

User Instruction Manual LAD-SAF^{*} Flexible Cable Ladder Safety Systems This manual is intended to be used as part of an employee training program as required by OSHA.

WARNING: These instructions must be provided to the user and installer of this equipment. The user and installer of this equipment must read and understand these instructions before use or installation. Follow the manufacturer's instructions for safety equipment used with this system. Follow these instructions for proper use, inspection, and maintenance of this equipment. This equipment is intended to be used as part of a complete LAD-SAF[®] ladder safety system. Alterations, substitutions, or misuse of this equipment, or failure to follow instructions, may result in serious injury or death.

IMPORTANT: If you have questions on the installation, use, maintenance, or suitability of this equipment for your application, contact DBI/SALA.

IMPORTANT: Before using this equipment, record the product identification information from the installation and service label in the maintenance log in section 9.0 of this manual.



Table of Contents

1.0	Applications						
	1.1	Purpose	4				
	1.2	Limitations	4				
	1.3	Applicable Standards	4				
2.0	System Requirements						
	2.1	Compatibility of Components and Subsystems	4				
	2.2	Compatibility of Connectors	4				
	2.3	Load Requirements for Structure and Bracket Connections	4				
3.0	System Installation						
	3.1	General	5				
	3.2	Welding Recommendations	5				
	3.3	Top Bracket Installation	14				
	3.4	Installation of Carrier Cable to Top Bracket	20				
	3.5	Installation of Cable Guides, All Models	20				
	3.6	Installation of Bottom Bracket and Carrier Cable Tension Adjustment					
	3.7	Final Inspection and System Identification	25				
4.0	LAD-SAF [®] System Use						
	4.1	Before Each Use	26				
	4.2	Plan	26				
	4.3	Training	26				
	4.4	Connecting the Ladder Safety Sleeve to the Harness					
	4.5	Connecting the Ladder Safety Sleeve to the Carrier Cable					
	4.6	Climbing on the System	27				
5.0	Inspection						
	5.1	Frequency	28				
	5.2	Inspection Guidelines for LAD-SAF® System Installation	28				
	5.3	Inspection Guidelines for LAD-SAF® Ladder Safety Sleeve					
	5.4	If Inspection Reveals an Unsafe Condition					
6.0	Maintenance, Servicing, Storage						
7.0	Specifications						
8.0	Labeling2						
9.0	Insp	Inspection and Maintenance Log					

1.0 APPLICATIONS

- **1.1 PURPOSE:** LAD-SAF[®] flexible cable ladder safety systems are designed to provide protection against falling for persons connected to the system while climbing fixed ladders or similar climbing structures.
 - A. APPLICATIONS: LAD-SAF[®] systems include installations on fixed ladders or ladder like climbing surfaces that are part of a structure. Examples include; water tank ladders, mono poles (wood, steel, or concrete) buildings, manways, antenna structures, and towers.
- **1.2 LIMITATIONS:** LAD-SAF[®] systems are not intended to be installed on portable ladders. These systems are designed for use on ladders that are generally vertical. Ladders must be at least 75 degrees from horizontal for proper system operation, except for curved top bracket installations. The following application limitations must be considered before installing or using the LAD-SAF[®] system.
 - A. LADDER STRUCTURE: The ladder structure to which the system is installed must be capable of withstanding the loads applied by the system in the event of a fall.
 - **B. SYSTEM CAPACITY:** The number of users allowed on the system at one time varies depending on the type of system and installation. Generally, system capacities range from one to four users. See sections 2.0 and 3.0 for more information on capacity limitations. System capacities are based on a maximum user's weight, including tools and clothing, of 310 lbs.
 - C. ENVIRONMENTAL HAZARDS: Use of this equipment in areas with environmental hazards may require that additional precautions be taken to reduce the possibility of injury to the user or damage to the equipment. Hazards may include, but are not limited to: high heat caused by welding or metal cutting; caustic chemicals; seawater; high voltage power lines; explosive or toxic gases; moving machinery; sharp edges.
 - D. COMPONENT COMPATIBILITY: LAD-SAF[®] systems must be installed and used as a complete system. Only DBI-SALA's detachable cable sleeve may be used with this system. DBI-SALA recommends using a full body harness with a front attachment for ladder climbing. A body belt is not recommended for use with the LAD-SAF[®] system. If a fall occurs when using a body belt it may cause unintentional release and possible suffocation because of improper body support. Substitutions of equipment or system components must not be made without the written consent of DBI-SALA.
 - E. TRAINING: This equipment is intended to be installed and used by persons who have been trained in its correct application and use.
- **1.3** Refer to applicable local, state, and federal (OSHA) requirements governing this equipment for more information on ladder safety systems and associated components, including OSHA 1910.27.

2.0 SYSTEM REQUIREMENTS

- 2.1 COMPATIBILITY OF COMPONENTS AND SUBSYSTEMS: This equipment is designed for use with DBI-SALA approved components and subsystems. The use of non-approved components and subsystems may jeopardize compatibility of equipment, and could affect the safety and reliability of the complete system.
- 2.2 COMPATIBILITY OF CONNECTORS: Connectors used with this system (hooks, carabiners, D-rings) must be capable of supporting a minimum of 5,000 lbs. Use caution to assure compatibility of hooks and the connection point. See section 4.4 on making connections. Non-compatible connectors may unintentionally disengage (roll-out). Connectors must be compatible in size, shape, and strength. Self closing/self locking connectors are highly recommended by DBI-SALA.
- 2.3 LOAD REQUIREMENTS FOR STRUCTURE AND BRACKET CONNECTIONS: The climbing structure to which the LAD-SAF[®] system is installed must be capable of supporting the loads imposed by the system. For calculation purposes the required bracket load may be assumed to be distributed evenly between the number of rung attachments. For example; the 6116280 top bracket is supplied with three rung connections. The load required for each rung for a single user system is 1,125 lbs. per rung (3,375 lbs./3).
 - A. TOP BRACKET: The top bracket connection loads include system pretension and forces associated with

arresting a fall. Load requirements for the top bracket vary depending on the number of users allowed on the system at one time, top bracket model, and type of connection to the structure.

