Operating Instructions
KCD Contact CD stud welding gun
KCD CD Gap Stud Welding Gun
KCD CD insulation pin gun (.105”)

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Contents.

1. Introduction

1.1. General information

The instructions in this manual apply to the KCD Contact gun, the KCD Gap gun and the KCD .105” insulation pin gun. These guns are designed for use with KCD Capacitor Discharge (CD) and CDi stud welding systems. The user should be familiar with the operating instructions before using any KCD equipment. Please contact technical personnel at KCD studwelding should you have any difficulties.

1.2. Safety of use

It is important that the operator is familiar with the operating instructions for both the gun and the relevant model stud welding unit before commencing to ensure successful and trouble free operation. Supervisors should make sure that operating procedures comply with AS1554 and or ISO 14555 when using this equipment.

1.2.1. Setup Personnel

Setup personnel should have the relevant experience and knowledge to:

- Ensure that welding is done in a safe environment
- Set up the weld equipment according to this manual and the relevant manual for the power unit.
- Select the correct weld chuck
- Adjust power settings
- Test weld for conformance

1.2.2. Operator

Persons operating KCD capacitor discharge welding equipment must be over 18 years of age. Welding knowledge is assumed.

1.2.3. Employer

It is the employer's responsibility to ensure that a standard operating procedure is available and that operators are trained at regular intervals.

1.3. Application

KCD Capacitor Discharge stud welding guns and KCD capacitor discharge power units are designed specifically for welding capacitor discharge weld studs to weldable work surfaces using the capacitor discharge stud welding method. The required machine model and gun are determined by the maximum stud diameter, and the type of material that is to be welded.

2. Safety

2.1. Symbols

The safety information and symbols used in this manual are used to ensure the safe operation of this equipment.

WARNING: The safety information should be read and understood prior to operating. Failure to do so may result in serious injury or death.

The symbols listed in this manual are included to point out any potential hazard or risk to the operator and surrounding personnel. Attention is drawn to them using the following terms:

- **DANGER** and **WARNING**: The use of the terms danger and warning in this manual mean a serious risk of death, serious physical injury or substantial damage to property may occur if the measures advised are not followed.

- **CAUTION:** The use of the term caution in this manual mean that there is a risk of slight physical injury or damage to property may occur if the measures advised are not followed.

- **Note:** This term is used to point attention to important information within these instructions.

2.2. Definitions

WARNING: No pacemakers. Stud welding equipment generates high currents producing electro magnetic fields that can interfere with pacemakers Persons with a pacemaker fitted are not permitted to use this equipment.

CAUTION: Category 2 welding goggles with safety glass must be worn at all times whilst using this equipment.

CAUTION: The capacitor discharge stud welding gun emits a loud bang when fired. The acoustic pressure (107dB (A)), is enough to cause deafness.

WARNING: Risk of explosion. Do not use this equipment where there is a risk of explosion.

DANGER: High Voltage! Qualified personnel only.

CAUTION: Protective clothing that covers the whole body is required whilst using this equipment.

2.3 Safety measures.

2.3.1. Work Environment.

The safety information supplied within these instructions should be kept on hand at all times. All warning symbols on the power unit should be kept clean and visable at all times. Welding must be carried out in rooms where the following measures have been taken:

- The power unit is in a position where it does not create a trip hazard. Where applicable it should be stored on a shelf that is suited to the weight of the unit.
- All welding should be carried out away from any explosive material.
- Screens should be fitted to protect staff from the harmful effects of optical radiation.

- The operator safety information should be in a visable location within the work area that the power unit is being operated.
- Welding is not permitted in an area where flammable vapours exist.
- Appropriate ventillation is required at all times.
- CD stud welding equipment is not to be used in narrow corridoors with conductive walls and fittings.
- Studs should be welded in temperatures above 5 degrees celcius to ensure a successful weld result.
- Welding is not permitted in damp environments.
- A dry powder fire extinguisher should be kept in the work area at all times.

CAUTION: Strong magnetic fields are created when welding. The power unit must be kept away from sensitive electrical equipment when in use. Personnel with a pacemaker must keep a minimum distance of 10 metres from the weld area at all times.

WARNING: KCD studwelding stud guns and stud welding equipment is designed for use in an industrial and commercial environment only and is **NOT** suited for residential use.

2.3.2. Preliminary safety check

Before work commences at the start of each shift the operator must take the following steps to ensure the safety of the work environment:

- Check all parts of the power unit, weld gun and cables for any signs of damage.
- Check that all connections in the weld line are tight.

- Check that all safety devices are positioned correctly and are in working order.

2.3.3. Safety check at completion of work / shift:

After completion of work or at the end of each shift the operator must:

- Switch off the power unit and remove the mains plug.
- Ensure that the power unit is secured from unauthorised use
- Make sure that welded work is cleared from the work area.

2.3.4. In case of malfunction:

In the event of a malfunction The following steps must be followed:

- Turn off power unit and dissconect from mains.
- Secure the unit so that it is not able to we switched on and label as defective.
- Ensure that specified maintenance schedules are met.

It is recommended that all repairs are carried out by qualified staff at KCD studwelding. Any third party repairs must be carried out by suitably qualified personnel. KCD does not accept any responsibility for repairs carried out without knowledge or consent. Any unauthorised repairs will void the manufacturers warranty.

3. Modes of operation

3.1. Contact Stud welding method.

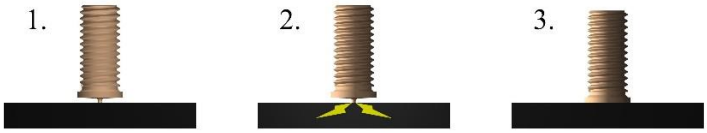


Figure 1.

1. The stud is loaded into the chuck and placed onto the parent material The ignition tip is in contact with the parent material. This is the start position for contact stud welding.
2. The gun trigger is pulled releasing the electrical energy from large capacitors in the power unit. The electrical energy passes between the stud and the parent material and disintigrates the ignition tip. A drawn arc is created between the stud and the parent material creating a molten pool.
3. The gun spring pressure forces the stud down into the molten pool. The weld cycle takes place in approximately 1-3 milliseconds. The completed weld developes the full strengh of the stud and the parent material and and will not break in the weld area.

3.2. Gap stud welding method.

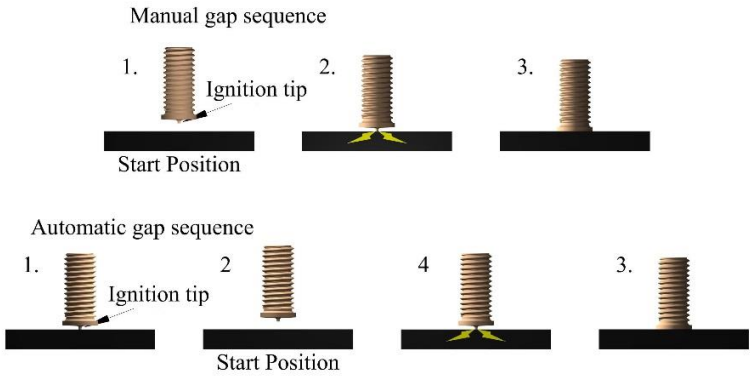


Figure 2.

There are two possible gap sequences determined by the power unit. Refer to the power unit operating instruction to determine whether it uses either the “Manual gap sequence” or the “Automatic gap sequence”.

3.2.1. Manual gap sequence.

1. The stud is loaded into the chuck and firmly pushed back towards the rear of the gun. This action engages the gun solenoid which creates a gap between the stud and the work. This is the gap start position.
2. The action of pulling the trigger releases the gun solenoid allowing the stud to move towards the work. The stud hits the work influenced by the gun spring pressure and the momentum created by the gap. Once the stud hits the parent material, the electrical energy from the capacitors inside the power unit, passes between the stud and the parent material and disintigrates the ignition tip. A drawn arc is created between the stud and the parent material creating a molten pool.

