

# Jergens®



## Ball Lock™ Mounting System

Jergens Introduces Another Piece to the Quick Change Puzzle

### Ball Lock Fixture Kits For HAAS\*

**HAAS models:**

- MINI MILL
- VF-E
- VF-O
- VF-I
- VF-OE
- VF-2
- VF-3
- VF-4
- VF-5



Changes Fixtures in **60 Seconds**  
...or Less

Kits for other machine  
manufacturers available.



\*HAAS is a trademark of HAAS Automation, Inc.

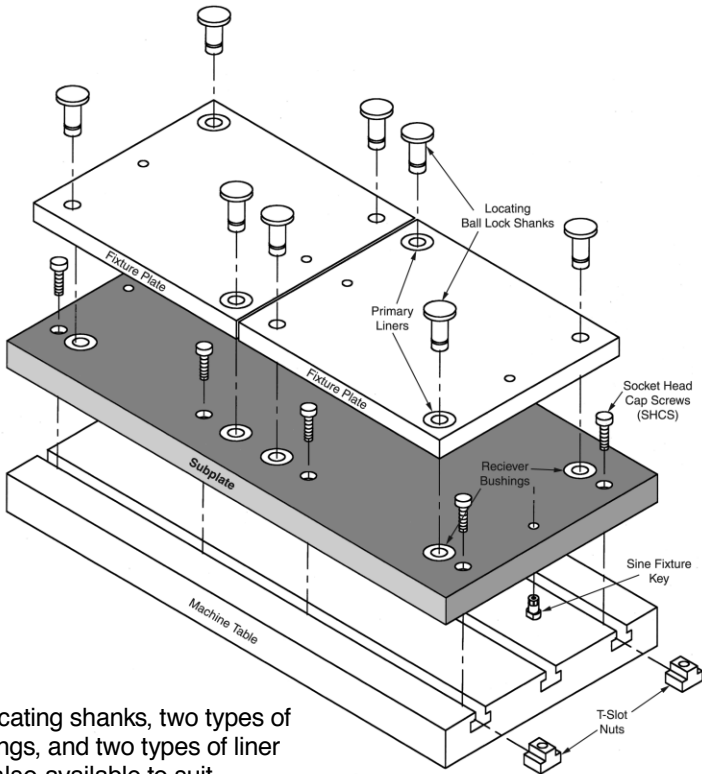
Locates

The Ball Lock™ System accurately positions your workpiece...to within ±.0005" or better, repeatability. This minimizes the need to indicate your fixture.

Locks

The Ball Lock System securely holds fixture plates to subplates with up to 20,000 lbs. of working load.

The Ball Lock Mounting System is designed to speed accurate locating and locking of fixture plates and subplates. The system consists of three parts: a Locating Shank, a Liner Bushing, and a Receiver Bushing. Using the Ball Lock Mounting System kit is a simple two step process. Install the subplate onto your machine table using the socket head cap screws, T-slot nuts, and the sine fixture key included with the Ball Lock Mounting System kit. Then insert the locating shanks through the liners and into the receivers to provide accurate location. A couple of turns of the set screw in each of the locating shanks provides positive holding force.



A variety of locating shanks, two types of receiver bushings, and two types of liner bushings are also available to suit customized requirements.

It is recommended that the use of the Ball Lock Mounting System for locating and clamping of fixture plates be incorporated in a systematic process.

All fixture plates have two locating points positioned as far apart as possible. There is no advantage to having more than two locating points.

How to use this guide

Machine Table

Dash Line Shows Machine Travel

Machine Manufacturer Model Number

Manufacturers Specifications

| Jergens Kit Number | Subplate/Fixture Plate Configurations |               | *Table Specifications   |
|--------------------|---------------------------------------|---------------|---|
|                    | HAAS Model No.: VF-OE                 |               |   |
|                    |                                       |               |   |
| 50005              | Standard Kit                          |               | Table Travel (X, Y, Z): 30", 16", 20"<br>Table Dimensions (L x W): 36" x 14"<br>Maximum Weight on Table: 3,000 lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 4.92" |
|                    | Subplate                              | Fixture Plate |   |
|                    |                                       |               | Optional Fixture Plate Configurations (sold separately)   |

Jergens Ball Lock Kit Part Number

Subplate Configuration

Installed Face Mount Receiver Bushings

.6255 Sine Fixture Key Holes (2 places)

Predrilled/C'Bored Mounting holes

Configuration of Fixture Plates Supplied/Included in Kit

Optional Fixture Plate(s) Sold Separately

## Most Commonly Asked Questions

### Q. What is the Ball Lock System?

A. A means of locating and locking two flat surfaces together. These are usually a fixture plate and a subplate.

### Q. How does it locate the plate?

A. It locates in the same manner as locating pins. In other words, there are two precision bores (receiver bushings) located on two precision pins (shanks).

### Q. How does it lock?

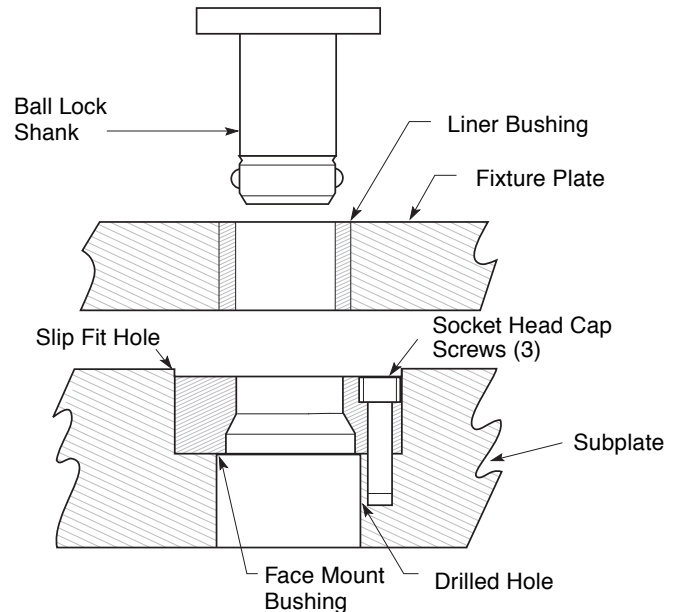
A. The Ball Lock system achieves its holding force by a combination of force generators. A threaded screw exerts force onto a center ball which, in turn, directs this force onto three balls that register on a taper seat.

### Q. What are the advantages of using the Ball Lock System over the conventional method of dowel pins and cap screws?

A. Both locating and locking are accomplished in the same motion. Two and one half turns are the maximum needed to lock (whereas a 1/2–13 cap screw with one and a half diameters of thread engagement would need ten turns to lock). On C.N.C. machines, the repeatability of fixture locations makes indicating of the fixture unnecessary.

