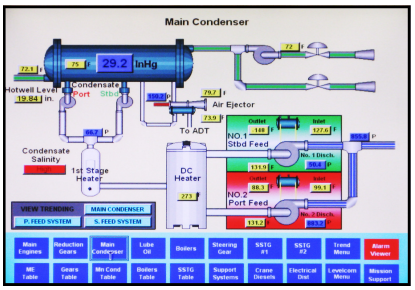
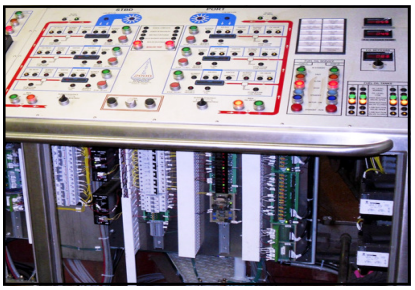
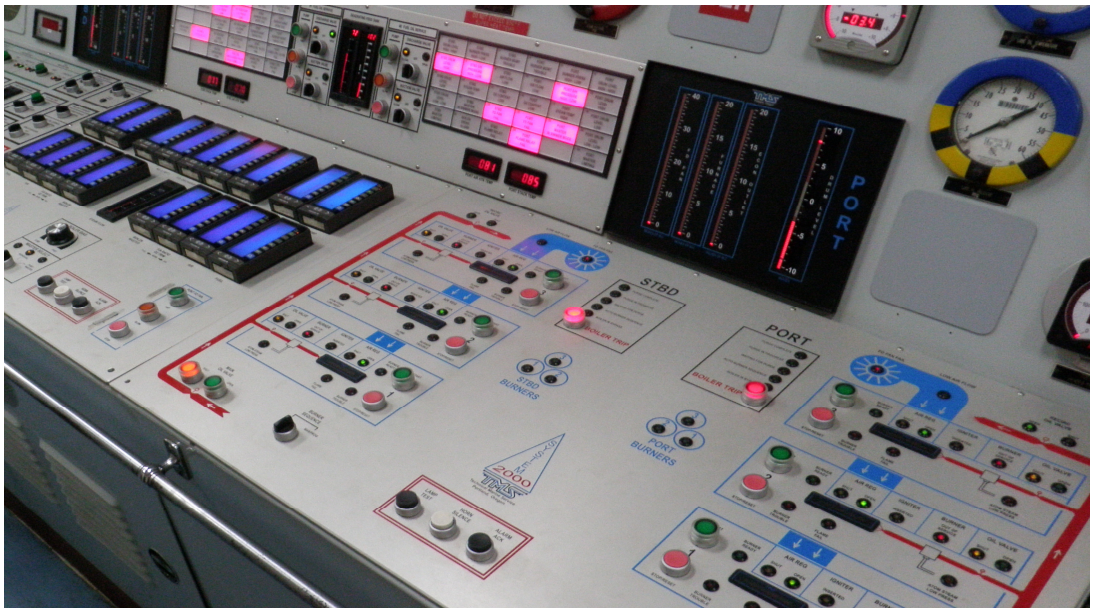






System 2000

Automated Steam Plant Control & Monitoring System

The System 2000, Engine Room automation package has become the gold standard for retro-fit boiler automation systems within the US flag, Merchant Marine over the past 20 years. TMS's System 2000 has been proven to be the most robust, reliable, trustworthy and user friendly system available in todays market.

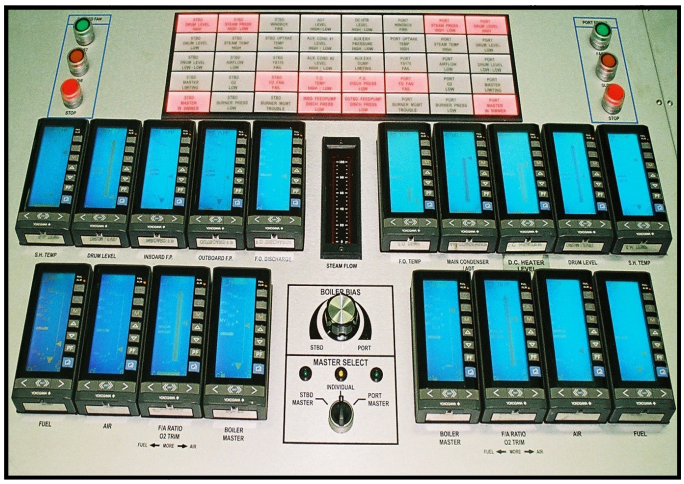
The System 2000 is a comprehensive steam propulsion plant automation package comprised of six modularized units: **Combustion Control, Burner Management, Power Monitor, Engineers Alarm, Temperature Monitor, and Trending Systems**.

