

A BRIEF INTRODUCTION TO

GLOBAL BOILER SERVICE

SPECIALISTS IN BOILER CONTROL SYSTEMS,
BURNER ADJUSTMENT & SERVICE





ABOUT US

Global Boiler Service is a Danish company in the Marine Boiler and Industrial Boiler Service market. We have a very high degree of know how regarding the varying control- and burner systems found on new and older boiler plants.

Global Boiler Service was founded in 2009 with Head Quarters located in northern Denmark, just outside the city of Aalborg. The tasks were, in the start-up phase, mainly restricted to general service visits onboard vessels worldwide, but has since then evolved into much more. Our business is today also covering scopes such as:

- Various upgrades to existing boiler control systems
- Complete replacement of boiler control systems
- Upgrades and replacement of burners
- Service on Inert gas systems incl. control systems
- Service on incinerator systems

And we are now also represented with Service Stations in Singapore and Shanghai.

As a natural development we started a Spare Parts Department in 2015. The ware house is located at our HQ in Denmark. This step was well welcomed by our customers and is today a big part of our business with a constant growing circle of customers as well as supply chain.

Our goal for the company has remained the same from start till today. We strive to:

- Solve bottle neck problems in the boiler service business
- Deliver technology to minimize emissions from boilers
- Deliver the best available service on boiler plants

...and through this we hope to build strong and long-lasting relationships with our customers worldwide.

Dann Hove Andersen & Peter Greve Madsen



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AUTOMATION AND SERVICE

No matter if your need is urgent onboard service, classification or retrofit, **Global Boiler** is ready to help. Our knowledge on burners and control systems makes **Global Boiler Service** a unique partner when it comes to secure and stable boiler function.

SERVICE

- Steam Boilers
- Thermal oil boilers
- Exhaust gas boilers
- Steam atom. Burners
- Pressure atom. Burners
- Rotary cup burners
- Relay / PLC control
- Rebuilding and retrofit
- LSFO upgrade
- Price upon request

SERVICE AGREEMENT

Keeps your maintenance costs at a minimum

- Alarm checking
- Controller checking
- Positioner checking
- Combustion adjustment
- Burner cleaning
- Electrical system check
- Status report
- Recommended spares report

URGENT BACK UP

Global Boiler Service knows the trouble many owners are facing when ordering spares for the BMS system. Often it is not possible to get a fully programmed controller but a standard is send out, and afterwards the customer needs to order a service engineer to install and program the unit.

During the annual survey, we download all data from various controllers in order to enable after sale of fully operational units. We will keep record of your data, unique for each vessel ensuring optimum after sales service.



SPARE PARTS OVERVIEW

Burners	Boilers	Pumps	Water control
Weishaupt	Aalborg	Allweiler	Igema
KB	Kangrim	Grundfos	Mobrey
KBSA/D	Saacke	Dickow	Gestra
Volcano	Mitsubishi	KBS	Spirax
Sunflame	Gesab	Kral	
Oilon	Miura	Suntec	
Saacke	Osaka	Danfoss	
Clayton	Garioni Naval		
Riello			
Smoke Density	Water Level	Blower	
Mobrey	Klinger	Barker Bille	
Green Instrument	Bonetti		
	Level		
	Vaihinger		
Valves			
ARI	Danfoss	Spirax	Meson
Leser	EGO	Samson	Econosto
NAF	Parker	Tyco Valves	Masoneilan
Electrical Equipment		Other Equipment	
Telemecanique	Finder	Haselhofer	Opsis
Siemens	SES	Rosemount	Air Torque
Sälzer	Endress & Hauser	Aqua Metro	Camozzi
PR Electronic	Johnson	Steinen	Daniamant
Carlo Gavazzi	Honeywell	Monarch	Jumo
Erab	Dungs	SKF	Deif
Landis & Gyr	ABB	FAG	Omron
Sauter	Vacon	Norgren	Clyde Bergmann
Gestra	Linak	Airtec	
Danfoss		Belpa	

BOILER CONTROL SYSTEM

INTRODUCTION

The boiler control system from **Global Boiler Service A/S** is engineered to ensure safe and reliable operation with minimum attendance. This is achievable via use of high quality components and an "easy to use" user interface.

