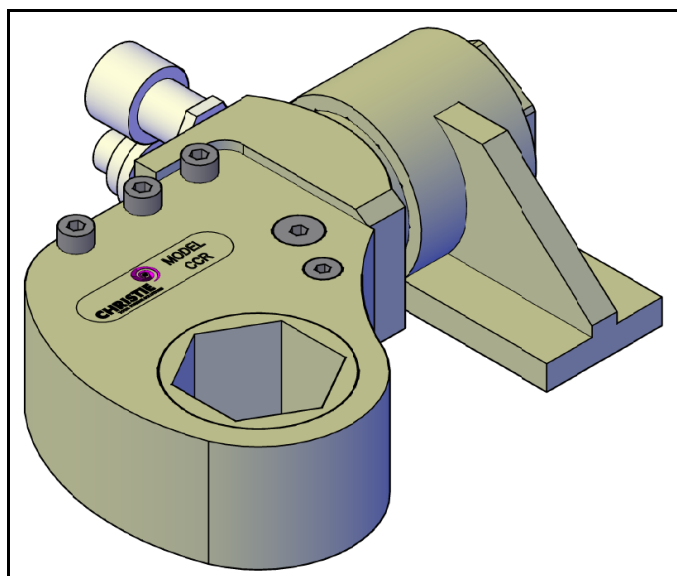
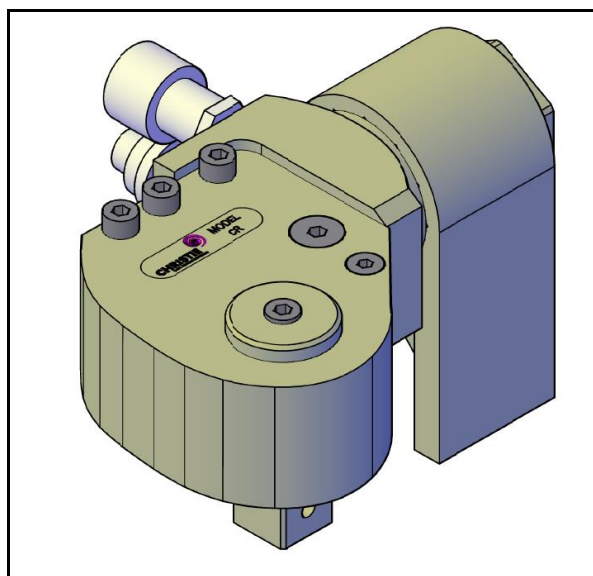


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**CHRISTIE**  
TOTAL TORQUE SOLUTIONS

**COMPACT RATCHET (CR) &  
COMPACT CASSETTE RATCHET (CCR)  
OPERATORS HANDBOOK**



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## INTRODUCTION

The Compact Ratchet (CR) and Compact Cassette Ratchet (CCR) Wrench's are reversible, non-impacting, torque controlled bolt tightening and un-tightening tools designed to operate in a reciprocating action.

The CR and CCR Wrench's must always be used with the following:-

- Clean hydraulic oil ISO32 or equivalent.
- A suitable double acting hydraulic pump unit capable of safely delivering 10,000 PSIG (700 Bar) hydraulic pressure.

Cont'd.... on next page

- Suitable hydraulic hoses and couplings capable of safely delivering 10,000 PSIG (700 Bar) hydraulic pressure, ideal safety factor 4:1.
- Stable torque reaction (see Figures 4 & 5). Reacting against the hexagon area of the body, without using the foot, is permissible. Always keep the reaction point as far away as possible from the output drive.
- Impact quality sockets.

If the intended use is other than for nuts, bolts and threaded fasteners contact W. Christie (Industrial) Ltd

It is the responsibility of the user to consider associated site risks before introducing the equipment into the work-place

### **TRAINING REQUIREMENTS**

Training on the correct use of the CR and CCR tools with the hydraulic power pack is available. Please contact W. Christie (Industrial) Ltd for more information.

### **GENERAL SAFETY**

The improper use of hydraulic equipment is unsafe and may result in personal injury. It is important that operators have read, understood and comply with all instructions in this user guide.

If more than one individual is involved in the operation of the equipment then all must read the operators handbook. Good communication must be established to prevent accidents or misunderstandings.

Operators must be equipped with the following personal protective equipment (PPE):-

- Eye Protection (Safety Glasses / Goggles)
- Safety Footwear (Steel Toe Cap Boots)
- Heavy Gloves

Impact quality sockets must be secured to the tool square drive by means of a pin and ring combination.

Care must be taken not to exceed the maximum working pressure of the equipment. See the torque chart provided. Failure or breakup of components may result in personal injury.

Take care not to stand on, run over or trip over hydraulic hoses. Injury may result. To minimise danger ensure that these lines are not run across walkways, ladders, roadways and doorways, etc and that people likely to pass through the working area are aware of the danger.

To prevent entanglement with moving parts operators must not wear loose clothing, ties, jewellery etc... Long hair must be tied back.

Always keep hands, fingers and body parts clear of the reaction foot at all times. Trapping in this area can result in serious personal injury.

Before use, check the hydraulic hoses are not cut, split, kinked or damaged in any way. If in doubt **Do not use**.

All hydraulic equipment and ancillary products should be inspected for damage and irregularities prior to use. If in doubt **Do not use**.

Never lift or drag hoses or cables. This weakens the swagings and puts unnecessary stress on threads and couplings. Subsequent failure may result in causing injury.

If a reaction is being used, **Ensure** that the reaction securing screw is fully tightened to prevent the reaction from sliding off the tool.

