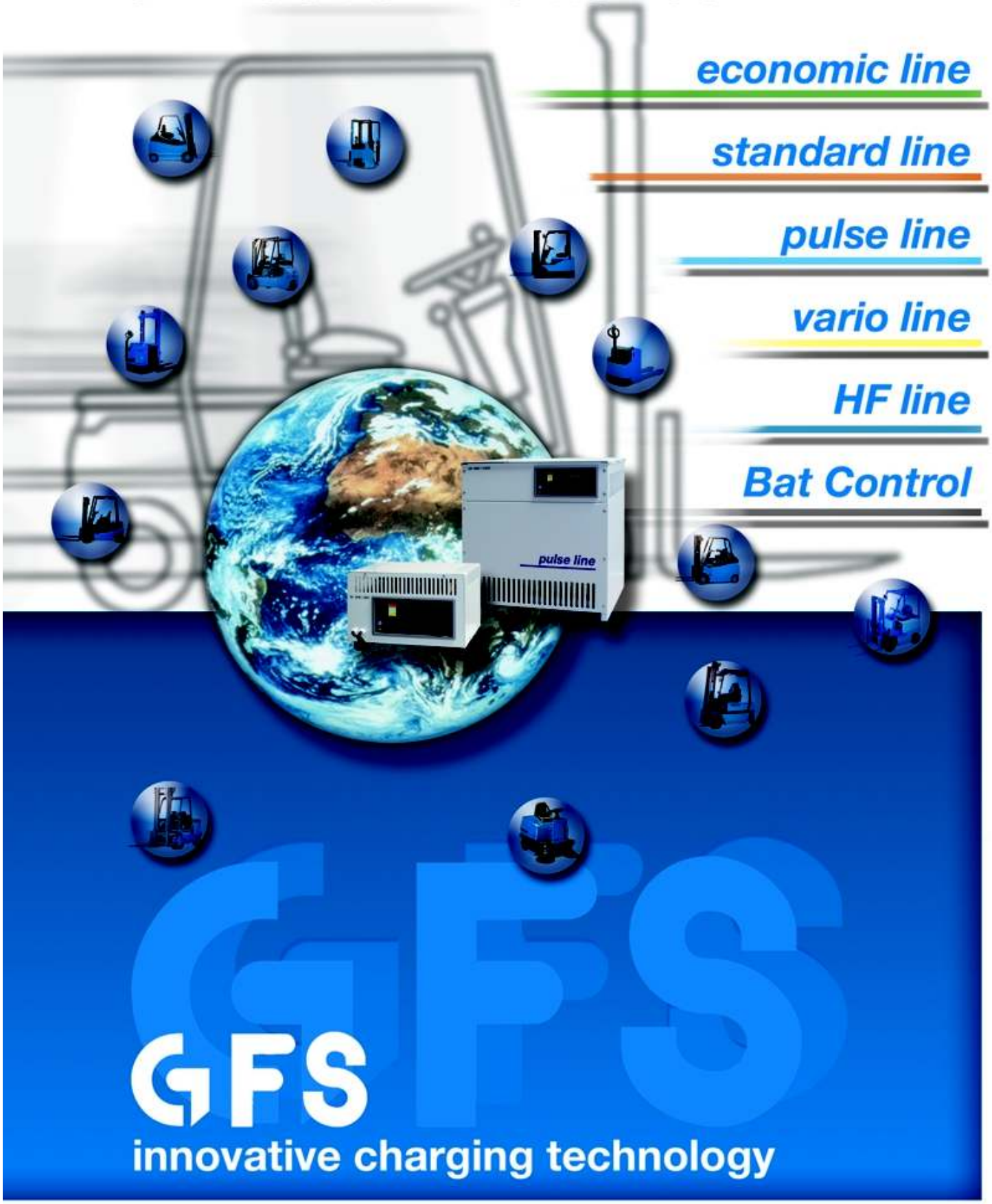
Modern Charging Systems for Traction Batteries



economic line

standard line

pulse line

vario line

HF line

Bat Control

GFS

innovative charging technology

GFS - New Charging Technology

The new GFS-Chargers feature the highest flexibility and the simplest usability. They set new standards regarding the quantity and extent of retrievable data.

Thanks to the improved design of the LED-diodes displayed as traffic lights the charging status can be watched from a distance.

Pulse-chargers with WpWa-characteristics

This modern charging system is suitable for short time charging (three-shift operation) without air expense, piping, acid pumps or special batteries. The batteries are charged gently by current-pulses in the recharging phase. Savings in energy and maintenance are possible due to the low charging factor. All chargers are equipped with a digital display and data compilation via the USB - interface.

Standard-chargers with WaN-characteristics

These universally applicable systems work according to Wa-characteristics and DIN 41774 and are automatically switched off after the charging process is completed. Charging is controlled electronically via Ah-balancing in order to avoid overcharging or undercharging. Modern electronic switches are implemented, including the safety-cut-off switch. Data storage and retrieval via interface USB

Economic-chargers with WaE-characteristics

Well-priced systems with Wa-characteristics automatically switch off after the charging process is complete. The charging process is controlled by time, meaning the remaining charging time is automatically programmed based on the required main charging time between 2,0 and 2,4 V/Z. The automatic shut down takes place after programmed cycle is completed.

Vario-chargers with IUIa-characteristics

These systems are mainly used for the charging of maintenance-free traction batteries with IUIa-characteristics according to DIN 41773. Mains voltage fluctuations which affect the charging current are automatically compensated. Charging time is between 7 and 14 hours, depending on battery capacity and type of device.

HF-chargers

The chargers of the new HF-line work with tact technology.

Bat-Control

The battery control system “Bat-Control” monitors the battery during the discharging and charging process.

Patent No. 198 33 096
Pulse Charging Technology

Our quality management is certified by DIN EN ISO 9001.

Our Innovations

Clearly visible LED diodes shaped as traffic light indicate the course of charging. Additionally a display shows charging voltage, charging current, Ah charged as well as the charging period. The error messages are programmable in various languages.

New Control Electronics

New control electronics allow for the data of the last 1008 charging cycles to be transmitted through the USB interface. For the first time it is possible to have access to the charging data over a battery's lifetime. Microprocessor controlling recognizes deep discharged and sulfurized batteries.

The simple to use programming software allows the appliances to be configured for special cases, such as in refrigerators, or to be controlled externally.

Additionally, the compilation of a BGV-A3 inspection report and a programmable delay of the charging start (1-1000 min. or time) is possible with this software. Our technically improved chargers particularly the patented pulse line series lead to a significant reduction of running costs and provide a smooth charge of the batteries.
The new housing is designed for simple wall mounting.

