



Engineered to Uncompromising Standards. ***Yours***

Engineering Solutions Guide

World class electrical engineering



SAE
J1939

// 16 application markets, 50 years experience



Power	Oil & Gas	Transportation	Defense	Machinery
				
Engine	Offshore	Marine	Navy	Hazardous Area
				
Genset	Onshore	Off Highway	Army	Automation
				
Nuclear Power Plant	LNG/CNG	Locomotive		
				
Conventional Power Plant		Automotive		
				
Renewables				

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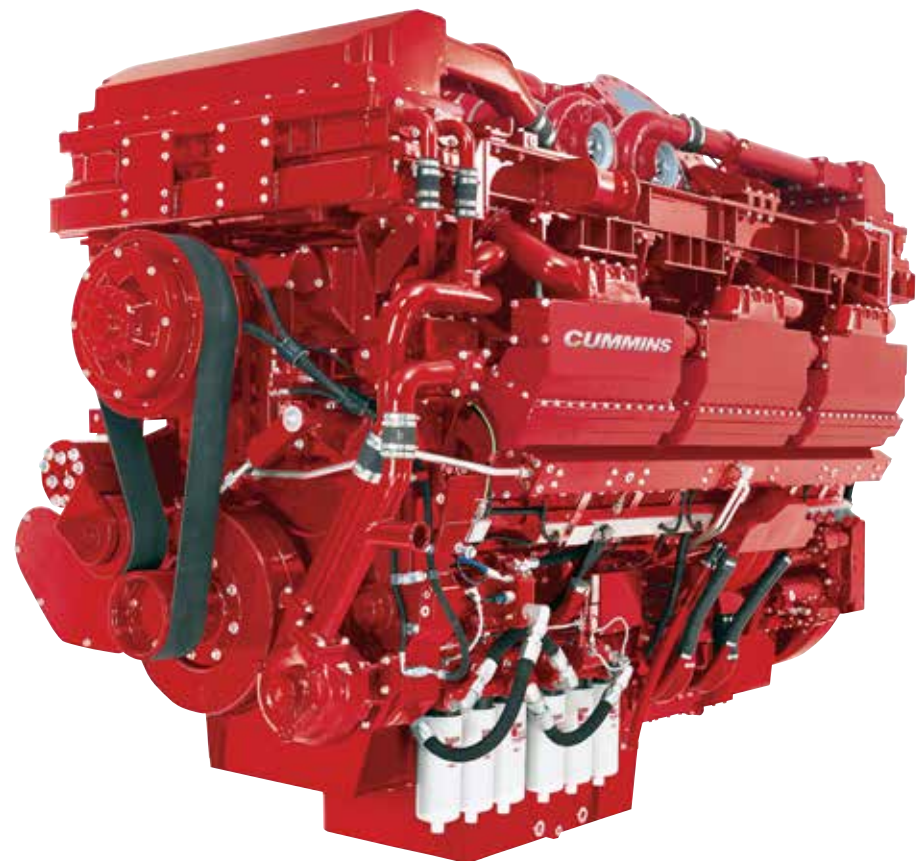
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// YOUR needs, our promise

- Exceeding your expectations
- Delivering you the benefits of continual improvement & open communication
- Serving you with a 'Can Do!' process-led approach
- Caring for all people, treating everyone with dignity and respect
- Solving your challenges through a global response

Engineered to Uncompromising Standards. Yours





//Engine & Genset

Your global partner for diesel and natural gas engine and genset components

We offer individual components and complete systems - **wiring harnesses, industrial sensors and controls, alarm monitoring, safety systems (AMS) and local operating panels (LOP)** for all your high horsepower applications.

CMR provides full **product lifecycle management** support to engine and genset customers, covering R&D collaboration, engagement on design and optimization of production locations to meet cost and supply requirements.

We can also install, service

and recondition all your componentry anywhere, globally.

A modern engine platform can utilize 25 or more sensors.

Operating in harsh environments that can include high levels of airborne dust and humidity and temperatures that can vary from - 40°C to over 150°C, CMR's equipment is precision engineered to protect delicate electrical and electronic components from any potential water ingress, including daily hose down and cleaning.

Using our experience of working with **30 global OEM's**, we are now developing the next generation of engine

management systems. CMR is designing highly advanced wiring technology that can monitor and control shock and vibration levels alongside sophisticated new emission control detection and sensor technology.

Engaged in the development of the latest Eco-friendly IMO/ EPA Tier engines, we routinely **embed design, manufacturing and product support teams** in or near your manufacturing locations globally, to facilitate rapid new design introductions thereby improving your competitiveness.

Your qualified partner for power plant systems engineering

CMR is highly experienced in ensuring the reliable and safe operation of your **conventional, nuclear, distributed and renewable** power plant facilities.

