



Gyro Compass STANDARD 20

Type 110 - 800, 110 - 804 and 110 - 806

Consisting of:

- **Gyro Compass Casing with Outer Sphere, Type 110 - 222,**
- **Supporting Liquid, Type 148 - 162,**
- **Distilled Water, Type 148 - 398 and**
- **Gyrosphere, Type 111 - 006**

OPERATOR MANUAL

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Declaration of Conformity acc. to EC Directive 96/98/EC

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Safety Regulations



Caution!

- Maintenance and repair must be performed by trained and qualified personnel who are knowledgeable in equipment safety requirements!
- When the gyro compass is switched off, the rotors come to a standstill not before a running-down time of approx. 15 to 30 min has elapsed. During this time, no intervention in the gyro compass must be made.
The gyrosphere might be damaged !



- It is recommended that during times when the ship is in harbour for up to one week, the gyro compass is not switched off.
- If warnings occur, the function of the gyro compass equipment is not restricted. Elimination of the causes in good time prevents possible failures.
Please, inform authorized service personnel!



Caution!

If no RAYTHEON repeater compass is connected, the warnings and error messages are only displayed visually at the compass

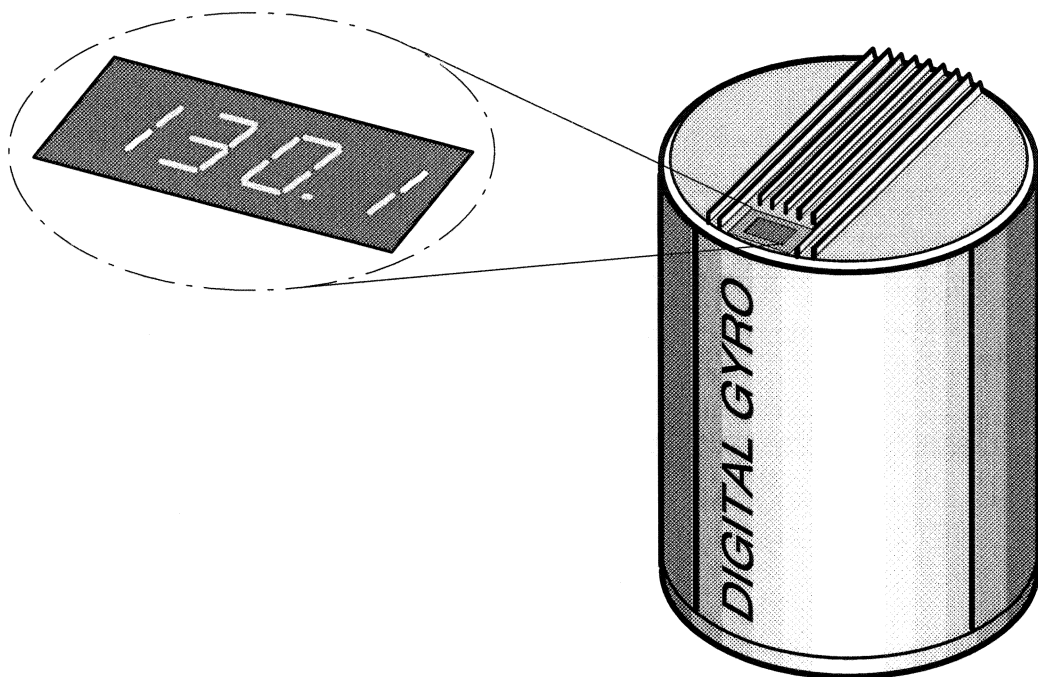
For this reason it is essential that the digital display at the compass is monitored all the time.

If supplementary audible signalling of error messages is required, it is a necessary to utilise the relevant contacts in the control unit.

1

General

The Gyro Compass STANDARD 20 provides an analog heading indication referred to true north. Via an absolute, coded scanning and transmission system, it guarantees an absolute and clear transmission of the compass heading reference via a serial interface to analog or digital repeater compasses, autopilot or other periphery devices that are able to process the serial interfaces of the compass.



Operator Manual

This operator manual contains all operating instructions as well as a survey of possible warnings and alarms indicated on the digital display.

Service Manual

In addition to the operator manual a service manual is available. It contains:

- information about installation and first putting into operation
- information about maintenance and shipboard repair
- a description of the gyro compass STANDARD 20



The operating instructions for the **entire** gyro compass equipment can be found in the main system description.

