

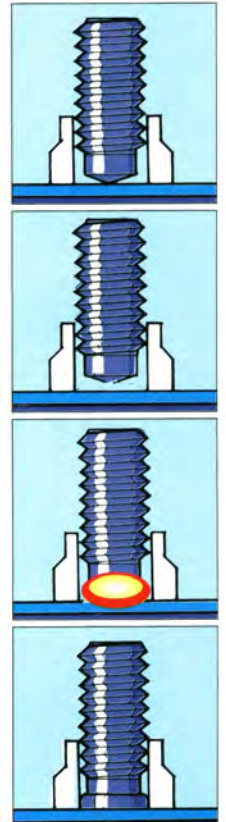
# TAYLOR STUDWELDING SYSTEMS LIMITED



## OPERATING GUIDE

FOR

# TYPES DA1-A, DA2-A & DA3-A DRAWN ARC PISTOLS



A TAYLORMADE DRAWN ARC STUD WELDING PISTOL

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# **USEFUL INFORMATION**

## **MANUFACTURERS DETAILS**

TAYLOR STUDWELDING SYSTEMS LIMITED  
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WEST YORKSHIRE  
WF13 2BD  
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TELEPHONE : +44 (0)1924 452123  
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WEB : www.taylor-studwelding.com

SALES DIRECT TEL : +44 (0)1924 487703  
TECHNICAL HELPLINE : +44 (0)1924 487701

You may wish to record the details of your controller below as this information will help with any technical assistance you may require:

<b>PISTOL SERIAL No.</b>	
<b>DATE PURCHASED.</b>	

## **PURPOSE AND CONTENT OF THIS GUIDE**

This guide has been written for :

- The personnel of the end-user responsible for the installation and maintenance of the pistol.
- The operator of the welding pistol.

This guide contains information relating to :

- Installation and connection.
- Operation.
- Technical specifications and parameters.
- Spare parts.

# **USEFUL INFORMATION**

## **FURTHER INFORMATION**

Should you require additional technical information, please contact us directly (details on previous page) or our local agent / distributor (details of agents etc. can be obtained from us).

This guide contains important information which is a pre-requisite for safe Operation of the pistol. The operating personnel must be able to consult this guide when necessary. In the interests of safety, make this guide available to your personnel in good time.

If the pistol is sold / passed on, please hand over this manual to the new owner and if possible please inform us of the name and address of the new owner, in case we need to contact him regarding the safety of the machine.



PLEASE READ THIS GUIDE CAREFULLY BEFORE INSTALLING OR OPERATING THE PISTOL.



PLEASE OBSERVE CAREFULLY ALL SAFETY PROCEDURES/INSTRUCTIONS.



DUE TO THE POWER REQUIREMENTS AND ELECTROMAGNETIC EMISSIONS PRODUCED DURING NORMAL USE, THIS PISTOL MUST ONLY BE OPERATED IN AN INDUSTRIAL ENVIRONMENT.



NEVER REMOVE ANY PORTION OF THE UNIT HOUSING WITHOUT FIRST ISOLATING THE PISTOL FROM THE CONTROLLER.

# **IMPORTANT SAFETY INFORMATION !**

## **PROTECT YOURSELF AND OTHERS !**

Read and understand these safety notes.

### **1. ELECTRICAL**

No portion of the outer cover of the welding pistol should be removed by anyone other than suitably qualified personnel and never whilst mains power is connected.



ALWAYS DISCONNECT THE MAINS LEAD BEFORE ATTEMPTING ANY MAINTENANCE.

BEWARE - RISK OF ELECTRIC SHOCK !

Do not use any fluids to clean electrical components as these may penetrate into the electrical system.

Installation must be according to the setting up procedure detailed on page 8 of this guide and must be in line with national, regional and local safety codes.

### **2. FIRE**

During welding small particles of very hot metal are expelled. Ensure that no combustible materials can be ignited by these.

### **3. PERSONNEL SAFETY**

Arc rays can burn your eyes and skin and noise can damage your hearing. Operators and personnel working in close proximity must wear suitable eye, ear and body protection.

Fumes and gases can seriously harm your health. Use the equipment only in a suitably ventilated area. If ventilation is inadequate, then appropriate fume extraction equipment must be used.

Hot metal spatter can cause fire and burns. Appropriate clothing must be worn. Clothing made from, or soiled with, combustible materials must NOT be worn.

Have a fire extinguisher nearby and know how to use it.

Magnetic fields from high currents can affect heart pacemakers or other electronically controlled medical devices. It is imperative that all personnel likely to come into the vicinity of any welding plant are warned of the possible risks before entering the area.

### **4. MAINTENANCE**

All cables must be inspected regularly to ensure that no danger exists from worn or damaged insulation or from unsound electrical connections. Special note should be made of the cables close to the pistol, where maximum wear occurs. As well as producing inconsistent welds, worn cables can overheat or spark, giving rise to the risk of fire.

# **IMPORTANT SAFETY INFORMATION !**

## **5. TRAINING**

Use of the equipment must be limited to authorised personnel only who must be suitably trained and must have read and understood this manual. This manual must be made available to all operators at all times. Further copies of this manual may be purchased from the manufacturer. Measures must be taken to prevent the use of this equipment by unauthorised personnel.

## **6. INSTALLATION**

Ensure that the site chosen for the equipment is able to support the weight of the equipment and that it will not fall or cause a danger in the course of its normal operation. Do not hang connecting cables over sharp edges and do not install connecting cables near heat sources or via traffic routes where people may trip over them or they may be damaged by the passage of vehicles (forklifts etc).

## **7. INTERFERENCE**

During welding operations, intense magnetic and electrical fields are unavoidably produced which may interfere with other sensitive Electronic equipment.

All Taylor Studwelding equipment is designed, manufactured and tested to conform the current appropriate European standards and directives regarding electromagnetic emissions and immunity and as such is safe to use in any normal environment.

## **8. DISPOSAL**

The equipment either wholly or any of its component parts may be disposed of as part of general industrial waste or passed to a scrap merchant. None of the components used in the manufacture are toxic, carcinogenic or harmful to health in their "as supplied" condition.

## **INTRODUCTION TO STUDWELDING**

The Taylor Studwelding DA2-A studwelding pistol when matched with an appropriate controller and earth cables is intended for precision stud welding up to 20 mm diameter full base studs. The pistol is lightweight, ergonomic and has been designed to operate with a minimum amount of maintenance.

The energy required to carry out the welding operation is derived from an appropriate studwelding controller.

Taylor Studwelding Systems Ltd controllers are modern, robustly designed and offer maximum reliability combined with an easy to understand operator interface.

### **THE PROCESS**

The process of drawn arc studwelding is long established and well proven. The basic steps are as follows :

- A measured amount of weld stud protrusion is set at the welding pistol.
- Once in position, the pistol lifts the stud away from the work-piece, simultaneously striking an arc between the two.
- Both the tip of the weld stud and the surface of the work-piece melt as the arc is sustained for a pre-determined interval.
- At the completion of the pre-determined interval, the pistol returns the weld stud to the molten pool on the work-piece, thus forming a weld.

The most common and traditional drawn arc welds have a weld duration greater than 100ms and employ the use of a single use ceramic arc shield, commonly referred to as a ferrule. This ferrule helps to protect the arc during the weld and assists in formation of the final fillet. Post welding the ferrule is removed and disposed of.

It is possible to stud weld without a ferrule. When using this method it is recommended practice to employ a suitable shielding gas to reduce the amount of porosity in the completed weld and improve weld quality.

## SETTING UP AND WELDING

As standard, the DA2-A pistol comes fitted with standard legs and a standard foot adaptor. The pistol has a standard UK and American taper adaptor fitted to the M10 thread on the weld shaft. This enables the use of standard UK tapered DA chucks, enabling studs up to 20mm in diameter to be welded (see fig.1).



Other arrangements are available as shown in figs. 2 & 3.

In fig.2 the adapter is not fitted to the weld shaft to enabling standard European screw-on chucks to be used, enabling studs up to 20mm in diameter to be welded.



In fig.3 a 35mm gas foot arrangement using long legs and an extended form of screw-on chuck allows for welding, with or without gas.

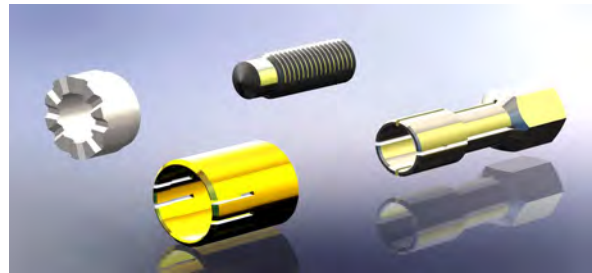
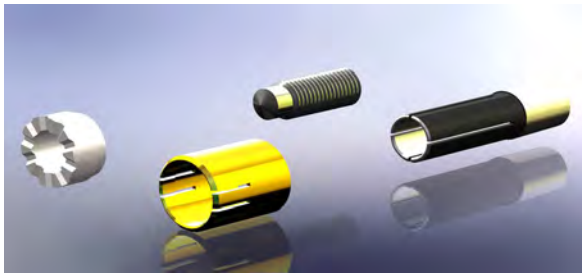


Please refer to the accessories section of this guide for information regarding chucks and other accessories for the pistol.

