

SEARCH AND RESCUE  
RADAR TRANSPONDER

# MUSSON – 502

Technical Description



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# 1. INTRODUCTION

1.1. SART MUSSON-502 (hereinafter – SART) Technical Description is intended as a guide in operating principle and specifications.

1.2. Prior to operating SART, refer to Technical Description, Service Log, as well as to Schematic Circuit Diagram.

## 2. PURPOSE

2.1. SART is designed for positioning an object in distress by 3-cm range radar of vessels in the area. SART is installed on vessel survival lifeboats or other survival facilities.

2.2. SART responds automatically to 3-cm radar outgoing pulses. The SART code displayed on the radar screen, is a series of dots extending radially outwards from the location of the transponder. SART provides positioning in a range of least 5 nautical miles with its antenna 1 meter and radar antenna 15 meters above sea level.

2.3. SART operating conditions are as follows:

temperature range: from minus 20°C to +55°C, operating,

from minus 30°C to +65°C, standby;

vibration in 5 - 80 Hz range with 1.6 mm amplitude for 5...13.2 Hz frequency and acceleration 1 g (10 m/s<sup>2</sup>) for 13.2 -80 Hz frequencies;

impact load with acceleration 10 g (100 m/s<sup>2</sup>) at 40 - 80 impacts per minute;

relative humidity of 95 % at 40°C temperature;

salt (sea) fog, frost, dew, icing;

rolls and tilts.

2.4. SART meets requirements of Russian Register Regulations on Sea Vessel Conventional Equipment, Safety of Life on Sea (Conventional) (SOLAS - 74), IMO resolutions, CCIR recommendations and IEK standards. SART is manufactured under Register supervision.

### 3. SPECIFICATIONS

3.1.SART basic parameters and characteristics are specified in Table 1

Table 1

Description	Norm
Frequency band, MHz	9200...9500
Receiver effective sensitivity, dBm, min	minus 50
Effective radiated power, mW, min	400
Radiated pulse period, mcs	100
Re-adjustment pulse	Sawtooth
Re-adjustment period, mcs:	
Forward	7.5+-1
Return	0.4+-0.1
Received pulse paralysis time, mcs, min	10
Response delay, mcs, min	0.5
Operating life, hs, min	
standby mode	96
response mode	8
Polarization	Horizontal
Antenna:	
vertical, min	+/-12.5°
Horizontal	omnidirectional with +2 dB drift
Request parameters:	
period, mcs	0.05...1.5
repetition, Hz	400...4000

3.2. SART gives confidence to survivors by visual indication (LED flashes). Similarly, SART responds to radiation by outgoing pulses (LED flashes).

3.3. SART mass without battery, is 1.2 kg, max.

3.4. SART color - orange.

3.5. SART has positive floatability.

### 4. COMPONENTS

4.1. SART components are specified in Table 2.

Description	Quantity	Note
SART , complete with bracket and battery	1	
Service Log	1	
Certificate of MC1.1	Not included for Export	

## 5. ARRANGEMENT AND MOUNTING

5.1. SART (with a bracket) is arranged in vessel side rooms nearby exits.

5.2. The bracket is designed for mounting SART on a vessel wall and preventing it against accidental activation.

5.3. SART installation dimensions are specified in the outline drawing (Appendix 1). SART installation versions are given in Appendix 2.

5.4. In distress, SART is removed from the vessel wall and installed in life survival facilities according to Appendices 3, 4. SART has a console assigned for SART holding in hands in survival vessel such as lifeboat. If it is impossible to install the SART in special place or keep it in hands SART has to be installed on a maximum height but not less than 1 meter above the sea surface.

## 6. MARKING

6.1. The following data is found on SART body label:  
Manufacturer trademark;  
SART index;  
serial number;  
date of manufacture;  
brief operating instructions in Russian and English;  
due batteries replacement date.

## 7. MAINTENANCE

7.1. SART maintenance includes preventive inspection and check for serviceability after battery cell replacement but not less than once a year.

7.1.1. SART preventive inspection includes check for damage, seal availability and due cell replacement date. Preventive visual inspection is provided prior to putting a vessel to sea.

7.1.2. SART check for serviceability includes visual inspection, switching on and its operation in connection with vessel radar.

7.2. SART is checked for operability as follows.  
Remove a seal from a bracket (see Appendix 2).

Remove SART from a bracket.

Switch SART on turning the knob clockwise and setting into the ON-position.

Check that the LED found in the knob transparent window, is on.

SART is ready for operation.

Switch SART off turning the knob counterclockwise. As a result, the LED indicator is off.

Switch vessel radar on.

