INDUSTRIAL 5G GATEWAY FOR IC7 DRIVE REMOTE MANAGEMENT

HIGHLIGHTS

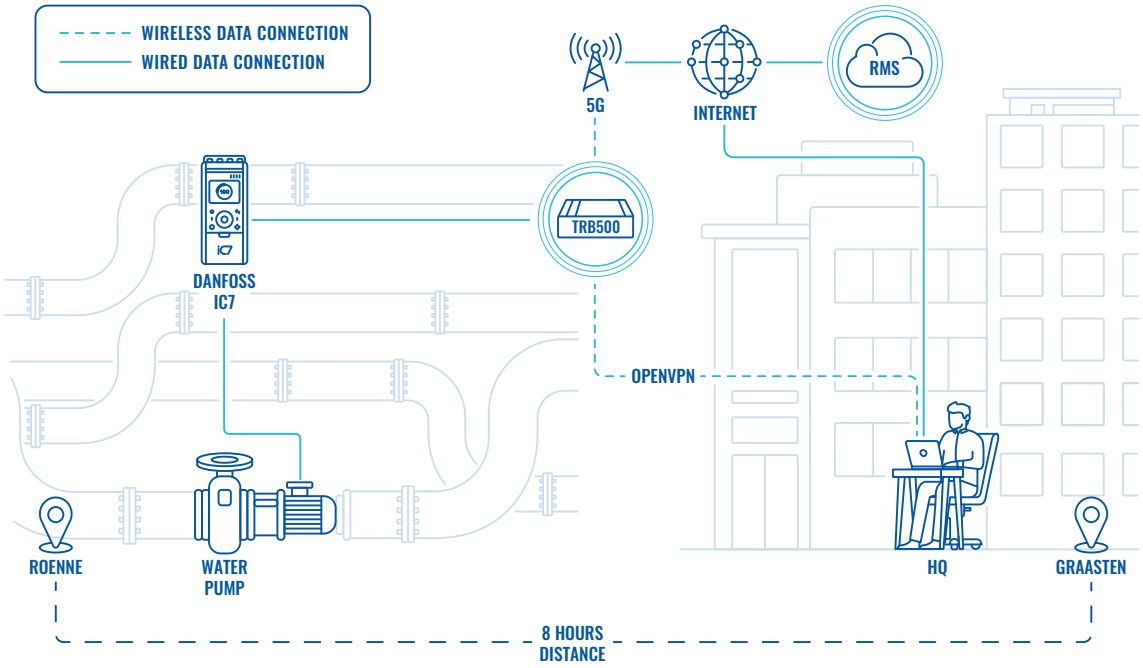
- Danfoss is a Danish technology manufacturer on a mission to decarbonise the world. Their goal is to increase energy efficiency and reduce CO2 emissions.
- The iC7 series is an industrial IoT drive created by Danfoss, helping our partner to achieve its sustainability goals. Continuous and undisrupted connectivity is vital for this device to operate successfully in an IIoT context.
- Danfoss used the TRB500 5G gateway by Teltonika Networks, allowing for remote monitoring and management via RMS.

THE CHALLENGE – CARBON DIOXIDE EMISSIONS

Did you know CO2 stays in the atmosphere from 300 to 1000 years?
It means that as we change the atmosphere by emitting CO2, those alterations will endure on the timescale of many human lives. According to the International Energy Agency, global CO2 emissions from energy combustion and industrial processes grew by 0.9% (321 Mt) in 2022, reaching a new, all-time high of 36.8 Gt.
Can we lower CO2 levels by ourselves?
Yes, by enabling decarbonisation in an intelligent, cost-optimal manner and ensuring carbon neutrality in our operations. This concept was explored by our Danish partners at Danfoss. Their vision is getting more benefits out of less energy by rethinking its systems and using it smarter.
This vision resulted in the integration of iC7 drive into the solution, enabling it to prevent more CO2 emissions. This device is a high performance IoT drive for multiple demanding applications, as a key component allowing the integration of different communication protocols. The iC7 series gives you a whole new way to optimise your system with a modular control platform that allows you to expand functionality to meet your every need.
During the solution testing phase, one of the iC7 drives was deployed on an island. Due to its remote location, regular travel would have consumed time, energy, and created unnecessary CO2 emissions. That is why remote monitoring and remote management were needed. This required a connectivity device that would not only allow remote management and monitoring but also be resilient to the harsh conditions of industrial environment.
Additionally, our partner needed a fast connection, direct monitoring ability, collection of larger amounts of data, and a high bandwidth. All these needs meant that the connectivity device would need more than what 4G has to offer. That is where the 5G generation came into consideration.

5G offers several advantages, such as faster data transfer rates, which are crucial for maintaining seamless connectivity in remote locations. 5G networks have lower latency than 4G networks, meaning there is less delay in data transmission. This reduced latency is particularly important for real-time applications, such as remote control of machinery or equipment in remote locations.

TOPOLOGY



THE SOLUTION – INDUSTRIAL 5G GATEWAY

Our partner, Danfoss, wanted to create a time and energy-saving sustainable solution. To implement it, it chose the TRB500 industrial 5G gateway by Teltonika Networks. The Danfoss iC7 drive connects to the 5G gateway via an Ethernet port, using a point-to-point connection.

This solution is part of an EU-funded development project, where one of our partner's iC7 drives was installed on Bornholm Island for field testing. Travel time to the island is around 6-8 hours, meaning that remote management and monitoring capabilities were needed. Such capabilities prevent unnecessary CO2 emissions associated with travelling to and from the island.

The TRB500 5G gateway enables our partner to establish a secure remote connection via VPN from its office to the Danfoss iC7 drive, located in an island or a factory. This connection allows MyDriveInsight, Danfoss's remote management tool, to provide easy access to its drives and power converters.

Most importantly, establishing a VPN connection is easily achieved using our very own Remote Management System (RMS). Another important benefit of RMS is making both command-line interface (CLI) and configuration interface available.

The iC7 drive has three Ethernet ports available: two for fieldbus connectivity and one acting as a service port. The service port allows our partner to manage the drive, keeping our partner's operations totally separate from those of the end user.

The TRB500 industrial gateway is packed with all kinds of great features, with one of them being VPN support. This 5G gateway supports VPN services, including OpenVPN, ZeroTier, IPsec, Stunnel and many more. Thanks to this array of VPN protocols supported, the Danfoss team can rest assured that cybersecurity threats from malicious hackers are kept to the very minimum.

Moreover, this 5G gateway has cellular speeds of up to 1 Gbps and supports both NA & NSA architectures. It's very compact for an industrial gateway, making it easier to include in the solution's setup. It's also backward compatible with 4G (LTE Cat 20) and 3G, meaning that it can still be used in areas where 5G isn't supported.

Another great thing is that this 5G gateway is protected with an aluminium housing, so it could withstand harsh industrial environment and stay unaffected by temperatures ranging from -40 °C to 75 °C.

This Danfoss's solution was not only easy to implement but also provided undisrupted connectivity, allowing to reduce CO2 emissions using remote management instead of travelling to the site.