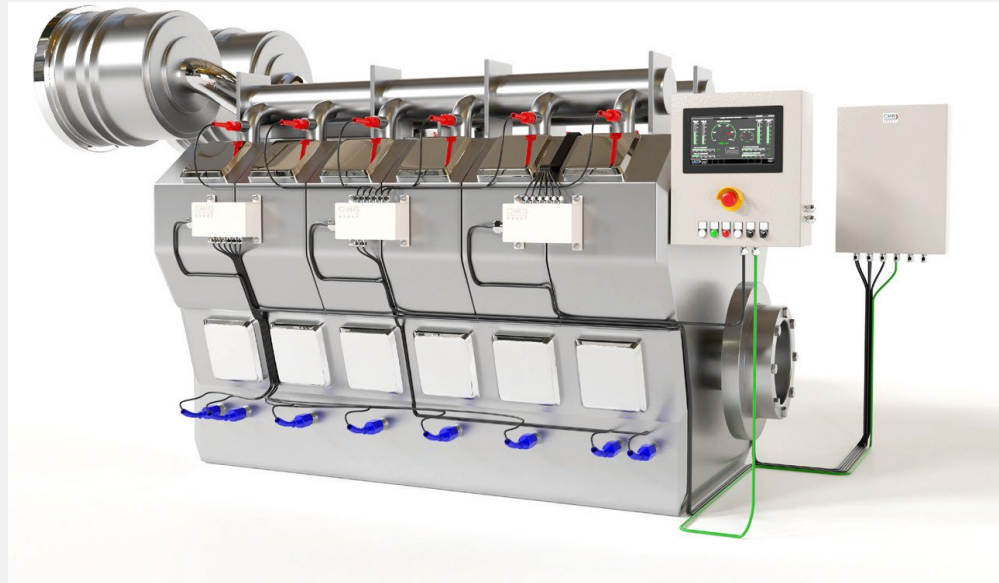




**ENGINE CONTROL  
SYSTEM**



**TURN-KEY RETROFIT SOLUTION**



**THE ADVANCED & RETRO-COMPATIBLE ENGINE CONTROL SYSTEM  
TO EXTEND YOUR ENGINE LIFE CYCLE**

E Pulse is a microprocessor-based system composed of the following Marine Approved main equipment:

## ➤ Local Operating Panel (LOP) :

- Rack unit : Panel PC touch screen and dedicated Man Machine Interface for the readout of the engine parameters
- Protection modules
- Control buttons for : start – stop – emergency stop – slow turning – local/remote – speed control +/-

## ➤ Main Control Cabinet (MCC)


- Main Control Unit (MCU) : Data processing of all engine parameters
- Redundant Safety Unit (RSU) : Engine Safety System : Speed (engine & TC) Start – Stop – Start blocking – Auto Shutdown – Load reduction - Redundancy with MCU
- Data Communication Module with external system
- Output control Module : Relays for safety purposes

## ➤ Sensors Junction Boxes + cables (JB) :

- Sensors Cabling Topology remains the same.
- Pre-wired Junction boxes with individual cable harness to plug directly to the Main Control Cabinet
- Mechanical fastening interface remains the same as the existing DCU & MCU



## KEY BENEFITS

- **Spare parts from the shelf available for over 20 years**
- **Fully retro compatible to the existing installation** (same System topology as existing on the engine)
- Designed and developed with the latest technology
  
- **Open-source programs gives full autonomy & independence to the end user**
- Very short downtime during retrofit operation Reduced OPEX cost
  
- E-Pulse does not impose changing the existing instruments installed on the engine.
- **➔ All instruments on the engine, owner stocks of spare parts remain the same.**
  
- No services required from OEM manufacturer.
- Class type approved components
-  Retrofits performed by our worldwide technical support and service network + **Remote assistance**

## FEATURES

- E-pulse is an Engine Control System Package, suitable for any type high and medium speed diesel engines in Marine and Power plant installations operating in heavy duty conditions.
- As a Microprocessor-based system, E-Pulse contains all the functionalities for the protection, the monitoring conditions and the control of the engines, their associated auxiliaries and interfaces to external systems.
- **All Interfaces to external systems** such as propulsion system, auxiliaries, vessel or plant management system **remain the same** in terms of hardwired I/O's and communication I/O's (Modbus RTU, Ethernet TCP/IP)



Recommendation & Advisory



Engineering & Design



System integration & FAT



System installation on board (marine) or on site (power plant)



System electrical installation + interface to vessel/plant management system



Start up & sea trials / Plant trials



Maintenance & Service

# Design Appraisal Document

Lloyd's Register EMEA  
UK & ITS0, Marine & Offshore  
Lloyds Register Global Technology Centre  
Southampton Bolderwood Innovation Campus  
Burgess Road  
SOUTHAMPTON SO16 7QF

Date  
26 March 2018

Please quote the document number on all future communications

CMR SYSTEMS- DHB DOUGHTY IMO 9190468 & DHB DAUNTLESS IMO 9190456  
INSTALLATION OF A NEW CONTROL AND ENGINEERING SYSTEM

This Marine Design Appraisal Document supersedes and cancels document number UKITSO/31902374/ETS, Issue 0, dated 12 March 2018

1. The Document(s) listed in paragraph 1 of the appendix have been examined for compliance with The Rules and Regulations for the Classification of Ships Jan 2018 Part 6 Chapters 1 & 2 and have been assigned an appraisal status as indicated

Matthew Higgins  
Southampton Office  
Lloyd's Register EMEA

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FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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Lloyd's Register EMEA  
UK & ITS0, Marine & Offshore  
Lloyds Register Global Technology Centre  
Southampton Bolderwood Innovation Campus  
Burgess Road  
SOUTHAMPTON SO16 7QF

Date  
26 March 2018

Please quote the document number on all future communications

Document no: UKITSO/31902374/ETS  
Issue number: 1  
Page 2 of 2

## Appendix

- The documents listed below have been examined
 

Document No.	Rev.	Title	Status	Date
534814	0	REPLACEMENT WECS 2000 SYSTEM ON WARTSILA 6L26A & VESSEL ALARM MONITORING SYSTEM TECHNICAL DOCUMENT	A	12-Mar-2018
792 C 118	0	WARTSILA 6L26A LOCAL OPERATING PANEL	A	12-Mar-2018
792 C 120	0	ALARM MONITORING SYSTEM	A	12-Mar-2018
WI-PI-02	10	DEVELOPMENT GUIDELINES	A	26-Mar-2018
- The documents listed below have been considered together with the submitted documents in the appraisal
 

Document No.	Rev.	Title
04/30009	E5	LR TA for Praxis Automation Technology B.V Integrated Ship Automation Sys
-	-	Email sent to client regarding a software quality plan for the installation. Dated 8/3/2018
- Documents not mentioned above are not required for appraisal or as supporting documentation and have not been retained.

