

D-M-E 2-Stage Ejectors

POSITIVE, PRECISION CONTROL
OF TWO-STAGE EJECTION



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Benefits

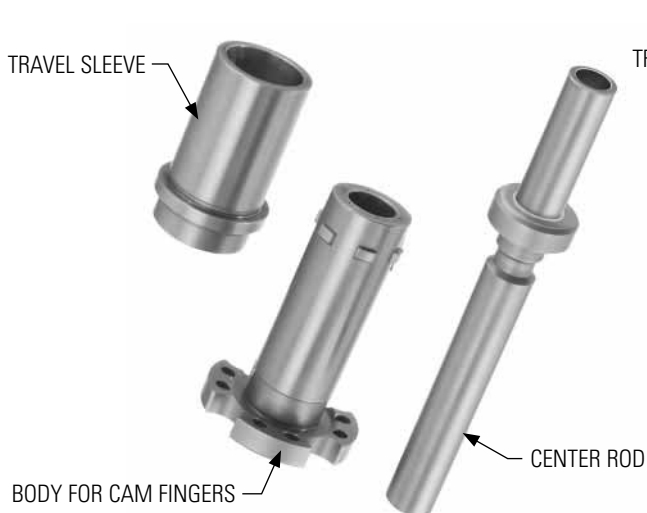
Positive, Precise Plate Control

D-M-E 2-Stage Ejectors (TS) adapt to a number of mold base sizes and plate thicknesses. They are available in two ejection sequences: Top Last (TL) and Bottom Last (BL). Each ejection sequence is available in three sizes to accommodate most standard D-M-E mold bases. The stroke range for each ejection stage is determined and fixed by the customer by cutting the Center Rod to the desired length (both TL and BL types) and by also cutting the Travel Sleeve to the desired length (BL type only). Once installed, the D-M-E 2-Stage Ejector ensures positive, precise control of the sequence and distance of each stroke of the two ejector plates. Once installed, there are no adjustments that can be accidentally changed.

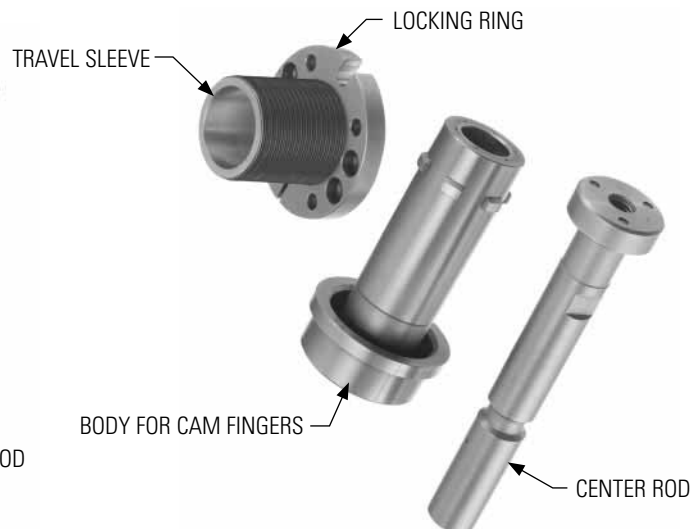
Benefits

- Both the first stage and second stage strokes are set independently
- Easy set-up and installation
- Fixed strokes cannot be tampered with or accidentally modified
- Internal installation – avoids interferences with water line connectors and externally mounted components
- Utilizes latching mechanism similar to D-M-E Internal Latch Lock for smooth operation and guidance
- Three sizes to choose from for each style, to accommodate most standard D-M-E mold bases
- Hardened steel components for long life

Top Last Subcomponents



Bottom Last Subcomponents



NOTE: Puller Pins are not shown. Puller Pins must be purchased separately.

