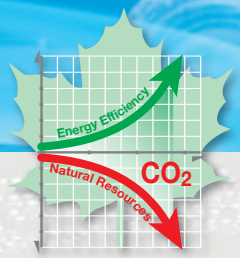


Excellent Technology, Efficiency and Quality



BELATRON

High-efficiency charging systems for drive batteries

- Multi-voltage operation
- Monitoring & reporting portal
- Can be upgraded for use with lithium batteries

Optimise charging processes, enhance availability – log, use and analyse your data

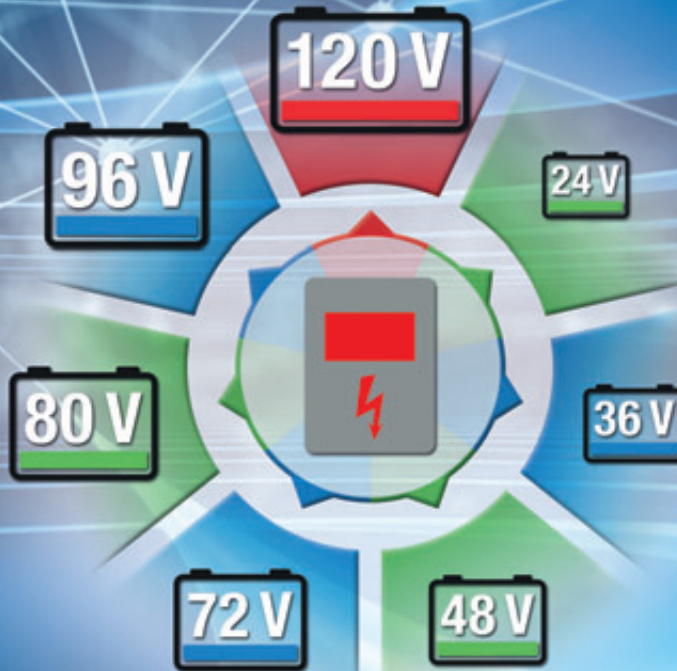


Fig. 10: Multi-voltage function diagram

System Comparison	BELATRON WT7	BELATRON WT16/32	BELATRON WT60/120/180
Economical – lower investment, installation and operating costs			
• High Efficiency	✓	✓	✓
• High Power Density	✓	✓	✓
Usability			
• Plug & Play	✓	✓	✓
• Large Charge Status Indicator	✗	⊖	✓
• Touchscreen	✗	⊖	⊖
Flexibility and Security of Investment			
• Storage of the end-of-charge data	✓	✓	✓
• Charging characteristics for a variety of battery types	✓	✓	✓
• Lithium ready	✗	⊖	⊖
• Multivoltage output	✗	✗	⊖
• Real-time clock	✗	⊖	⊖
• Temperature Compensated Charging	✗	⊖	⊖
• Charging start delay for energy-optimized charging	✗	⊖	⊖
• Master/Slave - operation	✗	✗	✓
Connectivity			
• Connection to BATCOM digital+	✗	⊖	⊖
• Network connectivity (e.g. for energy management)	✗	⊖	⊖
• NEXT Battery Selector dynamic	✗	⊖	⊖
• BENNING Traction Portal	✗	⊖	⊖
• Prepared for integration into energy management systems	✗	⊖	⊖
• Digital I/O card for extensive signaling and control of e.g. Charging starts	✗	⊖	⊖

✓ standard ⊖ optional ✗ not available

BELATRON High-Efficiency Charging Systems are cost-effective due to supreme energy efficiency

BENNING Traction Portal monitoring & reporting platform: user-friendly interface for displaying a charging station's relevant operating parameters



Fig. 1: BELATRON 24 V - 30 A, Casing WT7



Fig. 2: BELATRON 24 V - 65 A, Casing WT16



Fig. 3: BELATRON 24 V - 80 A, Casing WT32 with optional network interface and touchscreen



Fig. 4: BELATRON 48 V - 60 A, Casing WT32 with optional traffic-light display for charge status

Combination of efficiency and connectivity

The BELATRON range is supported by the latest generation of future-oriented, energy-efficient charging technology. Chargers of up to 96 V and 300 A are covered as standard.

The required grid connection capacity is minimised thanks to the achievement of as much as 96 % efficiency together with a $\cos(\varphi)$ of up to ~ 1 , and this in turn reduces investment, installation & operating costs. Thanks to the sinusoidal power consumption and the superior output power factor, there is no need for the reactive current compensation system to be expanded.