### Appraisal Status Key

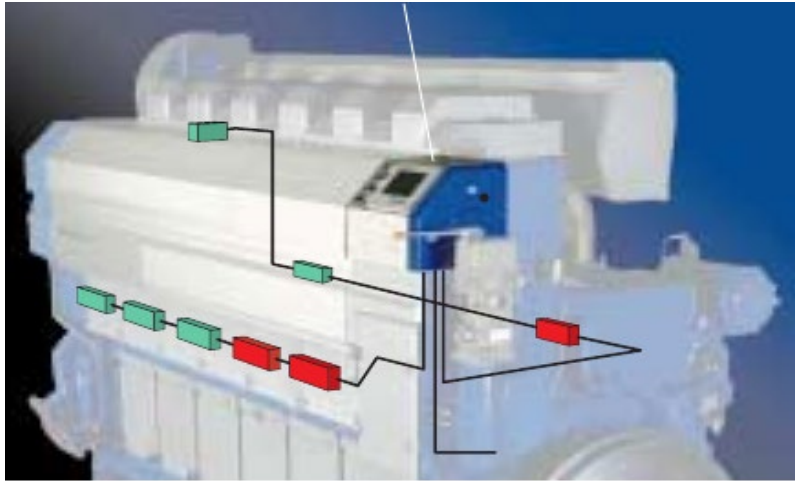
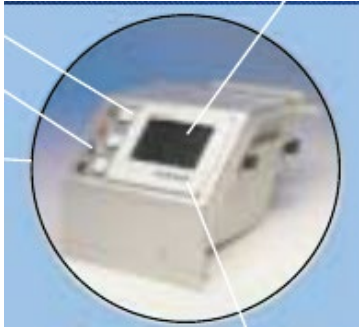
A Approved – provided the arrangements are to the surveyor's satisfaction

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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REPLACEMENT WECS 2000 SYSTEM ON WARTSILA 6L26A & VESSEL ALARM MONITORING SYSTEM  
TECHNICAL DOCUMENT  
WARTSILA 6L26A LOCAL OPERATING PANEL  
ALARM MONITORING SYSTEM  
DEVELOPMENT GUIDELINES

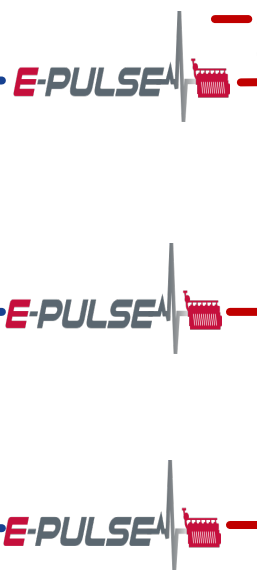
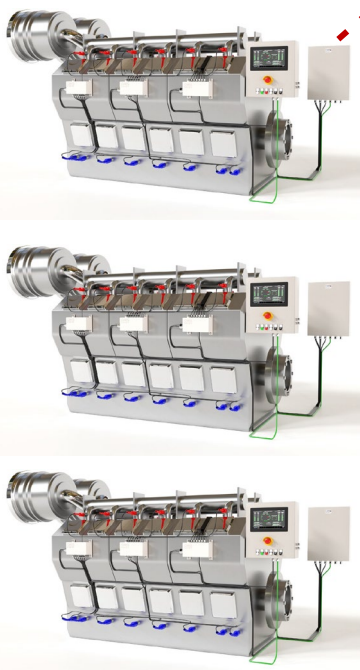




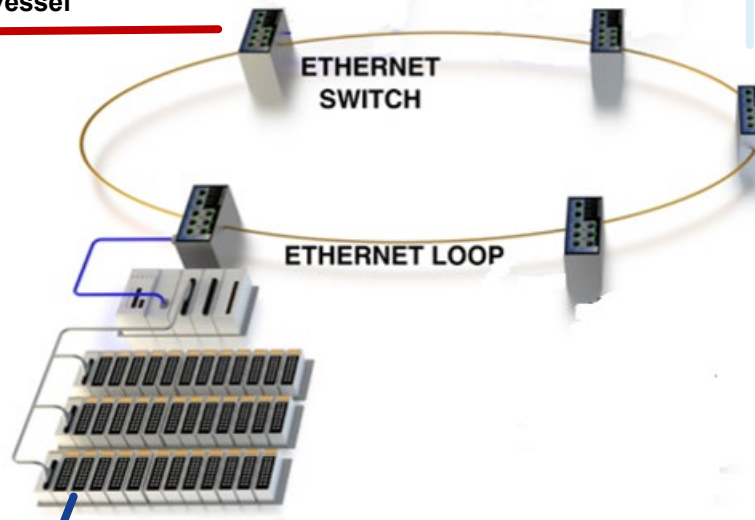
- **Local Operating Panel (LOP):**
  - Touch screen Display + dedicated HMI
  - Engine or wall mounting acc. to configuration
  
- **Main Control Cabinet (MCC)**
  - Contains the electronics that processes all engine parameters.
  - MCC is installed separately close to the engine
  - Communication module for remote assistance.
  - Interface to external systems : Propulsion, Automation, VMS, Plant management system
  
- **Sensors Junction Boxes + cables:**
  - New JB dimensions are exactly the same as the existing ones on the engine.
  - Sensors Cabling Topology remains the same
  - Existing sensors + stock remain the same



**Onboard E Pulse  
Maintenance Laptop**



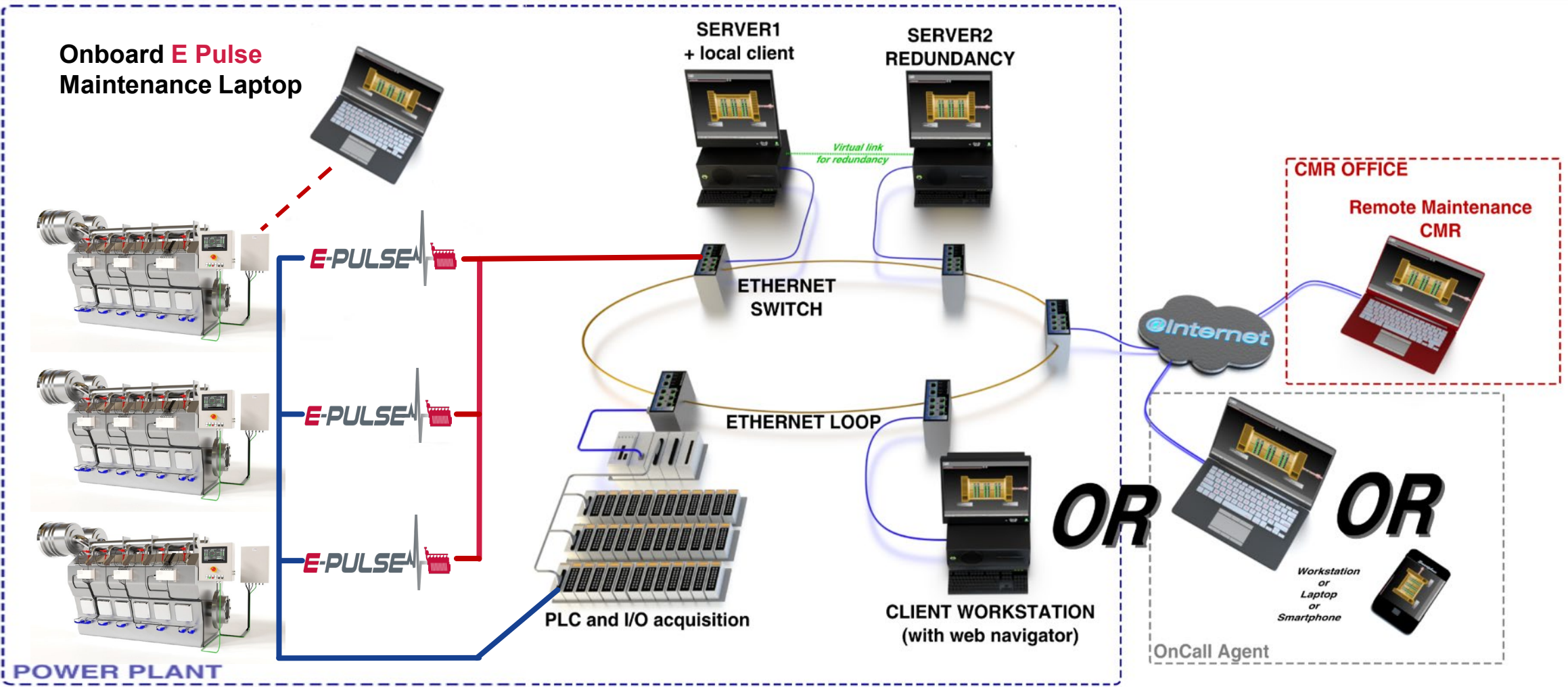
— Serial interface as existing  
on your vessel



— H/W interface as existing on your vessel i.e. :  
Vessel Automation System  
Vessel Propulsion System  
Auxiliaries, Etc..



