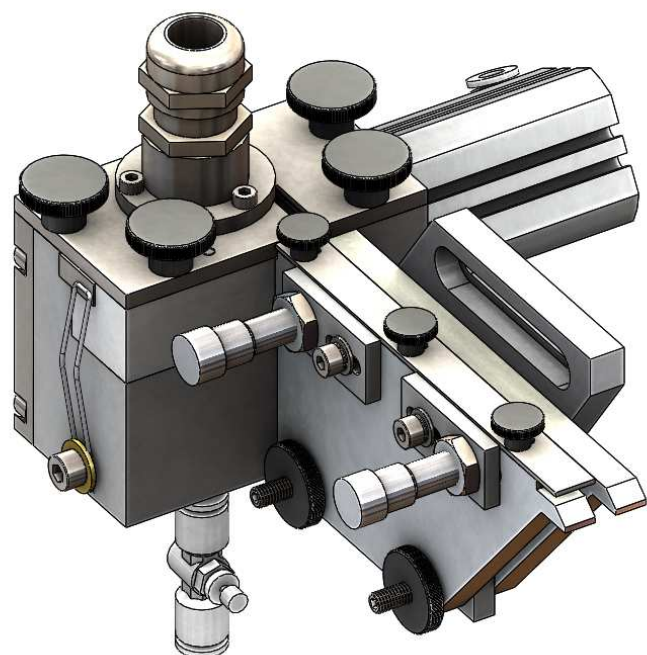
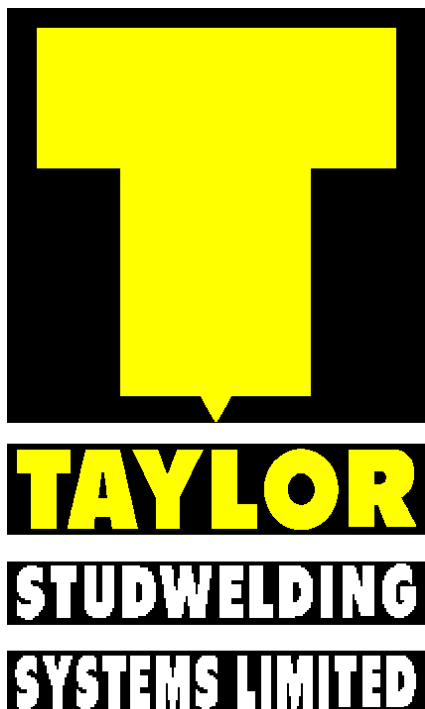


# TAYLOR STUDWELDING SYSTEMS LIMITED.

OPERATING MANUAL  
FOR  
BOWL FEEDER & ESCAPEMENT UNIT



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# **GENERAL INFORMATION**

## **MANUFACTURERS DETAILS**



**TAYLOR STUDWELDING SYSTEMS LIMITED  
COMMERCIAL ROAD  
DEWSBURY  
WEST YORKSHIRE  
WF13 2BD  
ENGLAND**

**TELEPHONE : +44 (0)1924 452123  
FACSIMILE : +44 (0)1924 430059  
e-mail : info@taylor-studwelding.com**




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

## **PURPOSE AND CONTENT OF THIS MANUAL**

**This manual has been written for :**

-  **The operator of the welding machine.**
-  **The personnel of the final customer responsible for the installation and operation of the machine.**

**This manual contains information on :**

-  **Installation and connection**
-  **Operation.**
-  **Technical data.**
-  **Spare parts.**
-  **Accessories.**

# **GENERAL INFORMATION**

## **FURTHER INFORMATION**

Should you require additional technical information, please contact us directly (details on page 3) or our local agent / distributor (details of agents etc. can be obtained from us).

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

If the equipment is sold / passed on, please hand over this manual to the new owner. Please immediately inform us of the name and address of the new owner, in case we need to contact him regarding the safety of the device.



***Please read this manual carefully before installation of the machine.***



***Please especially observe the safety instructions.***

# **INTRODUCTION**

## **INTRODUCTION**

The complete range of Taylor Studwelding Systems Capacitor Discharge and Drawn Arc units are compact, portable Stud Welding equipments. The units are specifically designed to enable a small diameter range of ferrous and non-ferrous weld studs to be welded to light gauge, self-finish or pre-coated materials, and in the case of CD with little or no reverse marking.

The equipment consists of an automatic feed escapement for use with an auto feed welding pistol or SIK2 weld.

Two different processes are available: Capacitor Discharge (CD) and Drawn Arc (DA), these are outlined below.

## **THE PROCESS (CD)**

Capacitor Discharge stud welding is a form of welding in which the energy required for the welding process is derived from a bank of charged capacitors. This stored energy is discharged across the gap between the two surfaces to be welded as they are propelled towards each other. The arc produced heats the two surfaces, melting a thin film of metal on each surface and the propelling force closes the gap between the two faces, thus forming a weld.

In contact welding the stud to be welded is forced by spring pressure on to the plate. At this point the arc gap between the two components is maintained by a small pip on the welding face of the stud. On initiation of the high current pulse from the capacitors, this pip vaporises and an arc is drawn between the workpiece and the stud. The heat from this arc melts the base of the stud and the area of the work piece directly beneath the stud, whilst the spring pressure from the pistol accelerates the stud towards the workpiece. Within 3 to 4 milliseconds the stud hits the workpiece and the arc is extinguished. The kinetic energy contained in the moving stud and the remaining spring pressure, forge the molten parts together to form a weld.

# **INTRODUCTION**

## **THE PROCESS (DA)**

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 weld control unit.

Infinitely variable weld time allows for short cycle welding, with or without inert gas purging.

# **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 !!!**

**BE AWARE !** The CD equipment may contain a sealed power supply module which operates on high frequency inverter principles. Due to the potentially fatal voltages in this module we do not recommend tampering with the module. It can be safely removed and replaced via our factory exchange system.

**BE AWARE !** Capacitors store electrical energy. Check for residual charge before carrying out any internal maintenance.

**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 pages 10 to 15 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.

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

# SETTING UP

## SETTING UP THE BOWL & ESCAPEMENT

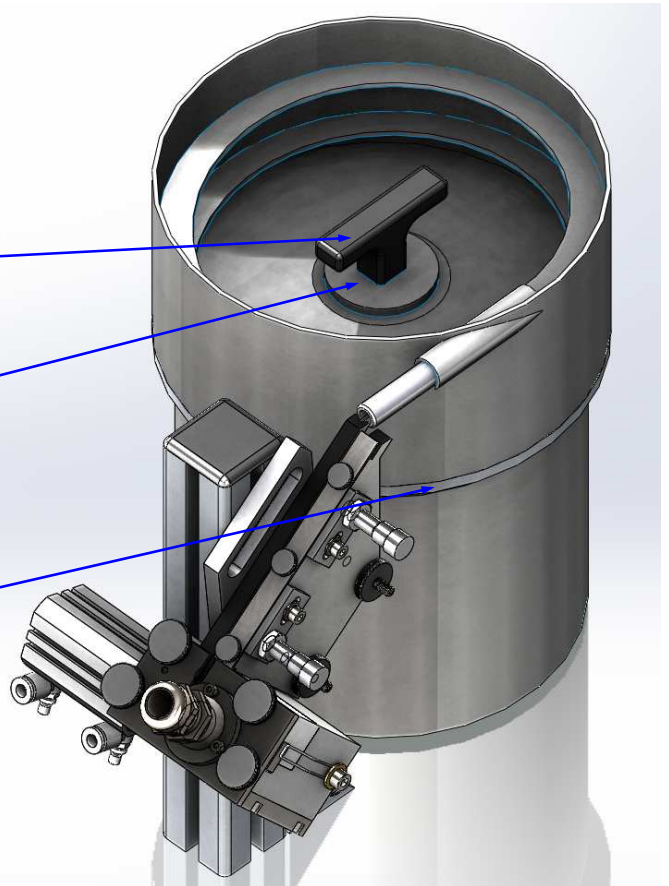
Setup the bowl feed & for the required stud diameter.

To change the bowl, undo the screw in the centre of the bowl, remove the bowl and replace with the correct one for the stud being used (see pages 25 to 30 for a list suitable bowls).

bowl mounting screw  
75-101-568

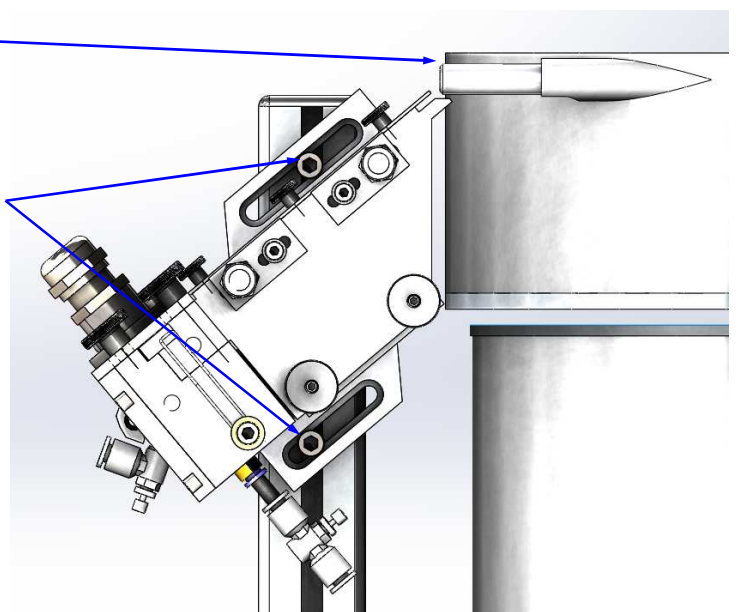
Anti-rotation washer  
71-103-151

Base plate  
71-103-040  
(not used with cast bowls)



Align the output tube of the bowl with the track of the escapement and re-tighten the central screw.

