

C.G. INCH MANUAL

SAFETY:

Your C.G INCH action has been carefully assembled, adjusted and checked under close standards at WOODY Engineering, from parts individually controlled at various stages of the manufacturing and treatments.

To ensure safe operation, it is important that subsequent work, particularly Trigger adjustment be made by a gunsmith or other competent person. It is also advisable to have safety check (and proof if applicable) undertaken on the finished rifle at this time.

Always ensure the Bolt is removed, chamber empty and barrel clear before handling the rifle.

WARRANTY:

The action and all its components are manufactured using the best materials and processes. Any eventual repairs are to be performed using the original parts as supplied by the manufacturer or his appointed agents. Use of foreign parts or modification of the originals will automatically withdraw the manufacturer's responsibility and guarantee.

SPECIFICATION:

Material used:

Rifle action, Bolt and all internal functional parts are made from high-Nickel/ high-Chromium and Molybdenum content 36NiCrMo16 steel alloy.

The material is submitted to a specific atmosphere-controlled heat treatment process, ensuring a core hardness of 52 on the Rockwell 'C' scale (minimum resistance 180 kg/mm² or 256,000 psi/115 tonnes sq. inch).

One of the major characteristics of this combination of steel and heat treatment is the total absence of warping ensuring that no further finishing such as grinding is required. This choice of exotic Ni-Cr-Mo steel also ensures finished items are free from any tendency to brittleness. "

Receiver:

-Total weight including trigger	1530 grams / 3.4 lbs
-External diameter	38 mm / 1.496"
-Length	187 mm / 7.362"
-Bedding screws (3)	M6 x 1
-Scope rail fixing screws (5)	M4 x0,7
-Length of loading port	85 mm / 3.316"
-Barrel thread	1.125 x 16tpi
-Length of barrel shoulders incl. threads	35 mm / 1.378"
-Section of receiver at chamber area	1093 sq. mm / 1.694 sq. in.
-Section central	1030 sq. mm / 1.1.596 sq. in.
-Section at locking lug point	591sq.mm / .916 sq. in.

Bolt:

-Length of travel	85 mm / 3.316"
-Primary extraction	2 mm / .079"
-Closure camming	2 mm / .079"
-Bolt rotation	60°
-Shear area - lugs	480 sq. mm / .744 sq. in.
-Calculated total shear resistance	86.5 tonnes
-Engagement area - lugs	67 sq. mm / .104 sq. in.
-Approx. total Lugs bearing angle	165°
-Frontal section	385 sq. mm / .597 sq. in.
-Min centre section	310 sq. mm / .496 sq. in.
-Section at lugs point	398 sq. mm / .617 sq. in.
-Depth of bolt-face recess	2.9mm / .114"

-Diameter bolt-face recess - std.	.308" (12 mm)
" " " "	.223"(9.6 mm)
-Other diameters on request	
-Maximum diameter bolt-face	.338" Lapua (15 mm)
-Diameter bolt body	22 mm / .866"
-Outside diameter of bolt lugs	27 mm / 1.063"

Firing pin/ignition system:

-Stroke to point of impact	2.6 mm / 0.102"
-Stroke - empty chamber	3.9 mm / 0.154"
-Lock time (calculated)	1.3 milliseconds
-Impact force	190N

Trigger:

-Model	C.G-XTreme Uni
-Adjustment range - single stage:	80 to 600 gram
-Adjustment range - double stage:	
Light spring	350 to 750 gram
Heavy spring	750 to 1800 gram

1) Action Body:

-1-1 Barrelling the Action:

The attached drawing 6-4 shows the barrel shank dimensions for .308 and .223 case heads.

The length from barrel rear face to shoulder of $35+0.00/-0.02$ mm (1.377-379") is to be respected to ensure bearing of the barrel on the two shoulders. The two spigot location diameters 29 mm $-0.01/-0.03$ (1.141-1.440") (front) and 25.4 mm $+0.00/-0.02$ (0.999-1.000") (rear) ensures perfect centring of the barrel and its interchangeability with no zero shift. Threads are 1.125" x 16 tpi UN 60°. Their only function is to fix the barrel, not centring it (as threads are not truly self-centring). Tightening torque need not to be more than 25 metre/kilo (250Newton/metre) (184lb/ft).

Use of the special Action Wrench engaging the Receiver lugs is recommended.