1. These top brackets allow up to four users on the system at one time:

6116048, 6116050, 6116051, 6116052, 6116054, 6116055, 6116056, 6116057, 6116059, 6116210, 6116224, 6116250, 6116261, 6116280, 6116282, 6116286, 6116290, 6116291, 6116292, 6116293, 6116294, 6116295, 6116296, 6116328 and 6116410

Note: Other installation requirements may limit the number of users allowed on a system. See section 3.0. Top Bracket Connection Loads: One user on the system: 3,375 lbs.

Two users on the system: 4,350 lbs. Three users on the system: 5,325 lbs. Four users on the system: 6,300 lbs.

Exception: 6116054 top bracket is designed for use with 6116336 or 6116337 grab bar extension. When the grab bar is used as a connection for a personal fall arrest system the bracket connection must support a minimum of 5,000 lbs., or 3,600 lbs. for a certified anchorage. See ANSI Z359.1 and OSHA regulations.

2. These top brackets allow one user only: 6116005, 6116010, 6116016, 6116120, 6116325, and 6116324 Top Bracket Connection Loads: One user on the system: 3,375 lbs.

B. BOTTOM BRACKET: The bottom bracket connection must be capable of supporting a system pretension load of 750 lbs. in the direction of loading.

3.0 SYSTEM INSTALLATION

3.1 LAD-SAF[®] systems are designed for easy installation onto a variety of ladder structures. To begin the installation you need to know the model numbers of the top and bottom brackets, cable guides, and type of cable (galvanized or stainless steel). Figures 1, 2, and 3 identify most models. Some brackets are designed to be installed using stand-off supports which go between the bracket and structure. You need to know model numbers of stand-off supports if included with your system. See Figure 4 on page 13 for model numbers of most stand-off supports. Follow the instructions for the models included in your system.

Generally, the LAD-SAF® system is installed from the top of the ladder down. The basic procedure is:

- Step 1. Install the top bracket
- Step 2. Connect the cable to the top bracket
- Step 3. Install the cable guides
- Step 4. Install the bottom bracket
- Step 5. Tension the cable
- Step 6. Inspect the installation

Planning the installation can minimize the amount of time on the ladder and improve safety.

3.2 WELDING RECOMMENDATIONS: Some installations require welding brackets to the structure. DBI-SALA recommends that welding be completed by a certified professional welder in accordance with codes and specifications of the American Welding Society. Base and filler materials must be compatible with galvanized or stainless steel, depending on the materials of your system. Protect finished welds from corrosion with coating or paint.

WARNING: Use caution when installing LAD-SAF[®] systems. Wear personal protective equipment, including safety glasses and steel-toed shoes. Use personal fall arrest or restraint systems when exposed to a fall hazard. Use caution when installing LAD-SAF[®] systems near electrical power lines. LAD-SAF[®] cables are conductive. Do not connect to a partially installed LAD-SAF[®] system.

Figure 1 - Top Brackets



Figure 1 - Top Brackets (continued)







Figure 2 - Bottom Brackets (continued)



Figure 3 - Cable Guides



6100249 Cable Guide, S.S., 45° bend



6100140 Cable Guide



6100400 Cable Guide, Galv. 6100401 Cable Guide, S.S. 6100402 Cable Guide, Galv., 1-3/4" center



6100430 Cable Guide, Galv. 6100431 Cable Guide, Galv. 6100432 Cable Guide, S.S. 6100435 Cable Guide, S.S., 4" extra length



6100448 Cable Guide, S.S., 1-1/5" angle rung 6100449 Cable Guide, S.S., 2-3/8"x7/8" rung 6100453 Cable Guide, S.S., 1-1/4" angle rung 6100454 Cable Guide, S.S., 1"x3/4" angle



6100525 Cable Guide, S.S., 1-1/2" angle rung



6100420 Cable Guide, Galv. (S.S. hardware), 1-1/4x2" rung 6100421 Cable Guide, S.S., 1-1/4"x2" rung 6100422 Cable Guide, S.S., 1-3/4"x1-3/4" rung 6100423 Cable Guide, S.S., 1-3/4"x2-1/4" rung 6100424 Cable Guide, S.S., 1-3/8"x1-3/4" rung 6100425 Cable Guide, S.S., 2"x1" rung 6100426 Cable Guide, S.S., 2"x2" rung 6100427 Cable Guide, S.S., 1-5/8"x1" rung 6100428 Cable Guide, Galv., 1-1/2" rung 6100429 Cable Guide, S.S., 2-1/4"x2-1/2" rung 6100457 Cable Guide, S.S.



