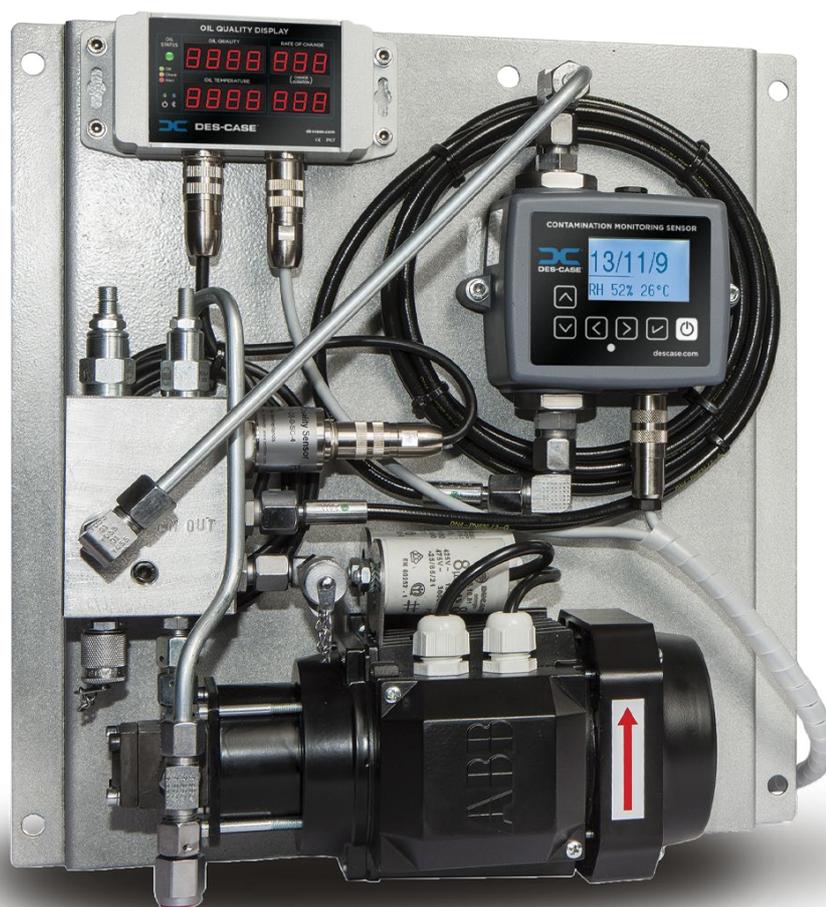


CONDITION MONITORING

Condition Monitoring Center

The Condition Monitoring Center (CMC) combines technology to enable sampling on low pressure hydraulic and lubrication systems where aeration can be an issue. The CMC suppresses the air bubbles so they are no longer counted as particles. It also allows for continuous particle monitoring on systems where no oil pressure is evident.