**CR & CCR WRENCH MODELS COVERED BY MANUAL**

**CR Models:-**

Model	Weight (Kg)	Maximum Torque		Square Drive
		Lbf.ft	Nm	
CR1	4	1,000	1,360	3/4"
CR1.5	6	1,500	2,040	1"
CR3	8	3,300	4,488	1"
CR5	13	5,800	7,888	1-1/2"
CR7	16	7,400	10,060	1-1/2"
CR11	22	11,000	14,960	1-1/2"
CR15	31	15,000	20,400	2-1/2"
CR20	44	21,000	28,560	2-1/2"
CR30	54	32,000	43,520	2-1/2"
CR50	103	50,000	68,000	3-1/2"
CR60	146	60,000	81,350	3-1/2"
CR80	178	80,000	108,800	3-1/2"

**CCR Models:-**

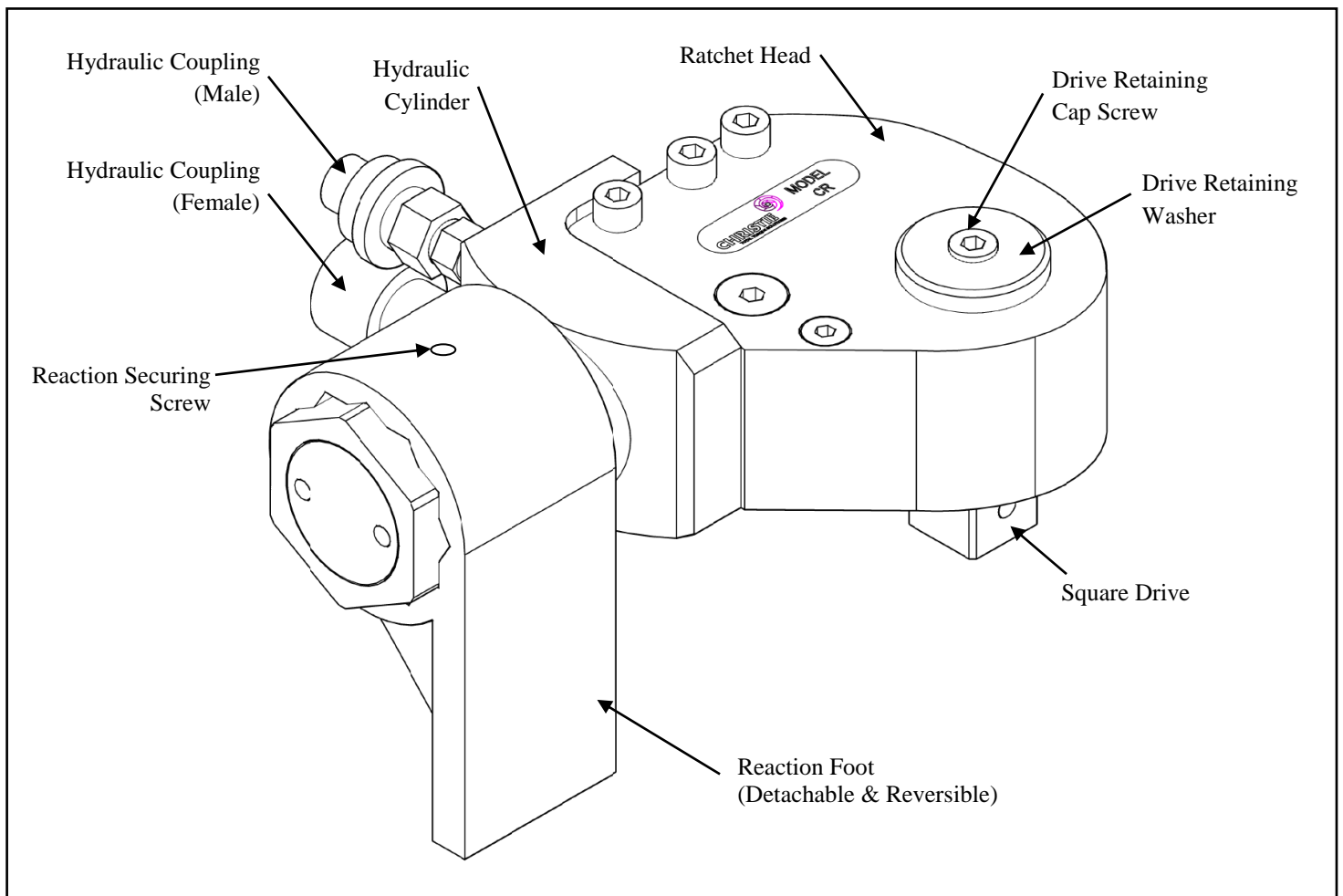
Model	Maximum A/F		Maximum Torque	
	Inch	mm	Lbf.ft	Nm
CCR1	1-13/16"	41	1,000	1,360
CCR1.5	2-3/16"	55	1,500	2,040
CCR3	2-9/16"	65	3,300	4,488
CCR5	3"	75	5,800	7,888
CCR7	3-1/8"	80	7,400	10,060
CCR11	4-5/8"	120	11,000	14,960
CCR15	4-5/8"	120	15,000	20,400
CCR20	5"	130	21,000	28,560
CCR30	6-1/8"	155	32,000	43,520
CCR50	8"	205	50,000	68,000
CCR60	9"	160	60,000	81,350
CCR80	10"	250	80,000	108,800