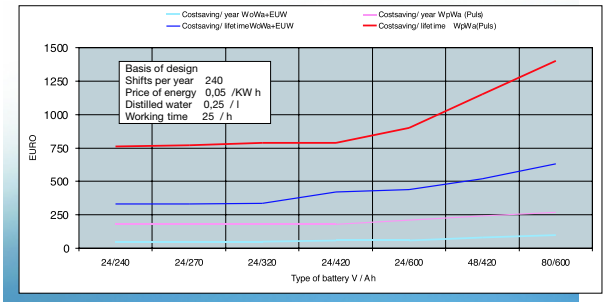
The reduced overload factor leads to a lower rise in temperature of the battery during the charging process, safes maintenance expenses and extends the battery lifetime.

Cost savings ...

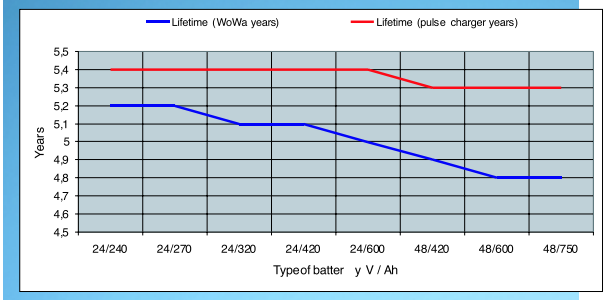
... through optimized charging technology

Compare: normal charging technology and the new pulse charging technology
The following characteristic curves display the advantages of pulse charging technology with respect to heat build-up, savings in operational costs and increasing the lifetime of your battery.

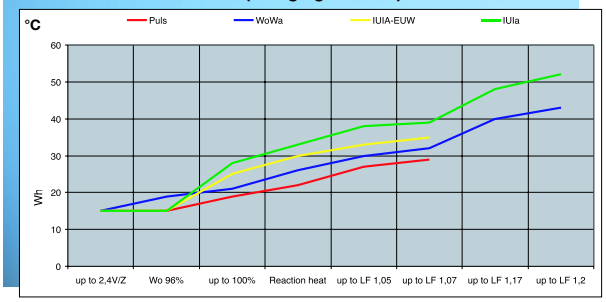
Cost saving in 1 year and cost saving in a lifetime of the battery (ZVEI)



Lifetime according to chosen charging system (ZVEI)



Development of heat according to chosen charging system (charging time 8 h)



Economic WaE – chargers

The chargers of the series economic line are equipped with charging electronics, work according to modified Wa-characteristics and are perfect for charging low-maintenance traction batteries for normal use. They were specifically developed for charging periods between 10 and 14 hours, however, due to their amplified character they can also be used for shorter charging periods. All chargers are delivered with network cables and plugs as well as battery cables without charging plugs.

Charging Electronics

The fully automatic charging process according to Wa–characteristics is controlled and monitored via time, depending on the status of the battery. The remaining charging time is automatically calculated and pre-programmed based on the required main charging time. This leads to reliable, gentle and energy-saving recharging of the battery. After completing the charging process, the apparatus shuts off automatically. There is also an automatic safety-cut-off switch in case of malfunction. The operational status of the apparatus is displayed by the integrated LED-diodes.

Features

- Time controlled charging process
- Delayed automatic switch-on
- Automatic cut-off after completion of the charging process
- Automatic balancing charge
- Temperature monitoring of the transformer
- Safety-cut-off in case of malfunction
- Display of the operational status via LED-diodes

Advantages

- Highly cost effective
- Proven charging technology
- Simple operation
- Robust design
- Wall mounting

Housing Dimensions

Type	Height mm	Width mm	Depth* mm
TR 00	260	420	290
TR 01	450	480	340
TR 02	520	480	420
WS 2	750	550	430
WS 3	900	600	500

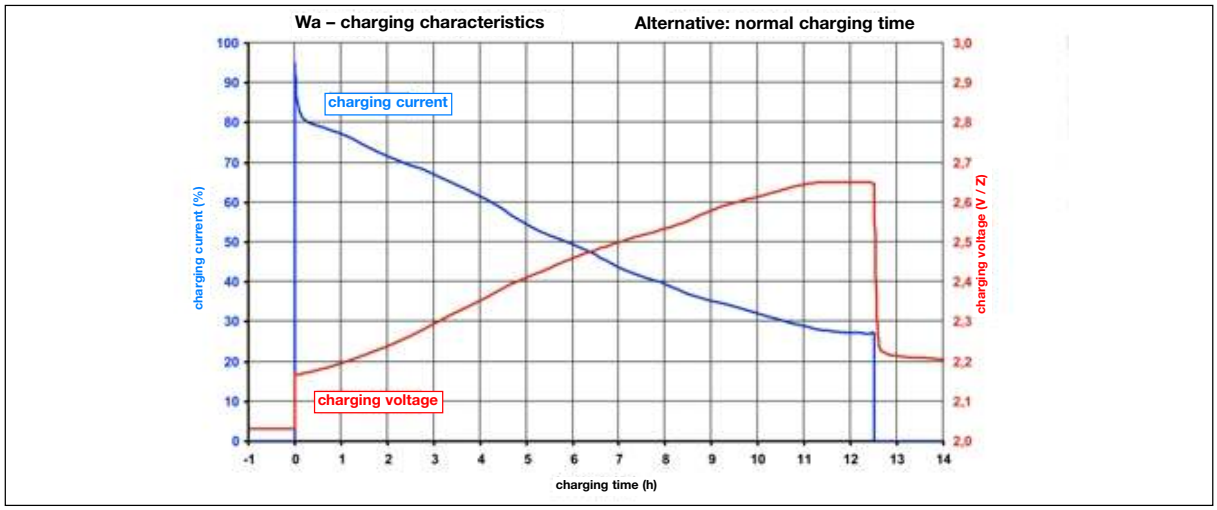
* 30 mm included in depth measurement for wall mounting

System Characteristics

The charging current flows at 2 V/Z and drops off to approx. 50% I_n when the gas voltage (2,4 V/Z) is reached. When the final charging voltage of 2.65 V/Z is reached, the charging current drops further to approx. 27% I_n.