**CMR Group office  
Remote assistance**

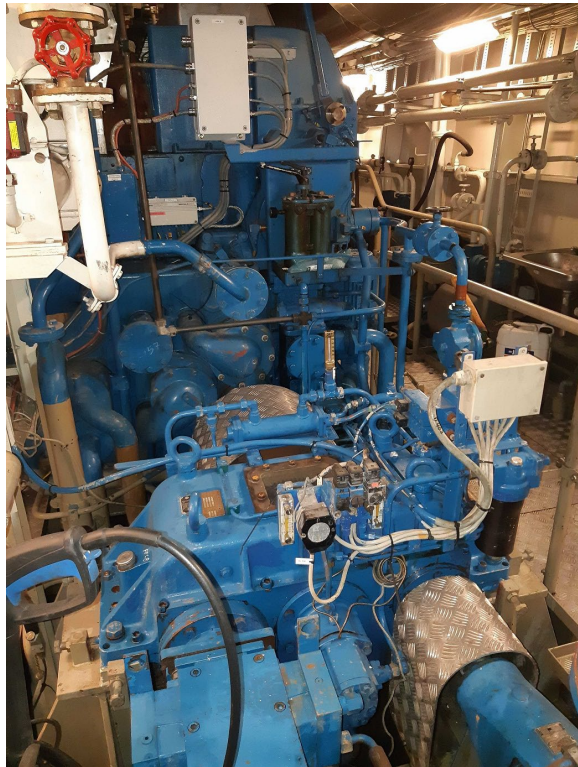




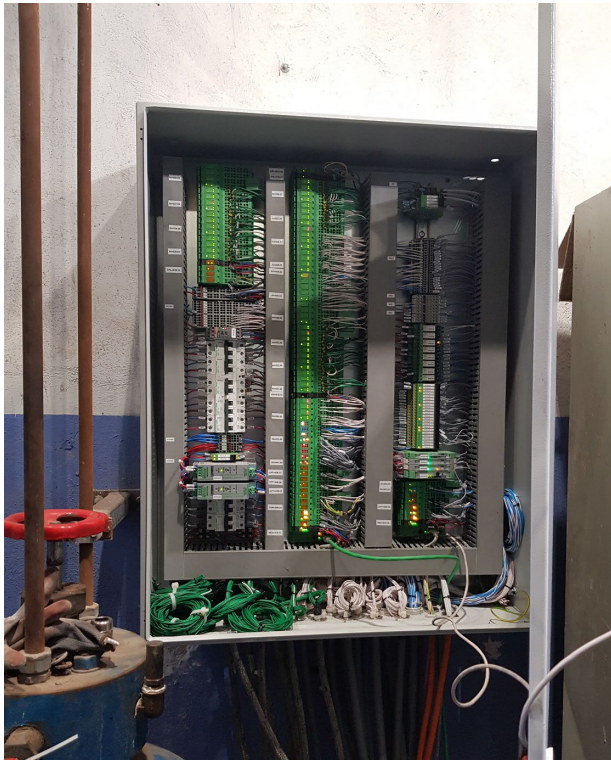
- **CMR Group HQ FRANCE - Marseille**
- **CMR GROUP KOREA - Busan**
- **CMR Group PHILIPPINES – Manila**
- **CMR GROUP INDIA - Pune**
- **CMR Group TUNISIA - Tunis**
- **CMR Group UK - Newcastle**
- **CMR Group US - Pittsburgh**
- **CMR Group CHINA - Suzhou**
- **CMR Group FAR EAST - Singapore**



**W 9L26 Marine**



# W 12V32 Power Plant



# W 18V26 Power Plant



# Nohab 16V25 Marine



**DEUTZ Marine engines**



# ABC Marine engines

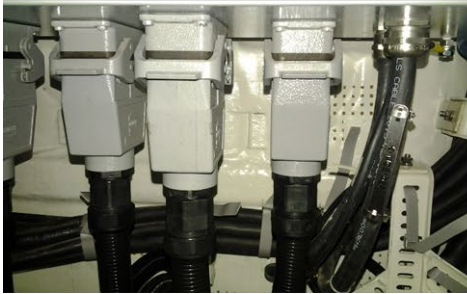
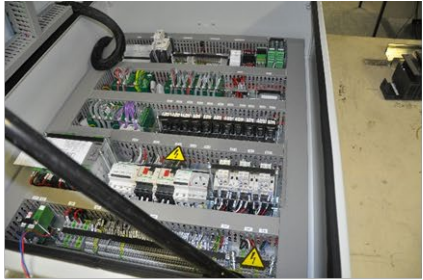


