check that cables for lighting are easily detachable, if needed.
- Check that the pick-up sensor's cable is easily detachable.
- Check that nuts and bolts holding the gimbals and compass are easily removed.

An example of what is checked in the workshop is measuring of the friction in the compass and settling period in order to determine possible wear and its suitability to the ships rolling period. Magnetic moment on A-class compass is measured, readability etc is checked. It may then be found that the compass needs to be dismantled, emptied of fluids and have interior parts replaced. System and expansion tank may need to be re-sealed or exchanged and compass fluid to be filtered. The compass bowl may need to be repainted inside, lubber mark corrected, system to be balanced etc.

If the compass, following an overhaul, then complies with the regulations in force as ISO, IMO, TSFS and the Type Certificate a new **Individual Certificate** is issued, valid for two years.

2. Adjustment:

Carried out under way by turning the ship (called swing), with a 2-year interval or a 1-year interval for ships equipped with a degaussing system. If so it's best to do the swing **after** visiting the degaussing station. Swing followed by adjustment may also be required for other reasons, such as dry docking, structural work, welding, repairs, etc. or if the compass has otherwise become unreliable.

The swing is done in order to establish the ship's magnetic status at the place where the compass sits. The deviation is obtained by reading the compass while at the same time comparing it with a reliable reference, as in a gyro-, flux- or GPS-compass. Adjustment is then done using permanent magnets, soft iron spheres and Flinders bar in order to reduce the influence of the ship's magnetic field to a minimum. Obviously the compass has to be mounted in its intended place and the ship needs to be at sea and under way ready to steer any course that the adjuster asks.

Preceding the swing and adjustment there are some things that should be taken care of.

Before the adjuster arrives, and in order to make the swing as swift as possible, one may let the crew do some checks on the installation and prepare the compass with its compensation aids in order to make sure that everything is in order and easily accessible.

In each case, and in good time, the following preparations should be carried out by the crew;

- Tarpaulin, manholes etc to be removed.
- Check that the binnacles helmet, access doors and openings are easily opened for access.
- Communication, place of compass – bridge, established and tested.
- Check that compass lighting is in working order.
- Check that periscope is cleaned. Best done when the compass is away for overhaul.
- Check that the bolts on the spheres are greased and easy to loosen.
- Materials for the Flinders bar is brought forward.
- Any special tools and special magnets for the binnacle are brought forward.
- Manual for calibration of TMC/THD is brought forward.
- Possibility to break the power to the TMC/THD main unit checked.
- Any equipment such as cranes, davits, boats etc should be in its stowed position.

Following the completion of the swing and the adjustment a **Table of Deviation** will be issued by the adjuster. From this table it can be read the type and value of any residual deviation that can't be compensated for, as well as the place and size of the compensation aids.

3. Ordering maintenance on a magnetic compass:

In order to avoid any misunderstanding, it's therefore vitally important to be absolutely clear about which type of maintenance is wanted, and in the case of adjustment whether the ship is equipped with a functioning and reliable gyro- or GPS-compass suitable as a reference.

Since many ships are equipped with more than one compass it's also important to specify which of the ships compasses the order concerns and where they are placed onboard. This is to make sure the adjuster brings the right equipment. For example, if the adjustment concerns a lifeboat or an FRB the adjuster needs to bring his own reference in form of a flux- or GPS-compass.

If the ship is equipped with a degaussing system, and tables for both when the system is active and when it's off are wanted, this should be stated in the order. In the absence of separate compass corrector coils for the degaussing system it needs to be said which table is to be the main table. The second table will then be a trailing table where the fulfilment of demands may not be reached.

It's also desirable that the order is clear on time, place and means for em- / disembarkment. Any transport to and from the ship by boat is to be arranged/provided and paid for by the ship/client.

Usually the certificate and table is handed over to the master as an original document after the service is carried out. Should the client want more copies or other means of delivery then this should also be stated in the order.

Example of Certificate:

BARGON
Knösö Udde 10
371 64 Lyckeby

INTYGNR:
Certificate no: 17/004

Member of SWEDISH COMPASSADJUSTERS ASSOCIATION
ÅGARE / Owner: M/Y Pax, bga, styrkompass

Individual test-certificate for magnetic compass (class A) and accessories.

