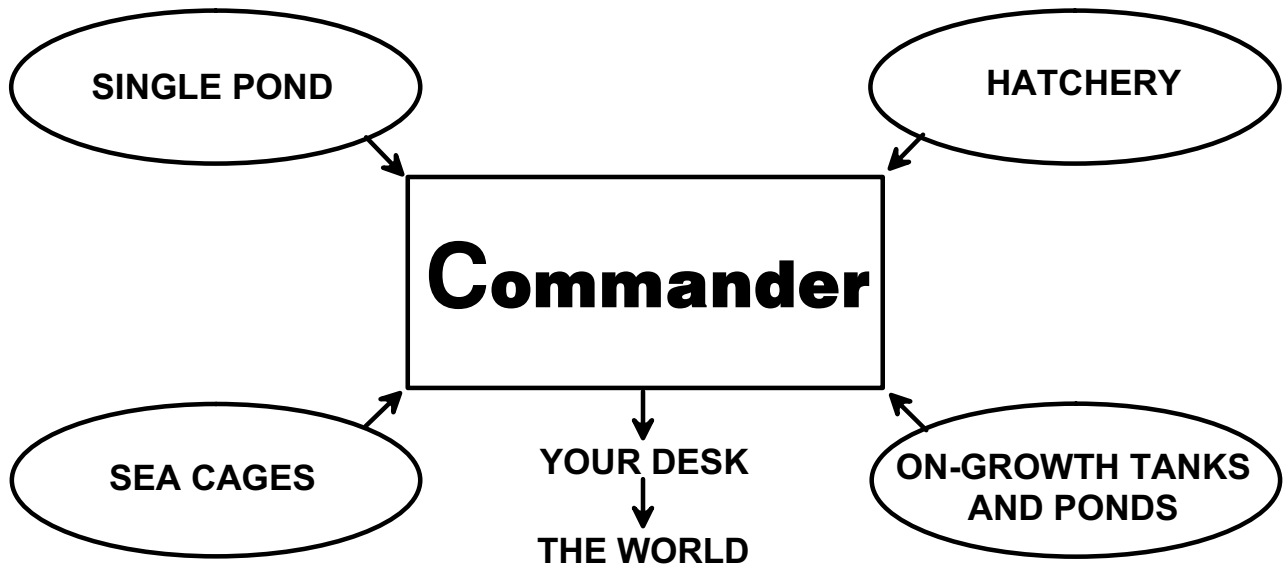


# OxyGuard Commander

*Measuring, Monitoring, Control & Alarm System for Total Control*



## The complete concept for measurement and control:

- **Unsurpassed overview and security.**  
*The system can function without a PC and can be divided into independent sections.*
- **Total Control - oxygen injection, heating, pumping - everything!**  
*there are special programs for feed control, lighting control etc.*
- **Easy to optimize operation -**  
*Both of daily production and strategic operation.*
- **Range of units for easy system construction**  
*Just add a unit anywhere, anytime, for more measurement and control.*
- **Only a single data cable for all signals**  
*Right up to the point of measurement!*
- **LAN connection as standard**  
*You can connect with field bus cable or LAN*
- **Access the system from anywhere!**  
*From the on site office or the other side of the World*
- **Wireless LAN for even more freedom and flexibility**  
*Ideal for large installations and cage to shore!*
- **Easy integration with other systems**  
*farm management systems etc*

## Commander controls everything!

*and keeps records of exactly what happened!*

# Functions and Features

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## Main Functions:

### Measurement, Monitoring, Data Logging, Alarm and control of:

**Dissolved Oxygen**  
**Temperature**  
**pH**  
**ORP**  
**Water Level**  
**Pressure**  
**Flow**  
**Pumps, Filters, Blowers, Lighting, Feeders etc.**

## System Features:

- Easy installation: Place input and output units where needed.  
Just one thin cable between all units.
- Easy configuration: The system can be divided into independent sections as desired.  
Sectioning does not have to be dependent on the physical lay-out.  
Input-output linking is made via software.  
Functions can be changed and units can be added as needed.
- Easy to use: Measurements and functions are shown on a graphical representation of the installation on the PC screen. Alarms in bright colours for instant recognition.
- Fault-tolerant: You can remove parts and the rest keeps on working!
- Versatile: You can connect any meter or component with on/off or analogue input or output. There is no practical size limit.
- Economic: Commander gives closer control of DO and other parameters, giving better feed use with less injected oxygen.
- Security: Immediate alarms on PC, with remote alarms, horns etc. as desired.