6100455 Cable Guide, S.S., 1-1/4"x1-1/4" angle



6100505 Cable Guide, S.S. 6100506 Cable Guide, S.S. 1-1/4"x1-1/4"x3/16" angle

Figure 3 - Cable Guides (continued)



6100460 Cable Guide, S.S., w/twist 39° 6100461 Cable Guide, S.S., w/twist 27° 6100462 Cable Guide, S.S., w/twist 45°



6100475 Cable Guide, S.S. 1-1/2"x1-1/2" angle 30°



6100533 Cable Guide, S.S. w/latch and clamp plate



6100532 Cable Guide Galv., with latch



6100530 Cable Guide 6100531 Cable Guide no U-bolt



6100515 Cable Guide, Galv. 6100516 Cable Guide, Galv., With caps 6100517 Cable Guide, S.S.



6100470 Cable Guide



6100520 Cable Guide, S.S., 4.313" long 6100521 Cable Guide, Galv., with caps 6100522 Cable Guide, Galv. 6100523 Cable Guide, S.S., 4.125" long



3.3 TOP BRACKET INSTALLATION: Before installing the top bracket it is recommended that the ladder or climbing structure be evaluated by a qualified engineer to determine if the load requirements for the system are satisfied.

A. INSTALLATION OF 6116280, 6116410, AND 6116056 TOP BRACKETS:

Direct Connection to Ladder:

See Figure 5 for a typical installations of the 6116280, 6116410, and 6116056 top brackets onto a round rung ladder. The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The top bracket is typically mounted in the center of the climbing surface for ease of climbing, but may be located towards the side of the ladder if required.

6116280, 6116410:

• The top bracket may be installed with up to four feet extending above the top rung connection for systems limited to one user. This will allow the use of only two ladder rung clamps. Ensure the ladder will withstand the required loads between the two rungs.



- The top bracket may be installed with up to three feet extending above the top rung connection for systems allowing up to two users simultaneously.
- The top bracket may be installed with up to two feet extending above the top rung connection for systems allowing up to four users simultaneously.

6116056:

• The top bracket may be installed with up to five feet extending above the top bracket connection for systems allowing up to four users simultaneously.

WARNING: One rung clamp (two for the 6116410 bracket) is designed to bolt through the bracket and onto the rung. This clamp must not be omitted, or the bracket may slip under load.

Install rung clamps using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

Stand-off Support Connection:

Figure 6 shows the installation of the 6116280 top bracket using a horizontal stand-off bracket. These installations are limited to one user on the system at a time. Use hex bolts in place of U-bolts to attach the 6116280 top bracket to the horizontal stand-off. Torque fasteners to 20-25 ft.-lbs.





Ladder Rung Support:

Figure 7 shows the installation of the 6100151 ladder rung support piece. The rung support is used to support hollow rungs with a minimum inside diameter between 1 inch and 1-1/8 inch. In some applications the ladder rungs must be supported in order to meet required strengths and to prevent rung collapse. The rung support piece can be used on those rungs supporting top brackets, cable guide and bottom brackets.

The ladder or climbing structure must be evaluated by a qualified engineer to determine if the load requirements for the system with rung supports are satisfied.

Install ladder rung support at each LAD-SAF[®] component connection point.

B. INSTALLATION OF 6116054 TOP BRACKET AND 6116336 GRAB BAR:

See Figure 8 for a typical installation of the 6116054 top bracket onto a round rung ladder. The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The top bracket is typically mounted in the center of the climbing surface for ease of climbing, but may be located towards the side of the ladder if required.

WARNING: The top rung clamp bolts through a plate that is welded onto the bracket. This rung clamp must not be omitted, or the bracket may slip under load.

Install rung clamps using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

The 6116336 grab bar is installed by sliding the grab bar into the square tube of the bracket and installing the detent pin into the grab bar.

C. INSTALLATION OF 6116010 AND 6116016 CURVED LADDER TOP BRACKETS:

See Figure 9 for a typical installation of the 6116010 and 6116016 top brackets onto a round rung ladder. The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. Adjust the top bracket position so that the carrier cable conforms to the curvature of the ladder. Cable guides must be positioned along the ladder curve to prevent the cable from contacting the ladder. See section 3.4 for information on cable guides. The top bracket is typically mounted in the center of the climbing surface for ease of climbing, but may be located towards the side of the ladder if required. Install rung clamps using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

D. INSTALLATION OF 6116210, 6116250, AND 6116261 BOLT-ONTOP BRACKETS:

See Figure 10 for a typical installation of the 6116210, 6116250, and 6116261 top brackets. The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The top bracket is typically mounted in the center of the climbing surface, directly above the ladder, for ease of climbing, but may be located towards the side of the ladder, twelve inches maximum from center, if required. The top brackets are to be connected to the structure with a DBI-SALA or customer supplied stand-off support. Stand-off supports must support the loads specified in section 2.3, and must be compatible with the LAD-SAF® system.

Figure 8 - Installing Top Bracket and Grab Bar





6100710 Weld-on Stand-off Installation:

Install the 6100710 stand-off support as shown in Figure 10. See section 3.2 for welding recommendations. The stand-off must be perpendicular to the pole surface and in-line with the carrier cable.



Angle Leg and Round Leg Stand-off Installation:

See Figure 11 for the installation of the angle and round leg stand-off supports. Install stand-off supports using the hardware provided. Do not substitute other fasteners. Torque 3/8-inch fasteners to 20-25 ft.-lbs. Install the top bracket to the stand-off support using the 1/2-inch fasteners provided. Torque 1/2-inch fasteners to 40-45 ft.-lbs. Note: For the 6116250 stand-off, fasteners are not supplied. DBI-SALA recommends using lock washers, double nuts, or other methods to ensure fasteners will not loosen.

