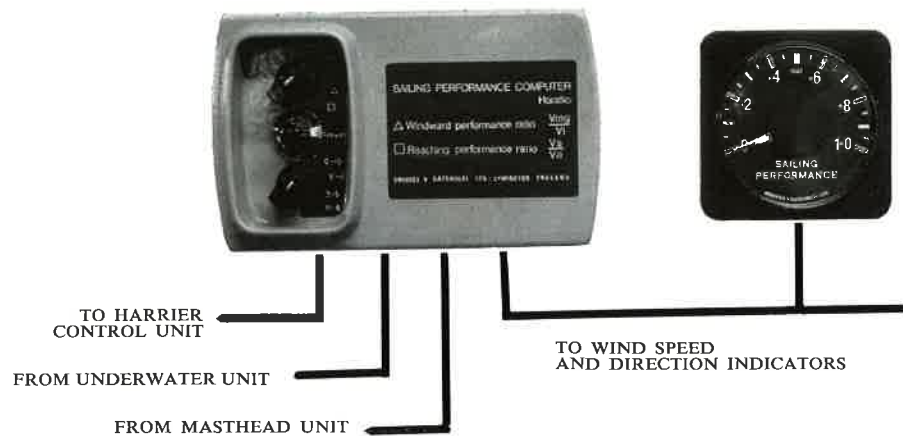


SAILING PERFORMANCE COMPUTER



HORATIO

HORATIO enables a yacht to be sailed to windward to best advantage and thus to reach the windward mark in the least possible time by indicating when the velocity made good (Vmg) to windward has reached its maximum value for the existing strength of wind. It has the additional facility of providing a very sensitive indication that optimum sail trim has been achieved when the yacht is sailing with the wind free.

HORATIO is a fully transistorised analogue computer contained in one of our standard hermetically sealed instrument cases. It accepts electrical wind direction and speed data from the Hengist/Horsa masthead unit and boat speed data from the Harrier or Hermes underwater unit. The read-out dial is a standard 4 in (10 cm) diameter indicator. HORATIO is powered by the yacht's 12-36 volt d.c. system from which it draws a current of only 0.14 amp. To reduce the number of separate instrument cases and also to simplify the cabling arrangements, the Hengist/Horsa electrical circuits have been included in HORATIO and the Hengist/Horsa indicators are connected directly to the case of HORATIO.

When sailing a yacht to windward the helmsman attempts to keep the boat as close to the wind as he can with advantage, intuitively balancing speed through the water against course angle relative to the wind direction. The best compromise is achieved when the speed of the yacht resolved into the direction of the true wind is at a maximum. This quantity is called the speed made good to windward and is denoted by 'Vmg'. HORATIO provides a very sensitive indication of changes in Vmg caused by changes in sail-trim and course angle, enabling it always to be maintained at, or near to, its maximum value. The quantity that is actually computed is the ratio of Vmg to the speed of the true wind, i.e. $\frac{V_{mg}}{V_t}$. This ratio is more useful than Vmg alone since it does not vary significantly with changes in wind speed and therefore enables the crew to continue trimming and steering for maximum efficiency without having to wait for a period in which the wind speed, hence also Vmg, is steady.

For sailing with the wind free HORATIO computes the ratio of the boat's speed (V_s) to that of the apparent wind speed (V_a); i.e. V_s/V_a . This quantity also remains sensibly constant with changes in wind speed, particularly at the lower register of wind speed when the yacht is not approaching her maximum theoretical speed.

The read-out dial is calibrated from 0 to 1. A typical maximum Vmg/Vt reading for a modern ocean racing yacht of 35 ft. L.W.L. is 0.45, while V_s/V_a can reach 0.60 with a beam wind. A switch on the computer enables the sensitivity of the indicator to be increased five times and one then selects the appropriate scale range from the three provided; i.e. 0.2-0.4, 0.3-0.5, 0.4-0.6. Variations of the performance ratio of only 1% can be observed with ease.

SPECIFICATION

Size

Computer case 8½ in × 4¾ in × 3¼ in. (20.7 × 12.4 × 8.1 cm)
Indicator 4 in (10 cm) dia.

Weight

Computer case 3½ lbs (1.75 kg)
Indicator 1 lb (0.45 kg)

Power Supply

12-36V from ship's d.c. supply.
140 mA current drain.

Accuracy

Computer maximum error ± 3% over the practical ranges of the input quantities with wind speeds of less than 20 knots.

Ambient temperature range

0°-60°C.