

## SRA ECHO SOUNDING EQUIPMENT, TYPE PEK-2G (\*)

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### General.

The SRA Echo Sounding Equipment PEK-2G operates with magnetostriction and is designed to provide direct optical indication and graphical recording of the depths of the water below the keel of the ship. It has two ranges 0-100 metres and 0-1000 metres.

The equipment comprises the following main parts :—

Indicator Unit ; Relay Box ; Transmitter ; Receiver ; Junction Box ; Rotary Converter, 220, 110 or 24 volts to 50 volts AC 50 c/s.

### Indicator Unit.

The indicator, the recorder and the amplifier are housed together in a siluminium cabinet, show in fig. 1. The amplifier is placed along the back wall of this cabinet and is kept in position by the recorder unit in front of the amplifier (see fig. 3). When the amplifier is brought in position it is automatically switched-in by fixed plug connectors. Thus it is very easily exchangeable.

The depth indicator and the recorder are mounted on a movable frame which is fixed in the cabinet with hinges. They are driven with constant speed by a common motor. This motor is kept in position by only two knurled screws and is coupled to the depth indicator by a dog clutch, thus being easily changeable.

The switching between the two ranges, 0-100 metres and 0-1.000 metres, is carried out by means of a lever on the front of the depth indicator.

*The depth indicator* has an easy reading scale, graduated from 0-100 metres and 0-50 fathoms. The depth indicator comprises a neon tube radially attached to a rotating disk. This neon tube gives at every sounding pulse a light flash at the figure on the scale which corresponds to the depth. Within the range 0-1000 metres the reading is multiplied by 10. The connections to the rotating neon tube is made without brushes and slirings of any kind via a specially constructed rotating transformer coupled to the relay valve of the amplifier. In the range 0-100 metres about 8 sounding pulses per second are transmitted. In the range 0-1.000 metres the repetition rate of transmitting pulses is only one tenth of this value. It is thus easy to recognize the range being used by observing the rate of flashes of the neon tube.

A cam operated contact on the shaft of the depth indicator controls the relay, which gives the sounding pulses. The sounding pulse is transmitted at the same moment when the neon tube is passing through the zero point of the scale. The moment of the sounding pulse release can be adjusted by regulation of a lever.

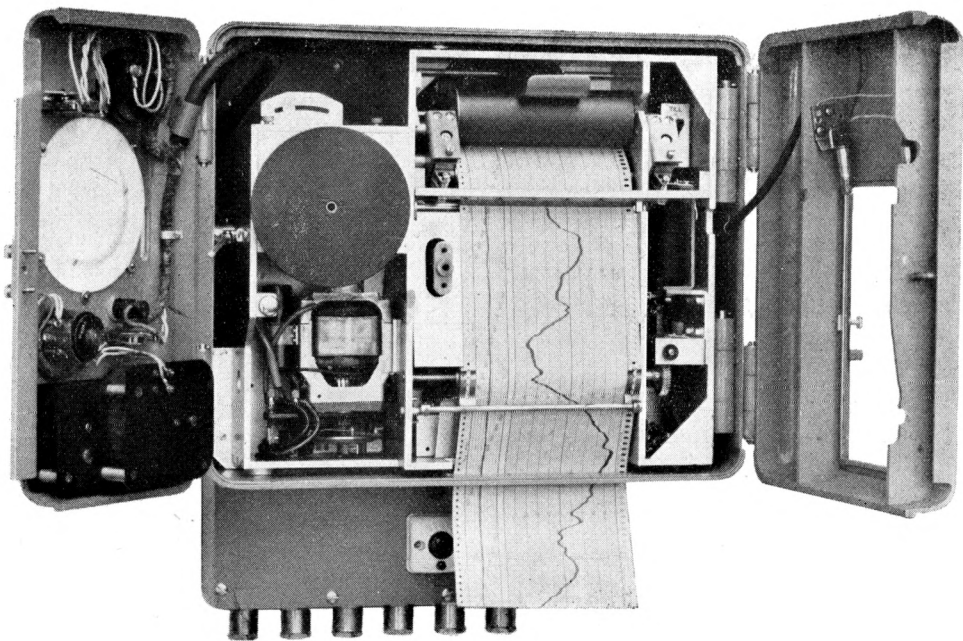
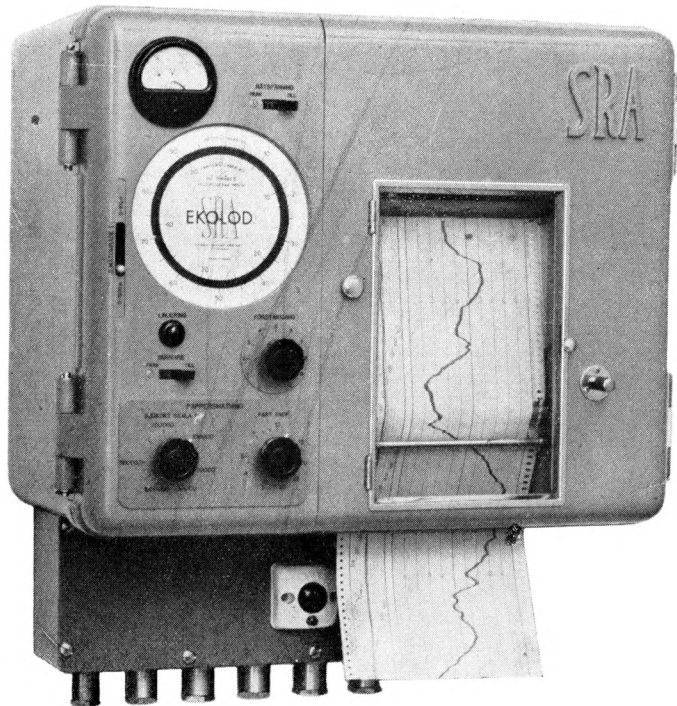
The depth indicator is provided with a further similar contact device blocking the amplifier in the moment of transmission.

