



MAINTENANCE-FREE BATTERY

v.1.0

Application battery selection.

1. Theory.

When choosing a buffer battery for application, the parameter of support time during battery operation. PN-EN 50131-6 standard – "Alarm systems – Breaking signalling system – Part 6 Feeders" determines this time with the following formula:

$$Q_{AKU} = 1.25 * [(I_d + I_z) * T_d]$$

where:

Q_{AKU} – battery volume [Ah]

1,25 – ratio taking into consideration the battery volume loss as a result of aging

I_d – energy consumed by receptions during the supervision [A]

I_z – energy consumed by individual needs of the feeder [A]

T_d – required time of supervision [h]

Used batteries dedicated for Pulsar feeders (alarm systems, access control, etc.) should meet the requirements for SLA or VRLA (SLA /Sealed Lead-Acid/, VRLA /Valve Regulated Lead-Acid/) maintenance-free lead-acid batteries. SLA batteries are composed of: three links – 6V version or six links: 12V version.

Battery volume depends on many factors, the one stated by the manufacturer concerns properly loaded battery, in 20°C, discharged by direct current for 20 hours. Battery volume in low temperatures drops to the level of: 10°C – 95%, 0°C – 85%, -10°C – 75%, -20°C – 65%. Whereas the increased working temperature lowers the battery life, each temperature increase of working temperature with +8°C shortens the lifetime by half. That is why when assembling in feeders and housings it is necessary to ensure proper distance from fixed elements and proper air circulation around the battery.

The following working phases have been detected:

Charging: batteries should be charged with direct voltage with current constraint. Recommended initial charging current should equal 0.1C [A] (maximum 0.3C [A], where C – battery volume). Charging voltage during buffer operation should range between 2.25 and 2.30 V/link (recommended 2.275 V/link), which is between 13.5 and 13.8 V for 12V batteries. In case of batteries working in environment with high temperature fluctuations, the feeder should be equipped with temperature compensation system or charging (exit) voltage regulation, which would allow to change charging voltage with temperature change (temperature condensation factor equals -3.3 [mV/°C/link] up to 20°C.).

Discharging: maximum momentary (5 sec) discharging time equals 15C, direct discharging current should equal 1C-2C (where C – battery volume). Final link voltage is a critical discharging parameter, which is connected with discharging current. Pulsar feeders equipped with a system protecting the battery against excessive discharging (UVP) have a threshold set on the level of 1.65V/link (10V for 13.8V feeders and 20V for 27.6V feeders). In case of using feeders without the above-mentioned protection, it is not advisable to discharge the battery below the voltage presented in the table.

Discharging current [A]	Minimal voltage [V/link]
$I < 0.2 C$	1.75
$0.2 C < I < 0.5 C$	1.70
$0.5 C < I < 1.0 C$	1.55
$I > 1.0 C$	1.30

2. Sample data.

Table presenting approximate maximal battery discharging time with direct current, the measure accepted minimal final voltage of 1.65V/link, and the ambient temperature equals 25 °C.

