

Oil & Gas Product & Service Guide

World class offshore and onshore solutions



LV Main Switchboard



LV Drawout Switchboard



LV Harmonic Filter



MV Main Switchboard



MV Transformer



AC Variable Speed Drive



Thruster Motor



Consoles



Remote Monitoring



Hazardous Area



Control Panels



Fuel Quality



Gas Regulation



LNG Sensors



Temperature & Pressure Sensors



Wiring Systems



// Contents

03 Switchboards & Power Management

- Low voltage experts
- Certified by Siemens
- World leaders in jacking & skid systems
- Turnkey projects

06 Control & Monitoring

- Remote Monitoring
- Systems Integration
- Custom Products
- Hazardous Area
- Control Panels
- Gas Regulation
- LNG Sensors
- Temperature & Pressure Sensors
- Wiring Systems

// 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





CMR Group delivers world class electrical engineering solutions to the upstream, midstream and downstream sectors of the global oil and gas industry.

Operating offshore and onshore for over 30 years, we have built an enviable reputation for engineering, quality and reliability.

Successfully expanding into the unconventional shale gas sector, CMR Group has gained preferred supplier status for instrumentation and control equipment with world-class OEM's.

We are pleased to offer:

Research & Development

Rig builders and OEMs can turn to CMR Group for customized engineering of electrical and electronic components, including advanced turnkey solutions.

Project Management

Working to your designs or to our custom specifications, CMR project manages integration of switchboards, power management componentry and control and monitoring for your oil and natural gas extraction platforms or equipment.

Manufacturing

We maintain complete control of quality throughout production by our highly trained personnel operating in our globally located manufacturing plants.

Service

No matter where your crude pumping, gas compression, exploration, well servicing operations or vessels are located, CMR Group provides a responsive service from a global network of electronics and electrical engineering experts.



Your need for reliable power - switchboards, power management and turnkey solutions

CMR Group 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.

Low voltage experts

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 licence from Siemens™.

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

Certified by Siemens

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.



// World leaders in jacking & skid systems



Your experienced offshore engineering partner

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 MMC, control consoles and monitoring system.

Turnkey projects

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. Turnkey projects include the design, supply and commissioning of:

- Electrical System S studies (using ETAP software, USA) – short circuit calculation, load flow, transient stability, relay coordination, motor acceleration, harmonics and electrical earth faults

- Medium voltage switchboards (Siemens™ or Schneider™ Electric)
- Medium voltage dry (AN), air-cooled (AF), air-water-cooled (AWAF), cast resin distribution or phase shift transformer
- Low voltage dry type transformers
- Drilling VFD switchboards including braking resistors
- Thruster VFD switchboards for offshore rigs
- Thruster VFD switchboards for vessels
- Thruster motors for offshore rigs
- Thruster motors for vessels
- Low voltage switchboards, MCC's and distribution boards
- Power management systems (for jack-up rig and FPSO only)



// Control & Monitoring



Your need for local or remote supervision and monitoring

CMR Group supports midstream customers with reliable operation of equipment, vehicles, vessels and tankers for crude and natural gas extraction, including crude pumping, gas compression, drilling, well stimulation, seismic exploration systems, well servicing and transportation.

