

Advanced Control Performance Optimization (ACPO) for MEGADRIVE-LCI

Service note for Drive System Consulting



To improve the robustness of MEGADRIVE-LCI drives against severe network disturbances, ABB offers a specific application from its Drive System Consulting service, which draws on the achievements of model predictive control. This application is called Advanced Control Performance Optimization (ACPO).

This approach allows drive systems to overcome the previous boundaries and advance to a new level, achieving unprecedented availability through robustness against grid voltage disturbances, and significantly increasing ride-through capability.

What is it about?

ABB's MEGADRIVE-LCI drives are well-known in a range of industries as representing the highest reliability and as an excellent solution for driving large loads with high power and robustness requirements. However, the highly proven thyristorbased

solution has always suffered from relatively high sensitivity to grid voltage sags, resulting in it losing torque during the sag and consequently halting the process whenever the application exceeded its system boundary limits.

To address these issues, ABB offers ACPO, where high performances during network transients are attained by implementing Model Predictive Torque Control (MPTC) in the MEGADRIVE-LCI. The control simulates the drive system and its process boundary conditions in real time and identifies the bestperforming control parameters.

These state-of-the-art control algorithms allow high dynamic changes and the supply of torque to the process even during strong network instabilities. The drive is thus operated according to the actual needs of the process instead of pre-defined static limits.

The service delivery of ACPO consists of the following steps:

- System analysis
- Solution development
- Solution Implementation

System analysis

The first step in providing tailored ACPO for the MEGADRIVE-LCI is a system analysis. If you operate machinery such as compressors with MEGADRIVE-LCI and have experienced limits caused by grid voltage sags, this analysis is a great way to determine what potential there may be for extending the ride-through capability of your drive system during grid disturbances.

In this analysis, the limitations of your process and their implications are defined as inputs for the new control model. This means fine-tuning the drive and pushing its operating range to its limits, based on the dynamic process requirements.

Solution development

The improved ride-through capability is achieved by applying a new software-based control algorithm MPTC in combination with process-specific modelling of the load characteristics and the related protection scheme. The new MPTC approach is able to calculate the performance in the near future on a continuous basis and select the optimum solution to reach the required control target.

The model thus devised is used in a specific advanced hardware-in-the-loop (HIL) environment to model, simulate and actually test the new control behavior, using the previously defined process model and genuine customer-specific application data and real measured cases to document and predict the advanced performance of the new control approach.

If requested, the potential for additional improvement can also be examined during the solution development. For example, the power factor towards the grid can often be improved, which increases the efficiency and reduces the cost of operation of the drive system. This also reduces the loading on the transformer and filter components, helping to extend the lifetime of these additional system components.

Solution implementation

After the finalization of the control-based solution and a review of the new features, the next step is to implement it in the target application. We support a roll-out step by step in order to establish the required confidence and prove that the advanced solution will work as predicted beyond the earlier boundaries – this allows you to push the limits of today's process stability, while keeping potential risks to the minimum.

Service Delivery process



You want to improve the performance of your drive system

Do you want to see what improvement potential your drive system has? Would you like to run your process more cost-effectively? Are you interested in benefiting from the latest technological achievements to optimize your system's efficiency?



Contact your local ABB

ABB service team will review your specific needs and propose the best approach.



Asset Optimization Potential Analysis

We provide an expert analysis for your drive system to identify its improvement potential. You select the most promising potential improvements among the identified ones for further exploration.



System improvement planning and implementation

The implementation is planned together with your experts. Detailed implementation proposals for selected items are developed based on the best modeling methods, to be applied to the drive system.



Feel the difference

The improvements are effective immediately and in a sustainable manner. The improved operation can be measured through defined KPIs.

For more information, please contact your local ABB representative or visit:

<https://new.abb.com/drives/services/>
<https://new.abb.com/drives/services/engineering-and-consulting/drive-engineering-consulting>

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