VELOGICAL

Dynamo User Manual

General

Many thanks for your decision to purchase a VELOGICAL dynamo.
The VELOGICAL dynamo is an extremely small and easy rolling rim dynamo which was originally developed for racing and special bikes. Its mechanical design allows speeds of up to 100 kmh/62mph. Since its speed depends essentially on riding speed only, it can be used for different wheel sizes without adaptation.
Due to its design, it is only approved for operation with LED bulbs on the front and rear lights, whereby the front headlight must contain a voltage limiter (now standard for commercially available LED headlights).
Since it has neither voltage nor current limitation, its power increases with the rate of rotation or riding speed, so safe operation is only possible under one of the following conditions:

- Connection of a **powerful** LED headlight (>40Lux and metal housing) plus thermistor in the main circuit (for current limitation) up to a maximum speed of 50 kmh/31mph.
- Connection of an LED headlamp **tested** by VELOGICAL as **an example** plus thermistor in the main circuit up to a maximum speed of 60 kph//37 mph for "Trekking" and 70kph/43.5 mph for the "Sport" version.
- Direct connection (without thermistor) to an on-board power supply unit with regulated AC or three-phase input (e.g. B&M E-Werk, Forumslader or VELOGICAL universal power source).

Depending on the intended use and speed range, we offer the VELOGICAL dynamo in two variants:

- "SPORT" (red): maximum speed, minimum braking effect, reduced power under 10 kph/6.2 mph
- "TREKKING" (natural aluminum): everyday riding speeds, low braking effect, reduced power below 8kh/5mph.

There are five versions for mounting the VELOGICAL dynamo to the frame:

- "Brake boss adapter left or right" for fitting in front of a rim brake
- "Tube adapter" with different brackets for different installation scenarios on round and oval tubes.

Since the VELOGICAL dynamo runs on the rim, it should have a flat flank section. In addition to the metallic bright brake flanks, the rim wall may also be painted or anodized or made of other materials.
Clean the rim wall occasionally with a damp cloth and prevent this area from coming into contact with oils or greases.

Fitting

Fitting takes place at your own risk and should only be undertaken by qualified mechanics or assemblers. VELOGICAL cannot accept any liability for incorrect assembly or improper use.

A Fitting with brake boss adapter left

With 11 ° tilt angle, this adapter (see Figure 1) is designed for the usual fork geometry on 26" and 28" wheels. Instead of the left front boss, it can also be fitted to the right-hand rear brake boss on many bikes. The assembly steps are identical:

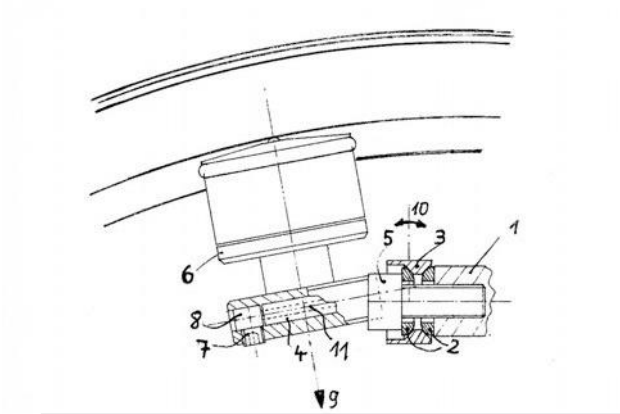


Figure 1
Cross-section dynamo with brake boss adapter.
1) Brake boss, 2) Ball washers, 3) Brake boss adapter, 4) Brass tubes, 5) Screw, 6) Dynamo, 7) Grub screw, 8) stainless steel head, 9) Dynamo axle, 10) Pivot range, 11) Torsion spring

