

# SON Schmidts Original Nabendynamo

## Installation Instructions 16"-20"

Schmidts Original hub dynamo marked 16"-20" (SON20) is designed for a front wheel measuring 399 mm to 520 mm overall. It brings the famous high efficiency of the SON concept to the recumbent or folding bike rider. If built into bigger wheels, the dynamo will cause even lower drag, but will reach its nominal voltage only at higher speeds than required by German law. In a 20" wheel 6V3W are reached at 16 km/h, built into a 28" wheel at least 22 km/h is needed.

The perfect partner for a gearless hub dynamo is the E6 halogen headlamp with integral switch. Its outstanding light technology, solid mechanical design, reliable electrical contacts and good sealing ensure problem-free operation in daily use, regardless of weather. Other good choices are the Lumotec or Lumotec Oval Plus with toggle switch. They are (like the E6) directly wired to an 'umbilical' cable, complete with plugs for easy connection to the hub. Other headlights with integrated switch like Lumotec Oval Senso Plus or LED-headlamp Dlumotec Topal by Busch & Müller are also usable. Building the hub into a wheel is best left to an expert - who should nevertheless note the information below.

### Wheelbuilding

The SON20 is designed for the usual crossed form of spoking. Radial spoking is not permitted. Flange thickness and spoke holes are optimized for high quality 2 mm (14 g) spokes.

The correct length of spokes is determined with reference to the rim radius  $r_2$  (see drawing below). This radius is half the distance measured between two opposite nipple head seats. The ideal spoke length  $l$  is calculated as:

$$l = \sqrt{r_1^2 + r_2^2 + a^2 - 2 \cdot r_1 \cdot r_2 \cdot \cos \frac{k \cdot 720^\circ}{n}} \quad \begin{array}{l} k = \text{number of crossings} \\ n = \text{total number of spokes} \end{array}$$

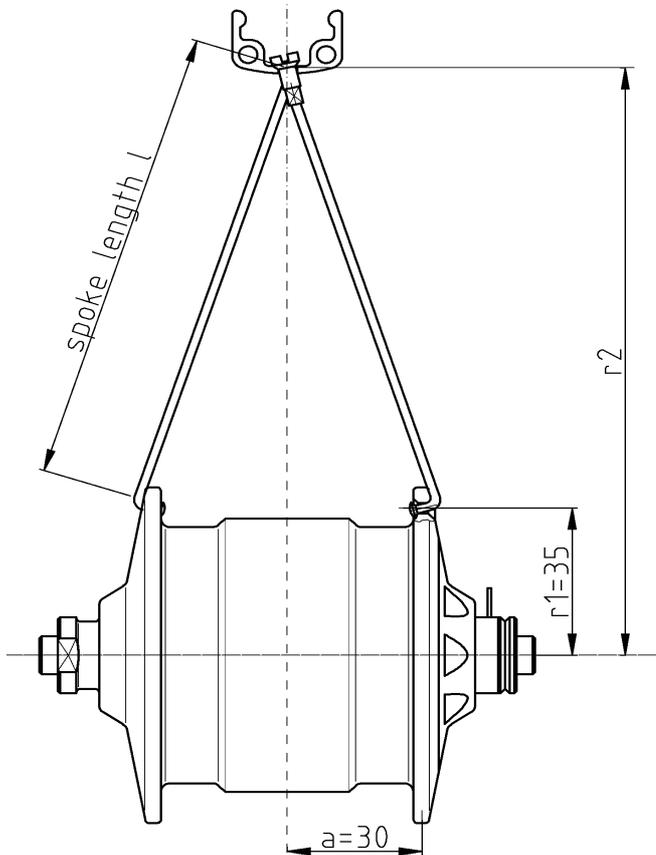
For usual 16" or 20" wheels this can be simplified to:

$$36 \text{ hole, 3 cross: } l \approx r_2 - 12,5 \text{ mm}$$

$$32 \text{ hole, 2 cross: } l \approx r_2 - 20 \text{ mm}$$

If in doubt, or if the result comes between available sizes, use spokes up to one millimetre shorter. The disc brake hub differs in some aspects, so please note the special info leaflet.

### Fitting the front wheel



Schmidts Original hub dynamo SON20 fits a fork designed to accept an axle of 9 mm diameter and a width of 100 mm between dropouts. The electrical connections should be on the right hand side (to prevent unscrewing of the hub).