If necessary loosen these 2 screws to move the position of the escapement.

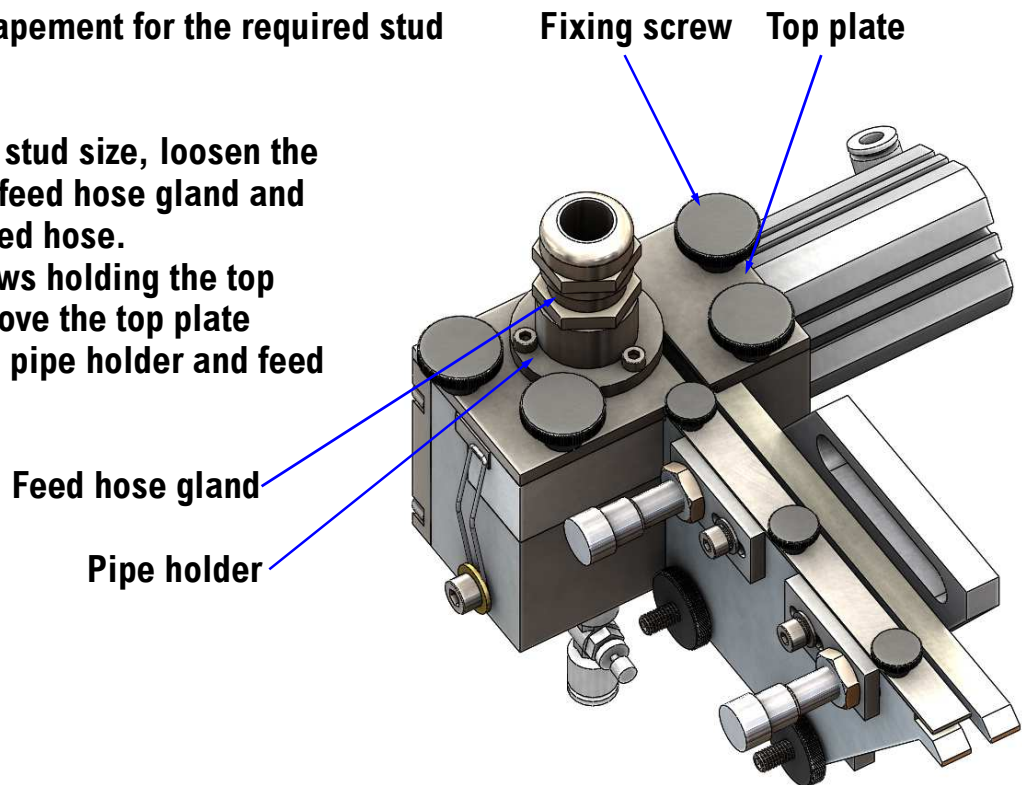


# SETTING UP

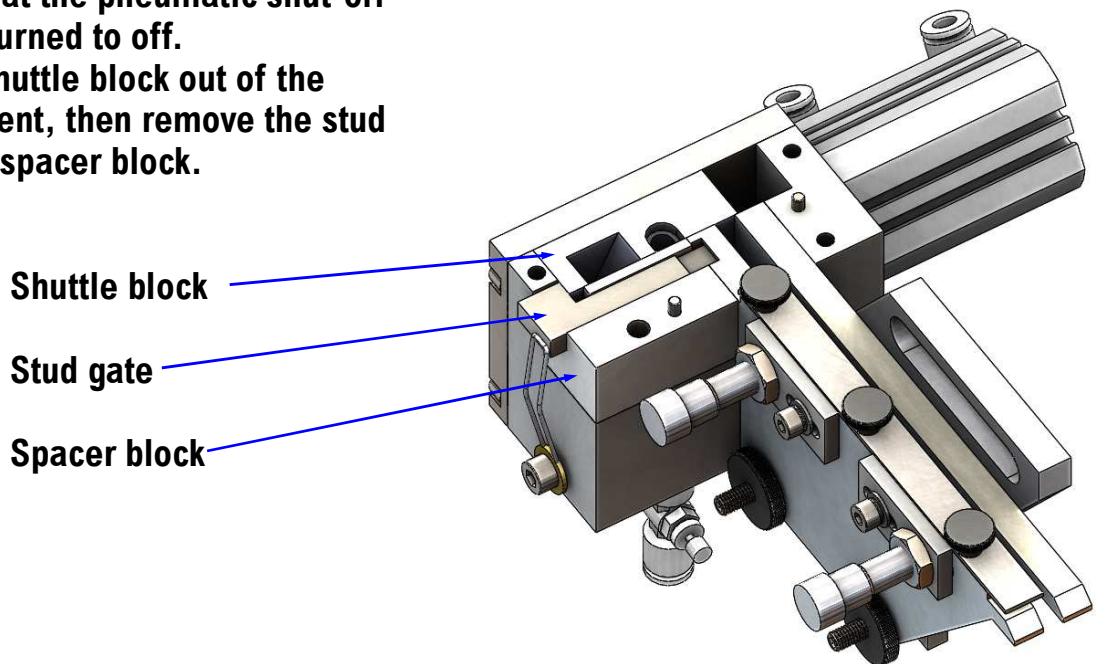
## SETTING UP THE BOWL & ESCAPEMENT

Setup the escapement for the required stud diameter.

To change the stud size, loosen the top nut of the feed hose gland and pull out the feed hose. Undo the screws holding the top plate and remove the top plate complete with pipe holder and feed hose gland.



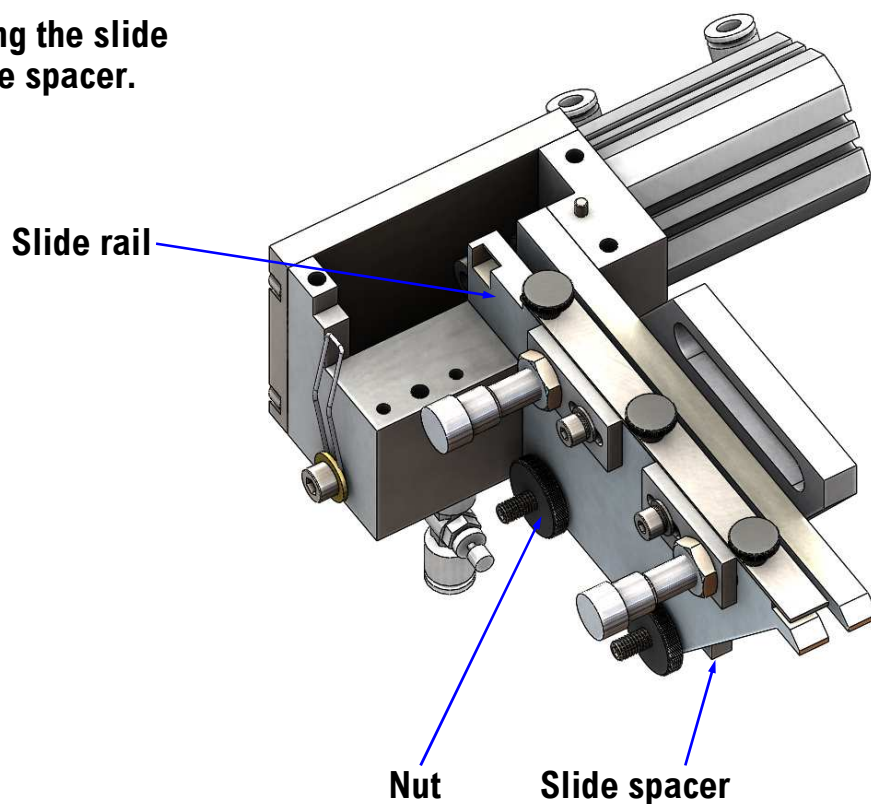
Ensure that the pneumatic shut-off valve is turned to off. Lift the shuttle block out of the Escapement, then remove the stud gate and spacer block.