Size and Quantity Selection Guidelines

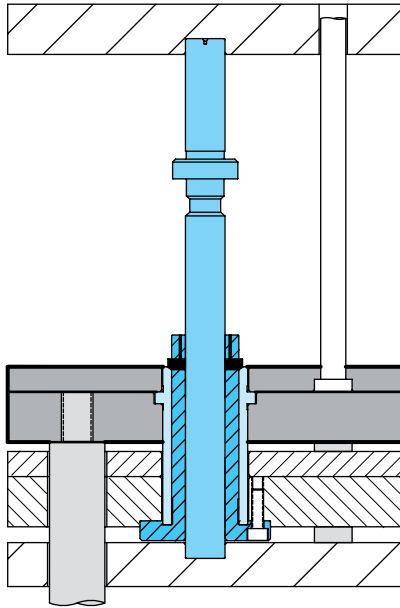
- Select 20mm diameter (small), 26mm diameter (medium), or 32mm diameter (large) 2-Stage Ejector based on the width of the mold base (large molds, thick plates or heavy load applications may require the next size assembly).
- Determine the travel range for each ejection stroke (first and second), being careful not to exceed the maximum stroke specified for the chosen 2-Stage Ejector style and size. This selection is based on the specific application.
- In general, a minimum of two 2-Stage Ejectors are required. For larger molds, thick plates, or an application where loads are near maximum, additional assemblies and/or larger assemblies may be required. An application must never exceed the maximum recommended load values.
- A balanced load must be maintained to avoid cocking and binding which could cause severe overloading. Only one size of 2-Stage Ejectors should be used in each mold base.

View a 2-Stage Ejectors animation at www.dme.net/2stage

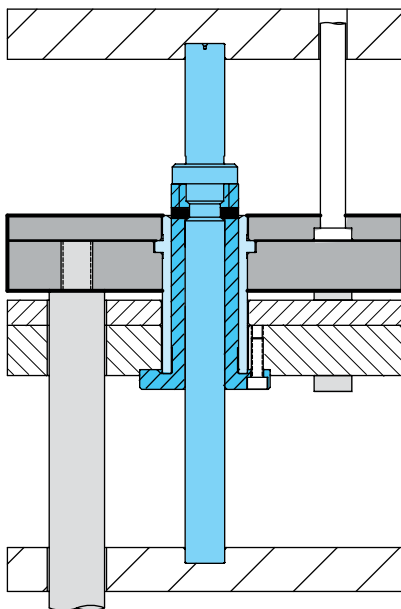
| 2-STAGE EJECTOR ASSEMBLY ITEM NUMBER | BASIC CENTER ROD DIA | STROKE 1 | | STROKE 2 | | RECOMMENDED MAXIMUM MOLD BASE WIDTH | MAXIMUM RECOMMENDED LOAD VALUES (PER ASS'Y) | | |
|--|----------------------|----------|---------|----------|---------|--|---|-----------|----|
| | | MINIMUM | MAXIMUM | MINIMUM | MAXIMUM | | STATIC | DYNAMIC | |
| 2-STAGE EJECTOR TOP LAST (TS TL) | | | | | | | | | |
| TS TL 20 A | 20mm (Small) | 1.0 | 79.0 | 4.0 | 79.0 | Up to 200mm, 1 TL-20 Up to 450mm, 2 TL-20 | 5.8 kN | 0.58 kN | mm |
| | | .04 | 3.11 | .16 | 3.11 | Up to 8", 1 TL 20 Up to 18", 2 TL 20 | 1300 lbf | 130.0 lbf | in |
| TS TL 26 A | 26mm (Medium) | 1.0 | 84.0 | 6.0 | 84.0 | Up to 450mm, 1 TL 26 Up to 600mm, 2 TL 26 | 10.8 kN | 1.08 kN | mm |
| | | .04 | 3.31 | .24 | 3.31 | Up to 18", 1 TL 26 Up to 26", 2 TL 26 | 2428 lbf | 242.8 lbf | in |
| TS TL 32 A | 32mm (Large) | 1.0 | 92.0 | 8.0 | 92.0 | Up to 600mm, 1 TL 32 Up to 900mm, 2 TL 32 | 19.6 kN | 1.96 kN | mm |
| | | .04 | 3.62 | .31 | 3.62 | Up to 26", 1 TL 32 Up to 35.5", 2 TL 32 | 4406 lbf | 440.6 lbf | in |
| 2-STAGE EJECTOR BOTTOM LAST (TS BL) | | | | | | | | | |
| TS BL-20 A* | 20mm (Small) | 8.0 | 82.0 | 12.0 | 82.0 | Up to 200mm, 1 BL-20 Up to 450mm, 2 BL-20 | 5.8 kN | 0.58 kN | mm |
| | | .32 | 3.23 | .47 | 3.23 | Up to 8", 1 BL-20 Up to 18", 2 BL-20 | 1300 lbf | 130.0 lbf | in |
| TS BL-26 A* | 26mm (Medium) | 10.0 | 92.0 | 18.0 | 92.0 | Up to 450mm, 1 BL-26 Up to 600mm, 2 BL-26 | 10.8 kN | 1.08 kN | mm |
| | | .40 | 3.62 | .71 | 3.62 | Up to 18", 1 BL-26 Up to 26", 2 BL-26 | 2428 lbf | 242.8 lbf | in |
| TS BL-32 A* | 32mm (Large) | 12.0 | 102.0 | 24.0 | 102.0 | Up to 600mm, 1 BL-32 Up to 900mm, 2 BL-32 | 19.6 kN | 1.96 kN | mm |
| | | .47 | 4.02 | .95 | 4.02 | Up to 26", 1 BL-32 Up to 35.5", 2 BL-32 | 4406 lbf | 440.6 lbf | in |

