Fall Protection

USER INSTRUCTION MANUAL
EZ-Stop™ Energy Absorbing Lanyards
EZ-Stop™ Force2™ Energy Absorbing Lanyards
EZ-Stop™ WrapBax™2 Lanyards
EZ-Stop™ Modular Lanyards
Shockwave™2 Force2™ Energy Absorbing Lanyards
Model numbers: See Page 12

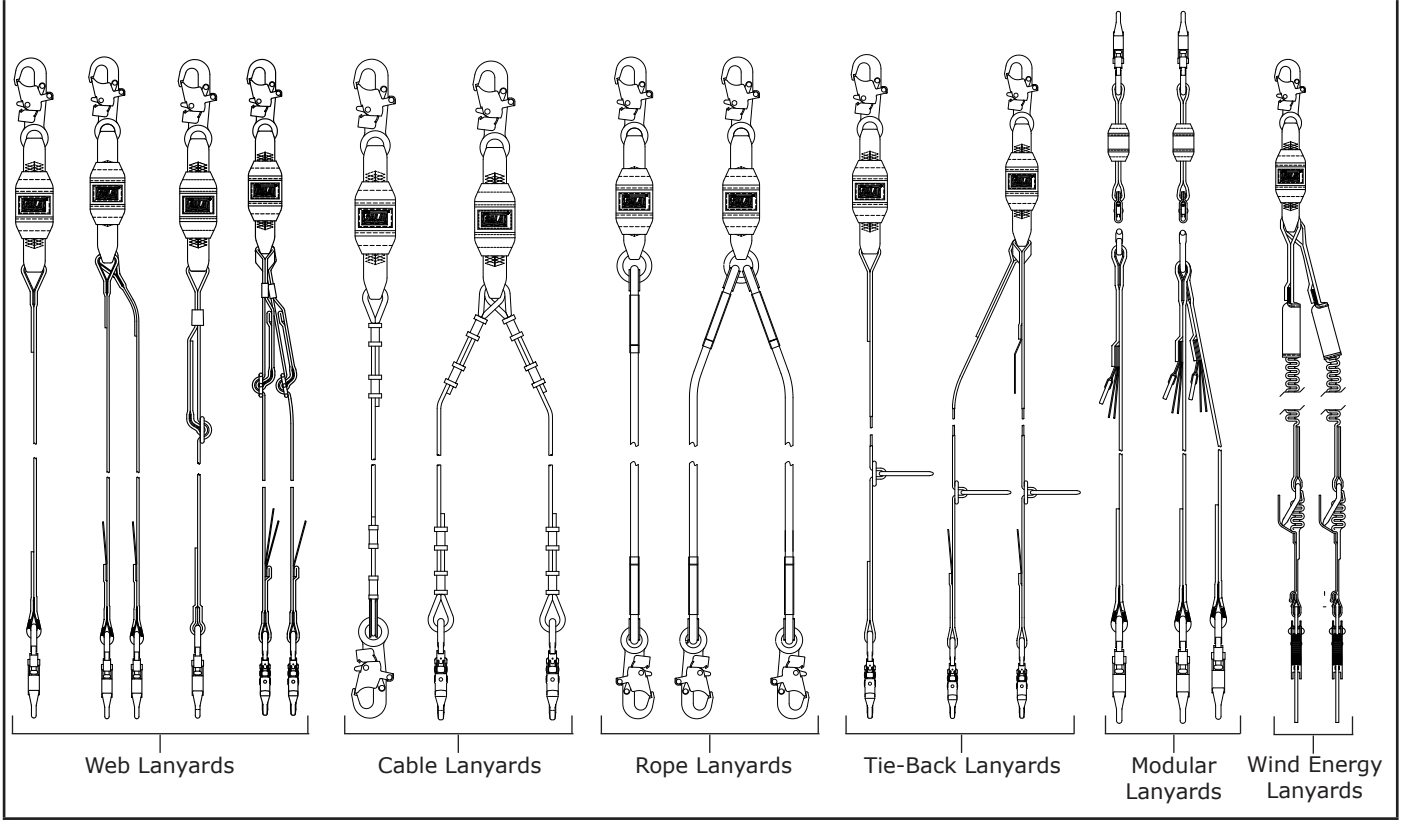
DBI-SALA
ENERGY ABSORBING LANYARDS

Please read this User Manual carefully before installing and using this product.

LANYARDS WITH INTEGRAL ENERGY ABSORBERS AND ENERGY ABSORBER COMPONENTS USED IN PERSONAL FALL ARREST SYSTEMS (ANSI Z359.13)

This manual is intended to meet the Manufacturer's Instructions as required by ANSI Z359.13 and should be used as part of an employee training program as required by OSHA.

Figure 1 - EZ-Stop™ Energy Absorbing Lanyards



DESCRIPTION:

Figure 1 identifies currently available DBI-Sala EZ-Stop Energy Absorbing Lanyard types.

IMPORTANT: *Before using this equipment, record the product identification information from the ID label in the "Inspection and Maintenance Log" in this instruction document.*

EN

SAFETY INFORMATION

Please read, understand, and follow all safety information contained in these instructions prior to the use of this Energy Absorbing Lanyard. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

These instructions must be provided to the user of this equipment. Retain these instructions for future reference

Intended Use:

This Energy Absorbing Lanyard is intended for use as part of a complete personal fall protection system.

Use in any other application including, but not limited to, material handling, recreational or sports related activities, or other activities not described in the User Instructions, is not approved by 3M and could result in serious injury or death.

This device is only to be used by trained users in workplace applications.

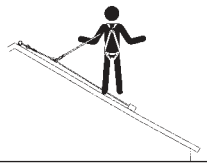
⚠ WARNING

This Energy Absorbing Lanyard is part of a personal fall protection system. It is expected that all users be fully trained in the safe installation and operation of their personal fall protection system. **Misuse of this device could result in serious injury or death.** For proper selection, operation, installation, maintenance, and service, refer to these User Instructions and all manufacturer recommendations, see your supervisor, or contact 3M Technical Services

- **To reduce the risks associated with working with an Energy Absorbing Lanyard which, if not avoided, could result in serious injury or death:**
  - Inspect the device before each use, at least annually, and after any fall event. Inspect in accordance with the User Instructions.
  - If inspection reveals an unsafe or defective condition, remove the device from service and destroy it.
  - Any device that has been subject to fall arrest or impact force must be immediately removed from service. Refer to the User Instructions or contact 3M Fall Protection.
  - Ensure all connecting subsystems (e.g. lanyards) are kept free from all hazards including, but not limited to, entanglement with other workers, yourself, moving machinery, or other surrounding objects.
  - Ensure proper edge protection is used when the device may come into contact with sharp edges or corners.
  - Attach the unused leg(s) of the lanyard to the parking attachment(s) on the harness if equipped.
  - Do not tie or knot the lanyard.
  - Do not exceed the number of allowable users.
  - Ensure that fall protection systems/subsystems assembled from components made by different manufacturers are compatible and meet the requirements of applicable standards, including the ANSI Z359 or other applicable fall protection codes, standards, or requirements. Always consult a Competent or Qualified Person before using these systems.
- **To reduce the risks associated with working at height which, if not avoided, could result in serious injury or death:**
  - Ensure your health and physical condition allow you to safely withstand all of the forces associated with working at height. Consult with your doctor if you have any questions regarding your ability to use this equipment.
  - Never exceed allowable capacity of your fall protection equipment.
  - Never exceed maximum free fall distance of your fall protection equipment.
  - Do not use any fall protection equipment that fails pre-use or other scheduled inspections, or if you have concerns about the use or suitability of the equipment for your application. Contact 3M Technical Services with any questions.
  - Some subsystem and component combinations may interfere with the operation of this equipment. Only use compatible connections. Consult 3M prior to using this equipment in combination with components or subsystems other than those described in the User Instructions.
  - Use extra precautions when working around moving machinery (e.g. top drive of oil rigs), electrical hazards, extreme temperatures, chemical hazards, explosive or toxic gases, sharp edges, or below overhead materials that could fall onto you or the fall protection equipment.
  - Use Arc Flash or Hot Works devices when working in high heat environments.
  - Avoid surfaces and objects that can damage the user or equipment.
  - Ensure there is adequate fall clearance when working at height.
  - Never modify or alter your fall protection equipment. Only 3M or parties authorized in writing by 3M may make repairs to the equipment.
  - Prior to use of fall protection equipment, ensure a rescue plan is in place which allows for prompt rescue if a fall incident occurs.
  - If a fall incident occurs, immediately seek medical attention for the worker who has fallen.
  - Do not use a body belt for fall arrest applications. Use only a Full Body Harness.
  - Minimize swing falls by working as directly below the anchorage point as possible.
  - If training with this device, a secondary fall protection system must be utilized in a manner that does not expose the trainee to an unintended fall hazard.
  - Always wear appropriate personal protective equipment when installing, using, or inspecting the device/system.

