



# PROPULSION CONTROLS AND ALARM MONITORING

## MV Columbia



**PORT MAIN ENGINE**

416 RPM

LUBE OIL LO PRESSURE 78 PSI	INBD TURBO RPM 8610	OUTBD TURBO RPM 8481	COOLING WATER AIR PRESSURE 38 PSI
LOIL RETURN TEMP 132	LUBE OIL PRESS 35 PSI	MANV. PRESS 34 PSI	PORT ME START ME
LOAD/TEMP 241	FUEL OIL PRESSURE 83 PSI	AVG EXHAUST TEMP 730	STBD ME
LOAD/TEMP 92	FUEL BACK TRANSMITTER 81 PSI	MANIFOLD AIR PRESSURE 12 PSI	OVERVIEW PAGE 1
	INBD MANIFOLD AIR TEMP 48	OUTBD MANIFOLD AIR TEMP 65	PORT EXHAUST
			STBD EXHAUST
			STEERING GEAR
			RED GEAR & CP PITCH
			START AIR PRESSURE 39 PSI
			RED THROTTLE

**DIGITAL ALARM POINTS**

PORT ME EXHAUST OIL	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS
PORT ME EXHAUST PRESS	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS
PORT ME EXHAUST PRESS	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS
PORT ME EXHAUST PRESS	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS

PRINT SCREEN

Control panel featuring a central monitor displaying a bar chart, flanked by two columns of indicator lights. Below the monitor are two large red-handled levers for gear and pitch control, and several analog gauges.

**REDUCTION GEAR AND PROPELLER PITCH**

PORT PROPELLER PITCH 59.1 %	REDUCTION GEAR LUBE OIL PRESSURE 35.6 PSI
STBD PROPELLER PITCH 78.3 %	REDUCTION GEAR LUBE OIL PRESSURE 58.2 PSI

**DIGITAL ALARM POINTS**

PORT ME EXHAUST OIL	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS
PORT ME EXHAUST PRESS	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS
PORT ME EXHAUST PRESS	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS
PORT ME EXHAUST PRESS	PORT ME EXHAUST TEMP	PORT ME EXHAUST PRESS

PRINT SCREEN

MAIN ENGINES

581

TEST HOMERUNNING RELEASE

MAIN ENGINES  
C1

**ALARM SYSTEM OVERVIEW**

Diagram showing the alarm system layout with various components and their interconnections.

DISPLAY UPS VOLTAGE  
24 VDC

**DIGITAL ALARM POINTS**

ALARM SYSTEM OVERVIEW	ALARM SYSTEM OVERVIEW
ALARM SYSTEM OVERVIEW	ALARM SYSTEM OVERVIEW
ALARM SYSTEM OVERVIEW	ALARM SYSTEM OVERVIEW

PRINT SCREEN

Large control console with multiple rows of indicator lights, buttons, and a central monitor, used for engine and alarm monitoring.

**Alaska Marine Highway System  
127.4 m RO-RO/Passenger Ferry  
MV Columbia**

**Specifications**

Owner .....	Alaska Marine Highway System
Classification .....	ABS Class ✕A1 ✕AMS
Length Overall .....	127.4 m (418 ft.)
Propulsion Engines .....	2 × Enterprise each developing 6,175 BHP (4,605 kW)
Reduction Gears .....	2 × Single Input / Single Output
CP Propellers .....	2 × Escher-Wyss

PMC retro-fitted this vessel with our long established PMC electro-pneumatic twin screw propulsion control system. The system for the *MV Columbia* consists of three all electronic bridge stations, complete with electric shaft functions and electrically driven control heads with pneumatic outputs located in the Engineer's Operating Station. The Engineer's Operating Station control heads produce the pneumatic signals for speed and pitch control. Fast, stable automatic load control is provided by PMC's PCA-2LA pitch controllers.

Also used in this retrofit is the powerful, easy to use PMC **Integrated Machinery, Alarm and Control System (IMACS)**. The IMACS combines two independent **Omni Chief** distributed control and monitoring systems, and two ship's computers.

Each **Omni Chief** system consists of one local **Omni Chief** display panel and local collector. Each **Omni Chief** display panel has a dedicated 96-point display showing the status of the optically isolated analog and digital field sensors. All alarm configuration changes (setpoints, time delays, etc.) can be accomplished from the **Omni Chief** display panels, as well as from the two ship's computers.

Communication to the ship's computers, located at the Engineer's Operating Station, is over a high-speed network. The PMC **IMACS**, a technically advanced Windows™ based graphical user interface is installed on the computers, allowing the user to monitor machinery and perform trending.

The system automatically logs all machinery alarms for future reference. A total of 104 custom graphic pages and 28 pop-up windows allow the user to easily identify and monitor the 200+ machinery status points.

The graphic pages contained in the **IMACS** onboard the *MV Columbia* includes:

- Propulsion control parameter screen, trending control signals such as load command, main engine speed setting, fuel rack position, pitch, etc.
- Operating parameter screens for each main engine, generator and the bow thruster.
- Individual cylinder exhaust gas temperature measurements for both main engines are reported on a comparison bar graph. Average and deviation alarms with independent high and low limits are calculated real time.
- Running hours and Start/Stop totals are shown on a single page for all major machinery.
- A data-logging page was created to display all parameters monitored on a single text screen.

To complete the retrofit, PMC designed and manufactured a new propulsion control console for the Engineer's Operating Station, and flush mounting plates for the Bridge stations. All the PMC supplied controls and instrumentation as well as existing ship's equipment were incorporated into the new propulsion control console and flush mounting plates.

**PRIME MOVER CONTROLS INC.**

3600 GILMORE WAY, BURNABY BC CANADA V5G 4R8  
TEL (604) 433-4644 FAX (604) 433-5570 info@pmc-controls.com