*The Recorder.*—A characteristic feature of this equipment is that the recording paper has two parallel runnings, linear graduations 0-1000 metres and 0-100 metres. The first graduation occupies 25 mm. and the latter 90 mm. of the width of the paper. The recorder draws at the same time two curves one within each graduation. The curve in the 1.000 metres range where every 2,5 mm. represents 100 metres is used for reading of the hundred metres figure of the depth while the ten metres figure and one metre figure are taken from the 100 m. graduation, where a depth of one metre corresponds to 0,9 mm. on the paper. Thus the recorder in reality has ten ranges, 0-100, 100-200, 200-300 metres and so on to 900-1.000 m. It passes over automatically from one range to another and the range in use is also recorded automatically on the paper. Manual switching between successive 100 metres intervals is thus avoided.

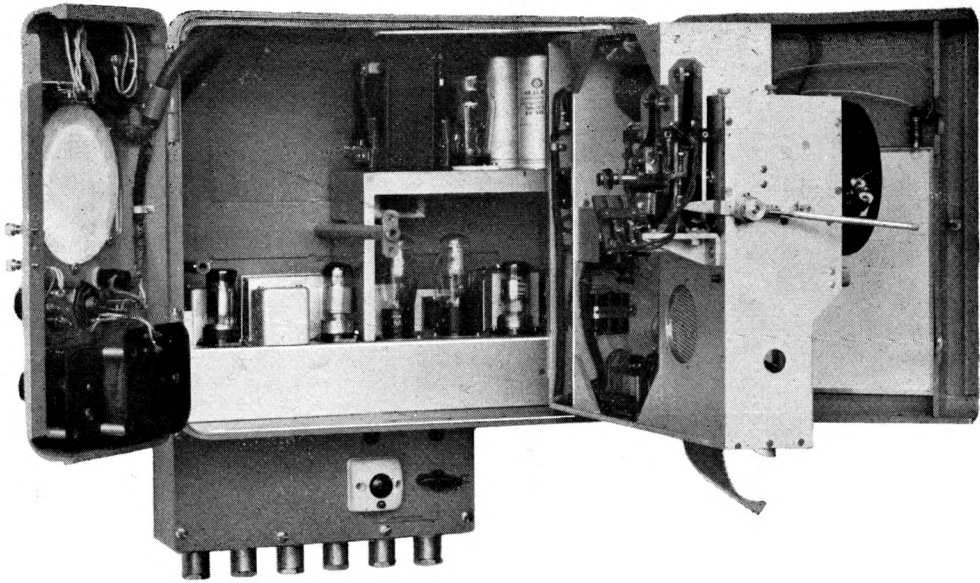
Through the window in the movable door the recording paper can be seen on which the depth curve is registered. The paper runs over rolls and is driven by means of a notched wheel by an impulse motor. The feed speed is continuously adjustable between 0,1 and 2 metres per hour. The paper speed can be adjusted with two knobs graduated in knots resp. chart scale. If the knob marked "knots" is adjusted on a figure which corresponds to the speed

