A subgroup $H$ of an abelian group $G$ is a ccs-subgroup of $G$ if the natural map $\varphi : G \to G/H$ has a continuous cross section, i.e., a continuous map $\Gamma : (G/H)^\# \to G^\#$ such that $\varphi \circ \Gamma = \text{id}_{G/H}$. ($\#$ denotes the largest totally bounded topological group topology.) W. W. Comfort, S. Hernández, D. Remus and F. J. Trigos-Arrieta [Res. Expo. Math. 24, 57–76 (2001; Zbl 1014.22004)] introduced and studied the class of the ACCS((#) groups, that is, the class of groups $H$ that are ccs-subgroups of any enveloping group $G$. In the present paper, necessary conditions for ccs-groups are given. This provides an upper bound for the size of the reduced groups (groups whose only divisible subgroup is $\{e\}$) in ACCS((#) so that the reduced groups in ACCS((#) form a set) and shows that large powers may belong to ACCS((#) only if they are divisible. This gives a large class of new examples of non ccs-subgroups. New properties of the class ACCS((#) are established, e.g., closure with the expectation of taking extensions and direct summands. This provides new examples of ccs-groups. For example, there exist $c$-many pairwise nonisomorphic rank-one torsion-free (reduced) groups and $c$-many pairwise nonisomorphic reduced groups, each of size $c$.

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References:

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