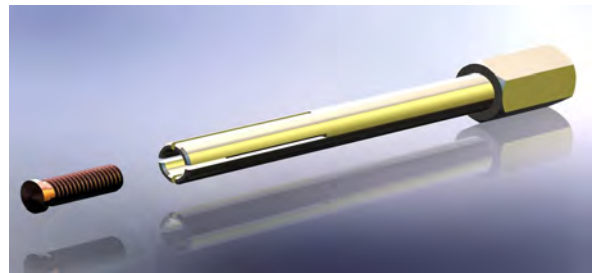
The DA2-A pistol is commonly referred to as a “ring lift” pistol. This means the pistol has an internal clutch, allowing for moderate inconsistencies in the length of the studs being welded, without affecting weld quality.



## SETTING UP AND WELDING

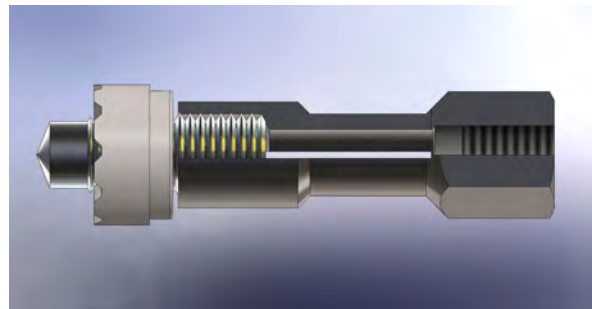


Once you have selected the type and size of stud you wish to weld and obtained the correct chuck (see the accessories section of this guide for a list of available sizes), you will need to set up the chuck and fit it to the pistol.

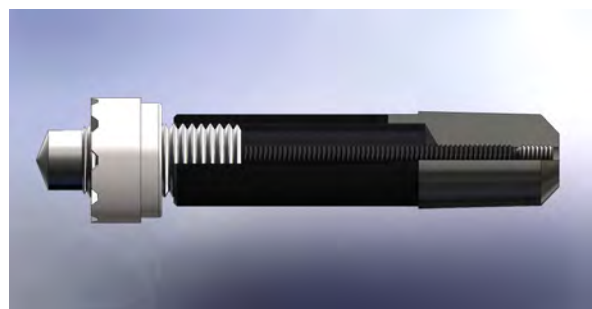


On the page “An introduction to studwelding”, under the heading “The Process” it explains that a measured amount of stud protrusion is set at the welding pistol.

To ensure that the correct amount of protrusion will be available once the chuck is fitted to the pistol, it is important to set the chuck correctly in the first place. Some chucks have a pre-determined depth (see right) which will only allow a certain amount of the stud to be inserted.



Other chucks have a backstop arrangement that allows the depth of engagement to be adjusted.



Regardless of which type of chuck is employed, when welding with ceramic ferrules, it is important that sufficient stud length is exposed to allow more than the “burn-off” allowance of the stud to pass completely through the ferrule. Insufficient allowance may result in the leading edge of the chuck hitting the back of the ferrule during welding. This would result in failed welds.

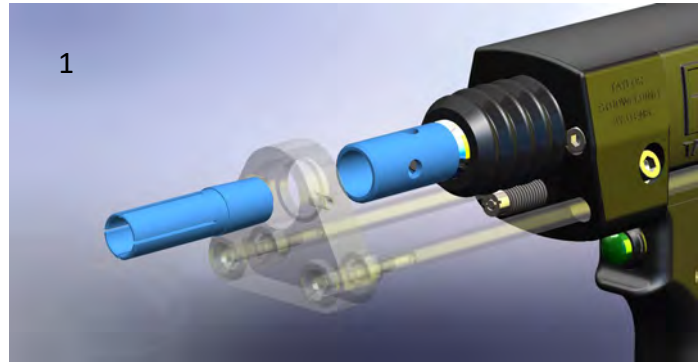


In non-ferrule welding it is only necessary to set the chuck so that sufficient stud length is exposed to prevent damage to the leading edge of the chuck during welding.

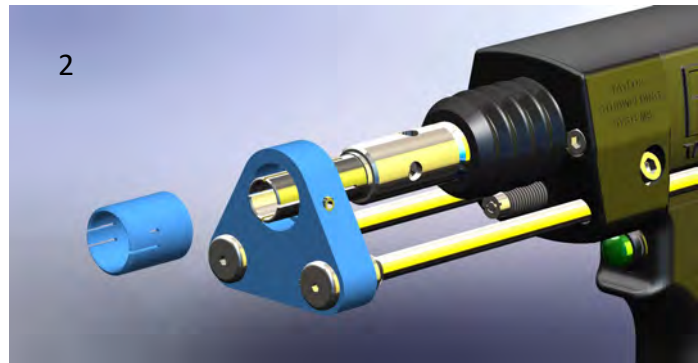
Having set up the chuck, you are now ready to fit it into the pistol.

## SETTING UP AND WELDING

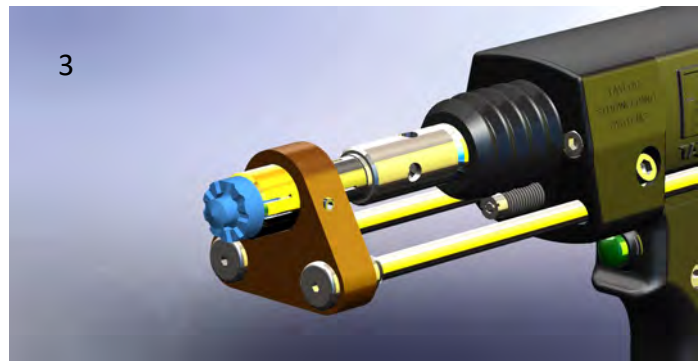
Fit the chuck into the tapered shaft adaptor (fig.1) and secure in place by gently tapping the chuck to lock the taper. The chuck may be subsequently removed using a twist drift (see page 22 for tools) inserted through the cross-drilled holes in the taper adaptor.



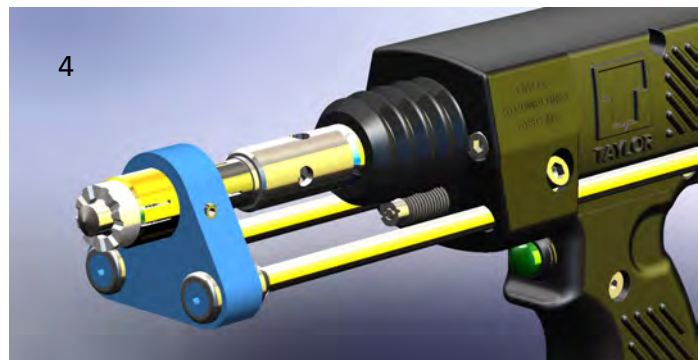
Fit the ferrule grip into the foot adaptor (fig.2) and secure in place using the 2 set screws in the foot adaptor. Do not over-tighten the set screws as this may result in damage to either the ferrule grip or the foot adaptor or both.



Place a stud and ferrule into the chuck and grip (fig.3). Ensure the stud is pressed fully home and that the ferrule is properly seated in the grip.



Centre the ferrule over the stud (fig.4). Use the 2 countersunk socket screws set in the foot washers to loosen and adjust the position of the foot adaptor on the pistol legs. It is very important that the ferrule does not bind on the stud as this will cause poor, inconsistent and failed welds.



## SETTING UP AND WELDING

Set the correct protrusion (fig.5) by loosening the two socket cap screws fitted at an angle in the sides of the front end cap.