Install SART at 3 - 5 mile distance from the radar antenna and switch SART on.

SART can be checked by any test device which has Russian Maritime Register Approval.

## **Note**

SART is stable to electromagnetic radiation of 621 W/sq.m power density. It corresponds to SART location at 60 m distance from a radar which radiates 30 kW pulses. NEVER position SART to the antenna of the operating radar nearer of said distance.

In response to radar operation in the 3-cm range, the SART LED indicator starts to blink instead of constant glow. Simultaneously, 12 radial dots appear on the radar screen (in pairs).

To save SART batteries and to avoid interference with other operating radars, SART serviceability check time should be as short as possible. The SART indicator stops to blink in some seconds after stopping its radiation. Switch SART off. Mount SART onto the bracket and seal.

### **7.3. Battery cell replacement.**

The batteries have to be replaced after 4 years since the date of issue. For replacement use only SAFT LSH-14 batteries.

Unscrew and remove cap with cantilever. Remove ring and switching handle. Remove a fuse found on PCB. Pulling a cord found on said PCB, withdraw carefully the SART electronic unit from cap. Remove gasket. Check the position of LED PCB locking guides. Holding LED PCB by a hand, undo and remove screws and washers. Raise LED PCB a little and remove battery cells from compartment. Insert new cells according to polarity indicated on the LED PCB. Orientate LED PCB to the widest slot of compartment by the guiding locks. Mount the LED PCB and fasten by screws. Put gasket. Insert the SART electronic unit into the cap. Insert a fuse on the LED PCB. Set the switching knob into the OFF-position. Match marks on the cap and switching knob by rotating the module. Ensure that gasket seals cap tightly along its base. Put ring. Put and screw in the cap - cantilever assy until home.

Check SART for serviceability after replacement of cells according to p.7.2.

Note:

Protect the SART electronic unit against shocks. Never put said unit on conducting surfaces. Never close unit contacts.

WARNING:

SART lithium cells are dangerous. NEVER short-circuit the cells, heat above 70 C, solder or weld on the body, store waste cells in non-standard place.

## **8. CONTAINERS AND PACKING**

8.1. SART is accepted by Quality Inspection Department, installed in a bracket, put into polyethylene cover.

8.2. The individual package is put into a wooden case. For Export Service package depends on quantity.

## 9. ACCEPTANCE CERTIFICATE

SART MUSSON-502, serial number \_\_\_\_\_  
meets the specifications and found fit for service.

Date of manufacture \_\_\_\_\_

Stamp here

Signature of person  
in charge of acceptance \_\_\_\_\_

The standard guarantee of the manufacturer is 12 month since the day of device selling, if the guarantee is not noted in the contract.

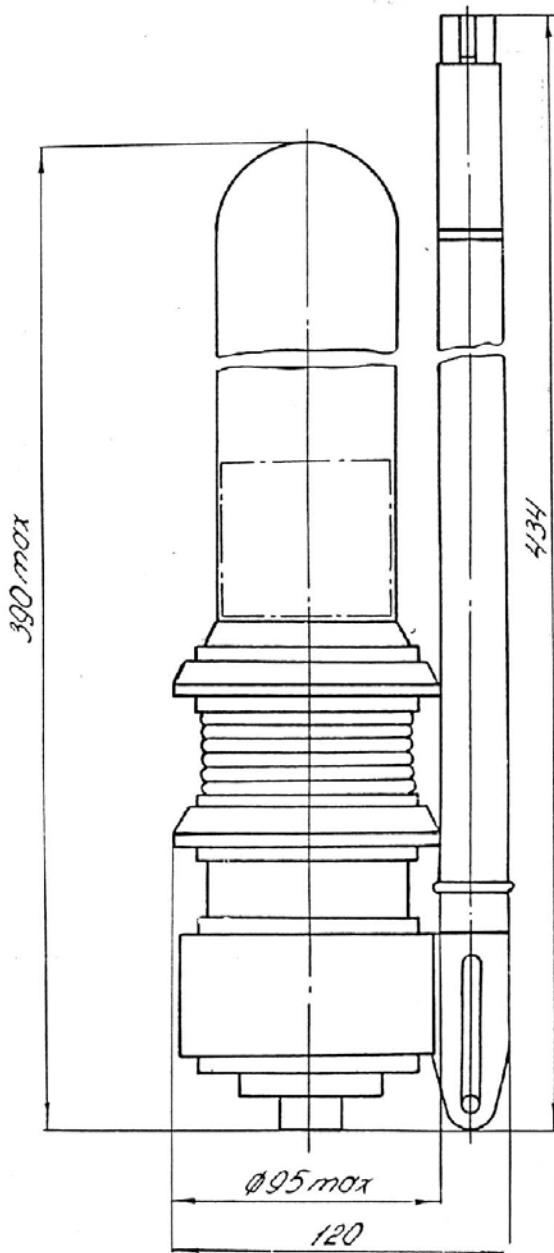
Manufactured: Musson Marine Ltd  
P.O. Box 20, 99053, Vakulenchuk Str 29/4a  
Sevastopol, Ukraine  
Tel: + 38 0692 238081 Fax: + 38 0692 557123  
E-mail: vb@mussonmarine.com  
Website: www.mussonmarine.com