The 120° cone is machined such as to ensure a 0.2 mm (.008") gap between barrel female cone and Bolt face male cone. This is to be checked during machining. The radius at chamber entrance is to be kept to the minimum, as the cone ensures perfect feeding of all ammunition cases, whatever diameter and length.

-1-2 Bolt Stop

The Bolt Stop Pin (#41-03) is reversible and indexed by the Bolt Stop Clamp (#41-04-A). The standard clamp has Stop Pin maintain only function, but an extended model (#41(04-B) can replace it to allow side mounting of Central / T-Mac type rear sights.

Other combined brackets can be supplied (Redfield prism) .

-1-3 Dovetail

The Dovetail is a standard Anschütz 12 mm x 60° and accepts all the sights or accessories intended for this dovetail.

1-4 Scope fitting Screws

They are spaced by pairs at 21.85 mm (0.860" standard) and three are provided at front and two at rear. They are Metric M4 x 0.7 mm.

See drawing #6-6 showing the screws holes spacings.

-1-5 Bedding Screws

Three M6 x 1 mm are located (from front face of Action):

 N° 1 (forward) 17.8 mm (0.700")

 N° 2 (middle) 68.6 mm (2.700")

 N° 3 (rear) 175 mm (6.090")

They are normally fitted with fleXibloc studs, for direct fitting in any fleXibed or fleXibloc bedding system. The Studs can be removed with a 3 mm Allen key (they are Loctited) when using conventional bedding screws if the fleXibloc system is not being used.

If Bedding is HHE "fleXibed", the bedding sleeve is 9mm diameter, and the Bedding Screws are M6x1mm, DIN 7991 (angled head), Class 12.9.

Unless otherwise ordered, C.G. INCH actions are supplied for C.G. 'fleXibloc sleeves (#41-15-A), of 10mm diameter, with a shoulder at top . The Bedding Screws are M6x1, DIN 912 (socket head), Class 12.9.

For conventional or pillar bedding, it is recommended to use the rear face of the Action Body as recoil absorption, this provides an ample surface most in line with the bore axis, and immediately behind the Bolt Lugs. The Bedding Screws are then dependant in their length on the way the inletting is accomplished. In this case, the bedding screws are M6, DIN912 (Socket head), Class mini 8.8.

A Recoil Stud (#41-15-C) acting as Recoil Lug is available and can be fitted in lieu of one of the Front Bedding Screws, the middle one being the recommendation.

2) Bolt :

The attached drawing 6-2 shows the Bolt assembly cutaway.

-2-1 To disassemble the Bolt:

The Bolt is easily removed from the Action Body by simply rotating it a further 35° and pulling it fully out of the Action.

Be aware that the Rear Plug (#41-11) has a LEFT-HAND thread, and therefore, it has to be loosened by turning it

clock-wise using a 5 mm Allen Wrench. This is deliberate for safety reasons:

In case of an incident such as misfire or jammed round, Safety Rules require the de-activation of the action prior trying to correct the problem. This is usually done by loosening the Rear Plug of the Bolt. If the Rear Plug has a R/H thread, this slackening operation is done anti-clockwise, that is in the rotational direction of the opening of the Bolt, thus creating a potential risk of premature opening before the mechanism has been deactivated. With L/H threads, the clockwise loosening effort keeps the Bolt closed. Full disassembly of the Bolt internals is described in 3-1.

The Extractor (#41-13) is of the claw-type, self-gripping. It can be removed by pushing backwards the Extractor Plunger (#41-14), while the Extractor is lifted out of its pocket in the Bolt. It is recommended to undertake this operation with the Bolt in a transparent plastic bag, in order to not lose Extractor, Plunger or Spring. The extractor is reassembled by simply pushing it backwards in its pocket, after having replaced the Spring and the Plunger, which must be correctly oriented with the notch to the centre of the Bolt. Make sure it is well in place, well maintains the extractor and operates freely.

The Bolt Handle (#41-12) is screwed on the Bolt. Removing the Bolt Knob (#41-29) give access to two flats milled on the Bolt Handle. Using a 7 mm spanner, the Bolt Handle can be removed or tightened. This operation is explained here in the unlikely case the Bolt Handle gets loose after being forced during hard extraction of an over-pressure round fired.

2-2 Care and Maintenance:

The Bolt should be maintained clean and dry, except for long term storage. It must be carefully dried when it gets wet during a shoot. It is strongly recommended to lubricate the Bolt Lugs and Cocking Ramp with Molybdenum Disulphide grease. In very dusty conditions particular attention is to be taken on the Lugs, as grease attracts abrasive dust. Under those circumstances regular cleaning is to be undertaken.