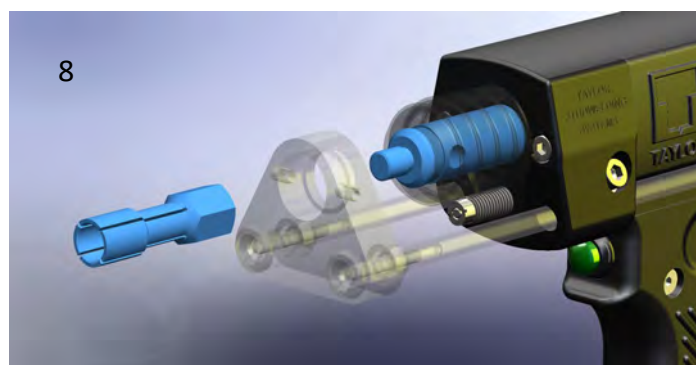
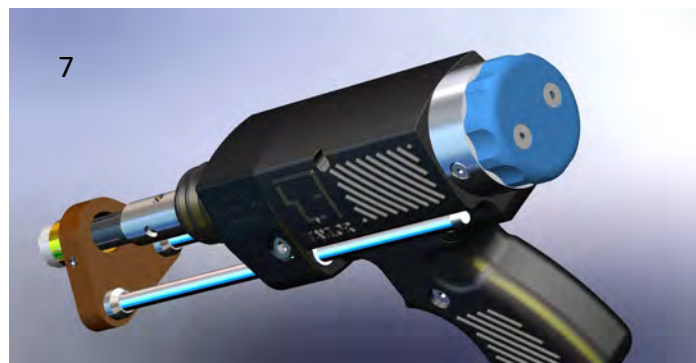
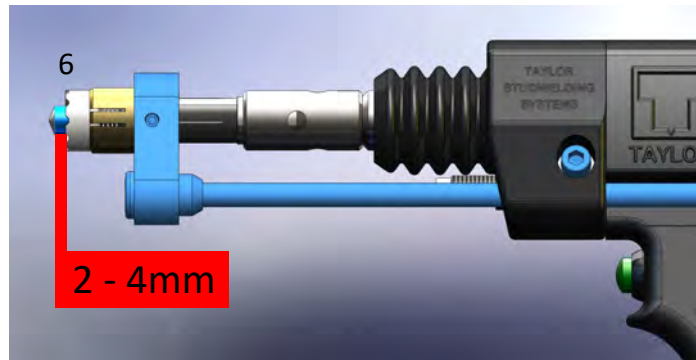
Slide the foot/leg assembly in/out (fig.6) to achieve the desired stud protrusion, which should be around 2 - 4mm depending on the diameter of stud being welded. Protrusion is the distance from the front face of the ferrule to the front edge of the stud, not including the coned tip.

IMPORTANT! Please note that it is necessary to check/reset the protrusion when changing the stud length/diameter.

Adjustment of the pistol lift is achieved by turning the rear end cap of the pistol (fig.7). The cap has a "click" detent where one "click" is approx' equal to a 0.25mm change in lift. Turning the cap clockwise (CW) will reduce lift, whilst turning the cap anti-clockwise (ACW) will increase lift. Upon first use when the lift position is unknown, it is good practice to zero the pistol by turning the adjuster fully CW, then in stages turning the adjuster ACW, pulling the trigger between adjusts to observe the lift, adjust until the pistol begins to lift. Once the pistol begins to lift, one click CW is the zero position and the desired lift can be set from this point.

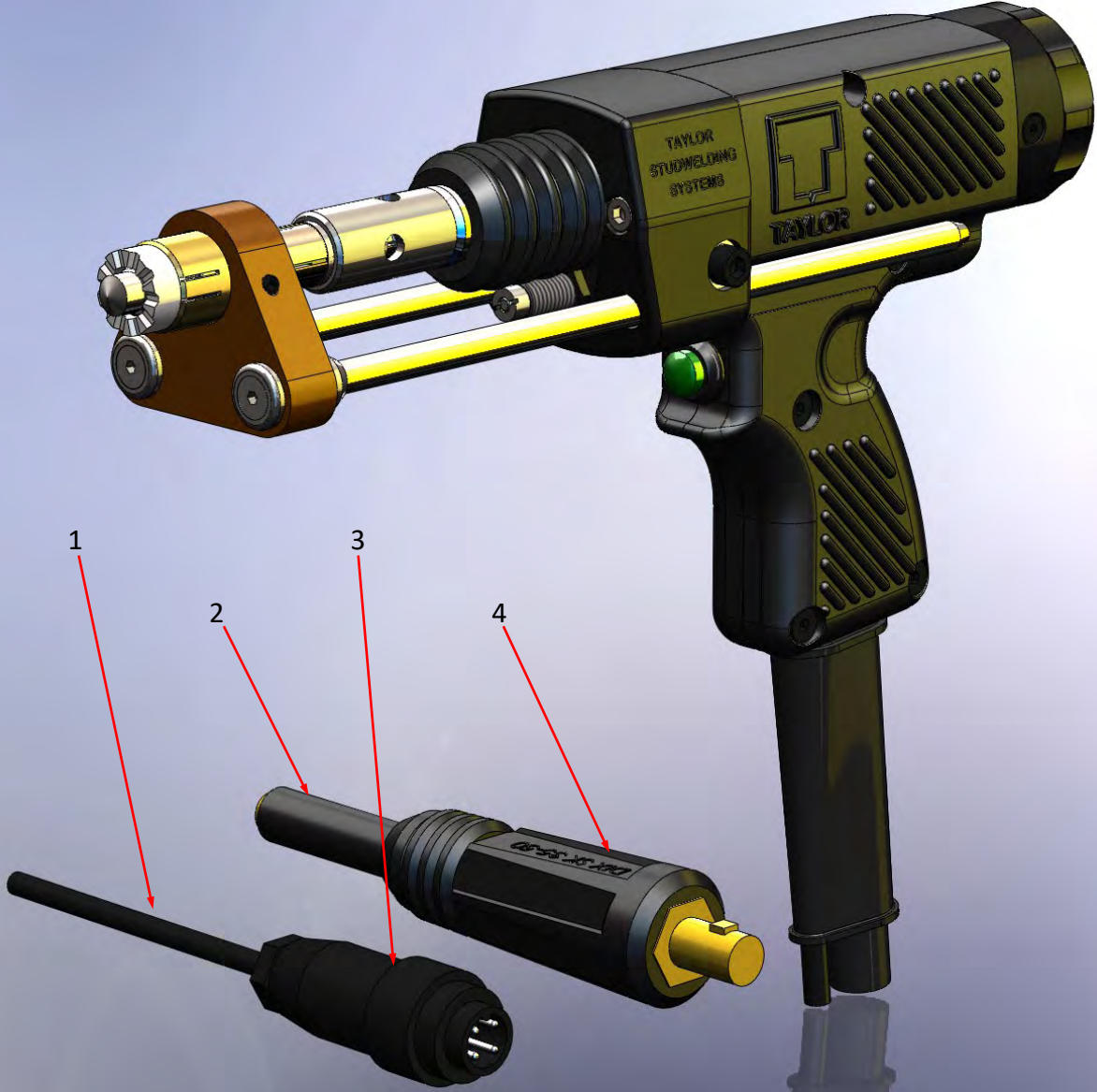
PLEASE NOTE! It is possible to use European type screw-on chucks with this pistol. This is achieved by removing and discarding the tapered chuck adaptor. The adaptor can be removed by using a pair of bars through the cross-drilled holes in the adaptor and the front shaft adaptor (check under the rubber protection bellows for the shaft hole). Likewise the chuck is then fitted (fig.8) by bracing the shaft using this hole and an appropriate wrench. It is IMPORTANT that the shaft is properly braced when fitting or removing screw-on chucks. Failure to do so may result in damage to the pistol.

IMPORTANT! Information contained in this operating guide is intended to assist in setting up the pistol. The suggested settings are intended as a starting point only. Fine tuning the settings to achieve the most satisfactory results is essential and is the responsibility of the user of the pistol.



# EXPLODED DIAGRAMS & PARTS LISTINGS

SEE PAGES 13 TO 16 FOR COMPLETE STAGED BREAKDOWN OF PISTOL.



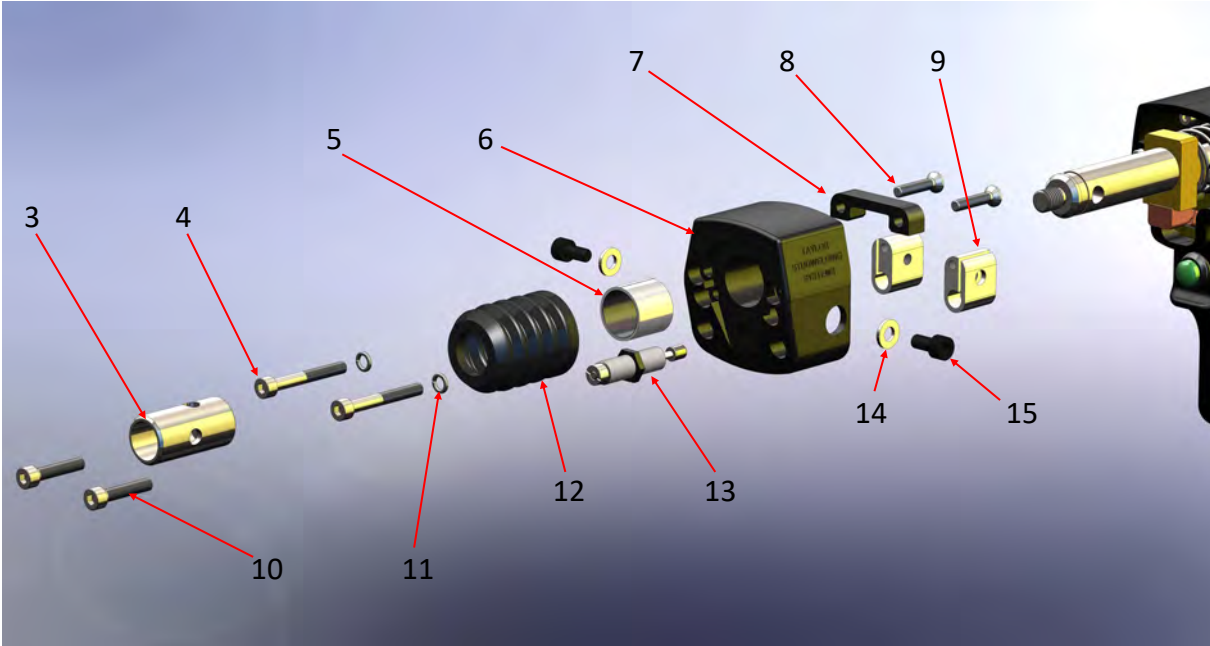
ITEM	QTY.	PART No.	DESCRIPTION
1	5½	71-300-009	CONTROL CABLE
2	5	71-300-004	WELDING CABLE
3	1	71-101-030	CONTROL PLUG
4	1	81-101-051	WELDING PLUG
5	9	71-101-032	CABLE TIE (NOT SHOWN)

