TRIATHLON®

INTELLIGENT BATTERIES

Lithium-Ion batteries

Energy. Endurance. Power.

TRIATHLON® – The Company

As an assembly manufacturer and developer of Lead-Acid batteries and Lithium-Ion battery systems, TRIATHLON® produces batteries for a wide range of industrial motive power applications including electric forklifts and pallet trucks, mobile lifting platforms and cleaning machines.

Decades of experience and technical expertise, combined with state-of-the-art production facilities ensure the highest quality of motive power batteries available. The site is certified according to ISO 9001, ISO 14001 and ISO 45001.

A solid network of sales and service partners in Germany, Europe and the United States provide competent solution based advice and both flexible and reliable onsite service.

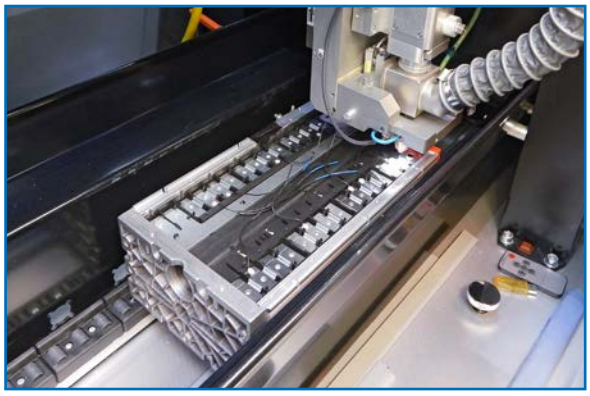
Reliable

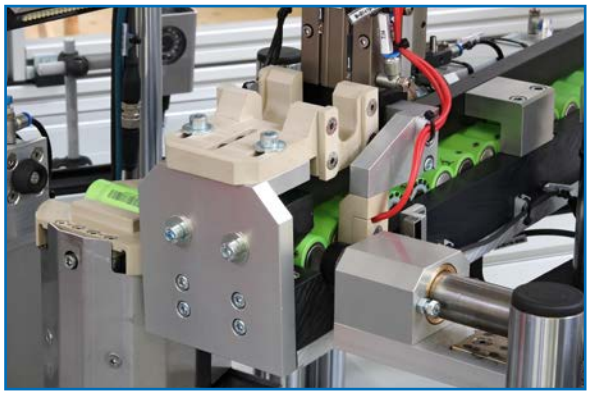
Flexible

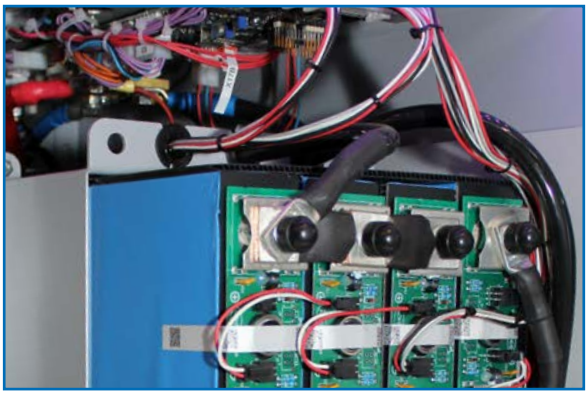
Powerful

Competent

The advantages







Multi-shift operations, more hours of actual lift truck usage, and a never ending drive to increase productivity in all sectors of manufacturing and logistics requires full-time availability of electric lift trucks.

The market driven push to respond to greater availability of lift trucks has led to opportunity and fast charging of Lead-Acid batteries. Lead-Acid battery technology simply cannot achieve some of today's material handling demands without spare batteries and battery change-outs, especially in multi-shift 24/7 operations.

Due to years of research and development we can now offer new and innovative cost effective solutions for heavy-duty electric motive power operations.

TRIATHLON® Lithium-Ion battery systems can be opportunity and fast charged thus enabling multi-shift use without spare batteries and non-productive battery change-outs.

The systems are exclusively designed with high performance Lithium-Ion cells which fulfill all requirements for heavy duty industrial motive power use.

