

MANUAL

DT1000 DT 1200 DT1600



DA2



DA8

INTRODUCTION

The Dabotek Studwelding System DT1000, DT1300 & DT1600 form a compact drawn arc stud welding system that is intended for precision stud welding up to 16mm diameter with the DT1000, 19mm diameter with the DT1300 and 20mm diameter with the DT1600. The system is easily transportable and has been designed to operate with a minimum amount of maintenance.

The pistol is modern, ergonomically designed and offers maximum comfort in handling with minimum operator fatigue.

The complete system consists of a control unit, a welding pistol and the necessary interconnecting cables and accessories.

THE PROCESS.

The Drawn Arc process is a long established, well proven method of stud welding. The pistol lifts the stud to be welded away from the workpiece, simultaneously striking an arc between the two. This causes both the stud and the workpiece to melt. After the pre-selected weld time has elapsed, the pistol returns the stud to the molten pool on the workpiece, thus forming the weld. The energy required to perform the weld is derived from a transformer - rectifier in the control unit.

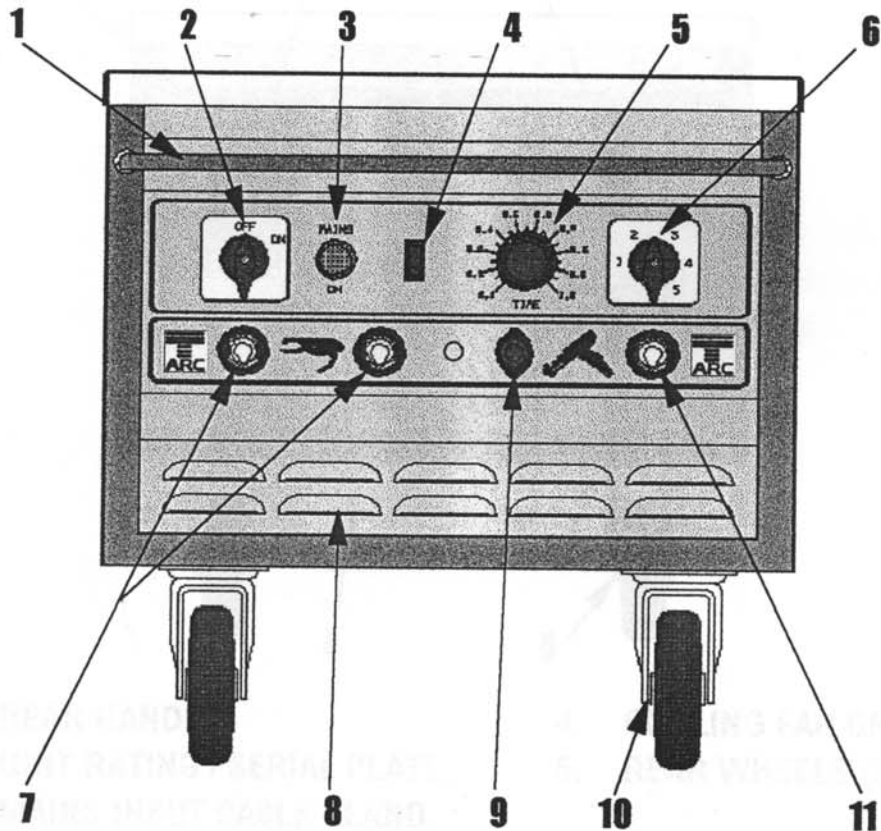
Infinitely variable weld time allows for both short cycle and conventional drawn arc methods to be used, with either a plain nose cone or a traditional ceramic ferrule arrangement. The equipment is offered with four pistol variations to suit individual customer needs.

EQUIPMENT SCHEDULE

1. SYSTEM 1000DA, 1300DA OR 1600DA COMPACT CONTROL UNIT.
2. PISTOL ASSEMBLY, COMPRISING :-
 - a. THE PISTOL.
 - b. ONE SET OF ADJUSTABLE LEGS.
 - c. ONE SET OF ADJUSTABLE LEG WASHERS AND SCREWS.
3. EARTH CABLE , COMPRISING :-
 - a. TWO OFF, 5m CABLE ASSEMBLY.
 - b. TWO OFF, LARGE SELF-GRIP CLAMP.
4. TOOLS, COMPRISING :-
 - a. ONE OFF METRIC ALLEN KEY SET.
 - b. ONE OFF, 15mm SPANNER.
 - c. ONE OFF, CHUCK EJECTOR TOOL.
5. EQUIPMENT OPERATING MANUAL.
6. ACCESSORIES PROVIDED :-
 - a. TWO OFF, STANDARD CHUCKS.
 - b. TWO OFF STANDARD FERRULE GRIPS.
7. ACCESSORIES - OPTIONAL EXTRAS :-
 - a. STANDARD CHUCKS, RANGE 3mm TO 20mm.
 - b. STANDARD FERRULE GRIPS, RANGE 3mm TO 20mm.
8. CABLES - OPTIONAL EXTRAS :-
 - a. 5m PISTOL EXTENSION CABLES.
 - b. 5m EARTH EXTENSION CABLES.