## ACCESSORIES AVAILABLE TO BUY OR HIRE

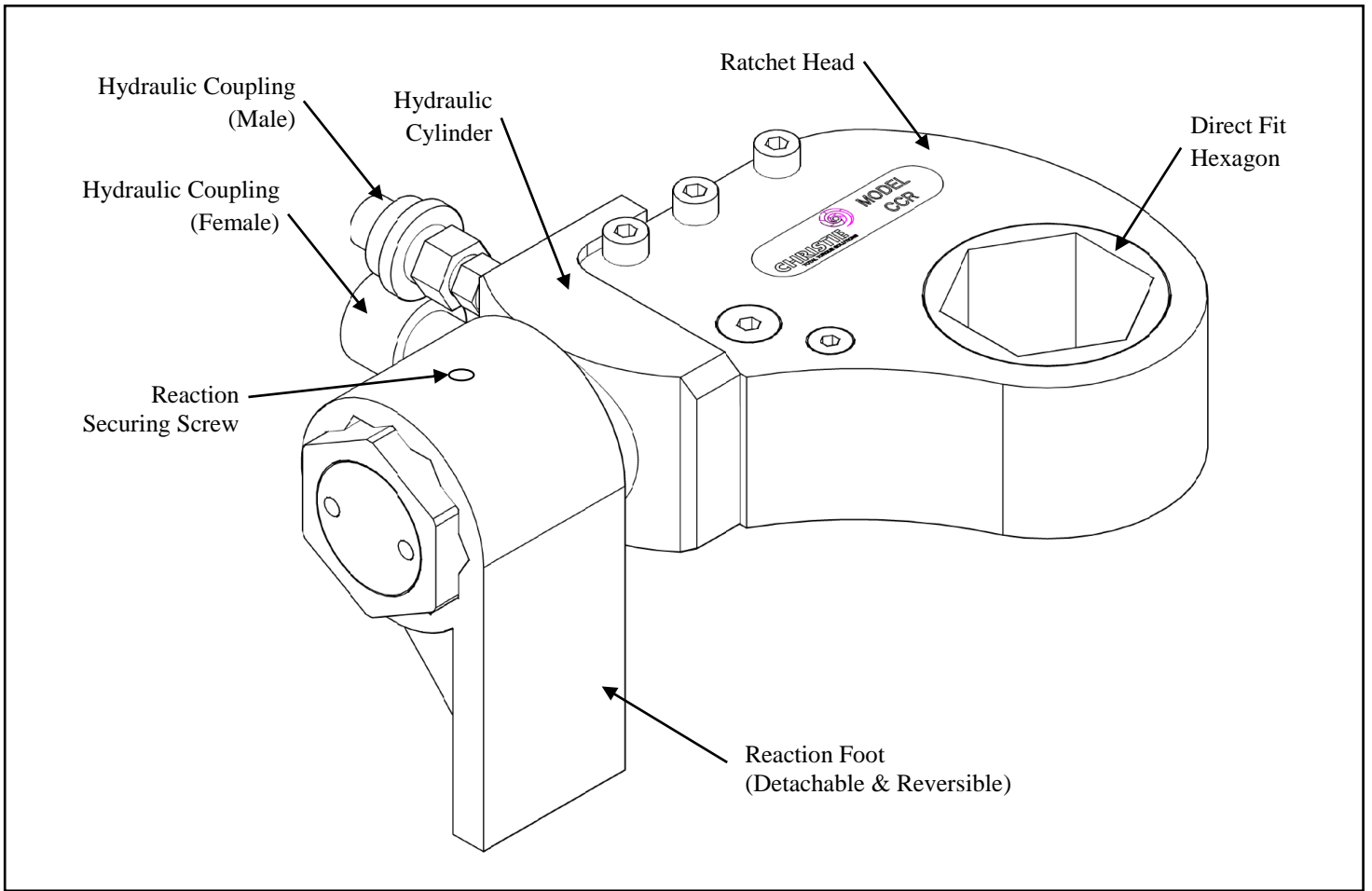
The following accessories are available upon request and can be custom made to suit requirements. Please contact W. Christie (Industrial) Ltd for more information:-

- Special Reaction Feet.
- Custom Wrench Lifting points.
- Hydraulic Power Pack Units (Typical units listed below):-
  - ADR70XD-LPR (Air Driven, Xtra, Desert Operation, Low Pressure Return)
  - ADR70MD-LPR (Air Driven, Micro, Desert Operation, Low Pressure Return)
  - EDR70X-LPR (Electric Driven, Xtra, Low Pressure Return)
  - EDR70M-LPR (Electric Driven, Micro, Low Pressure Return)
- Impact Quality Sockets.

