

General Technical Data for Compact Power Module KE-K and KS series

Through the years DCOC has developed a highly evolved modular system resulting in powerful, flexible and cost effective power pack range, identified as “**compact power modules**”. In its easier configuration, a “compact power module” is an assembly of electric motor, central manifold with valves, pump, oil tank and a few connection elements. The central manifold, with its built-in valves, allows to achieve a large variety of hydraulic control circuits. If more complex circuits are needed, modular integrated blocks can be added by flange mounting, or interfacing, to the central manifold to extend its capabilities.

Typical applications

Passenger lift
Fork lift
Car and motorcycle lift
Lift table
Dumper
Tail gate
Scissor lift
Gangway and davits for boats
Material handling
Foods machinery

Power module selection

Choose the circuit which meets your application requirements.

Take note of all dimensions resulting from the basic components chosen for your application.

Note

dimensions may vary slightly and should be confirmed by DCOC, if the assembly is to be installed in a space with narrow clearance.

The tank capacity and the tank dimensions need to be large enough to assure proper pump suction: there must always be a reserve of oil in the tank when all cylinders are fully extended and avoid overflow when cylinders are fully retracted.

The tank must be evaluated also for best separation of air from oil, and for settling down oil contamination. It should be placed in a space with, at least, natural ventilation and it should permit enough heat dissipation to prevent high fluid temperature.

Select the electric motor by evaluating the power needed and the motor compliance with the heat developed during the expected run time (or “duty cycle”).

Hydraulic fluid for compact power module

Mineral oil based hydraulic fluids suitable for hydraulic systems can be used; they should have physical lubricating and chemical properties as specified by:

MINERAL OIL BASED HYDRAULIC FLUIDS HL
(DIN 51524 part 1)

MINERAL OIL BASED HYDRAULIC FLUIDS HL P
(DIN 51524 part 2)

For use of environmentally friendly fluids please consult DCOC.

Fluid viscosity, temperature range of the operating fluid, ambient temperature

The fluid viscosity should remain within the range 10 to 300 cSt (centistokes); recommended 15 to 120 cSt.

Permissive cold start viscosity is maximum 2000 cSt.

The fluid temperature should remain within the range -15°C and 80°C (5°F and 176°F).

Note

For compact power module with plastic tank the fluid temperature should remain within the range -15°C and 70°C (5°F and 158°F).

Ambient temperature -15°C +40°C (5°F and 104°F).

Fluid cleanliness requirements and maintenance

We recommend a cleanliness of the operating fluid according to ISO 4406 Class 20/18/15 or cleaner. All components of the hydraulic circuit, including hoses and actuators, must be flushed and cleaned before assembling, because the compact power module has a suction filter only.

The hydraulic fluid should be replaced after the first 50 hours, and then every 1000 hours, or, at least, once a year.

Power module installation

The mounting position (is basically un-restricted; just avoid installations that could compromise the pump suction, it is recommended to support the power module on vibration dampening blocks when the mounting structure is expected to vibrate.

Wiring and starting-up

The wiring between battery and electric motor should be selected in order to avoid excessive voltage drop (recommended less than 1 V).

It is strictly forbidden to allow the backwards rotation of the pump even at the first starting: to prevent reverse

rotation, the wiring polarities must be correctly connected (except for the reversible pumps).

Caution: when energized, the surface temperature of the electric motor could reach temperature levels of 60-80°C (140-176°F): care should be taken to avoid any accidental contact of people with the motor surface.

A.C. motors

The tolerances on the nominal voltage are:

Single phase motor: 230V +/-5% -

Three phase motor: 230-400V +/-10%.

Protection degree : IP54 (protection against dust and water splash).

Insulation class: F (155°C) (311°F).

All motors are aluminum alloy die cast without painting.

Note

Standard Single phase motors have a permanently connected run capacitor. If the motor starts with pressure in the circuit (load in the actuator) we suggest the use of specials dedicated manifolds KE series with integrated Start-Up valve (Manifold code M09 and M19).

D.C. Motors

DCOC has a wide range of D.C. motors. In the following pages you will find a selection of our standard range.

For further information about our complete range please contact our Sales department.

All the motors shown have clockwise rotation suitable for driving our counter clockwise gear pumps.

For each motor a diagram is shown that enables the customer to select the right pump displacement needed for the required flow and working pressure.

To be sure of selecting the best electric motor for the application, also the duty cycle has to be verified.

Following are the definitions of the type of duty cycles:

S2 = Short time duty cycle: indicate the number of minutes the motor can operate before reaching the maximum allowable temperature. After this time the motor must cool down until the ambient temperature is reached.

S3 = Intermittent duty cycle: indicate the maximum time percentage (%) based on 10 minute period within the motor can run until reaching the maximum allowable temperature. For example an S3 value of 15% = 1,5 minutes running time every 10 minutes period. For 8,5 minutes the motor is switched-off.