# IFM Marine engines





# Navy MIL – Specification



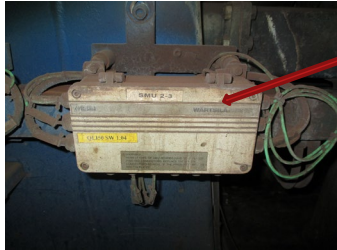
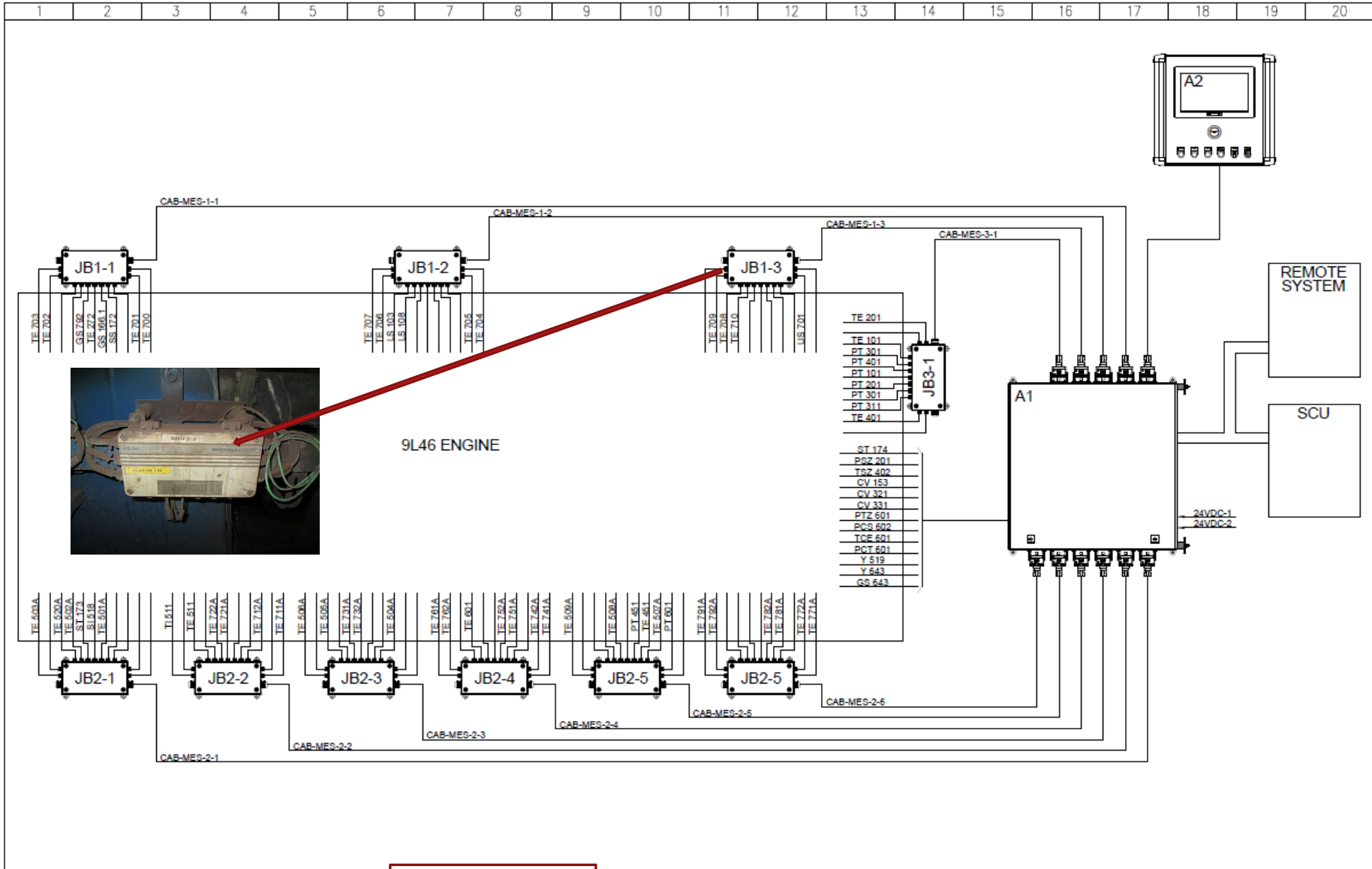
## Power Gen Specification



- Supplying Control Panels, Sensors and Wiring Systems for back up power and continuous power
- Clients include large blue chip companies
- Manufacturing for 1,000 Genset units annually
- Focus supplier and partner
- Continue to grow and support new programs and platform ranges



# E PULSE SYSTEM ARCHITECTURE W9L46 – General arrangement



9L46 ENGINE

REVISION	A		REVISION	IT	IT	DESS	DATE	10/11/17
B			G			VISA	JMPS	
C						DATE	10/11/17	
D						VISA	XXX	



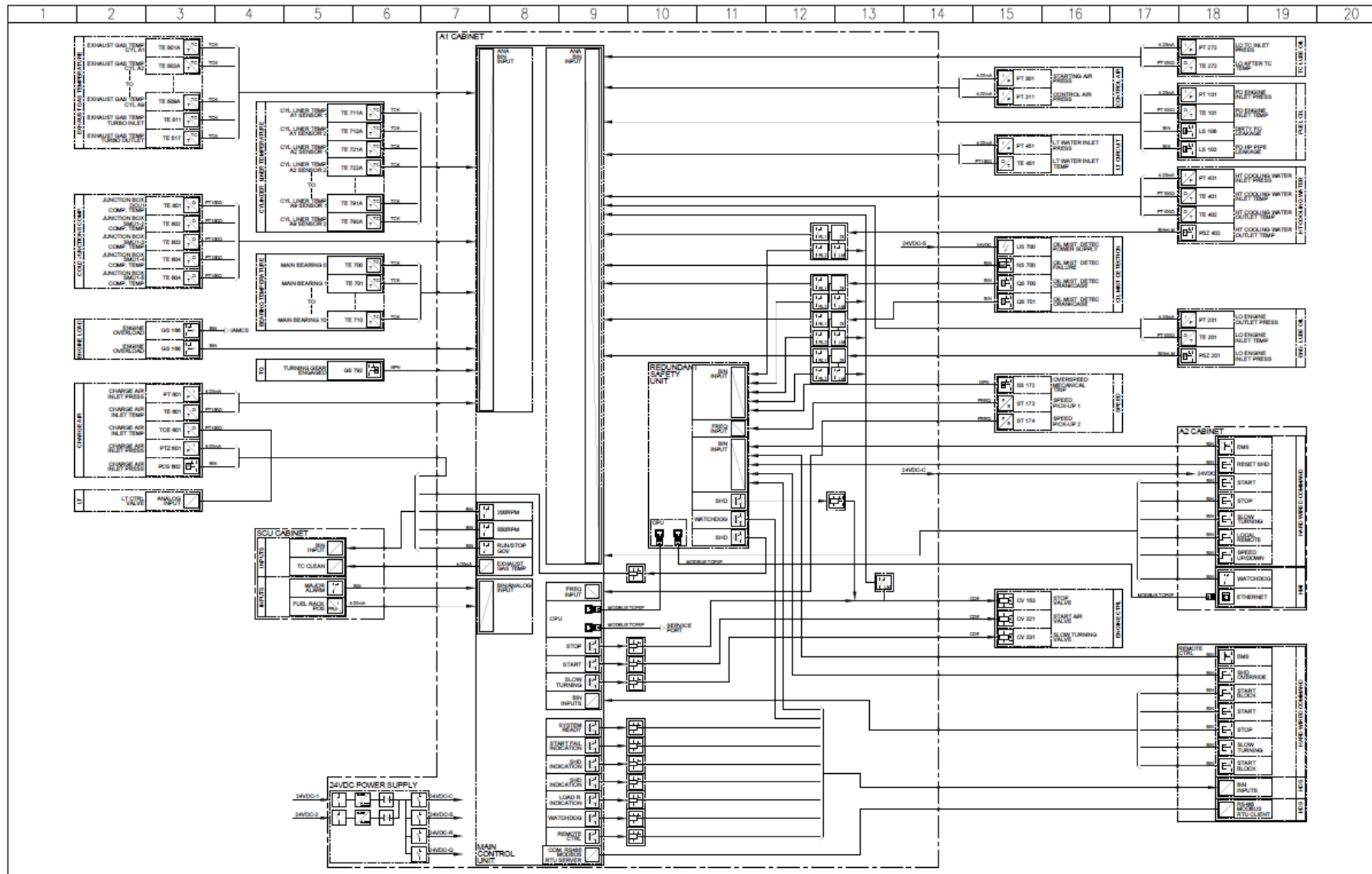
9L46 LOCAL OPERATING PANEL  
GENERAL ARRANGEMENT

