

▶ **Lead-acid batteries**



**Energy. Endurance. Performance.**



*As a manufacturer of lead-acid batteries and lithium-ion battery systems, TRIATHLON® develops and produces high-quality batteries for industrial applications in electrically powered industrial trucks, electric pallet trucks, mobile lifting work platforms and cleaning machines.*

Decades of experience, technical know-how and state-of-the-art production facilities promise the highest quality of vehicle traction batteries. The site is certified to ISO 9001, ISO 14001 and ISO 45001.

A dense network of sales partners in Germany, Europe, Australia and the USA always guarantees you competent advice and reliable and flexible on-site service.

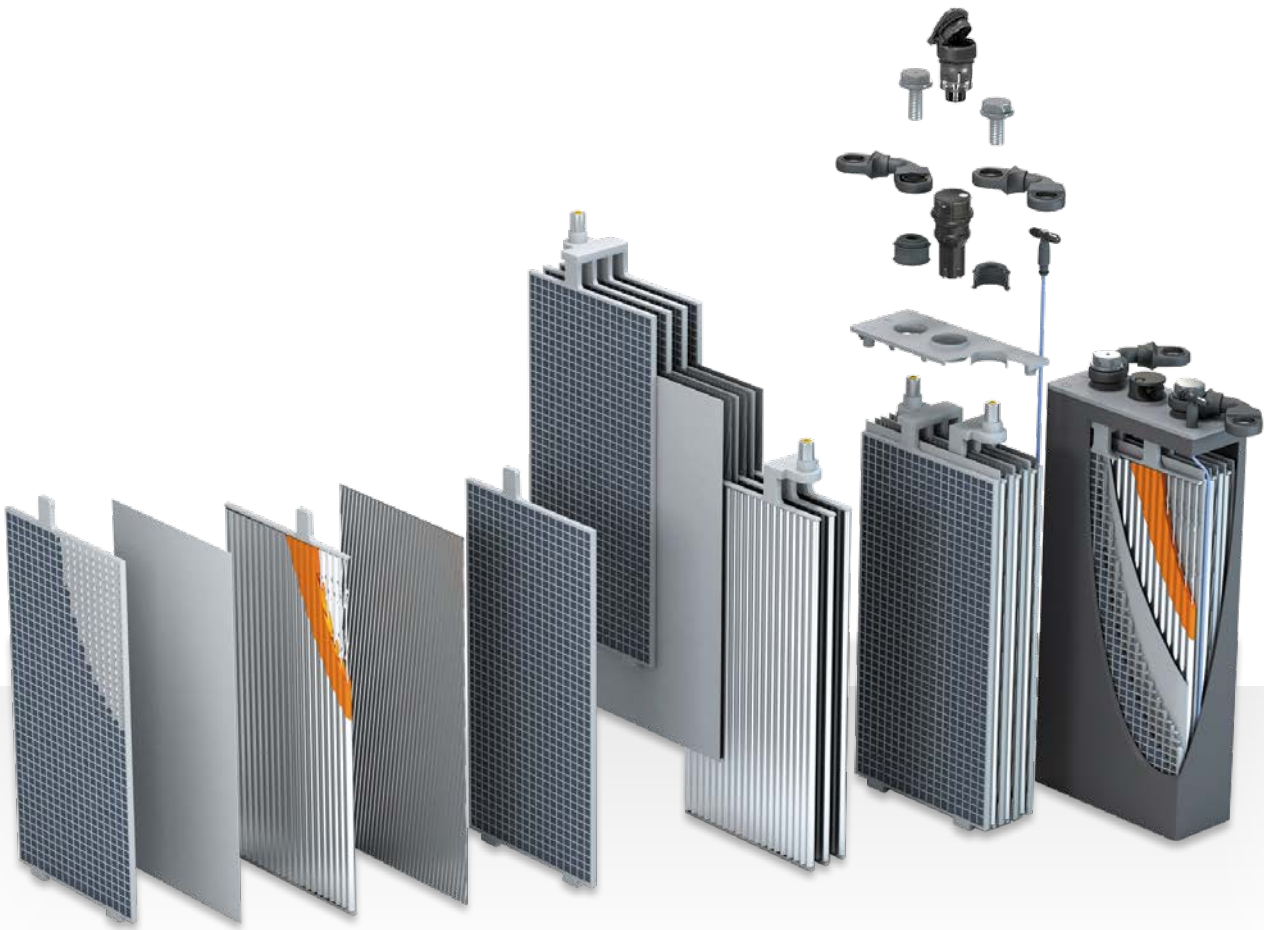
 **Reliable**

 **Flexible**

 **High performance**

 **Competent**

Only the sum of the



With the well-engineered and standardized TRIATHLON® lead-acid batteries in armored plate technology with bolted flex connectors, you can realize the high demands from the low-load range to the heavy-load range in multi-shift operation particularly reliably. For light to normal stress, we provide drive energy with maintenance-free gel technology, which is characterized by good cycle properties and freedom from maintenance.

TRIATHLON® batteries of the TPzS, TPzB and TPzV series ensure a safe power supply in electric industrial trucks. We work permanently and consistently on new and innovative solutions for safe, cost-efficient and reliable electric battery-powered operation.

For heavy-duty applications we recommend our TPzS more Power series. The novel nanotechnology significantly reduces the thermal load.

With our TPzS more Freedom series, you can increase productivity and reduce operating costs through reduced water refill intervals and low energy costs.