The S2 and S3 values are related to the current draw. On the label of motor are indicated the S2 and S3 values referred to the nominal power of the motor.

To check the S2 or S3 value at different conditions is necessary to find the value of current in the motor-pumps

diagram and related it with the represented list.

All the diagrams motor-pumps are obtained at the nominal voltage of 12 or 24 Volt using fluid ISO VG 46 at 20-30°C (68-86°F).

Central manifolds

All the Central Manifolds shown in the catalogue are made in die cast aluminium alloy except the manifold code 10 for CPM MR series that is made by extruded bar. The validation of the Central Manifolds follows a life-test with 250 bar (625 psi) pulsed pressure repeated for 300.000 cycles.

Built-in valves

A wide range of cartridge valves and special plugs is available to be assembled in our Central Manifolds. The cartridge valves shown are designed for use in our Compact Power Module and are manufactured using steel with high mechanical strength. Surface treatments protect the exposed parts to the external environment. Standard seals are NBR (BUNA-N) with backup rings in PTFE. The cartridge valves with "leak proof seat design" have an average leakage of 10-15 drops/minute (< 1 cm³/minute 0.06 in³/min.) at the maximum pressure using fluid ISO VG46 at 40°C (104°F). The validation of the cartridge valves follows a life-test at pulsed maximum pressure (indicated for each valve) repeated for 500.000 cycles.

All the solenoid cartridge valves are fitted with protective O-Rings installed between the pole tube and the coil. These O-Rings protect the internal parts from condensation and contaminants , which could cause malfunction.

All the solenoid cartridge valves are designed for operating in D.C.

Power supply in A.C. requires a connector with bridge rectifier included.

External gear pumps

DCOC offers a wide range of External Gear Pumps to cover different kinds of applications. The standard versions are suitable for the biggest part of applications. For applications requiring higher peaks of pressure (for example Car Lift and Presses) a version with cast iron covers is available. For applications requiring high numbers of Start&Stop or low noise feature the tapered shaft version for elastic coupling is preferred (available only for central manifold K series with A.C. motors). All the pumps are pressure compensated to guarantee the best efficiency.

Oil tanks

In this catalogue you will find a wide selection of steel and plastic tanks available as a standard product. If a special tank is required please contact our Sales Department. Steel tanks have Black paint finish and are suitable for operating temperature range -15°C / +80°C (5°F / 176°F). Plastic tanks are obtained in one piece in order to avoid welded parts that are weak points at extreme temperature and vibrations. Plastic tanks are suitable for operating temperature range -15°C / +70°C (5°F / 158°F).

Note

even if the plastic tank mounting system is designed to avoid oil leakage the tank must be securely anchored when fitted in mobile equipment and when subject to shocks and heavy vibrations. Please check that the anchorages do not stress or deform the tank.

Modular stackable elements

Our modular system offers a wide range of standardised elements. They are divided in two main series:
 Modular Elements “N” series: Modular blocks for different mounting position with mechanical valve or interface for CETOP valves to create parallel or series circuits.
 Modular Elements “V” series: Modular blocks that incorporate solenoid operated cartridge valves 2,3,4 way. All the Modular Elements are made in extruded aluminum alloy. In the catalogue you will find a selection of the main used models.

Note

To reduce the complexity of the system and optimize the available space, special Modular Elements can be designed and manufactured following the customers needs. In this case please contact our Sales Department.

European machine directive 2006/42/CE

According to the Machine Directive 2006/42/CE, a complete power module, as described in paragraph 15 and made available to the European market, enters into the definition of “partly completed machinery”.

Instead, the power module sub-assemblies (motor, pump, reservoir, central manifold,...), when not assembled into a complete power pack, are considered “components” which can be employed in a “machinery” or a “partly completed machinery”. In this case, the DCOC components and sub-assemblies must be fitted in compliance with all the relevant technical data sheet applicable to the product, and shall not be operated, adjusted or disassembled before the complete machinery where they are incorporated has been

declared to be in compliance with the Machine Directive 2006/42/CE.

Note

All the components shown in the catalogue ARE NOT suitable for use in potentially explosive atmosphere.

