

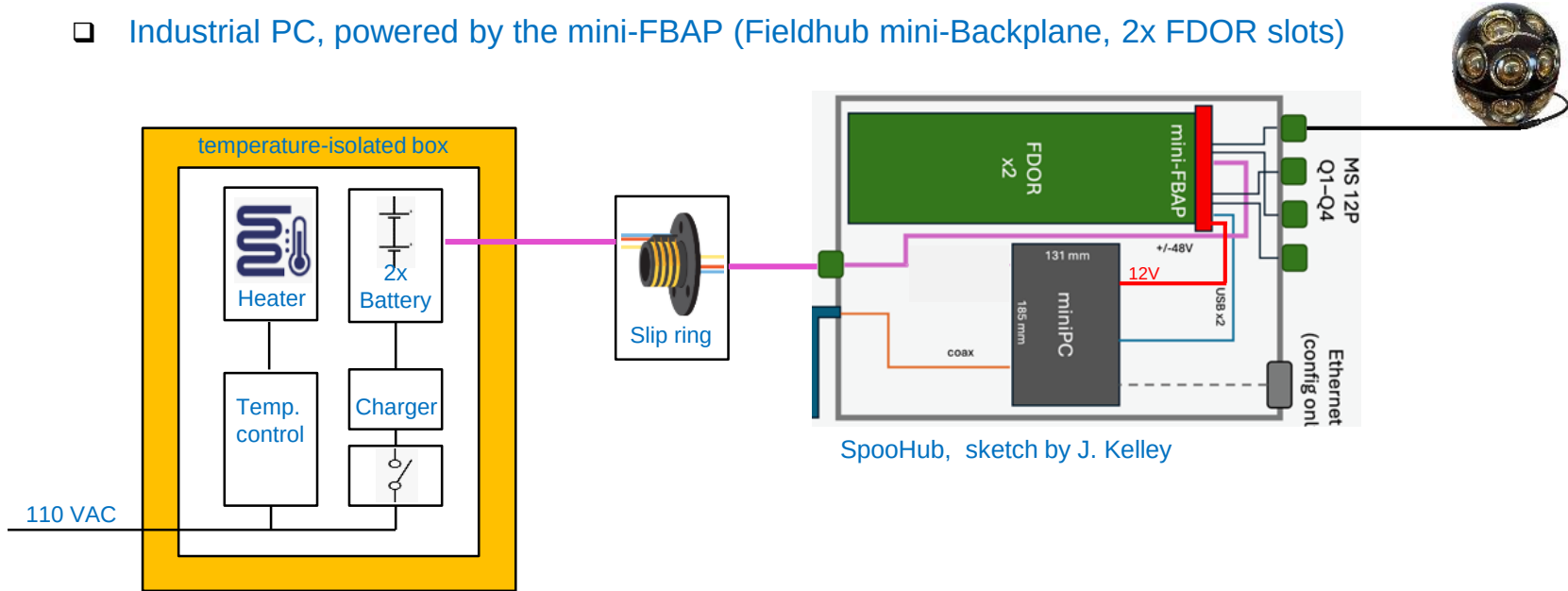


2025 / 26 Season, In-Water Operations using a

SpoolHub

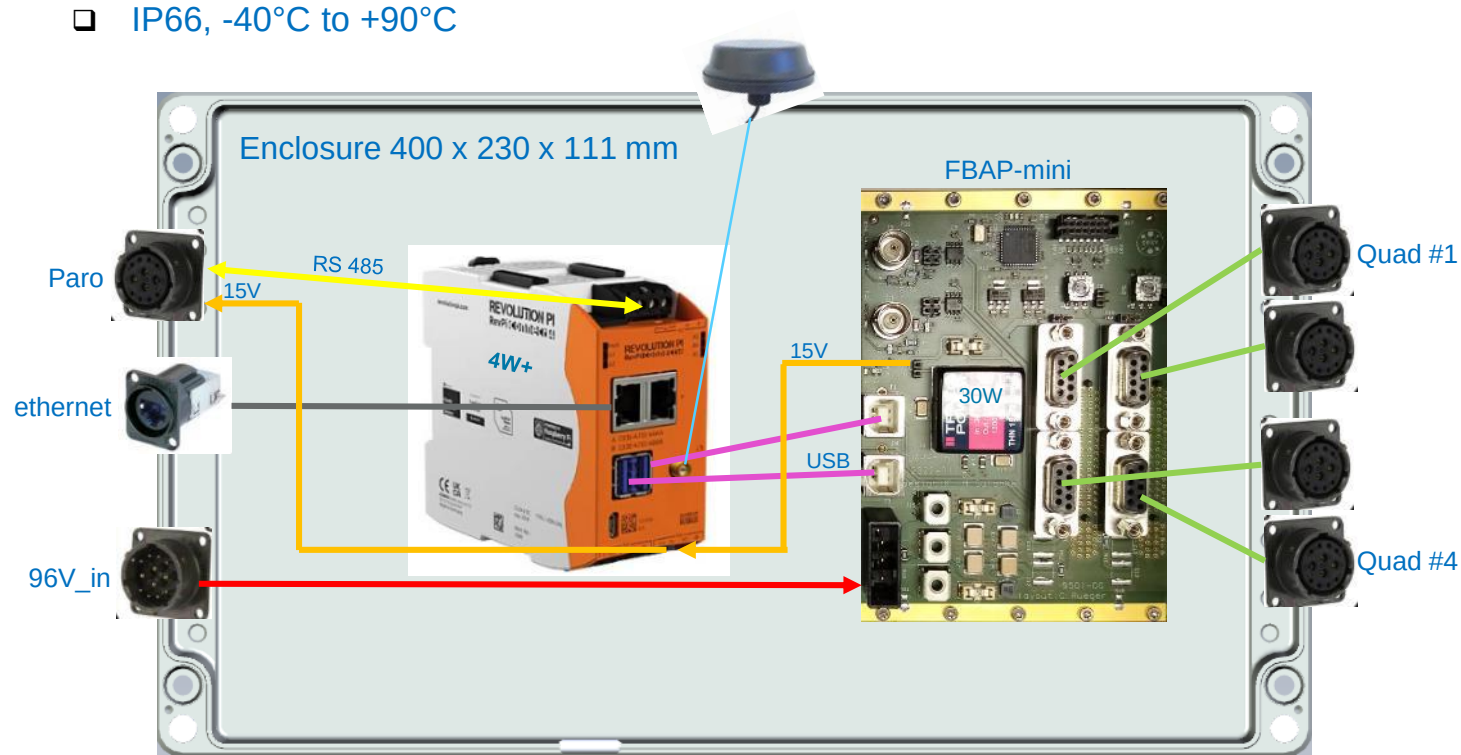
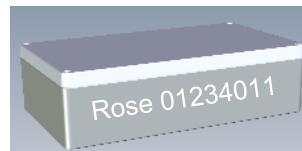
Overall Schema

- ❑ SpoolHub, fully decoupled from the EMI generating spool-drive
- ❑ Powered by two 48V battery power (only) over the slip ring
- ❑ Industrial PC, powered by the mini-FBAP (Fieldhub mini-Backplane, 2x FDOR slots)