The base of the system is the new Siemens S7-1500 PLC. Siemens is supplying high quality components with worldwide availability. Further, there is a supply guarantee of 10 years when components are replaced with new models. This guarantees you a **long lasting solution!**

The system is implementable in a "single boiler" system or in a "multiple boiler" system where a common section is added.

For new building or retrofit, and available to any kind of boiler and burner.

EASY SYSTEM OVERVIEW

The HMI is made with focus on easy system access, overview and operation.

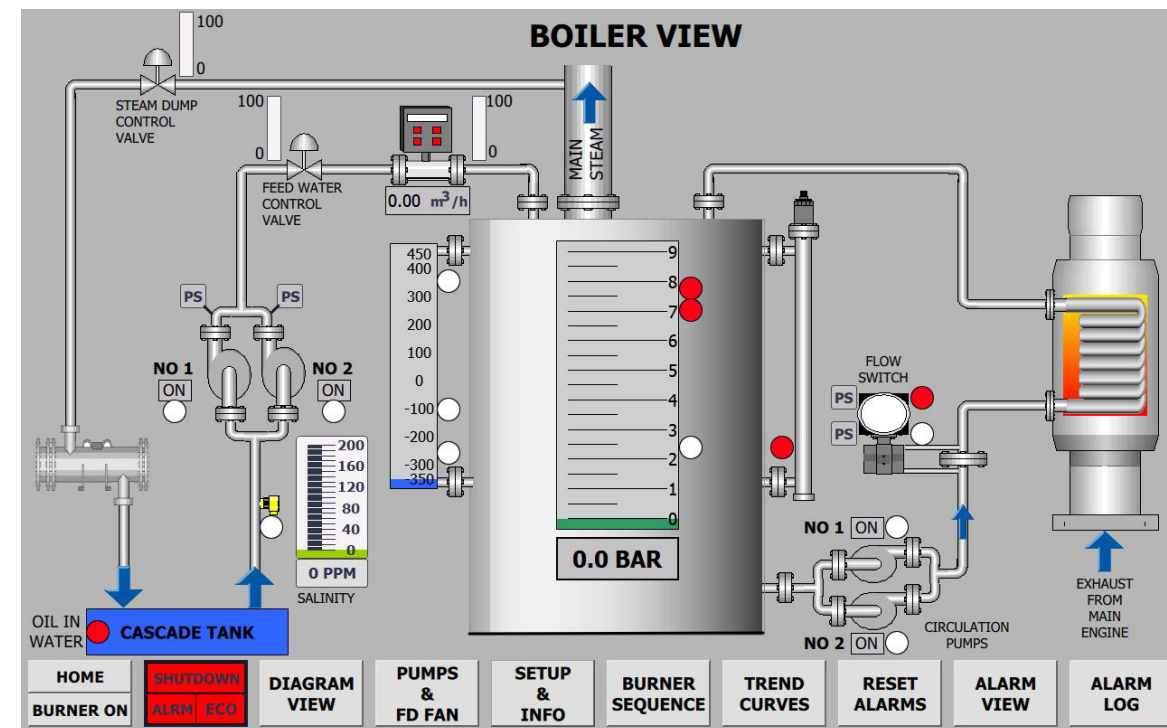


Figure 1: Boiler, steam and feed water

Various changes in layout are available. Final layout is done with vessels general color code in mind.

All parameters are accessible via the HMI.

Degree of access can be limited via password protection.

