



DEACAM  
FERMECRAFT

# AUTOMATED FERMENTATION SYSTEM

custom engineered technology by

**DEACAM**  
Not your average electricians

"Fermecraft is delivering the latest in automation practices for craft beverage industries. It enables full control over all production devices, improving product and efficiency."

**Warren Bradford**  
Deacam

**DEACAM**  
INDUSTRIAL ELECTRICAL ENGINEERING



**DEACAM**  
**FERMECRAFT**

Fermecraft is revolutionising the fermentation industry by changing the way breweries and wineries work. Deacam's automated design links all vessels and equipment required in the fermentation and brewing process and re-structures these applications to work in a cohesive way, eliminating wastage and errors, whilst maximising efficiency and quality.

Fermecraft is manufactured using the best industrial materials and technology to create a product that automates the fermentation and brewing process by monitoring and setting offsets to produce a consistent and controllable product.

The Fermecraft system includes:

- World class hardware, including General Electric components
- Ferment profiles
- Optimised cooling profiles
- Glycol pressure control
- Temperature accuracy & stability
- Automatic carbonation and pre-purge control
- Weather forecasting
- VPS cloud based server for data collection and control
- Expandability
- Remote access and fault alarms



Fermecraft is taking complex fermentation processes and simplifying them by providing a system that is capable of both monitoring and controlling all linked equipment and operational systems in a centralised PLC (Programmable Logic Controller).

Fermecraft's control is centralised around a PLC and connected HMI (Human Machine Interface). The PLC is connected to production devices such as temperature probes, glycol valves, augers, mixes etc. via decentralised IO-Link gateways that interconnect with an industrial field bus (Profinet®).

