

Access Rescue Canada: Equipment Note



MPD™ (Multi-Purpose Device)

Date: December 20, 2015

The MPD may be used for lowering, raising and belay systems and is designed for use with static or low-stretch kernmantle life safety rope.



Use only rope that has been inspected, is of proper size and is in good condition. The user should be aware that environmental conditions may have an effect on the rope's interaction with the MPD. For example, water saturated ropes, icy ropes or ropes otherwise covered with substances such as clay, tar or oil will, to varying extents, affect the rope's interaction with the MPD. The user should be aware of these conditions and make necessary adjustments, such as adding additional friction. Saturated ropes or ropes covered with foreign material may not progress smoothly through the MPD, possibly resulting in a ratcheting type of progression

as the rope moves through the device. Additionally, rope that is dirty, sandy or muddy may cause increased wear to the fixed and moving brakes, which may reduce the device's ability to arrest and hold a load.

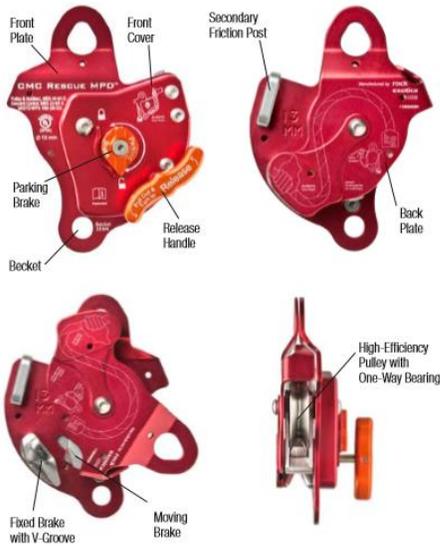
Release Handle

The Release Handle is used to rotate the Moving Brake off of the rope, allowing rope movement through the device for lowering a load or releasing tension on a line, such as with a guiding line or track line. Pulling the Release Handle out engages a set of gears connected to the Moving Brake. To minimize wear on the Moving Brake, it is recommended to turn the handle fully counterclockwise to completely unseat the Moving Brake from the rope and to control the rate primarily with friction of the rope applied against the Fixed Brake V-Groove. To stop lowering and lock the rope, disengage the Release Handle.

NOTE: Although there is a return spring to assist in disengaging the Release Handle, it is the user's responsibility to ensure that the handle is fully pushed in when not actively lowering.

IF AT ANY TIME YOU NOTICE A SUDDEN CHANGE IN SPEED OR TENSION ON THE ROPE RUNNING THROUGH THE MPD, IMMEDIATELY LET GO OF THE RELEASE HANDLE (DISENGAGE) TO STOP THE LOAD.

As with all new rescue equipment, the MPD should be thoroughly inspected before being placed in service. The MPD is a robust unit but should still be inspected after each use to ensure that damage did not occur. When inspecting, look for any damaged, dirty or sticking components, excessive wear or any other factor that may prevent proper function.



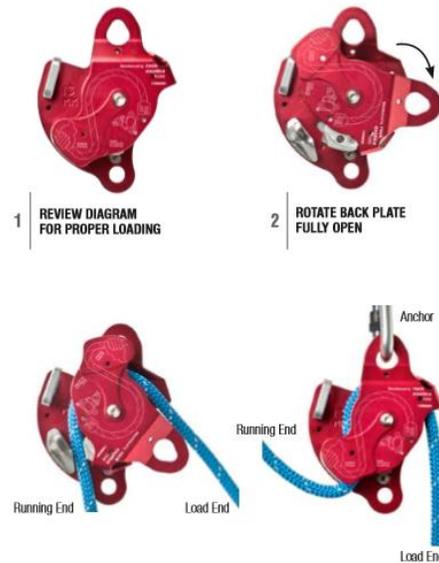
Brake

A unique feature of the MPD is the Parking Brake, which when locked, prevents inadvertent letting out of the rope. The design of the Parking Brake allows for rope to be taken in if required without having to unlock it, although increased rope friction will be encountered. Lock the Parking Brake prior to releasing your grip from the running end of the rope, except when the MPD is rigged as a ratchet or progress capture in a pulley system. For example, once the rigged MPD is connected to the anchor, for safety, lock the Parking Brake until you are ready to use the device. To fully lock the Parking Brake when using non-tensioned, icy or saturated rope, it