High energy density, low space requirement at point of use

The size of the casing has been almost halved, whilst retaining the same output power. The compact construction makes it possible to achieve a high density of installation in the smallest space. This reduces the space taken up in the charging station.

Versatility, thanks to multi-voltage function

A new addition is the multi-voltage function which makes it possible for the widest range of different batteries (24 V, 48 V, 80 V – and 36 V, 72 V, 96 V and 120 V) to be charged with just one BELATRON charger. This ensures additional flexibility in the optimisation of charging processes.

Maximum availability

With modular-design BELATRON chargers starting from the WT60 specification and higher, the system can continue to operate with the remaining modules if one output section fails. On-site service staff will be able to assign master functionality to a different output module. Accordingly, data communication and display to the outside world will still be assured. Charging can continue – albeit at a reduced level – until the spares arrive.

Communication with energy management systems

Our chargers are able to interact – with energy management systems, for example – via an optional interface card (communications controller). In conjunction with the BATCOM digital+ battery controller, the communications interface provides comprehensive energy data, thus enabling seamless recording of power consumption levels.

Load shedding in order to avoid load peaks

Additionally, in conjunction with the BMS NG system (Battery-Management-System Next Generation), processes such as “load shedding” can be automated, in order to avoid load peaks.



Fig. 5: With the BATCOM digital+ battery controller, it's a straightforward task to log and save relevant operating data in the interaction between floor conveyors, drive batteries and chargers: the data can be collected at any time via Bluetooth® link



Fig. 6: BELATRON 48 V - 120 A, Casing WT60

Bluetooth®

Monitoring and reporting platform

On the BENNING Traction Portal, there is an intuitive-interface visual display to indicate a charging station's relevant operating parameters. The operating parameters can be consulted online at any time.

Two-way communication: straightforward and uncomplicated

The wireless data exchange option enables two-way communication. The corresponding app can be used for various terminals, and the employed Bluetooth® lowenergytechnology enables rapid and straightforward connection between the BATCOM digital+ battery controller and - furthermore - not only with the PC, but also with mobile devices such as tablets and smartphones.

The main advantages include:

- Straightforward basic setup at the stage of installation
- Display of main battery parameters
- Support in process of fleet deployment optimisation

NEXT Battery Selector dynamic – organising frequency of use so as to extend battery life

Because a battery's temperature rises when it's charged and discharged, there is the risk of needlessly raising battery temperatures when the charge/discharge cycles follow on rapidly from each other without any cooling-off phases in the course of a working week. However, such a rapid succession of cycles needs to be avoided in order not to shorten your battery's life unnecessarily. And it's a fact that when the batteries are at a lower temperature, they consume less water. And that helps to reduce operating costs.

You can work all of the batteries consistently with the NEXT Battery Selector dynamic* option. A prominent LED alert will tell your staff which of your fully-charged batteries has the earliest historic switch-off time. Accordingly, your battery is kept satisfactorily cool, water consumption is minimised and the entire battery pool is worked in a balanced manner.

Scan the QR code with your mobile phone for further information.