*Puller Pins are **not** included with BL Assemblies and must be ordered separately.

Top Last Sequencing

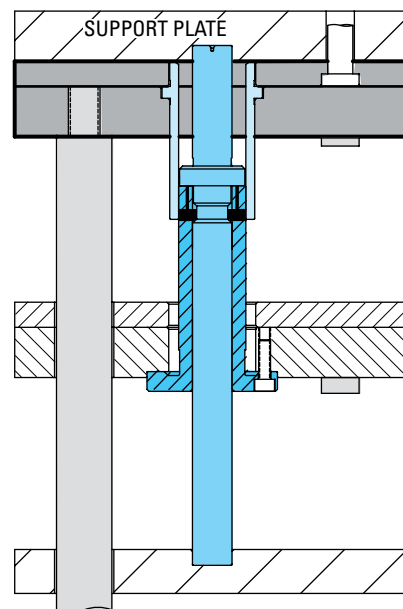


1. Ejector Plates Back



2. First Ejector Stroke

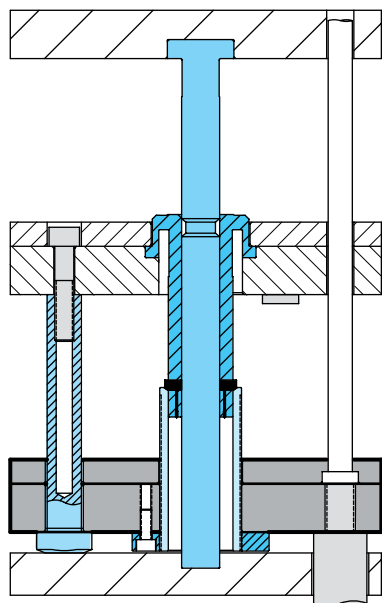
After a predetermined amount of travel, the latch mechanism latches onto the Center Rod, thereby fixing the position of the bottom (moving platen side) ejector plate assembly.