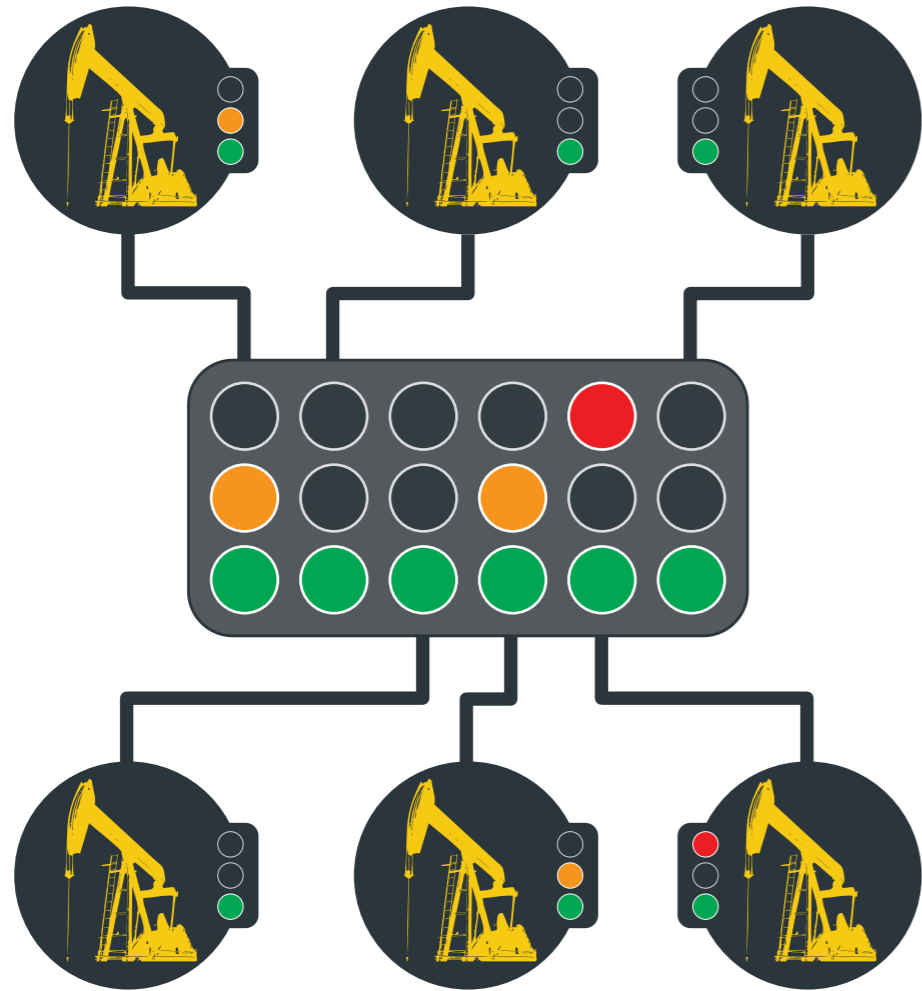
We are expert suppliers to OEM and aftermarket integrators of prime power sources including large diesel, dual fuel and gas fueled engines and equipment.

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

Our main customers include:

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

// Remote Monitoring



Your need for remote supervision of drilling wells

CMR is able to supply highly flexible, scalable 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 a range of African installations.

Our system consists of:

Panel PC touch screens

- Digital and analog signal acknowledgements & monitoring
- Alarm monitoring
- Values, status and alarm change records
- HMI display
- System interaction

Communication module

- Radio polling or other (e.g. 3G and SAT)
- Remote control and maintenance (if required)

Smart antenna

- Radio communication transmission or other on demand

Acquisition modules

- Channel data acquisition
- Signal conversion and transmission - SCADA with Modbus protocol

Based on microprocessor technology, all autonomous drilling well functions and associated electronic components are monitored in real time.



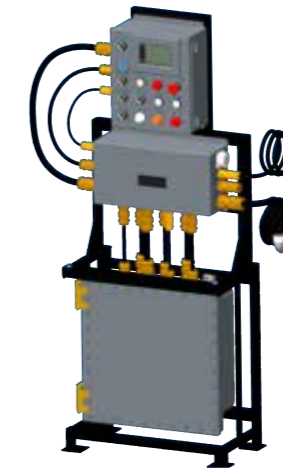
// Hazardous Area Custom Products



Your equipment regularly needs to operate in hazardous areas and meet international requirements

We routinely develop explosion-proof products to operate safely in flammable atmospheres, a particular hazard of methane production and transmission.

Best of all, CMR can do it quickly. Your demand for new oil and gas field equipment has enabled CMR to develop



a range of skills in specifying and building critical solutions for common applications including engines, compressors and pumps.

Your designs may need to meet specific industrial standards. We have years of experience in gaining product approvals such as CE, CSA, IEC, NEMA, ATEX, ITAR or UL and marine classification standards including Lloyd's Register (LRS), Det Norske Veritas

(DNV), Nippon Kaiji Kyokai (NKK), Bureau Veritas (BV), Korean Register (KRS), China Corporation Register of Ships (CRS), Registro Italiano Navale Azione (RINA), Russian Register (RRS), and the American Bureau of Shipping (ABS).

Working either independently or to your design and build schedule, prototypes can be developed in a local application center and transferred for production to a best-cost CMR manufacturing location.

This capability is available across our full portfolio including electronics, sensors and wiring harnesses.



// Control Panels

Your specific applications demand optimized control. We can accommodate any industrial need for local or remote control, junction boxes or electrical system interfaces.

CMR's Local Operating Panels incorporating our Smart Innovative Monitoring System, SIMS™, set the industry standard benchmark.

Our systems process and display all user defined parameters, trigger local alarm outputs, update the alarm list and store events in the log book. Built upon modular

architecture, SIMS operates with one acquisition unit and one Human to Machine Interface (HMI) module.

Typically used for I/O, engine monitoring, controls, gensets, pumps, compressors, offshore and other industrial applications, the unique CMR process allows us to manufacture low or high volumes, while maintaining strict quality standards and delivery performance.

