

# ROTTLER

## F103/4/5 SERIES OPTIONAL EQUIPEMENT PARTS MANUAL







## **ORDERING PROCEDURE**

Contact your regional Rottler sales rep for assistance in ordering optional equipment, replacement parts, or tooling.

If you are unable to contact your regional Rottler sales rep, call the factory at 253-872-7050 and ask to speak to the parts sales specialist.

Have the following information handy to expedite the ordering process:

1. Your name, business name, and contact number
2. Customer number
3. If you don't have a customer number, your billing address
4. Shipping address if different from billing address
5. Machine model and serial number
6. Part number and description of what you want to order
7. Preferred method of shipment

You may also contact us via e-mail with the above information. Send e-mail requests to:  
[parts@rottermfg.com](mailto:parts@rottermfg.com)

In some cases you may be requested to send a photo of the part you are ordering if it is a replacement part, or doesn't appear in the database.

If you are unsure which part you need to order, contact our service department and ask to speak to one of our service consultants. They will assist you in determining which part you require.

**THERE IS A MINIMUM ORDER OF \$25.00**



# F103A, F104A, F105A OPTIONAL EQUIPMENT PARTS MANUAL

## Contents

<b>Automatic Tool Changer .....</b>	<b>1</b>
<b>9116 Automatic Rotary Tool Changer Parts .....</b>	<b>1</b>
<b>Wireless Probing System for Automatic Centering and Measuring .....</b>	<b>1</b>
<b>650-3-59X Renishaw Wireless Radio Probing System Parts .....</b>	<b>1</b>
<b>Optional Equipment for Boring and Surfacing .....</b>	<b>4</b>
<b>Fixturing for In-Line and V Blocks .....</b>	<b>4</b>
<b>6309N Tower Type Block Hold Down Clamp Parts .....</b>	<b>4</b>
<b>6405F Large V Block Fixture Parts .....</b>	<b>7</b>
<b>6405L Parallel Risers Parts .....</b>	<b>9</b>
<b>Main Bearing Bore Locator Sets for 6405F Block Fixture .....</b>	<b>10</b>
<b>6407A Locator Assembly, Main, CAT 399 / Large V-Block Fixture (Matched Pair) .....</b>	<b>10</b>
<b>6407C Locator Assembly, Main, CAT 3500 / Large V-Block Fixture (Matched Pair) .....</b>	<b>10</b>
<b>6407E Locator Assembly, Main, Cummins 1710 / Large V-Block Fixture (Matched Pair) .....</b>	<b>10</b>
<b>6407G Locator Assembly, Main, Cummins K50 / Large V-Block Fixture (Matched Pair) .....</b>	<b>10</b>
<b>6407J Locator Assembly, Main, Cummins QSK / Large V-Block Fixture (Matched Pair) .....</b>	<b>10</b>
<b>6407L Locator Assembly, Main, Waukesha 7042 / Large V-Block Fixture (Matched Pair) .....</b>	<b>10</b>
<b>6407N Locator Assembly, Main, MTU 4000 / Large V-Block Fixture (Matched Pair) .....</b>	<b>11</b>
<b>6407Q Locator Assembly, Main, CAT C175 / Large V-Block Fixture (Matched Pair) .....</b>	<b>11</b>
<b>6407S Locator Assembly, Main, 5.1143 diameter bore (Matched Pair) .....</b>	<b>11</b>
<b>6407U Locator Assembly, Main, 5.1393 diameter bore (Matched Pair) .....</b>	<b>11</b>
<b>6407W Locator Assembly, Main, MTU 396 .....</b>	<b>11</b>
<b>6419 Locator, Assembly, Main, Jenbacher 3,4.2095" (106.92mm) (Matched Pair) .....</b>	<b>11</b>
<b>7152A Dual Axis Level Assembly Parts .....</b>	<b>12</b>
<b>6370Z Parallels Parts .....</b>	<b>13</b>
<b>6725 Small to Mid-Range In-Line and V Block Fixture Parts .....</b>	<b>14</b>
<b>6370C Parallels Parts .....</b>	<b>16</b>
<b>7219W Heavy Duty T-Slot Universal Parallels Parts .....</b>	<b>17</b>
<b>11115 Parallels Parts .....</b>	<b>18</b>
<b>6511 3/4" (19.05mm) Clamp Kit .....</b>	<b>18</b>
<b>Fixturing for Surfacing Cylinder Heads and Manifolds .....</b>	<b>19</b>
<b>7209M Leveling Table Sections .....</b>	<b>19</b>



**Table Section Parts ..... 20**

**Tilt Clamp Section Parts ..... 21**

**Front / Rear Tilt Section Parts ..... 22**

**Left / Right Tilt Section Parts ..... 24**

**Tensioner Section Parts..... 25**

**Base Section Parts ..... 26**

**7209N 2-Piece Vise ..... 27**

**Adaptor for F60 Model Fixtures ..... 28**

**9111A T-Slot Plate ..... 28**

**Boring and Sleeving Tooling ..... 29**

**6516H Blind Hole Stub Cutterhead Package Components..... 29**

**6516G Cutterhead Parts ..... 30**

**900-2-19 Micrometer Parts..... 31**

**6801 Series Insert Holder Parts..... 32**

**6519Z Blind Hole Stub Cutterhead Package Components ..... 33**

**6519Y Cutterhead Parts ..... 34**

**900-2-20 Micrometer Parts..... 35**

**6593 Series Insert Holder Parts..... 36**

**6520 Series Toolholder Parts ..... 36**

**6598 Series Insert Cartridge Parts ..... 36**

**6256Q Blind Hole Cutterhead Package Components ..... 37**

**6256P Cutterhead Parts ..... 38**

**900-2-20 Micrometer Parts..... 40**

**6260L Insert Cartridge Parts..... 41**

**6260M Insert Cartridge Parts..... 41**

**6598 Series Insert Cartridge Parts ..... 42**

**6259 Series Toolholder Parts ..... 42**

**6464J Blind Hole Cutterhead Package Components ..... 43**

**6464H Cutterhead Parts ..... 44**

**900-2-20 Micrometer Parts..... 46**

**6598 Series Insert Cartridge Parts ..... 47**

**6259 Series Toolholder Parts ..... 47**

**6588 Blind Hole Cutterhead Package Components ..... 48**

**6588A Cutterhead Parts ..... 49**

**900-2-20 Micrometer Parts..... 51**



<b>6598 Series Insert Cartridge Parts</b> .....	<b>52</b>
<b>6259 Series Toolholder Parts</b> .....	<b>52</b>
<b>6593S Insert Cartridge Parts</b> .....	<b>52</b>
<b>Surfacing Tooling</b> .....	<b>53</b>
<b>6294V Surfacing Cutterhead Parts</b> .....	<b>53</b>
<b>6294U Surfacing Cutterhead Parts</b> .....	<b>55</b>
<b>6294T Surfacing Cutterhead Parts</b> .....	<b>57</b>
<b>6294W Surfacing Cutterhead Parts</b> .....	<b>59</b>
<b>6301J CBN Insert, 1/16 Radius</b> .....	<b>60</b>
<b>6303V CBN Insert, Octagonal (16-Cutting Corners)</b> .....	<b>60</b>
<b>Special Surfacing Tooling for Milling Metal Sprayed Head Gasket Decks</b> .....	<b>61</b>
<b>6864 Multi Tooth Milling Head Parts</b> .....	<b>61</b>
<b>6865 Multi Tooth Milling Head Parts</b> .....	<b>63</b>
<b>General Purpose Accessories</b> .....	<b>64</b>
<b>502-12-7B Digital Runout Probe and Readout Components</b> .....	<b>64</b>
<b>6864E Replacement Insert</b> .....	<b>65</b>
<b>6864D Replacement Cartridge</b> .....	<b>65</b>
<b>General Purpose Tooling</b> .....	<b>65</b>
<b>6648 Caterpillar 3400 Series Tappet Bore Repair Tooling Package Components</b> .....	<b>65</b>
<b>6835 Small Precision Adjustable Boring Head Components</b> .....	<b>66</b>
<b>6757Z Large Heavy Duty Adjustable Boring/Facing Head Components</b> .....	<b>67</b>
<b>6648K Collet kit 1/8 - 1" (3 - 26mm)</b> .....	<b>68</b>
<b>650-2-45G 1" (25.4mm) Diameter Solid Carbide End Mill x 4.00" (101.4mm) Length</b> .....	<b>69</b>
<b>650-2-43F 3/4" (19.05mm) Four Fluted End Mill X 4" (101.4mm) Length</b> .....	<b>69</b>
<b>650-2-3V Cutterhead Assembly Components</b> .....	<b>70</b>
<b>Spindle Adapters for Mounting Universal Tooling</b> .....	<b>71</b>
<b>6648M Spindle Adapter Parts</b> .....	<b>71</b>
<b>6649B .750" (19.05mm) Spindle Adapter Parts</b> .....	<b>72</b>
<b>6170C Adapter, Blank Parts</b> .....	<b>73</b>
<b>6170J #40 Taper Adapter</b> .....	<b>74</b>
<b>6170K R8 Taper Adaptor Parts</b> .....	<b>75</b>
<b>6514Q #5 Morse Taper Adapter Parts</b> .....	<b>76</b>
<b>Main Line Bore Equipment</b> .....	<b>77</b>
<b>6753J Straight 90 Degree Right Angle Drive Parts</b> .....	<b>77</b>
<b>6856 Straight 90 Degree Right Angle Drive Parts</b> .....	<b>81</b>
<b>6753L Special Belt Drive 90 Degree Right Angle Drive Parts</b> .....	<b>85</b>



**650-2-39B Cutterhead Package Components ..... 88**

**650-2-39F Cutterhead Parts ..... 89**

**900-2-19 Micrometer Parts ..... 90**

**6801 Series Insert Holder Parts ..... 91**

**650-2-39C Cutterhead Package Components ..... 92**

**650-2-39G Cutterhead Parts ..... 93**

**900-2-19 Micrometer Parts ..... 94**

**6801 Series Insert Holder Parts ..... 95**

**650-2-39A Cutterhead Package Components ..... 96**

**650-2-39E Cutterhead Parts ..... 97**

**900-2-19 Micrometer Parts ..... 98**

**6801 Series Insert Holder Parts ..... 99**

**Line Bore Fixturing for Small to Large Blocks and Heads ..... 100**

**650-3-56 Line Bore Pivot Table Fixture Parts ..... 100**

**6821 Adjustable Universal Line Boring Fixture Assembly Parts ..... 102**

**6843 90 Degree V Block Support Parts ..... 104**

**6823E 90 Degree V Block Support Parts ..... 105**

**6789L 113 Degree V Block Support Parts ..... 106**

**6789N 116 Degree V Block Support Parts ..... 107**

**6789E 115 Degree V Block Support Parts ..... 108**

**6823B 120 Degree V Block Support Parts ..... 109**

**6789K 130 Degree V Block Support Parts ..... 110**

**6789Q 140 Degree V Block Support Parts ..... 111**

**6789T 110 Degree V Block Support Parts ..... 112**

**Line Bore Tooling for Extra Large Blocks ..... 113**

**6773F Heavy Duty Offset 90 Degree Right Angle Drive Assembly Parts ..... 113**

**6519V Heavy Duty Line Bore Cutterhead Package Components ..... 116**

**6519U Cutterhead Parts ..... 117**

**900-2-20 Micrometer Parts ..... 118**

**6520 Series Toolholder Parts ..... 118**

**6519P Heavy Duty Line Bore Cutterhead Package Components ..... 119**

**6519S Cutterhead Parts ..... 120**

**900-2-20 Micrometer Parts ..... 121**

**6520 Series Toolholder Parts ..... 121**

**6519M Heavy Duty Line Bore Cutterhead Package Components ..... 122**

<b>6519Q Cutterhead Parts</b> .....	<b>123</b>
<b>900-2-20 Micrometer Parts</b> .....	<b>124</b>
<b>6520 Series Toolholder Parts</b> .....	<b>124</b>
<b>6519N Heavy Duty Line Bore Cutterhead Package Components</b> .....	<b>125</b>
<b>6519R Cutterhead Parts</b> .....	<b>126</b>
<b>900-2-20 Micrometer Parts</b> .....	<b>127</b>
<b>6520 Series Toolholder Parts</b> .....	<b>128</b>
<b>6598 Series Insert Cartridge Parts</b> .....	<b>128</b>
<b>Line Bore Fixturing for Extra Large Blocks</b> .....	<b>129</b>
<b>6810 Waukesha 7042, 9390 and CAT 379, 398, 399 Line Boring Fixture Parts</b> .....	<b>129</b>
<b>6815 White Superior 8G825 Line Boring Fixture Parts</b> .....	<b>131</b>
<b>6846 White Superior 12 &amp; 16 G825 Line Boring Fixture Parts</b> .....	<b>132</b>
<b>Line Bore Set Up and Alignment Equipment</b> .....	<b>134</b>
<b>502-12-7B Digital Runout Probe and Readout Parts</b> .....	<b>134</b>
<b>502-9-9A Mechanical Run Out Indicator</b> .....	<b>135</b>
<b>502-9-9J Mechanical Run Out Indicator</b> .....	<b>135</b>
<b>502-9-9S Indicator Mount</b> .....	<b>135</b>
<b>502-12-4A Magnetic Indicator Holder</b> .....	<b>135</b>
<b>502-12-4 General Purpose Magnetic Indicator Holder</b> .....	<b>136</b>
<b>Equipment for Preparing Blocks for Line Boring</b> .....	<b>137</b>
<b>7209N 2-Piece Vise Parts</b> .....	<b>137</b>
<b>6514L Shell Mill Parts</b> .....	<b>138</b>
<b>6514W Shell Mill Parts</b> .....	<b>140</b>
<b>Main Line Thrust Facing Utilizing Circular Interpolation</b> .....	<b>141</b>
<b>6855C Thrust Facing Tooling Package Parts</b> .....	<b>141</b>
<b>Special Tooling for Block End Machining</b> .....	<b>143</b>
<b>6779H Adaptor Parts</b> .....	<b>143</b>
<b>6779L Surfacing Cutterhead Assembly Parts</b> .....	<b>144</b>
<b>6779M Surfacing Cutterhead Assembly Parts</b> .....	<b>145</b>
<b>6779N Crossfeed Head Assembly Parts</b> .....	<b>146</b>
<b>Connecting Rod Boring and Surfacing Equipment</b> .....	<b>147</b>
<b>650-3-44R Precision Connecting Rod Fixturing System Parts</b> .....	<b>147</b>
<b>Frame Assembly Parts</b> .....	<b>148</b>
<b>Carriage Assembly Parts</b> .....	<b>150</b>
<b>Control Box Parts</b> .....	<b>152</b>
<b>Clamp Arm Assembly Parts</b> .....	<b>154</b>



**Fixturing & Tooling for Machining Large Engine & Compressor Connecting Rods** ..... **155**

**650-3-64 Precision Connecting Rod Fixturing System Parts**..... **155**

**Carriage Assembly Parts** ..... **156**

**Centering Cylinder Parts** ..... **158**

**Clamp Arm Assembly Parts**..... **160**

**Control Box Assembly Parts** ..... **161**

**650-3-66 Compressor Conrod Cap Surfacing Fixture Parts**..... **162**

**6870 Precision Large Connecting Rod Fixture Parts**..... **166**

**Support Table Parts**..... **167**

**Pivot Base Assembly Parts** ..... **168**

**Pivot Table Assembly Parts**..... **169**

**Table Clamps and Jacks Parts**..... **170**

**Tooling for Connecting Rod Boring**..... **172**

**6516H Blind Hole Cutterhead Package Components**..... **172**

**6516G Cutterhead Parts**..... **173**

**900-2-19 Micrometer Parts**..... **174**

**6801 Series Insert Holder Parts**..... **175**

**6519 Blind Hole Stub Cutterhead Package Components** ..... **176**

**6519E Cutterhead Parts** ..... **177**

**900-2-20 Micrometer Parts**..... **179**

**6520 Series Toolholder Parts** ..... **180**

**6593 Series Insert Holder Parts**..... **180**

**6598 Series Insert Cartridge Parts**..... **180**

**Enclosure Parts** ..... **181**



## Automatic Tool Changer

### 9116 Automatic Rotary Tool Changer Parts

Assembly Image and Parts List are unavailable at this time.

Please visit the service tab of our web page [www.rottlermfg.com](http://www.rottlermfg.com) and Send a Service Request. Or contact the Rottler Factory Service at [service@rottlermfg.com](mailto:service@rottlermfg.com) for assistance.

You may also call Rottler at 1-800-452-0534 or 1-253-872-7050

Please ensure you have the Machine Model and Serial Number available when contacting Rottler for Service

## Wireless Probing System for Automatic Centering and Measuring

### 650-3-59X Renishaw Wireless Radio Probing System Parts



**650-3-59Z Probe**



**650-3-59C**



**6648Q**



**6648T**



**650-3-59D**



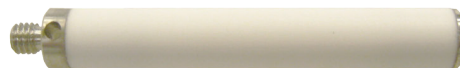
**650-3-59E**



**6648R**



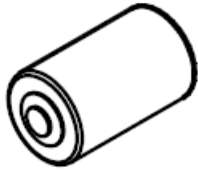
**6648S**



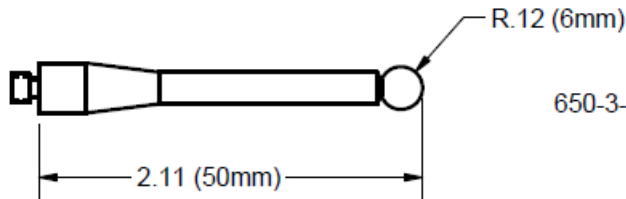
**650-3-59K**



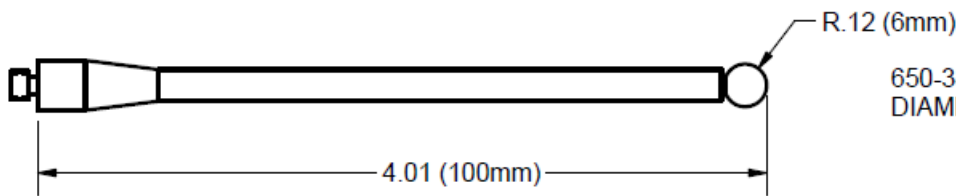
**6648U**



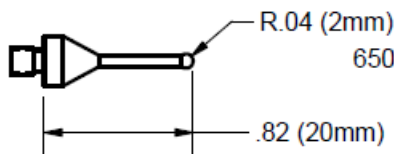
6648U SPARE BATTERY FOR RENISHAW PROBE (2 REQUIRED)



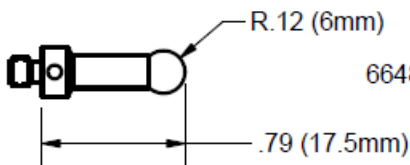
650-3-59C 50mm LONG x 6mm DIAMETER STYLUS



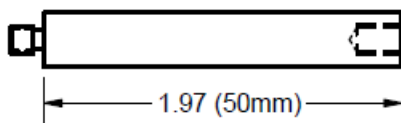
650-3-59D 100mm LONG x 6mm DIAMETER STYLUS



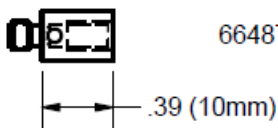
650-2-59E 20mm LONG x 2mm DIAMETER STYLUS



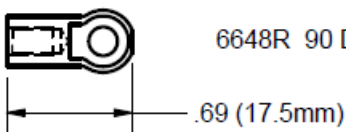
6648Q 17.5mm LONG x 6mm DIAMETER STYLUS



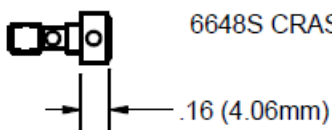
650-3-59K 50mm LONG EXTENSION FOR 50mm AND 100mm STYLUS



6648T 10mm LONG STYLUS EXTENSION

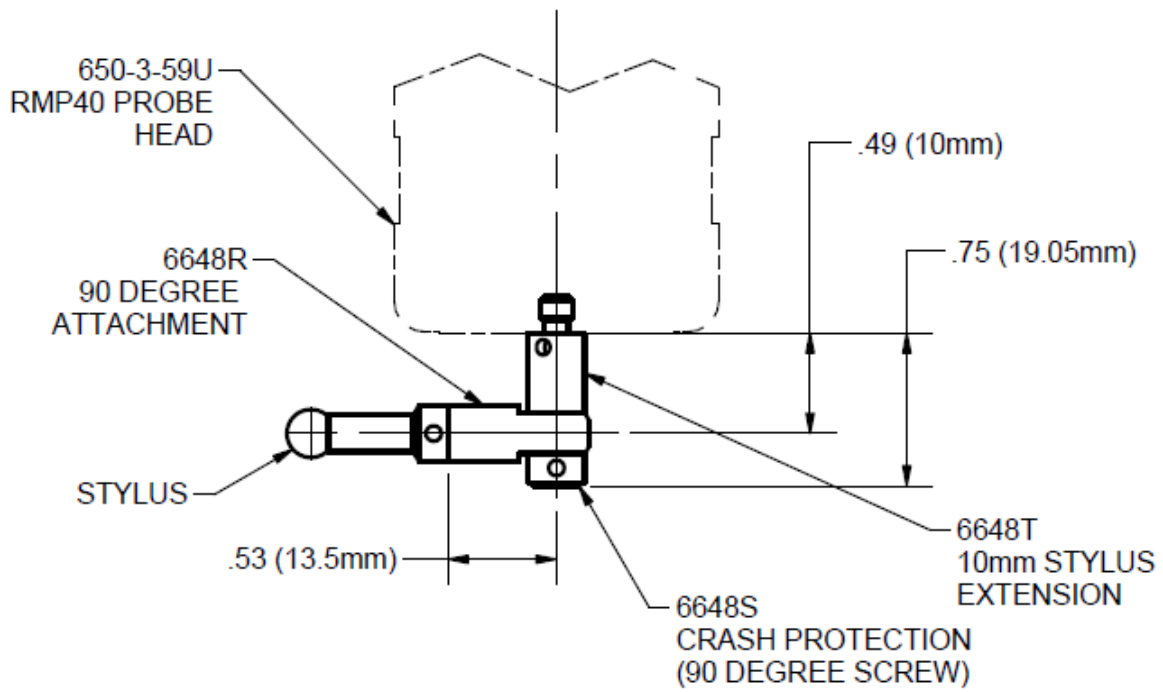


6648R 90 DEGREE STYLUS ATTACHMENT

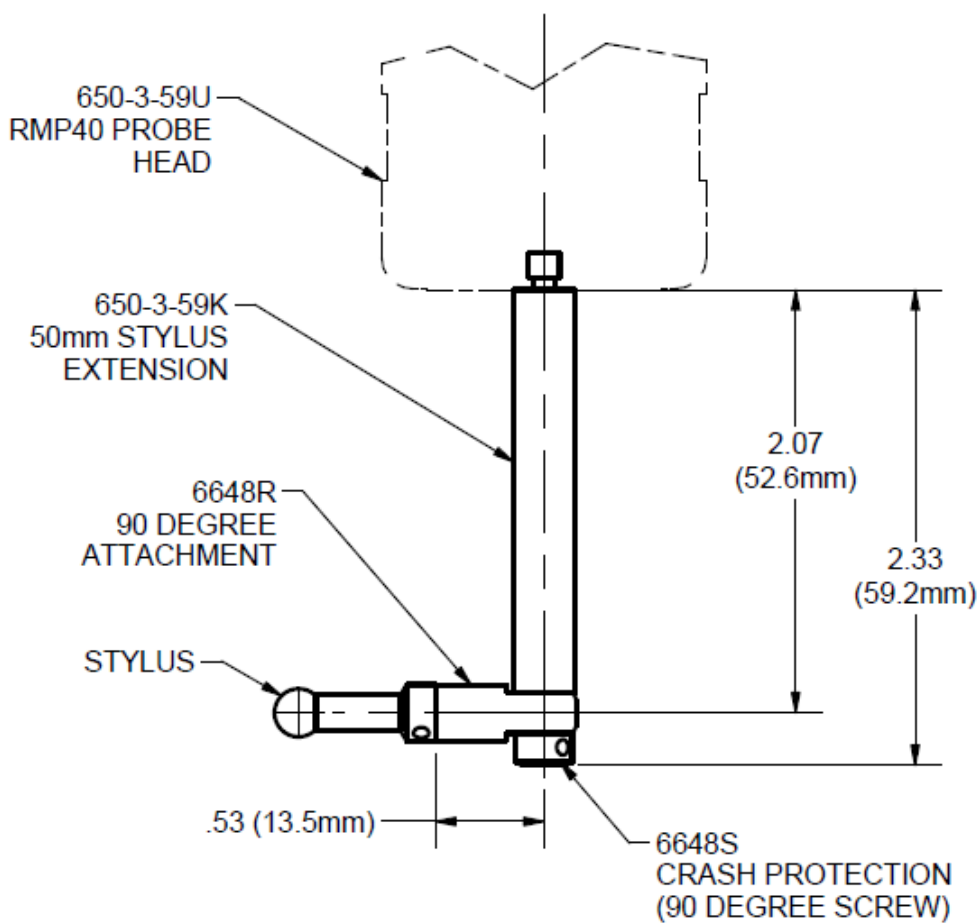


6648S CRASH PROTECTION (90 DEG. SCREW)

### 90 DEGREE PROBE MOUNTING - SHORT COMBINATION



### 90 DEGREE PROBE MOUNTING - LONG COMBINATION

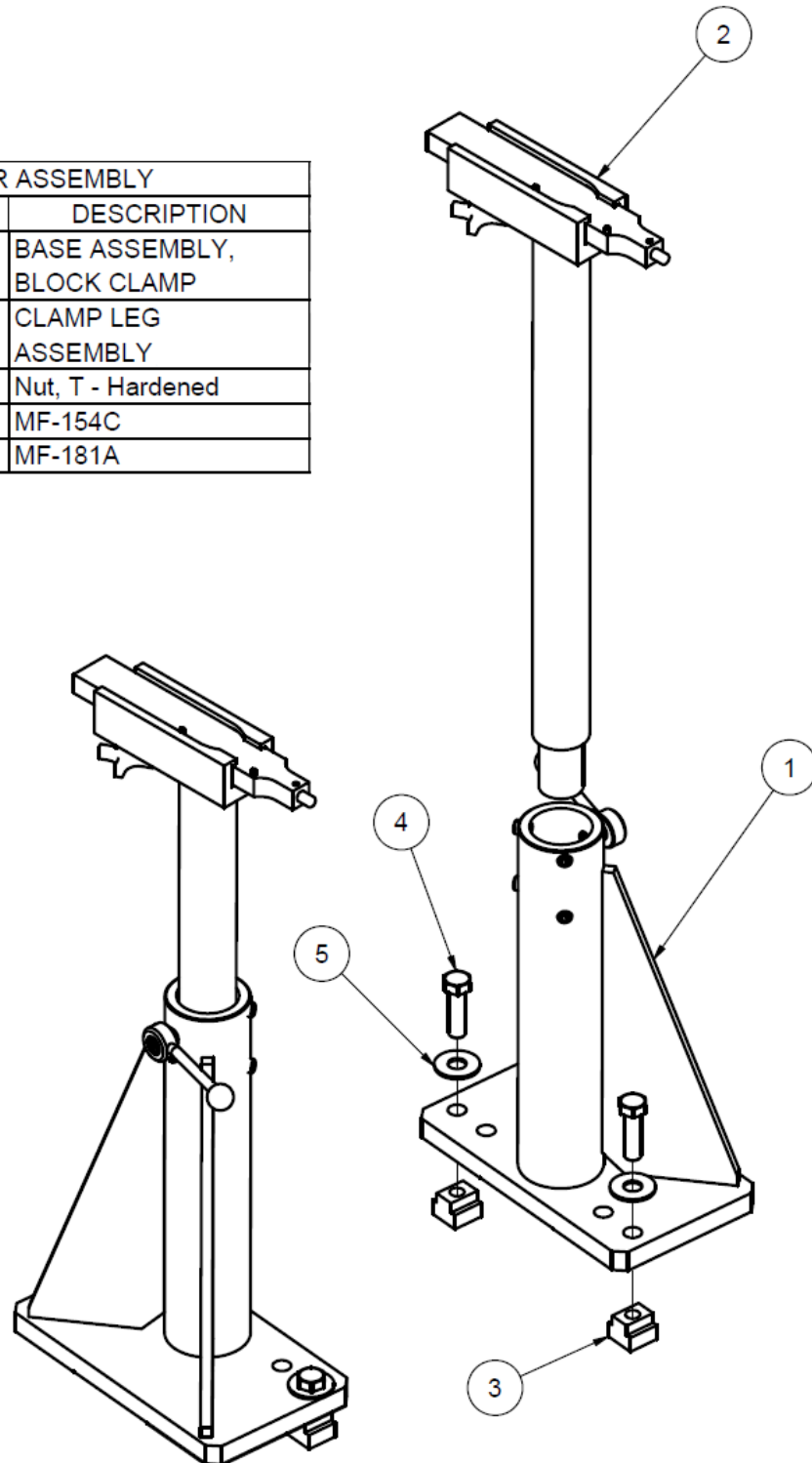


## Optional Equipment for Boring and Surfacing

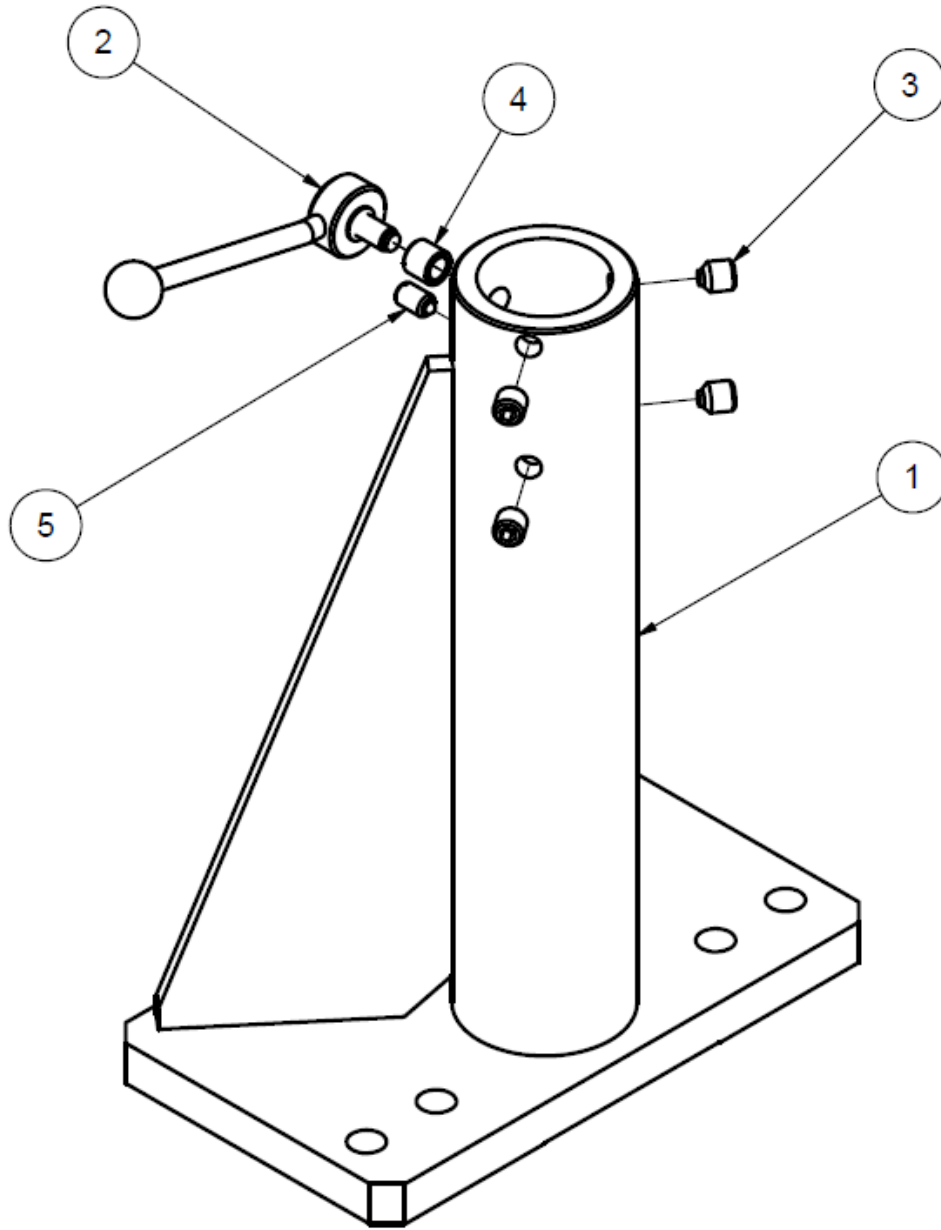
### Fixturing for In-Line and V Blocks

#### 6309N Tower Type Block Hold Down Clamp Parts

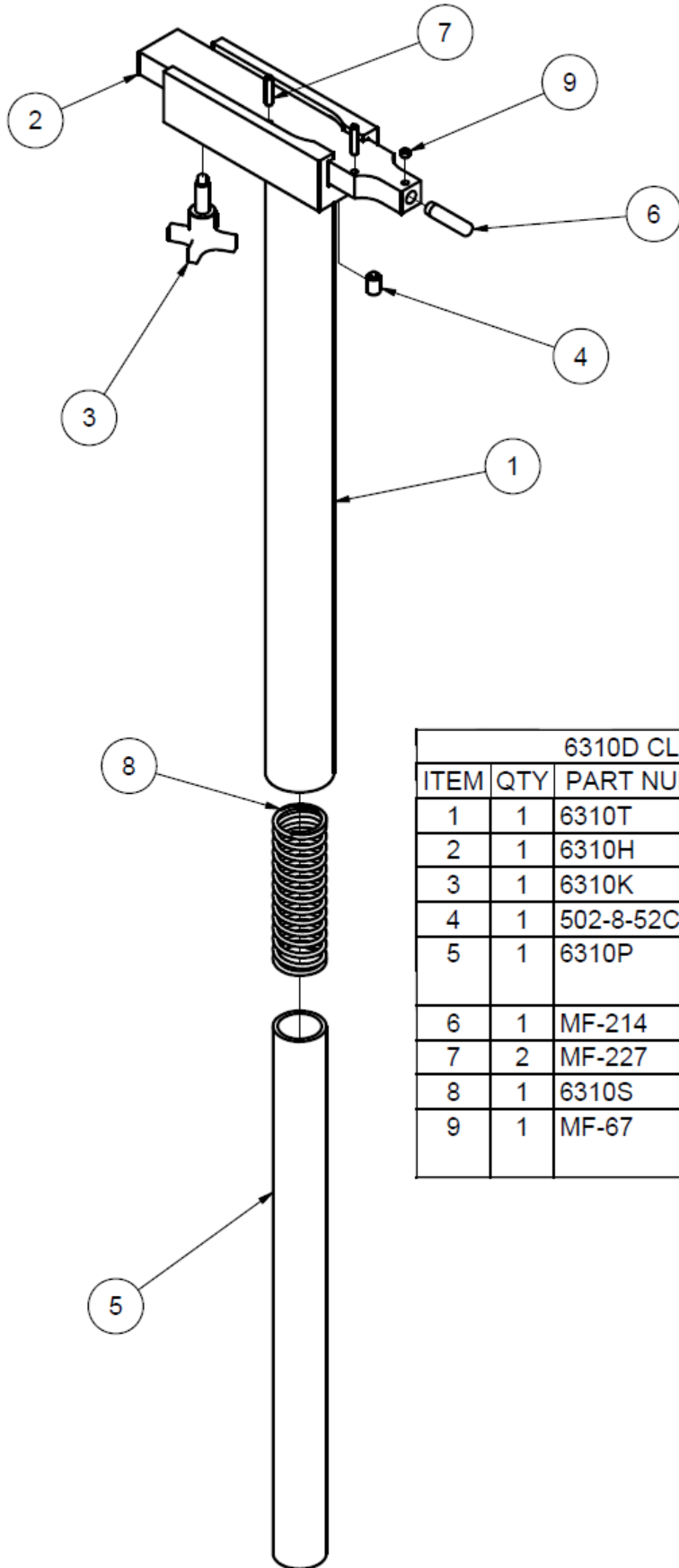
6309N CLAMP TOWER ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6309J	BASE ASSEMBLY, BLOCK CLAMP
2	2	6310D	CLAMP LEG ASSEMBLY
3	4	6160	Nut, T - Hardened
4	4	MF-154C	MF-154C
5	4	MF-181A	MF-181A





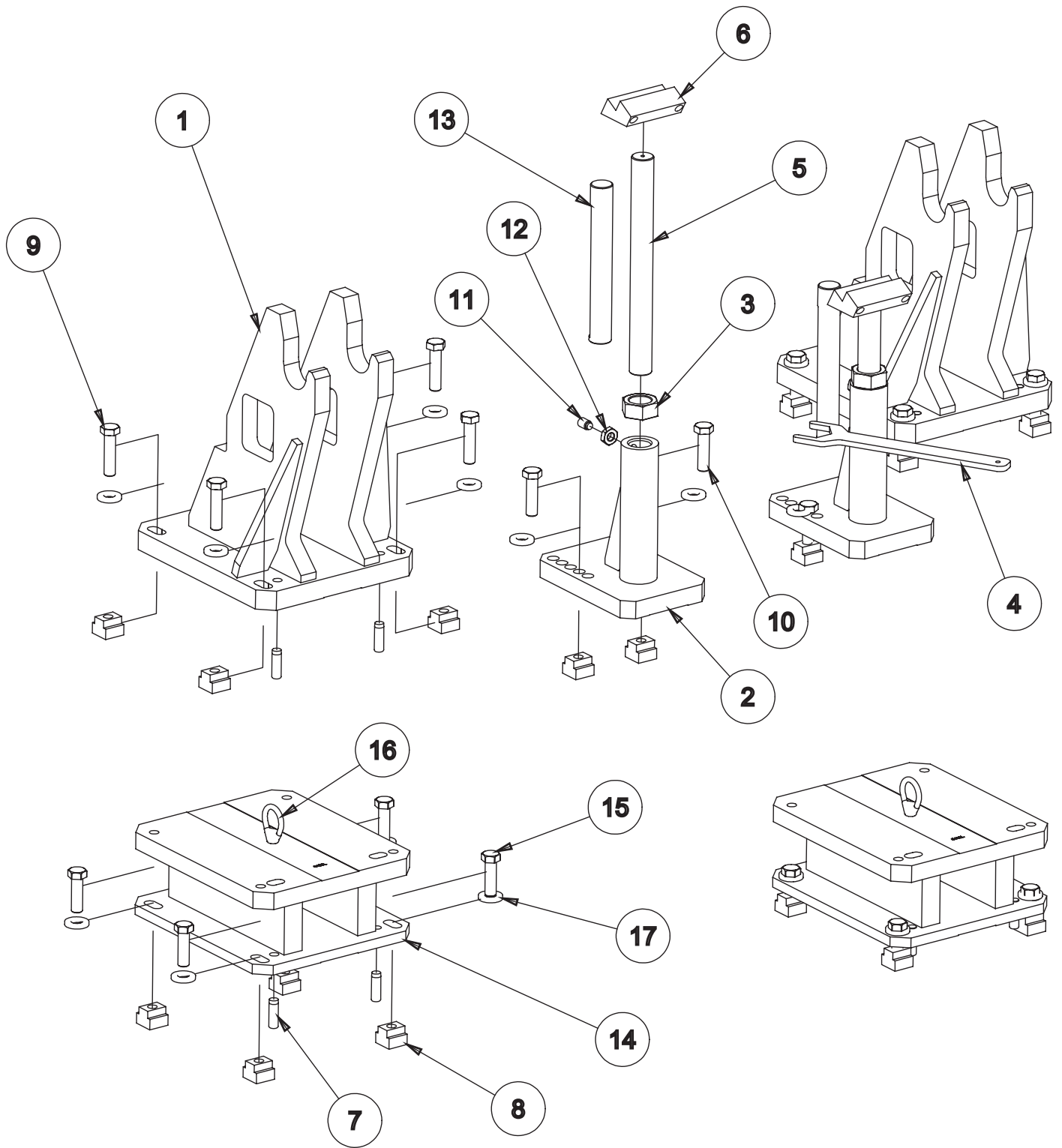


6309J CLAMP TOWER BASE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6309L	Block Clamp Base
2	1	6310N	HANDLE ASSEMBLY, CLAMP TOWER
3	4	6310Y	Brass Tipped Set Screw
4	1	6310R	Thread Insert
5	1	502-8-52C	Spring Plunger



6310D CLAMP LEG ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6310T	CLAMP LEG WELDMENT
2	1	6310H	Clamp Shoe
3	1	6310K	Hand Knob
4	1	502-8-52C	Spring Plunger
5	1	6310P	SPACER, LONG SPRING SHOCK F90 CLAMP LEG
6	1	MF-214	1/2 x 2 Dowel Pin
7	2	MF-227	1/4 x 1 1/4 Roll Pin
8	1	6310S	Spring
9	1	MF-67	FALT POINT SET SCREW 5/16-18UNC x 1/4" LG.

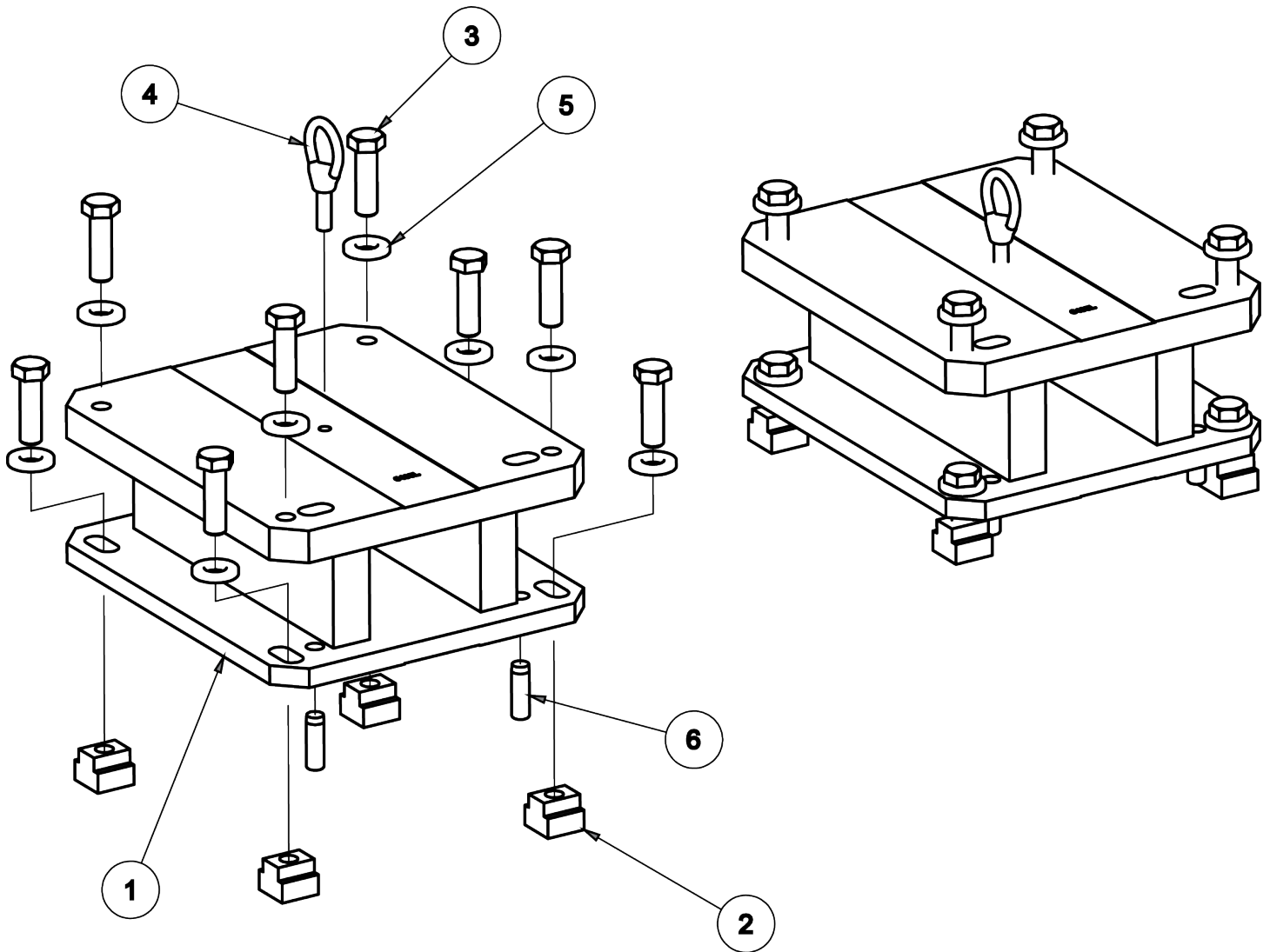
## 6405F Large V Block Fixture Parts



**6405F**  
LARGE DIESEL FIXTURE ASSEMBLY  
F90/F105

6405F LARGE V-BLOCK FIXTURE - F90/F105			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6405G	SUPPORT (MACHINING) LARGE V-BLOCK, UPPER BLOCK MACHINING - F90
2	2	6412A	JACK BODY (MACHINING) - 399 CAT BLOCK F80/90
3	2	6566H	Jacking Nut
4	1	6566K	WRENCH, JACKING NUT - DIESEL FIXTURING
5	2	6396B	Jacking Screw 15.5"
6	2	6413	Jacking Block
7	8	502-11-60	Dowel Pin 5/8 x 2
8	20	6160	Nut, T - Hardened
9	8	MF-154J	3/4-10UNC x 3" LG. HEX BOLT
10	4	MF-154H	3/4-10UNC x 2-3/4" LG. HEX BOLT
11	2	6395B	5/8-11UNC x 1" LG. HALF DOG SET SCREW
12	2	MF-173	5/8-11UNC HEX JAM NUT
13	2	6396A	JACKING SCREW - V-BLOCK FIXTURE 11.3" LG.
14	2	6405K	6" RISER (MACHINING), LARGE V-BLOCK FIXTURE - F100
15	8	MF-154C	3/4-10UNC x 2-1/2" LG. HEX BOLT
16	2	502-3-13	Lift Eye
17	20	6287	WASHER, THRUST 3/4"

**6405L Parallel Risers Parts**

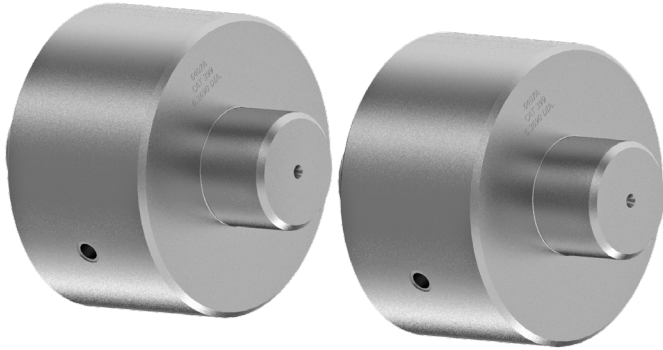


6405L 6" RISER ASSEMBLY - LARGE V-BLOCK FIXTURE - F100			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6405K	6" RISER (MACHINING), LARGE V-BLOCK FIXTURE - F100
2	8	6160	Nut, T - Hardened
3	16	MF-154C	3/4-10UNC x 2-1/2" LG. HEX BOLT
4	2	502-3-13	Lift Eye
5	16	6287	WASHER, THRUST 3/4"
6	4	502-11-60	5/8" DIA. x 2" LG. DOWEL PIN

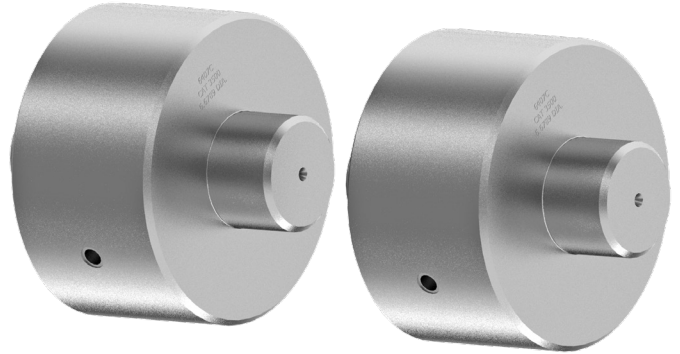
**Main Bearing Bore Locator Sets for 6405F Block Fixture**

If Customer Requires Size Other than Available from Stock, Rottler will Manufacture the Required Size.  
Customer Must Provide the Size, Including Tolerance of the Main Bearing Bore.

**6407A Locator Assembly, Main, CAT 399 / Large V-Block Fixture (Matched Pair)**



**6407C Locator Assembly, Main, CAT 3500 / Large V-Block Fixture (Matched Pair)**



**6407E Locator Assembly, Main, Cummins 1710 / Large V-Block Fixture (Matched Pair)**



**6407G Locator Assembly, Main, Cummins K50 / Large V-Block Fixture (Matched Pair)**



**6407J Locator Assembly, Main, Cummins QSK / Large V-Block Fixture (Matched Pair)**

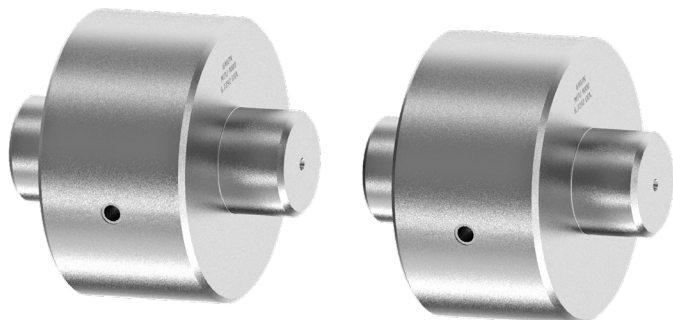


**6407L Locator Assembly, Main, Waukesha 7042 / Large V-Block Fixture (Matched Pair)**

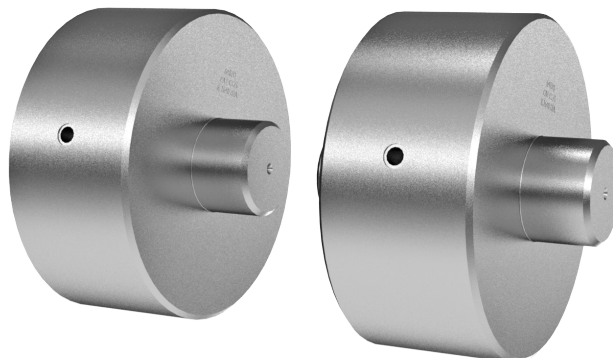




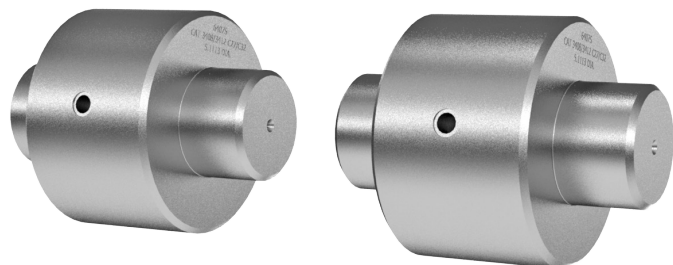
**6407N Locator Assembly, Main, MTU 4000 / Large V-Block Fixture (Matched Pair)**



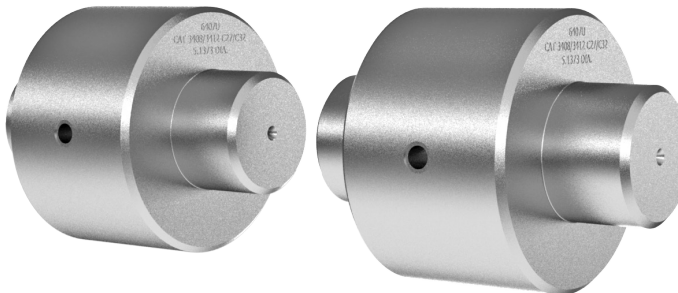
**6407Q Locator Assembly, Main, CAT C175 / Large V-Block Fixture (Matched Pair)**



**6407S Locator Assembly, Main, 5.1143 diameter bore (Matched Pair)**



**6407U Locator Assembly, Main, 5.1393 diameter bore (Matched Pair)**



**6407W Locator Assembly, Main, MTU 396**

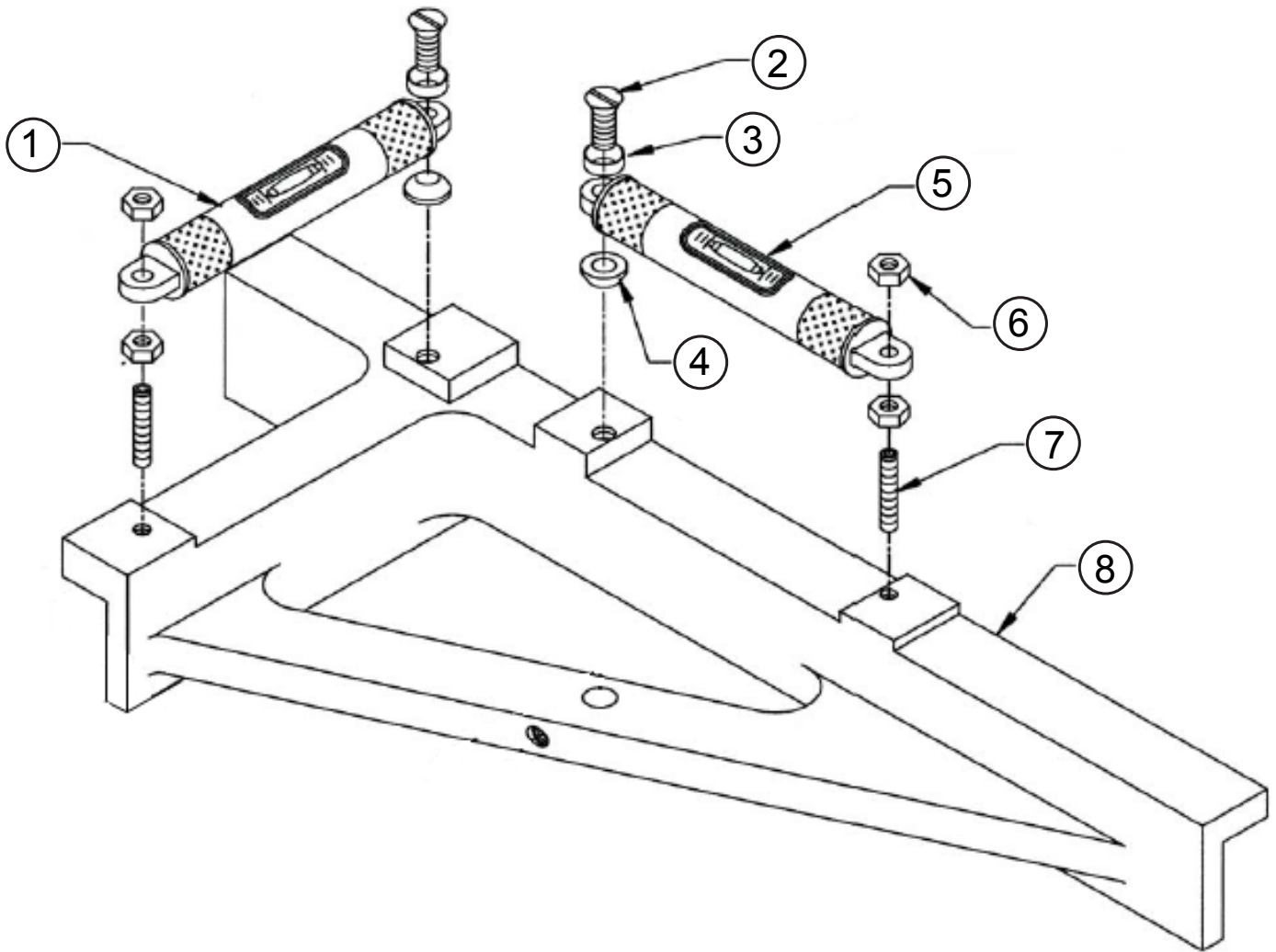


**6419 Locator, Assembly, Main, Jenbacher 3,4.2095" (106.92mm) (Matched Pair)**



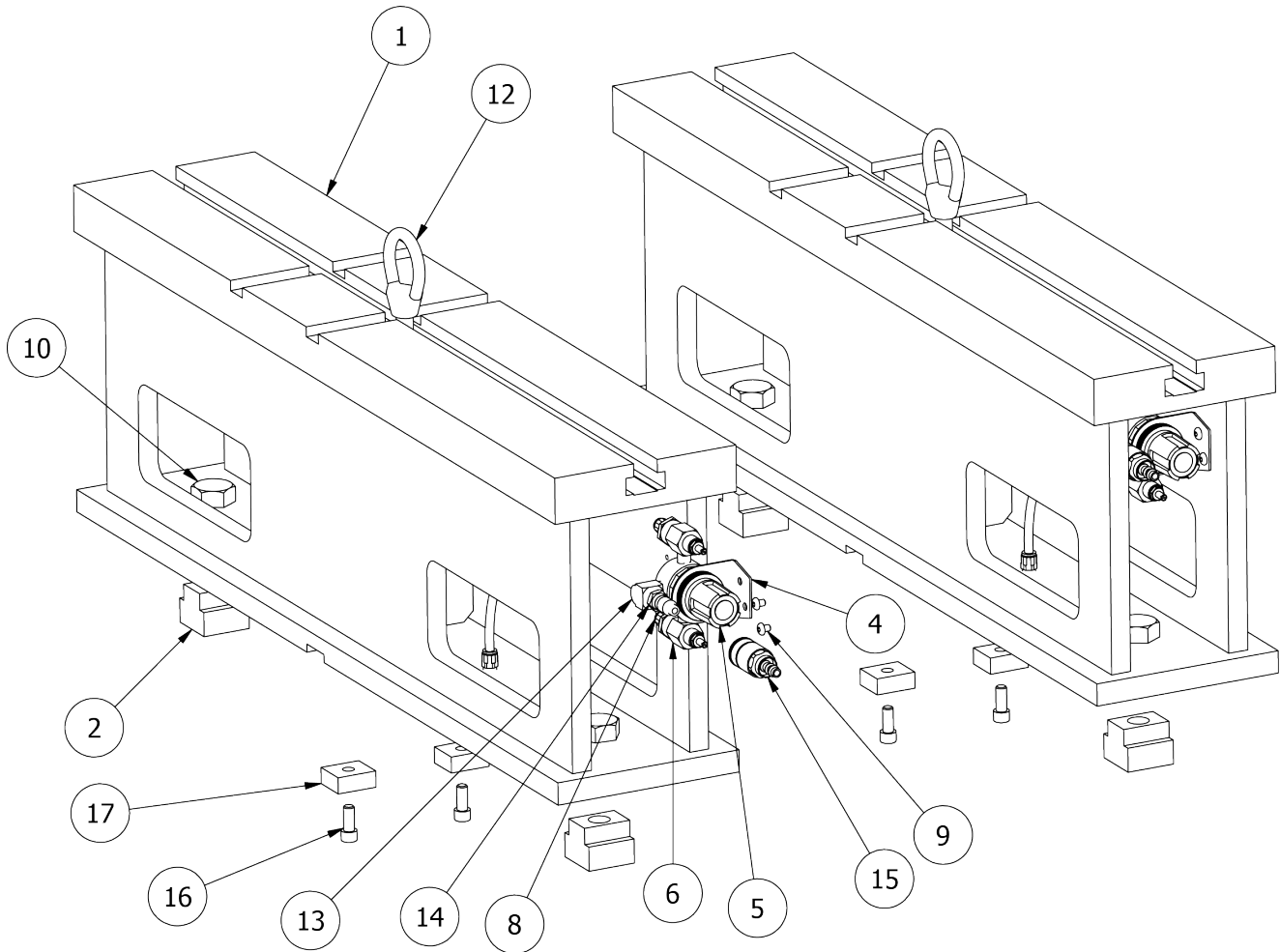


**7152A Dual Axis Level Assembly Parts**



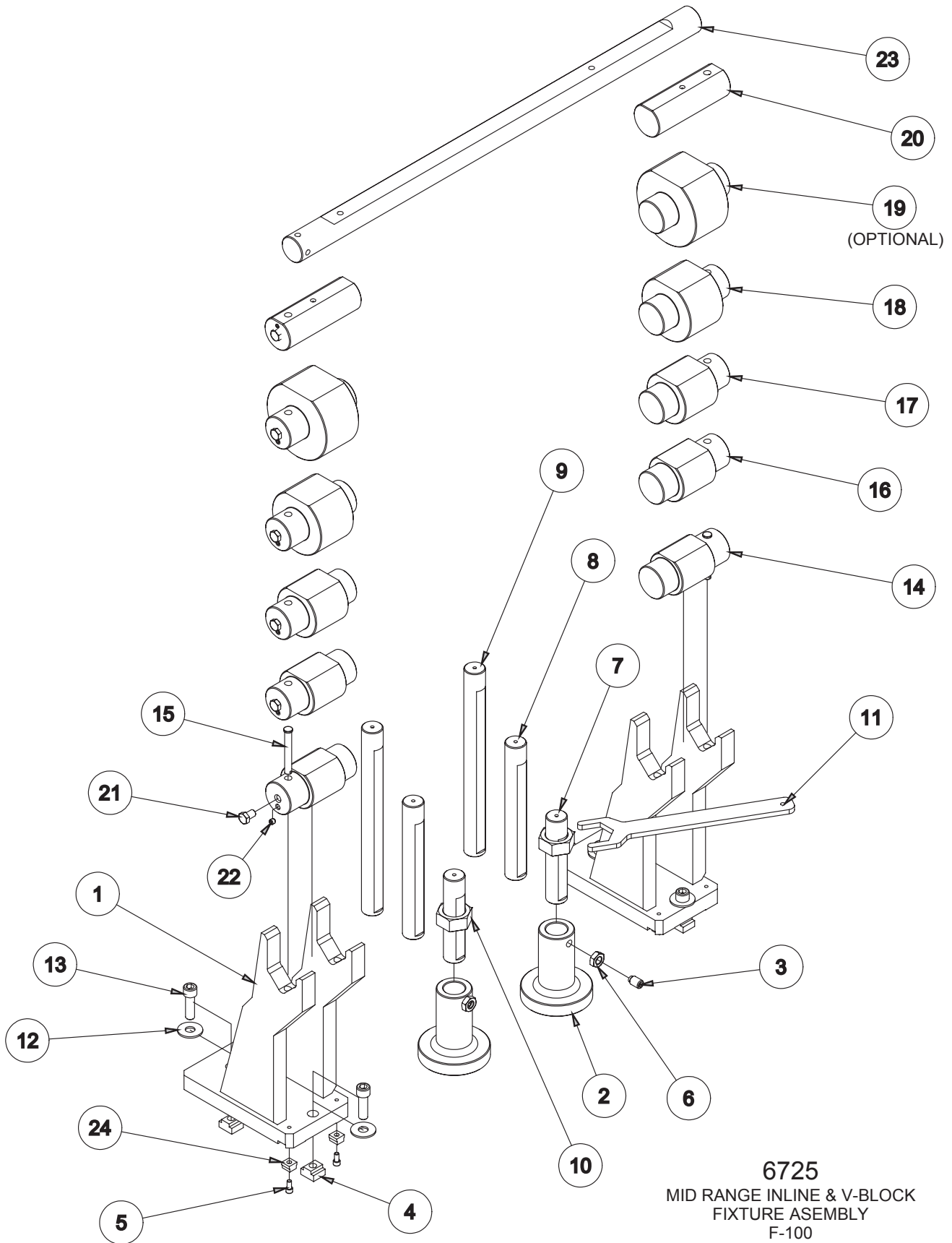
ITEM	PART #	DESCRIPTION
1	7152	VIAL ONLY LEVEL SF
2	7153G	SCREW,FLAT HEAD,12-24 HEAD SURFACING LEVEL
3	7153Z	WASHER, LEVEL MOUNTING (COUNTERSUNK HEAD)
4	7153V	WASHER, LEVEL MOUNTING (RADIUS HEAD)
5	7152C	COMPLETED VIAL LONGITUDINAL SF LEVEL ASSEMBLY
6	7153H	NUT,12-24 HEAD SURFACING LEVEL
7	7153J	SCREW,SOCKET SET 12-24 X 1" HEAD SURFACING LEVEL
8	7153S	BASE,HEAD SURFACE LEVEL

**6370Z Parallels Parts**



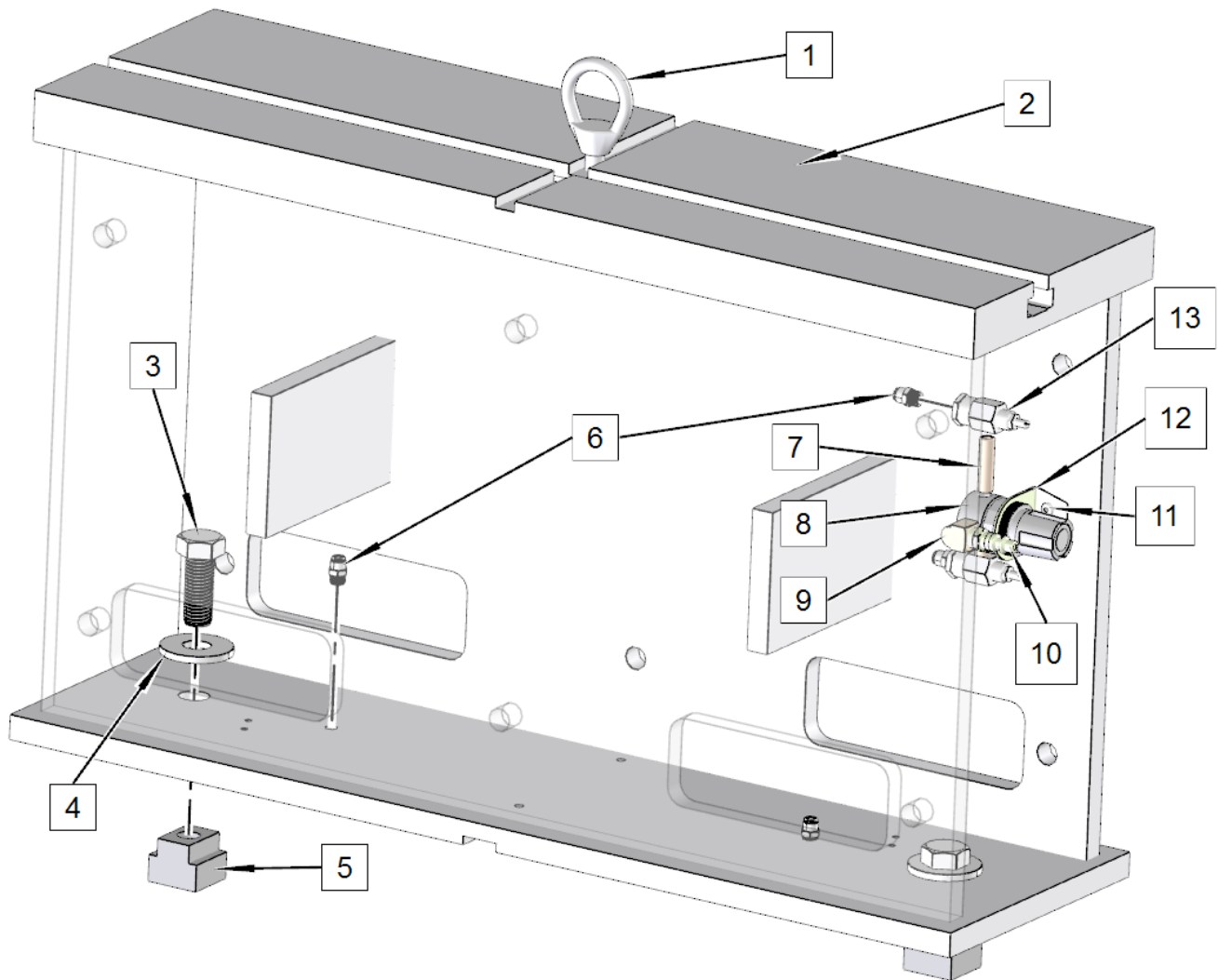
6370Z Parts List - 10" Parallels			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6370Y	10" Parallel Machining
2	4	6160	Nut, T - Hardened
4	2	502-27-17A	Regulator Bracket
5	2	502-27-17	Regulator 0 - 60 PSI
6	4	502-11-35A	Flo Control
7	4	502-11-17J	Close Nipple
8	8	514-4-17W	Legris Straight 1/4 x 1/8 npt
9	4	MF-87	10-24UNC x 1/4" LG. SOCKET BUTTON HEAD SCREW
10	4	MF-154B	3/4-10UNC x 1-3/4" LG. HEX BOLT
12	2	502-3-13	Lift Eye
13	2	502-11-17S	1/4 STREET ELL
14	2	502-11-16X	Quick Connect air Fitting Male
15	2	502-11-16W	Quick connect air fitting female
16	4	MF-21	5/16-18UNC x 5/8" LG. S.H.C.S.
17	4	6553K	Locating key

## 6725 Small to Mid-Range In-Line and V Block Fixture Parts



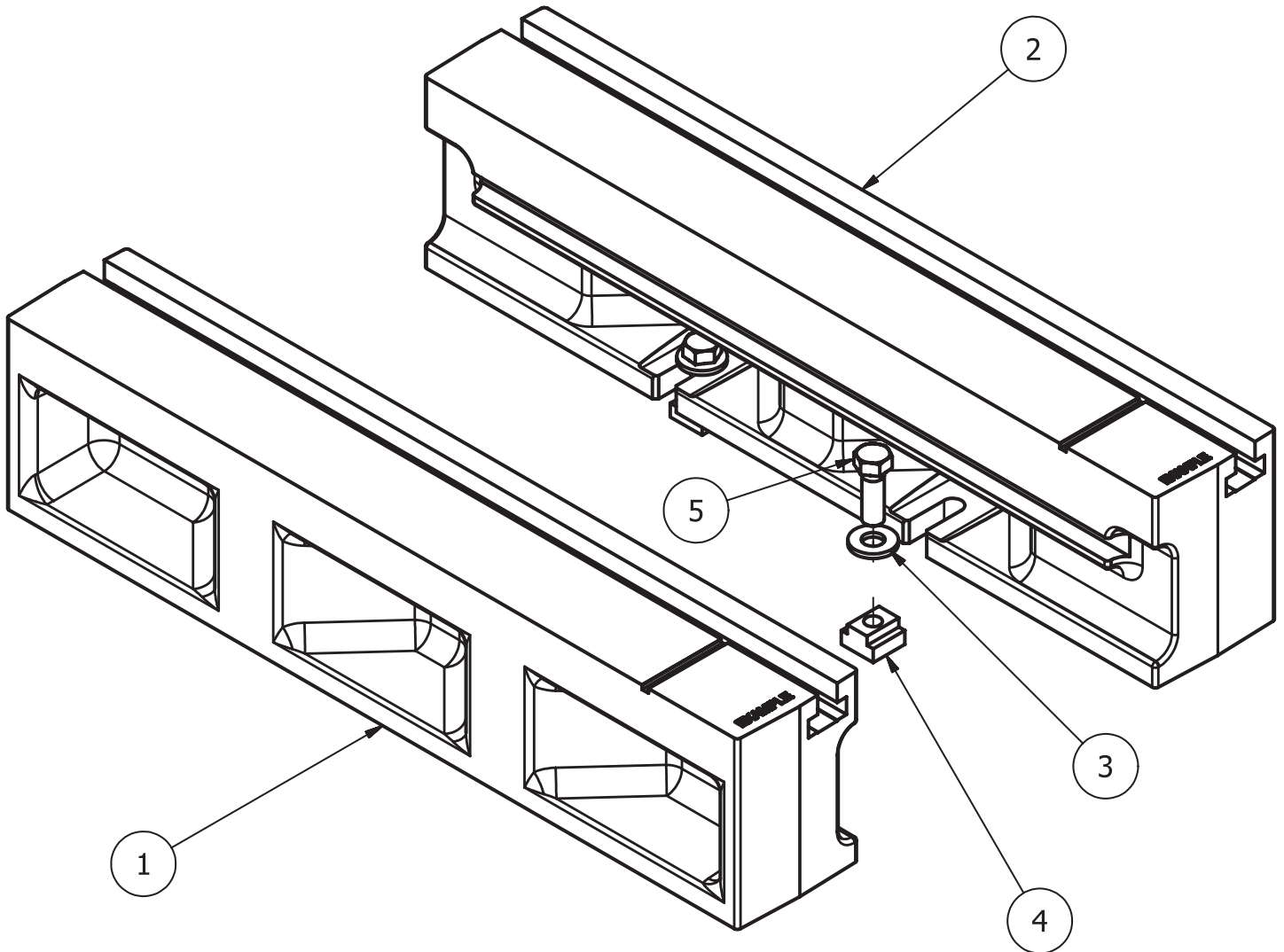
6725 MID RANGE INLINE & V-BLOCK FIXTURE ASSEMBLY - F100			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6553F	Machining, Main Bearing Support
2	2	6395D	JACK BODY
3	2	6395B	5/8-11 Half Dog 1" long
4	4	502-1-11A	3/4" T-Nut
5	4	MF-21	S.H.C.S. 5/16 - 18 UNC - 5/8
6	2	MF-173	5/8-11UNC HEX JAM NUT
7	2	6396	JACKING SCREW 7" LG.
8	2	6396A	JACKING SCREW 11-1/4" LG.
9	2	6396B	JACKING SCREW 15-1/2" LG.
10	2	6566H	Jacking Nut
11	1	6566K	WRENCH, JACKING NUT - DIESEL FIXTURING
12	4	MF-181	5/8" FLAT WASHER
13	4	MF-46D	S.H.C.S. 5/8 - 11 UNC - 2
14	2	6787C	LOCATOR, MAIN BEARING 3.22 TO 3.50 DIA.
15	2	6553H	PIN, LOCATION - DIESEL FIXTURE
16	2	6787D	Locator, main Bearing 3.50 to 4.00 dia.
17	2	6787E	Locator, main Bearing 4.00 to 5.00 dia.
18	2	6787F	Locator, main Bearing 5.00 to 6.00 dia.
19	2	6787G	Locator, main Bearing 6.00 to 7.00 dia. (OPTIONAL)
20	2	6787M	Locator, Main Bearing 2-1/2-3" dia.
21	10	MF-137E	1/2-13UNC x 3/4" LONG HEX BOLT
22	10	6788Q	SCREW, SET - BRASS TIPPED 3/8-16UNC x 5/16"
23	1	7241E	LOCATOR BAR, ECONOMY HEAD AND BLOCK FIXTURE
24	4	6869A	STEP KEY 3/4" - 5/8"

**6370C Parallels Parts**



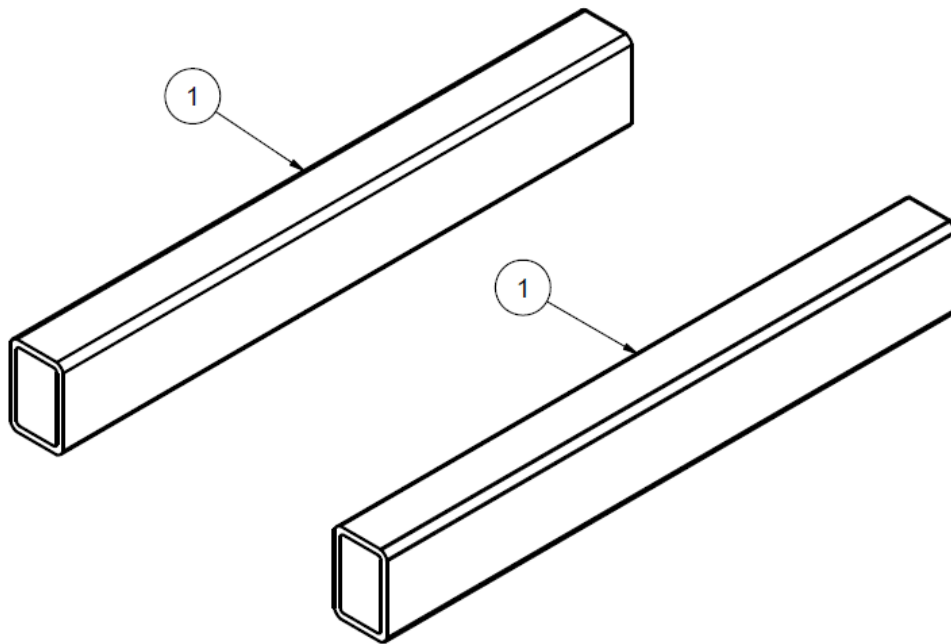
ITEM	PART #	DESCRIPTION
1	502-3-13	EYE, LIFTING
2	6370K	SUPPORT, PARALLEL
3	MF-154K	HEX BOLT 3/4-10 X 2"
4	MF-181A	FLAT WASHERS 3/4"
5	6160	NUT, "T"-HARDENED
6	514-4-17W	FITTING 1/8 NPT X 1/4 POLY STRAIGHT
7	502-11-17J	NIPPLE,CLOSE 1/8" MPT
8	502-27-17	REGULATOR,AIR 0-60 PSI
9	502-11-17S	ELBOW, ST, 1/4 FPT X 1/4 MPT
10	502-11-16X	CONNECTOR, MALE THREAD 1/4 NPTF
11	MF-87	SOCKET BUTTON HEAD SCREW 10-24 X 1/4"
12	502-27-17A	BRACKET, MOUNTING - REGULATOR
13	502-11-35A	VALVE, CONTROL - RFC FLO

**7219W Heavy Duty T-Slot Universal Parallels Parts**



7219W Parts List - 5.19" Parallels			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7219V	Riser, 5.19" Left Hand
2	1	7219T	Riser, 5.19" Right Hand
3	4	100-19A	Hardened washer 17/32 I.D.
4	4	650-3-10	TN-5 T-Nut
5	4	MF-137A	1/2-13UNC x 1-1/2" LG. HEX BOLT

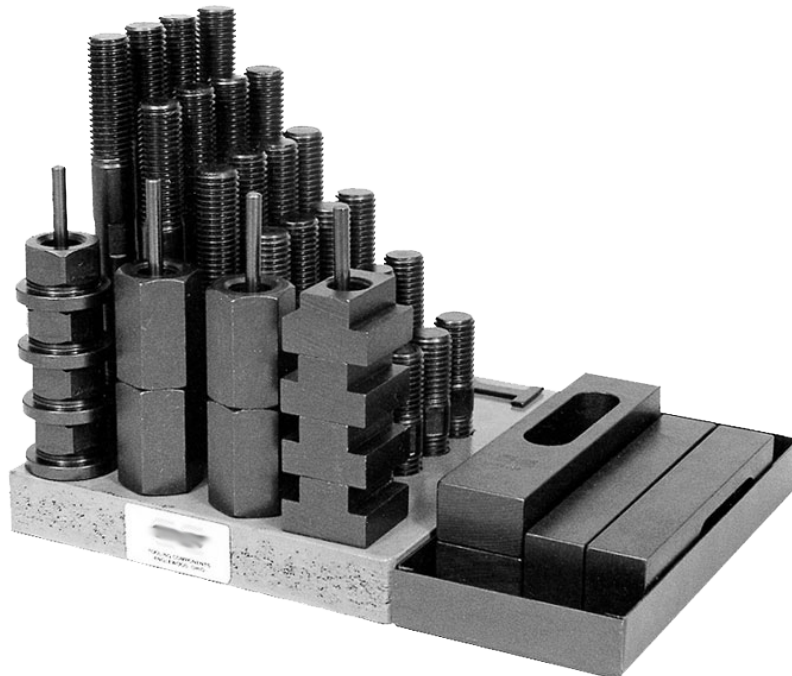
**11115 Parallels Parts**



11115 2" x 3" PARALLEL SET			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	11115A	2" x 3" PARALLEL

**6511 3/4" (19.05mm) Clamp Kit**

Sold only as complete kit.