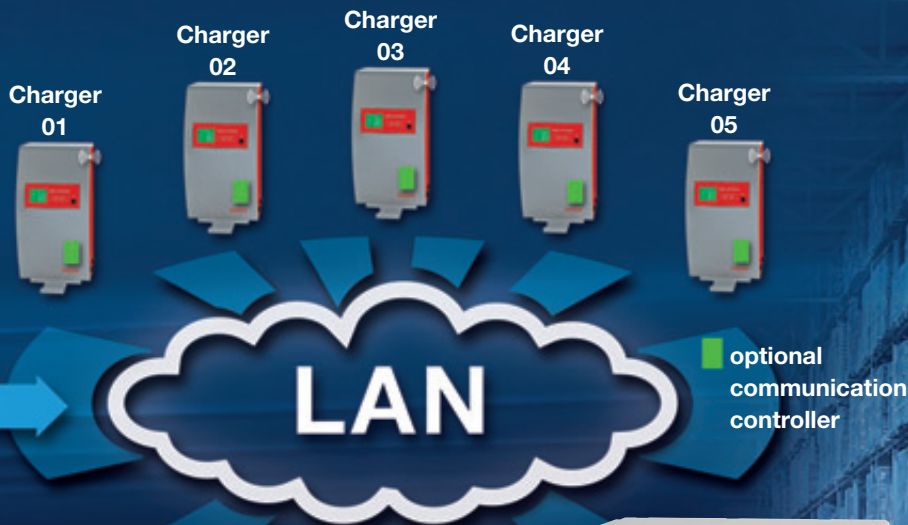


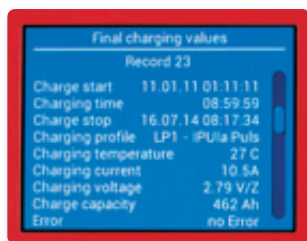
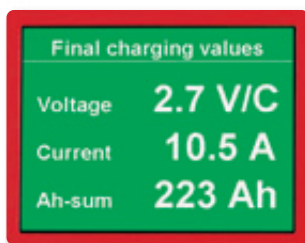
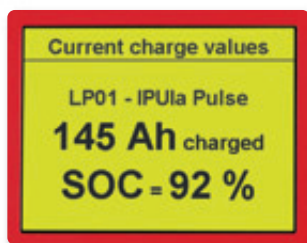
Fig. 7: BELATRON
48 V - 240 A, Casing WT120

Fig. 8: BELATRON
80 V - 255 A, Casing WT180



Fig. 9: BELATRON UC – Each 19" rack can accommodate either a 6 KW charger or two chargers of lower output

Optimised status display, thanks to large touch-screen



The 3.5" touch-screen enables not only settings but also parameters to be adapted. Furthermore, apparatus and battery information can be interrogated.

Configure charging circuits individually with the BELATRON UC Industrial range

When it comes to accommodating your chargers, the BELATRON UC Industrial range is a great option if there is very restricted installation space in a charging station.

Thanks to the vertical, modular system construction of this range, up to 18 independent charging circuits with various output voltages can be accommodated in one cabinet. This design saves a great deal of space (as per floor footprint) by comparison with stand-alone units.

Using these configuration options, you can simultaneously charge up a significantly larger number of batteries – of a variety of voltages and capacities – within a BELATRON UC cabinet of the same size.