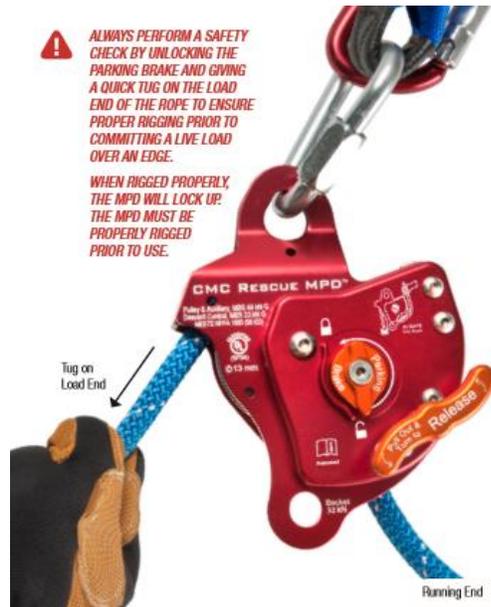
may first be necessary to pull out the Release Handle and rotate it clockwise to further force the Moving Brake against the rope.

Rigging the MPD

To rig the MPD, first ensure that the Parking Brake is unlocked. Hold the MPD so that the back plate faces up. Take note of the diagram showing the proper rope orientation, then open the MPD by rotating the back plate clockwise until there is sufficient space to insert the rope between the fixed and moving friction brakes. Insert the rope with the running end between the friction brakes and place the rope around the pulley in a clockwise direction. The load end of the rope exits the pulley opposite the friction brakes. Close the MPD by rotating the back plate completely counterclockwise, making sure that the rope properly enters and exits the MPD as shown in the diagram on the back plate. Attach the MPD to the anchor using an appropriate locking carabiner or screw link through both the front and back plates.



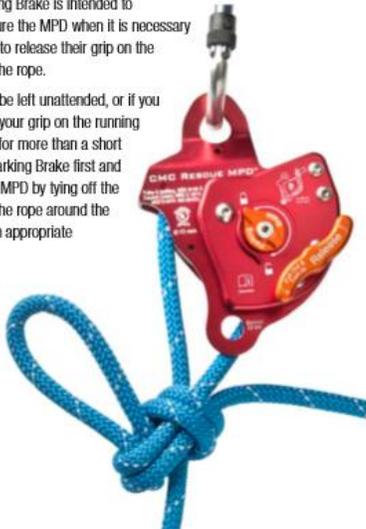
Rigging the MPD (Continued)



Securing the MPD

NOTE The Parking Brake is intended to temporarily secure the MPD when it is necessary for the operator to release their grip on the running end of the rope.

If the MPD is to be left unattended, or if you need to release your grip on the running end of the rope for more than a short time, lock the Parking Brake first and then secure the MPD by tying off the running end of the rope around the load end with an appropriate tie-off method.



Using the MPD as a descent control device

When used to control a descent, the MPD design allows for easy adjustment of the friction for the size of the load, rope type, and environmental and terrain conditions. The speed of the descent is controlled by the

friction of the rope applied against the Fixed Brake V-Groove. Always start with the running end held firmly back toward the anchor, parallel to the load end. Reduce the friction by varying the angle at which the running end enters the MPD. Maximum friction is applied when the Secondary Friction Post is used.

AT NO POINT SHOULD THE RUNNING END OF THE ROPE HAVE AN ANGLE OF LESS THAN 90° TO THE LOAD END OF THE ROPE.

Edge transitions can be the most challenging part of an operation. Using the MPD as a descent control device allows for a high degree of responsiveness and control. As the rescuer or rescuer and patient approach the edge, it is very easy to take in rope through the MPD to prepare for the edge transition. Pre-tensioning of the Main Line is also simplified because of this.

TO LOWER To lower, firmly grip the running end of the rope and tightly hold it against the Fixed Brake V-Groove, bringing it back toward the anchor and parallel to the load end, creating an “S-shaped” bend in the rope as it passes through the MPD. Pass the rope over the Secondary Friction Post for heavier loads if needed. Unlock the Parking Brake and then firmly grip the Release Handle. For the most comfortable hand operating position, before pulling outward on the handle, give a slight clockwise turn of the wrist, then pull out to engage the release mechanism.

