MCC MPV6 system

Description

Area of application

The MPV6 valve system is an advanced product from MCC. It is the heart of the climate control system for heating and cooling distribution in vehicles. This product information and technical description covers the use, demands, and characteristics of the product.

Modularity of MPV6

To meet the customer needs, the MPV6 is a modular (MCC Patent) built valve system with a variety of configurations. The below figure is an interior view of the valve and shows the inner workings.

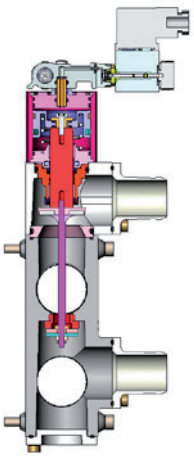


Figure: MPV6 interior view

Each module is manoeuvred with an electric pulse to a magnetic solenoid which acts on a pneumatic dampened cylinder that moves the piston in the valve. Internally, valve design has focused on using only high quality parts with extremely good chemical resistant materials.

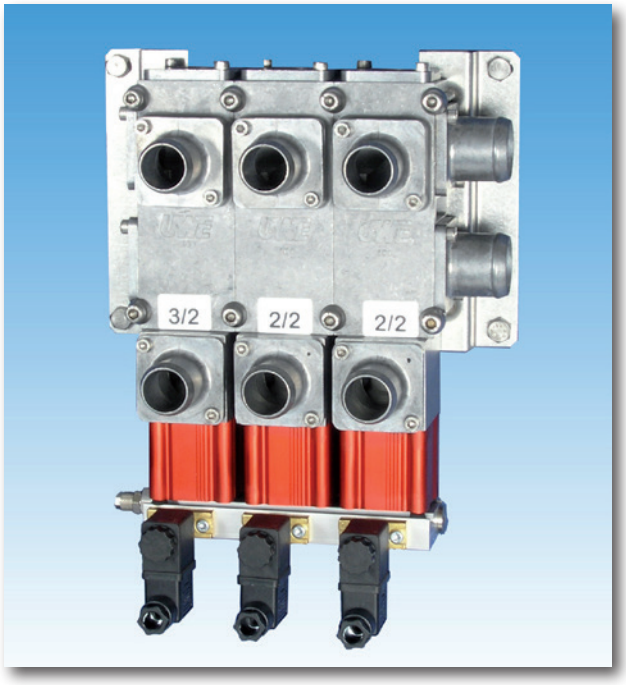


Figure: MPV6 system

MPV6 valve technology simplifies conventionally built central climate systems. Also, the MPV6 has a low flow resistance, which enables high flow rates when needed. The system can be built of from 1 to 4 modules mounted together. Due to the variation of mounting combinations, systems from MCC are not standardized. MCC customizes combinations for the customer after customer needs.