EXTERIOR FEATURES

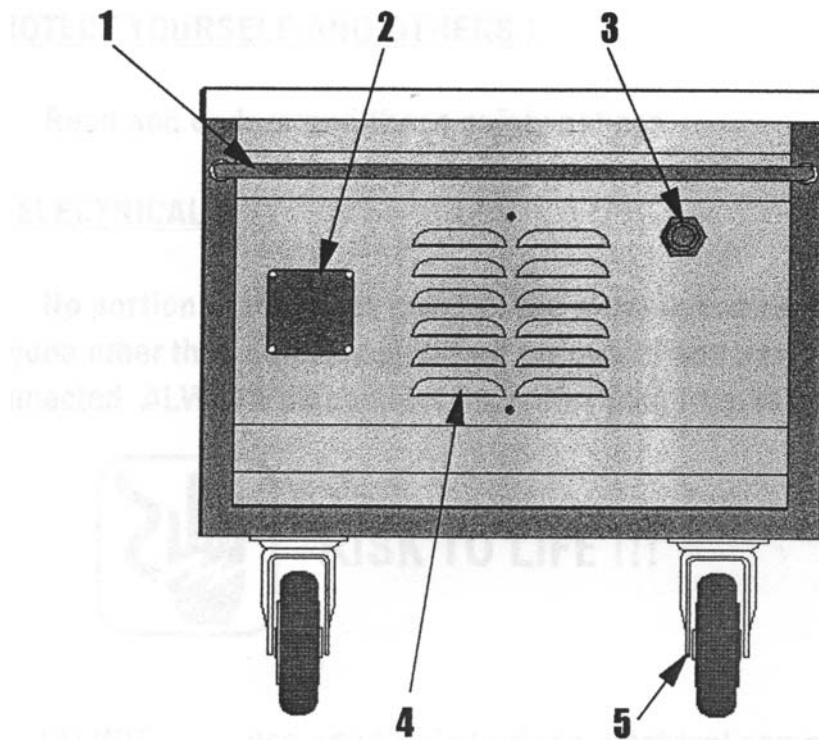
FRONT PANEL



- | | |
|---------------------------------|---|
| 1. FRONT HANDLE. | 7. WELDING EARTH SOCKETS. |
| 2. MAINS ON / OFF ISOLATOR. | 8. AIRFLOW VENTS. |
| 3. MAINS "ON" INDICATOR. | 9. WELDING PISTOL CONTROL SOCKET. |
| 4. GAS PURGE SWITCH (OPTIONAL). | 10. FRONT WHEELS. (STEERABLE TYPE WITH INTEGRAL BRAKE). |
| 5. TIME SELECTOR KNOB. | |
| 6. CURRENT SELECTOR SWITCH. | 11. WELDING PISTOL SOCKET. |

EXTERIOR FEATURES

REAR PANEL



- | | |
|--------------------------------|------------------------------|
| 1. REAR HANDLE | 4. COOLING FAN GRILLE. |
| 2. UNIT RATING / SERIAL PLATE. | 5. REAR WHEELS (FIXED TYPE). |
| 3. MAINS INPUT CABLE GLAND. | |

IMPORTANT NOTES !



Due to the power requirements and Electromagnetic emissions produced during normal use, this machine must only be operated in an industrial environment.



This machine operates from a mains supply of 415V AC 50/60 Hz. It can be adjusted to operate from 380V or 220V AC supplies, but this operation must be performed by qualified electrical personnel only.



Never obstruct the side panel louvers or the cooling fan finger guard as this may cause the unit to overheat during operation.



Never remove any portion of the unit housing without first isolating the unit from the mains electrical supply.

SAFETY

PROTECT YOURSELF AND OTHERS !

Read and understand these safety notices.

1. ELECTRICAL

No portion of the outer cover of the welding controller should be removed by anyone other than suitably qualified personnel and never whilst mains power is connected. ALWAYS disconnect the mains plug from the socket.



RISK TO LIFE !!!

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 10 of this manual 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.

SAFETY

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 RISK TO LIFE 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.

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.

SAFETY

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 and these may interfere with other sensitive electronic equipment.

As previously mentioned, all personnel wearing heart pacemakers or other electronically controlled medical devices must be kept well away from any welding operations.

The welding equipment should be installed at least 5 metres away from any computer equipment to minimise any possible interaction. Note that cables carrying signals between electronic devices are also capable of picking up interference which may modify the way in which those devices function and therefore should be sited outside the 5 metre zone.

Do not place objects which are sensitive to magnetism near the welding area, wristwatches, credit cards, computer disks etc. will all be rendered useless.

The welding equipment, like all other welding equipment, is itself electronically sensitive and its position relative to other radiation emitting equipment (mobile phones, remote controls, motor speed controllers etc.) must be considered.

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. Non of the components used in the manufacture are toxic, carcinogenic or harmful to health.

SETTING UP AND WELDING

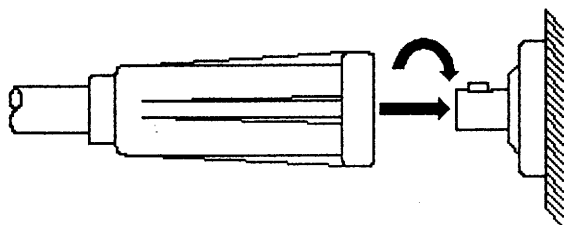
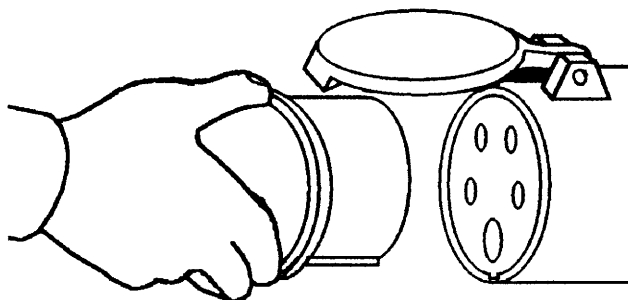


1. Set up the control unit at the place of work, ensuring that the mains switch is in the OFF position.

2. Plug the controller in to the three phase 415 V AC supply.

Note: It is possible to operate the controller on other voltages with a small internal adjustment.

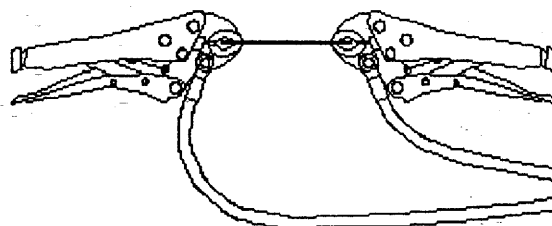
The voltages available are :-
3Ph AC - 220, & 380.



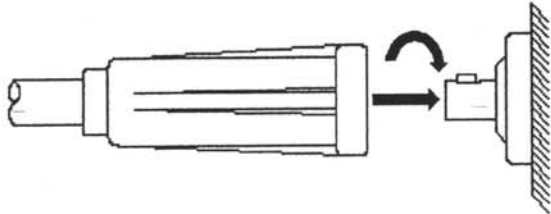
3. Plug the welding earth cable into the controller. Note that the cable end weld plug has a peg which mates with the key slot in the panel mounted socket.

