Equipment for suppression, reproduction and disposal of the bee mite in bee colonies VK30-5

1. Intended use

VK30-5 device is designed to suppress the reproduction and eliminate the mite Varroa destructor in bee colonies in a way that does not contaminate the hive environment and also allows its almost year-round continuous deployment.

2. Technical conditions

Battery (recommended): Battery consumption: Volume (1 speaker): Number of speaker outputs: Number of speakers: Number of adjustable frequencies: Operating temperature: Relative humidity - non-condensing: Coverage: Recommended lid height: Diameter of the speaker hole The lid is insulated on the inside ± 6 VDC/12 Ah (2x) max. 55 mAh 105 dBSPL 5 1x5, 2x5, 3x5 8 0 °C to 55 °C 90 % IP 20 8 to 10 cm 78.0 mm. Non-woven fabric is recommended

3. VK30-5 SofiTronic unit and cap

Fig. 1: VK30-5 SofiTronic unit and cap





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4. Block diagram VK30-5

Fig. 2: VK30-5 system



5. Monitoring the status of the batteries, charging



VK30-5 is powered by two standard motorcycle 6-volt batteries.

The monitoring module 6 checks their charge status. If the total voltage of the batteries drops below $2 \times 6 = 12.0 \text{ V}$, the VK30-5 will automatically switch off. Switching on again is only possible after the batteries have been charged to at least 12.5 V.

The batteries (2 x 6 = 12 V) are charged as one standard 12 V battery to the value shown in Table 1. This is ensured by the charging system. The interconnection of the batteries is provided by the VK30-5. See Fig. 2. The charging current should not exceed 0.1 amp-hour capacity of the battery. For example, batteries with a capacity of 10.0 Ah can be charged with a maximum current of $0.1 \times 10 = 1.0 \text{ A}$.

It is possible to buy 6-volt batteries from several manufacturers that have different characteristics. These are summarized in the following table.

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Relative Battery Capacity						
Charge Level v %	Maintenance-free batteries Battery voltage (V)	Gel batteries Battery voltage (V)	AGM Batteries Battery voltage (V)			
100 %	12,70+	12,85+	12,80+			
75 %	12,40	12,65	12,60			
50 %	12,20	12,00	12,00			
25 %	12,00	12,00	12,00			
0 %	11,80	11,80	11,80			

Table 1. The most commonly	y used batteries
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6. Activating the system

Once the batteries are connected, we can activate the system by pressing the ON button. When the ON button is pressed, the indicator LED is on. If the battery is charged to a voltage greater than 12.5 V, the indicator LED that indicates operation will remain lit even when the ON button is released.

The VK30-5 generates the selected frequency according to Tab. 2 until the battery voltage drops **below 12 V**.

If the battery voltage is less than 12.5V, the system cannot be activated/started, the signal LED will stop lighting when the button is released. The battery still needs to be recharged.

7. Ultrasonic Signal Generator, Frequencies

The ultrasonic signal generator module 9 can generate 2^3 = 8 different frequencies using three buttons (see Fig.1) 2 kHz, 4 kHz, 8 kHz. Frequency deviation: $\leq \pm 5\%$.

I Button pushed; **B**utton not pushed

Tab. 2: Setting the frequency of the ultrasonic signal. Recommended frequency: 20,500 Hz.

2 kHz	4 kHz	8 kHz	Frequency in Hz
Ļ	Ļ	↓	14 500
Î	↓	-	16 000
↓	Î	-	17 000
Î	Î	-	18 500
-	-	Î	<mark>20 500</mark>
Î	↓	Î	23 000
↓	Î	Î	25 000
Î	Î	Î	28 500

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8. Piezo – speakers

Unlike conventional loudspeakers, piezo loudspeakers "distinguish" the polarity of the signal. Their terminals are marked with + and - (minus) symbols. Therefore, it is important to connect the speakers exactly according to Fig. 3 so that their membranes oscillate in the same direction.

Fig. 4: Legend to the figures: see Fig. 2: VK30-5 system



9. Non-woven fabric

It is used for thermal insulation of the lid and to **suppress ultrasonic reflections**. The recommended thickness is at least 2 mm.

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