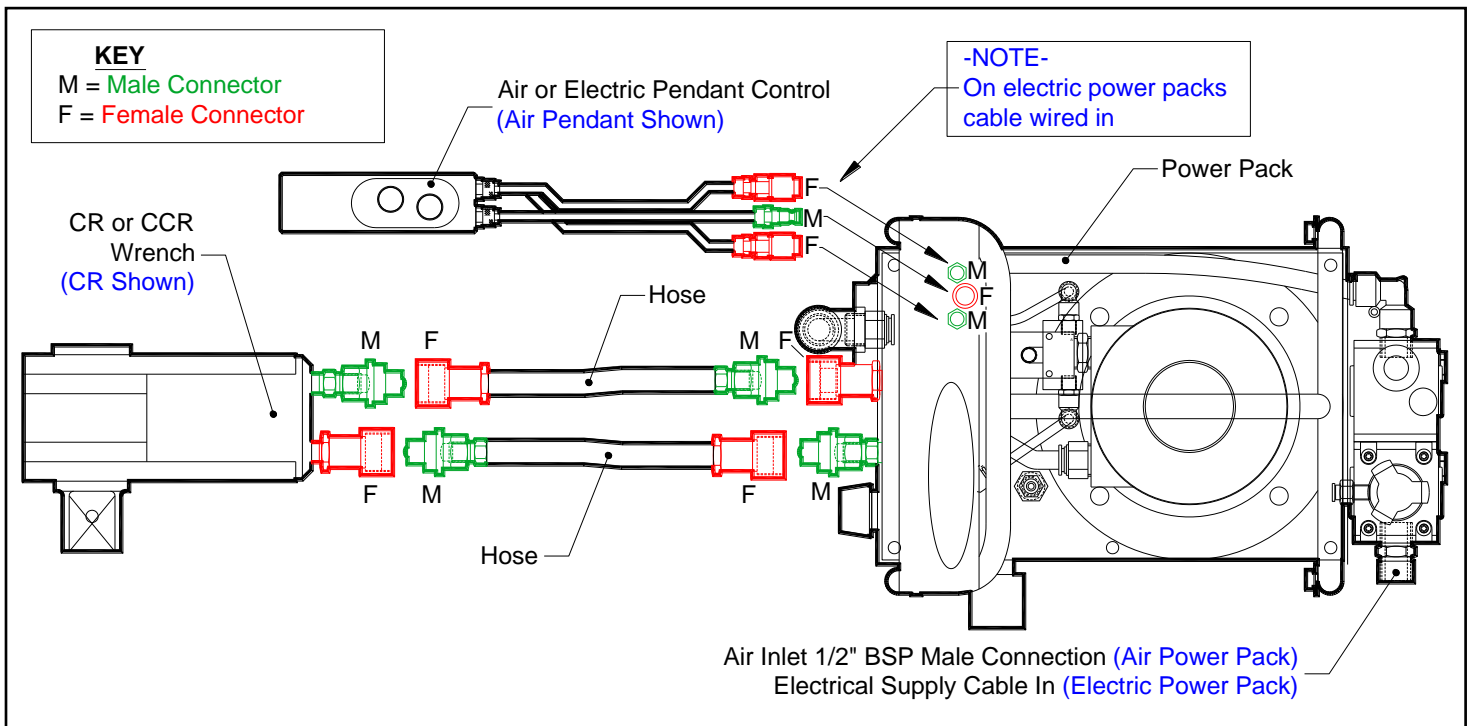
### CR WRENCH FEATURES – FIGURE 1



**CCR WRENCH FEATURES – FIGURE 2**



**CR & CCR CONNECTION LAYOUT – FIGURE 3**



## ASSEMBLY

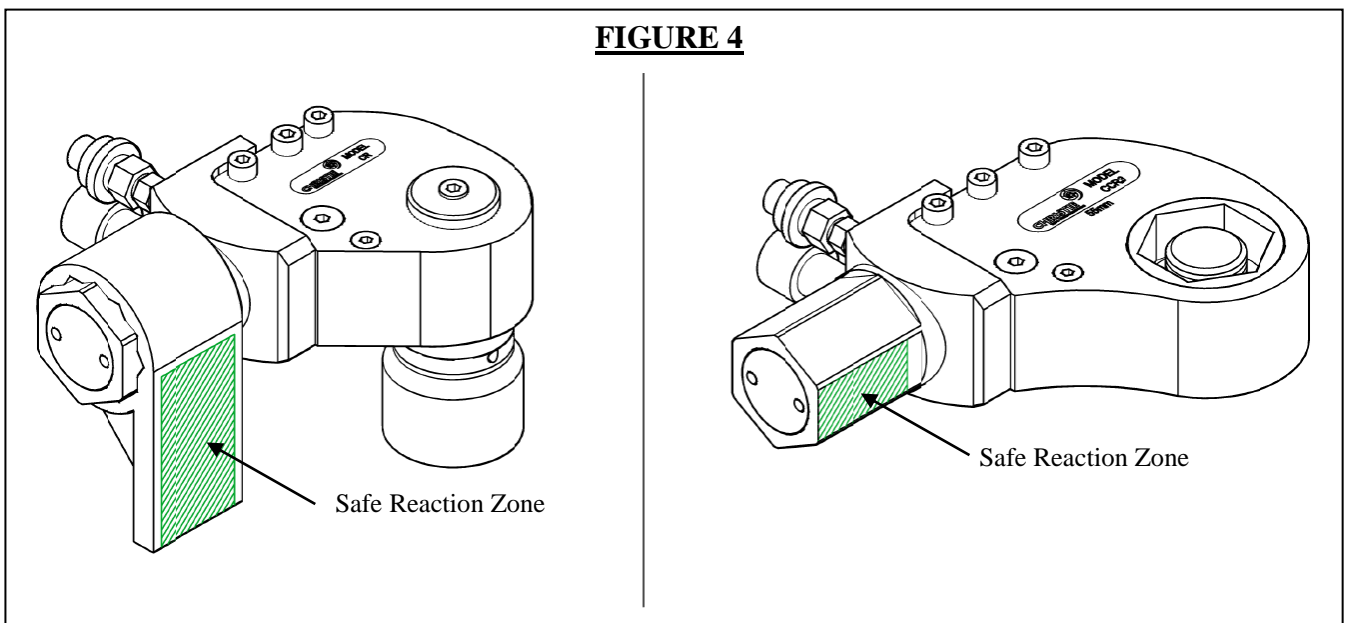
Please refer to figure 3 for Connection Layout

- If a reaction is being used, **Ensure** that the reaction securing screw is fully tightened to prevent the reaction from sliding off the tool.
- **Ensure** that the ratchet head fits comfortably on the application and there are no restrictions to the fastening operation.
- **Ensure** the couplings on the ratchet head and power packs hoses are compatible and in clean and good condition
- **Connect** the power pack unit's hoses to the hydraulic couplings on the CR / CCR wrench ensuring the screw collar on each female coupling screws fully up the shoulder on the male coupling
- If the CR / CCR tool is heavy enough to have lifting points then these should be used where possible to lift / manoeuvre the tooling into position.

## SAFE REACTION ZONE

Care must be taken to ensure that the reaction foot / area is only used within the limitations shown in figure 4. Failure to observe this instruction will result in premature wear or damage to the wrench. Do not react on the inside edge of the foot. Extreme forces are created which may cause damage to the wrench. If the application does not allow the use of a standard reaction foot, non-standard reaction feet can be provided.

Customers must not modify reaction feet and are strongly advised to contact W. Christie (Industrial) Ltd for technical assistance.



## TORQUE REACTION

React on reaction foot / area only. For correct reaction see figure 5. For an example of incorrect reaction see figure 6.

The reaction rotates in the opposite direction to nut rotation. The reaction foot must be allowed to rest squarely against an adjacent nut or nearby solid object.