IMPORTANT! Secure the connectors with a clockwise turn until they lock. Failure to do this may result in damage to the connectors during welding.

4. Attach the welding earth clamps to the workpiece at approximately 180° to each other, this will help prevent "arc-blow" when welding takes place. Prior to fitting the clamps, ensure that the contact area of the workpiece is free from rust, paint, grease etc., as this will result in a poor welding connection.



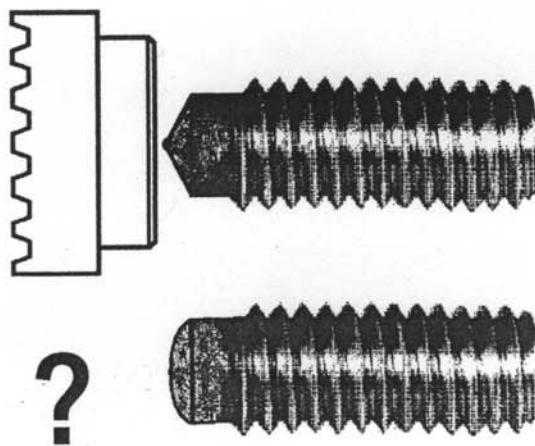
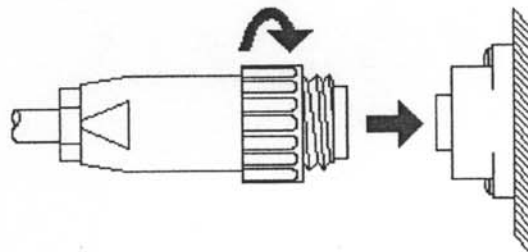
SETTING UP AND WELDING



5. Plug the welding pistol cable into the controller. Note that the cable end weld plug has a peg which mates with the key slot in the panel mounted socket.

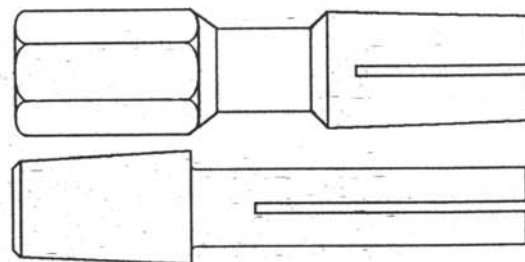
IMPORTANT! Secure the connectors with a clockwise turn until they lock. Failure to do this may result in damage to the connectors during welding.

6. Plug the pistol control cable into the controller. Note that the cable end plug and panel mounting socket are keyed to prevent incorrect fitting. Push the plug firmly home and twist the locking ring to secure the plug in position.

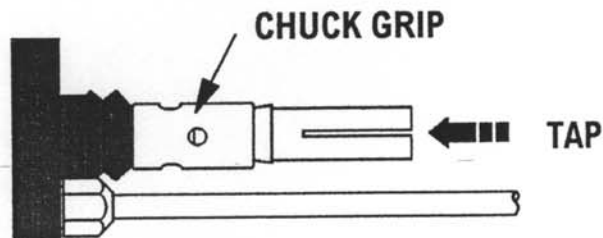


7. Select the required weldstud, on the basis of process, diameter, length and material.

8. Select the required Drawn Arc chuck for the chosen weldstud. Note that the pistol will accept European screw-on chucks as well as the standard English mores taper types.



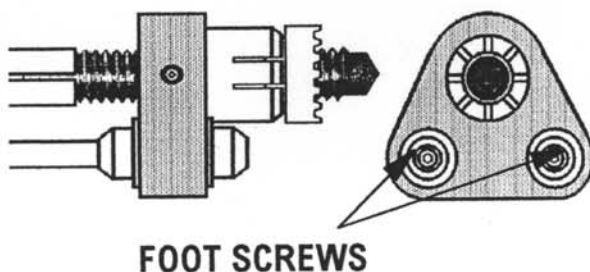
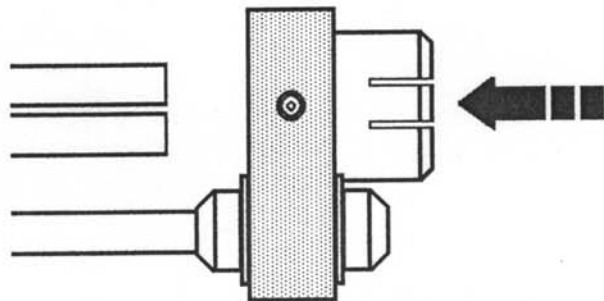
SETTING UP AND WELDING



9. Having selected the desired Drawn Arc chuck, insert it into the chuck grip of the pistol. Secure in place by lightly tapping home into the taper.

Note: When using screw on type chucks, you must first remove the chuck grip by unscrewing.

10. Select the correct size ferrule grip, and insert it into the foot adapter. Tighten the two grub screws to secure the ferrule grip firmly in place.

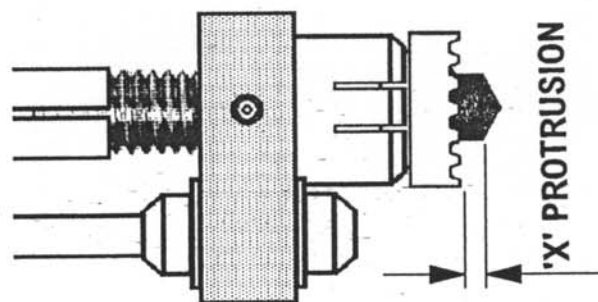


11. Insert the selected Drawn Arc stud into the appropriate ferrule into the grip. Centre the foot adapter by loosening the two foot screws and moving the foot adapter until the foot is centred in the ferrule.

NOTE! Improper welds will result if there is any binding between the stud and ferrule.