WARNING: Installations that use the angle leg or round leg stand-off support brackets are limited to one user on the system at a time.

E. INSTALLATION OF 6116224 WOOD POLE TOP BRACKET:

See Figure 12 for a typical installation of the 6116224 top bracket onto a wooden pole. The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The top bracket is typically mounted in the center of the climbing surface for ease of climbing, but may be located towards the side of the ladder if required. Use 1/2-inch fasteners (not provided) to attach the top bracket to the pole. Fasteners should extend through the pole when possible. DBI-SALA recommends using lock washers, double nuts, or other methods to ensure fasteners will not loosen.



F. INSTALLATION OF 6116005, 6116048, 6116050, 6116051, 6116052, 6116055, 6116057, 6116059, 6116282, 6116286, 6116290, 6116291, 6116292, 6116293, 6116294, 6116295, 6116296, 6116324, 6116325, and 6116328 TOP BRACKETS:

See Figure 13 for a typical installation of the top bracket onto a ladder. Some brackets utilize rung spacers while



others do not (see Figure 1 on pages 7 and 8). The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The top bracket is typically mounted in the center of the climbing surface for ease of climbing, but may be located towards the side of the ladder if required.

• The top bracket may be installed with up to four feet



extending above the top rung connection for systems limited to one user. This will allow the use of only two ladder rung clamps. Ensure the ladder will withstand the required loads between the two rungs.

- The top bracket may be installed with up to three feet extending above the top rung connection for systems allowing up to two users simultaneously.
- The top bracket may be installed with up to two feet extending above the top rung connection for systems allowing up to four users simultaneously.

WARNING: One rung clamp (lower connection) is designed to bolt through the bracket and onto the rung. This clamp must not be omitted, or the bracket may slip under load.

Install rung clamps using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

G. INSTALLATION OF 6116120 TELESCOPING TOP BRACKET:

See Figure 14 for a typical installation of the 6116120 top bracket onto a round rung ladder. The top bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The top bracket is typically mounted in the center of the climbing surface for ease of climbing, but may be located towards the side of the ladder if required. The 6116120 top bracket is designed to mount at or near the top of the ladder and telescope up when in use. Typical installations include access ladders into manholes and under trap doors.

Installations that use the 6116120 top bracket are limited to one user on the system at a time.

Install rung clamps using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

TO OPERATE: Pull up on the bracket handle and rotate it clockwise to lock it in place. Attach the cable sleeve according to sections 4.4 and 4.5. Climb up and down, see section 4.6. When you are done rotate the bracket handle counterclockwise and allow the bracket to slide back down into the stationary bracket.

- H. INSTALLATION OF D-RING ANCHORAGE: The D-ring Anchorage is designed for used with the DBI-SALA Force2[™] energy absorbing lanyard and full body harness. The D-ring Anchorage must be attached to a Lad-Saf[®] top bracket that is attached to a structure that meets the top bracket load requirements. See Figure 15.
- FREE FALL: OSHA regulations generally require that personal fall protection systems limit the potential free fall to six feet. When using the D-ring anchorage, the potential free fall may be greater than six feet. This is acceptable if the energy absorbing lanyard used to connect the D-ring anchorage can limit fall arrest forces to 1,800 lbs. Use only a DBI/SALA Force2[™] energy absorbing lanyard (12 ft. maximum free fall) and a full body harness with the D-ring anchorage. See OSHA and ANSI A10.14 requirements for more information.
- 2. INSTALLATION: See Figure 15. Install the Dring anchorage assembly no more than six inches above the ladder rung where the top clamp plate of the Lad-Saf® top bracket is attached. The D-ring must be on the climbing (cable) side of the top bracket. Clamp the D-ring anchorage assembly to the top bracket with the fasteners provided with the assembly. Torque fasteners to 20-25 ft.-lbs.
- 3. USE: Connect the lanyard end of the Force2[™] energy absorbing lanyard to the D-ring anchorage. Connect the energy absorber end to the back D-ring on your full body harness. Do not disconnect from the Lad-Saf system before connecting to the D-ring anchorage.





4. SWING FALLS: Swing falls occur when the anchorage point is not directly above the point where a fall occurs. The force of striking an object in a swing fall may cause serious injury. See Force2[™] energy absorbing lanyard instructions for more information.

3.4 INSTALLATION OF CARRIER CABLE TO TOP BRACKET:

WARNING: Keep the carrier cable and carrier clamp clean during installation. Contamination of the carrier clamp or cable could cause the clamp to malfunction.

- A. INSTALLATION OF GALVANIZED CARRIER CABLE:
- 1. Lay the carrier cable out on the ground in a clean area by rolling the coil. Do not pull cable from center of coil.

WARNING: Carrier cable is very stiff and may spring out of coil unexpectedly. Use caution when unrolling cable. Use appropriate safety gear, including gloves and safety glasses, when unrolling cable.

Inspect the cable for shipping damage before proceeding. Do not install damaged cable.

2. See Figure 16 for installation of the galvanized carrier cable into top bracket. Ensure the end of cable is free of kinks and unraveled strands. Pass the cable up through the top bracket pipe and the urethane shock absorber. Install the washer and carrier clamp onto cable with the cone of carrier clamp pointing down. At least 1.0 in., but no more than 2 in. of cable must protrude through the carrier clamp.