3. Finally the stud is forced down into the molten pool, completing the weld. The completed weld developes the full strengh of the stud and the parent material creating a very strong weld.

3.2.2. Automatic gap sequence.

1. The stud is loaded into the chuck and placed onto the parent material The ignition tip is in contact with the parent material. This is the start position for contact stud welding.
2. The action of pulling the trigger enables the gun solenoid for a period of 80 milliseconds lifting the stud back into the start position for gap stud welding.
3. After 80 miliseconds the gun solenoid is disabled allowing the stud to move towards the work. The stud hits the work influenced by the gun spring pressure and the momentum created by the gap. Once the stud hits the parent material, the electrical energy from the capacitors inside the power unit, passes between the stud and the parent material and disintigrates the ignition tip. A drawn arc is created between the stud and the parent material creating a molten pool.
4. Finally the stud is forced down into the molten pool, completing the weld. The completed weld developes the full strengh of the stud and the parent material creating a very strong weld.

4. Testing and inspection of successful weld.

4.1.1. Visual inspection.

It is important that the setup personnel and the operator know how to identify a ‘good’ weld as well as a ‘hot’ and ‘cold’ weld. This allows any potential problems to be identified and corrected efficiently.

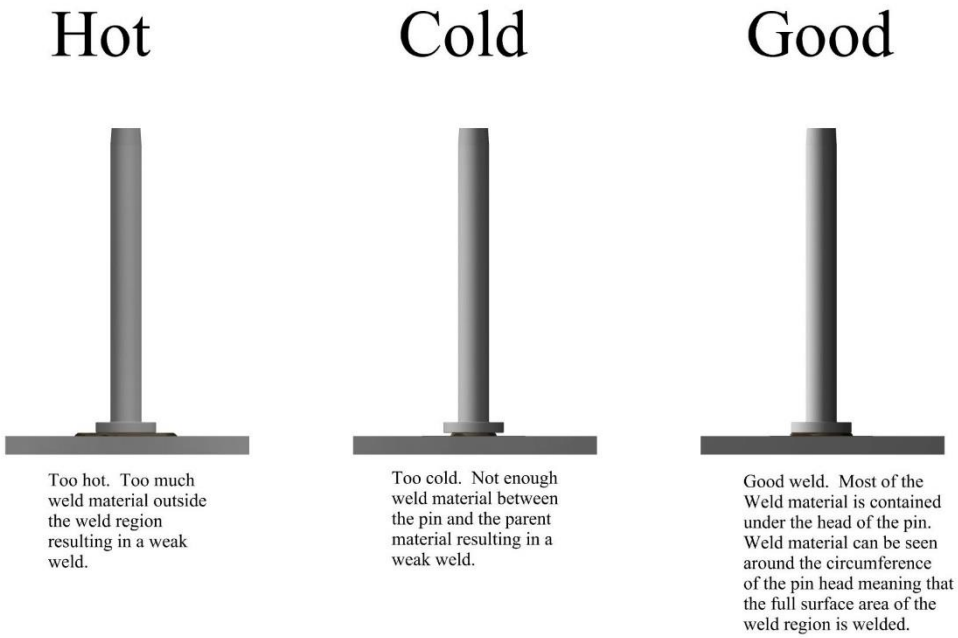


Figure 3.

Hot weld: Too much energy in the weld will result in a larger explosion upon ignition. The molten material is pushed out from under the pin which results in not enough molten material between the parent material and the pin. A hot weld can be identified by a dark black ring around the pin and excessive amounts of weld splatter outside the weld region.

Cold weld:

Low energy in the weld will result in not enough molten material between the pin and the parent material, as a result of this, the full surface area of the weld region under the pin is not welded.

Good weld:

A good weld occurs when the correct amount of energy is used during the weld process. It can be identified by a complete but not excessive amount of weld splatter gathered around the circumference of the weld area.

4.1.2. Bend testing.

Before commencing any work a simple bench test is required to be carried out by the setup personnel. No less than 6 pins are required to be welded onto a piece of the parent material. Each pin shall be bent through 60°. The bend should occur below the elasticity limit using a suitable testing tool as illustrated below.

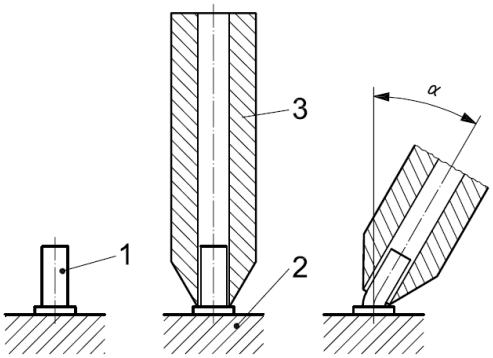


Figure 4.

Key: 1 = stud, 2 = Parent material, 3 = tool, α = Bend angle.

5. KCD insulation pin gun (.105”)

5.1. Application

The KCD .105” insulation pin gun is specifically designed to weld KCD .105” mild steel and stainless steel insulation pins. It is set up with a specially designed chuck guard to enable the operator to weld any length pin without having to change the setup. No adjustment is required for this gun. The “contact” method is used when welding with the KCD pin gun.

5.2. Method

A KCD .105” insulation pin is loaded into the end of the chuck guard nozzle and pushed down until the head of the pin is sitting against the nozzle:

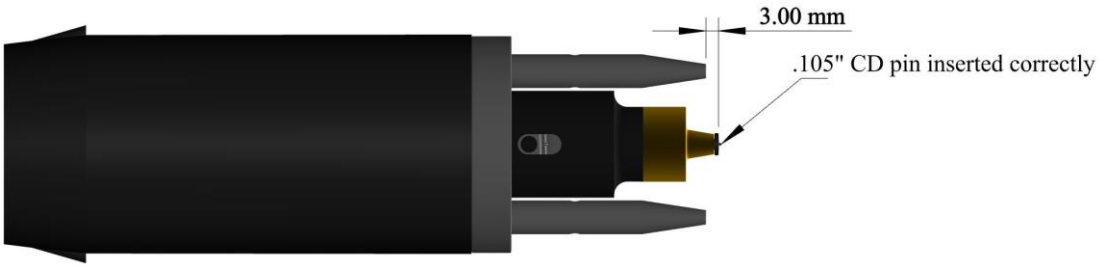


Figure 5.

Once the pin is loaded into the chuck and the welder is set according to the operating instructions, the pin is ready to weld. Place the gun onto the parent material in the desired location and push down until all three gun legs are positioned firmly on the parent material. Pull the gun trigger to start the weld process. The weld process last for a period of 1-3 milliseconds. Once the

pin is welded, remove the pin gun from the parent material. Be sure that the pin gun is removed from the pin vertically as removing the gun on an angle will cause the copper chuck jaws to open which will dramatically shorten the life of the chuck and cause loss of energy in the weld.

