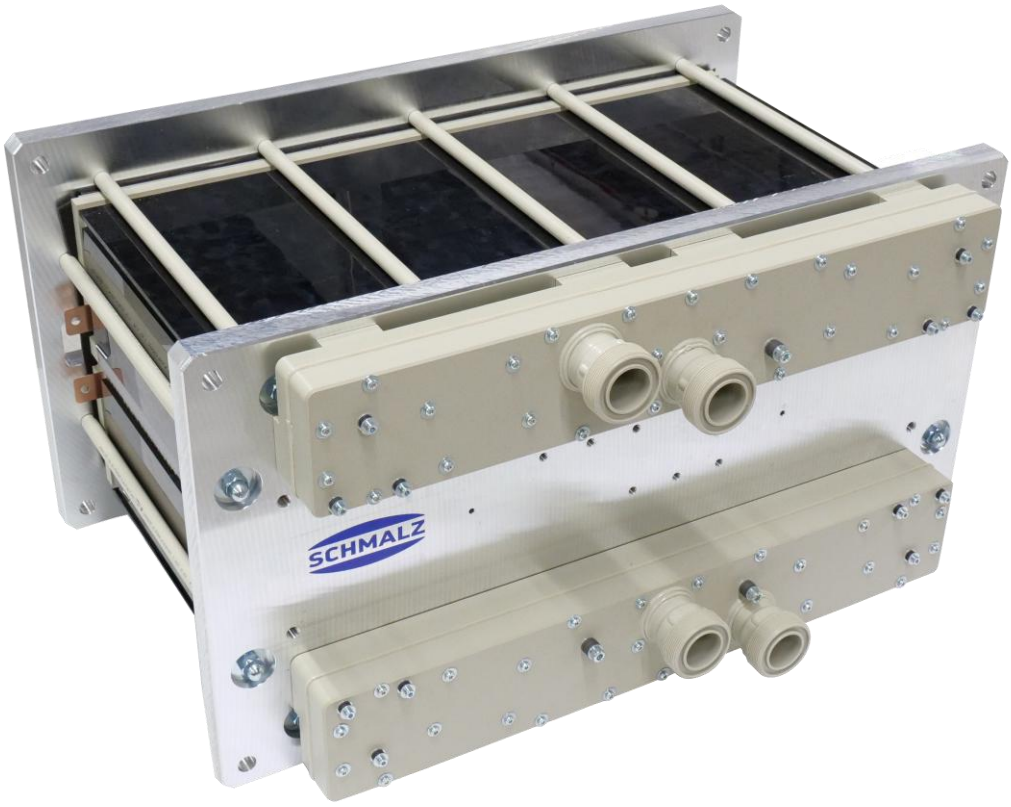
Datasheet

SCHMALZ Redox-Flow-Battery Stack Generation 3.0

article no. / type description

19.01.01.00839 / RFB-ST V 8-10 40Z



Area of application

Stack for use with vanadium electrolyte solution with sulfuric acid as base electrolyte. Before using other electrolyte solutions, it is obligatory to consult the J. Schmalz GmbH first.