## Ball Lock Kit Benefits

- Pre-Engineered Solution; Saves Time Specifying.
- No Extra Components to Purchase; Saves Time When Ordering.
- Pre-Installed Components and Easy to Use Instructions; Saves Installation Time.



|                                     | COMPONENTS INCLUDED IN KIT         |                              |                          |                          |                             |                          |                            |                        |                         |            |                  |               | Kit Weight<br>(Approx. Lbs.) |  |
|-------------------------------------|------------------------------------|------------------------------|--------------------------|--------------------------|-----------------------------|--------------------------|----------------------------|------------------------|-------------------------|------------|------------------|---------------|------------------------------|--|
| Steel Subplate Part No.<br>(Qty. 1) | Aluminum Fixture Plates (inches)** |                              |                          |                          |                             |                          |                            | Ball Lock Shanks       |                         | T-Slot Nut | Sine Fixture Key | SHCS          |                              |  |
|                                     | 28706<br>JIGSAW PLATE              | 28711<br>(11 7/8 X 14 X .75) | 28713<br>(14 X 14 X .75) | 28715<br>(16 X 16 X .75) | 28750<br>(28.75 X 12 x .75) | 28719<br>(20 X 16 X .75) | 28801<br>(16 X 16 x 1.125) | 49601<br>(20 mm x .75) | 49612<br>(25 mm x 1.00) | 43306      | 39503            | 1/2-13 x 1.5" |                              |  |
|                                     |                                    |                              |                          |                          |                             |                          |                            |                        |                         |            |                  |               |                              |  |
|                                     | Q U A N T I T Y                    |                              |                          |                          |                             |                          |                            |                        |                         |            |                  |               |                              |  |
| 49165                               |                                    |                              | 2                        | OPT.                     |                             | OPT.                     | OPT.                       | 8                      |                         | 8          | 2                | 8             | 195                          |  |

### Approximate Kit Weight.

Note: Parts and Fixturing should be taken into account when determining total weight allowable on machine table.

Subplate Part Number & Quantity in Kit

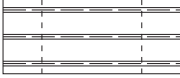
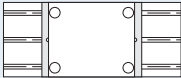
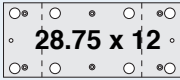

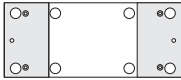
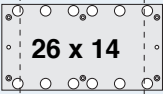
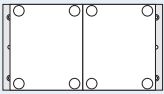
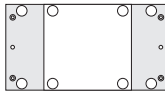
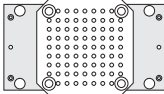
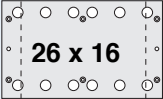
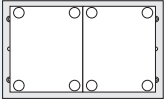
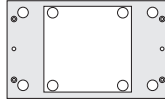
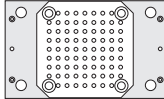
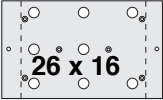
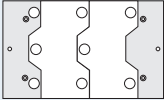
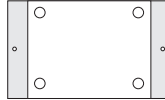

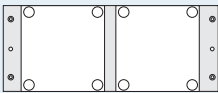
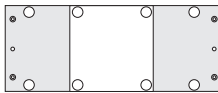
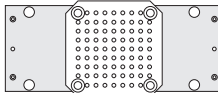
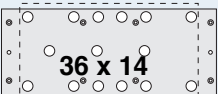
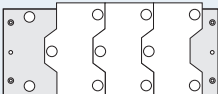
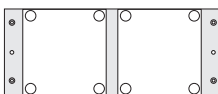
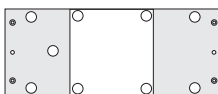
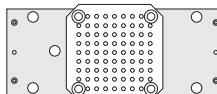
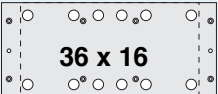
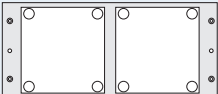
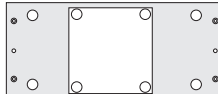
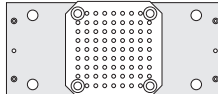
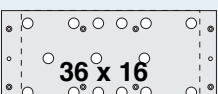
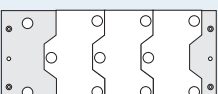
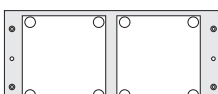
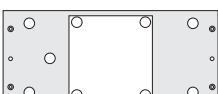
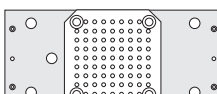
8-49601 Ball Lock Shanks Included in Kit (p.13)

2-Sine Fixture Keys Included in Kit (p.13)

(8) 1/2-13x1.5" Length Socket Head Cap Screws Included in Kit

2-28713 (14x14x.75 Aluminum Fixture Plates Included in Kit, p.12) (OPT.) Optional Fixture Plates That Will Fit Subplate Configuration

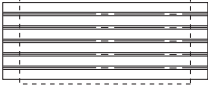

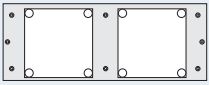
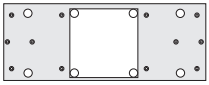
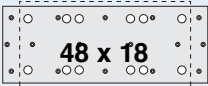
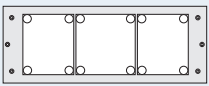
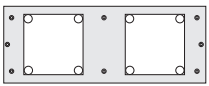
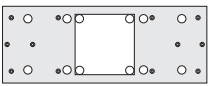
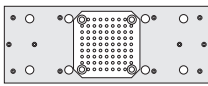

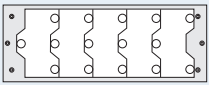
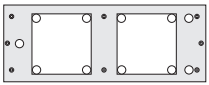
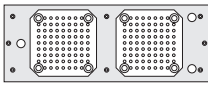

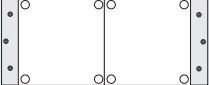
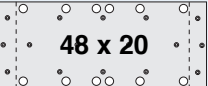
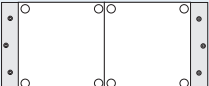
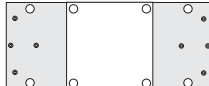

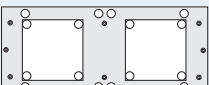
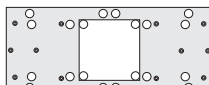
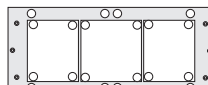
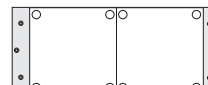

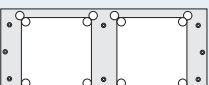
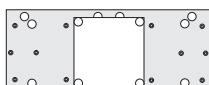
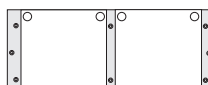