# EXPLODED DIAGRAMS & PARTS LISTINGS

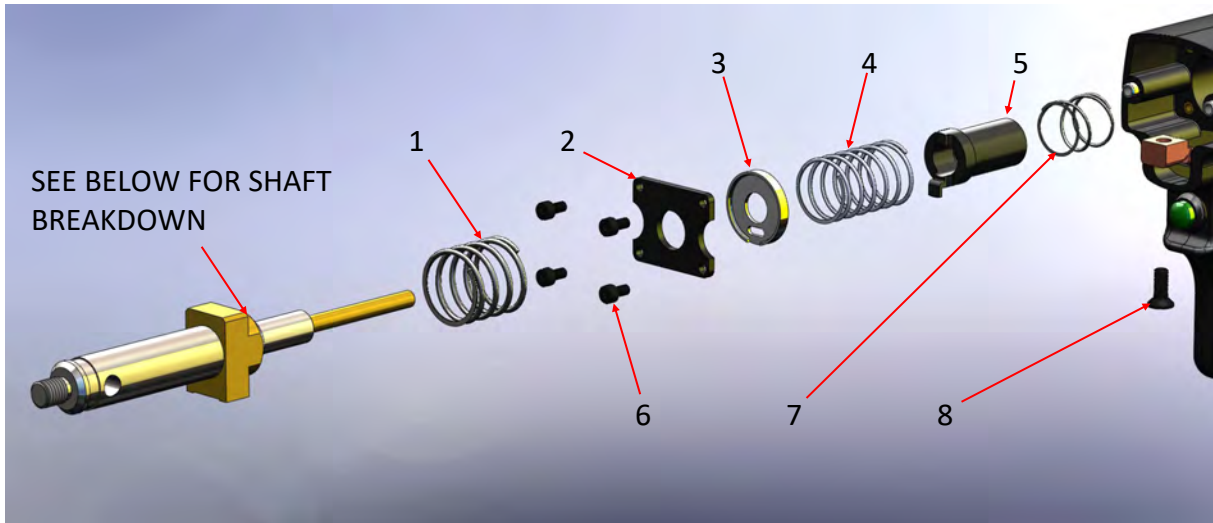


ITEM	QTY	PART No.	DESCRIPTION
1		SEE PAGE 18	FOOT ASSEMBLY
2		SEE PAGE 18	CHUCK & GRIP
3	1	81-101-005	CHUCK GRIP
4	2	Z105-05-040	SCREW
5	1	81-101-298	BEARING BUSH
6	1	81-101-190	FRONT END CAP
7	1	81-101-297	A R PLATE

8	2	Z120-05-025	SCREW
9	2	81-101-191	LEG GRIP
10	2	Z100-05-025	SCREW
11	2	Z615-05-000	WASHER
12	1	81-111-044	BELLOWS
13	1	81-101-293	DAMPER
14	2	Z600-06-000	WASHER
15	2	Z105-06-010	SCREW



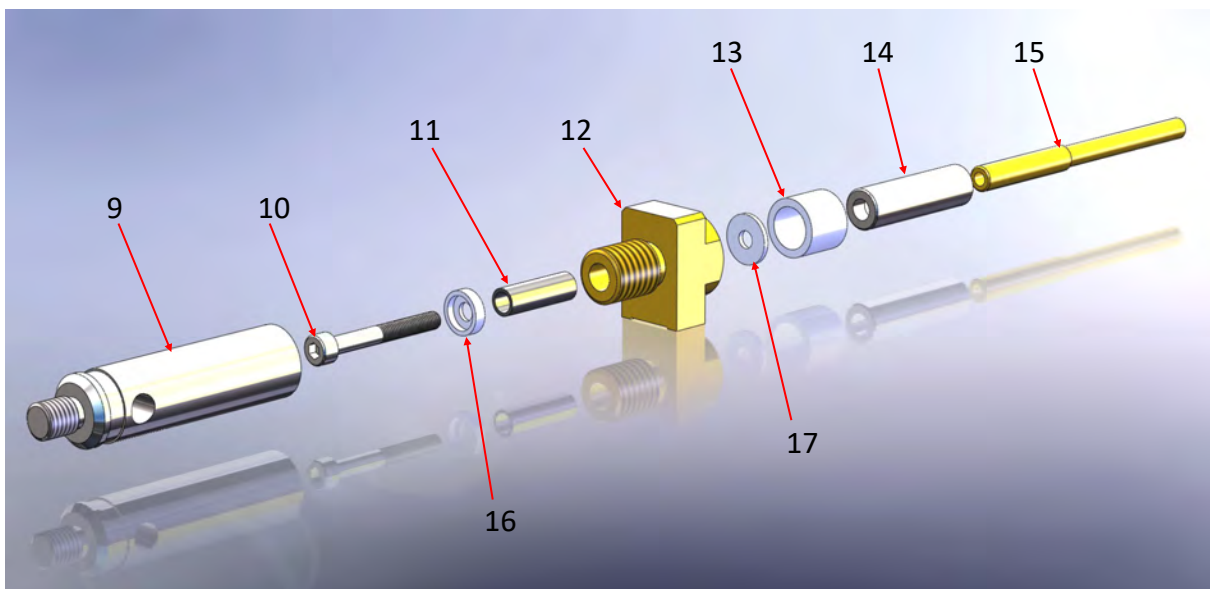
## EXPLODED DIAGRAMS & PARTS LISTINGS



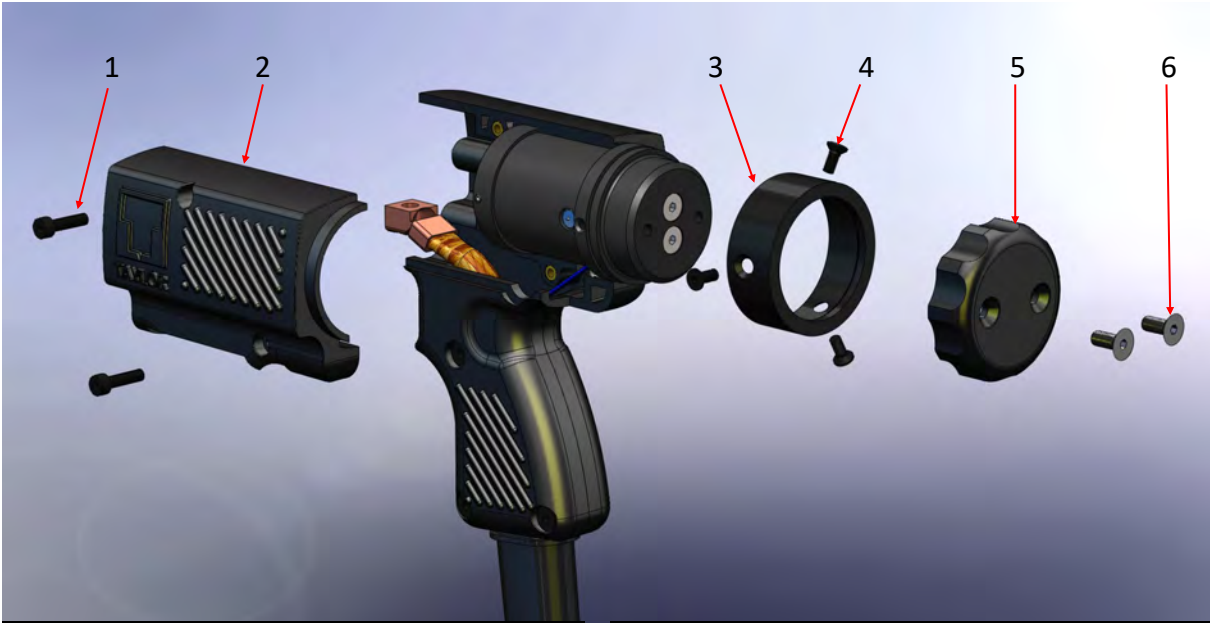
ITEM	QTY	PART No.	DESCRIPTION
1	1	81-101-299	SHAFT SPRING
2	1	81-101-014	RING RET. PLATE
3	1	81-101-015	LIFTING RING
4	1	81-101-018	RING SPRING
5	1	81-101-286	LIFTING HOOK
6	4	Z100-04-008	SCREW
7	1	81-101-345	HOOK SPRING
8	1	Z120-06-016	SCREW