Figure 2: Burner view

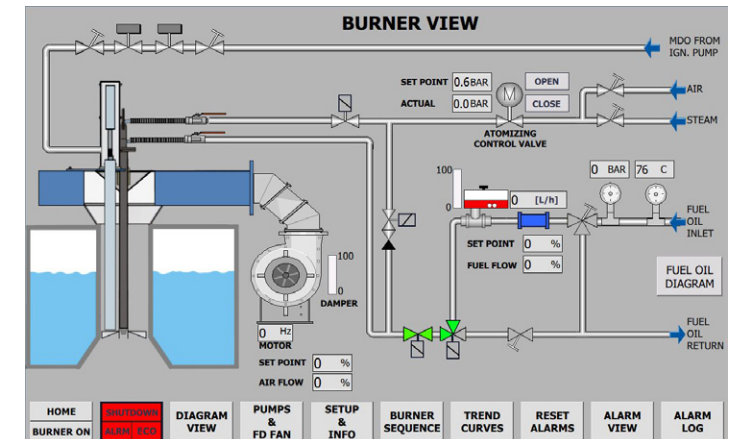


Figure 3: Easy overview

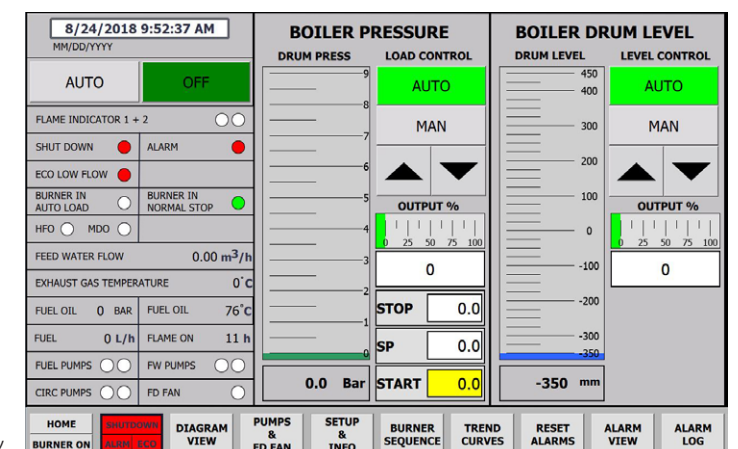
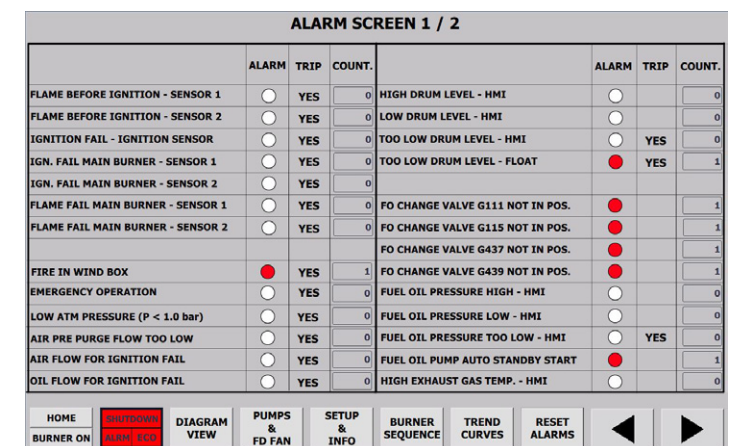
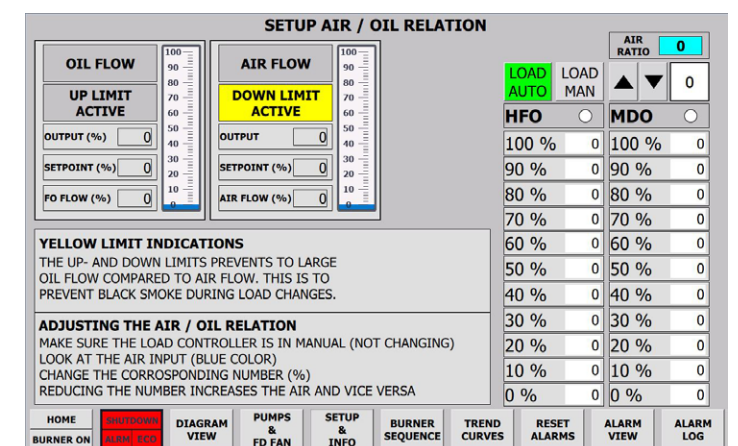


