



Cold performance testing of aftermarket sodium 12V batteries

ALBA 2026, Mainz

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Cold performance testing of aftermarket sodium 12V batteries

- Evaluation of new IEC 60095-8 draft procedure with commercially available 12V sodium-ion batteries (SIB)
- 3 SIB types with online availability selected
 - GoKWh GWN124S, motorcycle
 - 3.9 Ah (C_2), “150 CCA” (≤ 3 s)
 - JIEYO NaCRH6, automotive (LN3)
 - 50 Ah (C_{10}), “800 CCA” (-18 °C, ≤ 5 s)
 - RuiDeJin RDJ1260, automotive (LN3)
 - 60 Ah (C_1), 900 A ($15 - 45$ °C, ≤ 3 s)

- Test procedure
 - Evaluation of possible discharge limitations enforced by BMS
 - Experimental determination of C_n (> 10.5 V), I_{cc} (-18 °C, -29 °C)
 - PPC at 90%, 70% SoC, 0.1 to 0.7 I_{cc} pulses up to 5 s
 - CR 50% to 80% SoC, 0.5 I_{cc} pulses for 5 s
 - PPC at 70%, 50%, 30%, 10% SoC, 0.1 to 0.7 I_{cc} pulses

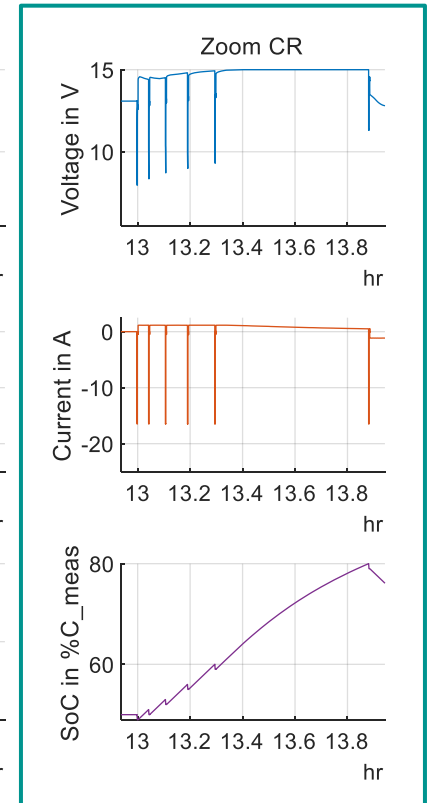
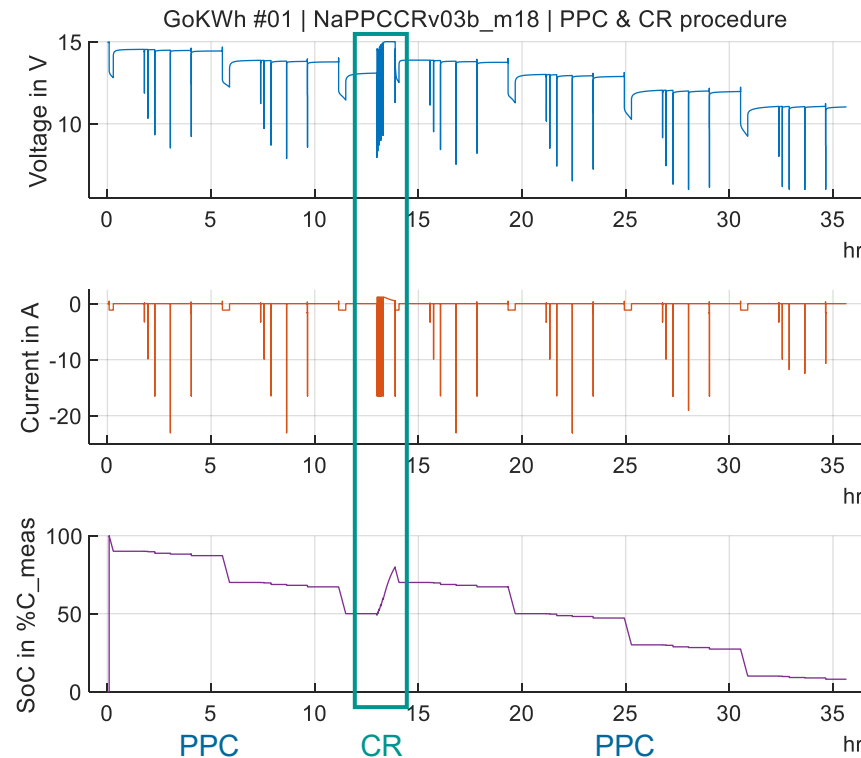
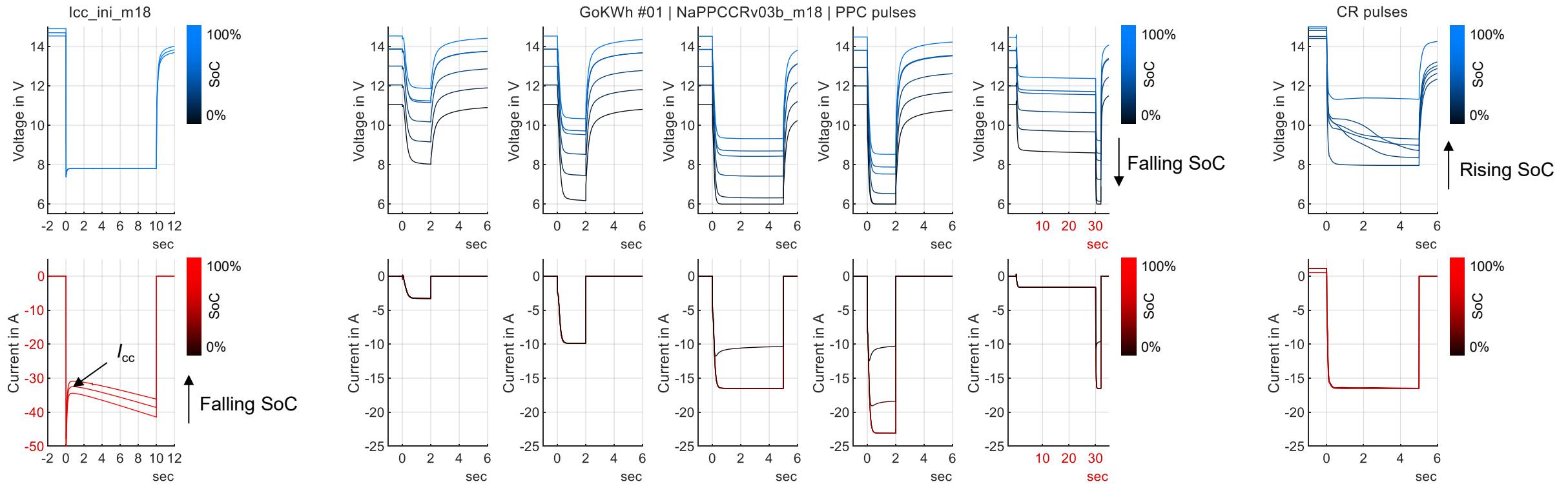