1) Remove the M6 screw (5 in Fig. 1) holding the brake on the boss (1).
2) Make sure that the convex faces of the spherical washers (2) lie against the adapter. Place the adapter (3) without dynamo horizontally in front of the boss so that the tube (4) points forward and tighten loosely. **Caution**: Ensure that the M6 screw is screwed into the base thread at least five turns/threads deep, otherwise the safe function of the brake will be impaired.
3) Check whether the adapter collides with any parts, insert a drilled-out spacer nut if necessary and re-check the screw-in depth again as under 2).
4) Height adjustment: Slide the dynamo (6) onto the tube with the connecting cables pointing outwards and turn the adapter until the O-ring of the dynamo rests approximately in the center of the rim.
5) Side-to-side adjustment: This is not possible with this adapter and usually not necessary, because brake bosses have a standard spacing. With narrow rims, sloping rim flanks or deviating special designs, it may be necessary to mount the dynamo "turned around" so that it moves closer to the rim. In this case, the connection cables point to the wheel and the grub screw (7) is moved so that it never presses on the brass tube (4) but always on the stainless steel head (8).
6) Angle adjustment: The imaginary extension of the dynamo axis (9) should intersect the wheel axis as precisely as possible to avoid friction and wear. The adapter can be swiveled (10) in its ball mount for this purpose.
7) Tightening: Remove the dynamo and hold the adapter in its optimal position with a 15mm open-ended spanner while tightening. Tightening torque of the M6 socket head bolt is 6Nm.
8) Adjust contact pressure: Leave the operating lever in the folding position (bracket perpendicular to the adapter), grease the brass tube and housing bore and push the dynamo onto the tube as far as it will go. Swivel the dynamo until the distance between the O-ring and the rim is 2mm and pre-tighten the M4 grub screw (7) against the stainless steel head (8) in this position.

9) Check the contact pressure: Lift the operating lever out of the notch and let it engage in the „on" position. The torsion spring (11) should now press the dynamo against the rim with clearly perceptible pretension and smoothly, which you can check by lifting it off the rim a few millimeters several times and letting it snap back.
10) Check: Move the connection cables safely out of the way, grab the wheel and spin it. The dynamo should roll smoothly and quietly on the rim. If it swings in and out too much, the wheel should be re-centered.
11) Tighten the M4 grub screw to final strength (with approx. 2.5Nm)
12) Press the greased black plug into the dynamo housing from below. Check again for ease of movement when snapping back.
13) Re-tightening: Approximately four weeks after assembly, the M4 grub screw should be re-tightened, as the pre-tension can reduce as it beds in.



Brake boss adapter left with adjustable ball support, mounting situation, angulation, axis position:
Normal position, folded down, working position folded up

B Fitting with brake boss adapter right
With its tilt angle of 14 °, this adapter can be used for special designs such as recumbent or folding bikes under 24" as well as on wheels with Magura rim brake, because of collision with the left lever. Instead of on the right-hand front wheel brake boss, fitting on the left rear brake boss is often possible too. If, in special cases, the angle of 14° plus tilting angle of the ball holder of approx. 5° is still not sufficient for correct angular adjustment (see in text A6), the brass tube can be bent by a further 6° so that tilting positions up to approx. 25° are possible.

The entire assembly process is analogous to that described under A with a special note that (as described under A8) the correct position of the M4 grub screw must be double checked: It should by no means be directed at the brass tube but always at the stainless steel head.

C Assembly of all tube adapters
1) Bracket assembly: Slide the smallest possible bracket that will fit over the tube without clamping at the correct location over the brace and twist so that the two ends face outward for easy access. Slide the adapter upright with brass tube on top and facing back over the brace ends. Use the top row of holes first. Place the washers and tighten the nuts until just before they stop. Now rotate the adapter so that it is inside the brace and the brass tube is facing forward in the direction of travel.
2) Height adjustment: Slide the dynamo onto the tube, with the connecting cables initially facing outwards, and slide the adapter along the strut until the dynamo's O-ring rests approximately in the center of the rim.
3) Side-to-side adjustment: With straight rims the dynamo should be vertical, with inclined rim flanks its axis should be approximately parallel to the contact surface. Depending on the installation direction (cable outside / inside), the dynamo moves further away / closer.
In any case, the grub screw in the dynamo housing must always be placed so that it never pinches the brass tube, but always the stainless steel head at the free end. To bring the adapter closer to the rim and protect the paint, an intermediate layer of self-adhesive felt is recommended. In order to bridge larger distances, there are suitable pads in the accessories. Fine adjustment is made by rotating the adapter around the strut axis, but you should not deviate too much from the longitudinal alignment. If there is a risk of collision with the spokes, protruding U-bolts must be shortened.
4) Angle adjustment: If you imagine extending the dynamo axis, this line should intersect the wheel axis as precisely as possible to avoid friction and wear. To this end, the adapter can be swiveled with respect to the strut. Note however that the U-bolt always tends to align itself perpendicular to the tube, taking the adapter with it. For larger deviations, use U-bracket diagonally.
5) Tighten: The M3 nuts are now tightened with a 5.5 mm nut and extension. Check the tightness and retighten several times if necessary. Experience has shown that the rear nut in the direction of travel is tightened more firmly than the front nut.
6) The remaining steps are identical to the assembly steps A8) to A13) on the brake boss adapter.