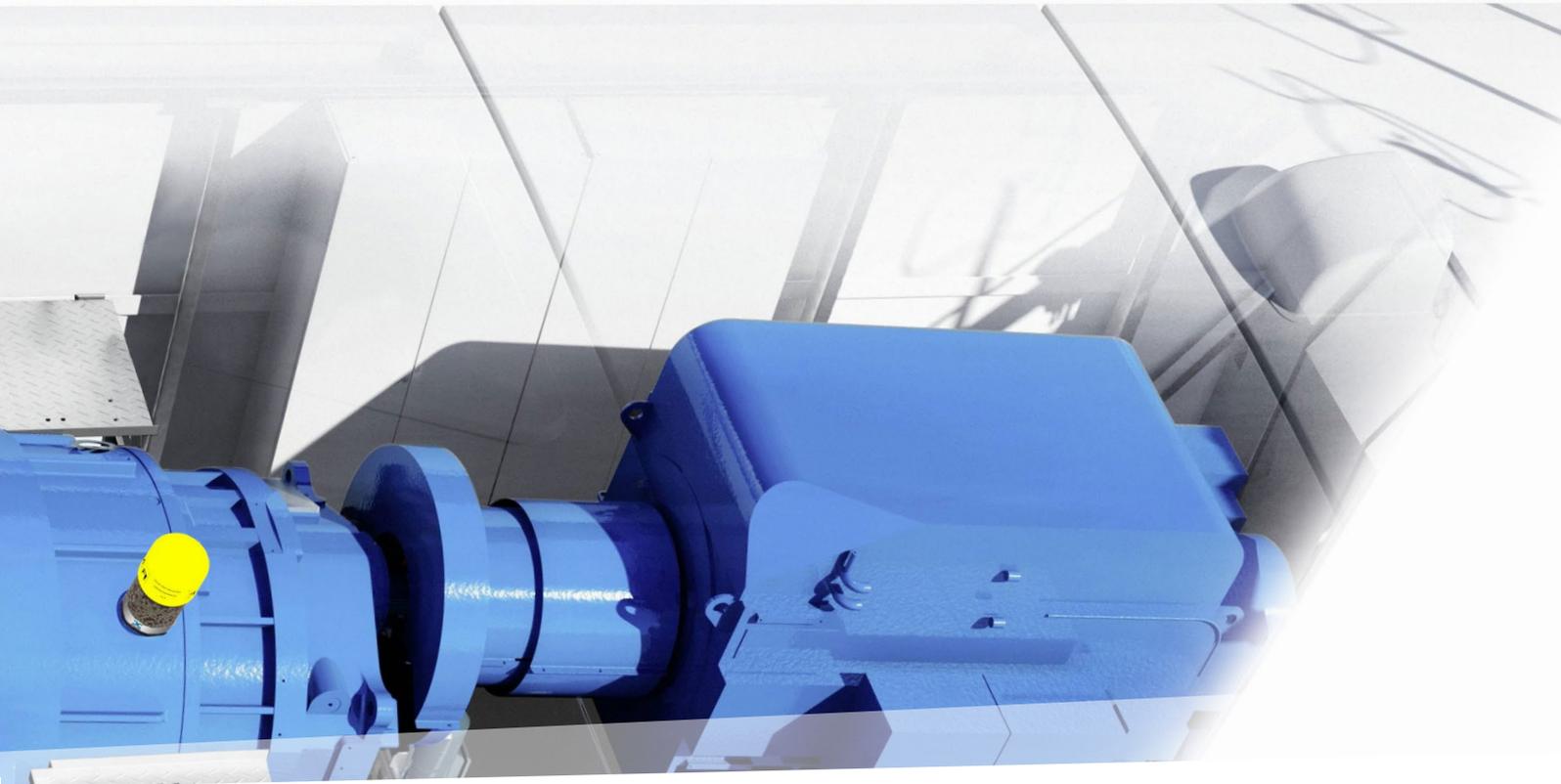
Condition Monitoring Center

WHERE CAN IT BE USED?

- ▶ Renewable energy
- ▶ Gearbox applications
- ▶ Automotive industry
- ▶ Paper industry
- ▶ Offshore systems
- ▶ Lubrication systems
- ▶ Marine thrusters
- ▶ Test Benches

THE CONDITION MONITORING CENTER (CMC) COMBINES TECHNOLOGY TO ENABLE SAMPLING ON LOW PRESSURE HYDRAULIC AND LUBRICATION SYSTEMS WHERE AERATION CAN BE AN ISSUE. THE CMC SUPPRESSES THE AIR BUBBLES SO THEY ARE NO LONGER COUNTED AS PARTICLES. IT ALSO ALLOWS FOR CONTINUOUS PARTICLE MONITORING ON SYSTEMS WHERE NO OIL PRESSURE IS EVIDENT.

The CMC can be installed in most low pressure hydraulic and lubrication systems. One option ranging from zero bar pressure to a max of 50 bar on the inlet of the system and 0,5 bar on the return of the system. A further option can be installed on systems with a max of 0,5 bar on inlet of CMC pump and a max of 6 bar on system return. These two options give the user the versatility to install the CMC in a variety of different system applications. Also the Condition Monitoring Center can be designed with an integrated magnetic coupling. This option can handle inlet and outlet pressures of 25 bar. Utilizing the best particle counter in its class as standard, the CMC delivers simplicity, practicality & accuracy for the most demanding of applications. Proven optical technology and algorithms ensure consistent monitoring of your system, providing peace of mind for your operators.



The CMC comes with an optional CMS complete with RS485/232 MODBUS & CANBUS (J1939 typical) protocols for remote control. CMS Communication & motor power needs to be completed by the customer during installation. The cable for motor power is not supplied. Optionally the CMC can be equipped with an Oil Quality Sensor (OQS), used for measuring oil degradation.

DESIGNED WITH YOU IN MIND...

The CMC is specifically configured to provide customers the versatility they require for existing systems or those in development. The built-in motor/pump assembly and automatic particle counter (CMS) can be wired to directly, allowing control through a wide range of communication protocols and logic controllers. A small footprint makes it the ideal solution for installation on new or retrofit applications. A wide range of operating voltages allow us to support a global market, and emerging technologies.

The CMC can give you reliable feedback about solid particle contamination levels, water level (%RH), oil degradation and temperature. Making it the most advanced diagnostic centre for hydraulic and lubrication fluids.

WHEN SHOULD IT BE USED?

- ▶ Entrained air or turbulent flows
- ▶ Higher viscosity fluids
- ▶ Un-pressurized systems

WHY SHOULD IT BE USED?