Inspect the cable for shipping damage before proceeding. Do not install damaged cable.

2. See Figure 17 for installation of a stainless steel carrier cable into the top bracket. Most stainless steel carrier cables are supplied with a swagged end fitting for connection to the top bracket. To install the carrier cable, feed the free end of the cable down through the top bracket pipe and the urethane shock absorber until the swage fitting is firmly seated into the shock absorber. Install the cap by seating it firmly onto the pipe.

3.5 INSTALLATION OF CABLE GUIDES, ALL MODELS:

Cable guides protect the carrier cable from chafing against the ladder or structure and to prevent the climber from excessively deflecting the cable from side to side. Cable guides should be positioned at approximately 25 foot intervals along the carrier cable between the top and bottom brackets, and at any point along the system where

the cable may abrade against the structure. Cable guides should be staggered along the system to reduce harmonic effects of the wind, such as at 23, 25, and 27 feet intervals. For high wind areas "L" shaped cable guides may be used. The "L" shaped cable guides should be alternated with opening on the left, then right, etc. up the ladder. Latching cable guides are also available.

Direct Connection to Ladder:

See Figure 18 for a typical installations of cable guides onto a ladder. Some cable guides utilize rung spacers and clamp plates while others do not (see Figure 3 on pages 11 and 12). Install the cable guide using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

6100135/6100136 Weld-on Stand-off Support Installation:

Install the 6100135 or 6100136 stand-off as shown in Figure 19. See section 3.2 for welding recommendations. The stand-off must be perpendicular to the pole surface and in-line with the carrier cable.

Angle Leg and Round Leg Stand-off Support Installation:

See Figure 20 for a typical installations of angle leg and round leg stand-off supports. Install the stand-off support using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

Install the cable guide to the stand-off support using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

3.6 INSTALLATION OF BOTTOM BRACKET AND CARRIER CABLE TENSION ADJUSTMENT:

Before installing the bottom bracket it is recommended that the ladder and/or climbing structure be evaluated by a qualified engineer to determine if the load requirements for the system specified in section 2.3 are met.







NOTE: Depending on the length of the system, and the environment in which the system is installed, it may be necessary to periodically re-tension the system. Extreme temperature ranges and very long systems will likely require periodic retentioning. The tension indicator can be purchased separately. Contact DBI-SALA for details.

A. INSTALLATION OF 6100050, 6100055, 6100060, 6100065, 6100070, 6100072, 6100073, 6100090, 6100091, 6100092, 6100093, 6100100, 6100110, 6100111, 6100112, 6100113, 6100114, 6100115, 6100116, 6100128, 6100131, 6100132, 6100133, and 6100134 BOTTOM BRACKETS:

Direct Connection to Ladder:

See Figure 21 for a typical installation of the bottom bracket onto a ladder. Some brackets utilize "U"-bolts while others utilize bolts and clamp plates to attach to the ladder (see Figure 2 on pages 9 and 10). The bottom bracket should be positioned to allow users safe access when connecting or disconnecting from

Carrier Cable Saddle Clip Tension Rod **Tension Indicator** Washer **Tensioning Nut** Jam Nut Bottom Bracket Installation

Figure 21 - Installing Bottom Brackets

the system. The bottom bracket must be mounted in-line (vertically) with the top bracket.

WARNING: One rung clamp is designed to bolt through the bracket and onto the rung. This clamp must not be omitted, or the bracket may slip under load.

> Install the rung clamps using hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

Stand-off Support Connection:

Figure 22 shows the installation of the above bottom brackets using a horizontal stand-off bracket. Use hex bolts provided in place of U-bolts to attach the bottom bracket to the horizontal stand-off. Torgue fasteners to 20-25 ft.-lbs.

Carrier Cable Tension Adjustment:

Figure 21 shows the assembly of the tension rod to the bottom bracket and carrier cable. Loosely clamp the saddle clips around the carrier cable. Slide the tension rod down the carrier cable and through the hole in the bracket until sufficient threads are exposed to allow the installation of the tension indicator, washers, and nuts. Remove the slack in the carrier cable by the pulling cable though the saddle clips. Tighten saddle clips to 45 ft.-lbs. Tighten the tensioning nut until the ring on the tension indicator is sheared off. A small amount of grease on the tension rod threads will reduce the effort required to tension the carrier cable. If there are insufficient threads exposed to fully tension the carrier cable, pull more carrier cable through the saddle clips on the tension rod and repeat the procedure. When correct carrier cable



tension is reached tighten the jam nut against the tensioning nut. Cut off excess cable just below the lower saddle clip.



Figure 22 - Installing Bottom Brackets





Bottom Bracket Installation:

See Figure 23 for a typical installations of the 6100095 and 6100015 bottom brackets onto a round rung ladder. See Figure 24 for a typical installation of the 6100224 bottom bracket with a weld-on stand-off support. The bottom bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The bottom bracket must be mounted in-line (vertically) with the top bracket.

WARNING: One rung clamp is designed to bolt through the bracket and onto the rung. This clamp must not be omitted, or the bracket may slip under load.

Install the rung clamps using the hardware provided. Do not substitute other fasteners. Torque fasteners to 20-25 ft.-lbs.

Weld-on Stand-off Installation:

Install the 6100710 stand-off support as shown in Figure 24. See section 3.2 for welding recommendations. The stand-off must be perpendicular to the pole surface and in-line with the carrier cable.