Image sources (left to right): GoKWh, JIEYO, RuiDeJin

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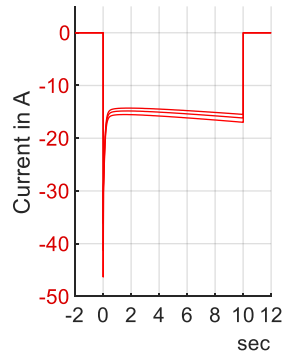
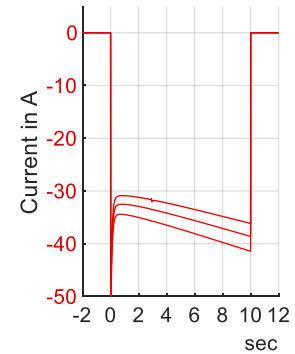
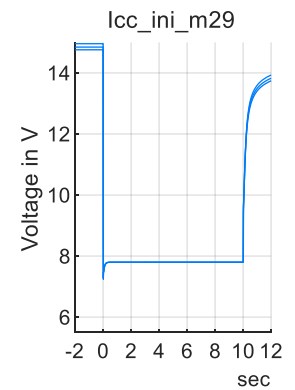
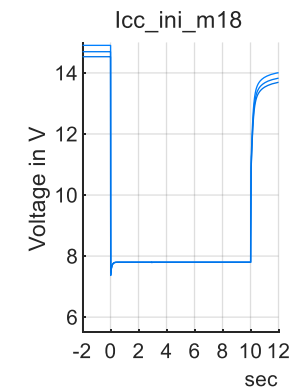
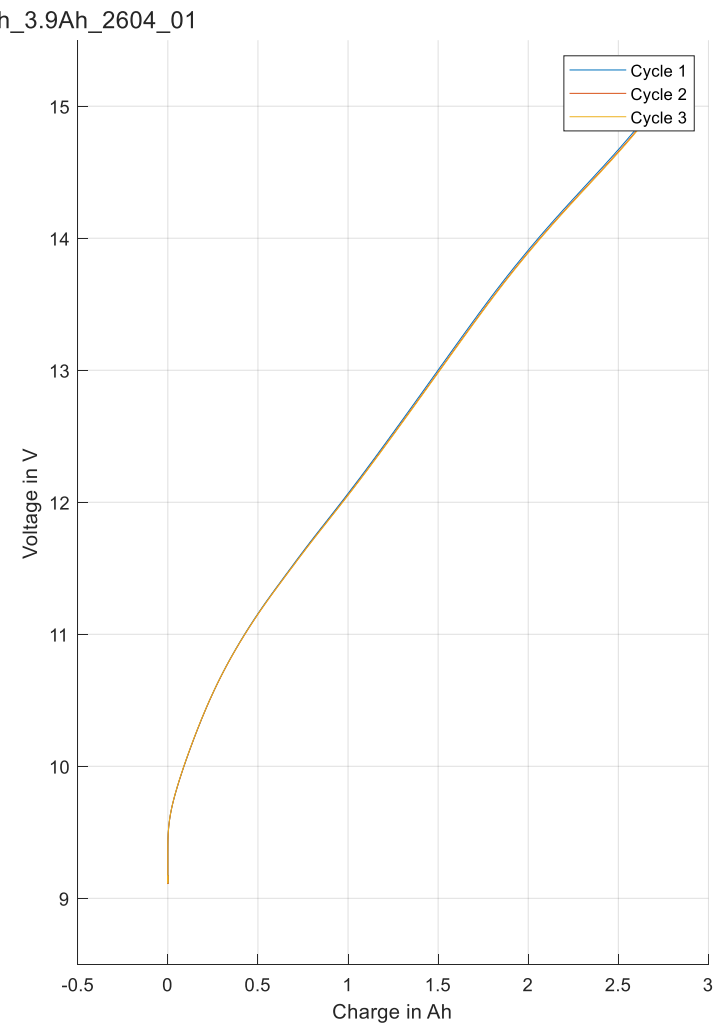
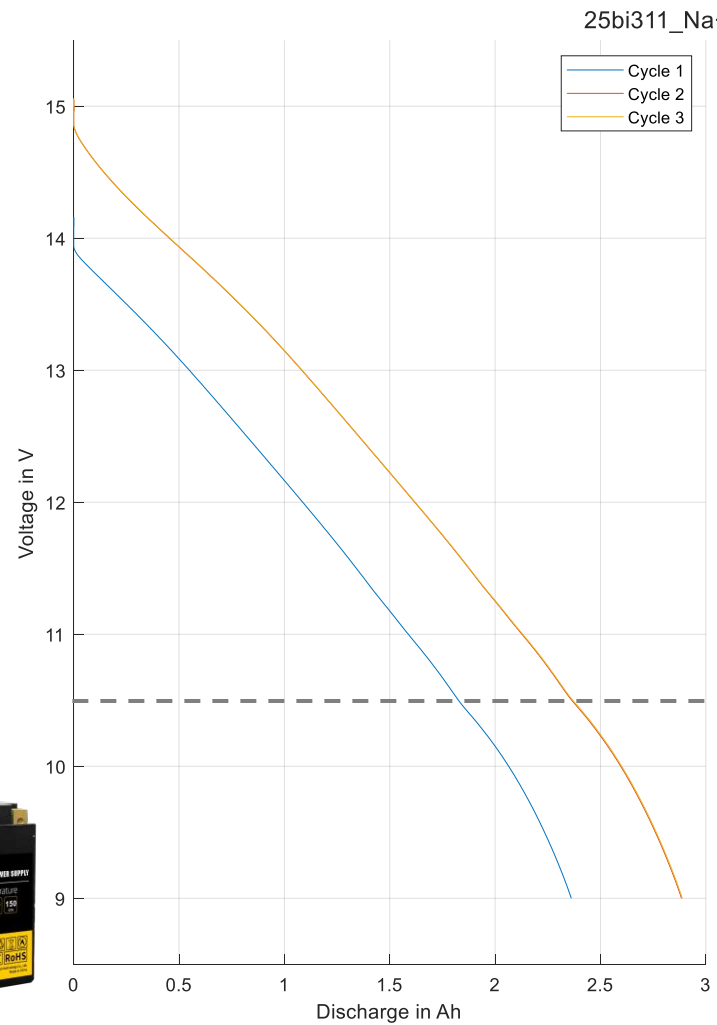


- First experiment with 0.5 C/15.0 V charging at -18 °C
 - Determination of I_{cc} rating: 3x dch 7.8 V (CV) for 10 s, min. current of 2nd pulse (SoC ~95%)
 - PPC sequence at 90%, 70%, 70% (after CR), 50%, 30%, 10% SoC (colored curves)
 - From left to right: 0.1 I_{cc} , 0.3 I_{cc} , 0.5 I_{cc} , 0.7, repeat 0.5 I_{cc} : 2-step (pre-dch), same throughput
 - CR sequence from 50% to 80% SoC, pulses at 50%, 51%, 53%, 56%, 60%, 80% SoC
 - 0.5 I_{cc} without resting, allows comparison to PPC