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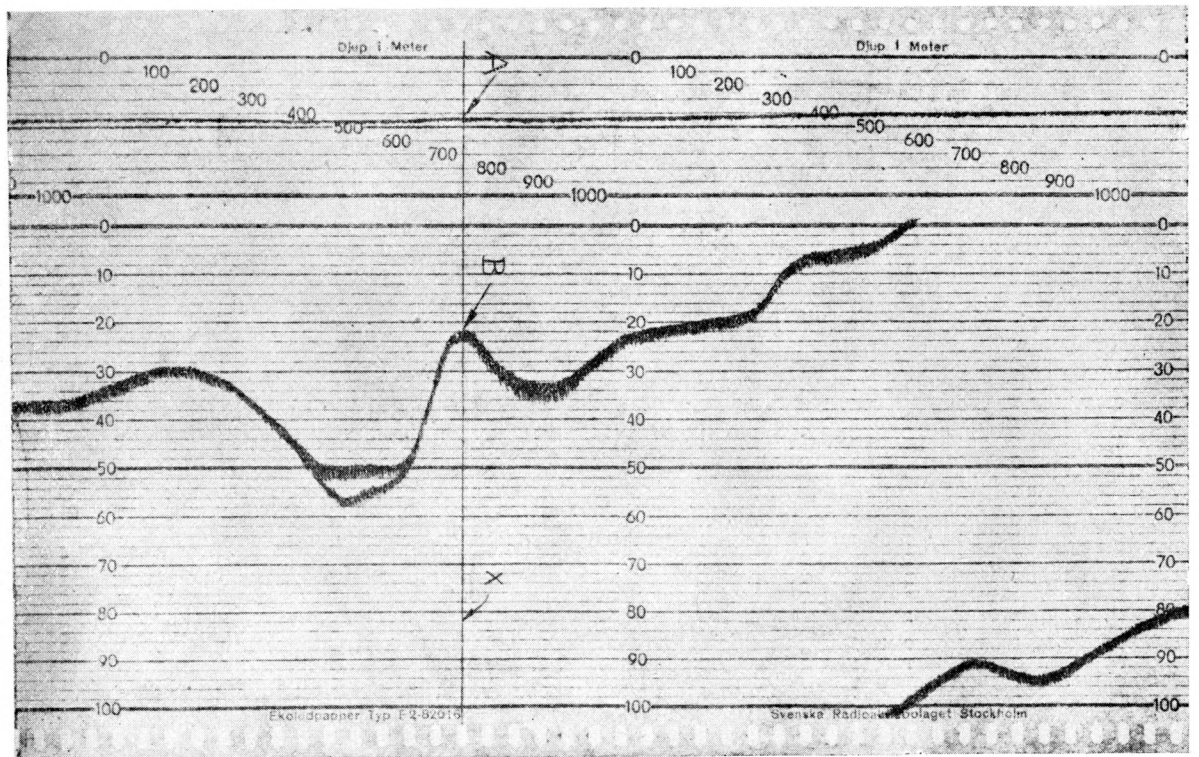
(\*) Manufactured by Svenska Radioaktiebolaget, Alstromergatan, 12, Stockholm.



**Fig. 1 & 2**  
SRA Echo-sounder, PEK-2G.



**Fig. 3**  
SRA Echo-sounder, PEK-2G.



**Fig. 4**  
For depth at X reading should be made at A, i.e. 430 metres approximately.  
The two last figures for exact depth are read at B, i.e. : 22.  
Consequently depth at X is 422 metres.

of the ship and the knob marked "chart scale" is adjusted to the value of say 1:100 000, the paper feed is automatically adjusted to give a record in such a scale that, when the ship moves one nautical mile, the length of the record corresponds to one nautical mile on a sea chart of the scale 1:100 000.

The paper runs through an opening in the bottom of the cabinet and the paper is visible inside the window to a length of about 20 cms. At the opening only about 1 cm. of the paper is hid, thus as a matter of fact all the depth record is always readable. The loading of a new paper roll is very easily carried out. The paper used is of the wax type. The impressions are made on a vibrating bar working against one rotating helix for each scale.

*The amplifier* has two amplification stages consisting of HF pentodes coupled to tuned circuits, the selectivity and transient response being chosen to give the most favourable interference relation. Further it has two gas triodes, working as relay valves for indicator and recorder respectively. The amplification is continuously adjustable by a knob on the front of the depth indicator. Blocking of the transmitting pulse and automatic amplification regulation are provided. The filament and anode tensions and the grid bias provided from a power unit combined with the amplifier.

#### **Relay Box.**

The relay box contains the relay giving the sounding pulses, the high voltage rectifier and its transformer, a charging resistance and a transmitter condenser.

The high voltage transformer is fed with 50 volts AC 50 c/s which over the depth indicator is obtained from the rotary converter.

#### **Transmitter and Receiver.**

The transmitter and receiver are of the magnetostriction type.

The magnetostriction elements operate at a frequency of 22000 c/s and they are made up of thin sheets insulated from each other to avoid eddy currents causing losses i.e. low efficiency. The transmitter winding has fewer turns and thicker wire than the receiver winding. In other respects transmitter and receiver are similar.

They may be mounted on the shell plating of the ship in hull castings, the underneath sides of which are covered by brass diaphragms. The projector is on all but one side packed in sound reducing sponge rubber, surrounded by a bronze box which in its turn is fitted in the above mentioned iron hull casting.

#### **Power Supply.**

The motor of the depth indicator and the transmitter relay of the relay box are fed with DC. The amplifier and the high tension rectifier of the relay box are fed with 50 volts AC from the rotary converter. The total power consumption is about 225 W. The DC supply voltage may be 220, 110 or 24 volts. It must be specified when ordering a sounding equipment.