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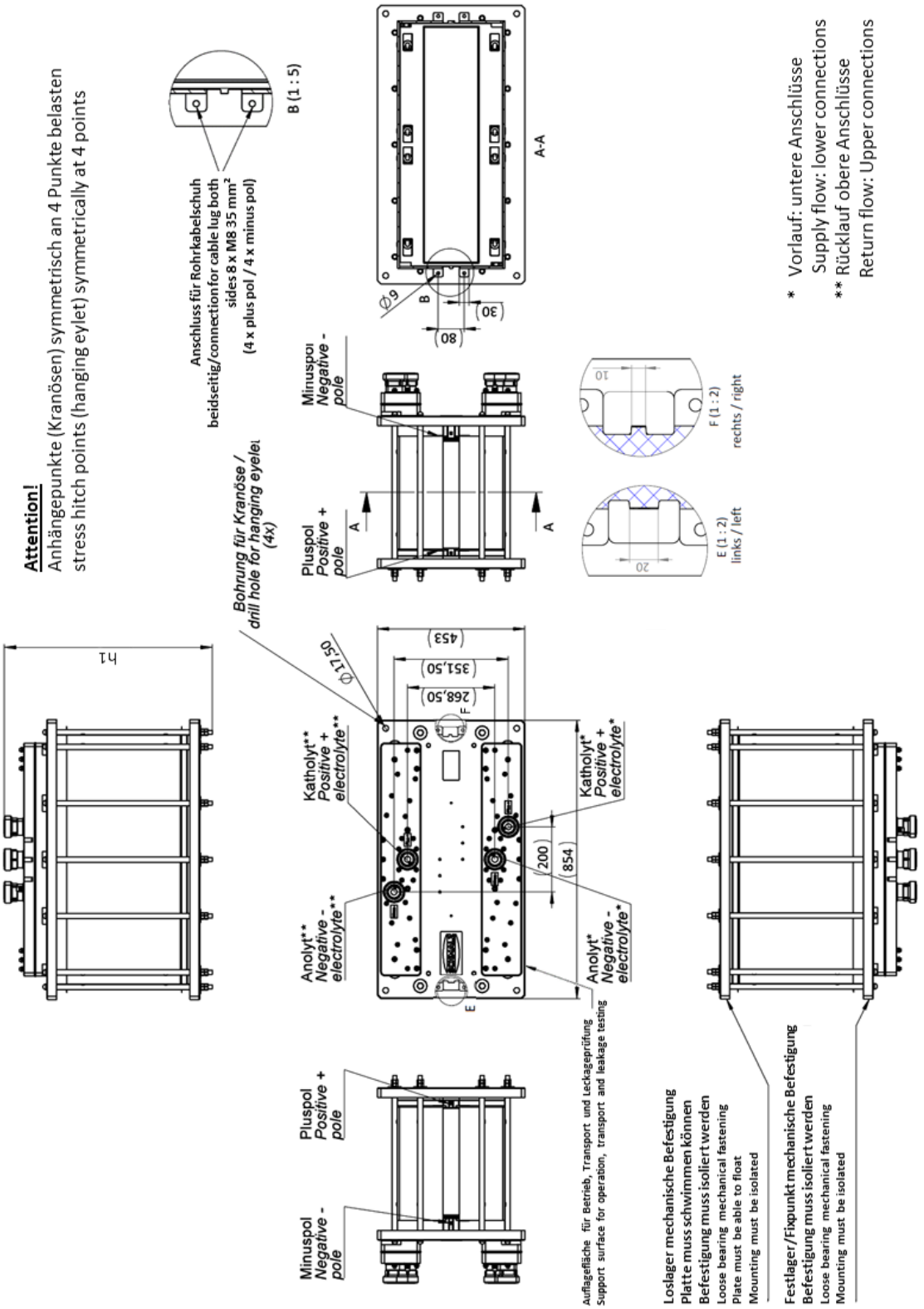
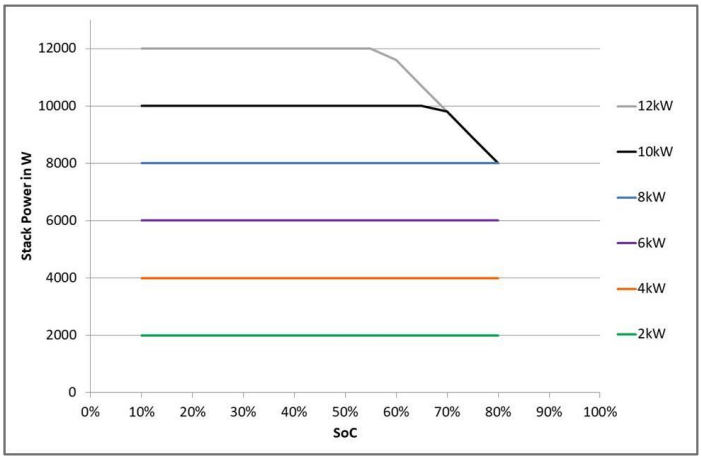
Stack dimensions