Figure 4: Alarm screen



Guides for calibration of components are available for each item

Figure 5: Setup access screen



EMERGENCY OPERATION

Component breakdown can force the operator to run the boiler in "Emergency mode".

Emergency mode is available in various steps depending on which component has failed. In full emergency mode, only "High Steam pres." alarm, "Too Low Water level" alarm and "Flame Failure" are active.



Figure 6: Emergency operation

Example 1: Breakdown on positioner for FD-Fan

- Burner is started in emergency mode as the faulty positioner makes auto control of airflow impossible. Atomizing steam and water level is still controlled by the control system as the faulty positioner does not affect the PLC.
- When burner is running at wanted load level (adjusted manually), the alarm system can be put in auto mode and thereby restoring all safety functions.

Example 2: PLC breakdown

- Burner is started and operated in full emergency mode. Only "High Steam pres." alarm, "Too Low Water level" alarm and "Flame Failure" are active. Boiler must be manned at all times.

OPERATIONAL SAFETY

As mentioned, the system is based on a Siemens S7-1500 PLC and the program is stored on a memory card. In the event of CPU failure, the memory card is simply moved from the faulty to the new CPU with no risk of data loss. All settings are loaded into the new CPU when power is restored. This also eliminates the risk of data loss during black out.

The S7-1500 is a modular based PLC. This means, you do not have to replace the entire system in event of failure. It also means that we can add further functions to your system without the need of additional control cabinets etc.

SPARE PARTS

Global Boiler can naturally supply all needed spare parts for the control system. However, all parts used are from major manufactures and are available worldwide.

See Spare Parts Overview on page 5.



Figure 7: Complete PLC unit

DELIVERY

In order to keep installation to a minimum, the system is delivered pre-assembled, to widest extend possible, and tested from our workshop in Aalborg, Denmark.

Depending on the type, the old control panel is either completely or partially removed.

Figure 8 is showing a pre-fabricated backplate for installation in an existing. In this case, the power section will be re-used.

New cabinet doors with HMI touch panel etc. can also be included.

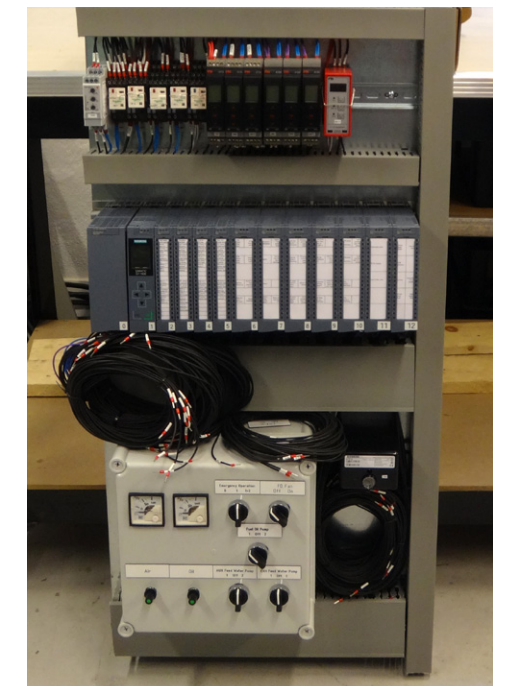


Figure 8: Pre-assembled backplate



Figure 9: New pre-assembled panels.