1.0 APPLICATIONS

1.1 PURPOSE: Energy absorbing lanyards are to be used as components in Personal Fall Protection Systems designed to safely arrest a fall. See Figure 1 for the energy absorbing lanyard types covered by this instruction. Energy absorbing lanyards are used in the following applications:

	**Fall Arrest:** Fall arrest systems safely stop the user in a free fall from a height. The user can then self-rescue or be rescued. Personal fall arrest systems typically include a full body harness and an energy absorbing lanyard. Maximum arresting force must not exceed 1,800 lbs (8 kN).
	**Restraint:** Restraint systems prevent the user from reaching a fall hazard (example: leading edge roof work).
	**Rescue:** The energy absorbing lanyard is used as a component of a back-up fall protection system during rescue or as part of the primary rescue system.

1.2 LIMITATIONS AND REQUIREMENTS*:*

WARNING: *Always consider the following application limitations and requirements before using this equipment.*

A. CAPACITY: The EZ-Stop Energy Absorbing Lanyard is designed for use by persons with a combined weight (clothing, tools, etc.) of no more than 310 lbs (141 kg)[1]. Make sure all of the components in your system are rated to a capacity appropriate to your application.

B. FREE FALL: Personal fall arrest systems incorporating this equipment must be rigged to limit the free fall to 6 feet (1.8 m) or less when using EZ-Stop energy absorbing lanyard models, or 12 feet (3.7 m) or less when using EZ-Stop Force2 and EZ-Stop Leading Edge energy absorbing lanyard models.

C. FALL CLEARANCE: There must be sufficient clearance below the user to arrest a fall before the user strikes the ground or other obstruction. The clearance required depends on several factors:

- Deployment distance
- Free fall distance
- Energy absorbing lanyard length
- Elevation of anchorage
- Movement of harness attachment element
- Worker height

Figure 2 illustrates fall clearance calculation for an energy absorbing lanyard.
Figure 4 indicates the deployment distance of the personal energy absorber according to the user weight and free fall distance.

D. SWING FALLS: Swing falls occur when the anchorage point is not directly above the point where a fall occurs (see Figure 3). Minimize swing falls by working as close to and directly below the anchorage point as possible. Do not permit a swing fall if injury could occur.

WARNING: *The force of striking an object in a swing fall may cause serious injury or death.*

Figure 2 – Fall Clearance

RD = LL + DD + HH + C	
RD	Required Fall Clearance Distance
LL	Length of Lanyard *(Specified on labeling)*
DD	Deployment Distance = *4 ft (1.2 m)* except: • for ANSI/OSHA Lanyards with Free Fall greater than 6 ft (1.8 m) up to 12 ft (3.7 m), or user weights greater than 310 lbs (141 kg) up to 420 lbs (191 kg), add 1 ft (0.3 m): *DD = 5 ft (1.5 m)*
HH	Height of Suspended Worker
C	Safety Factor = *1.5 ft (0.5 m)* (Factors in D-Ring Slide and Harness Stretch.)

Example: Assuming a 6 ft (1.8 m) tall user with a typical 6 ft (1.8 m) lanyard with 6 ft (1.8 m) Free Fall, Fall Clearance calculation would be as follows:
RD = LL + DD + HH + C
RD = 6 ft + 4 ft + 6 ft + 1.5 ft = 17.5 ft
RD = 1.8 m + 1.2 m + 1.8 m + 0.5 m = 5.3 m

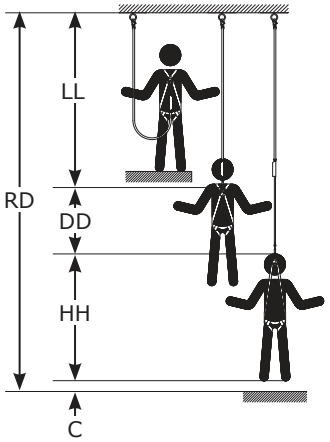
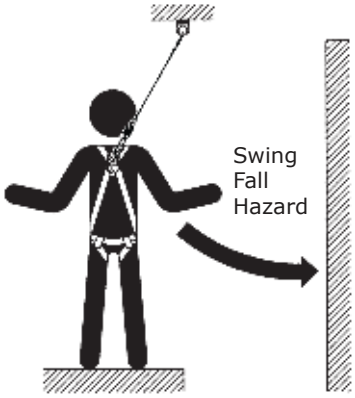


Figure 3 – Swing Falls



E. ENVIRONMENTAL HAZARDS: Use of this equipment in areas with environmental hazards may require additional precautions to prevent injury to the user or damage to the equipment. Hazards may include, but are not limited to; heat, chemicals, corrosive environments, high voltage power lines, gases, moving machinery, and sharp edges.

F. LANYARDS FOR HIGH TEMPERATURE ENVIRONMENTS: Lanyards with Kevlar webbing are designed for use in high temperature environments, with limitations: Kevlar webbing begins to char at 800° to 900° Fahrenheit. Kevlar webbing can withstand limited contact exposure to temperatures up to 1,000° F. Polyester webbing loses strength at 300° to 400° F. PVC coating on hardware has a melting point of approximately 350° F.

1 Capacity: *Most Capital Safety lanyards are factory tested to a maximum capacity of 310 lbs (141 kg). Force2 Lanyards are factory tested to a maximum capacity of 420 lbs (191 kg).*

G. TRAINING: It is the responsibility of the user and the purchaser of this equipment to assure that they are familiar with these instructions, trained in the correct care and use of, and are aware of the operating characteristics, application limits, and the consequences of improper use of this equipment.

H. LEADING EDGE: EZ-Stop Leading Edge Energy Absorbing Lanyards have been successfully tested for horizontal use and for falls over a steel edge without burrs (See Leading Edge models listed in Table 2). As a result, EZ-Stop Leading Edge Energy Absorbing Lanyards may be used in situations where a fall may occur over similar edges such as those found on steel shapes or metal sheeting. Avoid working where the lifeline will continuously or repeatedly abrade against sharp or abrasive edges. Eliminate such contact or protect edges using a heavy pad or other means.

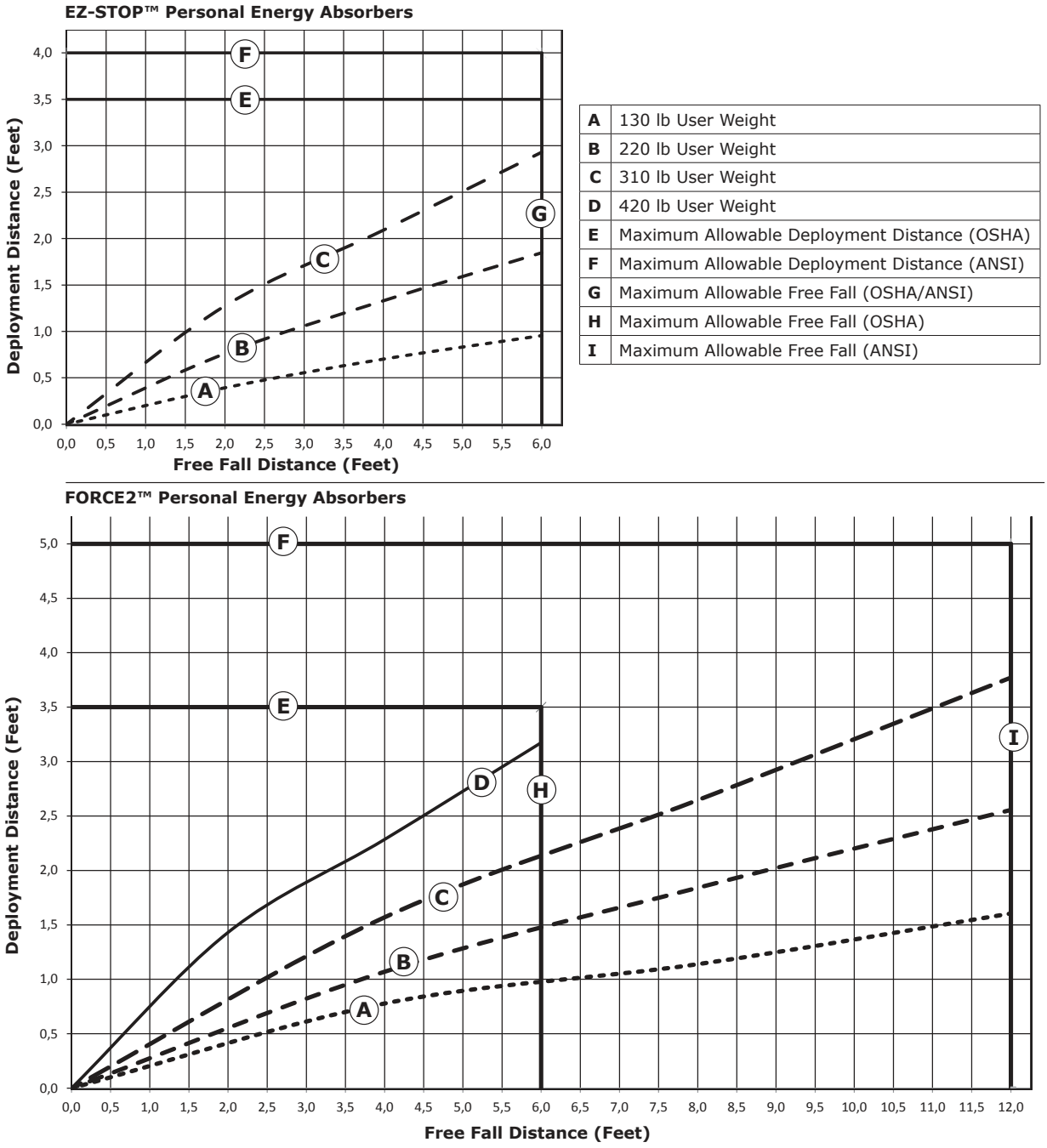
I. ARC FLASH: Arc Flash lanyards listed in Table 2 meet the test requirements of the ASTM F887-12 standard and are designed for use in environments where an arc flash (electrical explosion) could occur.