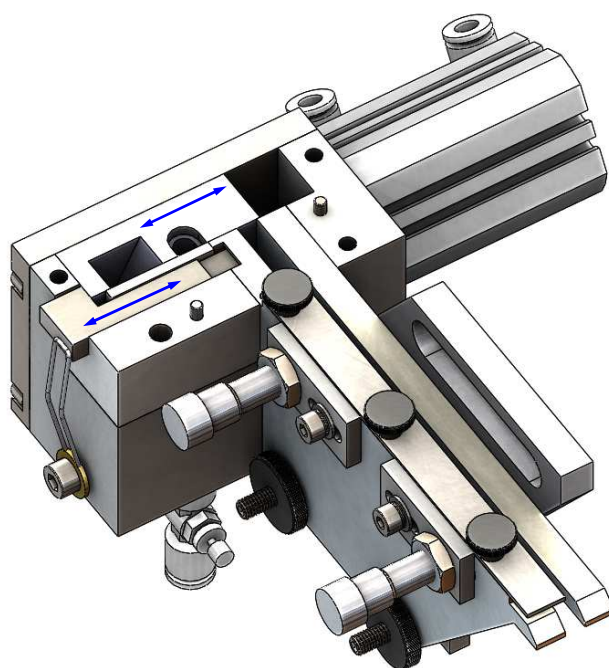
# SETTING UP

## SETTING UP THE BOWL & ESCAPEMENT

Loosen 2 the nuts holding the slide rail and remove the slide spacer.



Select the correct shuttle block, stud gate, spacer block and slide spacer for the studs being used and fit them to the escapement (see pages 23 & 24 for a list of parts). Retighten the slide rail holding nuts and make sure that the transfer block and gate are free to move.



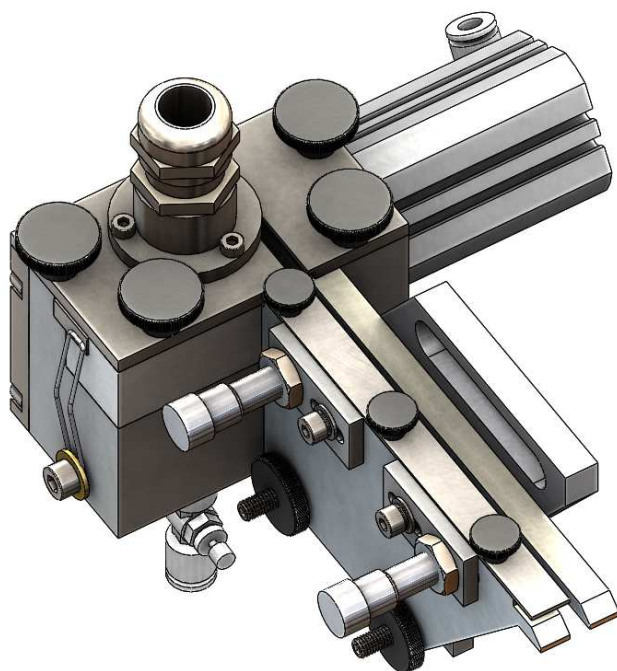
# SETTING UP

## SETTING UP THE BOWL & ESCAPEMENT

Select the correct pipe holder and top plate for the stud being used (see page 23), fit the pipe holder to the top plate and then the top plate to the escapement.

Screw the feed holder gland into the pipe holder.

Select the correct feed hose (see page 25) and push it in the gland and pipe holder, make sure it is pushed fully home and tighten the gland nut. This only needs to be hand tight.



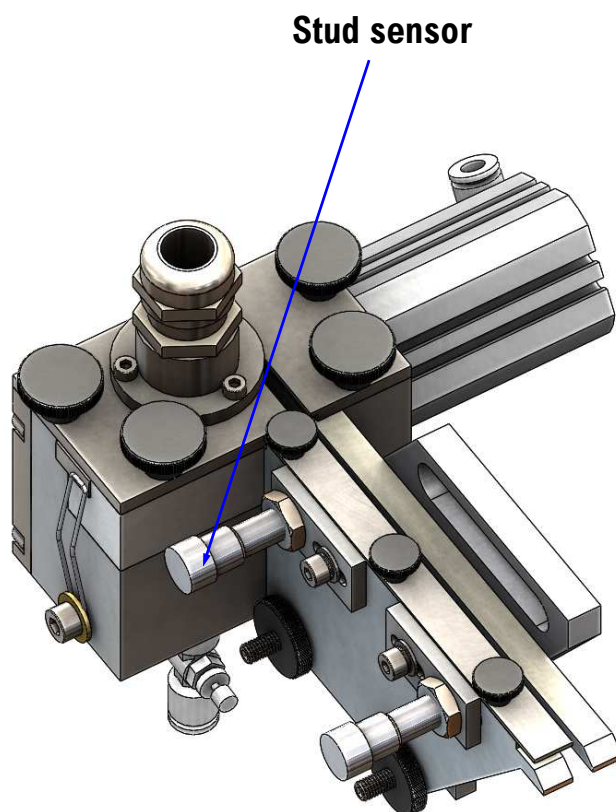
There are 2 stud sensors.

The top one turns the bowl feeder on and off depending on whether it is covered or uncovered.

If the bottom sensor is uncovered it stops the system from welding.

Screw the stud sensors into the slide bar so that the inner faces of the sensor and slide bar are flush, use the lock nut to hold them in place.

Adjust the sensor position horizontally depending on stud size to make sure it turns on when the track is full.

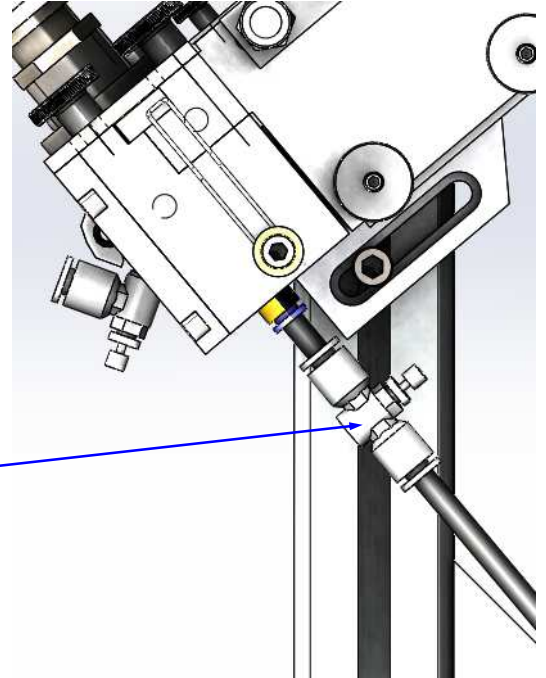


# SETTING UP

## SETTING UP THE BOWL & ESCAPEMENT

If necessary adjust the stud air flow. If the air flow is too slow the feed piston in the pistol may have returned to its rest position before the stud arrives in the weld head, or the stud may never reach the weld head.

Screw the adjuster in to reduce the flow and out to increase it.



Air flow adjuster

Adjust the vibration speed to match the feed rate of the bowl and the weld rate of the weld head. This may need to be adjusted as the quantity of studs in the bowl varies, i.e. as the quantity of studs falls, the vibration speed may need to be increased.