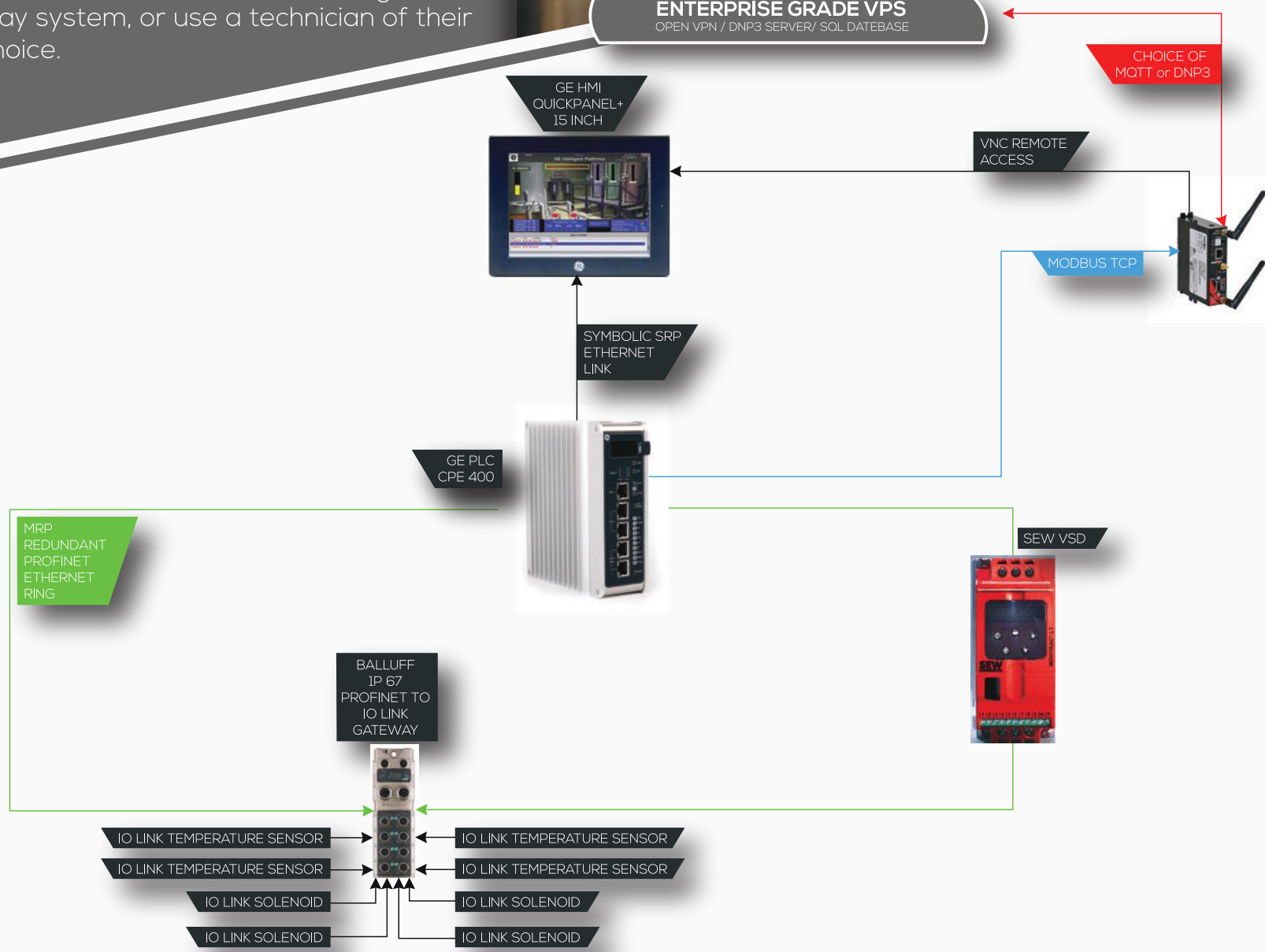


"The best thing about Fermecraft is the robustness of the system and quality of the components. You would be hard pressed to find the same experience that Deacam have in the craft brewing industry. They have completed an exceptional job here, and I would definitely recommend them to others."

**Callum Reeves**  
Owner of KAIJU Beer



By utilising the latest in industrial hardware, provided by recognised industry leaders, Fermecraft can bring system infrastructure and control ability, normally reserved for large production sites, to boutique craft operations. Profinet® to IO-Link gateways give the Fermecraft operator the ability to install Fermecraft themselves as a plug and play system, or use a technician of their choice.



"The **Fermecraft** system is awesome!  
High quality,  
You get what you pay for."

**Dereck Hales**  
Owner/Brewer,  
Bad Shepherd Brewing Co

IO-Link enables traditional analogue signals to be converted to digital at their source. This removes the risk of poor cabling routing that can introduce electrical inteference.

# Hardware

## SITE HMI

The Quickpanel + HMI works seamlessly with the GE RX3i CPE 400 PLC. The robust touchscreen built for industrial environments can withstand tremendous shock and is manufactured using gorilla glass, creating an incredibly strong surface with the sensitivity of touch screen functionality. The capacitive touch sensors mean that the picture is sharper than most HMI's, enhancing the viewing experience. This HMI uses a standard Windows operating system which leverages standard products and services such as VNC server for remote viewing and control purposes.

## PROFINET / IO LINK GATEWAY

The Profinet®/IO-Link gateways have a rating of 69K and also have the ability to accept standard IO-Link cables. IO-Link is a cross vendor standard for connection of sensors and other devices plus it leaves the end user with a lot of options in terms of sensor choice. The gateways can also participate in an MRP redundant Ethernet network which makes them the best fit for use with the GE RX3i CPE 400 PLC. This architecture provides far more up time and thus reliability. Control of all devices within Fermecraft are on the same Profinet® bus protocol

## IO-LINK SENSORS

The ability to connect IO Link sensors means Fermecraft can obtain far more data from the sensor itself when compared with using standard analogue devices.

The sensors can be calibrated and viewed via IO Link software tools making site maintenance easier as well as providing a great user experience.