1.3 APPLICABLE STANDARDS: Refer to national standards including the ANSI Z359 family of standards on fall protection, ANSI A10.32 and applicable local, state, and federal (OSHA) requirements governing occupational safety for more information on Energy Absorbing Lanyards, Energy Absorbers and associated components. EZ-Stop Arc Flash models listed in Table 2 meet the requirements of ASTM F887-13 for Type A Shock Absorbing Lanyards.

1.4 RESCUE PLAN: When using this equipment, the employer must have a rescue plan and the means at hand to implement the rescue, as well as communicate that plan to users, authorized persons, and rescuers.

1.5 INSPECTION BEFORE USE: The energy absorbing lanyard must be inspected according to procedures in *Section 4* of this instruction manual.

Figure 4 – Deployment Distance vs. Free Fall Distance, EZ-Stop™ Personal Energy Absorbers



A	130 lb User Weight
B	220 lb User Weight
C	310 lb User Weight
D	420 lb User Weight
E	Maximum Allowable Deployment Distance (OSHA)
F	Maximum Allowable Deployment Distance (ANSI)
G	Maximum Allowable Free Fall (OSHA/ANSI)
H	Maximum Allowable Free Fall (OSHA)
I	Maximum Allowable Free Fall (ANSI)

IMPORTANT: *All distances shown in Figure 4 are based on results obtained during dynamic performance testing of EZ-Stop energy absorbing lanyards in the ambient dry condition in accordance with ANSI Z359.13. Actual distances may vary depending on environmental conditions, swing falls, etc. The maximum elongation of energy absorber value specified on the product labeling should be used when performing fall clearance calculations.*

2.0 SYSTEM REQUIREMENTS

2.1 COMPATIBILITY OF COMPONENTS: Capital Safety equipment is designed for use with Capital Safety approved components and subsystems only. Substitutions or replacements made with non-approved components or subsystems may jeopardize compatibility of equipment and may effect the safety and reliability of the complete system.

2.2 COMPATIBILITY OF CONNECTORS:

IMPORTANT: *Use only connectors that are suitable to each application and are compatible with connecting elements.*

- Connectors must be compatible with the anchorage or other system components.
- Connectors must be compatible in size, shape, and strength.
- Non-compatible connectors may unintentionally disengage (see Figure 5).

Connectors are considered to be compatible with connecting elements when they have been designed to work together in such a way that their sizes and shapes do not cause their gate mechanisms to inadvertently open regardless of how they become oriented. Contact Capital Safety if you have any questions about compatibility.

Self-locking snap hooks and carabiners are required by ANSI Z359.13 and OSHA. Connectors (hooks, carabiners, and D-Rings) must be capable of supporting at least 5,000 lbs. (22.2 kN). Per ANSI Z359.12, connector gates must be able to withstand a load of 3,600 lbs (16 kN).

Figure 5 – Unintentional Disengagement

If the connecting element to which a snap hook (shown) or carabiner attaches is undersized or irregular in shape, a situation could occur where the connecting element applies a force to the gate of the snap hook or carabiner. This force may cause the gate (of either a self-locking or a non-locking snap hook) to open, allowing the snap hook or carabiner to disengage from the connecting point.

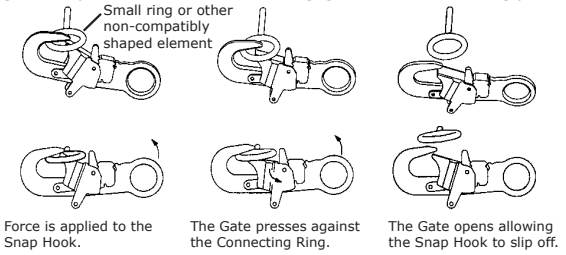
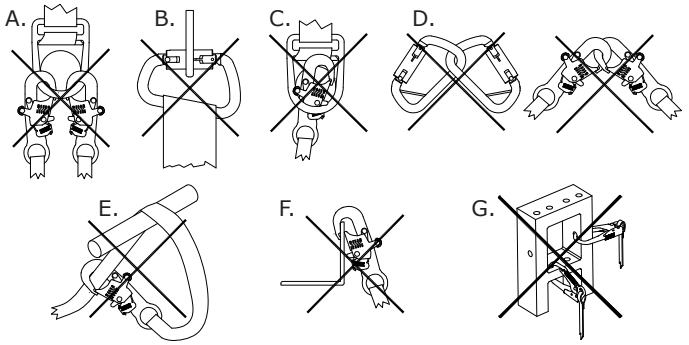


Figure 6 – Inappropriate Connections



2.3 MAKING CONNECTIONS: Capital Safety connectors (snap hooks and carabiners) are designed to be used only as specified in each product's user's instructions. See Figure 6 for inappropriate connections.

Capital Safety snap hooks and carabiners should not be connected:

A. To a D-Ring to which another connector is attached.

B. In a manner that would result in a load on the gate.

WARNING: *Large throat snap hooks should not be connected to standard size D-Rings or similar objects which will result in a load on the gate if the hook or D-Ring twists or rotates, unless the snap hook complies with ANSI Z359.12 and is equipped with a 3,600 lb (16 kN) gate. Check the marking on your snap hook to verify that it is appropriate for your application.*

C. In a false engagement, where features that protrude from the snap hook or carabiner catch on the anchor, and without visual confirmation seems to be fully engaged to the anchor point.

D. To each other.

E. Directly to webbing or rope lanyard or tie-back (unless the manufacturer's instructions for both the lanyard and connector specifically allows such a connection).

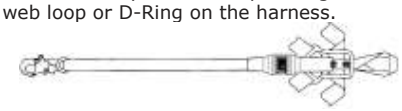
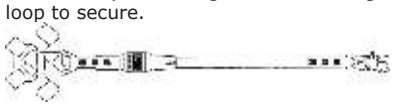
F. To any object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that roll-out could occur.

G. In a manner that does not allow the connector to align properly while under load (unless using Capital Safety snap hooks that have been specifically designed and tested for these applications). Contact Capital safety for more information.

CAUTION: *Ensure all connectors are fully closed and locked.*

2.4 EZ-STOP MODULAR ENERGY ABSORBING LANYARD MODELS: Refer to Operation and Use, Section 3.3 for instructions on the assembly of the energy absorbing and lanyard components of the EZ-Stop Modular Energy Absorbing Lanyard system.

2.5 WEB LOOP CONNECTIONS: Some lanyards are designed to choke onto a web loop to provide a compatible connection. To choke the lanyard on a web loop:

Insert the lanyard web loop through the web loop or D-Ring on the harness. 	Insert the appropriate end of the lanyard through the lanyard web loop. 	Pull the lanyard through the connecting web loop to secure. 

2.6 ANCHORAGE STRENGTH: Anchorages selected for use with the energy absorbing lanyards must have a strength capable of sustaining the static load requirements of the intended fall protection application:

A. Fall Arrest: Anchorages selected for personal fall arrest systems (PFAS) shall have a strength capable of sustaining static loads applied in the directions permitted by the system of at least:

1. Two times the average[2] arresting force for certified anchorages[3], or

2. 5,000 pounds (22.2 kN) for non-certified anchorages.

When more than one fall arrest system is attached to an anchorage, the strengths set forth in (1) and (2) above shall be multiplied by the number of systems attached to the anchorage.