The TPzS more Life series is designed for optimized service life with maximum cycle stability.

With the TPzS more Space series, acid leakage during operation is prevented and it offers higher safety against overfilling.

advantages decides!



**PRODUCT PROPERTIES**

- ▶ Robust lead-acid technology with liquid electrolyte
- ▶ Proven armor plate technology
- ▶ State-of-the-art separator design ensures high acid volume and optimum electrolyte circulation
- ▶ High cycle stability
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 100 to 1550 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



**Technical data of the cells**

Width 198 mm, DIN cell

50 Ah plate			H1 = 260 H2 = 292		60 Ah plate			H1 = 333 H2 = 365		80 Ah plate			H1 = 396 H2 = 428		90 Ah plate			H1 = 463 H2 = 495		105 Ah plate			H1 = 511 H2 = 543	
Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm
2	TPzS	100	100	47	2	TPzS	120	120	47	2	TPzS	160	160	47	2	TPzS	180	180	47	2	TPzS	210	210	47
3	TPzS	150	150	65	3	TPzS	180	180	65	3	TPzS	240	240	65	3	TPzS	270	270	65	3	TPzS	315	315	65
4	TPzS	200	200	83	4	TPzS	240	240	83	4	TPzS	320	320	83	4	TPzS	360	360	83	4	TPzS	420	420	83
5	TPzS	250	250	101	5	TPzS	300	300	101	5	TPzS	400	400	101	5	TPzS	450	450	101	5	TPzS	525	525	101
6	TPzS	300	300	119	6	TPzS	360	360	119	6	TPzS	480	480	119	6	TPzS	540	540	119	6	TPzS	630	630	119
7	TPzS	350	350	137	7	TPzS	420	420	137	7	TPzS	560	560	137	7	TPzS	630	630	137	7	TPzS	735	735	137
8	TPzS	400	400	155	8	TPzS	480	480	155	8	TPzS	640	640	155	8	TPzS	720	720	155	8	TPzS	840	840	155
9	TPzS	450	450	173	9	TPzS	540	540	173	9	TPzS	720	720	173	9	TPzS	810	810	173	9	TPzS	945	945	173
10	TPzS	500	500	191	10	TPzS	600	600	191	10	TPzS	800	800	191	10	TPzS	900	900	191	10	TPzS	1050	1050	191