## SIXNET RAM

The connection from site to the cloud based VPS is made by using the open VPN protocol. The Sixnet acts as a VPN client and creates a bank grade encrypted connection to the server. This allows all traffic to be sent and received in a safe and secure manner. The VPS has a DNP3 server installed which collects data from the DNP3 clients (Sixnet RAM 6000). This protocol was designed for remote sites and has fantastic qualities on poor links and links with low bandwidth. The Sixnet has the ability to store data locally when the 3G/4G connection is not available. When the connection is available again, the locally stored data is sent back to the UPS for storage. This ensures data integrity over a wireless data connection. Site data collection is facilitated via a Sixnet RAM 6000 RTU. This device uses Modbus TCP/IP to collect shop floor data from the site CPE 400 PLC. This data is collected every 1 second.

## SEW-EURODRIVE

SEW-Eurodrive was chosen due to its ability to talk on a redundant Ethernet Profinet® network. The VSD (Variable Speed Drive) allows for full speed control of motors. Due to being on a Profinet® network we are able to read back diagnostic parameters from the VSD for alarming and diagnostic purposes.



## FERMENT PROFILES

The central control element of Fermecraft allows ferment chill and brew profiles to be loaded as recipes to the PLC.

Fermecraft will also compare each ferment profile and adjust all systems to allow for optimised efficiency in the running of all equipment, whilst maintaining each individual tank's ferment profile.

By storing this information, this ferment profile can be repeated exactly, or if desired adjusted to accommodate any changes that the brewer or winemaker may wish to make.

## OPTIMISED COOLING PROFILE

By using the KompileIT bridge, which is a coded smart system, Fermecraft has the ability to ask 'What are the priorities?' and allocate resources appropriately.

By applying these smart systems to the cooling systems Fermecraft is able to bring the fermenters, chillers, and glycol tanks together, rather than each operating in isolation.

To minimise stress on the components, Fermecraft is able to structure the process to enable everything to work efficiently and at optimal level.

Fermecraft is designed to minimise the duty cycle on the chiller, by analysing the data from all ferment vessels and scheduling when glycol is required. By optimising the cooling profile, Fermecraft is able to conserve energy.

## GLYCOL PRESSURE

Stabilising the glycol pressure for each ferment tank can be problematic.

Fermecraft uses a pressure sensor (IO-Link capable) on the pump, which feeds data back to the PLC, enabling a variable speed drive to control the speed of the pump. This allows Fermecraft to control and stabilise the pressure and flow rate of the glycol so that each fermentation vessel receives the correct glycol pressure, eliminating fluctuation and risk of damage. Once the glycol valves turn off after pumping through the lines, the PLC will ramp the pump down.

Fermecraft is able to save on glycol and energy usage, as well as safeguarding the fermenters and pump.

## CENTRAL CONTROL

The system runs off a central control panel that houses a customised PLC, which is connected to a HMI. The PLC connects to IO-Link field devices via the Profinet® to IO-Link gateway. All IO-Link devices are controllable from the PLC and all data can be read back via Profinet®.

The HMI connects to the PLC and provides supervisory control and commands, allowing the operator a central control position. The HMI screen displays all active, upcoming and past processes, providing clear and accurate information which allows for more efficient control. The HMI displays real time visuals of the connected devices, represented by animation of the working components.

## TEMPERATURE ACCURACY & STABILITY

Though all cooling systems allow for set limits, Fermecraft is capable of setting smart limits by reading that data from each element and adjusting the cooling and heating profiles accordingly.

By using these smart limits, in conjunction with the fermentation method, it is able to not only accurately measure the temperatures, but to control the linked devices to allow the tanks to reach the pre-determined set point.

## AUTOMATIC CARBONATION & PURGE CONTROL

The carbonisation and purge profiles are entered into the system as part of a recipe, enabling a consistent product and packaging run. By automating this crucial stage, Fermecraft is able to provide the exact level of carbonisation using CO<sub>2</sub> and pressure once the beer has been transferred to the bright tank. By using the Fermecraft pre-purge and automatic carbonisation recipes, the product quality is maintained.

