OEM Design recommendations

Revision	Date	Description	Author	Checked	Approved
0	23 Jun 2025	Creation			

Table of content

1 General

Brakes must be able to hold the aircraft back at full static engine run-up, provide adequate control during ground taxi operations, and be able to effectively stop the aircraft during landing and roll-out.

The thrust produced by the engine is opposed to the retarding force caused by the friction between the tire and the ground surface. In order to hold the aircraft back at full static engine run-up, the retarding force must be equal to or greater than the thrust produced by the engine.

Simply put, the brake system must provide adequate torque on the wheels to accomplish this. Several factors contribute to this — the brake pedal geometry, master cylinder piston diameter, brake caliper piston diameter, effective radius of the brake disc and the rolling radius of the tire.

1.1 Braking energy

The first function of a brake system is to transform aircraft kinetic energy into heat. This heat is absorbed and dissipated mostly by the disc (a thicker disc will absorb more heat energy). The kinetic energy required to stop an aircraft is a function of the mass of the aircraft and its landing speed.

You can calculate the kinetic energy requirement of your aircraft by using the following formula:

$$\text{Kinetic Energy [FT-LBS]} = \frac{0.044 \times W \times V^2}{N}$$

W = Gross weight (lbs)
V = Braking speed (kts)
N= number of wheels with brakes

Please fill the aircraft data sheet provided by BERINGER AERO or contact us with following information:

- Aircraft initial braking speed / Stall speed
- Aircraft Max Take Off Weight
- Number of braked wheels
- Pedal ratio (check paragraph **1.3**)
- Tires installed on each wheel

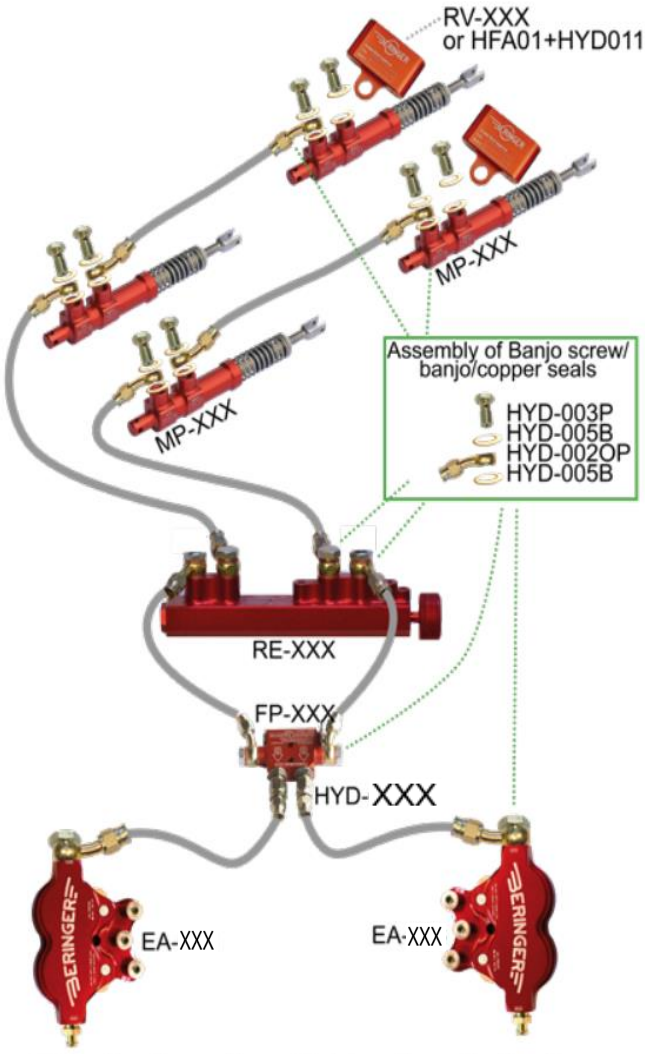
We will provide a specific braking configuration for the installation described.