Our control panels are all about ease – integration, configuration, installation and use.

CMR is at your disposal with full design support, prototyping, onsite validation, commissioning and service.



// Fuel Quality



Your systems may be subject to variable fuel quality at remote locations

Our patented NIRIS™ Diesel sensor provides real time spectral analysis on critical fuel information.

NIRIS can reduce fuel consumption levels by up to 5% as part of a fuel management strategy to improve efficiencies, while further benefits include lower fuel analysis costs, improved performance and the overall alleviation of time consuming and costly damage to components due to inferior or low-grade fuels.

When used in conjunction with an Engine Control Unit (ECU), the sensor detects fuel parameters through advanced hydro carbon profiling HCP® which measures the molecular structure of fuel. This allows real time optimization of injection, combustion and post-treatment for all types of fuel, including bio-fuels.

NIRIS is based on a smart combination of established infrared hardware and powerful data treatment software. Featuring an advanced infrared spectrometer that performs continuous in-line analysis - measuring over 12

different parameters including the Cetane index, density, percentage of biodiesel and HCP - the sensor provides simple, easy-to-understand information that engineers can use for assessing the quality of the diesel fuel powering engine systems such as: standard, premium or bad.

The unit can be quickly and easily retro-fitted anywhere between the low pressure and high pressure fuel pumps and interface with other instrumentation such as water or debris sensors through CANopen or SAE J1939 protocols.



// Gas Regulation

Your gas engines require cost effective fuel regulation

Our range of direct acting and pilot regulators offer the most cost-effective component solution.

CMR's P series regulators, most commonly in P99, P143, P200, P289 and P600 configuration, offer various relieving, monitoring and pressure shut-off options.



// LNG Sensors



Your need for safer control of natural gas

CMR develops and supplies specialist LNG temperature sensors to help mitigate the risk of explosion and damage to expensive equipment due to low temperature gas leaks.

For LNG tankers equipped with reciprocating dual fuel engines, CMR is the world's number one supplier of engine instrumentation.

Our TCM2 sensor monitors for gas leakages in the secondary double hull barrier space of industrial LNG tanks.

With the probe element and cable rated between -200°C to +200°C and measuring to class 1 or 2 standards, the sensor is engineered for performance.

According to user requirements, CMR can provide PT100 simplex or duplex versions with individual connection boxes or with marked wires.

We are also able to make a special version for extreme environments with a mineral insulation cable (MIC) which allows the sensor to be used in immersed locations.

Diversifying into the transportation sector, CMR also designs and supplies "low temperature" sensors for LNG powered trucks, locomotives or power stations.

With a measurement probe and cable rated from -200°C to +150°C, the measurement accuracy is class 2, IEC60751 standard.



//Temperature & Pressure Sensors

Your desire to work with a sensor expert

Our range of specialized sensors is the most tried and tested in the global high horsepower engine and rotating machine market.

Our knowledge of sensors spans 50 years, all tested and referenced by the world's largest engine and equipment manufacturers on every developed continent. CMR's deep understanding of engine platform requirements include elegant solutions deployed inside the crank case using wireless technology.

CMR offers specialized thermocouple / temperature sensors and pressure sensors to meet your exact requirements:

- Ambient (AMB™)
- Charge Air (MBT™)
- Combustion Chamber (MTC™)
- Cylinder Liner (MTCH™)
- Exhaust Gas & Turbo Compressor (ETS™, MD™, MC™, EGT™)
- Exhaust Valve (MTS™)
- Fuel Quality (NIRIS™)
- Fluids (LTS™, MBT™)
- Hazardous Area (AD3)
- Knock (CNV™)
- Large End Bearing (BTS™, TB3™)
- Main Bearing (MP™)
- Pressure (P™)
- Rotating Machine Bearings (BC™, BS™)
- Smart J1939 Sensors (J-SENSE™)

Approved by LCIE (Electrical Industries Central Laboratory), our AD3 hazardous areas (ATEX) sensor is designed for direct measurement of gas and fluid temperatures "in situ" of fluid and gas temperatures. Its feature set includes:

- Easy maintenance with interchangeable mountings.
- Possibility of 360°C orientation of head for access to the cable glands.
- Capable of integrating a head transmitter.
- Choice of sensing element - thermocouple (all types) or resistance probe.
- Simplex or duplex.

From standard thermocouples to advanced sensors with embedded CAN Bus and J1939 technology, CMR has it covered.



//Wiring Systems & Pipe Harnesses



Your ability to perform is based on a need for absolute reliability.

Our class-leading range of pre-cabled rigid and flexible harnesses can meet your every requirement.