Our customer groups include:

- Designers and manufacturers of capital equipment
- Facility owners of fossil fuel and nuclear energy facilities
- Genset packagers

We support you with reliably engineered solutions for two levels of plant operations:

- For Energy Generation Plants - Control and Alarm Monitoring and Safety Systems (AMS) to provide reliable and accurate controls, including nuclear energy facilities. We can design a complete monitoring and control system for any plant, including load sharing management and synchronization of generators.
- For genset monitoring and control we offer full integration support to packagers and end users

Specializing in nuclear power station automation we are certified by our customers, including **EDF**, for electrical engineering product supply, installation and servicing.

Products include:

- Electricity Control Command
- Automation
- Instrumentation including specialist nuclear sensors
- Process Computers
- Data Acquisition, Monitoring & Supervision
- System Integration
- Communication Networks

For power plants, our service capabilities are extensive:

- Feasibility Studies
- Design
- Process Development
- Project Management
- Installation, Service & Technical Support

CMR is capable and experienced in deploying **full supervision systems** for power plants of all sizes including data acquisition, control and office level desktop access. These include many coal-fired facilities exceeding 1000MW output.



// Offshore

Your provider of reliable power management systems

CMR is a global industry leader in the upstream E&P sector, manufacturing electrical systems for your jack-up and semi-submersible drilling rigs, FPSOs specialist diesel-electric offshore vessels and tankers.

With a specific focus on the Asian market, we design, manufacture and commission type-tested low voltage switchboards (less than 1 kV), motor control centers (MCC's) and distribution boards under license from Siemens.

Using high quality and durable components, CMR satisfies all offshore requirements, minimizing maintenance costs and down time.

As an **authorized system integrator** for the use of **Siemens S7** series PLCs, we have developed a range of world-class systems using this technology, including:

- power management
- generator control
- vessel monitoring
- jacking monitoring
- skid control

CMR supplies these switchgear and power management systems to international rig owners, FPSO operators and vessel owners.

For the last two decades, we have worked alongside the world's largest jack-up rig designers and builders to customize electrical control and monitoring systems for **jacking and skidding**.

Delivering more than **70 electrical control sets for jacking**, we supply all critical components, including the MCC, control consoles and monitoring system.

For **LNG tankers** equipped with reciprocating dual fuel engines, CMR is the world's

number one supplier of engine instrumentation.

In close collaboration with reputable European equipment suppliers, we also undertake **electrical turnkey projects** for jack-up rigs, FPSOs and specialist vessels using diesel-electric propulsion.

We also offer full servicing capability, anywhere in the world.



// Onshore

Your experienced oil and gas partner

CMR supports you as a **midstream customer**, particularly in North America and Africa, with reliable operation of equipment and vehicles for crude oil and natural gas extraction, including crude pumping, gas compression, drilling, well stimulation, seismic exploration systems and well servicing.

We are expert suppliers to OEM and aftermarket integrators of prime power sources including high horsepower diesel, dual fuel and gas fueled engines and equipment.

Downstream, particularly in Asia, our sensing technology supports the increasing number of applications for **LNG** transportation that are critical to safe management of fuel.

You may fall within one of our customers segments:

- Manufacturers of specialized equipment and vehicles for crude and natural gas extraction
- Owners or maintenance contractors of crude oil and natural gas extraction equipment
- End users of industrial equipment and natural gas fuel systems

CMR is able to supply highly flexible, scaleable **remote monitoring solutions** which are designed to operate and monitor a large number of remote drilling well installations. We have experience of the world's toughest oil field environments, including African installations.

CMR-manufactured equipment

supports hundreds of North American operations. Our **custom engineering** teams regularly gain specialist approvals (ATEX, CSA or UL) for oil and gas field equipment designs - yours or ours. Prototypes can be developed in a local application center and transferred for production to a best-cost CMR global manufacturing location.

CMR's expertise in **wiring systems, harnesses, interconnects, sensors, gas regulators** and **control panels** provides you with full turnkey capabilities.



//Marine



Your tried and tested marine automation specialist

CMR has been a **trusted source** of high quality electrical systems and electronic products for your marine and shipbuilding requirements for over **50 years**.

Our products support the reliable operation of your ship's engine and automated monitoring controls. Our customers:

- build or operate small to medium-sized commercial vessels, including work boats, ferries, specialized tugs, cargo ships, PSV and OSVs.
- own or build private pleasure craft, including yachts.

CMR protects the value of your engines and fleets with reliable, high-quality electrical and electronic systems by offering **turnkey vessel automation** solutions utilizing Integrated Alarm Monitoring and Control Systems (IMACS) and other

types of **marine electronics** including **low voltage /main switchboards, fire detection and CCTV**.

These **marine society approved systems** are certified by bodies that include Lloyd's Register (LRS), Det Norske Veritas (DNV), Bureau Veritas (BV) and American Bureau of Shipping (ABS).