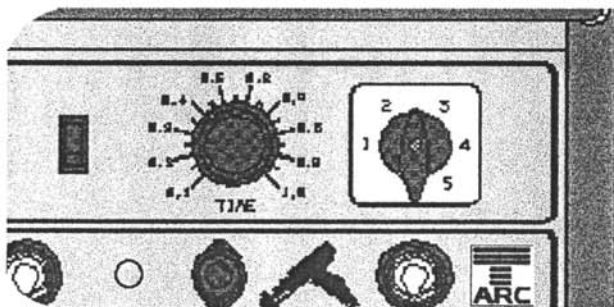
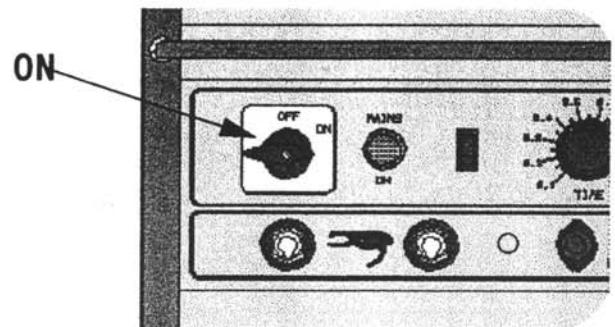
12. Set the desired protrusion by loosening the leg locking nuts and sliding the leg assembly until dimension 'X' is as shown on pages 16 to 18 for the specified stud size. Re-tighten the leg locking nuts so that the assembly cannot move.

NOTE! It is necessary to reset the protrusion when changing stud lengths / diameters.



SETTING UP AND WELDING

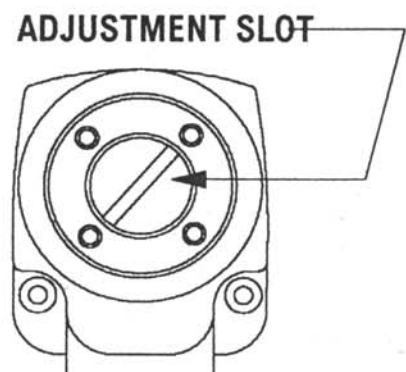
13. Switch the controller ON by turning the mains switch clockwise through 90°. The red indicator marked MAINS ON will light.



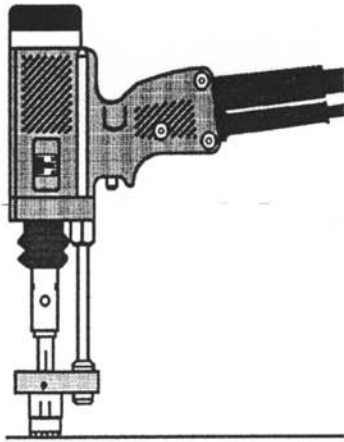
14. Selection of the required welding settings is made by selecting the appropriate settings on the time range knob and the current setting switch. For a guide to settings see pages 10 to 13.

15. If necessary, adjust the pistol lift. This is achieved by removing the rear end cap. Underneath the end cap is a click-stop adjuster, with a slot for coin adjustment. To increase pistol lift turn the adjuster anti-clockwise, each click of the adjuster represents an increase of 0.25mm. Reduction of lift is achieved by turning the adjuster clockwise.

To determine the amount of lift set on the pistol :- Set the time range to one second, then pull the trigger with the pistol away from the workpiece and measure the lift.



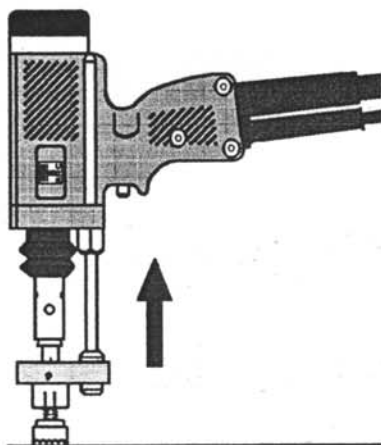
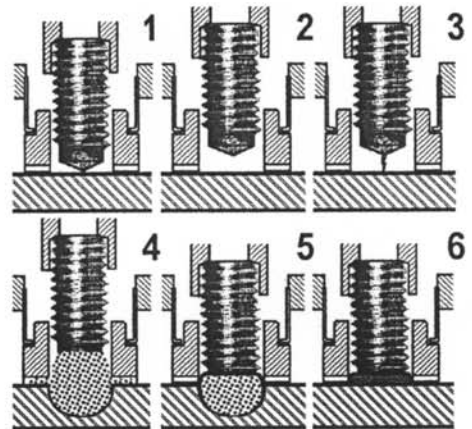
SETTING UP AND WELDING



16. Place the pistol perpendicular to the workpiece with the stud touching down at the desired location to be welded. Press down on the pistol until the ceramic ferrule rests firmly on the workpiece. Press the trigger to initiate the weld sequence.

17. The welding process is as follows

1. Start.
2. Pistol lifts stud.
3. Pilot Arc strikes.
4. Main Arc strikes melting both stud and workpiece.
5. Arc stops. Pistol plunges stud into molten pool.
6. Weld complete.



18. Having welded the stud, draw the pistol vertically off the stud. Failure to do this may cause the split tines of the chuck to splay out. This will result in the chuck and stud arcing together during subsequent welds.

19. Finally, remove the ferrule by lightly tapping until it shatters. Visually inspect the weld. For a guide to the inspection of the welded stud see page 19.



WELD SETTINGS

NOTES :-

The following pages (No's 16 to 18) detail the suggested settings for the DT1000, DT1300 & DT1600 systems.

The settings are given only as a general guide and it is recommended that sample welds be carried out on your own material, as quality of materials and site conditions may vary from user to user.

The setting charts were established with the performance of repetitive weld tests using the above controllers and a DA2 and DA6 ring lift pistols .

The drawn arc studs were welded with ceramic ferrules and reduced base or full base as appropriate.

Note : RB = reduced base, FB = full base.

Note : When measuring stud protrusion, do not include the cone on the end of the stud (see step 12, page 12).