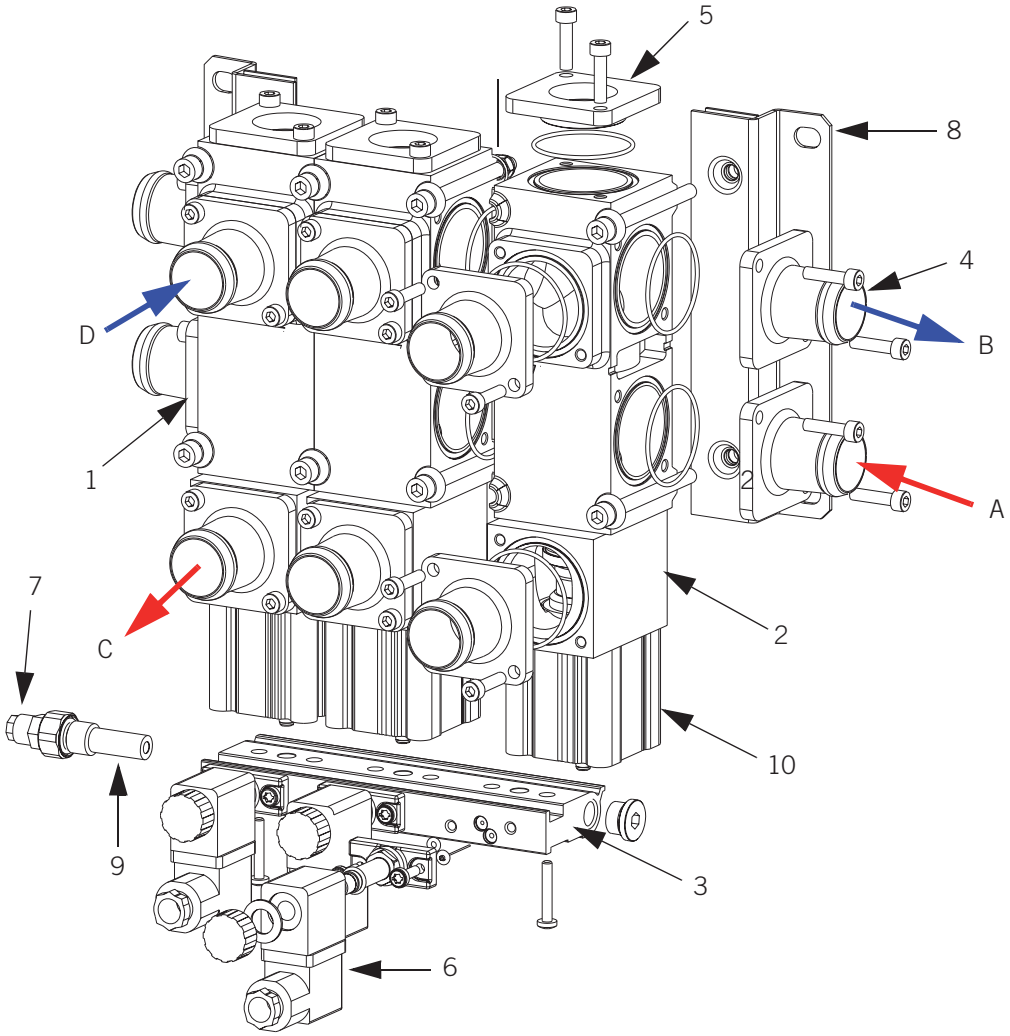
Futher information for MPV6

Product information	Prd0308E01en
Installation Instructions	Prd0317E01en
Solenoid Valve	Prd0310E01en
Spare Parts/ Optional Accessories	Prd0316E01en

Features

- pneumatic cylinder
- a one-piece air manifold
- lower air consumption
- sealed magnetic valve
- low electrical power needs
- high temperature resistance
- low water flow resistance
- compatible with Stationary Bus Heating (RAMP)
- main shut-off valve

Typical MPV6 valve system



Modules
1. Valve body
2. Valve middle section
3. Air manifold
4. Hose connection
5. Plug
6. Solenoid valve
7. Air connection
8. Mounting bracket
9. Filter
10. Pneumatic cylinder

Flow directions
A. Main supply
B. Main return
C. Circuit supply
D. Circuit return

Figure: Exploded view of a MPV6 system

Design and function

The MPV6 is a pulsation valve. Coolant from the engine is led to the main supply connection, and further distributed to the different heating circuits through an optional number of modules. The coolant then flows back to the circuit return connection, and then back to the engine through a main return connection.

Valve body

The valve body consists of a main supply and a main return and a return to the heating circuit. The flow to the circuit is controlled by a compressed air operated piston. The valve body can be equipped with or without a bypass valve between the main supply and return. The purpose of the bypass is to secure a main circuit flow even when the heating circuit valve is closed (used together with an auxiliary heater). Connections can be mounted in different ways and in different dimensions. **Note:** see above figure and technical data for further information.

Valve middle section

This part of the valve is equipped with a feed line to the heating circuit. The middle section can be rotated in steps of 180°, the end parts in steps of 90°. **Note:** see above Modules no. 2.

Valve air manifold

In this section of the valve is an air manifold fed with compressed air and controlled by a solenoid valve.
The customer can specify NC or NO (state of the valve), by selecting one of two different positions of the internal spring in the cylinder. The air manifold has a flexible attachment to the valve group to compensate for the temperature movements.