PLC BASED PID CONTROLLER SYSTEM

Preprogrammed to Vessel requirements

1 system to replace several controllers

Reduces needs for spare parts

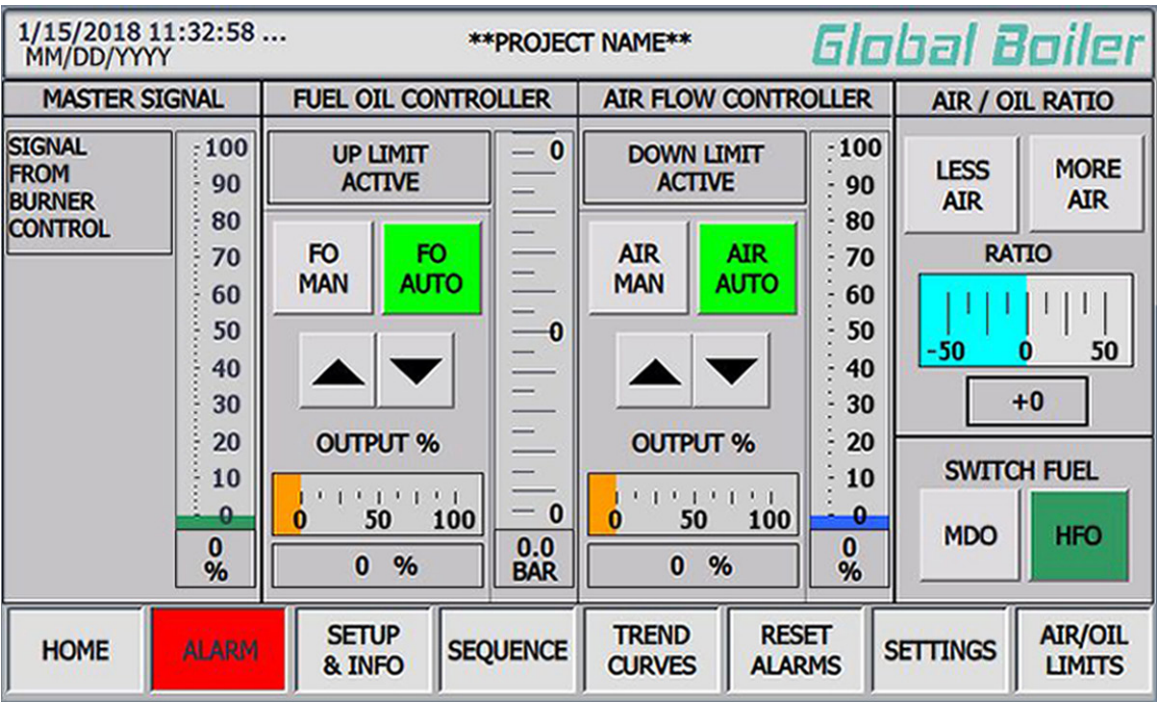
Excellent process overview

Easy parameter setup

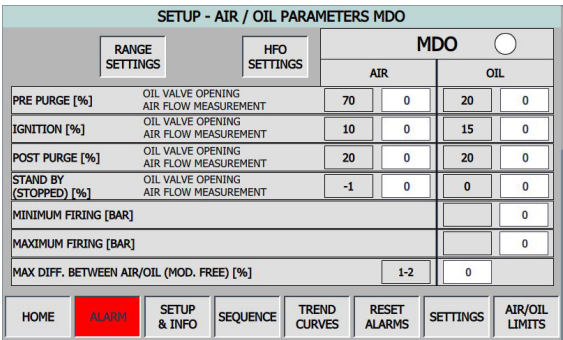