Carrier Cable Tension Adjustment:

Figures 23 and 24 show the assembly of the tension rod to the bottom bracket and carrier cable. Loosely clamp the saddle clips around the carrier cable. Slide the tension rod down the carrier cable and through the hole in the bracket until sufficient threads are exposed to allow the installation of the washers and nuts. Remove slack in the carrier cable by pulling the cable through the saddle clips. Tighten the saddle clips to 45 ft.-lbs. Tighten the tensioning nut until the carrier cable is taut. A small amount of grease on the tension rod threads will



Figure 24 - Installing Bolt-on Bottom Bracket & Weld-on Stand-off

reduce the effort required to tension the carrier cable. Compress the spring to approximately 5-1/2 inches. Do not completely compress the spring. If there are insufficient threads exposed to fully tension the carrier cable, pull more carrier cable through the saddle clips on the tension rod and repeat the procedure. When the correct carrier cable tension is reached, tighten the jam nut against the tensioning nut. Cut off excess cable just below the lower saddle clip.

C. INSTALLATION OF 6100035 AND 6100038 BOLT-ON BOTTOM BRACKETS:

Bottom Bracket Installation:

See Figure 25 for a typical installation of the 6100035 and 6100038 bottom brackets. The bottom bracket should be positioned to allow users safe access when connecting or disconnecting from



the system. The bottom bracket must be mounted in-line (vertically) with the top bracket. The 6100035 and 6100040 bottom brackets are designed to be connected to the structure using a DBI/SALA or customer supplied stand-off support. Customer supplied stand-off supports must be capable of withstanding the loads specified in section 2.3 and must be compatible with the LAD-SAF® system.

Weld-on Stand-off Installation:

Install the 6100710 stand-off support as shown in Figure 25. See section 3.2 for welding recommendations. The stand-off must be perpendicular to the pole surface and in-line with the carrier cable.

Angle Leg and Round Leg Stand-off Installation:

See Figure 26 for the installation of round and angle leg stand-off supports. Install stand-off supports using the hardware provided. Do not substitute other fasteners. Torque 3/8 inch fasteners to 20-25 ft.-lbs. Install bottom bracket to stand-off support using 1/2-inch fasteners provided. Torque 1/2-inch fasteners to 40-45 ft.-lbs.

Carrier Cable Tension Adjustment:



Figure 25 shows the assembly of the tension rod to the bottom bracket and carrier cable. Loosely clamp the saddle clips around the carrier cable. Slide the tension rod down the carrier cable and through the hole in the bracket until sufficient threads are exposed to allow the installation of the tension indicator, washers, and nuts. Remove slack in the carrier cable by pulling the cable though the saddle clips. Tighten saddle clips to 45 ft.-lbs. Tighten the tensioning nut until the ring on the tension indicator is sheared off. A small amount of grease on the tension rod threads will reduce the effort required to tension the carrier cable. If there are insufficient threads exposed to fully tension the carrier cable, pull more carrier cable through the saddle clips

on the tension rod and repeat the procedure. When the correct carrier cable tension is reached, tighten the jam nut against the tensioning nut. Cut off excess cable just below the lower saddle clip.

D. INSTALLATION OF 6100045 WOOD POLE BOTTOM BRACKET:

Bottom Bracket Installation:

See Figure 27 for a typical installation of the 6100045 bottom bracket. The bottom bracket should be positioned to allow users safe access when connecting or disconnecting from the system. The bottom bracket must be mounted in-line (vertically) with the top bracket. Use 1/2-inch fasteners (not provided) to attach the bottom bracket to the pole. DBI-SALA recommends using lock washers, double nuts, or other methods to ensure fasteners will not loosen.



Carrier Cable Tension Adjustment:

Figure 27 shows the assembly of the tension rod to the bottom bracket and carrier cable. Loosely clamp the saddle clips around the carrier cable. Slide the tension rod down the carrier cable and through the hole in the bracket until sufficient threads are exposed to allow the installation of the tension indicator, washers, and nuts. Remove slack in the carrier cable by pulling the cable though the saddle clips. Tighten saddle clips to 45 ft.-lbs. Tighten the tensioning nut until the ring on the tension indicator is sheared off. A small amount of grease on the tension rod threads will reduce the effort required to tension the carrier cable. If there are insufficient threads exposed to fully tension the carrier cable, pull more carrier cable through the saddle clips on the tension rod and repeat the procedure. When the correct carrier cable tension is reached, tighten the jam nut against the tensioning nut. Cut off excess cable just below the lower saddle clip.

E. 5900172 COUNTERWEIGHT:

To install the 5900172 counterweight onto the carrier cable, loosen the saddle clips and pass the carrier cable through the counterweight. Position the counterweight to allow users safe access when connecting or disconnecting from the system. Tighten the saddle clips against the carrier cable.

3.7 FINAL INSPECTION AND SYSTEM IDENTIFICATION:

- A. Install the installation and service label onto the ladder or structure in a prominent location. Use the steel wire provided with the label to attach it to the ladder or structure. Before installing the label, mark the installation date and number of users allowed in the appropriate locations on the label. Use a metal letter stamp to mark the label. Record the system identification information in the inspection and maintenance log in section 9.0 of this manual.
- **B.** After installation conduct a final inspection of the system as follows:
 - Ensure all fasteners are in place and properly tightened.
 - Ensure the carrier cable is properly tensioned.
 - Ensure the carrier cable does not abrade against the structure at any point.
 - Ensure the system information is recorded on the label and inspection log.