3) Firing Mechanism:

3-1 To disassemble:

-Remove the Bolt Rear Plug as explained above (see 2-1).

-Slip the Compression Sleeve (#41-09) rearwards to free the Sear Pin (#41-07) from its maintaining slots in the Compression Sleeve; this allows removal of the Sear Pin with the Roller (#41-08) maintained by a 6mm Elastic Ring (41-31). If this Elastic Ring is removed, make sure the Roller is returned to its correct position, this is with the chamfer INWARDS to the Bolt. The removal of the Sear Pin frees the complete Hammer assembly, which can then be removed together with the Compression Sleeve by simply turning the Bolt head up.

-The Firing Pin Tip (#41-10) comes with the Hammer assembly and is carefully recovered.

-3-2 Firing Pin Tip and Protrusion:

-First, note that the Firing Pin Tip is symmetric and can be fitted in either position, one of the tips being operational, and the second one protected inside the Hammer for subsequent use. In the unlikely case of a Firing Pin Tip break, just turn the Firing Pin Tip front to rear to continue firing. As this operation can be accomplished in seconds, shooting interruption is minimal. It is recommended to experiment with this changeover in order to be able to do it satisfactorily if it has to be done "in the field".

-The protrusion is 1.4 mm for SR primers (.056"), 1,5 mm for LR ones (.0591), carefully set at the factory, and cannot get out of adjustment, and the change of tip end does not affect the setting, as all the Firing Pin Tips are closely toleranced and are interchangeable.

-3-3 Hammer:

The Hammer is a complete unit (#41-05-06 + 27), and generally does not need to be taken apart. However, should this be necessary, for example to change the Belleville Spring Discs (#41-27), it should be remembered that the threads at the centre are fixed by a thread-locking compound which needs heat to remove, and must be refitted in the same way. The number of washers is normally 31. As they are used at only 50% of their total load capacity, periodical replacements are not necessary, nor recommended. Only original Spring Discs are to be used. Our discs are produced under close specifications and delivered to us under an Aerospace-type Quality Release Certificate. Firstly, start the Spring Disc assembling by placing the rearmost one with its external bearing against the spacer, then the others are placed in opposed pairs, ending with the last one with its internal face against the Front Hammer (#41-05).

-3-4 Cocking Cam and Roller:

A Roller is fitted on the Sear Pin, to ensure rolling on the Cocking Ramp of the Bolt, instead as friction-sliding. This is a typical feature of the C.G design and well-proven to reduce considerably the Bolt opening effort and preventing any wear of the bearing surfaces. There must be a play of 0.1 to 0.2 mm (.004" to .008") between the radius at the bottom of the Cocking Ramp and the Roller (in forward position). To check this, insert the Hammer Assembly in the Bolt (without the Sear Pin Tip and the Compression Sleeve), and push it firmly forward against the dry firing shoulder in the Bolt. The Sear Pin and Roller must enter freely, and the Roller takes its position in the Cocking Ramp, with the above-mentioned 0.1– 0.2 mm clearance. This is set at the factory, and need only to be checked if the Hammer is disassembled to access the Spring Discs stack. We do not recommend users to do this. It is adjusted by fitting 0.1 or 0.2 mm thickness and 5.2 mm diameter shims at bottom of female threads of the Front Hammer.

-3-5 To reassemble:

-Holding the Bolt vertical, introduce the Firing Pin Tip. Ensure that it moves freely into position and its tip appears in the Bolt head recess.

-With the Bolt turned horizontal, slide the Hammer with the Compression sleeve into the Bolt, taking care it goes full way, ensuring the Sear Pin location hole in the Hammer is apparent in the Cocking Ramp opening.

-Place the Sear Pin in its location through the front of one of the slots of the Compression Sleeve. Make sure it is fully engaged with the Roller well bearing on the Cocking Ramp. Failing to do this will result in it not being possible to move the Compression Sleeve forward, and engage the Rear Plug.

-Maintaining the Roller on its 'cocked' position on the Cocking Ramp, install and screw by hand the Rear Plug. This must screw up freely up to 5 mm (.020') of its final location, when the spring tension can be felt. Tighten firmly (but do not over tighten) the Rear Plug.