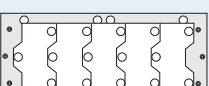
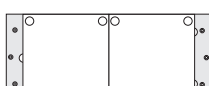
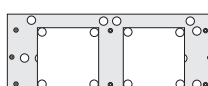
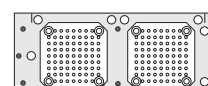
8-T-Slot Nuts Included in Kit (p.13)

| Jergens<br>Kit<br>Number | Subplate/Fixture Plate Configurations  |   |  |
|--------------------------|--|---|--|
|                          | <b>HAAS Model No.: MINI-MILL</b> <b>*Table Specifications</b> Table Travel (X, Y, Z): 16", 12", 10"<br>Table Dimensions (L x W): 28.75" x 12"<br>Maximum Weight on Table: 500 lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 4.331"                  |   |  |
|                          | Standard Kit   |   | Optional Fixture Plate Configurations (sold separately)  |
|                          | Subplate   | Fixture Plate   |  |
| 50000                    |   |    |  |
| 50001                    |   |    |    |
|                          | <b>HAAS Model No.: VF-E</b> <b>*Table Specifications</b> Table Travel (X, Y, Z): 20", 16", 20"<br><b>VF-0</b> Table Dimensions (L x W): 26" x 14"<br><b>VF-1</b> Maximum Weight on Table: 3,000 lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 4.92" |   |  |
| 50002                    |   |    |     |
| 50003                    |    |   |     |
| 50004                    |   |  |    |
|                          | <b>HAAS Model No.: VF-OE</b> <b>*Table Specifications</b> Table Travel (X, Y, Z): 30", 16", 20"<br><b>VF-2</b> Table Dimensions (L x W): 36" x 14"<br>Maximum Weight on Table: 3,000 lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 4.92"            |   |  |
| 50005                    |   |  |     |
| 50006                    |   |  |    |
| 50007                    |   |  |     |
| 50008                    |   |  |    |

\*NOTE: Ball Lock Subplate mounting is based on the table specifications listed. Please verify the machine table specifications before ordering. See note about Engineering Changes on page 13.

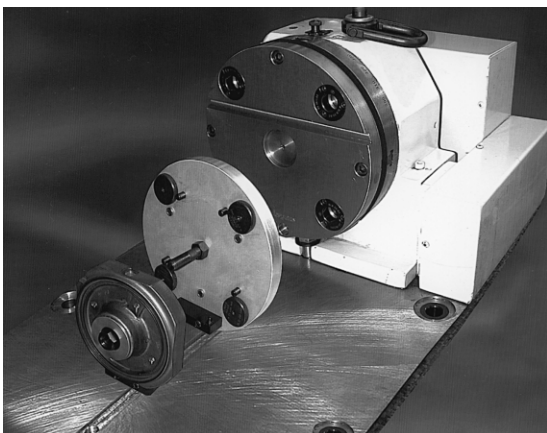
|  | COMPONENTS INCLUDED IN KIT          |                                    |                              |                          |                           |                             |                          |                            |                        |                         |            |                  | Kit Weight<br>(Approx. Lbs.) |               |
|--|-------------------------------------|------------------------------------|------------------------------|--------------------------|---------------------------|-----------------------------|--------------------------|----------------------------|------------------------|-------------------------|------------|------------------|------------------------------|---------------|
|  | Steel Subplate Part No.<br>(Qty. 1) | Aluminum Fixture Plates (inches)** |                              |                          |                           |                             |                          |                            | Ball Lock Shanks       |                         | T-Slot Nut | Sine Fixture Key |                              | SHCS          |
|  |                                     | 28706<br>JIGSAW PLATE              | 28711<br>(11 7/8 X 14 X .75) | 28713<br>(14 X 14 X .75) | 28715<br>(16 X 16 X .75 ) | 28750<br>(28.75 X 12 x .75) | 28719<br>(20 X 16 X .75) | 28801<br>(16 X 16 x 1.125) | 49601<br>(20 mm x .75) | 49612<br>(25 mm x 1.00) | 43306      | 39503            |                              | 1/2-13 x 1.5" |
|  |                                     | Q U A N T I T Y                    |                              |                          |                           |                             |                          |                            |                        |                         |            |                  |                              |               |
|  | 49160                               |                                    | 1                            |                          |                           |                             |                          |                            | 4                      |                         | 4          | 2                | 4                            | 77            |
|  | 49161                               |                                    | OPT.                         |                          |                           | 1                           |                          |                            | 4                      |                         | 6          | 2                | 6                            | 138           |
|  |                                     |                                    |                              |                          |                           |                             |                          |                            |                        |                         |            |                  |                              |               |
|  | 49162                               |                                    | 2                            | OPT.                     | OPT.                      |                             |                          | OPT.                       | 8                      |                         | 6          | 2                | 6                            | 146           |
|  | 49163                               |                                    | 2                            | OPT.                     | OPT.                      |                             |                          | OPT.                       | 8                      |                         | 6          | 2                | 6                            | 162           |
|  | 49164                               | 2                                  |                              |                          |                           |                             | OPT.                     |                            | 6                      |                         | 6          | 2                | 6                            | 155           |
|  |                                     |                                    |                              |                          |                           |                             |                          |                            |                        |                         |            |                  |                              |               |
|  | 49165                               |                                    |                              | 2                        | OPT.                      |                             | OPT.                     | OPT.                       | 8                      |                         | 8          | 2                | 8                            | 195           |
|  | 49166                               | 3                                  |                              | OPT.                     | OPT.                      |                             | OPT.                     | OPT.                       | 9                      |                         | 8          | 2                | 8                            | 194           |
|  | 49167                               |                                    |                              | 2                        | OPT.                      |                             | OPT.                     | OPT.                       | 8                      |                         | 8          | 2                | 8                            | 218           |
|  | 49168                               | 3                                  |                              | OPT.                     | OPT.                      |                             | OPT.                     | OPT.                       | 9                      |                         | 8          | 2                | 8                            | 217           |

\*\* Also Available in Steel

| Jergens<br>Kit<br>Number | Subplate/Fixture Plate Configurations   |   |  |
|--------------------------|---|---|--|
|                          | HAAS Model No.: VF-3  | *Table Specifications   | Table Travel (X, Y, Z): 40", 20", 25"<br>Table Dimensions (L x W): 48" x 18"<br>Maximum Weight on Table: 3,500 lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 3.15"  |
|                          |    |   |  |
|                          | Standard Kit  |   | Optional Fixture Plate Configurations (sold separately)  |
|                          | Subplate  | Fixture Plate   |  |
| 50009                    |    |    |    |
| 50010                    |    |    |          |
| 50011                    |    |    |     |
| 50012                    |    |    |  |
| 50013                    |    |    |    |
| 50014                    |   |   |       |
| 50015                    |  |  |     |
| 50016                    |  |  |    |

\*NOTE: Ball Lock Subplate mounting is based on the table specifications listed. Please verify the machine table specifications before ordering. See note about Engineering Changes on page 13.

## Thinking Ahead to Give You an Edge:



Ask us about  
Ball Lock for  
Indexers and  
other machine  
manufacturers  
available.