5.3. Pin gun parts and part numbers

5.3.1. Exploded Diagram:

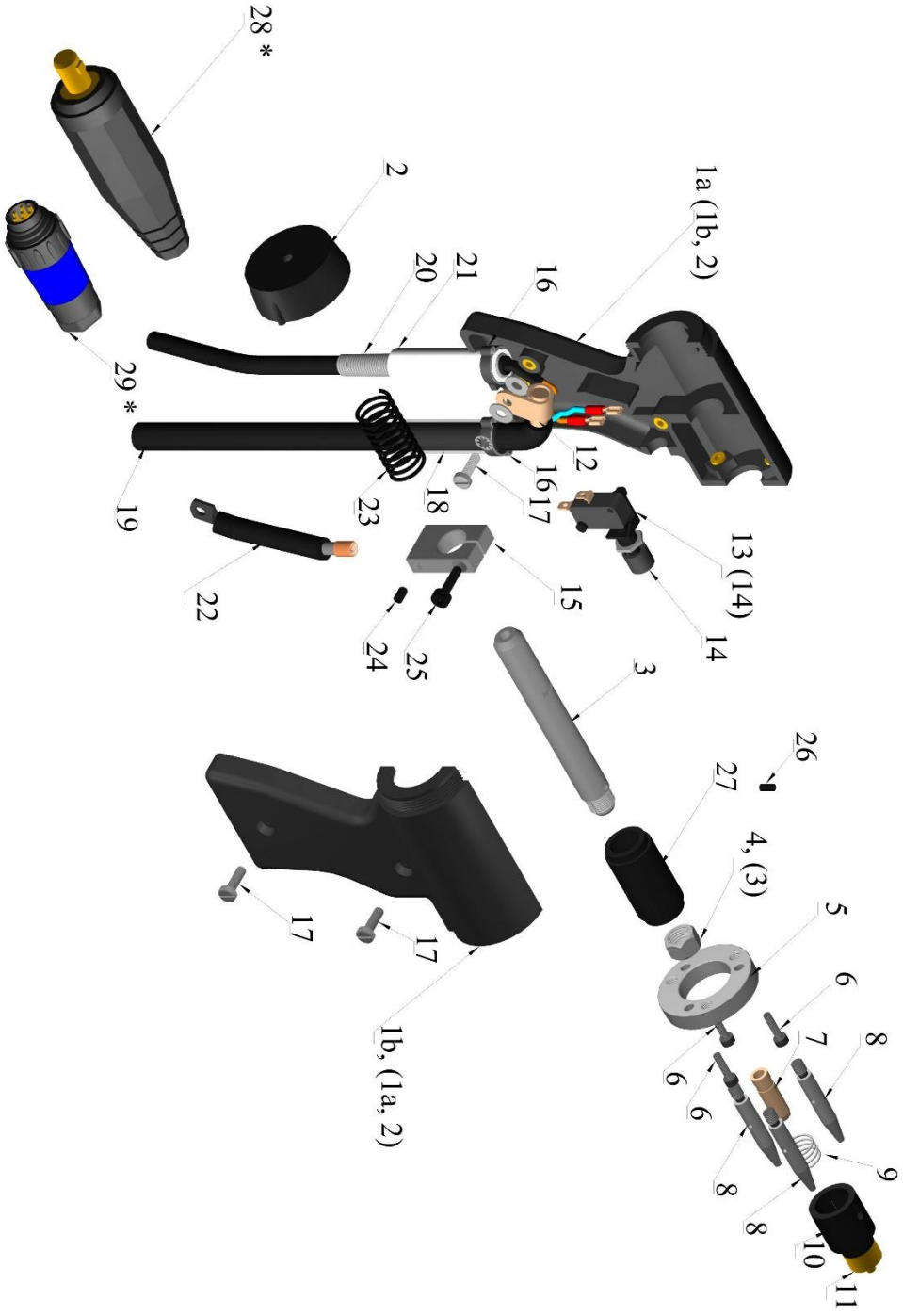


Figure 6.

5.3.2. Pin gun part identification chart.

Number	Part Number	Description
1a, (1b,2)	GUNAC/05	Pin gun Body
2	GUNAC/07	Back Cap
3, (4)	GUNAC/16	Pin gun Shaft
4	GUNAC/49	Gun shaft nut
5	GUNAC/101	Face plate
6	GUNAC/485	M4 x 16mm Cap head screw
7	CCH/01	.105” Copper chuck
8	GUNAC/11	1-13/16” Gun leg
9	GUNAC/30	Chuck guard spring
10, (9, 11)	GUNAC/27	Chuck guard assembly
11	GUNAC/28	Standard brass nozzle
12	GUNAC/68	Copper flag
13, (14)	GUNAC/31	Trigger switch c/w trigger button
14	GUNAC/311	Trigger button
15	GUNAC/19	Gun shaft clamping block
16	LCC/06	Cable clamp OTK 2015
17	GUNAC/489	M5 x 16mm Pan head screw
18	GCCON/26	Weld cable clear sleeve
19	CAB/03	25mm2 weld cable (4.8M)
20	GCCON/27	Control cable spring
21	GCCON/26	Control cable sleeve
22	GUNAC/21	Internal pigtail lead
23	GUNAC/205	Standard pin gun spring (Ø1.8mm x Ø20.0mm x 75.0mm)
24	GUNAC/48	Grub screw 5/32”
25	GUNAC/483	3/16 x ¾” cap head screw
26	GUNAC/48	5/32” Grub screw
27	GUNAC/18	Gun shaft bearing (short)
28*	GCCON/115	Weld plug 35-50mm2
29*	GCCON/071	Control plug 6+PE

() indicates parts included with part no.

*** Please see below for alternative part no for older power unit models, (CD180 & CD1000)**

27B	GCCON/10	CAM-LOK weld plug CD180 & CD1000 up to Jan 2014).
28B	GCCON/07	Control plug (CD1000).

Figure 7.

5.4. Maintenance

5.4.1. Cleaning.

To prevent any undesired welding results, the KCD .105" insulation gun requires cleaning at regular intervals. The gun shaft should feel free and the gun shaft should not catch on the internal gun shaft bearing at any time. If cleaning is required it is advised that **NO GREASE** is be used, the gun should be dry at all times.

5.4.2. Consumables

It is required that the operator is able to identify the consumable parts on the KCD pin gun. They should be able to recognise when these parts are worn and require replacement.

5.4.3. Copper chuck.

The user should be able to weld anywhere from 2,000-10,000 CD pins before the chuck requires replacement. The copper chuck should be pinch tight against the weld pin during the weld process. If the pin becomes loose in the chuck, the chuck guard should be removed and the chuck should be inspected. If the hole in the end of the chuck is much larger than the pin diameter, a new chuck will need to be fitted. If the jaws on the chuck have opened a little then they will need to be closed with a suitable pair of pliers. The two main signs that the copper chuck requires replacement are as follows:

- Pin falls out of the end of the weld gun and is not tight against the chuck.
- Arcing on the side of the welded pin can be seen where it was sitting against the chuck during the weld process.

5.4.4. Chuck guard assembly.

When the weld gun is pushed down into position on the parent material the chuck guard pushes the jaws of the chuck against the pin to be welded ensuring a good connection between the pin and the weld chuck. The chuck guard will wear over time. This will mean that the copper chuck will not last as long as required due to the loose connection between the pin and the chuck.

The chuck guard assembly is also a consumable part, however it should last for a considerable amount of time compared with the copper chuck. The chuck guard nozzle will shorten over the length of its life. As a result the head of the pin will begin to sit closer to the gun legs than the required 3mm. A worn nozzle will result in not enough spring pressure when the pin is on the parent material resulting a longer than desired weld time.

If the operator is using more chucks than usual then it is recommended that the chuck guard is replaced.

5.4.5. Replacement of copper chuck.

To replace the copper chuck, first remove the 5/32” grub screw that holds the chuck guard assembly in place and then remove the chuck guard assembly as shown in figure 8. Loosen (Do not remove), the M13 gun shaft nut at the end of the gun shaft and remove the copper chuck. Replace the used chuck with a new one and be sure to tighten the nut. Failure to tighten the nut will result in damage to the gun shaft and / or the copper chuck. Once the chuck is in place, slide the chuck guard over the chuck and fit the grub screw to hold it in place.