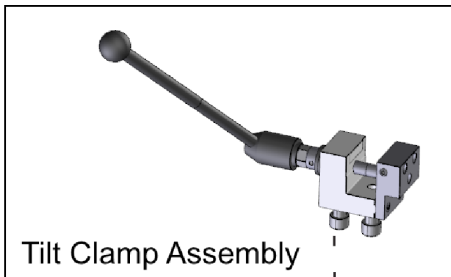
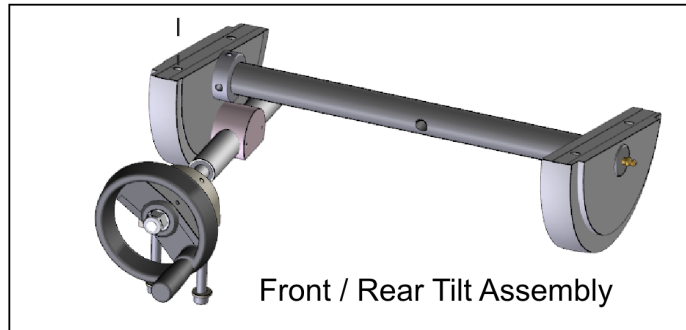
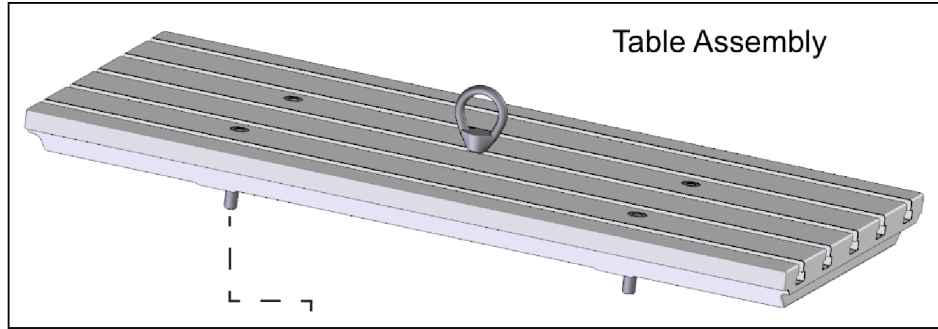




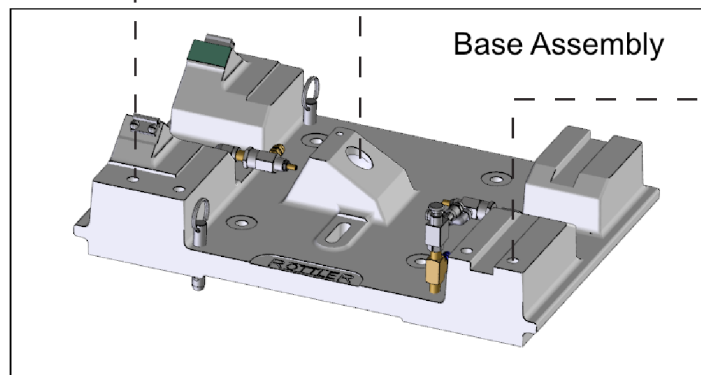
# Fixturing for Surfacing Cylinder Heads and Manifolds

## 7209M Leveling Table Sections

### 7209M Leveling Table Sections

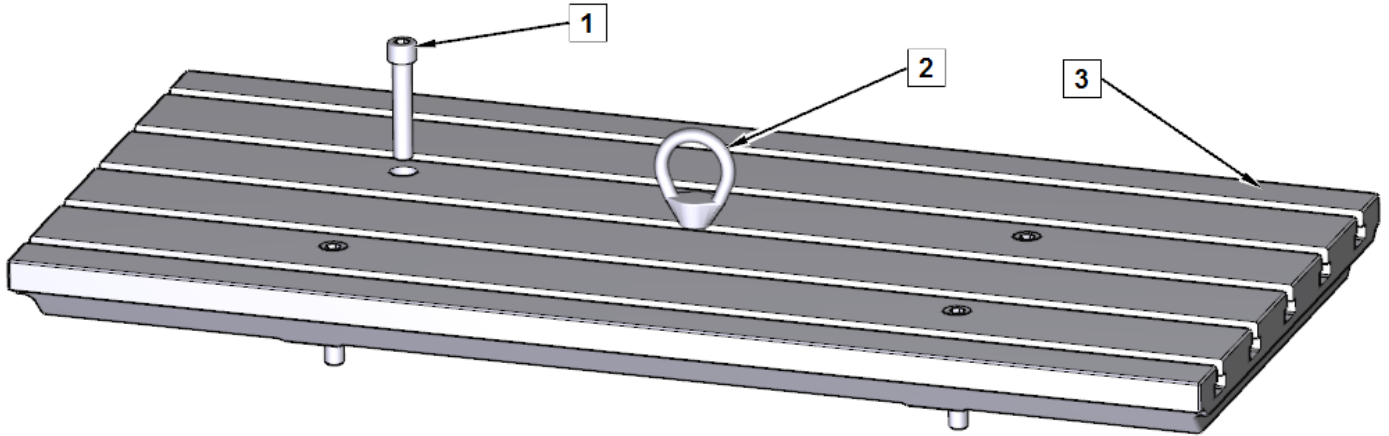


### Tensioner Assembly



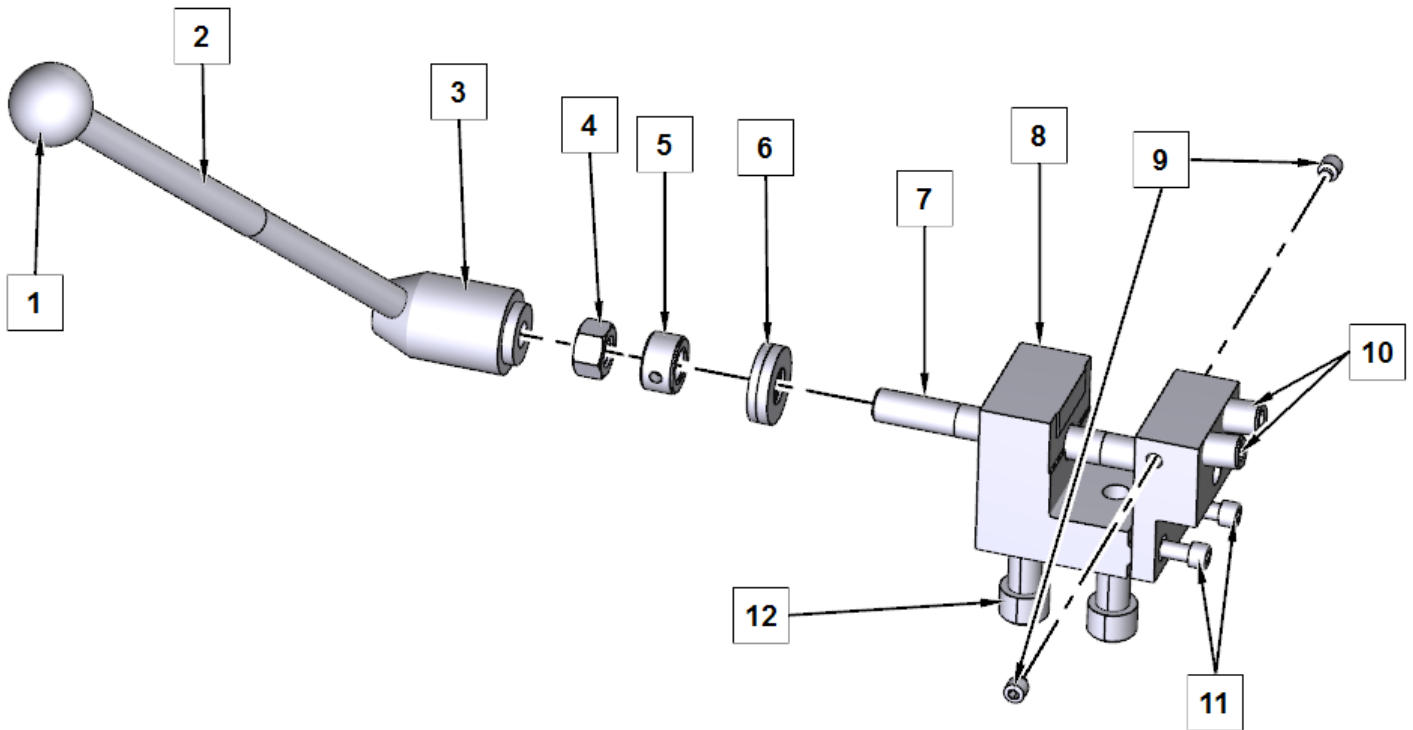


**Table Section Parts**



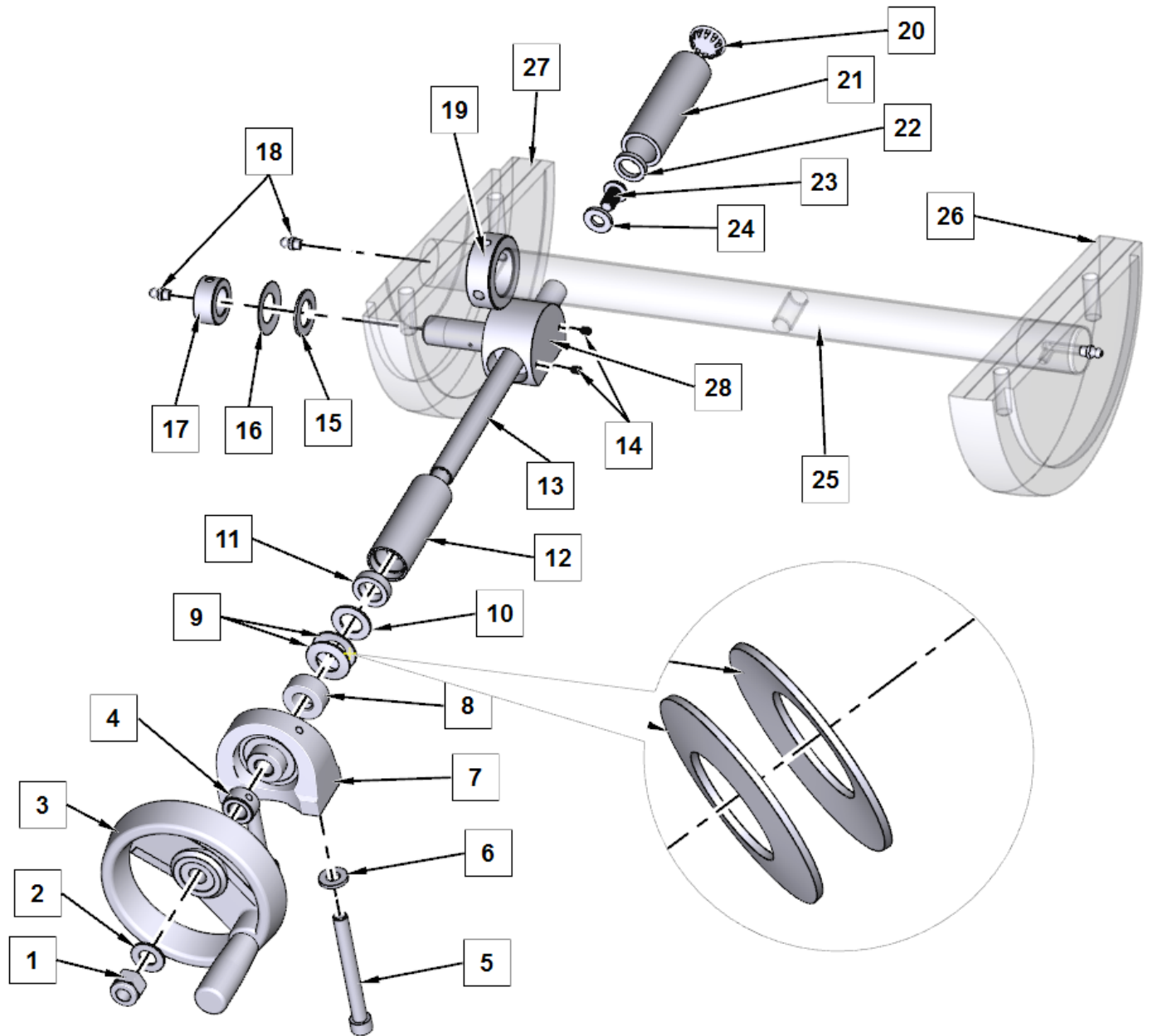
ITEM	PART #	DESCRIPTION
1	MF-45	SOCKET HEAD CAPSCREW 1/2-13 X 2"
2	502-3-13	EYE, LIFTING
3	7207C	TABLE, DUAL AXIS HEAD FIXTURE

**Tilt Clamp Section Parts**



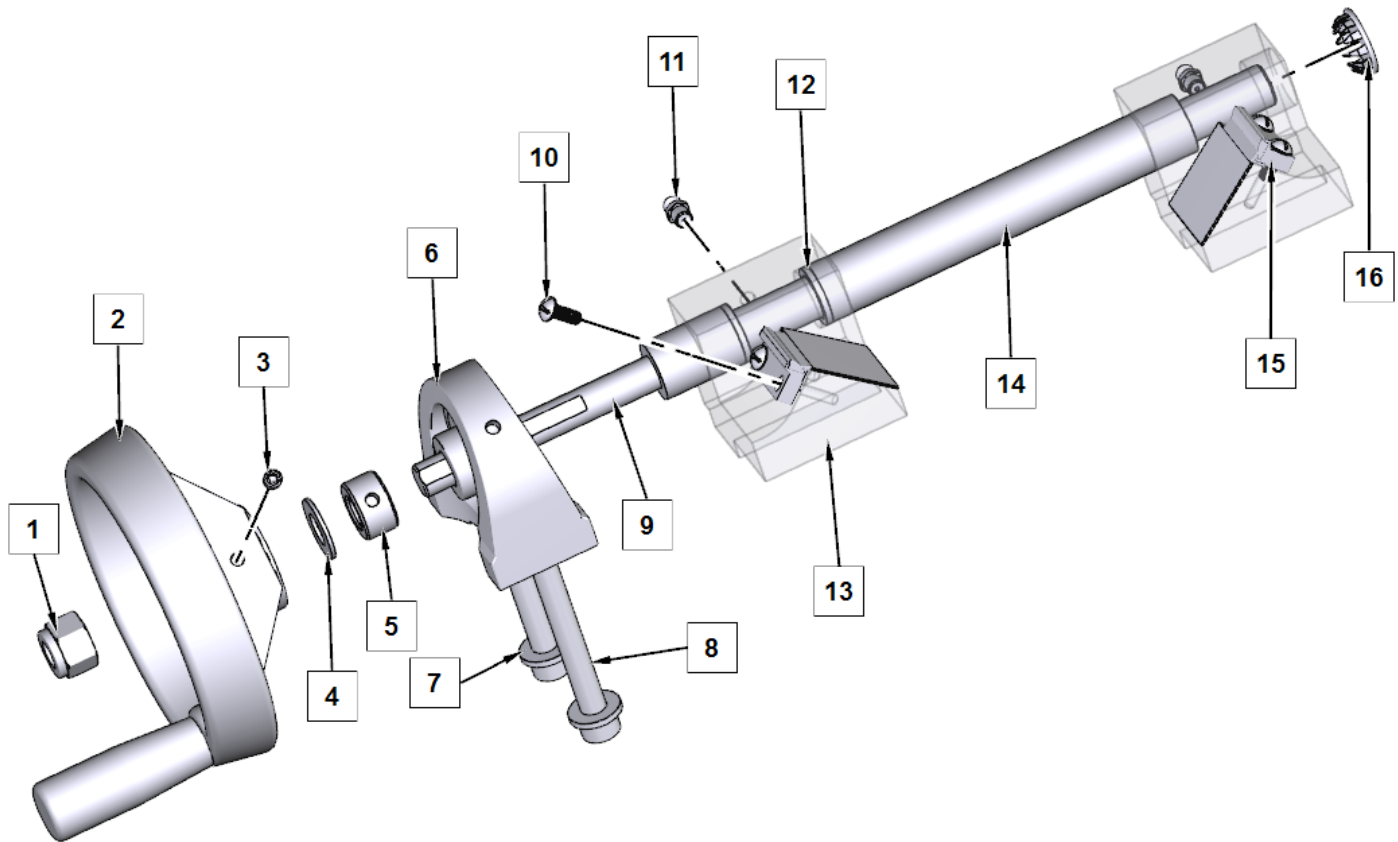
ITEM	PART #	DESCRIPTION
1	514-2-39E	KNOB, ADJUSTABLE HANDLE
2	514-2-39B	EXTENDER, ADJUSTABLE HANDLE
3	514-2-39D	HANDLE, ADJUSTABLE-CLAMP STOP
4	MF-165	HEX NUT 1/2-13 NC
5	7209J	COLLAR, 1/2" SHAFT
6	7209E	WASHER, SPHERICAL
7	7207Z	SHAFT, JOURNAL CLAMP
8	7210J	CLAMP BLOCK, JOURNAL CLAMP
9	504-29-36	SCREW, SET - BRASS TIPPED 5/16-18NC X 5/16"
10	7209B	SCREW, SET 1/2-20UNF X 3/4" (BRASS TIPPED)
11	MF-12	SOCKET HEAD CAP SCREW 1/4-20 X 1/2"
12	MF-45	SOCKET HEAD CAP SCREW 1/2-13 X 2"

## Front / Rear Tilt Section Parts



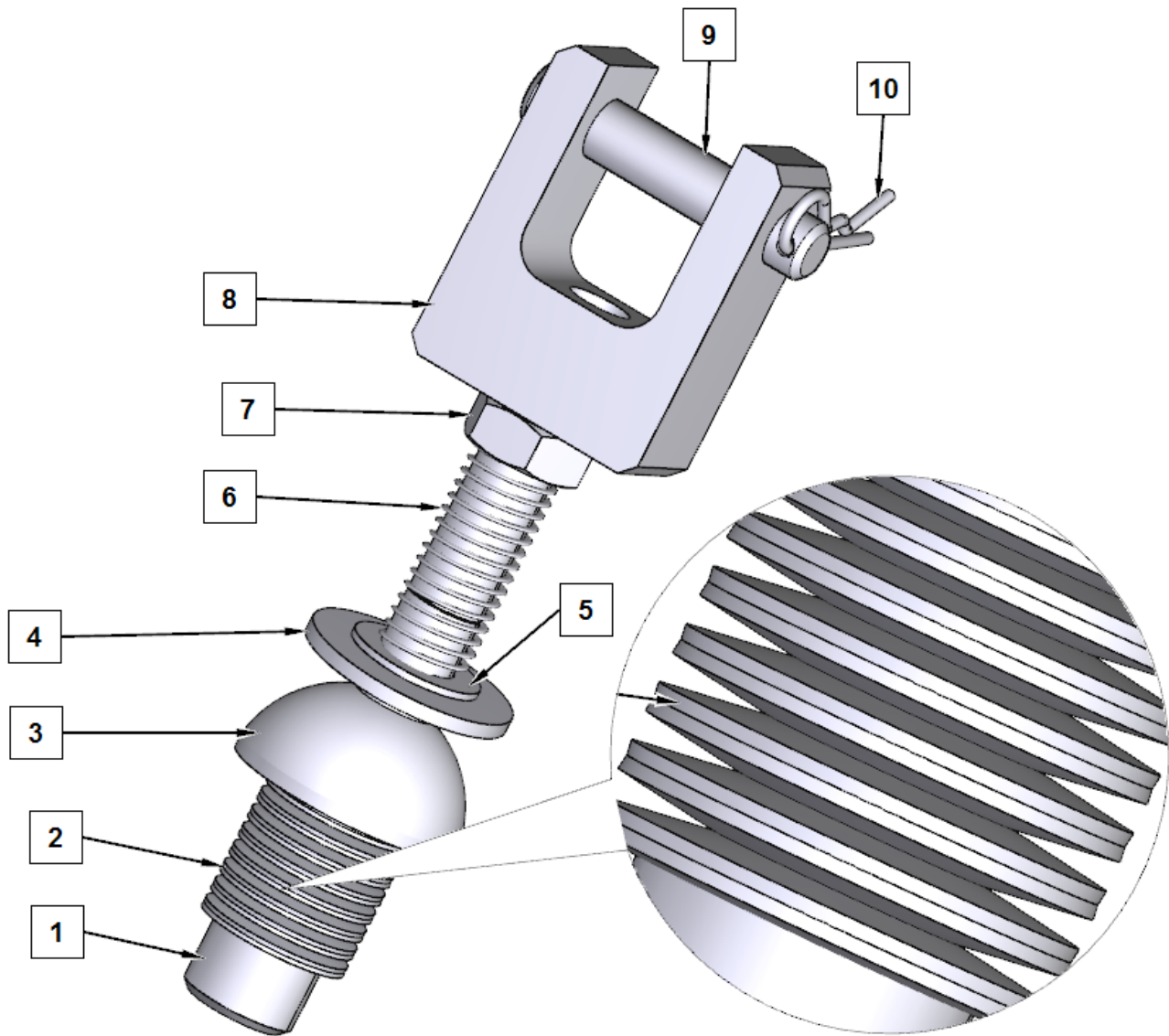
ITEM	PART #	DESCRIPTION
1	MF-186	NYLOCK NUT 1/2-13 NC
2	100-19	WASHER, THRUST
3	7201M	HANDWHEEL
4	7209J	COLLAR, 1/2" SHAFT
5	MF-36A	SOCKET HEAD CAP SCREW 3/8-16 X 3 1/2"
6	100-28-32	WASHER, 3/32" THICK
7	7201D	BLOCK, PILLOW LEVEL ADJUST
8	7199E	COLLAR, SUPPORT BLOCK (5/8" DIA)
9	514-7-21	WASHER, BELLEVILLE
10	514-7-20	WASHER, THRUST
11	7209F	SEAL, PIVOT NUT TUBE
12	7201Y	TUBE, SEALED-PIVOT NUT
13	7209Q	SHAFT, FRONT/REAR TABLE TILT
14	MF-52	SOCKET SET SCREW CUP POINT 10-24 X 1/4"
15	514-2-90	WASHER, THRUST
16	7209K	WASHER, BELLEVILLE-PIVOT NUT
17	7201X	COLLAR, PIVOT NUT
18	MF-189	1/4-28 STRAIGHT LUBE GREASE FITTING
19	7207X	COLLAR, CLAMP BAR-1 1/4"
20	506-3-1	PLUG, SNAP IN HOLE-7/8"
21	7201T	TUBE, CAPPED-PIVOT NUT
22	514-7-35	O RING, LEVELING TABLE
23	MF-97	SOCKET BUTTON HEAD SCREW 3/8-16 X 5/8"
24	100-28-32	WASHER, 3/32"
25	7207V	BAR, CLAMP
26	7207J	JOURNAL, RIGHT
27	7207H	JOURNAL, LEFT

## Left / Right Tilt Section Parts



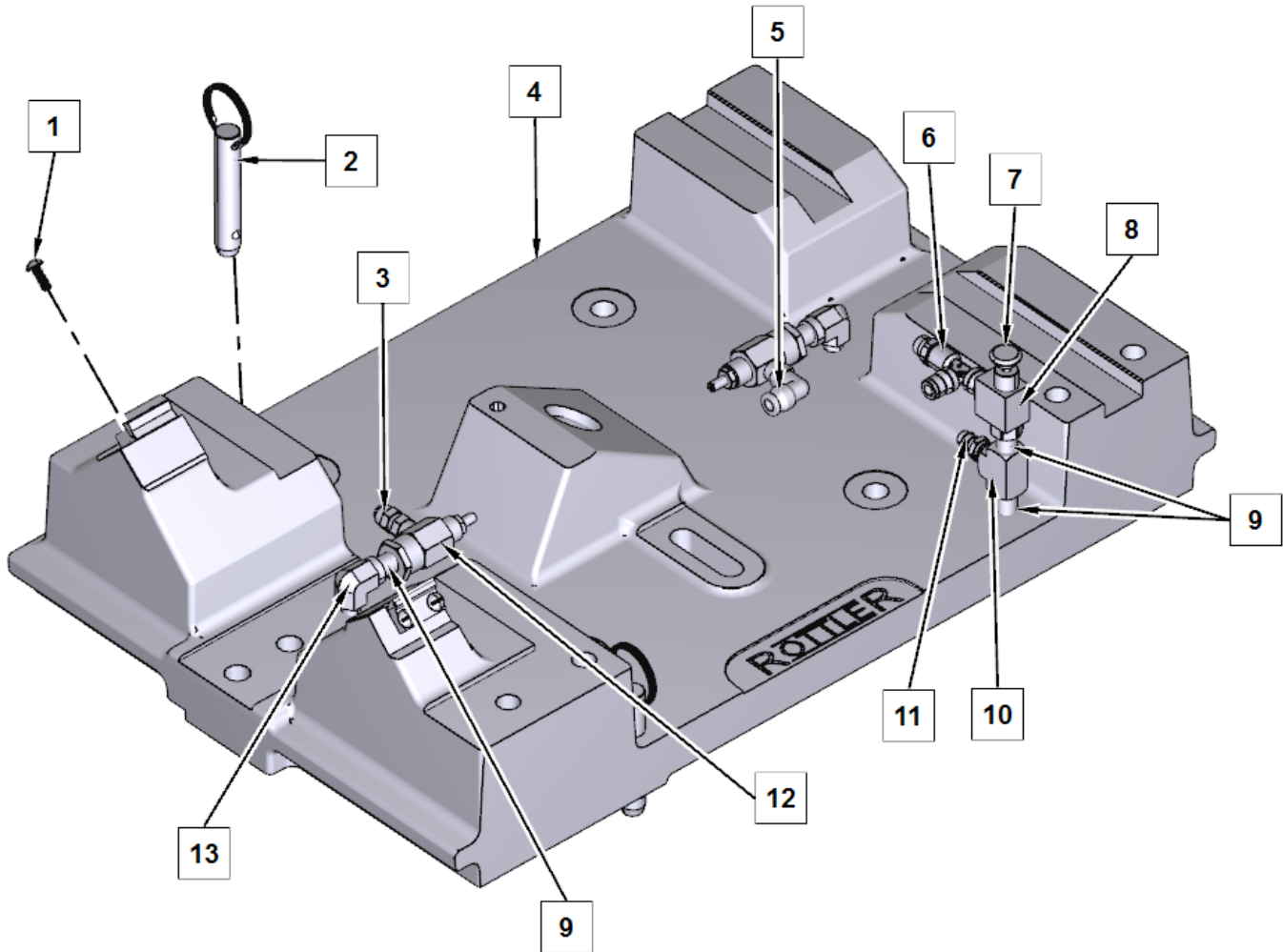
ITEM	PART #	DESCRIPTION
1	MF-186	NYLOCK NUT 1/2-13 NC
2	7201M	HANDWHEEL
3	MF-60	SOCKET SET SCREW CUP POINT 1/4-20 X 1/4"
4	100-19	WASHER, THRUST
5	7209J	COLLAR, 1/2" SHAFT
6	7201D	BLOCK, PILLOW LEVEL ADJUST
7	100-28-32	WASHER, 3/32"
8	MF-36A	SOCKET HEAD CAP SCREW 3/8-16 X 3 1/2"
9	7207M	SHAFT, LEFT/RIGHT TILT
10	MF-111	ROUND HEAD MACHINE SCREW 10-24 X 1/2"
11	MF-189	1/4-28 STRAIGHT LUBE GREASE FITTING
12	7209H	BUMPER, LEFT/RIGHT PIVOT
13	7222	BLOCK, FRONT BEARING
14	7207N	COVER, LEFT/RIGHT TILT SHAFT
15	7198Y	WIPER, JOURNAL
16	506-3-1	PLUG, SNAP IN HOLE-7/8"

**Tensioner Section Parts**



ITEM	PART #	DESCRIPTION
1	7209W	SCREW, CLAMP BAR
2	514-7-21	WASHER, BELLEVILLE
3	7209U	WASHER, SPHERICAL-HOLD DOWN
4	MF-181	FLAT WASHERS 5/8"
5	514-7-20	WASHER, THRUST
6	100-28-20C	SPRING,HOLD DOWN
7	MF-173	HEX JAM NUT 5/8-11 NC
8	7209S	ROD END, CLAMP BAR
9	7210B	PIN, CLEVIS
10	7232K	HITCH PIN CLIP

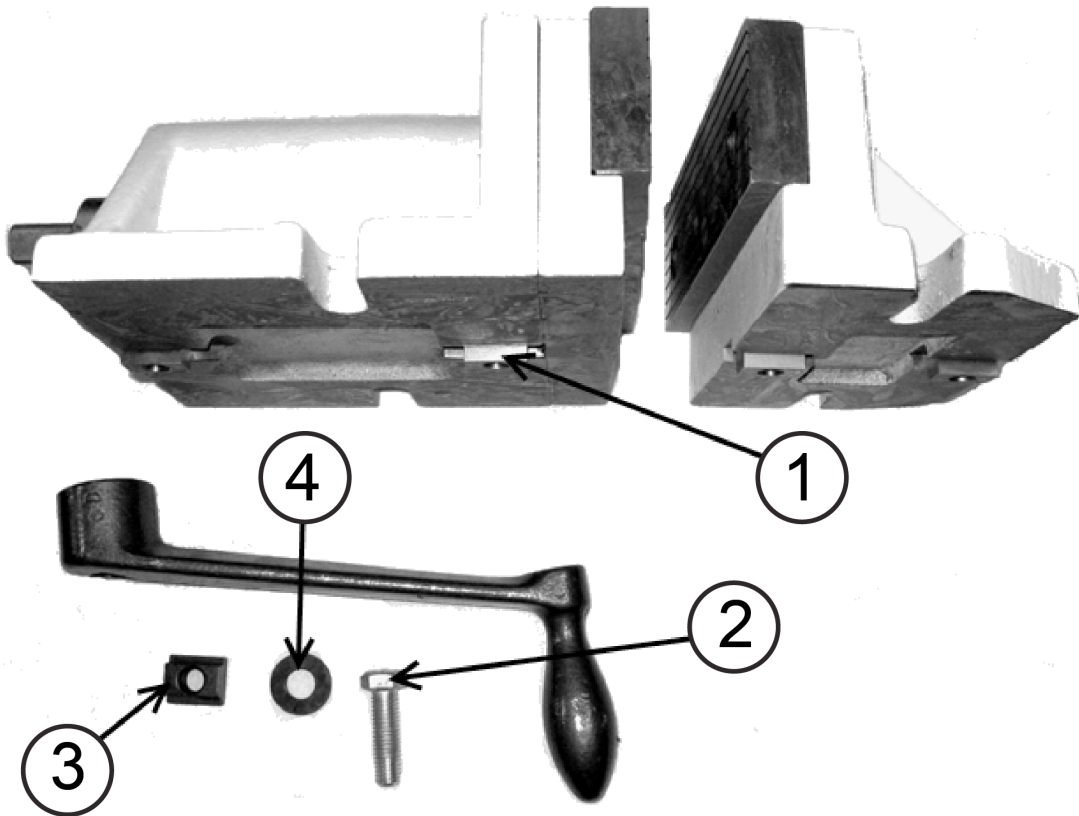
**Base Section Parts**



ITEM	PART #	DESCRIPTION
1	MF-111	ROUND HEAD MACHINE SCREW 10-24 X 1/2"
2	7210C	PIN, GUIDE ROTTLER LEVELING TABLE
3	502-11-16E	CONNECTOR, MALE, 1/4 X 1/8" PT
4	7233	FRAME, TABLE
5	514-4-17E	ELBOW, 90 DEGREE MALE - 1/4" X 1/8" NPT
6	514-4-17X	TEE, RUNNING 1/8-NPT X 1/4
7	502-1-56	PUSHBUTTON
8	514-2-65	VALVE, AIR - LIMIT & STOP
9	502-11-17J	NIPPLE,CLOSE 1/8" MPT
10	502-11-17C	TEE, 1/8 X 1/8"
11	502-1-96A	INSERT, BARBED - HOSE
12	502-11-35A	VALVE, CONTROL - RFC FLO
13	502-11-17R	ELBOW, ST, 1/8 FPT X 1/8 MPT



## 7209N 2-Piece Vise



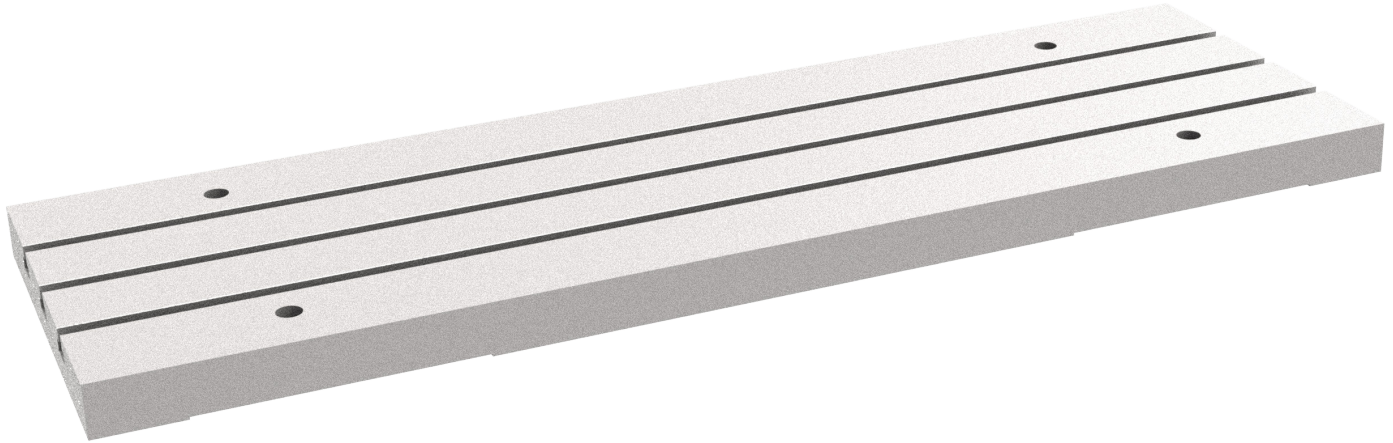
ITEM	PART #	DESCRIPTION
1	7210E	KEY, STEPPED
2	MF-137F	HEX BOLT 1/2-13 X 1 3/4"
3	7137B	NUT, "T"
4	100-19A	WASHER, HARDENED 17/32" ID



## Adaptor for F60 Model Fixtures

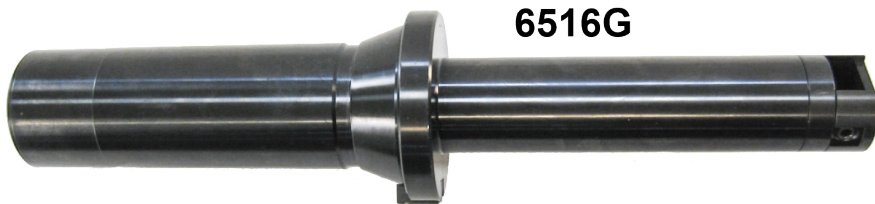
### 9111A T-Slot Plate

Sold only as complete assembly.

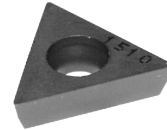


## Boring and Sleeving Tooling

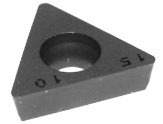
### 6516H Blind Hole Stub Cutterhead Package Components



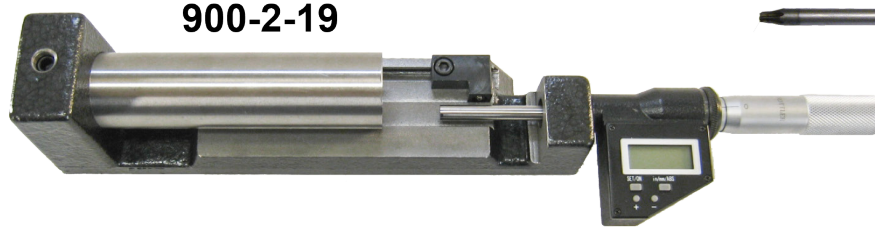
6516G



RT321



RT322

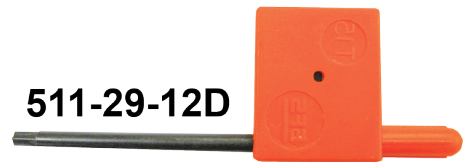


900-2-19

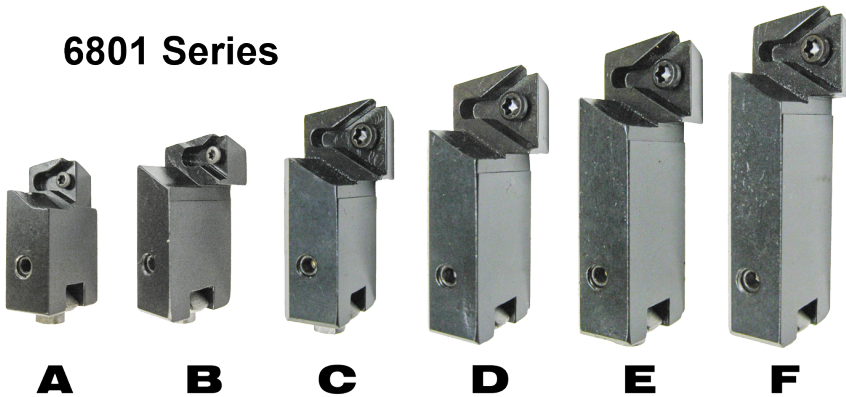
T8D



511-29-12D



6801 Series



A

B

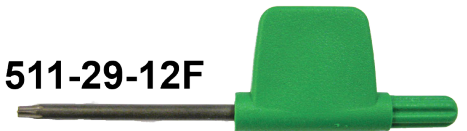
C

D

E

F

511-29-12F



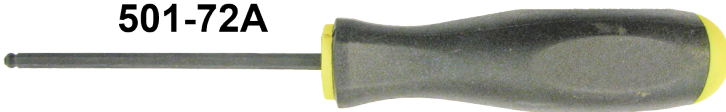
RT321F



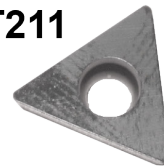
RT322F



501-72A



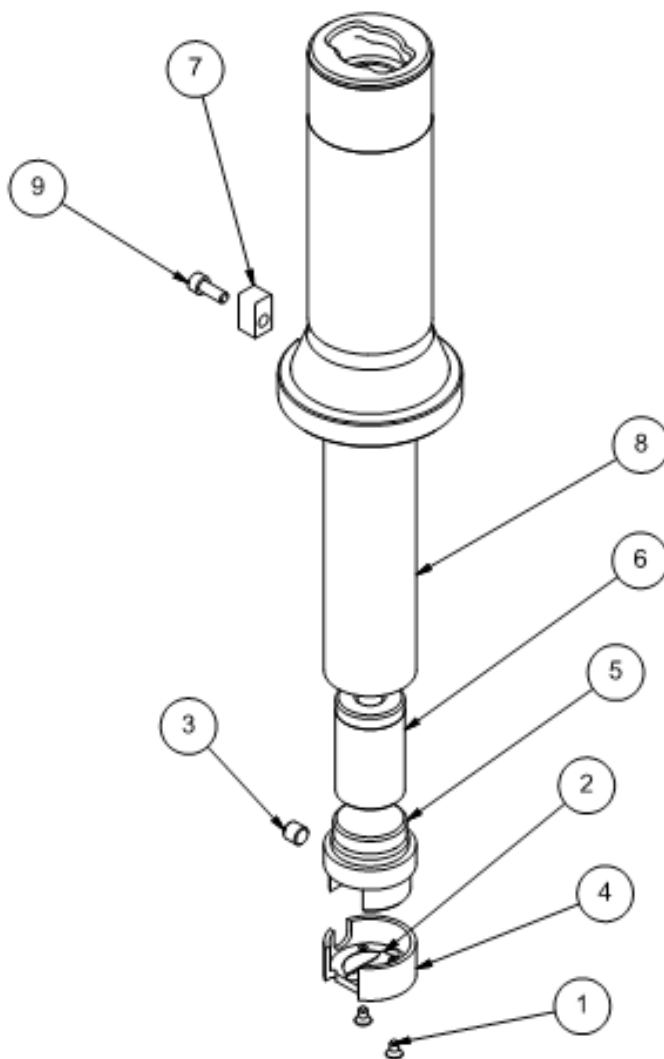
RT211



RT212

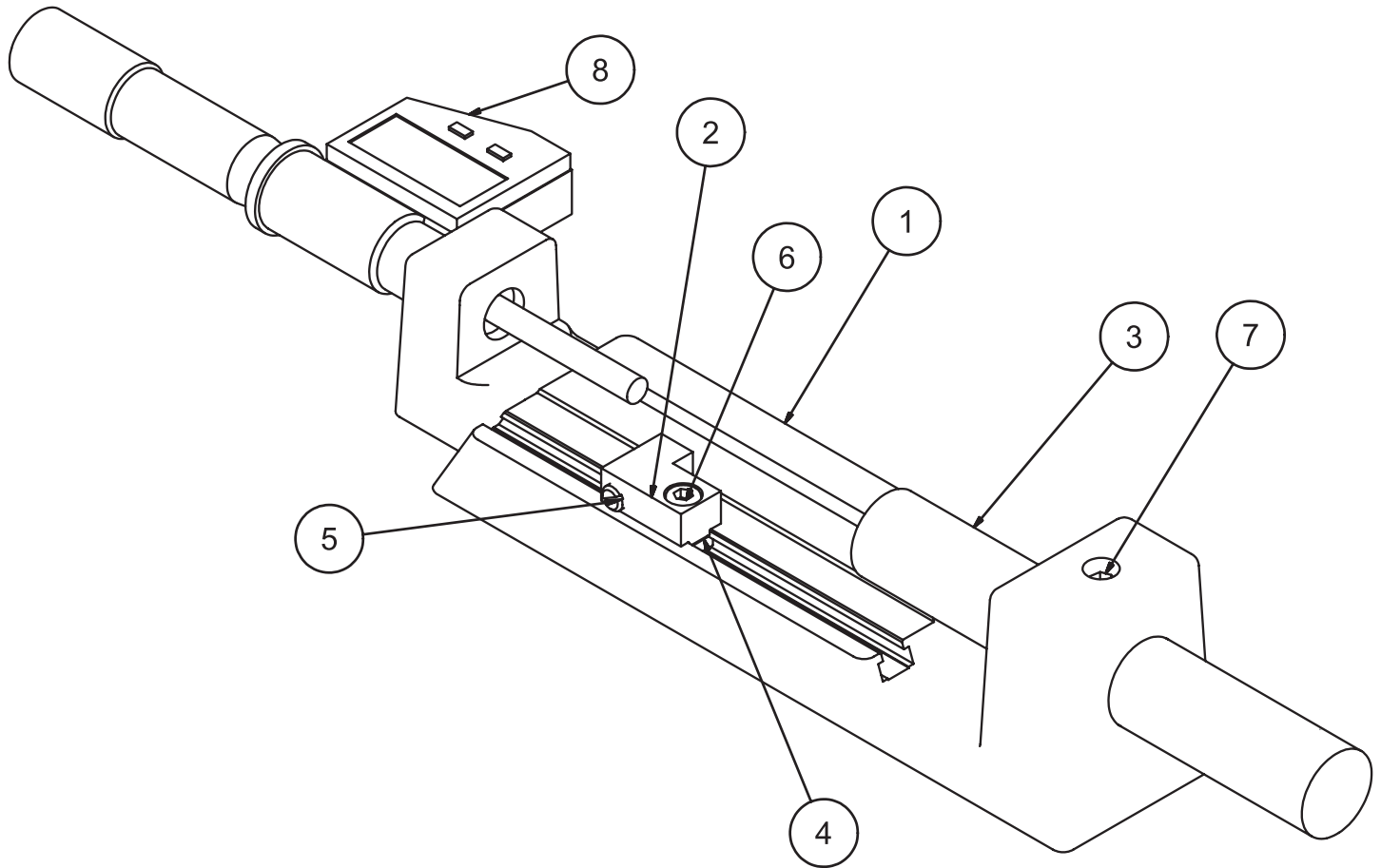


**6516G Cutterhead Parts**



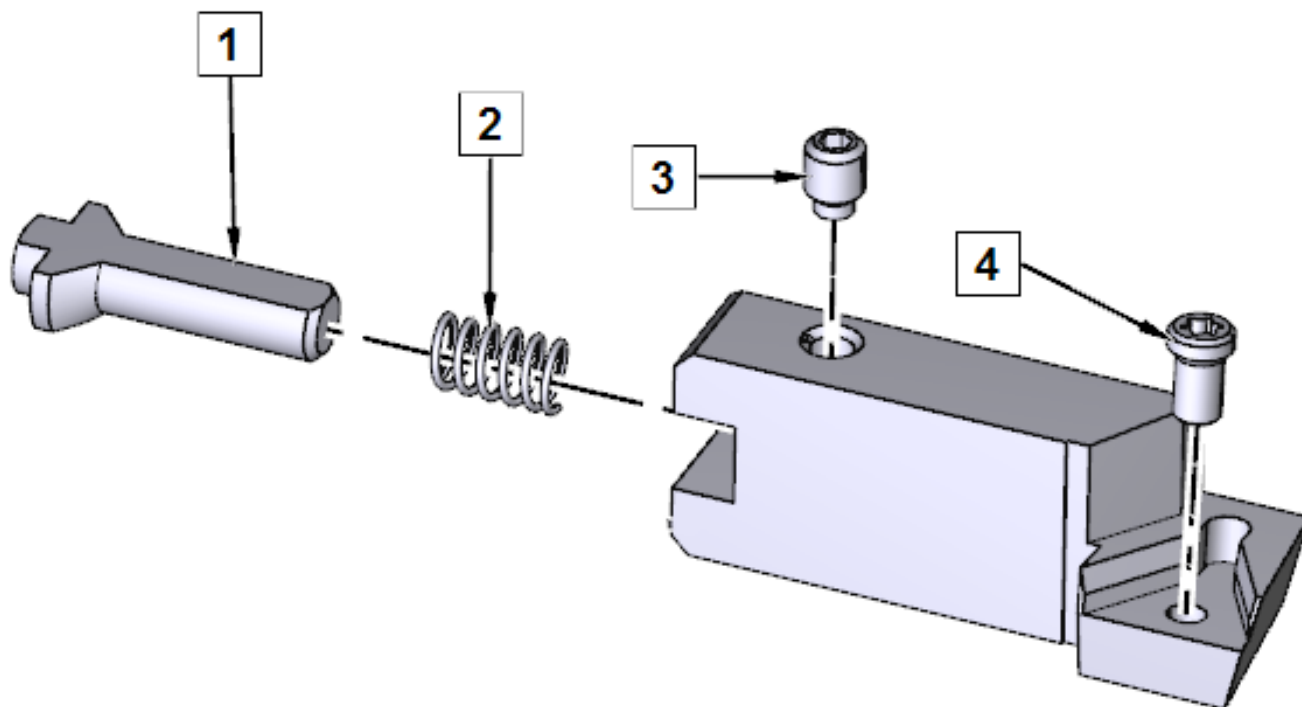
6516G 1-1/2 Stub Bar			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	MF-120A	Socket Flat Head 6-32 UNC x 0.25
2	1	100-1B	Tool Lock Spring
3	1	502-25-1	Tool Holder Lock Screw
4	1	600-5	Cutter Head Cap
5	1	600-7-2D	Lower Body 1-1/2" Stub Bar
6	1	600-8-2	Counter Weight
7	1	6181	DRIVE KEY
8	1	6516F	Adapter - 1-1/2" Stub Bar F-9
9	1	MF-5A	S.H.C.S. 10 - 24 UNC - 1/2

**900-2-19 Micrometer Parts**



900-2-19 Micrometer Assembly			
ITEM	QTY	PART NUMBE	DESCRIPTION
1	1	502-30-10B	Frame
2	1	502-30-10M	Clamp Block
3	1	502-31-10A	Anvil
4	1	502-30-10J	Square Nut
5	1	502-30-10K	Ball Plunger
6	1	ANSI B18.3 - No. 10 - 24 UNC - 3/8	Hexagon Socket Head Cap Screw
7	1	502-30-10L	Brass Tipped Set Screw
8	1	501-34-2R	Digital Micrometer Head

**6801 Series Insert Holder Parts**

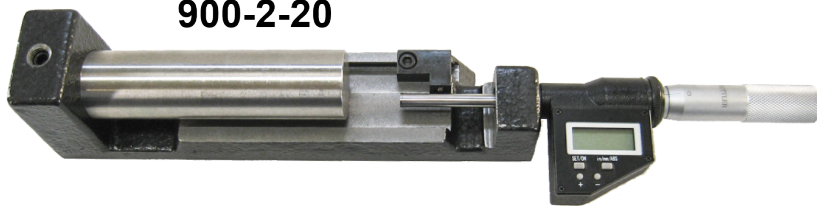


ITEM	PART #	DESCRIPTION
1	100-82-3B	PIN ADJUSTING LONG INDEXABLE INSERT TOOLHOLDER
2	100-82-1	SPRING, ADJUSTING PIN
3	100-82-2	SCREW,SET-BRASS GIB - 3/16" LONG
4	511-29-12C	SCREW, TORX M4 X .7 X .315" LONG

### 6519Z Blind Hole Stub Cutterhead Package Components

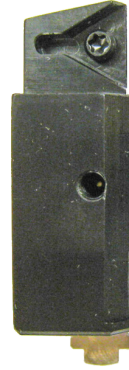


**6519Y**



**900-2-20**

### 6593 Series



**D**



**C**

### 6520 Series



**A**



**B**



**H**

### 6598 Series



**K**

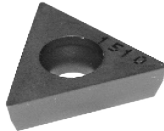


**R**



**M**

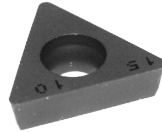
### RT321



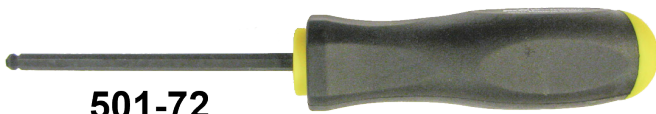
### RT322F



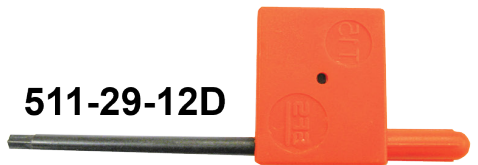
### RT322



### RT321F



**501-72**

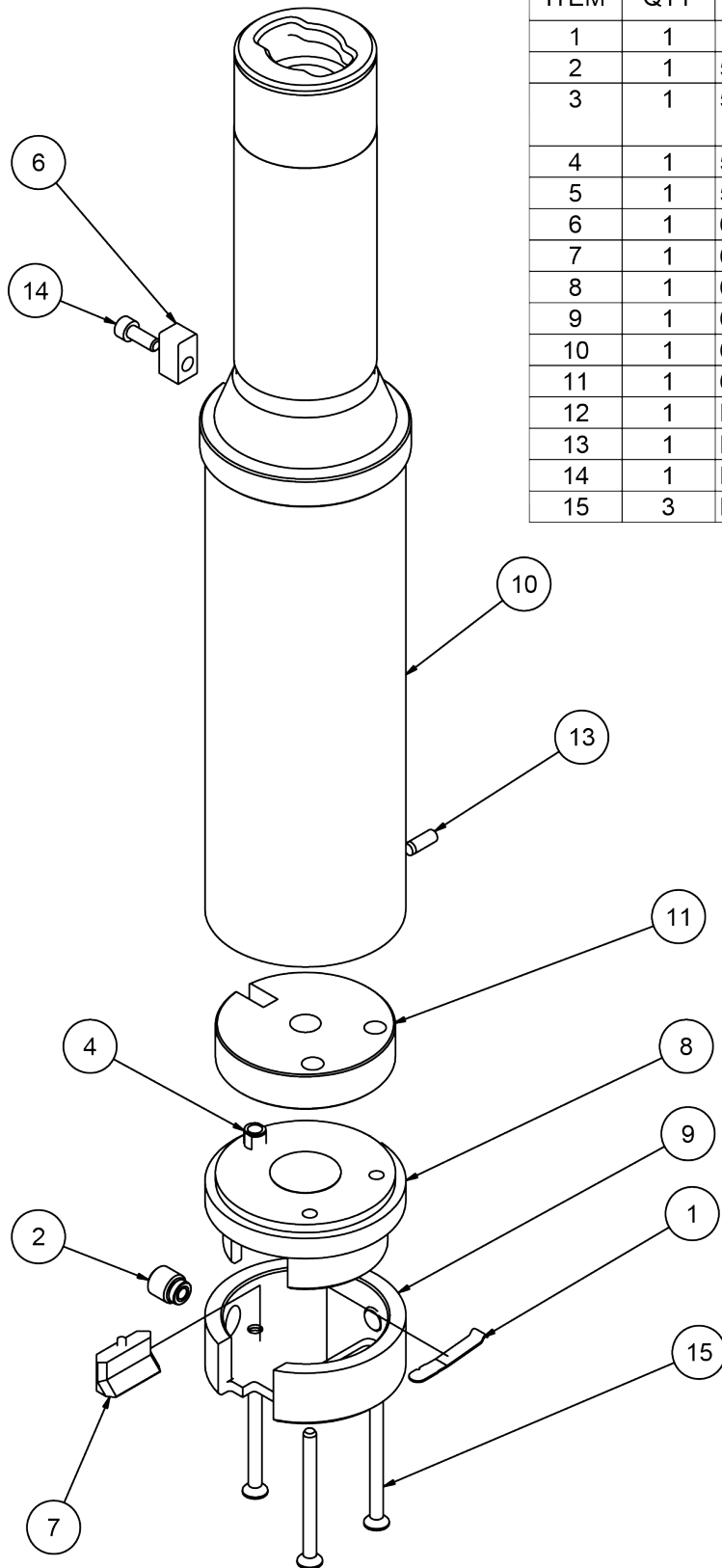


**511-29-12D**

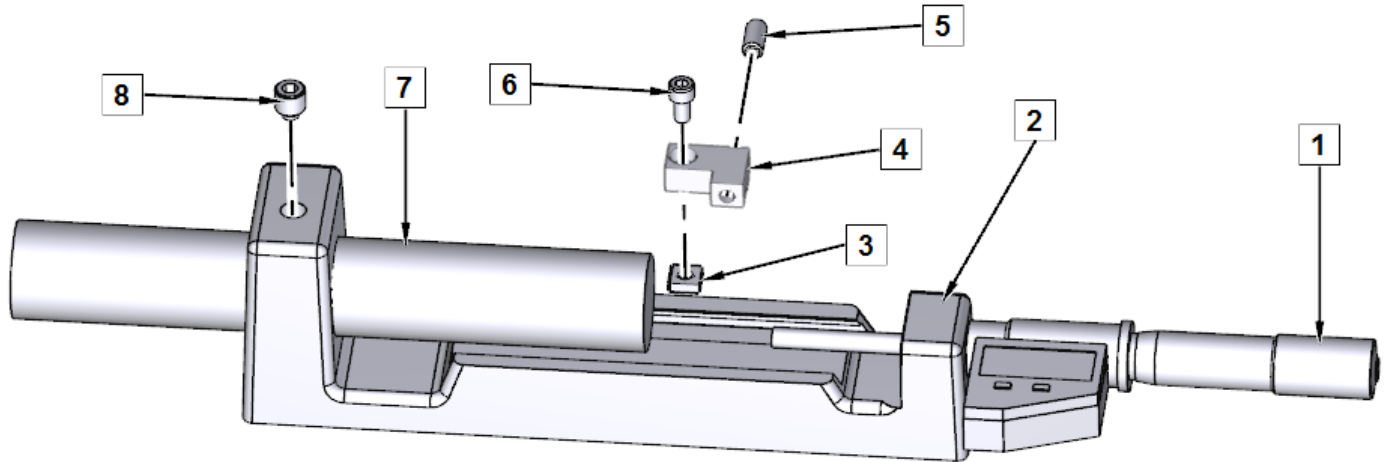


**6519Y Cutterhead Parts**

6519Y 2-7/8 Stub Bar			
ITEM	QTY	PART NUM	DESCRIPTION
1	1	100-1A	Tool Lock Spring
2	1	501-70A	Tool Holder Lock Screw ass'y
3	1	502-12-4D	SOCKET SET SCREW, BRASS TIPPED 8-32 X 1/8
4	1	502-2-45B	Bushing - Counterweight
5	1	502-2-85B	Index Screw
6	1	6181	DRIVE KEY
7	1	6263A	Tool Holder Clamp Screw
8	1	650-2-16	BODY, 2.9" STUB BAR F60
9	1	650-2-17	Cap, 2.9" Stub Bar
10	1	6519X	Adapter, 2.9 Dia. Blind Hole
11	1	6521	Counter Weight
12	1	MF-193	1/8 x 1/2 Dowel Pin
13	1	MF-196	3/16 x 1/2 Dowel Pin
14	1	MF-5A	S.H.C.S. 10 - 24 UNC - 1/2
15	3	MF-81C	Socket Flat Head 10-24 UNC x 2.25



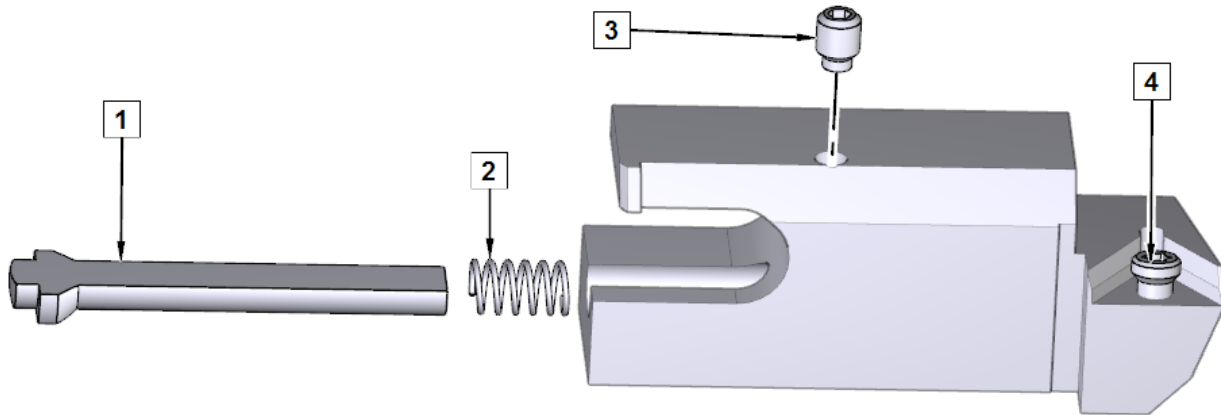
## 900-2-20 Micrometer Parts



ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

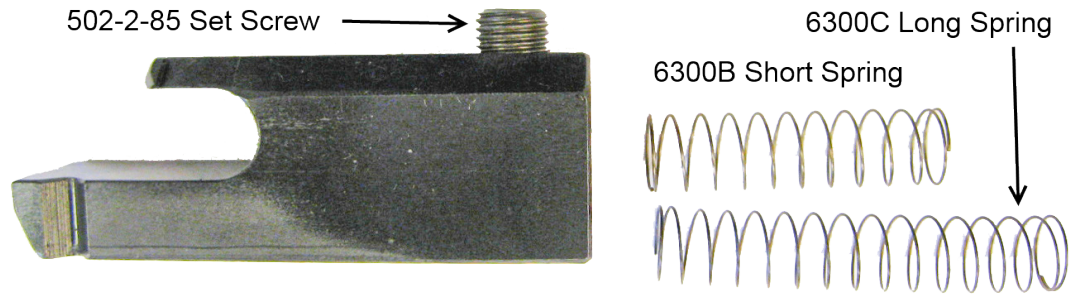


**6593 Series Insert Holder Parts**

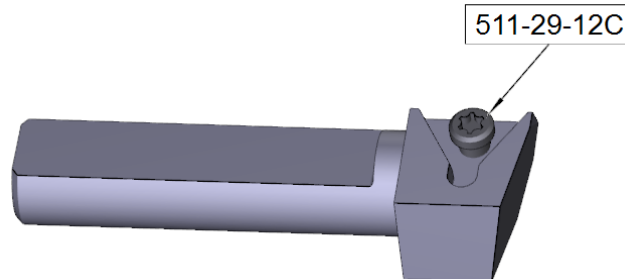


ITEM	PART #	DESCRIPTION
1	6593Q	PIN, ADJUSTING - TOOLHOLDER #6593C AND D ONLY
2	100-82-4	SPRING, ADJUSTING PIN
3	100-82-2	SCREW, SET-BRASS GIB - 3/16" LONG
4	511-29-12C	SCREW, TORX M4 X .7 X .315" LONG

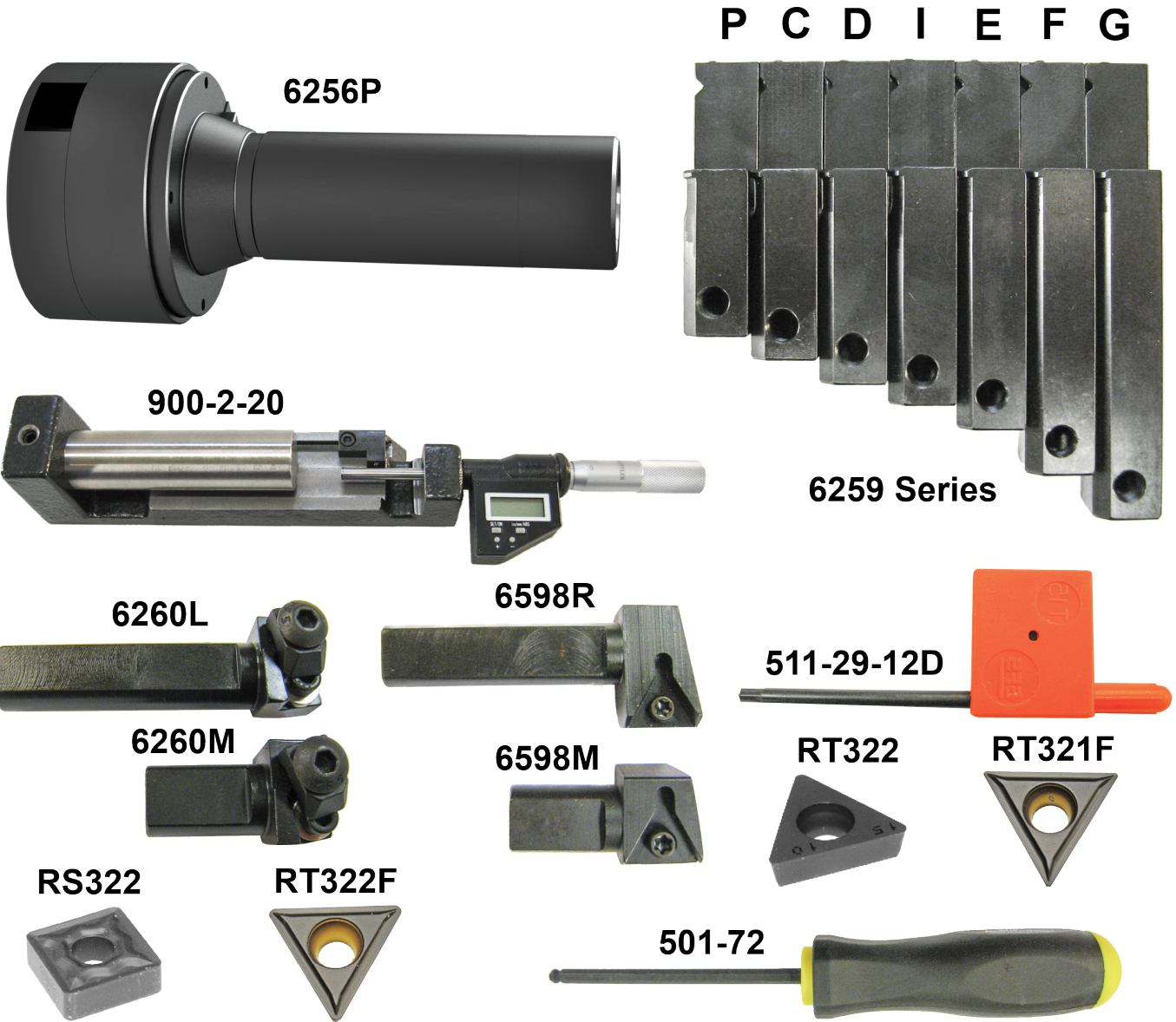
**6520 Series  
Toolholder Parts**



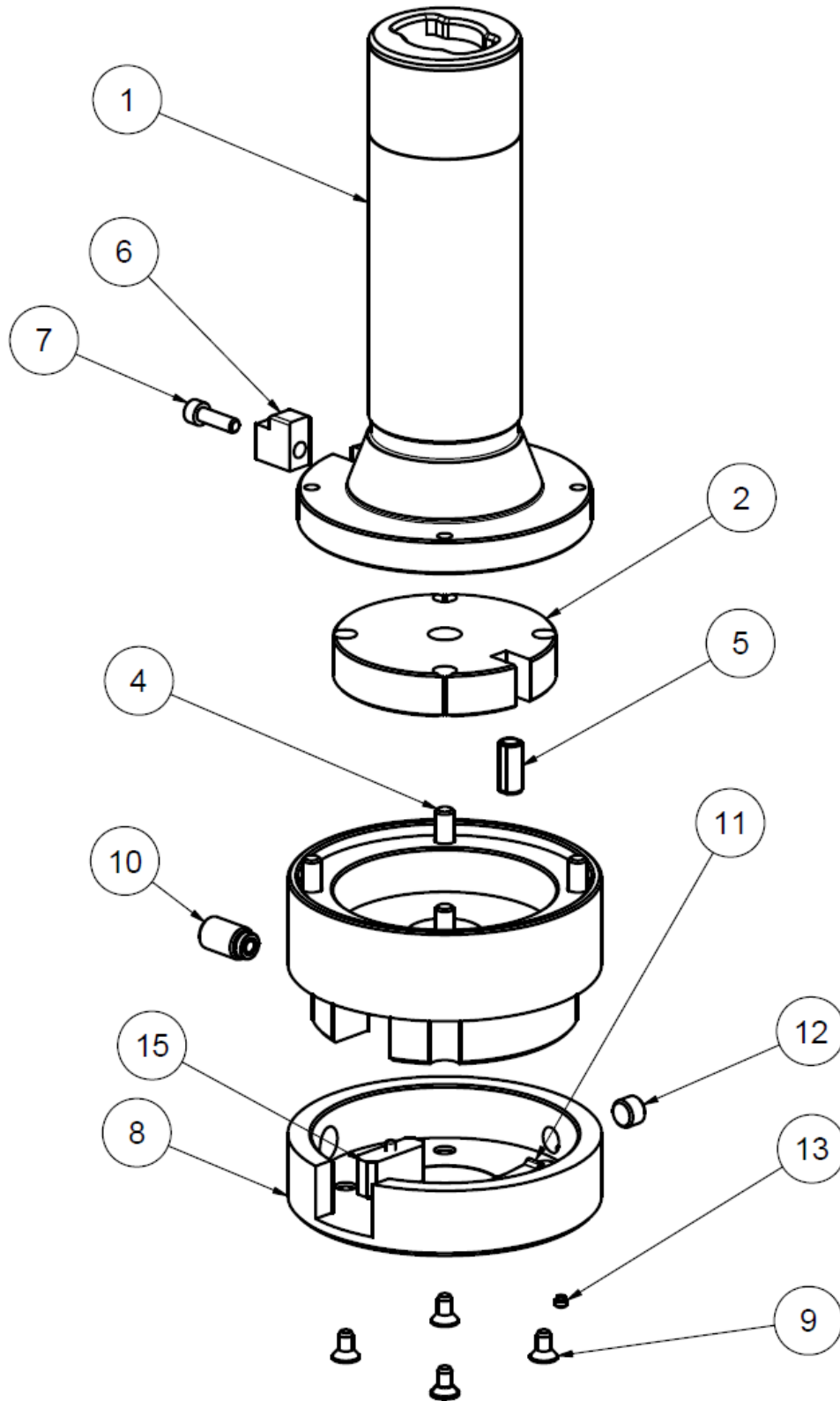
**6598 Series Insert Cartridge Parts**



### 6256Q Blind Hole Cutterhead Package Components

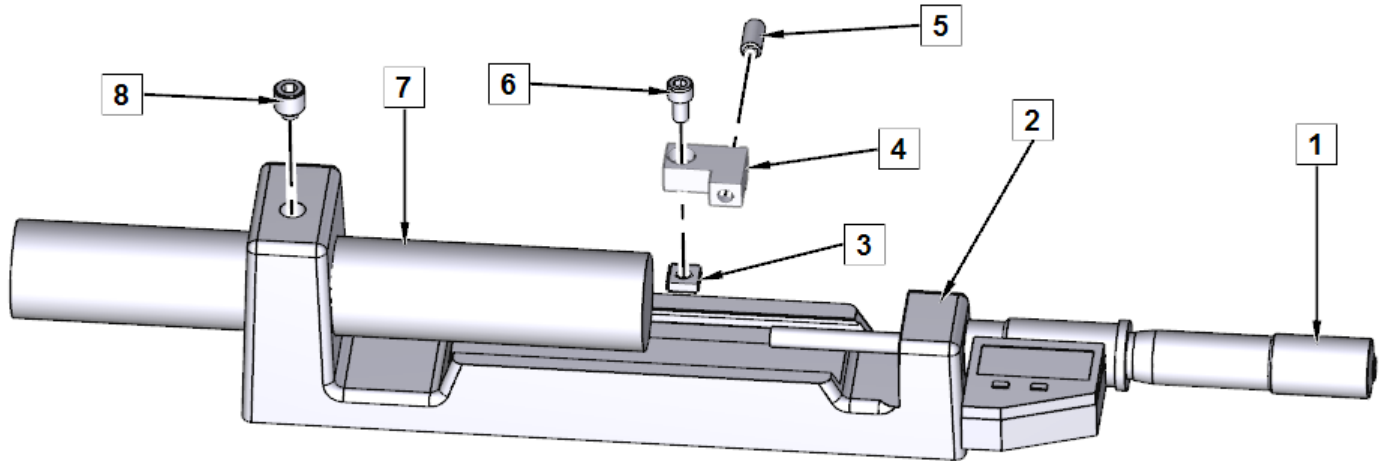


## 6256P Cutterhead Parts



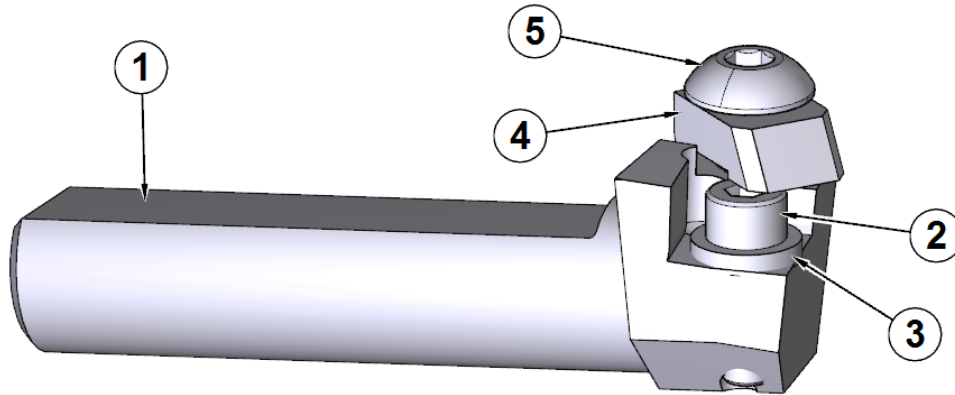
6256P 4-1/2" DIA. CUTTERHEAD			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6256M	Adapter - 7-3/4" Blind Hole Stub bar
2	1	600-20-11	Counter Weight
3	1	6256L	BODY, CUTTERHEAD 4.50" (NO CENTERING)
4	4	MF-15	S.H.C.S. 1/4 - 20 UNC - 1
5	1	502-2-45B	Bushing - Counterweight
6	1	6181A	Drive Key
7	1	MF-5	S.H.C.S. 10 - 24 UNC - 5/8
8	1	6256N	Cap, Cutterhead 4.50" (No Centering)
9	4	MF-78	Socket Flat Head 10-24 UNC x 0.375
10	1	501-70	Tool Holder lock Screw ass'y
11	1	100-1E	Tool Lock Spring
12	1	502-2-85B	Index Screw
13	1	502-12-4D	SOCKET SET SCREW, BRASS TIPPED 8-32 X 1//8
14	1	MF-193	1/8 x 1/2 Dowel Pin
15	1	6263B	Clamp Shoe (Tool Holder)

## 900-2-20 Micrometer Parts



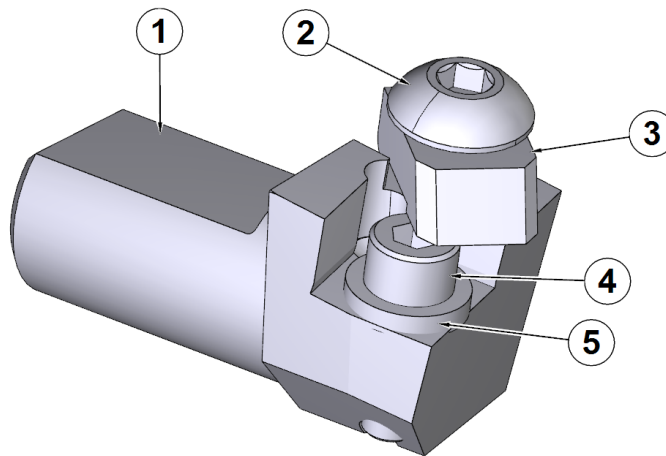
ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

**6260L Insert Cartridge Parts**



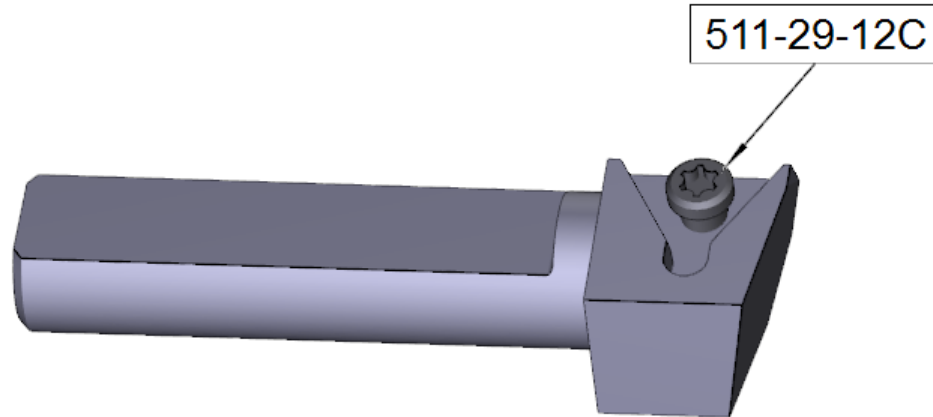
6260L CARTRIDGE ASSEMBLY - SQUARE INSERT NEG. RAKE INDEXABLE - 1.88" SHANK			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6594G	CARTRIDGE - SQUARE INSERT NEG. RAKE INDEXABLE - 1.88" SHANK
2	1	511-29-12	Screw
3	1	511-29-12B	Washer
4	1	6594K	Insert Clamp
5	1	MF-89A	10-32UNF x 5/8" LG. SOCKET BUTTON HEAD CAPSCREW

**6260M Insert Cartridge Parts**

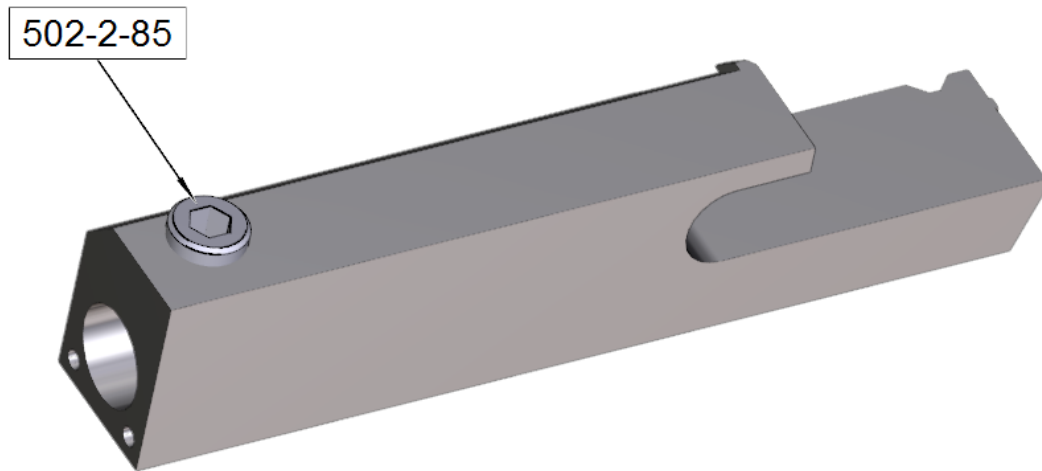


ITEM	PART #	DESCRIPTION
1	6594H	CARTRIDGE ONLY, INDEXABLE INSERT 13/16" LONG
2	MF-89A	SOCKET BUTTON HEAD SCREW 10-32 X 5/8"
3	6594K	CLAMP, TOOL SQUARE INSERT
4	511-29-12	SCREW, SOCKET HEAD CAP 6/32 X 7/16"
5	511-29-12B	WASHER, PRECISION-HOLDING SCREW

