

CHART-WORK – SCALE

Charts are available in different scales depending on their use. For passage planning you would use small scale charts and for close quarter manoeuvring you would use larger scale charts that give more detail. **Charts for the passage from Sydney to the Whitsundays:**

AUS810-825 – small scale charts for coastal navigation. Scale: 1 to 150,000

AUS200-253 – larger scale charts showing more detail for close quarter manoeuvring. Scale ranges from 1 to 25,000 to 1 to 75,000.

Chart No.	Description	Scale
Aus810	NSW - Port Stephens to Crowdy Head	1:150000
Aus811	NSW - Crowdy Head to Nambucca Heads	1:150000
Aus812	NSW - Nambucca Heads to Clarence River	1:150000
Aus813	NSW - Clarence River to Point Danger	1:150000
Aus814	QLD - Point Danger to Cape Moreton	1:150000
Aus815	QLD - Cape Moreton to Double Island Point	1:150000
Aus816	QLD - North Spit to Breaksea Spit	1:150000
Aus817	QLD - Great Sandy Strait and Hervey Bay	1:150000
Aus818	QLD - Sandy Cape to Bustard Head	1:150000
Aus819	QLD - Bustard Head to North Reef	1:150000
Aus820	QLD - North Reef to Port Clinton	1:150000
Aus822	QLD - Port Clinton to Percy Isles	1:150000
Aus823	QLD - Percy Isles to Mackay	1:150000
Aus824	QLD - Penrith Island to Whitsunday Island	1:150000
Aus825	QLD - Whitsunday Island to Bowen	1:150000
DETAILED CHARTS		
Aus200	NSW - Port Jackson	1:25000
Aus204	NSW - Broken Bay	1:40000
Aus215	NSW - Pittwater	1:12500
Aus221	NSW - Solitary Islands	1:50000
Aus235	QLD - Approaches to Moreton Bay	1:75000
Aus240	QLD - Great Sandy Strait (Southern Sheet)	1:50000
Aus241	QLD - Great Sandy Strait (Northern Sheet)	1:50000
Aus243	QLD - Approaches to Bundaberg	1:50000
Aus247	QLD - Keppel Bay	1:75000
Aus249	QLD - Approaches to Hay Point and Mackay	1:75000
Aus251	QLD - Bailey Islet to Repulse Islands	1:75000
Aus252	QLD - Whitsunday Group	1:75000
Aus253	QLD - Whitsunday Passage	1:37500

LONGITUDE & LATITUDE

Latitude runs east-west and is used to measure your position on the globe in the north-south direction. They run from 0° to 90°. 0° is the equator, 90°N is the North Pole and 90°S is the South Pole.

Longitude runs north-south and is used to measure position in the east-west direction. They are also known as meridians. They run from 0° to 180°. 0° is the prime meridian which runs through the Royal Observatory in Greenwich, London.

Latitude & Longitude is measured in degrees (°), minutes (′) and seconds (″). A degree is composed of 60 minutes which in turn comprises 60 seconds.

They can be shown in several ways and it's important to know which method you are looking at :

D°M' S" or D°M.M or D.D°

To convert between:

D M'S = 33°50'22.5"

D M.M = 33° 50.375 (calculation = 22.5/60=0.375)

D.D = 33.83959 (calculation = 50.375/60 =0.83959)

1 minute of LATITUDE = 1 nautical mile. Note that degrees of longitude get shorter as you approach the poles whereas latitude is always the same linear distance.

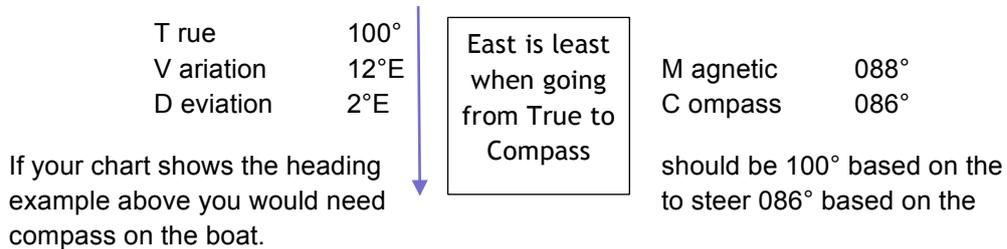
CHART DATUM

All depths (soundings) are measured from the chart datum. Usually this is the lowest astronomical tide, that is the lowest tide that be predicted under average meteorological conditions.

COMPASS

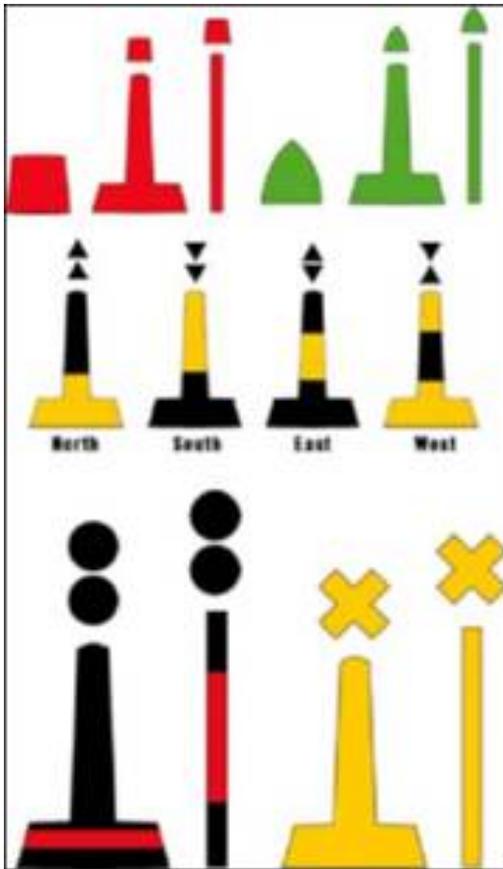
Charts will show the compass in both True and Magnetic. Generally the compass on a boat will show magnetic bearings therefore it's important to convert the true bearings from a chart to magnetic. The difference between the two is called **variation**. This is a different amount in different parts of the world. The variation is shown on the chart.