The Combustion Control Network, which is the heart of the System 2000 Boiler Automation Package, has been installed on over 30 merchant vessels to date.

Technical Marine Service's complete System 2000 Engine Room automation package consists of six separate systems that are fully integrated and work together in perfect harmony. The individual portions of SYSTEM 2000 can be used in stand alone applications or operate in conjunction with one another. The following sections describe each of the systems comprising the System 2000.

Technical Marine Service

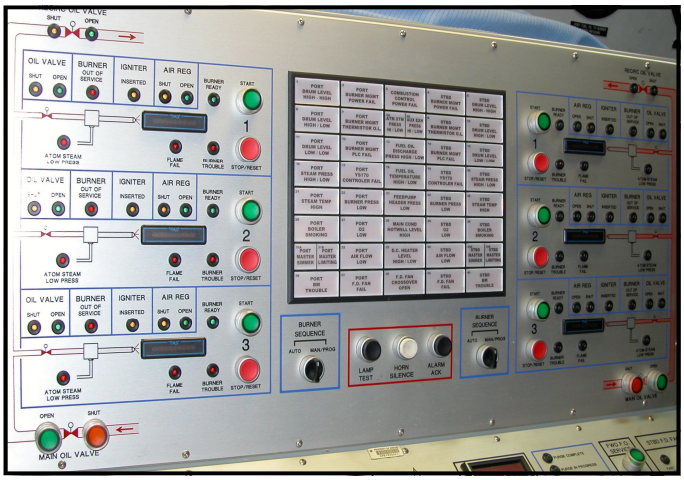
SYSTEM 2000



Combustion Control Panel

POWERMASTER 2000 Combustion Control System - The TMS Combustion Control System provides fully automatic control within a flexible building-block style package for all of the following plant processes: Drum Level, Feed Pump Pressure, Fuel Oil Pressure and Temperature, Burner Fuel Oil Header Pressure, Forced Draft Fan Speed and Air Flow, Fuel/Air Ratio, Steam Pressure and Temperature, DC Heater Level, Hotwell Level, and Auxiliary Exhaust Pressure.

The system includes sophisticated oxygen trim controls for clean burning while maintaining maximum fuel efficiency, and minimum air pollution. Intelligent programmed algorithms, providing truly amazing hands-off control over steam plant functions. The only requirement of operators is to monitor the controllers to detect operating flat problems and respond to alarms. In the unlikely event of equipment failure, or for other reasons, all functions may be operated manually.



Burner Management Remote Panel

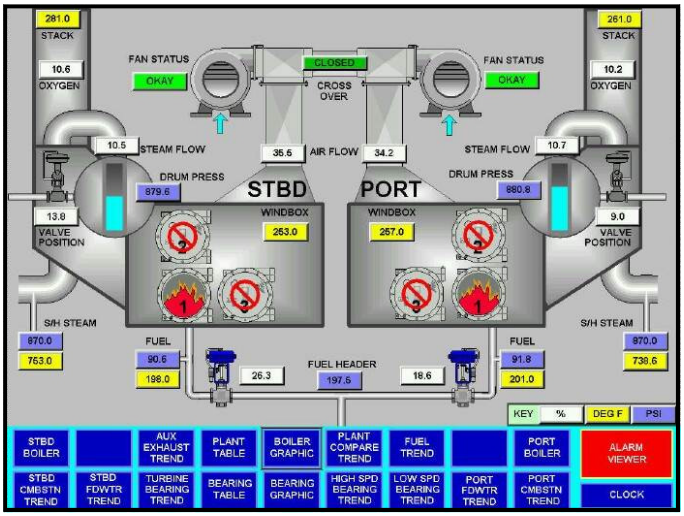
FIREWATCH 2000 Burner Management System - The TMS Burner Management System is outfitted with all the necessary operators &
indicators to monitor and control the functions of the boilers directly from the engineer's operating console. Each boiler has a completely separate system, each with its own ABS type-approved PLC. Panels mounted near each boiler-front provide monitoring of alarm and status functions, as well as full manual override of all oil valves, air registers and igniters. Basic boiler safety trips operate automatically, even in manual override mode. All new boiler front devices are mounted with serviceability, reliability, and heat considerations in mind.