**6598 Series Insert Cartridge Parts**

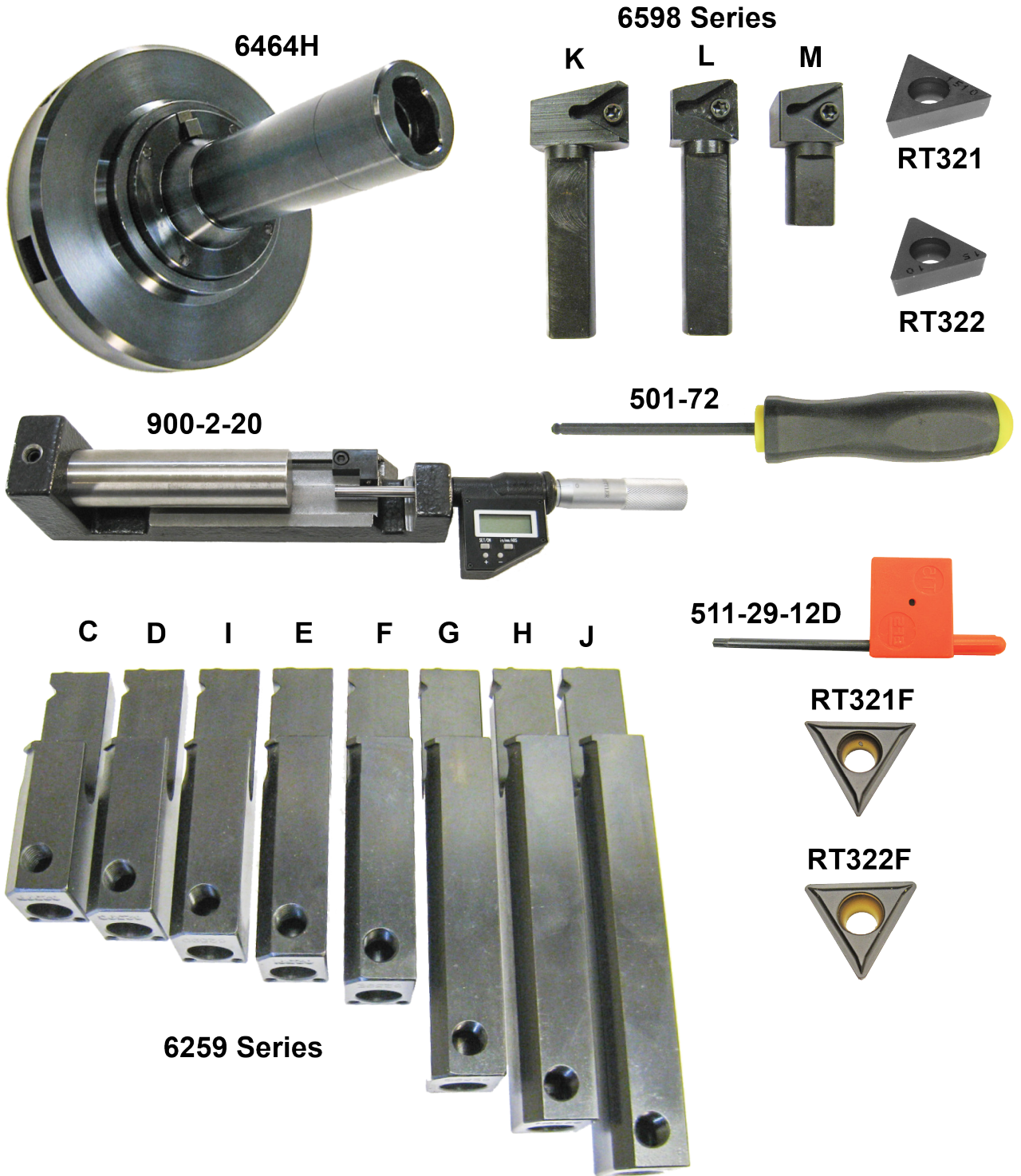


**6259 Series Toolholder Parts**

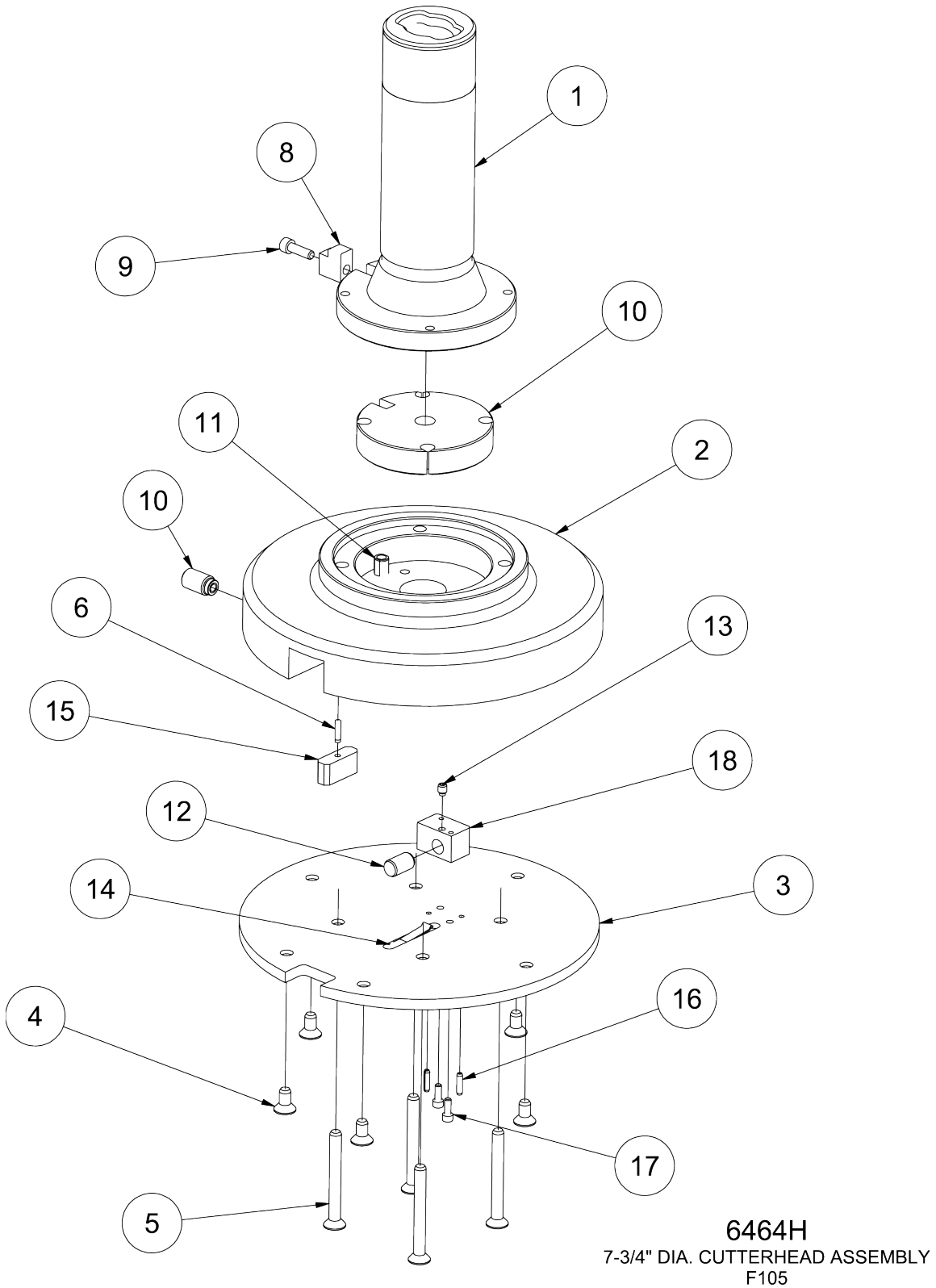




### 6464J Blind Hole Cutterhead Package Components

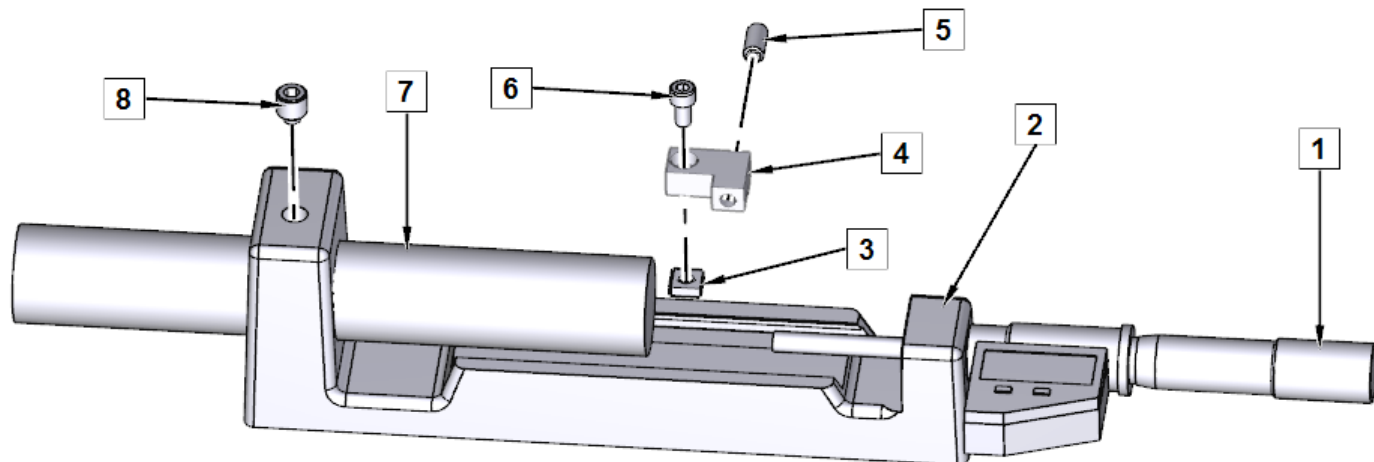


### 6464H Cutterhead Parts



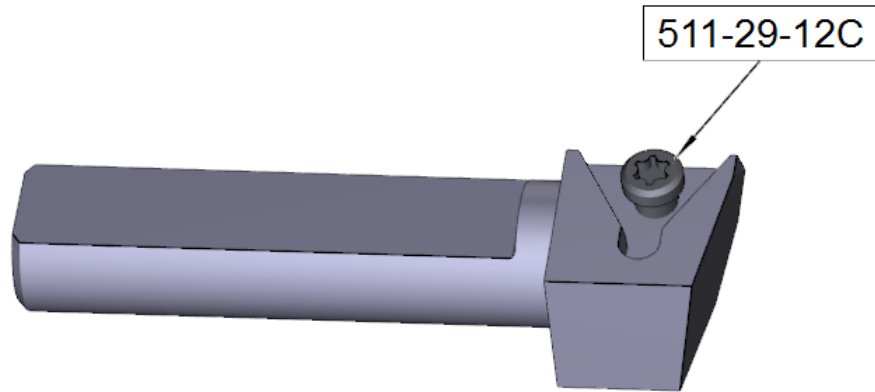
6464H 7-3/4" DIA. CUTTERHEAD - F105			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6256M	Adapter - 7-3/4" Blind Hole Stub bar
2	1	6466A	Cutter Head, 7.75 Dia (No Centering)
3	1	6469A	Cap, 7.75 Dia Cutter Head (No Centering)
4	5	MF-82	Socket Flat Head 1/4-20 UNC x 0.5
5	4	MF-83A	Socket Flat Head 1/4-20 UNC x 2.25
6	1	MF-193	1/8 x 1/2 Dowel Pin
7	1	501-70	Tool Holder lock Screw ass'y
8	1	6181A	KEY - MILLING CUTTERHEAD DRIVE F80
9	1	MF-5	S.H.C.S. 10 - 24 UNC - 5/8
10	1	600-20-11	Counter Weight
11	1	502-2-45B	BUSHING - UPPER CENTERING FINGER RETAINER
12	1	6468A	Adjusting Screw
13	1	100-82-2	Set Screw, brass tipped
14	1	100-1E	Tool Lock Spring
15	1	6263B	Clamp Shoe (Tool Holder)
16	2	MF-217	Pin - Slotted Spring
17	2	MF-1B	S.H.C.S. 6 - 32 UNC - 3/8
18	1	6468	PLUG, CUTTERHEAD 7-3/4" CUTTERHEAD

## 900-2-20 Micrometer Parts

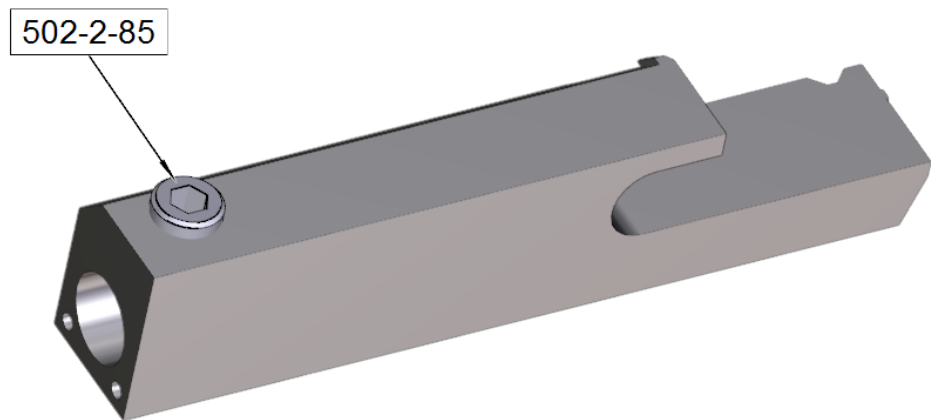


ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

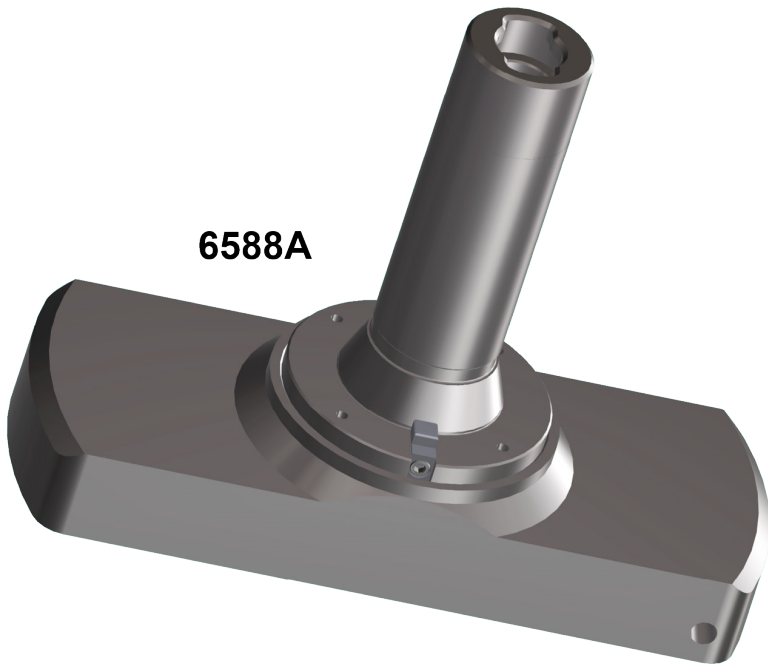
**6598 Series Insert  
Cartridge Parts**



**6259 Series Toolholder  
Parts**



### 6588 Blind Hole Cutterhead Package Components

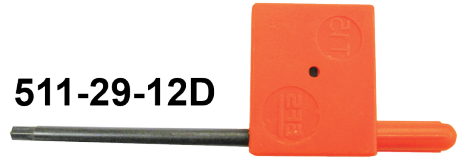


6588A

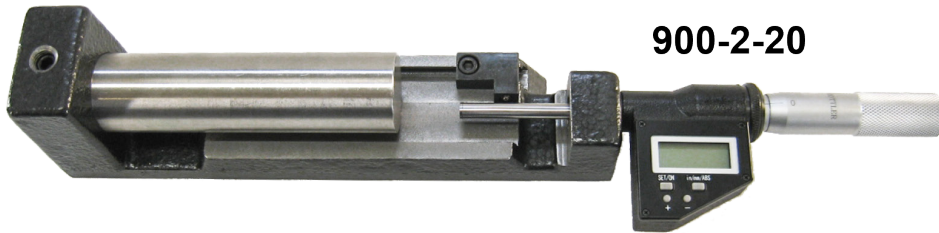
C D I E F G



6259 Series

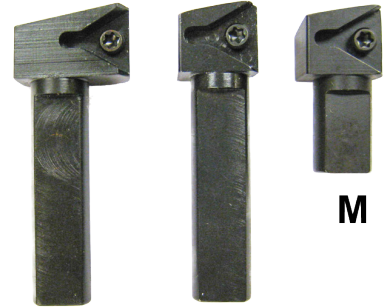


511-29-12D



900-2-20

6598 Series

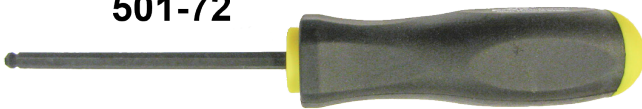


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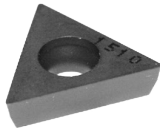
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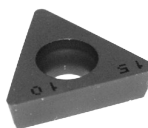
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RT321



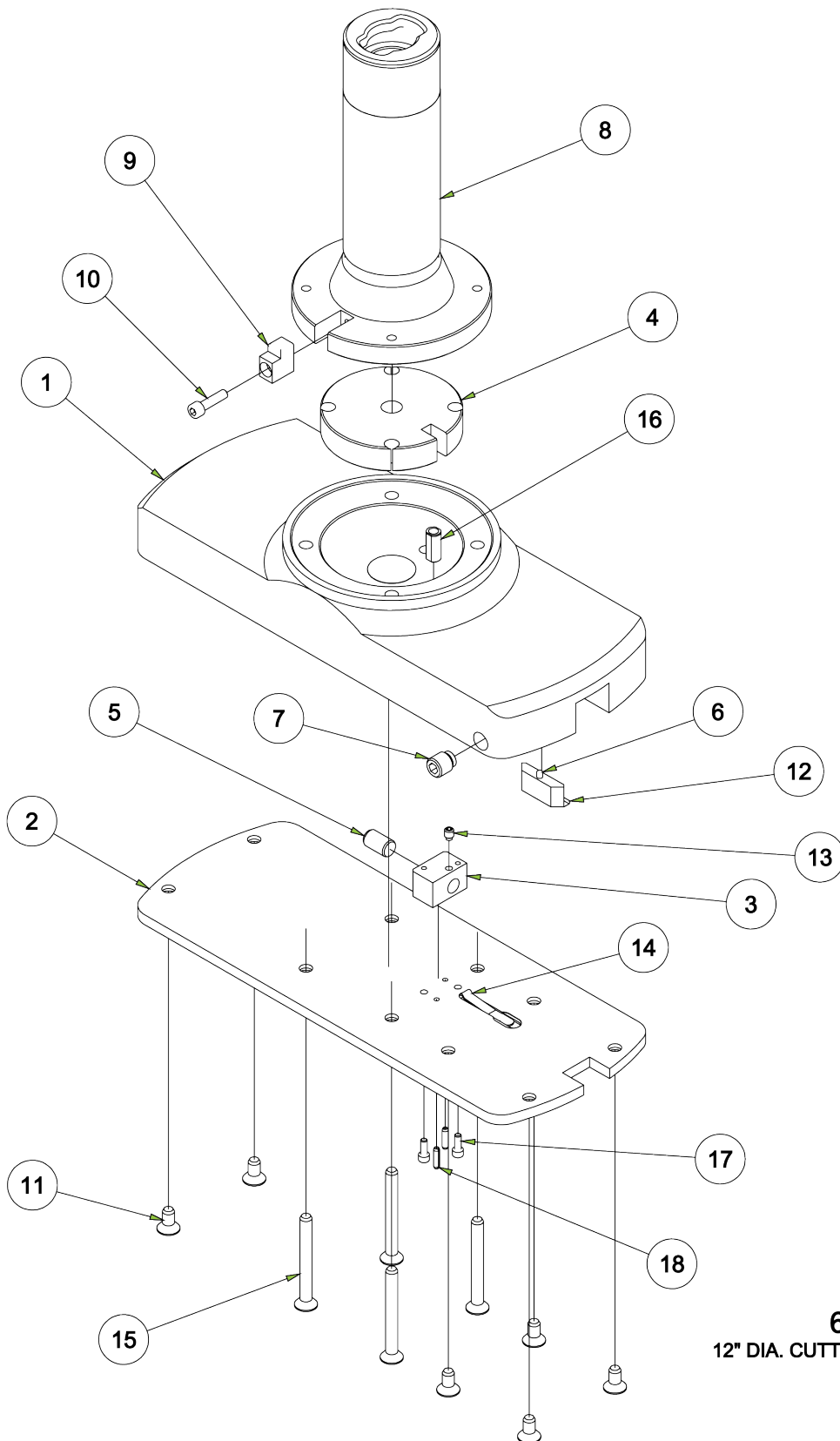
RT322



RT322F



### 6588A Cutterhead Parts

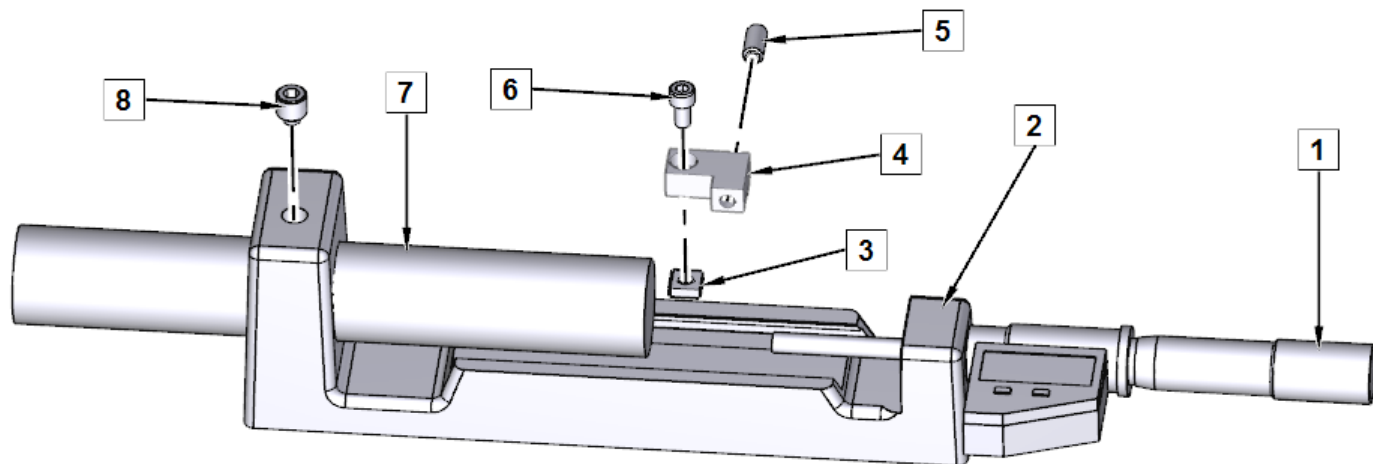


**6588A**  
12" DIA. CUTTERHEAD ASSEMBLY



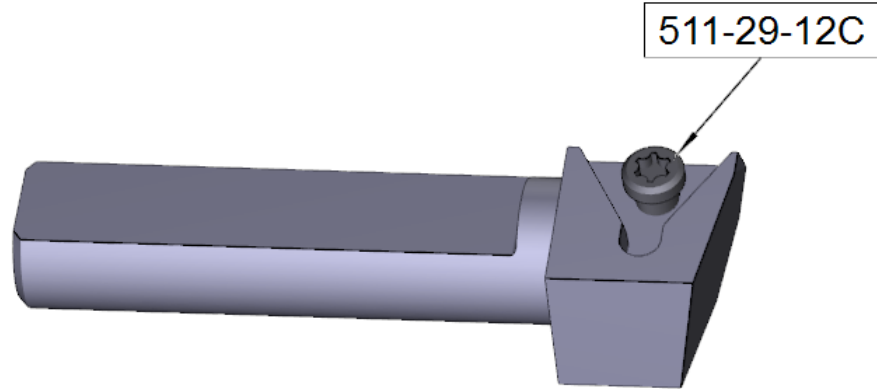
6588A 12" CUTTERHEAD ASSEMBLY - F105			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6588B	BODY, 12" CUTTERHEAD
2	1	6588C	CAP, 12" CUTTERHEAD
3	1	6468	PLUG, CUTTERHEAD 7-3/4" CUTTERHEAD
4	1	600-20-11	Counter Weight
5	1	6468A	Adjusting Screw
6	1	MF-193C	1/8" x 3/8" LG. DOWEL PIN
7	1	501-70A	Tool Holder Lock Screw ass'y
8	1	6464	ADAPTER, 7-3/4" DIA. CUTTERHEAD - F8
9	1	6181A	KEY - MILLING CUTTERHEAD DRIVE F80
10	1	MF-6	10-24UNC x 3/4" LG. S.H.C.S.
11	6	MF-83	1/4-20UNC x 1/2" LG. SOCKET FLAT HEAD SCREW
12	1	6263	Tool Holder Clamp Shoe
13	1	100-82-2	Set Screw, brass tipped
14	1	100-1E	Tool Lock Spring
15	4	MF-83A	1/4-20UNC x 2-1/4" LG. SOCKET FLAT HEAD SCREW
16	1	502-2-45B	BUSHING - UPPER CENTERING FINGER RETAINER
17	2	MF-1B	S.H.C.S. 6 - 32 UNC - 3/8
18	2	MF-217	1/8" x 1/2" LG. ROLL PIN

## 900-2-20 Micrometer Parts

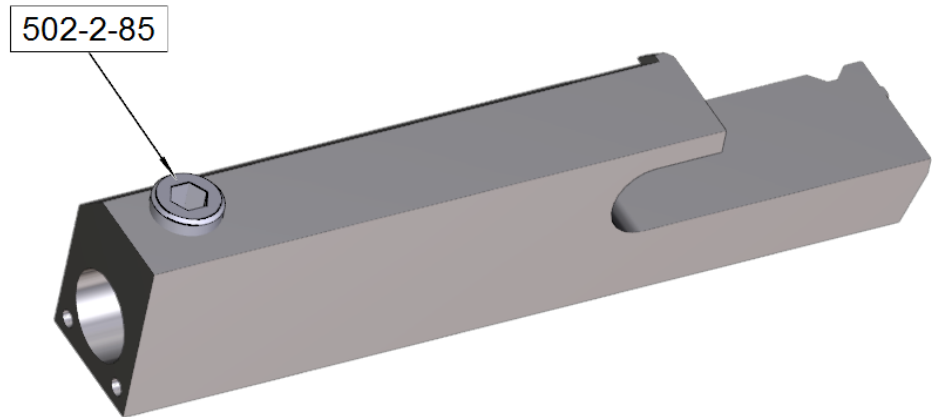


ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

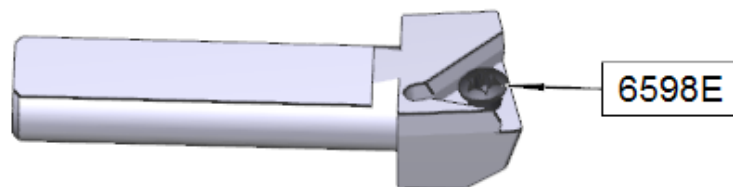
**6598 Series Insert  
Cartridge Parts**



**6259 Series Toolholder  
Parts**

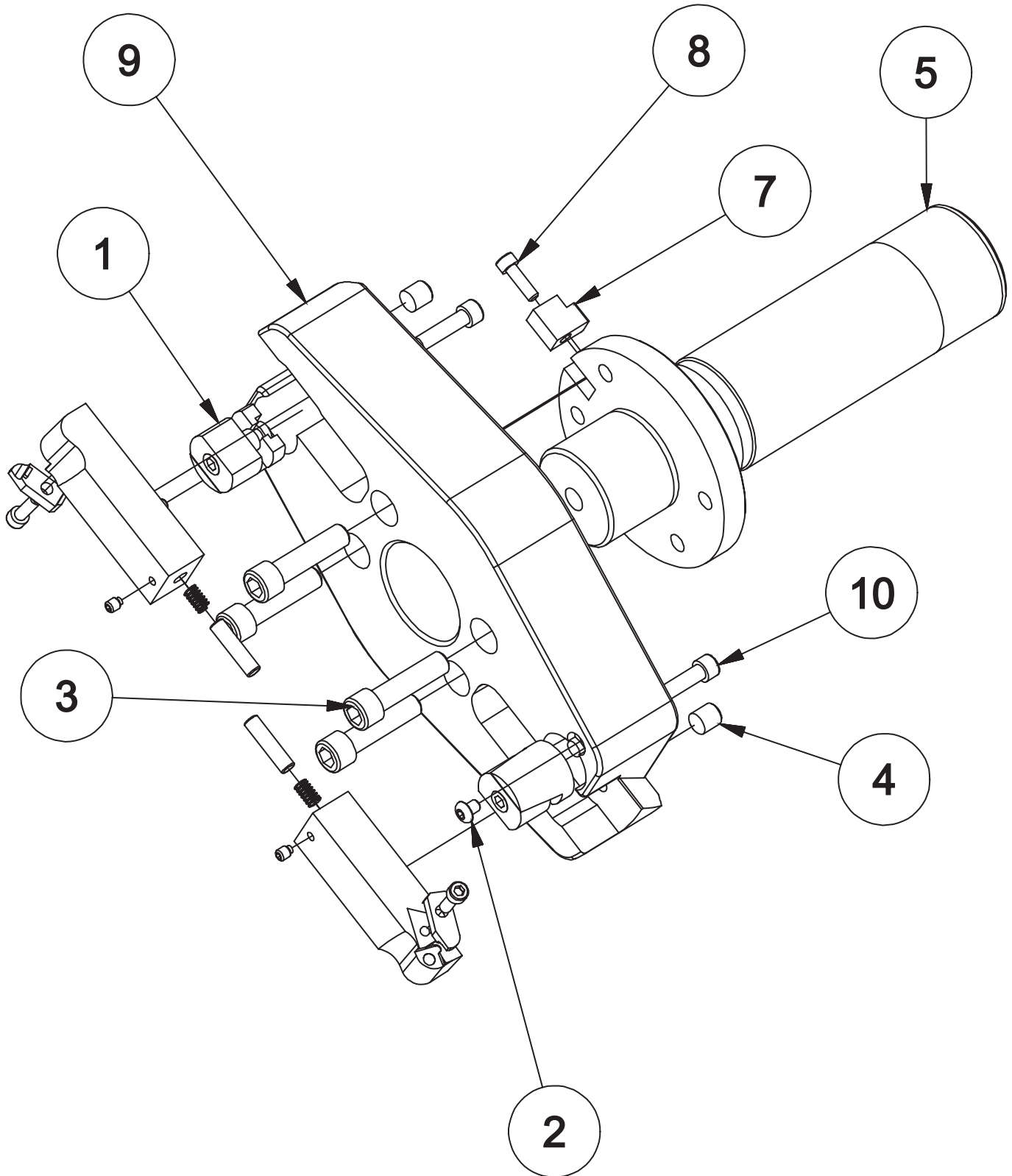


**6593S Insert Cartridge Parts**



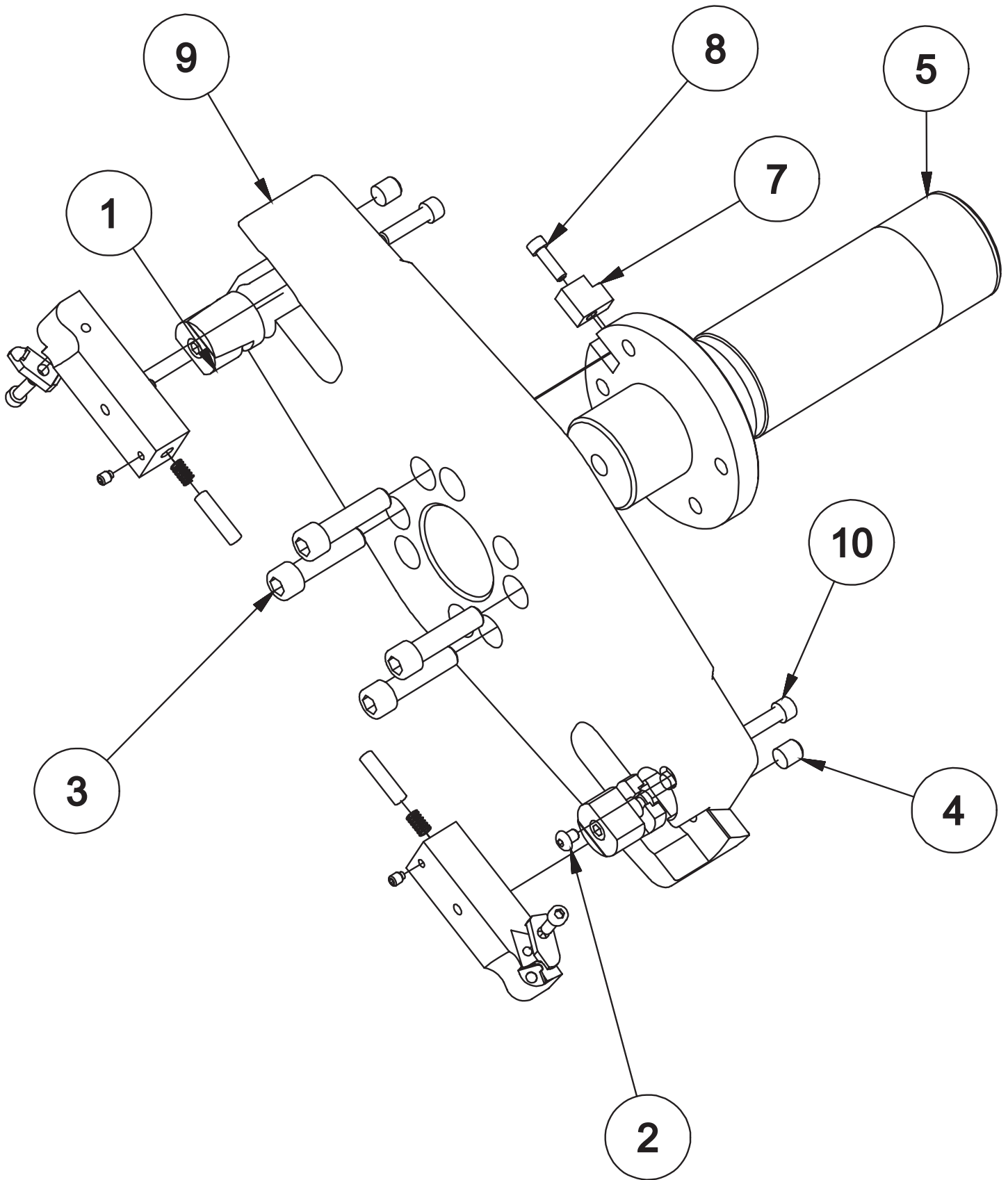
## Surfacing Tooling

### 6294V Surfacing Cutterhead Parts



6294V 10" FLYCUTTER ASSEMBLY			
ITEM	QTY	RMC PART	PART DESCRIPTION
1	2	7206K	'L' LOCK
2	2	MF-87	Hexagon Socket Button Head Cap Screw 10-24 x 1/4"
3	4	MF-33	Hexagon Socket Head Cap Screw 3/8-16 x 1-1/2"
4	2	7202C	Hexagon Socket Set Screw - Oval Point 3/8-16 x 3/8"
5	1	6170B	ADAPTER, SURFACING HEAD
6	2	7202W	TOOL HOLDER ASSEMBLY, FLY CUTTER
7	1	6181A	Drive Key
8	1	MF-5	Hexagon Socket Head Cap Screw 10-24 x 5/8"
9	1	7206L	10" CUTTERHEAD BODY - SURFACING
10	2	MF-15	Hexagon Socket Head Cap Screw 1/4-20 x 1"

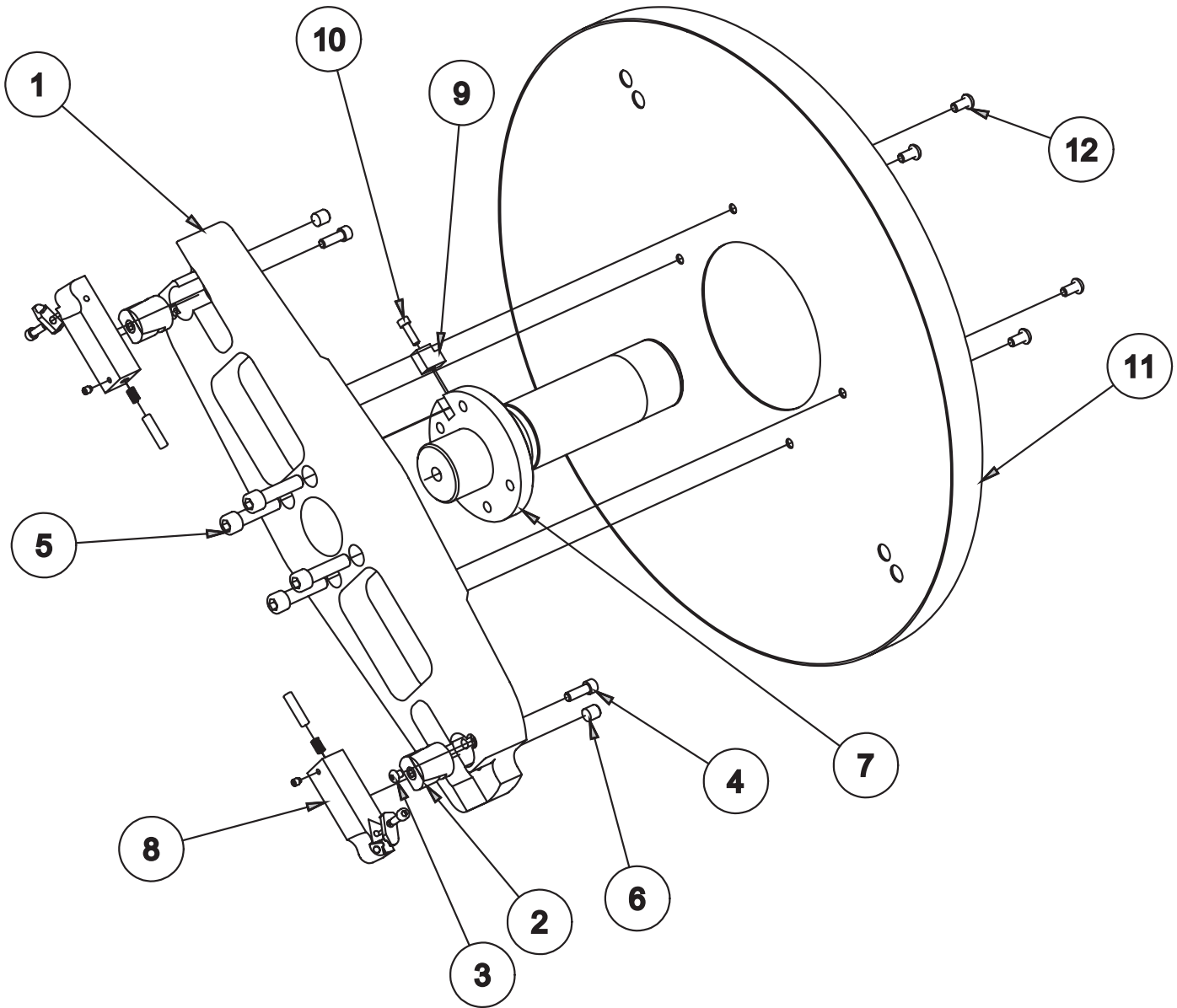
**6294U Surfacing Cutterhead Parts**



6294U 14" FLYCUTTER ASSEMBLY			
ITEM	QTY	RMC PART	PART DESCRIPTION
1	2	7206K	'L' LOCK
2	2	MF-87	Hexagon Socket Button Head Cap Screw 10-24 x 1/4"
3	4	MF-33	Hexagon Socket Head Cap Screw 3/8-16 x 1-1/2"
4	2	7202C	Hexagon Socket Set Screw - Oval Point 3/8-16 x 3/8"
5	1	6170B	ADAPTER, SURFACING HEAD
6	2	7202W	TOOL HOLDER ASSEMBLY, FLY CUTTER
7	1	6181A	Drive Key
8	1	MF-5	Hexagon Socket Head Cap Screw 10-24 x 5/8"
9	1	7206G	14" CUTTERHEAD BODY - SURFACING
10	2	MF-15	1/4-20UNC x 1" LG. S.H.C.S.



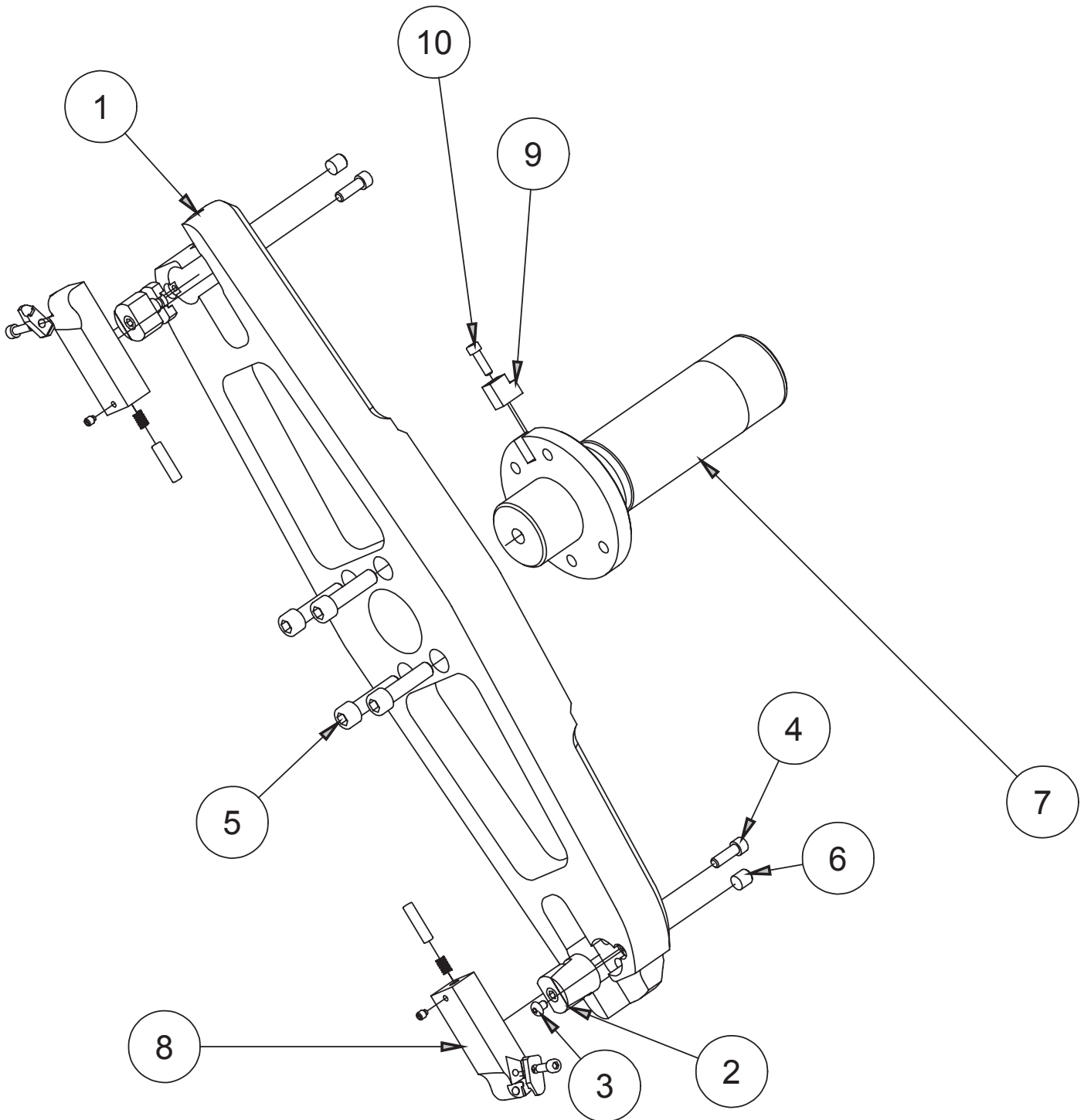
## 6294T Surfacing Cutterhead Parts



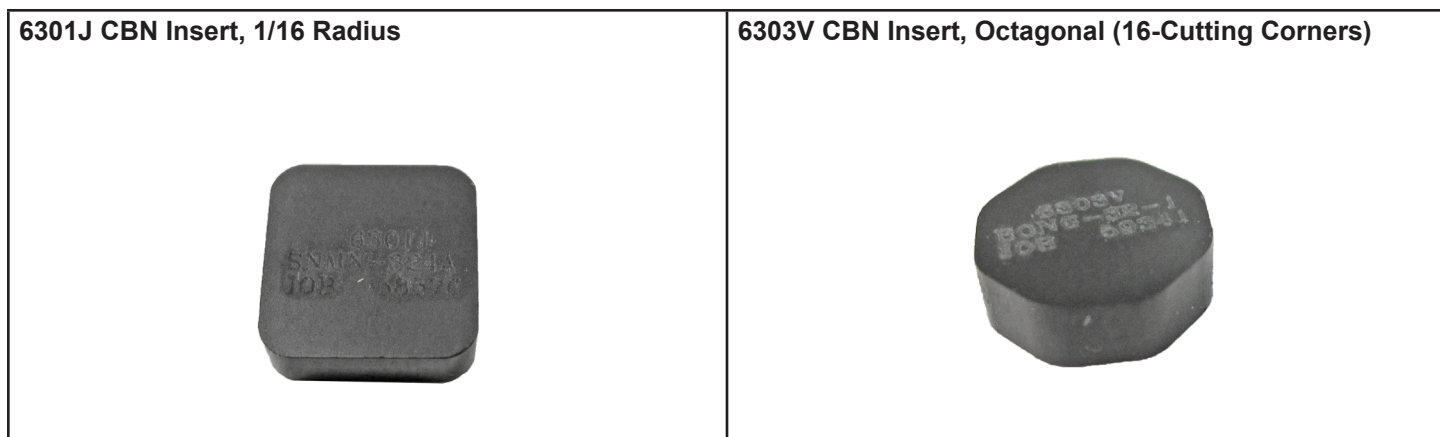


6294T 18" FLYCUTTER ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6294S	18" CUTTERHEAD BODY - SURFACING
2	2	7206K	L' LOCK
3	2	Mf-87	Socket Button Head Cap Screw 10 - 24 x 1/4
4	2	MF-14	1/4-20UNC x 3/4" LG. S.H.C.S.
5	4	Mf-33	Socket Head Cap screw 3/8 - 16 UNC - 1 1/2
6	2	7202C	3/8-16UNC x 3/8" LG. HEXAGON SOCKET OVAL POINT SET SCREW
7	1	6170B	ADAPTER, SURFACING HEAD
8	2	7202W	TOOL HOLDER ASSEMBLY, FLY CUTTER
9	1	6181A	Drive Key
10	1	Mf-5	Socket Head Cap screw No. 10 - 24 UNC - 5/8
11	1	650-2-8G	SHROUD, 18" SURFACING CUTTERHEAD
12	4	MF-90	1/4-20UNC x 1/2" LG. Hexagon Socket Button Head Cap Screw

### 6294W Surfacing Cutterhead Parts

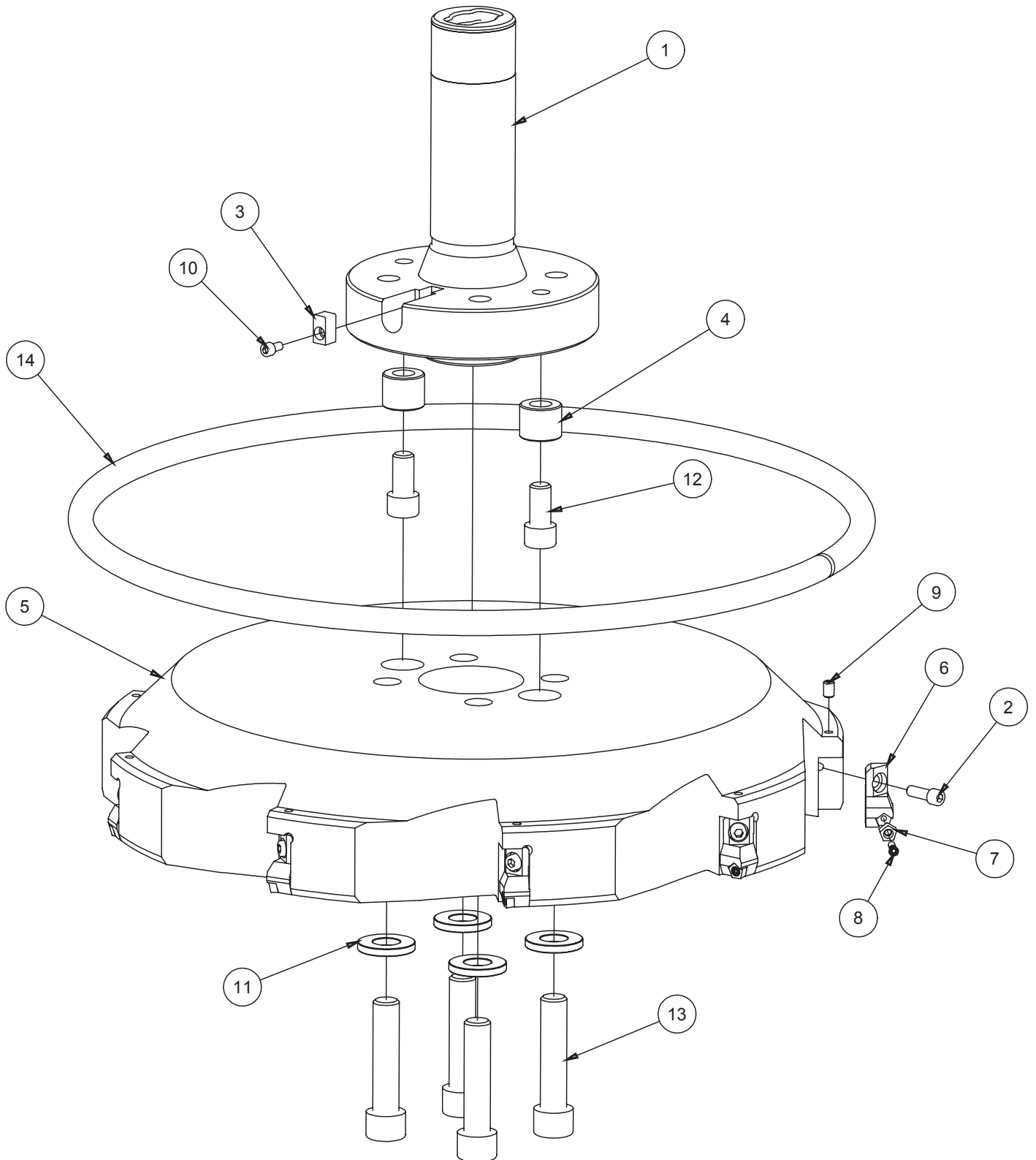


6294W 22" FLYCUTTER ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6294X	22" CUTTERHEAD BODY - SURFACING
2	2	7206K	L' LOCK
3	2	Mf-87	Socket Button Head Cap Screw 10 - 24 x 1/4
4	2	MF-14	1/4-20UNC x 3/4" LG. S.H.C.S.
5	4	Mf-33	3/8-16UNC x 1/2" LG. S.H.C.S.
6	2	7202C	HEXAGON SOCKET OVAL POINT SET SCREW 3/8-16UNC x 3/8" LG.
7	1	6170B	ADAPTER, SURFACING HEAD
8	2	7202W	TOOL HOLDER ASSEMBLY, FLY CUTTER
9	1	6181A	Drive Key
10	1	Mf-5	Socket Head Cap screw No. 10 - 24 UNC - 5/8



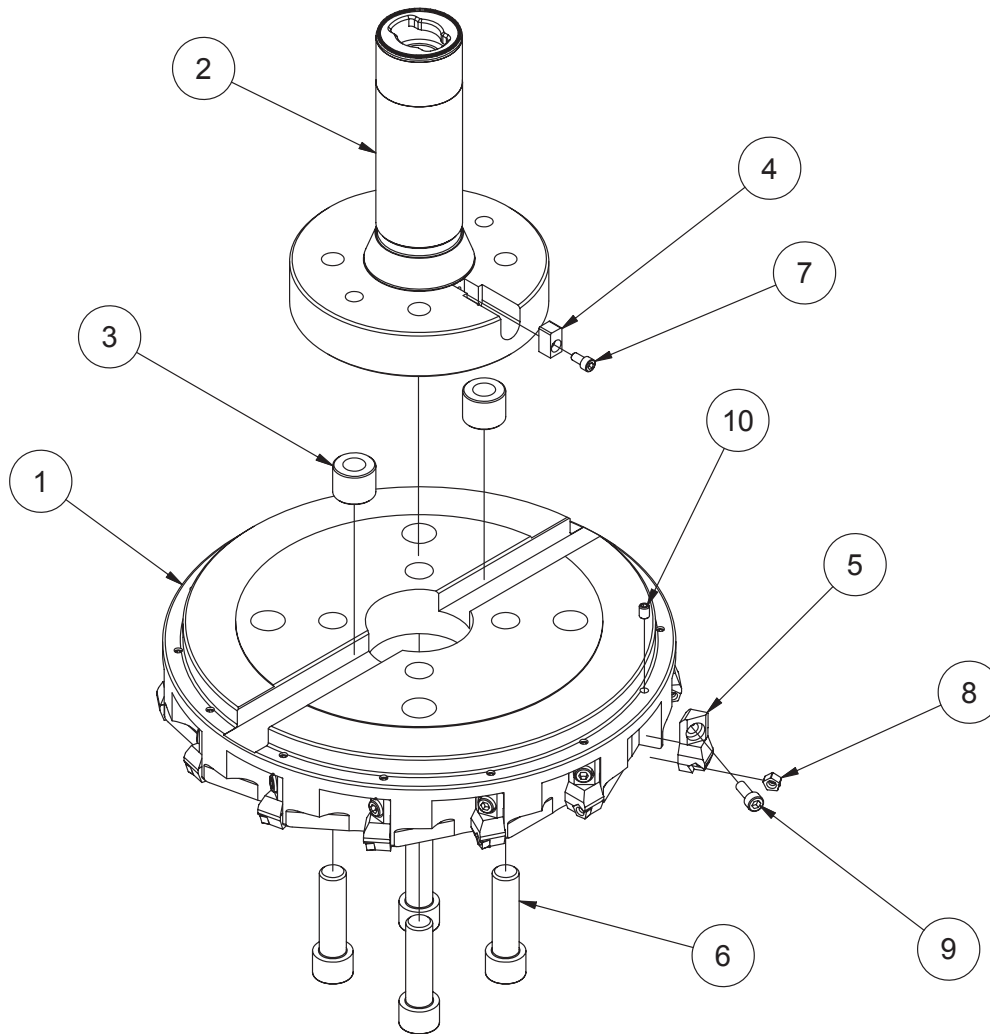
# Special Surfacing Tooling for Milling Metal Sprayed Head Gasket Decks

## 6864 Multi Tooth Milling Head Parts



6864 18" MILLING HEAD ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6514K	ADAPTER, LARGE SHELL MILL CUTTERHEAD
2	9	MF-14	S.H.C.S. 1/4 - 20 UNC - 3/4
3	1	6181	DRIVE KEY
4	2	6514U	DRIVE KEY - LARGE SHELL MILL ADAPTER
5	1	6864A	18 INCH SHELLMILL BODY
6	9	6864D	CARTRIDGE, 18" MULTITOOTH FACEMILL
7	9	6864E	INSERT, 18" MILLING HEAD ASSEMBLY
8	9	N/A	INSERT SCREW, TOOL CARTRIDGE -18" MILLING HEAD INCLUDED WITH 6864D
9	9	MF-59	1/4-20UNC x 3/8" LG. SOCKET FLAT POINT SET SCREW
10	1	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
11	4	502-1-16	WASHER, 5/8" HARDENED
12	2	MF-42	1/2-13UNC x 1" LG. S.H.C.S.
13	4	MF-46H	5/8-11UNC x 2-3/4" LG. S.H.C.S.
14	1	6864H	DAMPENER ASSEMBLY, 18" FACEMILL

**6865 Multi Tooth Milling Head Parts**

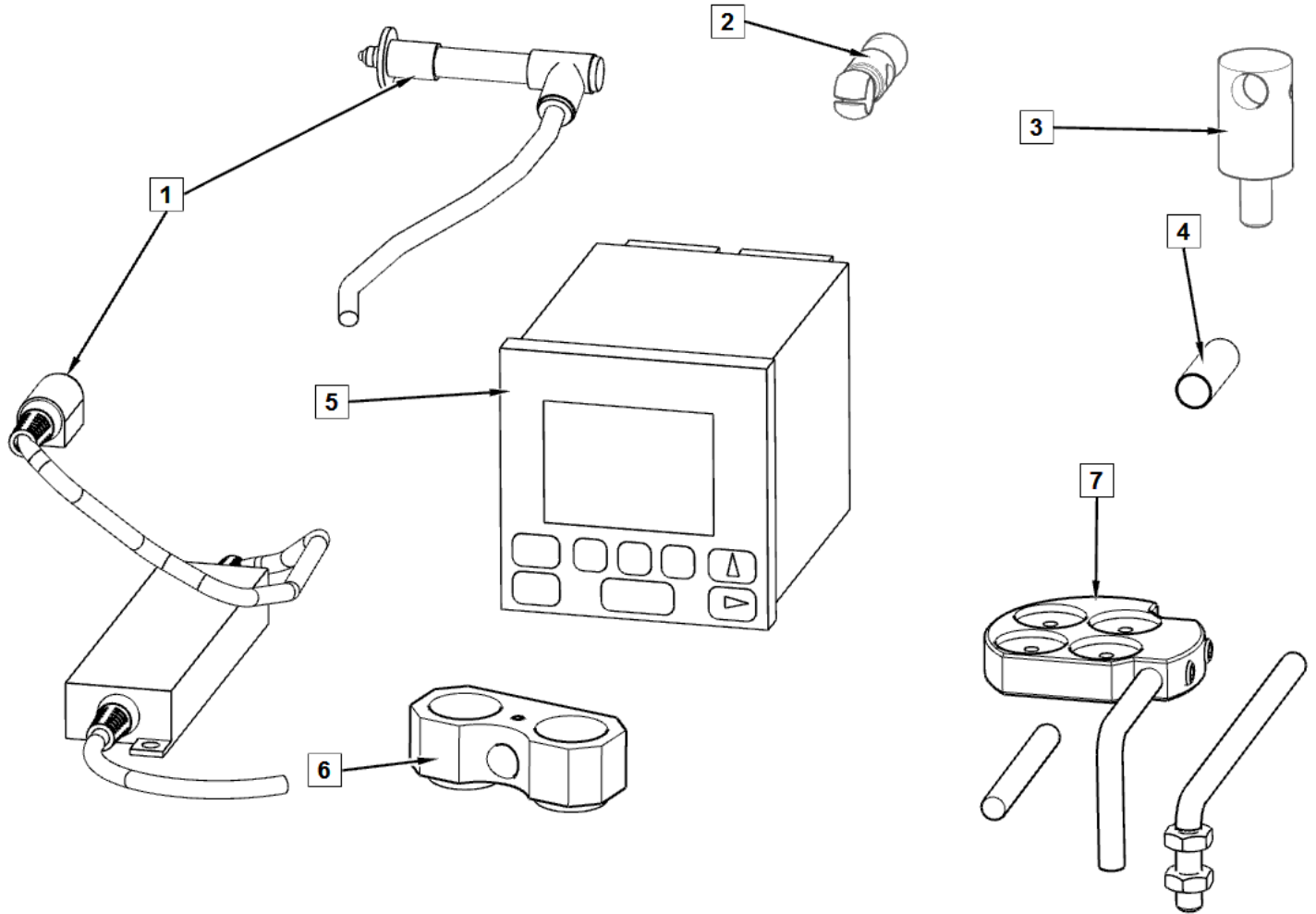


6865 SPECIAL 12" MULTITOOTH MILLING HEAD			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6865A	12" FACE MILL BODY
2	1	6514K	ADAPTER, LARGE SHELL MILL CUTTERHEAD
3	2	6514U	DRIVE KEY - LARGE SHELL MILL ADAPTER
4	1	6181	DRIVE KEY
5	14	6864D	CARTRIDGE, 18" MULTITOOTH FACEMILL
6	4	MF-46E	5/8-11UNC x 2-1/4" LG. S.H.C.S.
7	1	MF-4	10-24UNC x 3/8" LG.
8	14	6864E	INSERT, 18" MILLING HEAD ASSEMBLY
9	14	SOCKET HEAD CAPSCREW	M6x1 x 16mm LG. S.H.C.S. INCLUDED WITH 6864D CARTRIDGE
10	14	SOCKET SET SCREW	M6x1 x 10mm LG. FLAT POINT SOCKET SET SCREW INCLUDED WITH 6865A MILL BODY



## General Purpose Accessories

### 502-12-7B Digital Runout Probe and Readout Components

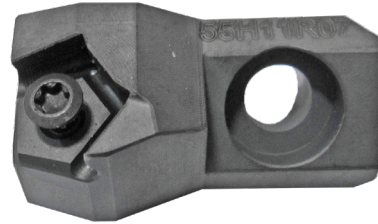


ITEM	PART #	DESCRIPTION
1	502-12-7C	DIGITAL GAUGE
2	502-11-40	CLAMP BODY
3	502-9-9S	INDICATOR MOUNT,RIGHT ANGLE DRIVE
4	502-12-7E	GAUGE ADAPTER SLEEVE
5	502-12-7D	1 AXIS GAGING DISPLAY-DIGITAL RUNOUT GAUGE
6	502-12-4A	MAGNETIC HOLDER ASSEMBLY
7	502-12-4	MAGNETIC HOLDER ASSEMBLY

6864E Replacement Insert



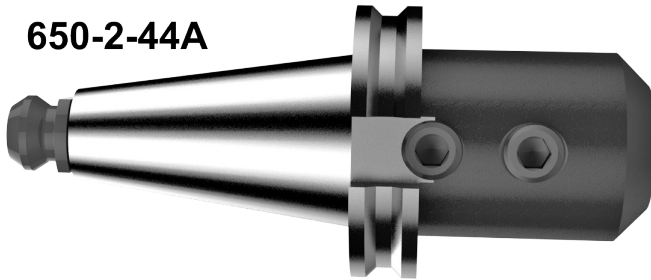
6864D Replacement Cartridge



## General Purpose Tooling

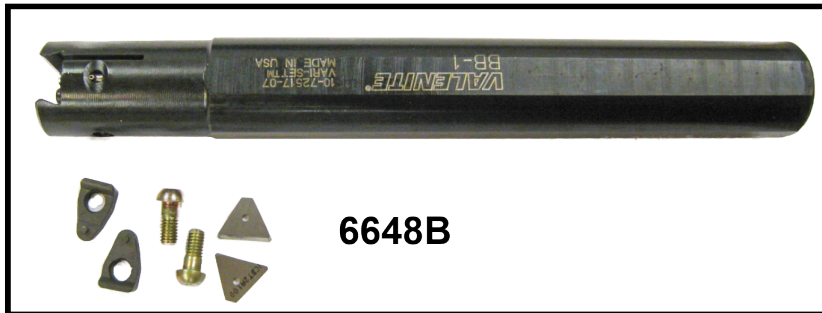
### 6648 Caterpillar 3400 Series Tappet Bore Repair Tooling Package Components

650-2-44A



6648C

6648D



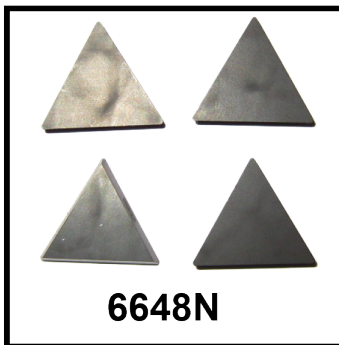
6648B



6648F



650-2-34D



6648N

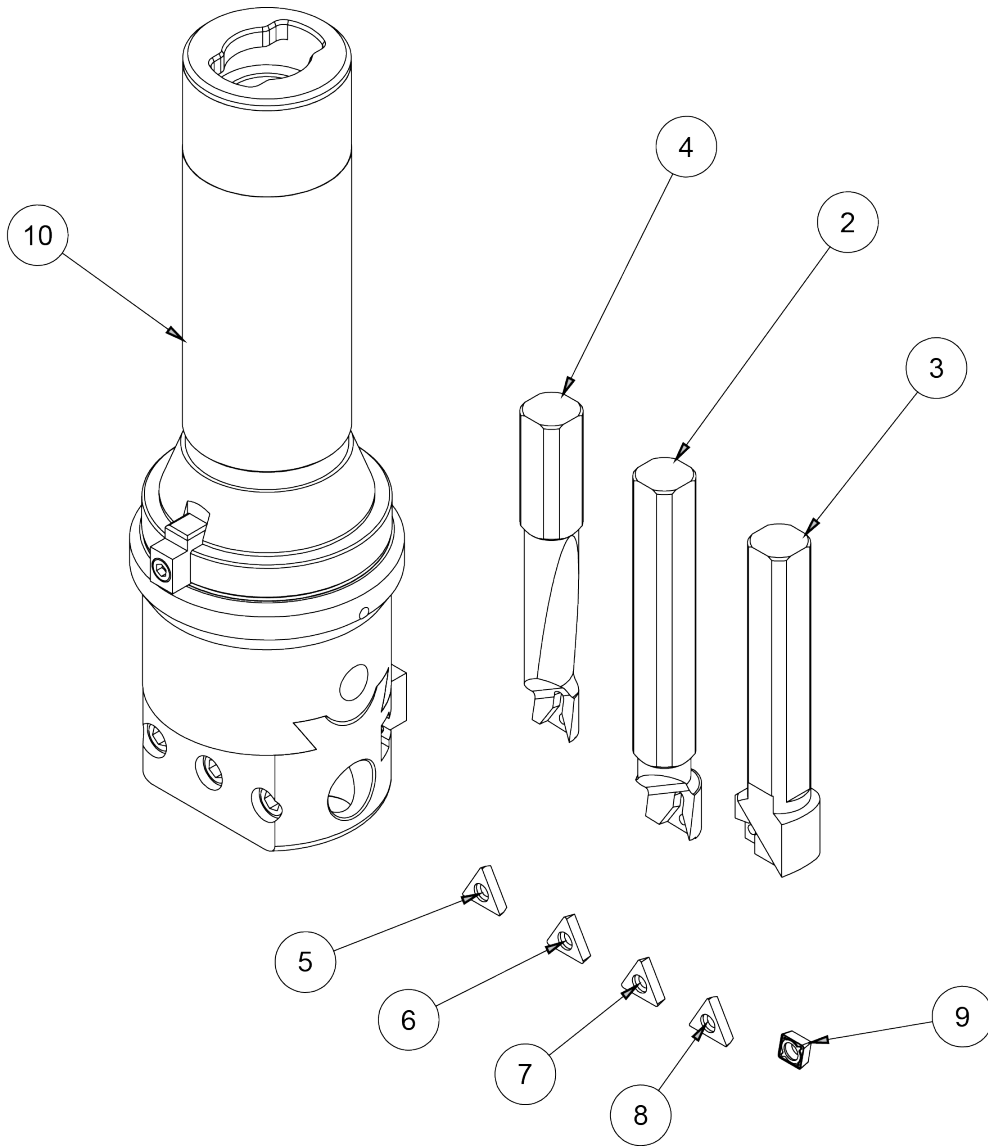


502-11-39F



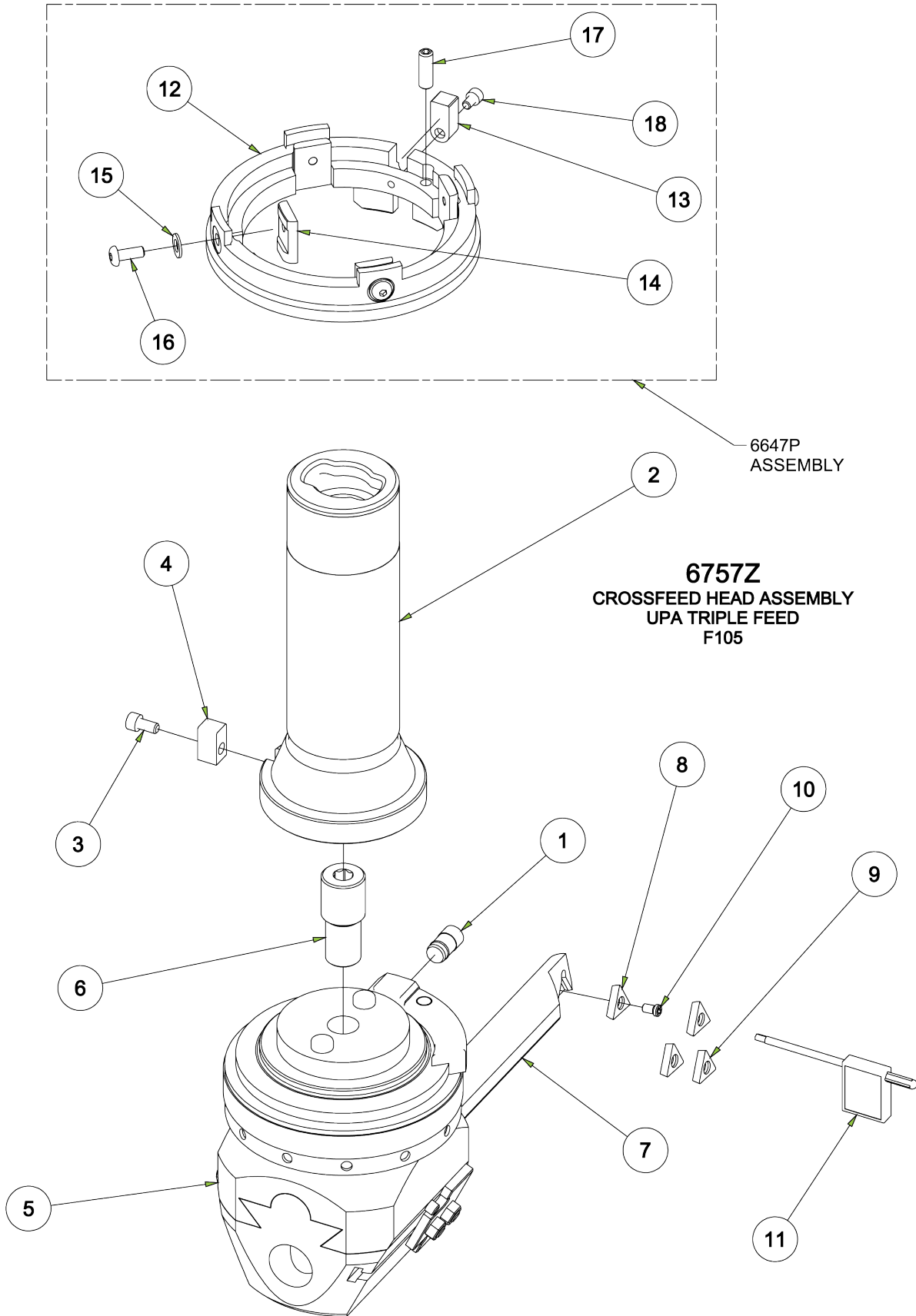
MF-71D

### 6835 Small Precision Adjustable Boring Head Components



6835 PRECISION ADJUSTABLE BORING HEAD W/ TOOLING			
ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	650-2-34P	BORING BAR, 1" PRECISION BORING HEAD ASS'Y
3	1	650-2-34U	FACING BAR - PRECISION BORING HEAD ASSEMBLY
4	1	650-2-34Q	BORING BAR, 3/4" PRECISION BORING HEAD ASS'Y
5	1	RT321	INSERT, TRIANGULAR POS. RAKE 3/8" I.C.
6	1	RT322	INSERT, TRIANGULAR 3/8" I.C.
7	1	RT322F	INSERT, TRIANGLE 1/32" R. PRECISION BORING
8	1	RT321F	INSERT, TRIANGULAR POS. RAKE 3/8" I.C. 1/64" R.
9	1	650-2-34V	INSERT, DIAMOND SHAPE 1/32" R.
10	1	6835C	SMALL PRECISION ADJUSTABLE BORING HEAD W/O TOOLING

### 6757Z Large Heavy Duty Adjustable Boring/Facing Head Components



6757Z CROSSFEED HEAD ASSEMBLY, UPA TRIPLE FEED - F105			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6647H	TORQUE SHAFT REWORK, WOHLHAUPTER CROSSFEED HEAD
2	1	6517Y	ADAPTER, WOHLHAUPTER CROSSFEED CUTTING HEAD
3	1	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
4	1	6181	KEY, CUTTERHEAD DRIVE STUB BARS F-8
5	1	6757X	WOHLHAUPTER CROSS FEED HEAD
6	1	6517Z	DIFFERENTIAL SCREW
7	1	6647J	INDEXABLE BORING BAR, WOHLHAUPTER HEAD
8	2	RT321	INSERT, TRIANGULAR POS. RAKE 3/8" I.C.
9	2	RT322	INSERT, TRIANGULAR 3/8" I.C.
10	1	511-29-12C	TORX SCREW M4x.7
11	1	511-29-12D	Torx wrench T-15
12	1	6647K	DRIVER, TORQUE SHAFT, CROSSFEED HEAD ASSEMBLY, F105
13	1	6647L	SPINDLE KEY, TORQUE SHAFT DRIVE ASSEMBLY
14	4	6647M	CLAMP PAD, TORQUE SHAFT DRIVE, CROSSFEED HEAD ASSEMBLY - F105
15	4	MF-175	#10 FLAT WASHER
16	4	MF-89B	10-32UNF x 1/2" LG. SOCKET BUTTON HEAD SCREW
17	1	MF-64A	1/4-20UNC x 3/4" LG. FLAT POINT SOCKET SET SCREW
18	1	MF-3B	S.H.C.S. 8 - 32 UNC - 1/4

**6648K Collet kit 1/8 - 1" (3 - 26mm)**

Sold as complete kit only.