Trend curves

Expandable

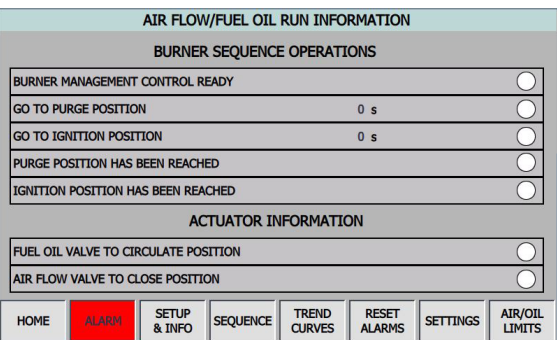
Spare parts available world wide



1 Main screen - oil/air controller



2 Parameter setup - oil/ controller air



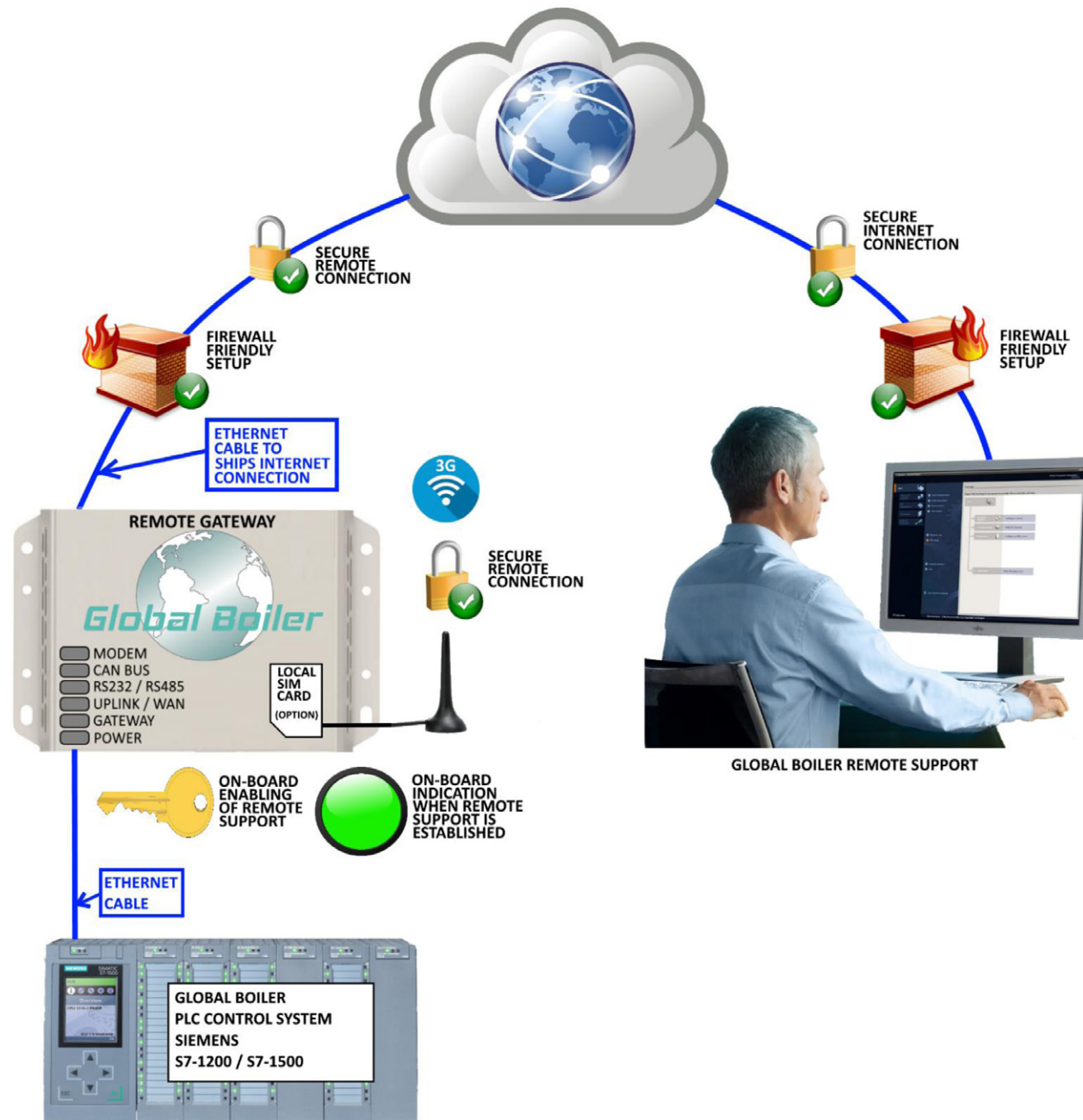
3 Sequence information - oil/air controller