NOTE: The Nadella thrust bearing (#41-30) need to be fitted with the plate (CP6x14) facing front, being maintained by the 6mm Elastic Pin.

Use of the De-Recocker[®] is recommended to check the free movement of the Hammer.

NOTE: The use of the De-Recocker[®] allows de-cocking the Bolt when kept for long periods in storage out of the Action. Failure to de-cock the Hammer is the major cause of spring eventual wear.

-3-6 Care and maintenance:

The Bolt internals should be lightly lubricated with light oil. The Nadella Bearing fixed on the Bolt End Plug should also be kept lightly oiled.

The Roller and the Cocking Cam can be greased together with the Bolt Lugs, using Molybdenum Disulphide grease.

4) Trigger

The attached drawing 6-3 shows the trigger

If the action is supplied with the original C.G INCH Trigger Guard, the Trigger is fixed to the Action together with the Trigger Guard spacer by two screws M4x35 and M4x30mm. The Trigger Guard can be removed for easier access to the adjustments by removing the single M4x20 cap screw, but the two screws apparent when the Trigger Guard is removed remain to hold the Spacer and Trigger.

4-a. Two-Stage settings:

-4-a-1 Description:

The Trigger is factory-set for Two-Stage operation, with final pull weight of 300 to over 1800 grams with approximately 60% on the first pull. The initial sear engagement is important and is reduced to a safe minimum during the first pull. At the end of the first pull, the leverage ratio changes, to provide a heavier second pull with a creep-free let-off. If the pressure on Trigger Shoe is released during the first pull stage, the trigger resumes full sear engagement and the operation can be repeated. The # 12 First Pull and # 13 Second Pull Screws are fitted with a ball bearing on the Second Lever. This ensures a smooth, friction-free first and second pulls with reduced wear for long term consistency.

-4-a-2 Lighter / heavier pull weights:

A lighter or heavier final pull weight First Lever Spring is located in the # 7 recess under the Cover Plate. Care is to be taken to not lose it when opening the Cover Plate.

-4-a-3 Trigger shoe:

The standard Trigger Shoe is reversible: one side is straight and knurled, while the other is slightly curved. A traditional curved Trigger Shoe is also available. Most of the aftermarket small-bore Trigger Shoes can be fitted to the standard 3.5 mm Rail. The Shoe can be adjusted lengthwise by slackening # 4 Clamp Screw. The Shoe can also be canted sideways on its rail before re-tightening the #4 Clamp Screw.

-4-a-4 Adjustments:

All adjustments are conducted with good quality 1.5 or 2 mm Allen keys. Trigger removal from the action requires a 3 mm Allen Key.

-4-a-5 Adjustment procedure:

Each CG Universal Trigger is set and tested on its own action at the factory, so the following procedure should rarely, if ever, be necessary.

It is easier to set the Trigger with the Action removed from the stock in order to observe the operation of the Trigger mechanism through the holes in the cover plate intended for this purpose.

- 1) Adjust the # 8 Forward Travel Screw so that the #1 5 Finger Rail is parallel to the bottom of the Trigger Housing.
- 2) Gently screw-in the #10 over-travel adjustment Screw just enough to block movement of the First Lever and Shoe Rail.
- 3) Replace and close the Bolt and check that the Action cocks. If not, unscrew the # 12 and/or # 13 Screws until it does.
- 4) With the Action cocked, slowly screw-in the # 13 Second Pull adjustment Screw until the Action lets-off, then, back it off ¼ turn.
- 5) Re-cock the Action and repeat the previous step with the # 12 first pull Screw.
- 6) Open the bolt and unscrew the # 8 Forward Travel Screw at least 2½ turns.
- 7) Re-cock the Action and, while applying pressure to the Trigger Finger, unscrew the # 10 Over-travel Screw (when fitted) until the Action lets-off. Unscrew the # 10 Over-travel Screw at least ½ turn more to ensure sufficient over-travel.

-4-a-6 Springs settings:

Using a 2 mm Allen key, completely slacken the # 11 First Lever Spring Screw and, using the same 2 mm key through the hole in the # 3 Fourth Lever, adjust the # 4 Second Lever Spring for a final pull weight as shown in column 2 of the table below.

Select a First Lever Spring from column 1 of the table below and adjust it to give the desired final pull.