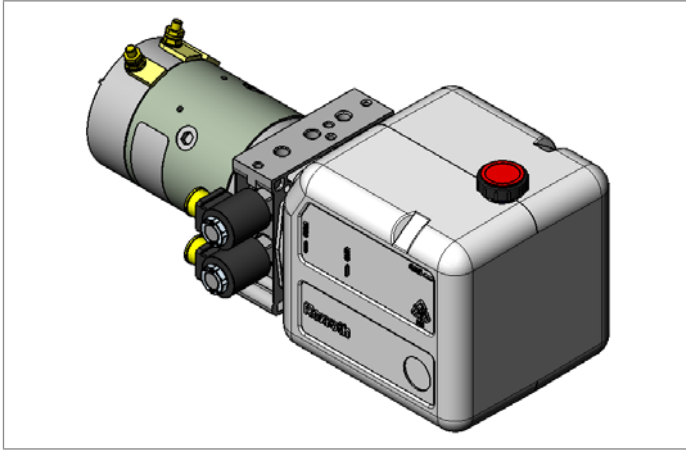
Technical information

Below you will find the most common equations used in hydraulics:

	Common Units	Symbols	Equations
Flow	l/min	Q	$Q = \frac{D \times n}{1000} \times 0,95$
Operating pressure	bar	P	$P = \frac{F}{0,1 \times A}$
Internal diameter hydraulic cylinder	mm	d	–
Area of hydraulic cylinder	mm ²	A	$A = \frac{\pi \times d^2}{4}$
Piston force	N	F	–
Drive shaft	rev/min	n	–
Power requirement for motor	kW	N	$N = \frac{P \times Q}{612}$
Pump displacement	cm ³ /rev	D	–
Torque requirement	Nm	M	$M = \frac{D \times P}{62,8 \times 0,87}$

Compact Power Module Type

Standard Type KE series



Complex circuits, direct flange AC motors.

DC motors up to 3000 W.

AC motors up to 4000 W (5,5 hp).

Pump displacement up to 7,9 cm³ (0,31 inch³).

Pressure up to 300 bar (4350 psi).

Optionals:

Start-up valve inside.

3-ways solenoid operated valve inside.

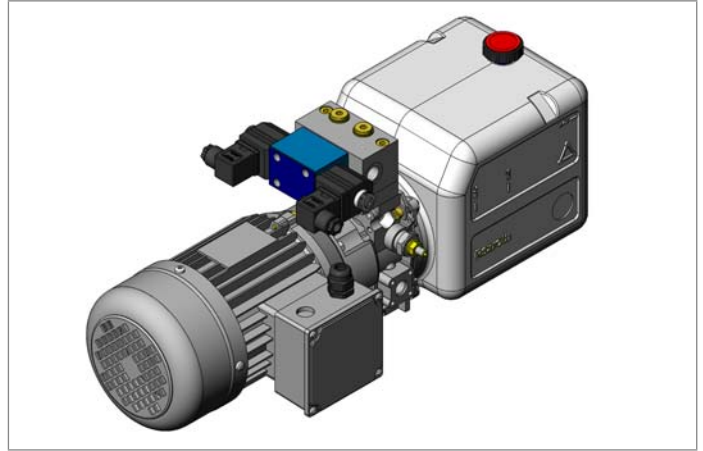
4-ways solenoid operated valve inside.

AC electric motor with direct coupling for smaller dimensions.

Gear pumps with splined shaft.

Low noise pumps.

Optional Type K series



Standardized central manifold for simple hydraulics circuits.

DC motors up to 3000 W.

AC motors up to 4000 W (5,5 hp).

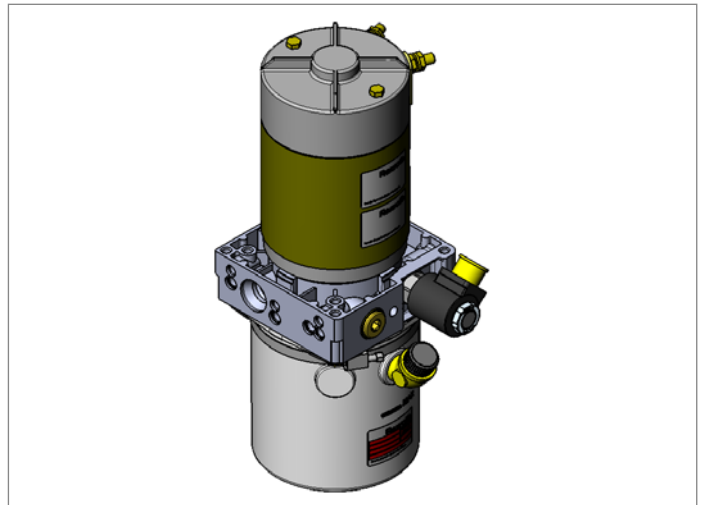
Pump displacement up to 7,9 cm³ (0,31 inch³).

Pressure up to 300 bar (4350 psi).

Optionals:

Elastic coupling.

Optional Type KS series



Designed for lifting applications.

Ready solution for simple acting circuits with the possibility of unloading valve.

DC motors up to 3000 W.

AC motors up to 4000 W (5,5 hp).

Pump displacement up to 7,9 cm³ (0,31 inch³).

Pressure up to 300 bar (4350 psi).

Note

that every power module type can be mounted in horizontal or vertical position.