792 C XXX

N° FOLIO 010 FOLIO SUIV. 011



# E PULSE SYSTEM FUNCTIONAL ARCHITECTURE W9L46



REVISION	A	E	DATE	10/11/17
	B	T	VISA	JMPS
	C	G	DATE	10/11/17
	D	H	VISA	XXX



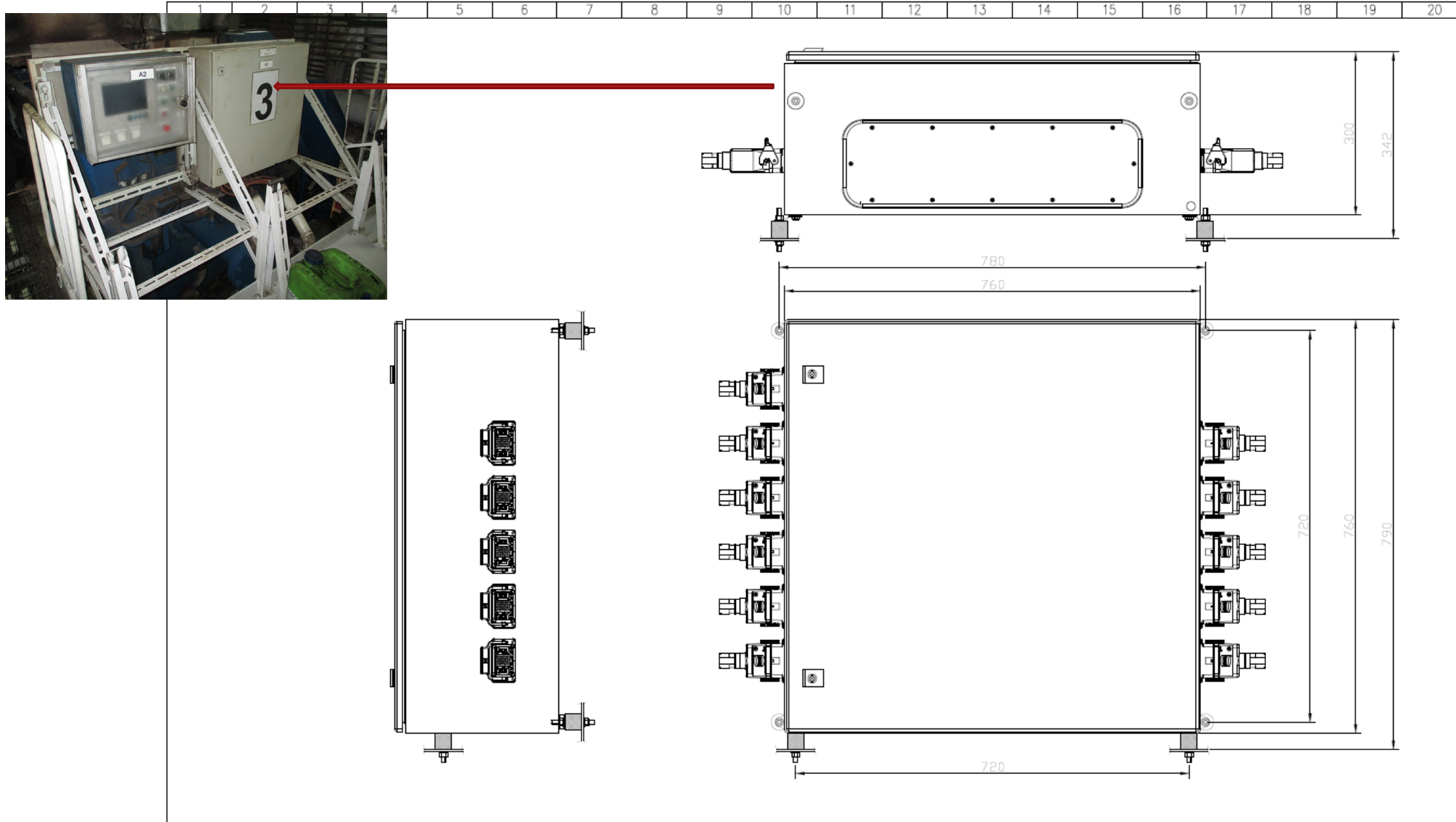
9L46 LOCAL OPERATING PANEL  
FUNCTIONAL ARCHITECTURE

792 C XXX

N° FOLIO 011 FOLIO SUM. 012



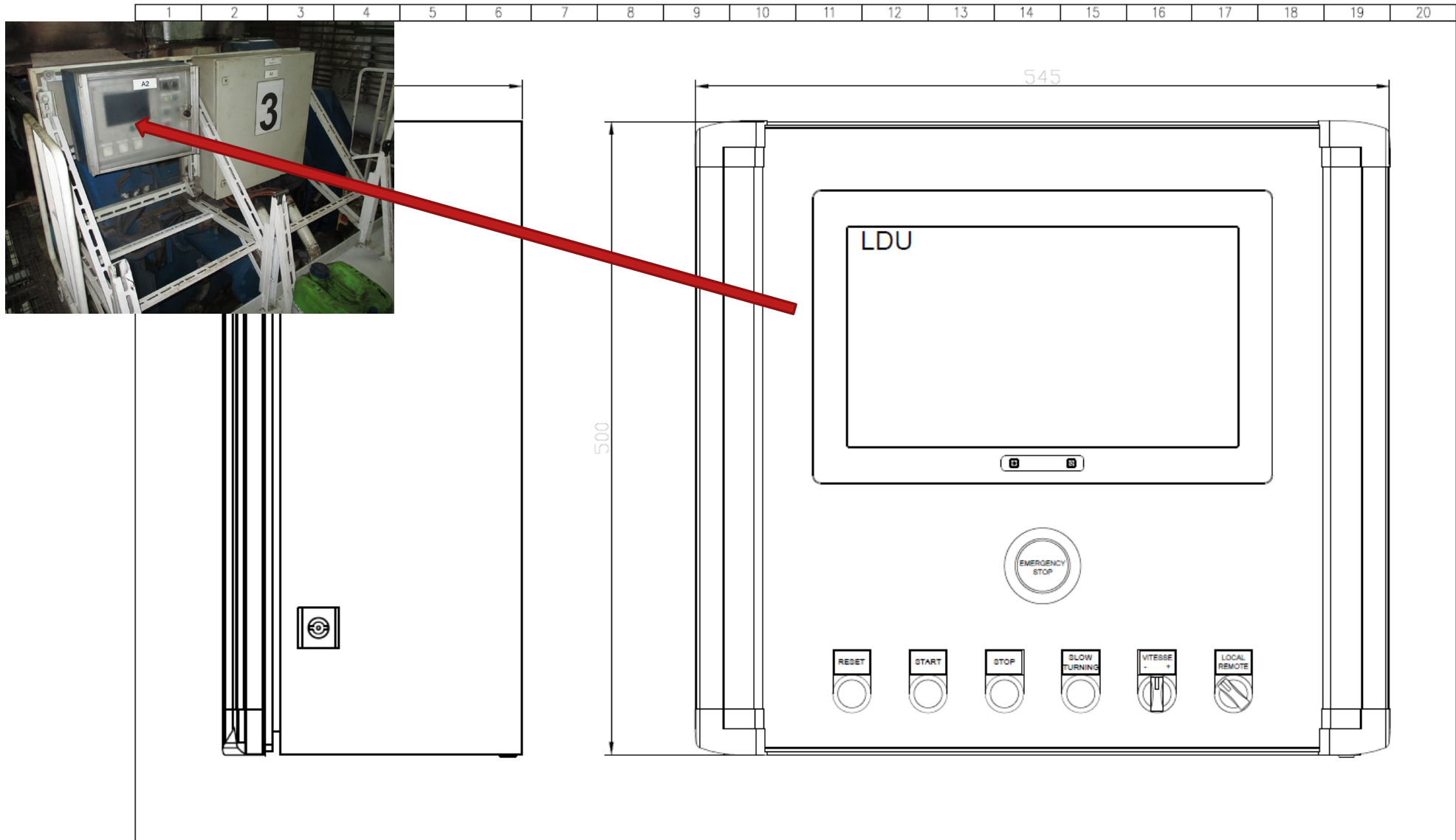
# E PULSE SYSTEM A1 CABINET W9L46



REVISION	A		DATE	10/11/17		<b>C·M·R</b> GROUP	9L46 LOCAL OPERATING PANEL A1 CABINET OVERVIEW	792 C XXX	N° FOLIO	FOLIO SUIV.
	B		VISA	JMPS					012	013
	C		DATE	10/11/17						
	D		VISA	XXX						