CMR's PIPEHarness™ systems, first patented in 1972, set the global industry standard for robustness.

Enclosed within aluminium profiles, the CMR PIPEHarness encapsulates and protects your critical wiring like no other harness on the market.

CMR uses a wide variety of production technologies in order to manufacture and test any type of system or ancillary components.

The range includes:

- Braided harnesses
- Cables & Inter-Connects
- Conduit harnesses
- Flexible harnesses
- Wire & Taped harnesses

Our pre-cabling systems are used both externally on the engine and equipment platforms and internally within the crank case.

CMR's PIPEHarness approach improves aesthetics, reduces cost of installation (TAKT time) and negates the chance of sensor inversion upon connection.

Our PIPEHarness range includes:

- Thermometric & Pyrometric pipes (CT™, CPT™ & CTT™, PYR™)
- Inside Crankcase Thermometric pipes (CTC™)
- Complex & Multi-Service (CAW™, CPW™, MSP™)
- Non-Rigid, flexible plug and play pipes (NR™)
- Patented Ignition Pipes for Gas engines, including Coils and Pulse transmission (CAL™, CAC™, CMB™)

- Smart Connecting pipes using CAN open, J1939 protocol (SCP™)

As you would expect, many systems are also UL, CSA and ATEX classified, while adhering to marine approval standards.

We bring 50 years of experience to your projects and have thousands of reference part numbers with engine and genset manufacturers throughout the world.



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.



CMR CHINA

CMR Suzhou Electrical Devices
#2 Building, Fangzhou Road 128
Suzhou Industrial Park
Suzhou, Jiangsu Province
CHINA P.C. 215024

Tel: +86 512 6289 0311-8000
Fax: +86 512 6289 0312
Email: cmr-cn@cmr-group.com

CMR-SUPPLY CHAIN

Technopole de Chateau Gombert
7 rue John Maynard Keynes
BP 85
13381 Marseille Cedex 13
FRANCE

Tel: +33 4 91 11 37 00
Fax: +33 4 91 11 37 32
Email: cmr-sc@cmr-group.com

CMR FAR EAST

CMR (Far East) PTE LTD
9 Tuas View Crescent,
SINGAPORE 637612

Tel: +65 6268 8311
Fax: +65 6265 7443
Email: cmr-fe@cmr-group.com

CMR GROUP HQ

Technopole de Chateau Gombert 7
rue John Maynard Keynes
BP 85
13381 Marseille Cedex 13 FRANCE

Tel: +33 4 91 11 37 00
Fax: +33 4 91 11 37 02
Email: cmr-fr@cmr-group.com

CMR INDIA

CMR Control Systems India Pvt Ltd
S.No.15/2 Bhilarewadi,
Dhone-Nahar Warehouse, Katraj
Pune - 411 046, INDIA

Tel: +91 (0) 78750 88891
Email: cmr-in@cmr-group.com

CMR GROUP KOREA

CMR Group Korea LLC
1206 Centum T-Tower,
66 Centum Joongang-ro (Central
Street), Haeundae-gu, Busan
SOUTH KOREA 612-020

Tel: +82 51 743 3902~3
Tel: +82 10 6307 0404
Fax: +82 51 743 3904
Email: cmr-gkr@cmr-group.com

CMR PHILIPPINES

CMRP Automation, Inc.
2QA 2F ODC International Plaza
219 Salcedo Street, Legaspi Village
Makati City 1229
PHILIPPINES

Tel: +63 2 587 5530
Tel: +63 917 812 1571
Email: cmr-ph@cmr-group.com

CMR THAILAND

CMR (Thailand) Company Limited
2526/20 Ratchadapisek Rd.,
Wongsawang, Bangsue, Bangkok
10800
THAILAND

Tel: +66 2 077 8986
Fax: +66 2 077 8986
Email: cmr-th@cmr-group.com

CMR TUNISIA

Contrôle Mesure Régulation Tunisie
Chemical Street 33
Industrial Aera
Sidi Rezig 2033
TUNISIA

Tel: +216 71 426 978
Fax: +216 71 426 993
Email: cmr-tn@cmr-group.com

CMR UK

Controle Mesure Regulation (UK) Ltd
New York Way
New York Industrial Park
Wallsend, Tyne and Wear
NE27 0QF
UNITED KINGDOM

Tel: +44 (0) 191 258 5222
Fax: +44 (0) 191 257 3975
Email: cmr-uk@cmr-group.com

CMR US

CMR USA, LLC
940 Riverside Place
Leetsdale, PA 15056
USA

Tel: +1 724 452 2200
Fax: +1 724 452 2203
Email: cmr-us@cmr-group.com

CMR Representative:



SAE
J1939