- ▶ Reliable & accurate performance.
- ▶ Allows for pro active maintenance
- ▶ Certifying test benches
- ▶ Easy to retro-fit.
- ▶ Exceptional communication & 4.000 test memory.
- ▶ Alarms for contamination levels
- ▶ Alarm for water
- ▶ Alarm for temperature

CMC Specification

OPERATIONAL PARAMETERS

| | |
|--|--|
| Fluid Compatibility / Corrosion Resistance | Hydrocarbon based & Synthetic hydraulic fluids |
| Min Inlet Pressure | positive pressure |
| Max Inlet pressure | 50 bar (pump option dependant) |
| Max Outlet pressure | 6 bar (pump option dependant) |
| Max. Fluid Temperature (Continuous) | Max. 80 °C viscosity dependant. Not lower than 10 cSt |
| Min Fluid Temperature (Continuous) | Viscosity dependant. Not greater than 1.000 cSt |
| Min Temperature (Start Up) | Viscosity dependant. Not greater than 1.000 cSt ≈ 25 °C ISO VG 320 |
| Max. Viscosity | 1.000 cSt |
| Min. Viscosity | 10 cSt |
| Min. Start Up Ambient Temperature | -30° C |
| Max. Continuous Ambient Temperature | 65° C |
| Power Consumption | 0.25 kW max |
| Weight | 13 Kg |

CONTAMINATION MONITORING SENSOR

| | |
|--------------------------------------|---|
| In-line contamination monitor | CMS with keypad and backlit display and relays. |
| Particle Sizing & Channels | As CMS: >4, 6, 14, 21, 25, 38, 50, 70 µm(c) to ISO 4406 1999 Standard |
| Moisture Sensing (RH%) | Available with or without moisture sensor |
| Communication Protocols | PLC compatible. RS485, RS232 & CanBus (J1939 typical) |
| Software | RMF View (Supplied with product) |
| Re-calibration | Defined by customer Quality Controls |
| On/off & Stop/Start signals (Remote) | Start/Stop signalling & test set up user defined. |
| Hydraulic Hoses (External) | Customer to source their own |
| Circuit Flow Rate | 40 ml/min to 400 ml/min (viscosity dependant) |
| Electric Motor | 110VAC, 230VAC, 400VAC, 690VAC |
| USBi Comms Junction Box | Optional , order with CMS |

OIL QUALITY SENSOR

| | |
|-----------------------|--|
| Material | Stainless Steel AISI304 |
| Analogue output | 4 - 20 mA |
| Digital output | 1xRS485: 9600 baud half duplex, Modbus protocol supported on RS485 CANbus: CANopen protocol supported on RS485 |
| Dimensions | 90 mm x 37 mm |
| Power supply | 9 - 30VDC |
| Protection class | IP67 |
| Weight | 160 g |
| Output connection | 6 PIN Lumberg |
| Mechanical connection | 1/2" BSP Thread |
| Seals | FPM |

OIL QUALITY DISPLAY

| | |
|---------------------------|------------------------|
| Material | Polycarbonate |
| Protection class | IP67 (when connected) |
| Analogue output | 4 - 20 mA |
| Digital output | RMF Systems protocol |
| Dimensions (LxWxH) | 120 mm x 66 mm x 42 mm |
| Weight | 225 g |
| Mounting | Integrated flanges |
| Power | 9 - 30 VDC |
| Average power consumption | 0.4 W |
| Power consumption | 30 mA continuous |
| Analog output | 4-20 mA |
| Display | Oil Quality |
| | Oil Temperature |
| | Rate of Change |
| | Status indicator |