WARNING: *Anchorages must be rigid. Large deformations of the anchorage will affect system performance, and may increase the required fall clearance below the system, which could result in serious injury or death.*

From OSHA 1926.500 and 1910.66: Anchorages used for attachment of PFAS must be independent of any anchorage being used to support or suspend platforms and must be capable of supporting at least 5,000 lbs. (22.2 kN) per each attached user. Or, be designed, installed, and used as part of a complete PFAS which maintains a safety factor of at least two, and is supervised by a qualified person.

B. Work Positioning: Anchorages selected for work positioning systems shall have a strength capable of sustaining static loads applied in the directions permitted by the system of at least:

3. Two times the foreseeable force for certified anchorages, or

4. 3,000 pounds (13.3 kN) for non-certified anchorages.

When more than one work positioning system is attached to an anchorage, the strengths set forth in (3) and (4) above shall be multiplied by the number of systems attached to the anchorage.

C. Restraint: Anchorages selected for restraint and travel restraint systems shall have a strength capable of sustaining static loads applied in the directions permitted by the system of at least:

5. Two times the foreseeable force for certified anchorages, or

6. 1,000 pounds (4.5 kN) for non-certified anchorages.

When more than one restraint or travel restraint system is attached to an anchorage, the strengths set forth in (5) and (6) above shall be multiplied by the number of systems attached to the anchorage.

D. Rescue: Anchorages selected for rescue systems shall have a strength capable of sustaining static loads applied in the directions permitted by the system of at least:

7. Five times the foreseeable force for certified anchorages, or

8. 3,000 pounds (13.3 kN) for non-certified anchorages.

When more than one rescue system is attached to an anchorage, the strengths set forth in (7) and (8) above shall be multiplied by the number of systems attached to the anchorage.

2 ***Average Arresting Force:*** *ANSI Z359.13 requires 6 ft energy absorbers to have an average arresting force no greater than 900 lbs. (4 kN) and a maximum deployment distance of 48 in. (1.2 m) without exceeding 1,800 lbs. (8 kN) maximum arresting force. 12 ft energy absorbers are required to have an average arresting force no greater than 1,350 lbs. (6 kN) and a maximum deployment distance of 60 in. (1.5 m) without exceeding 1,800 lbs. (8 kN) maximum arresting force.*

3 ***Certified Anchorage:*** *An anchorage for fall arrest, positioning, or rescue systems that a qualified person certifies to be capable of supporting the potential fall forces that could be encountered during a fall or that meet the criteria for certified anchorage prescribed by the associated standard(s).*

3.0 OPERATION AND USE

WARNING: *Do not alter or intentionally misuse this equipment. Consult Capital Safety when using this equipment in combination with components or subsystems other than those described in this manual. Some subsystem and component combinations may interfere with the operation of this equipment. Use caution when using this equipment around moving machinery, electrical hazards, chemical hazards, sharp edges, or overhead materials that may fall onto the lanyard. Do not loop the lanyard around small structural members. Failure to heed this warning may result in equipment malfunction, serious injury, or death.*

WARNING: *Consult your doctor if there is reason to doubt your fitness to safely absorb the shock from a fall arrest. Age and fitness seriously affect a worker's ability to withstand falls. Pregnant women or minors must not use any DBI SALA full body harness.*

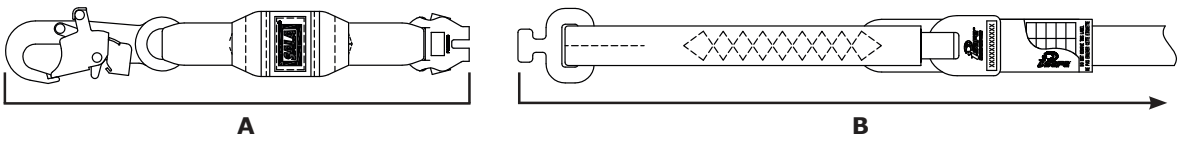
3.1 **BEFORE EACH USE** of this equipment, inspect it according to *"Inspection Checklist" (Table 1)*.

3.2 **PLAN** your system before use. Consider all factors that will affect your safety during use of this equipment. The following list gives important points to consider when planning your system:

- **A.** **ANCHORAGE:** Select an anchorage that meets the requirements specified in *"Limitations and Requirements"*.
- **B.** **SHARP EDGES:** Avoid working where system components may be in contact with, or abrade against, unprotected sharp edges.
- **C.** **AFTER A FALL:** Components which have been subjected to the forces of arresting a fall must be removed from service and destroyed. See the *"Inspection Checklist" (Table 1)*.
- **D.** **RESCUE:** The employer must have a rescue plan when using this equipment. The employer must have the ability to perform a rescue quickly and safely.

3.3 **EZ-STOP MODULAR ENERGY ABSORBING LANYARD COMPONENTS ASSEMBLY:** EZ-Stop Modular Energy Absorbing Lanyard system components must be properly assembled. The system consists of an energy absorber (**A**) and a single or twin leg lanyard (**B**) (See Figure 8).

Figure 8 – Modular EZ-Stop Energy Absorbing Lanyard Components



TO ASSEMBLE EZ-STOP MODULAR LANYARD COMPONENTS:

Step 1: Figure 9: Orient the energy absorber female connector and the lanyard male connector as shown.

Step 2: Figure 10: Press the female connector locks (**C**) on each side of the connector to unlock the device. Insert the male connector and slide to the bottom of the female connector. Release both locks to capture the male connector. The female connector locks must return to their fully extended position.

Step 3: Figure 11: Pull the energy absorber and lanyard in opposite directions to fully seat the male connector. The male connector must be securely locked in the position shown.

Figure 9 – Connector Orientation

Figure 10 – Press Female Connector Locks, Insert Male Connector

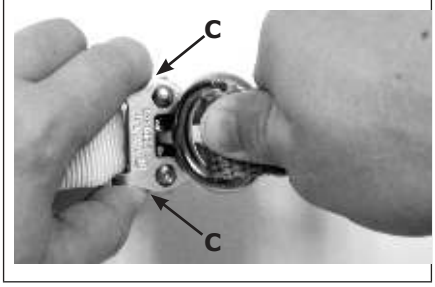
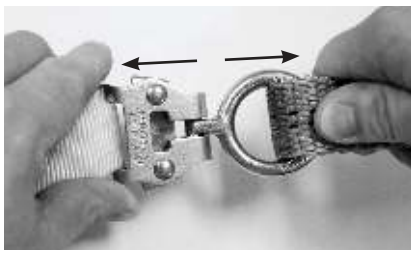


Figure 11 – Fully Connected



WARNING: *Do not use the modular lanyard assembly if the locks do not return to the fully extended position after following Steps 1, 2 and 3 in Section 3.3.*

An example of a failed connectiion is shown in Figure 12. The lanyard male connector is not fully inserted and locked within the energy absorber female connector. This is an unsafe condition and the modular lanyard components must not not be used.

Refer to Section 4.0 Inspection in this instruction for procedures to determine unsafe or defective component conditions.

Figure 12 – Failed Connection

TO DISASSEMBLE EZ-STOP LANYARD MODULAR COMPONENTS:

Step 1: Figure 13: Press the female connector locks (**C**) on each side of the connector to unlock the device.

Step 2: Figure 14: While pressing the female connector locks, push the energy absorber and lanyard connectors toward each other.

Step 3: Figure 15: Pull the male connector out of the female connector to separate the components.

Figure 13 – Press Female Connector Locks

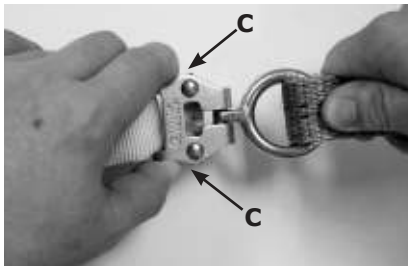


Figure 14 – Push Connectors Together

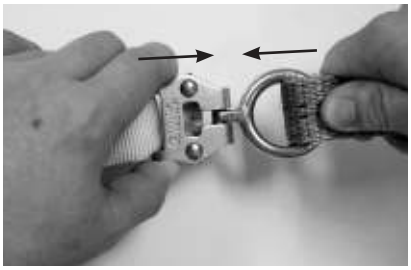
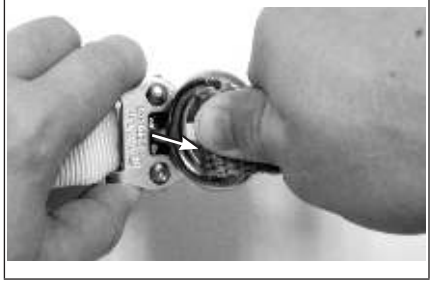


Figure 15 – Separate Components

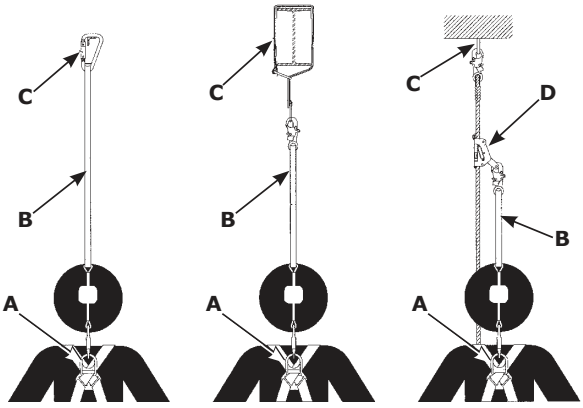


3.4 CONNECTING TO BODY SUPPORT AND ANCHORAGE OR ANCHORAGE CONNECTOR: See Figure 16. Energy absorbing lanyards should be connected to the body support first and then connected to the rest of the system. Always connect the energy absorber end of the lanyard to the D-Ring on the back between the shoulders (dorsal D-Ring) on a full body harness. DBI-SALA does not recommend using a body belt for fall arrest applications. If using a body belt, connect the energy absorbing end of the lanyard to the D-Ring and position the belt so the D-Ring is located on the back side of the body.