115 Ah plate			H1 = 542 H2 = 574		125 Ah plate			H1 = 569 H2 = 601		140 Ah plate			H1 = 683 H2 = 715		155 Ah plate			H1 = 713 H2 = 745						
Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm	Type	Ah	C <sub>5</sub>	L	mm
2	TPzS	230	230	47	2	TPzS	250	250	47	2	TPzS	280	280	47	2	TPzS	310	310	47	2	TPzS	310	310	47
3	TPzS	345	345	65	3	TPzS	375	375	65	3	TPzS	420	420	65	3	TPzS	465	465	65	3	TPzS	465	465	65
4	TPzS	460	460	83	4	TPzS	500	500	83	4	TPzS	560	560	83	4	TPzS	620	620	83	4	TPzS	620	620	83
5	TPzS	575	575	101	5	TPzS	625	625	101	5	TPzS	700	700	101	5	TPzS	775	775	101	5	TPzS	775	775	101
6	TPzS	690	690	119	6	TPzS	750	750	119	6	TPzS	840	840	119	6	TPzS	930	930	119	6	TPzS	930	930	119
7	TPzS	805	805	137	7	TPzS	875	875	137	7	TPzS	980	980	137	7	TPzS	1085	1085	137	7	TPzS	1085	1085	137
8	TPzS	920	920	155	8	TPzS	1000	1000	155	8	TPzS	1120	1120	155	8	TPzS	1240	1240	155	8	TPzS	1240	1240	155
9	TPzS	1035	1035	173	9	TPzS	1125	1125	173	9	TPzS	1260	1260	173	9	TPzS	1395	1395	173	9	TPzS	1395	1395	173
10	TPzS	1150	1150	191	10	TPzS	1250	1250	191	10	TPzS	1400	1400	191	10	TPzS	1550	1550	191	10	TPzS	1550	1550	191

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

Preferred applications:



# TRIATHLON® TPzS MP more Power

## PRODUCT PROPERTIES

- ▶ Thin tube armor plate with nanotube technology
- ▶ High energy density and discharge performance with improved thermal operating ranges
- ▶ Charging takes place with improved charge acceptance and a lower temperature stroke, thus significantly gentler
- ▶ State-of-the-art separator design ensures high acid volume and optimum electrolyte circulation
- ▶ High cycle stability
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 390 to 1680 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 198 mm, DIN cell

			H1 = 569 H2 = 601					H1 = 713 H2 = 745	
Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm
4	TPzS	390 MP	390	65	4	TPzS	495 MP	495	65
5	TPzS	520 MP	520	83	5	TPzS	640 MP	640	83
7	TPzS	660 MP	660	101	7	TPzS	840 MP	840	101
8	TPzS	780 MP	780	119	8	TPzS	990 MP	990	119
9	TPzS	880 MP	880	137	9	TPzS	1135 MP	1135	137
11	TPzS	1040 MP	1040	155	11	TPzS	1320 MP	1320	155
12	TPzS	1160 MP	1160	173	12	TPzS	1475 MP	1475	173
13	TPzS	1325 MP	1325	191	13	TPzS	1680 MP	1680	191

Other types on request

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

## Preferred applications:





# TRIATHLON® TPzS MF more Freedom

## PRODUCT PROPERTIES

- ▶ Low-maintenance lead-acid technology with significantly reduced water refill intervals in conjunction with an optimized charging characteristic curve
- ▶ Maintenance-free from 4, 8 or 13 weeks (depending on system design)
- ▶ Proven armor plate technology
- ▶ State-of-the-art separator design ensures high acid volume and optimum electrolyte circulation
- ▶ High cycle stability
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 250 to 1550 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 198 mm, DIN cell

125 Ah plate			H1 = 569 H2 = 601		155 Ah plate			H1 = 713 H2 = 745	
Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm
2	TPzS	250 MF	250	47	2	TPzS	310 MF	310	47
3	TPzS	375 MF	375	65	3	TPzS	465 MF	465	65
4	TPzS	500 MF	500	83	4	TPzS	620 MF	620	83
5	TPzS	625 MF	625	101	5	TPzS	775 MF	775	101
6	TPzS	750 MF	750	119	6	TPzS	930 MF	930	119
7	TPzS	875 MF	875	137	7	TPzS	1085 MF	1085	137
8	TPzS	1000 MF	1000	155	8	TPzS	1240 MF	1240	155
9	TPzS	1125 MF	1125	173	9	TPzS	1395 MF	1395	173
10	TPzS	1250 MF	1250	191	10	TPzS	1550 MF	1550	191