Technical data

Connections

Main supply	22, 28, 35 mm (or blind plate) *35 mm mainly feed & return lines from motor	Hose (bulge) connection
Heating supply	22, 28, 35* mm (or blind plate) *35 mm mainly feed & return lines from motor	Hose (bulge) connection
Air supply	6 mm OD	Standard air hose

Weight

Number of modules	Approx. Kg.
2-modules	3.8
3-modules	5.4
4-modules	7.0

Air connections

An air manifold simplifies operation of the MPV6. Pressurized air of 5–10 bar is used to manoeuvre the valve (maximum static pressure 12 bar). The air must be "clean" and free from humidity and other contaminates. An air filter is integrated (as delivered from MCC) to prevent particles from entering into the air channels in the valve.

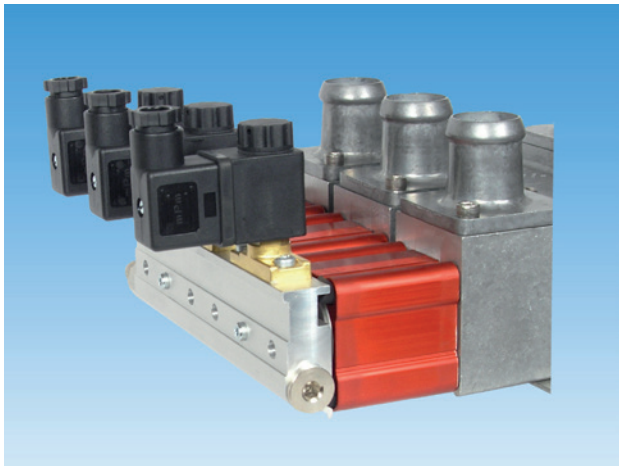


Figure: Air manifold

Electric characteristics

Volyage	24 VDC (range 19.2 to 31.2 volts)
Power consumption	1.5 /Watts per module (under operation)

In the diagram below you can see the calculated required air pressure needed to manoeuvre the valve at a certain water pressure.

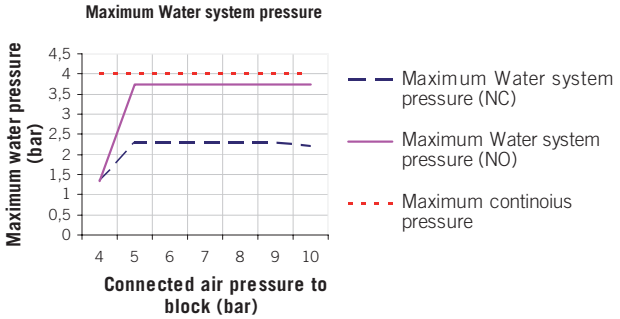


Figure: Water pressure limits when MPV6 is air pressure regulated

New feature

Interior of magnetic valve is designed to fit this type of regulating valve. This results in a optimized flow rate and integrated damping. Also, higher thermal margin and vibration resistance are reached. And improved insulation of the magnetic coil gives an extended lifetime in wet environments.

Logic positions

MPV6 valve will only have NC solenoids. However, the valve has a possibility to be specified with a constant NO or NC position due to the placement of a feeder internally. **Note:** See document "Product specification solenoid valve PRD0310E" if more information is needed.

Working Environment

MPV6 is designed specifically for a vehicle's working enviroment and will operate in the following temperature ranges.

Typical motor compartment installation

(Considered to be the worst placement for the valve system)

- **Short time span**, ED 0,1%: (after systems shut down or during system failure)
  Max surrounding air temperature +105°C to 125°C.
- **Short time span**, ED 8%: (during extreme driving conditions) Max surrounding air temperature > +95°C to < +105°C.
- **Long time span**, ED 60%: (engine idle, all systems normal operation).
  Max surrounding air temperature +60°C to 95°C. *
- **Short time span**, ED < 3%: (Start up, winter conditions) Minimum surrounding air temperature -40°C to < 0°C.

Life expectancy of the MPV6

The MPV6 is designed to work for a minimum of 4 million full stroked movements. Therefore, the expected life in a bus application is difficult to give. Lower internal water temperatures and a pure water/glycol mixture in the unit will give positive effects on component life time.