**The OxyGuard Commander** is a process control system specially designed to perform the functions necessary in a fish farm. Water quality metering, monitoring and control is the main task, but **Commander** has practically unlimited capabilities. **Commander** combines newly designed input and output units and software with a tried-and tested bus network to provide both small and large users with a very economic solution that is easily and precisely adapted to their exact needs.

**Commander** Systems can, just like the traditional OxyGuard multi-channel systems, be extended and adapted, but the **Commander** provides possibilities far beyond the scope of any traditional system. There is no limit to the number of channels that can be incorporated - just add the units you need - and the system can be divided into sections that will function alone even if connection to the rest of the bus network is broken. Wiring is greatly reduced since input and output units can be placed close to where the actual measurements are made or to where control is effected.

Via a PC running the main **Commander** program connection is possible both to other fieldbus systems and other computers. The latter can be performed through the office network or through the internet. A **Commander** System can thus become a part of the overall data system of the fish farm or mother company, enabling operation to be finely tuned to market demand trends to give a strategic advantage.

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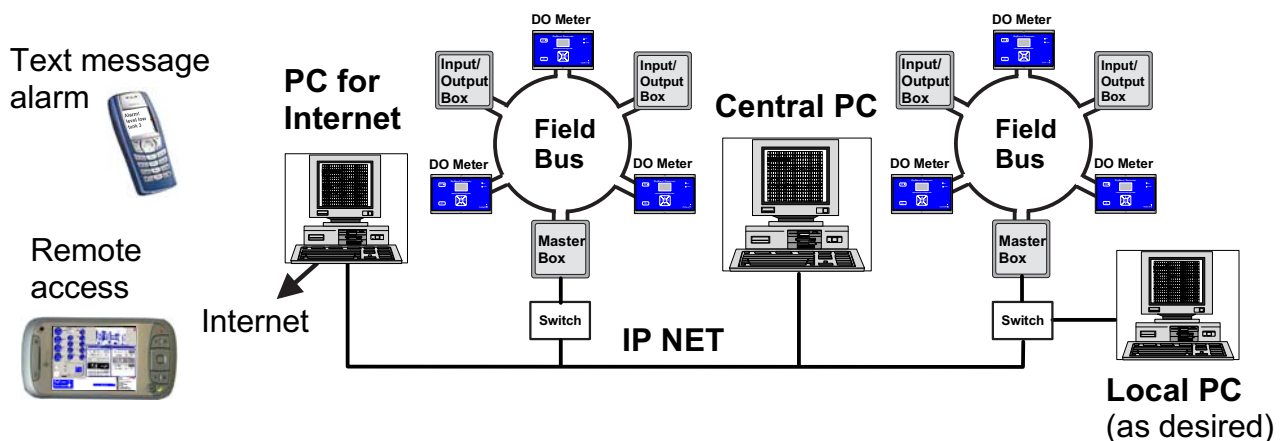
# System Design

The basic parts of a Commander system are a **Master Box, DO Meters with Probes, Input Boxes and Output Boxes**. These are connected together by a field bus cable (P-NET cable). Most systems have a single section with one Master Box. Very large systems can have several sections, each with its own Master Box. Commander uses 24VDC power from appropriate power supplies. Connection to a PC is either via the P-NET cable or via LAN. Set-up, adjustment and manual control is carried out via the PC.