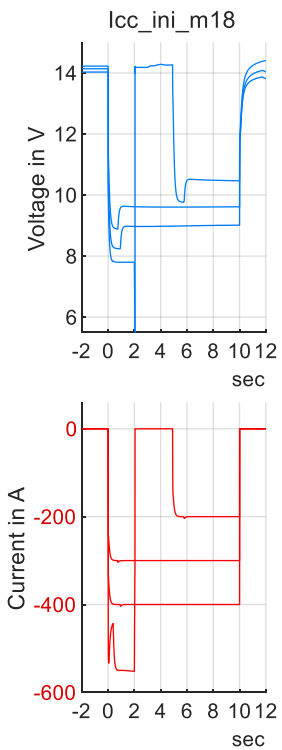
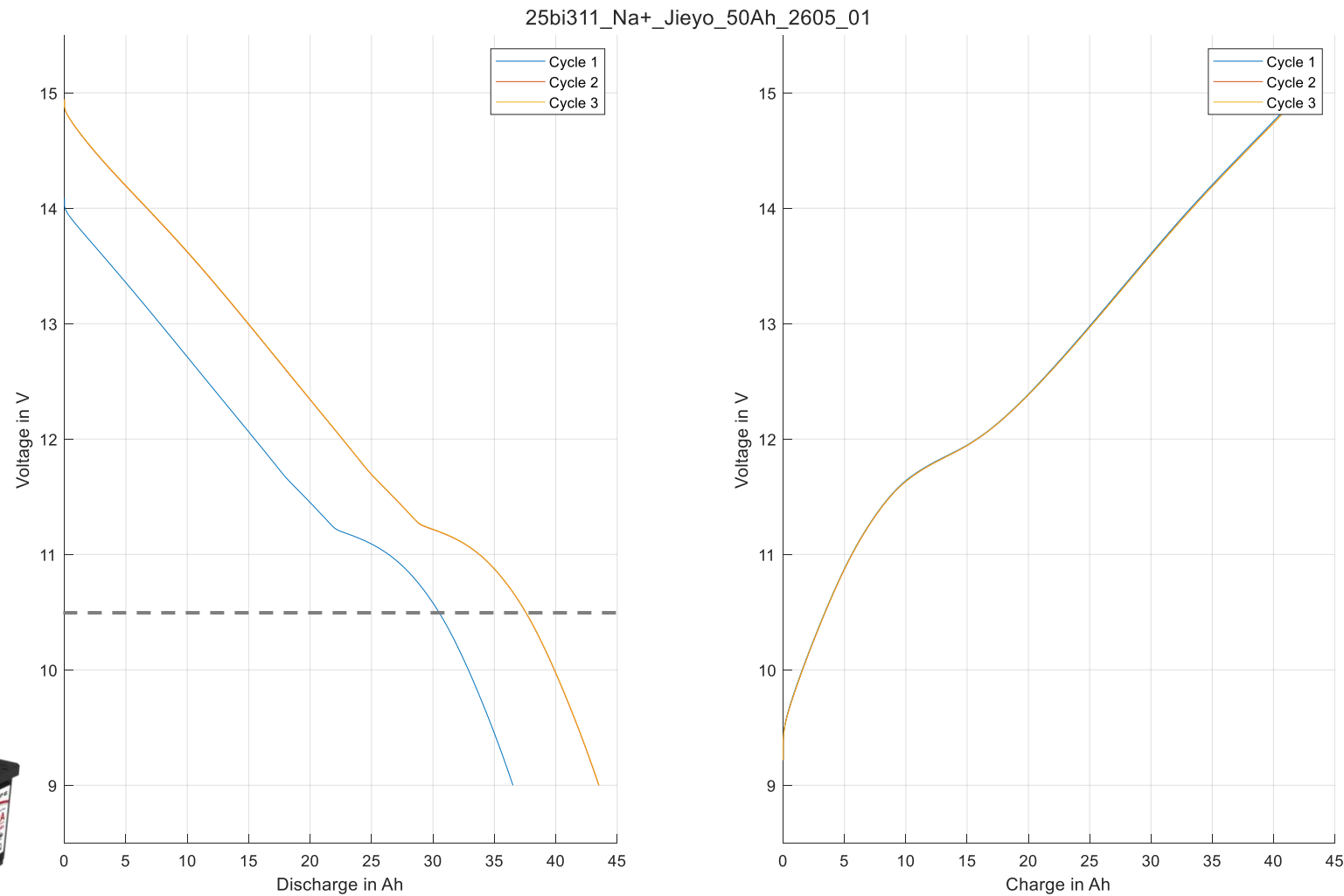


Quantity	Nominal	Measured
C_2	3.9 Ah (≥ 6 V)	2.3 Ah (≥ 10.5 V)
I_{cc}	150 A („CCA“, ≤ 3 s)	33 A (-18 °C, ≥ 7.8 V) 15 A (-29 °C, ≥ 7.8 V)