## 10. RECORD OF TECHNICAL INSPECTIONS

Date	Results	Next inspection due	Post, name and signature of inspector

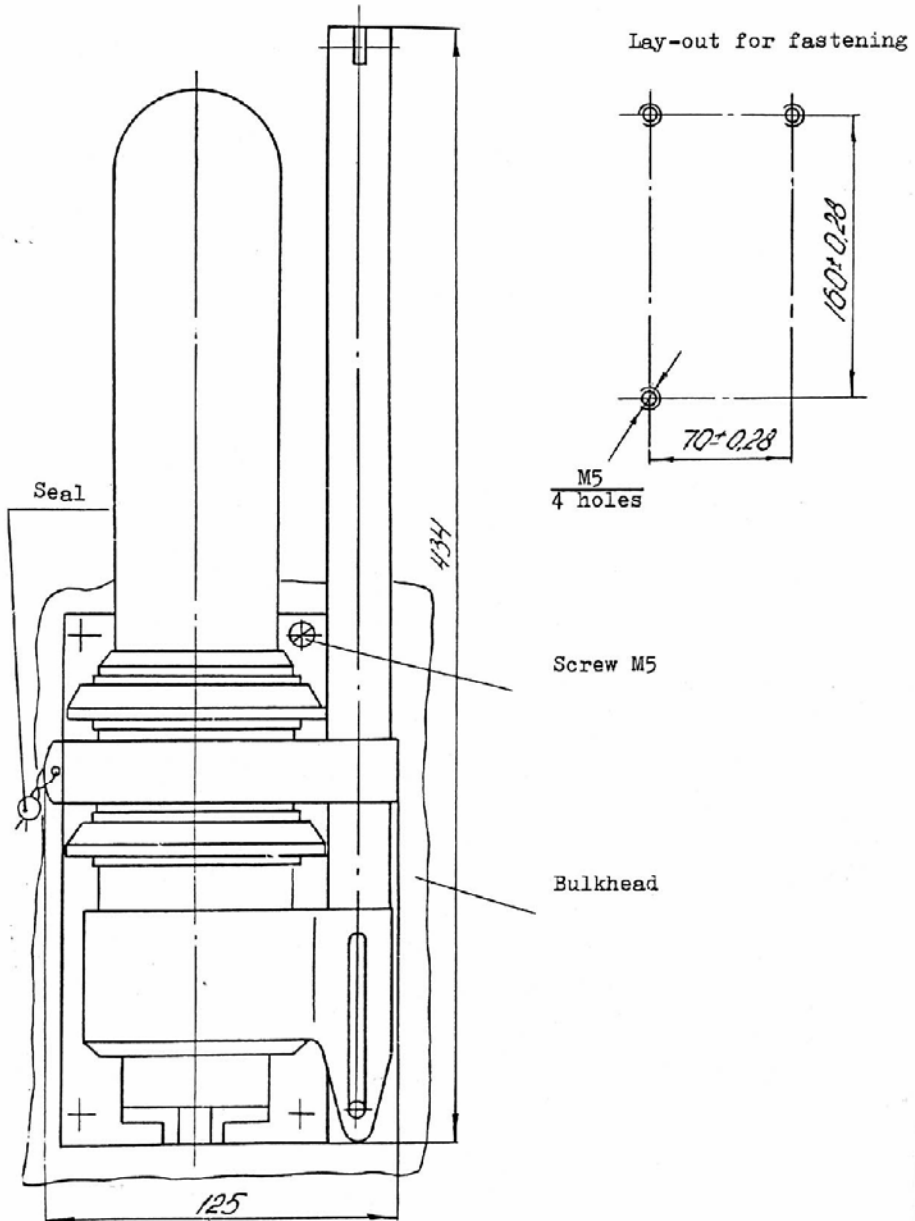
## 11. BATTERY REPLACEMENT

Date	Type of replaced battery cell	Type of spare battery cell. Date of manufacture	Post, name and signature of person in charge of replacement.