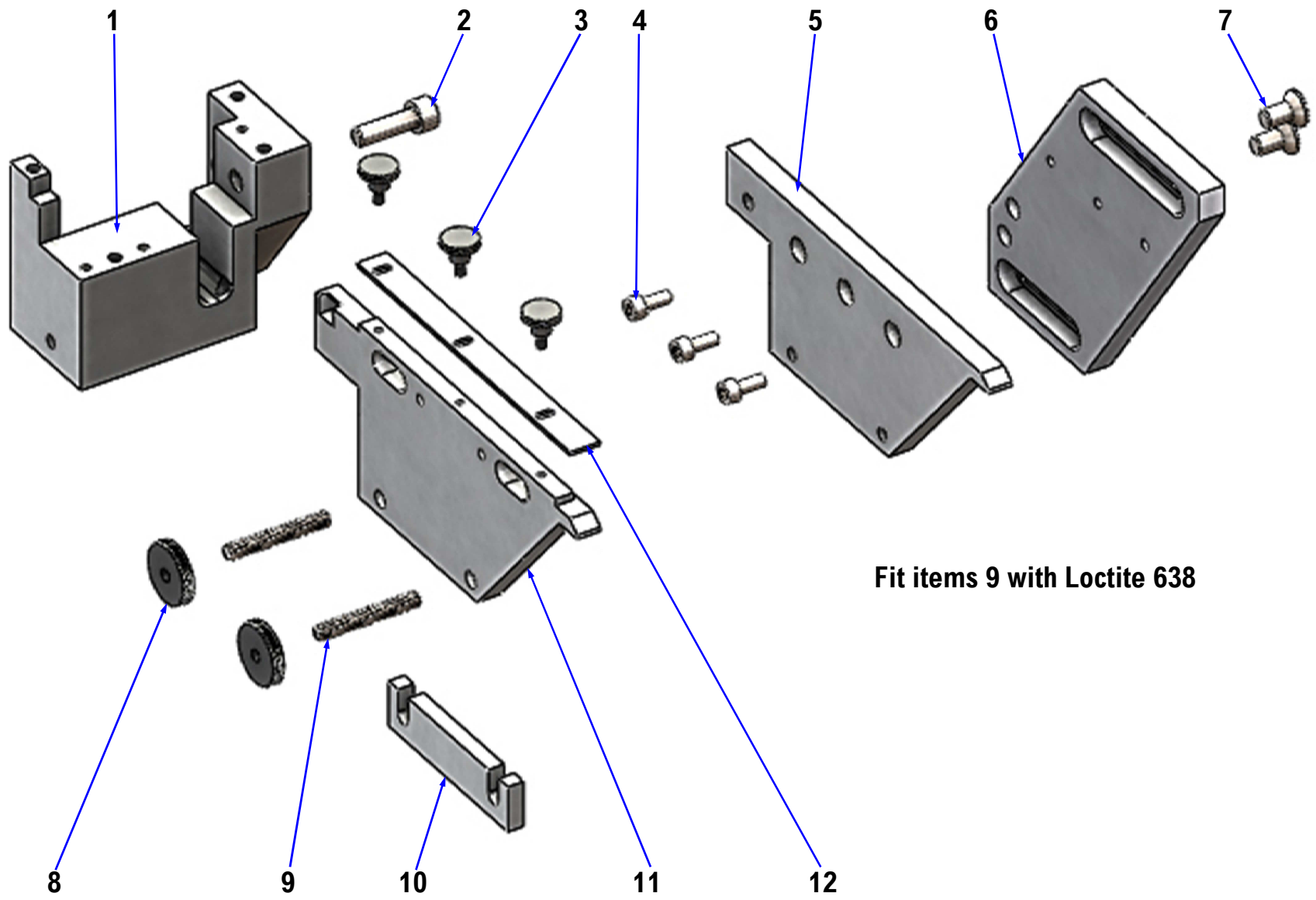
# SETTING UP

## SETTING UP THE WELD CONTROLLER

Set up the capacitor discharge or drawn arc weld controller as shown in the manual appropriate for that piece of equipment.