The example above references a CMR implementation on a 180M passenger ferry build at Brodosplit Shipyard, Croatia.



Total power output from this 4 engine, dual propulsion system vessel is 40MW.

CMR deployed the full **Vessel Management System (VMS)**, including:

- Power management
- Alarm monitoring
- Engine auxiliaries control
- Complete supervision, based on a loop architecture ethernet network system and communication with 15 on-board systems

Demonstrating CMR's ability to handle complex projects, the VMS directly manages 3,000 I/O channels through local specific control systems.

As a customer, we are able to deliver **highly cost-effective** marine solutions that allow you to competitively deploy new build vessels or undertake ambitious refurbishments.

//Land

Your global transportation solutions provider

CMR's equipment powers a wide range of your **off-highway, locomotive and large automotive vehicle** fleets.

From the **mine trucks of Africa** to the **natural gas trucks of China** and the **railroad networks of North America**, CMR can supply you with class-leading custom electronic instrumentation solutions to ensure that your major projects are delivered on time and to budget.

We are working closely with a UK based producer of electrical motors, generators and power electronics that is involved in the multi-million pound **Sao Paulo Metro extension**.

The Expresso Tiradente monorail is currently under construction in South America

and when fully equipped, will have the capacity to transport 48,000 passengers per hour, in each direction between the conurbations of Vila Prudente and Cidade Tiradentes.

This major new public transportation scheme is being built as part of the country's investment in infrastructure in preparation for the FIFA World Cup and Olympic & Paralympic Games.

Currently, the journey takes almost two hours. Investment in the new monorail system will see this reduced to approximately 50 minutes, benefiting 500,000 users daily.

CMR's engineering team has worked in close partnership from the start of the project to design and deliver a **customized solution** featuring advanced new wiring harness configurations for the new

assemblies that will be used to control the distribution of power around the trains and carriages.

This is the fifth successful project CMR has undertaken with this customer.



// Navy

Your need for safe and reliable systems

CMR has 40 years of experience in supplying the naval markets of North America, Europe, Africa and Asia.

Specializing in small and medium sized vessels as a primary contractor during the start-up stage of your new projects, we design, develop and supply custom products including **electrical instrumentation, control and alarm monitoring safety systems (AMS)**.

CMR's work covers both surface and subsea vessels for mission critical applications and meets all relevant naval type approvals.

Our Engine controls including **Local Operating Panels (LOP)** and **Local Power Panels (LPP)** are approved to MIL standards for EMC, shock and vibration.

One example of a custom submarine systems deployment

within Europe involved the creation of an **automated weapon handlings system** implemented within a Schneider™ PLC framework.

This project carried a high level of sophistication and calculated many operational parameters, including reviews of mechanical structure (finite element analysis), reliability/durability and the thermal exchange properties of the systems deployed.

Another CMR project, for two new 77 meter and 81 meter naval patrol vessels, supported the deployment and integration of advanced **Alarm Monitoring Systems (AMS)** and **Fire Detection Systems (FDS)**.

Working on behalf of an Asian navy, all project coordination, automation design and programming was undertaken by CMR to enable information from the FDS to be viewed on the AMS via Modbus TCP/IP.

This system allows the vessel's crews to have access to information about the status of the individual heat detectors, smoke detectors, water/flood detectors, hatch and water tight door positions on the same touch screen.



Your custom engineering specialist for military applications

CMR has specialist expertise in upgrading, refurbishing and engineering custom solutions your military equipment.