Main Dimensions

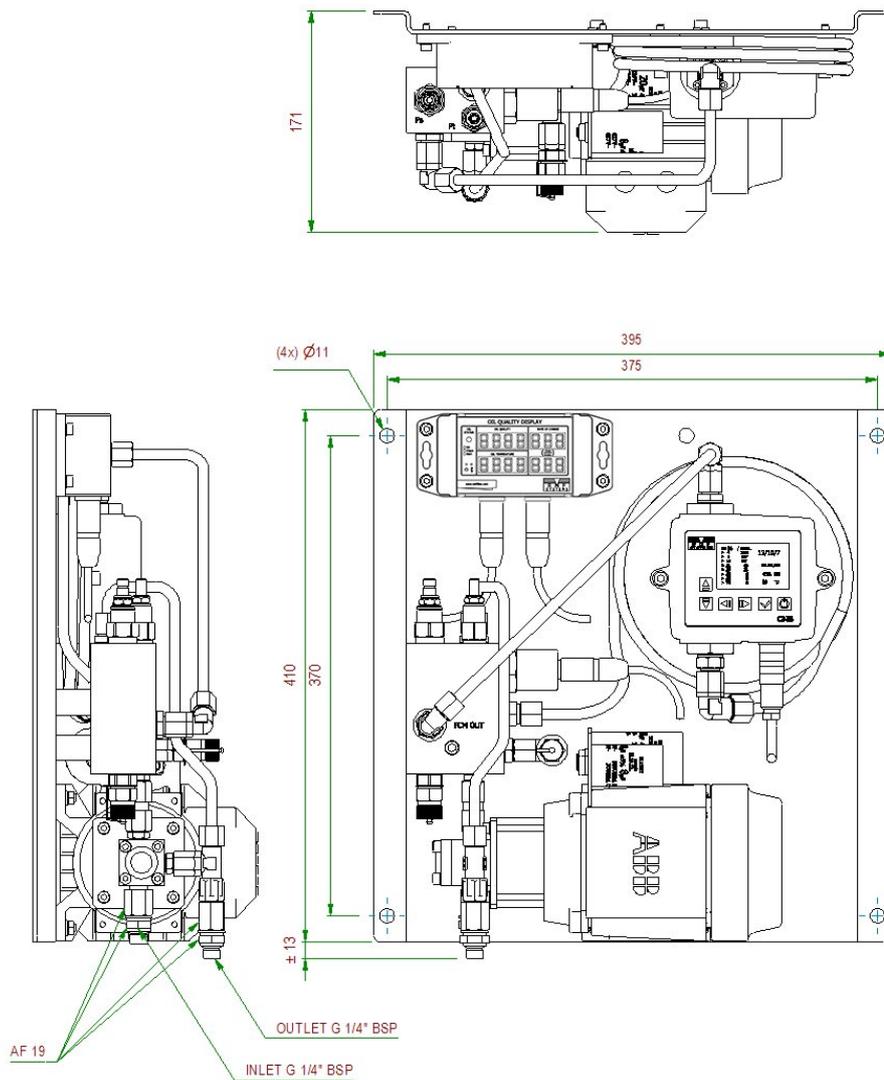


Figure 1: Main dimensions

Hydraulic Diagram

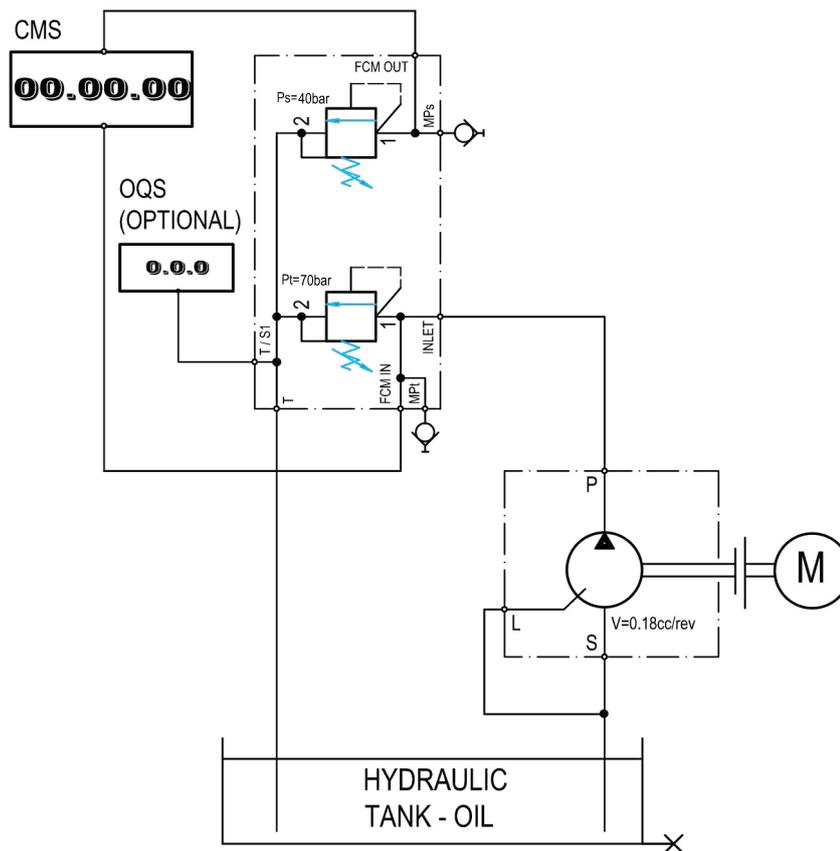


Figure 2: Diagram CMC without drain

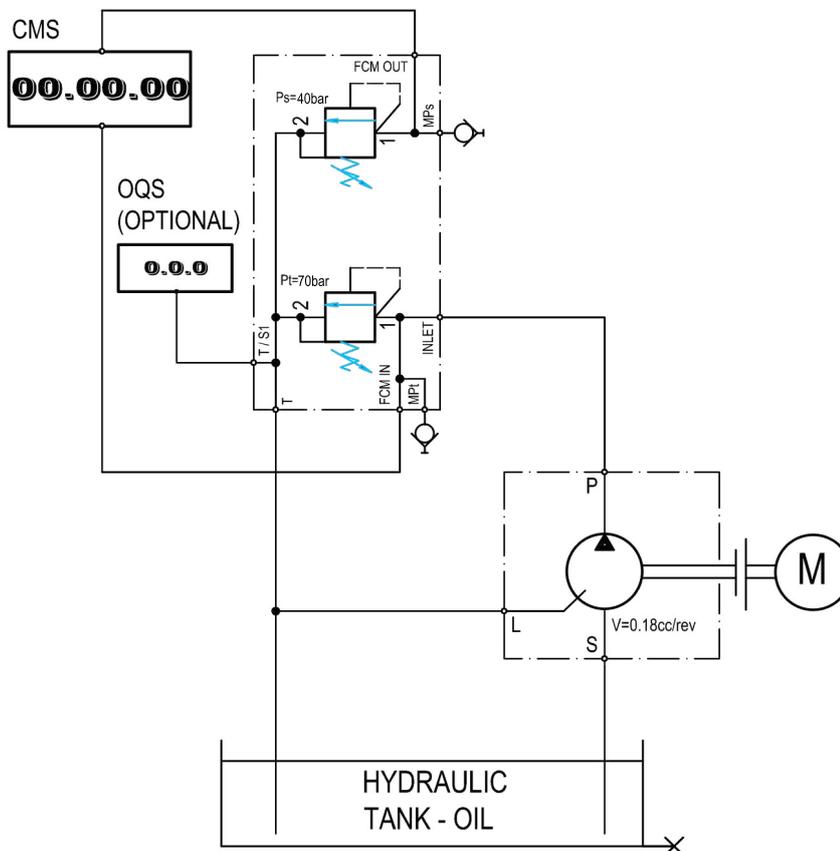


Figure 3: Diagram CMC with drain

Contamination Monitoring Sensor CMS 2

The CMS in-line contamination monitor automatically measures and displays particulate contamination, moisture and temperature levels in various hydraulic fluids. It is designed specifically to be mounted directly to systems where ongoing measurement or analysis is required, and where space and costs are limited.

CMS WATER EN TEMPERATURE SENSOR

The water sensor option measures water content using a capacitive RH (relative humidity) sensor. The results is expressed as percentage saturation.



100% RH corresponds to the point at which free water exists in the fluid, i.e. the fluid is no longer able to hold the water in a dissolved solution.

SOFTWARE

All CMS Units are supplied with software that can be installed on you PC. The results can be downloaded from the CMS to your computer. When the CMS is connected to the PC, it can be controlled directly by the software.

Alternatively historical results can be downloaded from the CMS's in built memory. The CMS memory has space for around 4000 log entries, when full, the oldest log entry is overwritten.

- ▶ Which test are logged, and when, are determined by the log settings
- ▶ Each log entry is time-stamped and contains the CMS serial number, so that it can be identified later.

CMS ALARM RELAY STATUS LED