Connect the lanyard end to the anchorage or anchorage connector. Some anchorage connector devices may be supplied with a permanently attached energy absorber. Use of an additional energy absorber or energy absorbing lanyard with this lanyard system is not recommended.

Figure 16 – Anchorage Connection Examples

A	Dorsal D-Ring, Full Body Harness
B	Energy Absorbing Lanyard
C	Anchorage Connector
D	Fall Arrestor



3.5 A. 100% TIE-OFF LANYARD CONSIDERATIONS: Commonly known as 100% tie-off, "Y" type, twin leg, or double lanyards; these energy absorbing lanyards can be used to provide continuous fall protection while ascending, descending, or moving laterally. With one lanyard leg attached, the worker can move to a new location, attach unused lanyard leg, and disconnect attached leg. This procedure is repeated until a new location is reached.

Other practices that must be followed in order to use a 100% tie-off type lanyard safely include:

1. The energy absorber portion of the lanyard must be connected to the dorsal D-Ring only. Use only the snap hook (or other connector provided) to attach the energy absorber portion directly to the harness dorsal D-Ring. See Figures 17 and 18.

2. Do not connect the energy absorber to the anchorage. See Figure 19.

Figure 17 – Correct Attachment

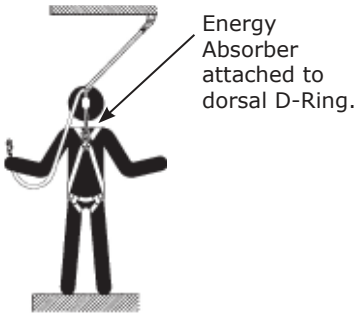


Figure 18 – Incorrect Attachment

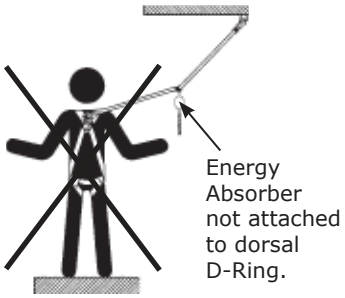
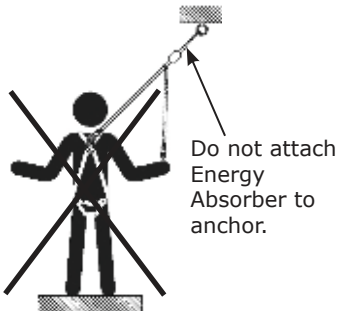
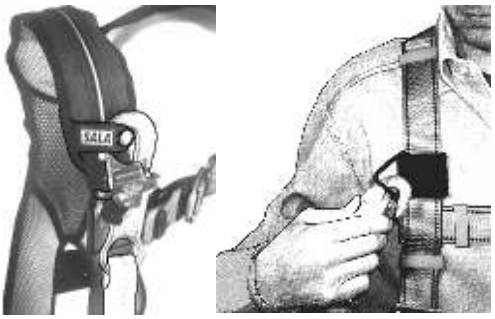


Figure 19 – Incorrect Attachment



3. Do not attach the unused leg of the lanyard back to the harness at any location unless a specially designed lanyard retainer is provided for this purpose. See Figure 20.
4. Connection of both lanyard legs to separate anchorage points is acceptable. See Figure 21.
5. When leapfrogging from one anchorage point to the next (such as traversing a horizontal or vertical structure) do not connect to anchorage points that are further apart than the lanyard length (as marked on the lanyard label). See Figure 22.

Figure 20 – Acceptable Designed Retainers

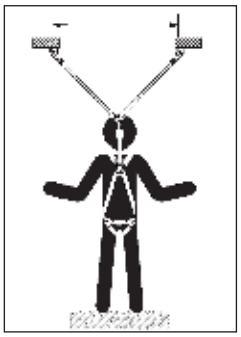


Energy absorber attached to dorsal D-Ring.

Figure 21 – Acceptable Attachment

Lanyard legs conneced to separate anchorage points.

Figure 22 – Maximum Lanyard Reach



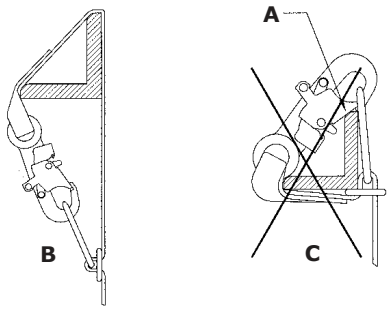
Do not attach to anchorage points wider than lanyard length.

6. Never connect more than one person to a "Y" type lanyard at a time.
7. **Do not** allow any lanyard to pass under arms or legs during use.

Attaching a Tie-Back Lanyard: See Figure 23. Place the tie-back lanyard over the anchoring structure. Ensure the lanyard is not twisted. Adjust the floating D-Ring so it hangs below the anchoring structure. Attach the lanyard end hook to the floating D-Ring.

Ensure the lanyard is cinched tight around the anchorage during use.

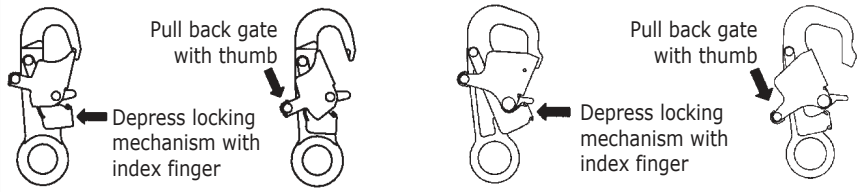
Figure 23 – Attaching Tie-Back



A Do not allow gate to contact anchorage member.
B Proper Connection.
C Improper connection.

Attaching a WrapBax Lanyard: See Figure 24. Snap hooks and WrapBax hooks operate in the same manner. Grip the hook handle in one hand. With your index finger, depress the locking mechanism in. With your thumb, pull back the gate latch. As the gate latch is pulled back, the gate will open. Release your grip and the gate will close.

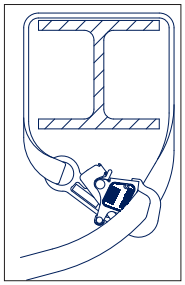
Figure 24 – Snap Hook and WrapBax Hook Operation



See Figure 25. Wrap the WrapBax lanyard around an appropriate anchor (see section 2.6), then open the gate of the WrapBax hook and pass the lanyard through the hook. The lanyard may make more than one wrap around the anchor, but the lanyard may only be passed through the WrapBax hook once. Make sure the lanyard is captured and the gate closes completely.

WARNING: *Only the WrapBax hook may be used to snap back directly onto the WrapBax lanyard.*

Figure 25 – Attaching WrapBax



B. CONNECTING TO THE BODY SUPPORT: Connect the energy absorbing lanyard or energy absorber to the D-Ring on the back between the shoulders (dorsal D-Ring) on a full body harness. Connect so the energy absorber portion of the lanyard is on the body support side. DBI-SALA does not recommend using a body belt for fall arrest applications. If using a body belt, connect the energy absorbing lanyard or energy absorber to the D-Ring and position the belt so the D-Ring is located on the back side of the body.

C. ATTACHING A LANYARD WITH WEB LOOPS: See Section 2.5.

D. CONNECTING TO A ROPE GRAB (FALL ARRESTOR): It is recommended the lanyard end (vs. the energy absorber end) be attached to the rope grab. This recommendation is made to reduce possible interference with the operation of the rope grab by the energy absorber "pack." Attaching a component style energy absorber to a rope grab is not recommended, with the exception of a "direct-coupling" between a rope grab and a harness. Some rope grabs may be supplied with a permanently attached energy absorbing lanyard. For these cases, use of an additional energy absorber connected between the rope grab and the body support is not recommended.