1.2 Classical configuration of BERINGER braking kit

Beringer braking systems are hydraulic systems and can be operated with hand brake, rudder brake actuators or by a servo engine (not provided by BERINGER).

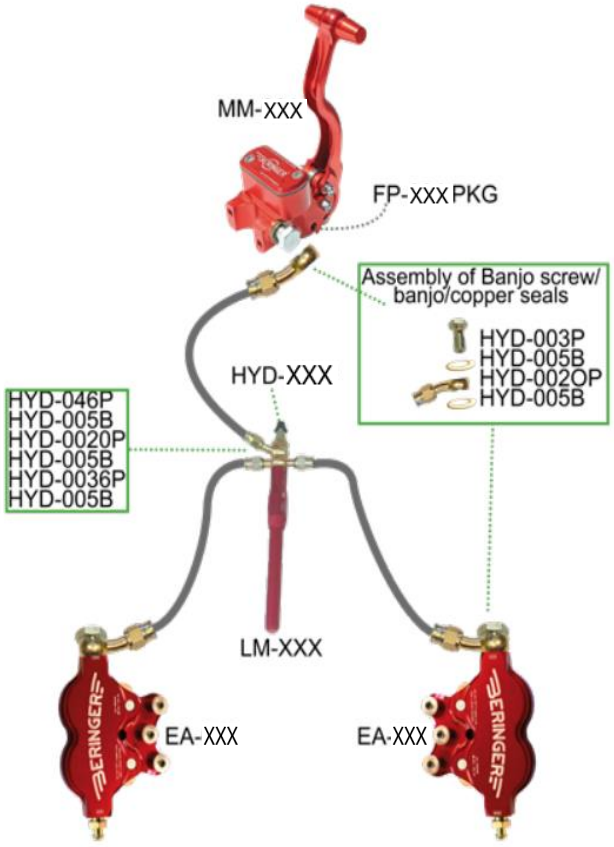
Classical configurations are described below:

Differential braking circuit Pilot/co-pilot rudder pedal master cylinders



This configuration can be modified depending on the Aircraft

Symmetrical braking circuit Hand master cylinder

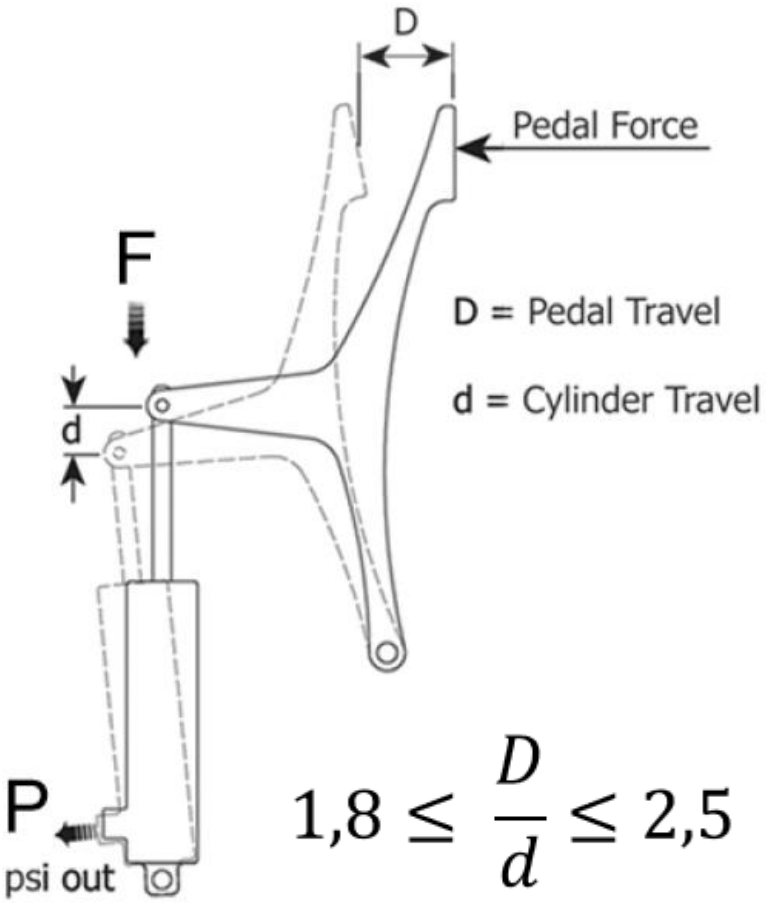


BERINGER AERO recommends installing the rudder Master-Cylinders ideally with the outlets and inlets facing upward to facilitate bleeding.