This operator manual is valid for the gyro compass types:

Type 110 - 800: normal gyro compass

Type 110 - 804: gyro compass with quick settle for the equipment STANDARD 20 PLUS

Type 110 - 806: gyro compass without casing for mounting in the steering stand ComPilot 20

2 Switching on the Gyro Compass

With switching-on the 24 V power supply, the gyro compass is put into operation.

3 Signalling during Operation

After switching on the gyro compass, the the digital display - visible through the window in the supporting plate - indicates:

(The digital display of the gyro compass type 110 - 806 for steering stand ComPilot 20 is visible by opening up the operator panel of the steering stand.)

Indications	Comments, Notes
1 Heating Phase 	During the heating phase, the temperature of the supporting liquid is indicated. For example: h : heating phase 28.8 : 28.8 °C
2 Settling Phase 	After reaching the lower operating temperature of 45 °C: - Automatical switching-on of the compass internal follow-up system by the sensor electronics - During a settling time of approx. 3h, the digital display indicates the heading with a full stop behind the last position. Course value still imprecise and not usable!
3 Heading Indication 	After termination of the settling procedure: - Heading indication  Accuracy: After approx. 3 hrs.: better 2° After approx. 5 hrs.: better $0.1^\circ \times 1/\cos \text{latitude}$

4

Speed Error Correction

The speed error δ is the difference between the course indicated by the gyro compass and the true course. The underlying causes of this error, which is governed by the ship's speed, course and local latitude, are of the physical type.

This speed error must be corrected as described below.

For amount and sign of speed error, see Speed Error Table on the following pages.



The TRUE COURSE equals the compass course taking into account the correction value drawn from the speed error table.

Pay attention to sign!

Example 1:

compass course:	345°
latitude:	55°
speed:	16 kn
correction value from table:	-1.7°
true course:	$345^\circ - 1.7^\circ = \underline{343.3^\circ}$

Example 2:

compass course:	223.7°
latitude:	55°
speed:	16 kn
correction value from table:	+1.3°
true course:	$223.7^\circ + 1.3^\circ = \underline{225.0^\circ}$

Example for a bearing:

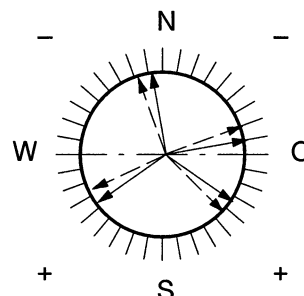
compass course:	255°
latitude:	55°
speed:	16 kn
bearing:	135°
correction value from table:	+0.5°
true bearing:	$135^\circ + 0.5^\circ = \underline{135.5^\circ}$



Valid:

The TRUE COURSE is always 'west' of the compass course.

————→ compass course
- - - -> true course



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4.1 Speed-error Table

Latitude in °	northerly		southerly		Speed in kn										
	Courses in ° Sign of Course Correction														
	—		+		4	8	12	16	20	24	28	32	36	40	44
0 to 20	0	360	180	180	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.1	2.4	2.6	2.9
	15	345	165	195	0.3	0.5	0.8	1.0	1.3	1.4	1.7	2.0	2.3	2.5	2.8
	30	330	150	210	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.8	2.0	2.3	2.5
	45	315	135	225	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1
	60	300	120	240	0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3	1.4
	75	285	105	255	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.8
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
30	0	360	180	180	0.3	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	3.2
	15	345	165	195	0.3	0.6	0.9	1.1	1.4	1.6	1.9	2.3	2.6	2.8	3.1
	30	330	150	210	0.2	0.5	0.7	1.0	1.2	1.5	1.7	2.0	2.3	2.5	2.8
	45	315	135	225	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.7	1.9	2.1	2.3
	60	300	120	240	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.3	1.5	1.6
	75	285	105	255	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.8
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
40	0	360	180	180	0.3	0.7	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7
	15	345	165	195	0.3	0.7	1.0	1.2	1.5	1.9	2.2	2.6	2.9	3.2	3.5
	30	330	150	210	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9	3.2
	45	315	135	225	0.2	0.4	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.4	2.6
	60	300	120	240	0.2	0.3	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.7	1.8
	75	285	105	255	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.9
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
45	0	360	180	180	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0
	15	345	165	195	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.8	3.1	3.5	3.8
	30	330	150	210	0.3	0.6	0.9	1.2	1.6	1.9	2.2	2.5	2.8	3.1	3.4
	45	315	135	225	0.3	0.5	0.8	1.0	1.2	1.5	1.8	2.0	2.3	2.5	2.8
	60	300	120	240	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.4	1.6	1.8	2.0
	75	285	105	255	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9	1.0
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
50	0	360	180	180	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.3
	15	345	165	195	0.4	0.8	1.1	1.5	1.8	2.2	2.6	3.1	3.4	3.8	4.2
	30	330	150	210	0.3	0.7	1.0	1.3	1.6	2.0	2.3	2.7	3.1	3.4	3.8
	45	315	135	225	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1
	60	300	120	240	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2
	75	285	105	255	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0