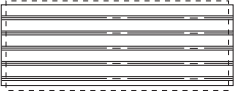
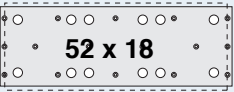
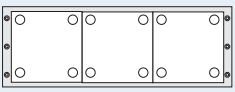
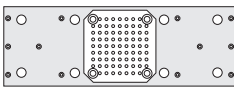
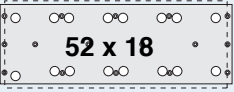
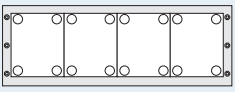
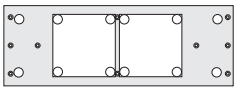
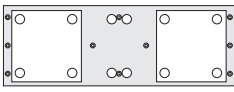
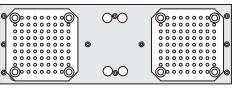

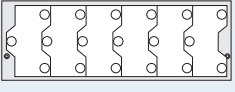
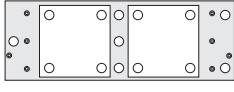
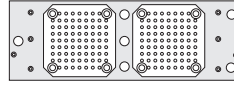
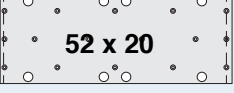
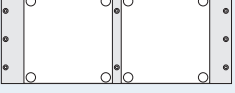
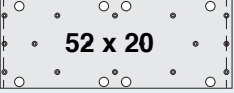
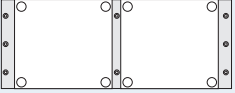
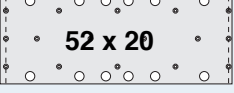
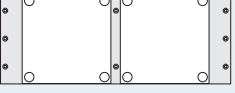
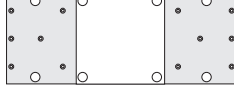
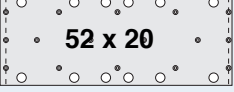
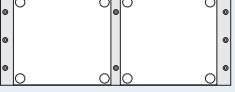
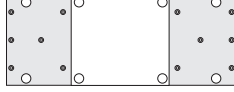
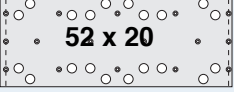
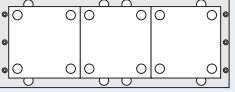
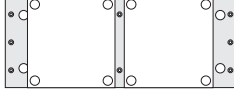
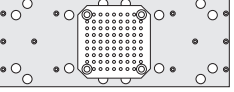

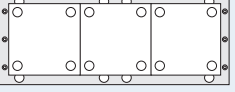
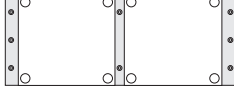
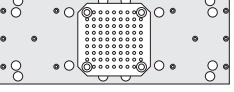
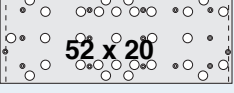
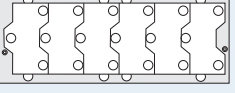
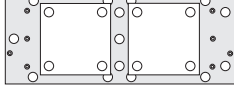
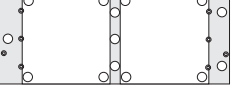
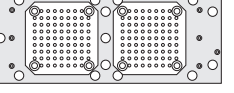
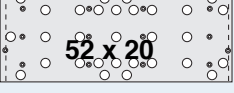
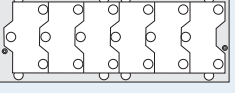
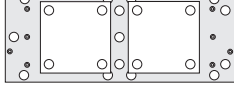
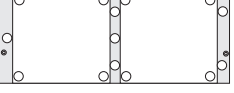
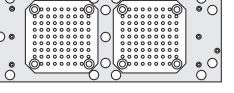
| COMPONENTS INCLUDED IN KIT          |                                    |                              |                          |                           |                          |                          |                        |                            |                        |                         |            |                  |             |    | Kit Weight<br>(Approx. Lbs.) |
|-------------------------------------|------------------------------------|------------------------------|--------------------------|---------------------------|--------------------------|--------------------------|------------------------|----------------------------|------------------------|-------------------------|------------|------------------|-------------|----|------------------------------|
| Steel Subplate Part No.<br>(Qty. 1) | Aluminum Fixture Plates (inches)** |                              |                          |                           |                          |                          |                        |                            | Ball Lock Shanks       |                         | T-Slot Nut | Sine Fixture Key | SHCS        |    |                              |
|                                     | 28706<br>JIGSAW PLATE              | 28711<br>(11 7/8 X 14 X .75) | 28713<br>(14 X 14 X .75) | 28715<br>(16 X 16 X .75 ) | 28717<br>(16 X 16 X .75) | 28719<br>(20 X 16 X .75) | 28727<br>(20 X 20 X 1) | 28801<br>(16 X 16 x 1.125) | 49601<br>(20 mm x .75) | 49612<br>(25 mm x 1.00) | 43306      | 39503            | 1/2-13x1.5" |    |                              |
| Q U A N T I T Y                     |                                    |                              |                          |                           |                          |                          |                        |                            |                        |                         |            |                  |             |    |                              |
|                                     | 49169                              |                              |                          |                           |                          | 2                        |                        |                            |                        | 8                       |            | 14               | 2           | 14 | 350                          |
|                                     | 49170                              |                              | 2                        | 1                         | OPT.                     |                          |                        |                            | OPT.                   | 12                      |            | 14               | 2           | 14 | 354                          |
|                                     | 49171                              | 5                            |                          | OPT.                      | OPT.                     |                          | OPT.                   |                            | OPT.                   | 15                      |            | 14               | 2           | 14 | 362                          |
|                                     | 49172                              |                              |                          |                           |                          |                          |                        | 2                          |                        |                         | 8          | 14               | 2           | 14 | 426                          |
|                                     | 49173                              |                              |                          |                           |                          |                          |                        | 2                          |                        |                         | 8          | 14               | 2           | 14 | 426                          |
|                                     | 49174                              |                              | OPT.                     | 2                         | OPT.                     |                          |                        | OPT.                       | OPT.                   | 8                       | OPT.       | 14               | 2           | 14 | 376                          |
|                                     | 49175                              |                              |                          |                           |                          | 2                        |                        | OPT.                       |                        | 8                       | OPT.       | 14               | 2           | 14 | 384                          |
|                                     | 49176                              | 5                            |                          | OPT.                      | OPT.                     |                          | OPT.                   | OPT.                       | OPT.                   | 15                      | OPT.       | 14               | 2           | 14 | 396                          |