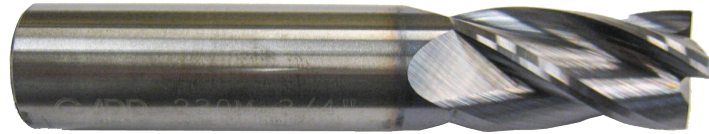
**650-2-45G 1" (25.4mm) Diameter Solid Carbide End Mill x 4.00" (101.4mm) Length**

Used for machining head gasket fire deck surface for water hole corrosion repairs

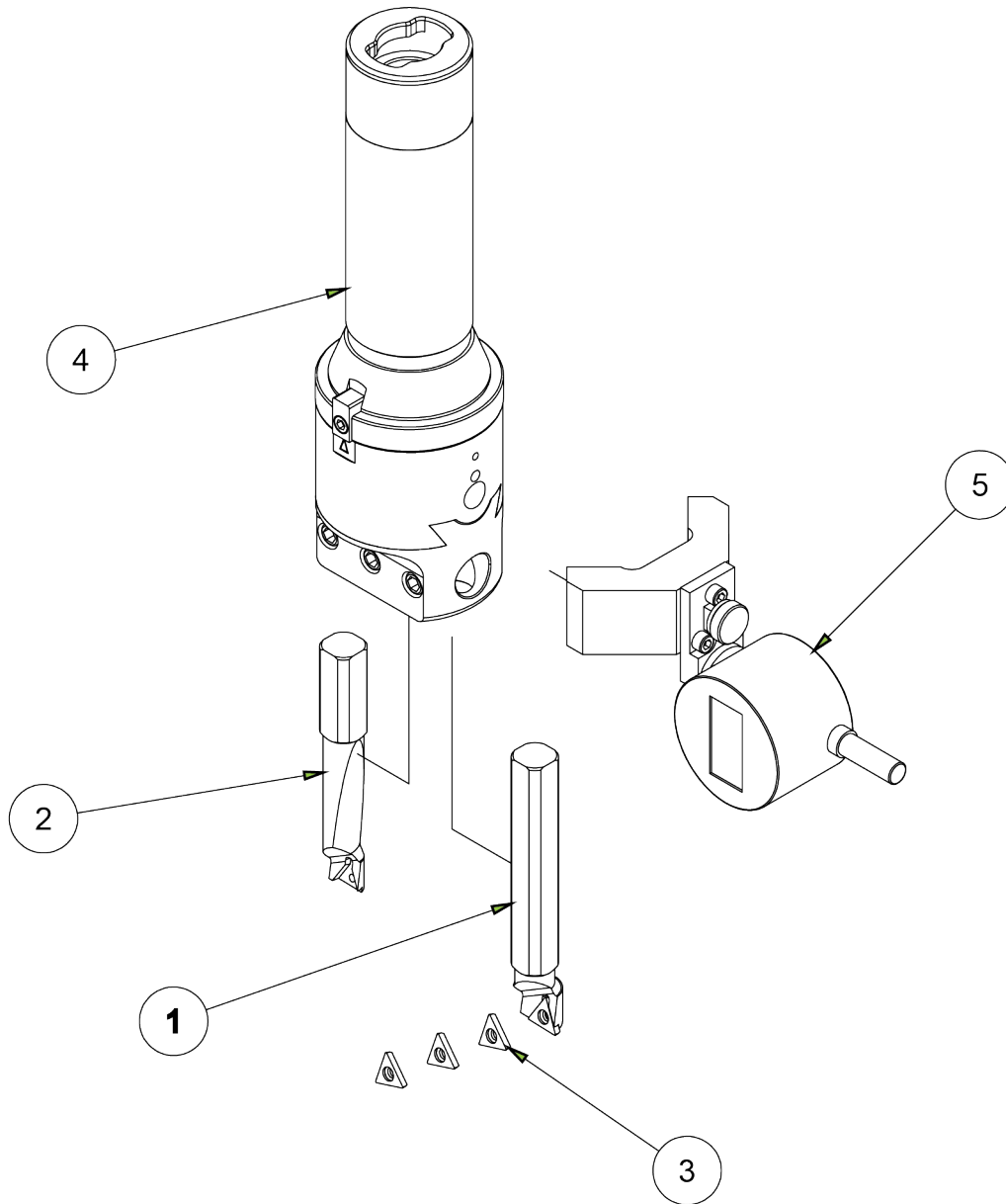


**650-2-43F 3/4" (19.05mm) Four Fluted End Mill X 4" (101.4mm) Length**

(.020" corner radius, flat bottom, no dish) Used for Machining Head Gasket Fire Deck Surface for Water Hold Corrosion Repairs



**650-2-3V Cutterhead Assembly Components**

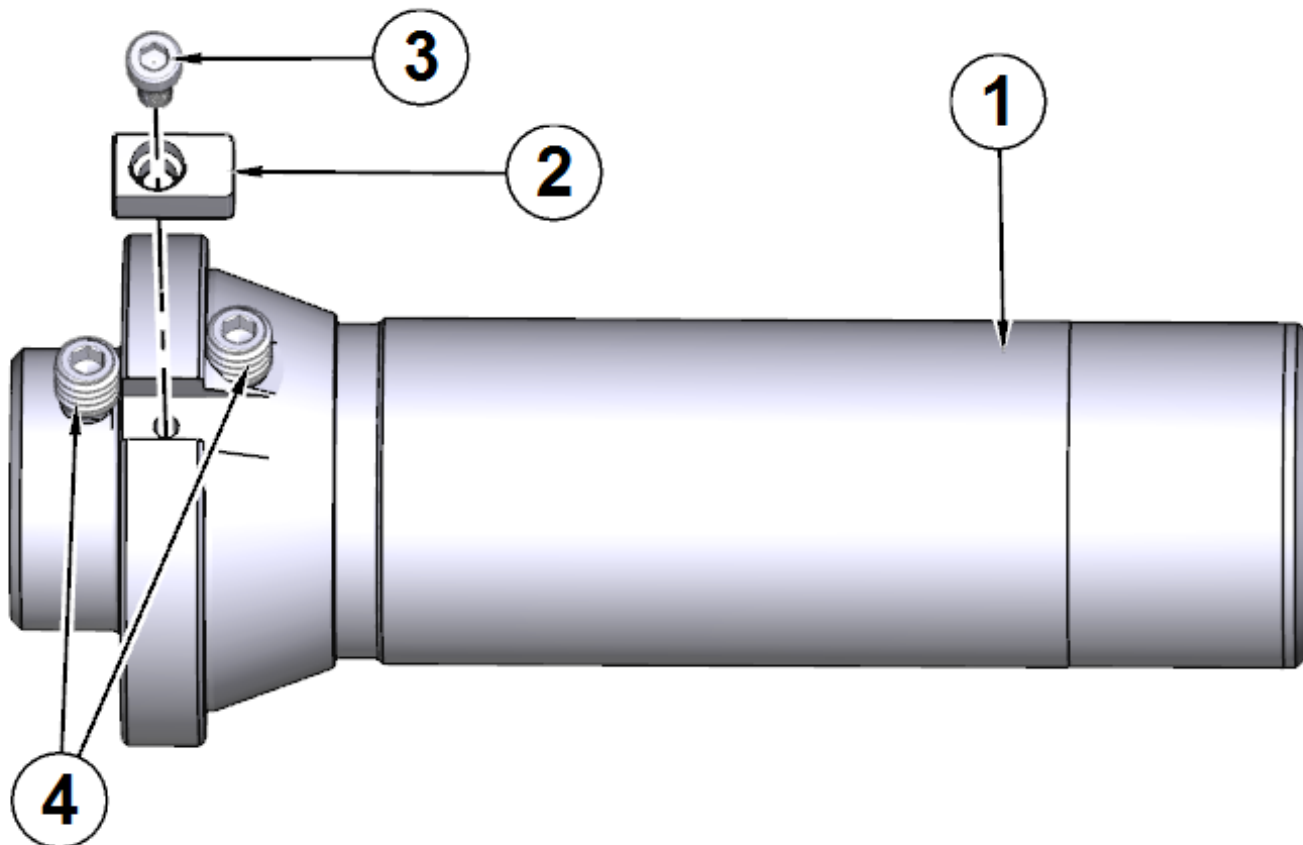


650-2-3V CUTTERHEAD ASSEMBLY .75" - 2.0" SPECIAL - F90			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-2-34P	BORING BAR, 1" PRECISION BORING HEAD ASS'Y
2	1	650-2-34Q	BORING BAR, 3/4" PRECISION BORING HEAD ASS'Y
3	4	650-2-34R	INSERT, TRIANGULAR POS. RAKE 3/8" I.C.
4	1	650-2-3W	PRECISION CUTTERHEAD ASSEMBLY WITHOUT TOOLING - SPECIAL F90
5	1	650-2-34C	DIGITAL INDICATOR ASSEMBLY



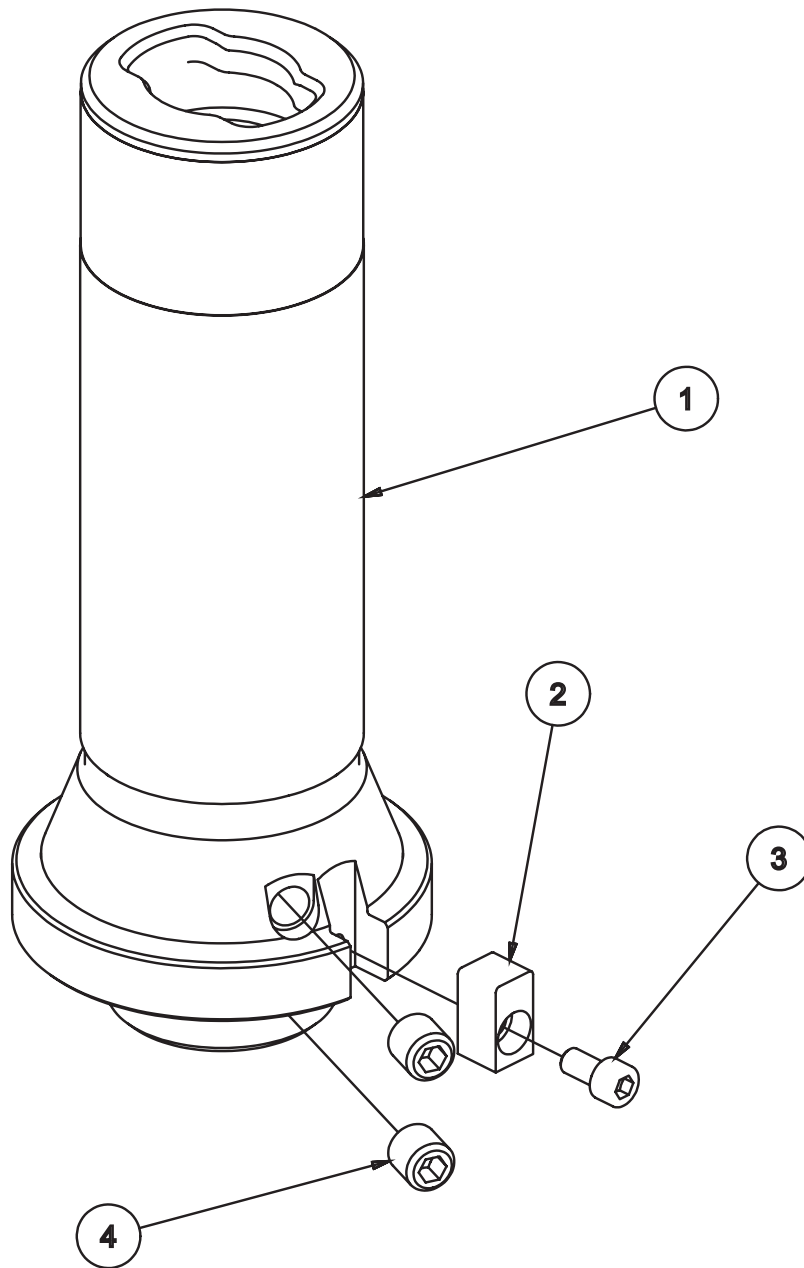
## Spindle Adapters for Mounting Universal Tooling

### 6648M Spindle Adapter Parts



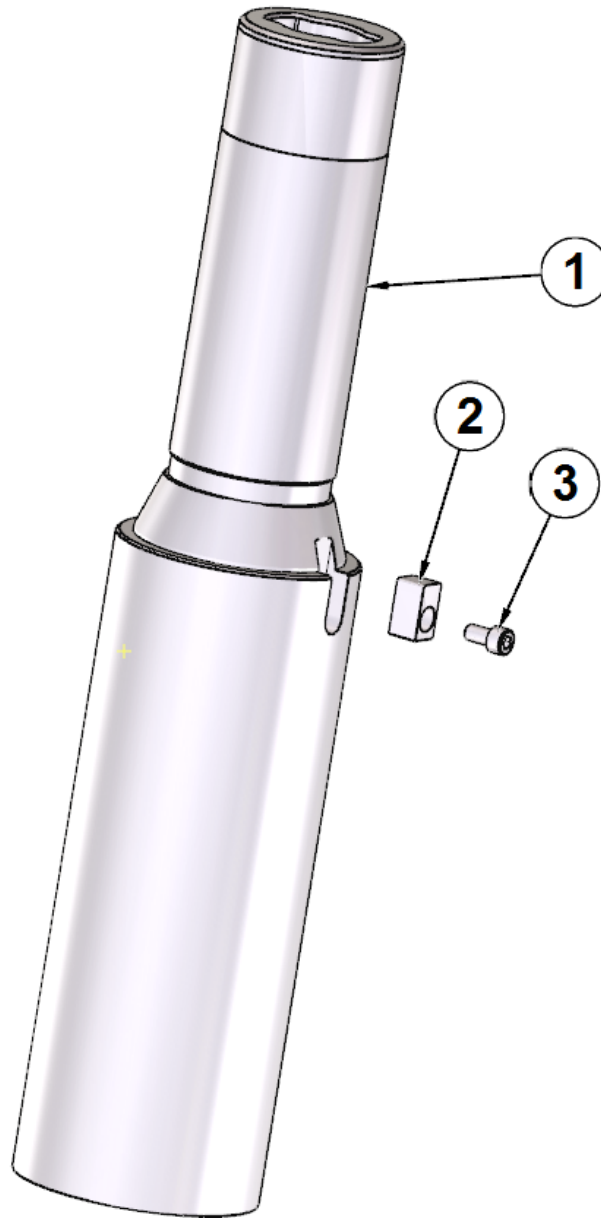
ITEM	PART #	DESCRIPTION
1	6648A	SPINDLE ADAPTER-1" (25.4MM) FOR DRIVING 1" DIAMETER SHANK TOOLING
2	6181	KEY,CUTTERHEAD DRIVE
3	MF-5A	SOCKET HEAD CAP SCREW 10-24 X 1/2"
4	MF-71D	SOCKET SET SCREW FLAT POINT 3/8-16 X 3/8"

**6649B .750" (19.05mm) Spindle Adapter Parts**



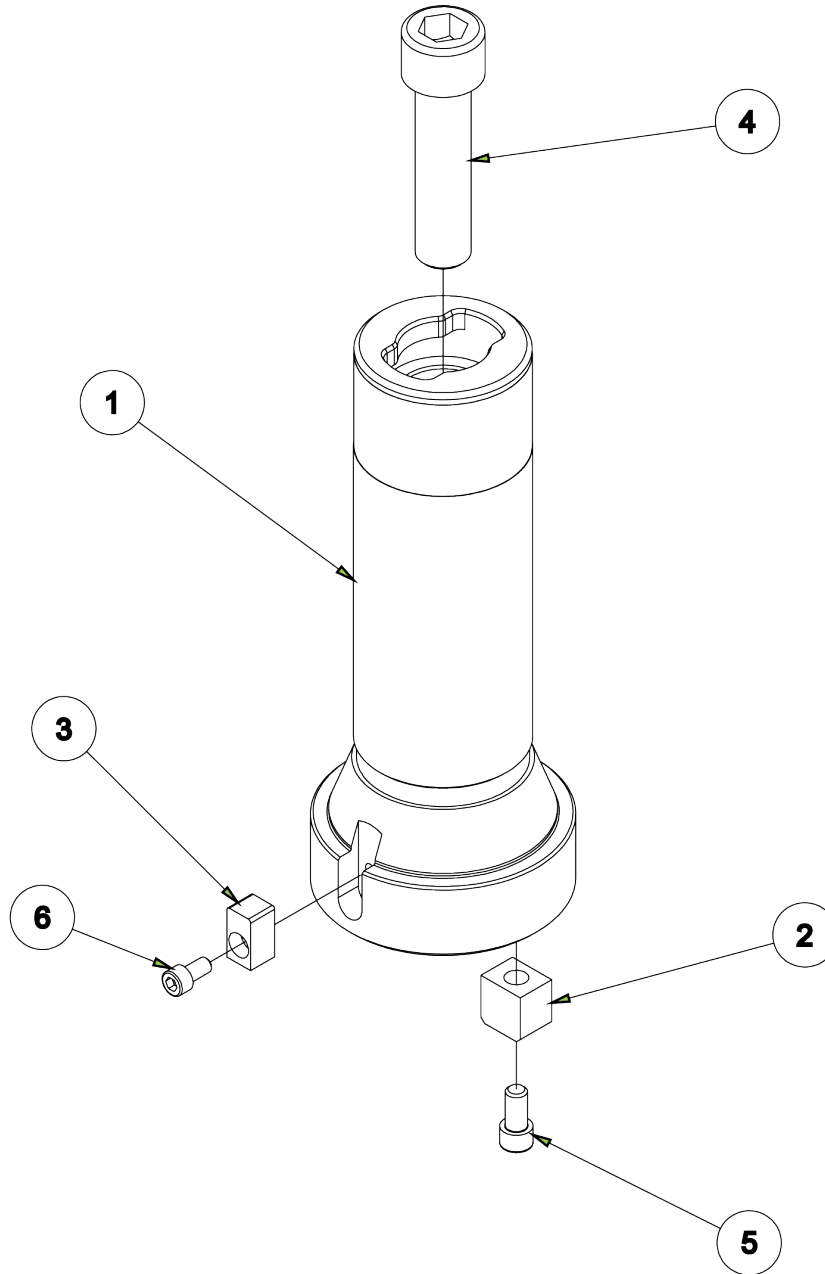
6649B ADAPTER ASSEMBLY, 3/4" END MILL F-8			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6649A	ADAPTER, 3/4" END MILL F-8
2	1	6181	KEY, CUTTERHEAD DRIVE STUB BARS F-8
3	1	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
4	2	MF-71D	3/8-16UNC x 3/8" LG. SOCKET FLAT POINT SET SCREW

**6170C Adapter, Blank Parts**



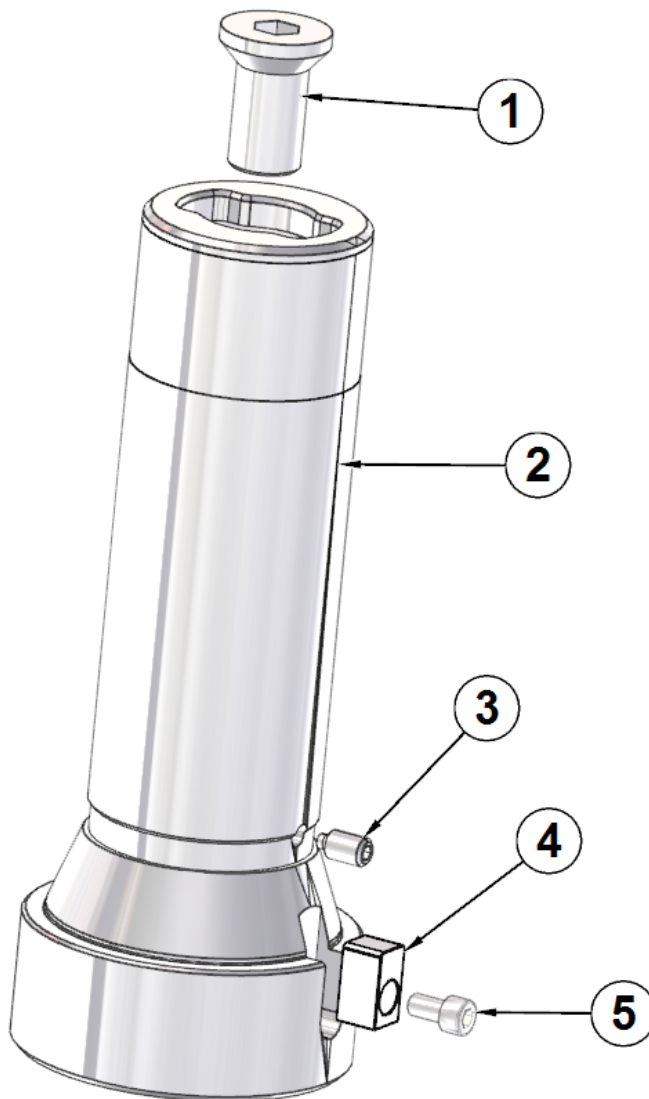
ITEM	PART #	DESCRIPTION
1	6170L	ADAPTER, BLANK
2	6181	KEY,CUTTERHEAD DRIVE
3	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"

**6170J #40 Taper Adapter**



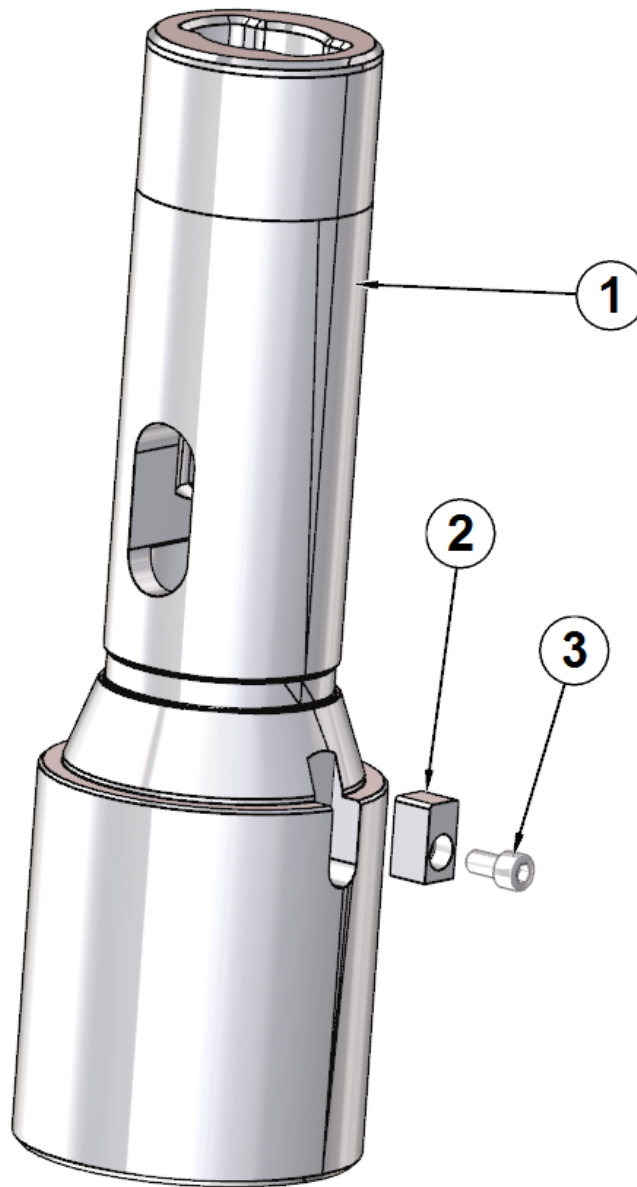
6170J ADAPTER ASSEMBLY, #40 TAPER			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6170E	ADAPTER, #40 TAPER
2	1	6170H	Drive key
3	1	6181	DRIVE KEY
4	1	502-1-86B	S.H.C.S. 5/8-11 x 2-1/2" LG.
5	1	MF-12	S.H.C.S. 1/4 - 20 UNC - 1/2
6	1	MF-4	S.H.C.S. 10 - 24 UNC - 3/8

**6170K R8 Taper Adaptor Parts**



ITEM	PART #	DESCRIPTION
1	6170P	CAP SCREW, 7/16-20 UNF x 1" LG SOCKET HEAD
2	6170D	ADAPTER
3	514-3-12K	SCREW, KEY LOWER LIMIT STOP
4	6181	KEY,CUTTERHEAD DRIVE
5	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"

**6514Q #5 Morse Taper Adapter Parts**

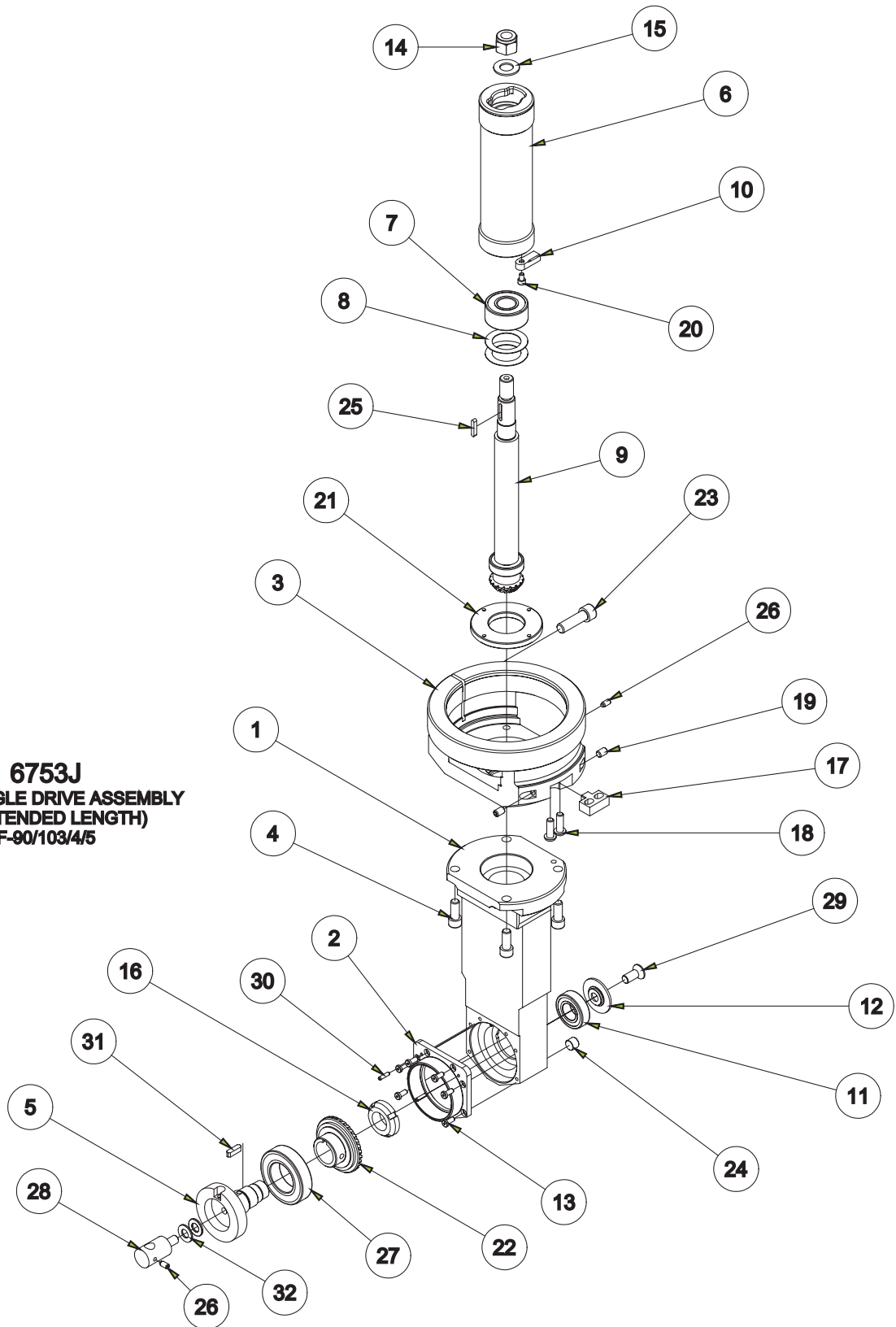


ITEM	PART #	DESCRIPTION
1	6514Q	ADAPTER, MORSE TAPER #5
2	6181	KEY,CUTTERHEAD DRIVE
3	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"

# Main Line Bore Equipment

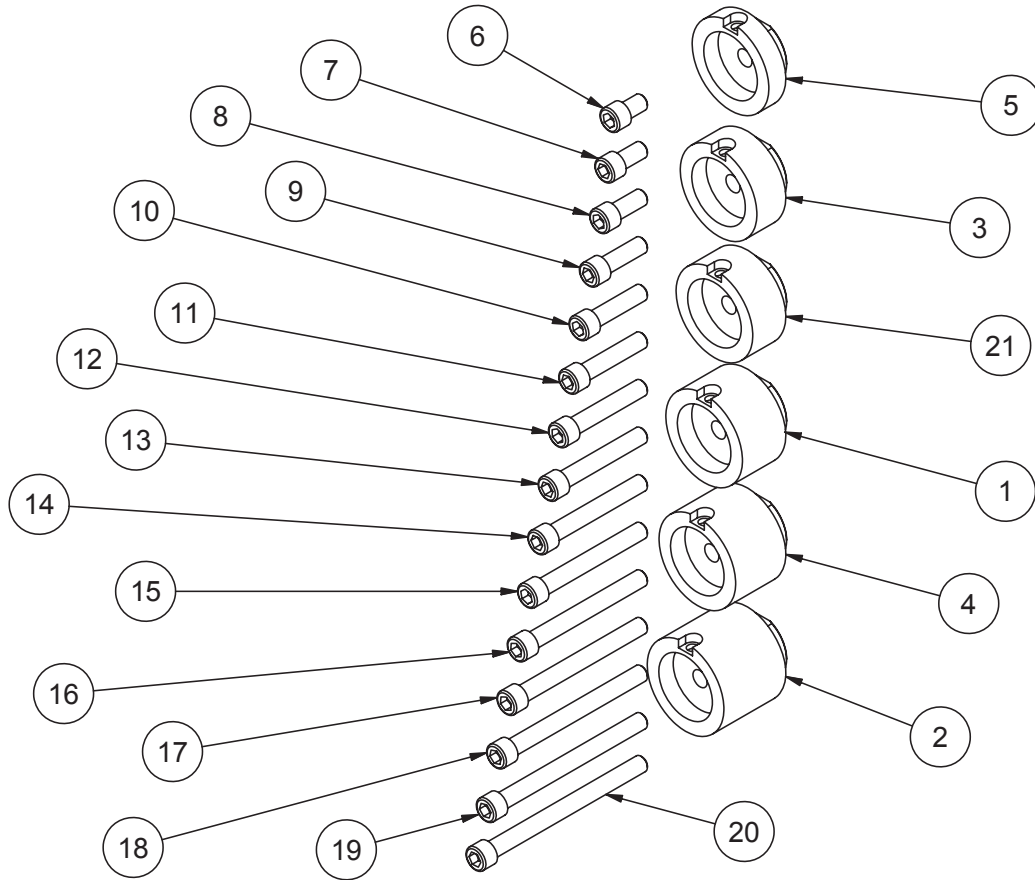
## 6753J Straight 90 Degree Right Angle Drive Parts

**6753J**  
RIGHT ANGLE DRIVE ASSEMBLY  
(2" EXTENDED LENGTH)  
F-90/103/4/5



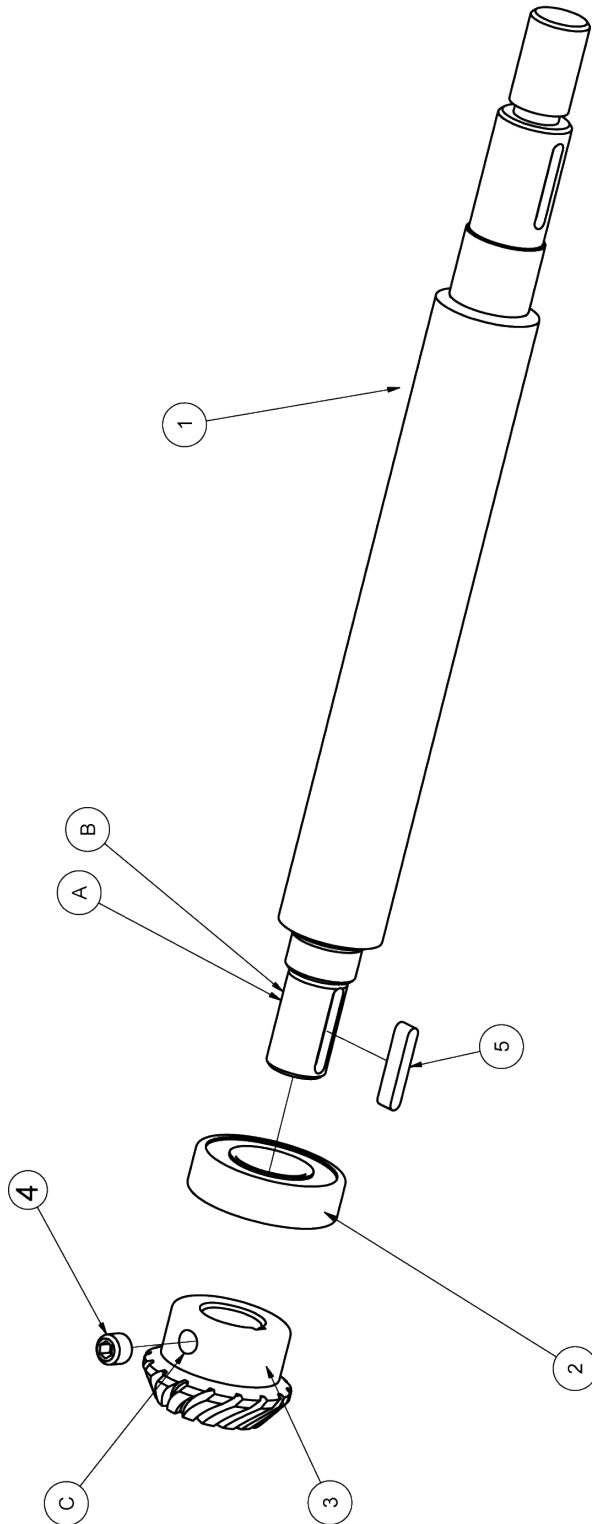


6753J RIGHT ANGLE DRIVE ASSEMBLY (2" EXTENDED) F-90/103/4/5			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6773D	HOUSING, GEAR - RIGHT ANGLE DRIVE (EXTENDED)
2	1	6774	COVER, BEARING RETAINER - F80/90 R.A.D.
3	1	6770B	HUB, MOUNTING, 90 DEGREE BORING HEAD F-9
4	4	MF-22	S.H.C.S. 5/16-18UNC x 3/4"
5	1	650-2-42A	SHAFT, HORIZONTAL - INTERMEDIATE PRECISION LINE BORE HEAD
6	1	6771A	DRIVER, F80, F90 90 DEG. LINE BORE HEAD
7	1	502-9-32	Bearing, Ball MRC 5203SBKFF
8	2	6007A	Bellville Spring, BS203
9	1	6775C	PINION AND SHAFT ASSEMBLY (2" EXTENDED) R.A.D.
10	1	6776	KEY, DRIVER ADAPTER, F80, F90 SERIES LINE BORE HEAD
11	1	6753E	Bearing, NDH Z99L03
12	1	6766F	End Cap
13	6	6774E	Hexagon Socket Head Cap Screw
14	1	MF-186	1/2-13 Nylock Nut
15	1	100-19	Washer
16	1	6705B	BEARING LOCK NUT
17	1	6750K	Key, Location 90 Degree Head
18	2	MF-92	1/4-20UNC x 3/4" LG. SOCKET BUTTON HEAD SCREW
19	2	MF-59	1/4-20UNC x 3/8" LG. FLAT POINT SET SCREW
20	1	MF-3D	8-32UNC x 1/4" LG. S.H.C.S.
21	1	6772A	Nut, Bearing Line Bore Head
22	1	6766H	RING GEAR REWORK - SMALL 90 DEG. R.A.D.
23	1	MF-32	S.H.C.S.3/8 - 16 UNC - 1 1/4
24	1	MF-233	Countersunk Hex-Head Plug 1/8
25	1	6753V	KEY (MICARTA), PINION - 90 DEGREE HEAD
26	2	100-82-2A	Brass tipped 10-24 Socket Set Screw
27	1	502-9-72B	BALL BEARING
28	1	502-9-9S	INDICATOR MOUNT, R.A.D.
29	1	6774K	5/16-24UNF x 3/4" LG. HEX SOCKET FLAT HEAD SCREW
30	2	MF-217	1/8 x 1/2 Roll Pin
31	1	7088A	KEY, PULLEY SF-1
32	2	MF-177	SAE FLAT WASHER 5/16"



SPACER SET - 6753J R.A.D. ASSEMBLY F90/F103/4/5

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-2-43	SPACER (1.05" LG.) PRECISION LINE BORE HEAD
2	1	650-2-43A	SPACER (1.50" LG.) PRECISION LINE BORE HEAD
3	1	650-2-43B	SPACER (.70" LG.) PRECISION LINE BORE HEAD
4	1	650-2-43D	SPACER (1.215" LG.) PRECISION LINE BORE HEAD
5	1	650-2-43E	SPACER (.41" LG.) PRECISION LINE BORE HEAD
6	1	MF21A	S.H.C.S. 5/16-18UNC - 1/2
7	1	MF-21	S.H.C.S.5/16 - 18 UNC - 5/8
8	1	MF-22	S.H.C.S.5/16 - 18 UNC - 3/4
9	1	MF-23	S.H.C.S.5/16 - 18 UNC - 1
10	1	MF-24	S.H.C.S.5/16 - 18 UNC - 1 1/4
11	1	MF-25	S.H.C.S. 5/16 - 18 UNC - 1 1/2
12	1	Mf-26	S.H.C.S.5/16 - 18 UNC - 1 3/4
13	1	MF-27	S.H.C.S. 5/16 - 18 UNC - 2
14	1	MF-38B	S.H.C.S.5/16 - 18 UNC - 2 1/4
15	1	MF-27A	S.H.C.S. 5/16 - 18 UNC - 2 1/2
16	1	MF-28	S.H.C.S. 5/16 - 18 UNC - 2 3/4
17	1	MF-28E	S.H.C.S.5/16 - 18 UNC - 3
18	1	MF-28F	S.H.C.S. 5/16-18UNC - 3-1/4
19	1	MF-28A	S.H.C.S. 5/16-18UNC - 3-1/2
20	1	MF-28G	S.H.C.S. 5/16-18UNC - 3-3/4
21	1	650-2-43G	SPACER (.80" LG.) PRECISION LINE BORE HEAD

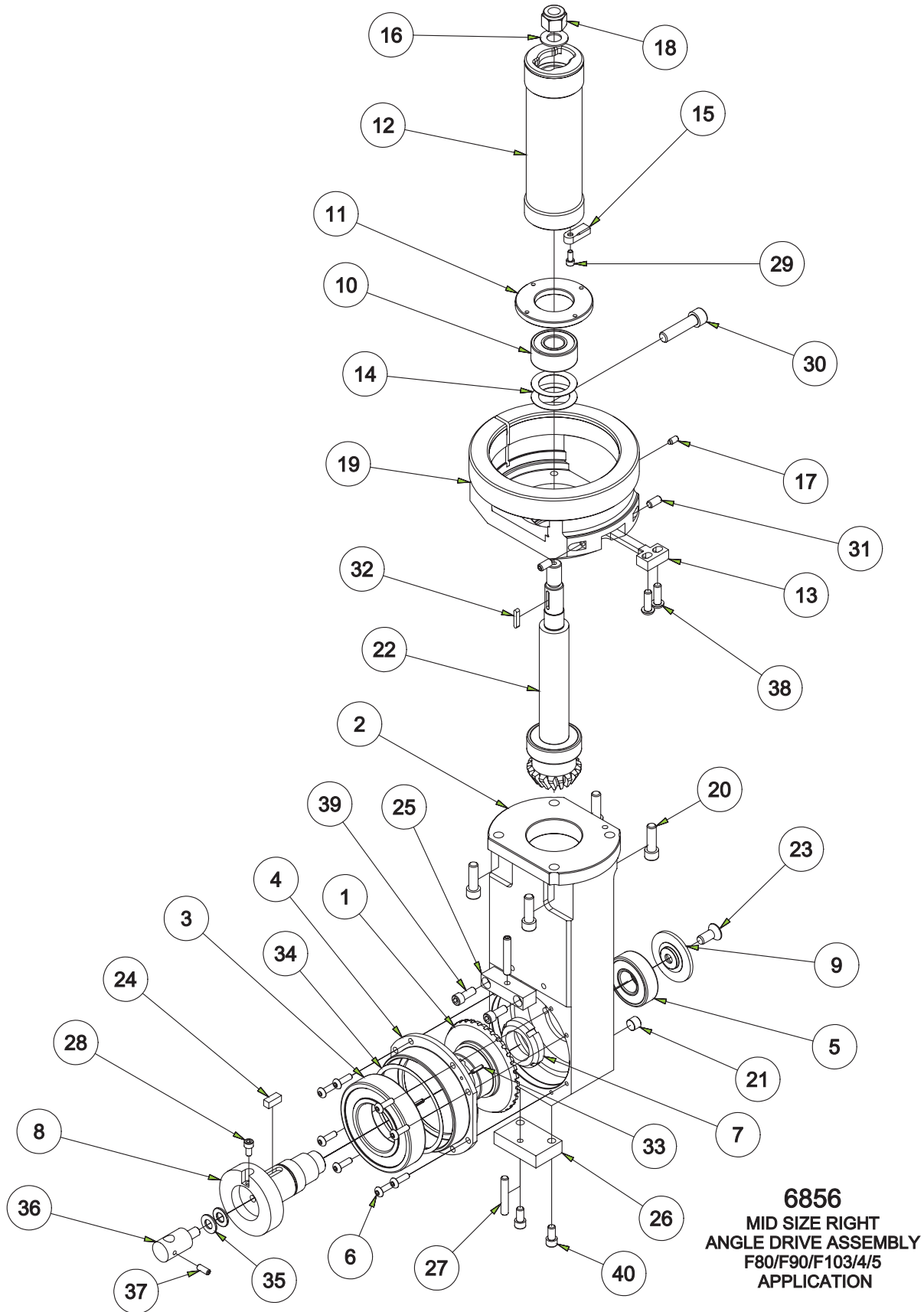


ASSEMBLY:

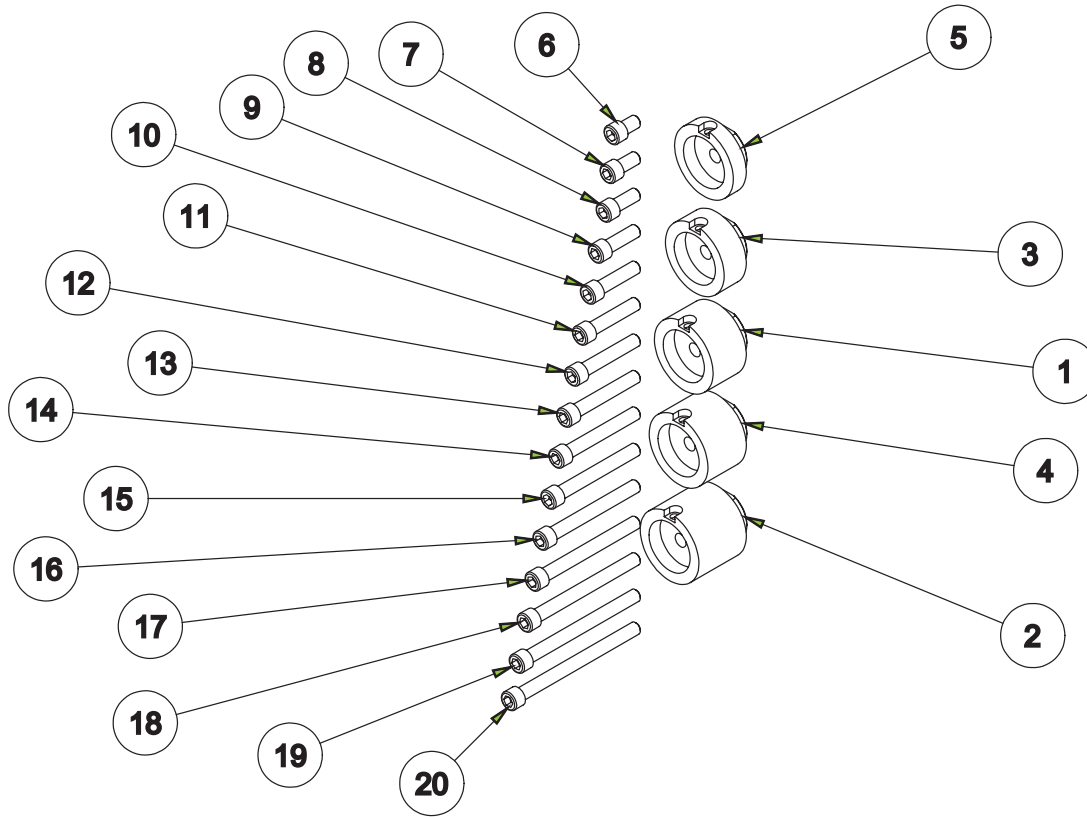
1. INSTALL DUMMY BEARING FROM TOOLING FILE ONTO 6775B SHAFT.
2. INSTALL DUMMY KEY FROM TOOLING FILE ONTO SHAFT.
3. REMOVE STOCK SET SCREW FROM 6752M PINION AND DISCARD. SLIDE PINION ONTO SHAFT.
4. MARK CENTERLINE OF THE 1/4-20UNC TAPPED HOLE (C) ON THE SHAFT. THIS MARK WILL BE POINT A.
5. REMOVE PINION, DUMMY BEARING, AND DUMMY KEY.
6. MARK SHAFT .030" UP FROM POINT A (CLOSER TO SHOULDER). THIS WILL BE POINT B.
7. WITH A 90° DRILL POINT, DRILL TO .22 DIAMETER AT B.
8. INSTALL 700-11 BEARING ONTO SHAFT.
9. INSTALL PINION ONTO SHAFT.
10. PLACE BLUE (REMOVABLE) LOCTITE ONTO MF-59B CONE POINT SET SCREW AND INSTALL INTO PINION. DO NOT OVERTIGHTEN THIS SCREW, IT WILL DEFORM THE TOOTH PATTERN.

6775C PINION SHAFT ASSEMBLY - R.A.D.				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	6775B	SHAFT - PINION EXTENDED SMALL RIGHT ANGLE DRIVE	
2	1	700-11	BALL BEARING	
3	1	6752M	PINION, 90 DEG HEAD	
4	1	MF-59B	1/4-20UNC x 5/16" LG. CONE POINT SET SCREW	
5	1	6753V	KEY (MICARTA), PINION - 90 DEGREE HEAD	

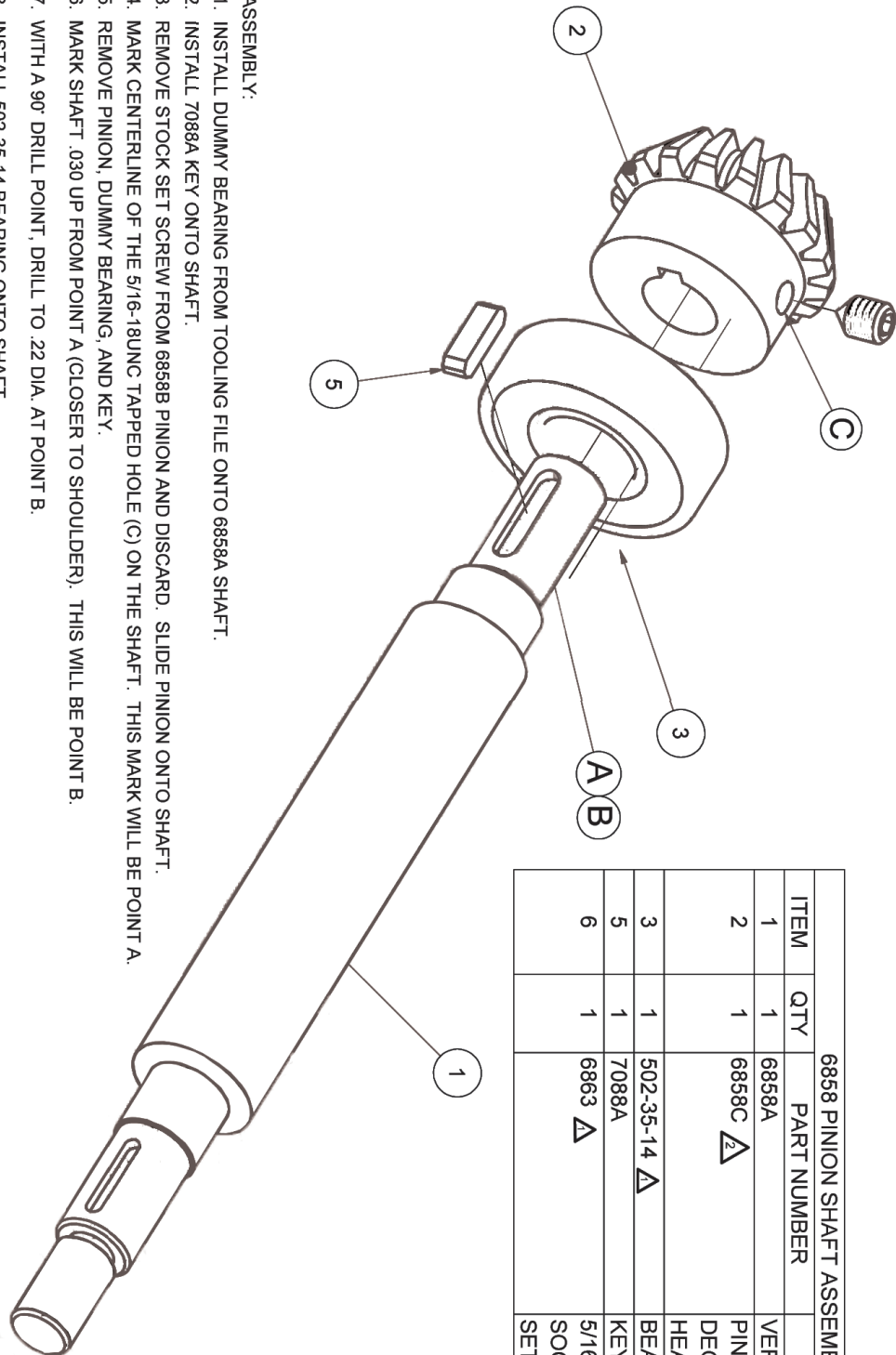
### 6856 Straight 90 Degree Right Angle Drive Parts



6856 MID SIZE RIGHT ANGLE DRIVE ASSEMBLY - F90/F103/4/5			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6859	REWORK 6859A SPIRAL BEVEL GEAR
2	1	6857	HOUSING, MID SIZE RIGHT ANGLE DRIVE F90
3	1	650-1-21A	BEARING, MID SIZE R.A.D.
4	1	6861	COVER, BEARING RETAINER - MID SIZE RIGHT ANGLE DRIVE
5	1	502-35-14	Bearing
6	8	MF-89	Hexagon Socket Button Head Cap Screw 10-24UNC x 5/8" LG.
7	1	6048	Bearing Nut
8	1	6860	HORIZONTAL SHAFT - MID SIZE RIGHT ANGLE DRIVE
9	1	6862	END CAP, BEARING RETAINER - MID SIZE RIGHT ANGLE DRIVE
10	1	502-9-32	Bearing, Ball MRC 5203SBKFF
11	1	6772A	Nut, Bearing Line Bore Head
12	1	6771A	DRIVER, F80, F90 90 DEG. LINE BORE HEAD
13	1	6750K	Key, Location 90 Degree Head
14	2	6007A	Bellville Spring, BS203
15	1	6776	KEY, DRIVER ADAPTER, F80, F90 SERIES LINE BORE HEAD
16	1	100-19	Washer
17	1	100-82-2A	Brass tipped 10-24 Socket Set Screw
18	1	MF-186	1/2-13 Nylock Nut
19	1	6770B	HUB, MOUNTING, 90 DEGREE BORING HEAD F-9
20	4	Mf-23	Socket Head Cap screw 5/16 - 18 UNC - 1
21	1	MF-233	PIPE PLUG 1/8-27NPT
22	1	6858	PINION SHAFT ASSEMBLY - MID SIZE RIGHT ANGLE DRIVE
23	1	6774K	Hexagon Socket Flat Countersunk Head Cap Screw 5/16-24UNF x 3/4" LONG
24	1	7191K	KEY, HORIZONTAL SHAFT MID SIZE R.A.D.
25	1	6857E	FINE ADJUSTING BLOCK, UPPER - MID SIZE R.A.D.
26	1	6857F	FINE ADJUSTING BLOCK, LOWER - MID SIZE R.A.D.
27	2	MF-66	1/4-20UNC x 1-1/2" LG. SOCKET SET SCREW
28	1	MF-4	10-24UNC x 3/8" LG. S.H.C.S.
29	1	6774E	8-32UNC x 3/8" LG. S.H.C.S.
30	1	MF-33	3/8-16UNC x 1-1/2 LG. S.H.C.S.
31	2	MF-59	SOCKET FLAT POINT SET SCREW 1/4-20 x 3/8" LG.
32	1	6753V	KEY (MICARTA), PINION - 90 DEGREE HEAD
33	2	MF-217	1/8 x 1/2 Roll Pin
34	1	6861A	SHIM, BEARING SPACER - HORIZONTAL SHAFT - MID SIZE F90 R.A.D.
35	2	MF-177	SAE FLAT WASHER 5/16"
36	1	502-9-9S	INDICATOR MOUNT, R.A.D.
37	1	MF-58A	10-24UNC x 1/2" LG. SOCKET FLAT POINT SET SCREW
38	2	Mf-92	Socket Button Head 1/4 - 20 x 3/4
39	2	MF-13	S.H.C.S. 1/4 - 20 UNC - 5/8
40	2	MF-12	S.H.C.S. 1/4 - 20 UNC - 1/2



CUTTERHEAD SPACER SET - MID SIZE LINE BORE HEAD - F80/90/F103/4/5			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-2-43	1.05 SPACER
2	1	650-2-43A	SPACER - 1.50" LONG
3	1	650-2-43B	SPACER - .70" LONG
4	1	650-2-43D	SPACER - 1.215" LONG
5	1	650-2-43E	SPACER - .41" LONG
6	1	MF21A	S.H.C.S. 5/16 - 18 UNC - 1/2
7	1	MF-21	S.H.C.S. 5/16 - 18 UNC - 5/8
8	1	MF-22	S.H.C.S. 5/16 - 18 UNC - 3/4
9	1	MF-23	S.H.C.S. 5/16 - 18 UNC - 1
10	1	MF-24	S.H.C.S. 5/16 - 18 UNC - 1-1/4
11	1	MF-25	S.H.C.S. 5/16 - 18 UNC - 1 1/2
12	1	Mf-26	S.H.C.S. 5/16 - 18 UNC - 1-3/4
13	1	MF-27	S.H.C.S. 5/16 - 18 UNC - 2
14	1	MF-27C	S.H.C.S. 5/16 - 18 UNC - 2-1/4
15	1	MF-27A	S.H.C.S. 5/16 - 18 UNC - 2 1/2
16	1	MF-28	S.H.C.S. 5/16 - 18 UNC - 2 3/4
17	1	MF-28E	S.H.C.S. 5/16 - 18 UNC - 3
18	1	MF-28F	S.H.C.S. 5/16 - 18 UNC - 3-1/4
19	1	MF-28A	S.H.C.S. 5/16 - 18 UNC - 3-1/2
20	1	MF-28G	S.H.C.S. 5/16 - 18 UNC - 3-3/4



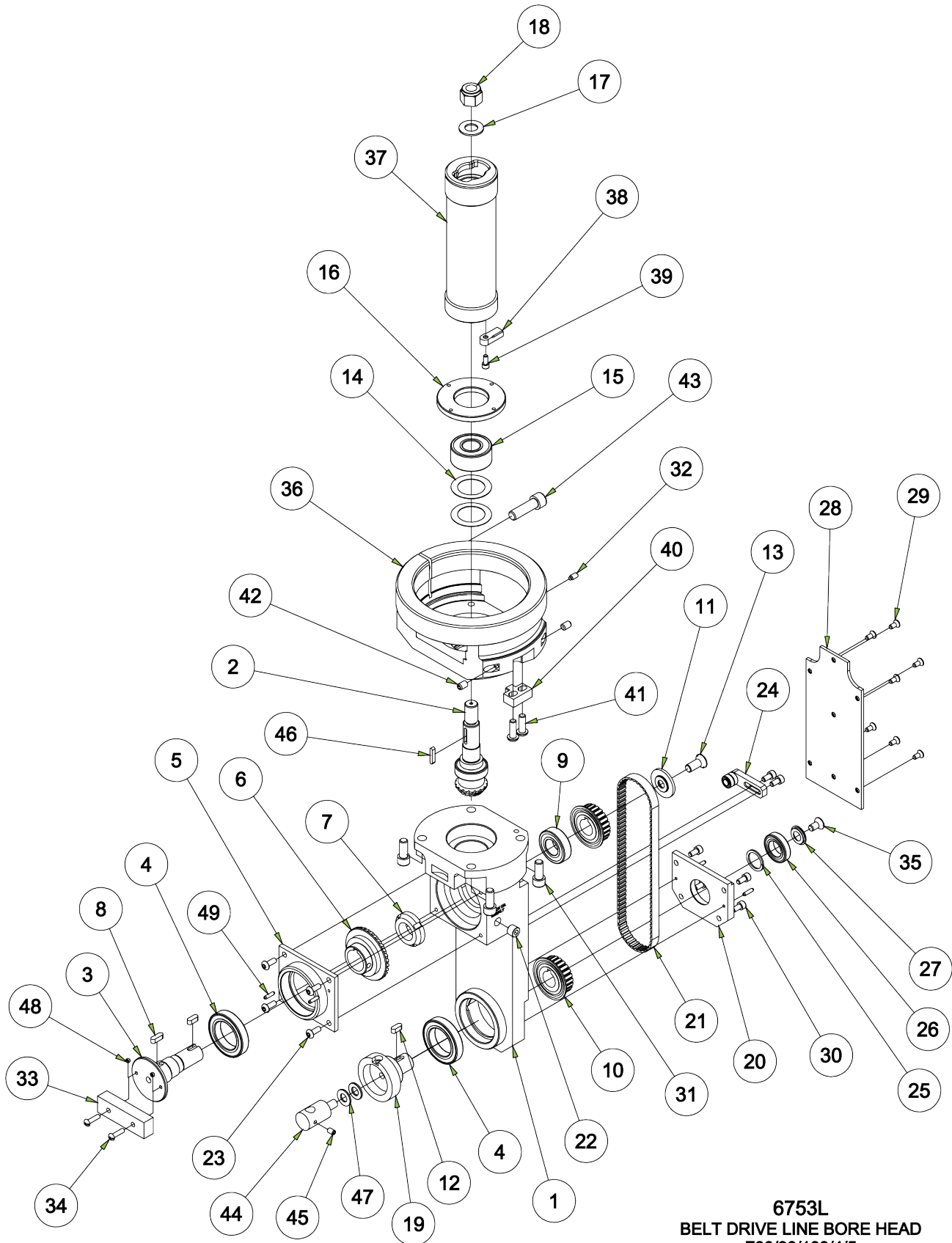
6858 PINION SHAFT ASSEMBLY			DESCRIPTION
ITEM	QTY	PART NUMBER	
1	1	6858A	VERTICAL SHAFT
2	1	6858C	PINION, MID SIZE 90 DEGREE LINE BORE HEAD
3	1	502-35-14	BEARING
5	1	7088A	KEY, PULLEY SF-1
6	1	6863	5/16-18UNC x 5/16" LG. SOCKET CONE POINT SET SCREW

ASSEMBLY:

1. INSTALL DUMMY BEARING FROM TOOLING FILE ONTO 6858A SHAFT.
2. INSTALL 7088A KEY ONTO SHAFT.
3. REMOVE STOCK SET SCREW FROM 6858B PINION AND DISCARD. SLIDE PINION ONTO SHAFT.
4. MARK CENTERLINE OF THE 5/16-18UNC TAPPED HOLE (C) ON THE SHAFT. THIS MARK WILL BE POINT A.
5. REMOVE PINION, DUMMY BEARING, AND KEY.
6. MARK SHAFT .030 UP FROM POINT A (CLOSER TO SHOULDER). THIS WILL BE POINT B.
7. WITH A 90° DRILL POINT, DRILL TO .22 DIA. AT POINT B.
8. INSTALL 502-35-14 BEARING ONTO SHAFT.
9. INSTALL PINION ONTO SHAFT.
10. PLACE BLUE (REMOVABLE) LOCKTITE ONTO 6863 CONE POINT SET SCREW AND INSTALL INTO PINION. DO NOT OVERTIGHTEN THIS SCREW, IT WILL DEFORM THE TOOTH PATTERN.

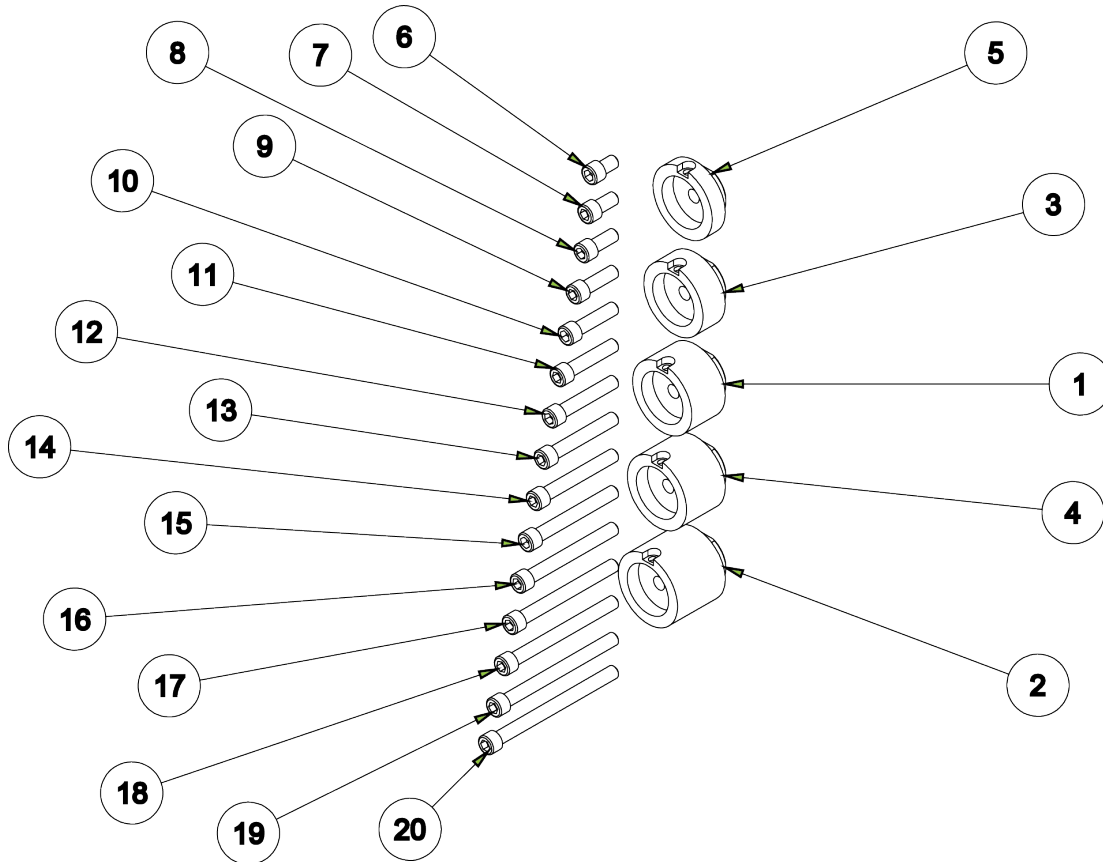


## 6753L Special Belt Drive 90 Degree Right Angle Drive Parts



6753L  
BELT DRIVE LINE BORE HEAD  
F80/90/103/4/5

6753L BELT DRIVE RIGHT ANGLE DRIVE - F80/90/103/4/5			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-2-38B	HOUSING, RIGHT ANGLE DRIVE BELT DRIVE - F65
2	1	650-2-37X	PINION & SHAFT ASSEMBLY BELT DRIVE LINE BORE HEAD
3	1	650-2-37D	SHAFT, HORIZONTAL UPPER - BELT DRIVE LINE BORE HEAD
4	2	502-9-72C	OUTER BALL BEARING, RIGHT ANGLE LINE BORING HEAD F-65
5	1	650-2-37C	BEARING COVER, BELT DRIVE RIGHT ANGLE DRIVE - F-65
6	1	6766W	RING GEAR REWORK - F60 SMALL 90 DEG. R.A.D.
7	1	6705B	BEARING LOCK NUT
8	1	650-2-18M	KEY, HORIZONTAL SHAFT, R.A.D.
9	1	6753E	Bearing, NDH Z99L03
10	2	650-2-37G	PULLEY (REWORK), BELT DRIVE R.A.D. - F60
11	1	650-2-37E	ENDCAP, UPPER PULLEY RETAINER - BELT DRIVE LINE BORE HEAD
12	2	650-2-37U	MICARTA KEY, BELT DRIVE LINE BORE HEAD
13	1	6774K	HEX SOCKET FLATHEAD SCREW 5/16-24UNF x 3/4"
14	2	6007A	Bellville Spring, BS203
15	1	502-9-32	Bearing, Ball MRC 5203SBKFF
16	1	6772A	Nut, Bearing Line Bore Head
17	1	100-19	Washer
18	1	MF-186	1/2-13 Nylock Nut
19	1	650-2-42B	Horizontal Shaft
20	1	650-2-37L	LOWER BEARING RETAINER - BELT DRIVE LINE BORE HEAD
21	1	650-2-38D	TIMING BELT, BELT DRIVE LINE BORE HEAD
22	1	MF-233	1/8-27NPT PIPE PLUG
23	4	Mf-88A	10-24UNC x 1/2" LG. S.H.C.S.
24	1	650-2-37P	BELT TENSIONER ASSY, BELT DRIVE LINE BORE HEAD
25	1	650-2-37V	SPACER, LOWER PULLEY - BELT DRIVE LINE BORE HEAD
26	1	650-2-37J	BEARING, BELT DRIVE LINE BORE HEAD
27	1	650-2-37K	END CAP, LOWER - BELT DRIVE LINE BORE HEAD
28	1	650-2-38C	BELT COVER, BELT DRIVE LINE BORE HEAD
29	7	MF-76	8-32UNC x 3/8" LG. SOCKET FLAT HEAD SCREW
30	6	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
31	4	MF-22	S.H.C.S.5/16 - 18 UNC - 3/4
32	1	100-82-2A	Brass tipped 10-24 Socket Set Screw
33	1	650-2-38a	RETAINING TOOL - BELT DRIVE R.A.D.
34	2	MF-105	ROUND HEAD MACHINE SCREW 8-32 x 5/8"
35	1	650-2-37Z	HEX SOCKET FLAT HEAD SCREW 1/4-28UNF x 1/2" LG.
36	1	6770B	HUB, MOUNTING, 90 DEGREE BORING HEAD F-9
37	1	6771A	DRIVER, F80, F90 90 DEG. LINE BORE HEAD
38	1	6776	KEY, DRIVER ADAPTER, F80, F90 SERIES LINE BORE HEAD
39	1	MF-3D	S.H.C.S. 8 - 32 UNC - 3/8
40	1	6750K	Key, Location 90 Degree Head
41	2	MF-92	1/4-20UNC x 3/4" LG. SOCKET BUTTON HEAD SCREW
42	2	MF-59	1/4-20UNC x 3/8" LG. SOCKET FLAT POINT SET SCREW
43	1	MF-32	3/8-16UNC x 1-1/4" LG. S.H.C.S.
44	1	502-9-9S	INDICATOR MOUNT, R.A.D.
45	1	MF-52	10-24UNC x .25" LONG SOCKET SET SCREW
46	1	6753V	KEY (MICARTA), PINION - 90 DEGREE HEAD
47	2	MF-177	SAE FLAT WASHER 5/16"
48	2	MF-49	8-32UNC x 1/8" LG. SOCKET SET SCREW
49	4	MF-217	1/8 x 1/2 Roll Pin



CUTTERHEAD SPACER SET - BELT DRIVE LINE BORE HEAD - F68			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-2-43	1.05 SPACER
2	1	650-2-43A	SPACER - 1.50" LONG
3	1	650-2-43B	SPACER - .70" LONG
4	1	650-2-43D	SPACER - 1.215" LONG
5	1	650-2-43E	SPACER - .41" LONG
6	1	MF21A	S.H.C.S. 5/16 - 18 UNC x 1/2
7	1	MF-21	S.H.C.S. 5/16 - 18 UNC - 5/8
8	1	MF-22	S.H.C.S. 5/16 - 18 UNC - 3/4
9	1	MF-23	S.H.C.S. 5/16 - 18 UNC x 1
10	1	MF-24	S.H.C.S. 5/16 - 18 UNC x 1-1/4
11	1	MF-25	S.H.C.S. 5/16 - 18 UNC - 1 1/2
12	1	Mf-26	S.H.C.S. 5/16 - 18 UNC x 1-3/4
13	1	MF-27	S.H.C.S. 5/16 - 18 UNC - 2
14	1	MF-27C	S.H.C.S. 5/16 - 18 UNC - 2-1/4
15	1	MF-27A	S.H.C.S. 5/16 - 18 UNC - 2 1/2
16	1	MF-28	S.H.C.S. 5/16 - 18 UNC - 2 3/4
17	1	MF-28E	S.H.C.S. 5/16 - 18 UNC - 3
18	1	MF-28F	S.H.C.S. 5/16 - 18 UNC - 3-1/4
19	1	MF-28A	S.H.C.S. 5/16 - 18 UNC - 3-1/2
20	1	MF-28G	S.H.C.S. 5/16 - 18 UNC - 3-3/4

## 650-2-39B Cutterhead Package Components

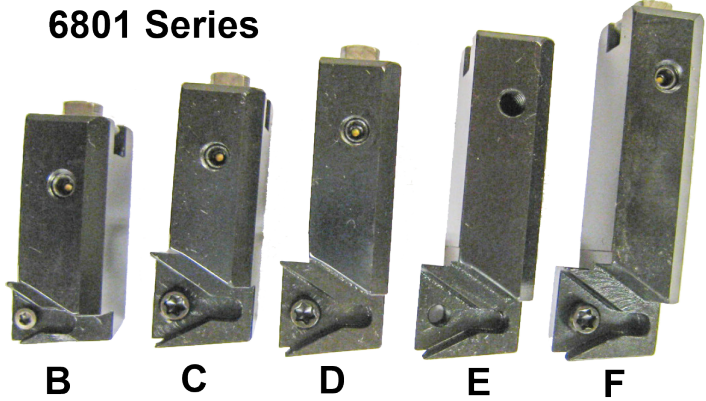


650-2-39F



RT321F

### 6801 Series



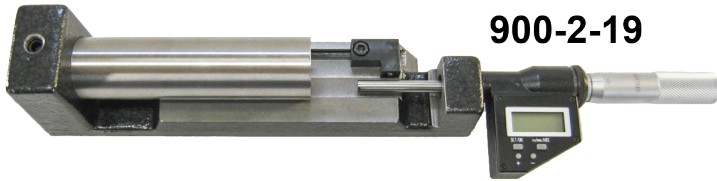
B

C

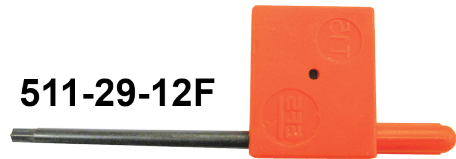
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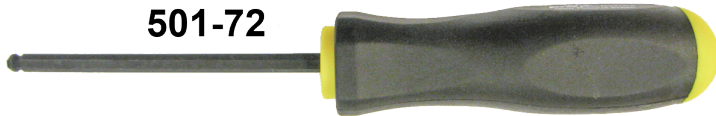
F



900-2-19



511-29-12F



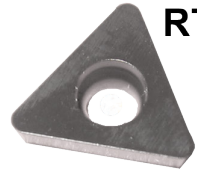
501-72



T8D



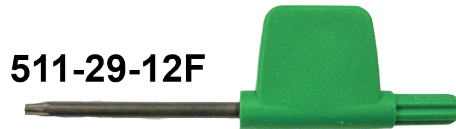
RT211



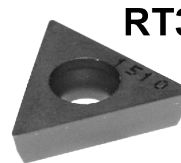
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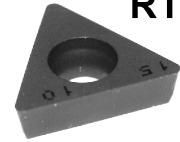
RT322F



511-29-12F

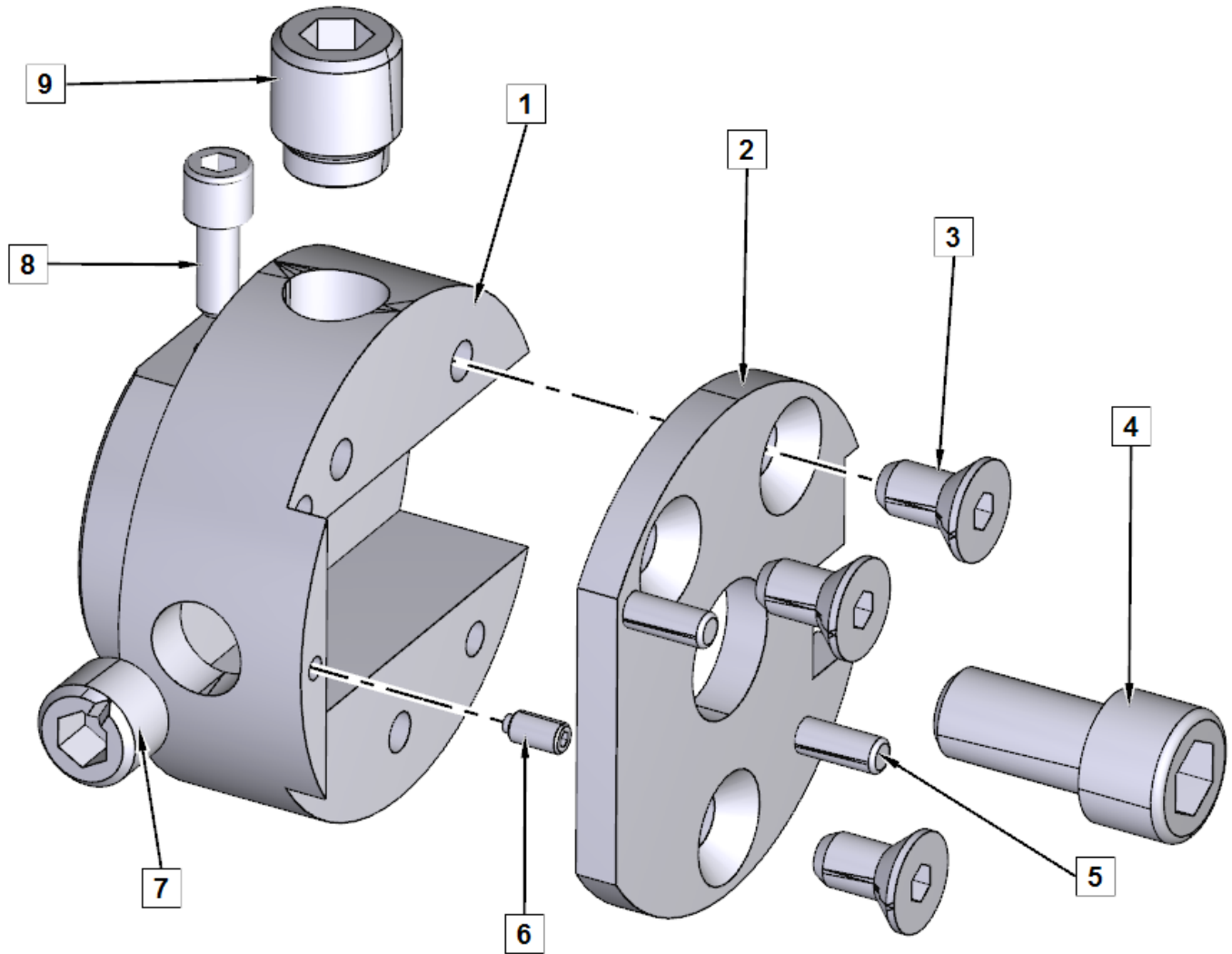


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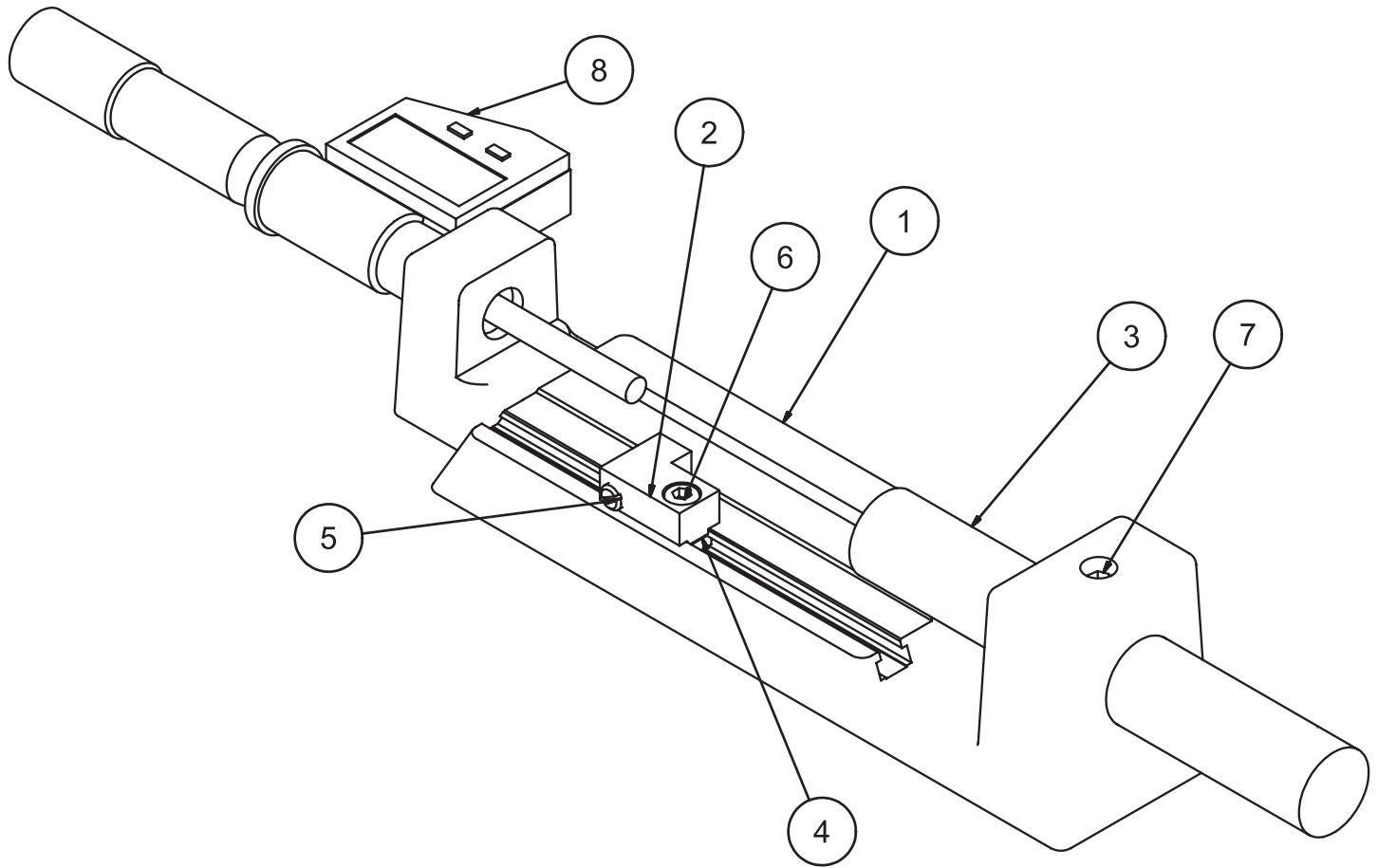
RT322

**650-2-39F Cutterhead Parts**



ITEM	PART #	DESCRIPTION
1	650-2-40A	BODY, 1.9" PRECISION LINE BORE CUTTERHEAD
2	650-2-41	CAP, 1.9" DIAMETER PRECISION LINE BORE HEAD
3	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
4	MF-21	SOCKET HEAD CAP SCREW 5/16-18 X 5/8"
5	MF-193C	DOWEL PINS 1/8 X 3/8"
6	650-2-6A	SOCKET SET SCREW BRASS TIPPED 4-40 X 3/16" LONG
7	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
8	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"
9	501-70A	SCREW, TOOL HOLDER LOCK ASSY