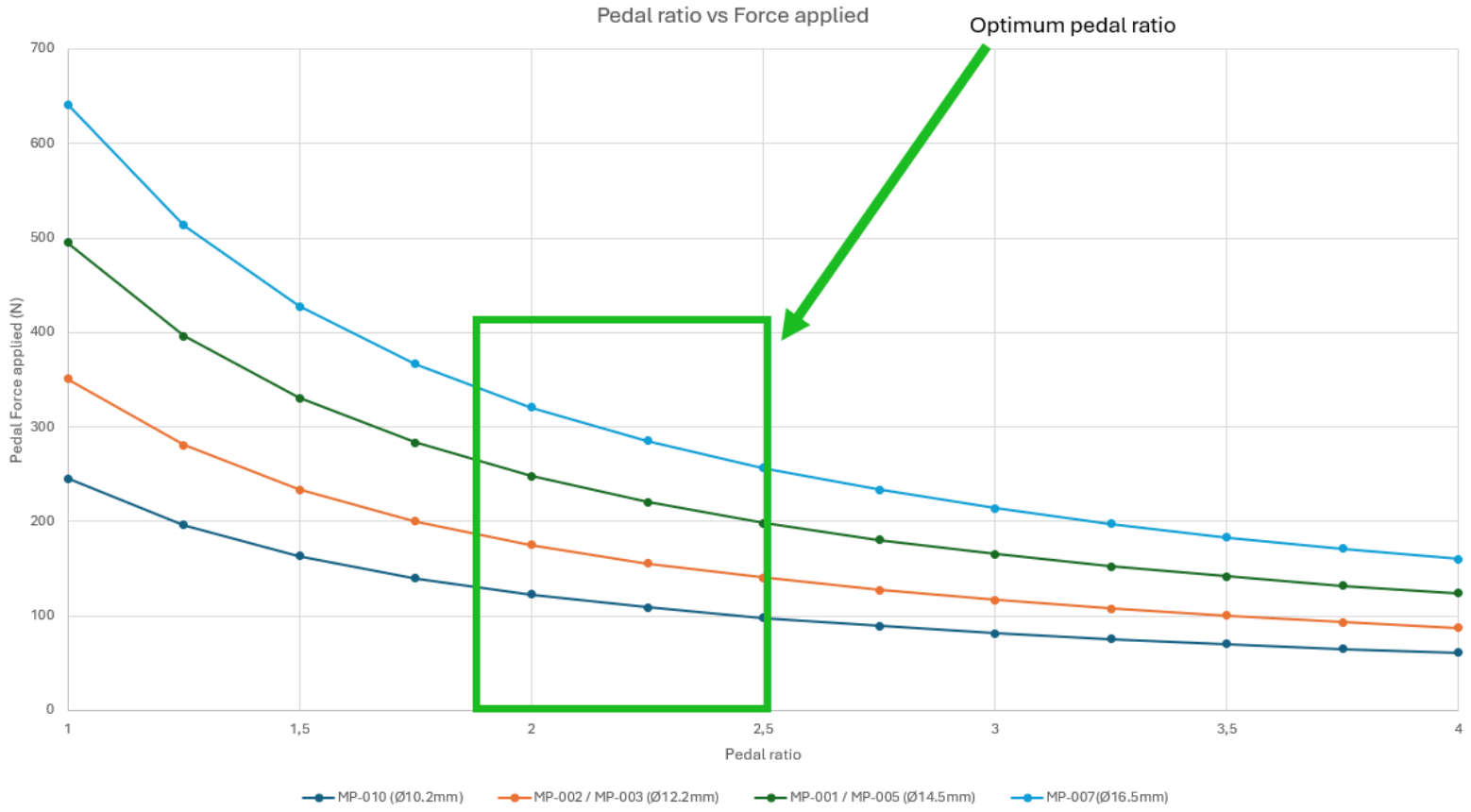
In case of differential braking system, reservoirs shall both be installed on the Master Cylinders upstream.