- **Be sure to check that the jaws on the chuck are closed enough to ensure a tight fit when a pin is inserted.**
- **Be sure that the chuck guard spring is in position inside the chuck guard when replacing the chuck guard.**

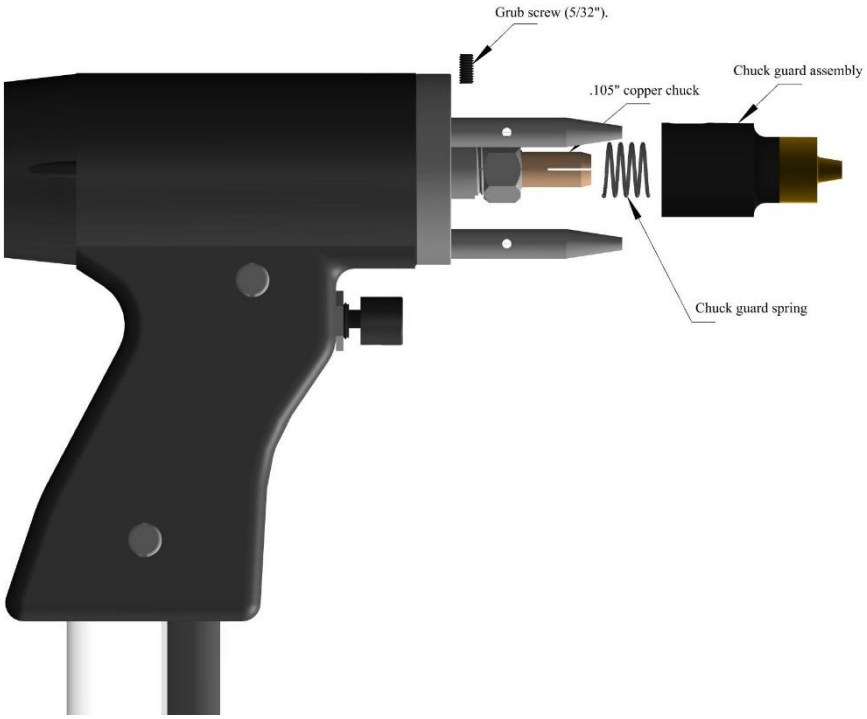


Figure 8.

5.5. Maintenance intervals:

5.5.1. Daily:

- Check the gun weld cable and gun control cable for visible damage. If the external insulation is found to be broken in any way the defective cable will need to be replaced immediately.

- Check the chuck for signs of wear. If the chuck is loose or worn either replace or close the jaws with a suitable pair of pliers.
- Check the chuck for signs of burning and remove any unwanted debris, pay particular attention to the four

slots on the side of the chuck. If any debris is noticed it will need to be removed.

- Remove the chuck guard and check the gun shaft nut is tight. If the nut is loose tighten it immediately to avoid damage to the chuck and or the gun shaft.
- Check for bent gun legs. Bent gun legs will need to be replaced to ensure that the weld pin sits perpendicular to the parent material and that the correct spring pressure is applied during the weld process.
- Check that the gun shaft moves freely. If the gun shaft feels like it is catching then it will need to be cleaned or replaced by a suitably qualified repair technician.

5.5.2. Yearly:

- Open gun and clean inside, ensure that particular attention is given to the gun shaft and gun shaft bearing as it is essential for correct operation that these two parts move freely

- Inspect internal components for wear or damage

WARNING: Yearly inspection should be carried out by a qualified repair technician. The weld gun should be disconnected from the welding power supply unit prior to maintenance as high voltage can be present in certain operating and fault conditions when connected to the welding unit.

5.6. Pin Gun Technical Data.

KCD Pin Gun	
Type	Contact stud welding gun
Stud size	≤ Ø5mm
Cable length, Cross sectional area (mm2).	4.8M, 25mm2
Dimensions (L x W x H)	170mm X 57mm X 148mm
Weight (Kg)	2.94Kg (including cables)
Noise Level	107dB (A)

Figure 9.

6. KCD Contact stud gun M3-M10.

6.1. Application.

The KCD contact stud gun is specifically designed to weld M3-M10 mild steel, stainless steel and brass CD Studs with an ignition tip. It can be setup for each diameter stud using the appropriate size copper chuck. The KCD contact stud gun can weld studs up to a length of 25mm using the standard gun front. An extendable foot piece is available for studs longer than 25mm. A 40mm diameter gun front is also available for precision placement of studs if required. The “contact” method is used when welding with the KCD contact stud gun.

6.2. Setup.

- Choose correct chuck for stud diameter to be welded.
- Loosen M13 (do not remove), gun shaft nut.
- Insert required copper chuck into gun shaft. Make sure that it is pushed all the way in.
- Tighten M13 gun shaft nut.
- Insert stud to be welded into the chuck and check position of the head.
- The head of the stud should protrude 3mm past the gun front. If adjustment is required then the stop in the back of the chuck can be set by removing the chuck and screwing the stop backwards or forwards using a 3/32AF hex key as supplied. Alternatively a 3/32AF T-handle hex key can be used to access the chuck stop via the rear of the gun without any need to remove the chuck.
- If an M3, M4 or M5 chuck is required then the turned down stop may need to be cut to accommodate for longer studs above 16mm long (see figure 10).
- The spring in the KCD contact stud gun is fixed and cannot be adjusted. The standard heavy black spring that is supplied with the gun is suitable for most

applications, however a lighter spring is available for larger diameter stainless steel studs and a heavier silver spring is available for welding studs onto plated material such as gal sheet, zinc anneal etc.

- Refer to corresponding power unit manual for machine settings and recommendations.
- Refer to figure 10 and figure 11 for a visual guide to contact gun setup.

6.2.1. Copper chuck stop adjustment diagram.

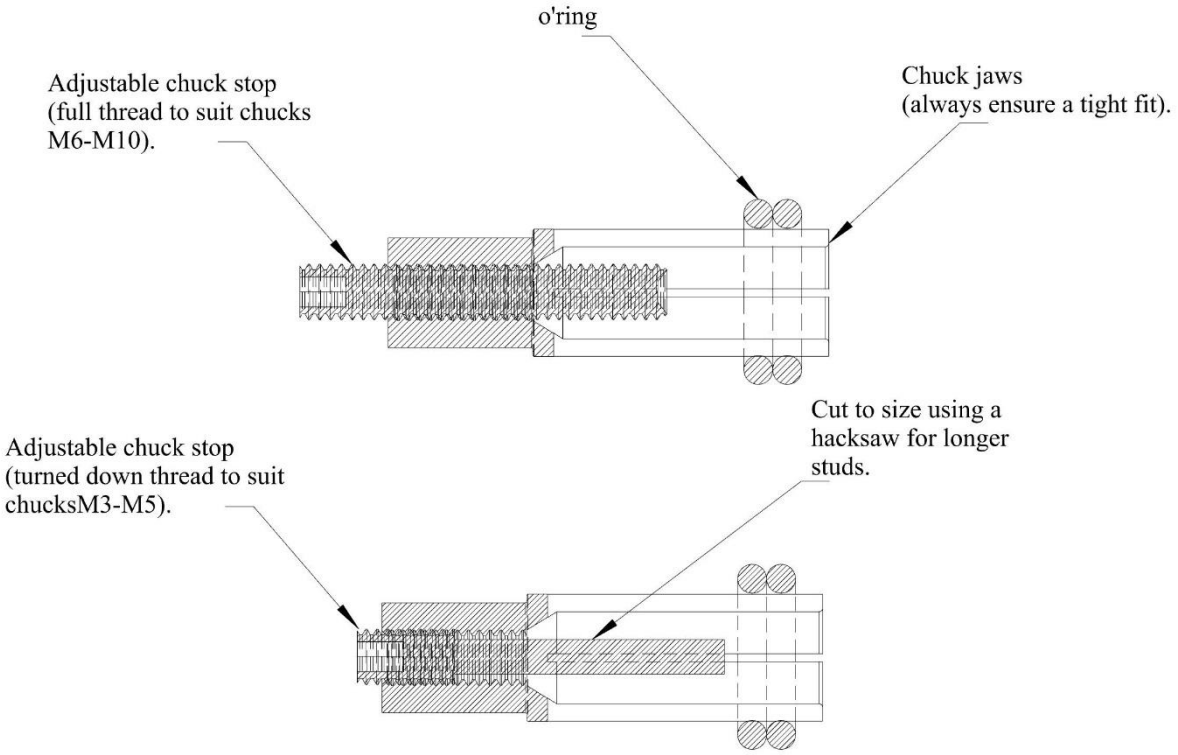


Figure 10.

