Cobot MagBase 10 2.0
P/N: 88001856
+ 1(303) 468.0662
magswitch.com

Cobot MagBase 10 2.0 Operation Manual

Safety:

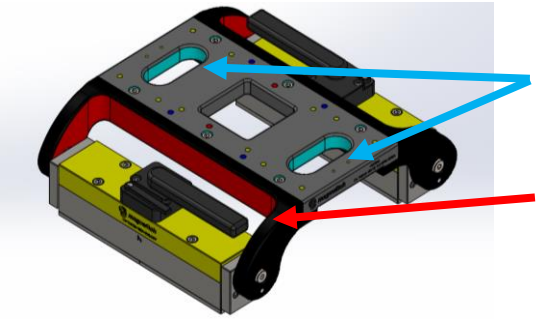
- ***Only lift the MagBase using the two handle cutouts in the platform.*** Items or body parts between the gripping surface of the magnet and ferromagnetic material or MagBase frame are at risk of crushing and impact forces.
- ***Never exceed the max rated load*** of the Magswitch magnet. This may result in an unsafe or dangerous condition.
- ***DO NOT attempt to disassemble or alter the device*** in any way. This will void the warranty and may result in an unsafe or dangerous condition. There are no user-serviceable components inside.
- ***Do not turn the magnet 'ON' unless it is in contact with ferromagnetic metal***. Actuation off-target will generate a strong, static, projected magnetic field which can accelerate, draw-in, and trap ferromagnetic material and damage magnetic storage media.
- ***Always inspect the tool*** to ensure that it is in good working order before and periodically during use.
- ***Avoid sudden jerking or shock force*** as this may exceed magnet holding capacity. Consider use of shear stops or other secondary methods, such as soft starts and stops to prevent loss of magnetic circuit.
- ***DO NOT operate the magnet at temperatures greater than 120ºFahrenheit (49ºCelsius) for prolonged periods***.
- ***DO NOT expose the magnet to temperatures greater than 176°Fahrenheit (80°Celsius).*** High temperatures will permanently degrade the magnet's effectiveness and may result in an unsafe condition.
- ***Not recommended for painted or finish coated surfaces without proper testing and advice*** as these may reduce the magnetic bond, breakaway force and shear performance. The magnet may damage the surface finish. Contact supplier for air gap data.
- This product contains PTFE or Lithium based lubricant. For MSDS information contact Magswitch.

⚠ **WARNING:** This product can expose you to chemicals including nickel and tetrafluoroethylene, which are known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov

⚠ **WARNING:** This product can expose you to chemicals including toluene, which are known to the State of California to cause birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

Operation:

Two people are needed to move the MagBase. Only lift the MagBase using the two handle cutouts in the platform to avoid crushing items and body parts between the magnets and MagBase frame.



To turn the magnet base ON:

- Position the magnetic base in contact with ferrous material such as carbon steel. The feet of both swiveling magnet assemblies should be flat on the surface and in intimate contact with the material. On curved or round surfaces, the notched feet of the swiveling magnet assemblies should match the contours of the object to which the magnet will be adhered.
    - Holding force decreases when surface contact decreases.
    - Holding force decreases when substrate material thickness decreases
    - Holding force decreases when there are "air gaps" such as paint buildup, rust, or nonferrous materials between the magnet and the ferrous surface
- Turn a knob on a swiveling magnet subassembly clockwise 180°. As the knob is turned the knob assembly will make clicking noises as the ratchet pawl advances. The base can be shifted on the surface of the substrate while partially actuated.
- In the ON state the actuation knob will point to the "MAX" engraving on the ratchet cover.
- Repeat for the second swiveling magnet assembly on the other side of the base.
- The magnet will not reach full strength until both knobs are rotated fully.

