SKIPPER ED 161
NAVIGATION SOUNDER
OPERATOR'S MANUAL

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DIAGRAMS
  Recording amplifier.
  Main control board.
  Power supply board.
  Inter-unit connections.
  Transmitter and receiver front-end.
  Alarm and digital depth read-out board.
TECHNICAL SPECIFICATIONS

**SKIPPER ED 161 Navigation Echosounder** is designed to meet the IMCO recommendations for echosounders in merchant vessels.

### Scale range
- **Range setting**: Range
  - 0: Digital depth indicator 0-999 meters, Recorder Off
  - A: 0 - 50 meters
  - B1: 0 - 500 meters
  - B2: 300 - 800 meters
  - B3: 600 - 1100 meters

Feet/Thatch scales are available.

### Transducers
- **Model**: TGM 60-90-25L
- **Frequency**: 50 kHz
- **Type**: Ceramic
- **Active face**: 70 mm circular
- **Beam width**: 30 degrees
- **Housing**: Steel tank
- **Length of cable**: 25 m

### Miscellaneous
- **Digital Depth Indicator**
  - **Range**: 1-999 m
  - **Depth warning**
    - **Range**: 1-999 m
    - **Mode**: Decreasing depth
  - **Warning**: Audio/Visual
  - **Dimensions of cabinet**
    - **Height**: 350 mm
    - **Width**: 330 mm
    - **Depth**: 150 mm
  - **Weight of cabinet**: Net 12 kg, Gross 14 kg
  - **Total gross weight of cabinet and transducer**: 50 kHz with steel tank 40 kg

### Supplementary Equipment
- **SKIPPER IR 201 Digital Depth Indicator with analog trend**
  - Digital Depth repeater for depths down to 999 meters or equivalent recordings in feet or fathoms.

### Receiver
- **Frequency**: 50 kHz or 70 kHz
- **Bandwidth**: 1.5 kHz
- **Bottom recording**: Normal
- **TVG function**: 20 LogR Adjustable
- **TVG range**: 5 - 1000 m
- **Gain control**: Continuous 30 dB

### Recorder
- **Type**: 6 inch belt recorder
- **Paper speed**: Continuously variable
  - Range A: 6 - 12 mm/min.
  - Range B: 1.2 - 2.4 mm/min.
- **Paper type**: Dry, TP6 - T16
- **Pulses per minute**
  - Range 0: 44
  - Range A: 272
  - Range B: 27.2

### Voltage supply
- **Main voltage**: 220 V AC/110 - 40 V DC
- **Power consumption**: 50 Watts
External controls

Depth warning selector.
This push-button selector provides setting of any warning depth down to 999 meters. The selected depth is shown on the depth warning indicator (Green figure).
When the depth becomes less than the pre-set value a buzzer will start and the digital depth warning indicator will blink. The warning signals will stop when recorded depth is deeper than the pre-set warning depth, or when zero-setting the depth warning selector.

Range Selector
Recorder On/Off.
This control selects the basic ranges according to the table given under technical specifications. In position 0 the recorder is switched off and the depth will be shown only on the digital depth indicator.
The depth warning and any remote depth indicators will be operational.
INTERNAL CONTROLS

1. Scale illumination lamps

2. Control illumination lamps

3. Paper speed control
   All ranges: 1.2 - 12 mm per minute continuously variable.

4. Time varied gain/TVG control
   Regulates the receiver amplification in the shallow water range.

5. Marker control
   A black line is drawn across the echogram when the knob is depressed.

6. Audio Alarm

7. Depth warning audio - On/Off

8. Mains selector

9. Fuse holder
   Fuses:
   12 V - 4 A
   24 V - 2 A
   32 V - 1.5 A
   220 V - 0.3 A

10. Zero-line adjuster
    For adjustment of the zero-line to correspond with the scale.
    By moving the zero-line downwards corresponding to the ship's (transducer's) draft true water depth is read on the echogram.

11. Recording stylus
    Contact spring

12. Trigger magnet
1. Switch off the echosounder.
2. Rotate the pen belt so that the recording pen is located at the back.
3. Take hold of the top front of the paper cassette, pull it out and let it swing down carefully.
4. Pull out the end disc knob for the magazine and remove the used paper roll.

5. Transfer the empty spool from right to left side and make sure that the end supporting discs enter the spool.
6. Insert a new roll of recording paper and thread the paper as shown on the figure.
7. Thread the end of the paper into the slot in the paper spool and turn the spool to tighten the roll.
8. Lift and lock the paper cassette in the recorder.
MAINTENANCE

General
This chapter deals with the maintenance work that may be done by the user. Major repairs and overhauls should be left to an authorized SKIPPER service engineer.

Cleaning
Keep the cabinet clean and dry. If desired, the cabinet may be polished with a good car wax. Take care not to wax the acryl window and front plate. This should be cleaned with ordinary soap and a wet cloth.

The transducer normally needs little attention. However, the radiating face should be cleaned when docking. Use syntetic soap. Marine growth may be removed with a piece of wood, whereupon the radiating face is carefully cleaned with fine-grade sand paper or emery paper.

The radiating face must not be painted
The recorder should be cleaned at regular intervals. A brush is fine for this purpose.

Oiling
Normally no oiling and greasing is required. If necessary apply only one drop of oil on moving parts.

Adjusting the recording pen
The recording pen has a magazine of thin steel wire which must be pulled out when the tip is worn down. This is usually done every time a new roll of paper is inserted.
1. Switch off the echosounder, open the cabinet door and rotate the pulley till the pen is in front.
2. Remove the pen from its holder.
3. Hold the pen as shown with a pair of pliers. Pull the wire slowly out from the thin guiding tube. Be careful not to damage the tube. Final length of wire outside the tube should be 10 - 12 mm (3/8 - 1/2 inch). If the wire has been pulled out too far, cut to correct length.
4. Straighten the wire as an extension of the guiding tube. The pen should be bent slightly to the left.

Spare Parts
With the echosounder a spare part kit is supplied:

- 8 es fuses
- 5 es scale lamps
- 2 es recording pens
- 2 es trailing contacts

Spare part Reg. No. 160-1
Replacing fuses:
SKIPPER ED 161 has one fuse which is located inside the cabinet. Switch off the echosounder before carrying out any replacement.

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>32</td>
<td>1.5</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>220</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Replacing illumination lamps
SKIPPER ED 161 is furnished with 4 illumination lamps located inside the front door. Switch off the echosounder before carrying out any replacement.