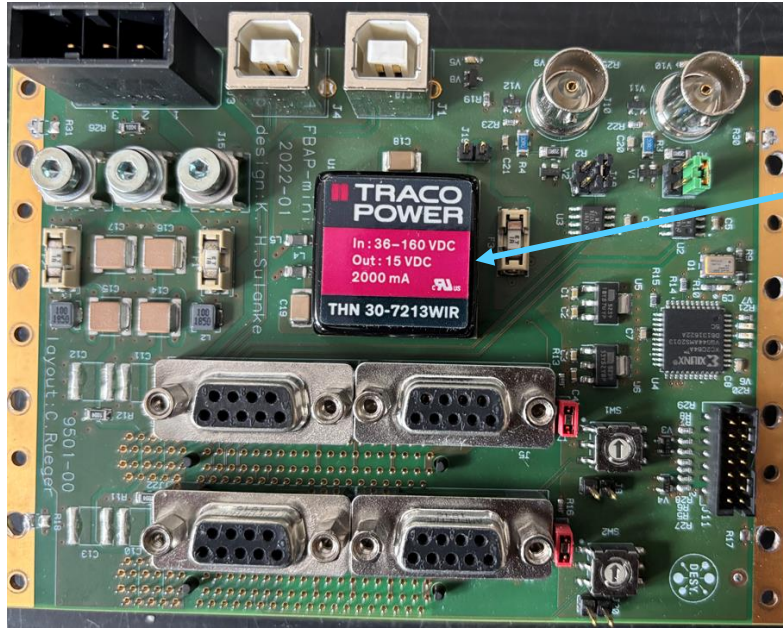
SpoolHub

- ❑ Robust Aluminum housing, 5.5mm walls
- ❑ IP66, -40°C to +90°C



SpoolHub, Power Consumption

- ❑ 2x FDOR => 5W, Industry PC „RevPI connect 4“ => 4W+, PARO => 0.4W
- ❑ With the new DC/DC we get a ~20 W safety margin



Changed from
12V / 15W to
15V / 30W

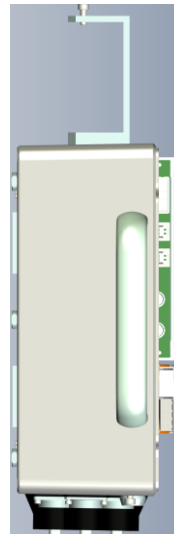
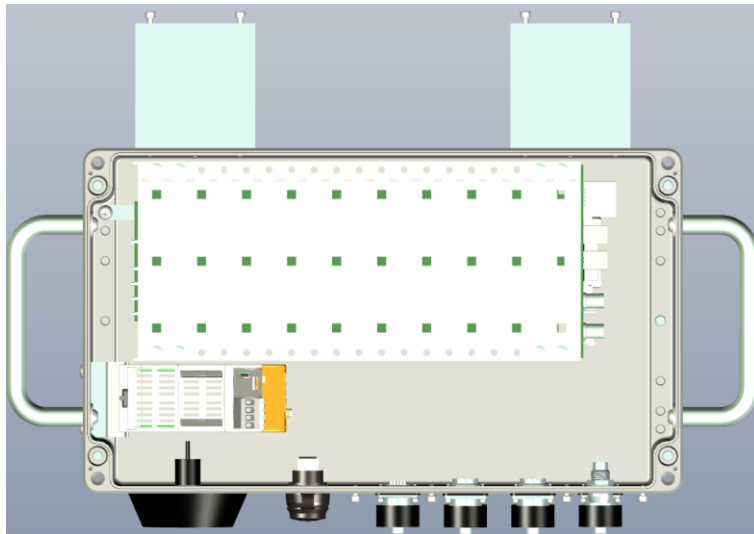
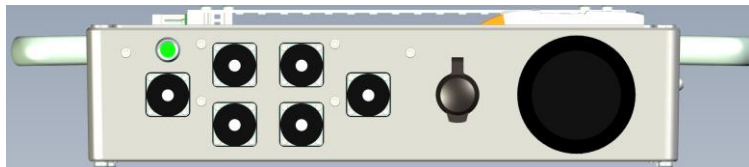
Why changing from 12V to 15V?