Type Table of BELATRON High-Efficiency Charging Systems

Output voltage [V]	Assignment of battery capacity [Ah]*			Nominal current [A]	Mains-current		Weight [kg]	Cabinet with		Type
	Flooded battery	Charging times GiS, (E)PzS battery	Maintenance-free battery GiV, (E)PzV		voltage [V]	current [A]		LED	Traffic-lights	
24	7.5 – 9 h**	11 – 13 h**	11 – 14 h							
	100 - 133	145 - 200	80 - 122	16	230	1.9	2.4	WT7	-	E 230 G 24 / 16 B- FB
	125 - 167	180 - 250	100 - 150	20	230	2.4	2.4	WT7	-	E 230 G 24 / 20 B- FB
	156 - 208	220 - 310	125 - 190	25	230	3	2.4	WT7	-	E 230 G 24 / 25 B- FB
	187 - 250	270 - 375	150 - 230	30	230	3.6	2.4	WT7	-	E 230 G 24 / 30 B- FB
	218 - 291	315 - 430	175 - 270	35	230	4	5	WT16	WT16	E 230 G 24 / 35 B- FB
	300 - 416	450 - 625	250 - 385	50	230	5.7	5	WT16	WT16	E 230 G 24 / 50 B- FB
	406 - 541	590 - 810	325 - 500	65	230	7.4	5	WT16	WT16	E 230 G 24 / 65 B- FB
	500 - 666	720 - 1000	400 - 615	80	230	9.1	11	WT32	WT32	E 230 G 24 / 80 B- FB
	625 - 833	900 - 1250	500 - 770	100	230	11.4	11	WT32	WT32	E 230 G 24 / 100 B- FB
	750 - 1000	1085 - 1500	600 - 920	120	230	13.7	11	WT32	WT32	E 230 G 24 / 120 B- FB
	937 - 1250	1350 - 1875	750 - 1150	150	3 x 400	5.6	20	-	WT60	D 400-480 G 24 / 150 B- FB
1062 - 1416	1550 - 2125	850 - 1300	170	3 x 400	6.3	31	-	WT120	D 400-480 G 24 / 170 B- FB	
1250 - 1665	-	1000 - 1540	200	3 x 400	7.5	31	-	WT120	D 400-480 G 24 / 200 B- FB	
1500 - 2000	-	1200 - 1850	240	3 x 400	9	31	-	WT120	D 400-480 G 24 / 240 B- FB	
48	125 - 167	180 - 250	100 - 150	20	230	4.4	5	WT16	WT16	E 230 G 48 / 20 B- FB
	156 - 208	220 - 310	125 - 190	25	230	5.5	5	WT16	WT16	E 230 G 48 / 25 B- FB
	218 - 291	315 - 430	175 - 270	35	230	7.7	11	WT32	WT32	E 230 G 48 / 35 B- FB
	300 - 416	450 - 625	250 - 385	50	230	10.1	11	WT32	WT32	E 230 G 48 / 50 B- FB
	375 - 500	540 - 750	300 - 460	60	230	13.2	11	WT32	WT32	E 230 G 48 / 60 B- FB
	516 - 708	774 - 1050	400 - 615	85	3 x 400	6.9	20	-	WT60	D 400-480 G 48 / 85 B- FB
	625 - 833	900 - 1250	500 - 770	100	3 x 400	7.5	20	-	WT60	D 400-480 G 48 / 100 B- FB
	750 - 1000	1085 - 1500	600 - 920	120	3 x 400	9	20	-	WT60	D 400-480 G 48 / 120 B- FB
	937 - 1250	1350 - 1875	750 - 1150	150	3 x 400	12.2	31	-	WT120	D 400-480 G 48 / 150 B- FB
	1062 - 1416	1550 - 2125	850 - 1300	170	3 x 400	12.8	31	-	WT120	D 400-480 G 48 / 170 B- FB
1250 - 1665	-	1000 - 1540	200	3 x 400	15	31	-	WT120	D 400-480 G 48 / 200 B- FB	
80	300 - 416	450 - 625	250 - 385	50	3 x 400	6.7	20	-	WT60	D 400-480 G 80 / 50 B- FB
	406 - 541	590 - 810	325 - 500	65	3 x 400	8	20	-	WT60	D 400-480 G 80 / 65 B- FB
	516 - 708	774 - 1050	400 - 615	85	3 x 400	10.5	20	-	WT60	D 400-480 G 80 / 85 B- FB
	625 - 833	900 - 1250	500 - 770	100	3 x 400	13.3	31	-	WT120	D 400-480 G 80 / 100 B- FB
	750 - 1000	1085 - 1500	600 - 920	120	3 x 400	14.8	31	-	WT120	D 400-480 G 80 / 120 B- FB
	937 - 1250	1350 - 1875	750 - 1150	150	3 x 400	18.5	31	-	WT120	D 400-480 G 80 / 150 B- FB
96	1062 - 1416	1550 - 2125	850 - 1300	170	3 x 400	21	31	-	WT120	D 400-480 G 80 / 170 B- FB
	470 - 625	530 - 650	435 - 560	70	3 x 400	10.5	20	-	WT60	D 400-480 G 96 / 70 B- FB
	625 - 833	900 - 1250	500 - 770	100	3 x 400	15	31	-	WT120	D 400-480 G 96 / 100 B- FB
	750 - 1000	1085 - 1500	600 - 920	120	3 x 400	18	31	-	WT120	D 400-480 G 96 / 120 B- FB
	920 - 1210	1265 - 1750	875 - 1100	140	3 x 400	21	31	-	WT120	D 400-480 G 96 / 140 B- FB
120	1062 - 1416	1550 - 2125	850 - 1300	170	3 x 400	25.5	45	-	WT180	D 400-480 G 96 / 170 B- FB
	1160 - 1475	1965 - 2465	925 - 1420	190	3 x 400	28.5	45	-	WT180	D 400-480 G 96 / 190 B- FB
	625 - 833	900 - 1250	500 - 770	100	3 x 400	19.6	31	-	WT120	D 400-480 G 120 / 100 B- FB
937 - 1250	1350 - 1875	750 - 1150	150	3 x 400	29.2	45	-	WT180	D 400-480 G 120 / 150 B- FB	

Additional voltage / current / casing versions

Subject to technical changes

* Guide values; refer to battery manufacturer's specifications

** Electrolyte circulation, approx. 0.5 h shorter charging time. Devices with EUW can be delivered in the deeper casing variant "WT...E".

Casing (WT versions)			
Type	Dimensions [mm]		
	Height	Width	Depth
WT7	218	177	116
WT16	352	220	127.5
WT32	400.5	220	237.5
WT60	603	312	201
WT120	603	312	305
WT180	603	312	409

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