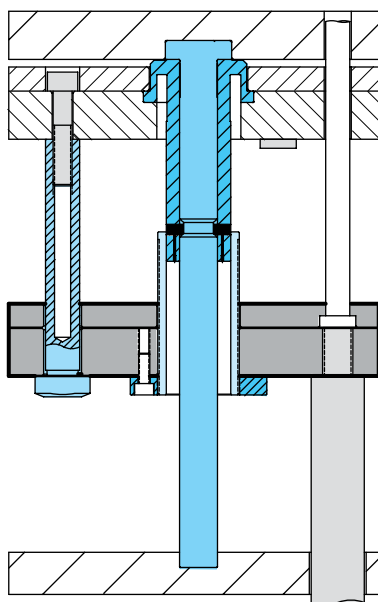
3. Second Ejector Stroke

The top (stationary platen side) ejector plate assembly continues to move through the "second" (or remaining) stroke until the top ejector plate assembly contacts the bottom of the support plate.

Bottom Last Sequencing

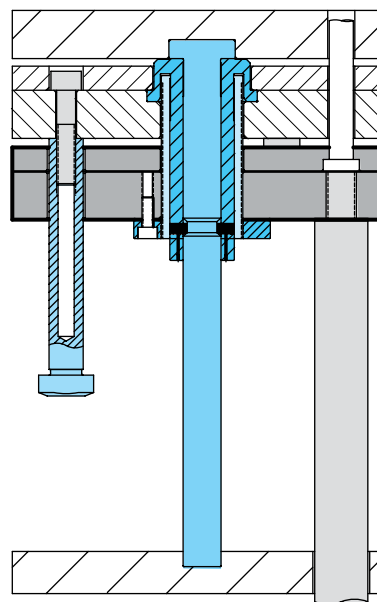


1. Ejector Plates Back



2. First Ejector Stroke

After a predetermined amount of travel, the latch mechanism latches onto the Center Rod, thereby fixing the position of the top (stationary platen side) ejector plate assembly.



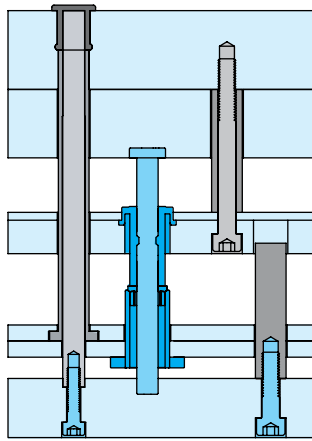
3. Second Ejector Stroke

The bottom (moving platen side) ejector plate assembly continues to move through the "second" (or remaining) stroke until the bottom ejector plate assembly contacts the top ejector plate assembly.

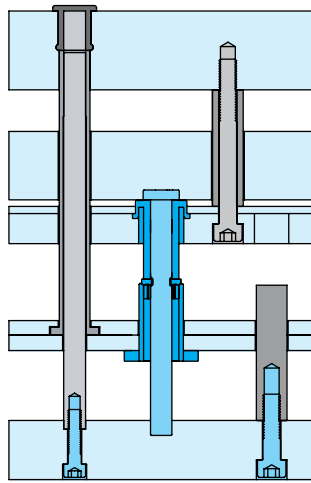
Application Examples

2-Stage Ejector Bottom Last Application Example 1

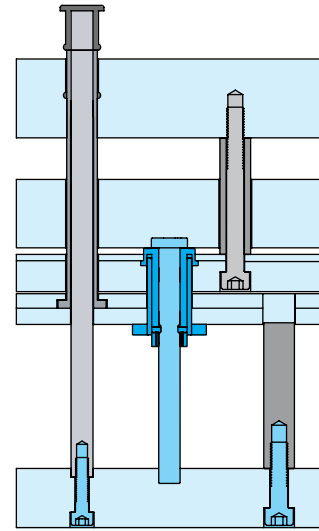
1. First ejector stroke lifts cavity plate and ejector sleeve. Center pin remains back. Part is free to be ejected.
2. Second stroke moves the ejector sleeve, releasing the part from cavity. **This configuration is recommended for parts with outside details with smooth or round edges.**