- ❑ Pressure sensor PARO, power supply range is 6V to 16V, 32mA max. @ 6V
- ❑ Cable resistance is ~140ohm (2800m), $32\text{mA} \times 140\text{ohm} = 4.48\text{V}$
 - ❑ With 15V, higher safety margin compared to 12V
 - ❑ Avoiding possible inrush current related oscillations at power-on that might „confuse“ the PARO internal electronics

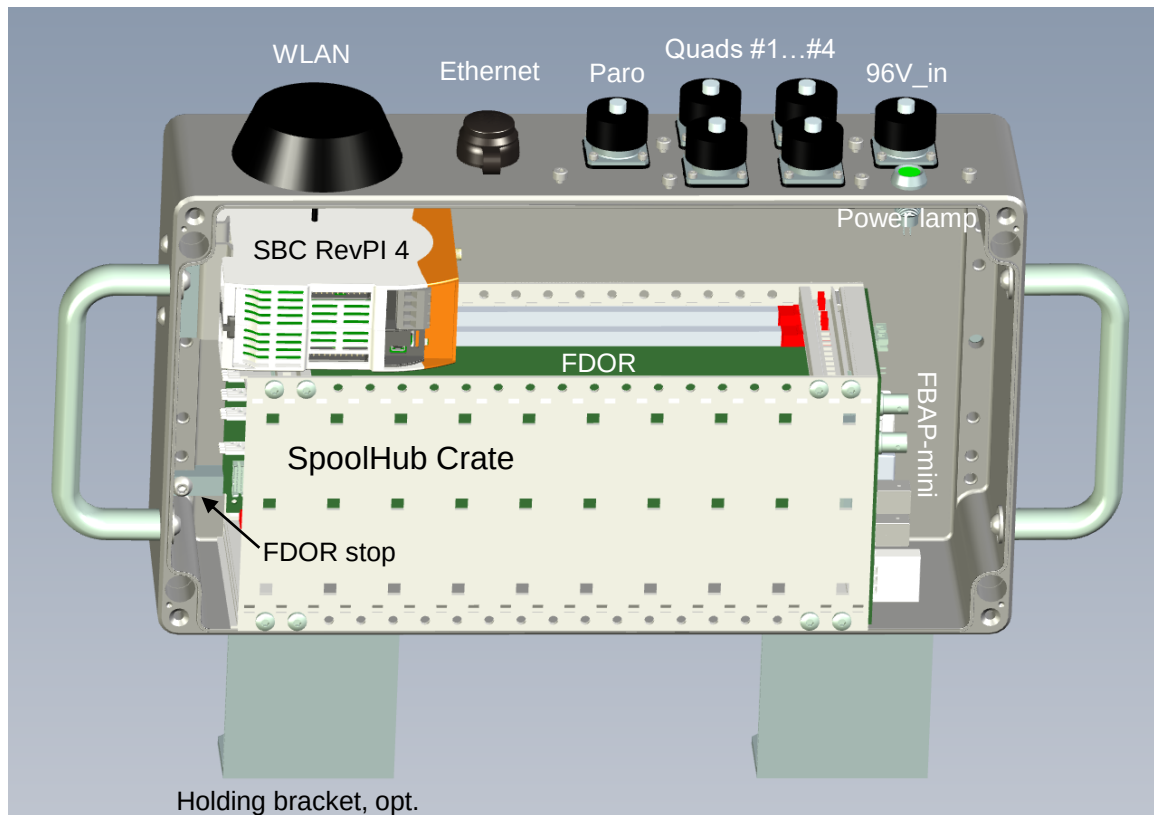


SpoolHub final Mechanics (shown w/o Lid)