Charging system for traction batteries with WaE – characteristics

charger WaE	voltage DC / Volt	charging current Ampere	charging times / battery capacity (low maintenance) 8,5 - 10 hours	10 - 12 hours	12 - 14 hours	housing type	weight kp	fuse (mains) A
E 24 / 20	24	20		134 - 154	154 - 190	TR 00	20	16
E 24 / 30	24	30	165 - 201	201 - 231	231 - 285	TR 00	22	16
E 24 / 40	24	40	220 - 268	268 - 308	308 - 380	TR 00	24	16
E 24 / 50	24	50	275 - 335	335 - 385	385 - 475	TR 00	26	16
E 24 / 60	24	60	330 - 402	402 - 462	462 - 570	TR 01	41	16
E 24 / 70	24	70	385 - 469	469 - 539	539 - 665	TR 01	45	16
E 24 / 90	24	90	495 - 603	603 - 693	693 - 855	TR 01	50	16
D 24 / 100	24	100	550 - 670	670 - 770	770 - 950	TR 01	60	16
D 24 / 120	24	120	660 - 804	804 - 924	924 - 1140	TR 01	64	16
D 24 / 150	24	150	825 - 1005	1005 - 1155	1155 - 1425	TR 02	71	16
D 24 / 170	24	170	935 - 1139	1139 - 1309	1309 - 1615	TR 02	90	16
D 24 / 200	24	200	1100 - 1340	1340 - 1540	1540 - 1900	TR 02	112	16
E 36 / 20	36	20		134 - 154	154 - 190	TR 00	24	16
E 36 / 30	36	30	165 - 201	201 - 231	231 - 285	TR 00	26	16
E 36 / 50	36	50	275 - 335	335 - 385	385 - 475	TR 01	46	16
E 36 / 60	36	60	330 - 402	402 - 462	462 - 570	TR 01	61	16
D 36 / 90	36	90	495 - 603	603 - 693	693 - 855	TR 02	72	16
D 36 / 120	36	120	660 - 804	804 - 924	924 - 1140	TR 02	74	16
D 36 / 150	36	150	825 - 1005	1005 - 1155	1155 - 1425	TR 02	87	16
D 36 / 170	36	170	935 - 1139	1139 - 1309	1309 - 1615	WS 2	125	25
D 36 / 200	36	200	1100 - 1340	1340 - 1540	1540 - 1900	WS 2	135	25
E 48 / 30	48	30	165 - 201	201 - 231	231 - 285	TR 01	44	16
E 48 / 45	48	45	248 - 302	302 - 347	347 - 428	TR 01	58	16
D 48 / 60	48	60	330 - 402	402 - 462	462 - 570	TR 01	62	16
D 48 / 70	48	70	385 - 469	469 - 539	539 - 665	TR 02	67	16
D 48 / 85	48	85	468 - 570	570 - 655	655 - 808	TR 02	74	16
D 48 / 100	48	100	550 - 670	670 - 770	770 - 950	TR 02	84	16
D 48 / 120	48	120	660 - 804	804 - 924	924 - 1140	TR 02	94	20
D 48 / 150	48	150	825 - 1005	1005 - 1155	1155 - 1425	WS 2	115	25
D 48 / 170	48	170	935 - 1139	1139 - 1309	1309 - 1615	WS 2	165	25
D 48 / 200	48	200	1100 - 1340	1340 - 1540	1540 - 1900	WS 2	175	25
E 80 / 20	80	20		134 - 154	154 - 190	TR 01	57	16
E 80 / 25	80	25	138 - 168	168 - 193	250 - 308	TR 01	57	16
D 80 / 40	80	40	220 - 268	268 - 308	308 - 380	TR 02	71	16
D 80 / 50	80	50	275 - 335	335 - 385	385 - 475	TR 02	73	16
D 80 / 60	80	60	330 - 402	402 - 462	462 - 570	TR 02	82	16
D 80 / 70	80	70	385 - 469	469 - 539	539 - 665	TR 02	94	16
D 80 / 85	80	85	468 - 570	570 - 655	655 - 808	WS 2	112	25
D 80 / 100	80	100	550 - 670	670 - 770	770 - 950	WS 2	118	25
D 80 / 120	80	120	660 - 804	804 - 924	924 - 1140	WS 2	128	25
D 80 / 150	80	150	825 -1005	1005 - 1155	1155 - 1425	WS 3	180	35
D 80 / 170	80	170	935 - 1139	1139 - 1309	1309 - 1615	WS 3	185	35



Standard WaN – chargers

The chargers of the standard line are equipped with most modern charging electronics, and are particularly good for charging low-maintenance batteries. They were specifically developed for charging periods between 8,5 and 14 hours. All chargers are delivered with a mains cable and plug as well as battery cable without charging plug.

Charging Electronics

The fully automatic charging process according to Wa–characteristics is controlled and monitored by a microprocessor switch via Ah-balancing. The required amount of current for full charging is determined by measuring and calculating the charging current and then multiplying it by a charging factor. This method of charging leads to a reliable, gentle and energy-saving charging process. Additionally, a safety-cut-off is provided, which interrupts the charging process in case of malfunction. All apparatuses are equipped with a USB interface in order to export the stored charging data. The operational status is displayed via integrated LED-diodes.

Features

- Storage of present charging data. USB - Interface for exporting of the past 1008 charging sequences
- Programmable delay in charging switch-on. Delay between 1-1000 minutes or starting time
- Relay contact for access to external LEDs
- Integrated BGV-A3 inspection report and BGV-A3 memo window
- Charging parameter options for “cold batteries”
- Automatic cut-off after completion of the charging process
- Automatic balancing charge and conservation charge every 10 days
- Recognition of deep discharged and sulfurized batteries
- Charging electronic with digital display for charging voltage, charging current, charging Ah and charging period
- Error messages are programmable in various languages

Options

- Air pump unit for electrolyte circulation
- Trigger for automatic water refilling

Advantages

- Suitable for multiple-shift operation
- Proven charging technology for short charging periods
- Optimized charging, gentle on battery
- Simple operation
- Wall mounting

Housing Dimensions

Type	Height mm	Width mm	Depth mm
TR 00	260	420	290
TR 01	450	480	340
TR 02	520	480	420
WS 2	750	550	430
WS 3	900	600	500