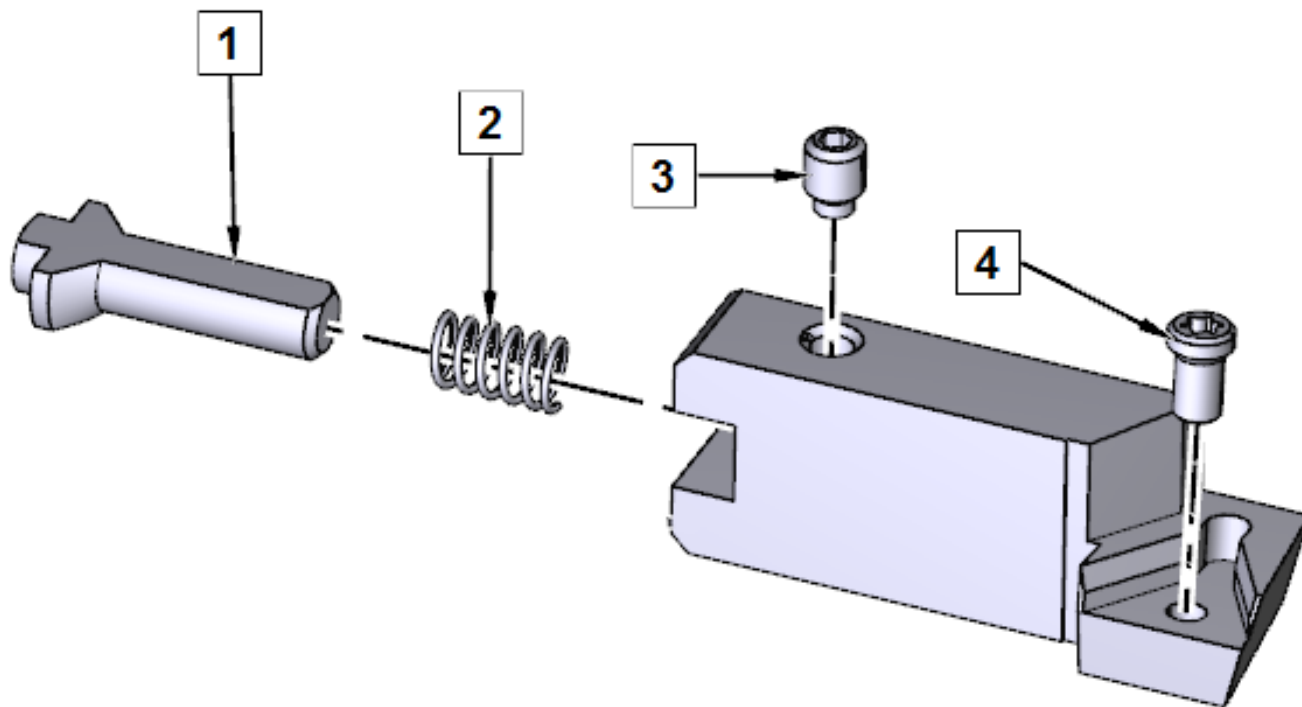
**900-2-19 Micrometer Parts**



900-2-19 Micrometer Assembly			
ITEM	QTY	PART NUMBE	DESCRIPTION
1	1	502-30-10B	Frame
2	1	502-30-10M	Clamp Block
3	1	502-31-10A	Anvil
4	1	502-30-10J	Square Nut
5	1	502-30-10K	Ball Plunger
6	1	ANSI B18.3 - No. 10 - 24 UNC - 3/8	Hexagon Socket Head Cap Screw
7	1	502-30-10L	Brass Tipped Set Screw
8	1	501-34-2R	Digital Micrometer Head



**6801 Series Insert Holder Parts**



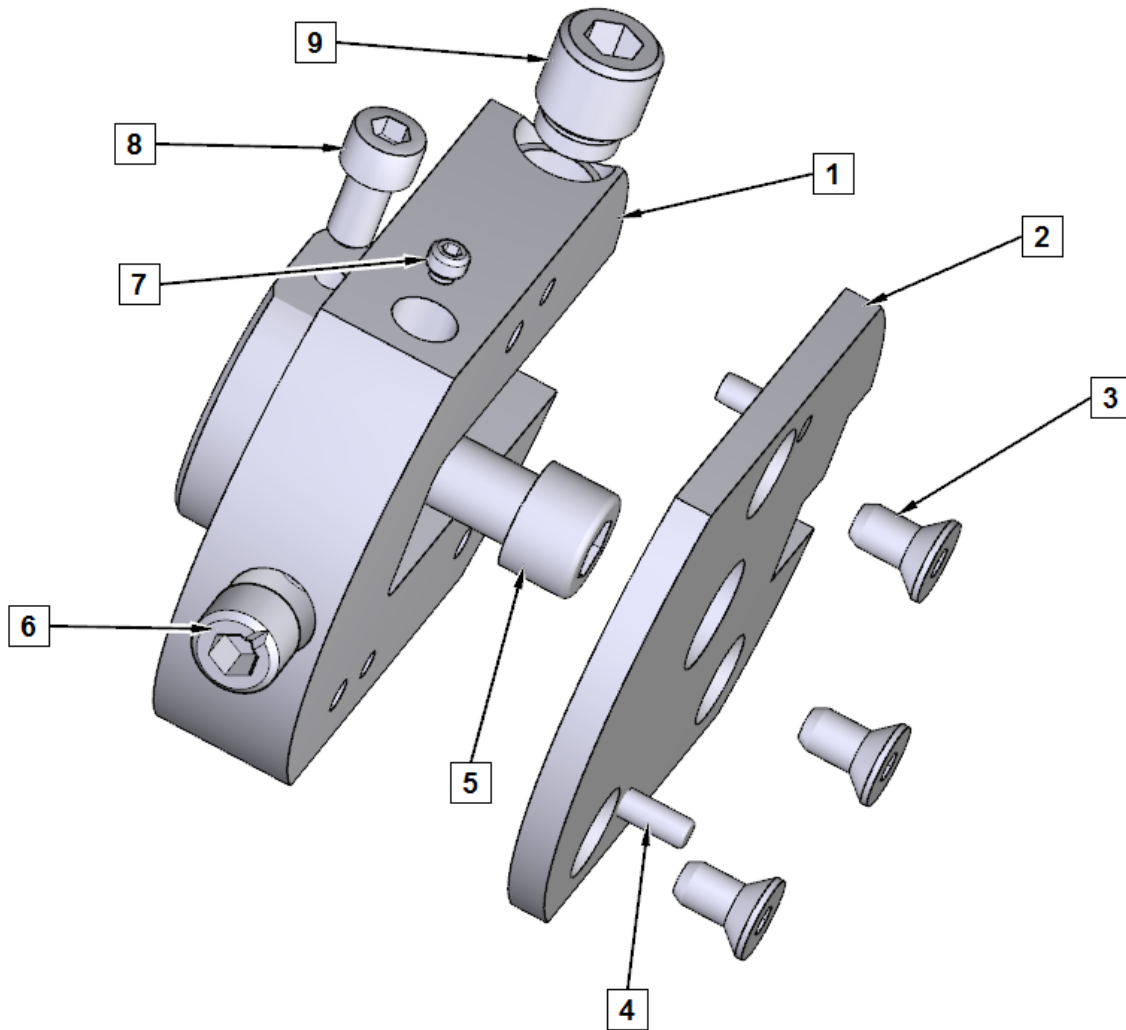
ITEM	PART #	DESCRIPTION
1	100-82-3B	PIN ADJUSTING LONG INDEXABLE INSERT TOOLHOLDER
2	100-82-1	SPRING, ADJUSTING PIN
3	100-82-2	SCREW, SET-BRASS GIB - 3/16" LONG
4	511-29-12C	SCREW, TORX M4 X .7 X .315" LONG

### 650-2-39C Cutterhead Package Components



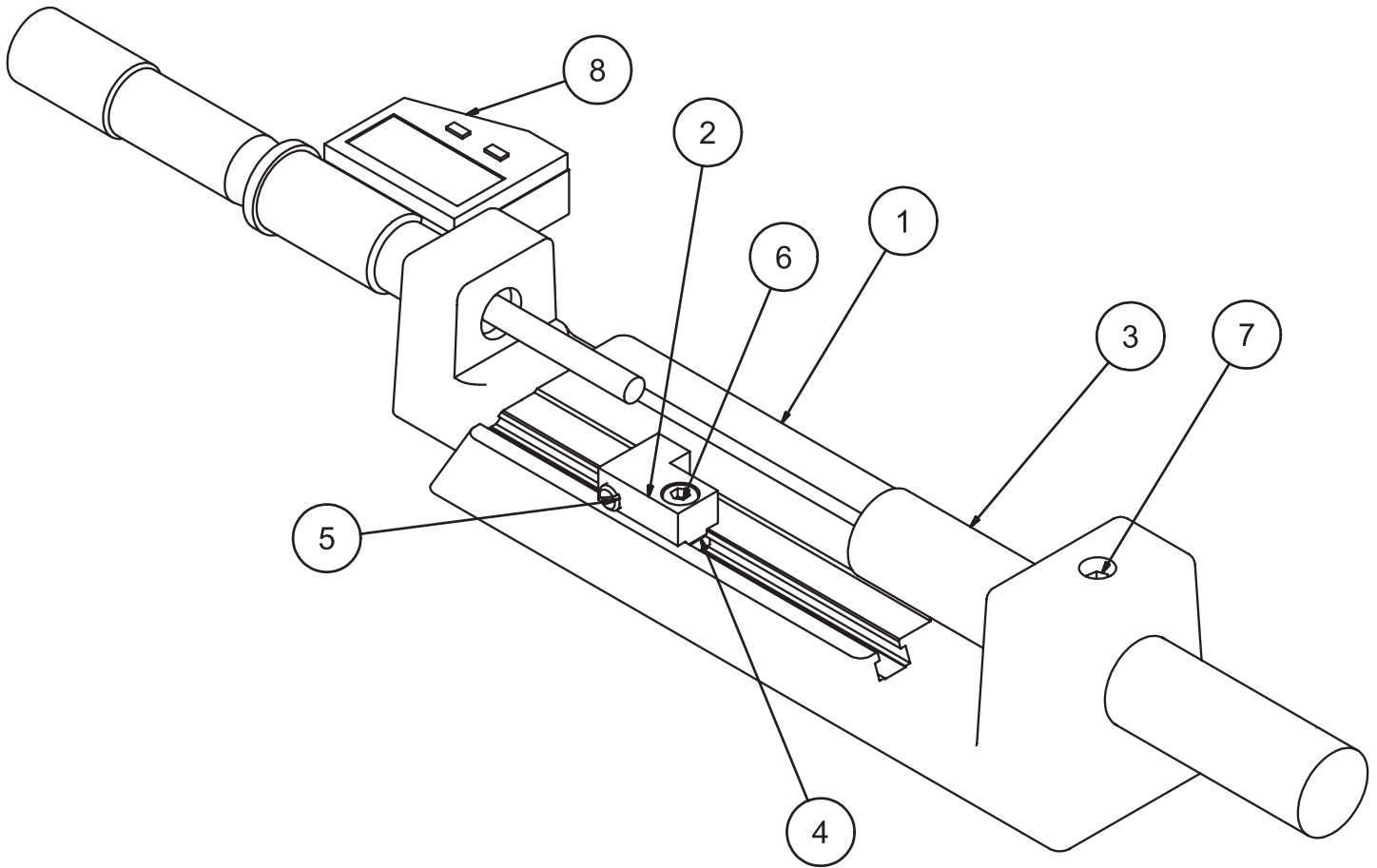


**650-2-39G Cutterhead Parts**



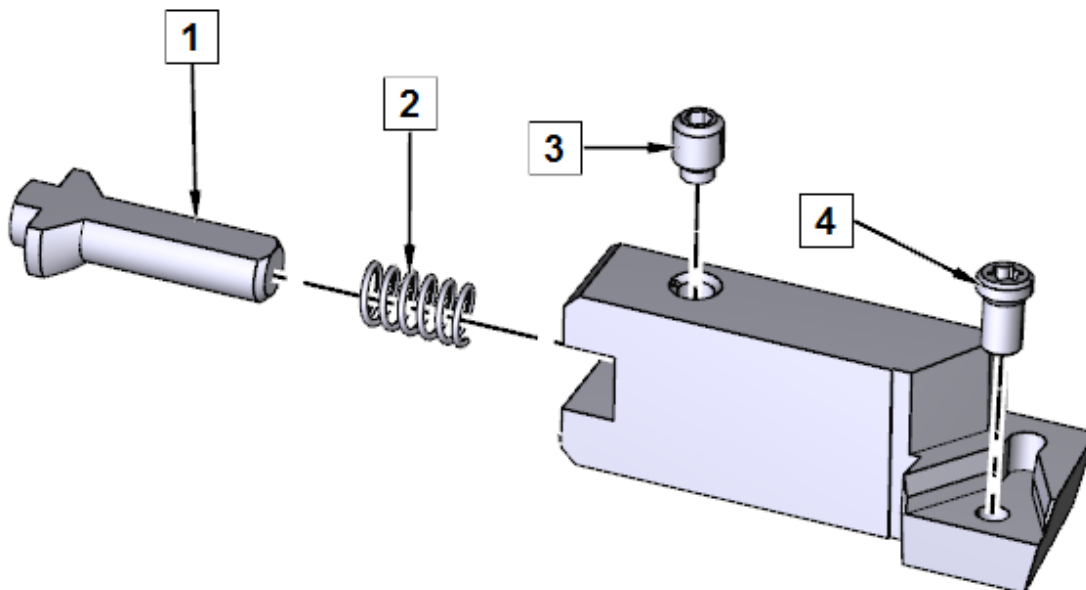
ITEM	PART #	DESCRIPTION
1	650-2-16E	BODY, 2.9" DIAMETER PRECISION LINE BORE CUTTERHEAD
2	650-2-17A	CAP, 2.9" DIAMETER PRECISION LINE BORE CUTTERHEAD
3	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
4	MF-193C	DOWEL PINS 1/8 X 3/8"
5	MF-21	SOCKET HEAD CAP SCREW 5/16-18 X 5/8"
6	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
7	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
8	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"
9	501-70A	SCREW, TOOL HOLDER LOCK ASSY

**900-2-19 Micrometer Parts**



900-2-19 Micrometer Assembly			
ITEM	QTY	PART NUMBE	DESCRIPTION
1	1	502-30-10B	Frame
2	1	502-30-10M	Clamp Block
3	1	502-31-10A	Anvil
4	1	502-30-10J	Square Nut
5	1	502-30-10K	Ball Plunger
6	1	ANSI B18.3 - No. 10 - 24 UNC - 3/8	Hexagon Socket Head Cap Screw
7	1	502-30-10L	Brass Tipped Set Screw
8	1	501-34-2R	Digital Micrometer Head

**6801 Series Insert Holder Parts**

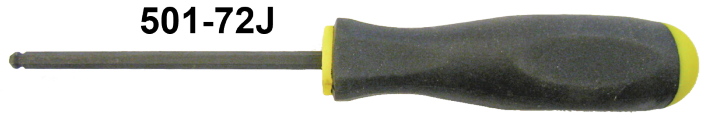


ITEM	PART #	DESCRIPTION
1	100-82-3B	PIN ADJUSTING LONG INDEXABLE INSERT TOOLHOLDER
2	100-82-1	SPRING, ADJUSTING PIN
3	100-82-2	SCREW,SET-BRASS GIB - 3/16" LONG
4	511-29-12C	SCREW, TORX M4 X .7 X .315" LONG

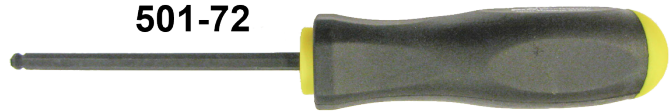
## 650-2-39A Cutterhead Package Components



**650-2-39E**



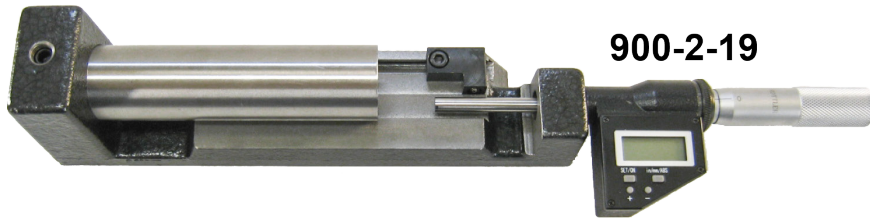
**501-72J**



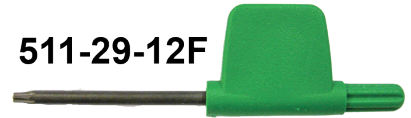
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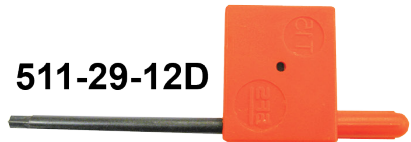
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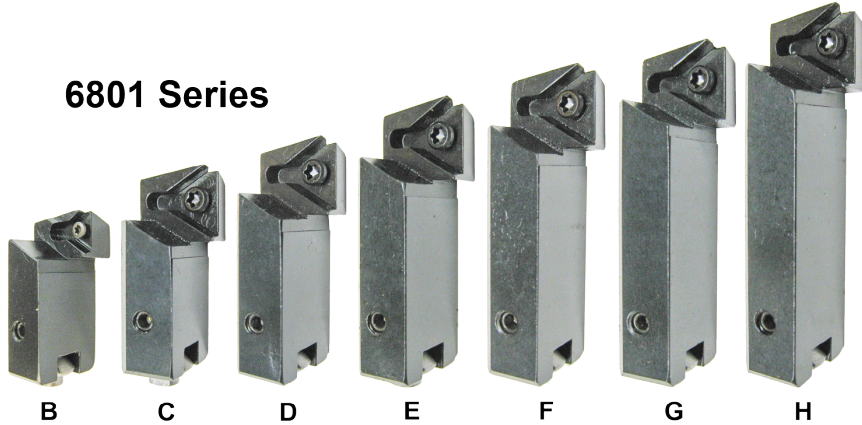


**511-29-12F**



**511-29-12D**

### 6801 Series



**B**

**C**

**D**

**E**

**F**

**G**

**H**

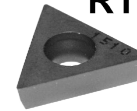
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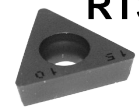
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**RT321**



**RT322**



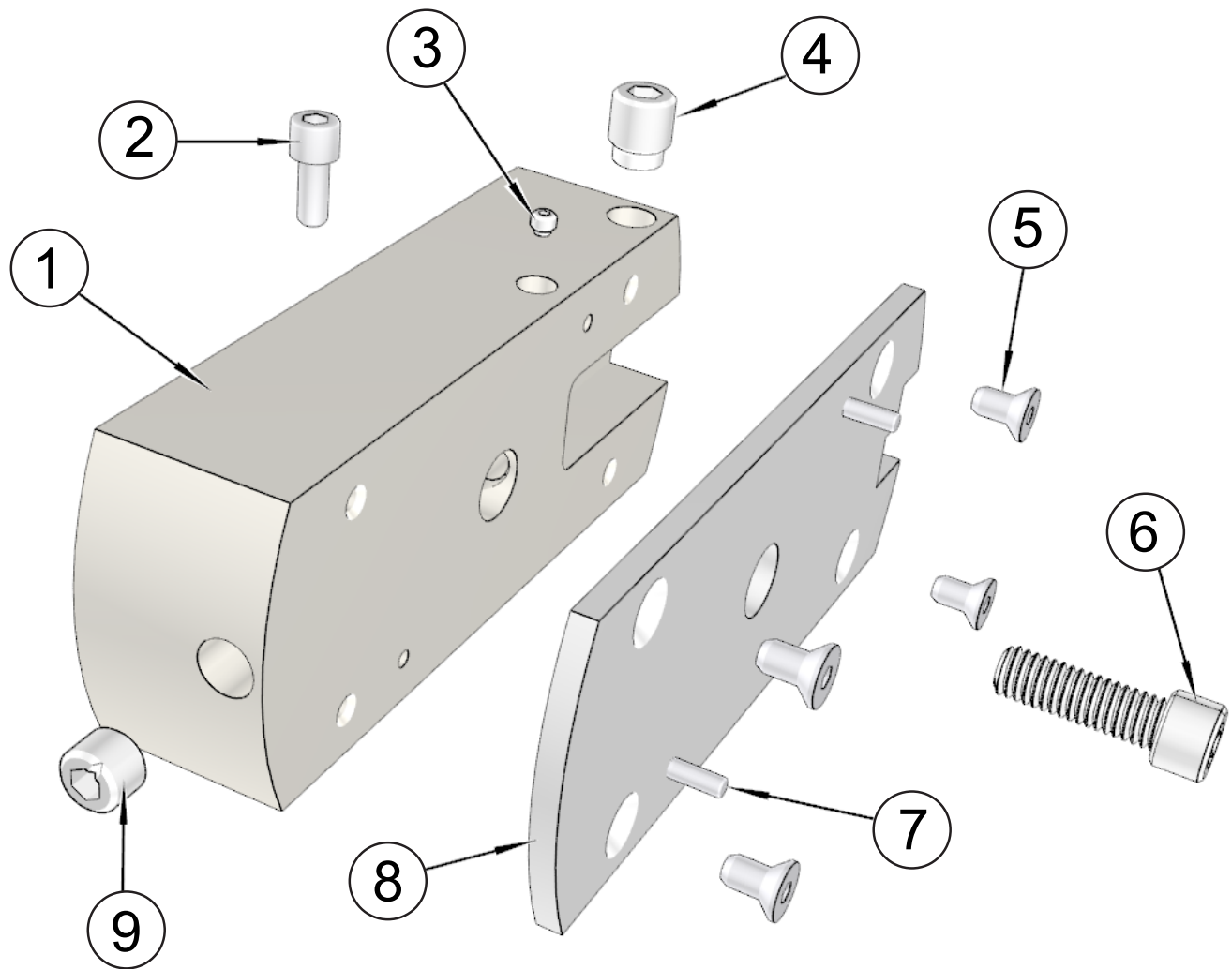
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**RT322F**

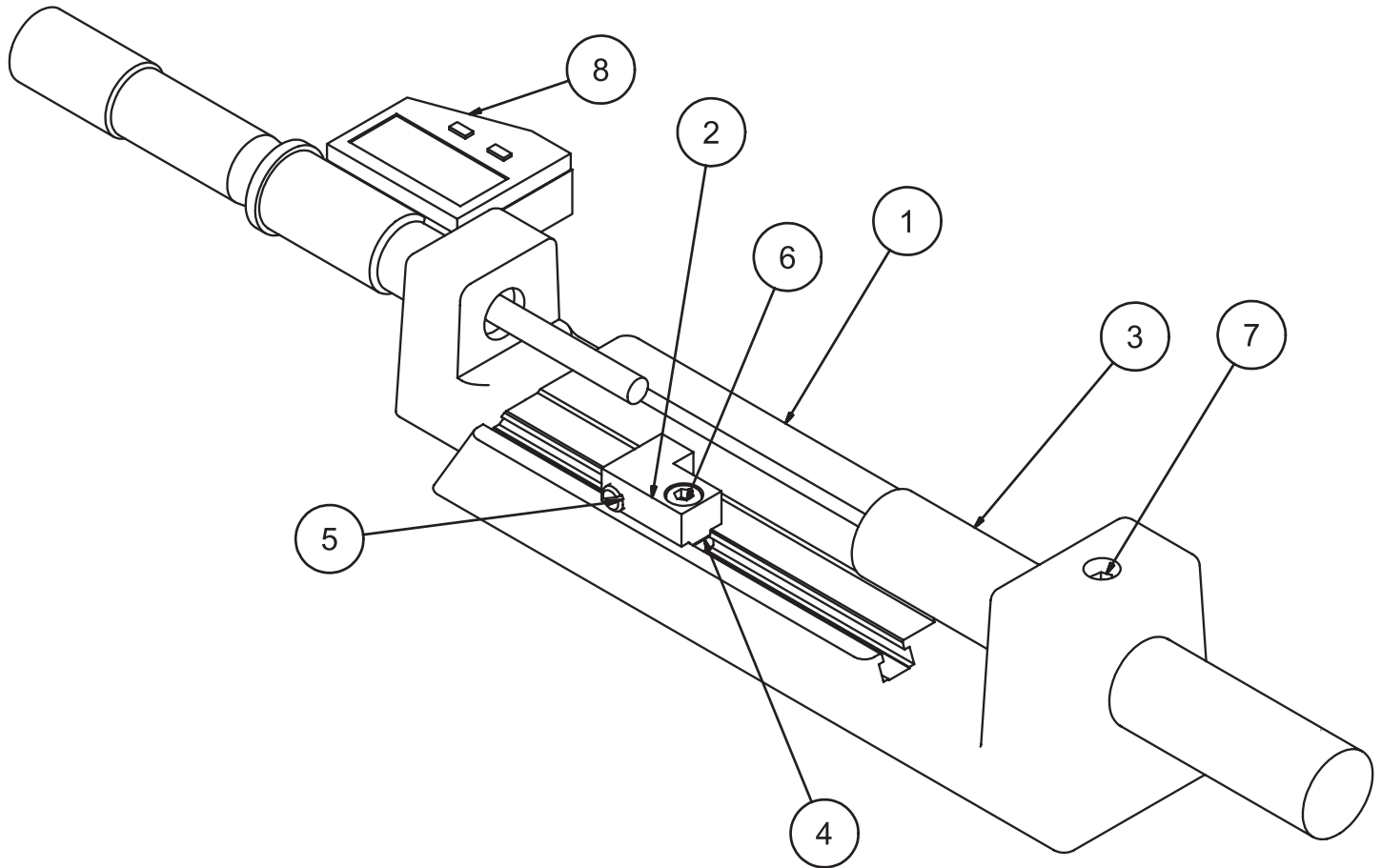


**650-2-39E Cutterhead Parts**



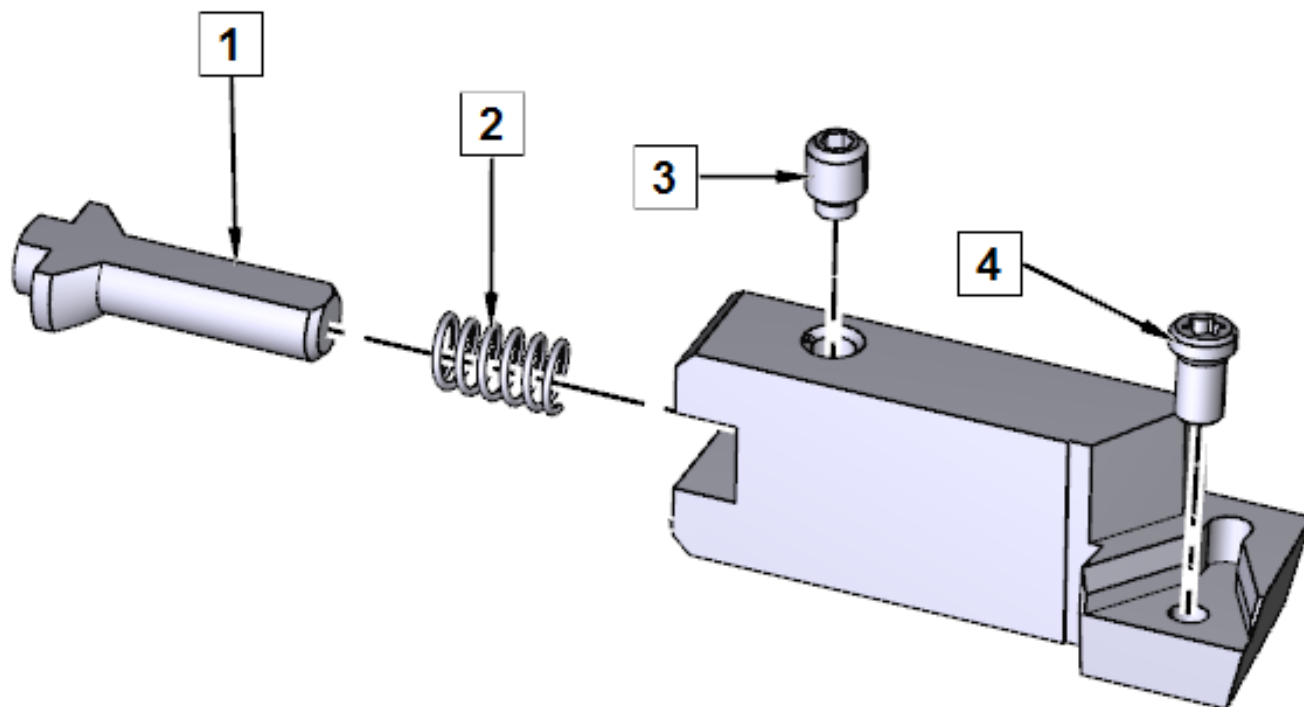
ITEM	PART #	DESCRIPTION
1	650-2-16C	BODY, 5.4" PRECISION LINE BORE CUTTERHEAD
2	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"
3	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
4	501-70A	SCREW, TOOL HOLDER LOCK ASSY
5	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
6	MF-23	SOCKET HEAD CAP SCREW 5/16-18 X 1"
7	MF-193C	DOWEL PIN 1/8 X 3/8"
8	650-2-17B	CAP, 5.4" PRECISION LINE BORE CUTTERHEAD
9	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD

**900-2-19 Micrometer Parts**



900-2-19 Micrometer Assembly			
ITEM	QTY	PART NUMBE	DESCRIPTION
1	1	502-30-10B	Frame
2	1	502-30-10M	Clamp Block
3	1	502-31-10A	Anvil
4	1	502-30-10J	Square Nut
5	1	502-30-10K	Ball Plunger
6	1	ANSI B18.3 - No. 10 - 24 UNC - 3/8	Hexagon Socket Head Cap Screw
7	1	502-30-10L	Brass Tipped Set Screw
8	1	501-34-2R	Digital Micrometer Head

**6801 Series Insert Holder Parts**

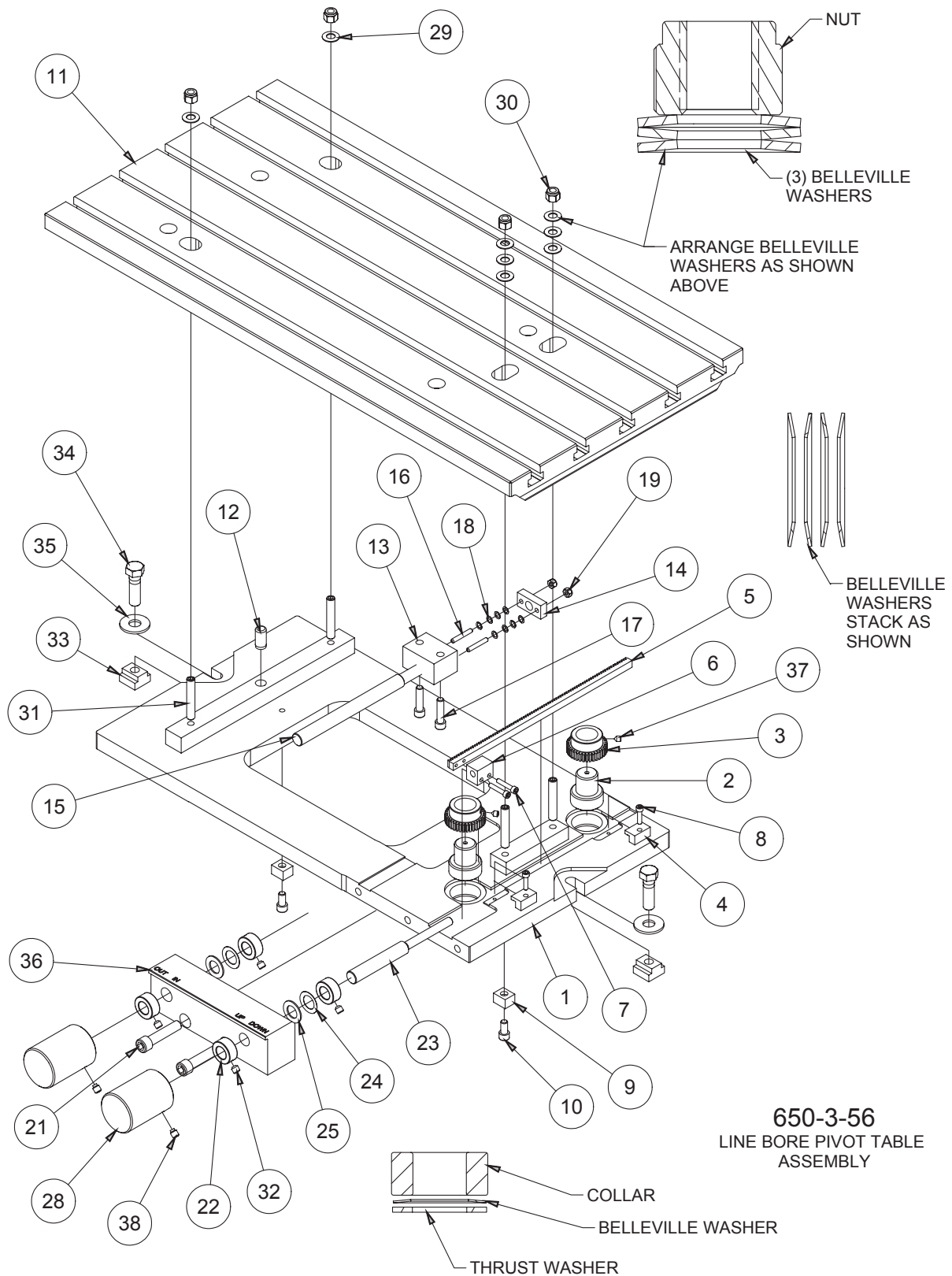


ITEM	PART #	DESCRIPTION
1	100-82-3B	PIN ADJUSTING LONG INDEXABLE INSERT TOOLHOLDER
2	100-82-1	SPRING, ADJUSTING PIN
3	100-82-2	SCREW,SET-BRASS GIB - 3/16" LONG
4	511-29-12C	SCREW, TORX M4 X .7 X .315" LONG



# Line Bore Fixturing for Small to Large Blocks and Heads

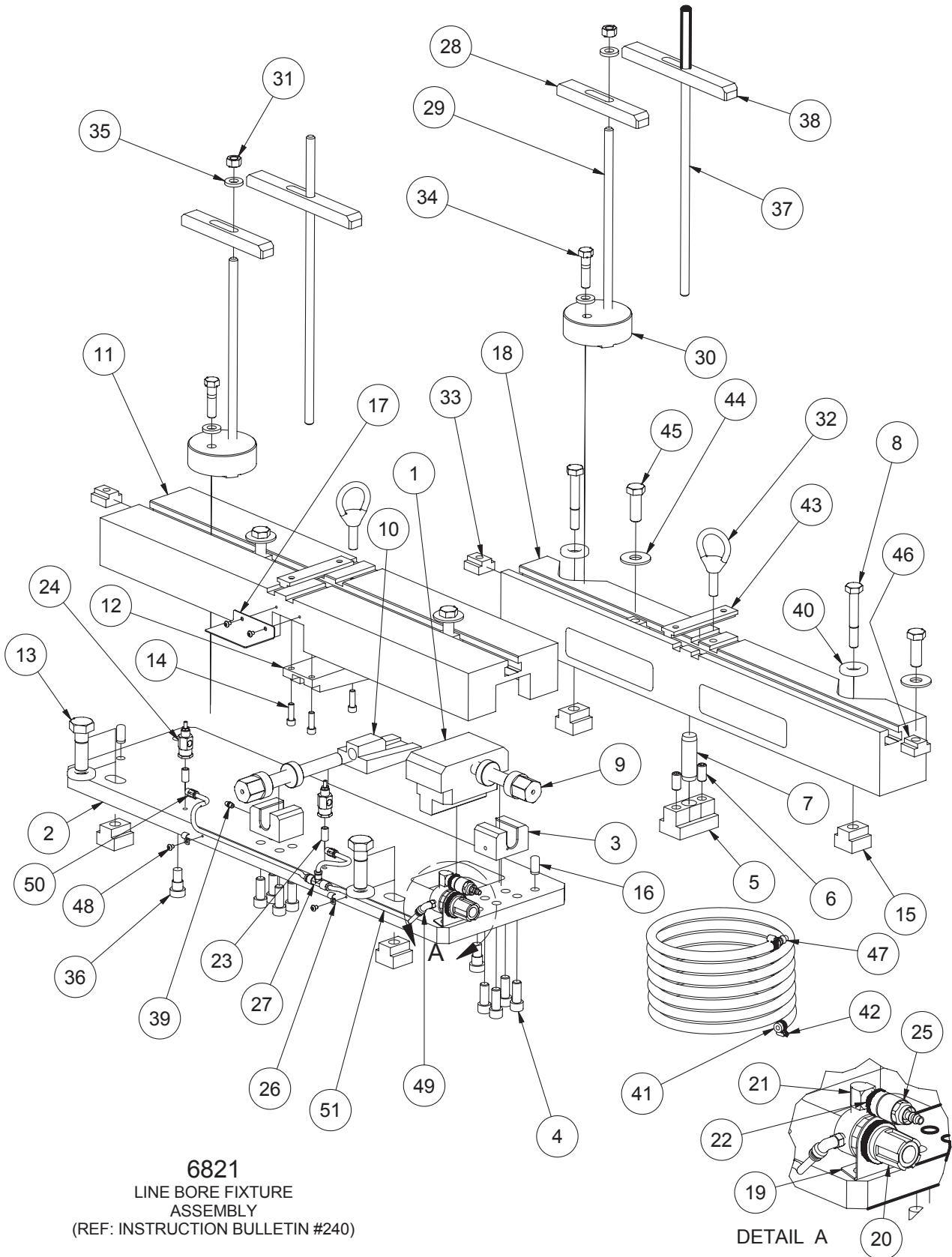
## 650-3-56 Line Bore Pivot Table Fixture Parts





650-3-56 LINE BORE PIVOT TABLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-56C	LINE BORE PIVOT TABLE ASSEMBLY
2	2	650-3-56D	JACK SCREW - PIVOT TABLE
3	2	650-3-56F	GEAR, JACK SCREW - PIVOT TABLE
4	2	650-3-56K	RETAINER, RACK - PIVOT TABLE
5	1	650-3-56V	RACK - PIVOT TABLE
6	1	650-3-56W	THREADED BLOCK - PIVOT TABLE
7	2	MF-6A	10-24UNC x 1" LG. S.H.C.S.
8	2	MF-6	10-24UNC x 3/4" LG. S.H.C.S.
9	2	650-3-9	Key
10	2	MF-21	5/16-18UNC x 5/8" LG. S.H.C.S.
11	1	650-3-56A	TABLE TOP - PIVOT TABLE
12	1	MF-213B	1/2" x 1" LG. DOWEL PIN
13	1	650-3-56N	THREADED BLOCK, PIVOT - PIVOT TABLE
14	1	650-3-56R	LOCK PLATE - PIVOT TABLE
15	1	650-2-29D	SHAFT, ROTATE ADJUST - PIVOT TABLE
16	2	MF-57A	10-24UNC x 1-1/4" LG. SOCKET SET SCREW
17	2	MF-24	5/16-18UNC x 1-1/4" LG. S.H.C.S.
18	8	650-3-56Q	BELLEVILLE SPRING
19	2	MF-186B	10-24UNC HEX NYLOCK NUT
21	2	MF-40A	7/16-14UNC x 2" LG. S.H.C.S.
22	4	7199E	COLLAR 1/2"
23	1	650-3-56U	lift Adjust Shaft
24	2	650-3-56S	Belleville spring Reid BDB-65
25	2	514-7-20	THRUST WASHER
28	2	650-2-29E	HANDLE
29	8	650-2-28P	BELLEVILLE WASHER
30	4	MF-187B	3/8-16UNC NYLOCK NUT
31	4	MF-75B	3/8-16UNC x 2-1/4" LG. SOCKET SET SCREW
32	4	6863	5/16-18 x 5/16" LG. CONE POINT SET SCREW
33	2	650-3-10	TN-5 T-Nut
34	2	MF-137F	1/2-13UNC x 1-3/4" LG. HEX BOLT
35	2	MF-180	1/2" FLAT WASHER
36	1	650-3-56L	CONTROL BLOCK - PIVOT TABLE
37	2	MF-59B	1/4-20UNC x 5/16" CONE POINT SET SCREW
38	2	504-29-36	5/16-18UNC x 5/8" LG. SOCKET HALF DOG SET SCREW

## 6821 Adjustable Universal Line Boring Fixture Assembly Parts

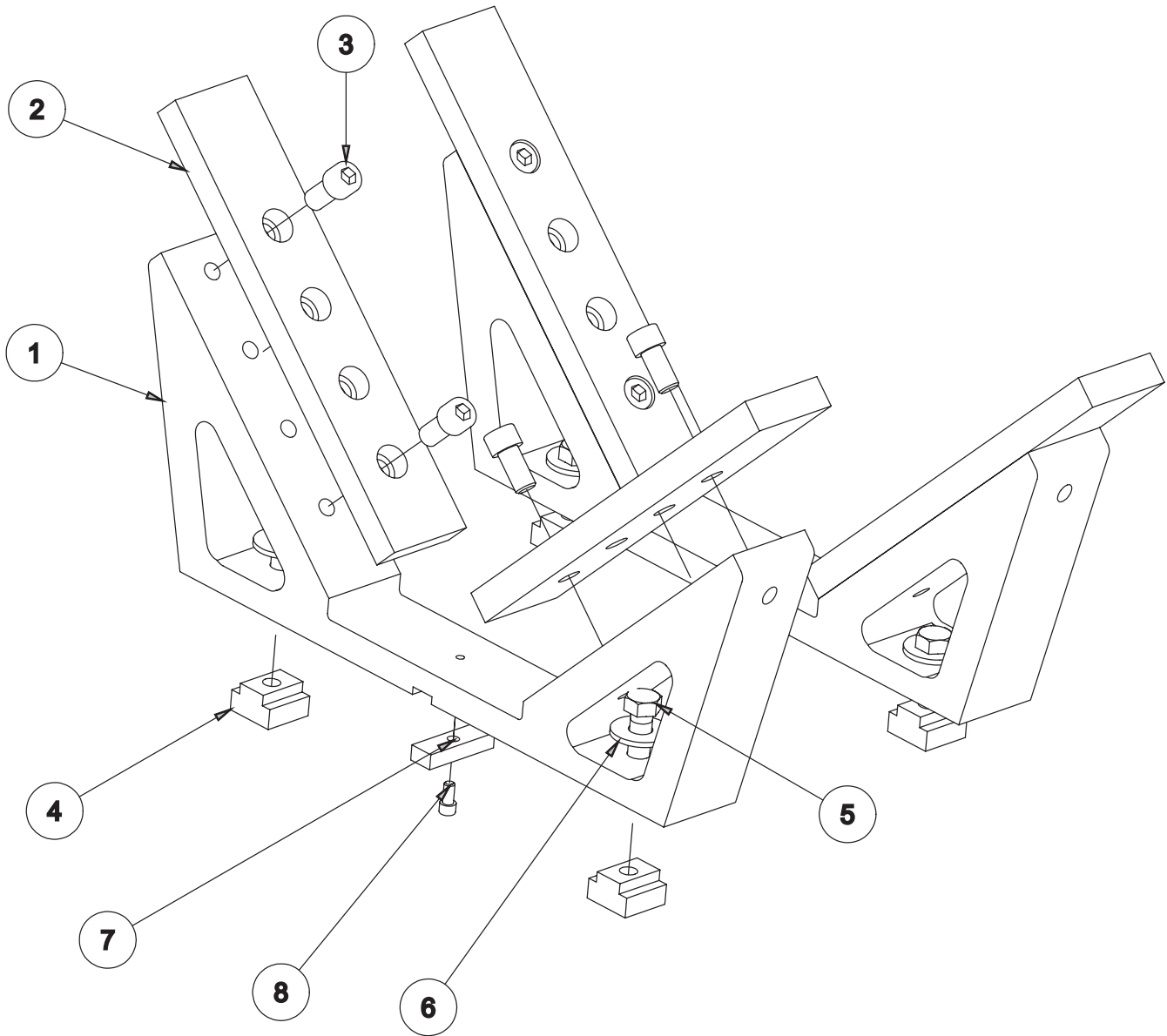


**6821**  
LINE BORE FIXTURE  
ASSEMBLY  
(REF: INSTRUCTION BULLETIN #240)

DETAIL A

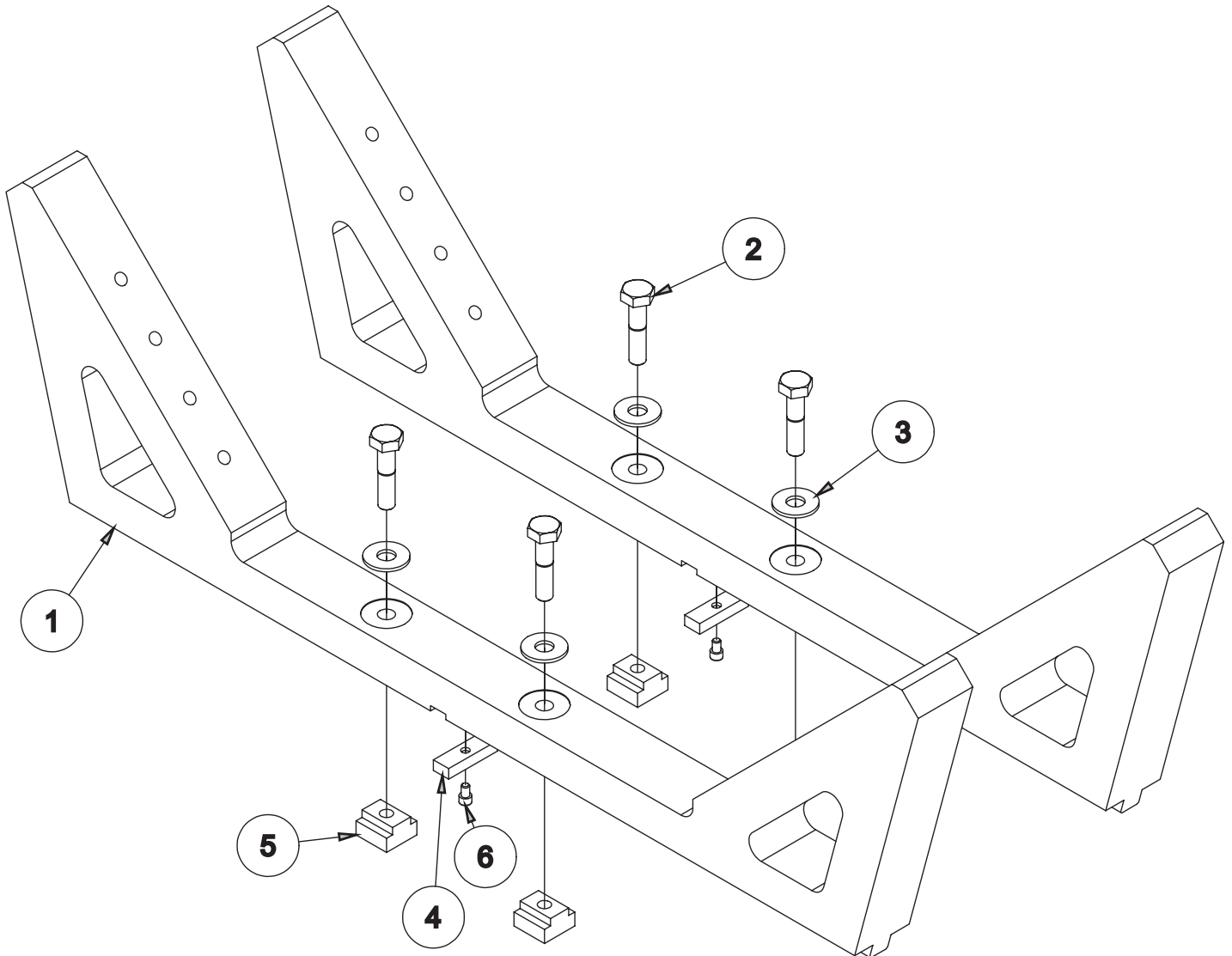
4	8	MF-43	1/2-13UNC x 1-1/4" S.H.C.S.
5	1	6820	Locating Pivot Key, Waukesha 7042/ CAT 399
6	2	MF-72	1/2-13UNC x 1" FLAT POINT SET SCREW
7	1	6819	Locating, Pivot Pin
8	2	6822B	3/4-10UNC x 4" LONG HEX BOLT
9	2	6828	SCREW, ADJUSTABLE PARALLEL F-8 LINE BORE FIXTURE
10	1	6827	Wedge, Lower Adjustable Parrallel
11	1	6824A	Pad, Upper Adjustable Parrallel
12	1	6826	Wedge, Upper Adjustable Parrallel
13	2	MF-154C	3/4-10 x 2-1/2" HEX BOLT
14	3	MF-23	5/16-18UNC x 1" S.H.C.S.
15	4	6160	Nut, T - Hardened
16	2	MF-213B	1/2" x 1" DOWEL PIN
17	1	6834	Chip Shield, Upper Pad Adjsutable Parrallel
18	1	6822A	Parrallel, Stationary Adjustable
19	1	502-27-17A	Regulator Bracket
20	1	502-27-17	Regulator 0 - 60 PSI
21	1	502-11-17S	1/4 STREET ELL
22	1	502-11-16X	Quick Connect air Fitting Male
23	2	502-11-17J	Nipple,Close 1/8" NPT
24	2	502-11-35A	Flo Control
25	1	502-11-16W	Quick connect air fitting female
26	2	502-12-16	Wire Clip
27	1	514-4-17N	Tee, Union 1/4 Tube
28	2	6833A	CLAMP BAR (7" LG), INLINE BLOCK F-88 LINE BORE FIXTURE
29	2	6833B	CLAMP ROD, (12") INLINE BLOCK F-88 LINE BORE FIXTURE
30	2	6833	Locator, In-Line Block
31	2	MF-165	1/2-13UNC HEX NUT
32	2	502-3-13	Lift Eye
33	2	502-1-11B	T-Nut 3/4"
34	2	MF-149C	1/2-13UNC x 2" HEX BOLT
35	4	MF-180	1/2" FLAT WASHER
36	2	514-7-22	Screw, Shoulder
37	2	6833D	CLAMP ROD, (18") INLINE BLOCK F-88 LINE BORE FIXTURE
38	2	6833E	CLAMP BAR (9"), INLINE BLOCK F-88 LINE BORE FIXTURE
39	1	MF-189	STRAIGHT GREASE FITTING
40	4	6287	WASHER, THRUST 3/4"
41	1	502-1-98	1/4" AIR HOSE
42	2	502-1-97	CLAMP, 1/4" I.D. HOSE
43	2	6372	KEY, LOCATION - 10" PARALLEL - F90
44	4	MF-181	5/8" FLAT WASHER
45	4	MF-154F	5/8-11UNC x 1-3/4" LG. HEX BOLT
46	4	502-1-11A	3/4" T-Nut

**6843 90 Degree V Block Support Parts**



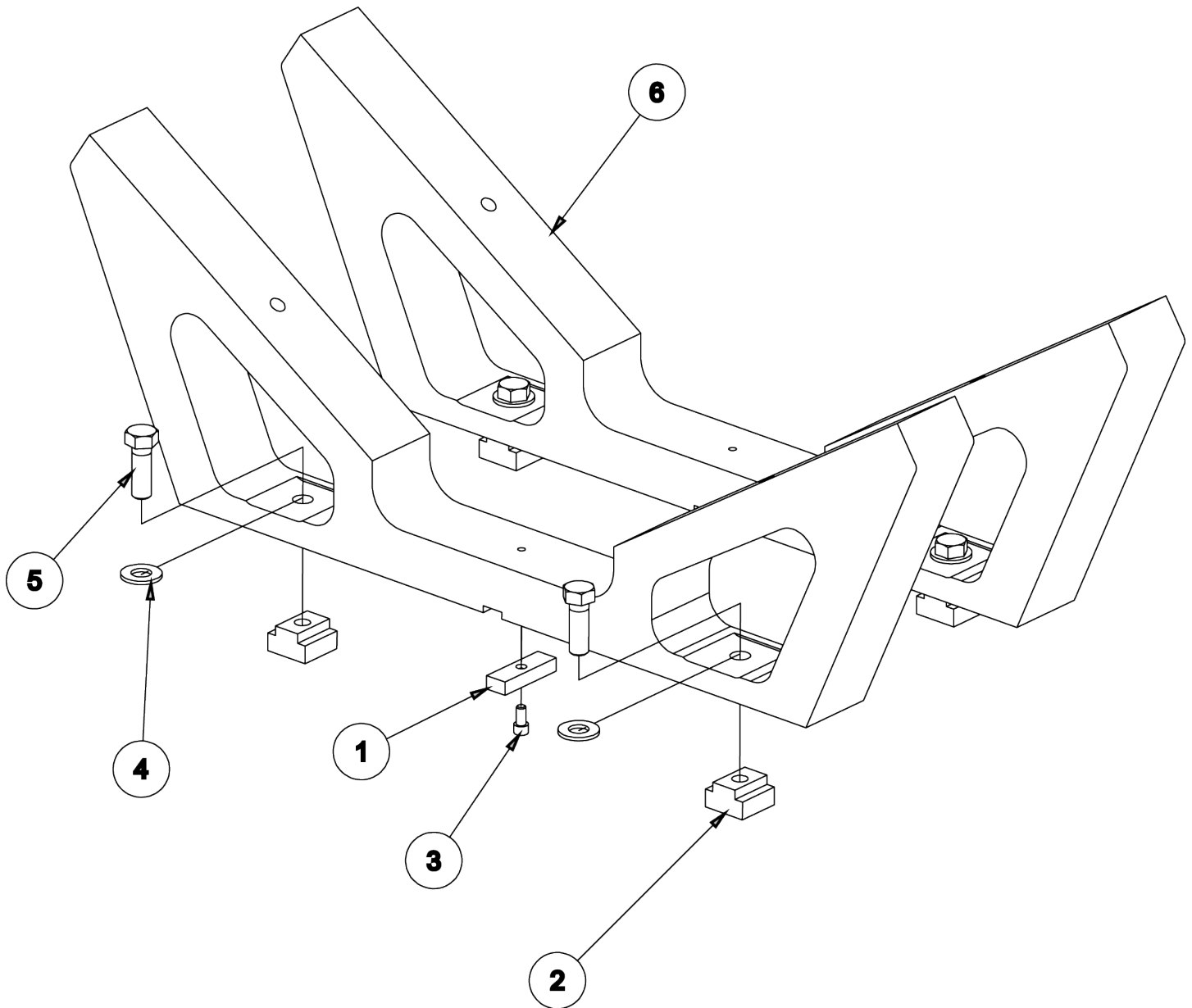
6843 90 DEG. V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6843A	Cradle, Right and Left V Block
2	4	6789D	ADAPTER PLATE, V-BLOCK CRADLE
3	8	MF-42	1/2-13UNC x 1" S.H.C.S.
4	4	502-1-11B	T-Nut 3/4"
5	4	MF-150A	1/2-13UNC x 1-1/2" HEX BOLT
6	4	MF-180	1/2" FLAT WASHER
7	2	6831	KEY
8	2	MF-12	1/4-20UNC x 1/2" S.H.C.S.

**6823E 90 Degree V Block Support Parts**



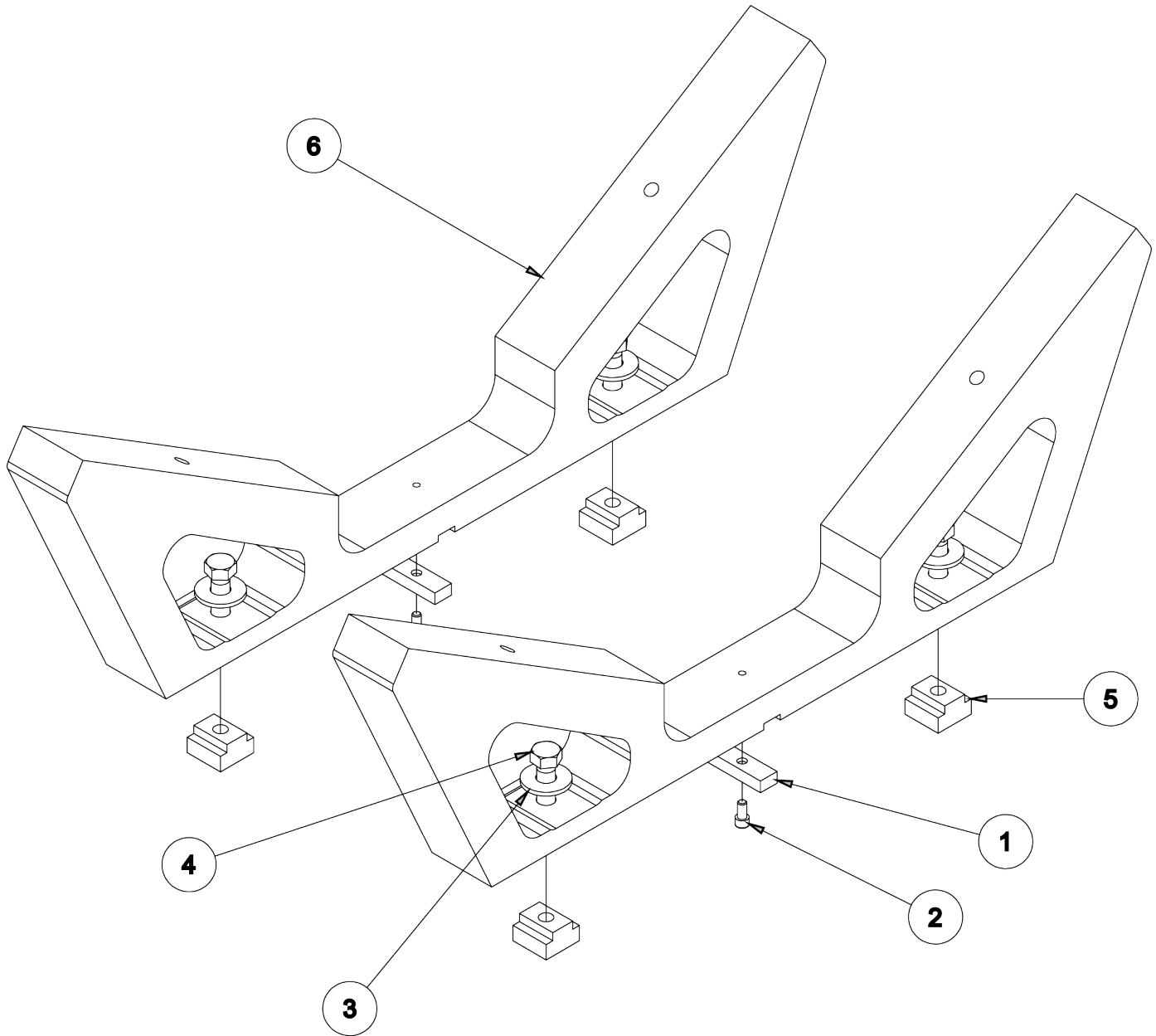
6823E LARGE 90 DEG V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6823D	CRADLE, LARGE 90 DEGREE V-BLOCK
2	4	MF-149A	Heavy Hex Bolt 1/2-13UNC x 2-1/4"
3	4	MF-180	1/2" FLAT WASHER
4	2	6831	KEY, FIXTURE
5	4	502-1-11B	T-Nut 3/4"
6	2	MF-149A ANSI B18.3 - 1/4 - 20 - 3/8	Hexagon Socket Head Cap Screw

**6789L 113 Degree V Block Support Parts**



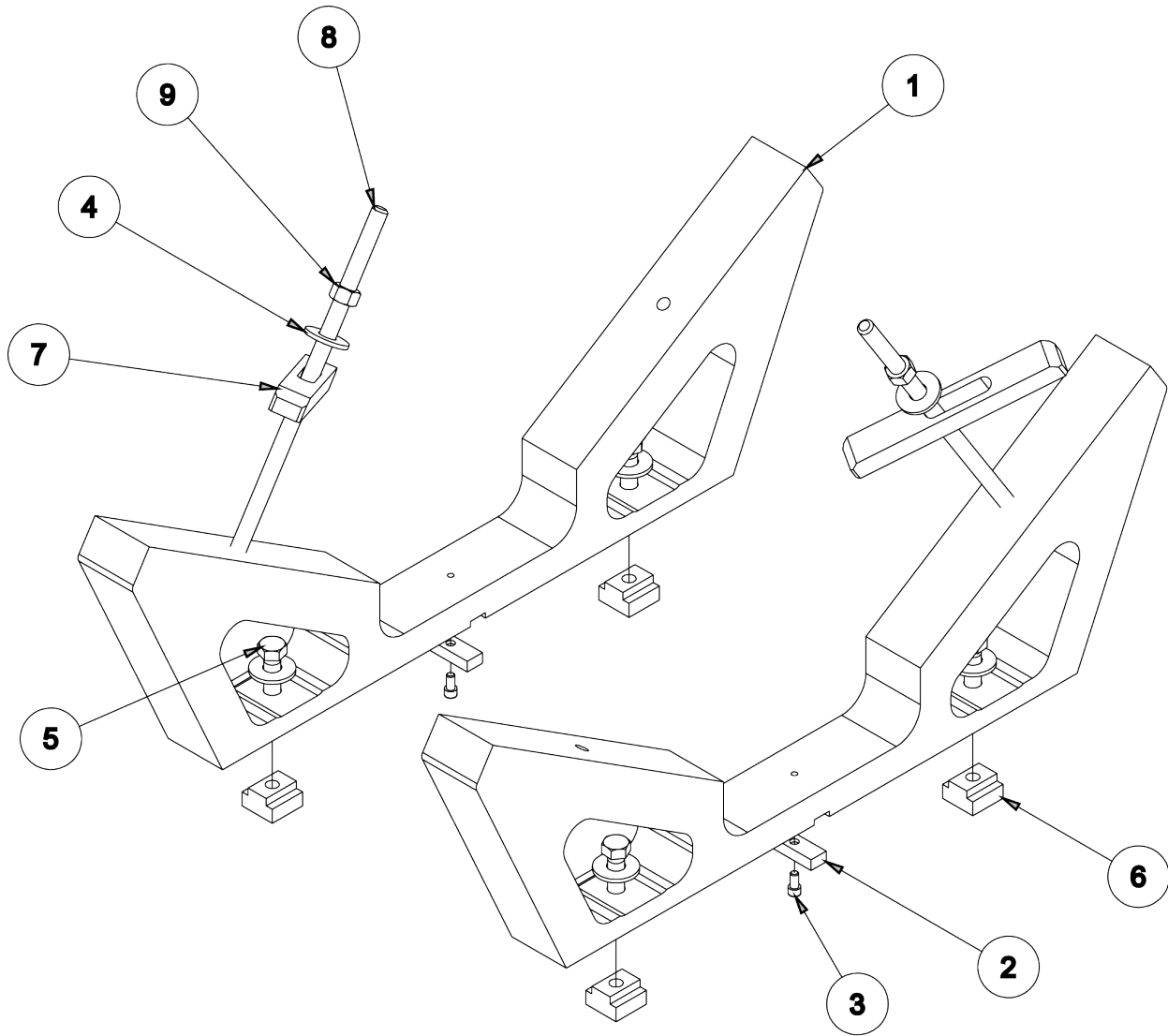
6789L DETROIT DIESEL V53 V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6831	KEY, FIXTURE
2	4	502-1-11B	T-Nut 3/4"
3	2	MF-12	S.H.C.S. 1/4 - 20 UNC - 1/2
4	4	MF-180	1/2" FLAT WASHER
5	4	MF-150A	1/2-13UNC x 1-1/2" LG. HEX BOLT
6	2	6789M	CRADLE, DETROIT DIESEL V53 BLOCK 113 DEG. 11'

**6789N 116 Degree V Block Support Parts**



6789N 116DEG. 12 MIN. V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6831	KEY, FIXTURE
2	2	MF-12	1/4-20UNC x 1/2" S.H.C.S.
3	4	MF-180	1/2" FLAT WASHER
4	4	MF-150A	1/2-13UNC x 1-1/2" HEX BOLT
5	4	502-1-11B	1/2-13UNC T-NUT
6	2	6789P	116 DEG. 12' V-BLOCK CRADLE

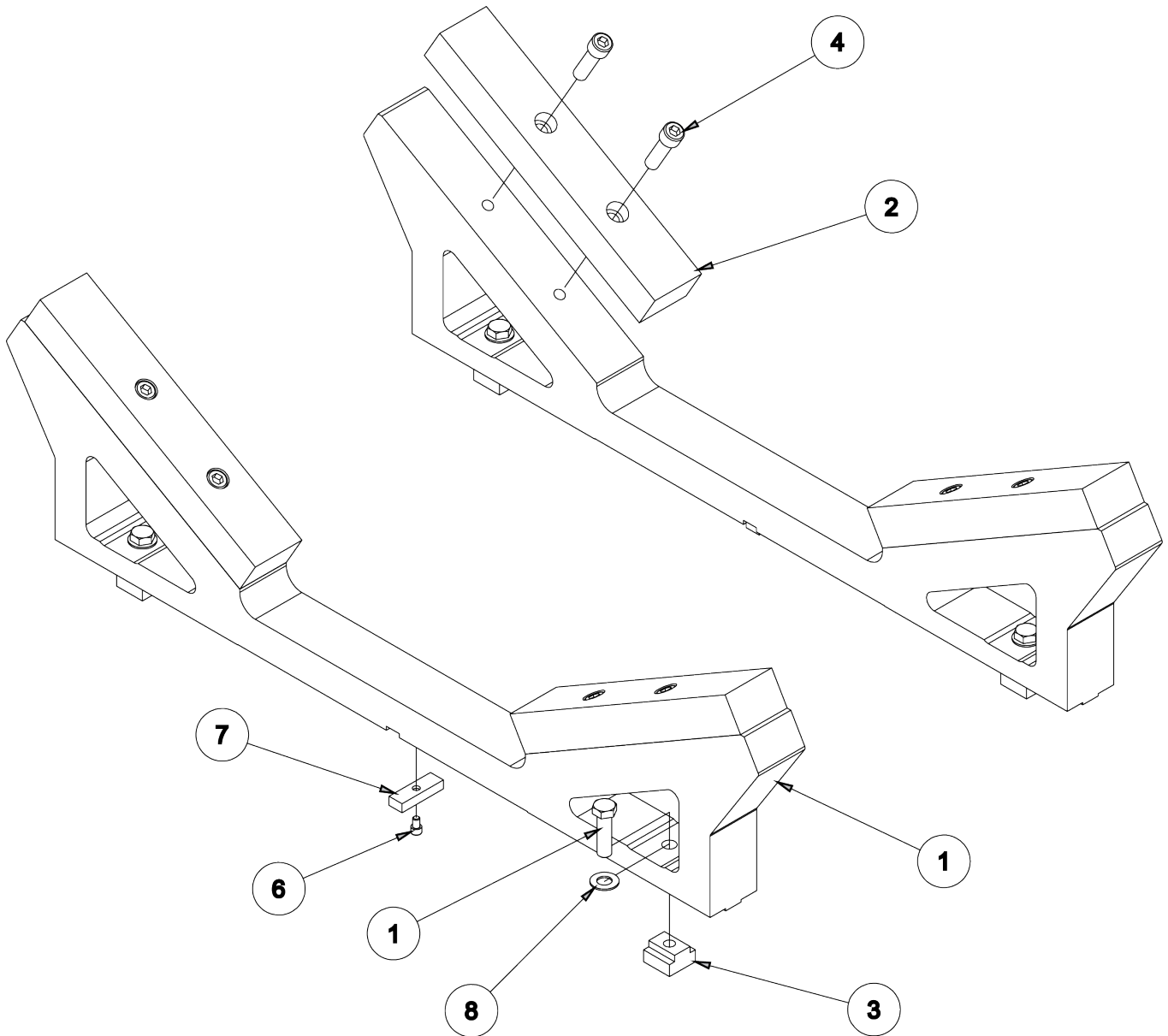
**6789E 115 Degree V Block Support Parts**



6789E CAT 3400 SERIES V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	RMC PART NO.	DESCRIPTION
1	2	6789F	115 DEG. V-BLOCK CRADLE
2	2	6831	KEY
3	2	MF-12	1/4-20UNC x 1/2" S.H.C.S.
4	6	MF-180	1/2" FLAT WASHER
5	4	MF-150A	1/2-13UNC x 1-1/2" HEX BOLT
6	4	502-1-11B	1/2-13UNC T-NUT
7	2	6833A	CLAMP BAR
8	2	6833B	CLAMP ROD
9	2	MF-165	1/2-13UNC HEX NUT

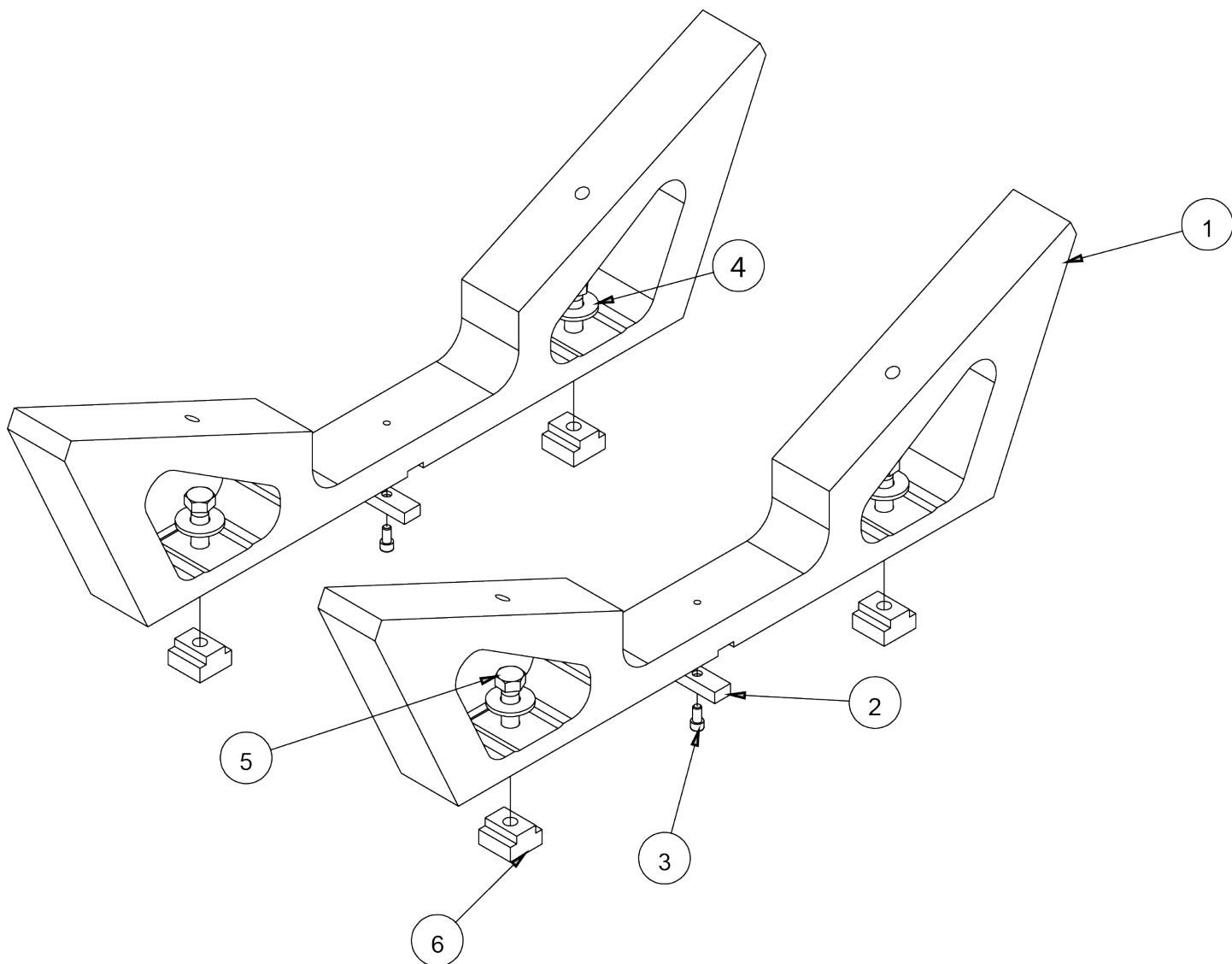


**6823B 120 Degree V Block Support Parts**



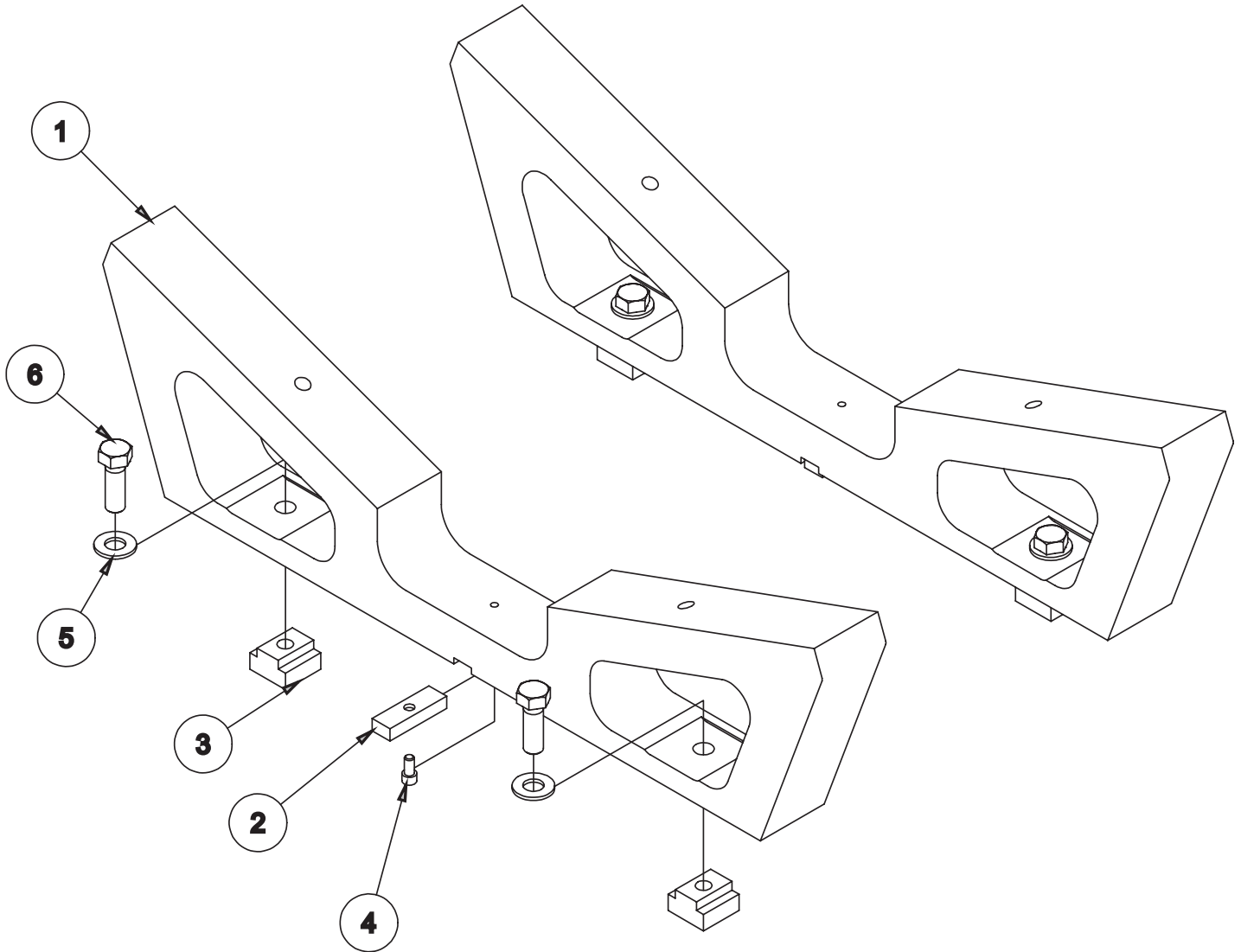
6823B CAT 3500 120 DEGREE V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6823A	CAT 3500 CRADLE
2	4	6789H	ADAPTER PLATE 1.5"
3	4	502-1-11B	T-Nut 3/4"
4	8	MF-44A	Hexagon Socket Head Cap Screw
5	4	MF-149B	1/2-13UNC x 1-3/4 HEX BOLT
6	2	MF-11	S.H.C.S. 1/4 - 20 UNC - 3/8
7	2	6831	KEY, FIXTURE
8	4	MF-180	1/2" FLAT WASHER

### 6789K 130 Degree V Block Support Parts



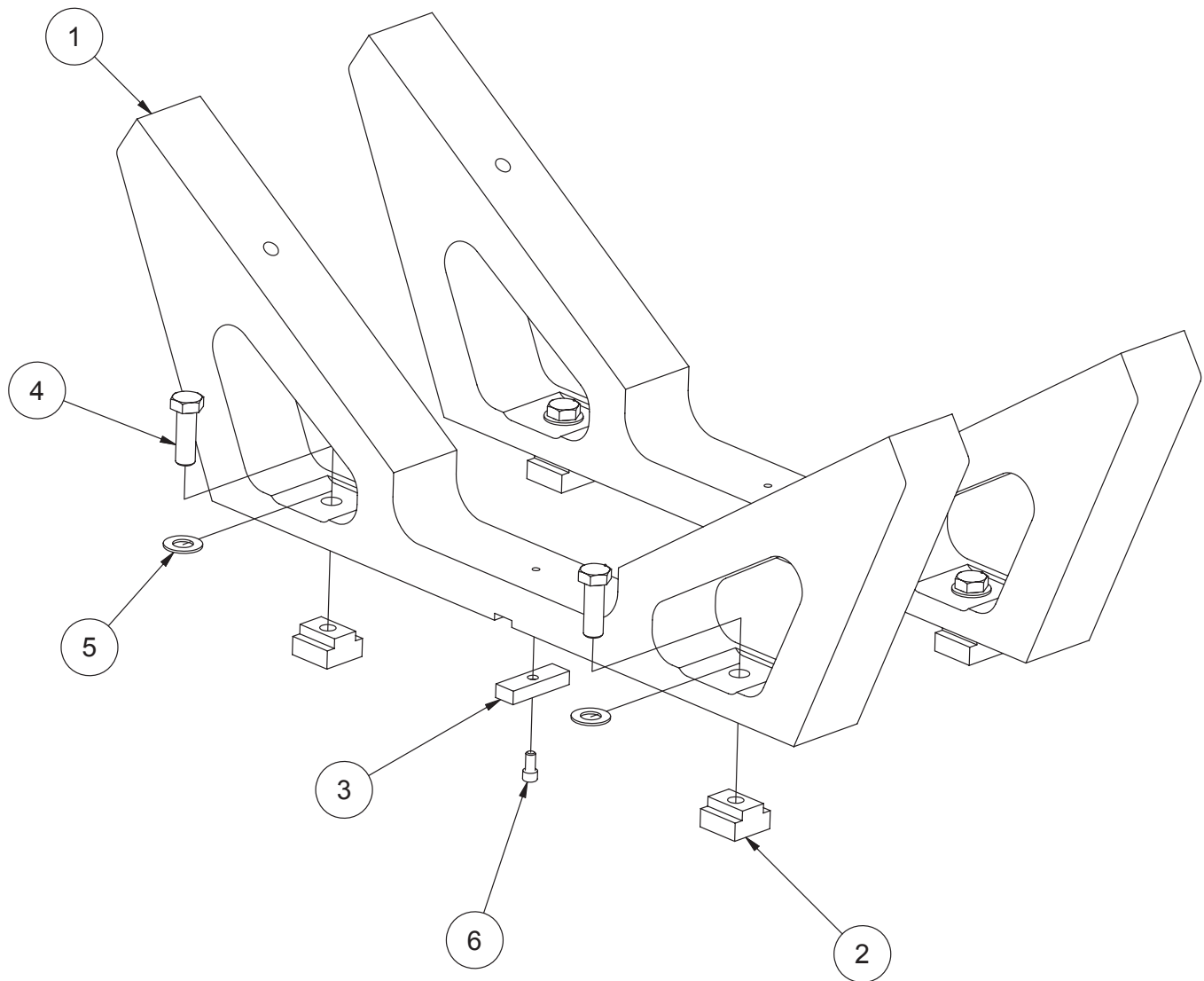
6789K 130 DEG. V-BLOCK SUPPORT ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6789J	130 DEG. V-BLOCK CRADLE
2	2	6831	KEY
3	2	MF-12	1/4-20UNC x 1/2" S.H.C.S.
4	4	MF-180	1/2" FLAT WASHER
5	4	MF-150A	1/2-13UNC x 1-1/2" HEX BOLT
6	4	502-1-11B	1/2-13UNC T-NUT