WELD SETTINGS SYSTEM DT1000

STUD TYPE	STUD SIZE	POWER SETTING	PROTRUSION (mm)	LIFT (mm)	TIME
FB	M3	1	2.5	1.5	0.1
FB	M4	1	2.5	1.5	0.15
RB	M5	1	2.5	1.5	0.2
FB	M5	1	2.5	1.5	0.25
RB	M6	1	2.5	1.5	0.25
FB	M6	2	2.5	1.5	0.2
RB	M8	2	3.0	1.5	0.3
FB	M8	3	3.0	1.5	0.25
RB	M10	3	4.0	1.5	0.4
FB	M10	4	4.0	1.5	0.3
RB	M12	4	4.5	1.5	0.45
FB	M12	5	4.5	1.5	0.4
RB	M16	5	5	1.5	0.55

WELD SETTINGS SYSTEM DT1300

STUD TYPE	STUD SIZE	POWER SETTING	PROTRUSION (mm)	LIFT (mm)	TIME
FB	M3	1	2.5	1.5	0.1
FB	M4	1	2.5	1.5	0.15
RB	M5	1	2.5	1.5	0.2
FB	M5	1	2.5	1.5	0.2
RB	M6	1	2.5	1.5	0.25
FB	M6	1	2.5	1.5	0.3
RB	M8	2	3.0	1.5	0.2
FB	M8	2	3.0	1.5	0.25
RB	M10	2	4.0	1.5	0.3
FB	M10	3	4.0	1.5	0.15
RB	M12	3	4.5	1.5	0.2
FB	M12	3	4.5	1.5	0.25
RB	M16	4	5	1.5	0.45
FB	M16	5	5	1.5	0.5

WELD SETTINGS SYSTEM DT1600

STUD TYPE	STUD SIZE	POWER SETTING	PROTRUSION (mm)	LIFT (mm)	TIME
RB	M6	1	2.5	1.5	0.15
FB	M6	1	2.5	1.5	0.15
RB	M8	1	3	1.5	0.2
FB	M8	1	3	1.5	0.25
RB	M10	2	4	1.5	0.2
FB	M10	2	4	1.5	0.3
RB	M12	3	4.5	1.5	0.25
FB	M12	3	4.5	1.5	0.3
RB	M16	4	5	1.5	0.35
FB	M16	4	5	1.5	0.45
RB	M20	5	5	1.5	0.4
FB	M20	5	5	1.5	0.5

VISUAL INSPECTION OF WELDS

The following four pages will help you to recognise a poor weld when you see one and give some of the possible explanations as to how it may have occurred. Your test welds should look like the first example diagram in the series and when you transfer to the actual job, periodic checks should be made to ensure that your welding is consistently good.

POINTS TO LOOK FOR IRRESPECTIVE OF PROCESS USED.

1. L.A.W. (Length After Welding). This should be correct to within $+ 0 / - 1$ mm.
2. The base fillet of the welded stud is complete.
3. The welded stud is perpendicular to the workpiece.

1. WHEN USING A CERAMIC FERRULE.

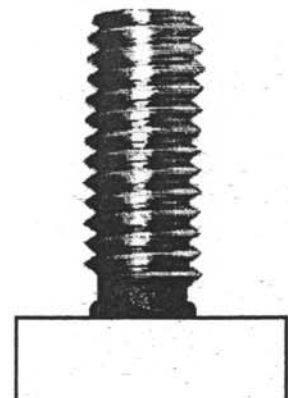
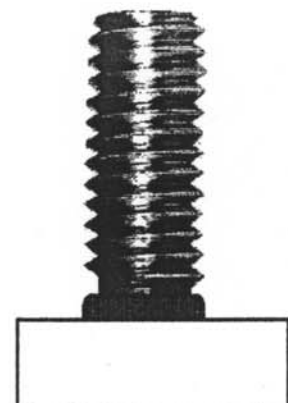
This diagram is an example of a good normal weld, fulfilling the criteria above i.e. the L.A.W. is correct, the stud has a complete, well formed and even fillet and is also perpendicular to the workpiece.

The following examples will help you to recognise the most common types of poor weld, explain the possible causes of these problems and how to remedy them.

EXAMPLE 1 :

PROBLEM : Insufficient heat, causing the L.A.W. to be too long and the fillet to be underdeveloped and / or incomplete.

REMEDY : Increase the welding time (see step 14 of the procedure on page 13).



VISUAL INSPECTION OF WELDS

EXAMPLE 2 :

PROBLEM : Excessive heat, causing the L.A.W. to be too short and the fillet to be too large and messy, spreading out under the ferrule and / or splashing up the threads.

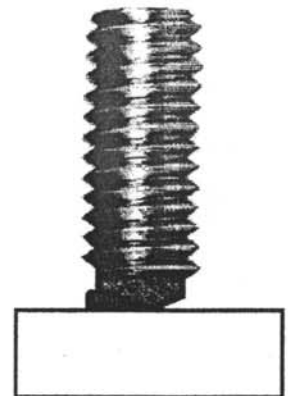
REMEDY : Reduce the welding time (see step 14 of the procedure on page 13).



EXAMPLE 3 :

PROBLEM : The ferrule is not being held firmly against the workpiece and / or the stud is binding against the ferrule.

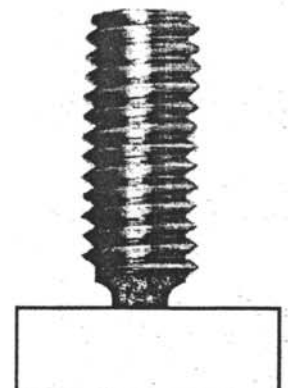
REMEDY : Hold the pistol firmly down to the workpiece (see step 16 of the procedure on page 14). and reset the alignment of the stud and ferrule (see step 11 of the procedure on page 12).



EXAMPLE 4 :

PROBLEM : Insufficient stud protrusion set on the pistol.

REMEDY : Adjust stud protrusion to correct setting (see step 12 of the procedure on page 12).



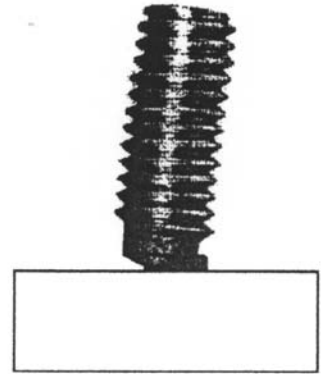
VISUAL INSPECTION OF WELDS

EXAMPLE 5 :

PROBLEM : Poor alignment i.e. stud is not perpendicular to the workpiece.

REMEDY : Hold the pistol perpendicular to the workpiece (see step 16 of the procedure on page 14).

NOTE : If the misalignment is only slight and in all other aspects the weld is good, then the weld may be salvaged by tapping straight with a soft mallet.