* 30 mm included in depth measurement for wall mounting

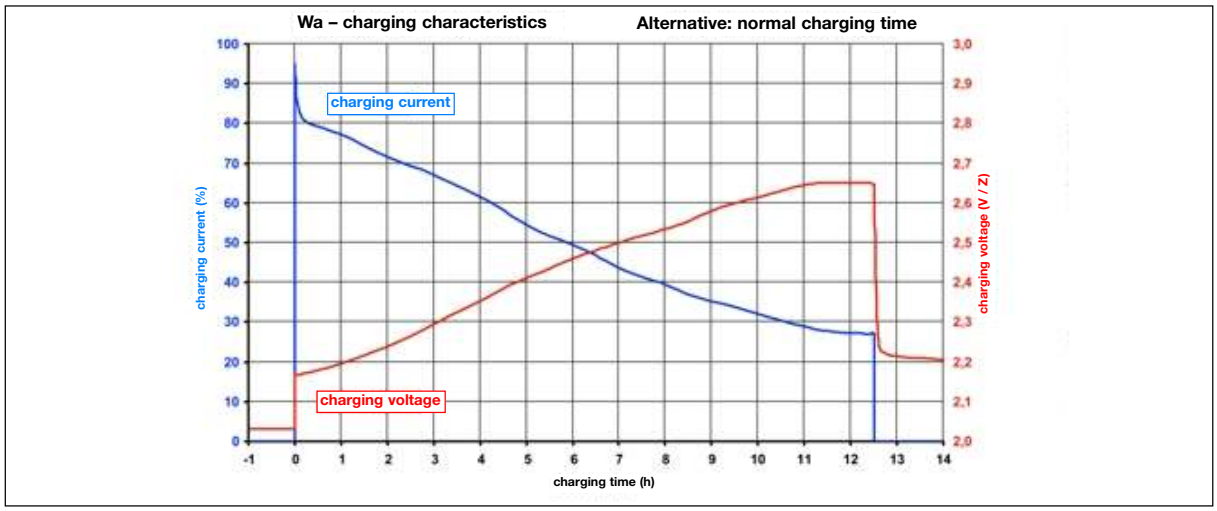
- Temperature monitoring of the transformer
- Safety-cut-off in case of malfunction
- Display of the operational status via LED
- Wall mounting for simple assembly

System Characteristics

The charging current flows at 2 V/Z and drops off to approx. 50% I_n when a gas voltage (2,4 V/Z) is reached. When the final charging voltage of 2.65 V/Z is reached, the charging current drops further to approx. 27% I_n.

Charging system for traction batteries with WaN – characteristics

charger WaN	voltage DC / Volt	charging current Ampere	charging times / battery capacity (low maintenance) 8,5 - 10 hours	10 - 12 hours	12 - 14 hours	housing type	weight kp	fuse (mains) A
E 24 / 20	24	20		134 - 154	154 - 190	TR 00	20	16
E 24 / 30	24	30	165 - 201	201 - 231	231 - 285	TR 00	22	16
E 24 / 40	24	40	220 - 268	268 - 308	308 - 380	TR 00	24	16
E 24 / 50	24	50	275 - 335	335 - 385	385 - 475	TR 00	26	16
E 24 / 60	24	60	330 - 402	402 - 462	462 - 570	TR 01	41	16
E 24 / 70	24	70	385 - 469	469 - 539	539 - 665	TR 01	45	16
E 24 / 90	24	90	495 - 603	603 - 693	693 - 855	TR 01	50	16
D 24 / 100	24	100	550 - 670	670 - 770	770 - 950	TR 01	60	16
D 24 / 120	24	120	660 - 804	804 - 924	924 - 1140	TR 01	64	16
D 24 / 150	24	150	825 - 1005	1005 - 1155	1155 - 1425	TR 02	71	16
D 24 / 170	24	170	935 - 1139	1139 - 1309	1309 - 1615	TR 02	90	16
D 24 / 200	24	200	1100 - 1340	1340 - 1540	1540 - 1900	TR 02	112	16
E 36 / 20	36	20		134 - 154	154 - 190	TR 00	24	16
E 36 / 30	36	30	165 - 201	201 - 231	231 - 285	TR 00	26	16
E 36 / 50	36	50	275 - 335	335 - 385	385 - 475	TR 01	46	16
E 36 / 60	36	60	330 - 402	402 - 462	462 - 570	TR 01	61	16
D 36 / 90	36	90	495 - 603	603 - 693	693 - 855	TR 02	72	16
D 36 / 120	36	120	660 - 804	804 - 924	924 - 1140	TR 02	74	16
D 36 / 150	36	150	825 - 1005	1005 - 1155	1155 - 1425	TR 02	87	16
D 36 / 170	36	170	935 - 1139	1139 - 1309	1309 - 1615	WS 2	125	25
D 36 / 200	36	200	1100 - 1340	1340 - 1540	1540 - 1900	WS 2	135	25
E 48 / 30	48	30	165 - 201	201 - 231	231 - 285	TR 01	44	16
E 48 / 45	48	45	248 - 302	302 - 347	347 - 428	TR 01	58	16
D 48 / 60	48	60	330 - 402	402 - 462	462 - 570	TR 01	62	16
D 48 / 70	48	70	385 - 469	469 - 539	539 - 665	TR 02	67	16
D 48 / 85	48	85	468 - 570	570 - 655	655 - 808	TR 02	74	16
D 48 / 100	48	100	550 - 670	670 - 770	770 - 950	TR 02	84	16
D 48 / 120	48	120	660 - 804	804 - 924	924 - 1140	TR 02	94	20
D 48 / 150	48	150	825 - 1005	1005 - 1155	1155 - 1425	WS 2	115	25
D 48 / 170	48	170	935 - 1139	1139 - 1309	1309 - 1615	WS 2	165	25
D 48 / 200	48	200	1100 - 1340	1340 - 1540	1540 - 1900	WS 2	175	25
E 80 / 20	80	20		134 - 154	154 - 190	TR 01	57	16
E 80 / 25	80	25	138 - 168	168 - 193	250 - 308	TR 01	57	16
D 80 / 40	80	40	220 - 268	268 - 308	308 - 380	TR 02	71	16
D 80 / 50	80	50	275 - 335	335 - 385	385 - 475	TR 02	73	16
D 80 / 60	80	60	330 - 402	402 - 462	462 - 570	TR 02	82	16
D 80 / 70	80	70	385 - 469	469 - 539	539 - 665	TR 02	94	16
D 80 / 85	80	85	468 - 570	570 - 655	655 - 808	WS 2	112	25
D 80 / 100	80	100	550 - 670	670 - 770	770 - 950	WS 2	118	25
D 80 / 120	80	120	660 - 804	804 - 924	924 - 1140	WS 2	128	25
D 80 / 150	80	150	825 -1005	1005 - 1155	1155 - 1425	WS 3	180	35
D 80 / 170	80	170	935 - 1139	1139 - 1309	1309 - 1615	WS 3	185	35



Pulse – chargers

The chargers of the pulse line, patented proven for every day use, are suitable for charging various types of batteries with liquid electrolytes. The apparatuses work according to WpWa-characteristics. A newly developed microprocessor-unit is used to control the charging process depending on the charging level of the battery. Ah-monitoring ensures that neither overcharging nor undercharging can occur. Due to the pulsing of the charging current and characteristics, it is possible to reach very short charging periods (approx. 6,5 hours) and to effectively prevent an acid stratification within the battery. The low charging factor of 1,07 enables savings in energy and a gentle charging of the battery, influencing the lifetime of the battery positively. The apparatuses are equipped with a digital display and LED-diodes indicating charging status. All charging data is stored and can be exported through the USB interface.