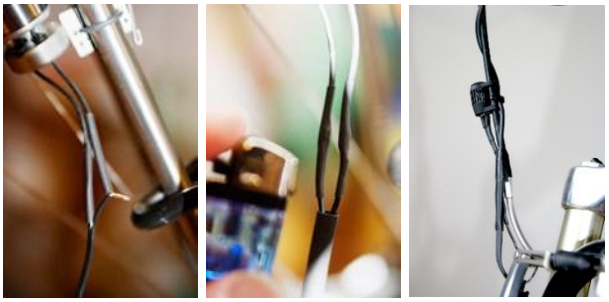


Tube adapter short (10-20mm)
Installation scenario: mounting position, home position, Folding position: Operating lever via left-hand side contact surface

Electrical connection

As a fixed component of the bicycle lights presented here, a PTC thermistor is installed in the main circuit in such a way that a connecting cable of the dynamo is permanently connected to a cable of the thermistor and the headlight is always connected to the respective still free cable of dynamo and thermistor. 12V/20W halogen bulbs with permanently connected connection cables from the factory are used as thermistors. When cold, they have an ohmic resistance of about 0.5Ω, which can increase more than tenfold at higher current flow. Since the bulb is not used for illumination, but only as a variable resistor, the filament is far from reaching the temperatures for which it is designed. Accordingly, the service life (3000h) and shock resistance are multiplied.
When laying the cable, please ensure that there is no tension on the cable, even with extreme handlebar deflection. Do not bend the cable sharply directly at the resistor. Keep cables and thermistors away from the wheels and when removing superfluous cable lengths, make sure never to cut off too close to the dynamo or headlight.

For a reliable cable connection, we recommend: pull on 25mm heat shrink tubing with Ø2.4mm on one side, strip both strands to 12mm, twist cable ends carefully. Then fold over, cover with heat shrink tubing, shrink.
When shrinking with a lighter, avoid direct contact with the flame, use the smallest possible flame, never overheat the cable insulation.



Cable connection with heat shrink tube
Thermistor example positioning front

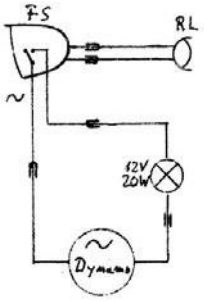


Figure 2

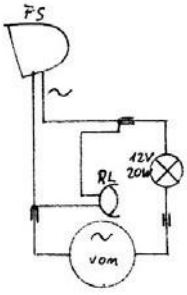


Figure 3

Figure 2 shows the common wiring when the dynamo is mounted on the front wheel. Usually the front headlights (FS) have an AC connection marked ~ for the dynamo and two separate connection contacts for the rear light (RL)

Figure 3 shows an elegant wiring, e.g. for road bikes with rear wheel dynamo. Instead of double wiring (to the front to the headlight and back to the rear light), the rear light is connected here on the shortest path parallel to the headlight. This variant is only permissible if it is ensured that the headlight is permanently switched on, because only then will the rear light be protected against overvoltage. Permanent connection is ensured by the fact that
a) a headlamp without a switch is used,
b) the switching element (e.g. switching ring) is removed.
c) the switch is blocked (e.g. with superglue).