Find out more about the advantages of TRIATHLON® Lithium-Ion technology on the following pages.

tell the story!

TRIATHLON® Lithium-Ion battery systems

A New Way Forward with TRIATHLON® Lithium-Ion Batteries!

Compared to conventional Lead-Acid batteries, Lithium-Ion technology has significant advantages. Now you can fully charge a completely discharged industrial battery within 1 - 2 hours. Opportunity charging is not only allowed but encouraged at any time and will not harm the battery. Time consuming, unsafe and non-productive battery change-outs are no longer necessary.

Lab results and real life field-testing of Lithium-Ion technology has found that these batteries deliver a significantly longer life than that of Lead-Acid batteries.

TRIATHLON® Lithium-Ion batteries are made up of Lithium-Ion cells that are assembled into modules which provide the required voltages and Ah capacities. We offer complete battery systems in all standard battery voltages. The battery system meets the highest safety requirements. Each battery system has an integrated monitoring system with a display unit and an opportunity charger.

TRIATHLON® Lithium-Ion battery systems are significantly more energy efficient than Lead-Acid batteries. The total efficiency of the system is up to 40 % greater than that of Lead-Acid batteries.

It pays to consider “a new way forward.” We welcome the opportunity to consult with you in greater detail.

Lithium-
Ion battery

The “Made in Germany” TRIATHLON® Lithium-Ion battery system consists of Lithium-Ion battery cells and modules, intelligent monitoring and control systems, extensive safety componentry, and a high-frequency opportunity/fast charger that communicates with the battery via CAN bus protocol.

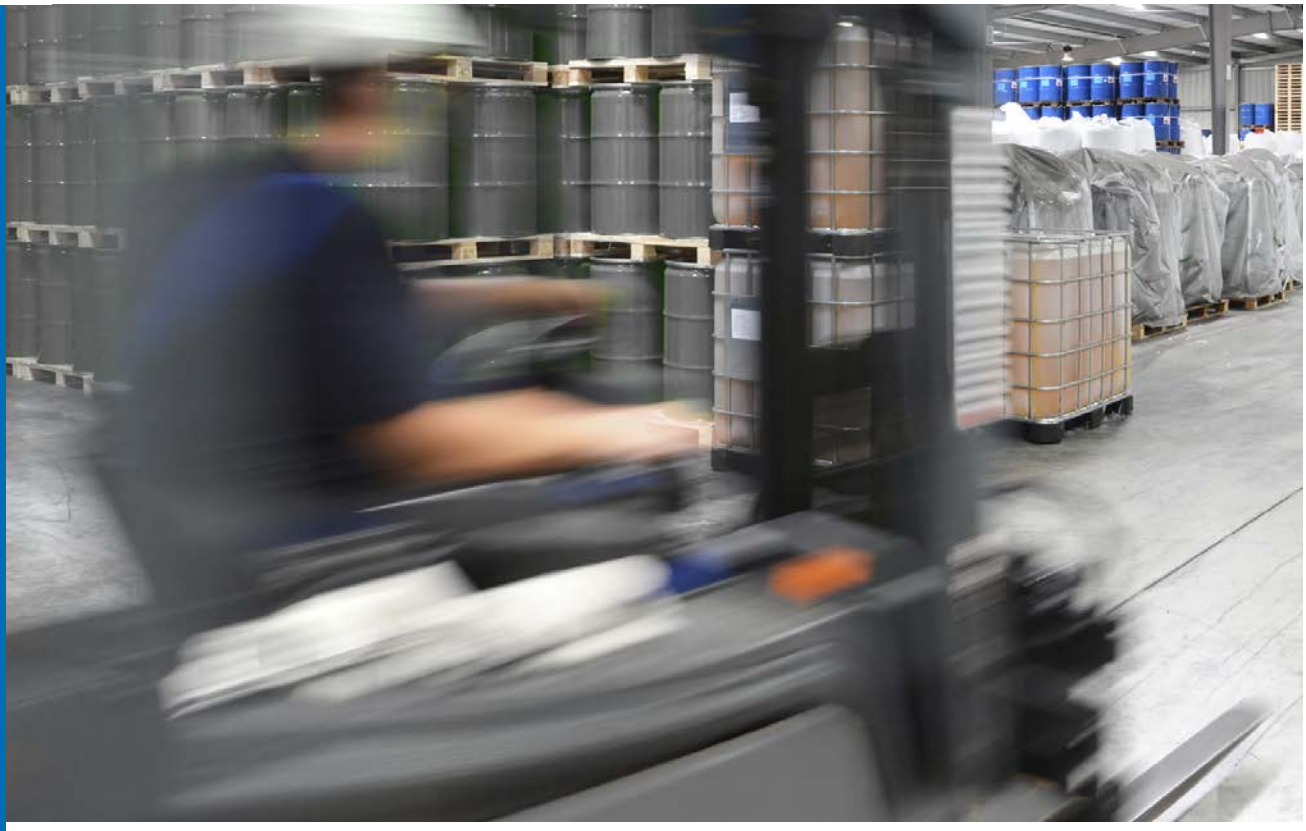
If battery discharge communication with the lift truck is not available based on the lift truck’s capabilities, an optional hard-wired external multi-functional display called the **ion Battery Guard** is provided. The ion Battery Guard is attached directly in the lift truck dash board so that the battery’s state of charge can be displayed and monitored by the operator.