1. Ejector Plates Back



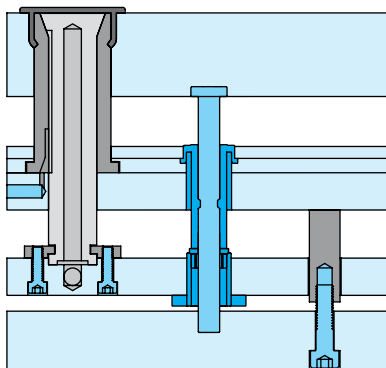
2. First Ejector Stroke



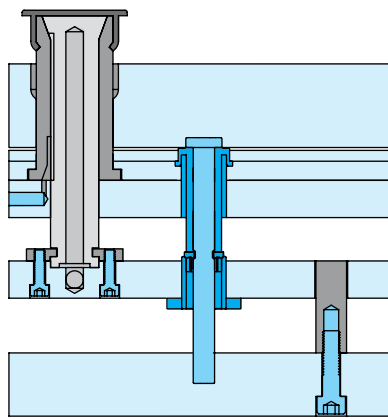
3. Second Ejector Stroke

2-Stage Ejector Bottom Last Application Example 2

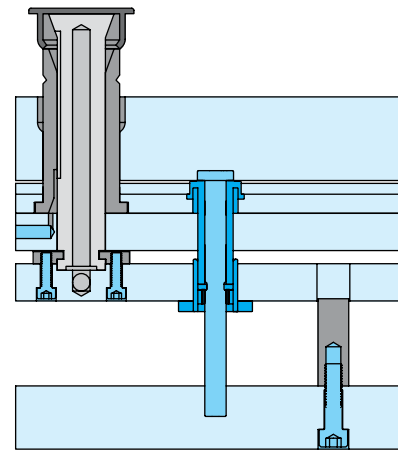
1. First ejector stroke pulls the central core pin and sleeve forward. Part is released from cavity.
2. Second stroke pulls the center pin and part forward. Because of plastic elasticity the part is stripped from core. **Recommended for parts with an inner undercut – a circular detail placed on the edge (for example, inward undercut).**



1. Ejector Plates Back



2. First Ejector Stroke

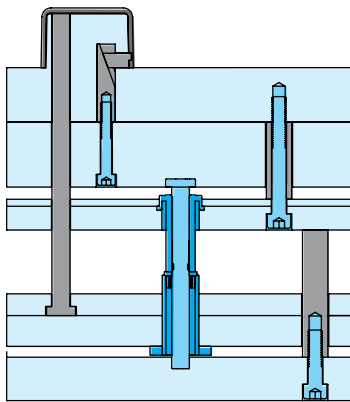


3. Second Ejector Stroke

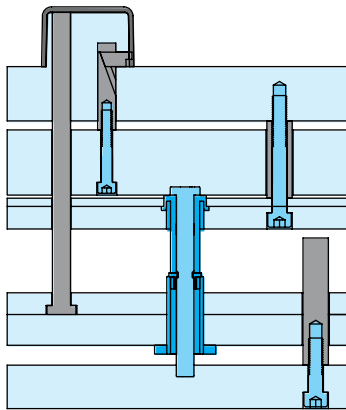
Application Examples

2-Stage Ejector Bottom Last – TSBL Application Example 3

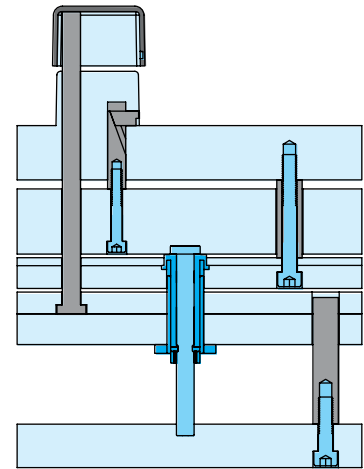
1. First ejector stroke moves forward the cavity plate with inner plate. This movement is forcing the edge to move inward. At the end of the stroke the edge clears the inner undercut.
2. Second stroke actuates the ejector pin. This releases the part from the core. **This configuration is recommended for parts with non-circular deep undercut details.**