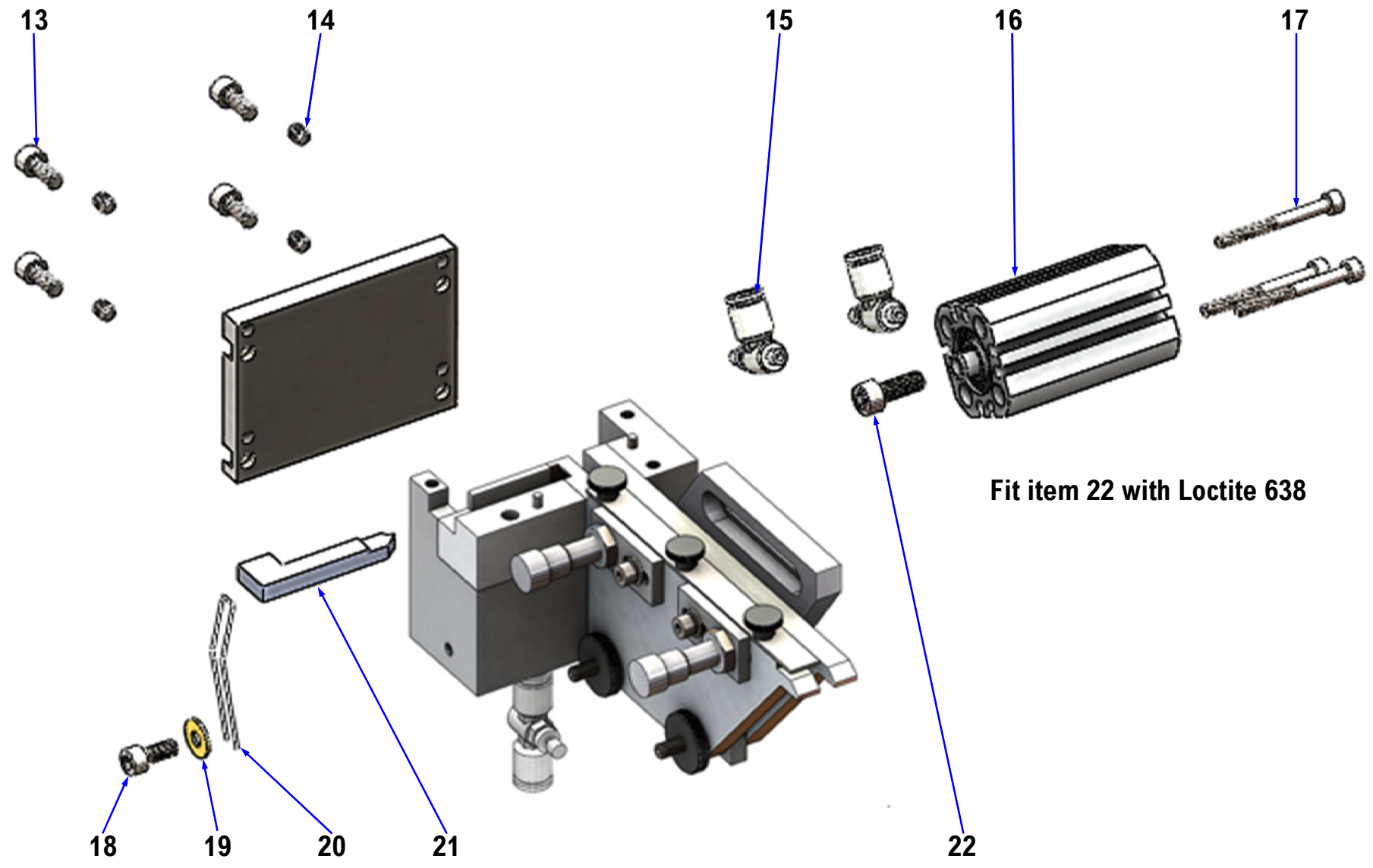
# ESCAPEMENT COMPONENT EXPLOSION



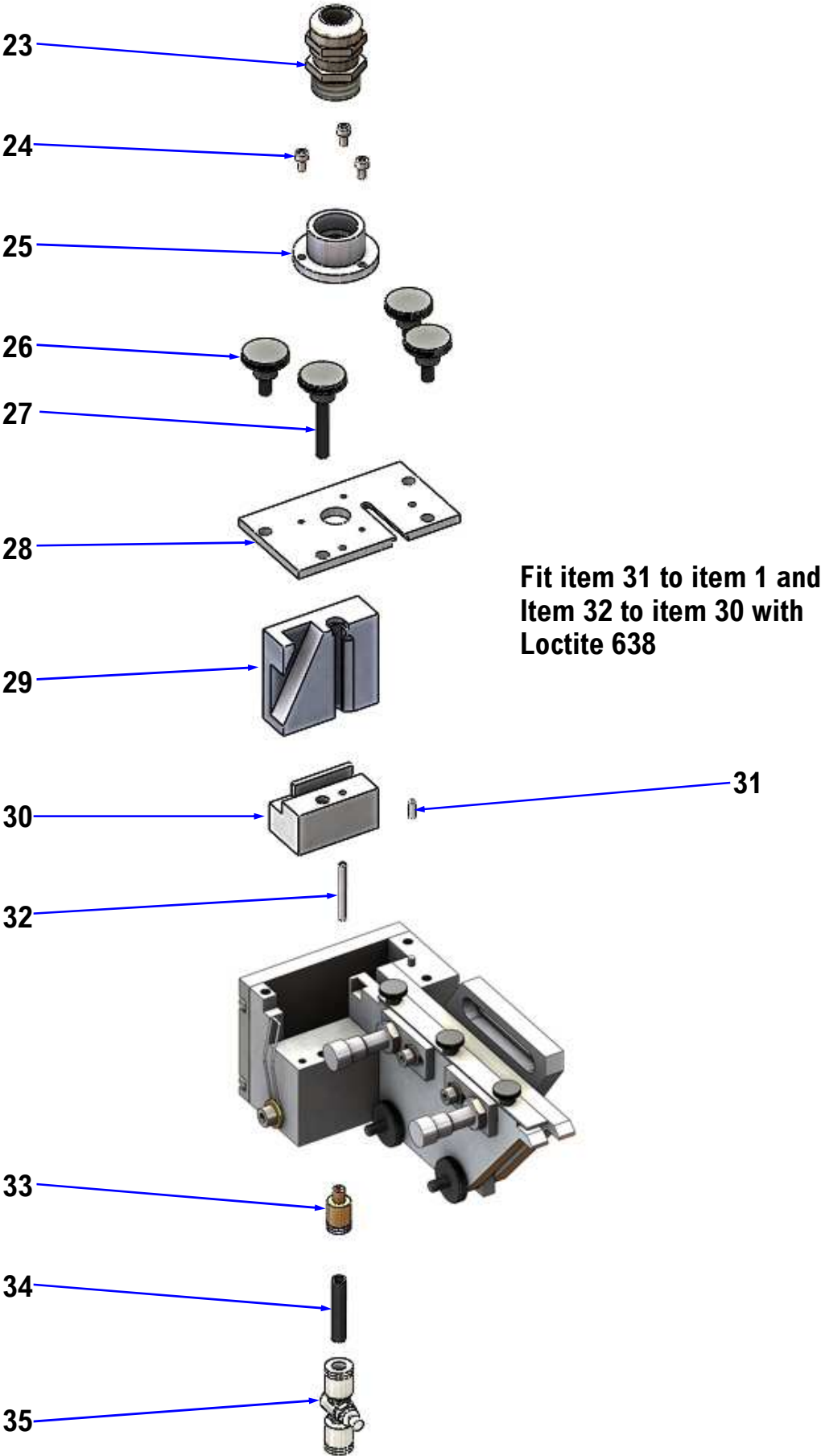
Fit items 9 with Loctite 638



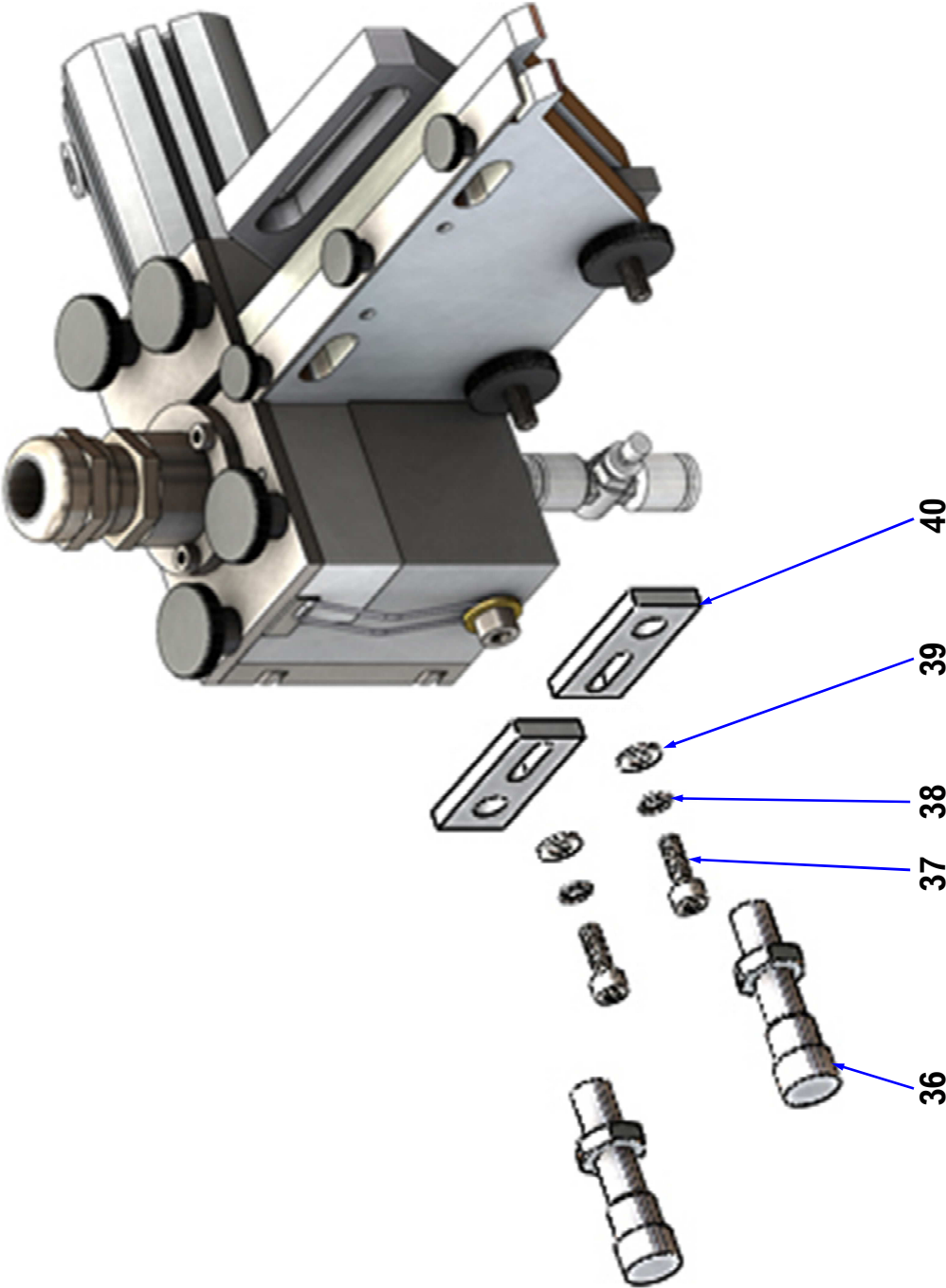
# ESCAPEMENT COMPONENT EXPLOSION



# ESCAPEMENT COMPONENT EXPLOSION



# ESCAPEMENT COMPONENT EXPLOSION



# ESCAPEMENT COMPONENT EXPLOSION

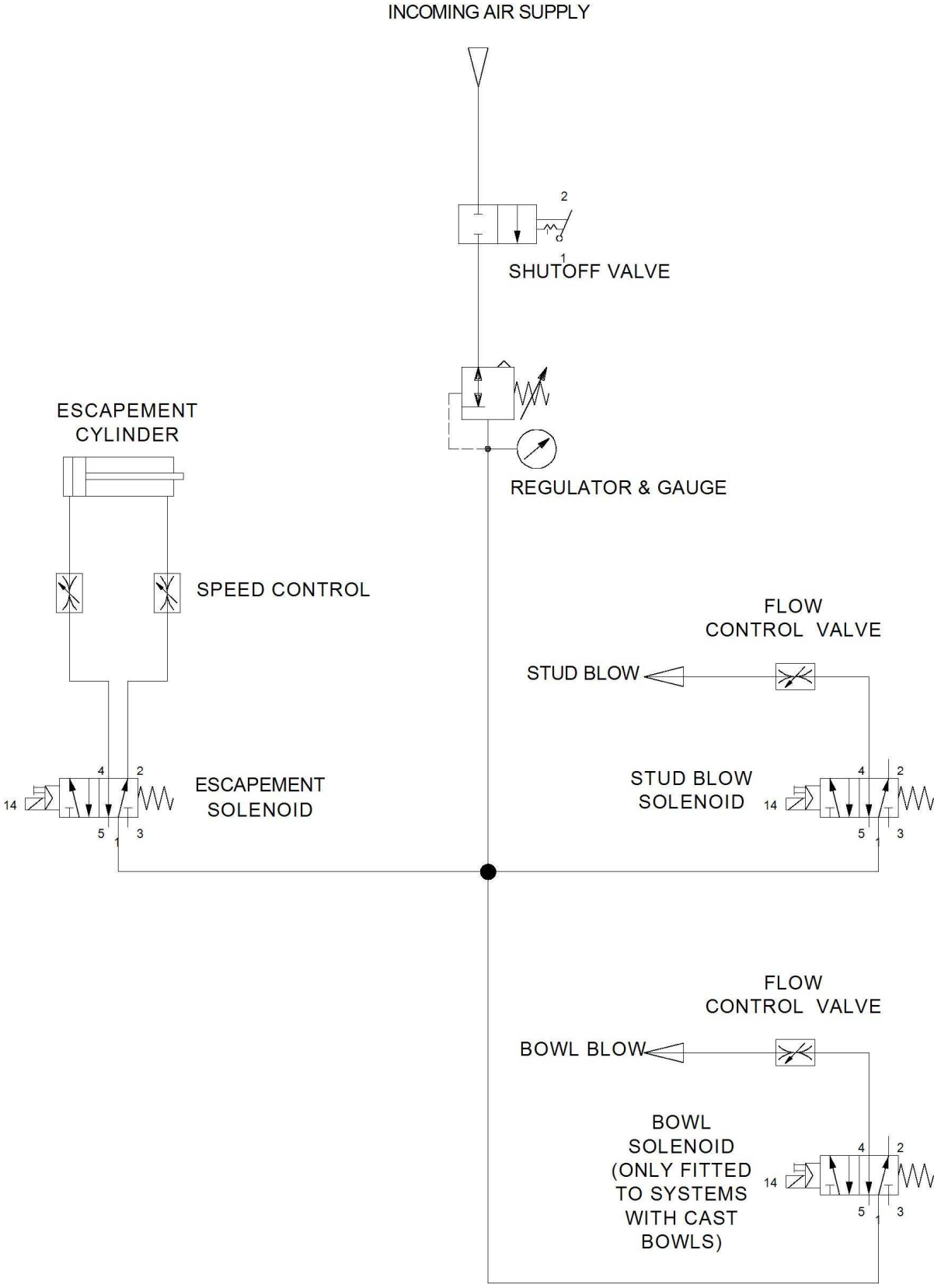
ITEM No	QTY	DESCRIPTION	PART No
1	1	MAIN BLOCK	73-100-207
2	1	SKT CAP HD SCREW M6 x 20 LONG	Z105-06-020
3	3	M3 x 6 THUMBSCREW	71-102-450
4	3	SKT CAP HD SCREW M4 x 10 LONG	Z105-04-010
5	1	RIGHT SLIDE RAIL	73-100-203
6	1	MOUNTING PLATE	73-100-205
7	2	SKT CSK SCREW M6 x 10 LONG	Z120-06-016
8	2	M5 THUMBNUIT	73-100-173
9	2	HEX SKT GRUB SCREW M5 x 35 LONG	Z400-05-035
10	1	SLIDE SPACER	SEE PAGE 24
11	1	LEFT SLIDE RAIL	73-100-204
12	1	TRACK COVER	71-103-911
13	4	SKT CAP HD SCREW M5 x 10 LONG	Z105-05-010
14	4	HEX SKT GRUB SCREW M5 x 6 LONG	Z400-05-006
15	2	PNEUMATIC SPEED CONTROL	PRE-P06-M5M
16	1	DRIVE CYLINDER	71-103-982
17	3	SKT CAP HD SCREW M4 x 65 LONG	Z100-04-065
18	1	SKT CAP HD SCREW M5 x 10 LONG	Z105-05-010
19	1	BRASS WASHER M6	Z605-05-000
20	1	GATE SPRING	71-103-919
21	1	GATE	SEE PAGE 24
22	1	SKT CAP HD SCREW M6 x 16 LONG	Z105-06-016
23 <sup>1</sup>	1	FEED HOSE GLAND	71-103-081
24	3	SKT CAP HD SCREW M3 x 8 LONG	Z105-03-008
25	1	PIPE HOLDER	SEE PAGE 23
26	3	THUMBSCREW M5 x 10	73-100-320
27	1	THUMBSCREW M5 x 30	73-100-321