Fully programmable burner sequence controls at the console and local panels allow selecting Automatic or Manual sequencing of burners. Digital signals passed between the Burner Management and Combustion Control systems to assure the plant can respond rapidly to changing load conditions. All functions of the FIREWATCH 2000 are monitored by the Burner Management Alarm System whose program is contained within the PLCs. Any malfunctions will cause both an audible and a visual response on large, bright annunciator windows. In the event of total power loss, the FIREWATCH 2000 Burner Management system will fully re-initialize itself once power is restored. Any alarms present before power loss will be reinstated; no information is lost during power outages. Burner Management alarms may be acknowledged and/or tested at any location.

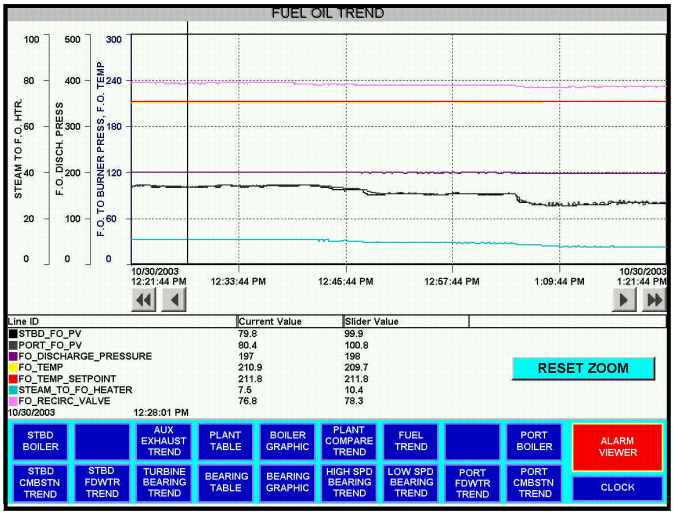
Engineers Operating Station - Alarm,
Temperature Monitor & Trending Systems

MONITOR 2000 Power Monitoring System - The TMS Power Monitor System, used in both the Combustion Control and Burner Management Systems, continually monitors the 24VDC power supply outputs and the most important current limiting devices that have been included in the system for safety purposes. Should any power supply fail, or any limiter be shorted the Power Monitor System will indicate this by sending a signal to the alarm system, warning operators to check the Power Monitor boards, which are equipped with LEDs that are clearly labeled so the offending circuit can be easily identified and the problem quickly traced.