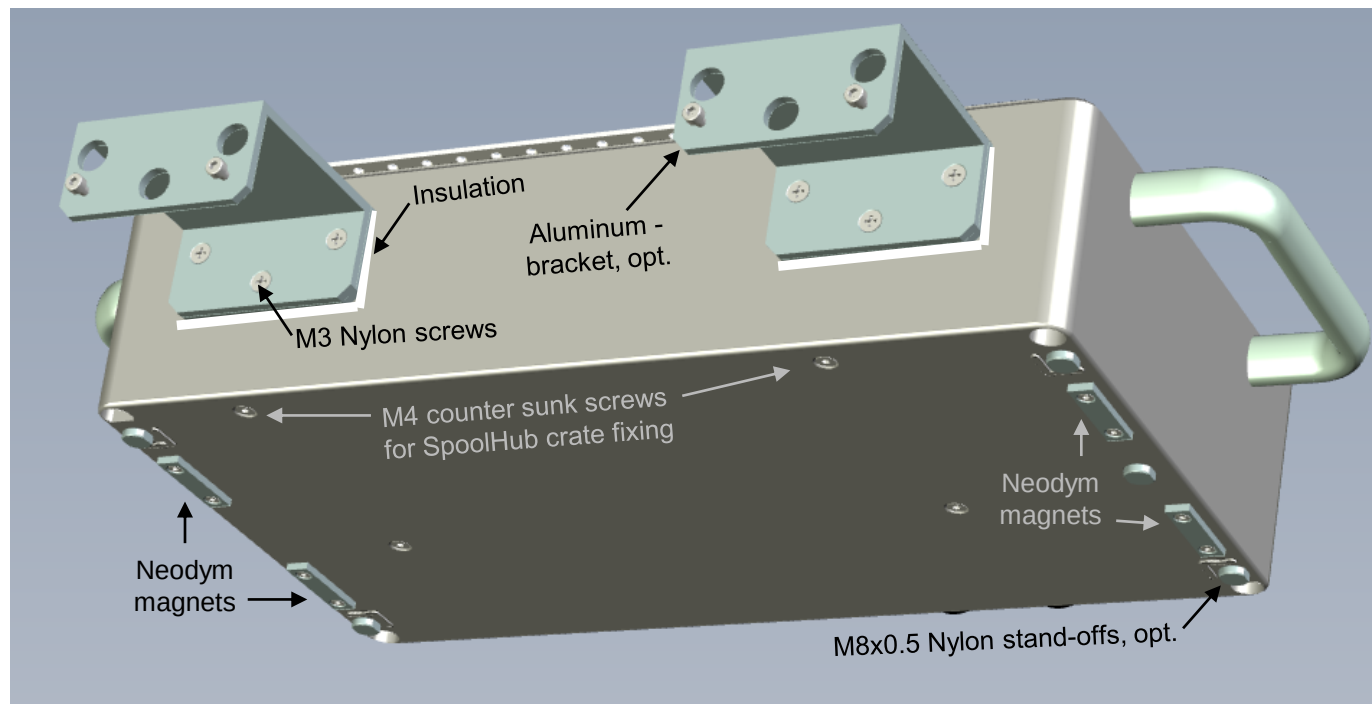
Design by Matthias Schust



SpoolHub, Detail #1

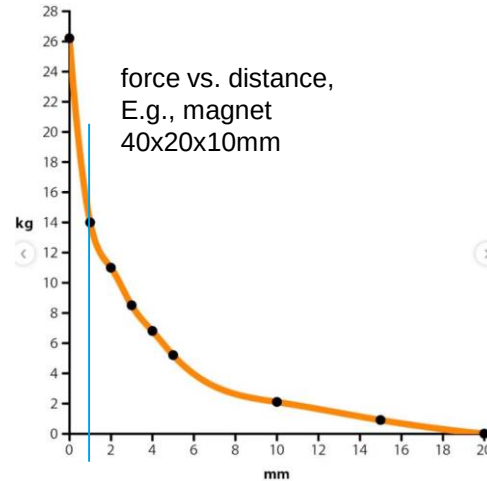
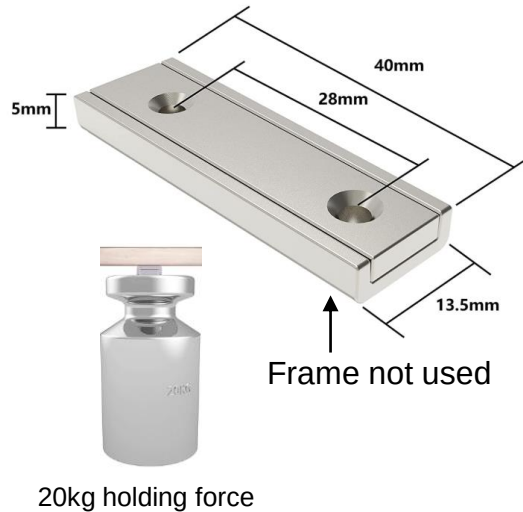


