

VisiFerm DO in the production of recombinant proteins

Less downtime leads to higher efficiency

Industry: BioPharma

Application: Fermentation of yeast

Hamilton product: VisiFerm DO Arc, Arc Wi Sensor Adapter, Arc View Mobile

Today, recombinant proteins and other products that result from the use of recombinant DNA (Deoxyribonucleic Acid) technology are found in almost every pharmacy, doctors or veterinarian's office, medical testing laboratory, and biological research laboratory. Recombinant proteins are produced using a range of different cell factories, including bacteria, yeast, filamentous fungi, insect cells and mammalian cells.

About 20% of protein-based biopharmaceuticals in the market are produced by *Saccharomyces* species, including insulin, hepatitis B surface antigen, glucagons and hirudin. Compared to bacteria, the main advantage of yeast expression systems is the similarity of their secretory pathway with mammalian systems and the capacity to perform strict quality control and post-translational modifications, including glycosylation, disulfide bond formation as well as the ability to secrete proteins in their native forms to facilitate downstream processing. Furthermore, yeast systems eliminate, compared to *E. coli*, contaminations of toxic pyrogens and do not contain microbial contamination or viral inclusions like in mammalian cells.

Easy integration and less downtime with the VisiFerm DO Arc

Albumedix is a credible technology developer with a strong heritage and track record in innovation and commercial recombinant albumin supply. A portfolio of engineered



Benefits of Visiferm DO Arc

- ▶ Robust and stable reading reduce failure rates
- ▶ No interference with electrical equipment (*i.e.* pumps *etc.*)
- ▶ Easy maintenance & long sensor lifetime
- ▶ Easy calibration: data stored in sensor head
- ▶ Up to date with wireless communication within the lab



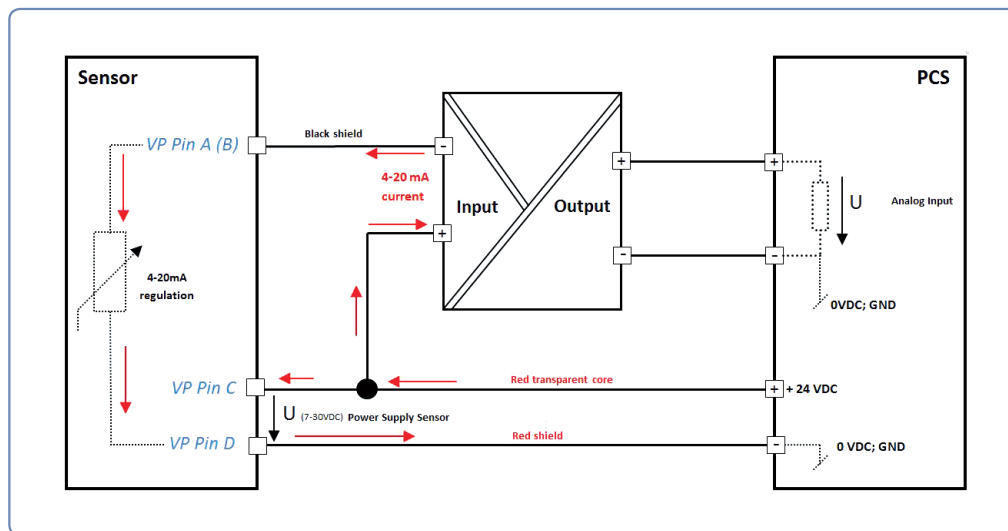
albumin variants has already been developed. In the human body, albumin is responsible for the maintenance of oncotic pressure, contributes to the maintenance of plasma pH and the distribution of a variety of endogenous and exogenous ligands.

Saccharomyces species are a work horse at Albumedix in their laboratories in the United Kingdom, to produce recombinant proteins. An average fed batch run takes about 5 days in a stirred vessel. In doing so the dissolved oxygen (DO) saturation is reduced from about 98% to the control point and is measured via the VisiFerm DO. The optical DO sensor is controlled and powered by a Pierre Guerin Tryton controller. Communication between Tryton controller and sensor uses its 4-20 mA capability. This robust signal is integrated in the controller leading to reduced downtimes, higher efficiency and more reliable fermentations. Additionally the Arc View Mobile and the Arc Wi sensor adapter enable Albumedix to be up to date about the sensor status and the measured values wirelessly at all times. The green light of the Arc Wi adapter indicating communication with the controller works fine and no errors or warnings have been detected. Compared to the previously used amperometric Clark cells the VisiFerm DO helps to reduce maintenance time and costs because polarization is no longer needed and the only spare part is the cap that can be replaced with ease. As a

consequence Albumedix has standardized on the VisiFerm DO Arc for their autoclavable fermenters.

Technical data VisiFerm DO Arc

Measuring Range	4 ppb to 25 ppm (DO) 0 to 62.85 %-vol or 0 to 300 %-sat
Measuring Principle	Oxygen dependent luminescence quenching
Pressure Range (bar g)	-1 to 12 bar
Operating Temperature Range	-10 to 140 °C
Autoclavable	Yes, max. Temperature 130 °C
CIP	Yes
Steam Sterilizable	Yes, max. Temperature 140 °C
O-ring Material	EPDM (FDA approved, USP Class VI)
Wetted Parts	Stainless steel 1.4435, Silicone (FDA approved, USP Class VI), EPDM (FDA approved, USP Class VI)
Analog Output	4-20 mA for DO, programmable, galvanically not isolated; pulse width modulation 5 kHz
Digital Output	RS485 Modbus



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