**6789Q 140 Degree V Block Support Parts**



6789Q 140 DEG. V-BLOCK CRADLE ASSEMBLY			
ITEM	QTY	PART NUMBER	PART DESCRIPTION
1	2	6789S	CRADLE 140 DEG.
2	2	6831	KEY, FIXTURE ADJUSTABLE
3	4	502-1-11B	T-NUT
4	2	MF-12	1/4-20UNC x 1/2" LG. S.H.C.S.
5	4	MF-180	1/2" FLAT WASHER
6	4	MF-150A	1/2-13UNC x 1-1/2" LG. HEX BOLT

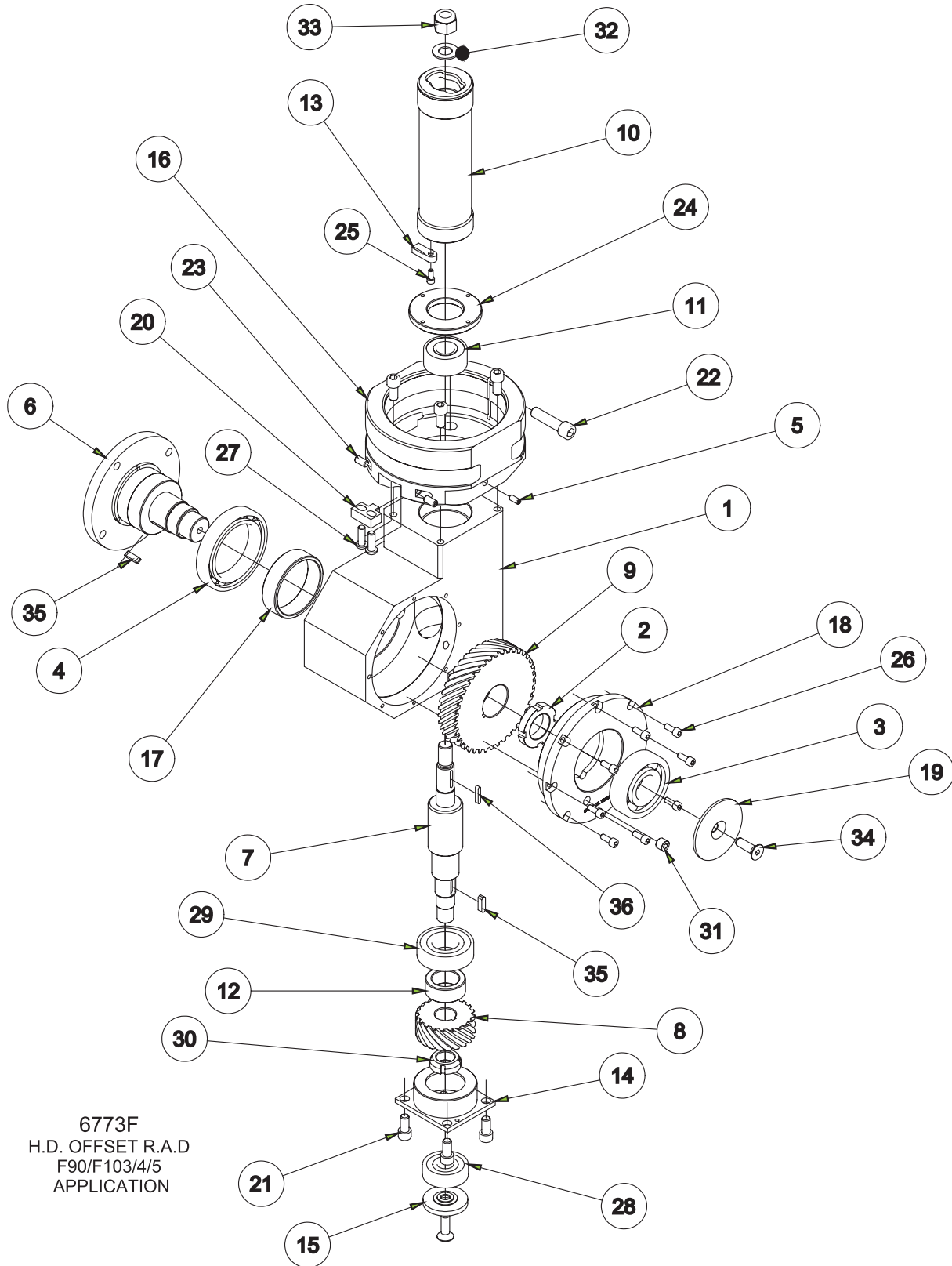
**6789T 110 Degree V Block Support Parts**



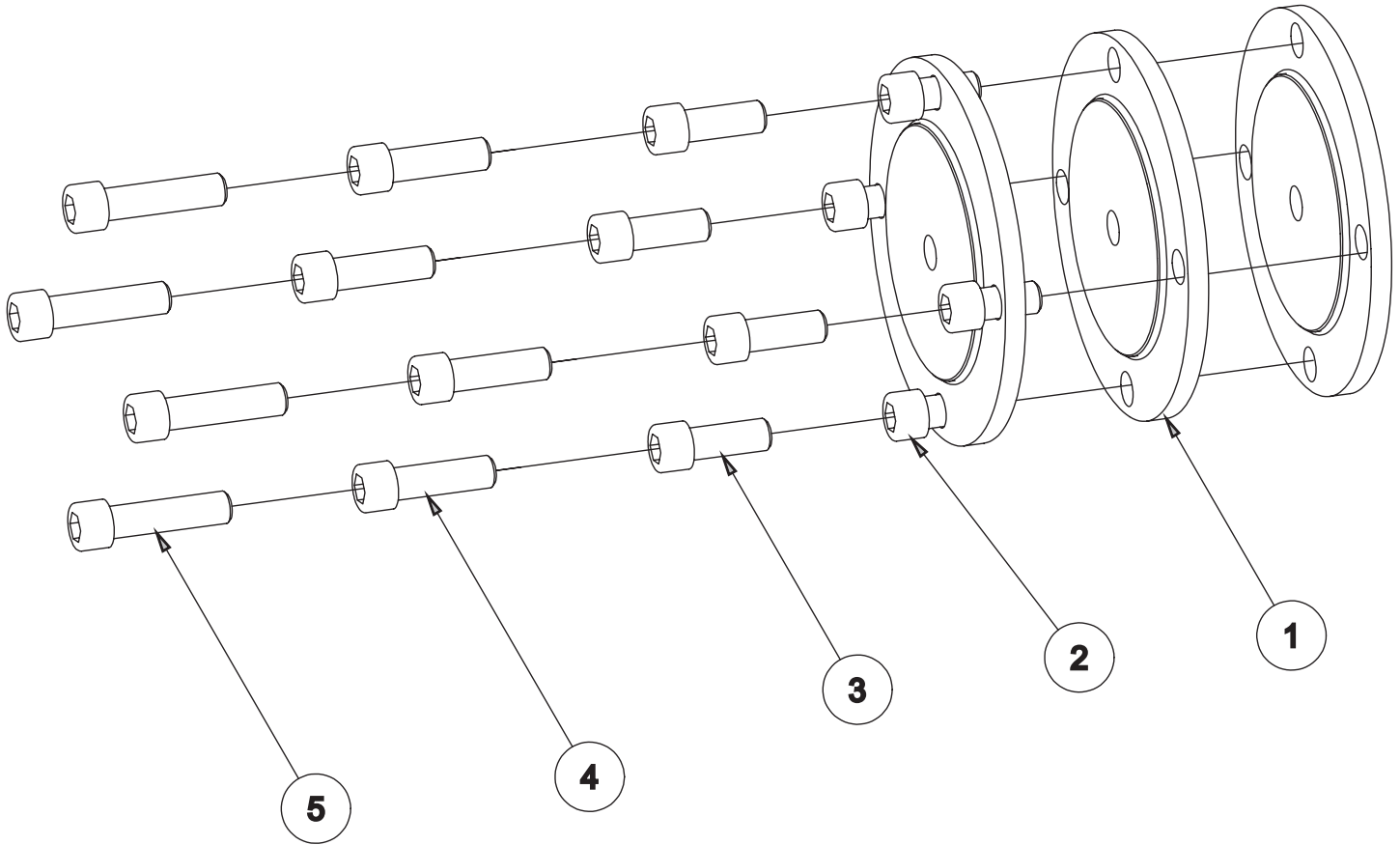
6789T CRADLE ASSEMBLY, GE JENBACHER 3 BLOCK (110 DEG.)- LINE BORE FIXTURE - F105			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6789U	CRADLE (MACHINING), GE JENBACHER 3 BLOCK - LINE BORE FIXTURE - F105
2	4	502-1-11B	T-Nut 3/4"
3	2	6831	KEY, FIXTURE
4	4	MF-150A	1/2-13UNC x 1.5" LONG HEX BOLT
5	4	MF-180	1/2" FLAT WASHER
6	2	MF-12	S.H.C.S. 1/4 - 20 UNC - 1/2

# Line Bore Tooling for Extra Large Blocks

## 6773F Heavy Duty Offset 90 Degree Right Angle Drive Assembly Parts



6773F H.D. OFFSET R.A.D. - F90/F103/4/5 APPLICATION			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6773G	HOUSING, GEAR HEAVY DUTY LINE BORE HEAD
2	1	6777B	BEARING NUT
3	1	6778F	BEARING
4	1	6778E	BEARING
5	1	100-82-2A	10-24UNC x 1/2" LG. BRASS TIPPED SET SCREW
6	1	6766X	Shaft, Horizontal
7	1	6777	SHAFT, VERTICAL HEAVY DUTY LINE BORE HEAD
8	1	6778	DRIVE GEAR, HEAVY DUTY LINE BORE HEAD
9	1	6778B	DRIVE GEAR, HEAVY DUTY LINE BORE HEAD
10	1	6771A	DRIVER, F80, F90 90 DEG. LINE BORE HEAD
11	1	502-9-32	Bearing, Ball MRC 5203SBKFF
12	1	6775F	SPACER, BEARING VERTICAL
13	1	6776	KEY, DRIVER ADAPTER, F80, F90 SERIES LINE BORE HEAD
14	1	6774F	BEARING RETAINER, VERTICAL H.D. LINE BORE HEAD
15	1	6777A	CAP, END VERTICAL SHAFT
16	1	6770C	HUB, MOUNTING H.D. LINE BORE HEAD
17	1	6775D	SPACER, BEARING, HORIZONTAL
18	1	6774G	BEARING RETAINER - HORIZONTAL H.D. LINE BORE HEAD
19	1	6775E	CAP, END HORIZONTAL SHAFT
20	1	6750K	Key, Location 90 Degree Head
21	8	MF-21	5/16-18UNC x 5/8" LG. S.H.C.S.
22	1	MF-32	3/8-16UNC x 1-1/4" LG. S.H.C.S.
23	2	MF-59	1/4-20UNC x 3/8" LG. SOCKET FLAT POINT SET SCREW
24	1	6772A	Nut, Bearing Line Bore Head
25	1	MF-3D	8-32UNC x 3/8" LG. S.H.C.S.
26	8	MF-5A	S.H.C.S. 10 - 24 UNC - 1/2
27	2	Mf-92	1/4-20UNC x 3/4" LG. SOCKET BUTTONHEAD SCREW
28	1	6778C	Bearing SKF 6302 2RSJEM
29	1	6778D	Bearing SKF 6205 2RZ
30	1	6777C	Lock Nut BH-03
31	1	MF-233	Countersunk Hex-Head Plug 1/8
32	1	100-19	Washer
33	1	MF-186	1/2-13 Nylock Nut
34	2	MF-77B	5/16-18UNC x 1" LG. SOCKET FLAT HEAD SCREW
35	2	7088A	KEY, PULLEY SF-1
36	1	6753V	KEY (MICARTA), PINION - 90 DEGREE HEAD



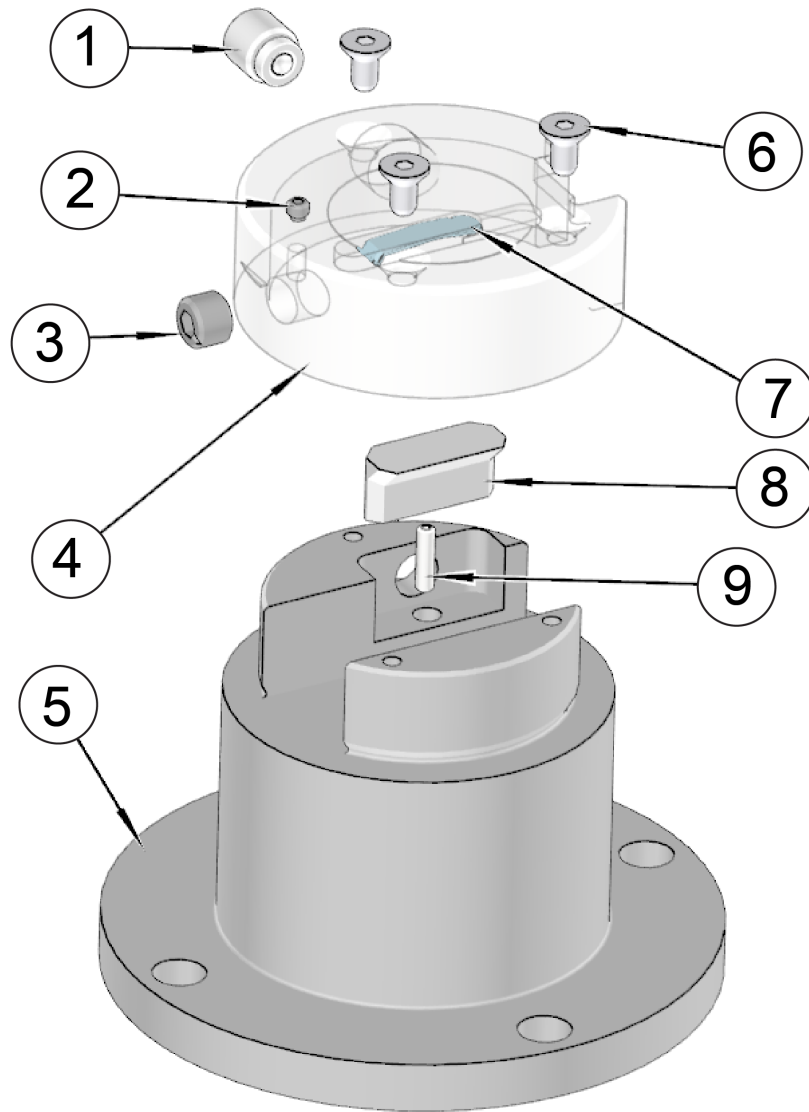
6773F R.A.D. CUTTERHEAD SPACERS AND SCREWS			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	6519W	1/4" Spacer Heavy duty line bore head
2	4	MF-30	3/8-16UNC x 3/4" LG. S.H.C.S.
3	4	MF-31	3/8-16UNC x 1" LG. S.H.C.S.
4	4	MF-32	3/8-16UNC x 1-1/4" LG. S.H.C.S.
5	4	MF-33	3/8-16UNC x 1-1/2" LG. S.H.C.S.



### 6519V Heavy Duty Line Bore Cutterhead Package Components

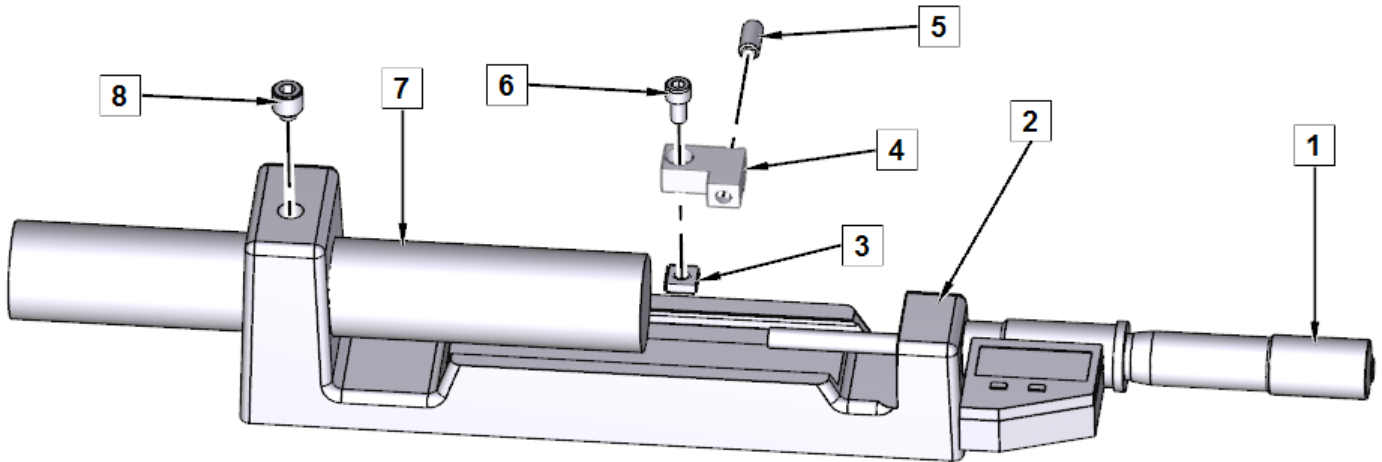


**6519U Cutterhead Parts**



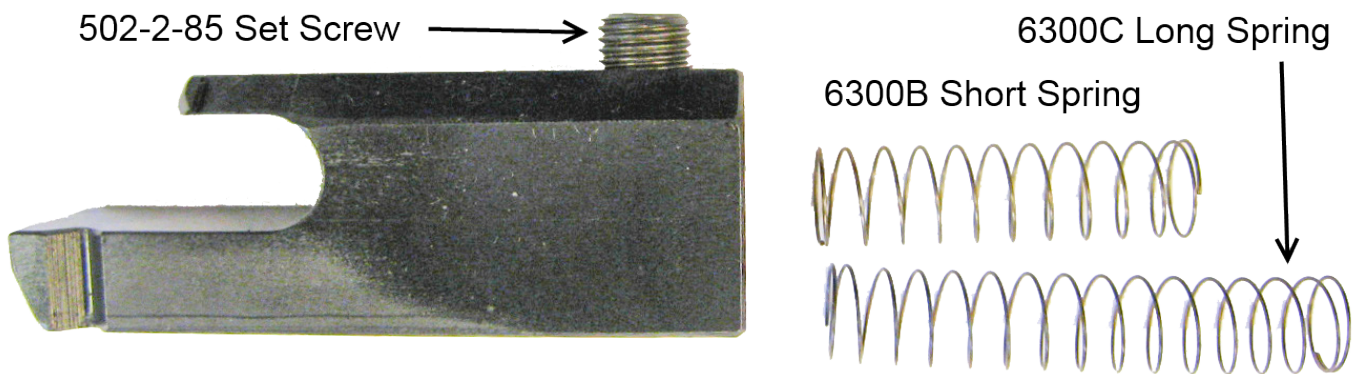
ITEM	PART #	DESCRIPTION
1	501-70A	SCREW, TOOL HOLDER LOCK ASSY
2	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
3	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
4	650-2-17	CAP, 2.9" STUB BAR
5	6519T	CUTTERHEAD BODY
6	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
7	100-1A	SPRING, TOOL LOCK 1 13/32"
8	6263A	SHOE, CLAMP-TOOL HOLDER PRODUCTION STUB BAR
9	MF-217	ROLL PIN 1/8 X 1/2"

**900-2-20 Micrometer Parts**



ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

**6520 Series Toolholder Parts**

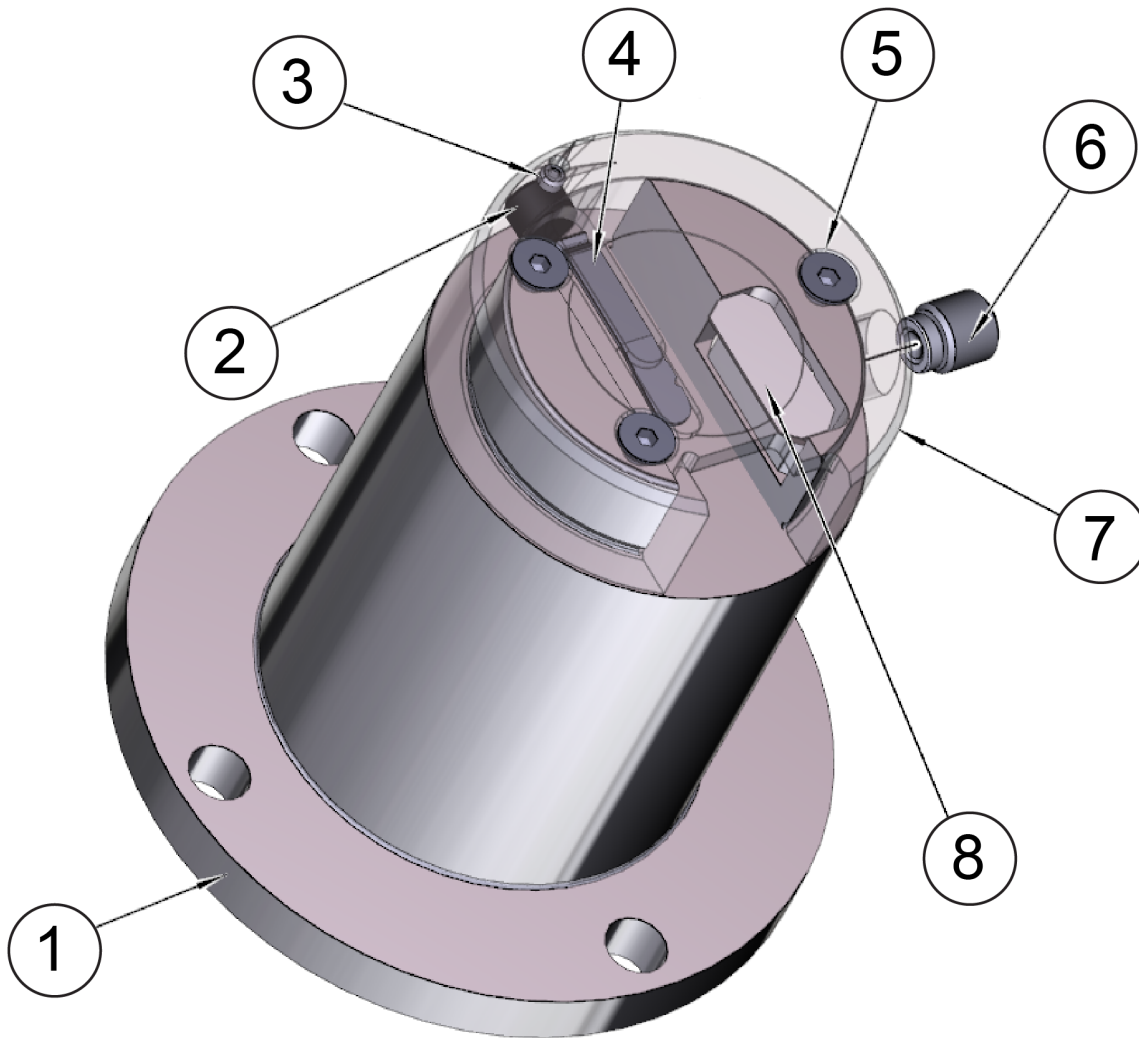


### 6519P Heavy Duty Line Bore Cutterhead Package Components



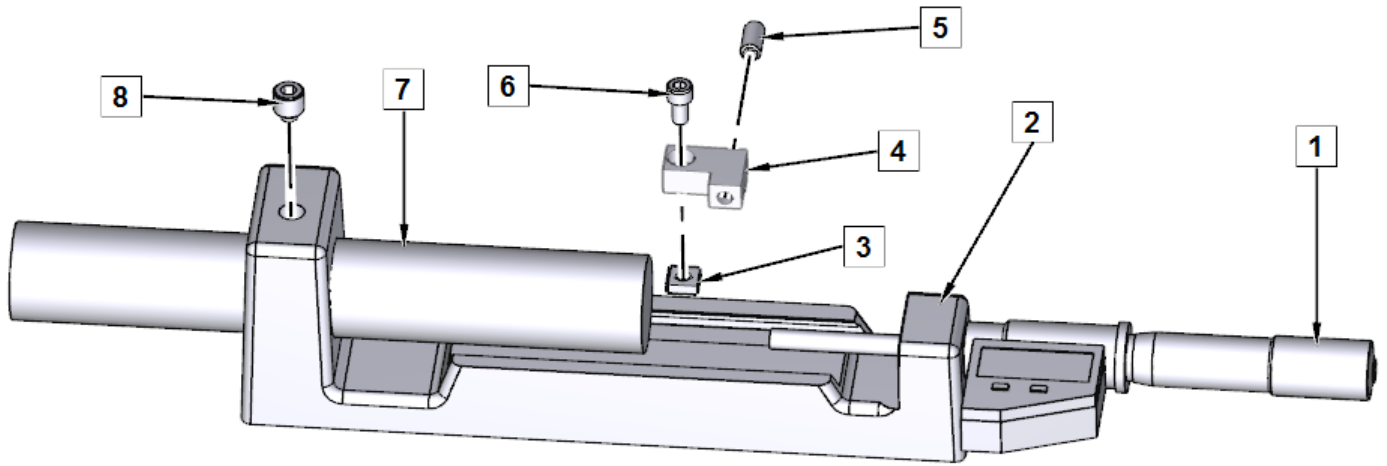


**6519S Cutterhead Parts**



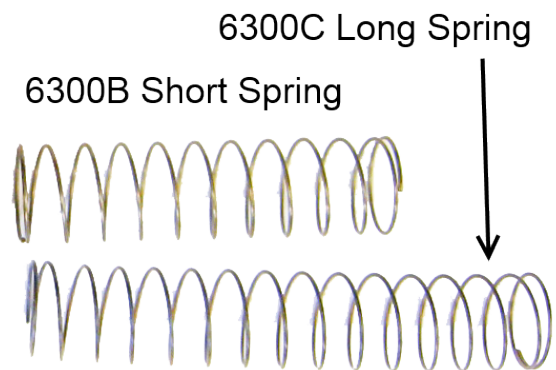
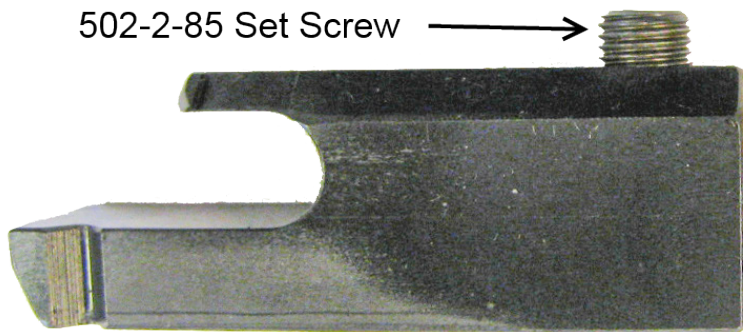
ITEM	PART #	DESCRIPTION
1	6519L	CUTTERHEAD BODY
2	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
3	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
4	100-1A	SPRING, TOOL LOCK 1 13/32"
5	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
6	501-70A	SCREW, TOOL HOLDER LOCK ASSY
7	650-2-17	CAP, 2.9" STUB BAR
8	6263A	SHOE, CLAMP-TOOL HOLDER PRODUCTION STUB BAR

**900-2-20 Micrometer Parts**



ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

**6520 Series Toolholder Parts**

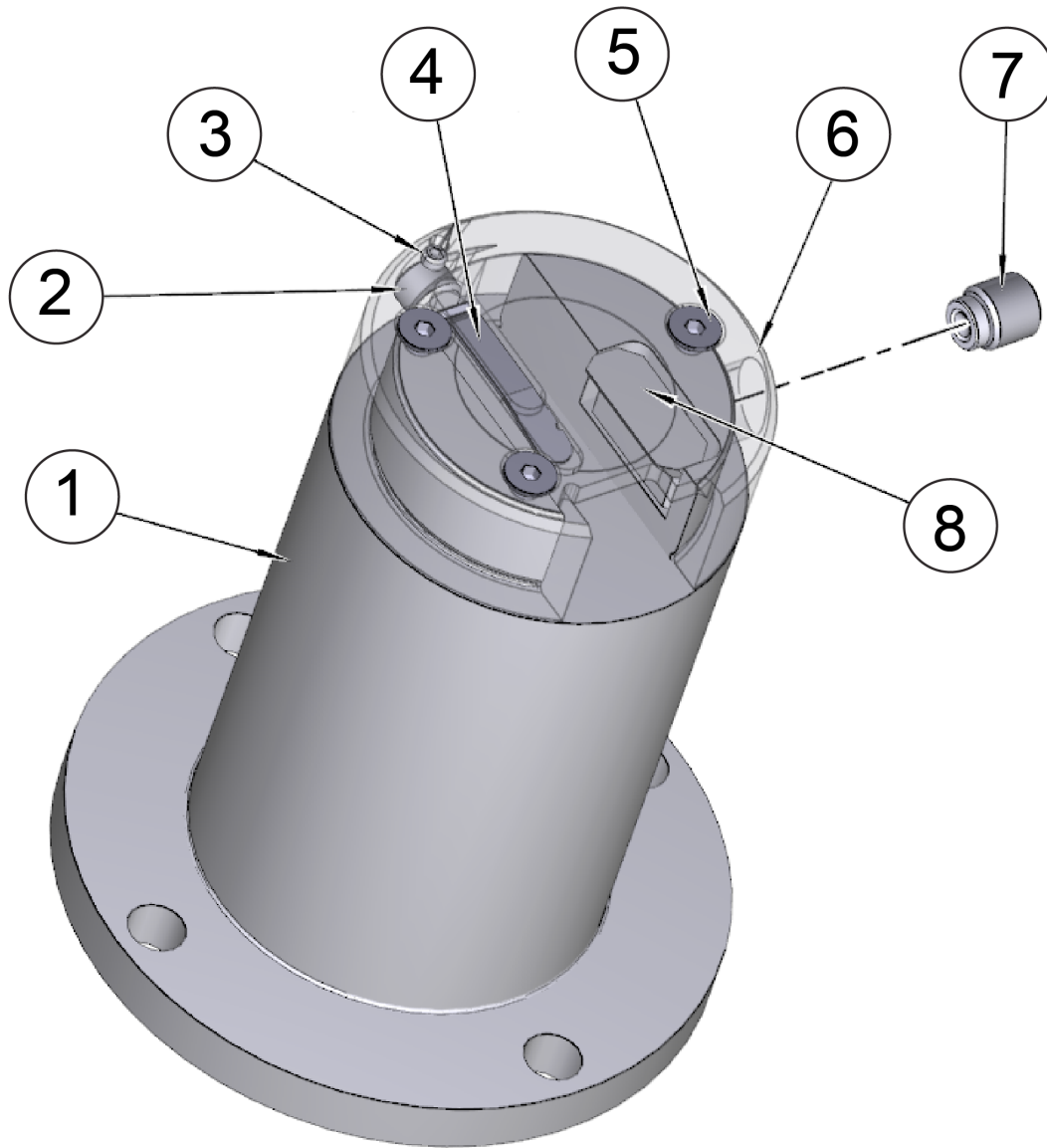


### 6519M Heavy Duty Line Bore Cutterhead Package Components



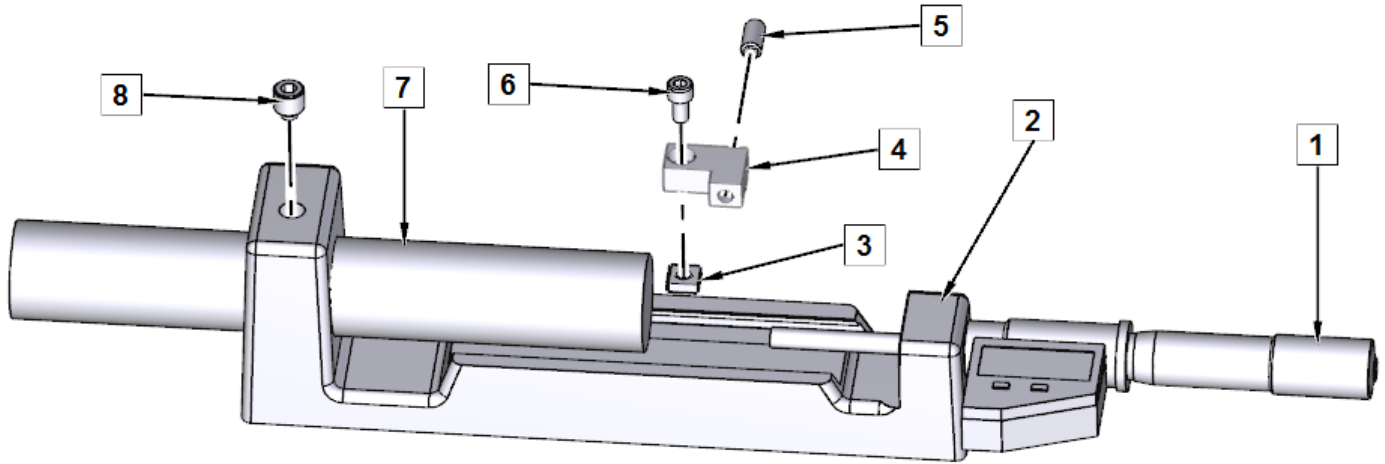


**6519Q Cutterhead Parts**



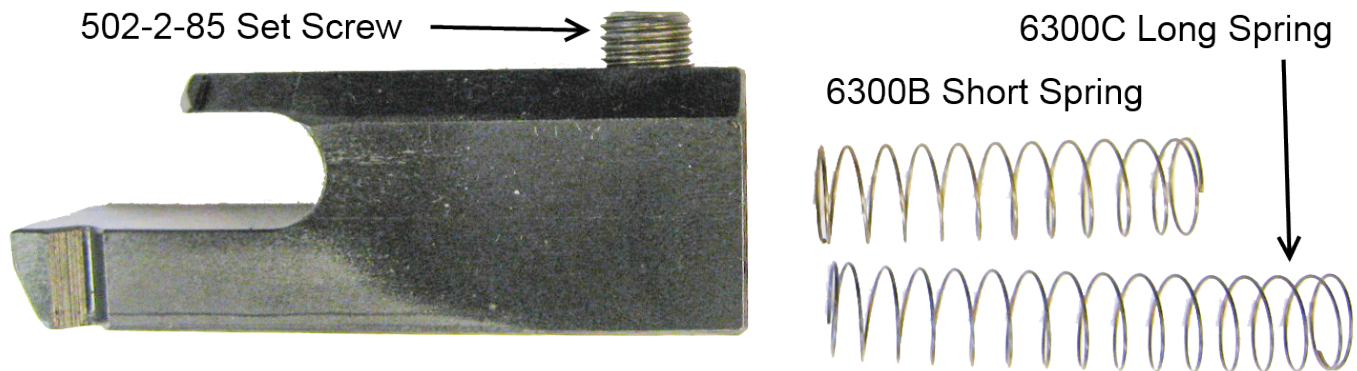
ITEM	PART #	DESCRIPTION
1	6519J	CUTTERHEAD BODY
2	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
3	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
4	100-1A	SPRING, TOOL LOCK 1 13/32"
5	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
6	650-2-17	CAP, 2.9" STUB BAR
7	501-70C	SCREW, TOOL HOLDER LOCK
8	6263A	SHOE, CLAMP-TOOL HOLDER PRODUCTION STUB BAR

**900-2-20 Micrometer Parts**

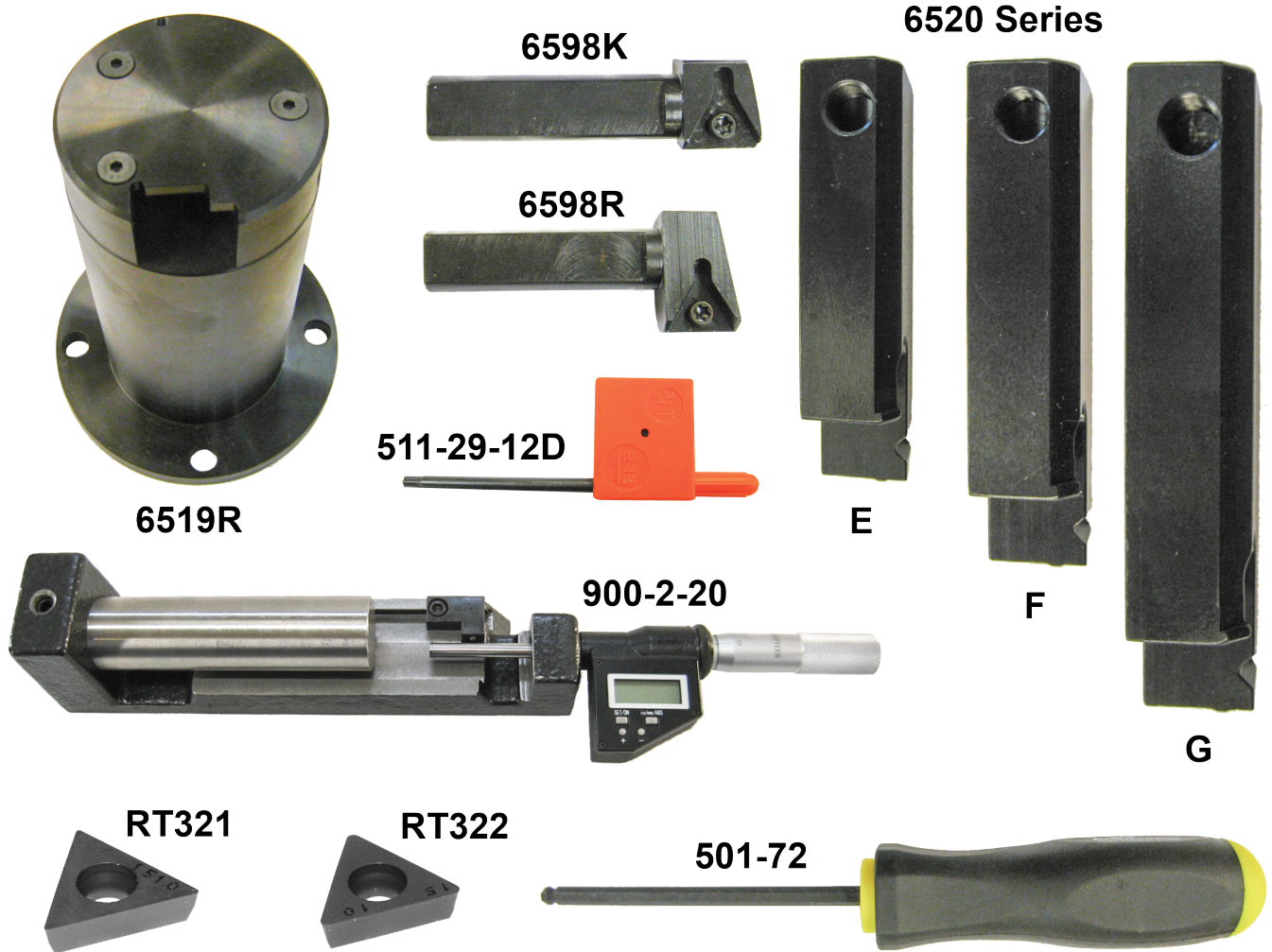


ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

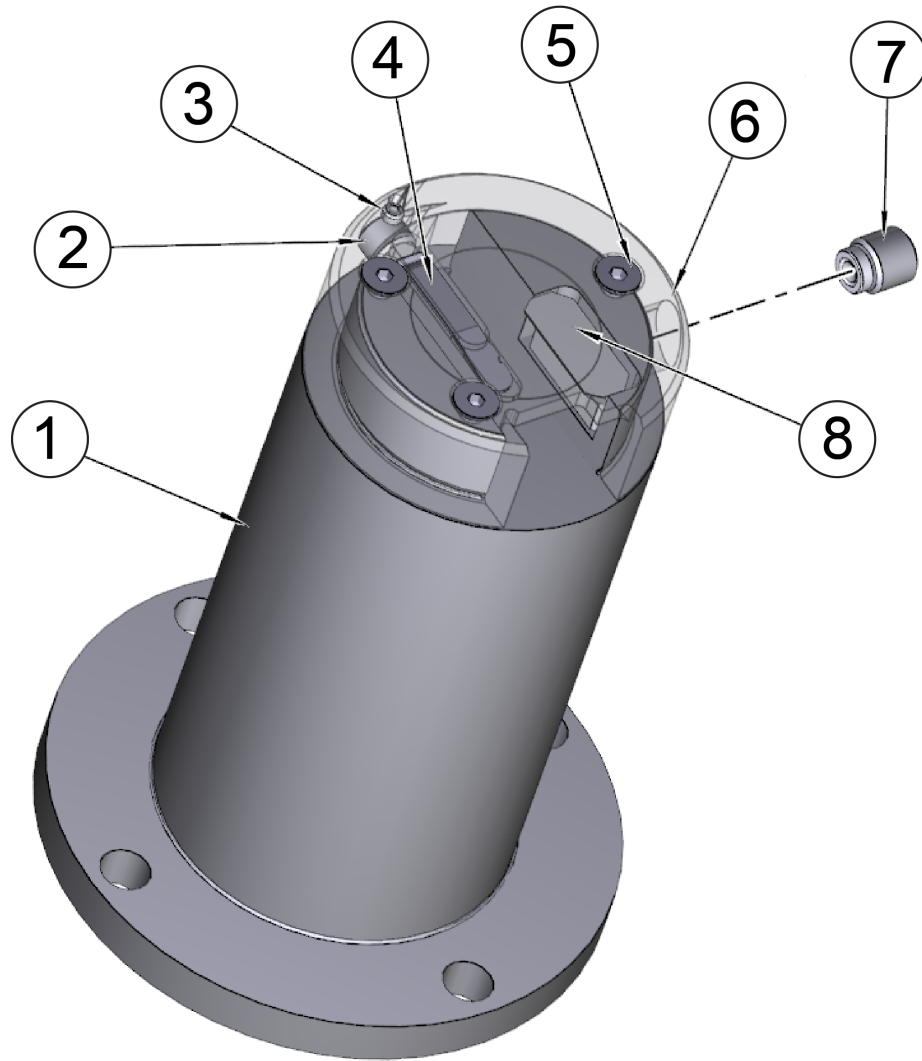
**6520 Series Toolholder Parts**



### 6519N Heavy Duty Line Bore Cutterhead Package Components

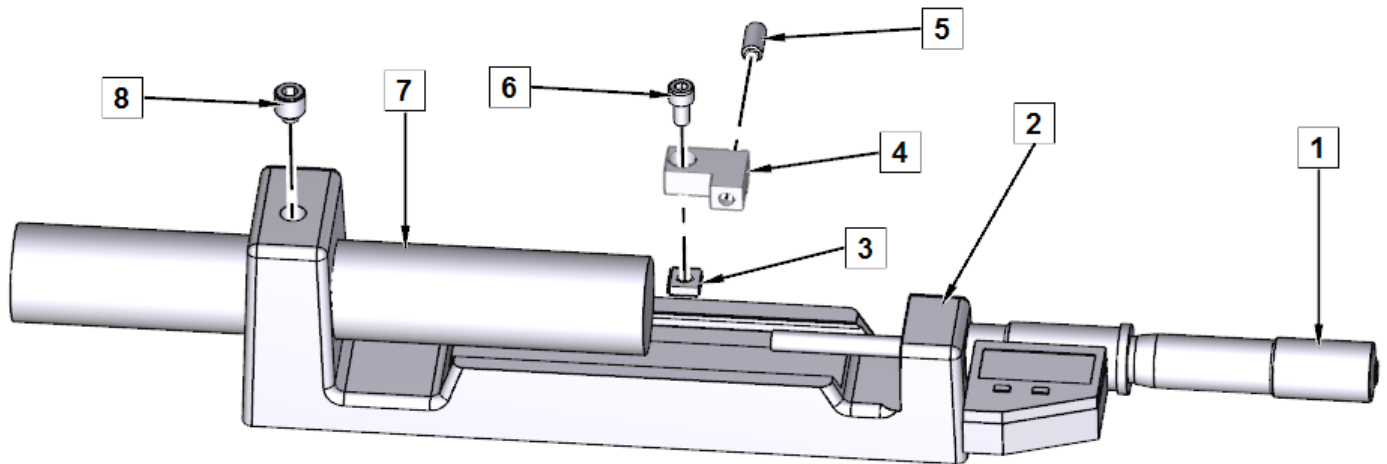


**6519R Cutterhead Parts**



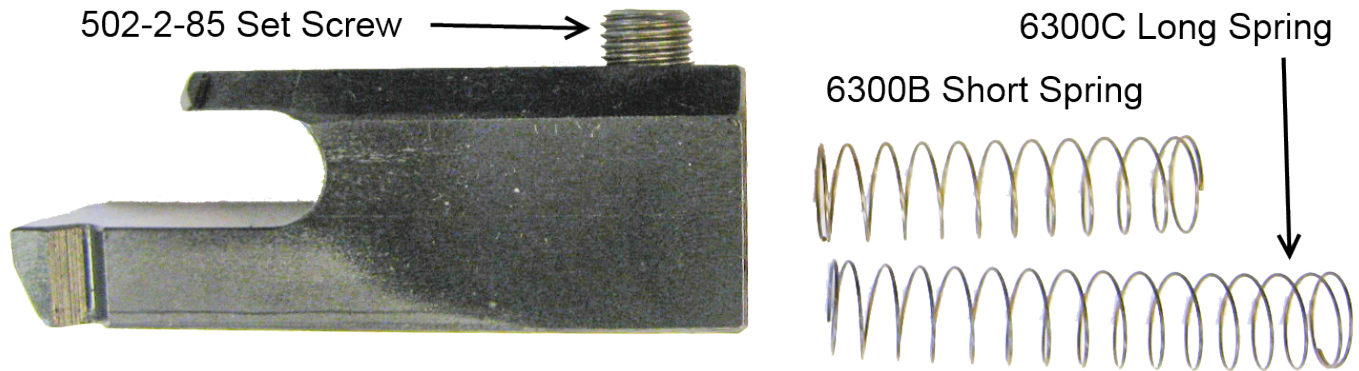
ITEM	PART #	DESCRIPTION
1	6519K	CUTTERHEAD BODY
2	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
3	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
4	100-1A	SPRING, TOOL LOCK 1 13/32"
5	MF-78	SOCKET FLAT HEAD SCREW 10-24 X 3/8"
6	650-2-17	CAP, 2.9" STUB BAR
7	501-70C	SCREW, TOOL HOLDER LOCK
8	6263A	SHOE, CLAMP-TOOL HOLDER PRODUCTION STUB BAR

## 900-2-20 Micrometer Parts

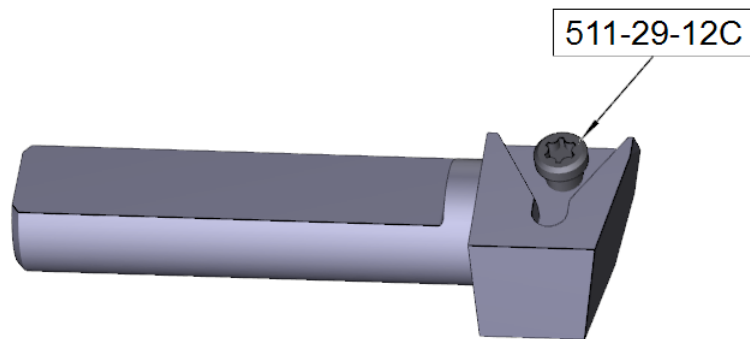


ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

### 6520 Series Toolholder Parts



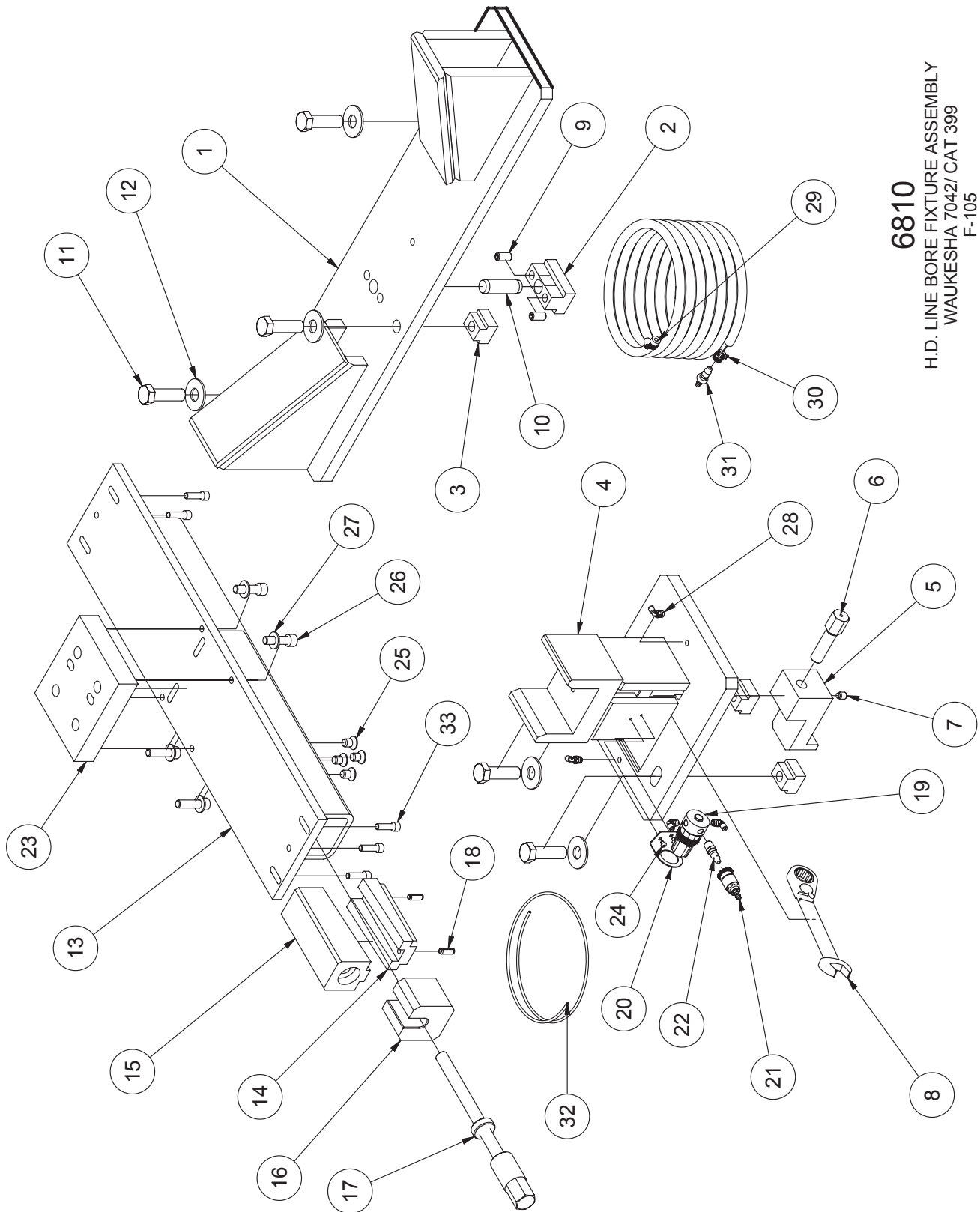
### 6598 Series Insert Cartridge Parts





# Line Bore Fixturing for Extra Large Blocks

## 6810 Waukesha 7042, 9390 and CAT 379, 398, 399 Line Boring Fixture Parts

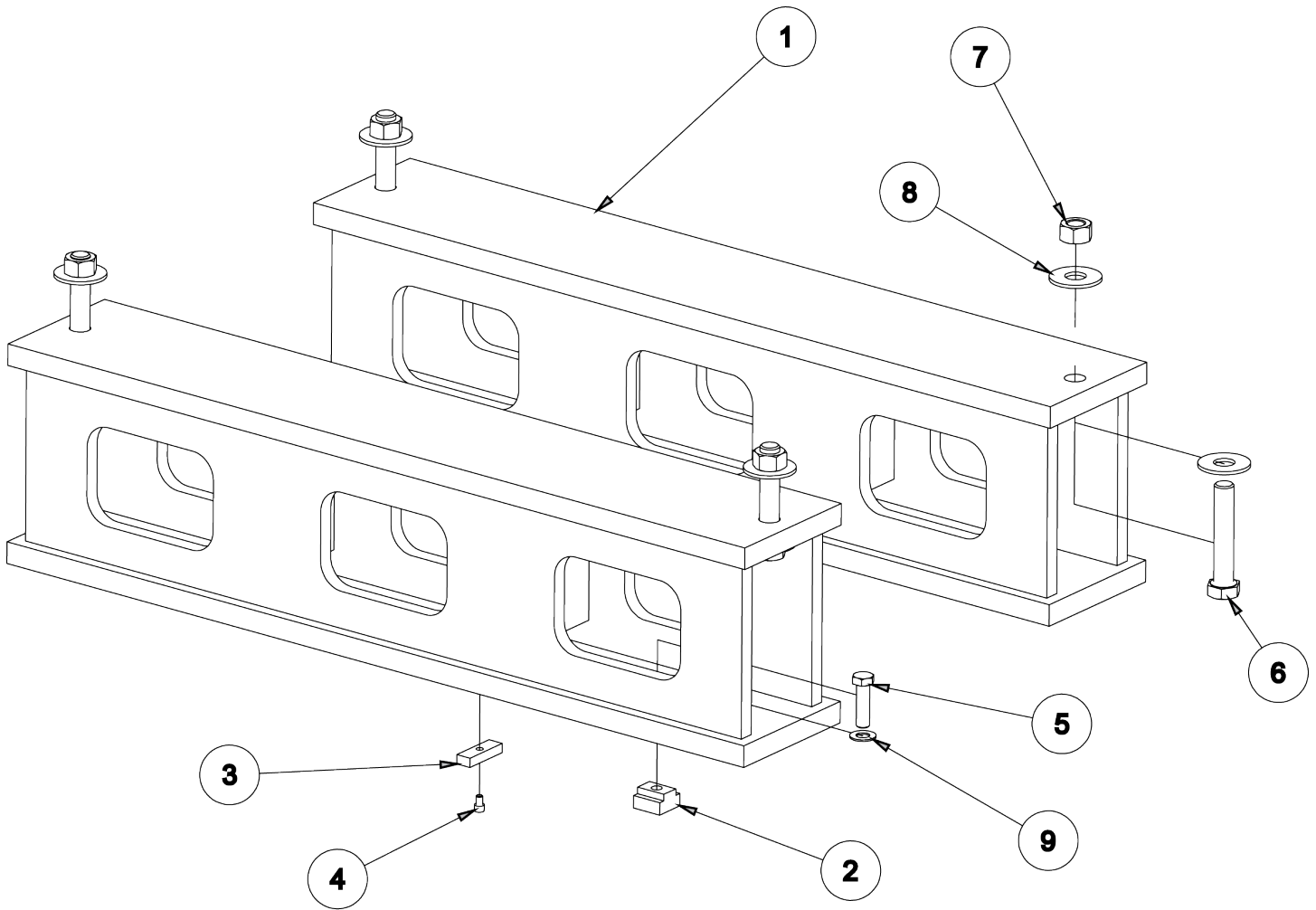


**6810**  
H.D. LINE BORE FIXTURE ASSEMBLY  
WAUKESHA 7042/ CAT 399  
F-105



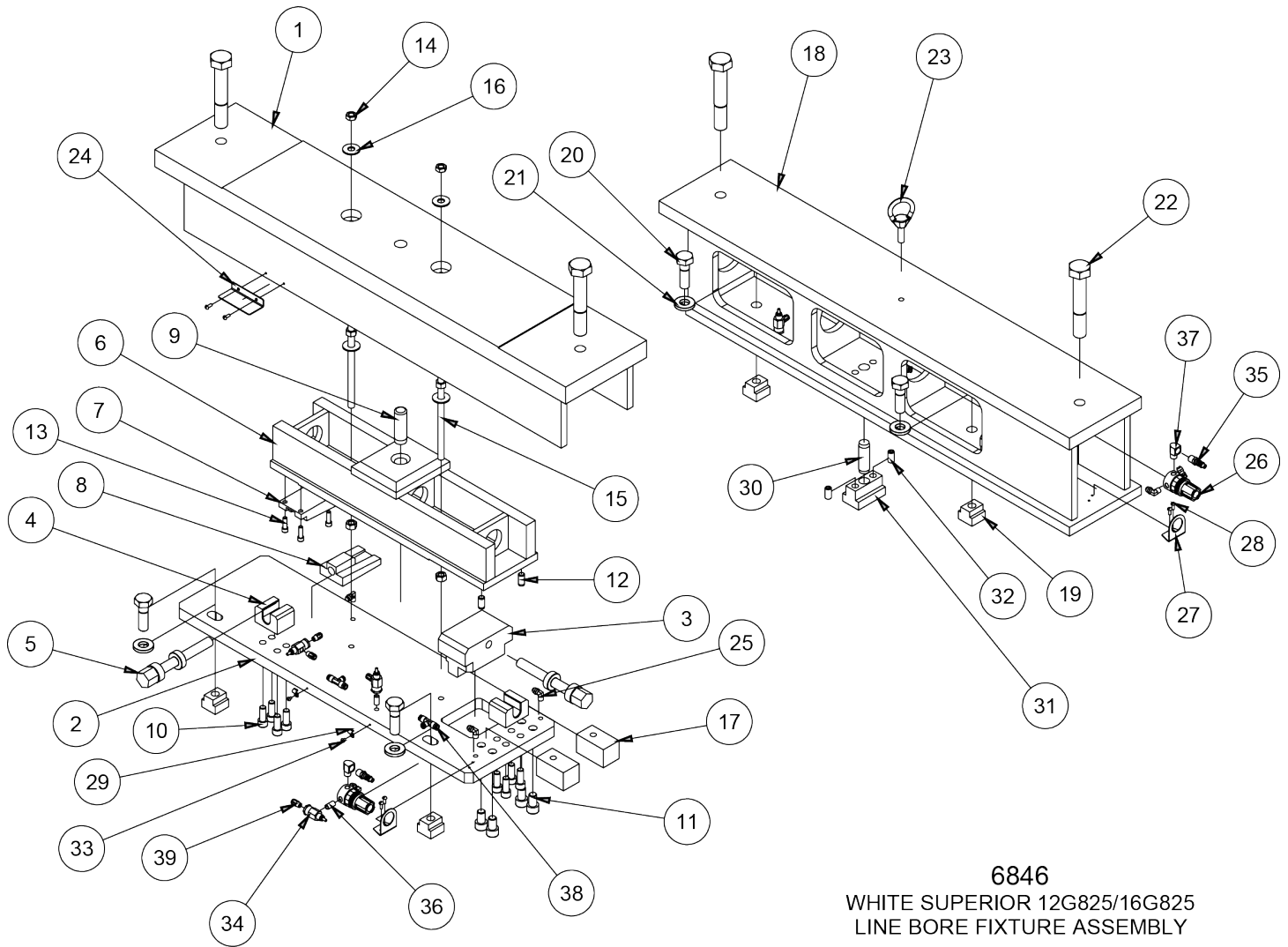
6810 HEAVY DUTY LINE BORE FIXTURE ASSEMBLY FOR WAUKESHA 7042/ CAT 399			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6811B	CRADLE (MACHINING) L.H. ADJUSTING, WAUKESHA 7042 LINE BORE FIXTURE
2	1	6820	LOCATING PIVOT KEY, DIESEL LINE BORE FIXTURE
3	5	6160	Nut, T - Hardened
4	1	6812C	SUPPORT (MACHINING) - WAUKESHA 7042/ CAT 399 LINE BORE FIXTURE
5	1	6814A	ADJUSTING BLOCK - WAUKESHA 7042/ CAT 399 LINE BORE FIXTURE
6	1	6812E	SCREW, ADJUSTING SUPPORT, WAUKESHA 7042/ CAT 399 LINE BORE FIXTURE
7	1	500-96-3C	7/16-14 x 1/2" BRASS TIPPED SET SCREW
8	1	6812F	1" REVERSIBLE RATCHETING WRENCH
9	2	MF-72	Flat Point 1/2-13 UNC x 1
10	1	6819	Locating, Pivot Pin
11	5	MF-154C	3/4-10UNC x 2-1/2" LG. HEX BOLT
12	5	MF-181A	3/4" FLAT WASHER
13	1	6813	TUBE ASSEMBLY, ADJUSTABLE, WAUKESHA 7042/ CAT 399 LINE BORE FIXTURE
14	1	6411	Lower Leveling Pad
15	1	6410	Upper Leveling Pad
16	1	6409	BRACKET, LEVELING SCREW (399 CAT) F-88
17	1	6408	Leveling Screw
18	2	MF-229B	Pin - Slotted Spring
19	1	502-27-17	Regulator 0 - 60 PSI
20	1	502-27-17A	Regulator Bracket
21	1	502-11-16W	Quick connect air fitting female
22	1	502-11-16X	Quick Connect air Fitting Male
23	1	6813C	ADAPTER, CAT 399 - WAUKESHA 7042/CAT 399 LINE BORE FIXTURE
24	2	MF-87	Socket Button Head 10 - 24 x 1/4
25	4	6409A	1/2-13UNC x 3/4" LG. SOCKET FLAT HEAD SCREW
26	4	MF-44A	Hexagon Socket Head Cap Screw
27	4	MF-180	1/2" FLAT WASHER
28	4	514-4-18	1/8 npt x 1/8 poly 90
29	1	502-1-98	1/4" AIR HOSE
30	2	502-1-97	CLAMP, 1/4" I.D. HOSE
31	1	502-11-16Y	CONNECTOR, MALE AIR 1/4 NPTF
32	1	514-4-24	1/4" AIR HOSE - 2 FEET
33	6	MF-32	S.H.C.S.3/8 - 16 UNC - 1 1/4

**6815 White Superior 8G825 Line Boring Fixture Parts**



6815 WHITE SUPERIOR 8G825 LINE BORE FIXTURE ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6816A	W.S. 8G825 LINE BORE FIXTURE (MACH.)
2	4	502-1-11B	T-Nut 3/4"
3	2	6831	KEY, FIXTURE
4	2	MF-11	S.H.C.S. 1/4 - 20 UNC - 3/8
5	4	MF-149B	1/2-13UNC x 1-3/4" LG. HEX BOLT
6	4	6822A	3/4-10UNC x 4" LONG HEX BOLT
7	4	MF-166A	3/4-10UNC HEX NUT
8	8	MF-181A	3/4" FLAT WASHER
9	4	MF-180	1/2" FLAT WASHER

### 6846 White Superior 12 & 16 G825 Line Boring Fixture Parts

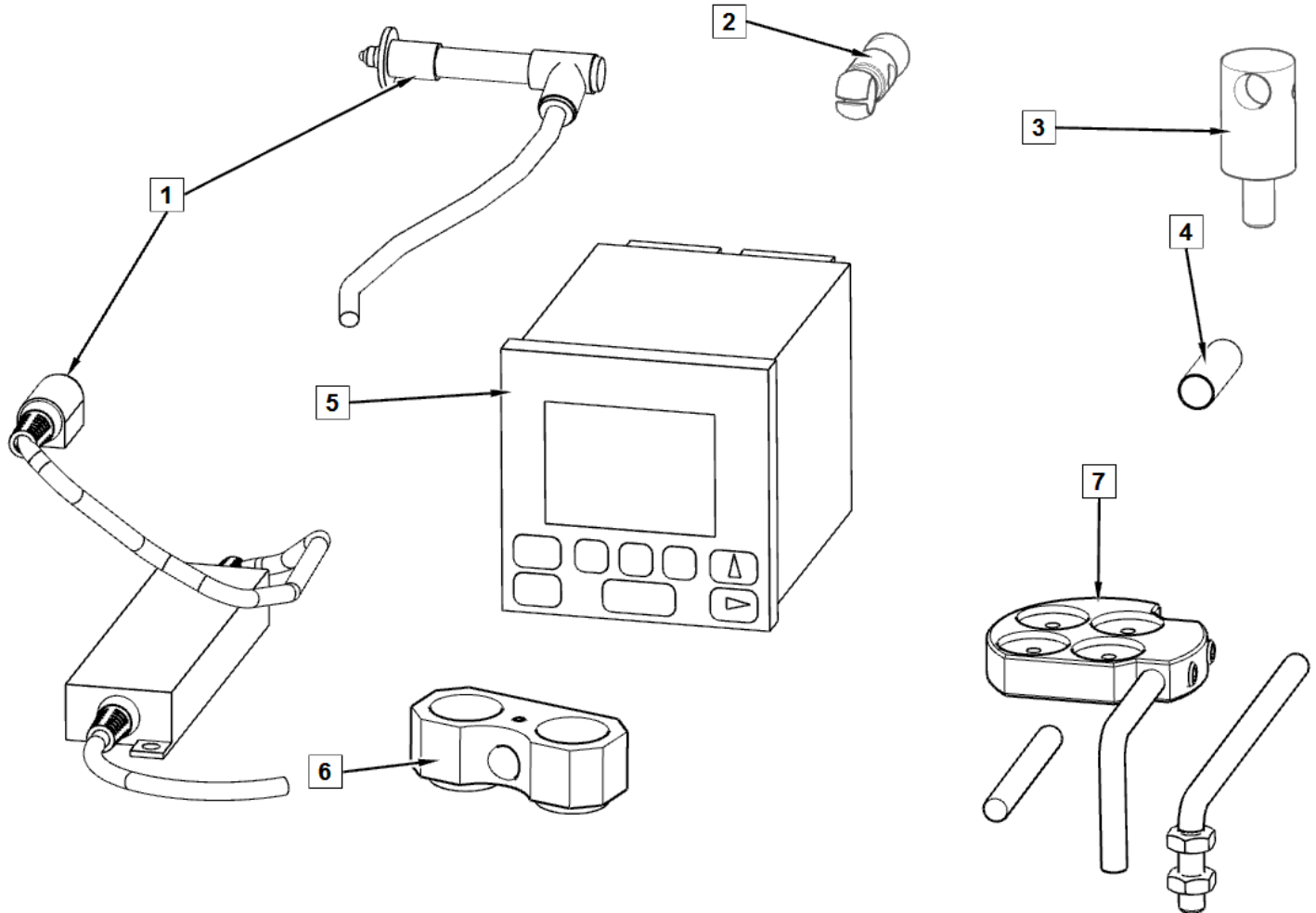


**6846**  
WHITE SUPERIOR 12G825/16G825  
LINE BORE FIXTURE ASSEMBLY

6846 WHITE SUPERIOR 12G825/16G825 LINE BORE FIXTURE			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6848A	ADAPTER (MACH.)
2	1	6852	LOWER PLATE REWORK
3	1	6830	Block, Adjusting Adjustable Parrallel
4	2	6829	Bracket, Screw Adjustable
5	2	6828	SCREW, ADJUSTABLE PARALLEL
6	1	6849A	TILT ARM (MACH.)
7	1	6826	Wedge, Upper Adjustable Parrallel
8	1	6827	Wedge, Lower Adjustable Parrallel
9	1	6853	LOCATING PIN
10	8	MF-43	1/2-13UNC x 1-1/4" S.H.C.S
11	4	MF-46F	5/8-11UNC x 1" S.H.C.S.
12	2	MF-213B	1/2" DIA. x 1" LG. DOWEL PIN
13	3	Mf-23	Socket Head Cap screw 5/16 - 18 UNC - 1
14	6	MF-165	1/2-13UNC HEX NUT
15	2	6848B	CLAMP STUD, ADJUSTABLE PARALLEL, WHITE SUPERIOR LINE BORE FIXTURE - F90
16	4	MF-180	1/2" FLAT WASHER
17	2	6850	LIFT BLOCK
18	1	6847A	STATIONARY PARALLEL
19	4	6160	Nut, T - Hardened
20	4	MF-154C	3/4-10UNC x 2-1/2" LG. HEAVY HEX BOLT
21	4	6287	WASHER, THRUST 3/4"
22	4	6854	1"-8UNC x 6" LG. HEAVY HEX BOLT
23	1	502-3-13	Lift Eye
24	1	6851	Chip Shield, Upper Pad Adjsutable Parrallel
25	6	502-11-16l	Elbow, Male 1/4 FPT x 1/8 PT
26	2	502-27-17	Regulator 0 - 60 PSI
27	2	502-27-17A	Regulator Bracket
28	6	MF-111	10-24UNC x 1/2" LG. SLOTTED ROUND HEAD MACHINE SCREW
29	2	502-12-16	Wire Clip
30	1	6819	Locating, Pivot Pin
31	1	6820	Locating Pivont Key, Waukesha 7042/ CAT 399
32	2	MF-72	1/2-13UNC x 1" LG. SOCKET FLAT POINT SET SCREW
33	2	Mf-86	Socket Button Head Cap Screw8 - 32 x 1/4
34	6	502-11-35A	Flo Control
35	2	502-11-16X	Quick Connect air Fitting Male
36	5	502-11-17J	Nipple,Close 1/8" NPT
37	2	502-11-17S	1/4 STREET ELL
38	3	514-4-17N	Tee, Union 1/4 Tube
39	7	514-4-17W	FITTING 1/8NPT x 1/4" POLY STRAIGHT

## Line Bore Set Up and Alignment Equipment

### 502-12-7B Digital Runout Probe and Readout Parts

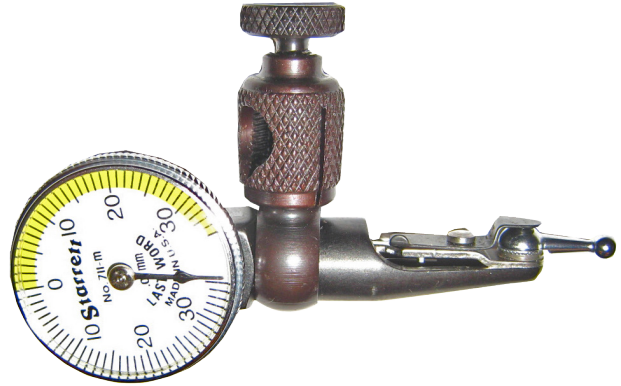


ITEM	PART #	DESCRIPTION
1	502-12-7C	DIGITAL GAUGE
2	502-11-40	CLAMP BODY
3	502-9-9S	INDICATOR MOUNT,RIGHT ANGLE DRIVE
4	502-12-7E	GAUGE ADAPTER SLEEVE
5	502-12-7D	1 AXIS GAGING DISPLAY-DIGITAL RUNOUT GAUGE
6	502-12-4A	MAGNETIC HOLDER ASSEMBLY
7	502-12-4	MAGNETIC HOLDER ASSEMBLY

**502-9-9A Mechanical Run Out Indicator**



**502-9-9J Mechanical Run Out Indicator**

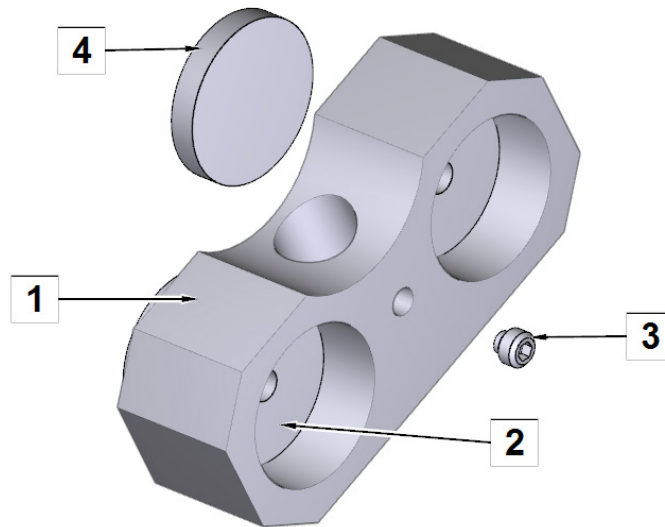


**502-9-9S Indicator Mount**

Angled for small diameter main line bores

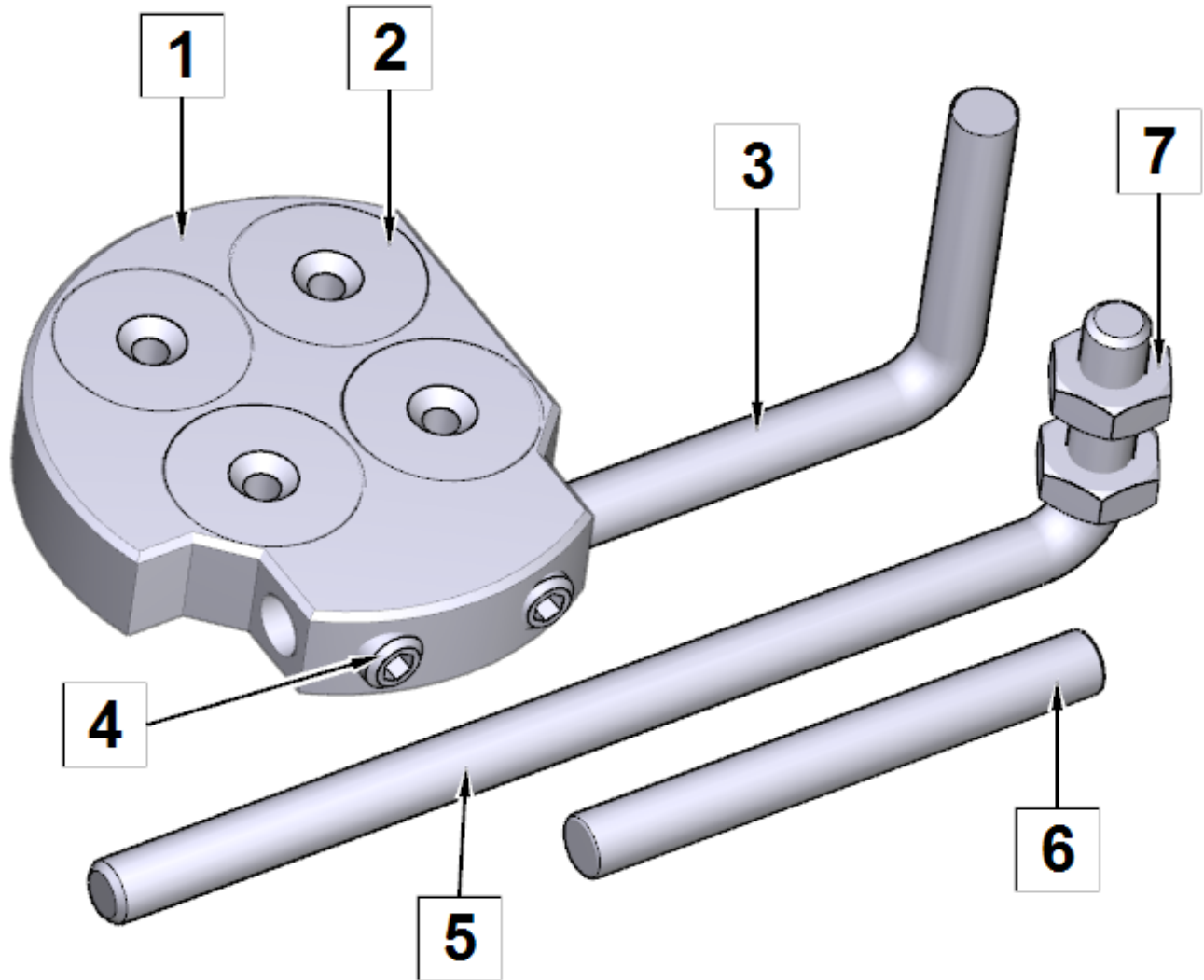


**502-12-4A Magnetic Indicator Holder**



ITEM	PART #	DESCRIPTION
1	502-12-4B	MAGNETIC HOLDER INDICATOR LINE BORING
2	502-11-39	MAGNET, SHALLOW POT
3	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)
4		MAGNET WASHER