# ESCAPEMENT COMPONENT EXPLOSION

ITEM No	QTY	DESCRIPTION	PART No
28	1	TOP PLATE	SEE PAGE 23
29	1	SHUTTLE BLOCK	SEE PAGE 23
30	1	SPACER BLOCK	SEE PAGE 24
31	1	DOWEL PIN DIA 3 x 8 LONG	71-101-007
32	1	DOWEL PIN DIA 3 x 28 LONG	81-114-212
33	1	STRAIGHT FITTING M5 x DIA 6	PFS-P06-M5M-INT
34	0.2m	PNEUMATIC PIPE DIA 6	71-200-159
35	1	PNEUMATIC SPEED CONTROL	PRS-P06-P06-F00
36	2	STUD SENSOR	75-102-450
37	2	SKT CAP HD SCREW M4 x 12 LONG	Z100-04-012
38	2	SPRING WASHER 4mm	Z615-04-000
39	2	PLAIN WASHER 4mm	Z600-04-000
40	2	SENSOR ADAPTOR PLATE	73-100-123

- <sup>1</sup> Item 23: For feed hose < 8mm Diameter fit 73-100-450  
For feed hose > 10mm Diameter fit 81-116-342

# PNEUMATIC DIAGRAM



# ACCESSORIES

## ESCAPEMENT

### Shuttle block

M3	71-103-863
M4	71-103-864
M5	71-103-865
M6	71-103-866
Dia 7.1	71-103-867
M8	71-103-868
Dia 9	71-103-869



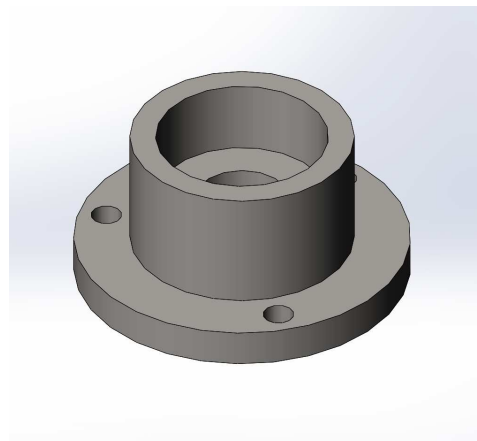
### Top plate

M3	71-103-873
M4	71-103-874
M5	71-103-875
M6	71-103-876
Dia 7.1	71-103-877
M8	71-103-878
Dia 9	73-100-209



### Pipe holder

M3	71-103-893
M4	71-103-894
M5	71-103-895
M6	71-103-896
M8 & Dia 7.1	71-103-898
Dia 9	71-103-899

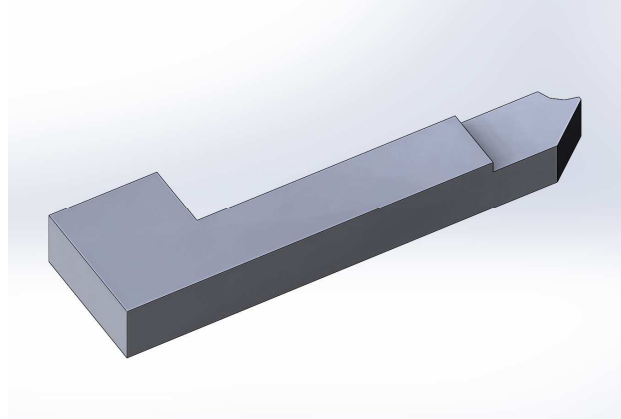


# ACCESSORIES

## ESCAPEMENT

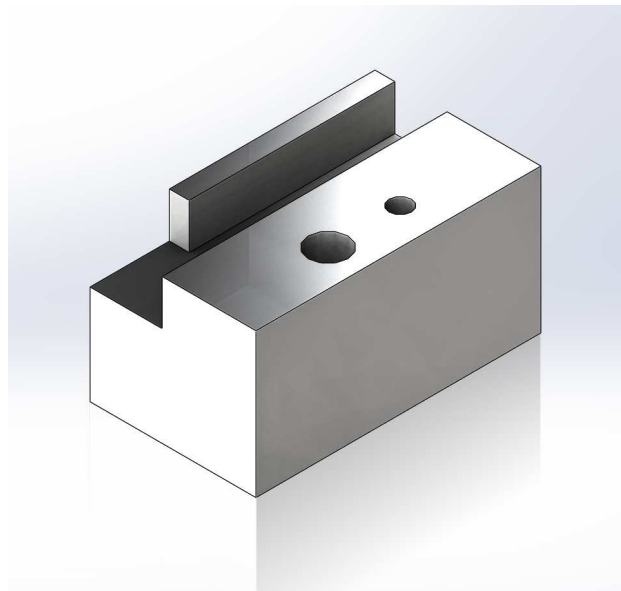
### Gate

M3	71-103-903
M4	71-103-904
M5	71-103-905
M6	71-103-906
Dia 7.1	71-103-907
M8	71-103-908
Dia 9	73-100-299



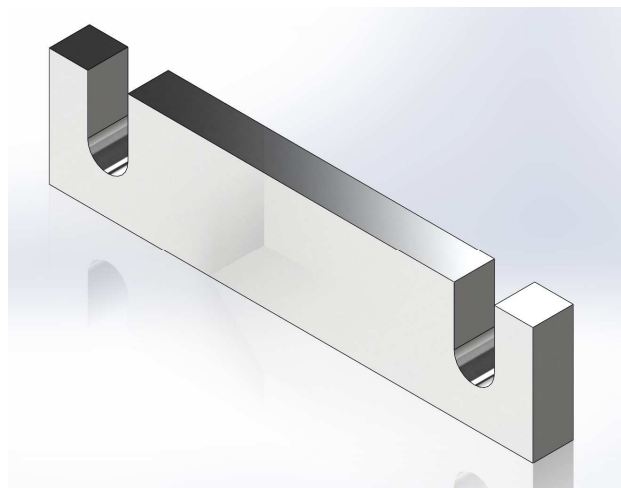
### Spacer block

M3	73-100-213
M4	73-100-214
M5	73-100-215
M6	73-100-216
Dia 7.1	73-100-217
M8	73-100-218
Dia 9	73-100-229



### Slide spacer

M3	73-100-153
M4	73-100-154
M5	73-100-155
M6	73-100-156
Dia 7.1	73-100-157
M8	73-100-158
Dia 9	73-100-159



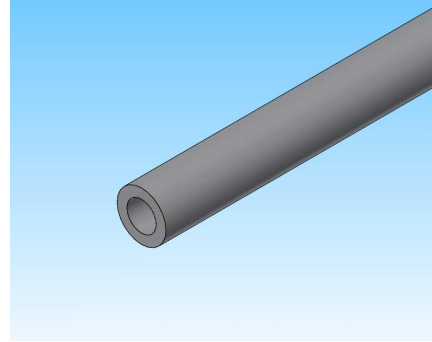


# ACCESSORIES

## ESCAPEMENT

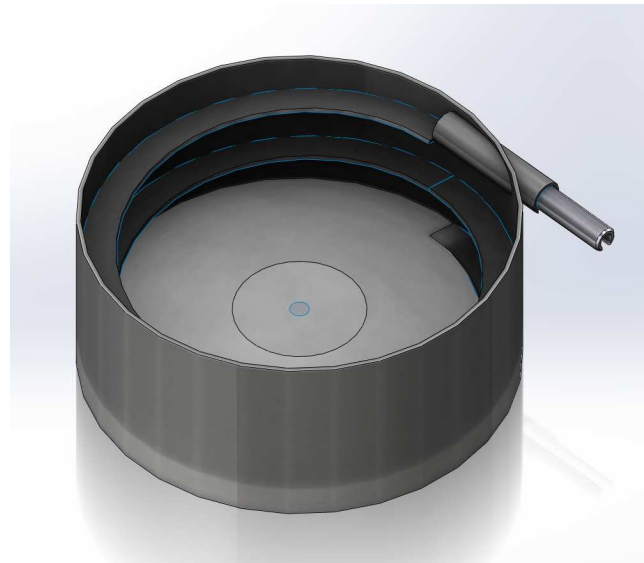
### Feed hose

Dia 3 x 8 PIN	79-103-312
Dia 3 T-Stud	79-103-313
M3	79-103-303
M4	79-103-304
M5	79-103-305
M6	79-103-306
M8 & Dia 7.1	79-103-308
Dia 9	79-103-309
M10	79-103-310
M8 L/F (16)	79-103-316
M8 L/F (14)	79-103-314