ITEM	QTY	PART No.	DESCRIPTION
9	1	81-101-192	SHAFT ADAPTOR
10	1	Z105-05-040	SCREW
11	1	81-101-194	INSULATOR
12	1	81-101-195	SHAFT BLOCK
13	1	81-101-197	INSULATOR
14	1	81-101-073	LIFTING SLEEVE
15	1	81-101-269	GUIDE ROD
16	1	81-101-193	INSULATOR
17	1	81-101-196	INSULATOR

COMPLETE SHAFT ASSEMBLY IS AVAILABLE UNDER PART No. : 81-101-134

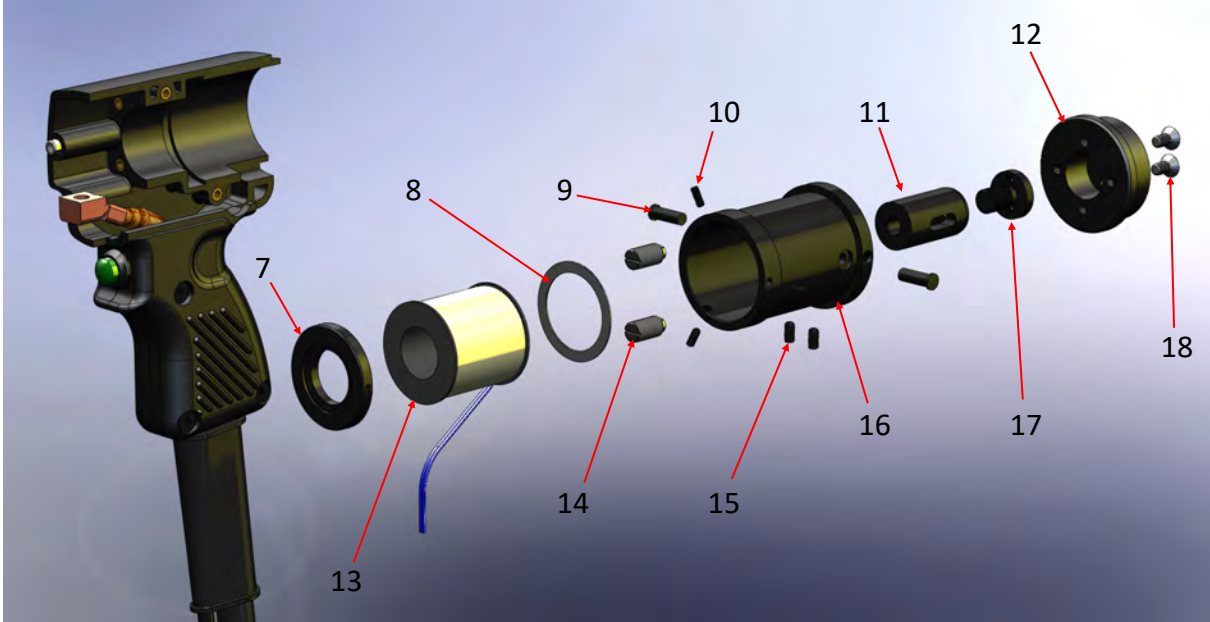


# EXPLODED DIAGRAMS & PARTS LISTINGS

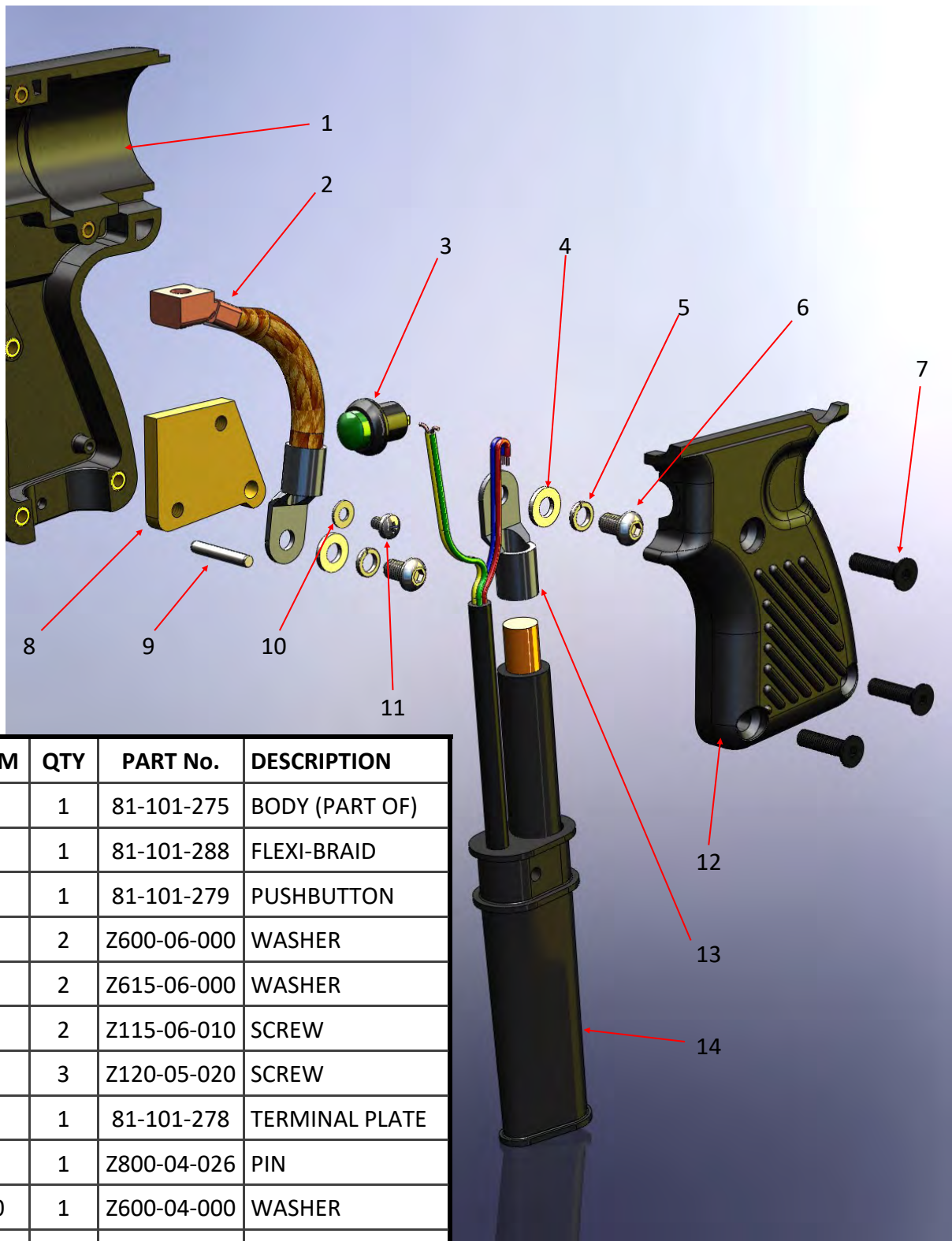


ITEM	QTY	PART No.	DESCRIPTION
1	2	Z100-04-016	SCREW
2	1	81-101-275	BODY (PART OF)
3	1	81-101-284	BODY RING
4	3	Z120-04-008	SCREW
5	1	81-101-285	REAR END CAP
6	2	Z120-05-012	SCREW
7	1	81-101-267	RETAINING RING
8	1	81-101-039	WASHER
9	2	Z650-05-016	PIN

ITEM	QTY	PART No.	DESCRIPTION
10	3	Z400-03-008	SET SCREW
11	1	81-101-281	BACKSTOP
12	1	81-101-283	DETENT CAP
13	1	81-101-170	COIL
14	2	81-111-039	DETENT
15	2	Z400-04-012	SET SCREW
16	1	81-101-280	COIL HOUSING
17	1	81-101-282	BACKSTOP DRIVER
18	2	Z120-05-010	SCREW