6.2.2. Contact stud gun setup diagram

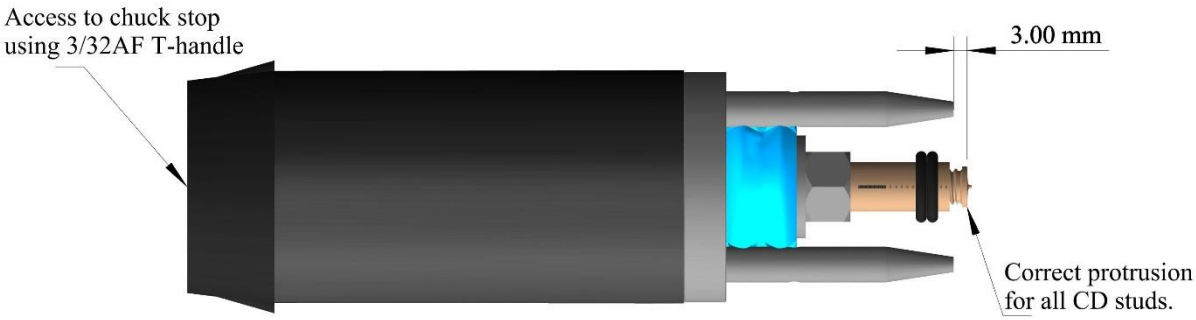


Figure 11.

6.3. Method

Once a stud is loaded into the chuck and the welder is set according to the operating instructions, the stud is ready to weld. Place the gun onto the parent material in the desired location and push down until all three gun legs are positioned firmly on the parent material. Pull the gun trigger to start the weld process. Once the stud is welded, remove the pin gun from the parent material. Be sure that the stud gun is removed from the stud vertically as any movement to either side will cause the copper chuck jaws to open and as a result the loose connection l dramatically shorten the life of the chuck and cause loss of energy in the weld.

6.4. Contact stud gun parts and part numbers.

6.4.1. Exploded diagram.

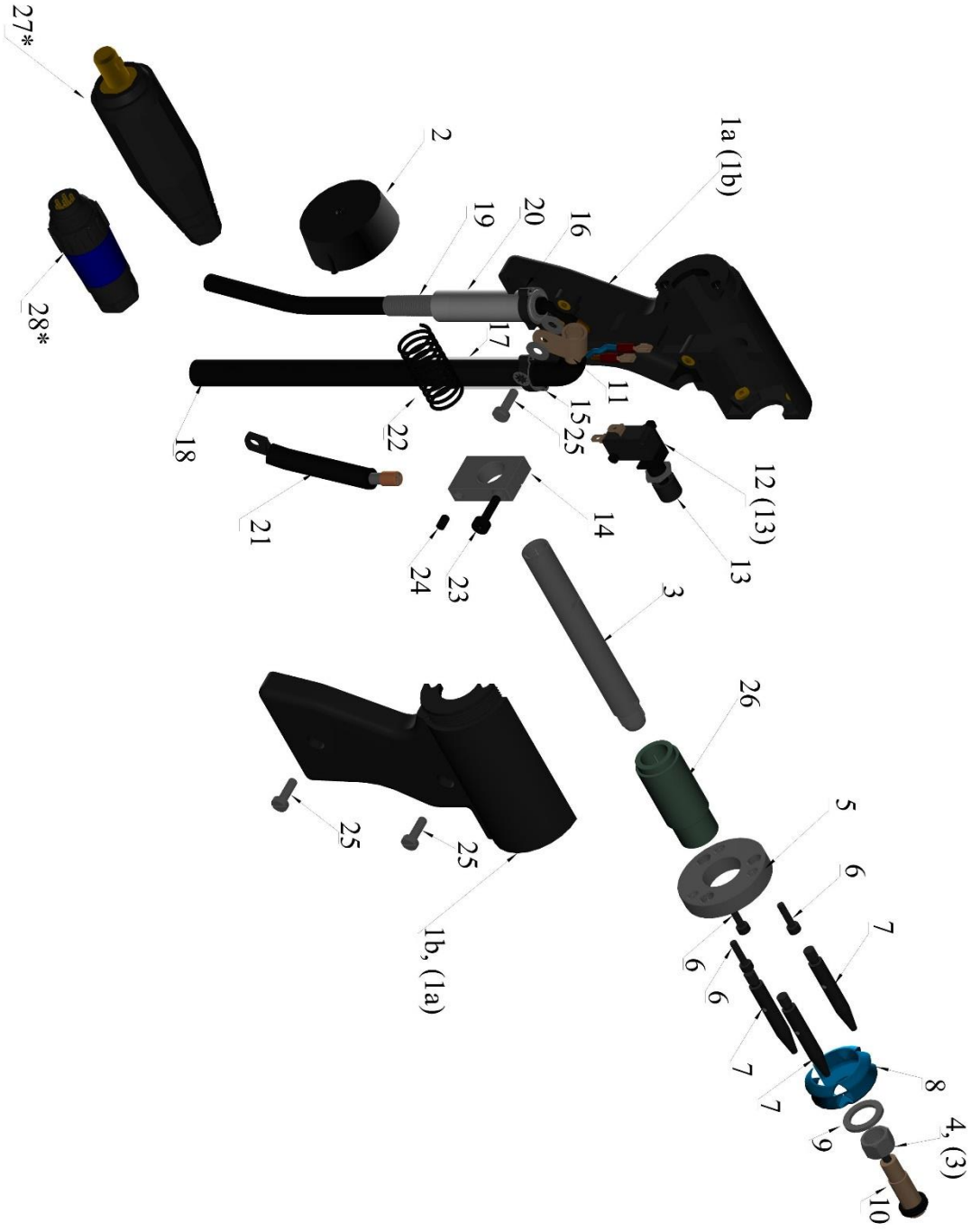


Figure 12.

6.4.2. Contact stud gun part identification chart.

Number	Part Number	Description
1a, (1b, 2)	GUNAC/06	Contact gun body
2	GUNAC/08	Back Cap
3, (4)	GUNAC/17	Contact / gap gun Shaft
4	GUNAC/49	Gun shaft nut
5	GUNAC/10	Face plate
6	GUNAC/485	M4 x 16mm Cap head screw
7	GUNAC/12	2-1/4" Gun leg
8	GUNAC/22	Rubber boot
9	GUNAC/245	Boot washer
10#	CCH/02	M3 copper chuck
10#	CCH/03	M4 copper chuck
10#	CCH/04	M5 copper chuck
10#	CCH/05	M6 copper chuck
10#	CCH/10	M8 copper chuck
10#	CCH/14	M10 copper chuck
11	GUNAC/68	Copper flag
12, (13)	GUNAC/31	Trigger switch c/w trigger button
13	GUNAC/311	Trigger button
14	GUNAC/19	Gun shaft clamping block
15	LCC/07	Cable clamp OTK 2018
16	LCC/06	Cable clamp OTK 2015
17	GCCON/28	Weld cable clear sleeve
18	CAB/04	35mm2 weld cable (3.3M)
19	GCCON/27	Control cable spring
20	GCCON/26	Control cable sleeve
21	GUNAC/21	Internal pigtail lead
22	GUNAC/202	Standard contact gun spring (Ø2.8mm x Ø29.5mm x 63.0mm)
23	GUNAC/483	3/16 X 3/4" Cap head screw
24	GUNAC/48	Grub screw 5/32"
25	GUNAC/489	M5 x 16mm Pan head screw
26	GUNAC/181	Gun shaft bearing (long)
27*	GCCON/115	Weld plug 35-50mm2
28*	GCCON/071	Control plug 6+PE

() indicates parts included in part no.
*** Please see below for alternative part no for (CD180, CD6000, CD8000, CD9000 & CD9000G).**
 # Dependant on required setup.