In some cases it may be permissible to couple an energy absorber component between the anchorage (or anchorage connector) and the rope grab lifeline. In all cases, ensure the length of the energy absorber or energy absorbing lanyard does not exceed the rope grab manufacturer's recommended maximum connection length (3 feet [.9 m] maximum per ANSI Z359.1).Consult the manufacturer's instructions provided with the Rope Grab for further details.

E. CONNECTING TO SELF RETRACTING LIFELINE: DBI-SALA does not recommend connecting an energy absorbing lanyard or energy absorber component to a self retracting lifeline. Special applications do exist where it may be permissible. Contact DBI-SALA if considering connecting an energy absorbing lanyard to a self retracting lifeline.

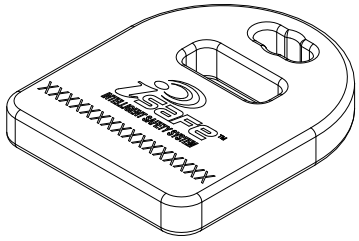
3.6 AFTER USE, return the lanyard for cleaning or storage as described in section 5.0.

4.0 INSPECTION

4.1 i-Safe™ RFID TAG: Some lanyards include an i-Safe Radio Frequency Identification (RFID) tag (Figure 26). The RFID tag can be used in conjunction with the i-Safe handheld reading device to simplify inspection and inventory control and provide records for your fall protection equipment.

If you are a first-time user, contact a Capital Safety Customer Service representative (see back cover); or if you have already registered, go to *isafe.capitalsafety.com*. Follow the instructions provided with your i-Safe handheld reader or software to transfer your data to your database.

Figure 26 – i-Safe RFID Tag



IMPORTANT: *The i-Safe Identification Number on the RFID Tag is for purposes of electronic record keeping with the i-Safe system. Where the Serial Number is printed on the product's ID Label (see 'Labeling"), the i-Safe Identification Number and Serial Number may be different numbers.*

4.2 INSPECTION FREQUENCY: The Energy Absorbing Lanyard shall be inspected by the user before each use and, additionally, by a competent person[4] other than the user at intervals of no more than one year[5]. Inspection procedures are described in the *"Inspection Checklist" (Table 1).* Results of each Competent Person inspection should be recorded on copies of the *"Inspection and Maintenance Log"* (lanyards) or tracked with the i-Safe system.

4.3 UNSAFE OR DEFECTIVE CONDITIONS: If inspection reveals an unsafe or defective condition, remove the lanyard from service and destroy. Lanyards are not repairable.

4.4 PRODUCT LIFE: The functional life of the lanyard is determined by work conditions and maintenance. As long as the lanyard passes inspection criteria, it may remain in service.

WARNING: *Failure to properly inspect the lanyard could result in product failure and serious injury or death.*

Table 1 – Inspection Checklist

Component:	**Inspection:** (*See Section 4.2 for Inspection Frequency*)	**Pass**	**Fail**
Lanyard Hardware	Inspect energy absorbing lanyard or energy absorber component hardware (snap hooks, adjusters, swages, thimbles, etc.). These items must not be damaged, broken, distorted, or have any sharp edges, burrs, cracks, worn parts, or corrosion. Ensure the connecting hooks work properly. Hook gates must move freely and lock upon closing. Ensure adjusters (if present) work properly.	☐	☐
Modular Lanyard Hardware	Inspect modular lanyard connection components for proper operation. Using the procedures in Section 3.3 of this instruction, confirm that female connector locks move freely when depressed and that they securely capture male connectors when the male and female components are assembled.	☐	☐

4 Competent Person: *One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.*

5 Inspection Frequency: *Extreme working conditions (harsh environments, prolonged use, etc.) may require increasing the frequency of competent person inspections.*

Table 1 – Inspection Checklist			
Webbing & Stitching (Figure 27)	The webbing material must be free of frayed, cut, or broken fibers. Check for tears, abrasions, mold, burns, or discoloration, etc. The webbing must be free of knots, excessive soiling, heavy paint buildup, and rust staining. Check for chemical or heat damage indicated by brown, discolored, or brittle areas. Check for ultraviolet damage indicated by discoloration and the presence of splinters or slivers on the webbing surface. All of the above factors are known to reduce webbing strength. Inspect stitching for pulled or cut stitches. Broken stitches may be an indication the energy absorbing lanyard or energy absorber component has been impact loaded and must be removed from service.	☐	☐
Wire Rope (Figure 28)	Inspect entire length of the wire rope. Always wear protective gloves when inspecting wire rope. Inspect for broken wires by passing cable through gloved hands, flexing it every few inches to expose breaks. Broken wires can be removed by bending the wire back and forth parallel to the rope length. Do not attempt to pull wires out of rope. Remove the energy absorbing lanyard from service immediately and destroy if there are six or more randomly distributed broken wires in one lay, or three or more broken wires in one strand in one lay. A "lay" of wire rope is the length of wire rope that it takes for a strand (the larger groups of wires) to complete one revolution or twist along the rope. Remove the energy absorbing lanyard from service immediately and destroy if there are any broken wires within 1 inch of the metal compression sleeves (swages) at either end of the assembly. The wire rope should be free of corrosion.	☐	☐
Energy Absorber & Impact Indication (Figure 29)	Inspect the energy absorber to determine if it has been activated. There should be no evidence of elongation. Ensure energy absorber cover is secure and not torn or damaged.	☐	☐
Labels	All labels should be present and fully legible (see Section 7 *'Labeling'*).	☐	☐
System & Subsystem Components	Inspect each system component or subsystem according to manufacturer's instructions and confirm that it can continue to be used.	☐	☐

Figure 27 - Webbing

Figure 28 - Wire Rope

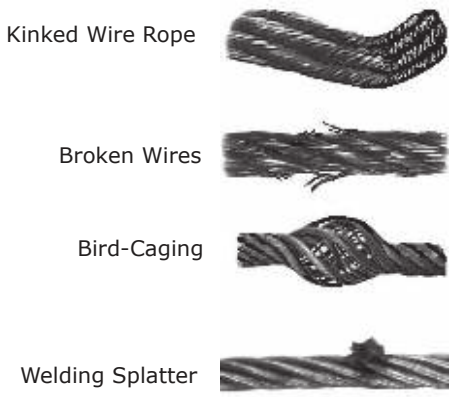
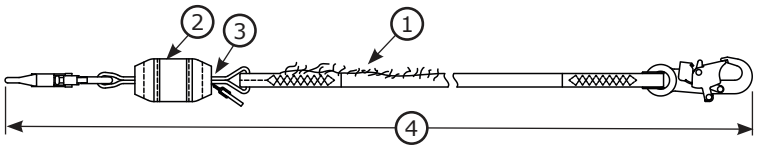


Figure 29 – Impact Indicators

The following items indicate the Energy Absorber has been subjected to impact loading and has been activated:

1. Torn webbing.
2. Torn or broken cover.
3. Open end or ripped out stitching.
4. Measured length is more than 15 cm (6 in.) longer than the length marked on the label.



5.0 MAINTENANCE, SERVICING, STORAGE

5.1 Clean lanyard with water and a mild detergent solution. Wipe off hardware with a clean, dry cloth, and hang to air dry. Do not force dry with heat. An excessive buildup of dirt, paint, etc., may prevent the lanyard from working properly, and in severe cases degrade the webbing or rope to a point where it has become weakened and should be removed from service. If you have any questions concerning the condition or cleaning of your lanyard, doubts about putting it into service or require more information, contact Capital Safety.

5.2 Additional maintenance and servicing procedures (replacement parts) must be completed by a factory authorized service center. Authorization must be in writing. Do not disassemble the unit. See Section 4.2 for inspection frequency.

5.3 Store the lanyard in a cool, dry, clean environment out of direct sunlight. Avoid areas where chemical vapors may exist. Thoroughly inspect the lanyard or energy absorber component after extended storage.