4.0 LAD-SAF[®] SYSTEM USE

- **4.1 BEFORE EACH USE** inspect the system according to section 5.0. Do not climb a structure that is not in good condition. Verify from the label markings that the system has been formally inspected within the last year. Do not use a defective or improperly maintained LAD-SAF[®] system. Inspect the detachable cable sleeve according to manufacturer's instructions. Inspect the full body harness according to manufacturer's instructions.
- **4.2 PLAN** your use of the LAD-SAF[®] system before starting work. Consider all factors that will affect your safety before starting your work. The following list gives some important points to consider when planning your work:
 - Ensure the system is rated for the number of users required on the system before use.
 - Consider hazards associated with connecting and disconnecting from the system. Ensure adequate anchor points, landing platforms, or other means are available at connection and disconnection points to allow safe transitions to and from the system.
 - Be aware of hazards in the work area that could cause injury to the user or damage to the system, such as; high heat, electrical hazards, chemical hazards, or moving machinery.
 - Use caution when climbing. Avoid carrying tools or equipment that do not allow your hands to be free for climbing. Ensure items carried are secure to avoid dropping them on climbers below. Climb within your ability. Long climbs may require several rest stops during ascent or descent to avoid exhaustion. Avoid climbing in high winds or severe weather whenever possible.
 - If a fall occurs the user (employer) must have a rescue plan and the ability to implement it.
- **4.3 TRAINING:** It is the responsibility of the user and purchaser of this equipment to assure they are familiar with the instructions, operating characteristics, application limits, and the consequences of improper use of this equipment. Users and purchasers of this equipment must be trained in the correct care and use of this equipment. Contact DBI-SALA for additional training guidelines.

4.4 CONNECTING THE LADDER SAFETY SLEEVE (6116500) TO THE HARNESS:

When connecting the ladder safety sleeve to the harness, ensure the connection is compatible in size and strength. See section 2.2. Use the connector supplied with the sleeve (usually an 2000523 carabiner). Do not substitute other connectors. Do not use other connecting devices, such as; short lanyards, chain, links, or clevis. These types of connectors do not meet DBI-SALA requirements. OSHA and ANSI A14.3 prohibits connections between the carrier cable and the harness that exceed nine inches in length. Connection between the sleeve and harness may be done before or after the sleeve has been installed onto the carrier cable. When connected, ensure the gate on the hook or carabiner is closed and locked. See Figure 28.



4.5 CONNECTING THE LADDER SAFETY SLEEVE (6116500) TO THE CARRIER CABLE:

WARNING: In situations where a fall hazard exists while connecting/disconnecting from the ladder safety system, use a back-up fall arrest system, such as a full body harness and lanyard, to protect against a fall.

- 1. Ensure the sleeve is correctly positioned relative to the carrier cable. The "up" arrow on the safety sleeve must be pointing to the ascending direction. Note: The 6116500 safety sleeve includes a gravity stop to reduce the possibility of installing the sleeve upside-down on the carrier cable. If the sleeve will not open far enough to accept the carrier cable, it is probably upside-down. See Figure 28.
- 2. Rotate the locking lever clockwise and pivot the handle to the upright position. This will draw back the cable

shoe and allow insertion of the carrier cable into the slot in the sleeve body. See Figure 29. With practice this can be done with one hand, freeing the other hand to grip the ladder.

- **3.** Hold the safety sleeve in the upright position and place upper roller onto carrier cable. See Figure 30.
- 4. Push back the upper roller extension and insert the carrier cable into slot on side of safety sleeve. Position carrier cable fully into the safety sleeve and release the handle. See Figure 31.
- 5. Ensure the locking lever is in the locked position before using the safety sleeve. It should not be possible to remove the safety sleeve from the carrier cable when the lever is in the locked position. Check the safety sleeve function by raising the handle and releasing the safety sleeve. The safety sleeve should lock firmly onto the carrier cable.
- 6. To remove the safety sleeve from the carrier cable, rotate the locking lever to the unlocked position and lift the lever arm. Push the safety sleeve forward against the carrier using the upper roller. Pull the safety sleeve from the carrier cable by allowing the sleeve to pivot on the upper roller.

4.6 CLIMBING ON THE SYSTEM:

- 1. Don the full body harness according to the manufacturer's instructions.
- **2.** Attach the detachable cable sleeve to the carrier cable according to the manufacturer's instructions.
- **3.** Connect the detachable cable sleeve to the attachment point on the full body harness according to manufacturer's the instructions.
- 4. To ascend, climb up the ladder normally. The detachable cable sleeve will follow the climber. The carrier cable will snap out of the cable guides as the climber passes the guides. Reconnect the carrier cable to the cable guide after passing each guide. Do not remove the detachable cable sleeve from the carrier cable to pass cable guides.
- 5. To descend, climb down smoothly in a normal position. Allow the detachable cable sleeve to lead the climber down. Climbing down out of position (leaning back excessively) will cause the detachable cable sleeve to lock on the carrier cable. If the detachable cable sleeve locks, move upward slightly to release and continue down the ladder.

IMPORTANT: Training must be conducted without exposing the user to a fall hazard. Training should be repeated on a periodic basis.