SpoolHub, Detail #2



SpoolHub, Detail #3, Neodym Magnets

- ❑ 4 pieces, 40x9.5x3mm, 20kg holding force each
- ❑ Insulated by soft silicone tube (1mm wall) or shrinking tube (~0.75mm wall)
- ❑ => max. holding force for the SpoolHub is about 40kg



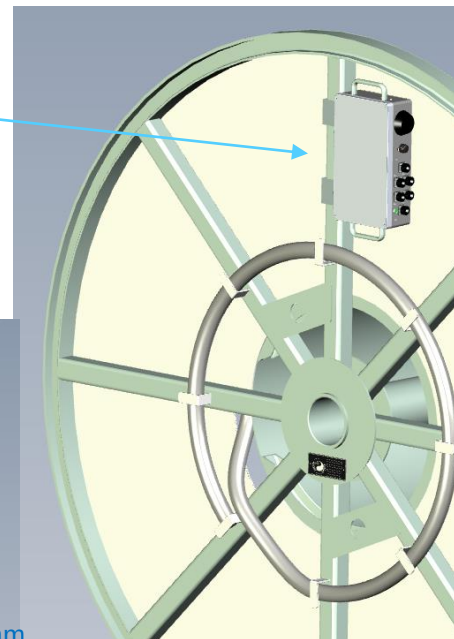
SpoolHub on the Spool



SpoolHub-
Position

48 mm

60 mm



Step file combination by
Matthias Schust

Patch Cable fixing on the Spool

- ❑ 8 pieces, 45kg holding force
- ❑ Temporary fix of patch cables, using cable ties
- ❑ Amazon, 24€