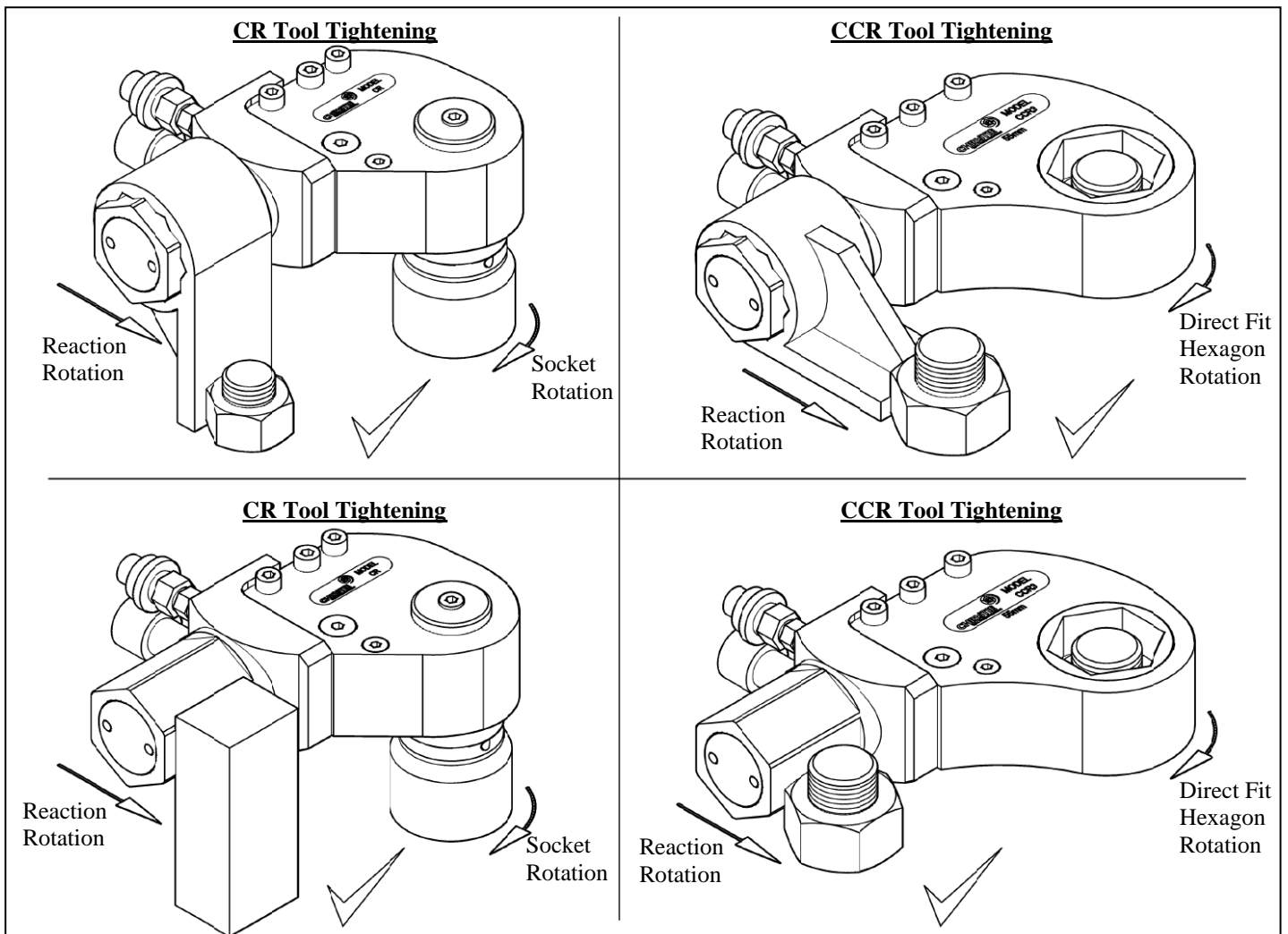
Keep hands / clothing etc clear of the reaction arm (Trapping Hazard).

**Do Not** react on weak or sloping surfaces. Tool or component breakage may occur.

**Do Not** extend the length of the reaction foot or induced side load may cause tool damage.

**Do Not** use the hydraulic couplings as a reaction point.

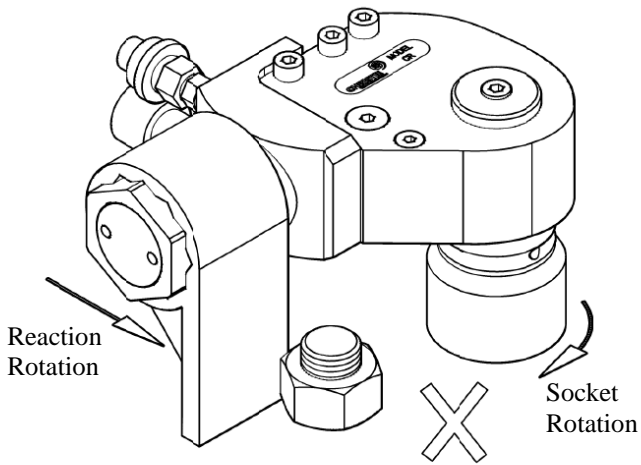
### CORRECT REACTION – FIGURE 5



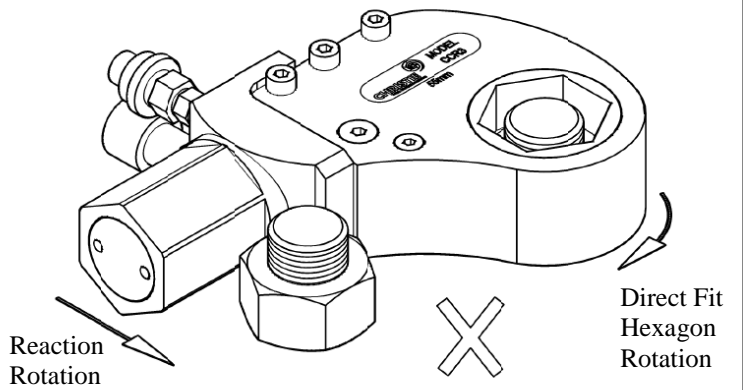


**INCORRECT REACTION – FIGURE 6**

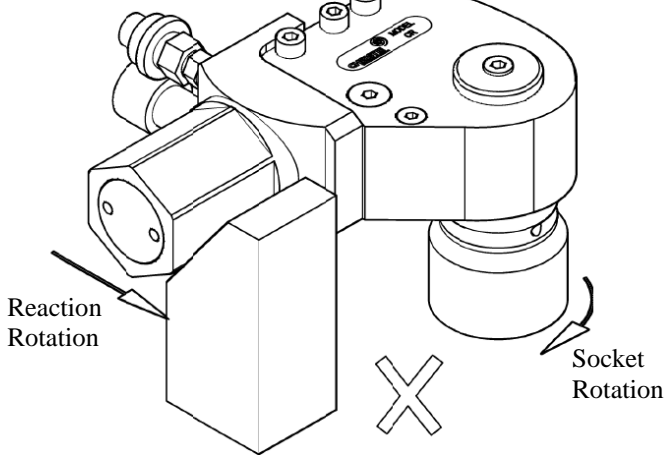
**Incorrect Reaction (Reaction Too Close)**