1.3 Brake pedal ratio and Master cylinder selection

The main function of the brake master cylinder is to provide adequate brake system hydraulic pressure. The master cylinder must be dimensioned for a maximum pressure of 60 bar / 870 psi.



The graphic below shows the optimal pedal ratio is between 1.8 and 2.5, regarding the different master cylinder references.



The pedal ratio may vary during pedal travel but shall ideally remain constant.

2 Tips for installing BERINGER kit

2.1 Caliper installation

Brake caliper shall be installed ideally with bleeding screw facing downward and if possible on the rear side of the wheel.

This will avoid foreign objects projections on the caliper and facilitate bleeding.

Screws shall be tightened as per drawing torque indication, and coated with the correct thread locker when the nut is not a self-locking nut.

Refer to **MM-00-005** available on our website in Support section for further information on tightening torques.

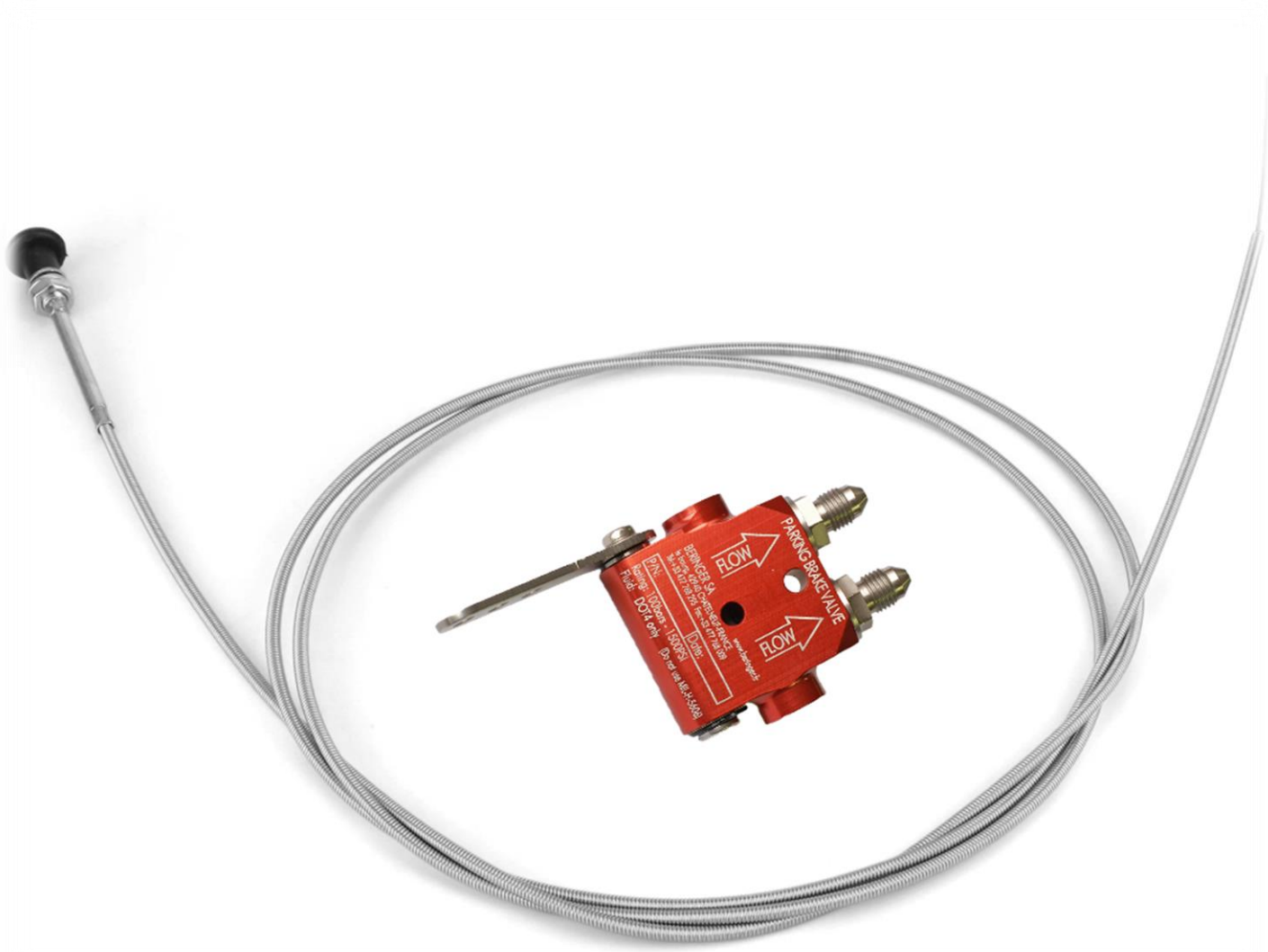
Pay attention to avoid heat radiation of the brake disc on the hoses, it could cause boiling of the brake liquid, leading to brake malfunction. Consequently, avoid routing the hoses close to the disc.