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# E PULSE SYSTEM A2 CABINET W9L46



REVISION	A		REVISION	H		DATE	10/11/17
	B					VISA	JMPS
	C					DATE	10/11/17
	D					VISA	XXX



9L46 LOCAL OPERATING PANEL  
A2 CABINET OVERVIEW

792 C XXX

N° FOLIO 014 FOLIO SUIV. \*-



# Marine Solutions References & projects



		ECS = Engine Control System							
		EMS = Engine Monitoring System							
COUNTRY	SHIP TYPE	SHIP NAME/Model	OWNER	SHIPYARD	CLASS	SYSTEM	ENGINE Model	YEAR	Engine Maker
GREECE	Ferry Catamaran	SKIATHOS EXPRESS	HELLENIC SEAWAYS	REFIT	BV	CLARINUX / ECS	4x W12V26 (Main engine)	2017	WARTSILA
SPAIN	Tuna fishing vessel	GALERNA 2 & 3	ALBACORA	NB : Armon Shipyard/Spain	BV	CLARINUX / EMS	2x 6L46 WARTSILA (Main engine)	2014	WARTSILA
France	Ro-Ro	MN EIDER	Compagnie Maritime Nantaise	REFIT	BV	CLARINUX / ECS	1x 6R46 + 1x 9R46 Wartsila (Main engine)	2010	WARTSILA
TUNISIA	Ferry	ELYSSA	COTUNAV	REFIT	GL	CLARINUX / ECS	2x 9M43 (Main engine)	2014	MAK
TUNISIA	Ferry	ELYSSA	COTUNAV	REFIT	GL	CLARINUX / EMS	4x S16R (Aux. engine)	2014	mitsubishi
TUNISIA	Ferry	AMILCAR	COTUNAV	REFIT	GL	CLARINUX / ECS	2x 9M43 (Main engine)	2016	MAK
TUNISIA	Ferry	AMILCAR	COTUNAV	REFIT	GL	CLARINUX / EMS	4x S16R (Aux. engine)	2016	mitsubishi
IRLAND	Ferry	ULYSSES	Irish Ferries	REFIT	LRS	CLARINUX / ECS	s	2014	MAK
The Netherlands	General Cargo	Atlantic Dawn	PARLEVLIIET & VAN DER PLAS	REFIT	GL	CLARINUX / ECS	2x 8M43 (Main engine)	2015	MAK
Norway	Oil/Chemical Tanker	LATANA	UTKILEN	REFIT	DNV	CLARINUX / ECS	1x 8M43 (Main engine)	2015	MAK
Algeria	Tug 45T	ZABANA AHMED 1	EPO (Entreprise Portuaire Oran)	NB: Armon Shipyard/Spain	BV	CLARINUX / EMS	1x 8MDZC (Main engine)	2009	ABC
Algeria	Tug 45T	ZABANA AHMED 2	EPO (Entreprise Portuaire Oran)	NB : Armon Shipyard/Spain	BV	CLARINUX / EMS	1x 8MDZC (Main engine)	2009	ABC
France	Tanker 5 to tanker 10		Maritima / CFT	NB: Aker Braila Romania	BV	CLARINUX / ECS	2 x S8U (Main engine)	2008 to 2010	mitsubishi
France	Tanker 1 to tanker 5		Maritima / CFT	NB: Aker Braila Romania	BV	CLARINUX / EMS	2 x 8L20 (Main engine)	2006 to 2008	WARTSILA
Singapore	200 pax catamaran	series Penguin 32	Standardized LOP P32 series	Penguin shipyard	BV	CLARINUX / ECS	2 x KTA - 38 (Main engine)	2005 tã 2010)	CUMMINS
Singapore	200 pax catamaran	series Penguin 32	Standardized LOP P33 series	Penguin shipyard	BV	CLARINUX / ECS	2 x KTA - 38 & KTA 50 (Main engine)	2005 tã 2010)	CUMMINS
Italy	OPV		Korean Navy	Kangnam Shipyard / Busan	KRS	E PULSE / ECS	V1312C2	2011 to	Isotta Fraschini Motori
France			Engine Builder		BV	E PULSE / ECS	M26 engine series	since 2012	MOTEURS BAUDOUIN
Germany			Engine Builder		DNV-GL	E PULSE / ECS	2015 TCO series	since 2012	DEUTZ
Japan			Engine Builder		ABS	CLARINUX / ECS	EY22 - EY26 - EY18	since 2013	YANMAR
England	Tug 55T	DHB Dauntless	Dover Port Authotities	REFIT	LRS	E PULSE / ECS	2x 6L26A Wartsila	2017	WARTSILA
England	Tug 55T	DHB Daughty	Dover Port Authotities	REFIT	LRS	E PULSE / ECS	2x 6L26A Wartsila	2018	WARTSILA
Norway	Fishing vessel	Rignator		REFIT	DNV	E PULSE / ECS	1x 9L26A Wartsila	2019	WARTSILA
Indonesia			Power plant	REFIT	N/A	E PULSE / ECS	9x 18V26A / Wartsila	2020	WARTSILA
Morocco	OPV	5 vessels	Royal Navy	REFIT	BV	E PULSE / ECS	10x 16V25	2019-2020-2021	WARTSILA
UK - NL	Ro-Ro	Pride of Hull	P&O (ongoing project)	REFIT	LRS	E PULSE / ECS	4x 9L46 + 2x 9L32	2021	WARTSILA
UK - NL	Ro-Ro	Pride of Rotterdam	P&O (ongoing project)	REFIT	LRS	E PULSE / ECS	4x 9L46 + 2x 9L32	2021	WARTSILA



1986 ...

708 AMS - Holland America Line  
Club Med



2008 ...

AMS Clarine System  
Supply Vessel



2011 ...

