

PRINCIPLE OF OPERATION OF THE PULSE RADAR ABM300/400-XXXR

Pulse radar transmits pulses of about of 6.3GHz with duration of **1.5ns**. **Turning on a microwave oscillator for duration of about 1.5ns creates these pulses. The modulation is a pulse desensitization.** These pulses stimulate dominant mode TE10 of rectangular resonator. The resonator is coupled to rod antenna. Reflecting pulses from an object are received by rod antenna that is coupled with the rectangular resonator and receiver circuit. The receiver circuit is connected to mixer and **at the output of the mixer a slow motion echoes are obtained.** **Repetition rate is decided by PLL circuit and is equal to 280ns.** Reflected pulses from objects return to the receiver and being stretched and slowed down using down sampling process controlled by PLL circuit. Two oscillators in the PLL circuit run 54Hz frequency difference. This low frequency is a new span for stretched and slowed down pulses. Echo envelope is converted to a digital marker that is monitored by a microprocessor. Microprocessor calculates distance and converts its timer to 4mA to 20mA current output. ABM300 models are 24Vdc supply (12Vdc to 30Vdc) and ABM400 are 115Vac or 230Vac supply.

Type of modulation used in the pulse radar: it is a pulse modulation with carrier frequency equal to 6.3Ghz. The duration of the burst (pulse) is 1.5ns.

Repetition rate: The repetition rate is 280ns

Duty cycle is calculated as ratio of the pulse width to repetition rate $1.5\text{ns}/280\text{ns}=5.36\text{e-}03$,

Theoretically **signal bandwidth** is $2/T$, where T is the pulse duration equal to 1.5ns, so the bandwidth is equal to 1.33GHz with the center frequency 6.3GHz, so it is 6.3Ghz +/-665MHz