To turn the magnet OFF:

- Prior to deactivation, ensure base is adequately supported to prevent unsafe conditions when magnets are released.
- Open the pawl release lever.
- Simultaneously, rotate the primary knob counterclockwise 180° until the knob points to the "OFF" engraving on the ratchet cover.
    - WARNING: the knob can rotate backwards rapidly if the substrate material is thin (or not present).
    - IF for some reason the magnet was actuated off-target or if the magnet was peeled from a thin substrate, take care to not get fingers caught between the actuation knob/lever and yellow cap. This can pose a pinch hazard.
- Repeat for the second swiveling magnet assembly on the other side of the base.
- When both magnets are fully OFF, there will be no attractive force between the base and the substrate material.

Commissioning:

The top surface of the 88001856 MagBase features a Ø170mm pitch circle for four M8 screws and two Ø8mm dowels spaced 120mm apart. This mounting pattern is compatible with Fanuc CRX-10, Fanuc CRX-20, UR10, UR10e and UR16e COBOTs. Calculations must be done to ensure that the MagBase can safely handle your COBOT and its load; see "Capability" on Page 4.

The two Ø8mm dowels are not installed when shipped and must be pressed in the mounting surface by the individual installing the robot. The dowel transitional fit may be tight, so a small arbor press is recommended for dowel installation.

When installing the robot, ensure the magnet base is firmly adhered to a ferrous surface (or otherwise rigidly fixtured to prevent it from twisting or binding during installation). Position the robot over the top of the bolt pattern and dowel pins (or position the base under the robot in the proper orientation).

Install (4x) M8 socket head cap screws through the COBOT baseplate into the corresponding M8 threaded holes in the MagBase baseplate. Follow the COBOT manufacturer's guidance for proper torqueing of the screws to secure the robot to the magnetic base.

The base has 8 additional M8 threaded holes and 4 M4 threaded holes to mount accessories. See the spec sheet (1101896) for a drawing with hole locations.

Note that there could be up to 0.2mm (0.008") of clearance between the bushings and shoulder screws in the MagWings. Use the dimensional data on Page 4 to calculate if this clearance could cause repeatability issues in your application.

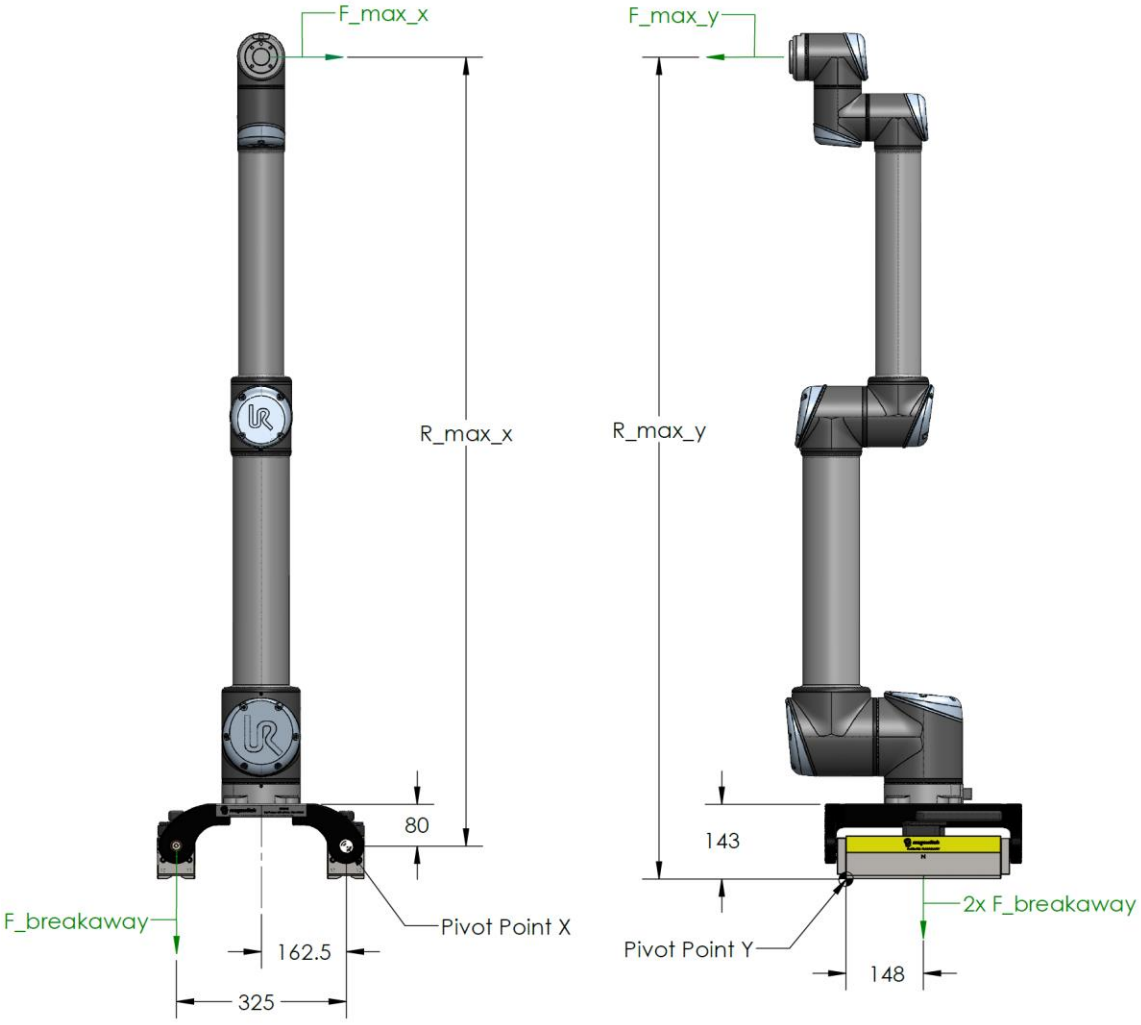
Mounting Pattern Compatibility:

