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CHARGING STRATEGY FOR TRACTION BATTERIES IN A MODULAR MOUNTING SYSTEM

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CHARGING STRATEGY FOR TRACTION BATTERIES IN A MODULAR MOUNTING SYSTEM

Technical task:

In a modular assembly system, workpieces are assembled at several stations.

Transport from one station to another is usually automated by an automated guided vehicle system (AGV). The vehicles must have an electrical energy storage system that supplies the control logic and, in particular, the drive and steering with energy. Usually batteries are used for this purpose, lithium-ion batteries being the most common in newer systems. An alternative would be supercaps, which can be charged very quickly but do not have the amount of energy, so they have to be charged more often. In the following, a charging strategy is described how vehicles with such batteries are automatically recharged.

Solution:

It makes little sense to load all vehicles at the same time because no vehicle is available for production during this period. This means that there does not have to be a loading station for every vehicle. As a rule, the number of loading stations is therefore less than the number of vehicles. For the loading strategy described here this is also not important. If one would like to use a production-free time to recharge all vehicles, it would be desirable if each vehicle had its own charging station.

In the vehicles, the charging status is monitored via current consumption/charging. Within a certain range of this charging state, the vehicle is allowed to drive for charging. From a range, significantly lower, the vehicle must drive to charge. In addition, the maximum number of vehicles that may drive for charging is limited. The settings can be selected e.g. as follows Charging up to 90 %, charging allowed when the charge level falls below 55 %, charging forced when the charge level falls below 25 %, maximum number of vehicles allowed to drive for charging: 5. If five vehicles are charging, a sixth vehicle may of course drive for charging when the charge level falls below 25 %. If the corresponding conditions are met, a loading job is created for the vehicle and the vehicle drives to the loading station and docks there.

The parameters described above are variable and can be adapted to the respective situation. Especially an aging of the batteries can lead to the fact that the limit, up to which charging is done, has to be lowered.

This procedure can of course also be used when production is stopped and no vehicle has a driving job. In such cases it makes sense to increase the number of vehicles driving for loading and to increase the parameter, from when on it is allowed to drive for loading. The control system can also automatically detect the state of production standstill and then adjust the parameters without manual intervention.

Advantages:

- Balanced loading process for all vehicles
- Consistently available vehicles for production