Performance and limitations

Working pressure range, water	0 – 2.3 (NC); 0 – 3.7 (NO) bar (occasionally under pressure during regulation min. -0.5 bar)
Pulse regulation cycle interval	6 – 10 seconds
Kv-value	10,7 bar open valve 4,2 bar closed valve (bypass)
Required air pressure	5 – 10 bar
Coolant temperature range	-40°C to +110°C
Ambient temperature range	-40°C to +95°C

Material

Valve body, middle	anodized aluminium
Valve air manifold	anodized aluminium
Seat sealing, water main	EPDM
Seat sealing, water bypass	Reinforced teflon
Static seals air side	Viton
Dynamic seals water/air	PTFE compound seals

Internally, valve design has focused on using only high quality parts that have extremely good chemical resistance. All static seals are designed to maintain their function over a long period.

Acceptable coolants and air quality requirements

System Coolant	Water/glycol mixture (50% ethylene/ propylene) Recommended Anti freeze: Texaco ETX 6280 (no casting sand from the motor block allowed, water only as a liquid is not allowed)
Compatibility	**Warning:** Use the same recommended brand; do not mix
Compressed air	Dried air (no alcohol/reduced amount of oil)
Exterior (for cleaning)	Dry cleaner/ mild soap **Note**: be aware of environmental effect when different liquids are mixed.

Filter cartridge

New feature

Installed is a filter cartridge with an integrated double stage filter. Filtration is < 15 micron particles. A second stage filter, active carbon, takes away residual oil from the air system so that it does not reach the valve. **Note:** The filter cartridge should be changed every second year as a step in the maintenance program.

New feature

A optional external oil filter is available for applications that are exposed to “oily” air. Part number for this option is 17800. The filter works with a “pure air” principle with filtration down to 0.01 microns. On the bottom of the filter holder is a drain.

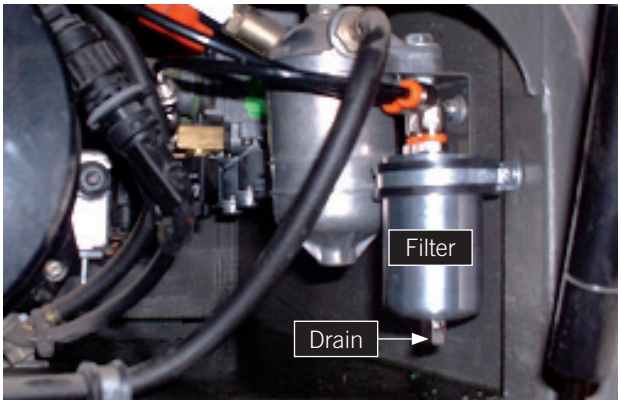
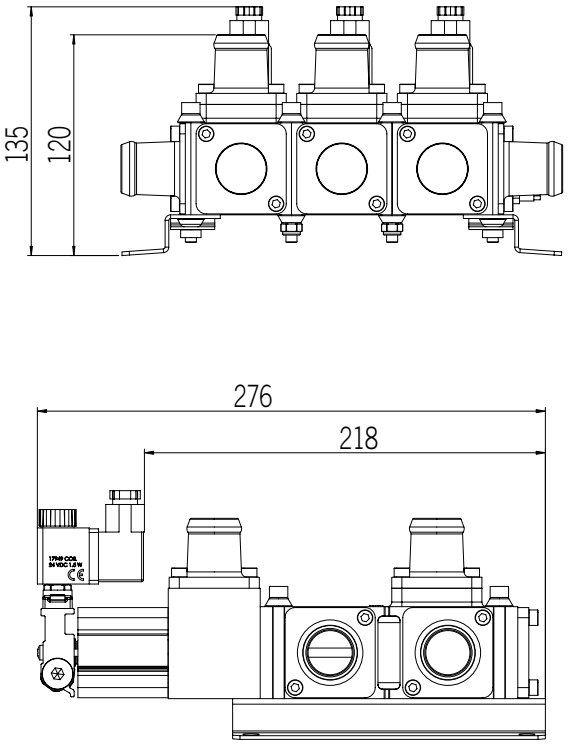
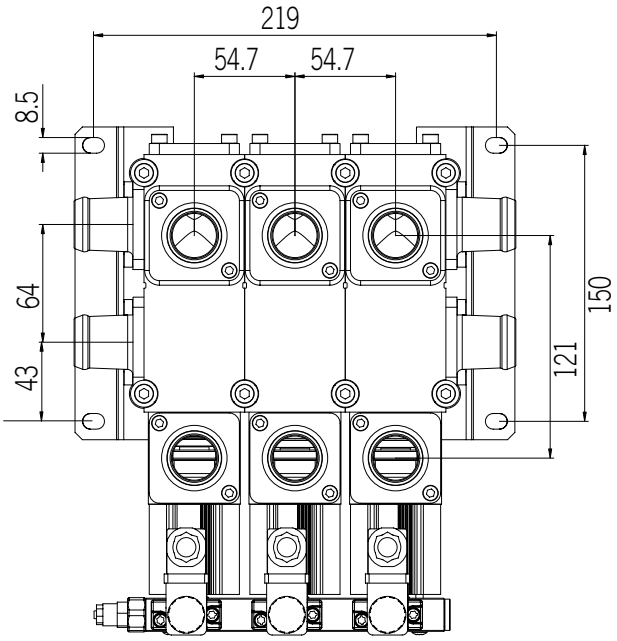