Fully Compatible	
UR	UR10
	UR10e
	UR16e
Fanuc	CRX-10 Series
	CRX-20 Series

Capability:

Due to the high dynamic loads a robot will exert on the magnetic base during operation, it is recommended that the following procedure be applied to match the substrate (magnetic surface) thickness to the speed at which the robot is moving and the mass of the end effector and arm. If your MagBase is mounted in a different orientation or if you have any questions about these calculations, please consult a Magswitch applications engineer. The customer is responsible for verification of all calculation to ensure that the MagBase is safe to use for their application.

1. Determine the maximum dynamic force the robot will exert about the magnet base pivot points as shown below. If a custom base plate is used, you MUST adjust the dimensions below accordingly.



2. Calculate the maximum exerted torque about the magnetic base pivot points
3. Use the dimensional data above and on the spec sheet (1101896) as required to infer the maximum breakaway force applied to each magnet array.
4. Multiply the calculated minimum breakaway force requirement by 10x. **NOTE: Universal Robots recommends a factor of safety of 10x.**
    a. If the magnet is applied to surfaces covered in paint, rust, or scale, or if the substrate is significantly different than 1018 steel or is curved, please consult a Magswitch engineer for de-rating factors.

5. Refer to the table below for the maximum breakaway data for ONE swiveling magnet array.

Material Thickness - mm (in)	1.5 (0.059)	1.9 (0.075)	2.7 (0.106)	3 (0.118)	3.5 (0.138)	4.76 (0.187)	6.35 (0.250)	9.53 (0.375)	12.7 (0.500)	19.05 (0.750)
Maximum Force [1,2,4] - N	1585	2109	3503	3648	4058	5591	8626	10241	10712	11036

6. Size the thickness of the substrate according to the maximum force shown above, taking into account the safety/de-rating factor used in step 4 above.
7. If at any point the calculated breakaway force exceeds the material substrate you are capable of using, or if application variables beyond your control prevent you from using this straightforward calculation, please contact a Magswitch engineer to discuss your requirements.
8. Shear forces in X and Y directions are less than the breakaway strength (approximately 20% of breakaway).

Notes on Electrical Isolation:

This magnetic pivot base is outfitted with conductive bushings and the magnet arrays are NOT isolated from the baseplate (and robot).