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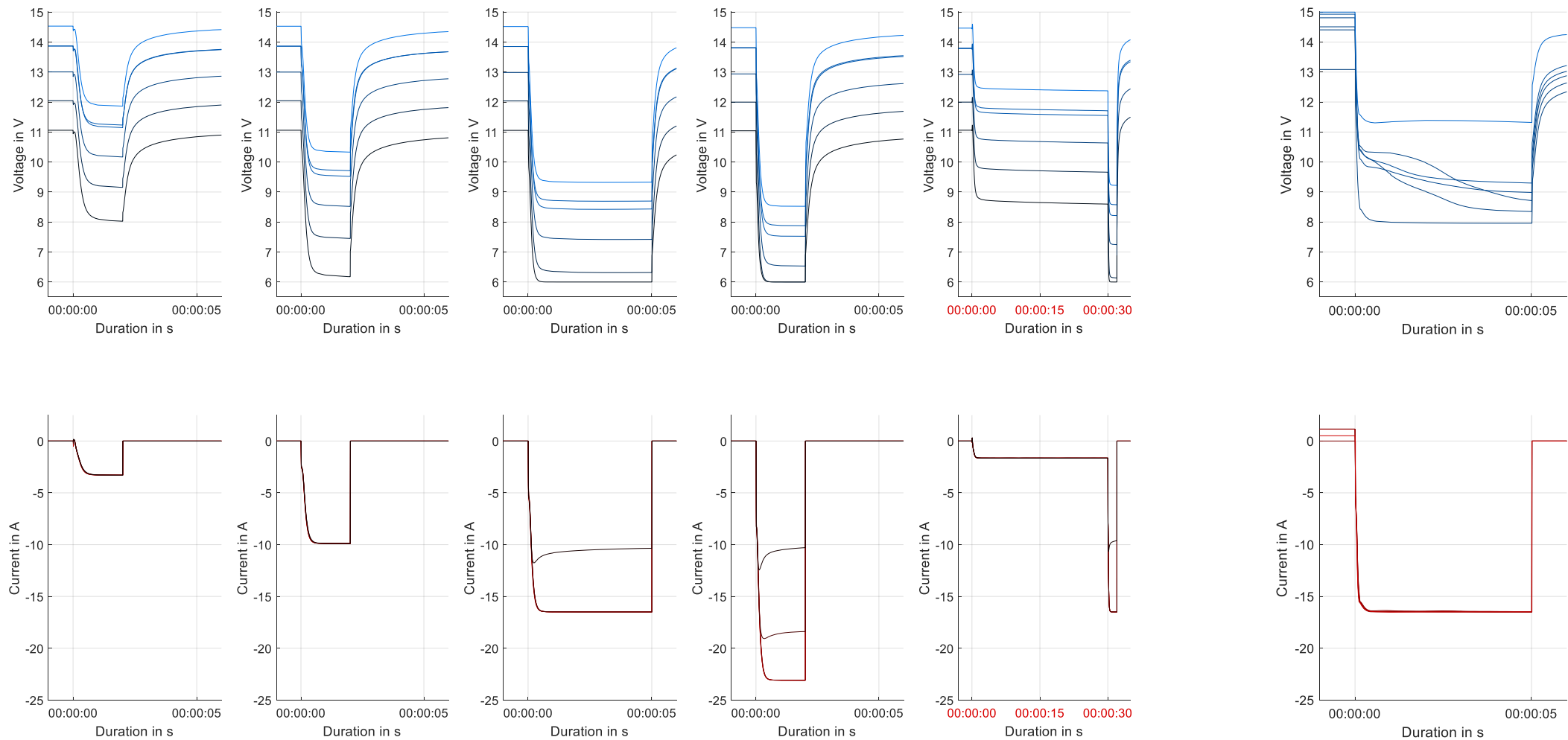


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Cold performance testing of aftermarket sodium 12V batteries

