BM SERIES ADJUSTABLE TENSION SAFETY CABLE APPLICATION TOOL

BERGEN CABLE DATASHEET

SEE PAGE 13 FOR IMPORTANT INFORMATION CONCERNING LIMITED WARRANTY, AND LIMITATION OF LIABILITY.

INTRODUCTION

The Bergen BM Series Safety Cable application tool is designed to crimp ferrules to Safety Cable in accordance with SAE specification AS4536*. The application tool installs Safety Cable kits identified in SAE specifications AS3509*, AS3510*, AS3511*, and AS3655*.

The following steps are important to assure proper Safety Cable applications:

1. Proper cable installation (section 1.0)
2. Proper loading and use of the application tool (section 2.0)
3. Verification of proper installation (section 3.0)
4. Tool Maintenance and calibration (section 4.0)

* SAE publications are available from:
SAE, International
400 Commonwealth Drive
Warrendale, PA 15096-0001 U.S.A.

1.0 PROPER CABLE INSTALLATION

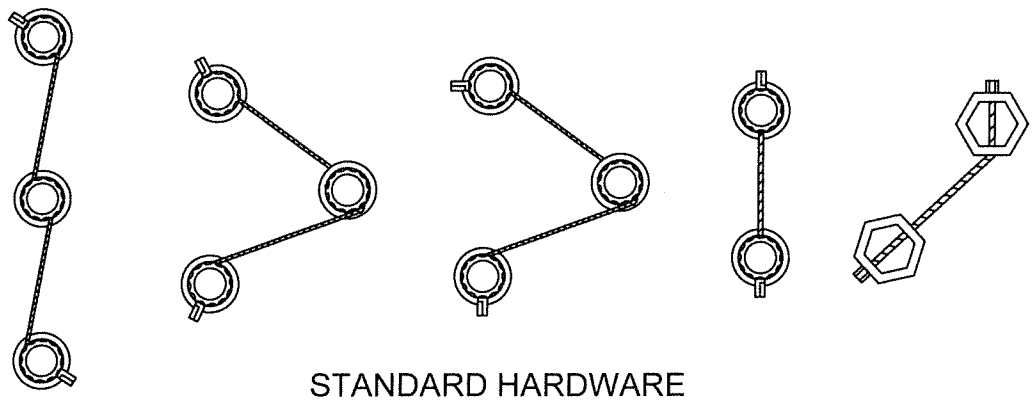
1.1 Various examples of Safety Cable installation are shown in Figs. 1 thru 3. Although all possible combinations are not shown, three basic rules apply:

A) It is recommended that Safety Cable be installed in such a manner that any tendency for a fastener to loosen will be counteracted by an additional tension on the cable. Sharp turns in excess of 135° should be avoided. Installed Safety Cable should produce a positive or neutral pull on the fastener.

B) Safety Cable should be installed in two or three bolt patterns. Two bolt patterns are preferred when Safety Cable is applied to an even number of fasteners.

C) Maximum span of Safety Cable shall be six inches from end to end.

FIG. 1

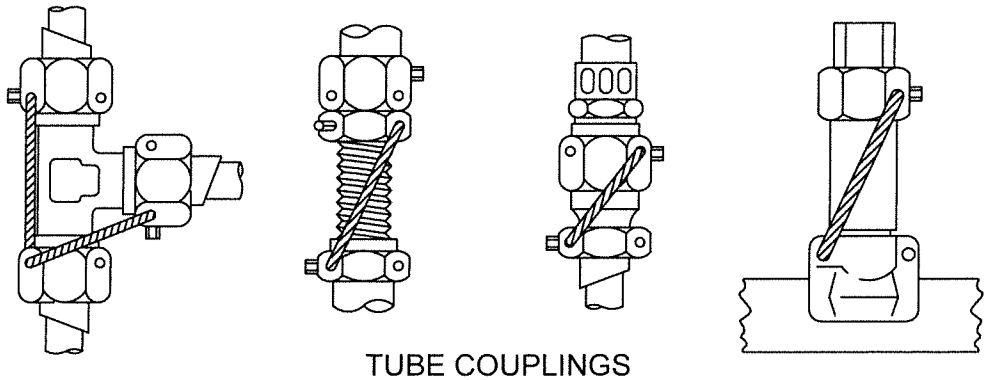


STANDARD HARDWARE

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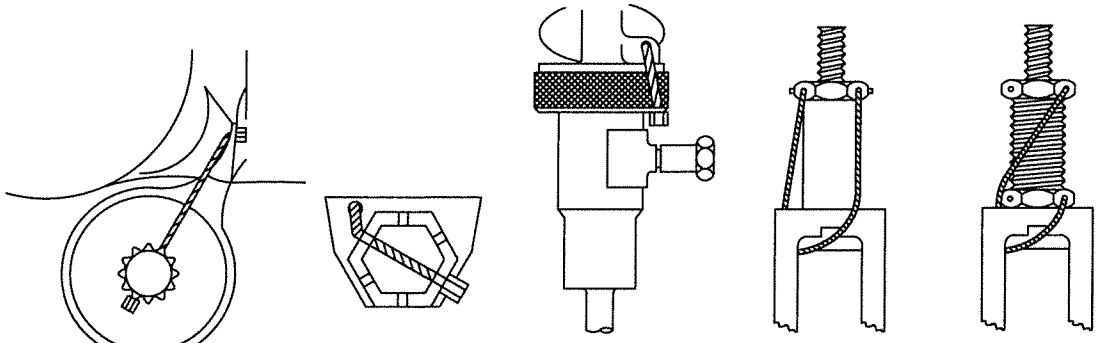
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FIG. 2



TUBE COUPLINGS

FIG. 3



OTHER APPLICATIONS

2.0 PROPER LOADING AND USE OF THE APPLICATION TOOL

2.1 Select the proper size and length of Safety Cable.

2.2 Install the Safety Cable through the fasteners as described in section 1.0.

2.3 The nose of the tool can be rotated to any position (see Fig. 4). Rotate the tool nose to the desired position.

2.4 Insert the free end of the cable through the ferrule as shown in Fig. 5 and pull out the ferrule from the magazine.

2.5 Insert the free end of the cable through the nose as shown in Fig. 6. Slide the tool along the cable to the desired position. Make certain that the ferrule is fully seated in the nose.

2.6 Position the tool nose such that the ferrule is pressed squarely against the fastener. Hold the tool nose steady and perpendicular to the fastener.

CAUTION: DO NOT RELEASE THE FREE END OF THE CABLE UNTIL IT HAS BEEN INSERTED THROUGH THE NOSE.

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FIG. 4

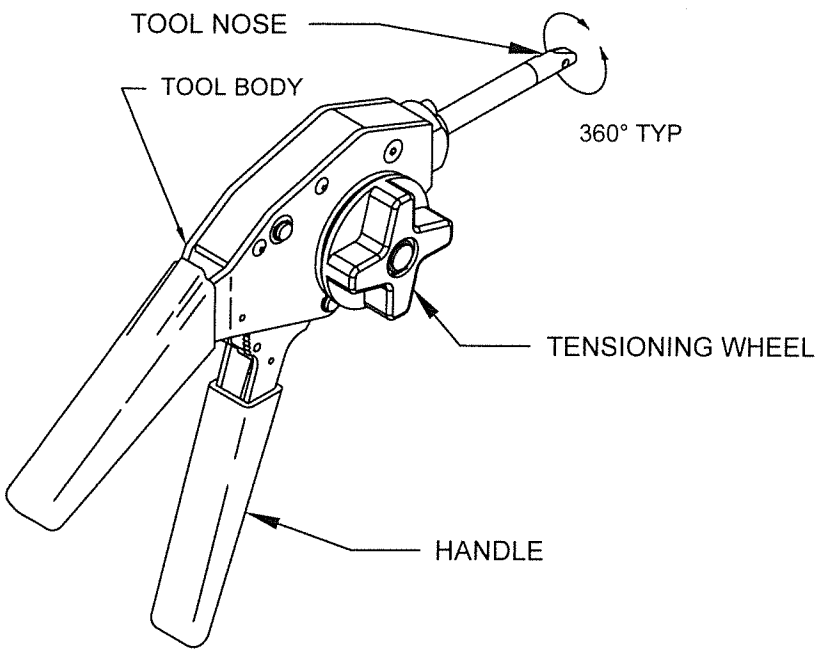


FIG. 5

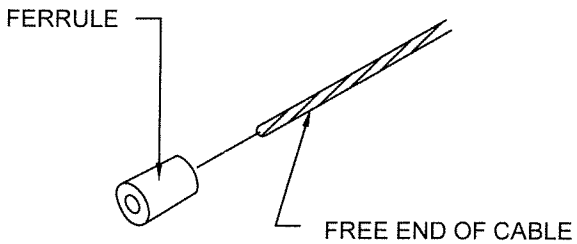
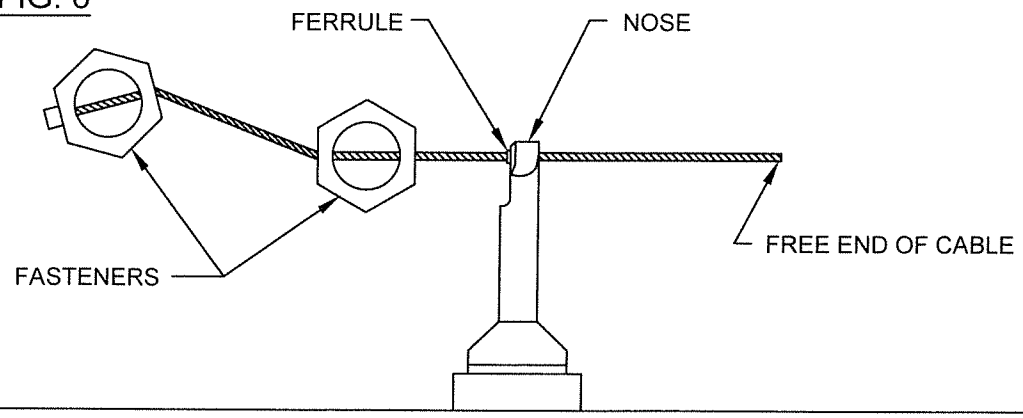


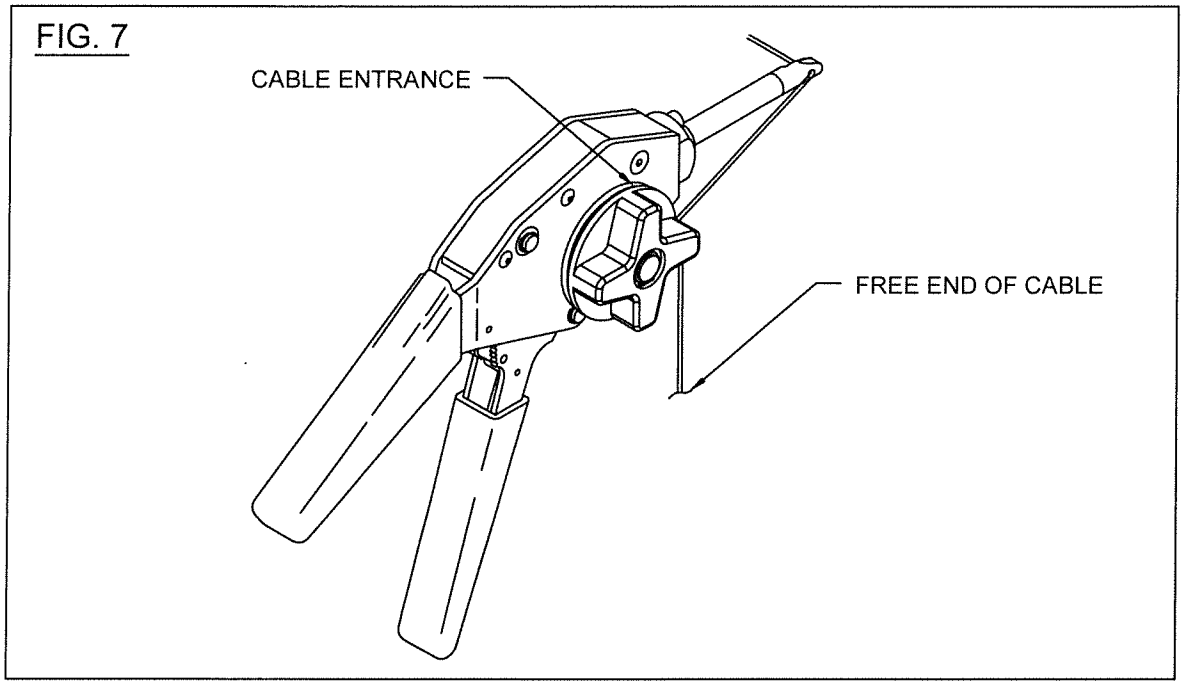
FIG. 6



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FIG. 7



2.7 Wrap the free end of the cable into the cable entrance as shown in Fig. 7. Wrap the cable one full revolution around the tensioning wheel making sure the cable is held in place by the wheel. Tension the cable by rotating the wheel clockwise until several distinct clicks are heard and felt.

2.8 Hold the tool nose steady, and perpendicular against the fastener to maintain consistent cable tension. Completely squeeze the handles to crimp and cut the cable.

2.9 After crimping and cutting, release the tool handle and slide the tool off the crimped ferrule. Pull the excess cable from the tool, by unwinding in the counterclockwise direction. Dispose of the cut cable properly.

3.0 VERIFICATION OF INSTALLATION

3.1 Verify proper tension of the cable. Refer to table 1, Fig. 8 for Safety Cable flex limits. (Not applicable for .062 diameter cable)

3.2 Verify that the cable was installed through the fasteners in accordance with section 1.0.

3.3 Verify that the cable was cut flush at the end of the ferrule with no strand extending more than 1/32 inch from the end of the ferrule.

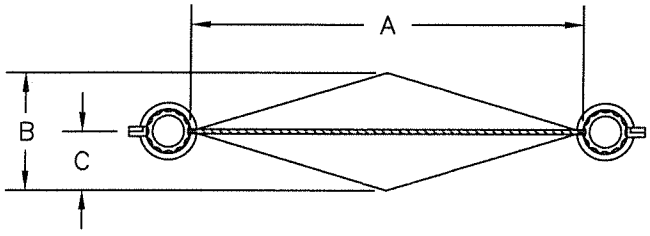
3.4 Visually inspect the cable for any nicks or other damage that may have occurred during installation.

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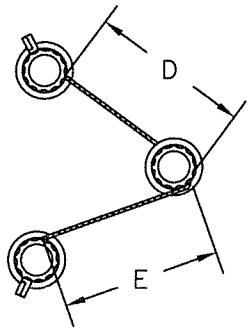
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TABLE 1	FLEX LIMITS, DIMENSIONS	
A IN. (mm)	B IN. (mm)	C IN. (mm)
0.5 (12.7)	0.125 (3.18)	0.062 (1.59)
1.0 (25.4)	0.250 (6.35)	0.125 (3.18)
2.0 (50.8)	0.375 (9.52)	0.188 (4.76)
3.0 (76.2)	0.375 (9.52)	0.188 (4.76)
4.0 (101.6)	0.500 (12.70)	0.250 (6.35)
5.0 (127.0)	0.500 (12.70)	0.250 (6.35)
6.0 (152.4)	0.625 (15.88)	0.312 (7.94)

FIG. 8



FLEX LIMIT



FOR THREE BOLT PATTERNS
A = D + E

4.0 TOOL MAINTENANCE AND CALIBRATION

The following procedure is recommended for proper care and maintenance of the BM series tools, to achieve a good installation of the Safety Cable.

4.1 Maintenance of the Crimp Cavity:
FERRULES CAN STICK OR JAM INSIDE THE CRIMP CAVITY IF THIS PROCEDURE IS NOT FOLLOWED.

4.1.1 During normal usage of the tool, dirt and debris can accumulate in the crimp cavity.

4.1.2 The accumulated debris must be cleaned periodically by brushing or scraping the crimp cavity. After cleaning, blow air to remove any debris still sticking.

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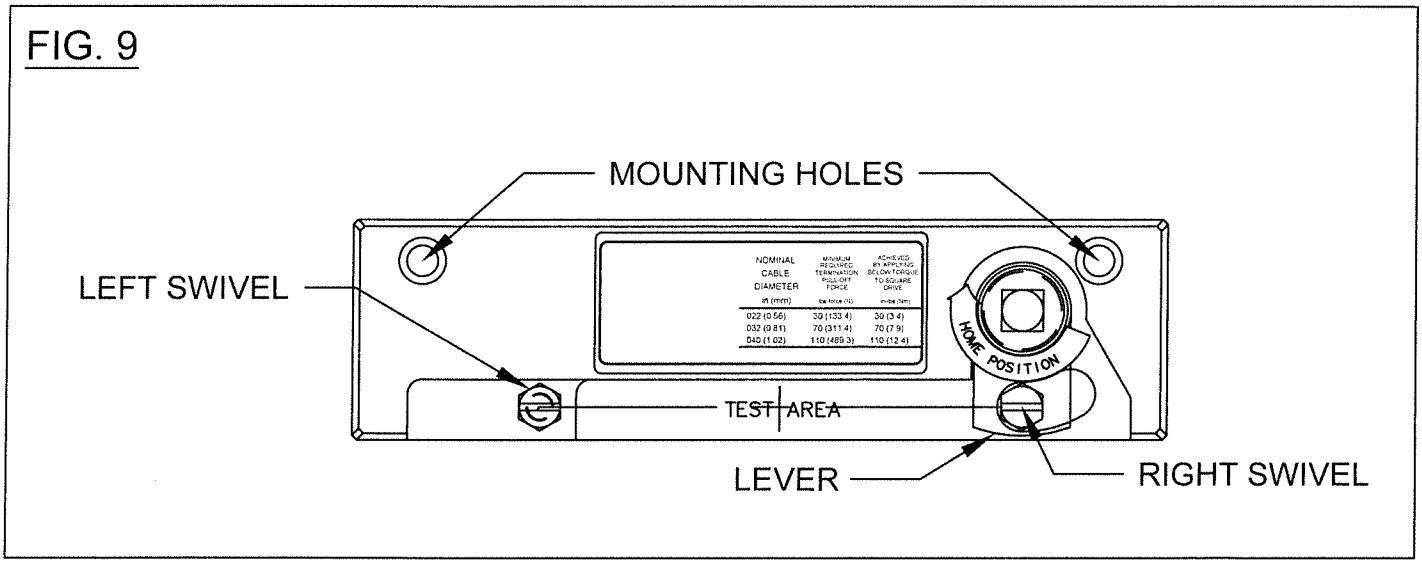
4.1.3 After the cavity is thoroughly cleaned, apply a thin film of lightweight synthetic or petroleum based oil.

4.1.4 The tool must be checked at regular intervals. The actual period between the checks depends on the number of crimps made with the concerned tool. The frequency of check, cleaning and applying of oil should be established by local Manufacturing Engineering, end users or installers depending on their practice and environment. Checking the crimp done by each tool at the beginning, middle and end of each shift is considered a good practice to ensure proper installation of the safety cable.

4.2 Checking of the Tool Crimp System Using Test Block TB-201:

4.2.1 Thread the cable into the left swivel and through the right swivel, holding the lever in the home position as shown in Figure 9. If the lever is not kept in the home position the results may be adversely affected. Terminate the cable per Section 2.0, making sure to close the handles completely.

FIG. 9



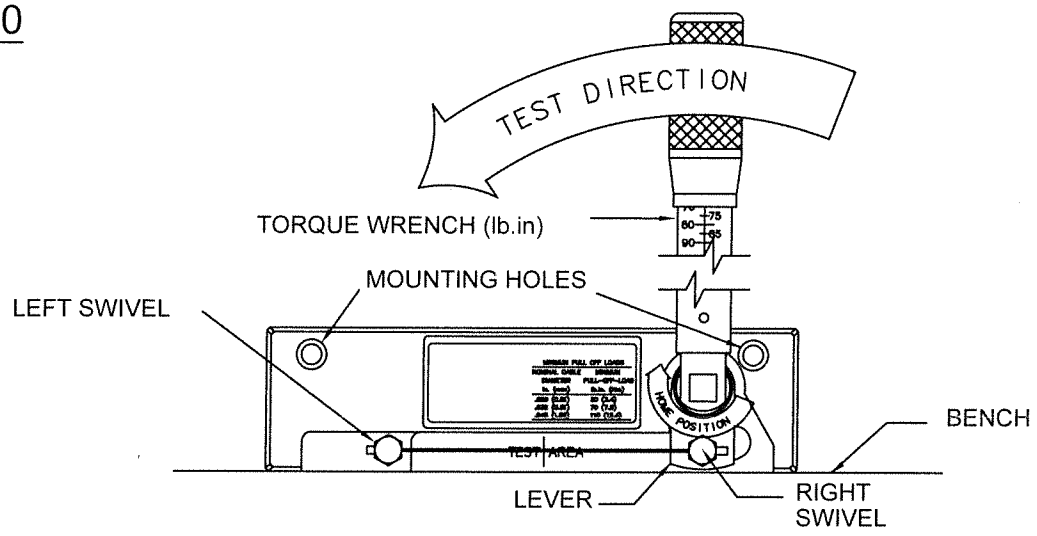
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4.2.2 Apply approximately 2 LB force to the cable with the SCTD013 Retention Tester at the line marked "TEST AREA". If the cable touches either the side or bottom surface of the test area then remove the cable from the test block and adjust the cable tension per Section 4.3. Terminate another cable as described above, making sure that the tool nose is perpendicular to the fastener as shown in Figure 6. Repeat this procedure until the cable does not touch either the side or bottom surfaces of the test area.

4.2.3 Place a calibrated 3/8" drive inch-pound wrench into the square drive hole, orienting the test block and torque wrench on a flat surface as shown in Figure 10. Apply the proper pull-off load as shown in Table 2. Release torque when minimum pull-off load is achieved. Do not apply additional tension to the cable.

FIG. 10



4.2.4 If the cable did not break or pull out of the ferrule after applying proper torque, remove the torque wrench and apply approximately 2lb force to the cable with the SCTD013 Retention Tester at the line marked "TEST AREA". If the cable does not touch the side or bottom surface of the test area, the crimp is acceptable.

4.2.5 If the cable breaks or pulls out of the ferrule, then the crimp is unacceptable and the tool indenter should be adjusted. If the cable touches either the side or the bottom surface of the test area, then the crimp is unacceptable and the tool indenter should be adjusted per section 4.5.

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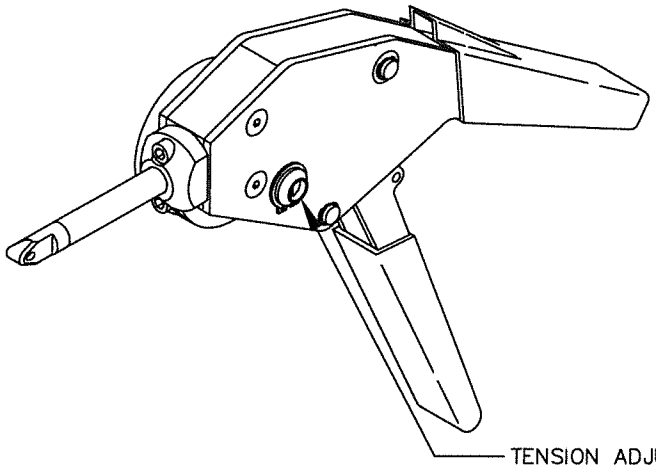
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4.3 Adjusting Cable Tension:

4.3.1 The cable tension may be adjusted using a 1/4" straight screw driver. Turn the tension adjustment screw (see figure 11) clockwise to increase cable tension or counterclockwise to decrease the cable tension. See Table 1 for allowable flex limits.

DO NOT OVER ADJUST THE CABLE TENSION, AS THIS CAN CAUSE INTERNAL DAMAGE ON THE TENSIONING WHEEL.

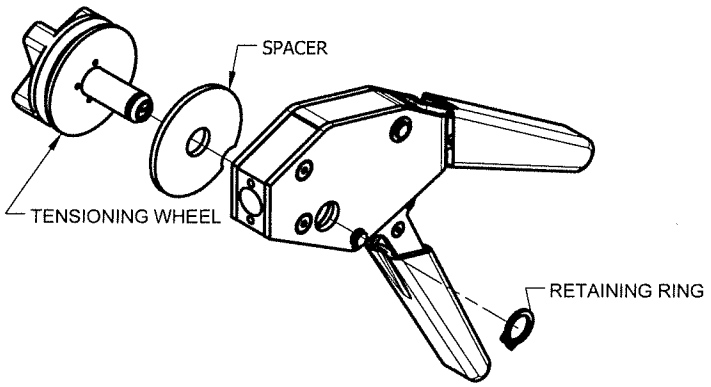
FIG. 11



4.4 Tensioning Wheel Location:
As shipped the tensioning wheel is always mounted on the right side, but may be mounted on the left side at field if required for dexterity.

4.4.1 Remove the retaining ring shown in figure 12, using proper retaining ring pliers. (Do not remove the retaining ring on the tension wheel).

FIG. 12

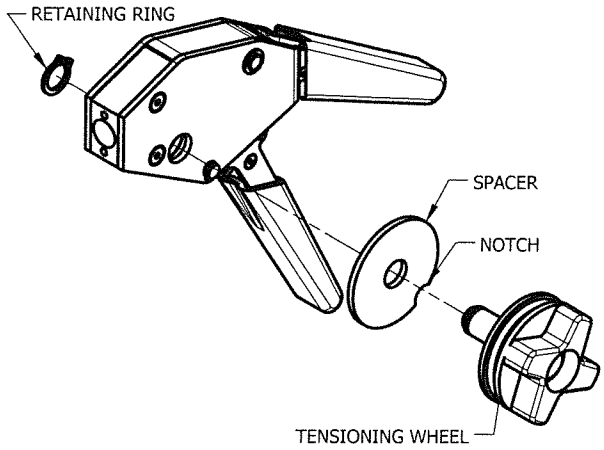


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4.4.2 Gently pull out the tensioning wheel and spacer from the tool. Install the spacer and tensioning wheel on the other side of the tool. Align the notch in the spacer with the pin in the tool body and reinstall the retaining ring (see figure 13).

FIG. 13



4.5 Indentor Adjustment:

CAUTION: We strongly recommend that the indentor adjustment or tool nose replacement must be done by a trained and experienced mechanic.

Always verify tool in accordance with Section 4.2 each time the tool nose is removed, adjusted or installed.

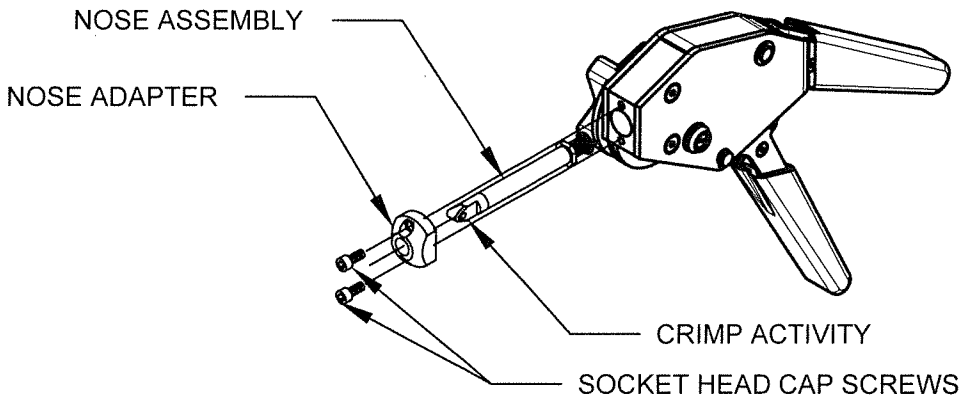
Tightening the crimp increases required hand forces during application and increases cable assembly tensile values. Loosening the crimp decreases required hand forces during the application and decreases cable assembly tensile values. Over adjustment may permanently damage the tool crimping mechanism.

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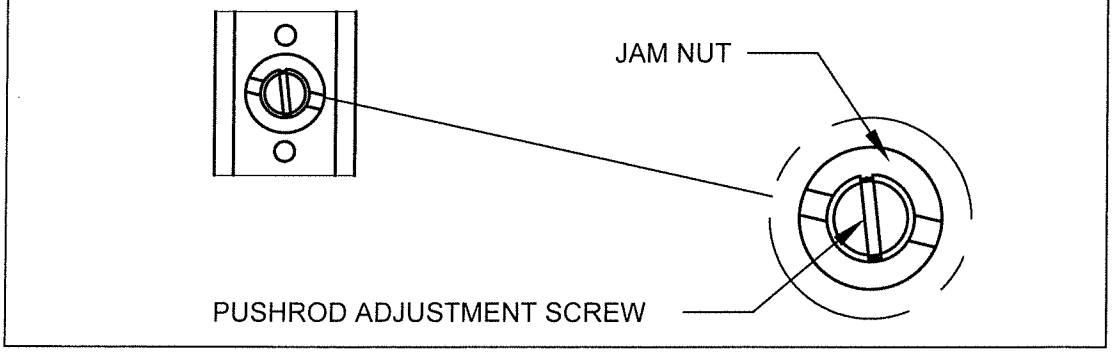
4.5.1 Remove the nose assembly by removing the two socket head cap screws as shown in Figure 14.

FIG. 14



4.5.2 Unlock the jam nut using the special spanner wrench SCT32084, and adjust the pushrod adjustment screw using a 1/4" straight edge screwdriver (see Figure 15) . Turn the pushrod adjustment screw clockwise to loosen the crimp. Turn the adjustment screw counterclockwise to tighten the crimp. After each adjustment securely tighten the jam nut (while holding the adjustment screw stationary with the screwdriver) prior to the installation of the nose assembly.

FIG. 15



4.5.3 Replace the nose assembly and the two socket head cap screws. Prevent binding by alternately turning each screw a small amount until tight. Check function as described in Section 4.2

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Bergen Safety Cable kit includes one cable with an end fitting attached and ferrule. Kits are packaged and sold in lots of 50; the ferrules are loaded in a spring loaded magazine. Following are the kit part numbers.

TABLE 2 - .022, .032, .040 NOMINAL DIAMETER CABLE KITS				Minimum Pull-Off Load-Lbf (Nm) or Torque-Lb.In
KIT PART NUMBER	(D) Cable Diameter	Component Material	(L) Length (Inches)	
K20B06	.022-.026 (1x7 Cable)	UNS S32100 CORROSION AND HEAT RESISTANT ALLOY (AMS5689)	6	30 (3.4)
K20B09			9	
K20B12			12	
K20B15			15	
K20B18			18	
K20B21			21	
K20B24			24	
K30B06	.032-.038 (3x7 Cable)	UNS S32100 CORROSION AND HEAT RESISTANT ALLOY (AMS5689)	6	70 (7.9)
K30B09			9	
K30B12			12	
K30B15			15	
K30B18			18	
K30B21			21	
K30B24			24	
K40B06	.040-.046 (7x7 Cable)	UNS S32100 CORROSION AND HEAT RESISTANT ALLOY (AMS5689)	6	110 (12.5)
K40B09			9	
K40B12			12	
K40B15			15	
K40B18			18	
K40B21			21	
K40B24			24	

NOTE: Letter "B" in the kit part number represents UNS S32100 Stainless Steel material. See "Bergen Cable Part Number" chart on page 12 for the letter codes of other materials.

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BM SERIES ADJUSTABLE TENSION SAFETY CABLE APPLICATION TOOL

BERGEN CABLE DATASHEET

SAE PART NUMBER

ASxxxx - 0X XX X

Document Number	
AS3509	(UNS N06600)
AS3510	(UNS S32100)
AS3511	(UNS S30400)
AS3655	(UNS N06625)

Cable Dia.	
01:	0.022"-0.026"
02:	0.032"-0.038"
03:	0.040"-0.046"
04:	0.062"-0.072"

Length
Minimum = 9" Maximum = 24" (In Increments of 3 Inches)

Identifier	
K:	Safety Cable and Ferrule
C:	Safety Cable only (No Ferrule)
F:	Ferrule only (No cable)

BERGEN CABLE PART NUMBER

X XX X XX

K:	Safety Cable and Ferrule
C:	Safety Cable only (No Ferrule)
F:	Ferrule only (No Cable)

Cable Dia.	
20:	0.022"–0.026"
30:	0.032"–0.038"
40:	0.040"–0.046"
50:	0.062"–0.072"

Material Code	
A	AS3509 (UNS N06600)
B	AS3510 (UNS S32100)
C	AS3511 (UNS S30400)
D	AS3655 (UNS N06625)

Length
Minimum = 9" Maximum = 24" (In Increments of 3 Inches)

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BM SERIES ADJUSTABLE TENSION SAFETY CABLE APPLICATION TOOL

Bergen Cable Technolgy offers complete refurbishing and recalibration services.

INVALIDATION OF LIMITED WARRANTY

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