Springs Table:

<u>-1-First Lever Spring Range</u>	<u>-2-Second Lever Spring</u>	<u>-3-Final Pull</u>
Light (0.36 mm /.014" wire)	250 gram	300-450 gram
Light (0.36 mm/.014" wire)	400 grams	450-600 grams
Heavy (0.55 mm/.022" wire)	500 grams	700-100 grams
Heavy (0.55 mm/.022" wire)	700-800 grams	1000-1800grams

Please note: After adjusting the # 4 Second Lever Spring it is important to check that the Second Lever resumes full Sear engagement when the Trigger Shoe is released after the first pull (i.e. without let-off). The movement of

the Second Lever can be observed through the inspection holes in the Cover Plate and/or from the underside of the Main Housing.

IMPORTANT:

Any failure of the Second Lever to resume full engagement when the Trigger Shoe is released during the first pull is a potentially dangerous malfunction requiring immediate cleaning, lubrication or adjustment of the Trigger.

After adjustment, dry-fire and verify that there is a definite 'step' before the Trigger releases on the final pull. If not, unscrew the # 12 Screw $\frac{1}{2}$ a turn.

For any final pull weight, the relationship between the # 4 and # 11 springs setting Screws governs the ratio of first and second pull weights. For instance, to achieve a more pronounced final pull, screw # 4 in $\frac{1}{2}$ turn and unscrew # 11 screw about $\frac{1}{2}$ turn.

4-b Single stage (Direct pull) settings:

The Trigger can also be used in Single-Stage (Direct Pull) mode. This allows much lighter pulls than those obtained in Two-Stage mode.

4-b-1 Adjustment to Single Pull:

For using the Trigger in this mode, the lighter springs are normally used for First Lever.

- 1) Using a 1.5 mm Allen Key, loosen the # 12 and # 13 Screws by at east $1\frac{1}{2}$ turns.
- 2) Set the # 8 Forward Travel Screw so that the Trigger Shoe Rail is parallel to the bottom of the Trigger Housing.
- 3/ Cock the Action and turn slowly clockwise the #1 3 (Second Pull), until the Action let-off.
- 4) Then, turn anti-clockwise the # 13 Pull Adjustment Screw by at least $\frac{1}{2}$ a turn.
- 5) Check–fire the action several times and make sure the # 16 Second Lever returns to its full - engagement position if the pressure is released on the Trigger Shoe and in the re-cocking cycle as well.
- 6) Final adjust the Pull for crisp let-off, making always sure the return-to-full-engagement is ensured.

If the Second Lever does not re-cock fully:

- a) Slacken the # 13 another $\frac{1}{6}$ or $\frac{1}{4}$ turn to allow for more engagement.
- b) Or turn clockwise the # 4 Screw to increase re-cocking pressure.

Please note:

-The use of # 12 Pull Adjustment Screw (First Pull), although possible, is not recommended for Single Pull operation mode.

-Once returned in the stock, the Trigger must be carefully Safety-tested following current rules conditions to ensure correct engagement.

After replacing the action and Trigger in the rifle stock, verify that the Trigger operates freely.

-4-c Care and Maintenance:

After cleaning, flush with lighter fluid and lubricate sparingly with light oil. This will evaporate and leave a dry lubricating film.

When used in very dusty conditions, the Trigger will operate satisfactorily without cleaning provided that the Final pull weight is set to 500 grams or more.

Each adjustment screw of your Trigger is secured by a Nylon friction lock. Thus the use of thread-locking compound on those screws is not recommended.

-5 ' fleXibloc ' Bedding system:

If the Action is to be installed in a custom stock using the fleXibloc Bedding Block, follow the instructions supplied with the Bedding Block.

If used in our own stock, the fleXibloc system requires no specific maintenance. The fleXibloc is moisture resistant and need simply to be dried after it eventually get wet during a shoot.

Slightly oil the fleXibloc bushing and bearing faces of the Bedding Screws for ease of removal.

The Bedding screws tightening torque is not critical. A torque of between 5 and 6 Newton/metre is recommended. This can also be ensured by using a long 5mm Allen key. When the key flexes under finger tension, the tightening is correct.

-6 Attached documents

- 6-1 Action general assembly
- 6-2 Firing Pin details.
- 6-3 Trigger parts reference picture.
- 6-4 Barrel Shanks .308 and .223 dimensions.
- 6-5 Scope mount screws spacings.
- 6-6 fleXibloc inletting instructions.
- 6-7 fleXibloc principle.
- 6-8 Parts List.

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