TESTING OF WELDS

There are two factors which should receive special attention in establishing visually whether or not a stud weld is sound. These are :

1. The length after weld (L.A.W.) of the stud should be correct. That is to say that a stud which is intended to be 50mm long after welding, should be correct within +0/-1mm.

A word of explanation is perhaps needed on this point. All studs produced include a "weld allowance". This allowance is so arranged for the different diameters of stud, that it will be completely melted during the welding process, provided of course that the correct conditions have been established and the correct values of current and time are used.

2. The fillet of metal formed around the base of the stud should be well formed, reasonably evenly distributed, completely free from blow holes and of a silver blue colour.

These two factors combined form the basis of all visual stud weld examination. It should be the aim of every operator to produce these results.

Under normal conditions a stud welded to clean mild steel plate of adequate thickness having the correct L.A.W. and fillet formation. as described above, will be a satisfactory weld.

It should be remembered, however, that different applications or conditions will produce slightly different visual results, particularly in the appearance of the fillet, i.e.. Slightly rusty, dirty or oily plate will produce blow holes in the fillet, in proportion to the degree of plate contamination.

Welding close to some magnetic obstruction may produce uneven fillet distribution. Too much power will produce a fillet that flows too easily and is lost either up in the threads of the stud or out through the ferrule vents, while too little power may not melt sufficient material to form a complete fillet.

It is important, therefore, to judge the degree to which these possible variations will affect the weld strength, but in general, provided that the L.A.W. is correct and the fillet formation is not unsightly, a visual examination is all that is required.

TESTING OF WELDS

Further testing may be carried out on a "percentage of production" basis, and the methods used fall into the classes outlined below.

1. DESTRUCTIVE TESTING.

Should only be used on studs welded to samples and test pieces.

a) Hammering a stud over may look spectacular, but it is not a satisfactory test, as the direction and force behind the blows is uncontrolled, as also is the point at which the impact takes place. The length, diameter and type of stud also have an effect on the results obtained.

b) Bending the stud over by using a tube of approximately the same bore as the stud diameter. This method is preferred to hammering, but again no conclusive evidence as to the strength of the weld is obtained.

c) Loading the stud by the use of washers / spacer and a nut until the stud breaks. This method is much more conclusive and should show that the weld is in fact stronger than the stud. Use of a suitably calibrated torque wrench for this test will give an indication of the U.T.S. developed by the stud material under test.

2. NON DESTRUCTIVE TESTING.

Generally the most practical way of testing threaded stud welds, without destroying the stud, is with the use of proof tests. Again a torque wrench is particularly useful for this purpose.

A table of torque settings is available on request from your equipment supplier.

STUDWELDING TECHNIQUES

The operating instructions given previously in this manual, apply to the majority of general applications, where it is possible to use the pistol in the down hand position and with standard cable lengths. For many applications these conditions do not apply and the following notes will give some guidance as to the methods used to obtain satisfactory results for a variety of applications.

1. WELDING TO A PLATE IN THE VERTICAL POSITION.

In this position there is a tendency for the weld metal to run to the underside of the stud during welding, due to the action of gravity, resulting in an uneven fillet. The effect is more noticeable as stud diameter increases and generally speaking it is not recommended that studs of 10mm diameter and over be welded to vertical plates for this reason. The essential requirement to obtain satisfactory fillet formation is to use the shortest weld time possible. Welding to a vertical surface reduces the maximum size of the stud a given power source will weld.

It must be remembered, that greater care is required to ensure that the stud is perpendicular to the workpiece. A special tripod foot attachment can be supplied if required. Take particular care to keep the ferrule grip, foot adapter and chuck clean.

2. WELDING TO A PLATE IN THE OVERHEAD POSITION.

IMPORTANT ! You must protect your face and shoulders with a helmet and cape before carrying out overhead welding operations. Weld spatter can do a lot of damage !

Firstly, obtain satisfactory weld settings in the down hand position before making attempts in the overhead position. Since the weld metal is transferred from stud to plate in small particles in the down hand position, it follows that, when welding overhead, the transfer takes place against gravity. As with vertical welding the best results will be achieved using the shortest possible weld time.

It is most important that the ferrule grip, foot adapter and chuck are kept clean to prevent shorts caused by weld spatter falling back onto them.

3. PISTOL ADJUSTMENTS WHEN WELDING IN THE VERTICAL OR OVERHEAD POSITIONS.

Problems may be encountered when welding in the vertical or overhead positions with a damped pistol.

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The operating instructions given previously in this manual, apply to the majority of general applications, where it is possible to use the pistol in the down hand position and with standard cable lengths. For many applications these conditions do not apply and the following notes will give some guidance as to the methods used to obtain satisfactory results for a variety of applications.

1. WELDING TO A PLATE IN THE VERTICAL POSITION.

In this position there is a tendency for the weld metal to run to the underside of the stud during welding, due to the action of gravity, resulting in an uneven fillet. The effect is more noticeable as stud diameter increases and generally speaking it is not recommended that studs of 10mm diameter and over be welded to vertical plates for this reason. The essential requirement to obtain satisfactory fillet formation is to use the shortest weld time possible. Welding to a vertical surface reduces the maximum size of the stud a given power source will weld.

It must be remembered, that greater care is required to ensure that the stud is perpendicular to the workpiece. A special tripod foot attachment can be supplied if required. Take particular care to keep the ferrule grip, foot adapter and chuck clean.

2. WELDING TO A PLATE IN THE OVERHEAD POSITION.

IMPORTANT ! You must protect your face and shoulders with a helmet and cape before carrying out overhead welding operations. Weld spatter can do a lot of damage !

Firstly, obtain satisfactory weld settings in the down hand position before making attempts in the overhead position. Since the weld metal is transferred from stud to plate in small particles in the down hand position, it follows that, when welding overhead, the transfer takes place against gravity. As with vertical welding the best results will be achieved using the shortest possible weld time.

It is most important that the ferrule grip, foot adapter and chuck are kept clean to prevent shorts caused by weld spatter falling back onto them.

3. PISTOL ADJUSTMENTS WHEN WELDING IN THE VERTICAL OR OVERHEAD POSITIONS.

Problems may be encountered when welding in the vertical or overhead positions with a damped pistol.

STUDWELDING TECHNIQUES

... continued.