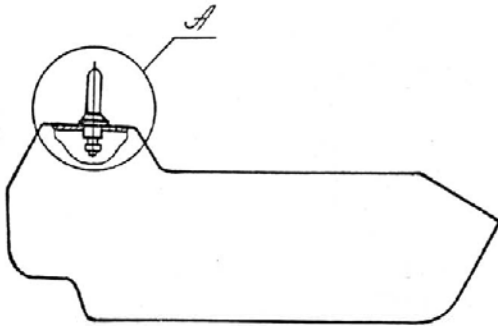


S A R T OVERALL DIMENSIONS

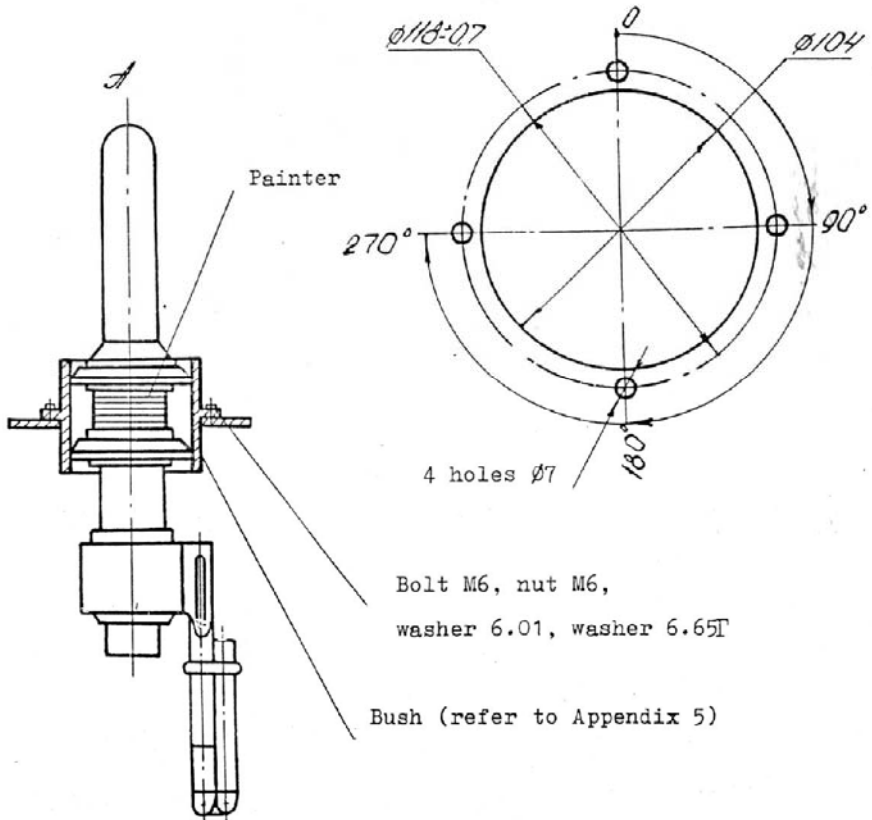
S A R T INSTALLATION ON SURVIVAL BOAT



S A R T INSTALLATION ON CANOPY RAFT



Lay-out of bush fastening



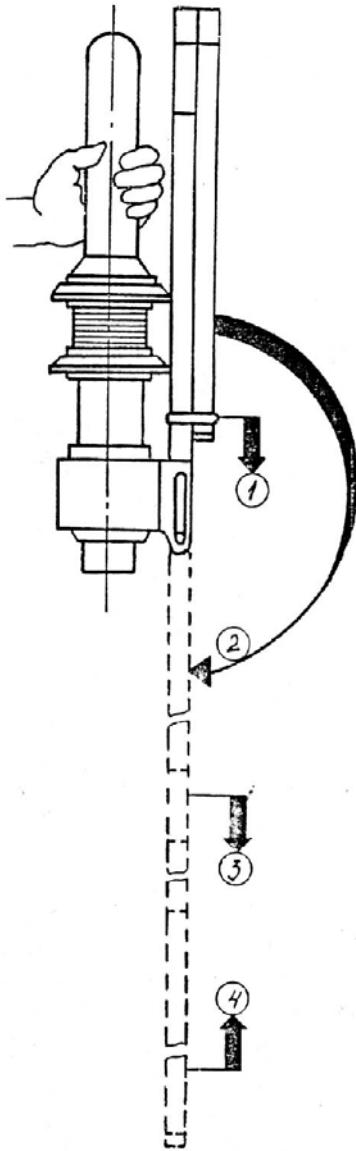


DIAGRAM OF S A R T CANTILEVER DEVELOPMENT