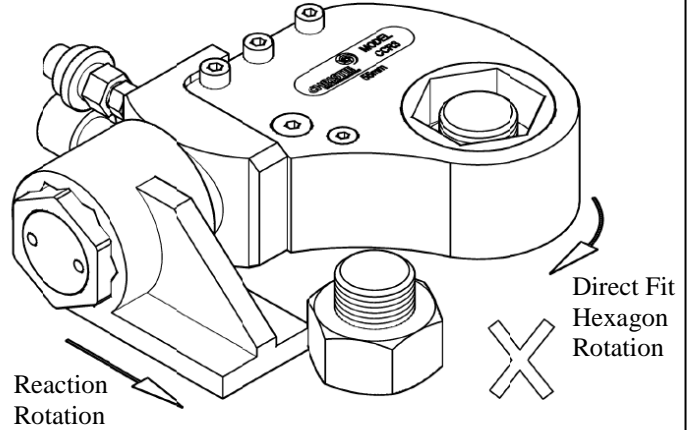
**Incorrect Reaction (Reaction Too Close)**



**Incorrect Reaction (Reaction Sloping)**



**Incorrect Reaction (Reaction Too Close)**



## **SETTING TORQUE AND OPERATING - BOLT TIGHTENING**

All tooling is supplied with a calibration certificate relating torque output to hydraulic pressure.

- 1) Determine required hydraulic pressure for desired torque.
- 2) With hydraulic wrench free of its application, extend the cylinder using the power pack hand pendant control (figure 3).
- 3) When full stroke is achieved, maintain forward pressure and adjust to required setting by the relief valve on the power pack unit, pressure increase or decrease will be indicated on the pump gauge.
- 4) Position the ratchet on its application, in the correct orientation for torque tightening (see Figure 5), orientate reaction point on the tool to the chosen reaction object. If using the reaction foot lock in position using the foot release screw.

### **WARNING:- KEEP HANDS CLEAR OF REACTION POINT.**

- 5) Extend the cylinder until the forward stroke is complete. Retract the cylinder, thus returning the ratchet to commence its next stroke.
- 6) The fastener is tight when the cylinder can no longer complete a full forward stroke.

**Note: A full stroke has been achieved when an audible click can be heard on the return stroke.**

### **WARNING:-**

- **KEEP HANDS CLEAR OF REACTION POINT.**
- **AT NO TIME MUST THE COUPLINGS BE USED AS A REACTION POINT, THIS IS EXTREMELY DANGEROUS.**
- **EXCEEDING THE MAXIMUM HYDRAULIC PRESSURE WILL OVERLOAD THE WRENCH AND MAY CAUSE SERIOUS DAMAGE.**

## **SETTING TORQUE AND OPERATING - BOLT LOOSENING**

- 1) Establish the maximum hydraulic pressure from calibration graph.
- 2) With hydraulic wrench free of its application, extend the cylinder using the power pack hand pendant control (figure 3).
- 3) When full stroke is achieved, maintain forward pressure and adjust to required setting by the relief valve on the power pack unit, pressure increase or decrease will be indicated on the pump gauge.
- 4) Position the ratchet on its application, in the correct orientation for de-torquing (mirror image of figure 5) maintaining good reaction and socket location.
- 5) Extend the cylinder until the forward stroke is complete, retract the cylinder, thus returning the ratchet to commence its next stroke.
- 6) Extend and retract the cylinder until fastener is loose.

## **BOLT TIGHTENING TO BOLT LOOSENING – CR TOOLS**

To change from tightening to loosening on CR tools (see figure 1 for features):-

- 1) Loosen the drive retaining cap screw using an Allen key and remove the drive retaining washer.
- 2) Remove the square drive from the ratchet head.
- 3) Insert the square drive into the ratchet head on the opposite side.
- 4) Position the drive retaining washer back onto the ratchet head and tighten the drive retaining cap screw using an Allen key.
- 5) On CR tools the square drive removed and fitted in the opposite side and the reaction foot altered accordingly
- 6) Adjust / remove the reaction foot accordingly (to suit application)

The reaction foot can be removed by loosening the foot release screw and sliding the reaction foot from the hydraulic cylinder.

## **BOLT TIGHTENING TO BOLT LOOSENING – CCR TOOLS**

To alternate from tightening to loosening on CCR tools

- 1) Turn the CCR tool over.
- 2) Adjust / Remove the reaction foot accordingly (To suit application)

The reaction foot can be removed by loosening the foot release screw and sliding the reaction foot from the hydraulic cylinder.

## HEAD REMOVAL AND REPLACEMENT

Note:- CR and CCR heads and bodies are interchangeable with the exception of CR3 and CCR3. The extended lever arm on the CCR3 body will give incorrect torque output if fitted to a CR3 head. Tools required:- allen keys, soft hammer, punch and torque wrench.