**502-12-4 General Purpose Magnetic Indicator Holder**

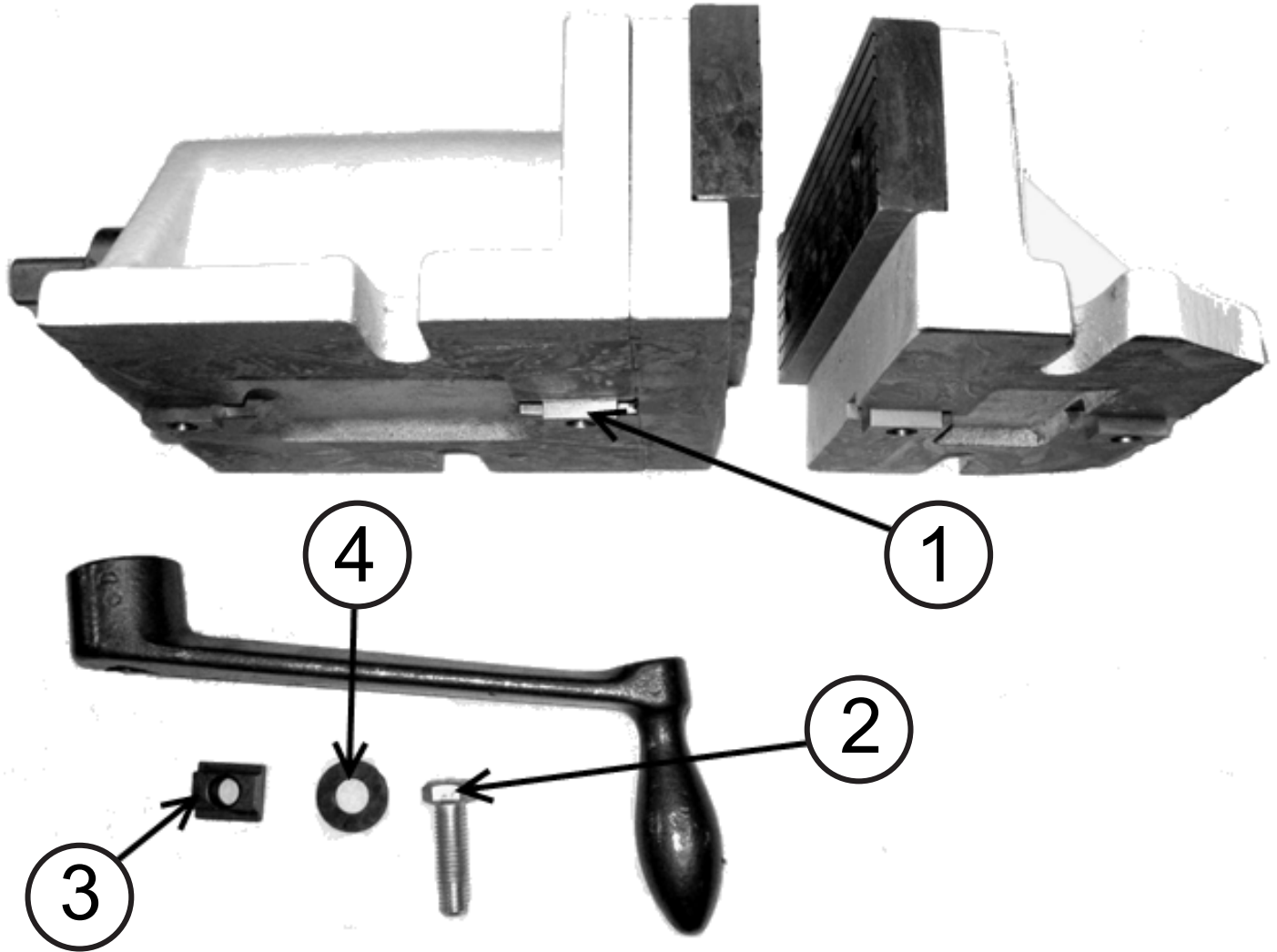


ITEM	PART #	DESCRIPTION
1	502-11-39A	HOLDER, MAGNET
2	502-11-39	MAGNETS, SHALLOW POT
3	502-11-39B	ROD, ADAPTOR, RIGHT ANGLE-SHORT
4	MF-58	SOCKET SET SCREW FLAT POINT 1/4-20 X 1/4"
5	502-11-39Q	ROD, ADAPTOR, RIGHT ANGLE-LONG
6	MF-208	DOWEL PIN 1/4 X 2 1/4"
7	MF-163	HEX NUT 1/4-20 NC



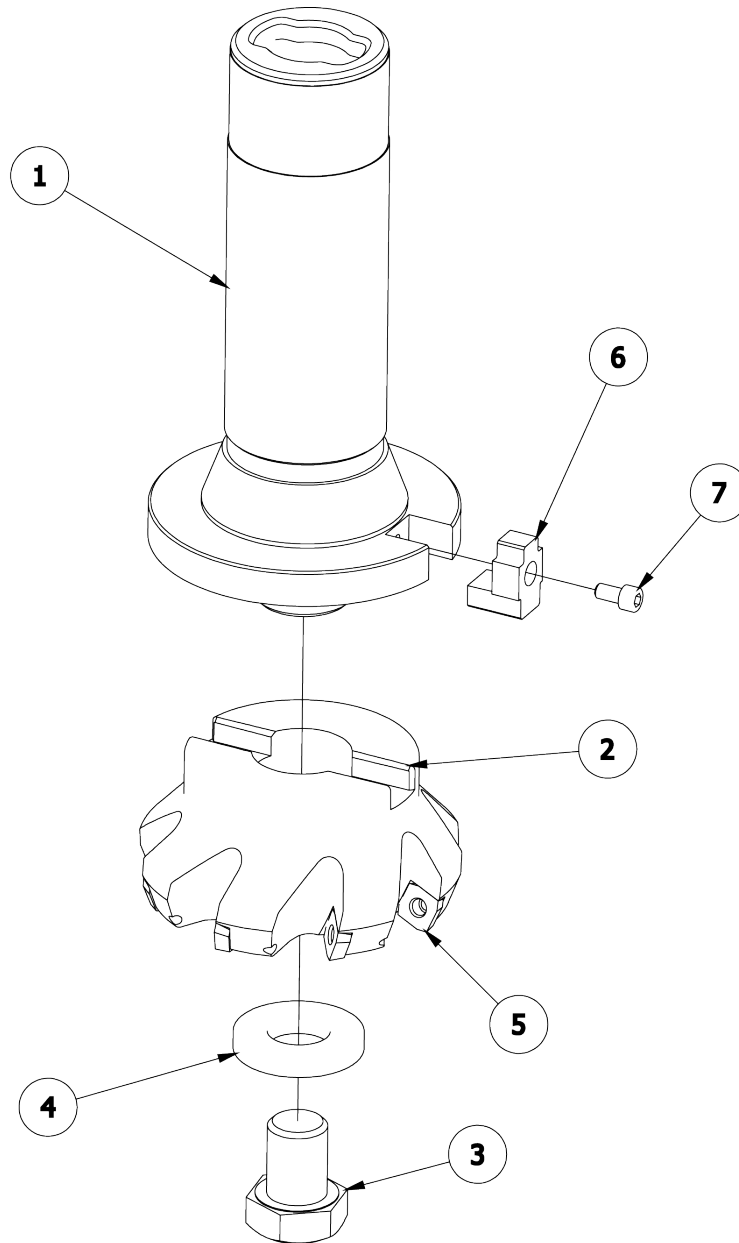
## Equipment for Preparing Blocks for Line Boring

### 7209N 2-Piece Vise Parts



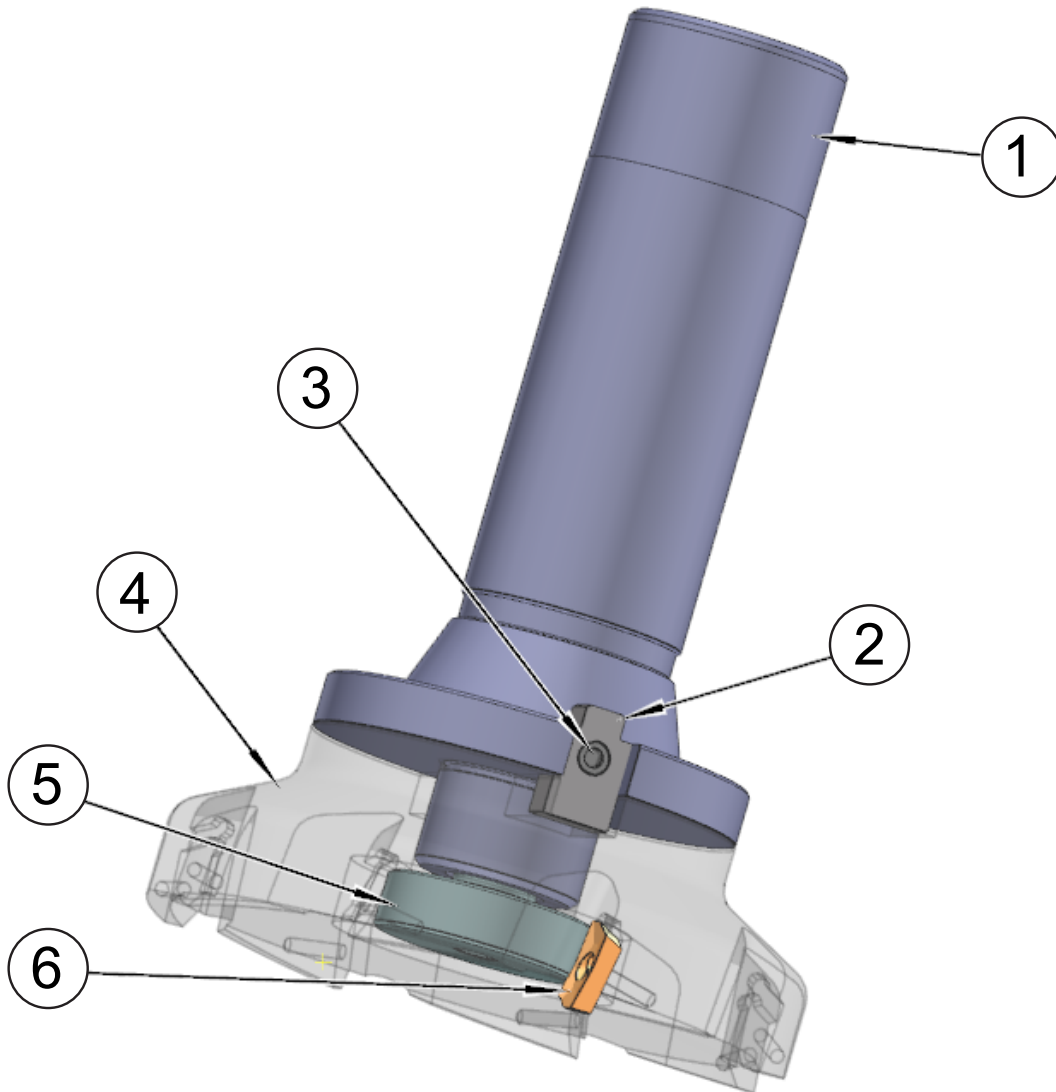
ITEM	PART #	DESCRIPTION
1	7210E	KEY, STEPPED
2	MF-137F	HEX BOLT 1/2-13 X 1 3/4"
3	7137B	NUT, "T"
4	100-19A	WASHER, HARDENED 17/32" ID

**6514L Shell Mill Parts**



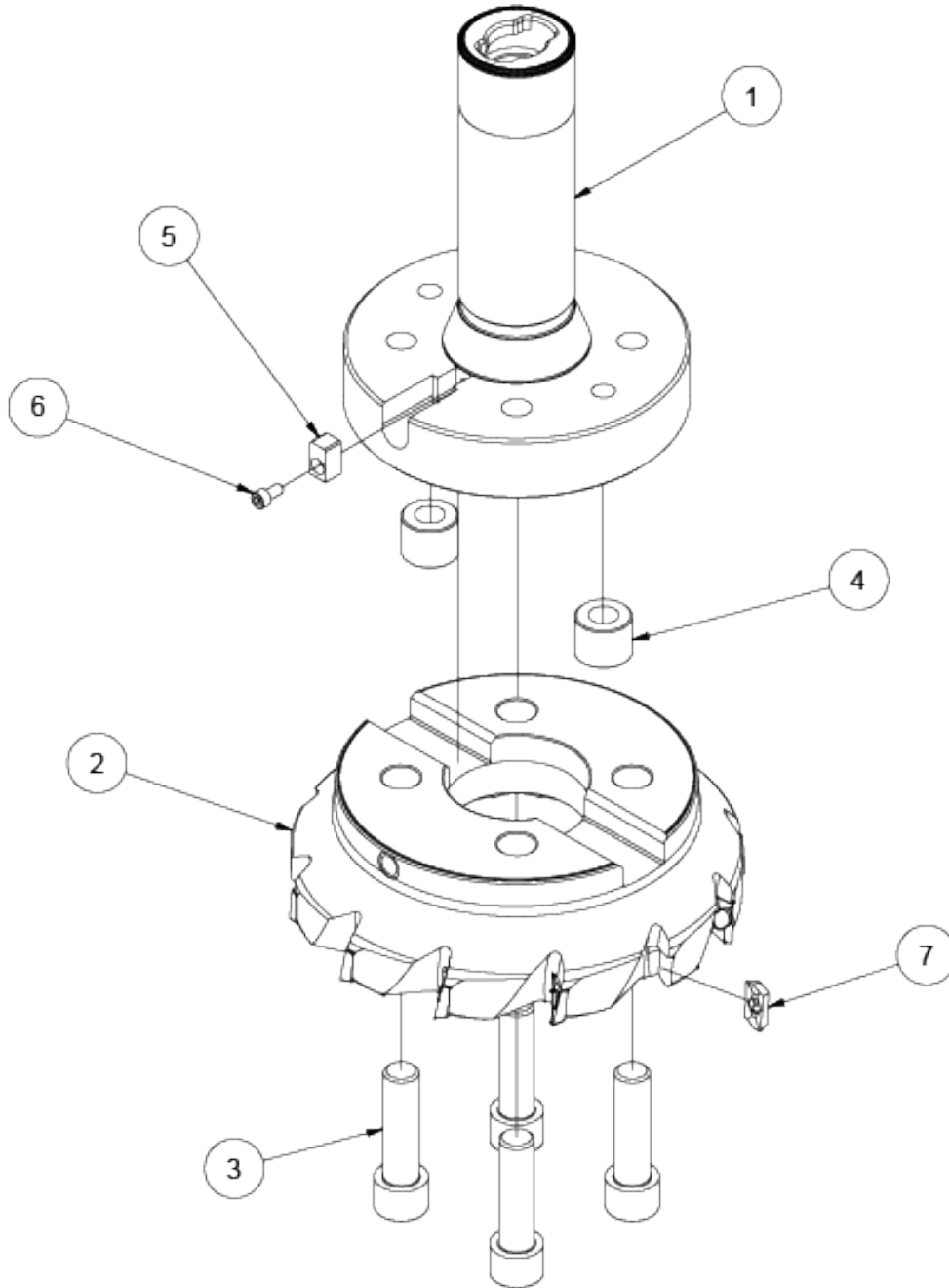
6514L 4" SHELL MILL ASSEMBLY Parts List				
ITEM	QTY	ROTTLER P/N	DESCRIPTION	MATERIAL
1	1	6514E	4" SHELL MILL ADAPTER	REWORK 6514A ADAPTER
2	1	6514N	4" SHELL MILL	KENNAMETAL KSSISR394SD4315F5
3	1	6514H	3/4-16 HEX BOLT	3/4" -16 x 1" HEX BOLT
4	1	6287	3/4" FLAT WASHER	3/4" FLAT WASHER
5	8	6514P	INSERT	KENNAMETAL
6	1	6514M	DRIVE KEY	1018 CRS 5/8" x 3/4" x 1.13" LG.
7	1	MF-5A	Hexagon Socket Head Cap Screw	10-24UNC x 1/2" S.H.C.S.

**6514V Shell Mill Parts**



ITEM	PART #	DESCRIPTION
1	6514A	ADAPTER, 5" SHELL MILL
2	6514B	KEY, 5" SHELL MILL
3	MF-5A	SOCKET HEAD CAP SCREW 10-24 X 1/2"
4	7224G	SHELL MILL ASSEMBLY 6"
5	6514R	MOUNTING SCREW, 5" SHELL MILL
6	6514T	INSERT, SHELL MILLS 18MM .03 (0.8MM) RAD

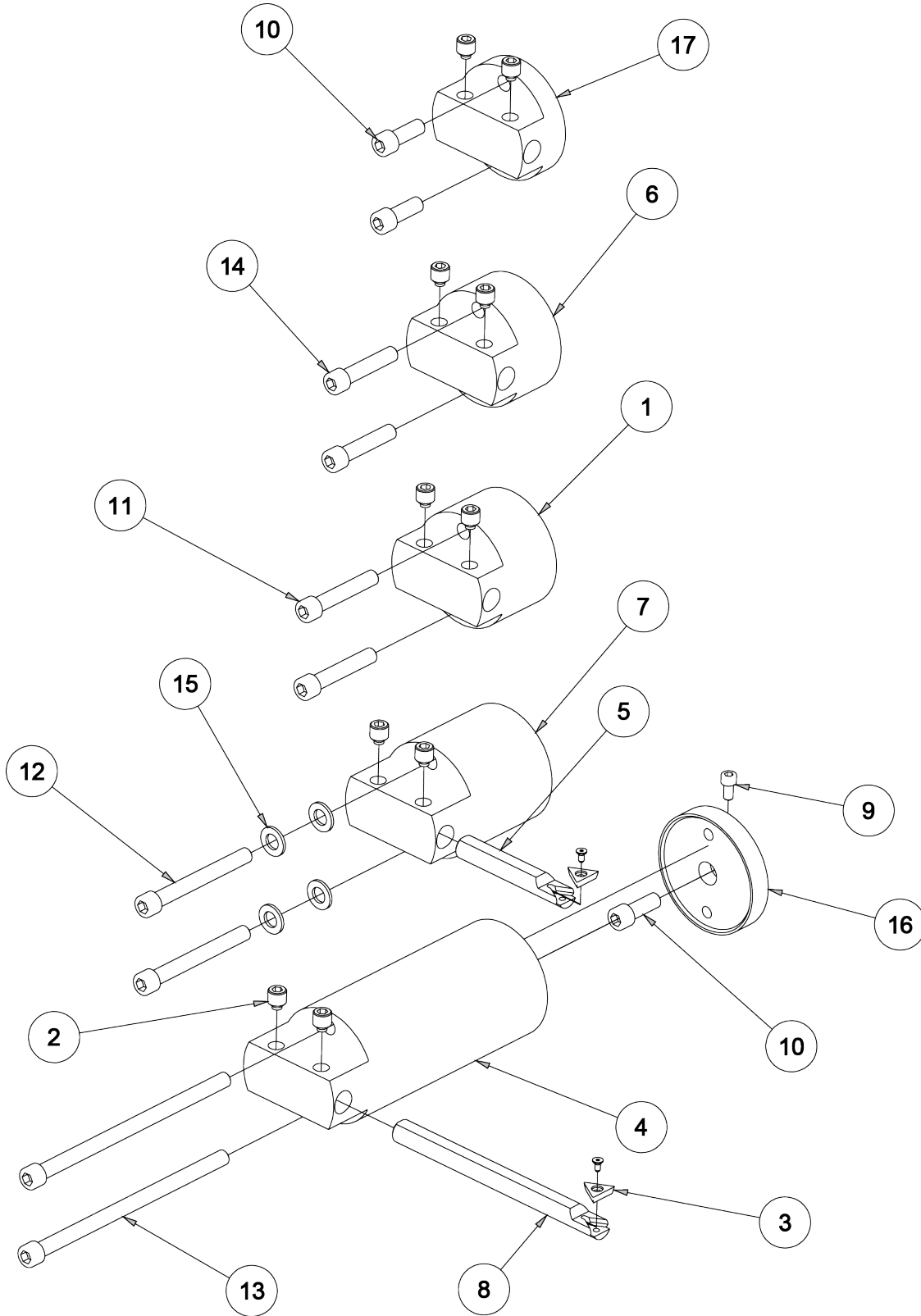
**6514W Shell Mill Parts**



6514W 8" SHELL MILL ASSEMBLY - F100			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6514K	ADAPTER, LARGE SHELL MILL CUTTERHEAD F-8
2	1	6514X	8" SHELL MILL
3	4	MF-46E	S.H.C.S. 5/8 - 11 UNC - 2 1/4
4	2	6514U	DRIVE KEY - LARGE SHELL MILL ADAPTER F8
5	1	6181	DRIVE KEY
6	1	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
7	12	6514Y	INSERT, SHELL MILL

# Main Line Thrust Facing Utilizing Circular Interpolation

## 6855C Thrust Facing Tooling Package Parts

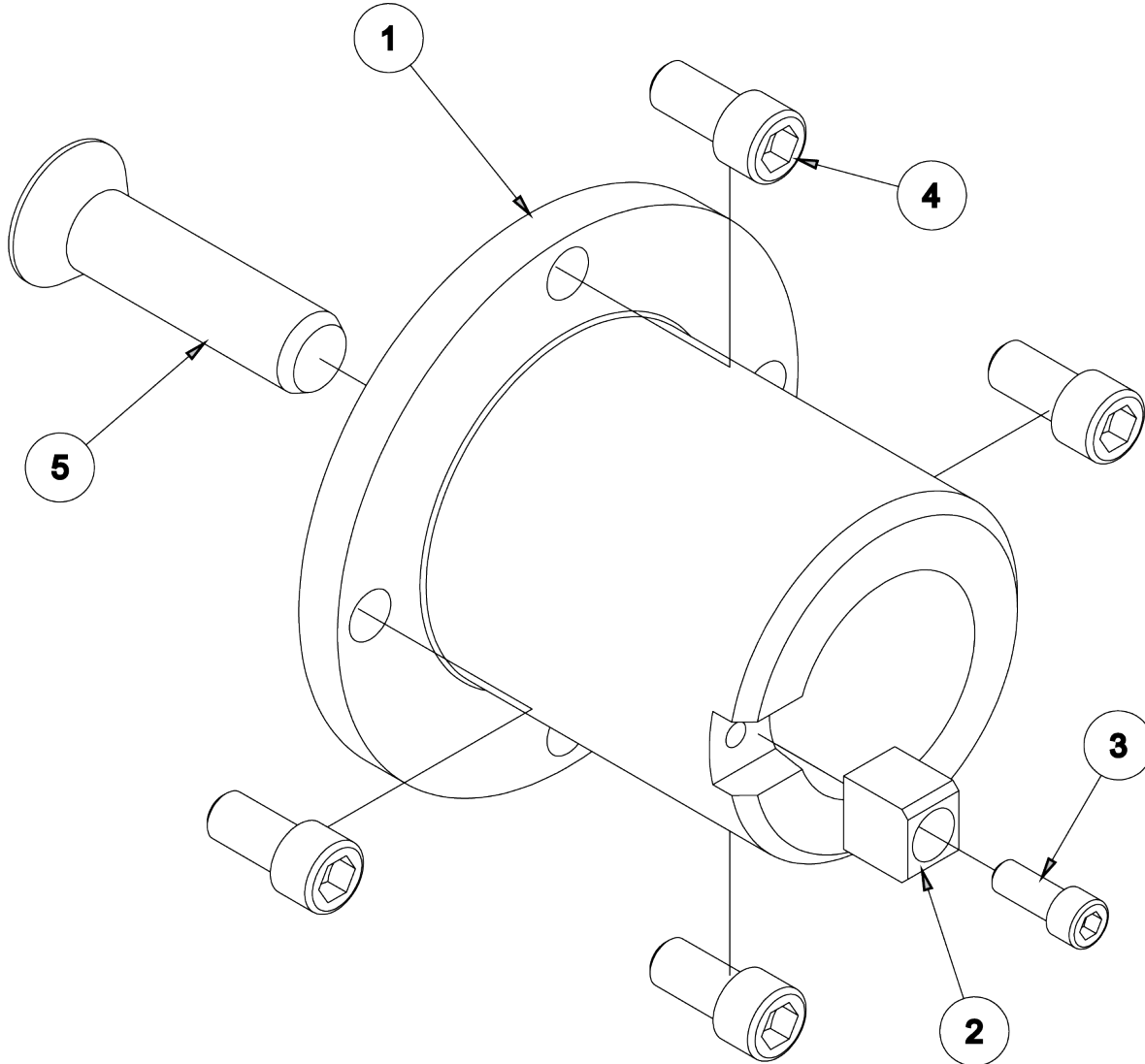


6855C THRUST FACING HEAD ASSEMBLY			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6855A	HEAD, THRUST FACING (2.18" LONG) LINE BORE
2	10	502-30-10L	Brass Tipped Set Screw
3	2	RT321	INSERT, TRIANGULAR POS. RAKE 3/8" I.C.
4	1	6855B	HEAD, THRUST FACING (6.25" LONG) LINE BORE
5	1	6855D	TRIANGLE INSERT CARTRIDGE - MAIN LINE THRUST FACING
6	1	6855E	HEAD, THRUST FACING (1.88" LONG) LINE BORE
7	1	6855F	HEAD, THRUST FACING (3.40" LONG) LINE BORE
8	1	6757R	TRIANGLE INSERT CARTRIDGE - MAIN LINE THRUST FACING
9	1	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
10	3	MF-21C	S.H.C.S. 5/16 - 18 UNC - 7/8
11	2	Mf-26	S.H.C.S. 5/16 - 18 UNC - 1 3/4
12	2	MF-28	S.H.C.S. 5/16 - 18 UNC - 2 3/4
13	2	MF-28D	S.H.C.S. 5/16 - 18 UNC - 5 1/2
14	2	MF-25	S.H.C.S. 5/16 - 18 UNC - 1 1/2
15	4	MF-177	5/16 SAE FLAT WASHER
16	1	6855	MOUNTING PLATE - THRUST FACING HEAD
17	1	6855J	HEAD, THRUST FACING (1.25" LONG) LINE BORE

### Special Tooling for Block End Machining

Requires Heavy Duty Right Angle Drive 6773F or 6779K

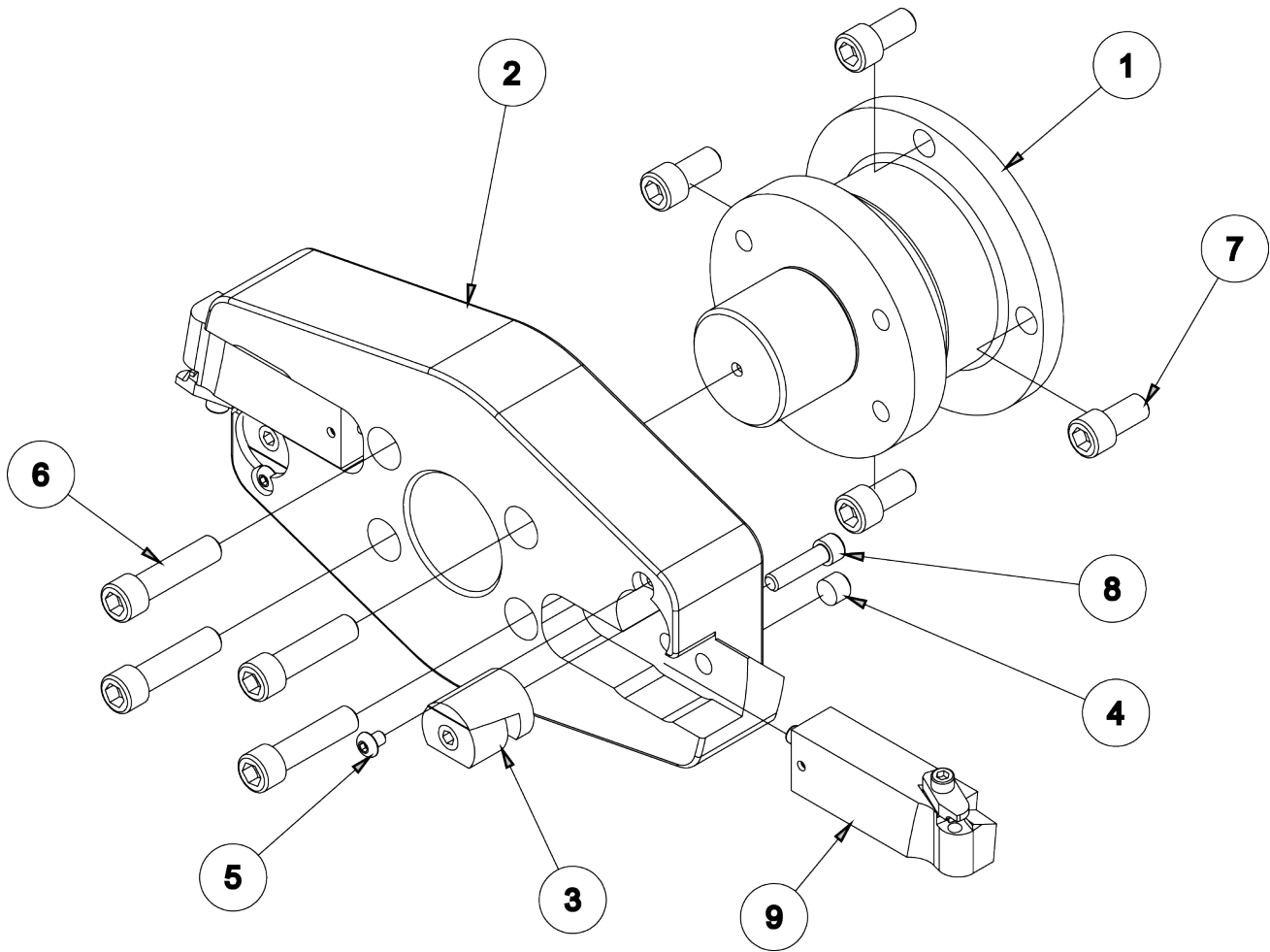
#### 6779H Adaptor Parts



6779H ADAPTER ASSEMBLY, 40 TAPER - H.D. OFFSET R.A.D.			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6779J	CAT 40 ADAPTER - H.D. OFFSET R.A.D.
2	1	6170H	Drive key
3	1	MF-13	1/4-20UNC x 5/8" LG. S.H.C.S.
4	4	MF-30	3/8-16UNC x 3/4" LG. S.H.C.S.
5	1	502-1-86D	5/8-11UNC x 2-1/2" LONG SOCKET FLAT HEAD SCREW

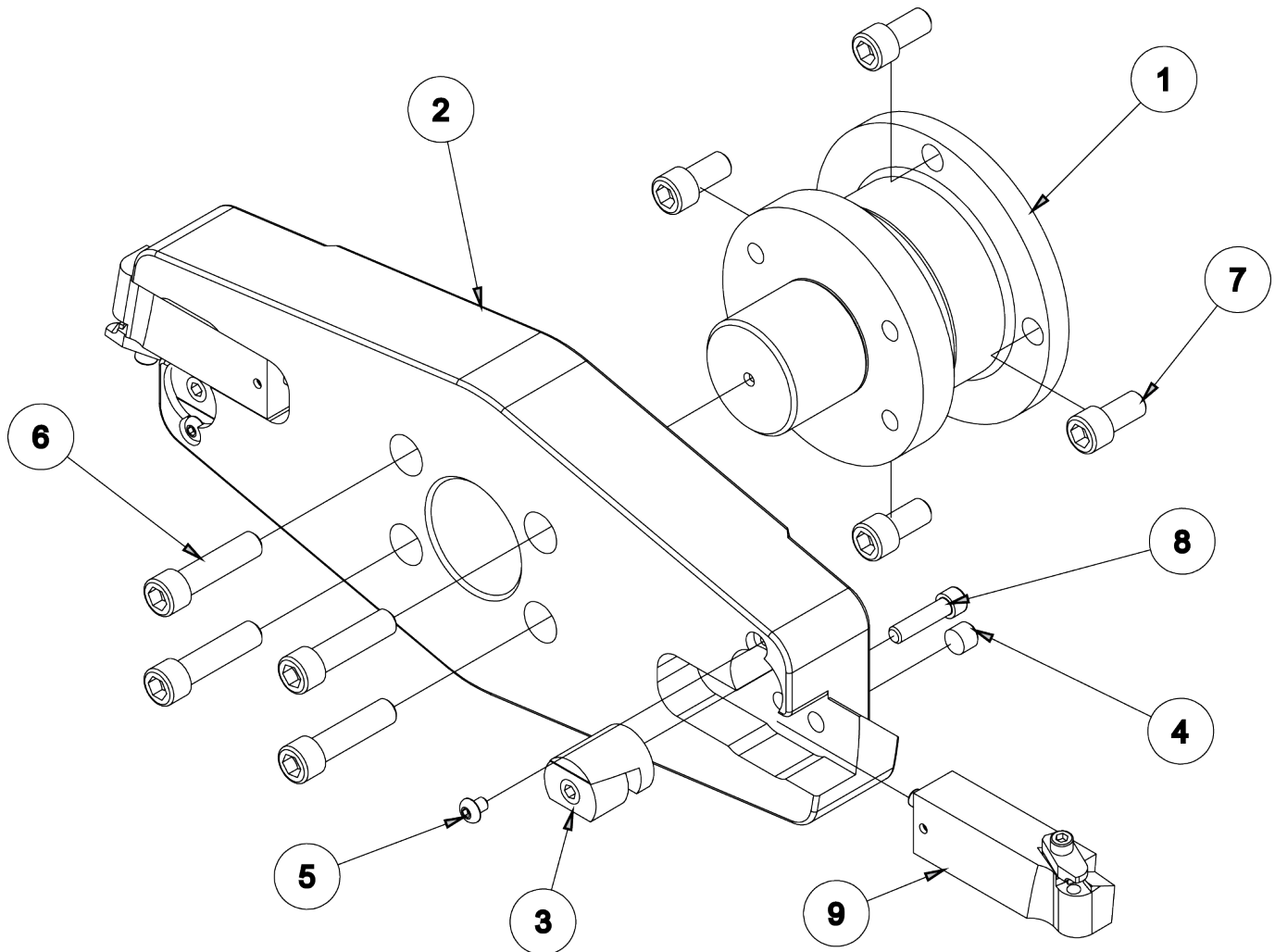


**6779L Surfacing Cutterhead Assembly Parts**



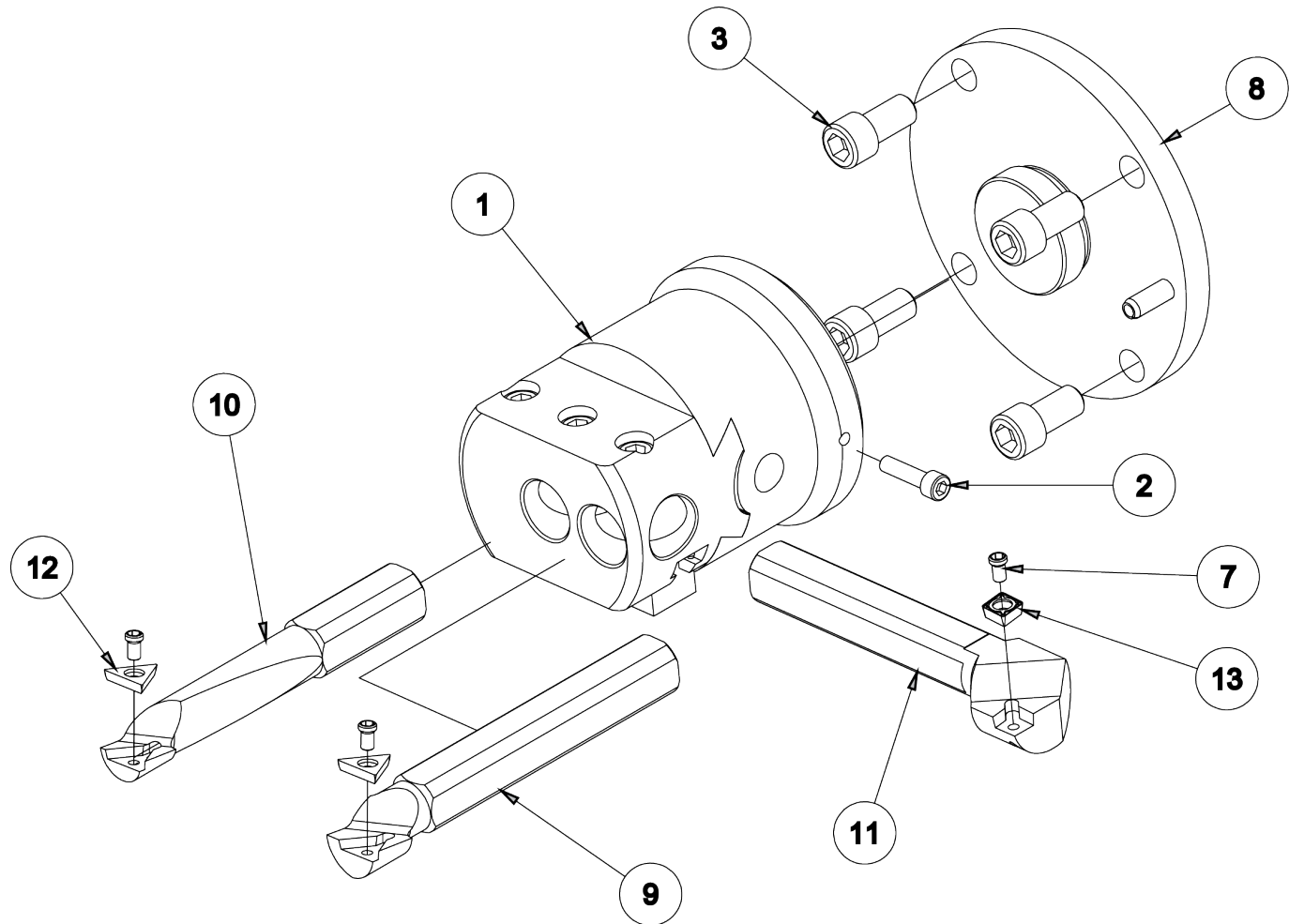
6779L 10" FLYCUTTER ASSEMBLY - H.D. OFFSET R.A.D.			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6779G	ADAPTOR, 7-3/4" CUTTERHEAD TO H.D. R.A.D.
2	1	7206L	CUTTERHEAD, SURFACING 10"
3	2	7206K	L-LOCK ASSEMBLY
4	2	7202C	10-24UNC x 3/8" LG. SOCKET OVAL POINT SET SCREW
5	2	MF-87	10-24UNC x 1/4" LG. SOCKET BUTTON HEAD SCREW
6	4	MF-33	3/8-16UNC x 1-1/2" LG. S.H.C.S.
7	4	MF-30	3/8-16UNC x 3/4" LONG S.H.C.S.
8	2	MF-15	1/4-20UNC x 1" LG. S.H.C.S.
9	2	7202W	TOOL HOLDER ASSEMBLY, FLY CUTTER

**6779M Surfacing Cutterhead Assembly Parts**



6779M 14" FLYCUTTER ASSEMBLY - H.D. OFFSET R.A.D.			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6779G	ADAPTOR, 7-3/4" CUTTERHEAD TO H.D. R.A.D.
2	1	7206G	CUTTERHEAD, SURFACING 14"
3	2	7206K	L-LOCK ASSEMBLY
4	2	7202C	10-24UNC x 3/8" LG. SOCKET OVAL POINT SET SCREW
5	2	MF-87	10-24UNC x 1/4" LG. SOCKET BUTTON HEAD SCREW
6	4	MF-33	3/8-16UNC x 1-1/2" LG. S.H.C.S.
7	4	MF-30	3/8-16UNC x 3/4" LG. S.H.C.S.
8	2	MF-15	1/4-20UNC x 1" LG. S.H.C.S.
9	2	7202W	TOOL HOLDER ASSEMBLY, FLY CUTTER

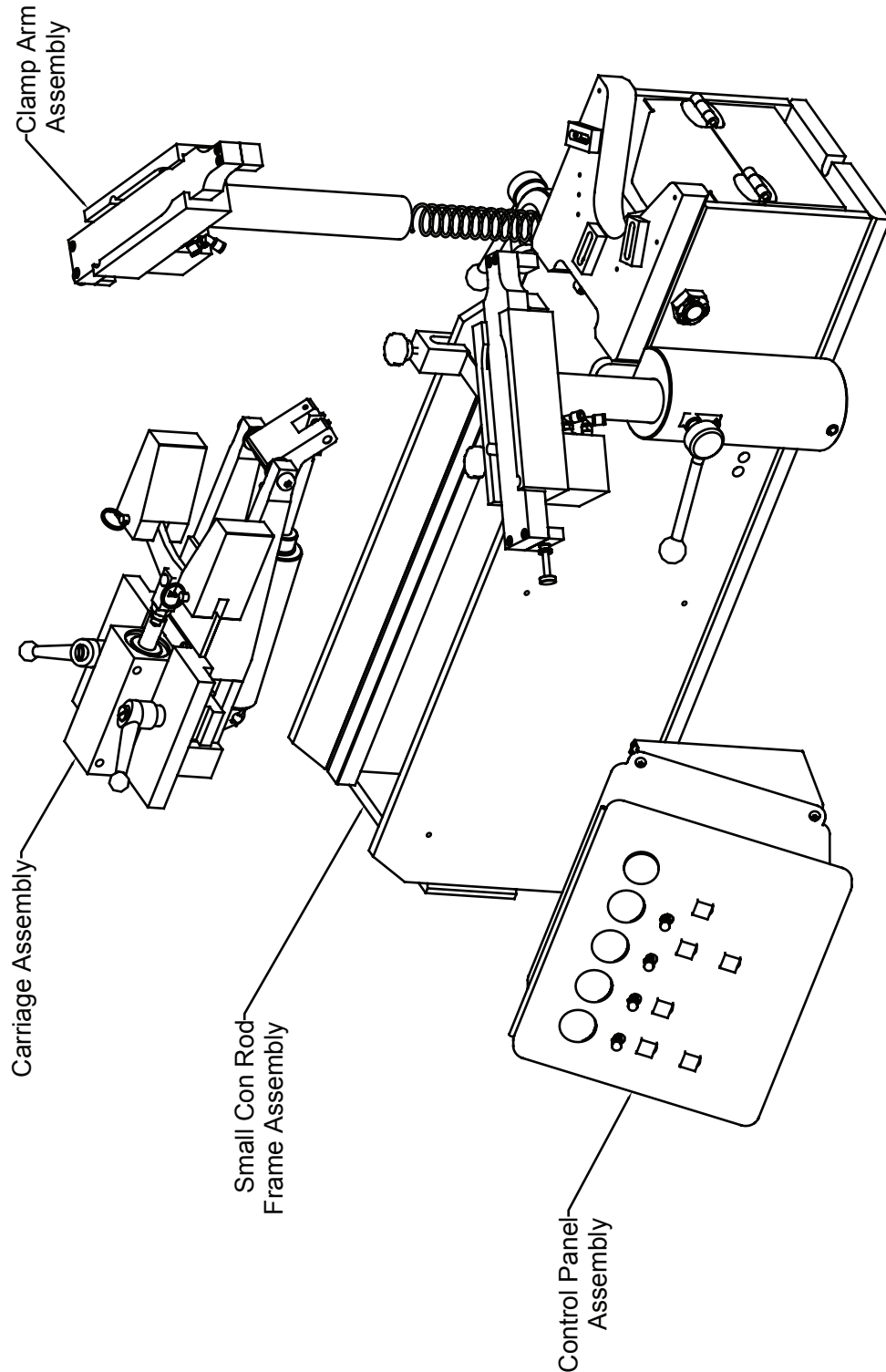
**6779N Crossfeed Head Assembly Parts**



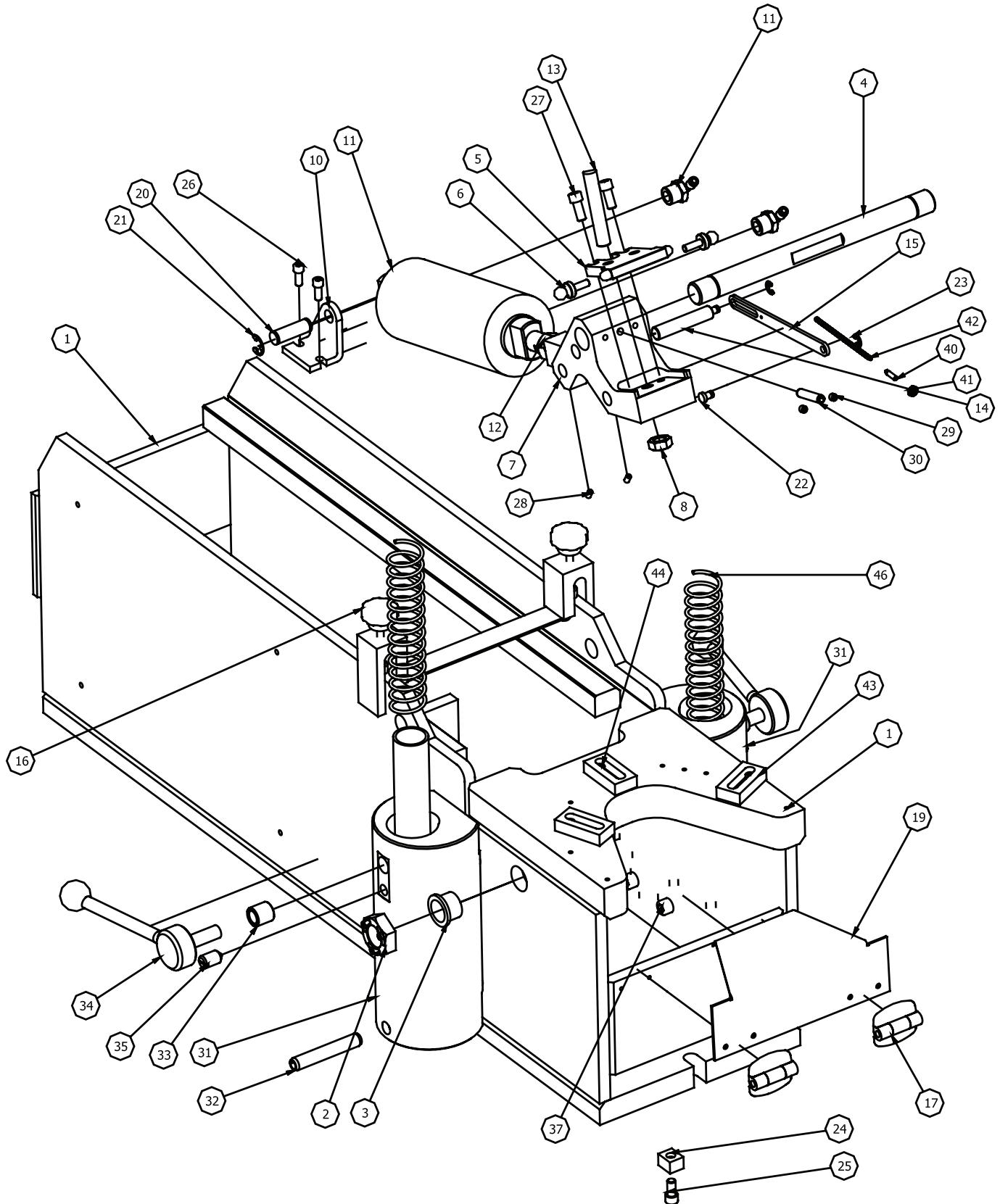
6779N CROSSFEED HEAD ASSEMBLY - H.D. OFFSET R.A.D.			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6565X	HEAD, CROSSFEED CRITERION
2	1	MF-10	10-32UNC x 3/4" LG. S.H.C.S.
3	4	Mf-30	3/8-16UNC x 3/4" LG. S.H.C.S.
7	3	CLAMP SCREW	SUPPLIED WITH BORING BAR
8	1	6779P	ADAPTER ASSEMBLY, CROSSFEED HEAD TO H.D. OFFSET R.A.D.
9	1	650-2-34P	BORING BAR, 1" PRECISION BORING HEAD ASS'Y
10	1	650-2-34Q	BORING BAR, 3/4" PRECISION BORING HEAD ASS'Y
11	1	650-2-34U	FACING BAR - PRECISION BORING HEAD ASSEMBLY
12	2	650-2-34R	INSERT, TRIANGULAR POS. RAKE 3/8" I.C.
13	1	650-2-34V	INSERT, DIAMOND SHAPE 1/32" R.

## Connecting Rod Boring and Surfacing Equipment

### 650-3-44R Precision Connecting Rod Fixturing System Parts

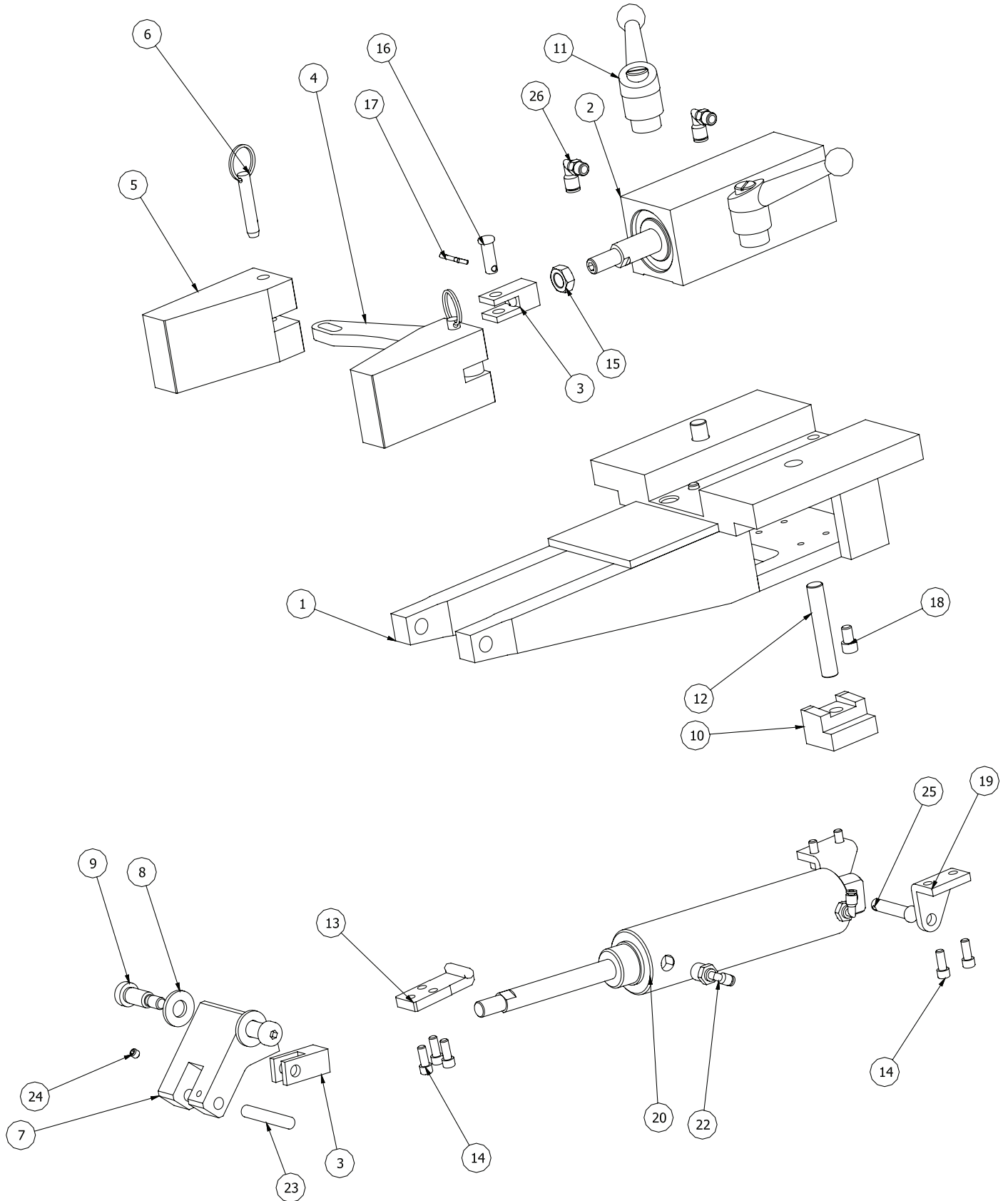


## Frame Assembly Parts



Small Precision Connecting Rod Fixture Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-67B	Small Frame
2	2	650-3-46T	Lock Nut REID BLN-105
3	2	650-3-46U	Flange Bearing Symmco SF-2832-12
4	1	650-3-46G	Pivot Shaft
5	1	650-3-46N	Locator 1.78
6	2	650-3-46C	Tooling Ball Reid #TCB-26820
7	1	650-3-46J	Locator Holder
8	1	ANSI B18.2.2 - 1/2 - 13	Hex Jam Nut
9	1	650-3-45H	Pivot Bracket Right
10	1	650-3-45K	Pivot Bracket Left
11	1	650-3-45G	Locating Cylinder
12	1	650-3-45J	Rod Clevis
13	1	650-3-47K	Stop Screw - Set 1/2-13 x 3
14	1	650-3-46K	Pivot Pin
15	1	650-3-46L	Linkage Arm
16	1	650-3-47B	Support Strap
17	2	650-3-46S	Hinge, Dust Cover
19	1	650-3-46Q	Locator Cover Con Rod Fixture
20	1	PIN1	Included in 650-3-47J
21	2	E_CLIP	Included in 650-3-47J
22	1	650-3-46H	Linkage Pin
23	2	650-3-46R	E-clip - Truearc E-Ring #RE-25ST
24	2	650-3-9	Key
25	2	MF-21 ANSI B18.3 - 5/16 - 18 - 5/8	Hexagon Socket Head Cap Screw
26	4	MF-13 ANSI B18.3 - 1/4 - 20 - 5/8	Hexagon Socket Head Cap Screw
27	2	MF-22 ANSI B18.3 - 5/16 - 18 - 3/4	Hexagon Socket Head Cap Screw
28	2	MF-53 ANSI B18.3 - 10-24 UNC - 0.375	Type B - Hexagon Socket Set Screw - Cup Point - UNC (Regular Thread - Inch)
29	2	MF-60 ANSI B18.3 - 1/4-20 UNC - 0.25	Type B - Hexagon Socket Set Screw - Cup Point - UNC (Regular Thread - Inch)
30	1	MF-210 ANSI B18.8.2 - 5/16 x 2.1/2	Pin - Slotted Spring
31	2	650-3-49Q	Clamp Base, ConRod Clamp arms
32	2	ANSI B18.8.2 - 1/2 x 3	Pin - Slotted Spring
33	2	6310R	Thread Insert
34	2	6310N	Handle
35	2	502-8-52C	Spring Plunger
37	8	ANSI B18.3 - 3/8 - 16 - 1	Hexagon Socket Head Cap Screw
40	1	650-3-48P	spring anchor Reid CSA-50
41	1	ANSI B18.6.3 - 8 - 32	Hex Machine Screw Nut UNC
42	1	514-7-83N	Extension Spring
43	3	650-3-48L	Support Parallel
44	3	ANSI B18.3 - No. 10 - 24 - 3/8	Hexagon Socket Head Cap Screw
45	2	650-3-49G	Support Tube
46	2	650-3-49M	Spring

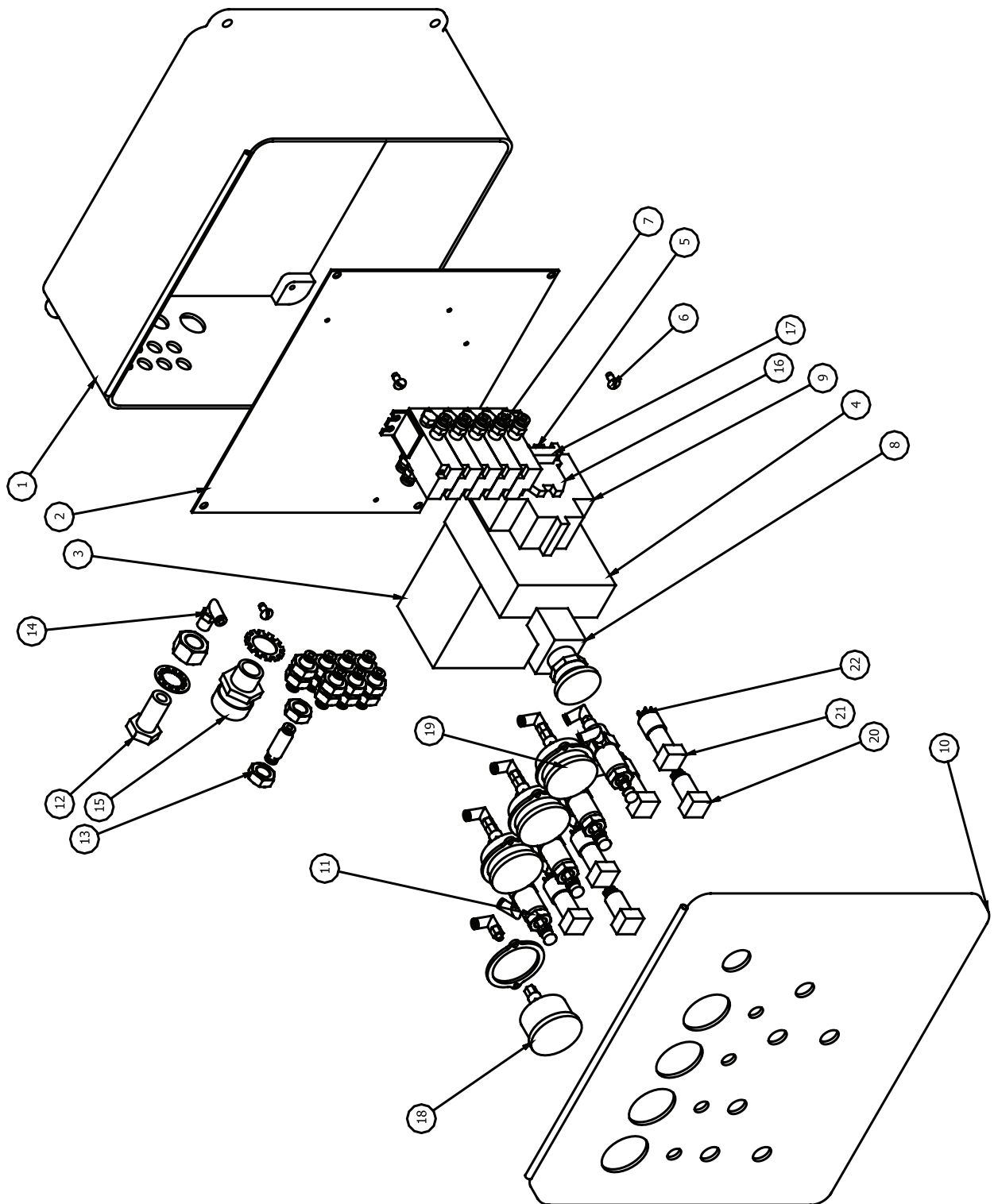
## Carriage Assembly Parts





Small Precision Connecting Rod Fixture Carriage Assembly Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-67	Carriage, Machining
2	1	650-3-45D	Wedge Cylinder
3	2	650-3-45L	Clevis
4	1	650-3-48J	Linkage, Wedge
5	2	650-3-48G	Wedge Clamp - Medium Con-Rod Fixture ass'y
6	2	650-3-48K	Release Pin, Clamp Wedge
7	1	650-3-47D	Centering Lever
8	2	100-19A	Hardened washer 17/32 I.D.
9	2	650-4-45	Hexagon Socket Head Shoulder Screw 0.500 x 1
10	2	650-3-48	Clamp Shoe
11	2	514-2-39	Handle
12	2	514-4-5B	Stud
13	1	650-3-47S	Centering Block - Medium Long
14	7	MF-13 ANSI B18.3 - 1/4 - 20 - 5/8	Hexagon Socket Head Cap Screw
15	1	ANSI B18.2.2 - 1/2 - 20	Hex Jam Nut
16	1	Rod Clevis Pin RC-5	
17	2	ANSI B18.8.1 - 1/8 x 3/4 Extended Prong Square Cut Type	Pin - Cotter
18	4	ANSI B18.3 - 5/16 - 18 - 1/2	Hexagon Socket Head Cap Screw
19	2	650-3-45K	Pivot Bracket
20	1	650-3-45F	Norgren RLG04
22	2	legris angle 25x532	Legris Angle 25X532
23	1	MF-212A ANSI B18.8.2 - 3/8 x 2 1/4	Pin - Hardened Ground Production Dowel
24	1	MF-60 ANSI B18.3 - 1/4-20 UNC x 0.25	Hexagon Socket Set Screw - Cup Point
25	1	Pivot Pin Norgren cyl	
26	2		Legris Angle

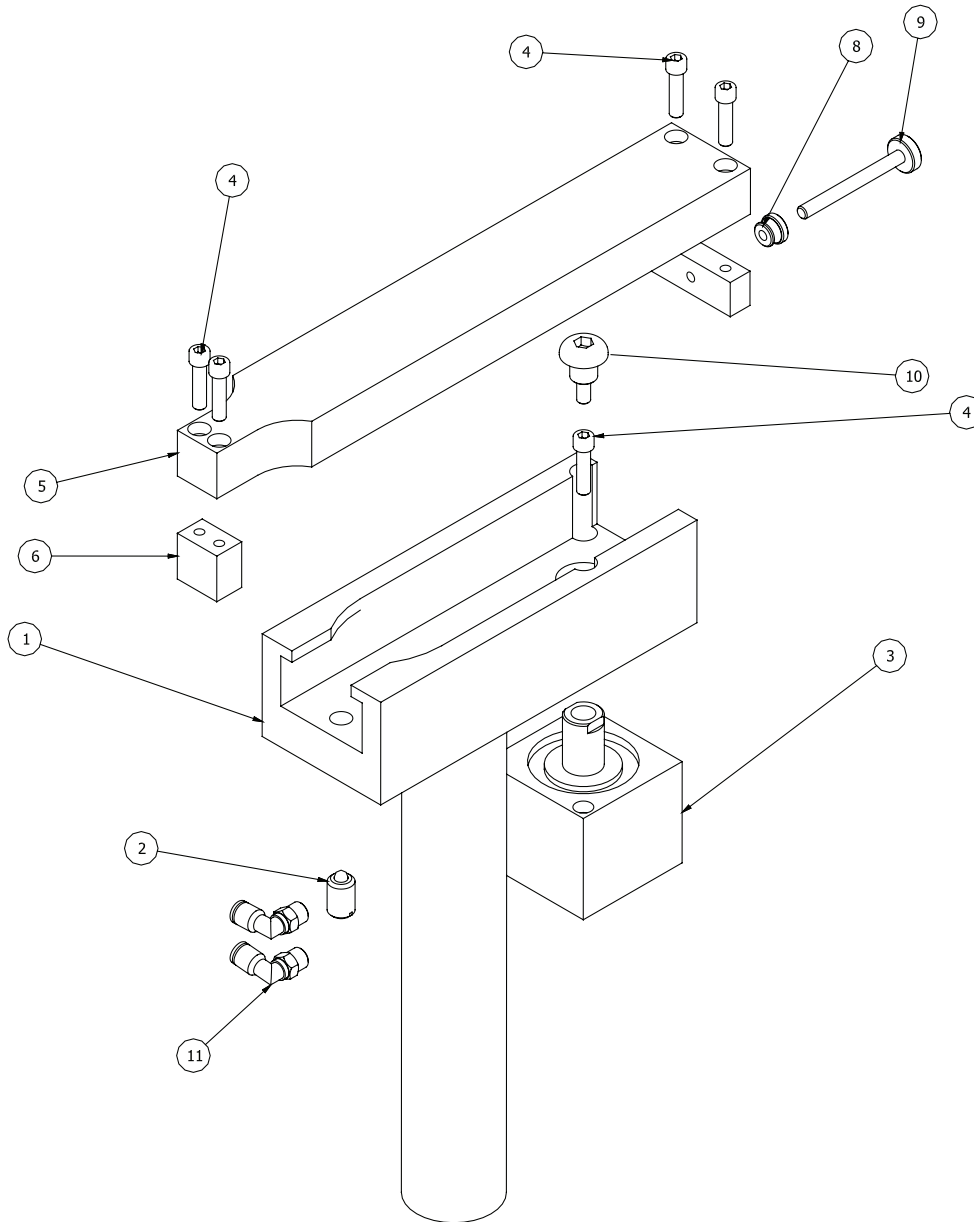
## Control Box Parts



## 650-3-47T Parts List - Control Panel Complete w/ Air (Buchannan)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	J1210HPL	Enclosure
2	1	BP1210AL	Enclosure Panel
3	1	PLC	Micro 3
4	1	650-3-47V	Power Supply
5	1	504-35-3F	Din Rail
6	4	ANSI B18.6.4 - 10-32 UNF - 0.375	Slotted Pan Head Tapping Screw - Type C
7	1	410-24vdc	Solenoid Assembly
8	1	6389	E-Stop Button
9	1	504-35-3	BREAKER, 2 AMP
10	1	Con Rod Lid1	
11	4	RSR	HUMPHREY, REGULATOR
12	1	PMF 532-N01U	NWH, BULKHEAD 1/4
13	8	C2029200	NORGREN, BULKHEAD 1/8
14	1	Air Fitting2	90 Degree
15	1	400-7-7	Strain Relief Assembly
16	1	514-7-74E	Ground Block
17	2	504-35-3M	End Cap
18	3	15.110.160PSI 1/8NPT 10/32PMC	NOSHOK,160 PSI GAUGE
19	1	15.110.60PSI 1/8NPT 10/31PMC	NOSHOK, 60 PSI GAUGE
20	2	6491U	PUSHBUTTON, WHITE
21	4	6491S	PUSHBUTTON, GREEN
22	4	502-37-59A	PUSHBUTTON, SOCKET

### Clamp Arm Assembly Parts

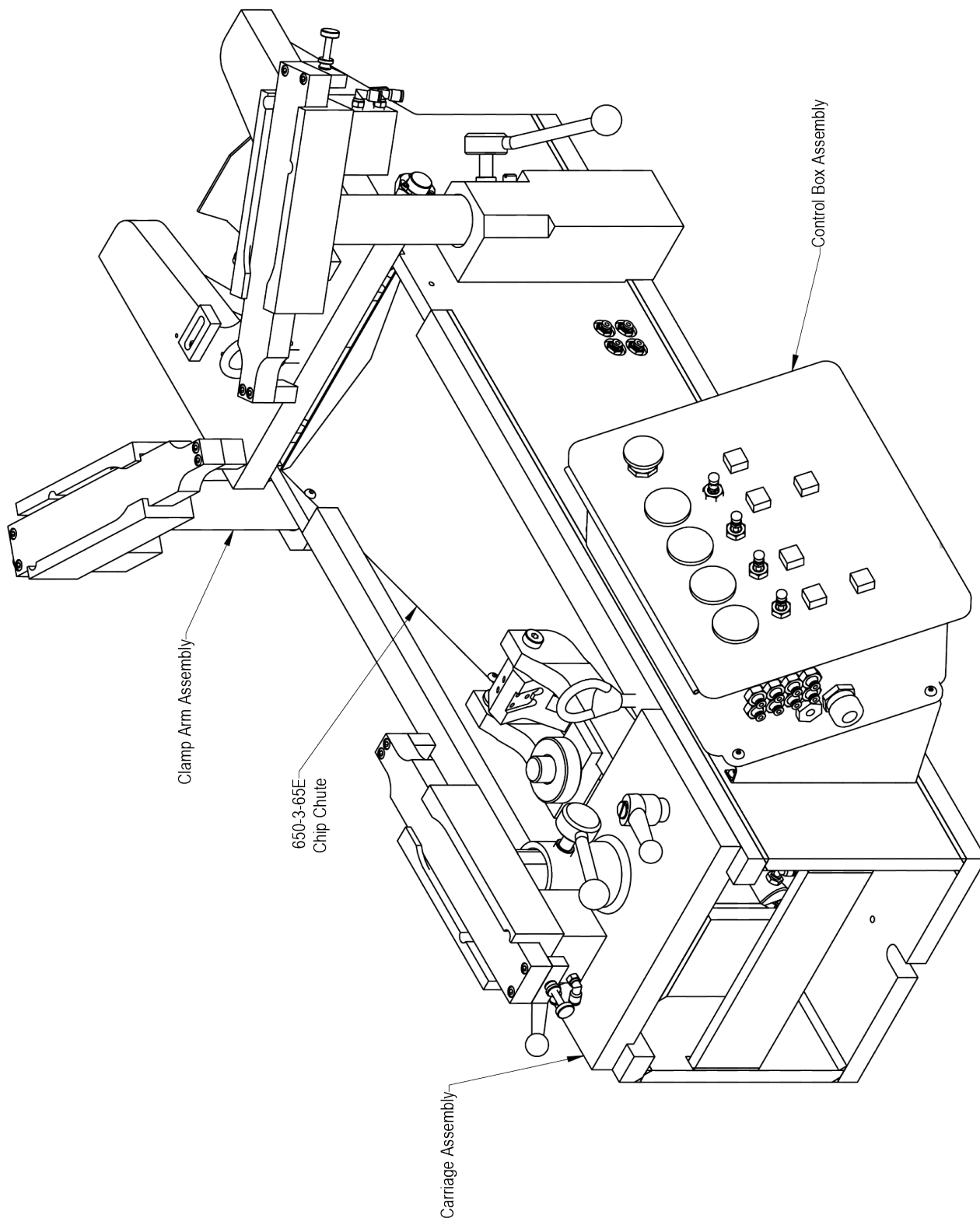


Small Precision Connecting Rod Fiture Clamp Arm Assembly Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-49H	Clamp Leg
2	1	502-8-52C	Spring Plunger
3	1	650-3-45E	Clamp Arm Cylinder
4	6	ANSI B18.3 - 1/4 - 20 UNC - 1	Hexagon Socket Head Cap Screw
5	1	650-3-49K	Clamp Arm
6	1	650-3-49L	Extension
7	1	650-3-49N	Stop Block
8	1	650-3-34J	Thumbknob Reid aj-721
9	1	650-3-34S	Clamp Screw
10	1	ANSI B18.3 - 1/2-20 - 5/8	Hexagon Socket Button Head Cap Screw
11	2	514-4-17Y	Legris Angle

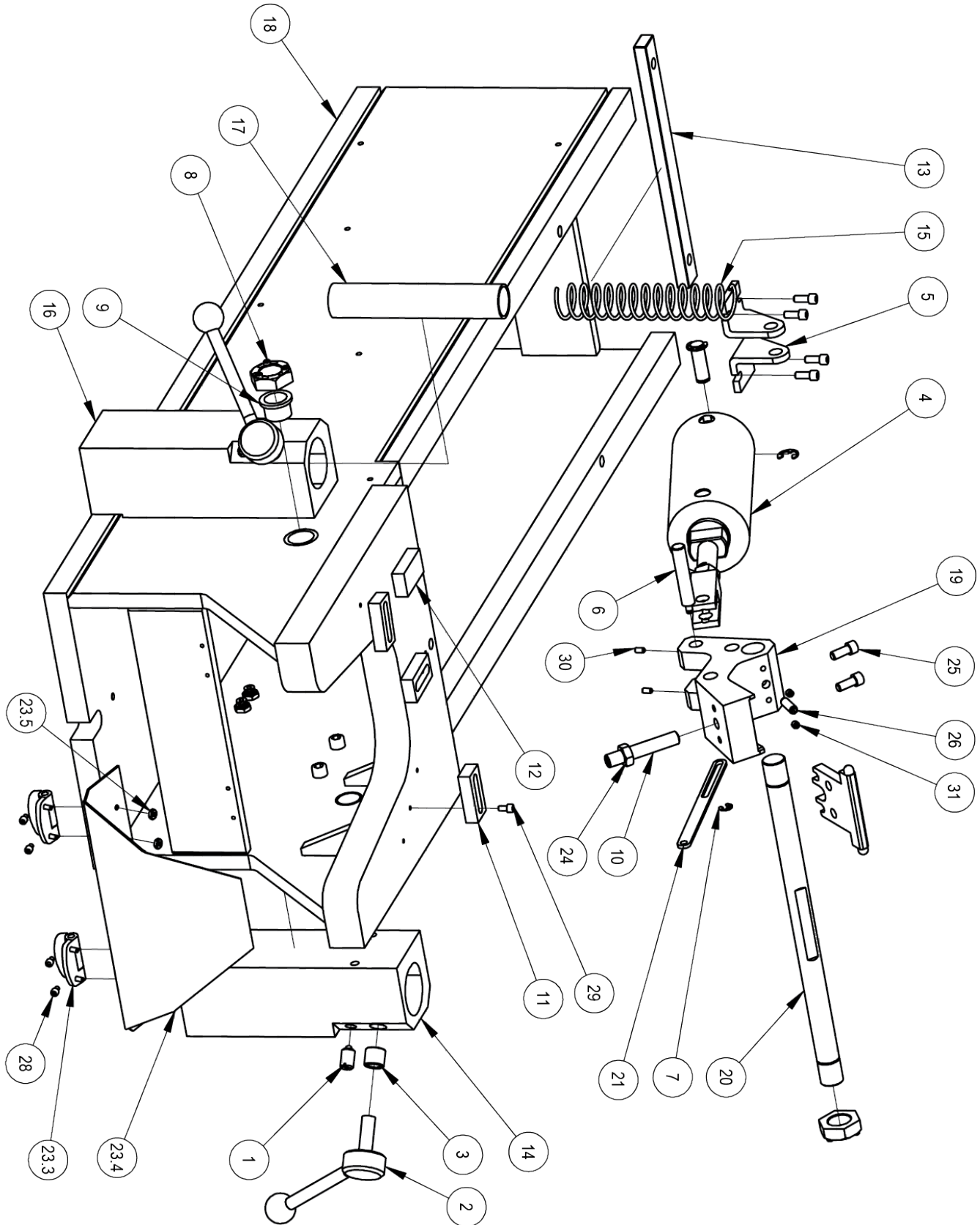
# Fixturing & Tooling for Machining Large Engine & Compressor Connecting Rods

## 650-3-64 Precision Connecting Rod Fixturing System Parts

### Heavy Duty ConRod Fixture



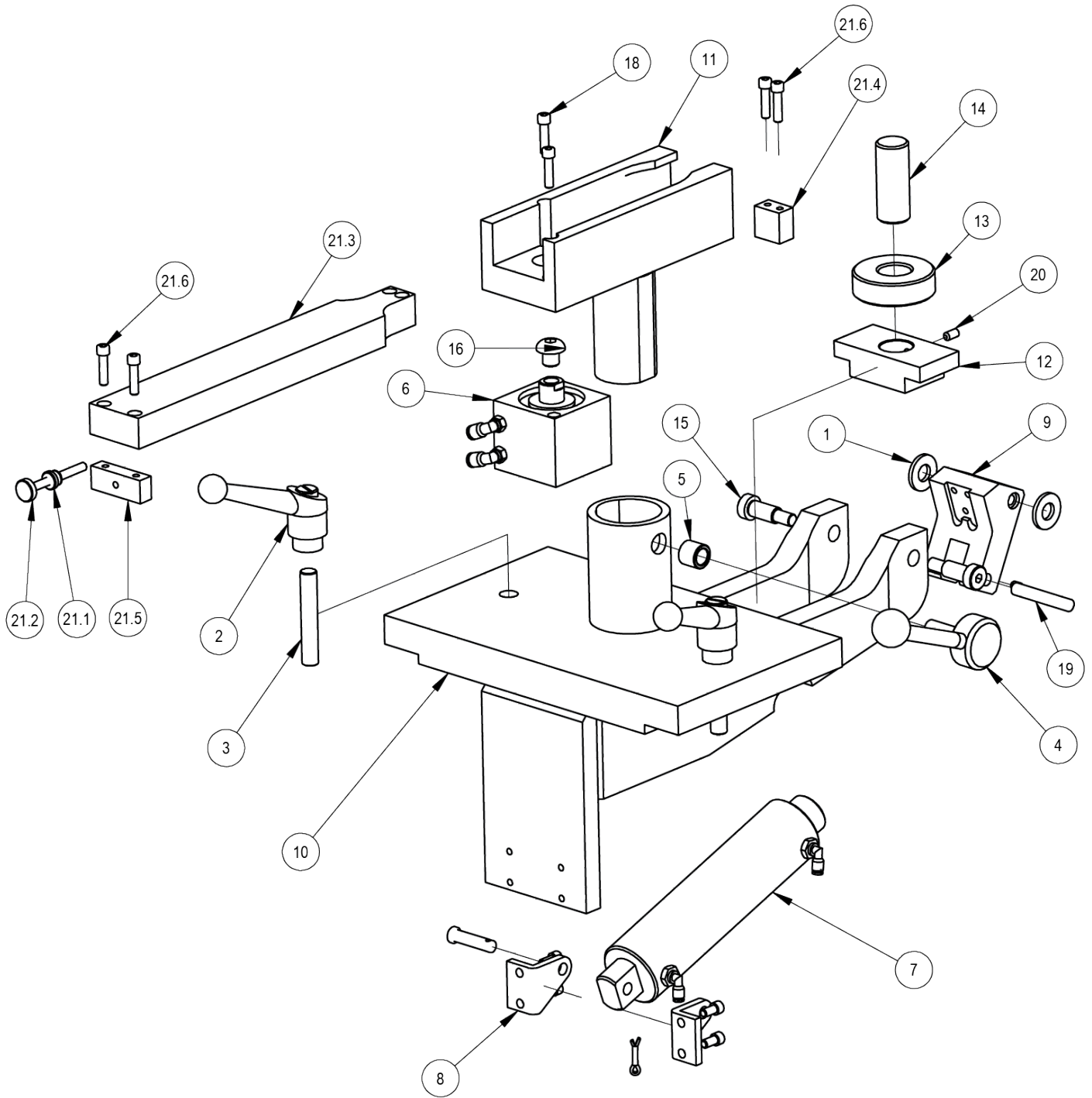
## Carriage Assembly Parts



Carriage Assembly			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	100-19A	Hardened washer 17/32 I.D.
2	2	514-2-39	Handle
3	2	514-4-5B	Stud
4	1	6310J	Clamp Handle
5	1	6310R	Thread Insert
6	1	650-3-45E	Clamp Arm Cylinder
7	1	650-3-45F	Centering Cylinder
8	1	650-3-45K	Pivot Bracket
9	1	650-3-47D	Centering Lever
10	1	650-3-64C	Carriage
11	1	650-3-64F	Short Clamp Arm
12	1	650-3-65A	Jack Body
13	1	650-3-65B	Jacking Nut
14	1	650-3-65C	Jacking Screw
15	2	650-4-18A	Shoulder screw, 1/2" x 1" long
16	1	650-4-41	Socket Button Head Cap Screw
17	1	ANSI B18.3 - 1/4-20 UNC x 0.38	Hexagon Socket Set Screw - Cup Point
18	2	MF-15	S.H.C.S. 1/4 - 20 UNC - 1
19	1	MF-212A	Pin - Hardened Dowel
20	1	MF-61	Hexagon Socket Set Screw - Cup Point
21.1	1	650-3-34J	Thumbknob Reid aj-721
21.2	1	650-3-34S	Clamp Screw
21.3	1	650-3-49K	Clamp Arm
21.4	1	650-3-49L	Clamp Arm Extension
21.5	1	650-3-49N	Stop Block
21.6	4	MF-15	S.H.C.S. 1/4 - 20 UNC - 1