Figure 4 shows a dual headlight system for high-speed drivers who want to use the excess dynamo power for improved road illumination, especially at higher speeds. Here, the secondary headlight (NS) is bridged with a low-power thermistor (12V/5W) so that the limited dynamo voltage is applied as fully as possible to the main headlight (HS) when driving slowly. Only at higher speeds does a usable voltage also build up at the secondary headlight. Of course, the rear light is connected to the main headlight here. The 12V/5W cold lead is only supplied on request.

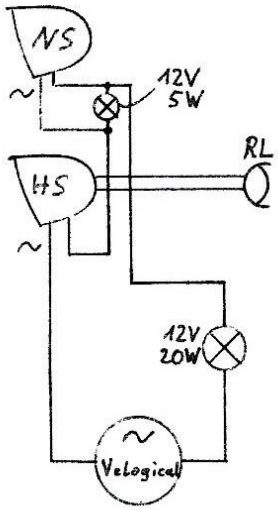


Figure 4

Devices for on-board power supply normally only work when the light is switched off. Use an additional plug or switch if necessary.

Online tutorials

Tutorials with details on fitting scenario: www.Flickr.com, search term compact dynamo + flickr or 4feetbiker + sets. The menu item albums or sets shows an overview of all tutorials available so far.
Videos of the assembly are on Youtube.
You can find a direct access to the tutorials via social media buttons on our website. www.velogical-engineering. com

Bicycle frame builder

We are happy to give personal recommendations after personal consultation.

Technical data

Weights:

- "SPORT" (red): 60g
- "TREKKING" (natural aluminium): 62g
- "Brake boss adapter" 12g
- "Tube adapter short" 17g
- "Tube adapter medium" 23g
- "Tube adapter long" 30g
- "Thermistor" 4g

Performance data:

"SPORT" (red) specific open circuit voltage: 0.45 V/km/h

"TREKKING" (Alu) spec. open circuit voltage: 0.52 V/km/h

Specific frequency for all types: 15 Hz/km/h

Efficiencies incl. Thermistors:

SPORT" at 15km/h: 59%

"TREKKING" at 15km/h: 64%

-mechanical limit speed*: 14530 rpm corresponds to 109.3 km/h

* at this speed the preload of the 23x4 EPDM O-ring is neutralized by centrifugal force

- Minimum required contact force**: 3,5N

** to generate a power of 1.5W and an assumed friction factor between O-ring and rim of 0.2

Warranty/Spare Parts The inner parts of the VELOGICAL dynamo do not use any components that are customer serviceable. Do not attempt to open the dynamo.

The O-ring in high industrial quality is resistant to UV light and can be easily replaced if necessary. The O-rings we have chosen have a defined preload for safe operation even at high driving speeds. The average service life of approximately 5000-7000 km exceeds that of a bicycle chain. With the two selectable O-ring sizes for fast riders and normal riders, the optimal operating speed of the dynamo can be changed by about 10%. Matching replacement O-rings are available in the VELOGICAL Online Shop.
If the bike is transported upside down or cleaned, protect the dynamo and LED front light with a plastic bag, for example, to prevent water from entering protected areas. Do not spray the LED light components with a sharp jet of water. The seals are designed for use under normal conditions and are intentionally not designed to be airtight to prevent condensation. Never completely submerge the bike in water and keep electrical components away from children.

If the knowledge required for assembly or the appropriate tools are missing, please contact specialist workshops that are familiar with these procedures. Correct commissioning is a prerequisite for the validity of the warranty.

The warranty period for the VELOGICAL dynamo is 2 years from the date of purchase upon presentation of the original sales receipt.

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.

Required tools

Tube adapter:

- Ratchet 1/4"

Brake boss adapter:

- Combination wrench 15mm as a counter piece

Scope of delivery

-1x special bracket, type selectable when ordering
-2x O-ring wide /drive wheel for fast riders
-2x O-ring thin /drive wheel for normal riders
-1x Thermistor
-1x Set heat shrink tube
-1x User manual
-1x Allen key Ø 2mm
(Hexagon socket, pin wrench)
-1x socket nut 5,5mm - 1/4”

Manufacturer

VELOGICAL engineering GmbH

www.velogical-engineering. com

We recommend that you read these instructions carefully to ensure that the dynamo is a reliable companion for a long time. Keep this manual in a safe place for future reference.

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