Charging Electronics

The fully automatic charging process according to WpWa– characteristics is electronically controlled and monitored by a modern micro-processor. The required amount of current for full charging is determined optimally according to the charged ampere hours during the main charging phase. This leads to a reliable, gentle and energy-saving charging process. After completing the charging process the system shuts off automatically. The operational status is displayed via integrated LED-diodes.

Features

- Storage of present charging data. USB – interface for exporting of the past 1008 charging sequences
- Programmable delay in charging switch-on. Delay between 1-1000 minutes or starting time
- Relay contact for access to external LEDs
- Integrated BGV-A3 inspection report and BGV-A3 memo window
- Charging parameter options for “cold batteries”
- Automatic cut-off after completion of the charging process
- Automatic balancing charge and conservation charge every 10 days
- Recognition of deep discharged and sulfurized batteries
- Temperature monitoring of the transformer

Options

- Trigger for automatic water refilling

Advantages

- Increased battery lifetime
- Higher availability of the fleet
- Reduced investment costs
- Reduced maintenance costs
- Reduced energy costs
- Suitable for multiple-shift operation
- Wall mounting

Housing Dimensions

Type	Height mm	Width mm	Depth mm
TR 00	260	420	290
TR 01	450	480	340
TR 02	520	480	420
WS 2	750	550	430
WS 3	900	600	500

* 30 mm included in depth measurement for wall mounting

- Safety-cut-off in case of malfunction
- Display of the operational status via LED
- Wall mounting for simple assembly
- Charging electronics with digital display of charging current, charging voltage, Ah and charging period
- Error messages programmable in various languages

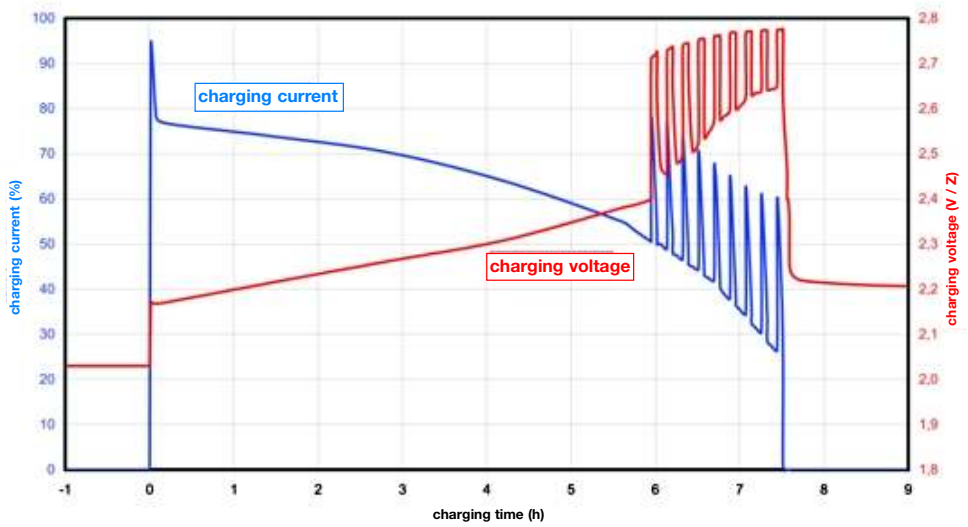
System characteristics

The charging current flows at 2 V/Z and drops off to approx. 50% I_n when a gas voltage (2,4 V/Z) is reached. When the final charging voltage of 2.65 V/Z is reached, the charging current drops further to approx. 27% In. The pulse charging current is approx. 75% I_n. at 2,4 V/Z.

No. 19833096 PATENTED 25.10.2001

Charging system for traction batteries with WpWaN – characteristics

charger	voltage	charging current	charging times/battery capacity (low maintenance)				housing	weight	fuse
WpWaN	DC / Volt	Ampere	6,5 - 7,5 hours	7,5 - 8,5 hours	8,5 - 12 hours	12 - 14 hours	Typ	kp (mains)	A
E 24 / 30	24	30	139 - 165	165 - 189	189 - 270	270 - 330	TR 00	23	16
E 24 / 40	24	40	185 - 220	220 - 252	252 - 360	360 - 440	TR 00	24	16
E 24 / 50	24	50	231 - 275	275 - 315	315 - 450	450 - 550	TR 00	26	16
E 24 / 60	24	60	277 - 330	330 - 378	378 - 540	540 - 660	TR 01	41	16
E 24 / 70	24	70	323 - 385	385 - 441	441 - 630	630 - 770	TR 01	45	16
E 24 / 90	24	90	416 - 495	495 - 567	567 - 810	810 - 990	TR 01	50	25
D 24 / 100	24	100	462 - 550	550 - 630	630 - 900	900 - 1100	TR 01	60	16
D 24 / 120	24	120	554 - 660	660 - 756	756 - 1080	1080 - 1320	TR 01	64	16
D 24 / 150	24	150	693 - 825	825 - 945	945 - 1350	1350 - 1650	TR 02	71	16
D 24 / 170	24	170	785 - 935	935 - 1071	1071 - 1530	1530 - 1870	TR 02	90	16
D 24 / 200	24	200	924 - 1100	1100 - 1260	1260 - 1800	1800 - 2200	TR 02	112	16
E 36 / 50	36	50	231 - 1100	275 - 315	315 - 450	450 - 550	TR 01	46	16
E 36 / 60	36	60	333 - 396	396 - 454	454 - 648	648 - 792	TR 01	61	25
D 36 / 90	36	85	416 - 495	495 - 567	567 - 810	810 - 990	TR 02	66	25
D 36 / 120	36	120	554 - 660	660 - 756	756 - 1080	1080 - 1320	TR 02	74	16
D 36 / 150	36	150	693 - 825	825 - 945	945 - 1350	1350 - 1650	TR 02	87	16
D 36 / 170	36	170	785 - 935	935 - 1071	1071 - 1530	1530 - 1870	WS 2	125	25
D 36 / 200	36	200	924 - 1100	1100 - 1260	1260 - 1800	1800 - 2200	WS 2	135	25
E 48 / 30	48	30	139 - 165	165 - 189	189 - 270	270 - 330	TR 01	44	16
E 48 / 45	48	45	208 - 248	248 - 284	284 - 405	405 - 495	TR 01	58	16
D 48 / 60	48	60	277 - 330	330 - 378	378 - 540	540 - 660	TR 01	62	16
D 48 / 70	48	70	323 - 385	385 - 441	441 - 630	630 - 770	TR 02	67	16
D 48 / 85	48	85	393 - 468	468 - 536	536 - 765	765 - 935	TR 02	74	16
D 48 / 100	48	100	462 - 550	550 - 630	630 - 900	900 - 1100	TR 02	84	16
D 48 / 120	48	120	554 - 660	660 - 756	756 - 1080	1080 - 1320	TR 02	94	20
D 48 / 150	48	150	693 - 825	825 - 945	945 - 1350	1350 - 1650	WS 2	115	25
D 48 / 170	48	170	785 - 935	935 - 1071	1071 - 1530	1530 - 1870	WS 2	165	25
D 48 / 200	48	200	924 - 1100	1100 - 1260	1260 - 1800	1800 - 2200	WS 2	175	25
E 80 / 25	80	25	116 - 138	138 - 158	158 - 225	225 - 275	TR 01	57	20
D 80 / 40	80	40	185 - 220	220 - 252	252 - 360	360 - 440	TR 02	71	16
D 80 / 50	80	50	231 - 275	275 - 315	315 - 450	450 - 550	TR 02	73	16
D 80 / 60	80	60	277 - 330	330 - 378	378 - 540	540 - 660	TR 02	82	16
D 80 / 70	80	70	323 - 385	385 - 441	441 - 630	630 - 770	TR 02	94	16
D 80 / 85	80	85	393 - 468	468 - 536	536 - 765	765 - 935	WS 2	112	25
D 80 / 100	80	100	462 - 550	550 - 630	630 - 900	900 - 1100	WS 2	118	25
D 80 / 120	80	120	554 - 660	660 - 756	756 - 1080	1080 - 1320	WS 2	128	25
D 80 / 150	80	150	693 - 825	825 - 945	945 - 1350	1350 - 1650	WS 3	180	35
D 80 / 170	80	170	785 - 935	935 - 1071	1071 - 1530	1530 - 1870	WS 3	185	35