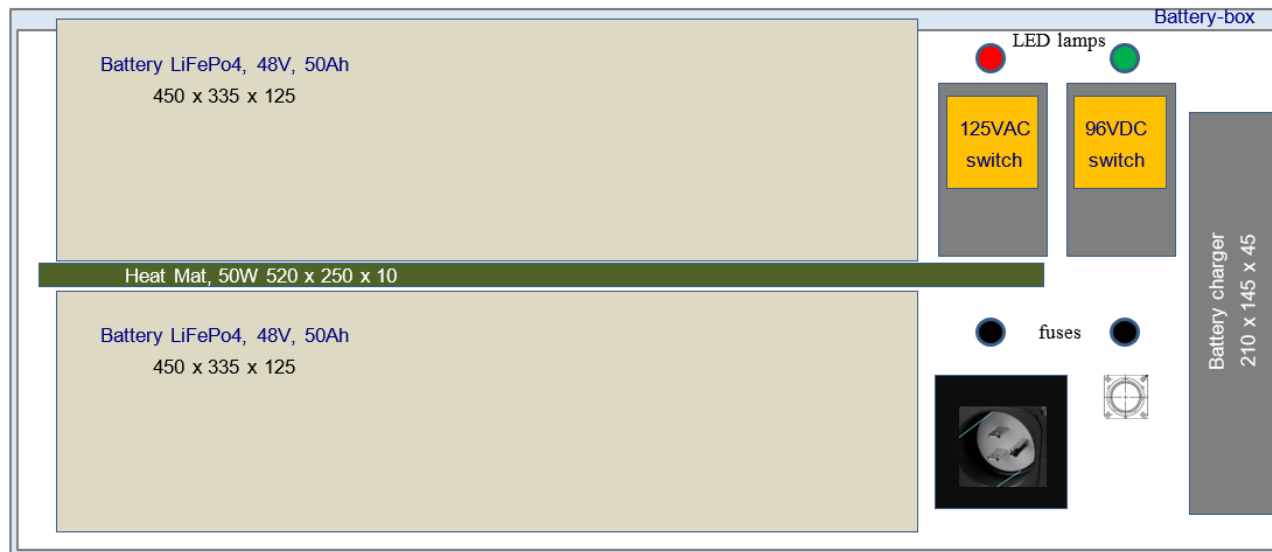
Spoolhub, Status

- ❑ Available
 - ❑ Mechanics workshop, enclosure modifications ordered
 - ❑ FBAP-mini, 12V to 15V (incl. new 30W DC/DC, THN 30-7212WIR) tested
 - ❑ FDOR cards at 12V -> 15V, tested
 - ❑ All other items available
- ❑ Still open
 - ❑ Cable assembly, internal and external cabling