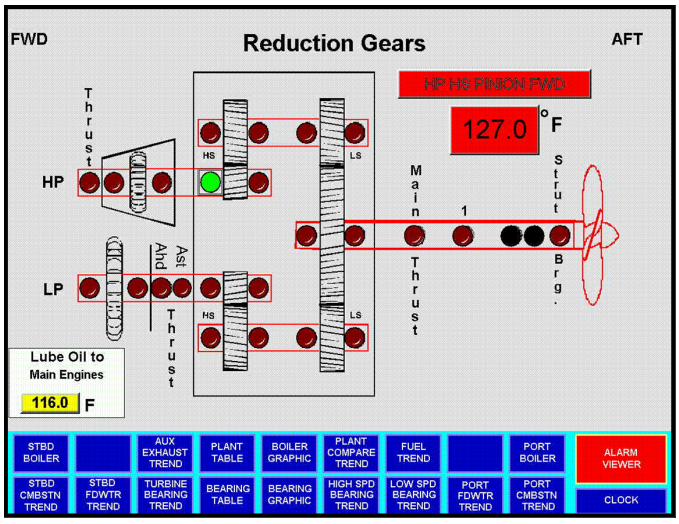
SYSTEM 2000



Trending System - Boiler Mimic Screen



Trending System - Fuel Oil Trend Screen



Trending System - Temperature Monitor Mimic Screen

STATALARM 2000 Engineers Alarm System - The TMS Engineers Alarm System is virtually unlimited in size constraints. The contact inputs are isolated, low voltage and current limited for safety. The annunciator is large, clear and easy to read. All indicators are ultra reliable LEDs. The Engineers Alarm System can be subdivided or consolidated as required. Time delays and specialized logic can be user programmed as applications demand. Audible devices can be programmed to sound in distinctive manners for specific alarms, if desired. A "first-out" program scheme indicates the first alarm to occur, should multiple alarms exist before the “Acknowledge” pushbutton is pressed.

The console-mounted pushbuttons are the only controls needed to operate the alarm system. In the event of total power loss, the STATALARM 2000 will fully re-initialize itself once power is restored. Any alarms present before power loss will be reinstated; no information is lost during power outages. As an option, all, or a portion, of the Engineers Alarm System can be integrated into a TRENDSIM 2000 Process Trending System.

TRENDSIM 2000 Process Trending System - The TMS Process Trending System displays current or past information on the screen in graphic format, and it also monitors and records all steam plant parameters in a historical database. All data is recorded to the computer disk for future reference, can be viewed at any time, or printed out as a hard copy. The system is mouse or touchscreen driven, so access to the information is easy and intuitive. Operators can design their own trend graphs, or simply use the graph windows that have already been programmed.

The primary function of the system is to display real time plant data for the benefit of the operator. To do this, graphic screens are developed that group plant information into systems, and display it in either ‘mimic’ or ‘table’ form. Time-based ‘trending’ screens are also developed so that operators can see, not only what a process value is, but whether it is increasing or decreasing, and at what rate. Such information enables operators to better identify plant dynamics and anticipate changes long before a process moves out of the acceptable range.

The TMS Trender is also fully equipped with pre-engineered software to provide complete alarm system functionality. Every data point that is received by the Trender can be configured to generate an alarm action at pre-determined set points. The alarm component of the TMS Trender is an extremely powerful and versatile tool that can be configured to replace or augment previously existing systems at a fraction of the cost of stand alone alarm systems.

THERMOSCAN 2000 Temperature Monitor System – The TMS Temperature Monitor System gives operators access to temperature points throughout the plant. Panels are custom manufactured with graphics displays and multiple two-color indicator points, each one representing a temperature sensor in the plant. A digital meter displays the temperature of the selected point. Each indicator can glow red or green, depending upon its status - when in alarm, the point flashes red/green until acknowledged. Acknowledged alarms remain steady red. Alarm set points - both high and low - may be viewed and/or changed. The Temperature Monitor System can also be integrated into a TRENDSIM 2000 Process Trending System and displayed as a ‘mimic’ screen.

RECCOMMENDATIONS

"The SYSTEM 2000…operates flawlessly on the two vessels under my responsibility. This system is a 'must' for those operators who demand reliability, excellence, and a 'can do' technical backup organization."

T. Purdom, Port Engineer / Superintendent

"The SYSTEM 2000 is so user friendly that it's not intimidating, even for a new operator. It supplies good system feedback…easy to learn…gives operators a comfortable feeling."

M. DeLauer, Chief Engineer

TMS System 2000 is installed on these Customers' ships:

Military Sealift Command (MSC)
Matson Navigation Company
Horizon Lines, Inc.
Keystone Shipping Company
Totem Ocean Trailer Express (TOTE)
Sea Star Line
Pacific Gulf Marine
SeaRiver Maritime, LLC
US Maritime Administration (MARAD)
Interocean American Shipping Corp
Ocean Duchess, Inc.
Crowley Technical Management
Patriot Contract Services, LLC

Technical Marine Service

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