The battery system has active protection componentry which monitors the entire system and virtually eliminates any misuse.

Fast/
Opportunity
charger

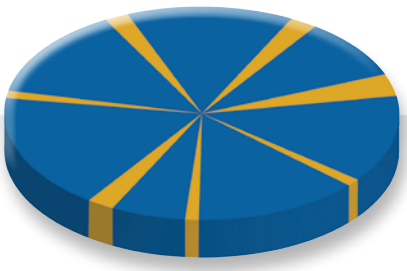
Optional:
External multi-functional display

Longer Operating Times



TRIATHLON®
LITHIUM-ION BATTERY

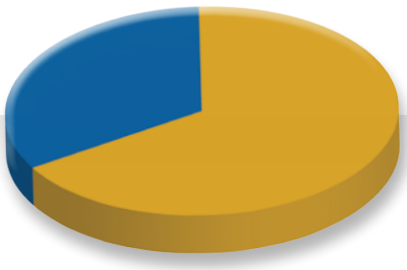
- Operating time
  approx. 21 - 22 h.
- Fast/Opportunity charging times
  approx. 2 - 3 h.



The operating time of the lift truck increases due to flexible fast/opportunity charging of the battery system.

TRIATHLON®
LEAD-ACID BATTERY

- Operating time
  approx. 8 h.
- Charging time/rest periods
  approx. 16 h.

