Let $k = F_p$ and let G act on A by conjugation. The subgroup $C_G(A)$ is also normal in G, and acts trivially on A. Writing $G' = G/_C G(A)$, we may therefore view A as a kG'-module. Since $|G'| = [G : C_G(A)]$ is prime to p = char k, kG' is a semisimple ring. The assumption that $B \lhd G$ implies that B is a kG' - submodule of A. Therefore, $A = B \oplus C$ for a suitable kG-submodule $C \subseteq A$. Going back to the multiplicative notation, we have $A = B \times C$, and $C \lhd G$.