6.0 MODELS AND SPECIFICATIONS

Lanyard Model	Energy Absorber Specifications	Adjustable/ Fixed Length	Lanyard Specifications
EZ-Stop Energy Absorber Component	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	Not applicable.
Fixed Length EZ-Stop Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	3/4 - 1 in. (1.9 - 2.5 cm) polyester web, 8,000 - 9,800 lbs. (35.6 - 43.6 kN) tensile strength.
Adjustable Length EZ-Stop Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Adjustable	1 in. (2.5 cm) polyester web, 9,800 lbs. (43.6 kN) tensile strength.
EZ-Stop Cable Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	1/4 in. (.64 cm) diameter steel cable, galvanized, vinyl jacket, 7,000 lbs. (31.1 kN) tensile strength.
EZ-Stop Rope Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	1/2 in. (1.3 cm) nylon/polyester rope, 10,000 lbs. (44.5 kN) tensile strength.
EZ-Stop Elastic Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	1 3/8 in. (3.5 cm) tubular polyester web, elastic web, 6,600 lbs. (29.4 kN) tensile strength
EZ-Stop Resist Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	1 in. (2.5 cm) polyester web, polyurethane coated, 9,800 lbs. (43.6 kN) tensile strength.
EZ-Stop Tie-Back Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	1 in. (2.5 cm) polyester web, tubular polyester web cover, 9,800 lbs. (43.6 kN) tensile strength.
EZ-Stop WrapBax2 Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	1 3/6 in. (3.0 cm) nylon web, 13,000 lbs. (57.8 kN) tensile strength
EZ-Stop Modular Energy Absorber	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	Not applicable.
EZ-Stop Modular Lanyard Legs	Not applicable.	Fixed	Specific to lanyard model; see applicable lanyard leg specification.
EZ-Stop Arc Flash Fixed Length Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular Nomex®/Kevlar® web wear pad (both ends), Nomex®/Kevlar® outer cover, Kevlar® thread, tensile strength greater than 5000 lbs.	Fixed	1 in. (2.5 cm) Kevlar® or polyurethane coated polyester web, 9,800 lbs. (43.6 kN) tensile strength.
Adjustable Length EZ-Stop Arc Flash Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular Nomex®/Kevlar® web wear pad (both ends), Nomex®/Kevlar® outer cover, Kevlar® thread, tensile strength greater than 5000 lbs.	Adjustable	1 in. (2.5 cm) Kevlar® web, 9,800 lbs. (43.6 kN) tensile strength.
EZ-Stop Arc Flash Tie Back Web Leg Lanyards	1 1/4 - 1 1/2 in. (3.2 - 3.8 cm) aromatic polyester web strength member, tubular Nomex®/Kevlar® web wear pad (both ends), Nomex®/Kevlar® outer cover, Kevlar® thread, tensile strength greater than 5000 lbs.	Fixed	1 in. (2.5 cm) Kevlar® web, 9,800 lbs. (43.6 kN) tensile strength.
Shockwave2 Force2 Wind Energy Web Leg Lanyards	1 1/2 in. (3.8 cm) aromatic polyester web strength member, tubular polyester web wear pad (both ends), nylon outer cover, polyester thread, tensile strength greater than 5000 lbs.	Fixed	2 in. (5.0 cm) tubular polyester web strength member, 6,000 lbs. (26.7 kN) tensile strength.

6.1 LANYARD END HOOK SPECIFICATIONS

Hook	Description	Material	Gate Strength	Throat Size
2000023	Double Action Captive Eye Carabiner	Anodized Aluminum Alloy	3,600 lbs (16 kN)	0.75 in (1.9 cm)
2000118	Double Action Lock Rebar Snap Hook	Zinc Plated Steel	3,600 lbs (16 kN)	2.5 in (6.4 cm)
2000125	Double Action Lock Rebar Snap Hook	Zinc Plated Steel	3,600 lbs (16 kN)	3.0 in (7.6 cm)
2000209	Double Action Lock Rebar Snap Hook	Anodized Aluminum Alloy	3,600 lbs (16 kN)	2.5 in (6.4 cm)
2000210	Double Action Lock Rebar Snap Hook	Zinc Plated Steel	3,600 lbs (16 kN)	2.5 in (6.4 cm)
2100044	Swiveling Self-Locking Snap Hook with Impact Indicator	Stainless Steel	3,600 lbs (16 kN)	0.75 in (1.9 cm)
2109193	Double Action Lock Rebar Snap Hook	Zinc Plated Steel	3,600 lbs (16 kN)	2.5 in (6.4 cm)
9501804	Double Action WrapBax2 Snap Hook	Zinc Plated Steel	5,000 lbs (22 kN)	0.82 in (2.1 cm)
9502058	Double Action Lock Rebar Snap Hook	Anodized Aluminum Alloy	3,600 lbs (16 kN)	2.25 in (5.7 cm)
9502116	Double Action Lock Snap Hook	Zinc Plated Steel	3,600 lbs (16 kN)	0.75 in (1.9 cm)
9502573	Double Action Lock Snap Hook	Zinc Plated Steel	3,600 lbs (16 kN)	0.71 in (1.8 cm)
9505254	Double Action Lock Snap Hook	Anodized Aluminum Alloy	3,600 lbs (16 kN)	0.75 in (1.9 cm)

IMPORTANT: *All systems, sub-systems and components marked with ANSI have been tested and qualified/verfied in an ISO 17025 accredited lab per ANSI Z359.7.*

6.2 This instruction applies to the following models:

WEB LANYARDS
1246010
1246011
1246012
1246013
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1246015
1246016
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ROPE LANYARDS
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MODULAR LANYARDS
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1246076
1246402

LEADING EDGE LANYARDS
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1246068
1246069
1246178
1246260
1246261
1246262

CABLE LANYARDS
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1246136
1246181
1246182
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1246184
1246185
1246186
1246187
1246188
1246189
1246190
1246244
1246403

ARC FLASH LANYARDS
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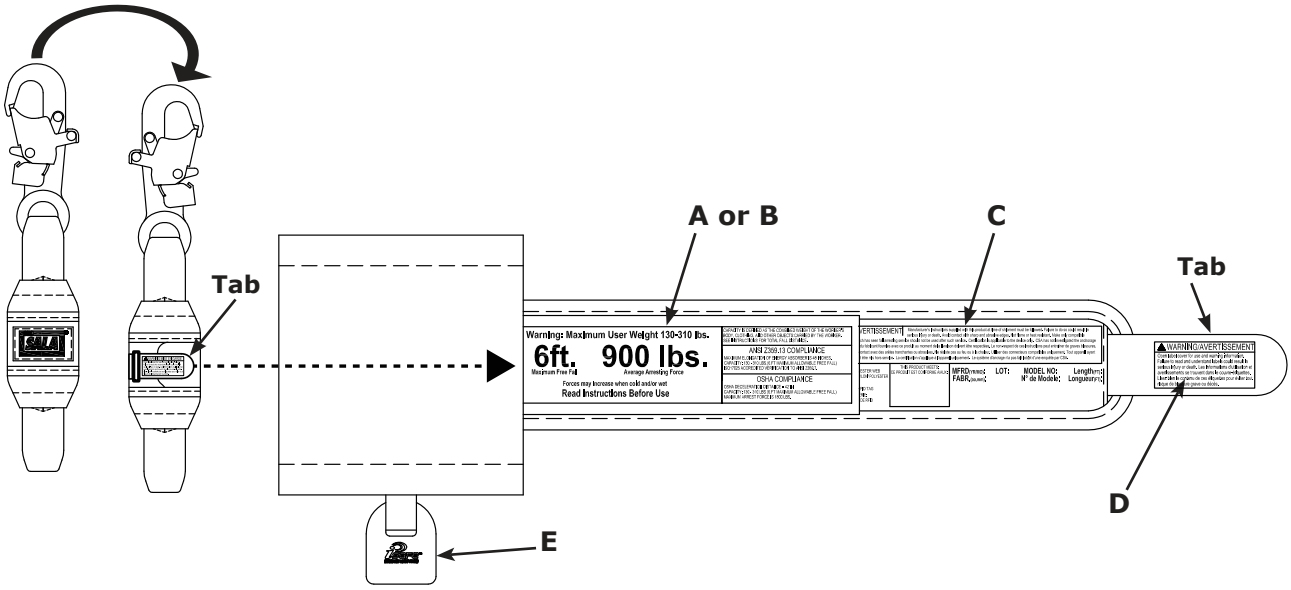
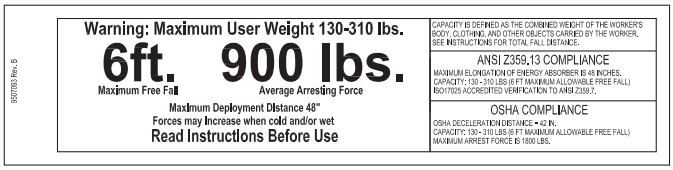
1246319
1246320
1246321
1246322
1246323
1246334C
1246336C
1246337
1246340
1246341
1246343
1246344
1246347
1246348
1246352
1246355

WIND ENERGY LANYARDS
1246030
1246032

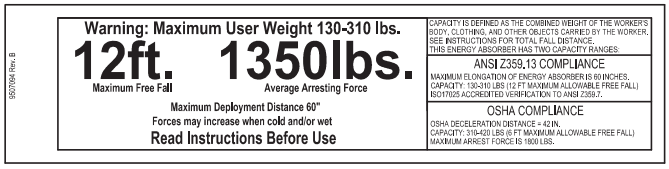
7.0 LABELING

ALL EZ-STOP LANYARD MODELS: Warning, Use, Identification and Inspection labels are located on and inside a protective cover on the back side of the lanyard energy absorber. Pull **Tab** to open the cover and expose the labels.

