

# VELOGICAL

## UNIVERSAL POWER SOURCE User Manual

### General

The VELOGICAL universal power source is the optimal component to use the full power potential (up to 20W) of the ultra-light VELOGICAL three-phase generator.

A new active rectifier especially developed for this application converts the generator's three-phase current almost loss-free into direct current for further processing. This input circuit (with three black cables) is voltage-resistant up to a maximum speed of 100 km/h, 62 mph and thus protects all downstream systems and consumers.

Also the downstream charge controller is a new development. The permanently active **Maximum Power Point Tracking (MPPT)** function adapts to the connected dynamo or generator as well as to different speeds and other operating conditions\*. The aim is to yield the highest possible energy from the dynamo, naturally in compliance with the maximum permissible limits for charging voltage and current of the connected buffer battery. At each start-up, 1 to 5 beeps will signal its charge status (20% per beep, 5 beeps = 80 to 100% charged).

Two voltage converters (DC/DC converters) are connected to the buffer battery:

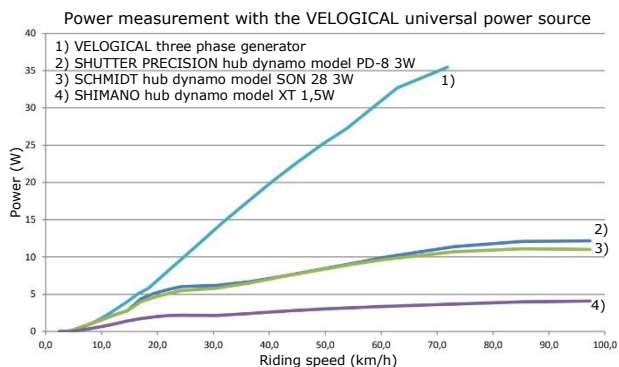
- one for the USB socket (version 1.2 for supplying a cell phone or a navigation system etc.)
- another one to produce 12V DC voltage. At this red/blue marked 12V output, suitable e-bike headlights, (light) horns as well as car accessories with low power (<24W) can be supplied.

A DC/AC converter is fed from the same 12V bar. Its output current is so dimensioned that the majority of commercially available bicycle lighting (i.e. mainly LED headlights and tail lights for hub or side rotor dynamos) can be operated with it. The green connection cables provided for this purpose must by no means get into contact the bicycle frame.

The VELOGICAL universal power source is offered in two versions: One exclusively for the VELOGICAL three-phase generator and a second one exclusively for standard hub dynamos.

### Energy balance

The VELOGICAL universal power source is powerful but not inexhaustible. The fully charged buffer battery with its energy of 10Wh can deliver a power of 10W for one hour before being completely empty. Continuous current drain is only possible if there is sufficient supply from the dynamo/generator, which depends upon the dynamo type and the riding speed.



The higher the speed, the more power can be tapped permanently. The 12V output can supply up to 24 W with the maximum current of 2A, enough for extremely bright e-bike headlights. This is OK as a flasher or searchlight, but rather unsuitable as permanent lighting as you would have to drive very fast permanently.

To prevent a complete blackout in the event of a lack of energy, the voltage at the outputs is reduced when the buffer is almost empty: The lighting becomes weaker as a result, but it is ensured that even if the buffer is completely discharged, the lights turn on as soon as 5 km/h are exceeded. Lighting has priority over USB supply.

The following tricks will greatly improve the energy balance:

- as standard, by automatic switch-off of all consumers 5min after end of travel (announced by a long beep),
- Manually switch off all unnecessary consumers (e.g. with the VELOGICAL switch),
- Select the most powerful hub dynamo, or possibly, the VELOGICAL three-phase generator,
- Re-charge the buffer battery at the power outlet. To this end, the universal power source must be disconnected from the dynamo and connected to a power pack. A suitable power pack and prepared plugs with cables are available in the accessories.

### Installation

The VELOGICAL universal power source is sealed on one side only while open at the cable outlet. This allows the inside to "breathe" and prevents the formation of condensation.

**Important note:** Always install the universal power source so that the cable outlet is always at the lowest point. Always insert cables into pockets and containers from below to prevent water from running along and entering.

If the length of the steerer tube allows installation, all connections must be led out downwards and suitable foam pieces must be used to prevent rattling, hitting, rubbing and falling out.

### Connection

- triple-black for connection to the VELOGICAL three-phase generator;
- black / black to hub dynamo. Only connect these two cables (lighting is operated with the green/green);
- red (+) / blue (-) for the 12V/2A/DC direct current connection;
- green/green 6V/AC for connection of dynamo lamps;
- USB port 5V/2A DC for devices.

When routing cables, please make sure there is no tension on the cables, even with extreme handlebar deflection. Keep all cables away from the wheels and when removing excess cable lengths, be careful never to cut too close to the headlight, generator or power source.

This is what we recommend as a reliable cable connection: pull on a 25mm heat shrink tube with Ø2.4mm on one side, strip both strands to 12mm, twist cable ends carefully. Then fold over, cover with heat shrink tube, shrink.

**Warning:** It is not permitted to connect electrical equipment directly to the VELOGICAL three-phase generator. Likewise, the universal power source must never be connected directly to the mains plug.

Fitting is at your own risk and should only be carried out by appropriately trained professionals. VELOGICAL cannot accept any liability for incorrect assembly or improper use.

### Operation:

In the idle state, the universal power source has no self-consumption. Only by turning the dynamo/generator will it wake up and report its charge status beeping 1 to 5 times (20% charge per beep).