Begin lowering by rotating the handle slowly counterclockwise all the way to completely unseat the Moving Brake from the rope, controlling the rate primarily with friction on the Fixed Brake V-Groove. Maintaining the

“S-shaped” bend in the rope will improve the function of the braking mechanism in the event it is needed and will increase the service life of the Moving Brake, reducing the potential for rope creep through the device.



ALWAYS MAINTAIN A FIRM GRIP ON THE RUNNING END OF THE ROPE DIRECTED BACK TOWARD THE ANCHOR IN AN “S-SHAPED” BEND BEFORE ENGAGING THE RELEASE HANDLE.

Preparing to Lower

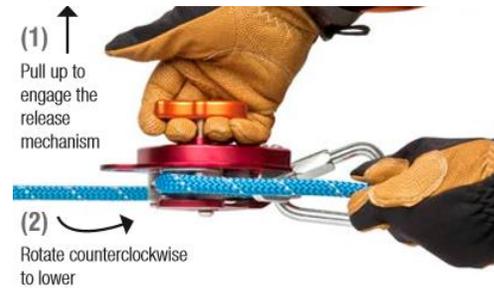
Firmly grip the running end of the rope and apply friction over the Fixed Brake V-Groove, bringing the rope back toward the anchor and parallel to the load end, creating an “S-shaped” bend in the rope.



ALWAYS MAINTAIN AN “S-SHAPED” BEND IN ROPE

To Lower

Unlock the Parking Brake. Grasp the Release Handle and pull up to engage the release mechanism (1) and then rotate counterclockwise to lower (2). Rotating the Moving Brake off the rope may significantly increase the service life of the MPD



FOR HEAVY LOADS Add additional friction by threading the rope over the Secondary Friction Post.



To Stop Lowering

To stop lowering and lock the rope, disengage the Release Handle.

NOTE: Although there is a return spring to assist in disengaging the Release Handle, it is the user’s responsibility to ensure that the handle is fully pushed in when not actively lowering.

ALWAYS MAINTAIN A FIRM GRIP ON THE RUNNING END OF THE ROPE WHEN THE PARKING BRAKE IS NOT LOCKED.

Using the MPD as a belay device

The MPD is designed to be used as a belay device to arrest a falling load should the Main Line system fail. It is recommended that during edge transitions, while either lowering or raising loads, that the Belay Line tension be kept hand tight and without slack in the line. Stumbles by the rescuer or litter tender(s) are most likely to occur during edge transitions, which may result in the ropes being run across edges that can potentially damage or cut them. It is less likely to damage both ropes if the Belay Line remains non-tensioned during these transitions. Additionally, greater descent control can be achieved if only one rope manages the rate of descent during edge transitions. If the Main Line system completely fails during an edge transition (e.g. anchor failure or improper system connection), and if both ropes are suspended above the terrain, as when using a high directional, then a dynamic fall onto the Belay Line is likely. Among rescuers, this is widely recognized as potentially the worst case dynamic event in rescue work. While every effort should be made to rig and operate systems to minimize the potential for such dynamic events, the MPD is designed and has been tested to arrest a 1 m fall onto 3 m of static rope with a rescue-sized load and limit the peak force below 15 kN (3,372 lbf) with no more than 1 m (3.3 ft) stopping distance (as advocated by the British Columbia Council of Technical Rescue Belay Competency Drop Test Criteria). Such a dynamic event is severe and warrants that all involved equipment be retired and properly disposed of after the operation is safely completed.

Belaying a Lowering System

When belaying a lowering system, once the rescuer has good control of the load and is in the correct descent path (this often occurs within the first 10 m [33 ft] of the descent), it is recommended to convert from hand-tight Belay Line tension to shared tension between the Main Line and Belay Line. Should the Main Line system fail from this point on, a Shared Tension system will minimize rope stretch and provide a considerably reduced arresting distance as compared to a conventional non-tensioned belay. It will also help mitigate other hazards, such as an inadvertently slack Belay Line or rope-induced rockfall, since the now-tensioned Belay Line will be suspended above the terrain between contact points, just like the Main Line.

Shared Tension Systems

Shared Tension Systems are essentially two lowering systems in place of one lowering system and a belay, with each line supporting approximately half the load. If either system should fail, the increased load on the other descent control device will cause an increase in rate of descent. While the MPD is an effective belay device capable of safely arresting a falling load, when used as a descent control device you are manually overriding the belay function. This could result in increased stopping distances if not using proper technique. Therefore, in a Shared Tension lower it is imperative that the running end rope of the Belay Line be held back toward the anchor, maintaining the “S-shaped” bend as the rope runs through the MPD. If there is a sudden change in speed or tension on the rope running through the MPD, the belayer must immediately let go of the

Release Handle (disengage) while maintaining a firm grip on the running end of the rope to ensure the braking mechanism activates and arrests the load in the shortest distance possible.