Vario IUIa – chargers

The chargers of the vario line are equipped with charging electronics and work according to regulated IUIa-characteristics. They are suitable for the charging of low-maintenance and maintenance-free batteries. All chargers are equipped with mains cables and plugs as well as battery cables without charging plugs.

Charging Electronics

The fully automatic charging process according to IUIa – characteristics is controlled and monitored electronically by a modern micro-processor. The required amount of current for is determined by calculating the already charged ampere hours during the main charging phase. This leads to a reliable, gentle and energy-saving charging process. After completing the charging process the system shuts off automatically. The operational status is displayed via integrated LED-diodes.

Features

- Charging by regulated characteristic
- Storage of present charging data. USB – interface for exporting of the past 1008 charging sequences
- Programmable delay in charging switch-on. Delay between 1-1000 minutes or starting time
- Relay contact for access to external LEDs
- Integrated BGV-A3 inspection report and BGV-A3 memo window
- Charging parameter options for “cold batteries”
- Automatic cut-off after completion of the charging process
- Automatic balancing charge and conservation charge every 10 days
- Recognition of total discharge and sulfurized batteries
- Temperature monitoring of the transformer
- Safety-cut-off in case of malfunction
- Display of the operational status via LED
- Wall mounting for simple assembly
- Charging electronics with digital display of charging current, charging voltage, Ah and charging period
- Error messages programmable in various languages

Options

- Air pump unit for electrolyte circulation
- Trigger for automatic water refilling

Advantages

- Universally applicable for maintenance-free and low-maintenance batteries
- Longer lifetime due to reduced heat-development during the charging process
- Optimal charging by compensation of voltage fluctuations
- Suitable for multiple-shift operation

Housing dimensions

Type	Height mm	Width mm	Depth mm
TR 00	260	420	290
TR 01	450	480	340
TR 02	520	480	420
WS 2	750	550	430
WS 3	900	600	500

* 30 mm included in depth measurement for wall mounting

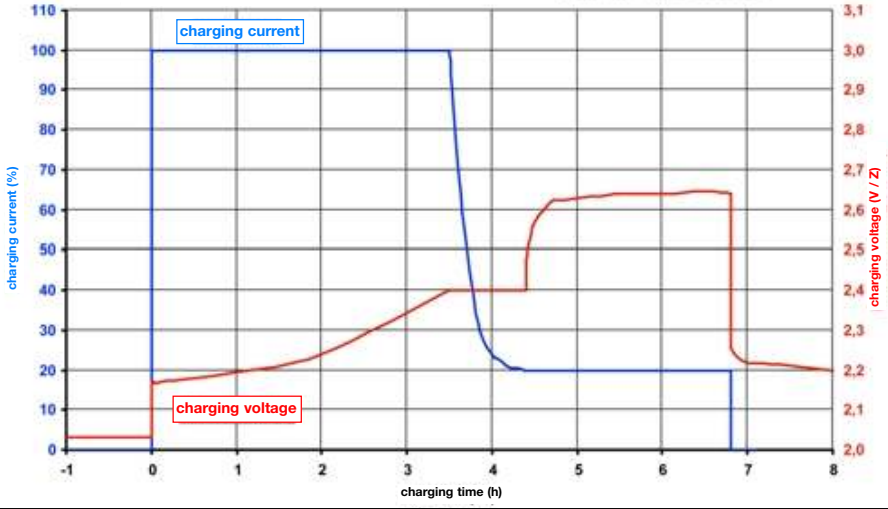
Apparatus Characteristics

The nominal charging current is regulated at 100% I_n ± 5%. The apparatus current drops from 100% In to the re-charging current I2 when a constant voltage is reached. The constant voltage is thereby regulated at ± 1%. Deviations in mains voltage of ± 10% are automatically compensated for.