Battery Box Toronto, Scaled Top View



Battery Box Toronto, Scaled Side View



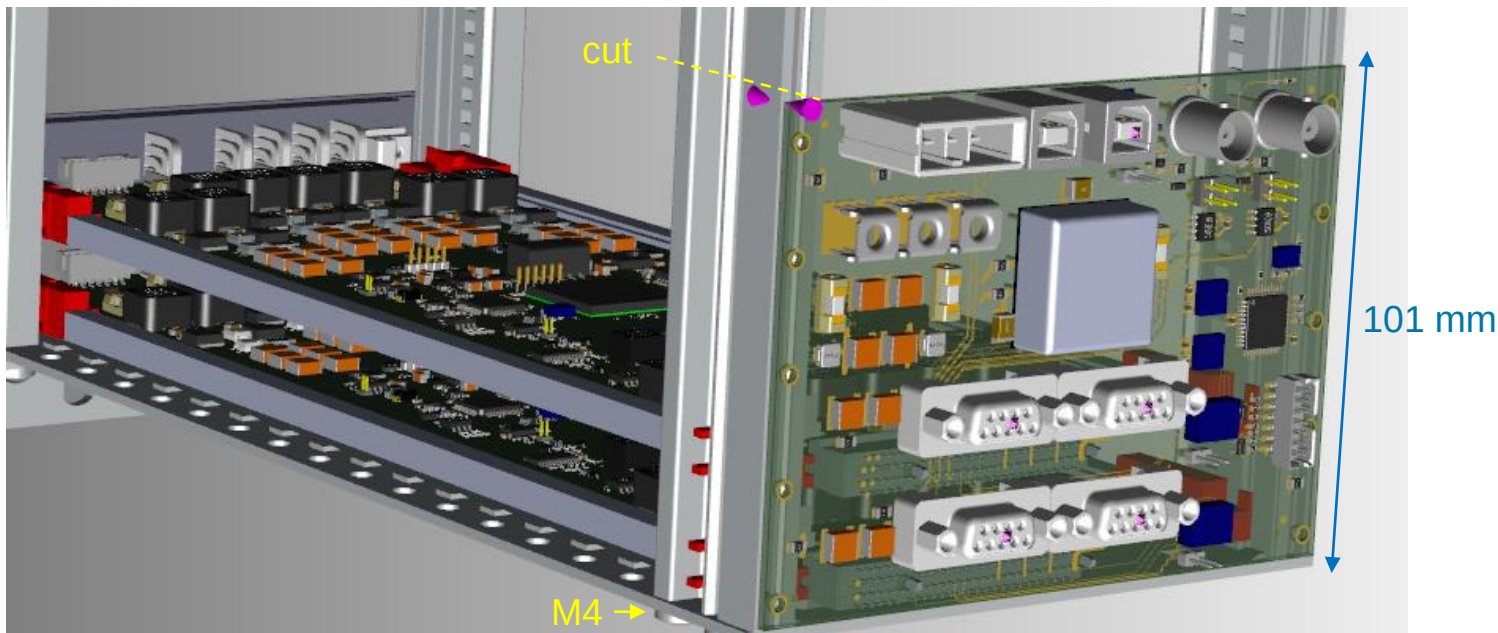
Battery Box, Status

- ❑ Available
 - ❑ Box „Toronto“, 80L, inner dimensions: 66.8 x 42.8 x **28.5** cm
 - ❑ + alternative box „Vancouver“, 123L 62.8 x 40.9 x **47.8** cm
 - ❑ 47.8cm height: **on top storage room for the SpoolHub + cables**
 - ❑ 2x LiFePO4 battery, 48V 50Ah, with built-in BMS (Battery Management System)
 - ❑ Thermal insulation
 - ❑ + almost all other items available
- ❑ Open items
 - ❑ Mechanical modification
 - ❑ NEMA 5-15 box mount plug (is ordered)
 - ❑ Cable assembly, internal & external cabling

Back Up

FBAP-mini with two FDOR Cards

- ❑ Shrink the 19" crate to 101mm width, by cutting the rails and using M4 countersunk screws

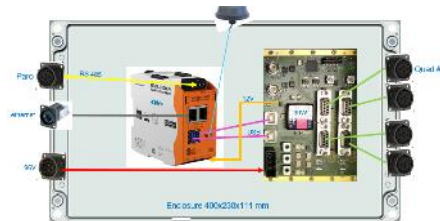


LiFePO4 Battery

- more than 4000 cycles and retains 80% of its capacity after 4000 deep cycles. Operating temperature range:
charging 0~55°C,
discharge: -20~55°C;
temperature protection:
high temperature 100°C protection
- Advanced BMS(Battery Management System) Protection



Spoolhub, Cables & Conns



Item	Conn. #1	Conn. #2	Cable type	Length	Comment
Paro to RevPI 4	PT02E-14-5S	Cable end sleeve	Lapp 91200 2x 0.25mm2	2x 0.5m	Cable length TBD 1x data, 1x power
Mini-FBAP to quad-conn.	DSUB9-male, Norcomp 772-E09-103R001 or Phoenix VS-09-ST-DSUB-EG or TE 5-747904-2 (or -5)	PT02E-14-12S	Lapp 912023 4x 0.25mm2	4x 0.5m	Cable length TBD, DSUB9 housing: Molex 173111-0496, -35°C to 125°C
96V power input to FBAP-mini	PT02E-14-5P	1-178128-3	Silicone sheet, 1x 0.5 mm2	3x 0.5m	Crimp pins 175195-3, 24-20 AWG, cable type / length is variable
Ethernet connection	Weidmuller 1018790000 incl. protection cap	RevPI 4 built-in	Telegaertner TG 100007966	0.5m	Cat6A, -40°C to +75°C, see Weidmuller spec., reduce (milling) the wall thickness down to 3mm
USB-A to USB-B cable	USB-A male	USB-B male, right angle, down (!) pointing	DeLock 84809	0,5m	Temperature range?
RevPI 4 power cable	Molex 22-01-3027 Crimp pins 08550102	Cable end sleeve	Lapp 91200 2x 0.25mm2	0.5m	FBAP-mini, J19, Molex 22-29-2021
WLAN-Antenna TANGO23/0.5M/SMAM/S/RP/19	n.a.	SMA plug (is part of the antenna)	50ohm coaxial	0.5m	Antenna Through Hole Mount, WiFi, WLAN, 2.4 GHz to 5.9 GHz, 5 dBi,

SpoolHub, Connector Arrangement, Scaled View