There is also another difference you will need to take into account when navigating – **deviation** – this is the adjustment you need to make to your boats compass to show magnetic bearing. The reason you need to do this is metals on the boat can influence the compasses reading and not show a real magnetic bearing. Deviation can be found on the compass card on the boat.



AIDS TO NAVIGATION

There are many different aids to navigation as follows:



CARDINAL MARKERS, CHANNEL MARKERS & SPECIAL MARKERS

The IACHLA Buoyage System is a worldwide standardised system created as Region A and Region B. North and South America and the Phillipines use System B and the rest of the world uses System A. The system is made of five buoy types- cardinal, lateral, isolated danger, special and safe water marks

Channel Markers

These show well-established channels and indicate port (left) and starboard (right) sides of the channels.

Port marks

A red can shape. At night, a red flashing light may be shown.

Starboard mark

A green conical shape. At night a green flashing light maybe shown. **Coming In Rule**

When entering harbour (up stream) the red port mark should be kept on the boat's port (left) side the green mark on the boat's starboard (right) side.

Going Out Rule

When leaving harbour (down stream) the red port mark should be kept on the boat's starboard (right) side and the green mark on the boat's port (left) side.

Cardinal Marks - yellow and black

Each indicates where there is deep water close to a danger and they show this relative to the compass. **NORTH** - white light continuous quick flashing light. Pass to North. **SOUTH** - white light 6 quick flashes + 1 long flash. Pass to South. **EAST** - white light 3 quick flashes. Pass to East. **WEST** - white light 9 quick flashes. Pass to West.

Isolated danger - red and black

Indicates an isolated danger, such as a submerged rock. It tells you not to pass too close. Coloured black with one or more horizontal red bands. If lit at night it shows a group of two white flashes. The top mark has two round spheres.

Special marks

Indicates a special area and you should beware. Coloured yellow, if lit at night it shows a flashing yellow light. The top mark is a single yellow cross. Check your chart to find out what is special in the area.

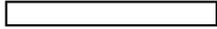
LIGHTHOUSES

For a light, a chart typically lists: color, phase, period, height above chart datum and distance visible from.

COLOUR:

R = red	G = green	Vi = violet	Or = orange
W = white	Bu = blue	Y = yellow	Am = amber

PHASE:

Description	Characteristic	Chart Abbreviation
Alternating		Alt. R.W.G.
Fixed		F.
Flashing		Fl.
Group flashing		Gp Fl.(2)
Occulting		Occ.
Group occulting		Gp Occ(3)
Quick flashing		Qk.Fl.
Very quick flashing		V.Qk.Fl.
Isophase		Iso.
Morse		Mo.(letter)

PERIOD

Time period the light sequence operates in. e.g 90s = every 90 seconds

HEIGHT:

Height of lighthouse above chart datum. e.g. 15m = 15 metres above chart datum

DISTANCE:

Distance from which the light is visible. E.g. 15M = light is visible from 15 metres away.

E.g.

Hornby Light, Sydney Harbour:

LFI 5s 10m 15M

Long Flashing light every 5 seconds at a height of 10m above chart datum with a range of 15 metres

NAVIGATION LIGHTS ON VESSELS



USING PAPER CHARTS

PLOTTING A ROUTE

Each night before dinner plot the route for the next day. Review the chart, along with the weather forecast and plot a route based on all factors available. Mark a few waypoints on the chart and connect with straight line showing bearing and distance (see next steps). Compare to the original plan and understand reasons why it differs.

HOW TO WORK OUT THE BEARING

- Line up your parallel ruler on the line between two way points
- Walk the parallel ruler to the centre of the compass rose
- The ruler will line up on two parts of the rose, select the heading which relates to your direction of travel. (e.g. 090° or 270° if you're heading east the bearing is 090, if you're heading west the bearing is 270°). This gives you the true bearing.
- To determine the course to steer adjust the true bearing to compass bearing using the below:

T rue	100°	East is least when going from True to Compass	M agnetic	088°
V ariation	12°E		C ompass	086°
D eviation	2°E			

SET & DRIFT

This heading can be impacted by the effect of wind, tide and current. The effect of these factors can be adjusted for when you know the set (e.g. **direction** of tide) and drift (e.g. speed of the tide).

An estimate of set and drift can be calculated over time by comparing an expected position with actual position.

HOW TO WORK OUT DISTANCE

Using your dividers - put one end of the dividers on your start point and the other end at your next waypoint. Then, without moving the dividers, place them against the latitude scale (vertical) and read the distance.

Remember: 1 minute of LATITUDE = 1 nautical mile

TAKING A PLOT

- Record GPS co-ordinates from iPad or Chartplotter in the log book
- Plot the coordinates on the paper chart (try and set a routine and do lat then long or long then lat everytime) in pencil. Mark with a cross and write the time (in 24hr clock) neatly against it.
- Check the position against the previously plotted route and determine any adjustment to heading (e.g. to counteract impact of tides, wind or bad steering!)
- Complete the log book entry (weather observations etc)