### Fabricated bowl top

M3	71-103-963
M4	71-103-964
M5	71-103-965
M6	71-103-966
Dia 7.1	71-103-967
M8	71-103-968



### Bowl exit tube

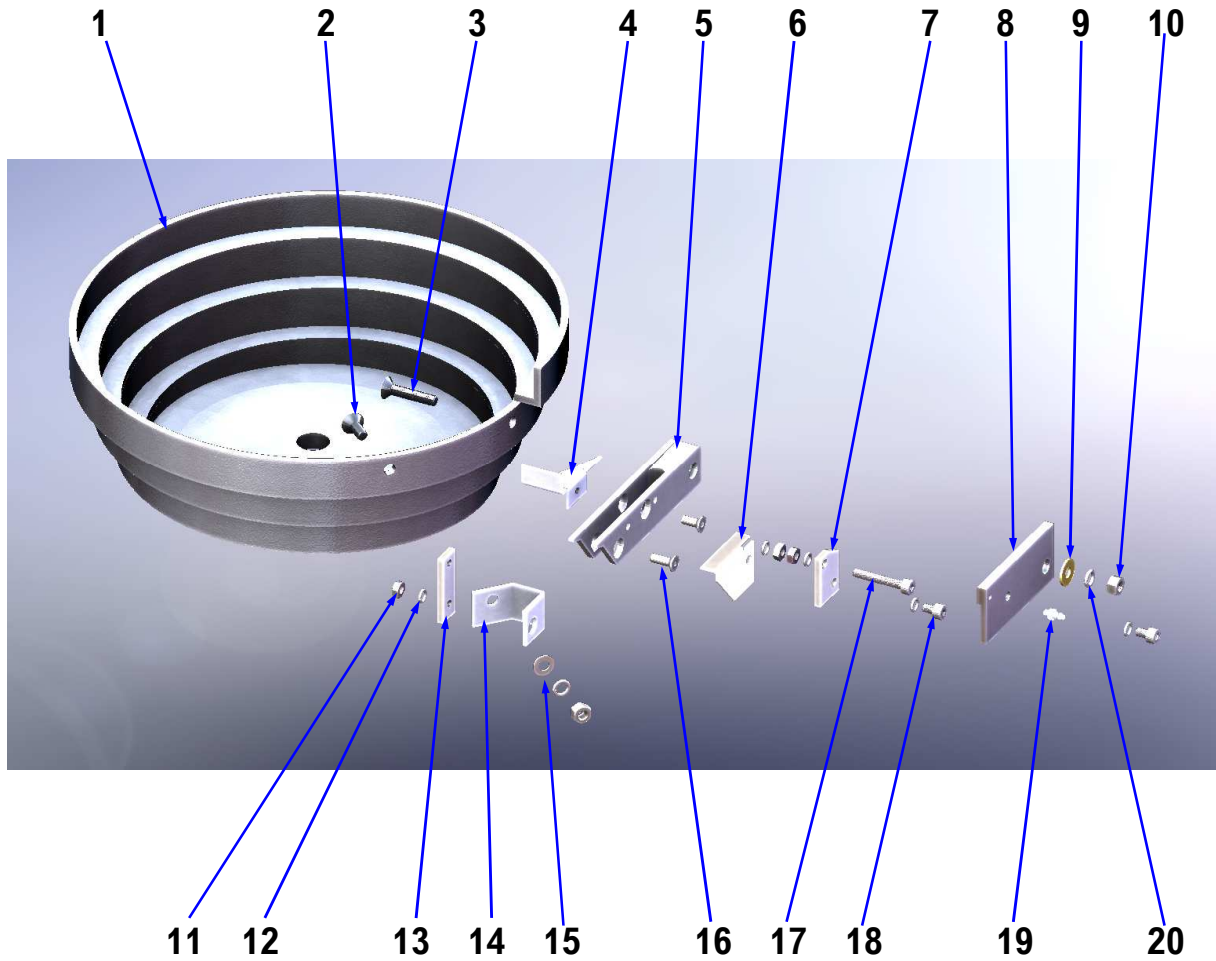
M3	71-103-943
M4	71-103-944
M5	71-103-945
M6	71-103-946
Dia 7.1	71-103-947
M8	71-103-948



**Note: Fabricated bowls are configured for one stud size only, it is not possible to change this by replacing the bowl exit tube.**

# ACCESSORIES

## Standard Cast Bowl



ITEM No	QTY	DESCRIPTION	PART No
1	1	ALUMINIUM CAST BOWL	72-103-162
2	1	M5 x 12 SKT CSK HD SCREW	Z120-05-012
3	1	M5 x 25 SKT CSK HD SCREW	Z120-05-025
4	1	FILL PLATE	73-100-166
5	1	EXIT TRACK M3 TO M8	SEE PAGE 28
6	1	TRACK COVER	73-100-259
7	1	CLAMP PLATE	73-100-291
8	1	SIDE PLATE M3 TO M8	SEE PAGE 28
9	1	M5 BRASS WASHER	Z605-05-999
10	2	M5 HEX NUT	Z505-05-000
11	3	M4 HEX NUT	Z505-04-000

# **ACCESSORIES**

## **Standard Cast Bowl**

<b>ITEM No</b>	<b>QTY</b>	<b>DESCRIPTION</b>	<b>PART No</b>
12	5	M4 SPRING WASHER	Z615-04-000
13	1	CLAMP PLATE	73-100-292
14	1	SUPPORT BRACKET	73-100-167
15	1	M5 PLAIN WASHER	Z600-05-000
16	2	M4 x 12 POZIDRIVE CSK HD SCREW	Z205-04-012
17	1	M4 x 25 SKT HD CAP SCREW	Z100-04-025
18	2	M4 x 8 SKT HD CAP SCREW	Z100-04-008
19	1	M3 x DIA 4 PNEUMATIC FITTING	PFS-B04-M3M
20	2	M5 SPRING WASHER	Z615-05-000

### **Complete assembly**

<b>M3</b>	<b>73-100-263</b>
<b>M4</b>	<b>73-100-264</b>
<b>M5</b>	<b>73-100-265</b>
<b>M6</b>	<b>73-100-266</b>
<b>Dia 7.1</b>	<b>73-100-267</b>
<b>M8</b>	<b>73-100-268</b>



# ACCESSORIES

## Standard cast bowl

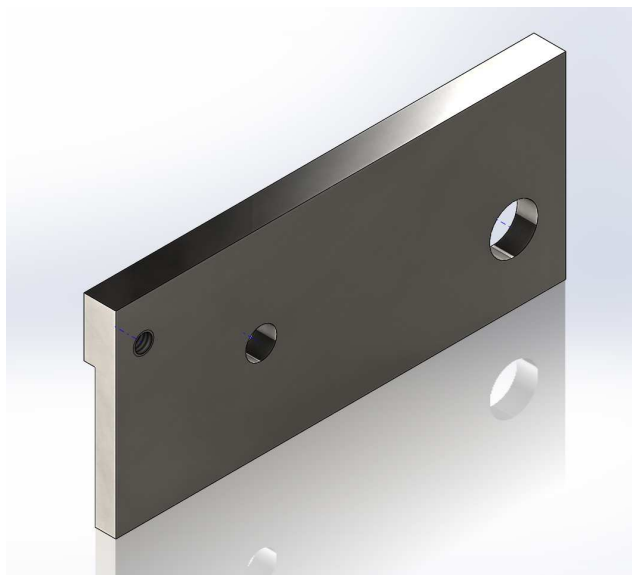
### Exit Track

<b>M3</b>	<b>73-100-243</b>
<b>M4</b>	<b>73-100-244</b>
<b>M5</b>	<b>73-100-245</b>
<b>M6</b>	<b>73-100-246</b>
<b>Dia 7.1</b>	<b>73-100-247</b>
<b>M8</b>	<b>73-100-248</b>