25bi311_Na+_GoKWh_3.9Ah_2604_01 | 25bi311_GoKWh_NaPPCCR_V03b_m18



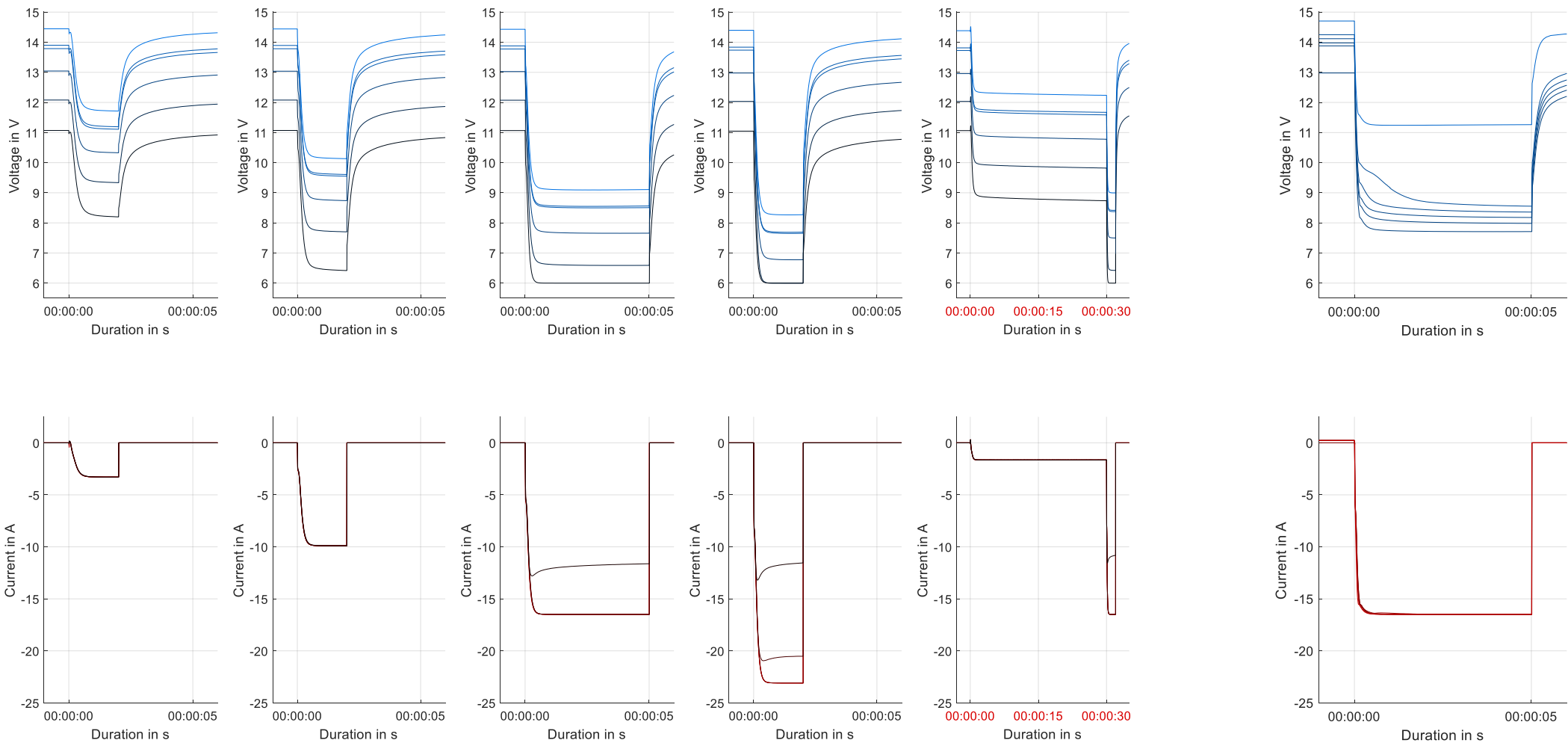
@ -18 °C



Cold performance testing of aftermarket sodium 12V batteries

25bi311_Na+_GoKWh_3.9Ah_2604_01 | 25bi311_GoKWh_NaPPCCR_V03b_m18