27B	GCCON/11	Cam-Lok weld plug CD6000, CD8000, CD9000 and CD9000G up to January 2014.
28B	GCCON/07	4pin control plug CD6000, CD8000, CD9000 & CD9000G.

Figure 13.

6.5. Maintenance intervals:

6.5.1. Daily:

- Check the weld cable and control cable for visible damage. If the external insulation is found to be broken in any way the defective cable will need to be replaced immediately.
- Check the chuck for signs of wear. If the chuck is loose or worn either replace the chuck or close the jaws with a suitable pair of pliers.
- Check that the gun shaft nut is tight. If the nut is loose tighten it immediately to avoid damage to the chuck and or the gun shaft.
- Check for bent gun legs. Bent gun legs will need to be replaced to ensure that the weld stud sits perpendicular to the parent material during the weld process.
- Check that the gun shaft moves freely. If the gun shaft feels like it is catching then it will need to be cleaned or replaced.

6.5.2. Yearly:

- Open gun and clean inside, ensure that particular attention is given to the gun shaft and gun shaft bearing as it is essential for correct operation that these two parts move freely
- Inspect internal components for wear or damage

WARNING: Yearly inspection should be carried out by a qualified repair technician. The weld gun should be disconnected from the welding power supply unit prior to

maintenance as high voltage can be present in certain operating and fault conditions when connected to the welding unit.

6.6. Contact stud Gun Technical Data.

KCD Stud Gun	
Type	Contact stud welding gun
Stud size	≤ Ø10mm
Cable length, Cross sectional area (mm2).	3.3M, 35mm2
Dimensions (L x W x H)	170mm X 57mm X 148mm
Weight (Kg)	2.1Kg (including cables)
Noise Level	107dB (A)

Figure 14.

7. KCD gap stud gun M3-M8.

7.1. Application.

The KCD gap stud gun is specifically designed to weld M3-M8 mild steel, stainless steel, brass and aluminium CD Studs with an ignition tip. It can be setup for each diameter stud using the appropriate size copper chuck. The KCD gap stud gun can weld studs up to a length of 25mm using the standard gun front. An extendable foot piece is available for studs longer than 25mm. A 40mm diameter gun front is also available for precision placement of studs if required. The “gap” and “contact” method can used when welding with the KCD gap Stud gun, however it is essential that the “gap” method is used for successful welding of aluminium CD studs.

7.2. Setup.

- Choose correct chuck for stud diameter to be welded.
- Loosen (do not remove), the M13 gun shaft nut.
- Insert required copper chuck into gun shaft. Make sure that it is pushed all the way in.
- Tighten M13 gun shaft nut.
- Insert stud to be welded into the chuck and check position of the head.
- The head of the stud should protrude 3mm past the gun legs. If adjustment is required then the stop in the back of the chuck can be set by removing the chuck and screwing the stop backwards or forwards using a 3/32AF hex key.
- If an M3, M4 or M5 chuck is required then the turned down stop may need to be cut short to accommodate for longer studs above 16mm long (see figure 15).

- The spring in the KCD gap stud gun is fixed and cannot be adjusted. Weld time is controlled by adjusting the gap size.

- To adjust the gap, loosen the M4 grub screw at the rear of the gun. Using a large flat screwdriver turn the gap stop anti clockwise to increase the gap size and clockwise to decrease the gap size. The gap size should be approximately 2-3mm. The gap size is the distance between the head of the loaded stud and the end of the gun legs when the gun shaft is pushed all the way back against the gap stop. Once adjusted don't forget to tighten the M4 grub screw to lock it in place. (See figure 10).
- Refer to corresponding power unit manual for machine settings and recommendations, if welding in gap mode the power unit gap/contact setting must be set to weld gap (refer to relevant power unit manual).
- Refer to figure 9 and figure 10 for a visual guide to contact gun setup.

7.2.1. Copper chuck stop adjustment diagram.

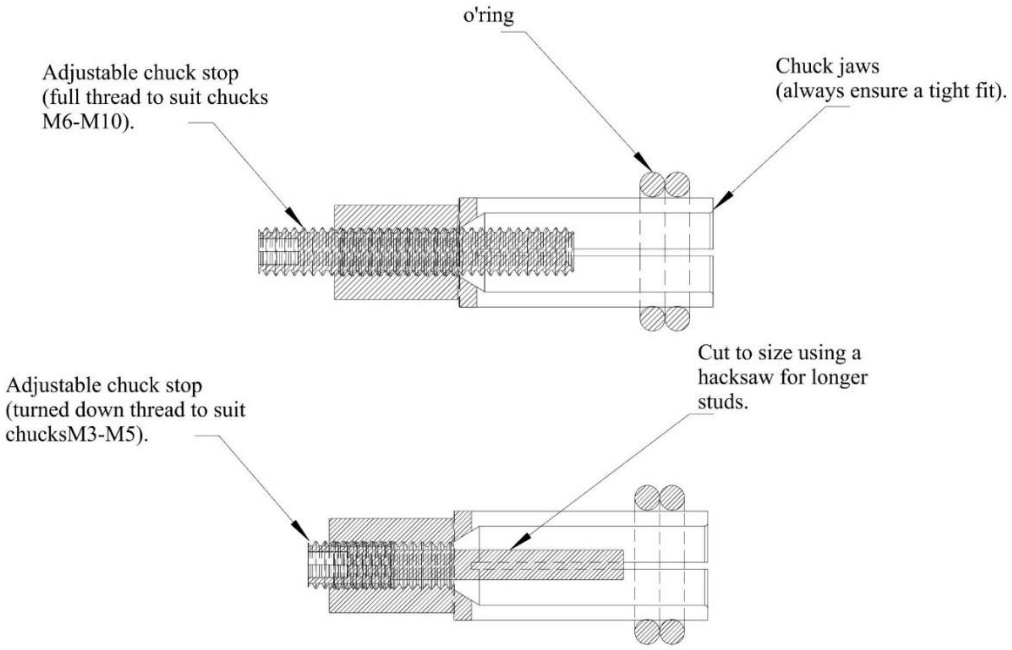
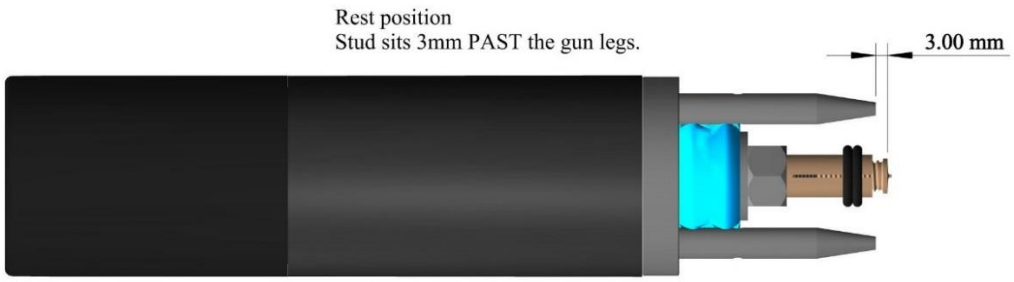
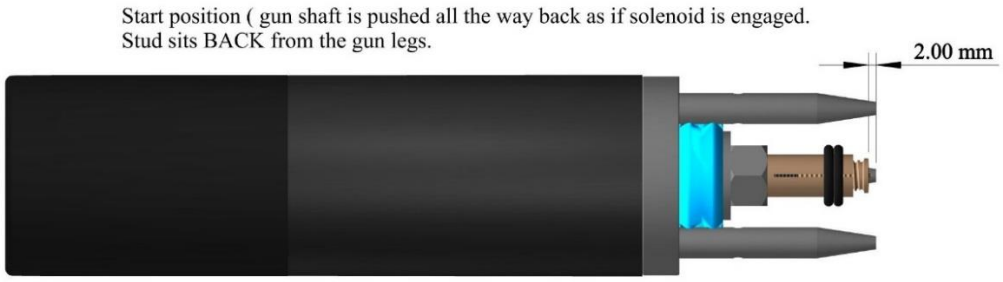


Figure 15.