1. Ejector Plates Back



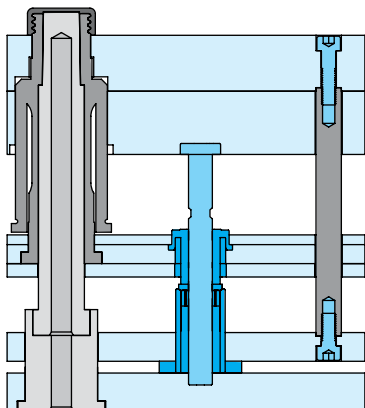
2. First Ejector Stroke



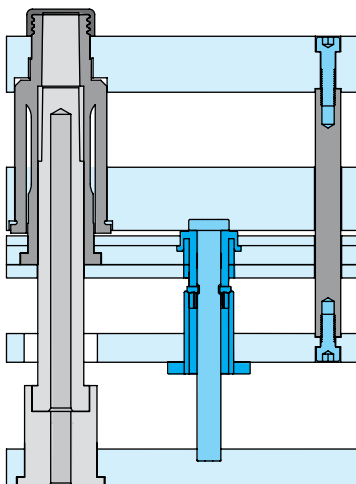
3. Second Ejector Stroke

2-Stage Ejector Bottom Last – TSBL Application Example 4

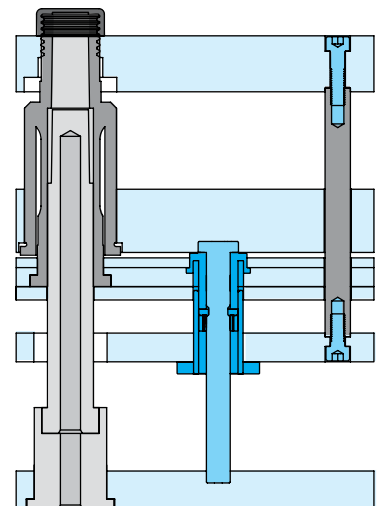
1. First ejector stroke lifts the collapsible core off the center pin. Collapse segments retract. After a certain traveling distance, when puller pin is clearing the inner side of segments, the positive collapse sleeve is actuated for positive collapse.
2. Second stroke moves the stripper plate past the end of the core so the part can be ejected from the mold. **This configuration is recommended for complex undercuts, collapsible core applications.**