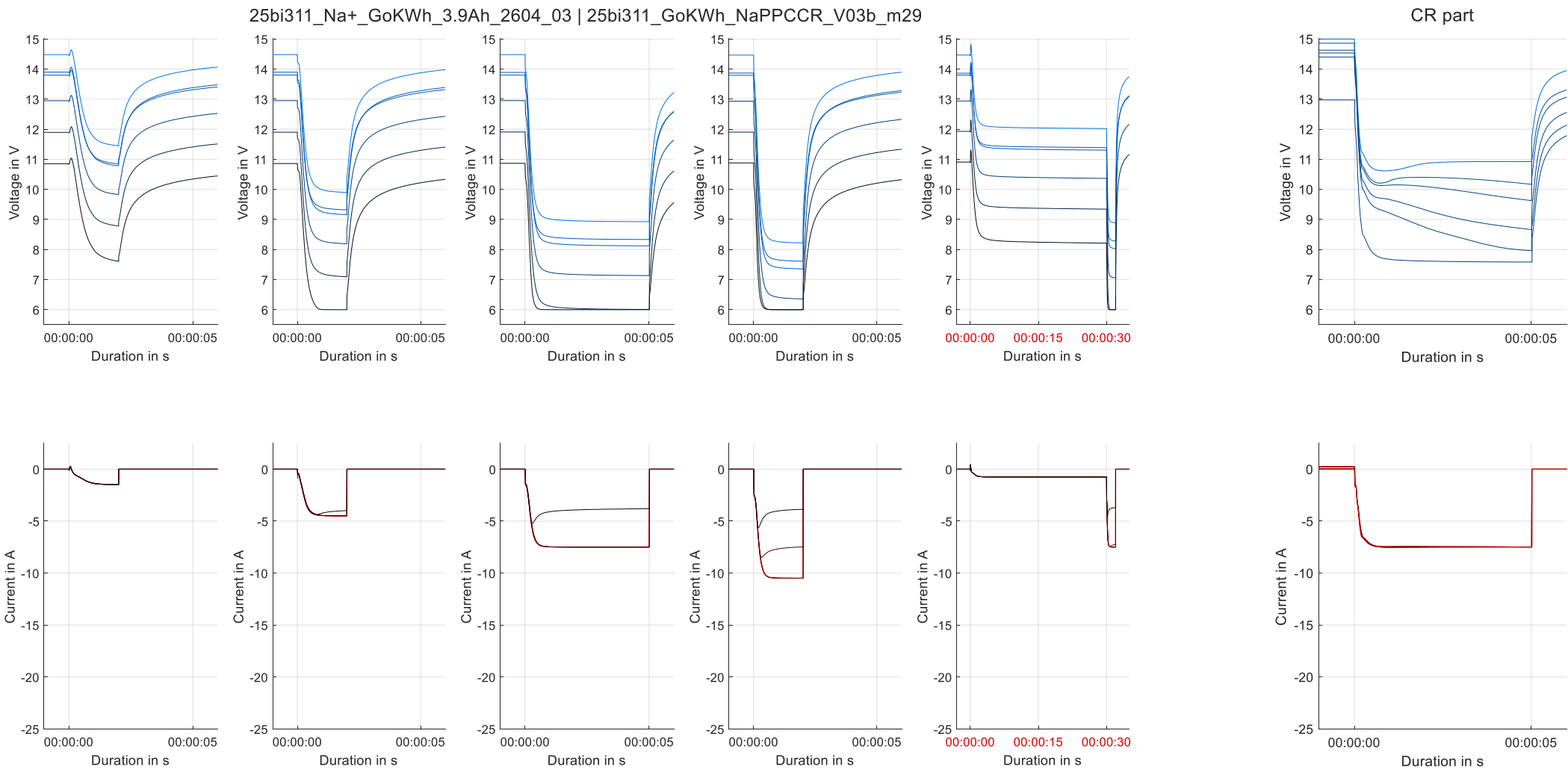
CR part



@ -18 °C



Cold performance testing of aftermarket sodium 12V batteries

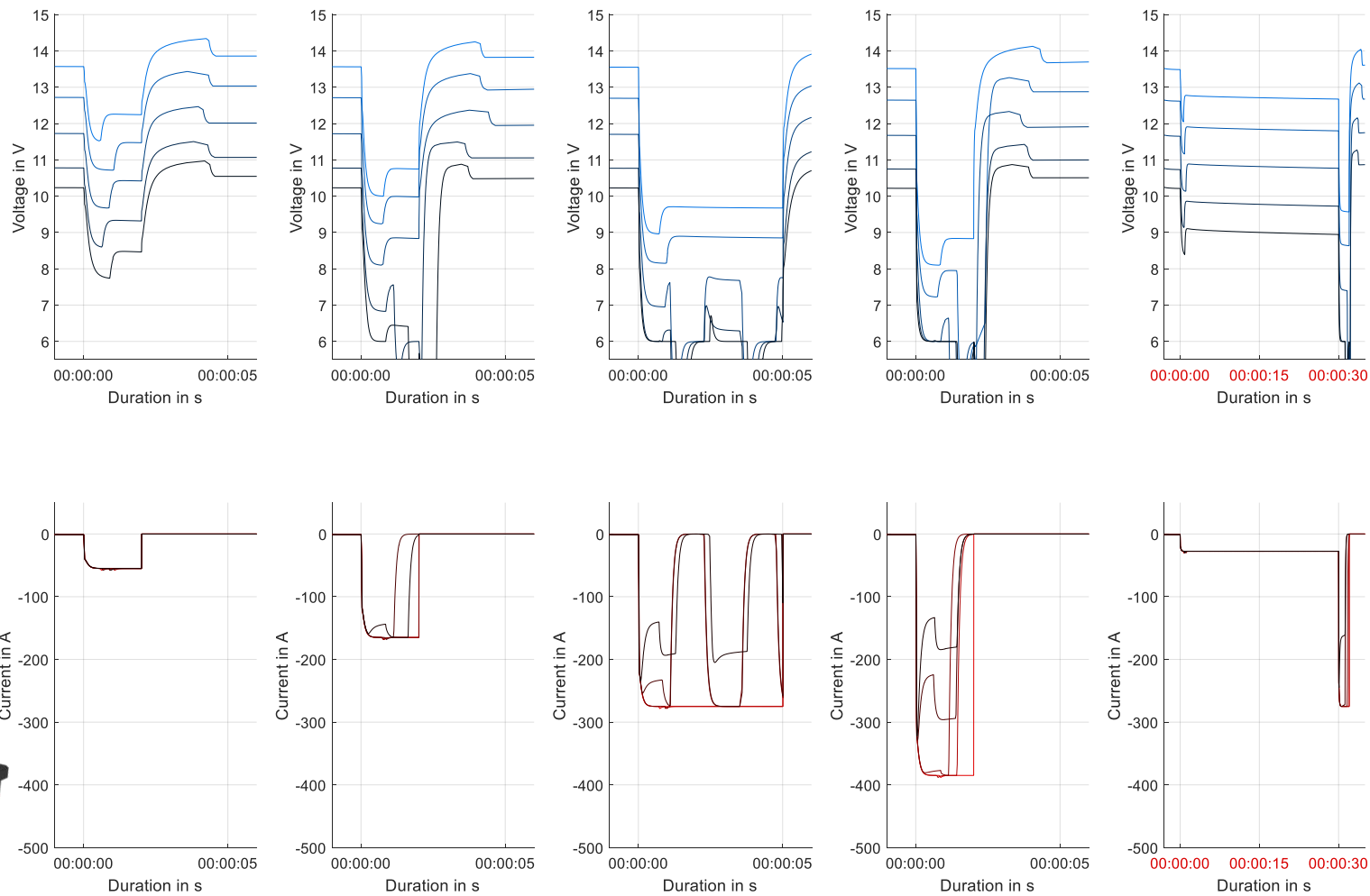


@ -29 °C



Cold performance testing of aftermarket sodium 12V batteries