All CMS versions have a multicoloured indicator on the front panel, which is used to indicate the status or alarm state. The alarm thresholds can be set from the supplied software via the serial interfaces.

SPECIFICATION

LED Based Light Extinction
Automatic Optical Particle Counter

Analysis Range

ISO 4406:1999 code 0 to 25
NAS 1638 Class 00 to 12
AS4059 Rev.E. Table 2
Sizes A-F: 000 to 12
(lower Limits Test Time dependent)

Measurement in 8 channels with particle sizing

4,6,14,21,25,38,50,70 $\mu\text{m(c)}$ to revised ISO 4406 Standard



CMS "USB-I" CONNECTOR

This is a ready-made solution for easily connecting a PC/ Laptop to the CMS. It comprises of a USB:RS485 interface with a terminal block pre-wired to connect directly to the CMS. An extra terminal block is provided for any customer wanting to wire external devices through two solid state relays. An external DC adapter can be used to power the complete system, or if the computer is always connected during use, power can be taken directly from the USB cable. Powered PC / Laptops only.

Oil Quality Sensor

OQS

The Oil Quality sensor (OQS) puts you in control with real-time monitoring of oil degradation due to contamination and water ingress. Expensive oil changes are now based on oil condition, not on historical schedule.

ENVIRONMENTAL

Strict schedule based maintenance programmes have several downsides. Environmental experts argue that the greatest of these is the preventable waste. The Oil Quality Sensor (OQS) real-time monitoring sensor makes extending the oil service life effortless.