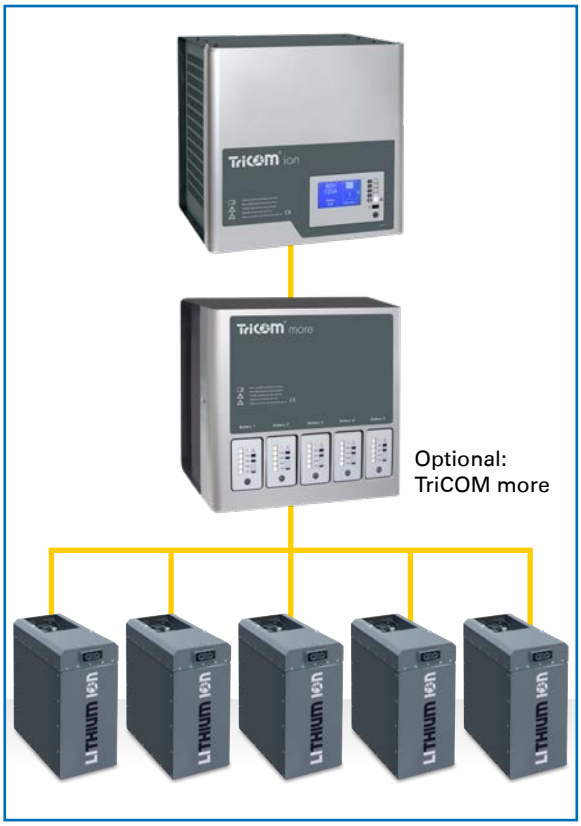


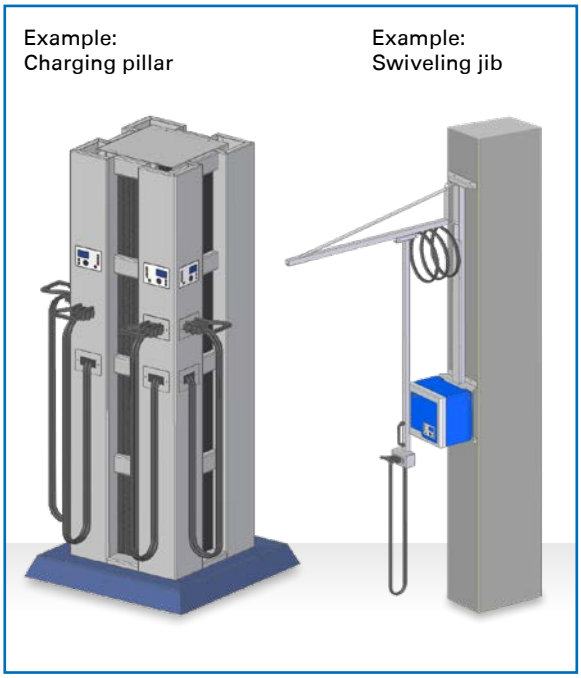
Your lift truck can be used virtually **"AROUND THE CLOCK"** without a battery change.

Endurance, Productivity and maximum performance under all conditions

SYSTEM FEATURES

- Flexible – the TRIATHLON® battery system can be used and charged anywhere and at any time.
- Fast Charge – full charging is possible within one hour.
- Opportunity Charge – opportunity charging is possible and encouraged at any state of charge and will not reduce battery life.
- TriCOM more – allows optional charging of up to eight batteries with only one charger.
- Zero Emissions – no gassing.
- Efficiency – a high tech battery system combined with an extremely efficient high-frequency charger with easy to read display.
- Capacity – the available energy is much greater than that of Lead-Acid batteries in the same box size. In most cases multi-shift use is possible without battery change-outs.
- Performance – the higher sustained voltage properties of the TRIATHLON® Lithium-Ion battery result in faster more consistent lifting and driving performance, especially noticeable toward the end of the shift.
- Energy Recuperation – the TRIATHLON® Lithium-Ion battery readily accepts any current fed back from the lift truck and uses it to increase run-time without any damage to the battery.
- Safe – the TRIATHLON® battery system is equipped with deep discharge and overcharge protection, individual cell temperature and voltage monitoring and various other safeguards which will prevent a short-circuit.
- Active – the TRIATHLON® battery system has active protection componentry which prevents application errors virtually 100 % of the time.
- TriCOM SR-Switching Technology – High system efficiency of up to 97 %.