## EXPLODED DIAGRAMS & PARTS LISTINGS

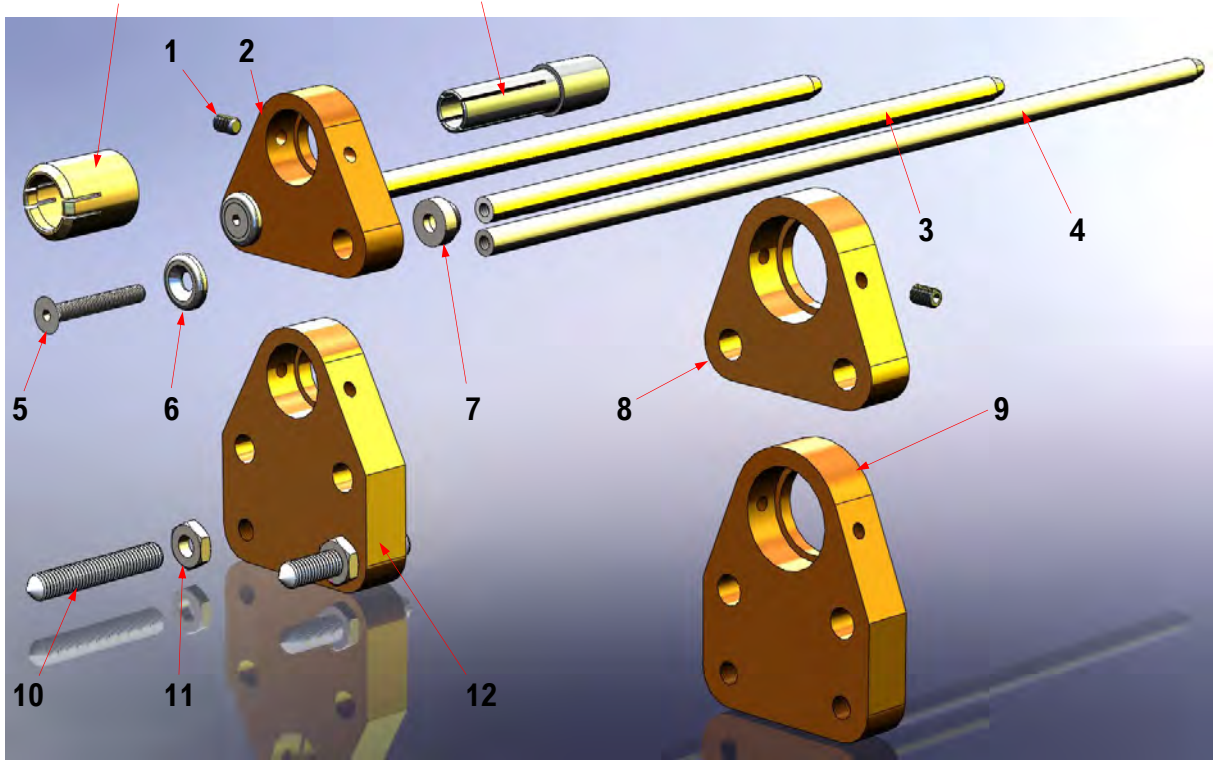


ITEM	QTY	PART No.	DESCRIPTION
1	1	81-101-275	BODY (PART OF)
2	1	81-101-288	FLEXI-BRAID
3	1	81-101-279	PUSHBUTTON
4	2	Z600-06-000	WASHER
5	2	Z615-06-000	WASHER
6	2	Z115-06-010	SCREW
7	3	Z120-05-020	SCREW
8	1	81-101-278	TERMINAL PLATE
9	1	Z800-04-026	PIN
10	1	Z600-04-000	WASHER
11	1	Z225-08-914	SCREW
12	1	81-101-275	BODY (PART OF)
13	1	Z700-06-S38	TERMINAL
14	1	81-101-287	CABLE SLEEVE



# ACCESSORIES

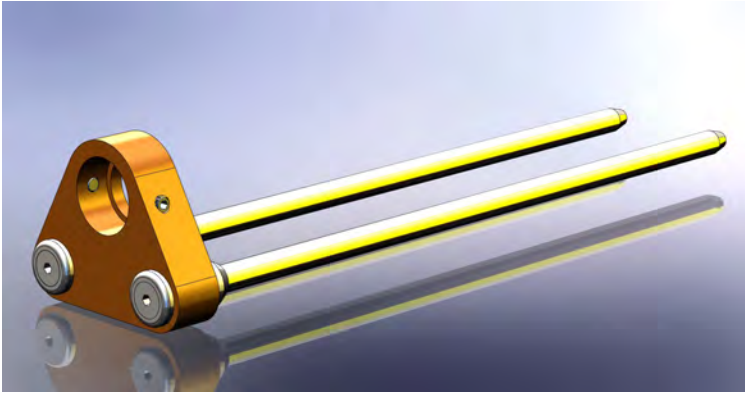
SEE PAGES 20 - 22 FOR OUR STANDARD DRAWN ARC, EUROPEAN AND GAS CHUCKS, FERRULE GRIPS AND ACCESSORIES RANGE



SEE NEXT PAGE FOR COMPLETE FOOT ASSEMBLY PART NUMBERS

ITEM	QTY.	PART No.	DESCRIPTION
1	2	Z400-05-008	GRUB SCREW
2	1	81-101-002	STANDARD FOOT ADAPTOR (M3 - M12)
3	2	81-101-004	STANDARD LEG (230mm)
4	2	89-101-081	EXTENDED LEG (330mm)
5	2	Z125-05-035	SCREW
6	2	81-101-003	FOOT WASHER
7	2	81-101-001	FOOT WASHER
8	1	81-101-063	STANDARD FOOT ADAPTOR (M16 - M20)
9	1	81-101-131	TRIPOD FOOT ADAPTOR (M16 - M20)
10	2	Z410-08-050	GRUB SCREW
11	2	Z510-08-000	LOCKNUT
12	1	81-101-126	TRIPOD FOOT ADAPTOR (M3 - M12)

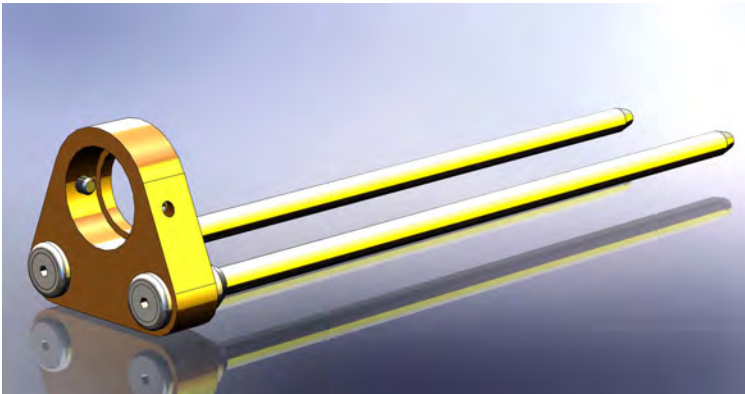
## **ACCESSORIES**



STANDARD FOOT ADAPTOR  
ASSEMBLY (M3 - M12,  
STANDARD LEGS)

COMPLETE ASSEMBLY :

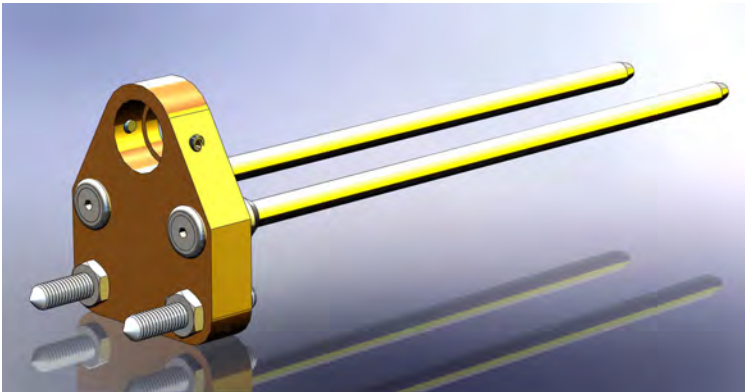
**81-101-158**



STANDARD FOOT ADAPTOR  
ASSEMBLY (M16 - M20,  
STANDARD LEGS)

COMPLETE ASSEMBLY :

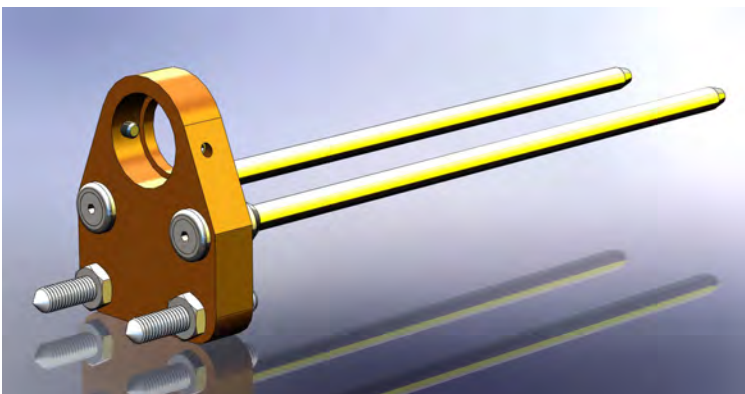
**81-101-159**



TRIPOD FOOT ADAPTOR  
ASSEMBLY (M3 - M12,  
STANDARD LEGS)