MARKET LEADING

The Oil Quality Sensor (OQS) is 60 times more sensitive to oil degradation than any other dielectric constant measuring sensor.

INTELLIGENT

The OQS measures the energy loss component of oil permittivity. All contaminants such as metallic particles, soot, water, oxidation, glycol and particularly burnt fuel dilution increase this measured value.



UNIVERSAL

Reliably measures oil degradation in all industrial equipments, including;

- ▶ Diesel and petrol engines
- ▶ Compressors
- ▶ Industrial gear reducers
- ▶ Wind turbines
- ▶ Generator sets
- ▶ Hydraulic systems

BENEFITS

- ▶ Reduced maintenance cost
- ▶ Extended oil change intervals
- ▶ Scheduled downtime intervals for increased productivity
- ▶ Reduced waste oil cost
- ▶ Improved equipment reliability
- ▶ Low cost investment tool
- ▶ Reduced carbon foot print
- ▶ Reduces total cost of ownership

OQS FACTS

- ▶ Robust design
- ▶ Resistant to high fluid temperatures, -40 C ° to 120 C °
- ▶ Resistant to fluid pressures up to 20 bar

OIL QUALITY DISPLAY

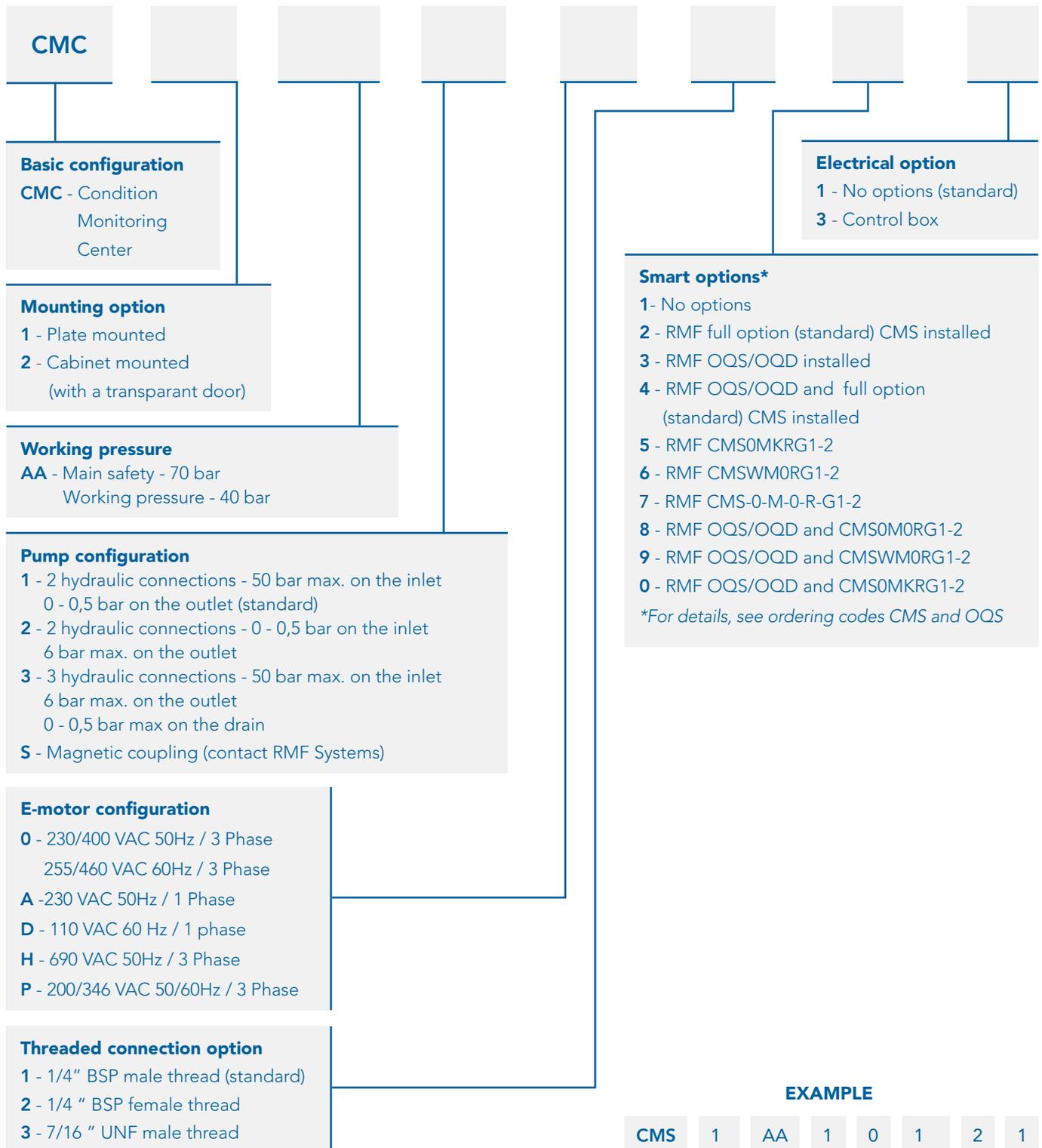
The Oil Quality Display is a simple but powerful device which allows you to read the quality and temperature of the oil from a sensor without a PC.