25bi311_Na+_Jieyo_50Ah_2605_01 | 25bi311_Jieyo_NaPPC_pd_V03b_m18_K37



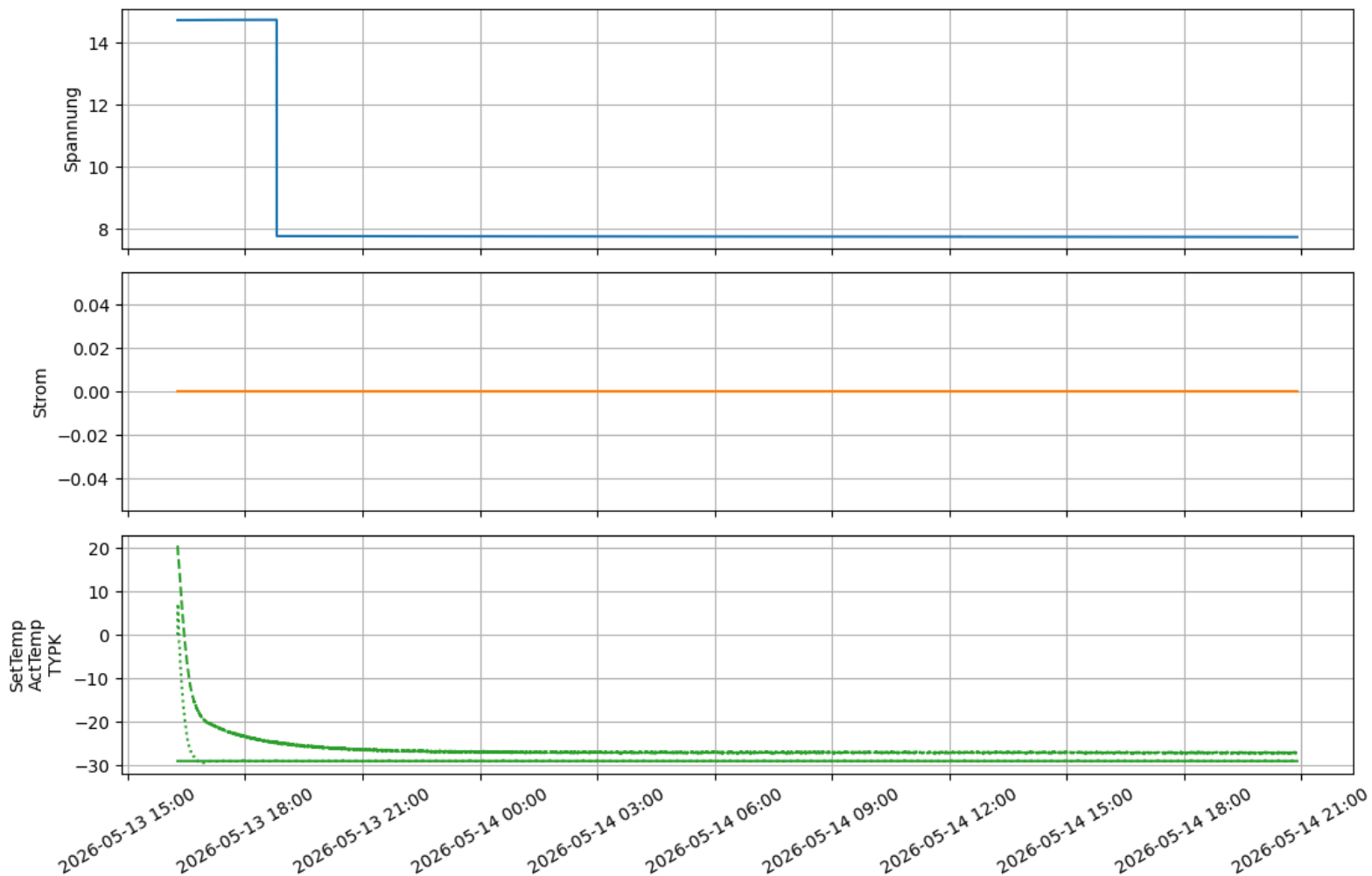
@ -18 °C



Cold performance testing of aftermarket sodium 12V batteries

25bi311_Na_Jieyo_50Ah_2605_02 | 25bi311_GoKWh_Temp_m29 | TS067213 | Format01

Test | Kreis 20-041



@ -29 °C