COMPLETE ASSEMBLY :

**81-101-140**

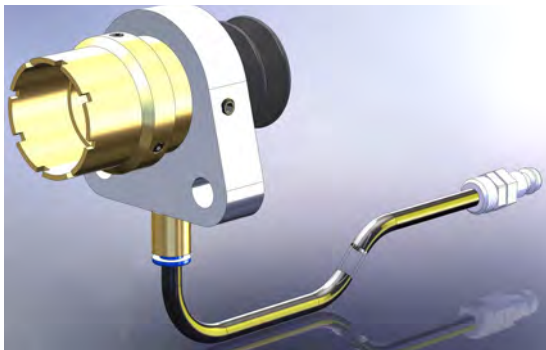


STANDARD FOOT ADAPTOR  
ASSEMBLY (M16 - M20,  
STANDARD LEGS)

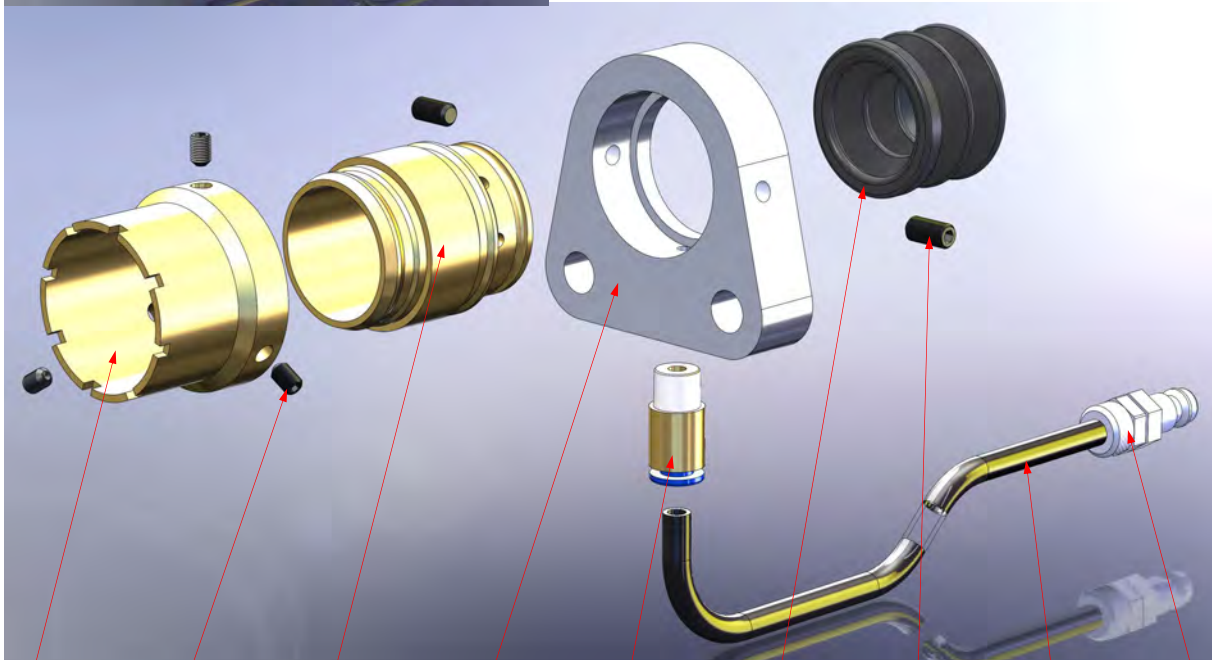
COMPLETE ASSEMBLY :

**81-101-141**

## **ACCESSORIES**



**COMPLETE ASSEMBLY (NO LEGS)**  
**PART NUMBER : 89-101-414**



1 2 3 4 5 6 7 8 9

ITEM	QTY.	PART No.	DESCRIPTION
1	1	89-101-249	Ø35mm NOSE CONE
2	3	Z400-05-006	GRUB SCREW
3	1	89-101-246	GAS CONE
4	1	89-101-245	FOOT ADAPTOR
5	1	PFS-P06-U1M-INT	GAS FITTING
6	1	89-101-244	BELLOWS
7	2	Z400-05-010	GRUB SCREW
8	5.5	71-200-043	GAS PIPE
9	1	71-200-067	GAS PLUG

# ACCESSORIES - CHUCKS

## EUROPEAN SCREW-ON TYPE

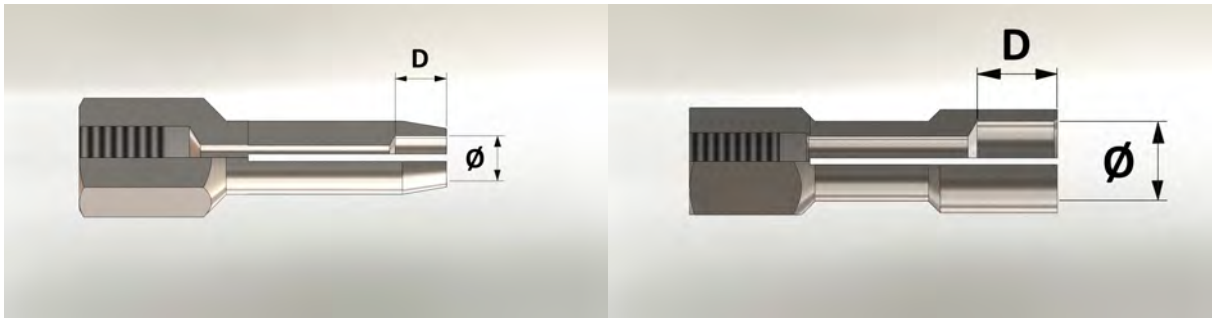


TABLE 1

LISTS OUR STANDARD STOCK RANGE OF CHUCKS.

TABLE 1

Ø	D	PART NUMBER
3	5	89-101-003
4	5	89-101-004
5	6	89-101-005
6	7	89-101-006
8	9	89-101-008
10	11	89-101-010
12	13	89-101-012

TABLE 2

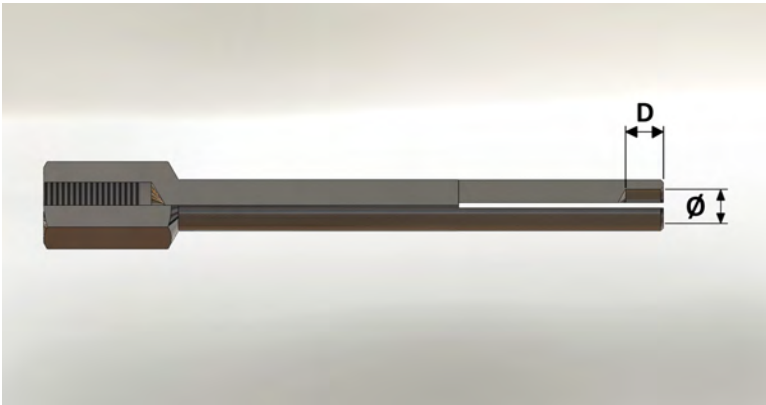
LISTS OUR NON STOCK RANGE OF CHUCKS.  
 NOTE! NON STOCK CHUCKS WILL REQUIRE ADDITIONAL  
 DELIVERY LEAD TIMES AND MAY BE SUBJECT TO  
 MINIMUM ORDER QUANTITY.

PLEASE NOTE.  
 IF THE CHUCK THAT YOU REQUIRE IS NOT SHOWN HERE,  
 PLEASE CHECK WITH US.