YOU MUST LET GO OF THE RELEASE HANDLE WHILE MAINTAINING A FIRM GRIP ON THE RUNNING END OF THE ROPE TO ACTIVATE THE BELAY!

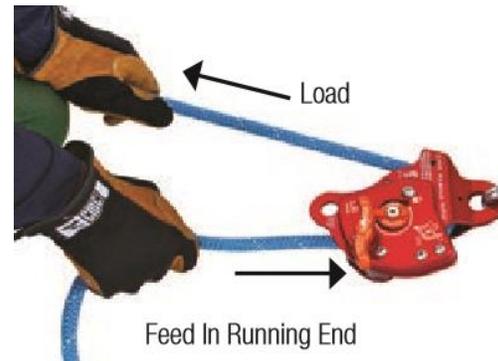
For the greatest system redundancy and therefore safety ensure the Belay Line system is anchored and operated independently of the Main Line system. As with the Main Line, it is recommended that someone assist the Belay Line operator by feeding rope to ensure there are no tangles or snags that would cause the operator to unnecessarily stop the operation.

Belaying the Edge Transition

To ensure proper hand-tight tension of the Belay Line (such as during edge transitions), firmly grip the load end of the rope with one hand and apply friction, so that there is no slack in the rope between the load and your hand. The other hand feeds the running end into the MPD so that the rope is unseated from the sheave tread. This will reduce rope drag on the sheave and keep the MPD from inadvertently locking up. This technique allows the operator to match the speed of the Main Line. In contrast, the technique of trying to simultaneously shuffle rope into and out of the MPD will result in a repetitious start-stop motion of the belay rope and will likely result in frequent unwanted lockups.

Applying Hand-Tight Tension to the Belay Line The operator is bracing his arm on his leg to help maintain a fixed position of the

friction hand, while the other hand feeds rope into the MPD.



FIRMLY GRIP RUNNING END OF ROPE TO ACTIVATE BELAY.

Belaying a Raising System

If the load is being raised, then the Belay Line can simply be pulled hand over hand through the MPD. However, if the distance the load has to be raised is greater than approximately 30 m (100 ft), it is recommended to convert the Belay Line system into a simple 3:1 mechanical advantage pulley system to assist with the raising of the load. The load can be raised more efficiently if the Belay Line assists with the raising, since it is possible that a lower mechanical advantage will be required by the Main Line. This will also take the stretch out of the line. For the final edge transition, convert back to a 1:1 system using only hand tight tension on the Belay Line by pulling it hand over hand through the MPD.

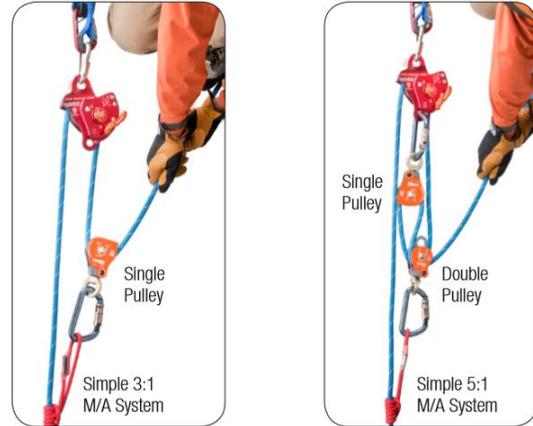
Mirrored Systems

Rope rescue systems, where both rope systems are capable of simultaneously performing as a Main Line and a Belay Line are referred to as Mirrored Systems. Unlike the MPD, most descent control devices are incapable of performing both functions

concurrently. Ideally, a true independent Mirrored System is achieved with maximum flexibility and versatility when both the Main Line and Belay Line are each managed with an MPD. This way either rope system can perform either function, without the need for complex changeovers or function specific equipment. Additionally, if an MPD is used for both the Main Line and Belay Line in a Shared Tension System, then should either of these systems fail, the other rope system can serve as a belay and the potential arresting distance is minimized since both ropes will be pre-stretched.

