

Plasma Control Technologies

Service Bulletin-27

Installation of Vacuum Capacitors

Convection and forced air cooled capacitors can be mounted in any position (vertical or horizontal).

For COMET **fixed capacitors** the outer electrode is identified by the ground symbol (\perp) or GND. We recommend that this side be on the negative side, if these capacitors are used in applications having a DC potential.

Mechanical Connections

As good engineering practice, it is strongly suggested that only one side is mounted on a rigid platform and the opposite side be connected to a non rigid plane (or strap) to prevent excessive thermo-mechanical and/or external forces from damaging the capacitor. In general the COMET capacitors are furnished at both ends with sturdy copper mounting rings. These rings have threaded holes aligned to within 2° . Where space permits, COMET provides two sets of holes per ring containing both metric threads as well as American Standard threads (UNC). The exact details are given on the individual data sheets or outline drawings. In some cases the mounting provision is provided only on one side. The other side requires a special flange. Wherever possible, COMET will furnish an integral flange on both sides on request.

Although modern ceramic vacuum capacitors look very rugged from the outside, one has to remember that due to the brazing process used to join ceramic and copper, the copper is in a soft, annealed condition and is therefore highly susceptible to mechanical deformation. For this reason, any rough handling like e.g. machining of the flanges has to be avoided. Use existing holes and threads for fixation and consider the admissible torque as given in the table below (Tab. 1)

Max. admissible Tightening Torque [Nm]											
	M3	M4	M5	M6	1/4"-20UNC	1/4"-28UNF	8-32UNC	3/8"-32UNEF	3/8"-16UNC	1/2"-28	M12x0.75
Basic-Con		1									
Dual-Con	1							2			
HAMi-Con									10		
Hexa-Con		2									
Hiper-Con				2	2						
LAMi-Cap				2	2						
LAMi-Con				2	2						
Li-Con						2					
Lumi-Con	1										
MAMi-Cap				2	2						
MAMi-Con				2	2						
Maxi-Con		2									
Midi-Con			2				2				
Mini-Cap		2									
Mini-Con			2								
Mono-Con								2			
NAMi-Cap				2	2						
NAMi-Con				2	2						
Power-Con		2									
Power-Solar		2									
SAMi-Cap				2	2						
SAMi-Con				2	2						
Smart-Con			2							2	
Supra-Con				2							
Trimmer-Cap											2
Uni-Con		1	2	2							
Uni-Select		1	2	2							
X-Cap			2								

Tab. 1: admissible torques for COMET Vacuum Capacitors

Water Cooled Capacitors

Water cooled capacitors call for additional precautions during mounting. The water pressure should not exceed 1 bar equal 13.7 psi at the inlet at any time. If this pressure has to be higher to provide adequate cooling, component life will be reduced. The water flow required is indicated on the individual data sheet on the current curves. For water quality see Service Bulletin SB-26 "Liquid Cooling System and Water Purity Requirements". Further the maximum outlet temperature should not be higher than 80°C, in some cases it has to be lower (see individual data sheet).

The preferred mounting position for a water cooled capacitor is vertical. Horizontal mounting is permissible if the precautions as shown in the following figures are adhered too. Fig. 1 shows the water connections and water flow for a fixed capacitor. Please note the correct mounting position for horizontal mounting. It is important to follow these directions. Fig. 2 shows the mounting positions and water connections for variable capacitors with a water flow of up to 15 l/min. Fitting "a" is located on some water cooled capacitor types on the same side as fitting "b". The preferred vertical mounting position is depicted in sketches A and B. In this position the trapping of air and/or vapor bubbles along the convolutions of the bellows is avoided.

If horizontal mounting is necessary the exact positioning as shown under C should be followed. The positions of the inlet and outlet as indicated will minimize the detrimental effect that trapped air and/or vapor bubbles can have on the bellows material.