27

5.0 INSPECTION

5.1 FREQUENCY:

LAD-SAF[®] INSTALLATION:

- **Before Each Use:** Visually inspect the ladder safety sleeve with the LAD-SAF[®] installation and ladder structure according to section 5.2. Inspect the D-ring anchorage assembly for damage. Check the torque on all fasteners. See Lad-Saf[®] instructions for more information.
- Formal Inspection: A formal inspection of the ladder safety sleeve with the LAD-SAF[®] installation and ladder structure must be performed at least annually by a competent person other than the user.
- After a Fall: If a fall occurs with the ladder safety sleeve or on the LAD-SAF[®] system a formal inspection of the entire system must be performed by a competent person other than the user. See sections 5.2, 5.3 and 5.4. Record the inspection results in the inspection and maintenance log in section 9.0.

5.2 Inspection Guidelines for the LAD-SAF® Installation:

- Inspect the top and bottom brackets for damage, corrosion, or rust. Look for cracks, bends, or wear that could affect the strength and operation of the system. Inspect for loose or missing fasteners; retighten or replace them if necessary.
- Inspect the cable guides. Ensure the cable guide is not worn or bent, and still locks onto the cable. Inspect for loose or missing fasteners; retighten or replace them if necessary.
- Inspect the carrier cable for damage. Look for worn or broken cable strands. Inspect for signs of abrasion against the ladder or structure. The cable must not contact the ladder or structure. Replace damaged cable if necessary. Check the carrier cable tension, ensuring there is no slack. Re-tension the carrier cable if necessary.
- Inspect the ladder structure for damage, rust, or deterioration that could affect the strength of the ladder.
- Inspect the installation and service label. The label should be securely held in place and fully legible. Record inspection dates on the system label. See section 8.0.

5.3 Inspection Guidelines for the LAD-SAF® Ladder Safety Sleeve:

- Inspect the handle and cable shoe for bends, cracks, and deformation. All fasteners must be securely attached. Operation of the handle and cable shoe must be free and smooth. Springs must be secure and of sufficient strength to pull the handle down.
- Inspect the locking lever for smooth operation, ensuring it springs back into its locked position when released.
- Inspect the sleeve body for wear on the inside where the cable passes through.
- Inspect the rollers and the upper roller extension. Ensure the rollers spin freely and the spring rotates the upper roller extension to the climbing position.
- Inspect the gravity stop. Hold the sleeve upside-down and ensure the gravity stop rotates into the locking position. It should not be possible to open the sleeve far enough to insert the cable.
- Inspect all labels and markings. All labels and markings must be present and fully legible. See section 8.0.
- **5.4** If inspection reveals an unsafe or defective condition remove the ladder safety system or the safety sleeve from service and destroy it or contact an authorized service center for repair.

6.0 MAINTENANCE, SERVICING, STORAGE

- **6.1** The LAD-SAF[®] installation requires no scheduled maintenance. See section 5.0 for inspection related maintenance issues. If the carrier cable becomes heavily soiled with oil, grease, paint, or other substances, clean it with appropriate cleaning solutions. Do not use acid or caustic chemicals that could damage the cable.
- **6.2** The LAD-SAF[®] sleeve may be cleaned using commercial parts-cleaning solvents and rinsed with warm, soapy water. Light machine oil may be applied to the moving parts if required. Do not use excessive oil, or allow oil to contact the cable clamping surfaces. Store the detachable cable sleeve in a cool, dry, clean environment, out of direct sunlight. Avoid areas where chemical vapors exits. Thoroughly inspect the sleeve after extended storage.
- **6.3** Additional maintenance and servicing procedures must be completed by an authorized service center. Authorization must be in writing.

7.0 SPECIFICATIONS

7.1 All top and bottom brackets, cable guides, carrier cable, and fasteners are made of galvanized or stainless steel. Contact DBI-SALA for material specification details if required. The LAD-SAF® system, when installed according to the user instructions, meets OSHA and ANSI requirements, including ANSI A14.3.

8.0 LABELING

8.1 These labels must be securely attached and fully legible:









9.0 INSPECTION AND MAINTENANCE LOG

DATE OF MANUFACTURE:

MODEL NUMBER: _____

DATE PURCHASED: _

r

INSPECTION DATE	INSPECTION ITEMS NOTED	CORRECTIVE ACTION	MAINTENANCE PERFORMED
Approved By:			
Approved By:			
Approved By:			
Annual Dur			
Арргочеа Ву:			
Approved By:		-	
Approved By:		_	
Approved By:	<u> </u>	_	
Approved By:			
Approved By:	1		
Approved By:			
Approved By:			
Annual D		-	
Approved By:			

WARRANTY

Equipment offered by DBI/SALA are warranted against factory defects in workmanship and materials for a period of two year from the date of installation or use by the owner, provided that this period shall not exceed two years from the date of shipment. Upon notice in writing, DBI/SALA will promptly repair or replace all defective items. DBI/SALA reserves the right to elect to have any defective item returned to its plant for inspection before making a repair or replacement. This warranty does not cover equipment damages resulting from abuse, damage in transit, or other damage beyond the control of DBI/ SALA. This warranty applies only to original purchaser and is the only one applicable to our products and is in lieu of all other warranties expressed or implied.



USA 3833 SALA Way Red Wing, MN 55066-5005 Toll Free: 800-328-6146 Phone: (651) 388-8282 Fax: (651) 388-5065 www.capitalsafety.com Canada 260 Export Boulevard Mississauga, Ontario L5S 1Y9 Toll Free: 800-387-7484 Phone: (905) 795-9333 Fax: (905) 795-8777 www.capitalsafety.com

This instruction manual is available for download at www.capitalsafety.com



Form: 5902228 Rev: L