To prevent problems occurring the damping effect should be removed. Undo the damper locknut and unscrew the damper (item 25, page 28) until the shaft movement is not slowed down by the damper.

(The damper thread should extend approximately 2mm into the housing)
Re-tighten the damper locknut.

Welding can now continue as outlined in sections 1. and 2.

4. USING LONG CABLE LENGTHS.

Frequently the pistol must be used some distance from the nearest available mains supply, for instance on board ship, in power station and building construction, in workshops building large pre-fabricated structures etc. In these cases long lengths of welding cable are used and it must be realised at the outset that, the longer the cables the smaller the maximum diameter of stud which can be welded with a given power source.

To help get over this problem, if larger diameter studs are to be welded with long lengths of cable, either increase the welding cable conductor size or parallel cables together.

5. WELDING STUDS LESS THAN 25mm LONG USING FERRULES.

As we have seen previously, the stud is held in a recess in the chuck and must be long enough to allow us to set the correct protrusion. A standard chuck has a recess 12mm deep and ferrules vary in length up to 13.5mm high. Thus if a stud is much less than 25mm LAW we shall not be able to obtain the correct protrusion, i.e.. The chuck may hit the ferrule on the return stroke and prevent the stud returning to the plate correctly.

This problem may be overcome by using "shallow recess" chucks (the recess depth is only 6mm) or if the studs are required to be very short, by using a special type of stud known as a "break-off" type. These studs have an overall LAW of 30mm and are welded using a standard chuck and ferrule. The stud is "necked" at the required length from the welding end. After welding, the surplus portion of the stud is broken off with a pair of pliers. By these means, very short studs can easily be welded.

STUDWELDING TECHNIQUES

... continued

This may occur with any diameter of stainless steel stud if the lift of the handtool is not correct. Due to this tendency to transfer in large particles time settings should be kept as low as possible.

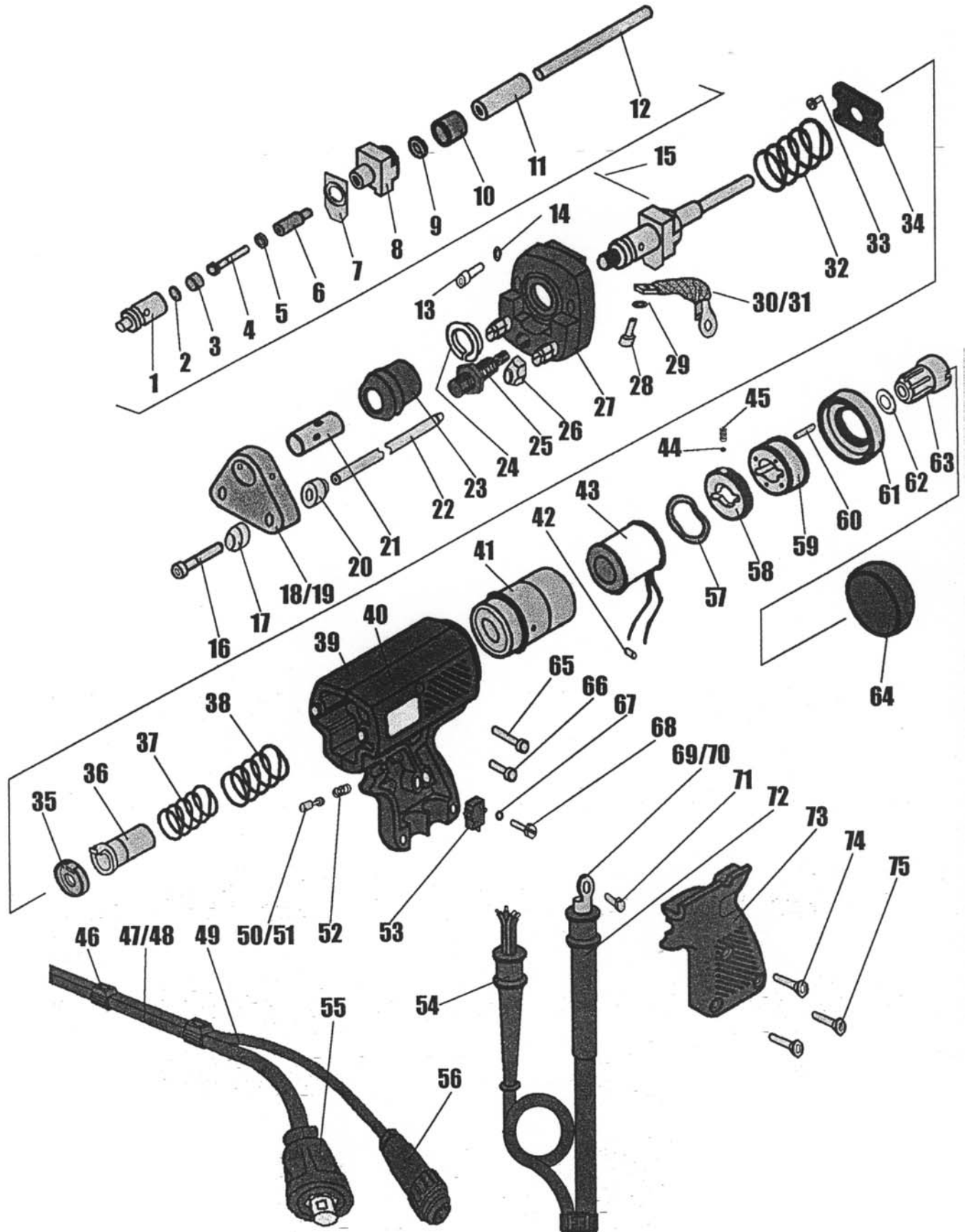
9. WELDING CLOSE TO CORNERS, FLANGES AND OTHER OBSTACLES.

When welding close to the edge of a plate, in / on a corner, on long strips of narrow plate etc., an effect known as "arc-blow" occasionally will produce an uneven fillet, in such a fillet, most of the material is blown to one side of the stud. "Arc-blow" is caused by the magnetic forces surrounding the arc being intensified in one direction, due to the presence of an air gap or the proximity of a large mass of magnetic material. It is dependant on a number of factors, size of stud, shape of component, position of earth connection, current density etc., and no hard and fast rules can be applied to correct it. The following methods are generally helpful, but if satisfactory results cannot be obtained, our field staff will be pleased to advise you.