1. Ejector Plates Back



2. First Ejector Stroke

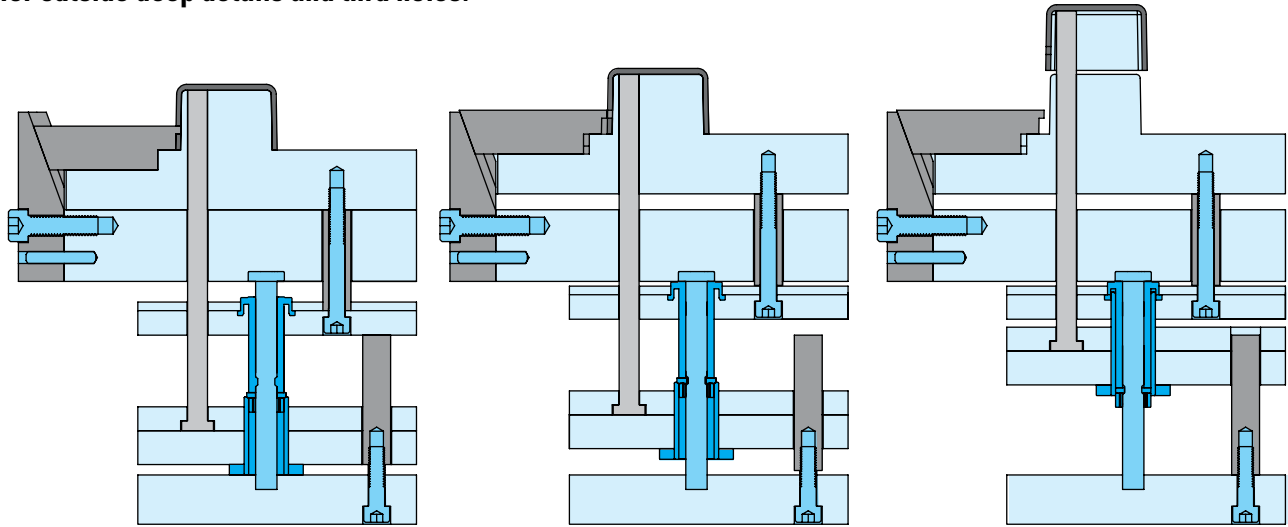


3. Second Ejector Stroke

Application Examples

2-Stage Ejector Bottom Last – TSBL Application Example 5

1. First ejector stroke moves the angle slide up. As a result the horizontal slide with the exterior detail pulls away from the part.
2. Second stroke actuates the ejector pin. Part is lifted behind the inner cavity. **This configuration is recommended for outside deep details and thru holes.**



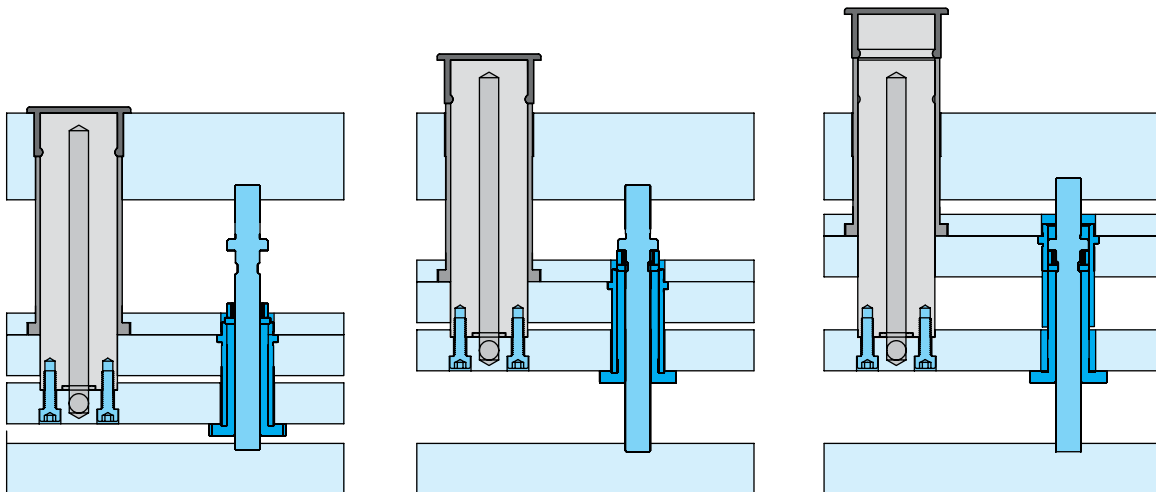
1. Ejector Plates Back

2. First Ejector Stroke

3. Second Ejector Stroke

2-Stage Ejector Top Last – TSTL Application Example

1. First ejector stroke lifts part, central pin and ejector bushing out of “B” plate.
2. Second stroke actuates the ejector bushing and the part is pushed out of the central pin core. **This configuration is recommended for inner undercuts with round, smooth edges.**