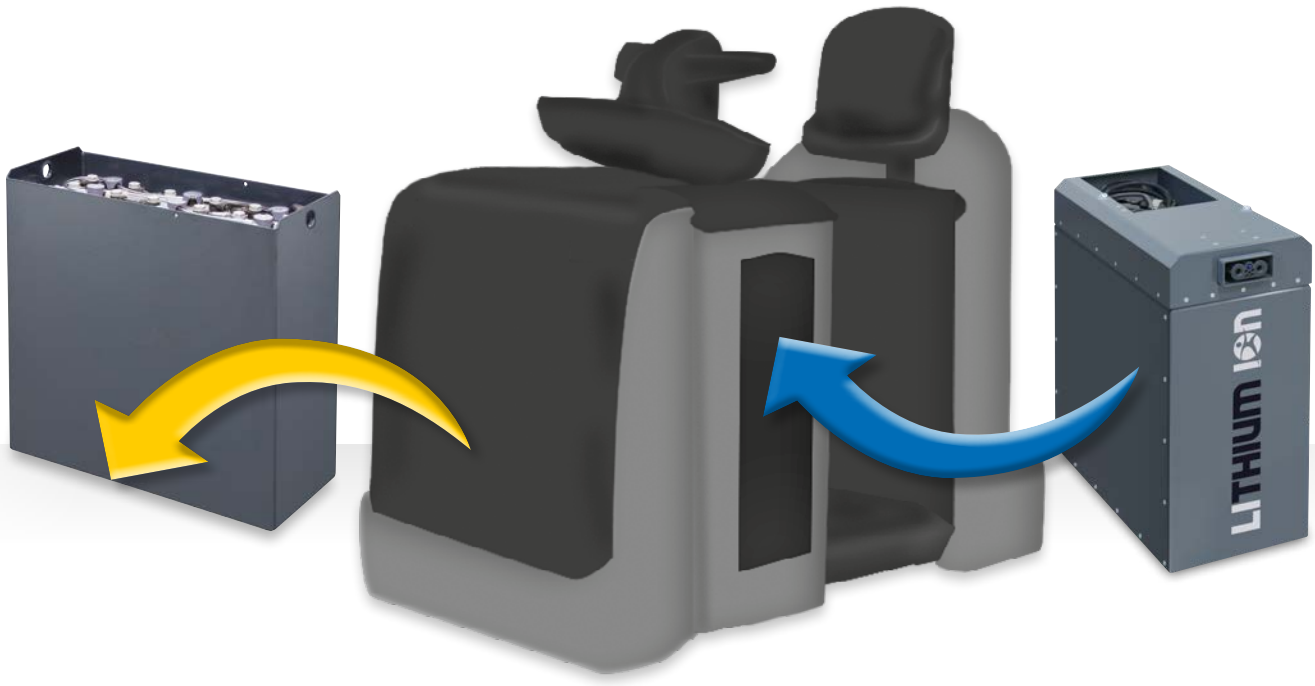


Fast and easy conversion

TRIATHLON® Lithium-Ion batteries can simply replace current Lead-Acid batteries without any modifications to new or existing lift trucks. Custom designed trays with similar dimensions and weights and features make the conversion very straightforward:

"LEAD OUT – LITHIUM IN"