Charging system for traction batteries with IUIa – characteristics

charger IUIa	voltage DC / Volt	charging current Ampere	charging times / PzV 12 - 14 hours	charging times / PzS 6,5 - 8 hours	charging times w. EUW 5 - 7 hours	housing Typ	weight kp	fuse (mains) A
E 24 / 20	24	20	110 - 160			TR 01	33	10
E 24 / 30	24	30	160 - 230	100 - 160	130 - 200	TR 01	36	10
E 24 / 40	24	40	220 - 320	130 - 210	170 - 270	TR 01	40	10
E 24 / 50	24	50	280 - 390	160 - 260	210 - 340	TR 01	44	16
E 24 / 60	24	60	330 - 470	200 - 320	260 - 410	TR 02	48	16
Z 24 / 80	24	80	440 - 630	260 - 420	340 - 520	WS 2	55	16
D 24 / 100	24	100	550 - 790	330 - 530	430 - 680	WS 2	104	10
D 24 / 120	24	120	660 - 940	400 - 630	510 - 820	WS 2	108	10
D 24 / 150	24	150	920 - 1180	500 - 790	640 - 1030	WS 2	112	16
D 24 / 180	24	180	990 - 1420	590 - 950	770 - 1230	WS 2	116	16
D 24 / 200	24	200	1100 - 1580	660 - 1060	850 - 1370	WS 2	120	16
E 36 / 20	36	20	110 - 160			TR 01	36	10
E 36 / 30	36	30	160 - 230	100 - 160	130 - 200	TR 02	39	16
E 36 / 40	36	40	220 - 320	130 - 210	170 - 270	TR 02	50	16
Z 36 / 50	36	50	280 - 390	160 - 260	210 - 340	TR 02	57	16
Z 36 / 60	36	60	330 - 470	200 - 320	260 - 410	TR 02	61	16
Z 36 / 80	36	80	440 - 630	260 - 420	340 - 520	WS 2	73	20
D 36 / 100	36	100	550 - 790	330 - 530	430 - 680	WS 2	112	16
D 36 / 120	36	120	660 - 940	400 - 630	510 - 820	WS 2	116	16
D 36 / 150	36	150	920 - 1180	500 - 790	640 - 1030	WS 3	126	20
D 36 / 180	36	180	990 - 1420	590 - 950	770 - 1230	WS 3	138	25
E 48 / 20	48	20	110 - 160			TR 02	40	10
E 48 / 25	48	25	130 - 200	80 - 130	110 - 140	TR 02	43	16
E 48 / 30	48	30	160 - 230	100 - 160	130 - 200	TR 02	47	16
Z 48 / 40	48	40	220 - 320	130 - 210	170 - 270	TR 02	55	16
Z 48 / 50	48	50	280 - 390	160 - 260	210 - 340	TR 02	58	16
Z 48 / 60	48	60	330 - 470	200 - 320	260 - 410	TR 02	66	20
Z 48 / 80	48	80	440 - 630	260 - 420	340 - 520	WS 2	74	25
D 48 / 100	48	100	550 - 790	330 - 530	430 - 680	WS 3	116	16
D 48 / 120	48	120	660 - 940	400 - 630	510 - 820	WS 3	123	20
D 48 / 150	48	150	920 - 1180	500 - 790	640 - 1030	WS 3	139	25
D 48 / 180	48	180	990 - 1420	590 - 950	770 - 1230	WS 3	167	35
E 80 / 20	80	20	110 - 160			TR 02	43	16
Z 80 / 25	80	25	130 - 200	80 - 130	110 - 140	WS 2	50	16
Z 80 / 40	80	40	220 - 320	130 - 210	170 - 270	WS 2	65	20
Z 80 / 50	80	50	280 - 390	160 - 260	210 - 340	WS 2	69	25
D 80 / 60	80	60	330 - 470	200 - 320	260 - 410	WS 3	105	16
D 80 / 80	80	80	440 - 630	260 - 420	340 - 520	WS 3	127	25
D 80 / 100	80	100	550 - 790	330 - 530	430 - 680	WS 3	137	35
D 80 / 120	80	120	660 - 940	400 - 630	510 - 820	ST 5.21	193	35
D 80 / 150	80	150	920 - 1180	500 - 790	640 - 1030	ST 5.21	203	50
D 80 / 170	80	180	990 - 1420	590 - 950	770 - 1230	ST 5.21	215	50

IUIa – charging characteristics **Alternative: short charging time**



HF line – chargers

The chargers of the new HF line work with tact technology. Microprocessor controls allow for a choice in charging process and characteristics in order to meet any requirement of the user. These chargers are suitable for low maintenance and maintenance-free traction batteries.

Features

- Control of characteristics via microprocessor charging electronics
- Automatic charging switch-on
- Automatic cut-off after completion of the charging process or separation of battery
- Regulated characteristics
- Universally applicable for low maintenance and maintenance-free traction batteries
- Optimal charging through compensation of mains voltage fluctuations
- High efficiency
- Various characteristics depending on type of battery
- Operational status via LED
- Failure analysis via LED
- Multifunctional LCD display for all models with 3 phases
- Preparation for wall mounting
- Suitable for multiple-shift operation

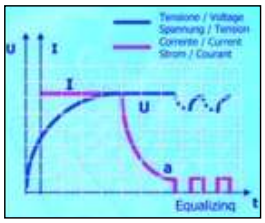
Advantages

- Reduced energy due to high efficiency
- Universally applicable for low maintenance and maintenance-free batteries
- Various charging characteristics depending on type of battery
- Optimal charging through compensation of mains voltage fluctuations
- Longer lifetime due to reduced heat-development during the charging process
- Suitable for multiple-shift operation

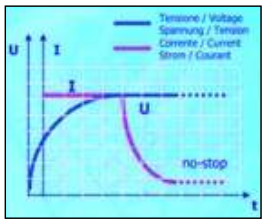
Modern HF charging technology for traction batteries

charger Type	voltage DC / Volt	charging current Ampere	battery capacity (Ah) 7 - 8 hours	battery capacity (Ah) 9 - 12 hours	battery capacity (Ah) 12 - 14 hours	housing dimensions (in mm) L	x W	x D
E 12 / 5	12	5	20 - 35	35 - 50	28 - 40	130	120	56
E 12 / 10	12	10	60 - 70	80 - 100	55 - 80	130	164	56
E 12 / 15	12	15	80 - 100	110 - 150	80 - 115	130	240	56
E 12 / 40	12	40	220 - 280	320 - 380	220 - 320	320	160	130
E 12 / 50	12	50	300 - 350	400 - 500	280 - 390	435	255	130
E 12 / 60	12	60	360 - 420	510 - 600	330 - 470	435	255	130
E 24 / 5	24	5	20 - 35	35 - 50	28 - 40	130	120	56
E 24 / 10	24	10	60 - 70	80 - 100	55 - 80	130	164	56
E 24 / 15	24	15	80 - 100	110 - 150	80 - 115	130	240	56
E 24 / 20	24	20	110 - 140	160 - 190	110 - 160	235	135	70
E 24 / 30	24	30	180 - 210	255 - 300	160 - 230	235	135	70
E 24 / 40	24	40	220 - 280	320 - 380	220 - 320	320	160	130
E 24 / 50	24	50	300 - 350	400 - 500	280 - 390	435	255	130
E 24 / 60	24	60	360 - 420	510 - 600	330 - 470	435	255	130
D 24 / 80	24	80	500 - 560	675 - 860	440 - 630	480	520	410
D 24 /120	24	120	720 - 840	1000 - 1200	660 - 940	480	520	410
D 24 /140	24	140	840 - 980	1120 - 1400	770 - 1100	480	520	410
D 24 /160	24	160	960 - 1120	1310 - 1600	880 - 1260	480	520	410
E 48 / 10	48	10	60 - 70	80 - 100	55 - 80	320	160	130
E 48 / 20	48	20	110 - 140	160 - 190	110 - 160	320	160	130
E 48 / 30	48	30	180 - 210	255 - 300	160 - 230	435	255	130
E 48 / 40	48	40	220 - 280	320 - 380	220 - 320	435	255	130
E 48 / 50	48	50	300 - 350	400 - 500	280 - 390	435	255	130
E 48 / 60	48	60	360 - 420	510 - 600	330 - 470	435	255	130
D 48 / 80	48	80	500 - 560	675 - 860	440 - 630	480	520	410
D 48 /100	48	100	590 - 690	810 - 1080	550 - 790	480	520	410
D 48 /120	48	120	720 - 840	1000 - 1200	660 - 940	480	520	410
D 48 /160	48	160	960 - 1120	1310 - 1600	880 - 1260	480	520	410
E 80 / 10	80	10	60 - 70	80 - 100	55 - 80	435	255	130
E 80 / 20	80	20	110 - 140	160 - 190	110 - 160	435	255	130
E 80 / 30	80	30	180 - 210	255 - 300	160 - 230	435	255	130
E 80 / 40	80	40	250 - 290	335 - 440	220 - 320	435	255	130
D 80 / 50	80	50	300 - 350	400 - 500	280 - 390	480	520	410
D 80 / 60	80	60	360 - 420	495 - 630	330 - 470	480	520	410
D 80 / 85	80	85	520 - 600	680 - 915	440 - 630	480	520	410
D 80 /120	80	120	720 - 840	1000 - 1200	660 - 940	480	520	410
D 80 /140	80	140	840 - 980	1120 - 1400	770 - 1100	480	520	410