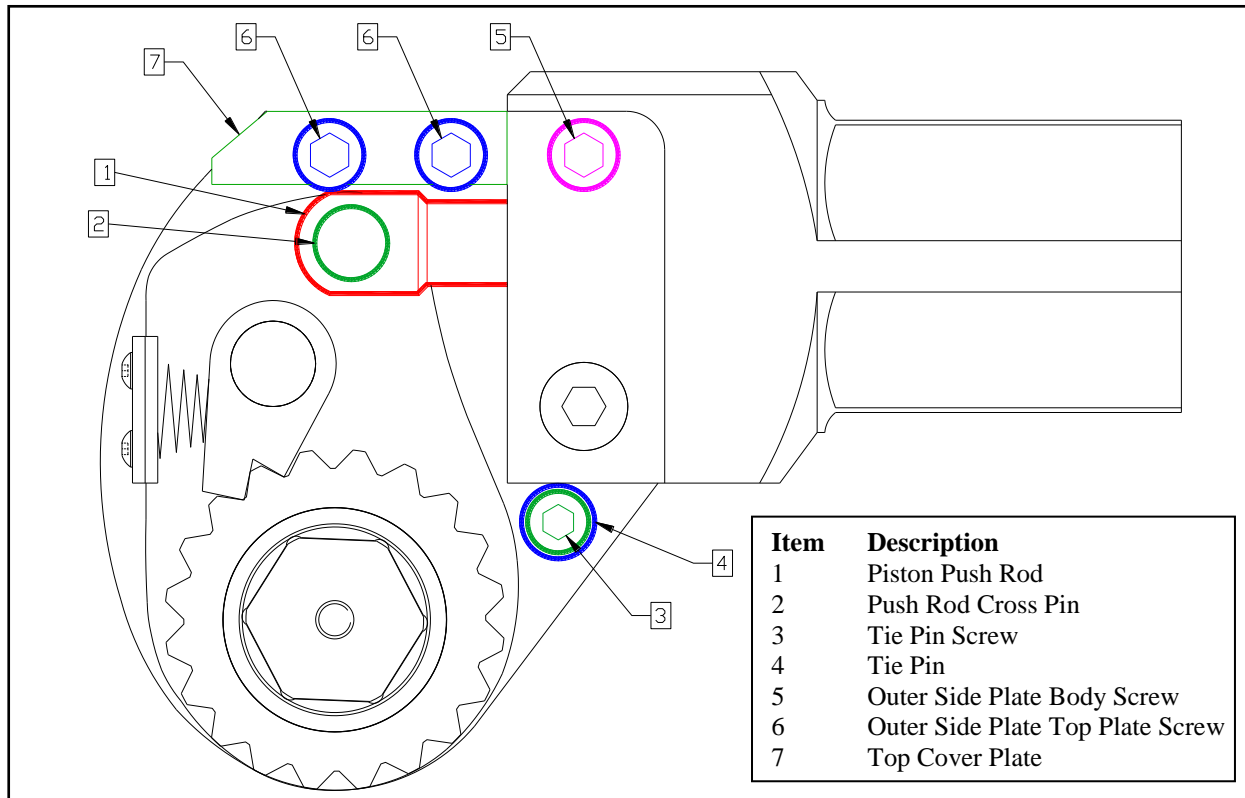
### REMOVAL:-

- 1) Ensure piston push rod (item 1) is in its fully retracted position.
- 2) Remove tie pin screw (item 3) from one side.
- 3) Remove all the outer side plate screws (items 5 and 6) from one side.
- 4) Remove the outer side plate body screw (item 5) from opposite side.
- 5) Replace tie pin screw (item 3) and locate by 2-3 threads.
- 6) Replace 1 off outer side plate top plate screw (item 6) and locate by 2-3 threads.
- 7) Tap heads of replaced screws to loosen the side plate on the opposite side.
- 8) Remove outer side plate top plate screw (item 6) and tie pin screw (item 3) and remove side plate.
- 9) Remove push rod cross pin (item 2).
- 10) Lift off ratchet head assembly.
- 11) Tap off second outer plate.

### REPLACEMENT:-

- 1) Place replacement ratchet head assembly in position and locate with push rod cross pin (item 2).
- 2) Position one outer side plate onto body and locate ratchet head assembly in its correct position.
- 3) Retain side plate with outer side plate body screw (item 5).
- 4) Assemble top cover plate (item 7) to outer side plate and retain with both outer side plate top plate screws (item 6).
- 5) Fit tie pin (item 4) and retain with tie pin screw (item 3).
- 6) Position opposite outer side plate in position and tap on.
- 7) Retain second outer side plate with outer side plate screws (items 5 and 6).
- 8) Torque tighten all screws.
- 9) Ensure free movement of output drive by manually rotating the gear.

**RATCHET HEAD COMPONENTS - FIGURE 7**



## HANDLING

For ease of handling, the larger tools are drilled and tapped for eyebolt lifting (see table below). Never lift or drag tooling by its connecting hoses as weakening of the swaging will occur.

<b>CR / CCR MODEL</b>	<b>TORQUE ON SIDE PLATE SCREWS (LBF/FT)</b>	<b>LIFTING HOLES THREAD</b>
1	11	-
1.5	28	-
3	28	-
5	55	-
7	55	-
11	99	-
15	220	-
20	220	-
30	220	M12
50	810	M16
60	810	M12
80	810	M16

## MAINTENANCE AND RECALIBRATION

To prevent premature failure and ensure confidence in torque supply, it is recommended that this equipment is serviced and calibrated at least on an annual basis, by W. Christie (Industrial) Ltd.

To maintain optimum performance and safety the following maintenance must be carried out:-

- Weekly:** Side Plate Screws are tightened to the correct torque (Items 5 & 6 – Figure 7)
- Monthly:** Ratchet mechanism lubricated with lithium EPL1 grease.
- Annually:** Serviced and calibrated by W. Christie (Industrial) Ltd