Other types on request

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

Preferred applications:



# TRIATHLON® TPzS MS more Space

## PRODUCT PROPERTIES

- ▶ A larger acid reservoir additionally prevents acid leakage during operation
- ▶ Higher safety against overfilling
- ▶ Proven armor plate technology
- ▶ State-of-the-art separator design ensures high acid volume and optimum electrolyte circulation
- ▶ High cycle stability
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 240 to 1550 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 198 mm, DIN cell

120 Ah plate				H1 = 569 H2 = 601		155 Ah plate				H1 = 713 H2 = 745	
Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm		
2	TPzS	240 MS	240	47	2	TPzS	310 MS	310	47		
3	TPzS	360 MS	360	65	3	TPzS	465 MS	465	65		
4	TPzS	480 MS	480	83	4	TPzS	620 MS	620	83		
5	TPzS	600 MS	600	101	5	TPzS	775 MS	775	101		
6	TPzS	720 MS	720	119	6	TPzS	930 MS	930	119		
7	TPzS	840 MS	840	137	7	TPzS	1085 MS	1085	137		
8	TPzS	960 MS	960	155	8	TPzS	1240 MS	1240	155		
9	TPzS	1080 MS	1080	173	9	TPzS	1395 MS	1395	173		
10	TPzS	1200 MS	1200	191	10	TPzS	1550 MS	1550	191		

Other types on request

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

## Preferred applications:





# TRIATHLON® TPzS ML more Life

## PRODUCT PROPERTIES

- ▶ Highest cycle stability with optimized service life
- ▶ Increased active mass with reduced acid density
- ▶ Robust lead-acid technology with liquid electrolyte
- ▶ Proven armor plate technology
- ▶ State-of-the-art separator design ensures high acid volume and optimum electrolyte circulation
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 236 to 1450 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 198 mm, DIN cell

118 Ah plate			H1 = 569 H2 = 601		145 Ah plate			H1 = 713 H2 = 745	
Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm
2	TPzS	236 ML	236	47	2	TPzS	290 ML	290	47
3	TPzS	354 ML	354	65	3	TPzS	435 ML	435	65
4	TPzS	472 ML	472	83	4	TPzS	580 ML	580	83
5	TPzS	590 ML	590	101	5	TPzS	725 ML	725	101
6	TPzS	708 ML	708	119	6	TPzS	870 ML	870	119
7	TPzS	826 ML	826	137	7	TPzS	1015 ML	1015	137
8	TPzS	944 ML	944	155	8	TPzS	1160 ML	1160	155
9	TPzS	1062 ML	1062	173	9	TPzS	1305 ML	1305	173
10	TPzS	1180 ML	1180	191	10	TPzS	1450 ML	1450	191

Other types on request

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

Preferred applications:





## PRODUCT PROPERTIES

- ▶ Robust lead-acid technology with liquid electrolyte
- ▶ Proven armor plate technology
- ▶ State-of-the-art separator design ensures high acid volume and optimum electrolyte circulation
- ▶ High cycle stability
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 64 to 1080 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 158 mm, British Standard (BS) cell