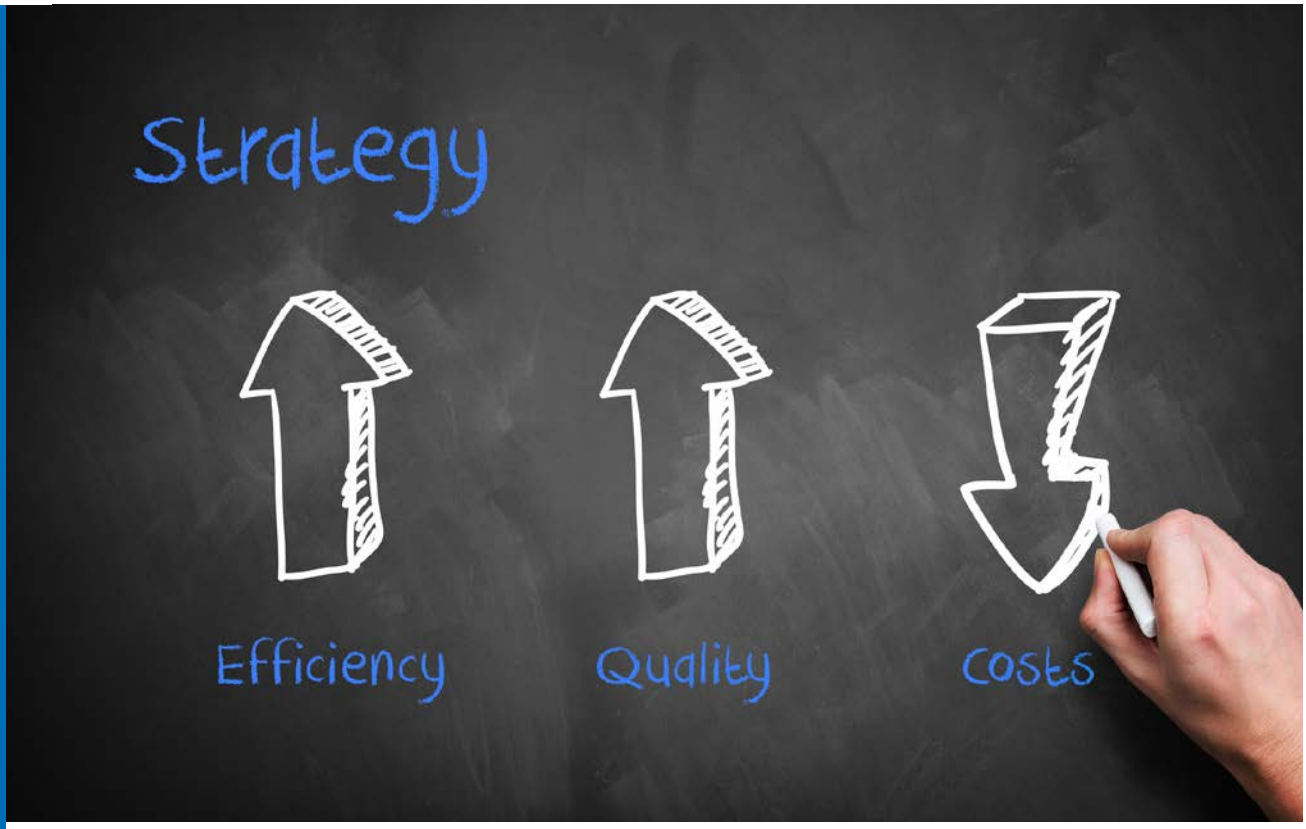
You begin from day one experiencing the cost savings and efficiency of TRIATHLON® Lithium-Ion technology.



THE ADVANTAGES

- More flexibility due to decentralized charging stations.
- No explosion hazard and no odors due to gassing.
- Longer operating times and higher productivity due to fast and opportunity charging.
- The TRIATHLON® battery system is absolutely maintenance-free - it does not have to be topped off with water.
- No need for battery change-outs and additional spare batteries.
- No battery change-out equipment needed - the TRIATHLON® battery stays in the vehicle during charging and throughout its useful life.
- No need for centralized battery rooms with expensive ventilation systems and fire doors.
- Very low operating costs combined with significant savings in electricity and water costs.
- TCO (Total Cost of Ownership) - significantly reduced total lifetime costs.
- Virtually 100 % protection against application errors.
- Significantly reduced CO_2 footprint.
- Different battery capacities and voltages can be charged on the same charger.

Total Cost of Ownership - total operating costs



In today's world, battery systems require a complete economic analysis that considers and evaluates all relevant costs including initial purchase price, chargers and maintenance and service – simply called… "total cost of ownership" (TCO).

When the cost of purchasing a Lithium-Ion battery system is compared with the cost of a conventional Lead-Acid battery, at first glance, the purchase price of the Lithium-Ion battery is higher. However, a conventional Lead-Acid battery needs additional items such as weekly watering, a single point watering system, electrolyte level sensor and maintenance unique to Lead-Acid such as battery washing and other costs associated with truck damage due to corrosion. In addition to the maintenance expenses, costs are also incurred for battery rooms and battery handling equipment, fire and hazmat safety, ventilation systems and of course additional spare batteries. Battery change-outs require valuable production and warehousing space and additional no value-add labor.

Another substantial cost factor is energy consumption. Due to significantly better total efficiency, the energy costs for charging a TRIATHLON® Lithium-Ion battery are up to 40 % lower than those of a Lead-Acid battery.

Thus, the conversion to Lithium-Ion batteries reduces total operating costs considerably.

To this end, TRIATHLON® and its sales partners offer professional and competent advice that considers the "Total Cost of Ownership."