7.2.2. Gap stud gun setup diagram


Rest position
Stud sits 3mm PAST the gun legs.
3.00 mm


Start position (gun shaft is pushed all the way back as if solenoid is engaged.
Stud sits BACK from the gun legs.
2.00 mm

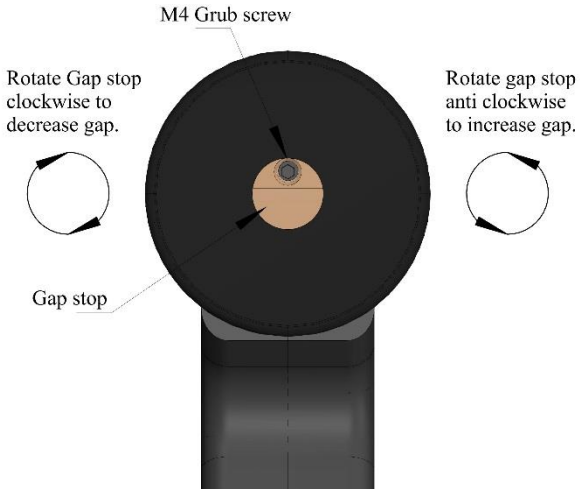

M4 Grub screw
Rotate Gap stop clockwise to decrease gap.
Rotate gap stop anti clockwise to increase gap.
Gap stop

Figure 16.

7.3. Method

Once a stud is loaded into the chuck and the gun and welder are set according to the operating instructions, the stud is ready to weld. If the gun is being used with our older model power units (CD8000 & 9000G), the stud will need to be manually pushed back until the solenoid holds the gun shaft in the start position (manual lift sequence), otherwise the automatic lift sequence is used.
Place the gun onto the parent material in the desired location and make sure all three gun legs are positioned firmly on the parent material. Pull the gun trigger to start the weld process. Once the stud is welded, remove the gap gun from the parent material. Be sure that the gap gun is removed from the stud vertically as any movement to either side will cause the copper chuck jaws to open and as a result the loose connection will dramatically shorten the life of the chuck and cause loss of energy in the weld. The velocity of the stud plunging onto the parent material is determined by the size of the gap and the spring inside the gun**. The larger the gap, the faster the plunge, the shorter the weld time.**

7.3.1. Manual gap sequence revisited (CD8000 & CD9000G).

The stud is loaded into the chuck and the gun shaft is pushed back into the start position by the operator. The gun is then placed onto the parent material, (the stud should be sitting 2-3mm back from the parent material).
Once the trigger is pulled the solenoid inside the gun will release the gun shaft causing the stud to plunge down onto the parent material. The stud will weld once contact is made with the parent material.

7.3.2. Automatic gap sequence revisited (CDi range and CD44 / 66).

The stud is loaded into the gun. The gun is then pushed down onto the parent material until all three gun legs are sitting firmly in place. The stud should be touching the parent material at this point. Once the trigger is pulled the solenoid will engage and the stud will pull back into the start position, after 80mS the stud will then plunge down onto the parent material and will be welded once it makes contact.

7.4. Gap stud gun parts and part numbers.

7.4.1. Exploded diagram.

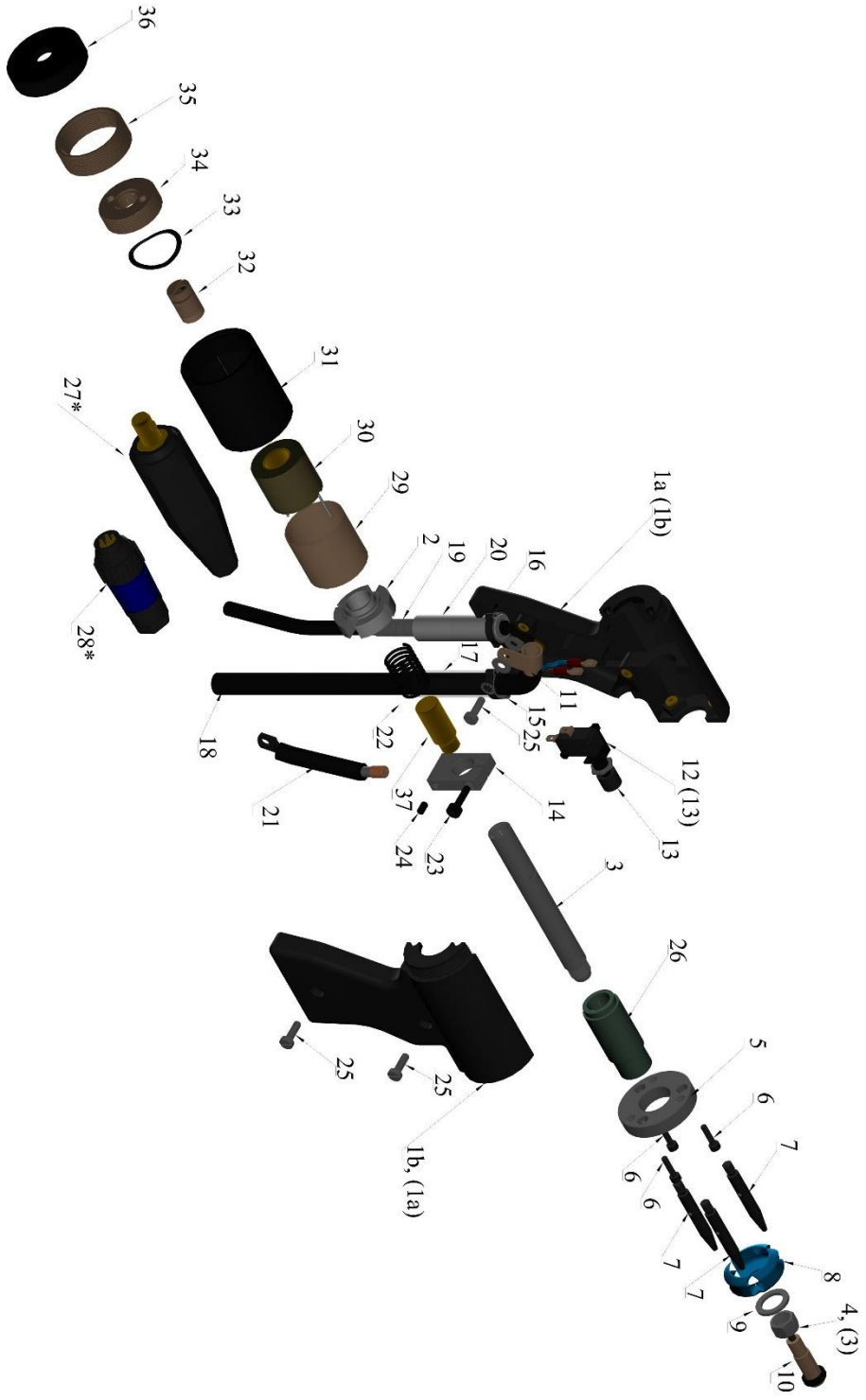


Figure 17.