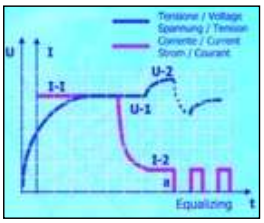
Characteristics



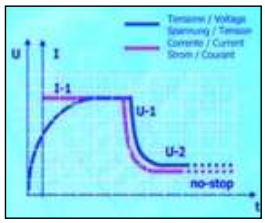
IUa + compensation charges



IU – characteristics



IUIa + compensation charges



IU_1U_2 – characteristics

Bat-Control System

The battery control system “Bat-Control” monitors the battery during the discharging and charging process and stores Data at the same time for use at a later time.

Benefits

This data is used for monitoring the following operational parameters of the battery:

- Charging status
- Discharging status
- Temperature of battery
- Deep discharge
- Number of cycles
- Durability when not charged
- Overload because discharging current too high
- Average voltage deviance

This data is also used for rental or leasing batteries to calculate energy consumption.

Advantages

- Integrated energy billing for rental or leasing batteries
- Storage of 1200 complete data sets
- Voltage range of battery 24-96 V
- Simple software for evaluation and energy billing
- Display of number of cycles, hours of operation, used Ah and kWh, charge factor, max. battery temperature, average battery temperature, number of charging cycles in between
- 3 models for 100-400 Ah, 410-800 Ah and 810-1600 Ah
- Display and calculation of stress factors such as: increased temperatures, increased charging current, total discharge, durability without charging
- Recording of energy consumption
- Automatic billing compilation

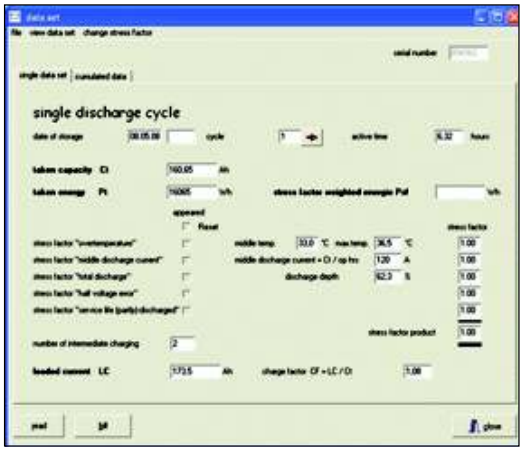
Battery Monitoring System “Bat-Control”

In this case, Bat-Control is used as a monitoring system. All relevant data is compiled and stored. In the case of a problem with the battery, the relevant data can be exported and evaluated to find the cause and subsequently the solution to the problem.

Storage per Discharging Cycle

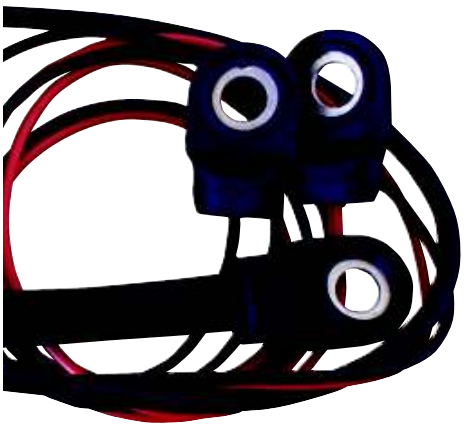
- Average discharging current
- Average and max. temperature of battery
- Discharge depth
- Charge factor
- Number of charging cycles in between
- Possible stress factors such as increased temperatures, increased charging current, total discharge, durability without charging

Up to 1200 complete data sets can be stored. If the storage is full, the oldest data will be deleted to make space for new data.



Integrated Billing for Leasing Batteries

- Integrated energy billing for rental or leasing batteries
- Storage of 1200 complete data sets
- Voltage range of battery 24-96V
- Simple software for evaluation and energy billing
- Display of number of cycles, hours of operation, used Ah and kWh, charge factor, max. battery temperature, average battery temperature, number of charging cycles in between
- 3 models for 100-400 Ah, 410-800 Ah and 810-1600 Ah
- Display and calculation of stress factors such as: increased temperatures, increased charging current, total discharge, durability without charging
- Recording of energy consumption
- Automatic billing compilation



Production and delivery program of the GfS Group

- Power supply equipment for safe lighting systems
- Power supply equipment for OP lighting systems
- Power supply equipment for ZSV systems

- AC power supply
- DC power supply

- UPS systems
- Inverter systems
- Special equipment
- Mains power supply

- Traction battery chargers

- Control and regulation devices
- Small electronic devices
- Transformers
- Steel cabinets
- Electronically controlled hand-dryers

All products represent the latest state-of-the-art technology and their functionality and reliability have been successfully tested in long-term practice.

User-oriented operation always guarantees a smooth operation process.

The right to constructive modifications and further development is reserved and can therefore be undertaken at any time without prior notification.

Our Quality management is certified according to DIN EN ISO 9001.

MLAm E 8_08

GFS

GFS Gesellschaft für Stromversorgungstechnik mbH

Nägelseestr. 35
D-79288 Gottenheim
Tel.:+49(0)7665/904-0
Fax:+49(0)7665/41807
E-mail: info@gfs-gmbh.de
www.gfs-gmbh.de