- Overview of current process status.
- Automatic and manual mode control of the actuators.
- Fine tuning of air to oil ratio
- Different Air/Oil ratio setup for Heavy Fuel Oil and Marine Diesel Oil. Making it possible to adjust the curve band of air flow.
- Individual setup for the Proportional Integral (PI) control of each controller.
- Setup for the various Master PLC position calls: (Pre-Purge Position, Ignition position, Post purge position, Stand by)
- Maximum/Minimum firing setup
- Maximum difference between Air/Oil during automatic operation.
- Adjustable alarms on missed purge position and ignition position calls. Making it visible if there has been a fault in the burner startup sequence.
- Trend Curves of the process. Making it possible to see the process, controller set points and actuator positions live and over time.
- The possibility to load commissioning settings into the controller, and save user settings. These functions are password protected.

Parts supplied with Air & Oil Controller	
Number of parts	Part name
1 X 	PLC Siemens S7-1200 ac/dc/rly
1 X 	Add-on card SM-1234 AI/AQ
1 X 	HMI Panel KTP700 Basic
1 x Memory Card	Simatic 4Mb memory card
1 lot Installation materials	

REMOTE SUPPORT

Remote connection for remote troubleshooting on Global Boiler PLC control systems.



AC-DRIVE ON FD-FAN

INTRODUCTION

The AC-Drive installation is an option applicable to burner systems with separate FD-Fan i.e. steam atomizing burners etc.

WHY?

Primarily fuel savings! The main benefit is reduction in minimum load. In many cases the size of the boiler plant on Tankers is based on cargo handling situations with very high steam demand. Normally, the turn down ratio on large auxiliary boilers is approximately 1:5 and this will often give a minimum load that is too high for continuous operation in periods with low steam demand.

Every start/stop cycle includes purging of the furnace with cold air. Below example shows the loss on each purge cycle for a 35 t/hr boiler. Total loss per year is naturally very much depending on operational pattern for the boilers.

Example:

- Boiler size: 35 t/hr, pressure: 7 bar, combined purge time: 90 sec.
- Total loss of energy per purge cycle: 126,500 kJ equivalent to approx. 4,0 kg fuel
- Operational pattern: Start/stop cycles per hour: 6, Slow steaming days pr. Year: 100
- **Total loss of fuel per Year: 57,6 tons**

With our modifications, the new turn down ratio can reach levels as low as 1:20. This means that the boiler will have far less start/stop cycles (if any) during periods with low steam demand.