## WEATHER FORECASTING

Fermentation processes rely heavily on temperature control, and though the tank temperature can be monitored and controlled, the change in ambient temperature can affect response times to these settings. There can be a variant from when the chilling cycle begins, to actually meeting the target temperature. Fermecraft provides the use of offsets so a temperature range can be established to control these variations in response to the predicted weather at each site.

Through the KompileIT software service, Fermecraft is able to access the appropriate national meteorological data each day to check the forecast for the following day. These weather services have been proven to be accurate 24 hours prior to the event. If the predicted temperatures are above or below a predetermined set point as installed by the operator on site, Fermecraft will engage a hot day or a cold day schedule that will have differences in the ferment profile depending on the season. They will be notified via email or SMS to inform them of the predicted temperature and the seasonal recipe threshold, and ask if they would like Fermecraft to implement the appropriate seasonal schedule determined by the temperature set points. If the user does not respond, Fermecraft will automatically implement the appropriate schedule to correlate with the forecasted temperature. If they do respond, they have the option to hold and not follow this procedure. Every tank that is in auto-operation will adjust its ferment profiles to match what the operator has set as the schedule.

There are other offsets the operator can choose to use and set depending on their climate and fermentation requirements. It allows for parameters to be set for devices to run more efficiently determined on the weather.

The meteorology service will also provide an expected sun yield for the facilities location, allowing solar assisted operations to schedule their devices to run, or not, using these pre-determined offsets. This application of Fermecraft gives the user the option to operate their devices at peak efficiency, saving on costs.

Fermecraft is able to connect to a number of solar inverters and is able to use their performance data to tune the brewing process on the fly.



## VPS CLOUD BASED SERVER FOR DATA COLLECTION AND CONTROL

All historical data relating to the operations profiles are stored using the KompileIT cloud based historian and alarming system. KompileIT logs and stores operating data for each and every device, allowing the operator to access their full ferment profiles indefinitely.

The operator has full ownership over this data and using a private login are able to search all information relating to their systems via a web browser.

Fermecraft also automatically generates carbonation reports, allowing a comparison between this and the ferment profiles.

Access to this information provides invaluable insight and analysis of the product.

## REMOTE ACCESS & ALARMING

Fermecraft is accessible to the operator at all times via the remote access function.

Connection via the KompileIT system to the brew platform allows for monitoring and adjustments to be made via the custom made site on all smart devices. As this is a site specific program, the operator can choose which function they would prefer to use. If remote monitoring is all that is required, full access can be limited to just this function.

Fault alarms are triggered when associated drives connected to the brew platform, such as the glycol chiller, are not meeting the required set points as determined in Fermecraft by the operator. Fermecraft will raise an alarm, alerting the operator to the issue and providing detailed information as to the source of the problem. These notifications will be sent out via SMS and Facebook messenger. The Facebook messenger software allows for rich user control, as well as increased reliability and efficiency in its communication processes. By identifying the problem immediately, Fermecraft is eliminating the need for lengthy diagnostics and protecting the equipment and fermentation that is currently underway. Using the remote access function, the operator is aware of all issues that may arise when the facility is unattended.

## EXPANDABILITY


Fermecraft is designed for expandability to seamlessly grow with production using IO-Link Balluf gateway technology.

Additional tanks and support equipment can be added to the system without the need for an on-site technician, enabling hassle free expansion.

Extra IO-Link hardware can be provided if further expansion is required.







"In-Line Packaging Systems is pleased to recommend Deacam as an innovative solutions and service provider to the brewing industry. Deacam's ability to integrate and automate systems, eliminating guesswork and manual processes is without precedent.

It is because of their commitment and innovation that In-Line is partnering with Deacam as an importer of Fermecraft for the North American fermentation industry, allowing us to offer our customers a system quite unlike anything currently on the market."

**Chad DeFriece**

In-Line Packaging Systems

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