Check that no other fault is present by welding a few studs on to a test piece and inspecting the fillet formation, before deciding that "arc-blow" is causing the uneven fillet.

"Arc-blow" can sometimes be corrected by placing a block of steel near the position of the weld area, on the opposite side to that at which the fillet has blown. When welding near the edge of a plate, the fillet will be blown towards the general mass of material, i.e.. away from the edge. The block in this case should therefore be placed at the edge the plate, touching it, thus providing a more evenly distributed magnetic field. The earth connection can be located immediately below the position of the stud weld, this latter is not always practicable, since it requires the earth connections to be moved frequently. The use of two earth connections, spaced evenly across the welding area, is also advisable.

DA1 & DA2 PISTOL EXPLOSION



DA1 & DA2 PISTOL PARTS LIST

ITEM	No. OFF	PART NUMBER	ITEM DESCRIPTION.
1	1	81-101-064	SHAFT ADAPTER
2	1	81-101-065	INSULATOR
3	1	81-101-066	INSULATOR
4	1	Z100-05-025	SHAFT SCREW
5	1	81-101-068	INSULATOR
6	1	81-101-069	INSULATOR
7	1	81-101-109	ACTUATOR PLATE
8	1	81-101-070	WELD SHAFT CONNECTOR BLOCK
9	1	81-101-071	INSULATOR
10	1	81-101-072	INSULATOR
11	1	81-101-073	LIFTING SLEEVE
12	1	81-101-106	WELDSHAFT GUIDE ROD
13	2	Z100-05-025	FRONT END CAP SCREW
14	2	Z615-05-000	SPRING WASHER
15	1	81-101-080	WELDSHAFT COMPLETE (ITEMS 1 TO 11)
16	2	Z105-05-035	FOOT ASSEMBLY SCREW
17	2	81-101-003	FOOT WASHER
18	1	81-101-002	FOOT ADAPTER (M3 TO M12)
19	1	81-101-063	FOOT ADAPTER M16 TO M20) DA2 ONLY
20	2	81-101-001	FOOT WASHER
21	1	81-101-005	TAPER CHUCK GRIP
22	2	81-101-004	STANDARD EXTENDED LEG
23	1	81-101-006	DUST PROTECTION BELLOWS
24	1	81-101-007	LOW FRICTION BEARING BUSH
25	1	81-101-107	DAMPER (DAMPED PISTOL)
25	1	81-101-108	BLANKING PLUG (UNDAMPED PISTOL)
26	2	81-101-077	LEG LOCKING NUT
27	1	81-101-010	FRONT END CAP ASSEMBLY
28	1	Z200-04-010	FLEXIBRAID FIXING SCREW
29	1	Z615-04-000	SPRING WASHER

DA1 & DA2 PISTOL PARTS LIST

ITEM	No. OFF	PART NUMBER	ITEM DESCRIPTION.
30	1	81-101-061	FLEXIBRAID (DA1 ONLY)
31	1	81-101-028	FLEXIBRAID (DA2 ONLY)
32	1	81-101-012	MAIN RETURN SPRING
33	4	Z220-04-008	RETAINING PLATE SCREW
34	1	81-101-014	RETAINING PLATE
35	1	81-101-015	LIFTING RING
36	1	81-101-252	LIFTING HOOK ASSEMBLY
37	1	81-101-017	LIFTING HOOK RETURN SPRING
38	1	81-101-018	LIFTING RING RETURN SPRING
39	1	81-101-023	R.H. PISTOL BODY MOULDING
40	1	81-101-024	L.H. PISTOL BODY MOULDING
41	1	81-101-103	SOLENOID COIL HOUSING
42	2	71-101-007	ANTI-ROTATION PIN
43	1	81-101-038	SOLENOID COIL
44	1	81-101-082	DETENT BALL
45	1	81-101-083	DETENT BALL RETURN SPRING
46	10	71-101-032	CABLE TIE CLIP
47	5M	71-300-003	WELD CABLE (DA1 ONLY)
48	5M	71-300-004	WELD CABLE (DA2 ONLY)
49	5M	71-300-009	CONTROL CABLE
50	1	81-101-089	TRIGGER PUSH BUTTON ACTUATOR
51	1	81-101-125	TRIGGER PUSH BUTTON
52	1	81-101-030	PUSH BUTTON RETURN SPRING
53	1	81-101-031	TRIGGER MICROSWITCH
54	1	81-101-051	WELD CABLE PLUG
55	1	81-101-054	CONTROL CABLE SLEEVE
56	1	81-101-030	CONTROL CABLE PLUG (4 PIN)
57	1	81-101-039	WAVE SPRING WASHER
58	1	81-101-043	DETENT MECHANISM HOUSING
59	1	81-101-104	COIL / DETENT LOCKING RING
60	4	Z410-05-020	LOCKING RING GRUB SCREW

DA1 & DA2 PISTOL PARTS LIST

ITEM	No. OFF	PART NUMBER	ITEM DESCRIPTION.
61	1	81-101-102	BODY CLAMPING RING
62	1	81-101-161	MAGNETIC RELEASE SHIM WASHER
63	1	81-101-105	LIFT ADJUSTMENT BACKSTOP
64	1	81-101-101	REAR END CAP
65	1	Z100-04-025	PISTOL BODY SCREW (TOP)
66	1	Z100-04-020	PISTOL BODY SCREW (BOTTOM)
67	2	Z600-25-000	PLAIN WASHER
68	2	Z200-25-015	MICROSWITCH FIXING SCREW
69	1	Z700-06-S38	RING TERMINAL (DA1 ONLY)
70	1	Z700-06-060	RING TERMINAL (DA2 ONLY)
71	1	81-101-057	WELD CABLE FIXING SCREW
72	1	81-101-044	WELD CABLE SLEEVE
73	1	81-101-045	PISTOL HANDLE GRIP
74	1	Z120-05-025	PISTOL GRIP FIXING SCREW (TOP)
75	2	Z120-05-020	PISTOL GRIP FIXING SCREW (BOTTOM)

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