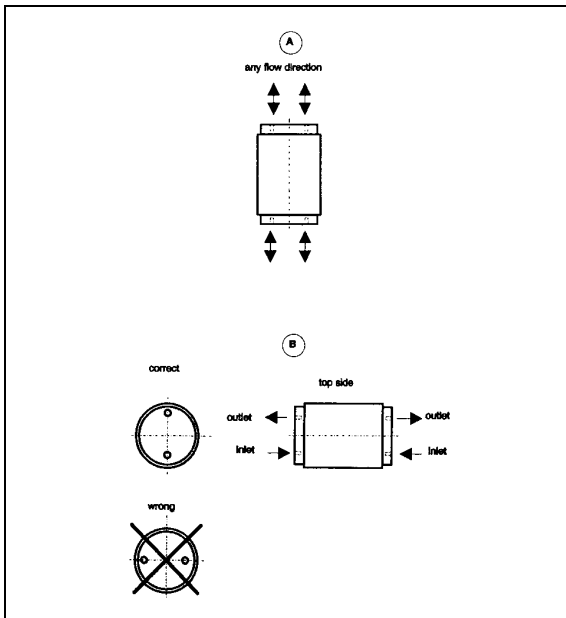


Fig. 1: water connections and water flow for fixed capacitor

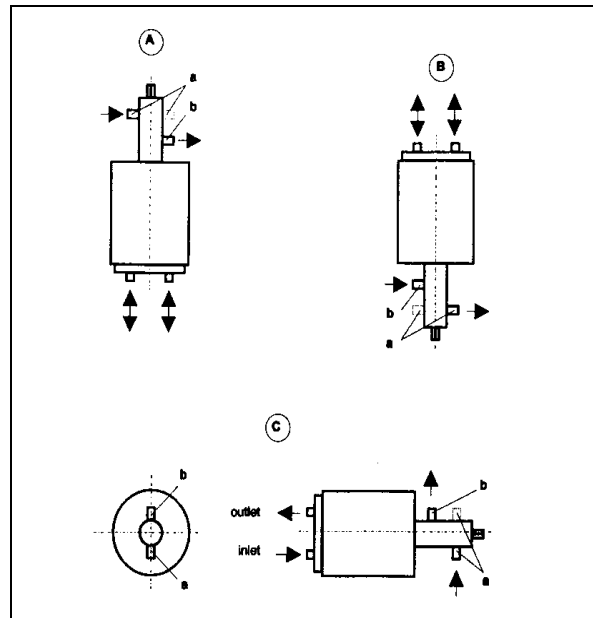


Fig. 2: water connections and water flow for variable capacitor

Turbulence Water Cooling

A description of this cooling system is given in Service Bulletin SB-5 "Variable Capacitor Water Cooling". Fig. 3 shows the positioning of the inlet and outlet of a horizontally mounted capacitor using turbulence water cooling, calling for 25 l/min of cooling water. Please note that the position of the water connections on the variable side remains always the same as indicated with arrows on the water fittings.

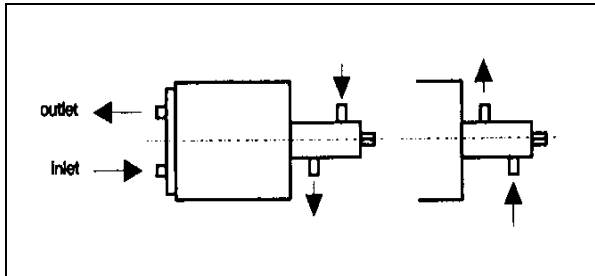


Fig. 3: positioning of the inlet and outlet of a horizontally mounted capacitor

Installation

For all capacitors it is recommended that one side be mounted non-rigid to prevent excessive thermo-mechanical and external forces from acting on the capacitor. Most COMET capacitors are equipped with copper mounting flanges at both ends. This is shown on the individual product data sheets. We suggest using these mounting flanges for all mechanical and electrical connections. Many standard solid flanges contain 6 metric thread holes alternating with 6 inch-sized thread holes.