## SPARES ORDERING

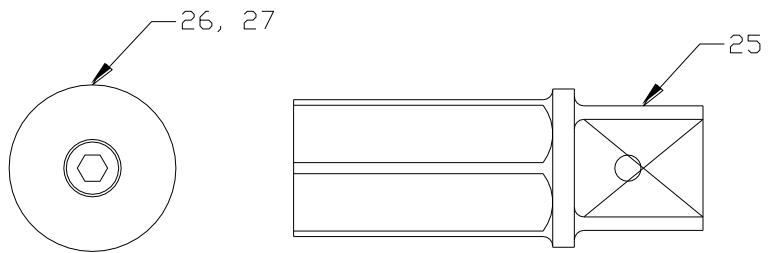
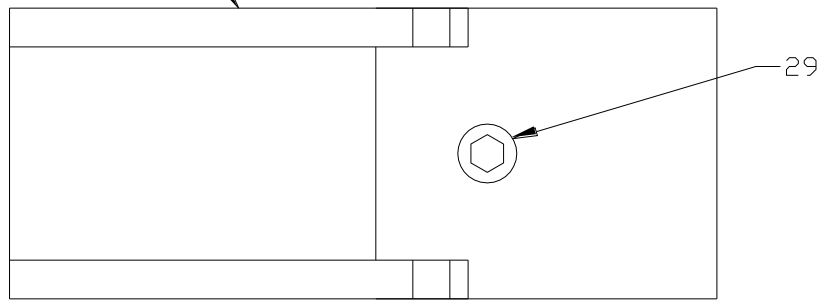
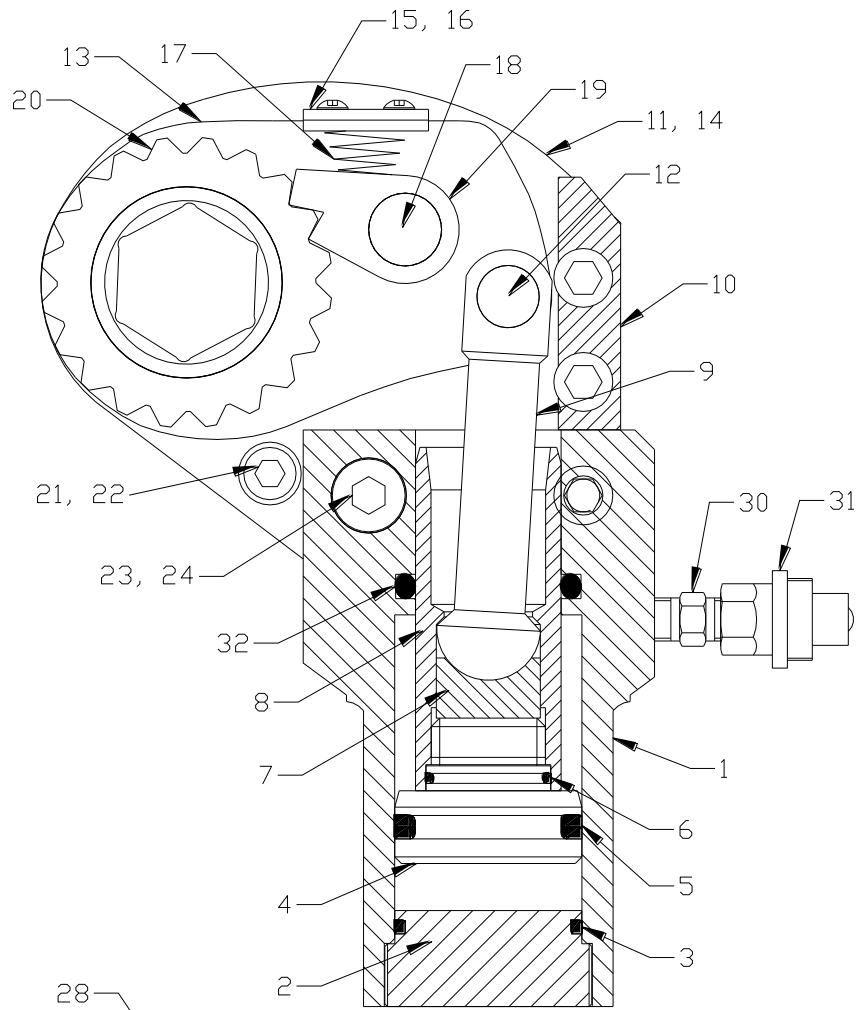
Note: Spare parts for CR heads and CCR heads are NOT interchangeable i.e. a CR1 pawl is not suitable for CCR1 tool therefore:-

**CR Tools:-** Refer to the tool parts list (figure 8) and proceed the part number with the model number e.g. to order the pawl for CR1:- CR1 664 (Pawl)

**CCR Tools:-** Refer to the tool parts list (figure 8) and proceed the part number with the model number AND the hexagon size of the ratchet gear e.g. to order the pawl for a CCR1 with a 40mm A/F hexagon:- CCR1 with 40mm A/F ratchet gear 664 (Pawl).

**CR / CCR PARTS LIST – FIGURE 8**

ITEM	PART No	DESCRIPTION	QTY / TOOL
1	646	Body	1
2	647	End Cap	1
3	648	End Cap Seal	1
4	649	Piston	1
5	650	Piston Seal	2
6	651	Sleeve Seal	1
7	652	Seat	1
8	533	Piston Tube	1
9	654	Push Rod	1
10	655	Top Cover Plate	1
11	656	Outer Side Plate Screws	6
12	657	Push Rod Cross Pin	1
13	658	Inner Side Plate	2
14	659	Outer Side Plate	2
15	660	Cone Spring Top Plate	1
16	661	Cover Plate Screws	4
17	662	Cone Spring	1
18	663	Pawl Pin	1
19	664	Pawl	1
20	665	Ratchet Gear	1
21	666	Tie Pin	1
22	667	Tie Pin Screw	2
23	668	Body Pin	2
24	669	Body Pin Screw	1
25	670	Square Drive	1
26	671	Square Drive Washer	1
27	672	Square Drive Screw	1
28	673	Reaction Foot	1
29	674	Reaction Foot Screw	1
30	675	1/4" NPT Nipple	1
31	676	Hydraulic Coupling	2
32	677	Body Seal	1



## **WARRANTY**

Christie CR and CCR wrenches come with a one year (1) conditional warranty.

Christie CR and CCR Wrenches are guaranteed against manufacturer and material defects, but not against abuse, misuse or neglect by the user.

The Square Drive is a non warranty item.

When returning tooling for examination, always ensure the reaction foot, Impact Sockets and Power Pack are returned.



## E.C. DECLARATION OF CONFORMITY

**MODELS COVERED:** CR1, CR1.5, CR3, CR5, CR7, CR11, CR15, CR20,  
CR30, CR50, CR60, CR80  
CCR1, CCR1.5, CCR3, CCR5, CCR7, CCR7, CCR11  
CCR15, CCR20, CCR30, CCR50, CCR60, CCR80

**DESCRIPTION:** Compact Ratchet (CR) and  
Compact Cassette Ratchet (CCR)

We hereby declare that the following machinery complies with the essential health and safety requirements of the European Machinery Directive 2006/42/EC published on the 9<sup>th</sup> June 2006

W Christie (Industrial) Ltd, Meadowbank Road, Rotherham S61 2NF, United Kingdom.

This machinery has been designed and manufactured in accordance with the following transposed harmonised European Standard:-

BS EN ISO 12100-2:2003 Safety of Machinery – Technical Principles

BS EN 792-6:2000 Hand-held, non-electric power tools - Safety requirements. Assembly power tools for threaded fasteners

**SIGNED:** 

**NAME:** R. G. Askham

**POSITION:** Senior Applications Engineer

On behalf of W Christie (Industrial) Ltd



**HIRE  
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