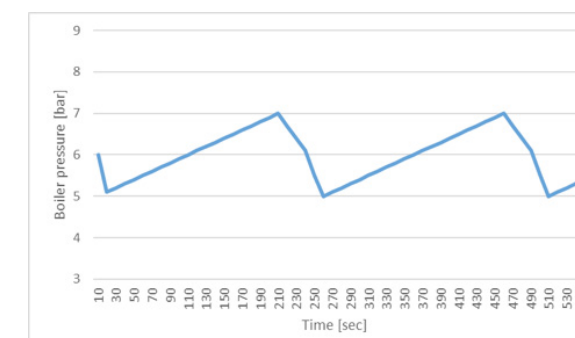


Figure 1: Before installation of AC-Drive.
Load level at 20%

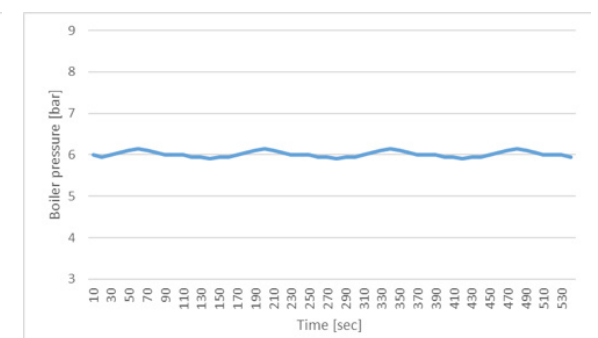
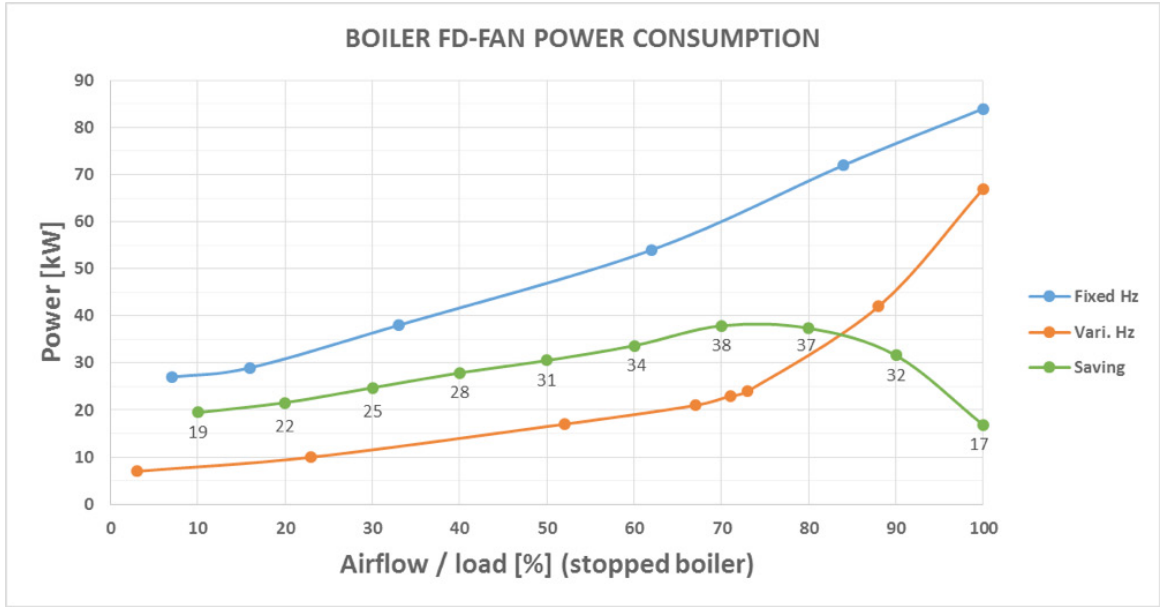


Figure 2: After installation of AC-Drive.
Load level at 8%

There will naturally also be a saving on the general power consumption on the electric motor. Again, the savings are depending on running hours, load pattern and size of electric motor.



Other benefits are:

- Reduced starting current.
 - Are you running two generators to cope with power demand during boiler start?
- Reduces/eliminates "air flow hunting"
- Reduced noise level

INTERESTED?

Send us below data and we will revert with an estimate for materials and installation as well as an estimated time for ROI.

- Data sheets on burner
- Running hours per year and general load pattern
- Data sheets for FD-fan incl. motor
- Complete set of wiring diagrams

LINEAR ACTUATOR

Linear actuator for precise and steady damper control.

- Robust design
- Built-in endstop switches
- Low maintenance
- Pre-assembled control box
- Easy installation

Parts supplied with Actuator Kit	
Number of parts	Part name
1 x 	Linear Actuator LA25
1 x 	Global Boiler Service Control Box
25 meters	2 x 1,5 mm ² marine cable
1 pcs	Circuit breaker, 6 A, 6kA
1 set	Wiring diagram

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