This enables you to set up the display box on site and then be able to see the oil quality and temperature readings as required. Use an Android app to connect your Smartphone with the OQD smart via Bluetooth. With it being IP67 rated (when connected) you do not need to worry about the need to keep it in a dry place. Also with it being made from polycarbonate it is a strong durable product which cannot be damaged easily. The new 'Rate of Change' feature allows you to easily monitor the degradation of oil over a programmable period of time.



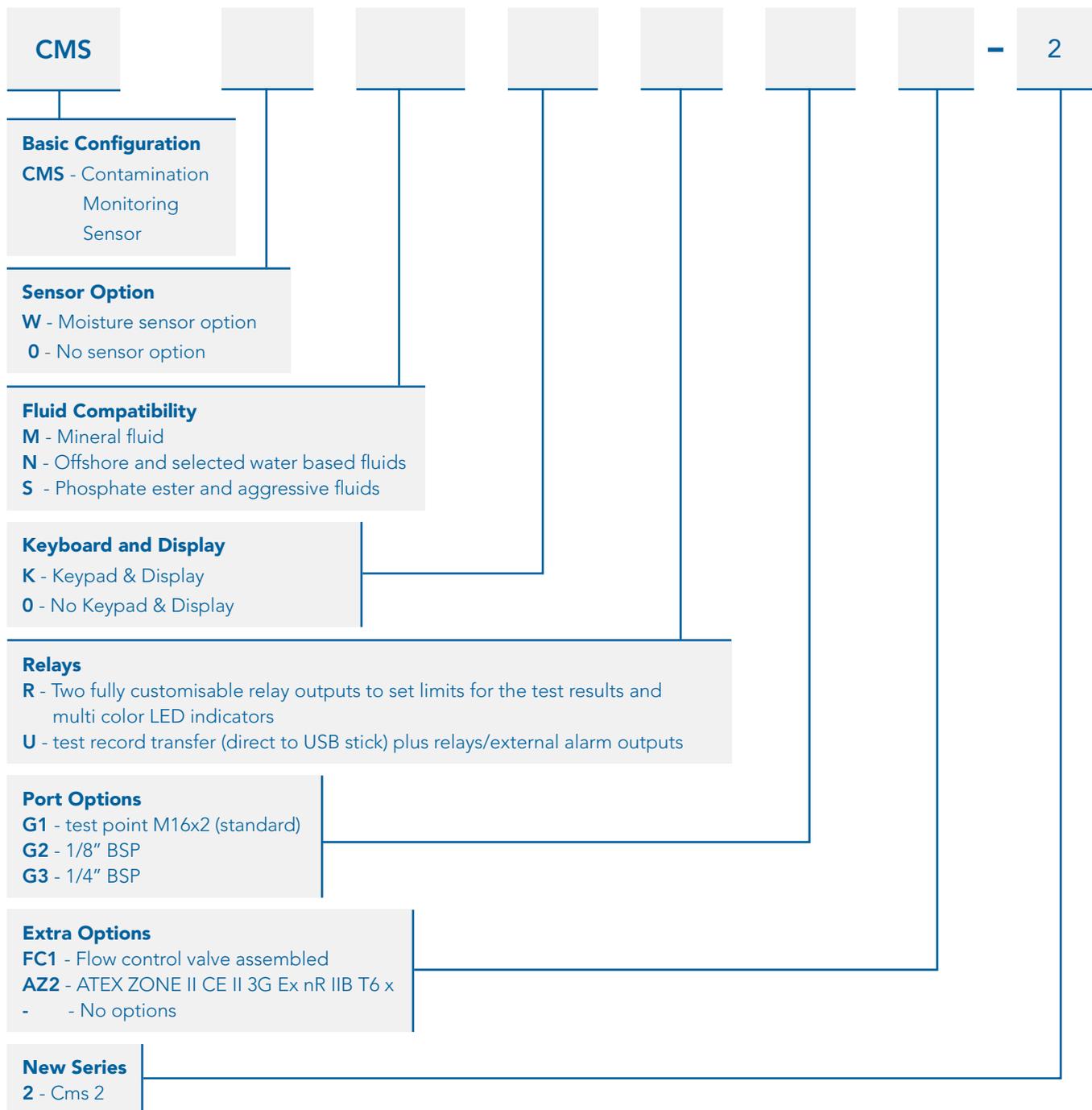
Ordering code

CONDITION MONITORING CENTER



Contamination Monitoring Sensor 2

ORDERING CODE



Related Products

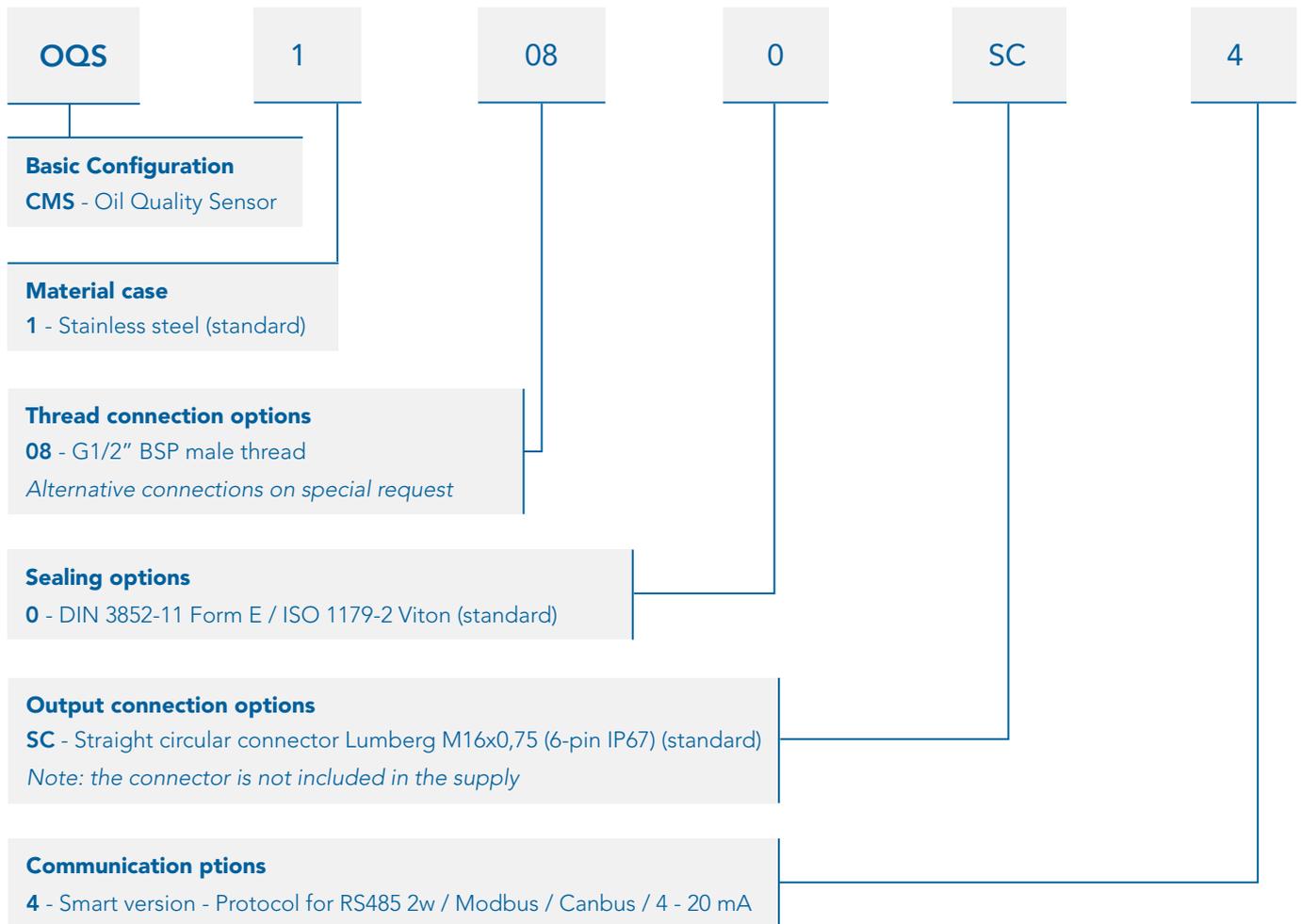
CMS-USBi - CMS to PC USB converter
CMS-RDU2 - CMS remote display unit with keypad

EXAMPLE

CMS W M K R G1 - 2

Oil Quality Sensor

ORDERING CODE



Accessories (order separately)

OQD-S-1 - Display with data logger

OQS CONFIGURATION KIT - USB communication cable with external power supply

OQC-02-1 - OQS to OQD cable

OQC-02-2 - OQS/OQD to bare ends cable