Brake caliper shall be installed ideally with bleeding screw facing downward and if possible on the rear side of the wheel

2.2 Parking brake installation

Parking brake valves from BERINGER AERO are designed to be operated with a push-pull button and a cable.

If the park brake is not connected to a push-pull button or any intermediate control for its activation, the lever of the park brake may untimely get back in closed position. The Service Bulletin **SB-036** available on our website in Support section shall be applied in that case.



2.3 Brake Fluid type

The type of brake fluid to use is most of the time written directly on the brake caliper. DOT4 usually has yellow to amber color and MINERAL (“Mil spec” or “aviation”) brake fluid is red most of the time. If you have any doubt please contact BERINGER AERO.

Pay attention to select the reference of the product corresponding to the correct fluid type. The two types of liquid are not miscible.

Brake fluid is critical to the function and performance of the brake system. Choosing the right brake fluid will ensure trouble free functioning for many years. Conversely, the wrong brake fluid will damage seals and cause failure of your brake system.

There are two predominant “families” of brake fluid in use worldwide:

2.3.1 DOT4 brake fluid

The first family is polyethylene-glycol based and is compatible with only EPDM seals.

In the “DOT” family, BERINGER AERO recommends using only DOT4 because the performance is adequate, and all DOT4 brands are miscible with each other.

DOT4 is used on many ultralight aircraft. You can purchase DOT4 almost everywhere around the globe as it is used on all many cars and most motorcycles.

2.3.2 Mineral brake fluid

The second family is synthetic mineral-oil based and compatible with only nitrile seals.

In the ”mineral” or “MIL” family we recommend using the MIL-PRF-87257 as a replacement of the MIL-H-5606. These 2 fluids are compatible and miscible with each other. MIL-PRF-87257 is fire resistant and has also a higher boiling point than MIL-H-5606.

2.4 Screws installation

When installed with self-locking nuts, screws shall be tightened to torque as per **MM-00-005**.

When not installed with self-locking nuts, screws are to be coated with thread locker described in the drawing of the assembly.

We strongly recommend using the fasteners provided by BERINGER AERO.

2.5 Brake lines

BERINGER AERO can provide crimped hoses if the routing of the braking system is provided with lengths, hydraulic fittings and the angles. Otherwise, BERINGER AERO can provide a bulk of hoses and reusable fittings than can be installed as per instructions described in **MM-00-002**.

3 Maintenance tips

All our installation and maintenance instructions are located on our main website

Support Section Support | Beringer Aero

as well as on our Webshop where you can subscribe to revision notifications

WEBSHOP Webshop | Beringer Aero

CONTACT: support@beringer-aero.com