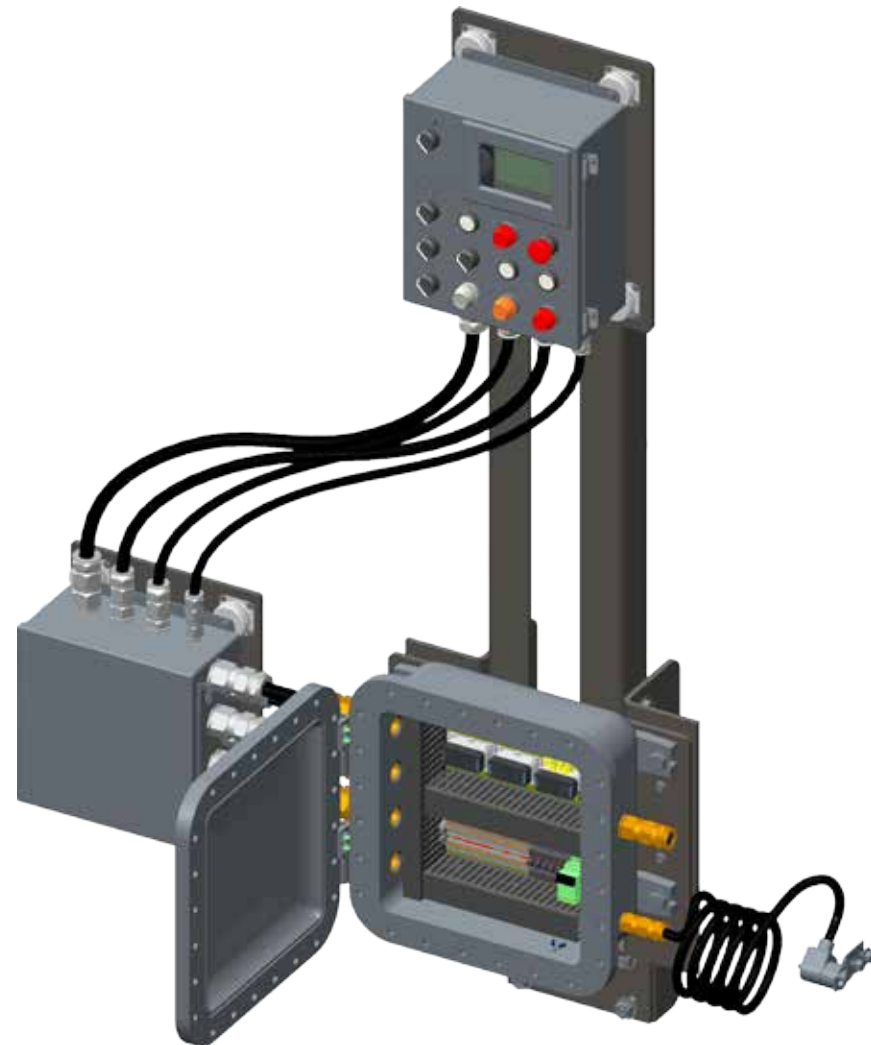
For the **landing catamaran** illustrated, CMR's control system ensures load balance equalization and efficient operation of a variety of **on-board systems** including the:

- interface to the power generation control and distribution
- interface with the propulsion control system
- power management
- local fans
- pumps (fire, bilge, GO transfer, electric, hydraulic)
- navigation lights
- alarms (fire, flooding, access, water jet)
- lifting wheelhouse



The overall design incorporates four ramps, with the two hulls tied to liaison arms and a moving platform, that is raised by hydraulic jacks. CMR is accustomed to this level of complexity when **integrating systems** to perform a variety of local or remote tasks.

Our custom engineering, software, installation and commissioning capabilities are offered globally on a full **turnkey** basis for all types of military projects.



// Hazardous Area

Your equipment regularly needs to operate in hazardous areas and meet international requirements (ATEX, CSA & UL)

CMR can develop and customize your products for **flammable area environments**.

A recent project undertaken by CMR in the US will be the first system of its type available for approved **Ex Class I, Division 2 applications**.

Compliance with this standard ensures the panels are safe for operation in locations where there is the potential for exposure to flammable volatile

liquids or flammable gases being handled, processed or used.

The new technology has been developed to meet specific customer needs and will be used to control **Cummins™** electronic controlled industrial engines, using the CM2150 ECU, for oil and gas power generators, pumps and compressor systems. It also features 'fail safe' architecture in case of a system error or component failure.

In developing these systems, CMR has drawn on its

engineering services, including specific expertise in hardware design and manufacturing, featuring advanced wiring harnesses and control technology.



// Automation

Your machinery automation partner

CMR has advanced knowledge and experience in all the major PLC based automation systems including ABB™, Allen-Bradley™, Schneider™ and Siemens™.

With a focus on delivering highly **customized automation and supervision systems**, we are a safe pair of hands for all your projects.

A specialist contract undertaken by CMR included the **refurbishment** of a machine crawler's motor system for one of **Europe's largest power plant operators**.

This project covered the wheel excavator, carrier band, lifting arm, arm rotator and primary power source in order to improve coal carrying efficiency.

Involving the replacement of eleven motors and servicing of another two, the project also covered the deployment of associated equipment such as hydraulic motors and lubrication pumps.

Implemented with Schenider™ PLC's, CMR was able to perform the refurbishment on-time and to strict specification, validating advanced calculations to control travel speed, orientation and lifting.



About CMR

YOUR global engineering partner.

Our proud heritage has navigated us from the shipping channels of Marseille, France towards all the major global industrial hubs.

With some of the first patents for marine electronics and ground-breaking technology transfers, to the latest in green innovation

for industrial fuel systems, CMR Group has consistently delivered you quality and reliable products for decades.

Our systems are found far and wide. From the oil and gas fields of Texas to the mine trucks of South America and the bustling ports of Asia, our supremely

engineered solutions perform 24/7, 365 days a year in your harshest environments.

CMR's quality accreditations include ISO 9001, TS16949 ISO 14001 & OHSAS 18,001.

We offer true quality, true reliability as your global engineering partner.



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