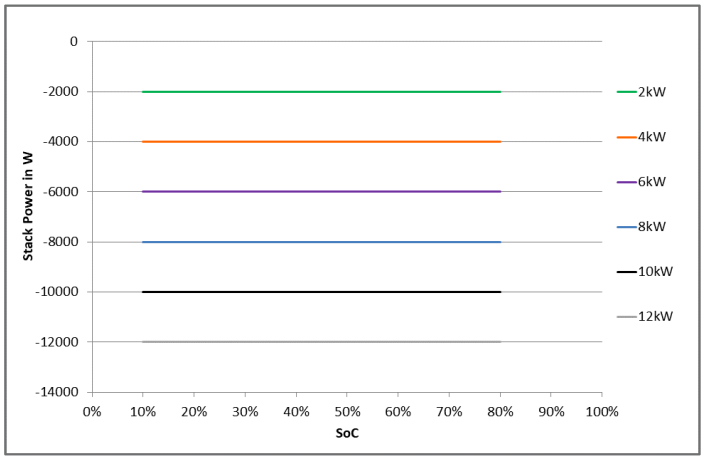
	5 Zellen/ cells	10 Zellen/ cells	20 Zellen/ cells	38 Zellen/ cells	39 Zellen/ cells	40 Zellen/ cells	42 Zellen/ cells	44 Zellen/ cells
h 1 [mm] **+/- 10 mm**	ca. 410	ca. 455	ca. 545	ca. 717	ca. 726	ca. 725	ca. 743	ca. 761

Parameter

Power	8 – 10 kW nominal, 12 kW peak
Voltage range	40 V to max. 63,2 V
Nominal current	165 A
Peak current	280 A
Number of cells	40
Volumetric flow rate	max. 60 l/min per anolyte- and catholyte side min. 20 l/min per anolyte- and catholyte side
Permitted operating pressure	max. 100 kPa (1,0 bar)
Maximum pressure difference	Maximum pressure difference of 10 kPa (0.1 bar) tolerated temporarily. Operate both half-cell sides with equal pressure
Permitted operating temperature	min. 10°C to max. 40° C
Permitted storage temperature	min. 0°C to max. 60° C
Internal volume	approx. 50 L (for both half-cell sides combined)
Dry weight	approx. 160 kg
Fluid connection	4 x G 2 ¼“ AG (groove designed for O-Ring 46,99 x 5,33 mm)
Electrical connection	4 x Plus-Pol 4 x Minus-Pol
Accessoires + spare parts	accessories: 19.01.01.01493 – half threaded connection female contains: - Union nut G 2 ¼“ - PP-insert DN50 
	Spare parts: 10.07.08.00713 - O-Ring FKM 46,99x5,33 



Power charging



Power discharging

General operation conditions and commissioning

Safety notes	▪ Control both half-cell sides of the stack by pressure – don't operate with pressure difference of more than 10 kPa (0.1 bar) [otherwise internal damage may occur] ▪ Do not block fluid circuits – pressure compensation for each half-cell side has to be ensured! [otherwise critical pressure difference between both half-cell sides may occur] ▪ Slight amounts of electrolyte may leak during operation and are not critical for the process (observe PSA notes in the operating instructions). In case of leakage, contact the manufacturer to evaluate the situation. ▪ Ensure correct and appropriate electric and hydraulic connections ▪ Pipes and electrical connections must be mounted without any tension /mechanical stress. If necessary, support the pipes mechanically. ▪ avoid pipe shocks ▪ Move stack with suitable lifting devices and secure it against tilting. ▪ Secure stack against electrical short circuit. ▪ Take note of the shutdown routine in the operating instructions and implement it. ▪ Pay attention to voltage deviations between stacks during commissioning and operation; take affected stacks immediately out of operation.
End-of-charge voltage	Max. 1,58V/cell (63,2 V for 40 cell Stack) to avoid side reactions and accelerated aging
Electrolyte supply	Don't operate stack below λ=5 during charge and λ=3 during discharge[1] [to avoid side reactions]
Temperature	Keep temperature in positive electrolyte circuit (return flow) below 40°C [otherwise V_2O_5 precipitates]
Commissioning	▪ Before commissioning, make sure that the temperature of the stack is equal to the ambient temperature at the place of installation. ▪ Fill stack slowly, constantly and symmetrically with 'raw electrolyte'[2]. ▪ Membrane must swell overnight (min. 12 h) immersed in the 'raw electrolyte'. ▪ Perform initial charging (electrolyte at state of charge -50% to approx. 20% state of charge) by applying a low current (max. 25 A).
Hazardous material information	Please note that the stack is tested for controlled leakage and shipped after assembly without electrolyte. After commissioning with electrolyte, the stack applies to the country specific rules concerning hazardous materials.

[1] λ: stoichiometric factor in operation = reactant infeed / electrical current
[2] 'raw electrolyte' = vanadium electrolyte solution containing vanadium(III) sulfate and vanadium(IV) oxide sulfate in a ratio of approximately 1 to 1 (SoC -50%)