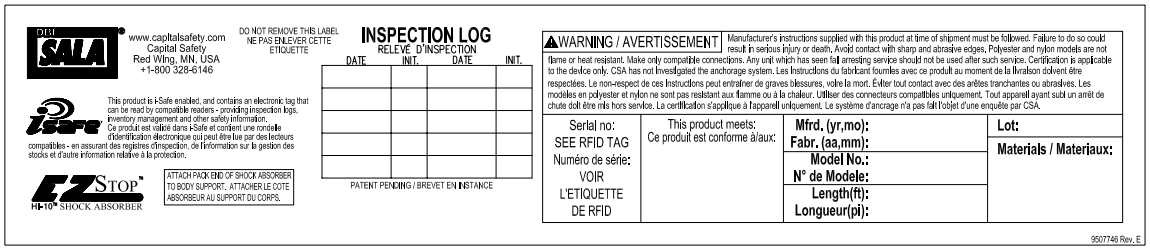




A: Warning/Use, ANSI models, EZ-Stop



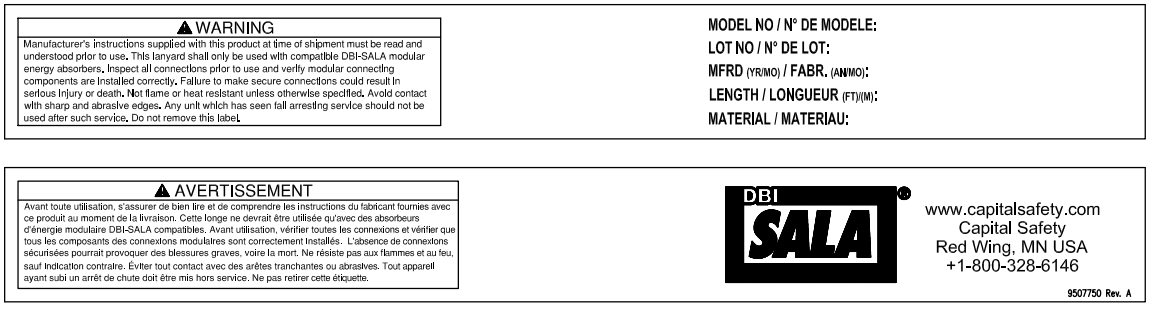
B: Warning/Use, ANSI models, EZ-Stop Force2



C: Warning/Inspection, on protective cover

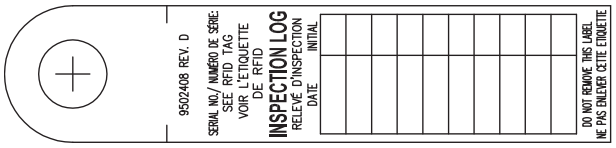
D: Warning, on protective cover tab

E: iSafe RFID Tag, attached to protective cover; also on some lanyard legs.

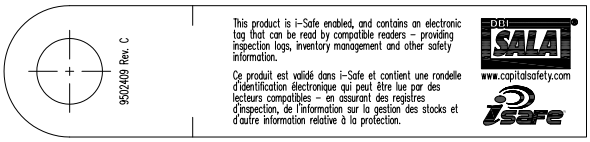


Warning/Use, ANSI models, EZ-Stop Modular Lanyard Leg Component

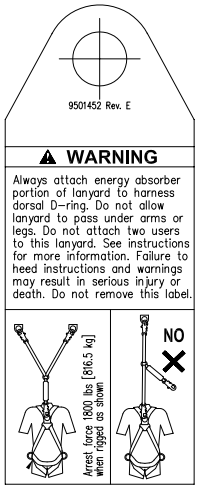
INDIVIDUAL LABELS, IDENTIFIED BY MODEL TYPE:



Inspection Log Label, all models



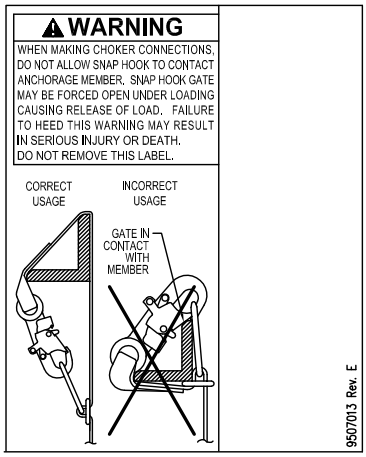
iSafe Label, all models

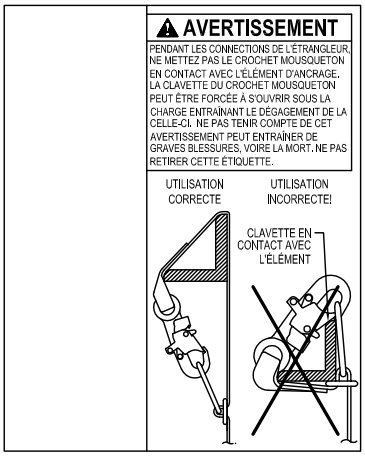


Front

Back

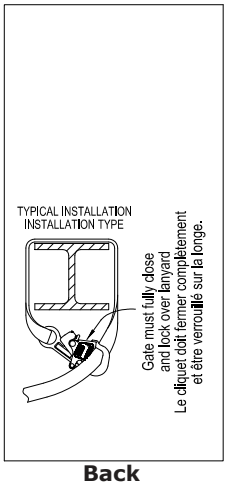
Warning/Use, Twin Leg models





Warning/Use, Tie-Back models

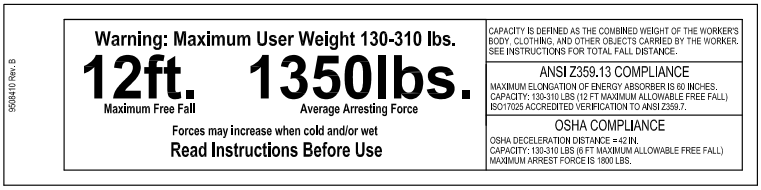
Front



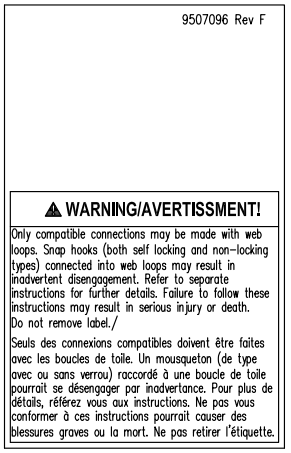
Back

Warning/Use, WrapBax models

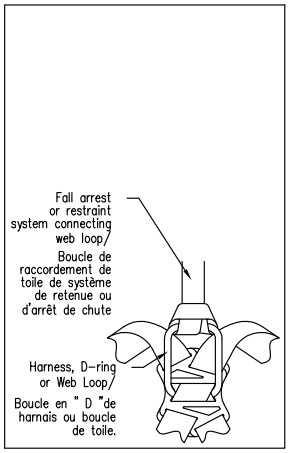
Warning/Use, WrapBax models



Warning/Use, Leading Edge models

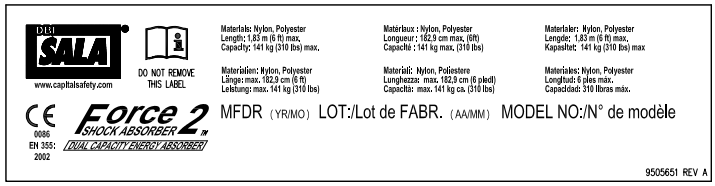


Front



Back

Warning/Use, Connecting Loop models



Material Specifications, Shockwave2 Force2 Wind Energy models

INSPECTION AND MAINTENANCE LOG

SERIAL NUMBER:	
MODEL NUMBER:	
DATE PURCHASED:	**DATE OF FIRST USE:**

INSPECTION DATE	**INSPECTION ITEMS NOTED**	**CORRECTIVE ACTION**	**MAINTENANCE PERFORMED**
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
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Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			
Approved By:			

U.S. PRODUCT WARRANTY, LIMITED REMEDY AND LIMITATION OF LIABILITY

WARRANTY: THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Unless otherwise provided by applicable law, 3M fall protection products are warranted against factory defects in workmanship and materials for a period of one year from the date of installation or first use by the original owner.

LIMITED REMEDY: Upon written notice to 3M, 3M will repair or replace any product determined by 3M to have a factory defect in workmanship or materials. 3M reserves the right to require product be returned to its facility for evaluation of warranty claims. This warranty does not cover product damage due to wear, abuse, misuse, damage in transit, failure to maintain the product or other damage beyond 3M's control. 3M will be the sole judge of product condition and warranty options.

This warranty applies only to the original purchaser and is the only warranty applicable to 3M's fall protection products. Please contact 3M's customer service department at 800-328-6146 or via email at 3MFallProtection@mmm.com for assistance.

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