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Technical
Documentation

Latitude in °	northerly		southerly		Speed in kn										
	Courses in ° Sign of Course Correction														
	–		+		4	8	12	16	20	24	28	32	36	40	44
55	0	360	180	180	0.4	0.9	1.3	1.8	2.2	2.7	3.1	3.6	4.0	4.4	4.9
	15	345	165	195	0.4	0.9	1.3	1.7	2.1	2.6	3.0	3.4	3.9	4.3	4.7
	30	330	150	210	0.4	0.8	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.8	4.2
	45	315	135	225	0.3	0.6	0.9	1.3	1.6	1.9	2.2	2.5	2.8	3.1	3.5
	60	300	120	240	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.4
	75	285	105	255	0.1	0.2	0.3	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
60	0	360	180	180	0.5	1.0	1.5	2.0	2.5	3.1	3.6	4.1	4.6	5.1	5.6
	15	345	165	195	0.5	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9	5.4
	30	330	150	210	0.4	0.8	1.3	1.7	2.1	2.6	3.1	3.5	4.0	4.4	4.9
	45	315	135	225	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0
	60	300	120	240	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8
	75	285	105	255	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.5
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
65	0	360	180	180	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.7
	15	345	165	195	0.6	1.2	1.7	2.3	2.9	3.5	4.1	4.7	5.2	5.8	6.4
	30	330	150	210	0.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7
	45	315	135	225	0.4	0.9	1.3	1.7	2.1	2.6	3.0	3.4	3.8	4.3	4.7
	60	300	120	240	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3
	75	285	105	255	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.6	1.7
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
70	0	360	180	180	0.7	1.5	2.2	3.0	3.7	4.5	5.2	6.0	6.7	7.5	8.2
	15	345	165	195	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9
	30	330	150	210	0.6	1.3	2.0	2.6	3.2	3.9	4.5	5.2	5.8	6.5	7.1
	45	315	135	225	0.5	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.7	5.3	5.8
	60	300	120	240	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4	3.7	4.1
	75	285	105	255	0.2	0.4	0.6	0.8	0.9	1.2	1.4	1.5	1.7	1.9	2.1
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0
75	0	360	180	180	1.0	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9
	15	345	165	195	0.9	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5
	30	330	150	210	0.8	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.6	9.4
	45	315	135	225	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7
	60	300	120	240	0.5	1.0	1.5	2.0	2.5	3.0	3.4	3.9	4.4	4.9	5.4
	75	285	105	255	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0

5 Signalling in Case Warnings have occurred

After one or more warnings have occurred, the decimal point is flashing as long as the warning is pending.



Decimal point



If warnings occur, the function of the gyro compass equipment is not restricted. Elimination of the causes in good time prevents possible failures.
Please, inform authorized service personal!

6 Signalling in Case an Alarm has occurred

Errors, which have occurred within the gyro compass STANDARD 20, are indicated in the digital display as an alarm; the compass internal follow-up system is switched off, the gyro compass supplies no course values, all connected indicators follows the course change no more!

Immediately take the following measures

- switch-over to redundant operating modes (other gyro compass, if possible; operation with magnetic compass)
- contact Raytheon Anschütz Service.

An alarm, which has occurred, is indicated in the digital display by an 'E' (as Error) and by a numeral, for example:



Following errors are indicated:

- | | |
|--|---|
| E1: Operating voltage in compass is faulty | E6: Temperature sensor breakdown |
| E2: Gyro supply faulty | E7: Height of gyrosphere outside of tolerance |
| E3: Encoder faulty | E8: Breakdown in heating |
| E4: Gyro current faulty | E9: Overtemperature >70°C |
| E5: Gyro Compass internal Follow-up faulty | |

7

Switching off the Sensor

The gyro compass sensor is put out of operation by switching off the 24 V power supply.



Caution!

The gyro rotors only come to a standstill after a run-down time of approx. 15 – 30 min after the gyro compass has been switched off. During this time the gyro compass must not be opened for service or similar. Gyrosphere might be damaged!



It is recommended that during times when the ship is in harbour for up to one week, the gyro compass is not switched off.

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