32 Ah plate			H1 = 264 H2 = 296		42 Ah plate			H1 = 323 H2 = 355		55 Ah plate			H1 = 402 H2 = 434		65 Ah plate			H1 = 454 H2 = 486	
Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm
2	TPzB	64	64	45	2	TPzB	84	84	45	2	TPzB	110	110	45	2	TPzB	130	130	45
3	TPzB	96	96	61	3	TPzB	126	126	61	3	TPzB	165	165	61	3	TPzB	195	195	61
4	TPzB	128	128	77	4	TPzB	168	168	77	4	TPzB	220	220	77	4	TPzB	260	260	77
5	TPzB	160	160	93	5	TPzB	210	210	93	5	TPzB	275	275	93	5	TPzB	325	325	93
6	TPzB	192	192	109	6	TPzB	252	252	109	6	TPzB	330	330	109	6	TPzB	390	390	109
7	TPzB	224	224	125	7	TPzB	294	294	125	7	TPzB	385	385	125	7	TPzB	455	455	125
8	TPzB	256	256	141	8	TPzB	336	336	141	8	TPzB	440	440	141	8	TPzB	520	520	141
9	TPzB	288	288	157	9	TPzB	378	378	157	9	TPzB	495	495	157	9	TPzB	585	585	157
10	TPzB	320	320	173	10	TPzB	420	420	173	10	TPzB	550	550	173	10	TPzB	650	650	173

75 Ah plate			H1 = 515 H2 = 547		86 Ah plate			H1 = 568 H2 = 600		100 Ah plate			H1 = 600 H2 = 632		108 Ah plate			H1 = 687 H2 = 719	
Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm	Type			Ah C <sub>5</sub>	L mm
2	TPzB	150	150	45	2	TPzB	172	172	45	2	TPzB	200	200	45	2	TPzB	216	216	45
3	TPzB	225	225	61	3	TPzB	258	258	61	3	TPzB	300	300	61	3	TPzB	324	324	61
4	TPzB	300	300	77	4	TPzB	344	344	77	4	TPzB	400	400	77	4	TPzB	432	432	77
5	TPzB	375	375	93	5	TPzB	430	430	93	5	TPzB	500	500	93	5	TPzB	540	540	93
6	TPzB	450	450	109	6	TPzB	516	516	109	6	TPzB	600	600	109	6	TPzB	648	648	109
7	TPzB	525	525	125	7	TPzB	602	602	125	7	TPzB	700	700	125	7	TPzB	756	756	125
8	TPzB	600	600	141	8	TPzB	688	688	141	8	TPzB	800	800	141	8	TPzB	864	864	141
9	TPzB	675	675	157	9	TPzB	774	774	157	9	TPzB	900	900	157	9	TPzB	972	972	157
10	TPzB	750	750	173	10	TPzB	860	860	173	10	TPzB	1000	1000	173	10	TPzB	1080	1080	173

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

### Preferred applications:



# ▶ TRIATHLON® TPzV-DS

## PRODUCT PROPERTIES

- ▶ Absolutely maintenance-free sealed lead-acid technology with GEL electrolyte
- ▶ Very low self-discharge
- ▶ Proven armor plate technology
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 120 to 1120 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 198 mm, DIN cell

60 Ah plate			75 Ah plate			85 Ah plate					
H1 = 333 H2 = 365			H1 = 396 H2 = 428			H1 = 463 H2 = 495					
Type	Ah C <sub>5</sub>	L mm	Type	Ah C <sub>5</sub>	L mm	Type	Ah C <sub>5</sub>	L mm			
2	TPzV-DS 120	120	47	2	TPzV-DS 150	150	47	2	TPzV-DS 170	170	47
3	TPzV-DS 180	180	65	3	TPzV-DS 225	225	65	3	TPzV-DS 255	255	65
4	TPzV-DS 240	240	83	4	TPzV-DS 300	300	83	4	TPzV-DS 340	340	83
5	TPzV-DS 300	300	101	5	TPzV-DS 375	375	101	5	TPzV-DS 425	425	101
6	TPzV-DS 360	360	119	6	TPzV-DS 450	450	119	6	TPzV-DS 510	510	119
7	TPzV-DS 420	420	137	7	TPzV-DS 525	525	137	7	TPzV-DS 595	595	137
8	TPzV-DS 480	480	155	8	TPzV-DS 600	600	155	8	TPzV-DS 680	680	155
10	TPzV-DS 600	600	192								