\*\* Also Available in Steel



## Now Available...

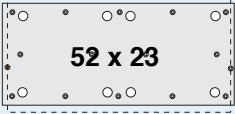
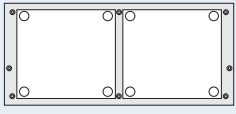
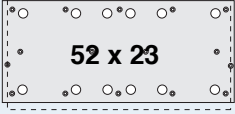
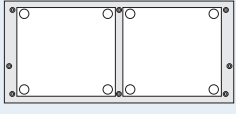
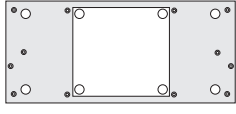
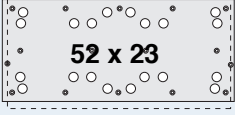
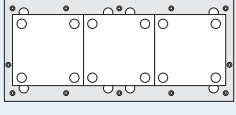
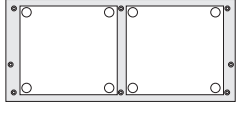
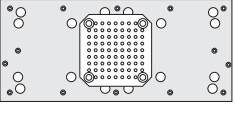
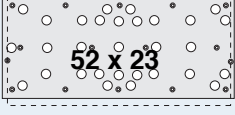
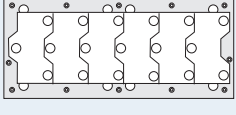
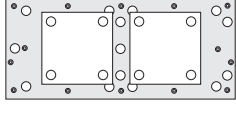
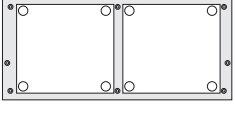
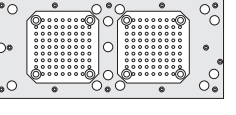
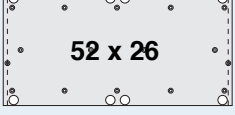
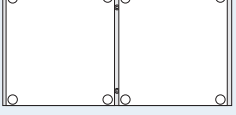
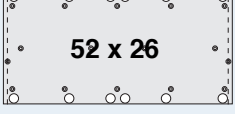
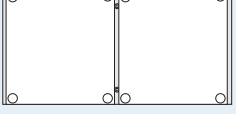
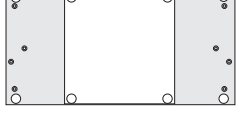
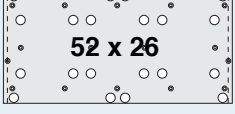
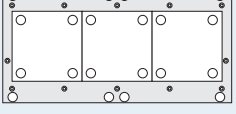
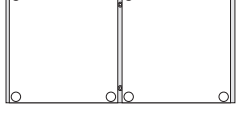
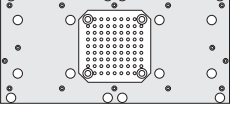
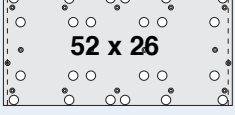
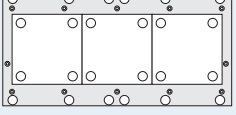
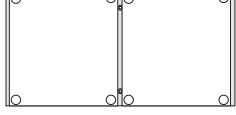
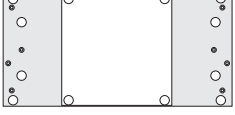
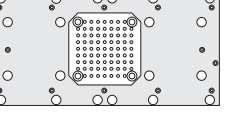
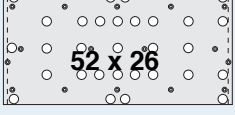
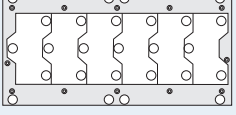
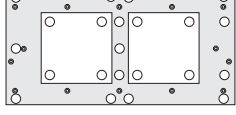
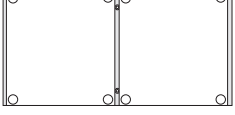
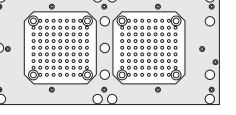
3D Solid Model Drawings, including  
Ball Lock components,  
downloadable from  
[www.jergensinc.com](http://www.jergensinc.com)

| Jergens<br>Kit<br>Number | Subplate/Fixture Plate Configurations   |   |  |
|--------------------------|---|---|--|
|                          | HAAS Model No.: VF-4  | *Table Specifications   | Table Travel (X, Y, Z): 50", 20", 25"<br>Table Dimensions (L x W): 52" x 18"<br>Maximum Weight on Table: 3,500 lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 3.15"  |
|                          |    |   |  |
|                          | Standard Kit  |   | Optional Fixture Plate Configurations (sold separately)  |
|                          | Subplate  | Fixture Plate   |  |
| 50017                    |    |    |    |
| 50018                    |    |    |          |
| 50019                    |    |    |     |
| 50020                    |    |    |  |
| 50021                    |  |  |  |
| 50022                    |  |  |    |
| 50023                    |  |  |    |
| 50024                    |  |  |     |
| 50025                    |  |  |     |
| 50026                    |  |  |    |
| 50027                    |  |  |    |

\*NOTE: Ball Lock Subplate mounting is based on the table specifications listed. Please verify the machine table specifications before ordering. See note about Engineering Changes on page 13.

|  | COMPONENTS INCLUDED IN KIT          |                                    |                              |                          |                           |                          |                        |                        |                            |                        |                         |            |                  |               | Kit Weight<br>(Approx. Lbs.) |  |
|--|-------------------------------------|------------------------------------|------------------------------|--------------------------|---------------------------|--------------------------|------------------------|------------------------|----------------------------|------------------------|-------------------------|------------|------------------|---------------|------------------------------|--|
|  | Steel Subplate Part No.<br>(Qty. 1) | Aluminum Fixture Plates (inches)** |                              |                          |                           |                          |                        |                        |                            | Ball Lock Shanks       |                         | T-Slot Nut | Sine Fixture Key | SHCS          |                              |  |
|  |                                     | 28706<br>JIGSAW PLATE              | 28711<br>(11 7/8 X 14 X .75) | 28713<br>(14 X 14 X .75) | 28715<br>(16 X 16 X .75 ) | 28719<br>(20 X 16 X .75) | 28727<br>(20 X 20 X 1) | 28745<br>(20 x 22 x 1) | 28801<br>(16 X 16 x 1.125) | 49601<br>(20 mm x .75) | 49612<br>(25 mm x 1.00) | 43306      | 39503            | 1/2-13 x 1.5" |                              |  |
|  |                                     | Q U A N T I T Y                    |                              |                          |                           |                          |                        |                        |                            |                        |                         |            |                  |               |                              |  |
|  | 49177                               |                                    |                              | OPT.                     | 3                         | OPT.                     |                        |                        | OPT.                       | 12                     |                         | 14         | 2                | 14            | 395                          |  |
|  | 49178                               |                                    | 4                            | OPT.                     | OPT.                      |                          |                        |                        | OPT.                       | 16                     |                         | 14         | 2                | 14            | 391                          |  |
|  | 49179                               | 6                                  |                              | OPT.                     | OPT.                      | OPT.                     |                        |                        | OPT.                       | 18                     |                         | 12         | 2                | 12            | 398                          |  |
|  | 49180                               |                                    |                              |                          |                           |                          | 2                      |                        |                            |                        | 8                       | 14         | 2                | 14            | 454                          |  |
|  | 49181                               |                                    |                              |                          |                           |                          |                        | 2                      |                            |                        | 8                       | 14         | 2                | 14            | 460                          |  |
|  | 49182                               |                                    |                              |                          |                           |                          | 2                      |                        |                            |                        | 8                       | 14         | 2                | 14            | 454                          |  |
|  | 49183                               |                                    |                              |                          |                           |                          |                        | 2                      |                            |                        | 8                       | 14         | 2                | 14            | 460                          |  |
|  | 49184                               |                                    |                              | OPT.                     | 3                         | OPT.                     | OPT.                   |                        | OPT.                       | 12                     | OPT.                    | 14         | 2                | 14            | 432                          |  |
|  | 49185                               |                                    |                              | OPT.                     | 3                         | OPT.                     |                        | OPT.                   | OPT.                       | 12                     | OPT.                    | 14         | 2                | 14            | 432                          |  |
|  | 49186                               | 6                                  |                              | OPT.                     | OPT.                      | OPT.                     | OPT.                   |                        | OPT.                       | 18                     | OPT.                    | 12         | 2                | 12            | 434                          |  |
|  | 49187                               | 6                                  |                              | OPT.                     | OPT.                      | OPT.                     |                        | OPT.                   | OPT.                       | 18                     | OPT.                    | 12         | 2                | 12            | 434                          |  |