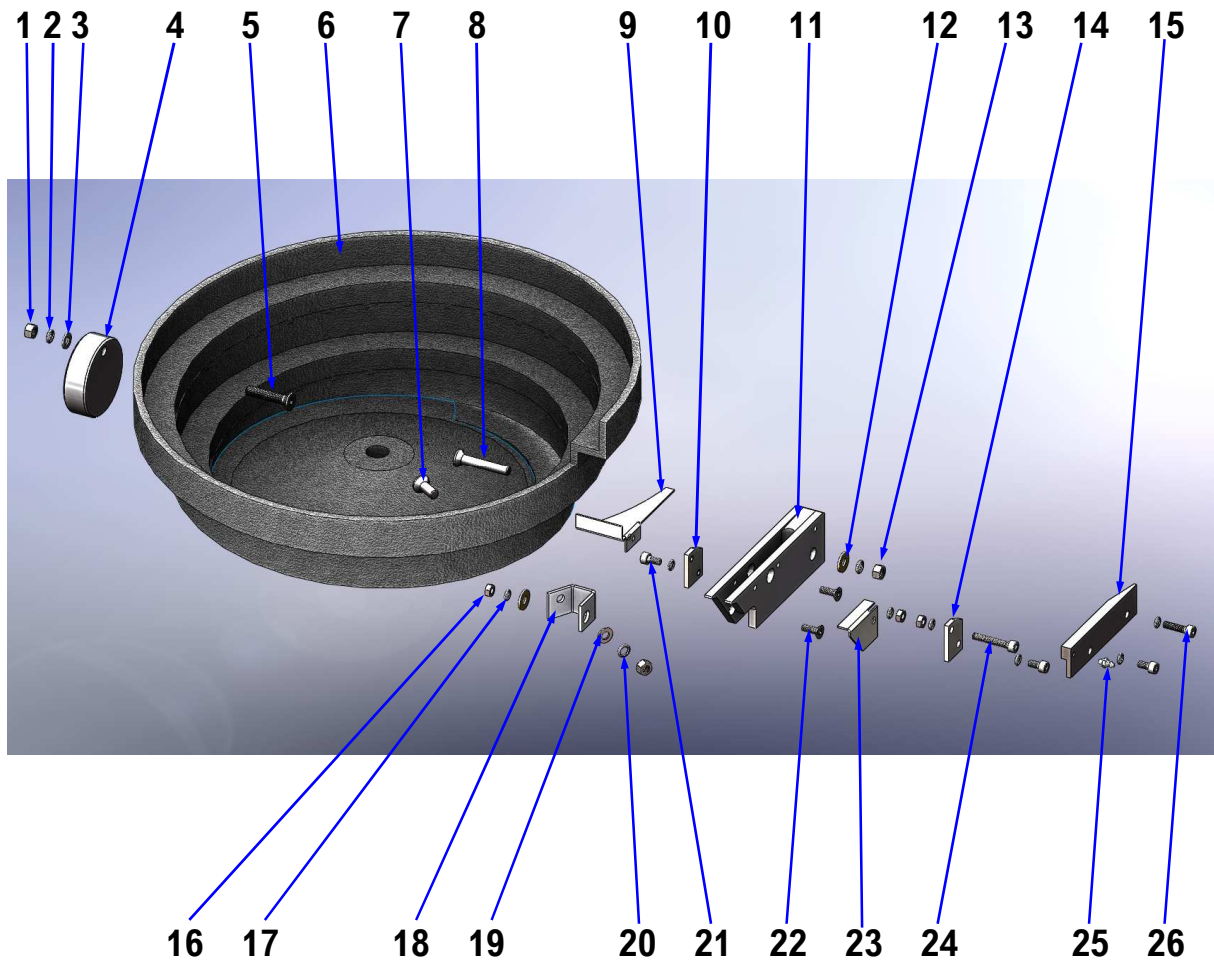
### Side Plate

<b>M3</b>	<b>73-100-233</b>
<b>M4</b>	<b>73-100-234</b>
<b>M5</b>	<b>73-100-235</b>
<b>M6</b>	<b>73-100-236</b>
<b>Dia 7.1</b>	<b>73-100-237</b>
<b>M8</b>	<b>73-100-238</b>



# ACCESSORIES

## Large Cast Bowl



ITEM No	QTY	DESCRIPTION	PART No
1	1	M6 HEX NUT	Z505-06-000
2	1	M6 SPRING WASHER	Z625-06-000
3	1	M6 PLAIN WASHER	Z600-06-000
4	1	BOWL COUNTERWEIGHT	73-100-295
5	1	M6 x 30 SKT CSK HD SCREW	Z125-06-030
6	1	ALUMINIUM CAST BOWL	71-103-062
7	1	M5 x 16 SKT CSK HD SCREW	Z120-05-016
8	1	M5 x 35 SKT CSK HD SCREW	Z120-05-035
9	1	FILL PLATE	73-100-290
10	1	CLAMP PLATE	73-100-293
11	1	EXIT TRACK M3 TO M8	SEE PAGE 31

# ACCESSORIES

## Large Cast Bowl

ITEM No	QTY	DESCRIPTION	PART No
12	2	M5 BRASS WASHER	Z605-05-999
13	2	M5 HEX NUT	Z505-05-000
14	1	CLAMP PLATE	73-100-291
15	1	SIDE PLATE M3 TO M8	SEE PAGE 31
16	3	M4 HEX NUT	Z505-04-000
17	7	M4 SPRING WASHER	Z615-04-000
18	1	SUPPORT BRACKET	73-100-294
19	1	M5 PLAIN WASHER	Z600-05-000
20	2	M5 SPRING WASHER	Z615-05-000
21	3	M4 x 8 SKT HD CAP SCREW	Z100-04-008
22	2	M4 x 12 POZIDRIVE CSK HD SCREW	Z205-04-012
23	1	TRACK COVER	73-100-259
24	1	M4 x 25 SKT HD CAP SCREW	Z100-04-025
25	1	M3 x DIA 4 PNEUMATIC FITTING	PFS-B04-M3M
26	1	M4 x 16 SKT HD CAP SCREW	Z100-04-016

### Complete assembly

M3	73-100-303
M4	73-100-304
M5	73-100-305
M6	73-100-306
Dia 7.1	73-100-307
M8	73-100-308
Dia 9	73-100-309
Earth Stud	73-100-301

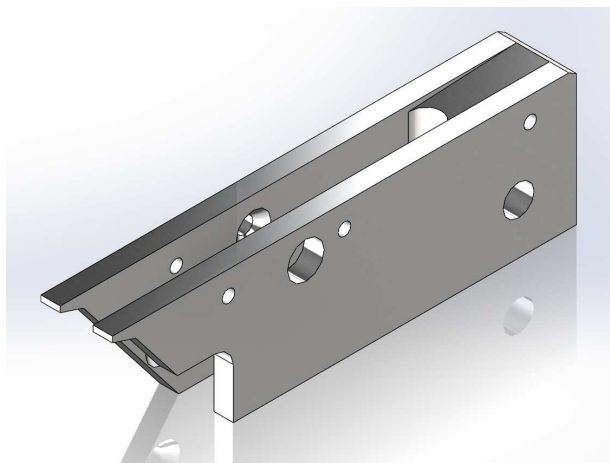


# ACCESSORIES

## Large cast bowl

### Exit Track

<b>M3</b>	<b>73-100-273</b>
<b>M4</b>	<b>73-100-274</b>
<b>M5</b>	<b>73-100-275</b>
<b>M6</b>	<b>73-100-276</b>
<b>Dia 7.1</b>	<b>73-100-277</b>
<b>M8</b>	<b>73-100-278</b>
<b>Dia 9</b>	<b>73-100-279</b>
<b>Earth Stud</b>	<b>73-100-271</b>



### Side Plate

<b>M3</b>	<b>73-100-283</b>
<b>M4</b>	<b>73-100-284</b>
<b>M5</b>	<b>73-100-285</b>
<b>M6</b>	<b>73-100-286</b>
<b>Dia 7.1</b>	<b>73-100-287</b>
<b>M8 &amp; Dia 9</b>	<b>73-100-288</b>
<b>Earth Stud</b>	<b>73-100-281</b>



# **EC DECLARATION OF CONFORMITY**

## **TAYLOR STUDWELDING SYSTEMS LIMITED**

Hereby certifies on it's sole responsibility that the following product :

**Stud Feeder Escapement.**

**Which is explicitly referred to by this Declaration meet the following Directives and Standards :**

Applicable EC directives and corresponding standards:

- Low voltage directive 2006/95/EC:  
BSEN60204-31 Safety of machinery - Electrical equipment of machines.
- EMC directive 2004/108/EC (electromagnetic compatibility):  
BSEN61000-6-3+A1 Electromagnetic compatibility - Generic emission standard  
BSEN61000-6-1 Electromagnetic compatibility - Generic immunity standard  
BSEN60974-10+A1 Electromagnetic compatibility (EMC) Product standard for Arc welding equipment
- Machine guidelines 2006/42/EC:  
BSEN60974-1 Arc welding equipment : Electromagnetic compatibility (EMC)

Documentation evidencing conformity with the requirements of the Directives is kept available for inspection at the above Manufacturer's headquarters.

**D. Taylor**



**Managing Director**