7.4.2. Gap stud gun part identification chart.

Number	Part Number	Description
1a, (1b)	GUNAC/065	Gap gun body
2	GUNAC/61	Spring retainer
3, (4)	GUNAC/17	Contact / gap gun Shaft
4	GUNAC/49	Gun shaft nut
5	GUNAC/10	Face plate
6	GUNAC/485	M4 x 16mm Cap head screw
7	GUNAC/12	2-1/4" Gun leg
8	GUNAC/22	Rubber boot
9	GUNAC/245	Boot washer
10#	CCH/02	M3 copper chuck
10#	CCH/03	M4 copper chuck
10#	CCH/04	M5 copper chuck
10#	CCH/05	M6 copper chuck
10#	CCH/10	M8 copper chuck
11	GUNAC/68	Copper flag
12, (13)	GUNAC/31	Trigger switch c/w trigger button
13	GUNAC/311	Trigger button
14	GUNAC/19	Gun shaft clamping block
15	LCC/07	Cable clamp OTK 2018
16	LCC/06	Cable clamp OTK 2015
17	GCCON/26	Weld cable clear sleeve
18	CAB/04	35mm2 weld cable (3.3M)
19	GCCON/27	Control cable spring
20	GCCON/26	Control cable sleeve
21	GUNAC/21	Internal pigtail lead
22	GUNAC/205	Standard gap spring (Ø2.0mm x Ø20.0mm x 50.0mm)
23	GUNAC/483	3/16 X 3/4" Cap head screw
24	GUNAC/48	Grub screw 5/32"
25	GUNAC/489	M5 x 16mm Pan head screw
26	GUNAC/181	Gun shaft bearing (long)
27*	GCCON/115	Weld plug 35-50mm2
28*	GCCON/071	Control plug 6+PE
29	GUNAC/58	Solenoid cup
30	GUNAC/62	Solenoid coil
31	GUNAC/54	Centre cap
32	GUNAC/56	Gap stop
33	GUNAC/59	Wave washer
34	GUNAC/55	M40 pressure disk
35	GUNAC/57	M40 threaded ring
36	GUNAC/53	End cap
37	GUNAC/60	Gun shaft end piece

() indicates parts included in part no.
*** Please see below for alternative part no for (CD180, CD8000 & CD9000G).**
 # Dependant on required setup.

27B	GCCON/07	Control plug 4pin (CD6000, CD8000, CD9000 and CD9000G)
28B	GCCON/11	Cam-Lok weld plug CD6000, CD8000, CD9000 & CD9000G up to Jan 2014

Figure 18.

7.5. Maintenance intervals:

7.5.1. Daily:

- Check the weld cable and control cable for visible damage. If the external insulation is found to be broken in any way the defective cable will need to be replaced immediately.
- Check the chuck for signs of wear. If the chuck is loose or worn either replace or close the jaws with a suitable pair of pliers.
- Check that the gun shaft nut is tight. If the nut is loose tighten it immediately to avoid damage to the chuck and or the gun shaft.
- Check for bent gun legs. Bent gun legs will need to be replaced to ensure that the weld stud sits perpendicular to the parent material during the weld process.
- Check that the gun shaft moves freely. If the gun shaft feels like it is catching then it will need to be cleaned or replaced.

7.5.2. Yearly:

- Open gun and clean inside, ensure that particular attention is given to the gun shaft and gun shaft bearing as it is essential for correct operation that these two parts move freely

- Inspect internal components for wear or damage

WARNING: Yearly inspection should be carried out by a qualified repair technician. The weld gun should be disconnected from the welding power supply unit prior to maintenance as high voltage can be present in certain operating and fault conditions when connected to the welding unit.

7.6. Gap gun technical data.

KCD Gap Gun	
Type	Gap & contact stud welding gun
Stud size	≤ 8mm
Cable length, Cross sectional area (mm2).	3.3M, 35mm2
Dimensions (L x W x H)	170mm X 57mm X 148mm
Weight (Kg)	3.02Kg (including cables)
Noise Level	107dB (A)

Figure 19.

8. Interchangeable gun fronts.

8.1. Ø40mm O/D Precision gun front.

The 40mm gun front is designed for use with a custom template to assist with accurate placement of studs. The template will need Ø40 holes cut out where the studs are to be welded. The gun fitted with the Ø40mm front, can then be placed the through the holes in the template so that the studs can be accurately welded at the centre of the template hole. A smaller 30mm diameter gun front is available upon request.

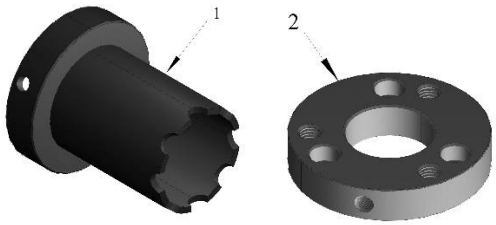


Figure 20.

Max stud length = 30mm for studs up to M6 Diameter
Max stud length = 25mm for studs M8 and M10 diameter.

8.2. Extendable foot piece

The extendable foot piece is used for welding studs from 8mm in length or longer up to 75mm long.

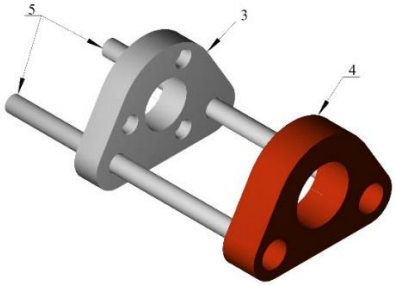


Figure 21.

8.3. Interchangeable gun front parts list.

	Description	Part number
1	40mm Precision head *	GUNAC/33
2	Face plate to suit precision head	GUNAC/100
3	Aluminium adjustable face plate	GUNAC/13
4	CD fibre foot piece	GUNAC/15
5	Adjustable gun legs 125mm	GUNAC/14

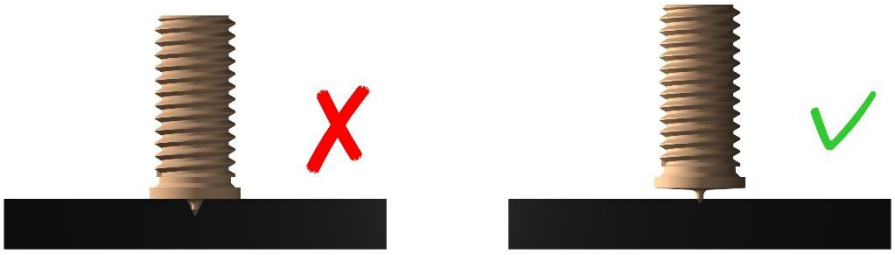
Figure 22.

* The Precision head is used to locate studs with a tolerance of approximately 1-2mm. If tighter tolerances are required, please contact KCD and enquire about our precision gun made to a tighter tolerance of +/- 0.2mm.

10. Stud welding tips and hints.

- The weld surface should be clean of any oil or foreign substances. Any paint, adonisation or other non-conductive coating should be removed both at the weld and ground connection prior to welding. Special materials such as Zinc seal, gal plate etc. require more power and a shorter weld time for a successful weld to occur. A contact gun with an X-heavy spring is required for larger diameter studs (M8 and over), otherwise a gap gun used in gap mode will achieve the same results.

- Centre punching is not recommended for stud positioning as the ignition tip can be buried in the centre punch hole and cause the weld to fail. If centre punching cannot be avoided then it is important that the hole is not so deep that the ignition tip can sit inside it. See figure 23.
- Some setups require the current flow to be reversed. This is achieved by disconnecting the gun weld cable and the ground cable and plugging them into the opposite terminal at the front of the power unit.
- Always make sure that weld cables are uncoiled as a coiled lead will reduce the overall weld current and reduce the weld energy.



Centre punch hole too deep. Weld current allowed to pass between the stud and the parent material without disintergrating the ignition tip.

Centre punch hole ok. Ignition tip is still sitting on top of the parent material allowing it to disintergrate when the weld current passes between the stud and the parent material.

Figure 23.

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