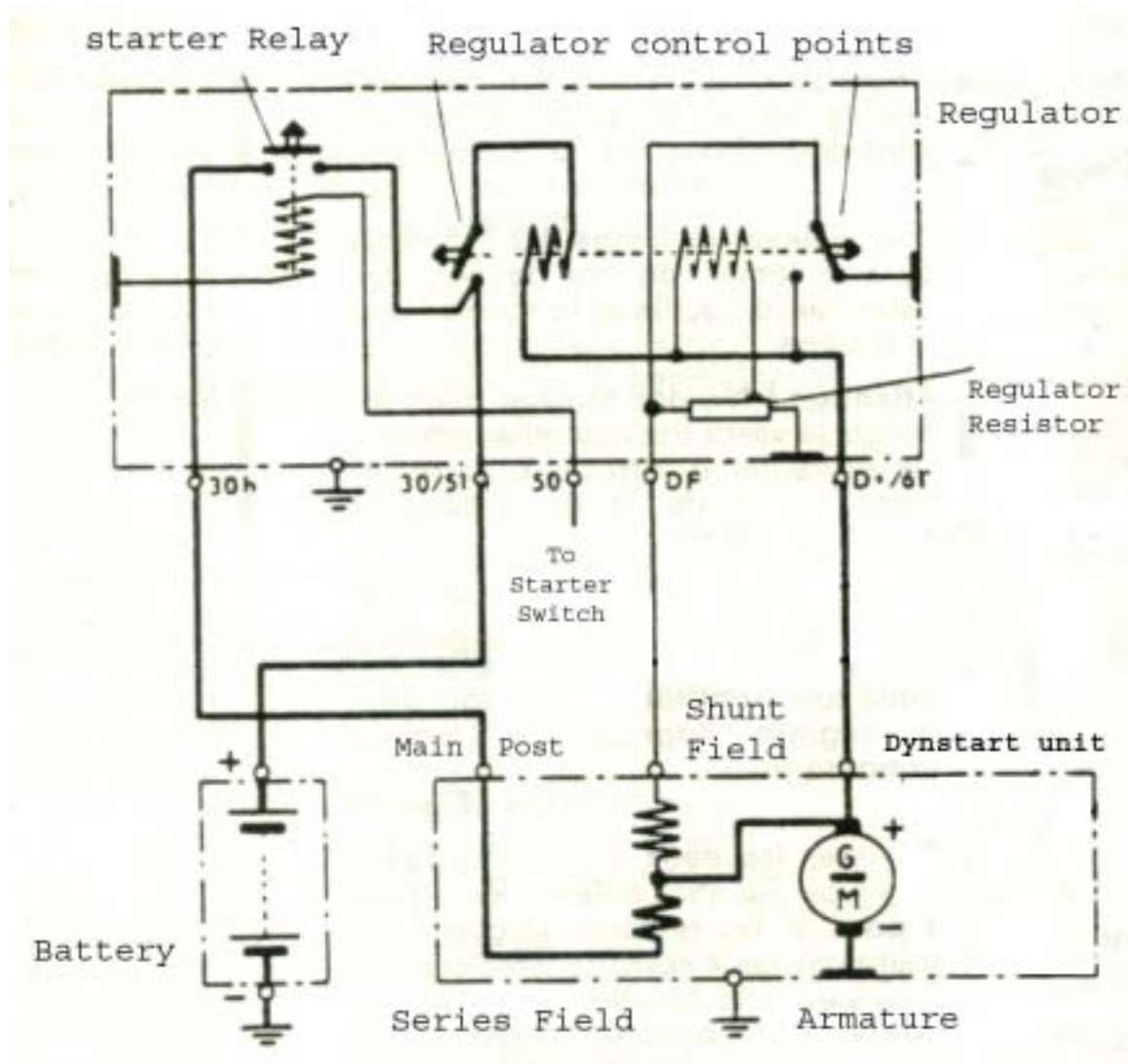


BOSCH DYNASTART

Bill Rogers

www.isettaofsc.homestead.com

The dynastart used on the BMW 600, Isetta and other microcars of the 1950s and 1960 incorporated an armature and two sets of field coils to provide a compact starter and generator in one unit. An electrical diagram of the dynastart and its connections to the controlling regulator is show below.



As can be seen from the diagram above, the regulator unit contained both the regulator and starter relays. In the starter mode, power is fed from the positive post of the battery and flows into terminal 30/51 of the regulator unit. When the starter relay is closed by the starter key located on the dash of the car, power is sent out terminal 30h of the regulator to the "main post" on the dynastart unit shown at the bottom of the diagram. This power flows through the series fields (heavy wire coils) and into the positive terminal of the armature. During starting the shunt fields are not carrying any power since the contacts in the regulator section are open. Also, terminal D+/61 are not utilized during this phase of operation.

After starting is complete and the engine is idling the system converts to a generator. The starter relay is opened and the series fields are not used in this situation. Now the unit is controlled by the regulator control points of the regulator. With the armature rotating, voltage is produced at the positive brushes of the armature. This power is collected by the brushes and is available at the D+/61 terminal. Also, power will flow through the series fields (smaller wire coils) and be present at the DF terminal of the regulator.

The coil and contact set in the center of the regulator is used to prevent reverse current (current flow into the dynastart) when the voltage generated by the dynastart is below battery voltage. This is accomplished by this coil sensing the direction of current flowing in it wires and opening in the event current is flowing in the wrong direction.

The contacts and coil connected to the DF terminal will open and close to provide a regulated voltage of 14 VDC at terminal D+/61 once the engine's speed reaches about 1500 – 2000 rpm. The points connected to the D+/61 terminal will close to charge the battery. Should the rotation of the engine and thus the armature slow to the point that the voltage on the + terminal of the armature drops below the battery voltage, a reverse current will be detected by the center relay and the contacts will open. This prevents the battery from being discharged during low speed operations.

A picture of the armature is shown below. This armature is no different than any armature used in either a generator or starter motor except that it has a much larger diameter. This larger diameter is designed to provide the additional torque and lower speed needed for its specialized application. Since the armature is mounted directly to the crankshaft and no gearing is provided between the starter and the engine, lower speed and higher torque is a necessity.



The field coil assembly is designed to carry both the series field and shunt fields. It is also designed to carry a set of points for the ignition system. The photo below does not show the points installed, but they would reside on the post shown in approximately the 1 o'clock position near the center hole. Also, the larger brass post with a nut on the top at about the 2 o'clock position is the connection for the cable from the regulator terminal 30h.



Four brushes can be seen in the photo above. During starting, power is applied to the brass post at the 2 O'clock position and it flows through the larger series fields to the brushes shown in the 4 and 8 o'clock positions. From there it flows through the armature and is collected with the remaining 2 brushes which are connected to ground. During the generator phase power flows out of the 2 brushes at the 4 and 8 o'clock positions and through the blue wire to the D+/61 terminals of the regulator.

The last photo shows the field coil side of the field coil assembly. There are a total of 8 coils. Four larger coils (series field) and 4 smaller coils (shunt field). The 4 larger are connected to the brass post described above and carry the full load of the starting current. Therefore, these coils are made from much larger wire. The smaller shunt coils are only used to excite the armature during the generator phase of operation and are made of much smaller gauge wire. These coils only carry a small current.