The technology of tomorrow,

BATTERY SYSTEM SPECIFICATION

- Rated Voltages:
  24, 36, 48, 72, 80, 96, 120 volt
- Available battery system
  energy content:
  1.9 to 190 kWh
- Available capacities:
  74 to >2000 Ah
- Discharging temperature range:
  -28 °C to +50 °C
- Charging temperature range:
  -28 °C to +50 °C
- Storage temperature range:
  -20 °C to +45 °C
- Charge factor: <1.03

Lithium-
Ion battery

CHARGING SYSTEM SPECIFICATION

- Voltages:
  24 to 80 volt
- Available charging power:
  1.4 to 36 kW
- Available charging currents:
  50 to 400 ampere
- Efficiency: 95 to 97 %
- No centralized charging station needed

Fast/
Opportunity
charger

today - safe and economical

TriCOM® ion Charger Models

Type of Charger	Charge Time										Mains connection				Weight in kg	Type of Cabinet
	1.0 h		1.5 h		2.0 h		2.5 h		3.0 h							
	kW	Ah	kW	Ah	kW	Ah	kW	Ah	kW	Ah	V	A	kVA	Plug		
24 V / TCS 2050	1.35	52	-	-	2.69	104	-	-	4.04	156	E 230	7.0	1.60	16A Schuko	12	450
24 V / TCS 2100	2.69	104	4.04	156	5.39	208	6.73	260	8.08	312	E 230	14.0	3.20	16A Schuko	12	450
24 V / TCT 2150	4.04	156	6.06	208	8.08	312	10.10	364	12.12	468	Z 400	10.5	4.80	16A CEE rot	30	550
24 V / TCT 2200	5.39	208	8.08	312	10.77	416	13.47	520	16.16	624	Z 400	14.0	6.40	16A CEE rot	30	550
24 V / TCT 2250	6.73	260	10.10	364	13.47	520	16.84	624	20.20	780	D 400	11.7	8.10	16A CEE rot	38	550
24 V / TCT 2300	8.08	312	12.12	468	16.16	624	20.20	728	24.24	936	D 400	14.0	9.70	16A CEE rot	38	550
24 V / TCT 2350	9.43	364	14.14	520	18.86	728	23.57	884	28.28	1040	D 400	24.5	11.30	32A CEE rot	45	560
24 V / TCT 2400	10.77	416	16.16	624	21.55	832	26.94	988	32.32	1248	D 400	28.0	12.90	32A CEE rot	45	560
36 V / TCS 3050	1.92	52	-	-	3.85	104	-	-	5.77	156	E 230	9.9	2.30	16A Schuko	12	450
36 V / TCT 3100	3.85	104	5.77	156	7.70	208	9.62	260	11.54	312	Z 400	9.9	4.50	16A CEE rot	30	550
36 V / TCT 3150	5.77	156	8.66	208	11.54	312	14.43	364	17.32	468	D 400	9.9	6.80	16A CEE rot	38	550
36 V / TCT 3200	7.70	208	11.54	312	15.39	416	19.24	520	23.09	624	D 400	19.8	9.10	32A CEE rot	45	560
36 V / TCT 3250	9.62	260	14.43	364	19.24	520	24.05	624	28.86	780	D 400	24.7	11.40	32A CEE rot	45	560
36 V / TCT 3300	11.54	312	17.32	468	23.09	624	28.86	728	34.63	936	D 400	23.7	13.60	32A CEE rot	58	650
36 V / TCT 3350	13.47	364	20.20	520	26.94	728	33.67	884	40.40	1040	D 400	23.1	15.90	32A CEE rot	66	650
36 V / TCT 3400	15.39	416	23.09	624	30.78	832	38.48	988	46.18	1248	D 400	33.9	18.20	63A CEE rot	80	750
48 V / TCS 4050	2.69	52	-	-	5.39	104	-	-	8.08	156	E 230	13.7	3.20	16A Schuko	12	450
48 V / TCT 4100	5.39	104	8.08	156	10.77	208	13.47	260	16.16	312	Z 400	13.7	6.30	16A CEE rot	30	550