Using the MPD as a Mechanical Advantage

The MPD is designed to function both as a pulley and as a ratchet or progress capture device in a M/A system. After lowering, there is no need for a complex changeover between a lowering system and a raising system. The one-way pulley inside the MPD applies friction during descent control but serves as a fully functional, high-efficiency pulley while raising the load. The MPD effectively locks the rope during pulley system resets with minimal settling in distance. To convert to an M/A system, simply attach a rope grab and traveling pulley to the Main Line and a simple 3:1 mechanical advantage is created. The MPD has a built in Becket that can be used to attach a change of direction pulley to allow higher mechanical advantage systems to be built (e.g. simple 5:1 or compound 9:1).



Care and Maintenance

Clean and dry the MPD after each use to remove any dust, debris or moisture. Do not store the MPD with equipment where it may be exposed to moist air, particularly where dissimilar metals are stored together. User Information shall be provided to the user of the product. NFPA Standard 1983 recommends separating the User Information from the equipment and retaining it in permanent record. The standard also recommends making a copy of the User Information to keep with the equipment and that the information should be referred to before and after each use. The most current version of the MPD User's Manual can be downloaded at cmrescue.com/mpd.

Inspection

Inspect the MPD according to your organization's policy for inspecting life safety equipment. Equipment should be inspected after each use by an inspector that meets your department's training standard for inspection of life safety equipment. Record the date of the inspection and the results in the equipment log. Each user should be trained in equipment inspection and should do a cursory inspection before each

use. The MPD should be inspected after each use to ensure that damage did not occur. When inspecting, look for any damaged, dirty or sticking components, excessive wear or any other factor that may prevent proper function. If any significant damage is observed, the equipment should be retired from service. The MPD must be inspected after an impact load has occurred. Inspect for any damage to the components. Evaluate the sheave for smooth operation of the bearing.

If any damage or indications of improper function are noted, the MPD should be immediately retired from service.

Repair

All repair work shall be performed by the manufacturer. Other work or modifications may void the warranty and shall release manufacturer and trainer from liability.

Specifications

Item Number 333000

- 13 mm Rope Model UL Classified to NFPA 1983-2012 Edition
- Pulley General Use
- Descent Control General Use
- Belay Device General Use
- Rope Diameter 13 mm* (1/2 in)
- Weight 1.1 kg (2 lb 8 oz)

Rated Strength

- Pulley 44 kN (9,891 lbf)
- Descent Control 23 kN (5,170 lbf)
- Becket 33 kN (7,418 lbf)
- Rope used for certification rounded up to 13 mm per NFPA 1983.

*Designed for use with 12.5 to 13 mm rope.

Item Number 333010

- 11 mm Rope Model UL Classified to NFPA 1983-2012 Edition
- Pulley General Use
- Descent Control Technical Use
- Belay Device General Use
- Rope Diameter 11 mm (7/16 in)
- Weight 1.1 kg (2 lb 8 oz)

Rated Strength

- Pulley 44 kN (9,891 lbf)
- Descent Control 20 kN (4,496 lbf)
- Becket 33 kN (7,418 lbf)

Quick Reference Guide

Safety Rigging

Safety/Rigging

1. Read and refer to this manual.
2. Tug on load end of rope to verify correct rigging before use.
3. Lock Parking Brake when MPD not under load.
4. Lock Parking Brake and tie off MPD when left unattended.

Descent / Lowering

1. Hold rope firmly back against Fixed Brake V-Groove, maintaining “S-shaped” bend in rope.
2. Add Secondary Friction Post for heavy loads.
3. Unlock Parking Brake.
4. Pull and turn Release Handle (full open).
5. Control speed with friction on Fixed Brake V-Groove.

Belay - Edge Transition

1. Hold load end of rope hand tight.
2. Unlock Parking Brake.
3. Feed running end of rope into MPD.
4. Maintain firm grip on running end to activate belay.

Belay - Shared Tension Systems

1. Hold rope firmly back against Fixed Brake V-Groove, maintaining “S-shaped” bend in rope.
2. Unlock Parking Brake.
3. Pull and turn Release Handle (full open).
4. Control tension with friction on Fixed Brake V-Groove.
5. Let go of Release Handle immediately to activate belay.

Mechanical Advantage Systems

1. Rig running end of rope through additional pulley(s).
2. Attach moving pulley to rope with rope grab.
3. Unlock Parking Brake.
4. Pull rope through M/A system.
5. MPD will hold rope during reset.