KOMPASS KLAS / Compass class: A

KOMPASS TYP / Compass type: Skål

KOMPASSKÅL / Compass bowl
TILLVERKARE / Manufacturer: Ritchie, Navigator DNV-200


TILLVERKNINGSNR / Serial no: BD34567

KARDANRINGEN
TILLVERKNINGSNR / Gymbal serial no: BD34567

KOMPASSKIVA / Directional system
TILLVERKARE / Manufacturer: Ritchie, Navigator DNV-200

TILLVERKNINGSNR / Serial no: BD34567

ROSENS DIAMETER / Card diameter: 135 mm



RESULTAT AV ÖVERSYN / Result of test

SKIVANS SVÄNGNINGSTID (defl 90 > 1 gr. / 40 gr > 1/2 per.) /
Compass setting time (defl 90 > 1 deg. / 40 deg > 1/2 per.) 34,2 s (max 38,6 s) (min 12,0 s) ($\pm 18,0 \mu T$)

SKIVANS INSVÄNGNINGSEFFEL (deflktion 2,0 grader) /
Compass setting error (deflection 2,0 degrees) 0,2 gr (max 0,5 gr) ($\pm 4,0 \mu T$)

SKIVANS FRIKTIONSEFFEL (rotation 6,0 grader/sak) /
Compass friction error (rotation 6,0 degrees/sak) 2,1 gr (max 6,0 gr) ($\pm 4,0 \mu T$)

MAGNETISKT MOMENT / Magnetic moment: 2,00 Am² (min 1,16 Am²)

DETTA INTYG HAR UTFÄRDATS I ENLIGHET MED TRANSPORTSTYRELSENS KONGÖRELSE (TSFS 2011:2) OCH I ENLIGHET MED INTERNATIONELLA STANDARDISERINGS KOMMISSIONENS (ISO) STANDARD 23862:2009. This certificate has been issued in accordance with the National Swedish Administration of Shipping and Navigation Ordinance TSFS 2011:2 and the International Organisation for Standardisation (ISO) standard 23862:2009.

INTYGET ÄR GILTIGT FÖR FARTYGG MED STYR-GYROKOMPASS TILL /
This certificate is valid for ship with steering gyro-compass until: 2020-02-24

INTYGET ÄR GILTIGT FÖR FARTYGG UTAN STYR-GYROKOMPASS TILL /
This certificate is valid for ship without steering gyro-compass until: 2019-02-24

UTFÄRDAT: LYCKEBY /
NÄMN / Signature: Nils-H Möllerström
Nils-H Möllerström
Place of issue: Lyckeby

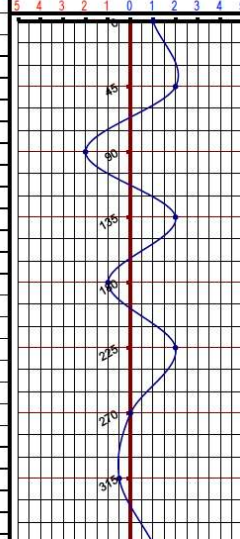
Example of Table of Deviations:

SWEDISH COMPASSADJUSTERS ASSOCIATION

TABLE OF DEVIATIONS

Strykcompass Ship: M/Y Pax, bga

Magnetic Course	Compass Course	Deviation
N 000,0	359,0	+1,0
015,0		
030,0		
NE 045,0	043,0	+2,0
060,0		
075,0		
E 090,0	092,0	-2,0
105,0		
120,0		
SE 135,0	133,0	+2,0
150,0		
165,0		
S 180,0	181,0	-1,0
195,0		
210,0		
SW 225,0	223,0	+2,0
240,0		
255,0		
W 270,0	270,0	+0,0
285,0		
300,0		
NW 315,0	315,5	-0,5
330,0		
345,0		
N 360,0	359,0	+1,0



Coefficients: A=+0,4 B=-1,0/+0,9 C=+1,0/-0,9 D=+0,6 E=+0,5
F=+1,0 G=+1,0 H=+0,0 K=-0,9 J=+0,0

Remarks: Vindrutetorkare parkerad åt sb.

Issued: Karlskrona redd, 2017-02-21

Pos of swing: Lat 56° 08,0 N, Lon 015° 36,0 E

Ships comm: H=16,8µT Z=47,7µT Φ=70,5

Ships int-ID: Callsign: SFUM / MMSI: 123456789

Nils-H Möllerström
Authorized Member of the Swedish
Compass Adjusters Association

POSITION OF COMPENSATION AIDS:

Heeling magnets: 1 pcs. Red poles: Upp Distance 13 cm Side

Fore and Aft magnets: 1,5 pcs. Red pole: F 18 cm sb

pcs. Red pole: sb

pcs. Red pole: sb

pcs. Red pole: sb

Athwartships magnets: 1 pcs. Red pole: bb 21 cm A

pcs. Red pole: A

pcs. Red pole: A

pcs. Red pole: A

Position of Spheres: sb

Flinder's Bar: sb

Remarks: Central compensation present.
Kompenseringsmedel för inducerad magnetism saknas. Deviation på interkardinalkurser kan ej korrigeras korrekt.

Swedish Compassadjusters Association: <http://www.kompassjusterarna.com/>
BGS: http://www.geomag.bgs.ac.uk/data_service/models_compass/wmm_calc.html
NOAA online GeoMag Calculator: <http://www.ngdc.noaa.gov/geomag-web/#igrfwmm>

Justers particulars: Phone: +46 708 39 52 76
Certificate of Competency: E-mail: nilmol01@hotmail.com
No: 109 / SKJF Web: <http://www.kompassjusterarna.com>
Company: BARGON Company phone:

