

M1500 Mini Action Tightening torque for Trigger Guard Screw

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1. Background

In the web conference with LSI on June 6th, Howa proposed that the recommended tightening torque for trigger guard screw for the Super Lite is 25 inch-pound, but LSI pointed out that it may not be tight enough. We have been informed that the trigger guard of the SL breaks at 40 inch-pound. We also need to check the recommended tightening torque for the Mini Action, which is made of a different resin material from the SL. (cf. Super Lite material: Mitsubishi Reny 1313H, Mini material: Toray Amilan CM1011G30)

2. Purpose

Investigate the proper tightening torque for the Mini Action's trigger guard screw.

3. Conclusion

The proper tightening torque trigger guard screw for the Mini Action is 35 inch-pound (4.0 N·m).

(cf. Recommended tightening torque for resin and metal from a torque wrench manufacturer : M6 screw /0.5Tseries : 23inch · pound (2.6N · m)

4. Results of the investigation

Table 1

No	Item	Content	Detail								
1	Survey of other manufacturers	<div>Howa researched the tightening torque of the trigger guard screw from the manuals of other manufacturers.</div> <table><tr><th>Material</th><th>Tightening torque (inch・pounds)</th></tr><tr><td>Metal</td><td>55～65</td></tr><tr><td>Resin</td><td>20～40</td></tr></table>	Material	Tightening torque (inch・pounds)	Metal	55～65	Resin	20～40	Exhibit 1		
Material	Tightening torque (inch・pounds)										
Metal	55～65										
Resin	20～40										
2	Tightening test (1) (Torque causing breakage)	<div>Retighten in increments of +5 inch・pound from 30inch・pound, and investigate the tightening torque at which the trigger guard is broken. (Without removing the trigger guard.)</div> <table><tr><th>Test piece No</th><th>Tightening torque causing breakage (inch・pounds)</th></tr><tr><td>TP1</td><td>50</td></tr><tr><td>TP2</td><td>50</td></tr><tr><td>TP3</td><td>50</td></tr></table>	Test piece No	Tightening torque causing breakage (inch・pounds)	TP1	50	TP2	50	TP3	50	Exhibit 2
Test piece No	Tightening torque causing breakage (inch・pounds)										
TP1	50										
TP2	50										
TP3	50										
3	Tightening test (2) (Repeated tightening)	<div>Howa conducted a test in which we tightened and loosened at 45, 40, and 35 inch・pounds for up to 100 times repeatedly. We removed the trigger guard from the stock every 10 times to check for damage.</div> <table><tr><td>Tightening torque (inch・pounds)</td><td>45</td><td>40</td><td>35</td></tr><tr><td>Number of times damage was found</td><td>60th</td><td>No damage after 100 times.</td><td>No damage after 100 times.</td></tr></table>	Tightening torque (inch・pounds)	45	40	35	Number of times damage was found	60th	No damage after 100 times.	No damage after 100 times.	Exhibit 3
Tightening torque (inch・pounds)	45	40	35								
Number of times damage was found	60th	No damage after 100 times.	No damage after 100 times.								

Survey of tightening torque for trigger guard screw of other manufacturers

Exhibit 1

Content	Check the tightening torque of other manufacturers' trigger guard screw from their manuals.
Result	Trigger guard made of metal : 55~65inch•pounds Trigger guard made of resin : 20~40inch•pounds

Tightening test of Model 1500 Mini Action (1)

1. Purpose

Investigating the tightening torque at which the trigger guard of Mini Action is broken.

2. Conclusion

When the tightening torque is increased by +5 inch-pound, the trigger guard will be broken at about 55 inch-pound. (Crack on the Rear side.)

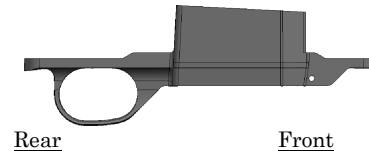
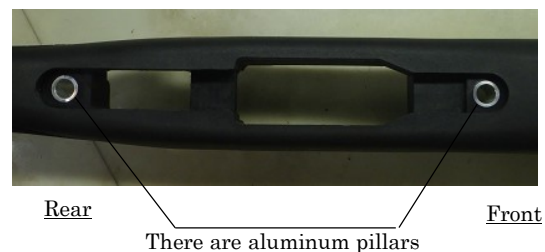


Fig.1

3. Stock used

Using HTI's mini-action stock.



4. Tightening Method

Retighten in increments of +5 inch-pound from 30 inch-pound until it is broken.

(3 test pieces, TP1: Without removing the trigger guard, TP2&3: Remove the trigger guard by every tightening.)

5. Result of the test

Table 1

○ : No damage, × : Damaged

Tightening torque		Test piece		
Inch · pounds	N · m	TP1	TP2	TP3
30	3.4	○	○	○
35	4.0	○	○	○
40	4.5	○	○	○
45	5.1	○	○	○
50	5.6	○	×	×
55	6.2	○	—	—
60	6.8	○	—	—
65	7.2	×	—	—

Note1 : See next page for photos of cracks.