The hub is secured using the included skewer set. It fits the same way as a quick-release, but fastens with a 5 mm allen key. Apply a little grease on thread and screw-head but not on the shank (to prevent clogging up the pressure compensation system

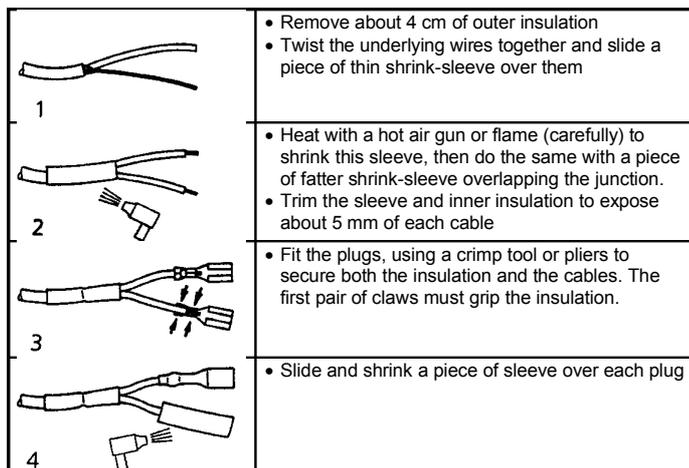
leading into the hollow axle). Recommended fastening torque is 8 to 10 Nm - easily achieved with the normal length of the allen key. If the skewer tension is too low, the axle may move inside the fork end causing a rattling noise.

Alternatively a lever-type quick-release may be substituted, or a proprietary security fastener such as Pitlock.

### Fitting the headlamp

The 50 cm coaxial cable attached to the headlamps with integral switch (manufactured or assembled by Schmidt Maschinenbau) should be just the right length to facilitate mounting of the lamp in the usual position, on a bracket in front of the fork crown or on a front carrier. It is suggested, that you fasten the cable to the fork blade etc. with nylon zip-ties, leaving enough slack by the axle to facilitate disconnection from and re-connection to the hub. Either plug may be connected to either spade terminal (they simply push together), it makes no difference which way round.

If you wish to mount the headlamp further away from the hub than this cable will permit, it is possible to order an E6 or Lumotec headlamp equipped with a longer cable and separate plugs etc. This can be trimmed to the required length, after which you must attach the plugs yourself according to the process illustrated below.



Headlamps with integrated switch by other manufacturers (e.g. Lumotec Oval Senso Plus) are usually equipped with twin cables instead of coaxial cable. Instead of step 1 and 2 the cable only has to be cut to length, the two wires separated for about 3 cm and the insulation removed at about 5 mm.

### Connection of a rear lamp

**The generator should always be connected to a 6V3W load. The usual way is the combination of the 2.4W halogen headlight and a 0.6W rear light or a special 6V3W halogen bulb. The permanent use of a 6V2.4W bulb alone will shorten the bulb lifetime radically (not valid for the E6 headlamp)!**

The switch in the headlamp will also control the operation of the rear lamp. A single wire connection from the innermost spade terminal (on some models marked with a flash) of the headlamp to the rear lamp will usually be sufficient (the system is earthed at the mounting hole of the lamp). A 2.8x0.5 mm plug should be connected according to pictures 3 and 4 of the table above.

A definite neutral/earth connection can be made (i.e. double wiring) by using the spade terminal marked with the earth symbol (only Lumotec and Lumotec Oval Plus) or by adding a 6 mm crimp eyelet between the lamp and its bracket.

Even LED rear lamps can be damaged by over-voltage. Therefore replace a burned-out bulb in the headlamp as soon as possible. Have a spare bulb ready.

### Maintenance

The generator is fully enclosed and maintenance free: there are no gears or other moving parts inside. The wiring and lamps should be checked regularly and any defects repaired in order to avoid dangers caused by high voltage.

The ball-bearing cartridges are pre-lubricated and similarly maintenance free in normal everyday use. A slight amount of play is normal with this type of bearing - do not attempt to adjust or regrease them.

To avoid water ingress do not immerse the hub and take care when washing it never to spray water (from a hose etc.) directly at the axle.

In case of any problems (e.g. worn bearings, damaged electrical contacts) let your bike shop contact the manufacturer or importer. For warranty claims (5 years) please add a copy of the purchase receipt.

### Important advice

**With the lights switched off, the fast spinning generator induces a high and possibly dangerous voltage. For this reason the switch and generator must be connected by a fully insulated cable like the one provided, i.e. with no bare parts.**

### Manufacturer

Wilfried Schmidt Maschinenbau  
Aixer Strasse 44  
D-72072 Tübingen  
Germany

Tel. (+49) 7071 38870  
Fax (+49) 7071 38876  
e-mail: info@nabendynamo.de  
www.nabendynamo.de