

January 10, 2025

Dear Customer,

Beginning in January of 2024, Daifuku's supplier of the steer drive units used in Model 100 SmartCart AGVs updated the steering motor design due to obsolescence.

Due to quality issues encountered and learned during deployment of the replacement steering motor, Daifuku took steps in June to limit distribution of that motor until the difficulties were quantified and understood. Since that time, we have been working diligently to create a solid solution for correction and deployment. The ultimate solution involves an updated steering assembly design that has been rigorously tested and validated to perform in the SmartCart AGV use case. Kits to upgrade to the new unit will be available in Q2 of 2025.

The revised design incorporates solutions to the failure modes experienced in the field:

Failure Mode	Failure Cause / Solution	Status
Steering assembly becomes loose, and steering becomes unstable	Steering reactions are too fast for gearbox as designed. A different gearbox with reduced output speed is utilized in the updated design	Prototype tested Production solution tested Design validated and approved
Steering gear becomes loose, and steering becomes unstable	Steering gear set screw coming loose. Coupling method between the steering gear and the gearbox output shaft is updated to a clamp design rather than a set screw	Prototype in testing Production solution for testing in February 2025
Screws holding motor to gear box shear	Steering reactions are too fast for gearbox as designed. Two additional screws are added to the gearbox output plate	Prototype in testing Production solution for testing in February 2025
Gearbox output gears breaking when AGV has heavy direct load	Steering reactions require too much torque for the gearbox as designed. Sintered gears are replaced with solid steel gears	Prototype in testing Production solution for testing in February 2025

Given the nature of the failures experienced, all due diligence has been given to appropriately describe the use case, validate the design approach, and test beyond the expectations for a unit in the field. This, unfortunately, does require time to complete and validate through the supply chain.

As soon as production units become available, Daifuku will provide upgrade kits to replace all impacted steering motor assemblies - regardless of operational state.

To facilitate a more immediate response, Daifuku has developed an interim solution to improve the longevity of the steering motor assemblies until upgrades are available. The interim solution consists of instructions to properly tighten the different hardware on the existing steering assembly coupled with a custom CCU firmware that slows down the steering motor operation to a speed that is within the design parameters of the steering motor assembly. This solution has been proven to be very effective at stabilizing the operation of the existing assemblies, while not harming vehicle or system operation.

With the use of the interim solution, Daifuku is also removing the limitation on use of the current steering motor assembly for spare parts and replacement.

Daifuku will begin contacting customers and coordinating delivery of the interim solution beginning in late January 2025.

Thank you,

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