EDAR-VSG-PLG  
IAMCS – RCS - PMS

2003

900/PLC IAMCS – PMS  
CELANOVA



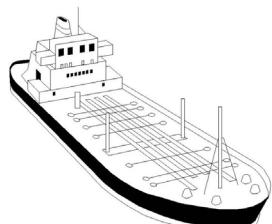
2020

POM  
IAMCS – PMS – PCS  
Cyber



1981

Y48 1st AMS  
CoMoR



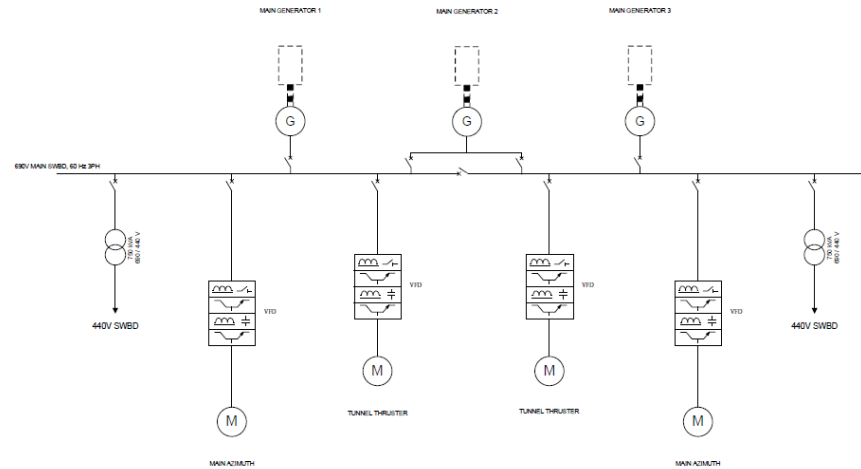
2000

900 AMS  
ENSCO 101

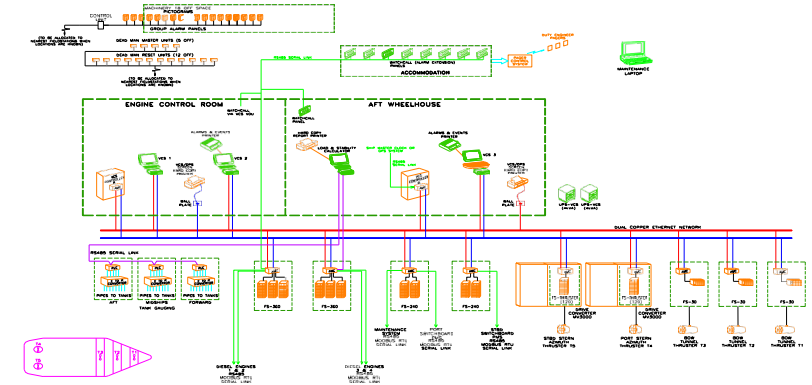


Ambition to be on par with the competition supplying a one-stop shop package including:

- Electric motors
- Battery packs
- Frequency converters
- Transformers
- Main Switchboard
- ICMS
- PMS



Propulsion SLD



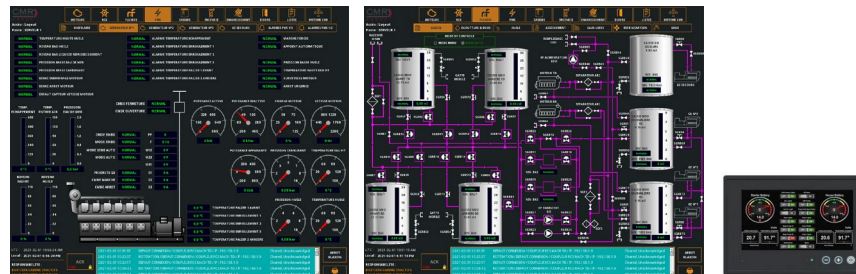
Automation / PMS SLD

## Hybrid Control Propulsion System

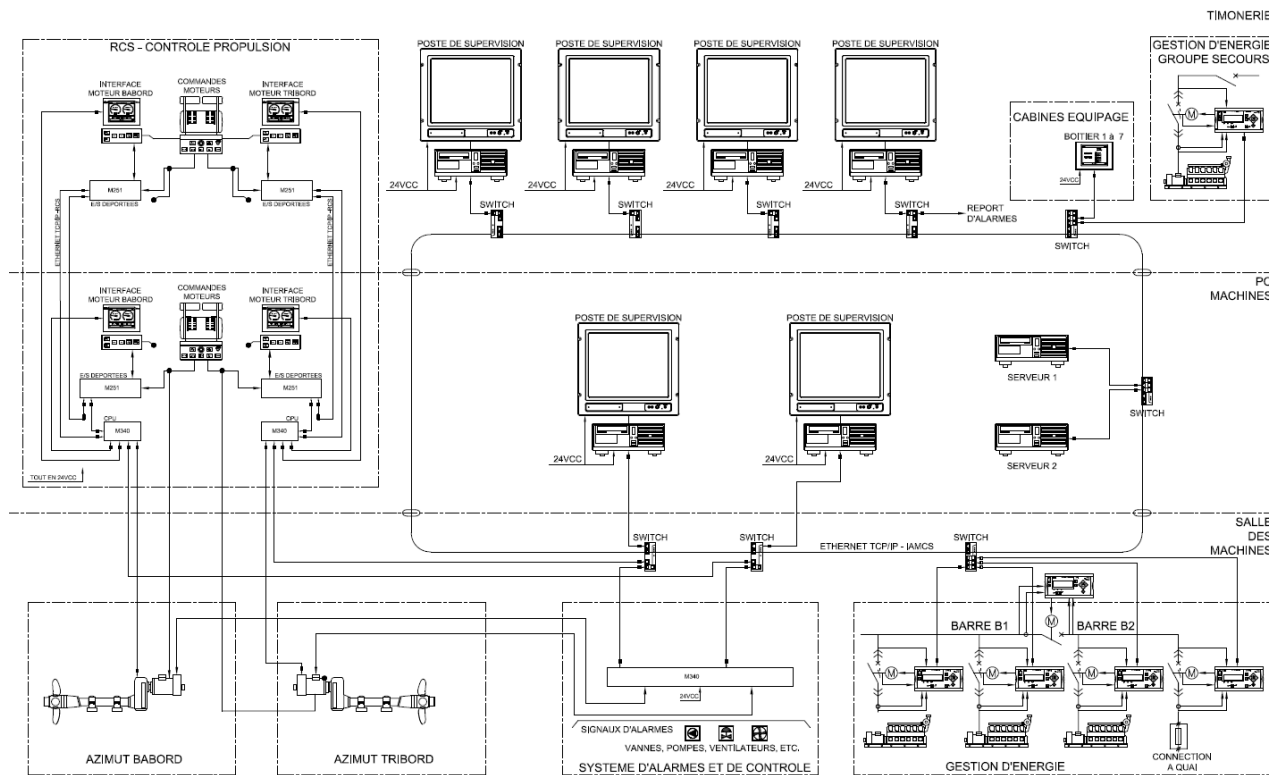
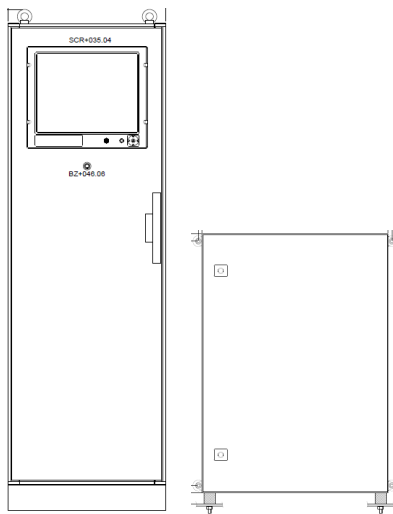
### Diesel Prop + Elect Prop with (Boost Mode)