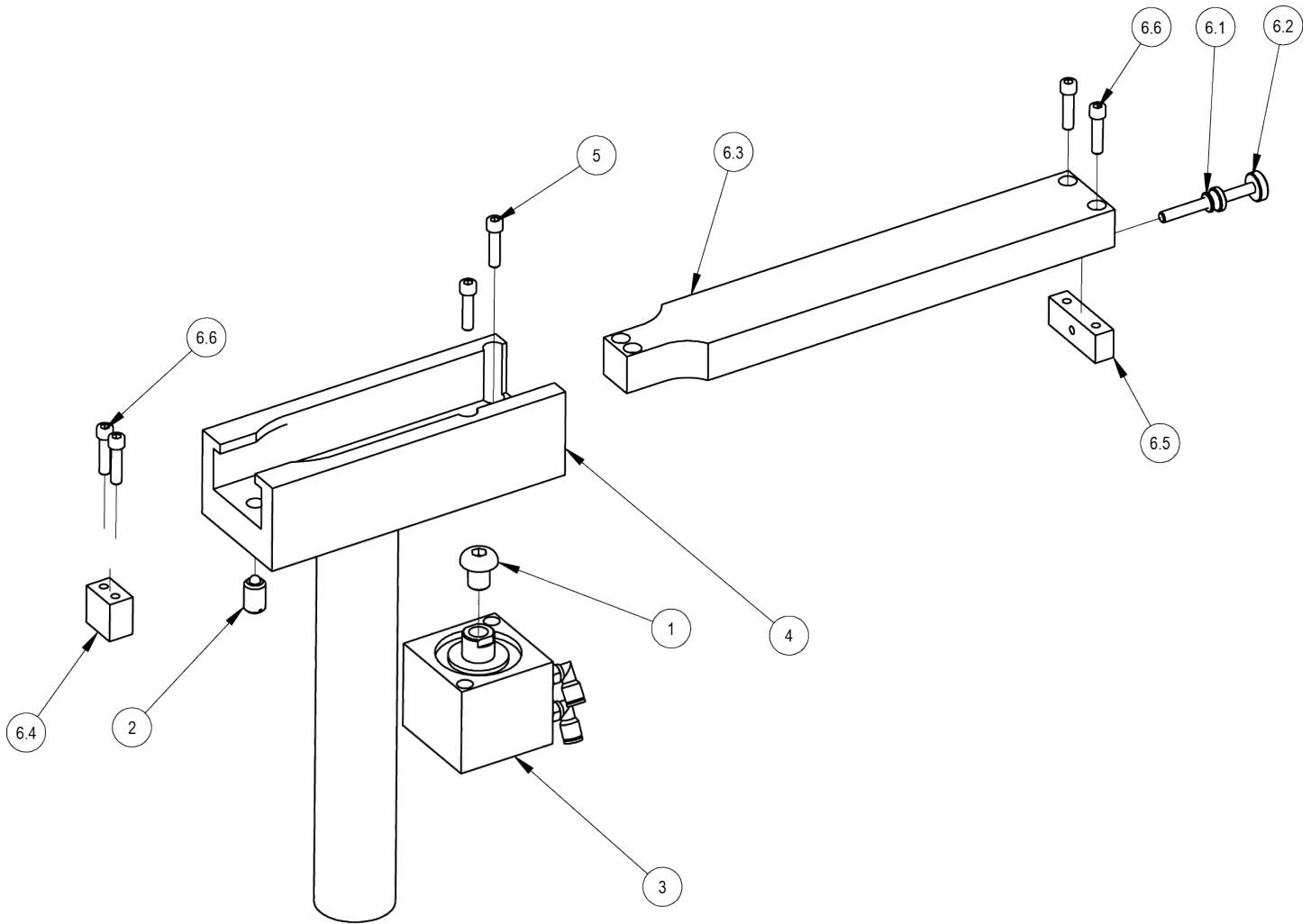


## Centering Cylinder Parts



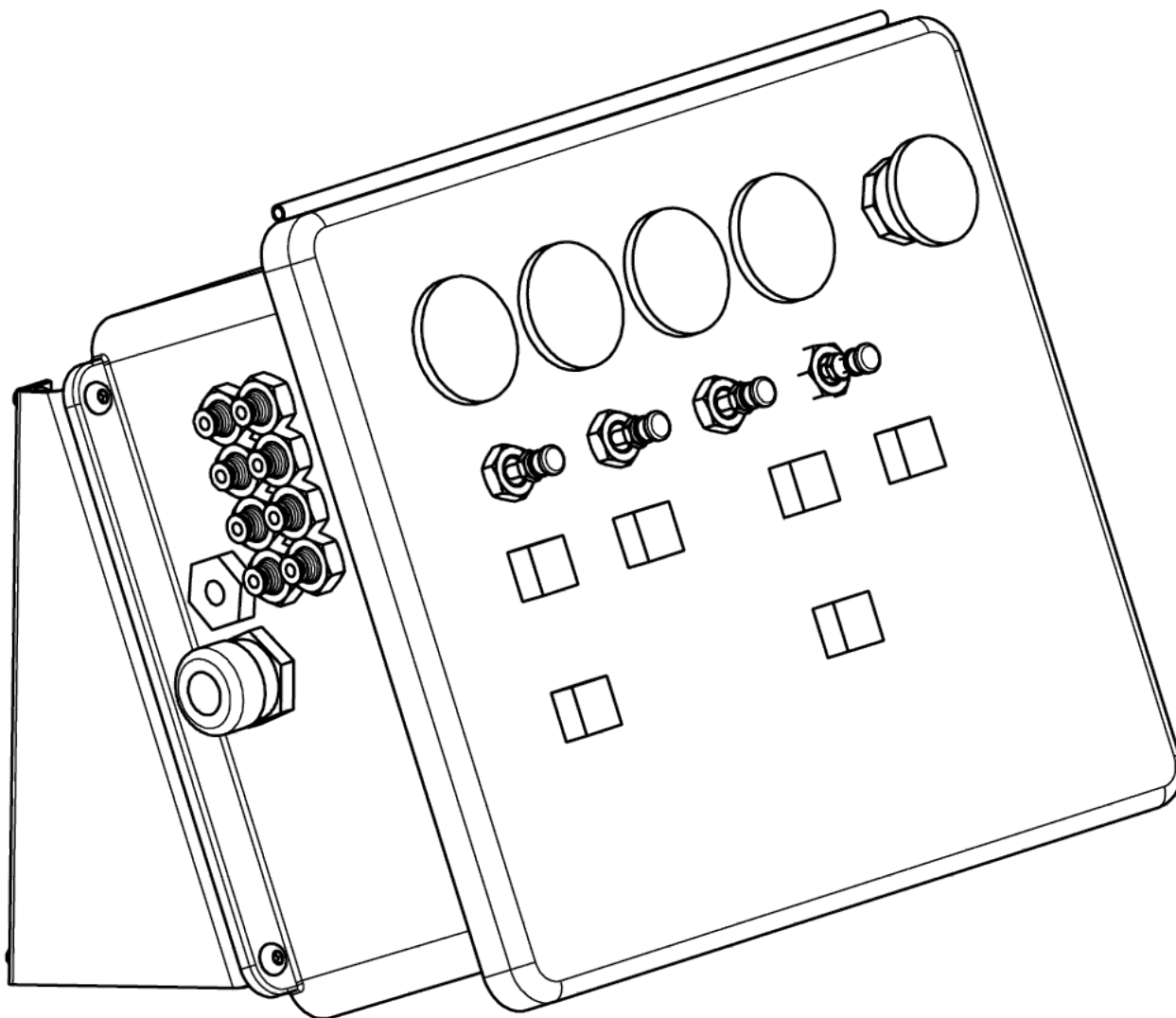
Conrod Centering Cylinder Assembly			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	502-8-52C	Spring Plunger
2	2	6310J	Clamp Handle
3	2	6310R	Thread Insert
4	2	650-3-45G	Locate Cylinder
5	1	650-3-45H	Pivot Bracket, Bimba #D-13512-A
6	1	650-3-46K	Pivot Pin
7	1	650-3-46R	E-clip - Truearc E-Ring #RE-25ST
8	2	650-3-46T	Lock Nut REID BLN-105
9	2	650-3-46U	Flange Bearing Symmco SF-2832-12
10	1	650-3-47K	Stop Screw
11	3	650-3-48L	Support Parallel
12	1	650-3-48M	Support Parallel, +.002
13	1	650-3-48R	Clamp Bar, Carriage, Large ConRod fixture
14	1	650-3-49F	Clamp Base - Left Side
15	2	650-3-49M	Spring
16	1	650-3-49e	Clamp Base - Right Side
17	2	650-3-49g	Clamp Leg Spacer Tube.
18	1	650-3-64A	Main Frame (Machining)
19	1	650-3-64G	Locator Holder
20	1	650-3-64M	Pivot Shaft
21	1	650-3-65G	Linkage Arm
22	2	650-3-9	Key
23.1	1	650-3-46H	Linkage Pin
23.2	1	650-3-46R	E-clip - Truearc E-Ring #RE-25ST
23.3	2	650-3-46S	Hinge
23.4	1	650-3-65F	Dust Cover
23.5	4	MF-160	Hex Machine Screw Nut 8-32
23.6	4	MF-3D	S.H.C.S. 8 - 32 UNC - 3/8
24	1	MF-165	Hex Jam Nut 1/2-13
25	2	MF-22	S.H.C.S. 5/16 - 18 UNC - 3/4
26	1	MF-227A	5/16 x 1-1/4 Roll Pin
27	8	MF-31	S.H.C.S. 3/8 - 16 UNC - 1
28	4	MF-3B	S.H.C.S. 8 - 32 UNC - 1/4
29	3	MF-4	S.H.C.S. 10 - 24 UNC - 3/8
30	2	MF-53	Cup Point Set Screw 10 - 24 x 3/8
31	2	MF-60	Cup Point Set Screw 1/4 - 20 x 1/4
32	2	MF21A	S.H.C.S. 5/16 - 18 UNC - 1/2

### Clamp Arm Assembly Parts



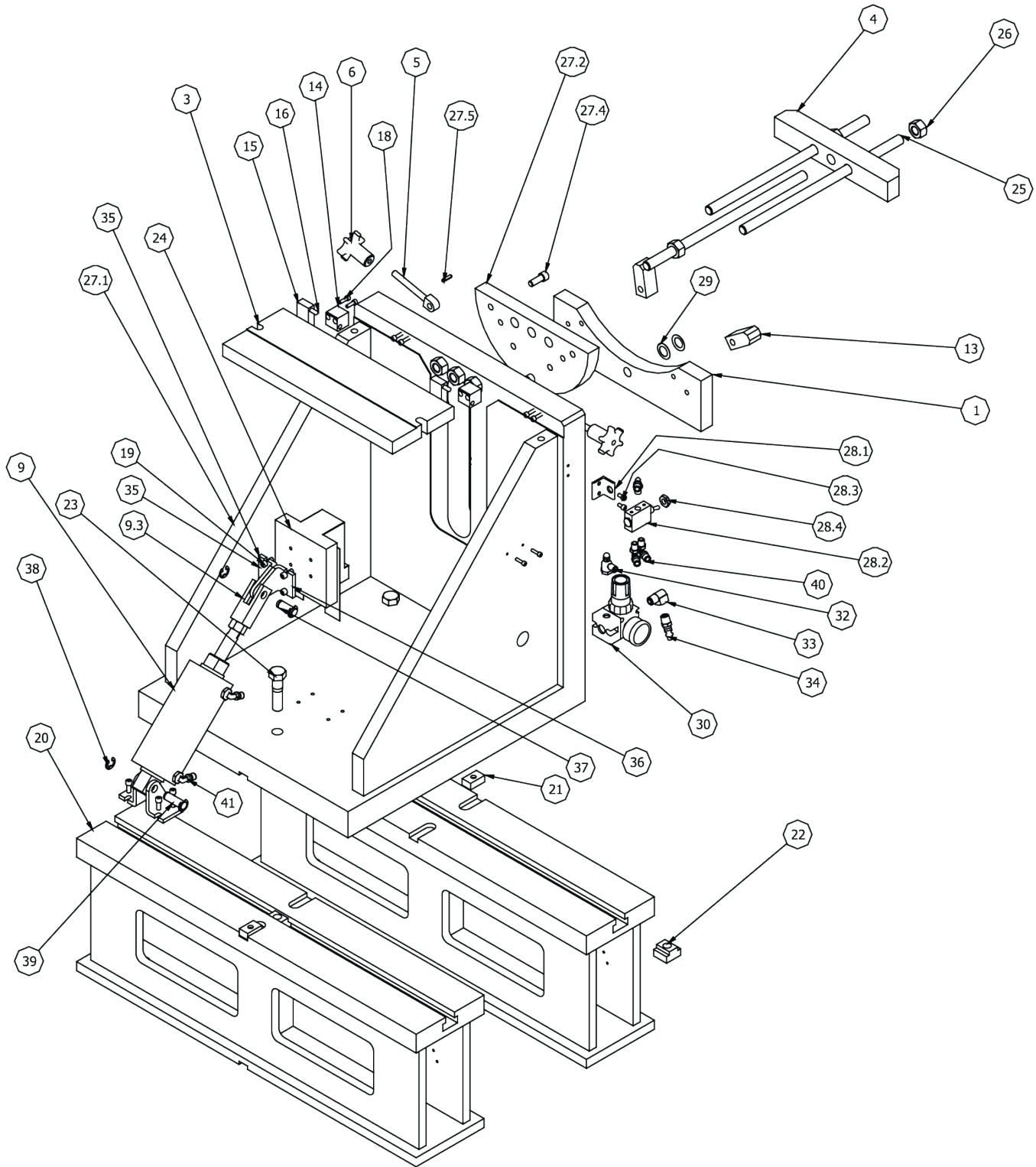
Clamp Arm Assembly			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-4-41	Socket Button Head
2	1	502-8-52C	Spring Plunger
3	1	650-3-45E	Clamp Arm Cylinder
4	1	650-3-49H	Clamp Leg
5	2	MF-15	S.H.C.S. 1/4 - 20 UNC - 1
6.1	1	650-3-34J	Thumbknob Reid aj-721
6.2	1	650-3-34S	Clamp Screw
6.3	1	650-3-49K	Clamp Arm
6.4	1	650-3-49L	Clamp Arm Extension
6.5	1	650-3-49N	Stop Block
6.6	4	MF-15	S.H.C.S. 1/4 - 20 UNC - 1

**Control Box Assembly Parts**

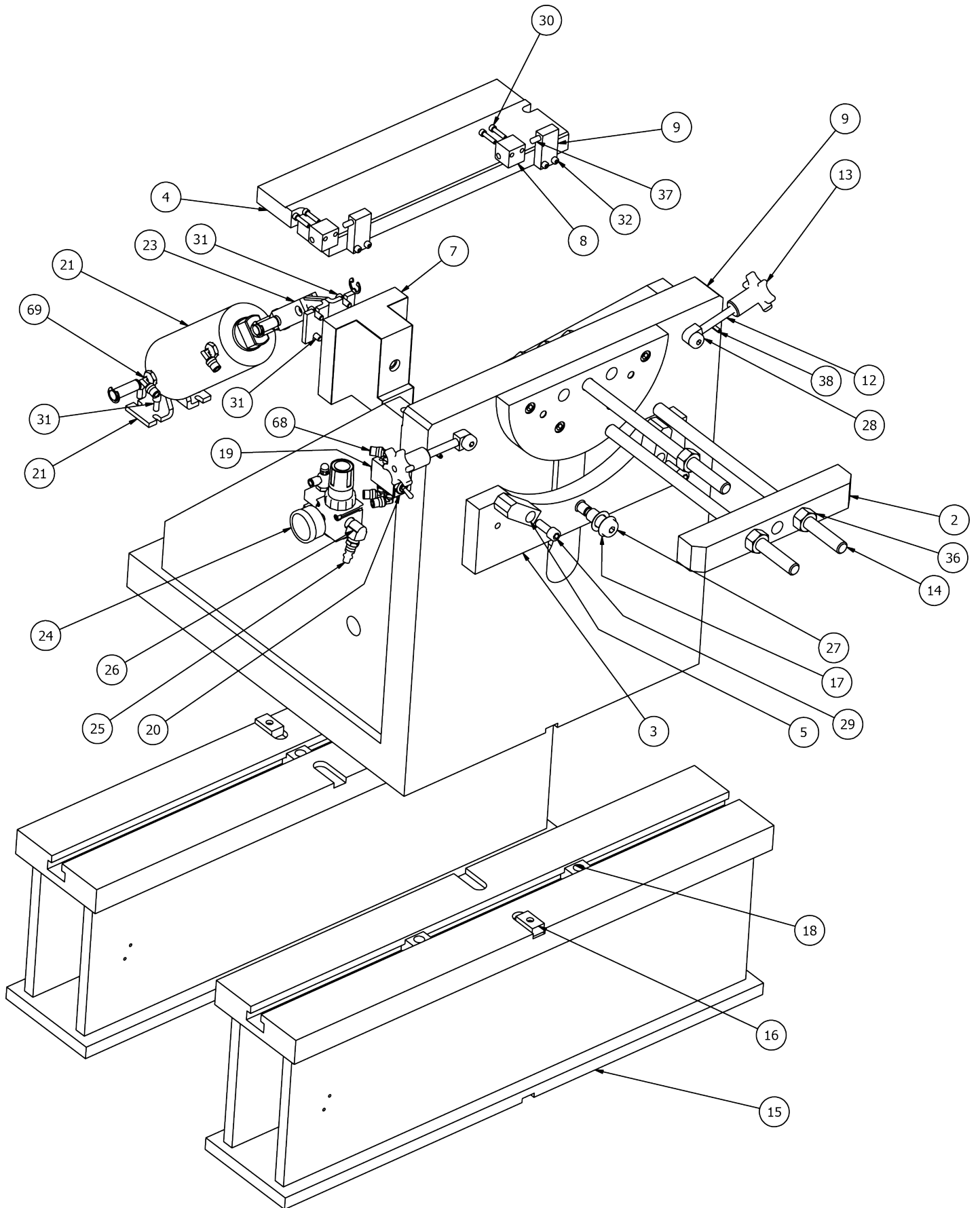


Control Box Assembly			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-47T	Conrod Control Box Assembly
2	4	650-3-47W	Rivet nut Reid ALC-47850
3	2	650-3-65D	Bracket, Control Box ConRod Fixture
4	4	ANSI B18.3 - 1/4 - 20 x 3/8	Button Head Cap Screw
5	4	MF-91	Button Head Cap Screw

## 650-3-66 Compressor Conrod Cap Surfacing Fixture Parts



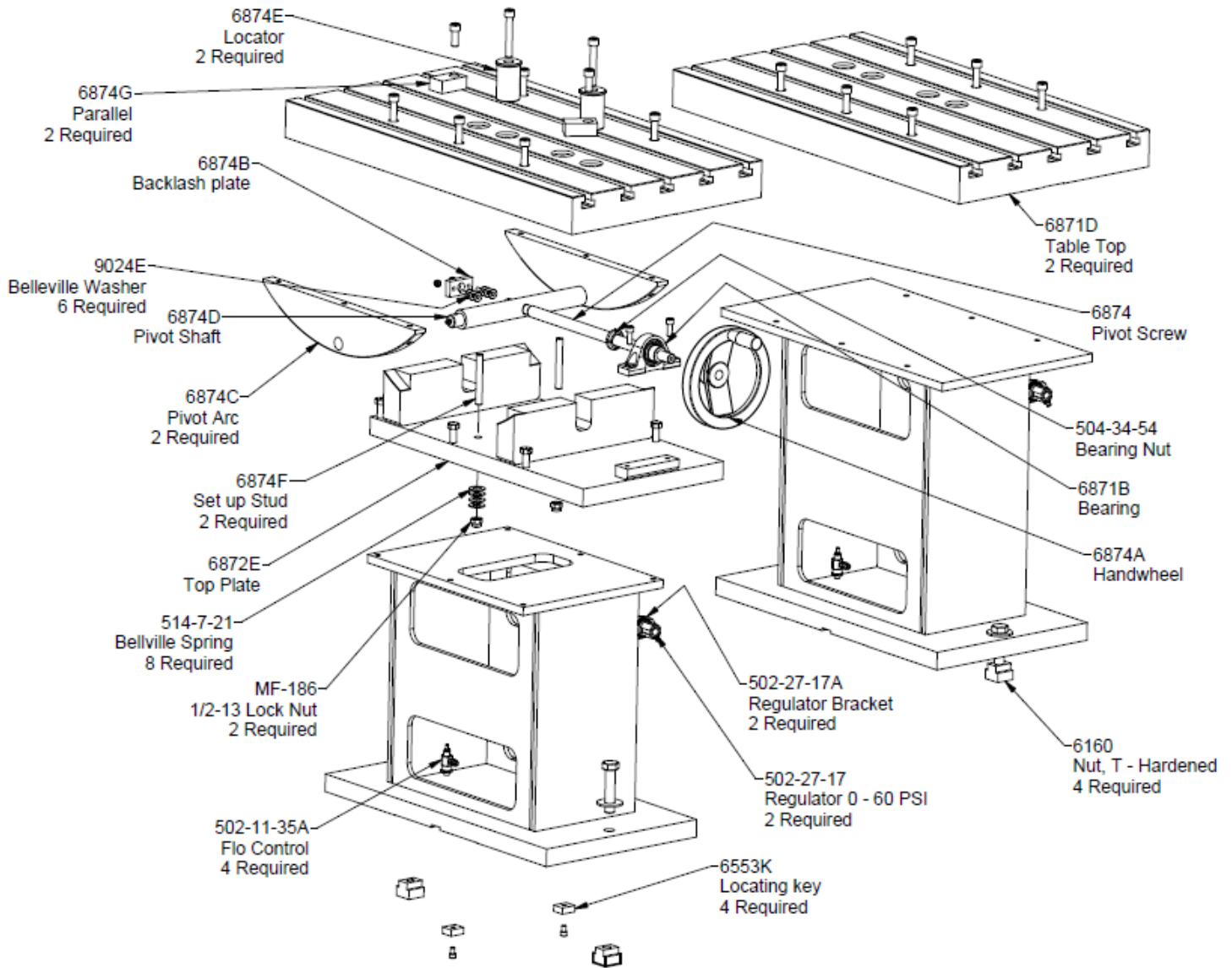
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-66C	Carriage, Cap Cutting Fixture
3	1	650-3-66D	Locate Plate
4	1	650-3-66B	Clamp Bar
5	2	650-3-66P	Eye bolt - reid swb-1
6	2	650-3-66N	Knob - reid tc2a
9	2	650-3-45G	Pivot Shaft
9.3	1	650-3-45J	CLewis 1" Bimba D-8314-A
13	2	650-3-66E	Lift Arm
14	2	650-3-66H	Lower Hinge
15	2	650-3-66J	Upper Hinge
16	2	MF-207 ANSI B18.8.2 - 1/4 x 1 1/2	Pin - Hardened Ground Production Dowel
18	4	MF-5 ANSI B18.3 - No. 10 - 24 - 5/8	Hexagon Socket Head Cap Screw
19	8	ANSI B18.3 - 1/4 - 20 - 5/8	Hexagon Socket Head Cap Screw
20	2	6370Y	10" Support Parallel
21	2	6553J	Locating Key
22	3	502-1-11A	T-Nut 3/4 table, 5/8-11 thread
23	3	MF-152A ANSI/ASME B18.2.1 - 5/8-11 UNC - 2.5	Hex Bolt - UNC (Regular Thread - Inch)
24	1	650-3-66G	Slide ass'y (Turcite)
25	3	650-3-66M	Clamp Stud
26	6	MF-166 ANSI B18.2.2 - 5/8 - 11	Hex Thick Nut
27	1	650-3-66k	Main Frame Assembly
27.1	1	650-3-66A	Cap Fixture Main Base
27.2	1	650-3-66L	Thrust Parallel
27.4	4	MF-31 ANSI B18.3 - 3/8 - 16 - 1	Hexagon Socket Head Cap Screw
27.5	2	MF-30 ANSI B18.8.2 - 3/16 x 3/4	Pin - Slotted Spring
27.6	2	MF-213ANSI B18.8.2 - 3/8 x 1 1/2	Pin - Hardened Ground Production Dowel
28	1	Air Switch Assembly	
28.1	1	502-1-55A	Air switch mount bracket
28.2	1	502-1-55	Air Switch, Clippard #MJTU-4
28.3	2	mf-4 ANSI B18.3 - No. 10 - 24 - 3/8	Hexagon Socket Head Cap Screw
28.4	1	Nut	Mount nut for 502-1-55 air switch.
29	2	650-3-56S	Belleville spring Reid BDB-65
30	1	514-2-70k	Regulator Ass'y
32	1	502-11-35A	Flow Control
33	1	502-11-17S	1/4 STREET ELL
34	1	502-11-16X	Quick Connect air Fitting Male
39	1	650-3-45H	Pivot Bracket
40	3	514-4-17V	1/4 poly x 1/4 npt 90, Legris metal
41	2	514-4-18B	1/4 poly x 1/4 npt 90, Legris metal
42	4	MF-6 ANSI B18.3 - No. 10 - 24 UNC - 3/4	Hexagon Socket Head Cap Screw
43	1	650-3-66Q	Shoulder Screw 5/8 X 1.25
44	2	650-3-66R	Shoulder Screw 1/2 X 1/2
45	2	MF-223ANSI B18.3 - 3/8 - 16 UNC - 1 1/4	Hexagon Socket Head Cap Screw
46	2	MF-3A ANSI B18.3 - No. 8 - 32 UNC - 7/8	Hexagon Socket Head Cap Screw



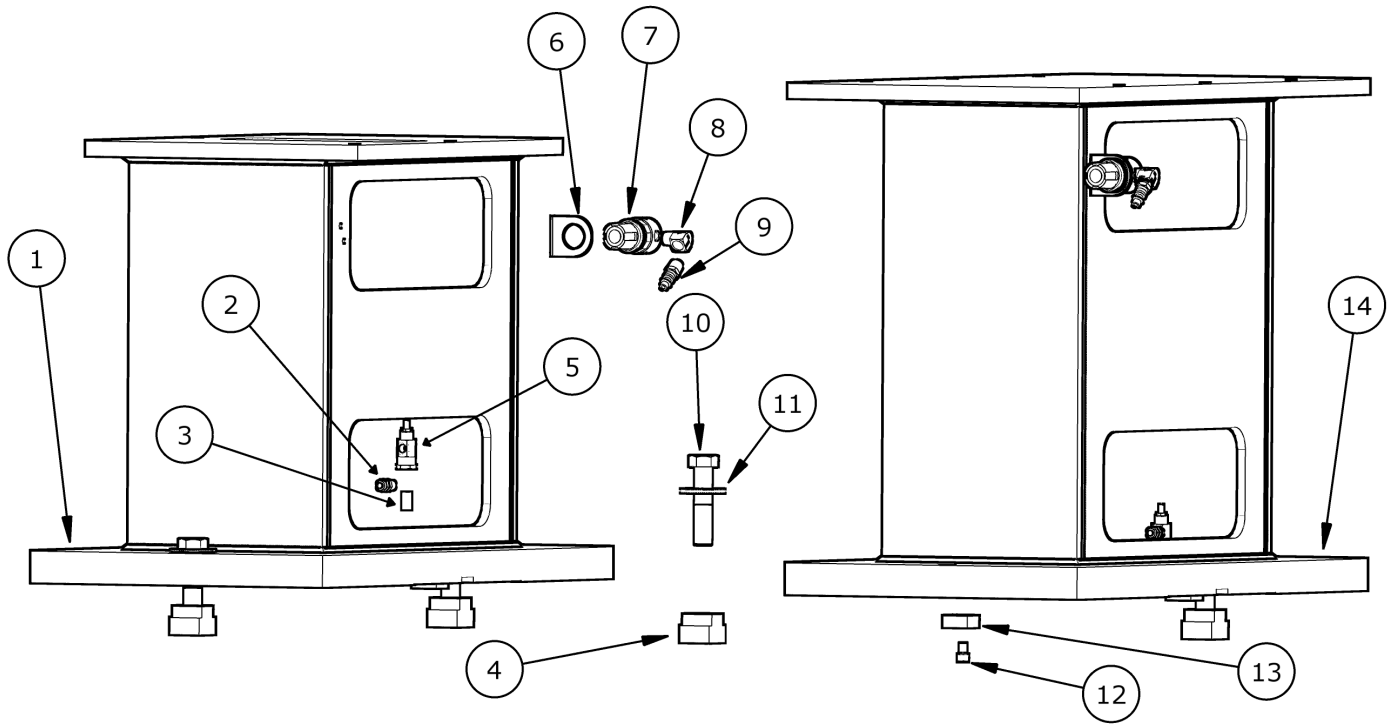


Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	650-3-66A	Cap Fixture Main Base
2	1	650-3-66B	Clamp Bar
3	1	650-3-66C	Carriage, Cap Cutting Fixture
4	1	650-3-66D	Locate Plate
5	2	650-3-66E	Lift Arm
6	1	650-3-66G	Slide Assembly
7	1	650-3-66F	Slide
8	2	650-3-66H	Lower Hinge
9	2	650-3-66J	Upper Hinge
10	1	650-3-66K	Cap fixture Main Base Assembly
11	1	650-3-66L	Thrust Parallel
12	2	650-3-66P	Eye bolt - reid swb-1
13	2	650-3-66N	Knob - reid tc2a
14	3	650-3-66M	Clamp Stud
15	2	6370Z	10" Support Parallel
16	2	6553J	Locating Key
17	2	650-3-56S	Belleville spring Reid BDB-65
18	3	502-1-11A	T-Nut 3/4 table, 5/8-11 thread
19	1	502-1-55	Air Switch, Clippard #MJTU-4
20	1	502-1-55A	Air switch mount bracket
21	1	650-3-45G	Locate Cylinder 704-dxp
22	2	650-3-45H	Pivot Bracket ass'y
23	1	650-3-45J	CLevis 1" Bimba D-8314-A
24	1	514-2-70k	Regulator Ass'y
25	1	502-11-16X	Quick Connect air Fitting Male
26	1	502-11-17S	1/4 STREET ELL
27	1	6613G	Shoulder Screw 5/8 X 1.25
28	2	7149B	Shoulder Screw 1/2 X 1/2
29	6	MF-31 - 3/8 - 16 - 1	Hexagon Socket Head Cap Screw
30	4	MF-___ - No. 10 - 24 - 7/8	Hexagon Socket Head Cap Screw
31	8	MF- 13 - 1/4 - 20 - 5/8	Hexagon Socket Head Cap Screw
32	4	MF-5 - No. 10 - 24 - 5/8	Hexagon Socket Head Cap Screw
33	2	MF-4 - No. 10 - 24 - 3/8	Hexagon Socket Head Cap Screw
34	2	MF-3F 8 - 32 - 1 1/2	Hexagon Socket Head Cap Screw
35	3	MF-152A - 5/8-11 - 2-1/2	Hex Bolt - UNC (Regular Thread - Inch)
36	6	MF-166 - 5/8 - 11	Hex Thick Nut
37	2	MF- 207 - 1/4 x 1 1/2	Pin - Hardened Ground Production Dowel
38	2	MF ___ - 3/16 x 3/4	Pin - Slotted Spring
39	2	MF - 213 - 3/8 x 1 1/2	Pin - Hardened Ground Production Dowel
68	3	514-4-17V	1/4 poly x 1/4 npt 90, Legris metal
69	2	514-4-18B	1/4 poly x 1/4 npt 90, Legris metal

### 6870 Precision Large Connecting Rod Fixture Parts

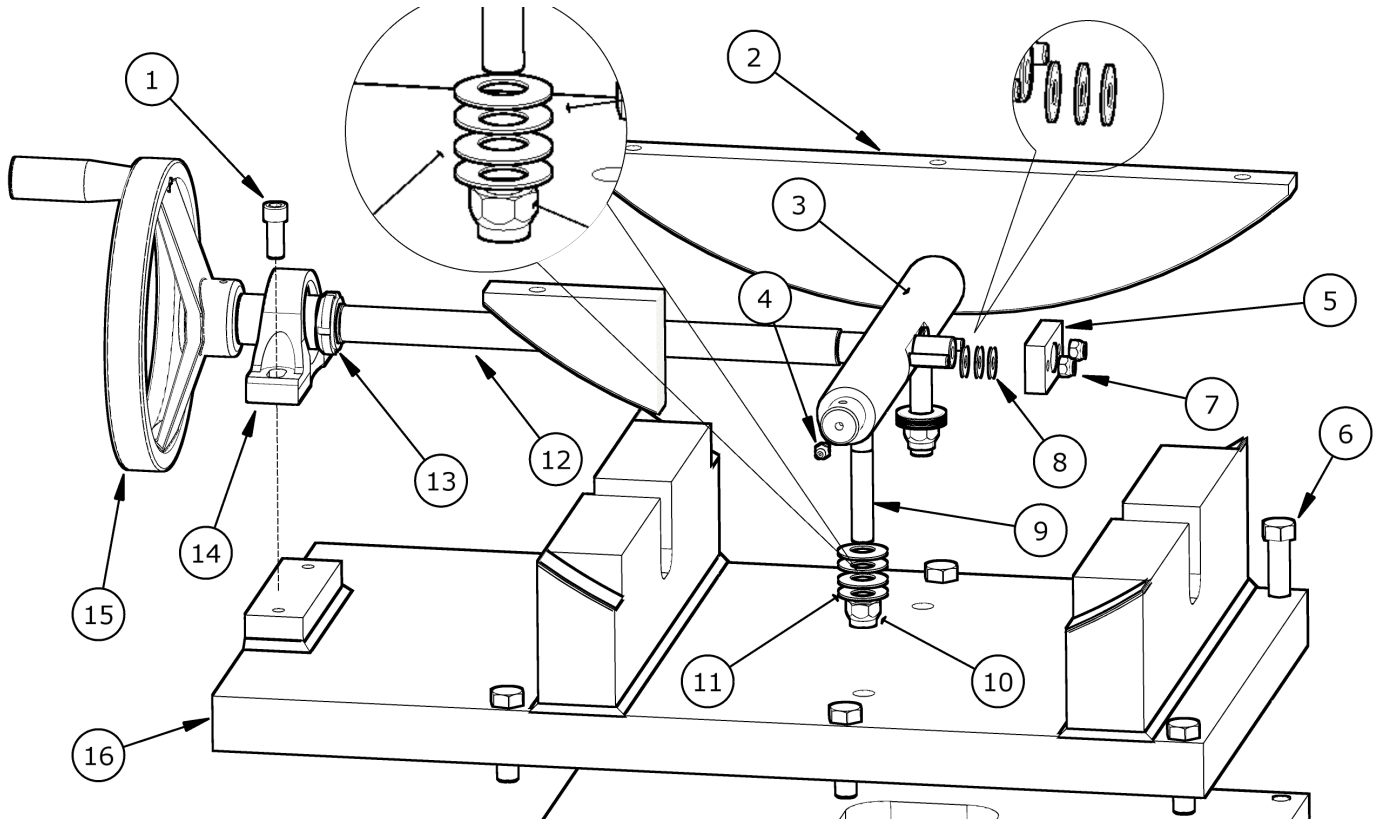


**Support Table Parts**



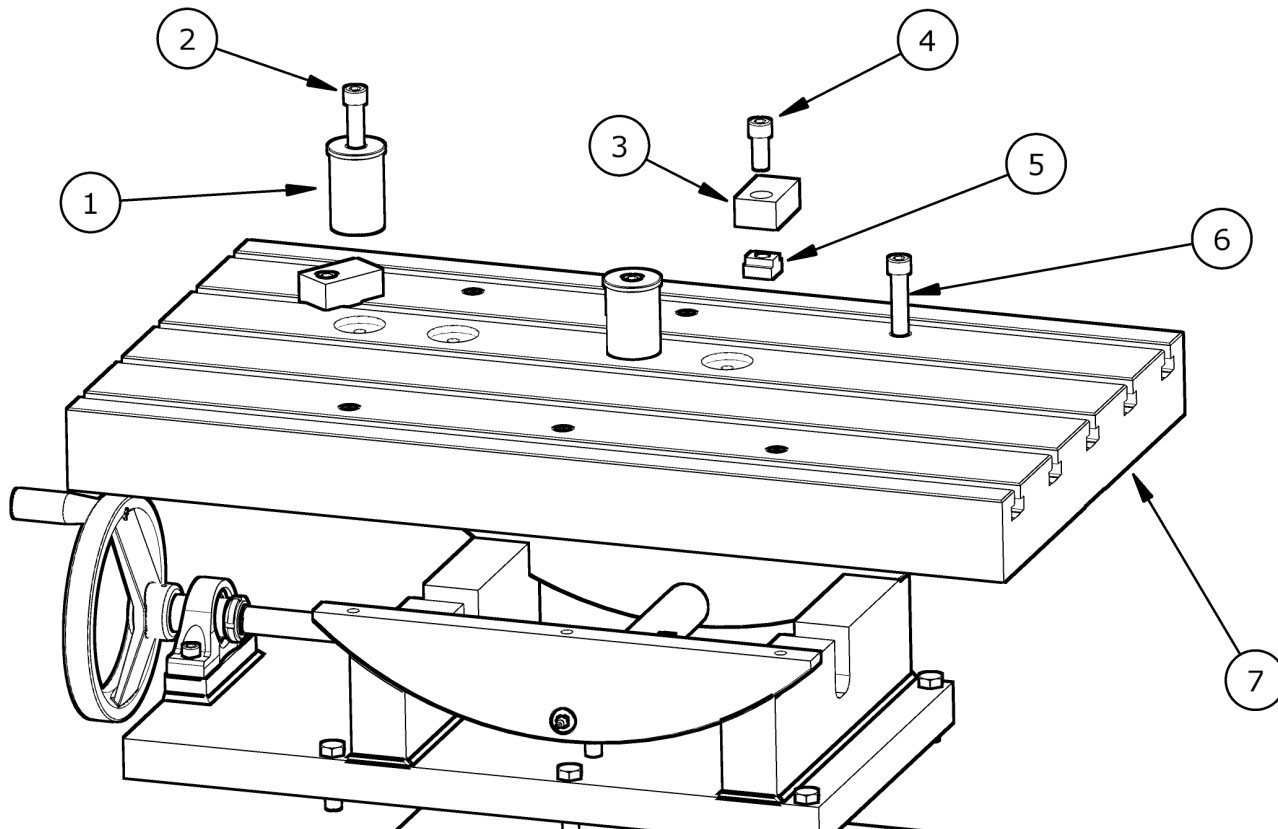
SUPPORT TABLE PARTS			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	6872B	PIVOT TABLE SUPPORT	1
2	514-4-17W	FITTING 1/8 NPT X 1/4 POLY STRAIGHT	2
3	502-11-17J	NIPPLE,CLOSE 1/8" MPT	2
4	6160	NUT, "T"-HARDENED	4
5	502-11-35A	VALVE, CONTROL - RFC FLO	2
6	502-27-17A	BRACKET, MOUNTING - REGULATOR	2
7	502-27-17	REGULATOR,AIR 0-60 PSI	2
8	502-11-17S	ELBOW, ST, 1/4 FPT X 1/4 MPT	2
9	502-11-16X	CONNECTOR, MALE THREAD 1/4 NPTF V6/V8 FIXTURE	2
10		3/4 X 3 1/2 UNC HEX BOLT	4
11	MF-181A	FLAT WASHERS 3/4"	4
12		5/16 - 18 X 1/2 SHCS	2
13	6553K	KEY, LOCATOR	2
14	6871C	TABLE SUPPORT	1

**Pivot Base Assembly Parts**



PIVOT ASSEMBLY PARTS			
ITEM	PART NUMBER	DESCRIPTION	QTY
1		3/8 - 16 x 1	2
2	6874C	PIVOT ARC	2
3	6874D	PIVOT SHAFT	1
4	MF-189	1/4-28 STRAIGHT GREASE FITTING	2
5	6874B	BACKLASH PLATE	1
6	MF-149C	HEX BOLT 1/2-13 X 2	6
7		1/4 - 20 NYLOK NUT	2
8	9024E	SPRING,BELLEVILLE	6
9	6874F	SET UP STUD	2
10		1/2 - 13 NYLOK NUT	2
11	514-7-21	WASHER, BELLEVILLE	8
12	6874	PIVOT SCREW	1
13	504-34-54	LOCKNUT	1
14	6871B	BEARING	1
15	6874A	HANDWHEEL	1
16	6872E	CRADLE	1

**Pivot Table Assembly Parts**



PIVOT TABLE PARTS			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	6874E	LOCATOR	2
2		1/2 – 13 X 3 1/4	2
3	6874G	PARALLEL	2
4		1/2 – 13 X 1 1/4	2
5	650-3-10	T-NUT, 1/2-13 WITH 5/8" TABLE SLOT	2
6		1/2 – 13 X 3 1/4	6
7	6871D	PIVOT TABLE TOP	1

### Table Clamps and Jacks Parts

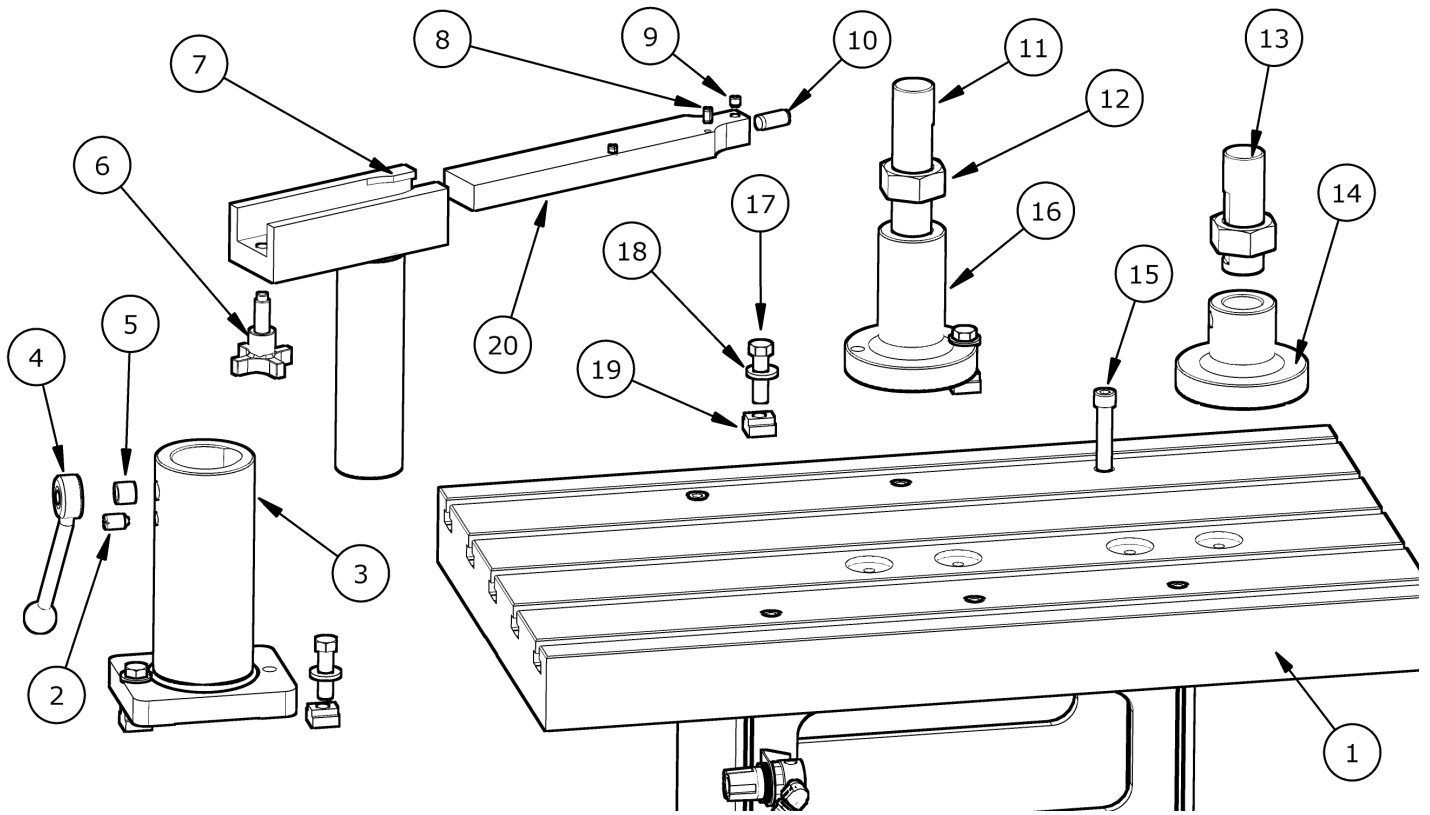
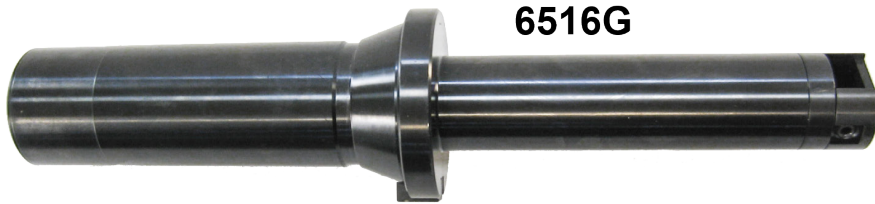


TABLE JACK AND CLAMP PARTS			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	6871D	TABLE TOP	1
2	502-8-52C	PLUNGER, SPRING	4
3	6870C	CLAMP SUPPORT	4
4	6310J	HANDLE, ADJUSTABLE	4
5	6310R	INSERT, THREAD	4
6	6310K	HAND KNOB BLOCK CLAMP	4
7	6873	CLAMP LEG	4
8		SLOTTED SPRING PIN 1/4 X 1/2	8
9		CUP POINT SET SCREW 5/16 X 5/16	4
10		DOWEL PIN 1/2 X 1 1/4	4
11	6396	SCREW, JACKING-V BLOCK FIXTURE (7")	1
12	6566H	NUT, JACKING(2 1/2")	2
13	7241N	SCREW, JACKING-ECONOMY FIXTURE (4 3/4")	1
14	7241Q	JACK BODY	1
15		1/2 – 13 X 3 1/4 SHCS	6
16	6395E	JACK BODY	1
17	MF-149C	HEX BOLT 1/2-13 X 2	10
18	100-19A	WASHER, HARDENED 17/32" ID	10
19	650-3-10	T-NUT, 1/2-13 WITH 5/8" TABLE SLOT	10
20	6310H	SHOE, BLOCK CLAMPS	4

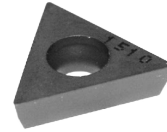


## Tooling for Connecting Rod Boring

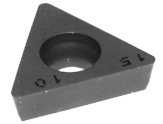
### 6516H Blind Hole Cutterhead Package Components



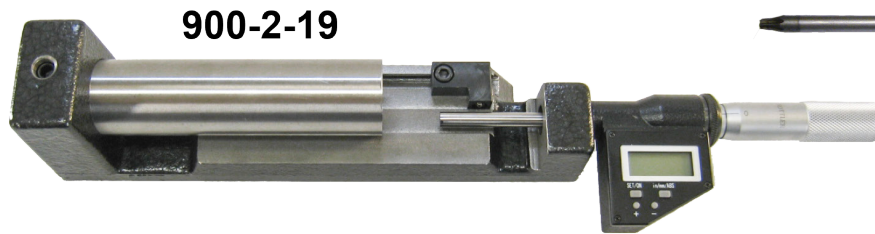
6516G



RT321



RT322

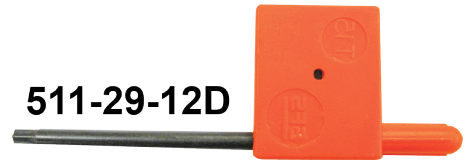


900-2-19

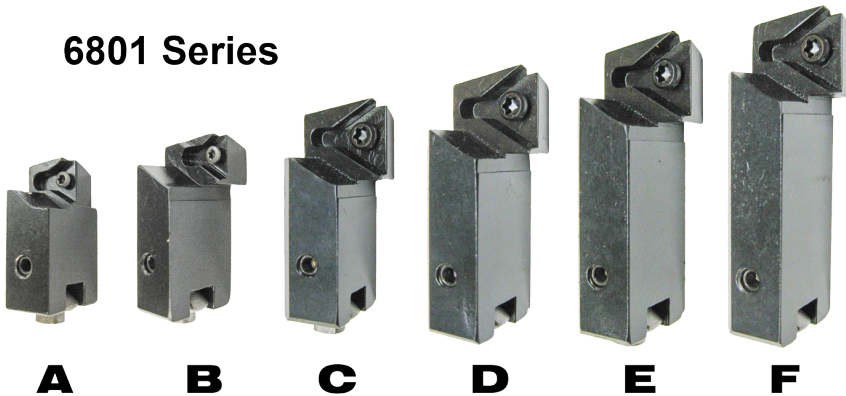
T8D



511-29-12D



6801 Series



A

B

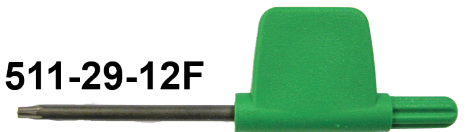
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511-29-12F



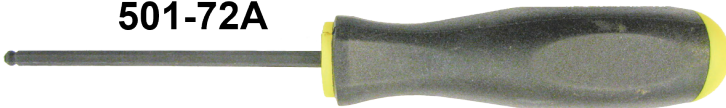
RT321F



RT322F



501-72A



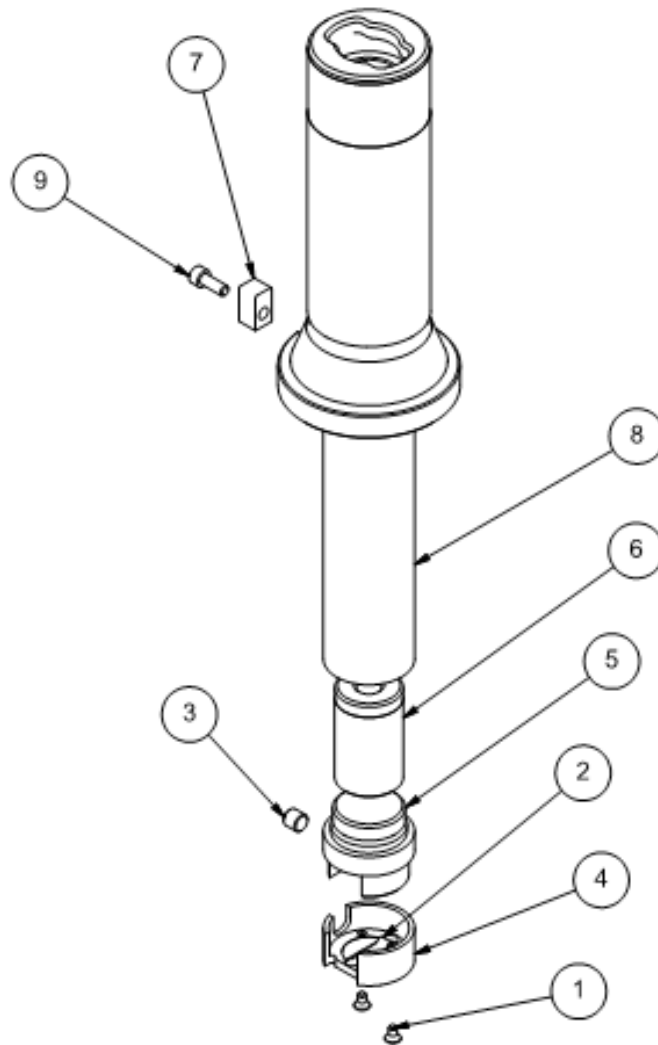
RT211



RT212

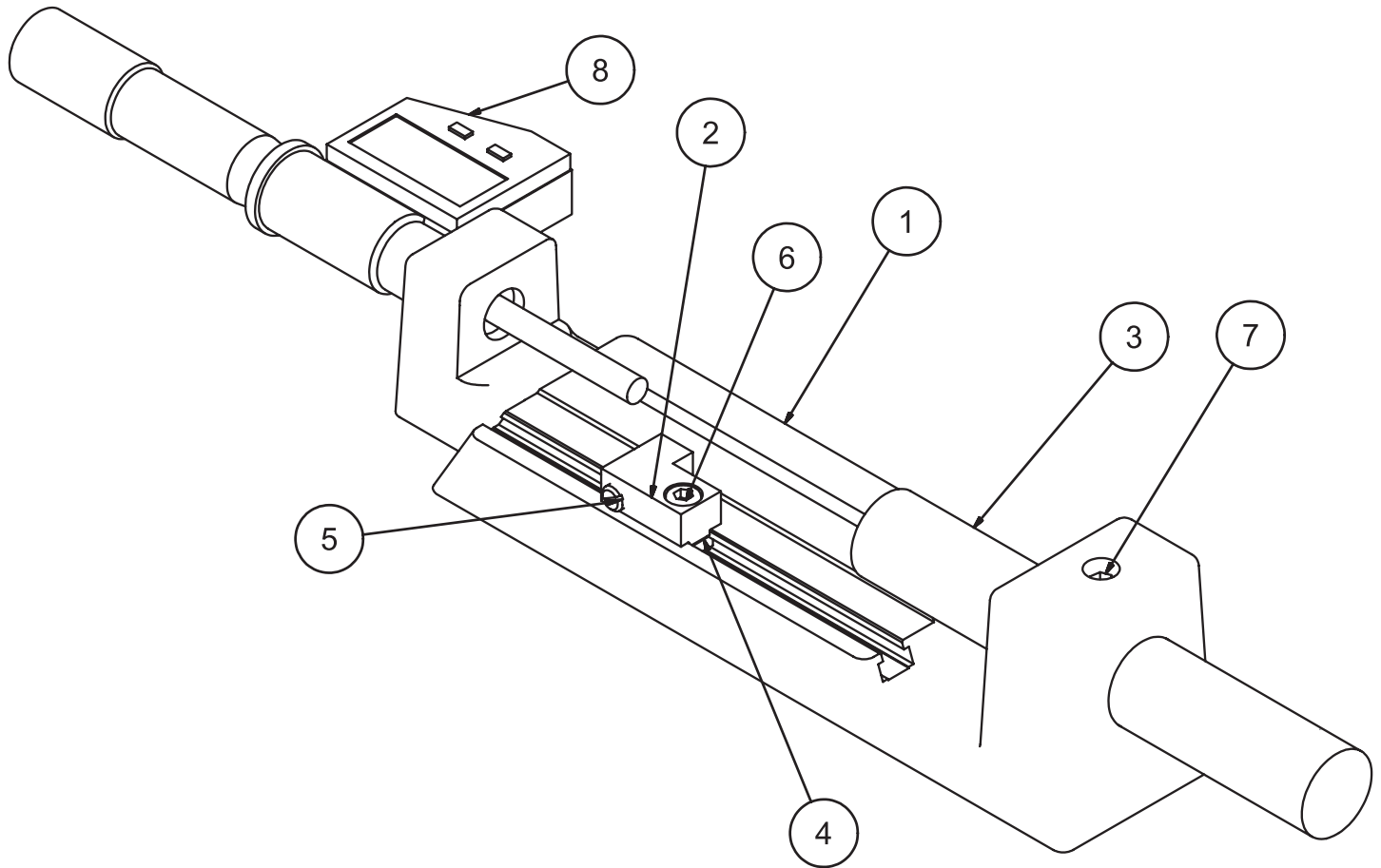


**6516G Cutterhead Parts**



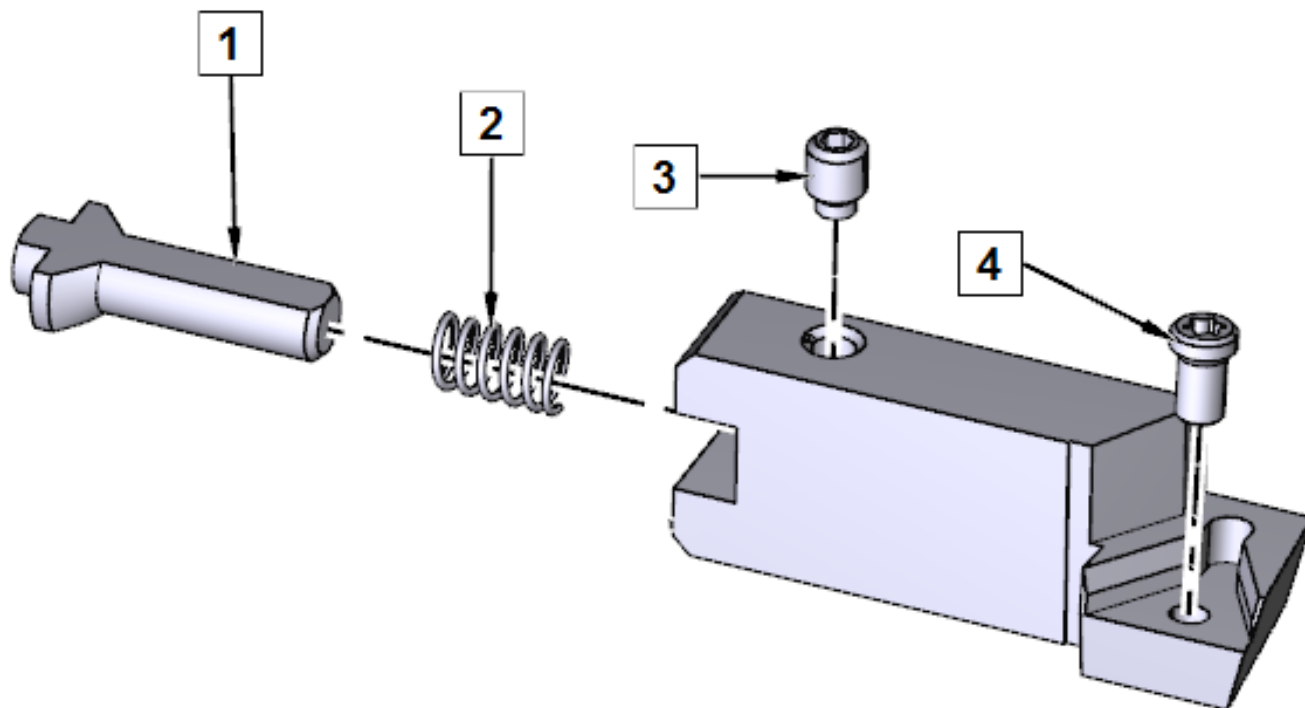
6516G 1-1/2 Stub Bar			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	MF-120A	Socket Flat Head 6-32 UNC x 0.25
2	1	100-1B	Tool Lock Spring
3	1	502-25-1	Tool Holder Lock Screw
4	1	600-5	Cutter Head Cap
5	1	600-7-2D	Lower Body 1-1/2" Stub Bar
6	1	600-8-2	Counter Weight
7	1	6181	DRIVE KEY
8	1	6516F	Adapter - 1-1/2" Stub Bar F-9
9	1	MF-5A	S.H.C.S. 10 - 24 UNC - 1/2

**900-2-19 Micrometer Parts**



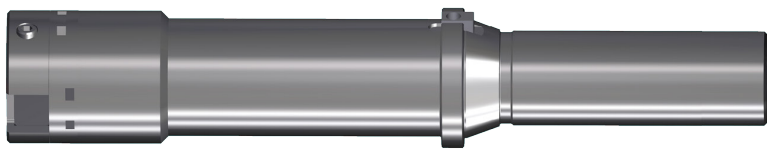
900-2-19 Micrometer Assembly			
ITEM	QTY	PART NUMBE	DESCRIPTION
1	1	502-30-10B	Frame
2	1	502-30-10M	Clamp Block
3	1	502-31-10A	Anvil
4	1	502-30-10J	Square Nut
5	1	502-30-10K	Ball Plunger
6	1	ANSI B18.3 - No. 10 - 24 UNC - 3/8	Hexagon Socket Head Cap Screw
7	1	502-30-10L	Brass Tipped Set Screw
8	1	501-34-2R	Digital Micrometer Head

**6801 Series Insert Holder Parts**



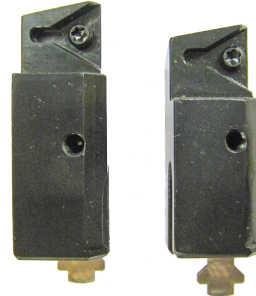
ITEM	PART #	DESCRIPTION
1	100-82-3B	PIN ADJUSTING LONG INDEXABLE INSERT TOOLHOLDER
2	100-82-1	SPRING, ADJUSTING PIN
3	100-82-2	SCREW,SET-BRASS GIB - 3/16" LONG
4	511-29-12C	SCREW, TORX M4 X .7 X .315" LONG

## 6519 Blind Hole Stub Cutterhead Package Components



6519E

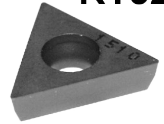
6593 Series



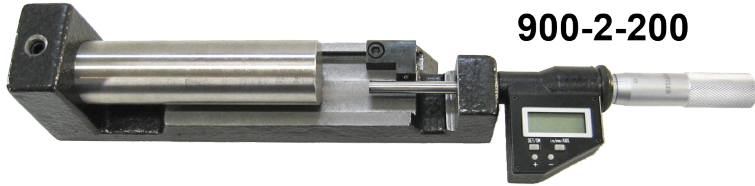
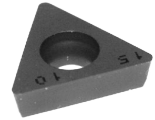
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RT321

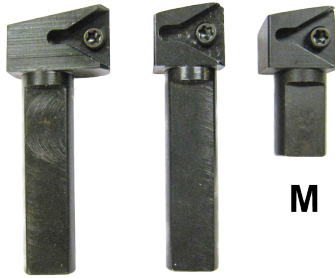


RT322



900-2-200

6598 Series

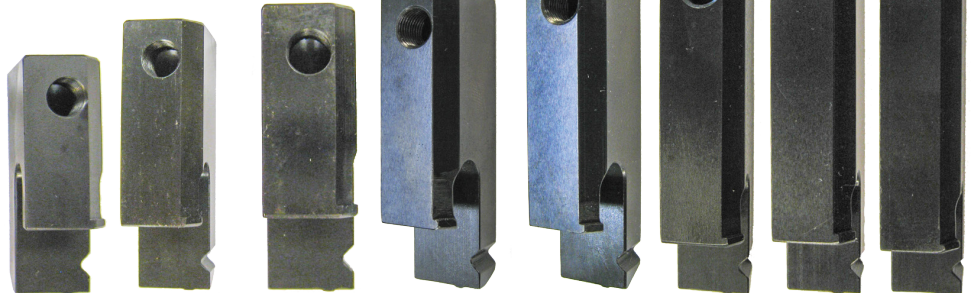


R

K

M

6520 Series



H

A

B

C

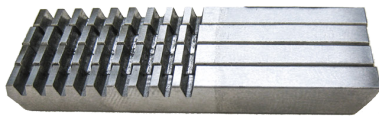
D

E

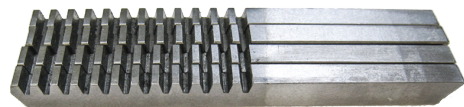
F

G

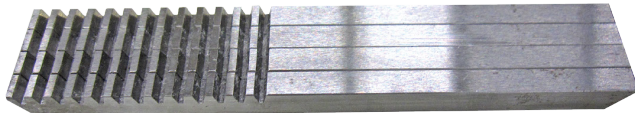
200-21-3



200-21-1



200-21-2



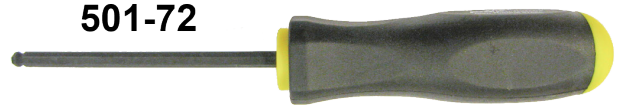
RT321F



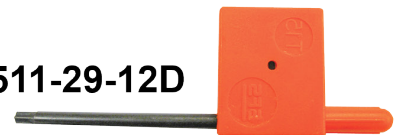
RT322F



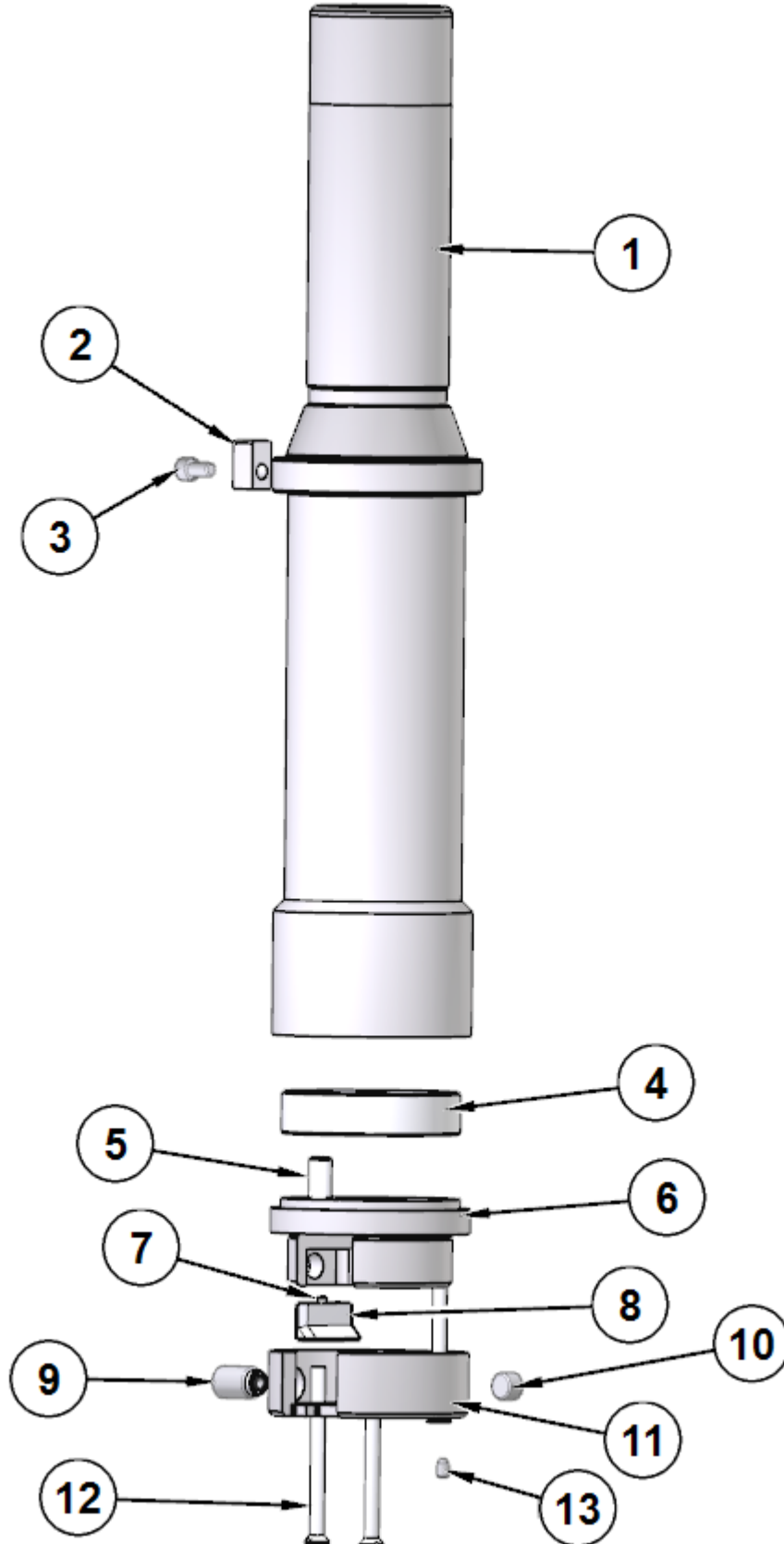
501-72



511-29-12D



## 6519E Cutterhead Parts

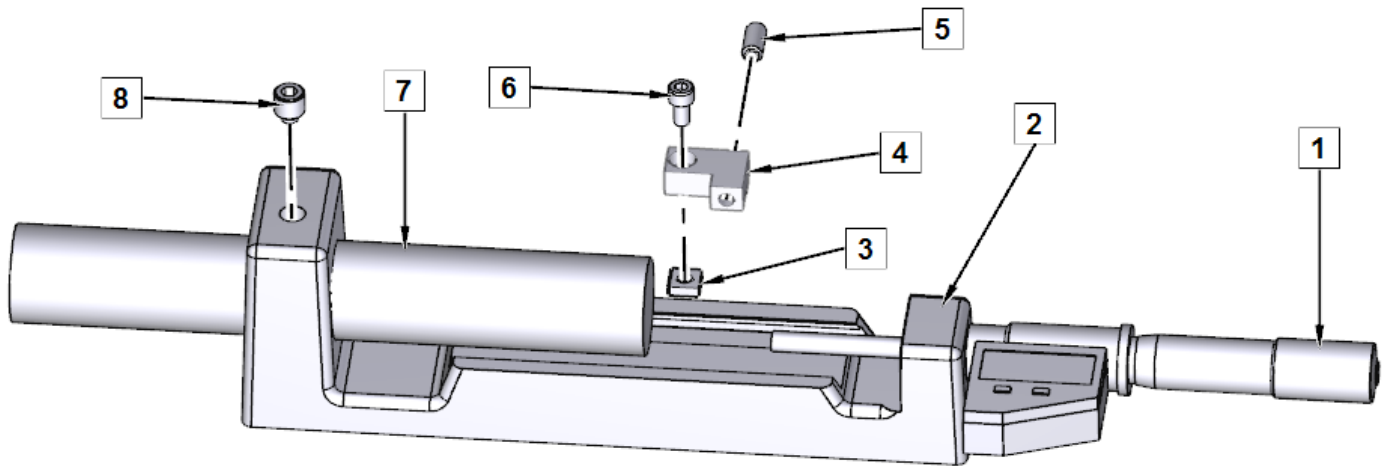




ITEM	PART #	DESCRIPTION
1	6519A	ADAPTER, CUTTERHEAD - B.H.S.B.
2	6181	KEY,CUTTERHEAD DRIVE
3	MF-4	SOCKET HEAD CAP SCREW 10-24 X 3/8"
4	6521	COUNTERWEIGHT B.H.S.B.
5	502-2-45B	BUSHING, UPPER CENTERING FINGER RETAINER
6	650-2-16	BODY, 2.9" STUB BAR
7	MF-193	DOWEL PIN 1/8 X 1/2"
8	6263A	SHOE,CLAMP-TOOL HOLDER PRODUCTION STUB BAR
9	501-70	SCREW, TOOL HOLDER LOCK ASSEMBLY
10	502-2-85B	SCREW, SET-INDEX 3/8-40 FINE THREAD
11	6519F	CAP,CUTTERHEAD, B.H.S.B
12		10-24 X 2 1/2 SLOTTED FLAT HEAD MACHINE SCREW
13	502-12-4D	SOCKET SET SCREW 8-32 X 1/8" (BRASS TIPPED)

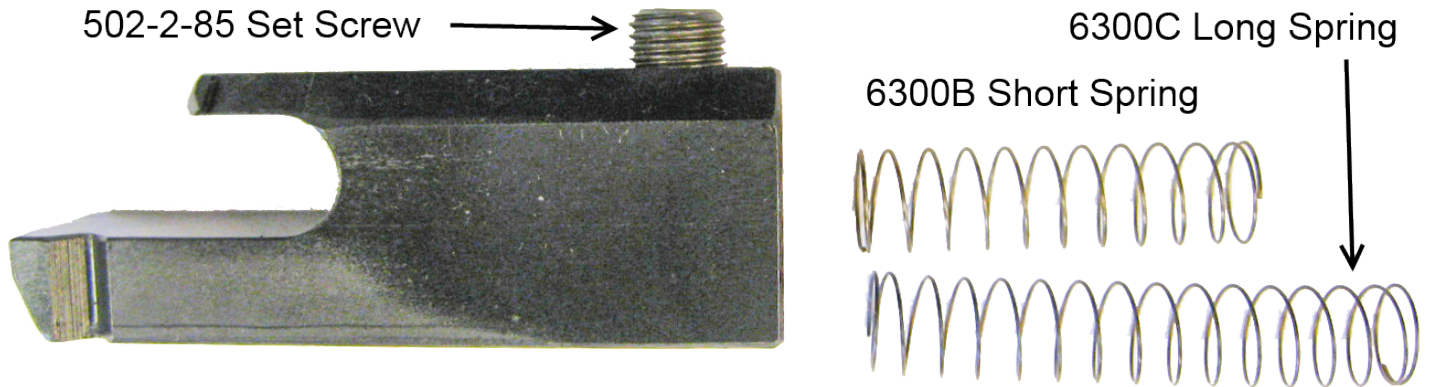


## 900-2-20 Micrometer Parts

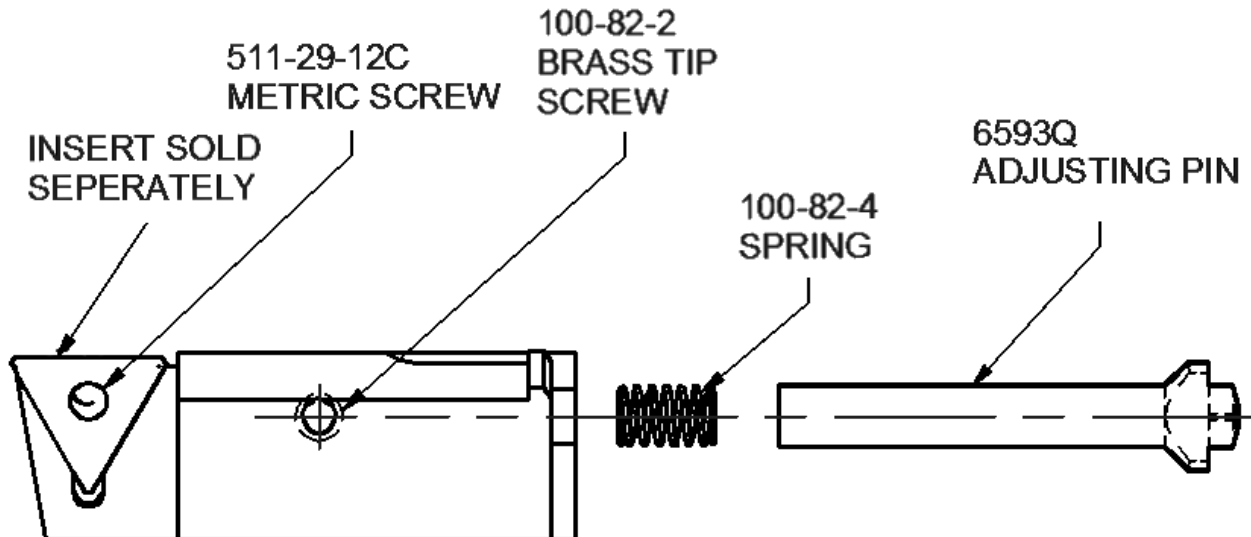


ITEM	PART #	DESCRIPTION
1	501-34-2R	HEAD, MICROMETER UNIVERSAL MIC HEAD DIGITAL READING INCH AND METRIC
2	502-30-10C	FRAME, MICROMETER
3	502-30-10J	SQUARE NUT-#10-24 MICROMETER FRAME
4	502-30-10M	CLAMP, MICROMETER
5	502-30-10K	BALL PLUNGER, 1/4-20 MICROMETER FRAME
6	MF-9A	SOCKET HEAD CAPSCREW 10-32 X 3/8"
7	502-30-10A	ANVIL, MICROMETER 7/8" DIAMETER X 5 5/8" LONG
8	502-30-10L	SET SCREW, BRASS TIPPED 3/8-24 X 3/8" LONG

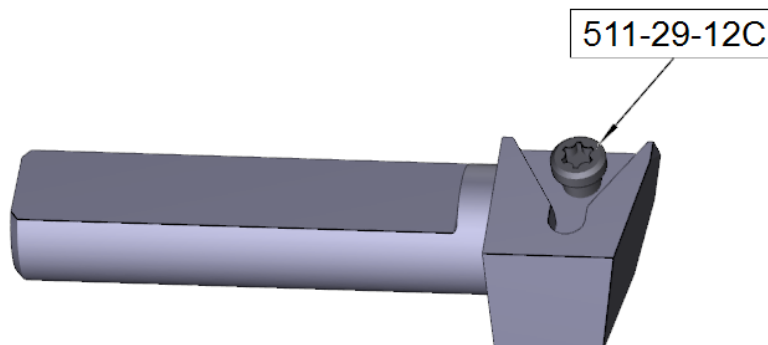
### 6520 Series Toolholder Parts



### 6593 Series Insert Holder Parts



### 6598 Series Insert Cartridge Parts





## **Enclosure Parts**

**Image of service parts is not available at this time.**

**Please visit the service tab of our web page, [www.rottlermfg.com](http://www.rottlermfg.com) to send a Service Request or contact the Rottler Factory Service at [service@rottlermfg.com](mailto:service@rottlermfg.com) for assistance.**

**You may also call Rottler at 1-800-452-0534 or 1-253-872-7050**

**Please ensure you have the Machine Model and Serial Number available when contacting Rottler for Service**

6875A TOOL CHANGER/STORAGE ASSEMBLY - F107/8/9			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6876	BASE (MACHINING), TOOL CHANGER/STORAGE ASSEMBLY - F90/100
2	1	6876B	PLUNGER RAMP, BASE, TOOL STORAGE ASSEMBLY - F90
3	2	MF-23	5/16-18 x 1" LG. S.H.C.S.
4	2	MF-177	SAE FLAT WASHER 5/16"
5	1	6877	BODY (MACHINING), TOOL CHANGER/STORAGE ASSEMBLY - F90
6	2	6876C	LINEAR RAIL ASSEMBLY (1 RAIL WITH 2 TRUCKS)
7	1	6878	TOP PLATE (MACHINING) TOOL CHANGER/STORAGE ASSEMBLY - F90
8	2	6877B	COVER PLATE, BASE, TOOL CHANGER/STORAGE ASSEMBLY - F90
9	1	6877C	THRUST BEARING, TOP PLATE, TOOL CHANGER/STORAGE ASSEMBLY - F90
10	1	6876D	CAM ACTION PLUNGER ASSEMBLY
11	1	6877D	SPRING PLUNGER ASSEMBLY
12	2	650-1-2G	Handle, Pendant
13	1	6878B	BEARING HUB, TOP PLATE, TOOL CHANGER/STORAGE ASSEMBLY - F90
14	1	502-35-14	Bearing
15	5	MF-42	S.H.C.S. 1/2 - 13 UNC - 1
16	8	MF-87	10-24UNC x 1/4" LG. SOCKET BUTTONHEAD SCREW
17	6	MF-150A	1/2-13UNC x 1-1/2 HEX BOLT
18	6	MF-171	1/2-13UNC HEX JAM NUT
19	4	650-4-27	M8x1.25 x 20mm S.H.C.S.
20	2	6879	RECEIVER ASSEMBLY, 18" FACEMILL
21	1	6879C	RECEIVER ASSEMBLY, FLYCUTTER - TOOL CHANGER/STORAGE ASSEMBLY - F90
22	1	6879F	6588A BRACKET ASSEMBLY
23	1	6879K	RECEIVER (MACHINING), H.D. OFFSET R.A.D. - TOOL CHANGER/STORAGE ASSEMBLY - F109
24	6	MF-189	STRAIGHT GREASE FITTING
25	4	MF-180	1/2" FLAT WASHER
26	1	100-19A	Hardened washer 17/32 I.D.
27	6	MF-181A	3/4" FLAT WASHER
28	6	MF-154B	3/4-10UNC x 1-3/4" LONG HEX BOLT
29	16	650-4-54	M6x1 x 25mm S.H.C.S.
30	4	MF-31	Hexagon Socket Head Cap Screw
31	4	MF-32	S.H.C.S. 3/8 - 16 UNC - 1 1/4
32	40	MF-14	S.H.C.S. 1/4 - 20 UNC - 3/4