

SERVICE SHEET No. 815

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Models D1, D3 and C10L VARLEY BATTERY. TYPE MC5/9.

The Varley battery differs in several ways from the conventional form of lead acid battery and the following description of its construction and the maintenance required will assist in ensuring that its maximum capacity is maintained.

The battery has the same general characteristics of the free-acid lead battery, but is unspillable and less sensitive to vibration by virtue of its construction. The acid in the battery is fully absorbed in the porous material which fills the space between the lead plates, and therefore, there is no free acid which can flow from the vents if the battery is overturned.

Maintenance

Whilst in service on the machine, the only maintenance required is to add the equivalent of a teaspoonful of distilled water to each cell at intervals of approximately once a month or six weeks. This small addition is to replace the moisture lost by evaporation and electrolysis, and it is essential that excess liquid is not added. All the added liquid should be absorbed within 20 minutes, and if any remains in the vents after this period, it must be removed by syphoning or shaking out. Topping up should not be carried out immediately before a journey.

An overflow of liquid from the Varley battery (usually indicated by a milky white substance on top of the battery) can only be caused by the addition of excess liquid and failure to remove the surplus, or by overcharging, or a combination of both.

As long as the overflow is not excessive and remains white in colour, the battery will probably remain completely unharmed. It should, therefore, be cleaned and any surplus liquid still remaining should be drained off. After spilling of this nature has taken place it may be advisable to add weak battery acid instead of distilled water when next the battery is due for topping up.

If the overflow develops a brown colour it is an indication of very heavy overcharging, and the battery has probably been damaged beyond repair.

In the event of the battery capacity being reduced after a considerable period of service it may prove advantageous to use weak battery acid instead of distilled water for topping up on one or two occasions.

State of Charge

The state of charge of Varley batteries should be determined by the following voltage readings. It is not possible to use a hydrometer.

Fully discharged	...	...	...	...	5.7 volts or under.
Partially discharged	...	...	...	...	6.15 volts or under.
Fully charged	...	...	...	...	6.3 volts or over.
On charge, fully charged	...	...	...	...	7.8 volts or over.

Charging the Battery from a Separate Source

All Varley batteries fitted to B.S.A. machines have already been filled and charged before despatch from the Works. A glance at the battery will show exactly when the battery was initially charged as a date code is stamped into each individual battery case.

A letter 'C' on the left-hand bottom corner of the positive side of the battery denotes that the battery has been fully charged by the manufacturer.

On the opposite bottom corner of the same side a letter and figure denote the month and year of the initial charge ('A' for January; 'B' for February; 'C' for March, etc., and '3' for 1953, '4' for 1954, '5' for 1955, and so on). As an example, a battery coded 'C' 'J4' denotes that the battery was filled with acid and initially charged by the manufacturer in October, 1954.

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If the battery is subsequently left idle for any length of time without being put into service then it should be given a boost charge in accordance with the table below:

Battery idle for 1—2 months	...	...	Charge at 1 amp. for 6 hours.
Battery idle for 3—6 months	...	...	Charge at 1 amp. for 12 hours.
Battery idle for more than 6 months	...	...	Charge at 1 amp. for 12 hours. Discharge the battery at 1—2 amps. then immediately re- charge at 1 amp. for 12 hours.

Under normal conditions the battery should never be allowed to stand idle for more than a month without charging.

Charging the battery on the bench is carried out in exactly similar manner to that adopted for free acid batteries. Add distilled water as necessary and if the battery has been allowed to get abnormally dry it should be topped up before and during charging. When the voltage reading on charge reaches 7.8 volts, continue charging for a further three hours. All surplus moisture should be absorbed into the battery within half an hour of switching off the charging current. If any liquid does remain in the vents it must be removed by syphoning or shaking out.

Charging a New Battery

If a new battery is to be installed on a machine and it has not already been filled and given its initial charge, then the following procedure must be carried out.

Remove the vent stoppers and fill the battery with pure accumulator acid of a specific gravity which agrees with the table below:

Temperate Climate	...	...	1.270
Warm Climate	...	...	1.250
Tropical Climate	...	...	1.235

The acid will be steadily absorbed into the battery and acid should be added to each cell in turn until the levels remain unchanged for several minutes.

Allow the battery to stand for a period of 2—8 hours. If any of the cells are dry after this period they should again be topped up with acid. It is particularly important that the battery absorbs sufficient acid during this initial period, if it is to give a long life and satisfactory performance. The battery must be put on charge within fifteen hours of the commencement of filling.

For the initial charge the input should be 60 Ah. at a rate not exceeding 1 amp. (i.e., 60 hours at 1 amp. or 80 hours at .75 amp.). During this first charge top up with distilled water only.

The charge should be continuous and it is not advisable for the current to be switched off until completion. If, for any major reason, the charging has to be stopped, the open circuit standing time should be allowed for.

During the final stage of charge, the voltage of the battery should read at least 7.8 volts (i.e., 2.6 volts per cell) and every cell should be gassing freely.

After completion of charge any liquid remaining in the vents should be removed by syphoning or shaking out. The battery should then be cleaned and thoroughly dried. Before replacing the vent stoppers, remove the sealing tape, if any. Grease the terminals slightly with vaseline before connecting up.