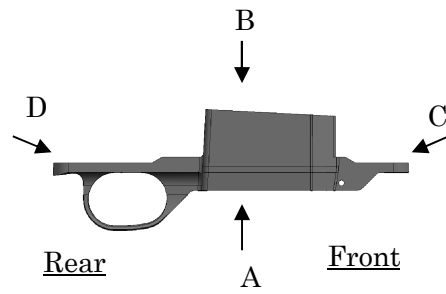
TP1

Without removing the trigger guard.

TP2&3

Remove the trigger guard by every tightening.

(Reference)



○ : No damage on visual inspection, × : Damage was found on visual inspection

Item		Before damage TP1 : 60inch · pound TP2/TP3 : 45inch · pound		After damage TP1 : 65inch · pound TP2/TP3 : 50inch · pound			
				View B		View C/D	
TP1	Front		○		○		×
	Rear		○		×		×
TP2	Front		○		○		○
	Rear		○		×		×
TP3	Front		○		○		○
	Rear		○		×		×

Tightening test of Model 1500 Mini Action (2)

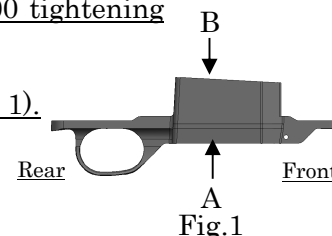
1. Purpose

Investigate the durability of the Mini Action's trigger guard by tightening torque.

2. Conclusion

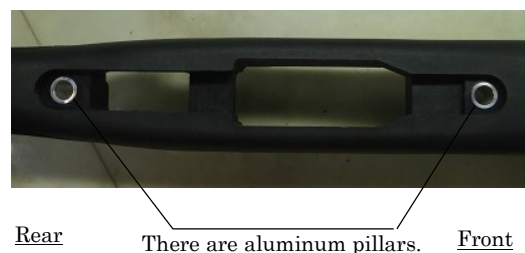
(1) Tightening torque of 35 inch-pound is durable with no breakage in 100 tightening tests.

(2) The first cracks to appear due to tightening are on the Rear/B-side (Fig. 1).



3. Stock used

Using HTI's mini-action stock.



4. Tightening Method

Howa conducted a test in which we tightened and loosened at 45, 40, and 35 inch-pounds for up to 100 times repeatedly. We removed the trigger guard from the stock every 10 times to check for damage.

5. Result of the test

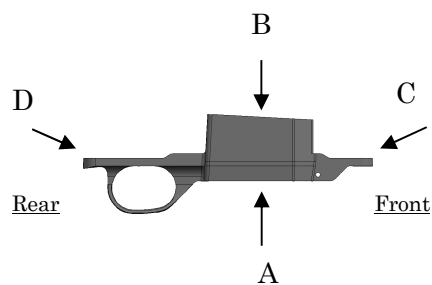
Table1

○ : No damage, × : Damaged






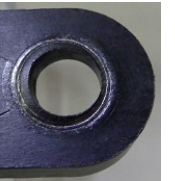




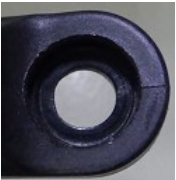

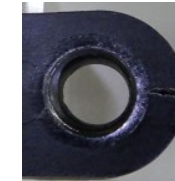
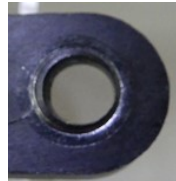
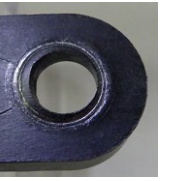
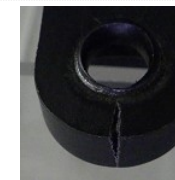

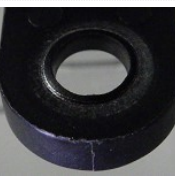
Tightening torque Inch·pounds (N·m) Number of tightening	45 (5.1)	40 (4.5)	35 (4.0)
10	○	○	○
20	○	○	○
30	○	○	○
40	○	○	○
50	○	○	○
60	×	○	○
70	—	○	○
80	—	○	○
90	—	○	○
100	—	○	○

Note1 : See next page for photos of damage.

(Reference)



○ : No damage on visual inspection, × : Damage was found on visual inspection

Test piece No		TP4	TP5	TP6
Tightening torque (inch·pounds)		45	40	35
Number of tightening		60	100	100
Front	View A			
	View B			
	View C			
	Comment	○	○	○
Rear	View A			
	View B			
	View D			
	Comment	× There is a crack on the B side.	○	○

Note1 : The first cracks to appear due to tightening are on the Rear/B-side.