48 V / TCT 4150	8.08	156	12.12	208	16.16	312	20.20	364	24.24	468	D 400	13.7	9.50	16A CEE rot	38	550
48 V / TCT 4200	10.77	208	16.16	312	21.55	416	26.94	520	32.32	624	D 400	27.5	12.60	32A CEE rot	45	560
48 V / TCT 4250	13.47	260	20.20	364	26.94	520	33.67	624	40.40	780	D 400	27.5	15.80	32A CEE rot	58	650
48 V / TCT 4300	16.16	312	24.24	468	32.32	624	40.40	728	48.48	936	D 400	27.5	18.90	32A CEE rot	66	650
48 V / TCT 4350	18.86	364	28.28	520	37.71	728	47.14	884	56.57	1040	D 400	41.2	22.10	63A CEE rot	80	750
48 V / TCT 4400	21.55	416	32.32	624	43.10	832	53.87	988	64.65	1248	D 400	41.2	25.30	63A CEE rot	89	950
72 V / TCT 7050	3.85	52	-	-	7.70	104	-	-	11.54	156	Z 400	9.7	4.50	16A CEE rot	30	550
72 V / TCT 7100	7.70	104	11.54	156	15.39	208	19.24	260	23.09	312	D 400	13.0	9.00	16A CEE rot	38	550
72 V / TCT 7150	11.54	156	17.32	208	23.09	312	28.86	364	34.63	468	D 400	29.2	13.50	32A CEE rot	45	560
72 V / TCT 7200	15.39	208	23.09	312	30.78	416	38.48	520	46.18	624	D 400	26.0	17.90	32A CEE rot	66	650
72 V / TCT 7250	19.24	260	28.86	364	38.48	520	48.10	624	57.72	780	D 400	41.8	22.40	63A CEE rot	80	750
72 V / TCT 7300	23.09	312	34.63	468	46.18	624	57.72	728	69.26	936	D 400	43.9	26.90	63A CEE rot	89	950
72 V / TCT 7350	26.94	364	40.40	520	53.87	728	67.34	884	80.81	1040	D 400	55.7	32.00	63A CEE rot	111	1250
72 V / TCT 7400	30.78	416	46.18	624	61.57	832	76.96	988	92.35	1248	D 400	57.9	36.60	63A CEE rot	119	1250
80 V / TCT 8050	4.23	52	-	-	8.47	104	-	-	12.70	156	Z 400	10.7	4.90	16A CEE rot	30	550
80 V / TCT 8100	8.47	104	12.70	156	16.93	208	21.16	260	25.40	312	D 400	14.3	9.90	16A CEE rot	38	550
80 V / TCT 8150	12.70	156	19.05	208	25.40	312	31.75	364	38.10	468	D 400	25.7	14.80	32A CEE rot	58	650
80 V / TCT 8200	16.93	208	25.40	312	33.86	416	42.33	520	50.79	624	D 400	28.6	19.70	32A CEE rot	66	650
80 V / TCT 8250	21.16	260	31.75	364	42.33	520	52.91	624	63.49	780	D 400	40.2	24.60	63A CEE rot	89	950
80 V / TCT 8300	25.40	312	38.10	468	50.79	624	63.49	728	76.19	936	D 400	42.8	29.60	63A CEE rot	97	950
80 V / TCT 8350	29.63	364	44.44	520	59.26	728	74.07	884	88.89	1040	D 400	54.5	34.50	63A CEE rot	119	1250
80 V / TCT 8400	33.86	416	50.79	624	67.72	832	84.66	988	101.59	1248	D 400	57.1	39.40	63A CEE rot	127	1250

Type of Cabinet	Width	Height	Depth
RF450	430 mm	275 mm	125 mm
RF550	430 mm	415 mm	355 mm
RF560	430 mm	510 mm	355 mm
RF650	430 mm	735 mm	355 mm
RF750	430 mm	840 mm	355 mm
RF950	430 mm	1015 mm	355 mm
RF1250	460 mm	1300 mm	550 mm

YOUR IDEAS / NOTES

TRIATHLON®
INTELLIGENT BATTERIES

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Dated January 2022 – We reserve the right to make changes without notice