## SCADA



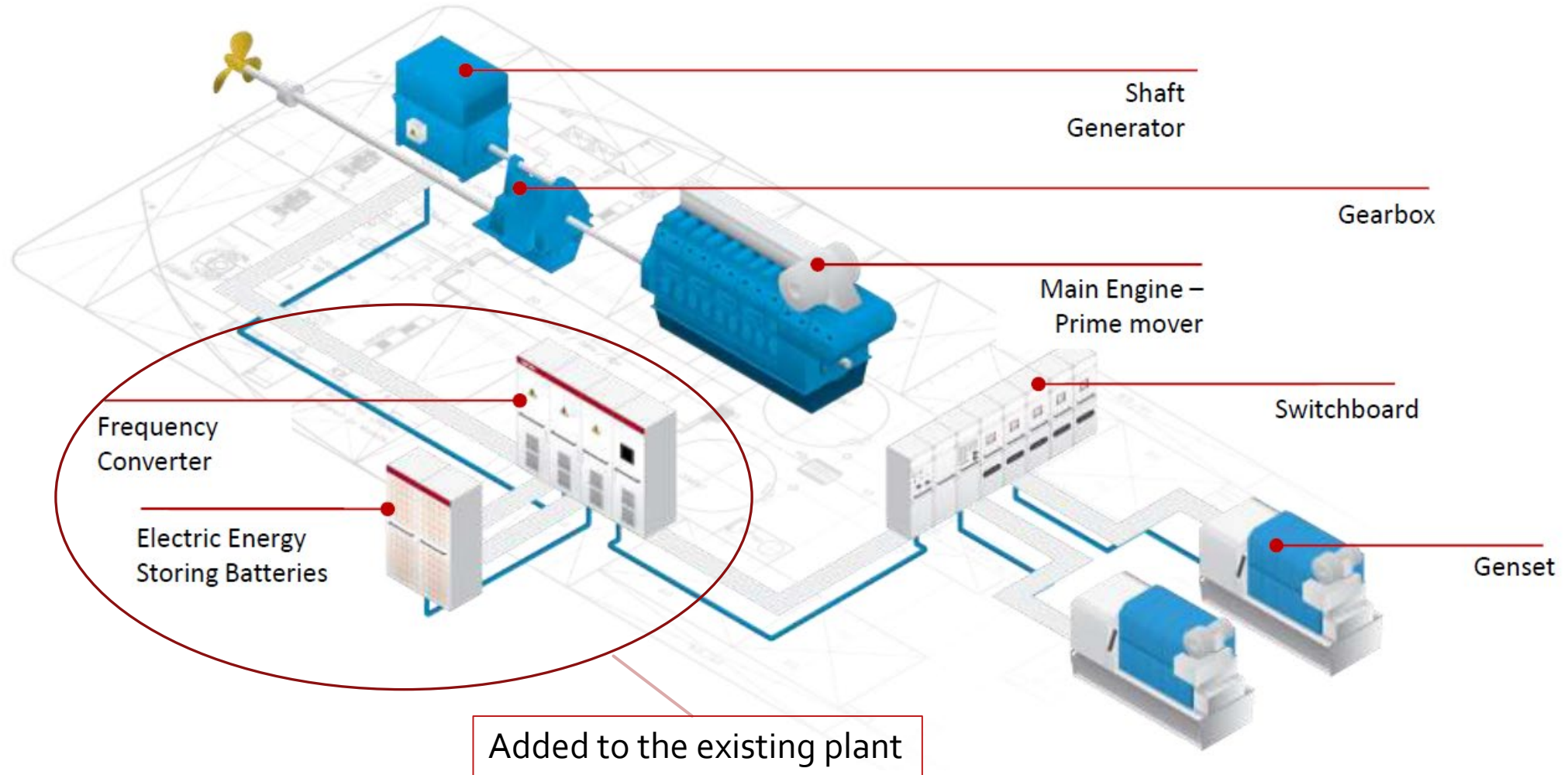
## Alarm & Control System



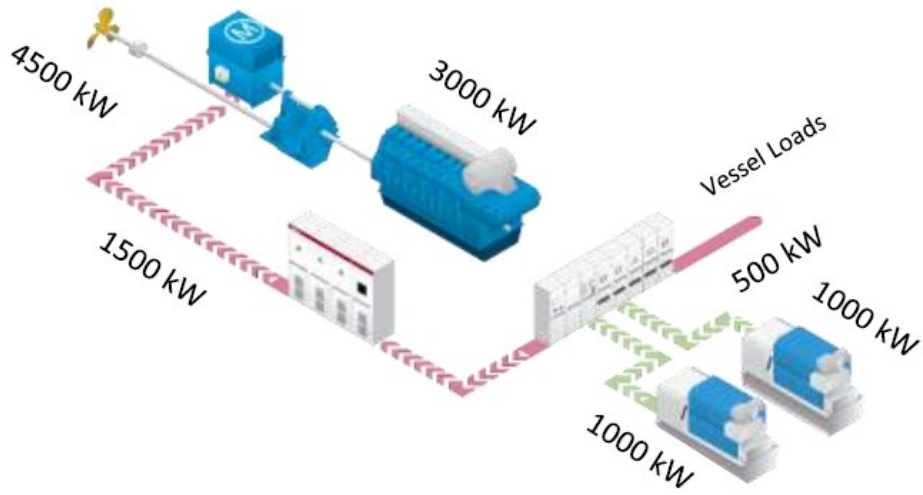
## Power Management System Gensets + Shore connection



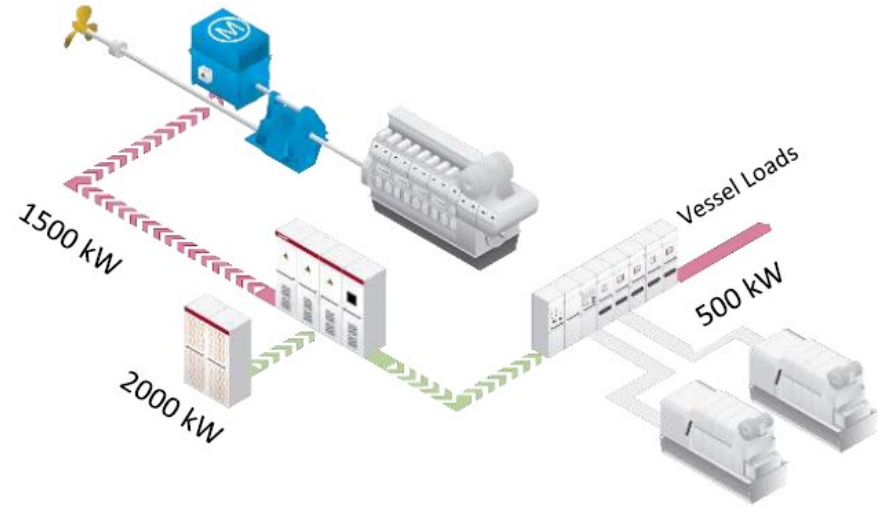
# Hybrid Propulsion New or Retrofit - Engine & Electrical Rooms



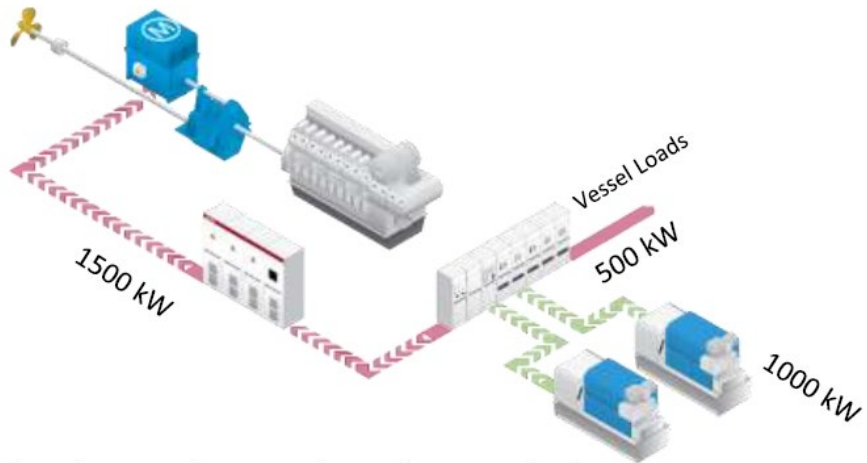
### Diesel Prop + Diesel Elect (Boost Mode)



### Battery Mode



### Diesel Elect Mode



### PTO Mode