\*\* Also Available in Steel

| Jergens<br>Kit<br>Number | Subplate/Fixture Plate Configurations   |   |  |
|--------------------------|---|---|--|
|                          | HAAS Model No.: VF-5  | *Table Specifications   | Table Travel (X, Y, Z): 50", 26", 30"<br>Table Dimensions (L x W): 52" x 23"<br>Maximum Weight on Table: 4,000lbs.<br>T-Slot Width: .625"<br>T-Slot Center Distance: 3.15"   |
|                          | Standard Kit  |   | Optional Fixture Plate Configurations (sold separately)  |
|                          | Subplate  | Fixture Plate   |  |
| 50028                    |    |    |  |
| 50029                    |    |    |    |
| 50030                    |    |    |     |
| 50031                    |    |    |          |
| 50032                    |   |   |  |
| 50033                    |  |  |    |
| 50034                    |  |  |     |
| 50035                    |  |  |    |
| 50036                    |  |  |    |

\*NOTE: Ball Lock Subplate mounting is based on the table specifications listed. Please verify the machine table specifications before ordering. See note about Engineering Changes on page 13.

Visit [www.jergensinc.com](http://www.jergensinc.com)  
to view our complete online catalog.

|  | COMPONENTS INCLUDED IN KIT          |                                    |                          |                           |                          |                        |                        |                            |                        |                         |            |                  |               | Kit Weight<br>(Approx. Lbs.) |  |
|--|-------------------------------------|------------------------------------|--------------------------|---------------------------|--------------------------|------------------------|------------------------|----------------------------|------------------------|-------------------------|------------|------------------|---------------|------------------------------|--|
|  | Steel Subplate Part No.<br>(Qty. 1) | Aluminum Fixture Plates (inches)** |                          |                           |                          |                        |                        |                            | Ball Lock Shanks       |                         | T-Slot Nut | Sine Fixture Key | SHCS          |                              |  |
|  |                                     | 28706<br>JIGSAW PLATE              | 28713<br>(14 X 14 X .75) | 28715<br>(16 X 16 X .75 ) | 28719<br>(20 X 16 X .75) | 28745<br>(20 x 22 x 1) | 28746<br>(25 X 26 X 1) | 28801<br>(16 X 16 x 1.125) | 49601<br>(20 mm x .75) | 49612<br>(25 mm x 1.00) | 43306      | 39503            | 1/2-13 x 1.5" |                              |  |
|  |                                     |                                    |                          |                           |                          |                        |                        |                            |                        |                         |            |                  |               |                              |  |
|  |                                     | Q U A N T I T Y                    |                          |                           |                          |                        |                        |                            |                        |                         |            |                  |               |                              |  |
|  | 49188                               |                                    |                          |                           |                          | 2                      |                        |                            |                        | 8                       | 14         | 2                | 14            | 515                          |  |
|  | 49189                               |                                    |                          |                           |                          | 2                      |                        |                            |                        | 8                       | 14         | 2                | 14            | 515                          |  |
|  | 49190                               |                                    | OPT.                     | 3                         | OPT.                     | OPT.                   |                        | OPT.                       | 12                     | OPT.                    | 14         | 2                | 14            | 487                          |  |
|  | 49191                               | 6                                  | OPT.                     | OPT.                      | OPT.                     | OPT.                   |                        | OPT.                       | 18                     | OPT.                    | 14         | 2                | 14            | 490                          |  |
|  | 49192                               |                                    |                          |                           |                          |                        | 2                      |                            |                        | 8                       | 14         | 2                | 14            | 611                          |  |
|  | 49193                               |                                    |                          |                           |                          |                        | 2                      |                            |                        | 8                       | 14         | 2                | 14            | 611                          |  |
|  | 49194                               |                                    | OPT.                     | 3                         | OPT.                     |                        | OPT.                   | OPT.                       | 12                     | OPT.                    | 14         | 2                | 14            | 542                          |  |
|  | 49195                               |                                    | OPT.                     | 3                         | OPT.                     |                        | OPT.                   | OPT.                       | 12                     | OPT.                    | 14         | 2                | 14            | 542                          |  |
|  | 49196                               | 6                                  | OPT.                     | OPT.                      | OPT.                     |                        | OPT.                   | OPT.                       | 18                     | OPT.                    | 14         | 2                | 14            | 545                          |  |

\*\* Also Available in Steel

- **Downloadable Drawings**
- **ACP – Automated Conversion Program**
- **Distributor Locator by Zip Code**