**The PC shows a unique graphical representation of the actual installation, so that the operator can easily and immediately see exactly what is happening at any time.**

Control functions are performed by Master Units in the Master boxes, according to the software that is loaded into them. Examples of such functions are data logging, control of inputs and outputs, control of the switching on and off of illumination, control of dissolved oxygen and temperature etc. and feed control.

Input to Commander is via DO meters connected to the P-NET bus, or by analogue or on/off signals (pH, level etc) connected to units in Input Boxes. Output from Commander (apart from logged data) is in the form of on/off or analogue signals from units in Output Boxes. There is no practical limit to the number of measurements and signals Commander can handle.



The above illustration shows how a system with two sections and two PC's might look. A smaller system (e.g. up to 60 DO measurements) would usually only have one section and one PC. A unit can be included to send text messages to one or more mobile phones if there is an alarm, and remote access is possible using fixed or mobile PC's. Effective security measures are used.

Another feature that ensures reliable, accurate measurements is the galvanic isolation that OxyGuard uses. Potential differences between different places in a large installation can disturb sensitive measurements, so OxyGuard input circuits for DO and pH probes and similar are galvanically isolated. The field bus also incorporates galvanic isolation, so that a fault in one of the connected units will not halt the operation of the entire system.

## The Commander Probe

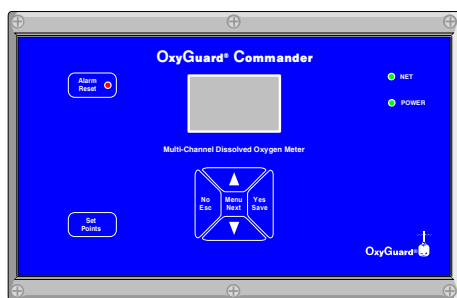
This is an improvement on previous OxyGuard probes.

- You no longer need to choose between mg/l and % saturation - the **Commander** gives you both.
- You no longer need separate temperature probes - the **Commander** also measures temperature.
- The **Commander** Probe is fitted with a membrane that is virtually unbreakable.
- The **Commander** probe is as near to maintenance-free as modern technology can make it.

## The Commander DO Meter

The Commander DO Meter measures dissolved oxygen in mg/l (ppm), dissolved oxygen in % saturation, temperature and barometric pressure. Up to 6 Commander probes, that measure both dissolved oxygen and temperature, can be connected to a DO Meter. Input modules ("input amplifiers"), one for each two probes, are inserted according to the number of probes connected. Measured values can be observed on the display of the unit, that also shows when there is an alarm.

The **Commander** DO meter incorporates a sensor for barometric pressure compensation and software routines that check probe stability and thus permit automatic calibration.



The DO meter can measure even if connection to the rest of the system is broken.

## Input from other meters and equipment

Input can be made from any other equipment that can provide an analogue or on/off signal. It is therefore easy to connect pH meters, flowmeters, level sensors or switches and other equipment to the Commander system. Control of these parameters can also be performed by the Commander system - the software can be set up to perform advanced control functions when needed.

On/off signals are often used in connection with motor control for pumps, blowers etc. The user can thus see the precise state of any connected device on the PC, and switch it on or off if needed.

## Outputs

Commander has **advanced control functions** that, for example, give **true PID control** of oxygen levels using on/off output signals to inexpensive magnetic valves. Other parameters can also be controlled using PID functions. If desired analogue outputs to more expensive proportional valves can be used.

On/off outputs are also used to switch motors, lighting, feeders etc. There are special programs for lighting and feeders that permit progressive changes - for example so that the lighting "on" time automatically follows the natural daylight.

## LAN and Wireless LAN

The LAN facility is now included as standard on Commander systems. With the correct software and security it is possible to access a Commander system both from a network computer or from a computer connected to the internet. This makes remote control and monitoring easy and opens a whole new range of possibilities for fish farmers.

The use of wireless LAN components make it possible to communicate between parts of a Commander system that cannot be connected by cable - for example between sea cages and the on-shore office.

To the operator, all the Commander systems connected to the LAN will work in the same way, no matter how far away the system actually is.