Figure: Filter system

Dimensions of a typical MPV6 system

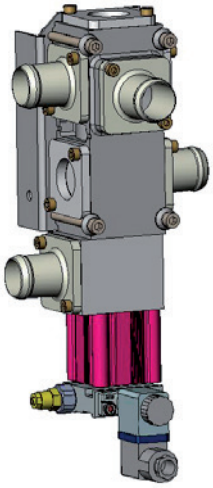




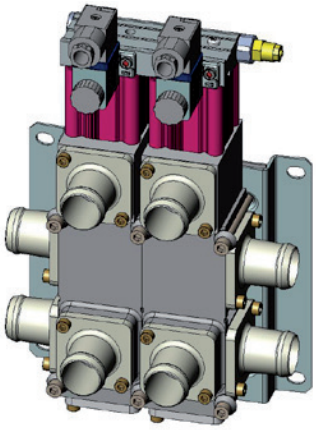
Measurement in mm

Figures showing configurations & part numbers

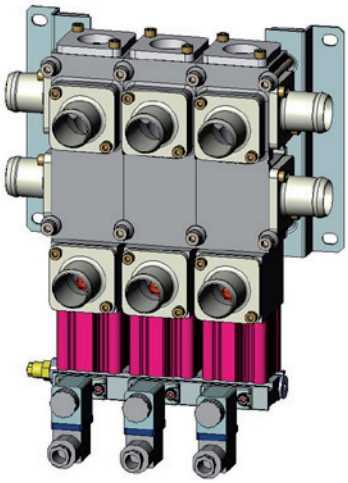
Example 1
Part Number
18500-1-xxx



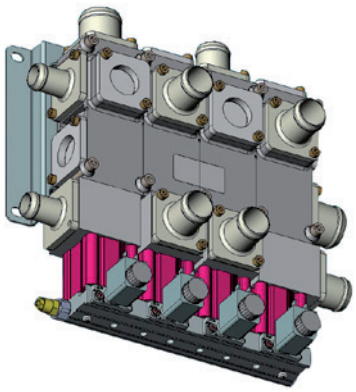
Example 2
Part Number
18500-2-xxx



Example 3
Part Number
18500-3-xxx



Example 4
Part number
18500-4-xxx



Note: Part Number The first three numbers (185) represents MPV6. Next are the number of modules. Last, xxx, are customer options. For example, to order a MPV6 to replace a X3M system the part number only changes from 175 (X3M) to 185 (MPV6).

Accessory

Welding Fixture	Part Number
Double (2) Block	17654
Triple (3) Block	17655
Quad (4) Blocks	17656

Note: Welding fixture for welding MPV6 mounting studs.