## Premachined Ball Lock Fixture Plates

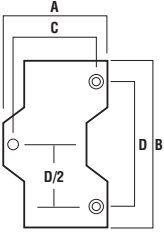
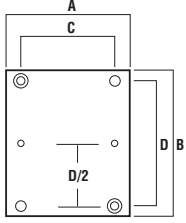
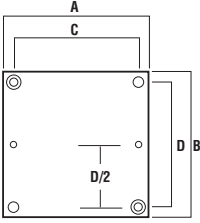
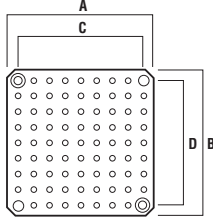
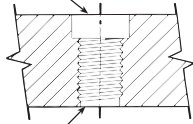
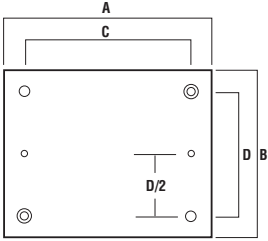
| Part Number |                 |        | Weight<br>(lbs) | Plate<br>Width<br>A | Plate<br>Length<br>B | Liner<br>Center<br>Distance<br>C | Liner<br>Center<br>Distance<br>D | Plate<br>Thickness<br>+/- .005 | Ball Lock<br>Shank<br>Size | Ball Lock<br>Shank<br>Part<br>Number |
|-------------|-----------------|--------|-----------------|---------------------|----------------------|----------------------------------|----------------------------------|--------------------------------|----------------------------|--------------------------------------|
| Aluminum    | Weight<br>(lbs) | Steel  |                 |                     |                      |                                  |                                  |                                |                            |                                      |
| 28706       | 9               | 28806  | 27              | 9.97                | 16                   | 8                                | 12                               | 0.75                           | 20MM X .75                 | 49601                                |
| 28711       | 12              | 28811  | 36              | 12                  | 14                   | 9                                | 12                               | 0.75                           | 20MM X .75                 | 49601                                |
| 28713       | 14              | 28813  | 42              | 14                  | 14                   | 12                               | 12                               | 0.75                           | 20MM X .75                 | 49601                                |
| 28715       | 18              | 28815  | 55              | 16                  | 16                   | 12                               | 12                               | 0.75                           | 20MM X .75                 | 49601                                |
| 28717       | 18              | 28817  | 55              | 16                  | 16                   | 14                               | 14                               | 0.75                           | 20MM X .75                 | 49601                                |
| 28719       | 23              | 28819  | 68              | 20                  | 16                   | 16                               | 12                               | 0.75                           | 20MM X .75                 | 49601                                |
| 28727       | 38              | 28827  | 114             | 20                  | 20                   | 17                               | 17                               | 1                              | 25MM X 1.0                 | 49612                                |
| 28745       | 41              | 28845  | 125             | 22                  | 20                   | 19                               | 17                               | 1                              | 25MM X 1.0                 | 49612                                |
| 28746       | 61              | 28846  | 186             | 26                  | 25                   | 23                               | 22                               | 1                              | 25MM X 1.0                 | 49612                                |
| 28750       | 24              | —      | —               | 28.75               | 12                   | 25                               | 9                                | 0.75                           | 20MM X .75                 | 49601                                |
| —           | —               | *28801 | 80              | 16                  | 16                   | 12                               | 12                               | 1.125                          | 20MM X 1.0                 | 49602                                |

\* Plate requires shank part number 49602 for proper locking. Plate has flame cut edges.

Aluminum fixture plates are made from cast aluminum tool and jig plate.

Steel fixture plates are made from Freemax 15 or equivalent, milled edges, surface ground both sides parallel .001

## Applications

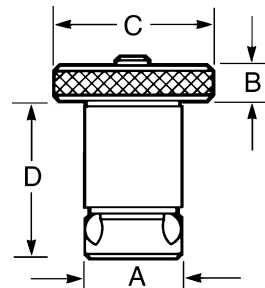
| Jigsaw Interlocking<br>Fixture Plate  | 12" x 14"<br>Fixture Plate   | 20" x 20"<br>16" x 16"<br>14" x 14"<br>Fixture Plate  | 16" x 16"<br>Grid Plate  | 22" x 20"<br>26" x 25"<br>20" x 16"<br>Fixture Plate   |
|---|--|---|--|--|
|  <p>Ideal for any 4" or 6" vise to allow nesting of vises for more parts per run</p> <p>Liners preinstalled</p> |  <p>Ideal for small part fixtures</p> <p>Allows for vise mounting</p> <p>Bored sine key holes for fixture building</p> <p>Liners preinstalled</p> |  <p>Ideal for multiple part fixtures</p> <p>Bored sine key holes for fixture building</p> <p>Liners preinstalled</p> |  <p>(77) 1/2-13 tapped holes and 5/8 bored holes for part locating and clamping</p> <p>Liners preinstalled</p> <p>.625 <math>\pm .0005</math><br/>-.0000<br/>Counterbore</p>  <p>1/2-13 tapped hole</p> |  <p>Ideal for large parts or fixtures</p> <p>Fits some Jergens premachined T-columns for horizontal machines</p> <p>Bored sine key holes for fixture building</p> <p>Liners preinstalled</p> |
| <b>Part Numbers:</b><br>28706<br>28806  | <b>Part Numbers:</b><br>28711<br>28811   | <b>Part Numbers:</b><br>28713    28813<br>28715    28815<br>28717    28817<br>28727    28827  | <b>Part Numbers:</b><br>28801  | <b>Part Numbers:</b><br>28719    28819<br>28745    28845<br>28746    28846<br>28750  |

## Shanks



U.S. Patent No's. 3,498,653  
4,135,418

- Material: Shank/Bushing, 4340  
Liner, 52100
- Finish: Black Oxide
- Heat Treat: Shanks, RC 40-45  
Bushings, RC 50-54  
Liners, RC 62-64



## Ball Lock Repair Kits Available Separately



### Custom Sizes Available

We are able to quote you on your special requirement columns, pre-machined with or without the Ball Lock components installed in place. Call 1-800-537-4367 for design specification information.

### Engineering Changes

Product improvement is a continuing process at Jergens. Specifications and engineering data are subject to change without notice. If current information is critical to your design, it is suggested that you contact Jergens Engineered Product Group to verify any dimensions or specifications.

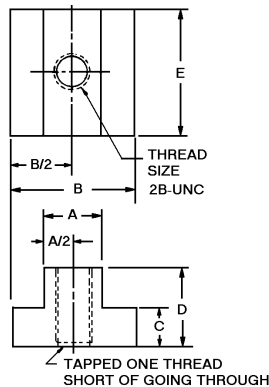
### Each Kit Includes:

- Replacement Screw
- Locking Balls
- Drive Ball
- O-Ring

### Locating Shank Dimensions

| Fixture Plate Thickness<br>±.005 | Shank Part Number | Shank Diameter (mm)<br>A | B   | C    | D    | Maximum Holddown Force (lbs) | Recommended Torque (in/lb) | Hex Wrench Size For Set Screw | Repair Kit Part Number |
|----------------------------------|-------------------|--------------------------|-----|------|------|------------------------------|----------------------------|-------------------------------|------------------------|
| .75                              | <b>49601</b>      | 20                       | .38 | 1.75 | 1.53 | 3,000                        | 35                         | 1/8                           | 49901                  |
| 1.00                             | <b>49602</b>      | 20                       | .38 | 1.75 | 1.78 | 3,000                        | 35                         | 1/8                           | 49902                  |
| .75                              | <b>49611</b>      | 25                       | .38 | 2.00 | 1.70 | 7,000                        | 80                         | 5/32                          | 49911                  |
| 1.00                             | <b>49612</b>      | 25                       | .38 | 2.00 | 1.95 | 7,000                        | 80                         | 5/32                          | 49912                  |

## T-Slot Nuts

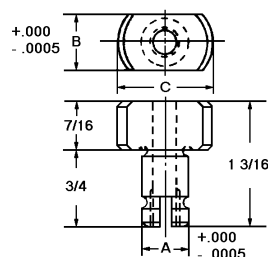


| Part Number  | Thread | T-Slot Width A | B | C     | D   | E     | Wt. (lbs)<br>10 Pcs. |
|--------------|--------|----------------|---|-------|-----|-------|----------------------|
| <b>43306</b> | 1/2-13 | 5/8            | 1 | 11/32 | 5/8 | 1 1/8 | 1.50                 |

- Material: C-1018
- Finish: Black Oxide
- Threads: 2B-UNC (Inch)
- Heat Treat: Case Hardened

The T-Slot Nuts along with supplied socket head cap screws are used to fasten the subplate to the T-Slots existing in the machine table.