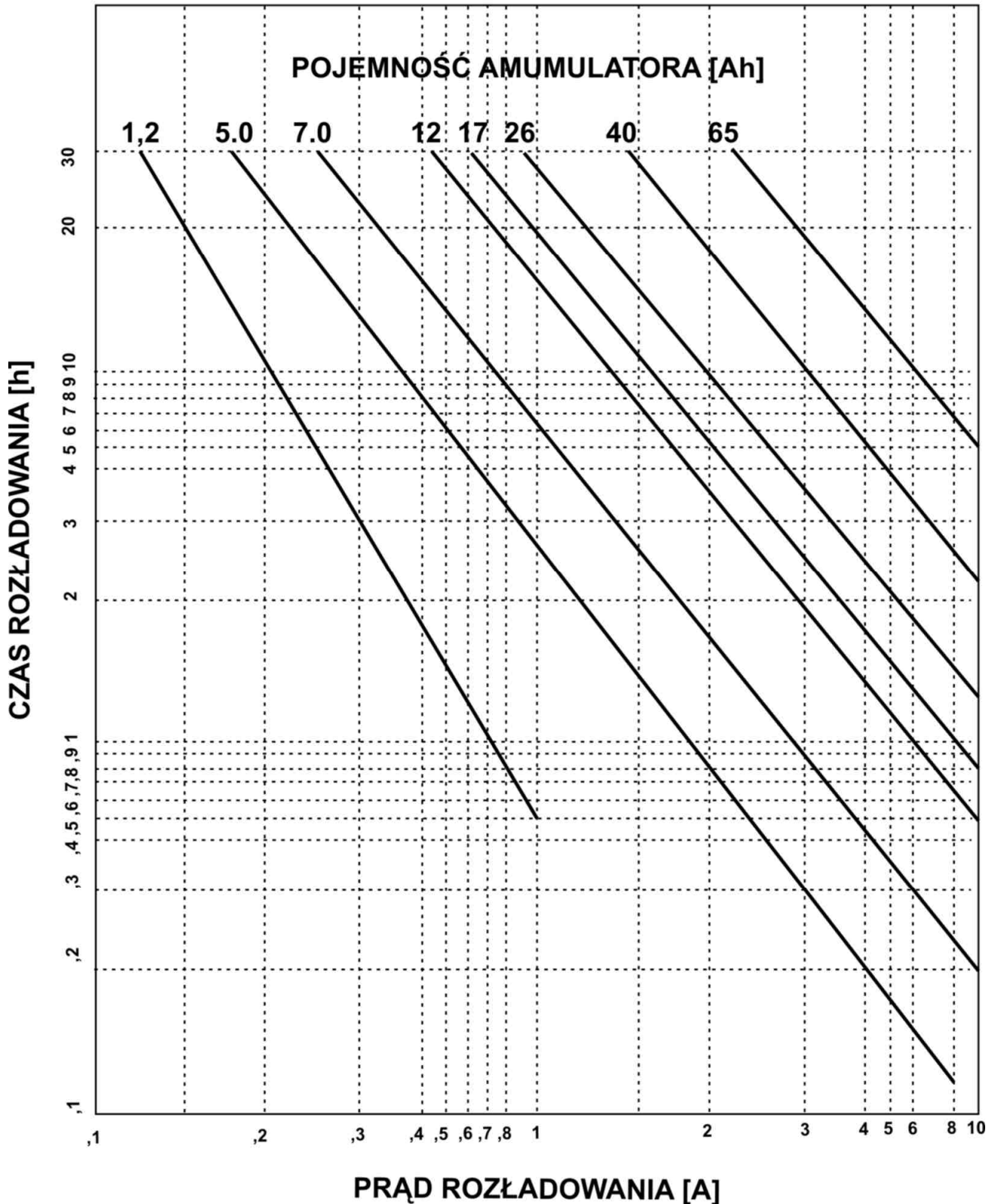
ALARMTEC BP Mark	30min	40min	50min	1 h	2 h	3 h	4 h	5 h	6 h	8 h	10 h	20 h
BP 5-12	5.6 A	4.4 A	3.7 A	3.19 A	1.7 A	1.2 A	0.9 A	0.8 A	0.7 A	0.5 A	0.4 A	0.2 A
BP 7-12	7.8 A	6.2 A	5.2 A	4.4 A	2.4 A	1.7 A	1.3 A	1.1 A	1.0 A	0.8 A	0.6 A	0.3 A
BP 12-12	13.5 A	10.7 A	8.9 A	7.6 A	4.1 A	2.9 A	2.3 A	2.0 A	1.7 A	1.3 A	1.1 A	0.6 A
BP 18-12	19.1 A	15.2 A	12.6 A	10.8 A	5.8 A	4.2 A	3.3 A	2.8 A	2.4 A	1.9 A	1.6 A	0.9 A
BP 26-12	29.7 A	23.5 A	19.5 A	16.7 A	9.0 A	6.5 A	5.2 A	4.4 A	3.8 A	2.9 A	2.4 A	1.3 A
BP 40-12	44.9 A	35.8 A	29.7 A	25.5 A	13.7 A	9.9 A	7.9 A	6.7 A	5.8 A	4.5 A	3.7 A	2.0 A
BP 65-12	72.8 A	58.2 A	48.5 A	41.5 A	22.3 A	16.1 A	12.9 A	10.9 A	9.4 A	7.3 A	6.1 A	3.2 A
BP 80-12	91.7 A	72.1 A	59.8 A	51.4 A	27.6 A	19.9 A	15.9 A	13.5 A	11.7 A	9.1 A	7.5 A	4.0 A
BP 100-12	115.2 A	90.7 A	75.3 A	64.6 A	34.8 A	25.0 A	20.0 A	20.0 A	14.7 A	11.5 A	9.5 A	5.0 A

(approximate parameters for ALARMTEC BP batteries, detailed data can be found on the manufacturer's/distributor's site).

Diagram: discharging time in current discharge function

BATTERY VOLUME [Ah]

Wykres: czas rozładowania w funkcji prądu rozładowania.



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