110 Ah plate			130 Ah plate			140 Ah plate					
H1 = 569 H2 = 601			H1 = 683 H2 = 715			H1 = 713 H2 = 745					
Type	Ah C <sub>5</sub>	L mm	Type	Ah C <sub>5</sub>	L mm	Type	Ah C <sub>5</sub>	L mm			
2	TPzV-DS 220	220	47	2	TPzV-DS 260	260	47	2	TPzV-DS 280	280	47
3	TPzV-DS 330	330	65	3	TPzV-DS 390	390	65	3	TPzV-DS 420	420	65
4	TPzV-DS 440	440	83	4	TPzV-DS 520	520	83	4	TPzV-DS 560	560	83
5	TPzV-DS 550	550	101	5	TPzV-DS 650	650	101	5	TPzV-DS 700	700	101
6	TPzV-DS 660	660	119	6	TPzV-DS 780	780	119	6	TPzV-DS 840	840	119
7	TPzV-DS 770	770	137	7	TPzV-DS 910	910	137	7	TPzV-DS 980	980	137
8	TPzV-DS 880	880	155	8	TPzV-DS 1040	1040	155	8	TPzV-DS 1120	1120	155

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

Preferred applications:



# TRIATHLON® TPzV-BS

## PRODUCT PROPERTIES

- ▶ Absolutely maintenance-free sealed lead-acid technology with GEL electrolyte
- ▶ Very low self-discharge
- ▶ Proven armor plate technology
- ▶ Fully insulated pole screws, flex connectors and flexible terminals
- ▶ Standardized nominal capacities from 140 to 680 Ah
- ▶ Cell and battery properties according to IEC 60254-2
- ▶ Excellent recyclability



## Technical data of the cells

Width 158 mm, British Standard (BS) cell

70 Ah plate				H1 = 515 H2 = 547		85 Ah plate			H1 = 600 H2 = 632	
Type		Ah	C <sub>s</sub>	L	Type		Ah	C <sub>s</sub>	L	
		mm					mm			
2	TPzV-BS	140	140	45	2	TPzV-BS	170	170	45	
3	TPzV-BS	210	210	61	3	TPzV-BS	255	255	61	
4	TPzV-BS	280	280	77	4	TPzV-BS	340	340	77	
5	TPzV-BS	350	350	93	5	TPzV-BS	425	425	93	
6	TPzV-BS	420	420	109	6	TPzV-BS	510	510	109	
7	TPzV-BS	490	490	125	7	TPzV-BS	595	595	125	
8	TPzV-BS	560	560	141	8	TPzV-BS	680	680	141	

H1 = Height above cover in mm, H2 = Total height in mm  
Height +/- 5 mm

Preferred applications:





One of the most important components for the function of traction batteries with lead-acid technology is the electrolyte; a solution of sulfuric acid and water. When batteries are recharged, water is converted into hydrogen and oxygen by electrolysis. This water consumption must be compensated with demineralized water shortly before the end of charging in the case of batteries with liquid electrolyte. High requirements apply to the purity of the refill water.

In order to ensure reliable operation of the batteries, it is necessary to perform regular care and maintenance. To this end, we offer the right accessories for your batteries. This ensures optimal maintenance and monitoring of the battery and allows you to react in time to prevent unnecessary failures or repairs.



## OPTIONS

### **AQUAmatic water refill system**

- ▶ Reliable filling of batteries.

### **Level sensor AQUAcontrol**

- ▶ Monitoring and display of the electrolyte level of the battery.

### **Batterie controller icon Battery Guard 4.0**

- ▶ Monitoring and control of the operating conditions of the battery and charger.

### **Electrolyte circulation**

- ▶ The efficient removal of the acidic coating reduces energy and water consumption.

### **AQUAmobil water refill cart**

- ▶ Location-independent and mains-independent filling of industrial batteries with demineralized water.



### **Charging technology**

- ▶ A prerequisite for the performance, low water consumption and long battery life of traction batteries is optimal recharging with TriCOM® series chargers.





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