TABLE 2

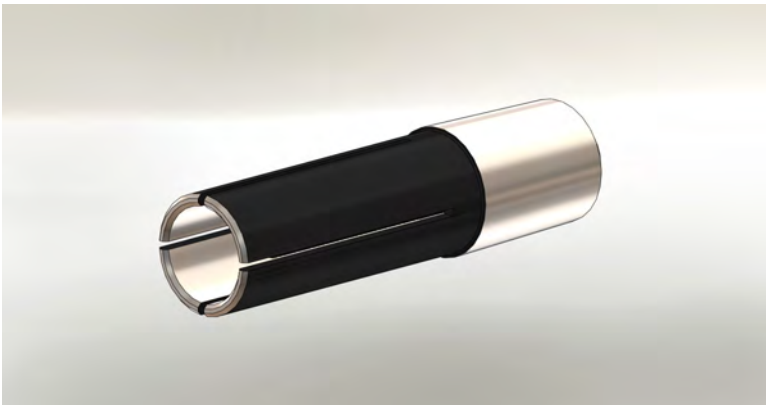
Ø	D	PART NUMBER
4	25	89-101-021
6	15	89-101-022
6	25	89-101-023
8	6	89-101-024
8	25	89-101-025
10	4	89-101-026
10	6	89-101-027
12	6	89-101-028

**ACCESSORIES - CHUCKS**  
**EUROPEAN SCREW-ON GAS TYPE**



ø	D	PART NUMBER
5	4	89-101-035
6	4	89-101-036
6	7	89-101-037
8	4	89-101-038
8	9	89-101-039
10	11	89-101-040
12	13	89-101-042

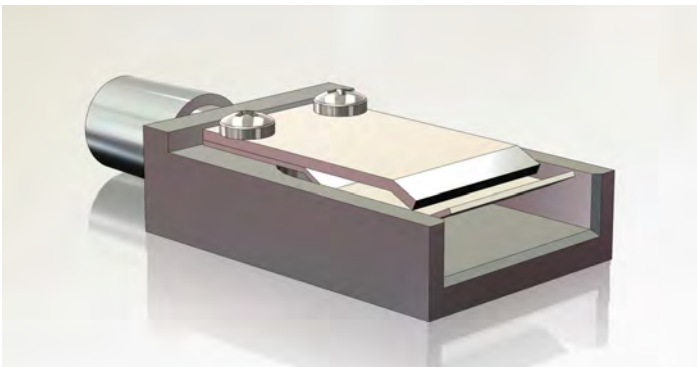
**ACCESSORIES - CHUCKS**  
**UK TAPER FIT - ADJUSTABLE**



ø	PART NUMBER
M3	89-101-203
M4	89-101-204
M5	89-101-205
M6	89-101-206
M8	89-101-208
M10	89-101-210
M12	89-101-212
M16	89-101-216

PLEASE NOTE. OTHER CHUCK SIZES ARE AVAILABLE.  
 PLEASE CHECK WITH US IF THE SIZE YOU WANT IS NOT LISTED HERE.

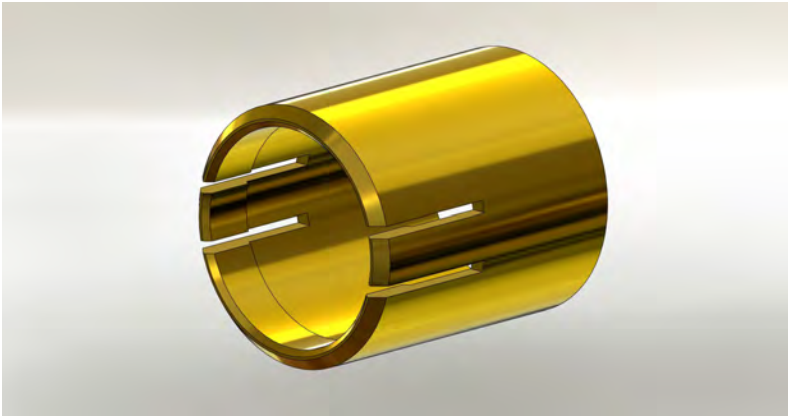
**ACCESSORIES - CHUCKS**  
**UK TAPER FIT - RECTANGULAR**



SIZE	PART NUMBER
6 x 30mm	89-101-203
6 x 19mm	89-101-204
3 x 16mm	89-101-205

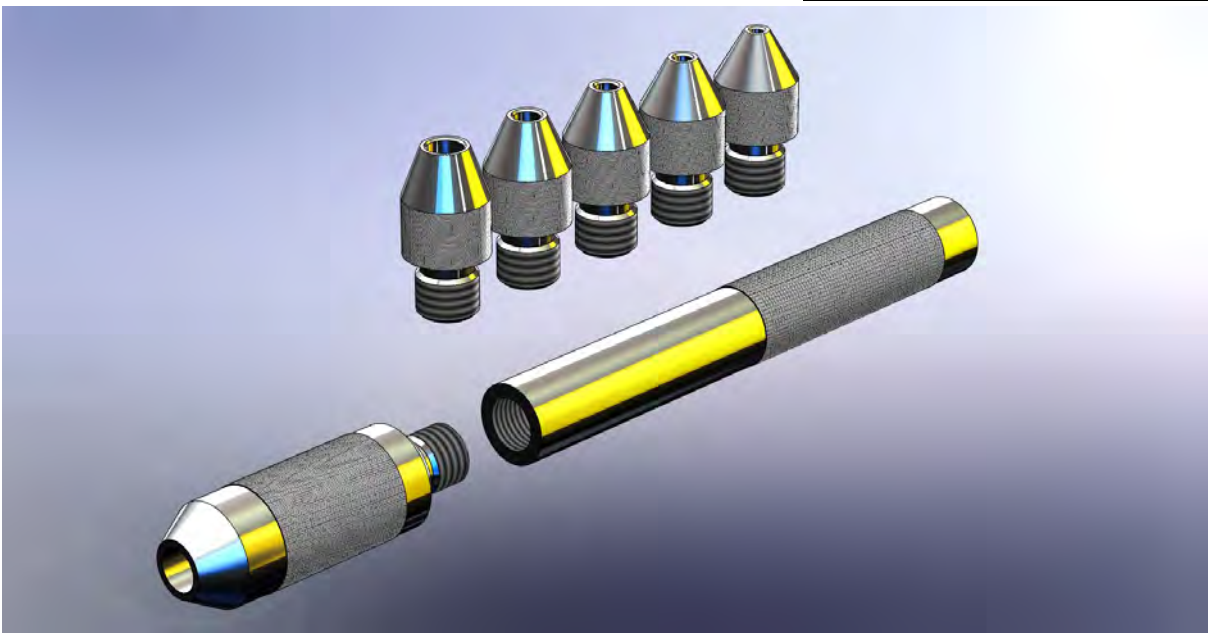
PLEASE NOTE. OTHER CHUCK SIZES ARE AVAILABLE.  
 PLEASE CHECK WITH US IF THE SIZE YOU WANT IS NOT LISTED HERE.

## ACCESSORIES - FERRULE GRIPS

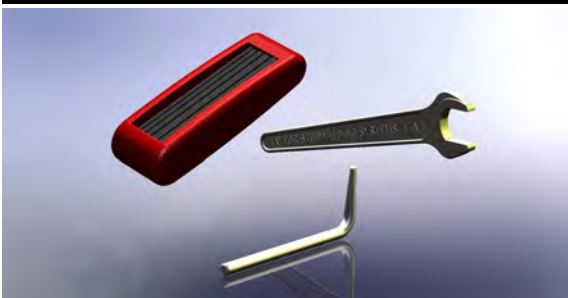


Ø	PART NUMBER
M3	89-101-051
M4	89-101-051
M5	89-101-052
M6	89-101-052
M8	89-101-053
M10	89-101-054
M12	89-101-055
M16	89-101-056
M20	89-101-057

## ACCESSORIES - BENDING BAR & TOOLS



TOOL	PART No.
KEY SET (2, 2.5, 3, 4, 5, 6, 8)	98-100-003
UK CHUCK EJECTOR TOOL (TWIST DRIFT)	98-100-001
17mm A/F CHUCK SPANNER	98-100-006



ITEM	PART NUMBER
BENDING BAR	79-101-121
M3 NOZZLE	79-101-123
M4 NOZZLE	79-101-124
M5 NOZZLE	79-101-125
M6 NOZZLE	79-101-126
M8 NOZZLE	79-101-127
M10 NOZZLE	79-101-128
COMPLETE SET	79-101-120

# EU DECLARATION OF CONFORMITY



Responsible Party Name : Taylor Studwelding Systems Ltd  
Address : Commercial Road  
Dewsbury  
West Yorkshire  
WF13 2BD  
UK

Designation of Product: Studwelding gun series DA1-A, DA2-A & DA3-A

The above mentioned equipment complies with the requirements of the following directives :

<b>93/68/EEC</b>	<b>The CE Marking Directive</b>
<b>2014/35/EU</b>	<b>The Low Voltage Directive</b>
<b>2014/30/EU</b>	<b>The Electromagnetic Compatibility Directive</b>

The above mentioned products conform to the following European standards :

<b>EN 60974-1:2012</b>	<b>ARC WELDING EQUIPMENT - PART 1 : WELDING POWER SOURCES</b>
<b>EN 60974-10:2014</b>	<b>ARC WELDING EQUIPMENT - PART 10 : ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS</b>

I hereby declare that the above mentioned equipment has been designed to comply with the relevant sections of the above referenced standards. The equipment complies with all applicable essential requirements of the above mentioned directives.

Signed.

David Taylor  
Managing Director

Authorised European Representative : **J D PEARMAN**  
**GLENN MILLERWEG 36**  
**1311 RT ALMERE**  
**NETHERLANDS**