Without consumption, the charge status should increase by 20%, i.e. one beep, after 6km of riding (always assuming a correctly installed three-phase generator and a constant riding speed of 20kmh/12.4 mph).

If no power is tapped from the generator (battery full, or no consumer), there is neither wear and tear nor the slightest braking effect. We therefore recommend you leave the generator permanently folded.

Never fold it when the bike is moving at full speed.

At delivery, the buffer battery is set to storage condition (40%= 2 beeps). Should you discontinue operation for a longer period, please store in a cool and dry place and charge/discharge to 2 to 3 beeps.

### Technical data

Weight:	90g
Dimensions: rod-shaped, length 200mm, diam. 20.5 mm	
Cable lengths:	approx. 400mm
USB connector:	5V/1.5A/7.5W Version 1.2
12V DC connection:	2A/ max. 24W
Lighting connector:	6-9V/500mA/100Hz/3W
Buffer battery:	3.7V/2900mAh/10.7Wh

**The warranty period for the VELOGICAL universal power source is 2 years from the date of purchase upon presentation of the original sales receipt.**

### Accessories:

- Housing, in case the universal power source does not fit into the steering column.
- Handlebar switch to turn off the lights
- Pushbutton for short actuation of (light) horns etc.
- Connector pad for USB socket on the head tube
- One 3-way and one 2-way connector with 1m cable each between socket and plug
- Main adapter with socket

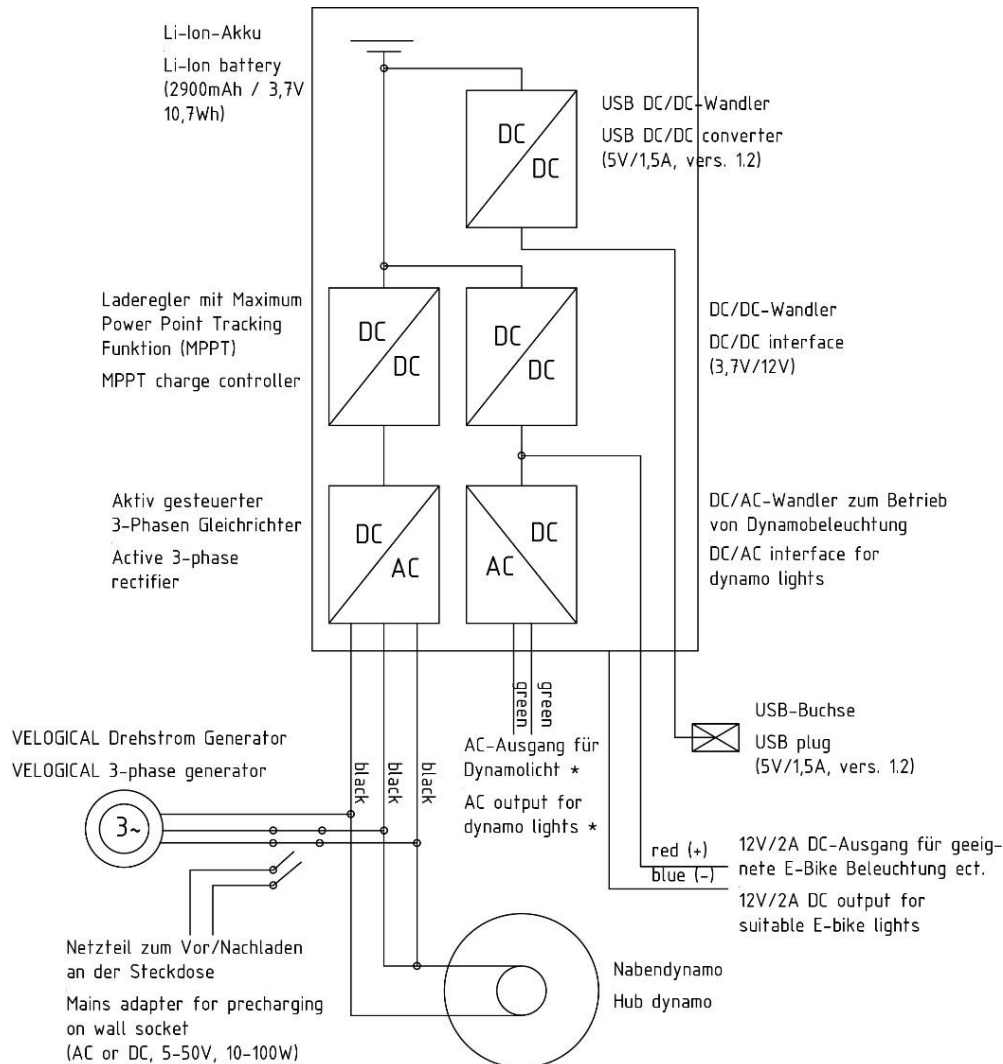
For service purposes, please contact VELOGICAL directly or your dealer. Justified claims for replacement refer to the current model at that time - we reserve the right to make technical changes. Long-term customer satisfaction is very important to us.

### Manufacturer

VELOGICAL engineering GmbH  
[www.velogical-engineering.com](http://www.velogical-engineering.com)

Please read these instructions carefully to ensure that the universal power source is a reliable and long-term companion. Keep this manual in a safe place for future reference.

\*Expert tip: When the buffer is empty, a short flicker may occur occasionally. This is caused by very short load drops. In this case, the controller makes a slip measurement to find out whether the generator slips excessively in wet conditions and whether there is a better operating point.



- \* Keines der Kabel darf mit Masse (Fahrradrahmen) verbunden werden.
- \* None of the cables may be connected to ground (frame).

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