## Sine Fixture Keys

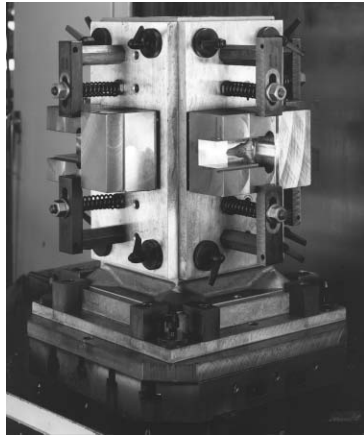


| Part Number  | Shank Size A | Slot Size B | C | Wt. (Lbs) |
|--------------|--------------|-------------|---|-----------|
| <b>39503</b> | .625         | .6245       | 1 | .11       |

- Material: 4140
- Heat Treat: 26-30

The sine fixture keys are used to quickly align and position the subplate to the T-Slots in the machine table using the bored sine key holes in the subplate. The unique expansion shaft allows the key to be locked in the underside of the subplate by using a standard hex wrench.

## Accurately Locate and Lock Fixture Plates to Subplates In Seconds...



00:60

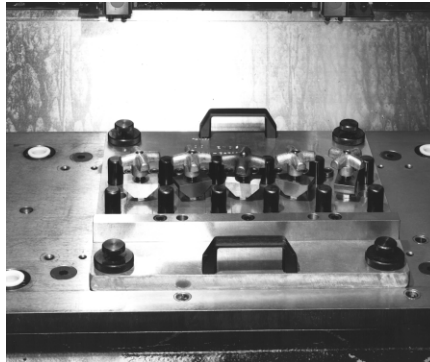
### Machining Cast Part

**Previous Set Up Method:**  
Located part with dowel pins, bolted part to tombstone fixture. Indicated part to zero datum point.

**Previous Set-Up Time:**  
15 minutes

**Set Up Using Ball Lock System:**  
Mount parts to fixture plate while machining other parts. Mount fixture plate to tombstone using Ball Lock shanks. No indicating required because system provides  $\pm .0005$  repeatability.

**Set Up Time With Ball Lock System:**  
60 seconds



00:60

### CNC Machine Base:

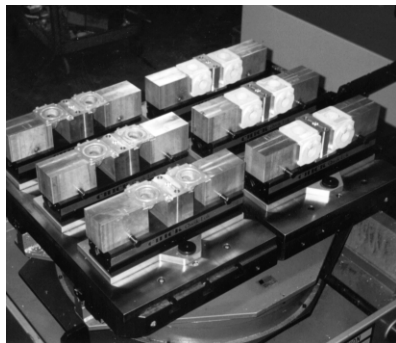
Drilling and reaming forged part.

**Previous Set Up Method:**  
Fixture plate located with dowel pins bolted to machine base. Fixture plate and parts indicated.

**Previous Set Up Time:**  
7 minutes

**Set Up Using Ball Lock System:**  
Parts are pre-mounted on fixture plate, which is then mounted to machine base using Ball Lock shanks. No need to indicate.

**Set Up Time with Ball Lock System:**  
60 seconds



01:20

### CNC Vertical Machining Center

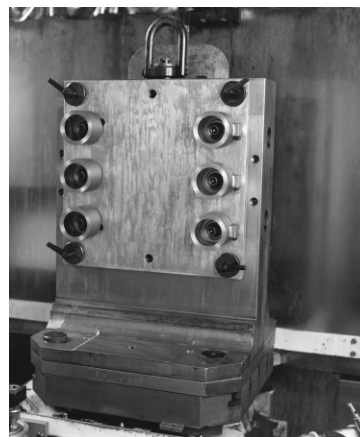
Machining aircraft valve parts

**Previous Set Up Method:**  
New Project. New Machine. No Prior History.

**Previous Set Up Time:**  
New Set Up.

**Set Up Using Ball Lock System:**  
Using Ball Lock Jig Saw Plate on Multi-Purpose Subplate enables operator to mount two more vises on the fixture. No indicating needed.

**Set Up Time With Ball Lock System:**  
80 seconds setting up six vises.



00:45

### Two-Sided Tombstone:

Drilling and tapping cylindrical bodies.

**Previous Set Up Method:**  
Fixture located and bolted to tombstone. Had to be indicated.

**Previous Set Up Time:**  
12 minutes

**Set Up Using Ball Lock System:**  
Fixture plate mounted and located with Ball Lock shanks. No need to indicate.

**Set Up Time with Ball Lock System:**  
45 seconds

## ...With No Indicating Required

## Benefits of Set-Up Reduction (Capacity)

### Current Method:

Minutes per set-up = \_\_\_\_\_ minutes

Number of set-ups per 8 hour shift = \_\_\_\_\_ set-ups

Total minutes of set-up per shift  
(*set-up minutes x number of set-ups*) = \_\_\_\_\_ minutes

Example (actual case study):  
60 minutes

1.5 set-ups

90 minutes

### Using the Ball Lock System:

Minutes per set-up = \_\_\_\_\_ minutes

Number of set-ups per 8 hour shift = \_\_\_\_\_ set-ups

Total minutes of set-up per shift  
(*set-up minutes x number of set-ups*) = \_\_\_\_\_ minutes

Increased capacity per machine per shift  
(*current method - Ball Lock method*) = \_\_\_\_\_ minutes

Savings per machine per shift = \_\_\_\_\_ minutes

Increased capacity  
(*number of minutes / 60*) = \_\_\_\_\_ hours

8 minutes

1.5 set-ups

12 minutes

78 minutes

78 minutes

1.3 hours

## Benefits of Set-Up Reduction (Profit)

Machine cost per hour = \_\_\_\_\_ \$

Increased production hours per shift  
(*increased capacity from above*) = \_\_\_\_\_ hours

Savings (profit) per machine per shift  
(*machine cost per hour x increased production hours*) = \_\_\_\_\_ \$

\$80.00

1.3 hours

\$104.00

# Quick Change Tooling From Jergens

...Also Available For Horizontal Machine Centers



**Free CD! Ball Lock System In Action**  
Call for your copy of the Ball Lock demonstration CD,  
or visit Jergens Website

**Jergens**  
[www.jergensinc.com](http://www.jergensinc.com)

Jergens, Inc. • 15700 S. Waterloo Rd. • Cleveland, Ohio 44110-3898  
(216) 486-5540 • (800) 537-4367 • Fax: (216) 481-6193



Quality System Certified  
Registration #9711001