OPERATIONAL DESCRIPTION

1 REVISION HISTORY

Issue	Date	Issued by	Modification
1	2002-11-11	GU-CFJ	Created

2 GENERAL INFORMATION

Manufacturer: Saab Marine Electronics AB
Contact: Carl Fjelkner
Email: carl.fjelkner@emersonprocess.com

FCC ID: K8C5401

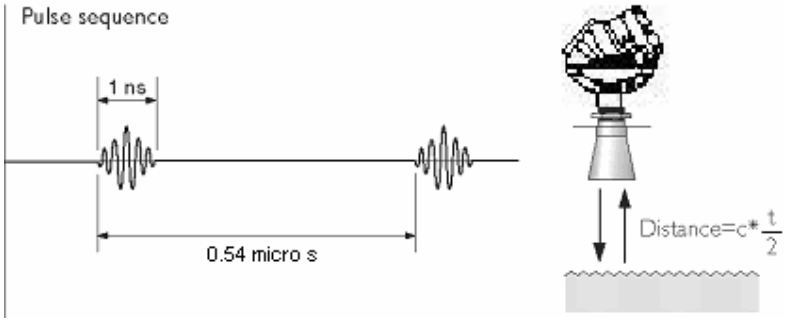
3 DOCUMENT INFORMATION

This document is a supplement to the 5401 Model Technical Description and describes the operation of the 5401.

Note: For block diagrams and a description of the function of the different boards please see attachments submitted under “5401_Blockdiagram”.

4 DESCRIPTION OF OPERATION

The level of the liquid is measured by short radar pulses which are transmitted from the antenna at the tank top towards the liquid. After the radar pulses are reflected by the liquid surface the antenna picks them up again. The distance from the gauge to the liquid is proportional to the time of flight of the microwave pulse.



Picture 1: Measurement principle

The measuring cycle is about 0.112 second. The first 0.035 second the echo pattern is acquired. A transmitter trigger that has a frequency of 1.8432 MHz produce the transmission pulses. The rising edge of the transmitter trigger generates the transmitter pulses which have a width of approximately 1ns. The frequency of the transmission pulse is 6.3GHz. The frequency tolerance is within ±100 MHz.

The sampling pulse for the receiver circuit is generated with a delay relative to the transmission pulse. The sampled signal is then time expanded and the received echo is expanded from 1 ns to 0.45 ms. The time expanded echo is easy to handle because of low speed signal.

The flight time between the transmitting pulse to the pulse reflected by the surface is measured in the expanded time domain and scaled with the known expansion factor.

The sampled signal frequency band becomes low and operational amplifiers amplify approximately +60dB before outputting the received echo signal to an A/D converter on the microprocessor board (MB).

After acquisition of data, signal processing is performed. The clock frequency of the microprocessor on the microprocessor board (MB) is 3.6864 MHz.

Simultaneously with the measuring function, the microprocessor handles communication through a external serial communication interface .

The following antennas are available:

Antenna	Gain
Cone 2”	Only used in pipe installations.
Cone 3”	Only used in pipe installations.
Cone 4”	14 dBi
Cone 6”	18 dBi
Cone 8”	20 dBi