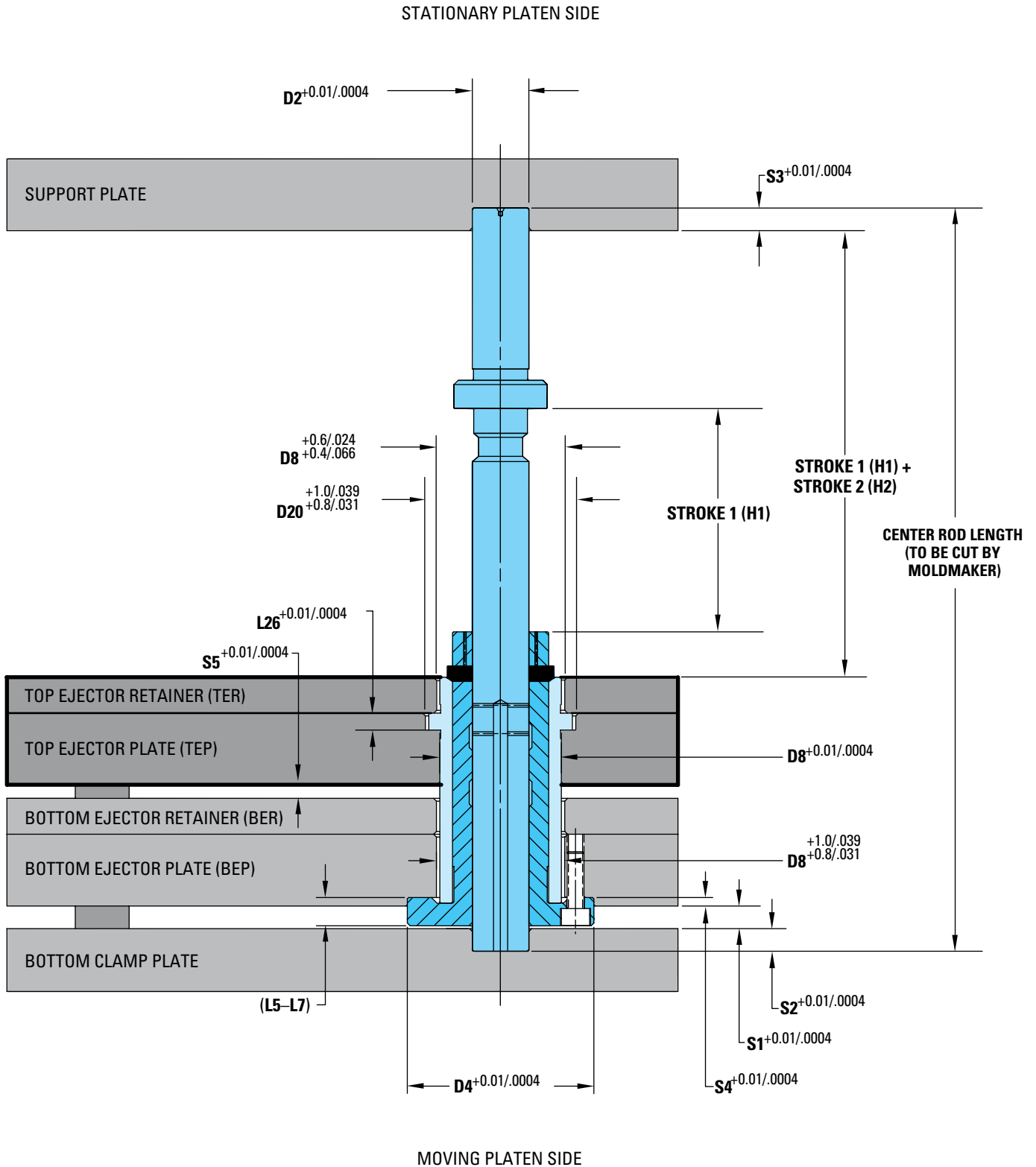


1. Ejector Plates Back

2. First Ejector Stroke

3. Second Ejector Stroke

Assembly and Installation Information – Top Last



- Tolerances depicted here are installation tolerances
- See component detail drawings for specific component tolerances
- Refer to applicable tables for nominal dimension

Assembly and Installation Information – Top Last

Top Last – TSTL

| ITEM NUMBER | CENTER ROD DIA | CENTER ROD LENGTH | H1 – STROKE 1 ⁽²⁾ | | H2 – STROKE 2 ⁽³⁾ | | |
|---|----------------|-------------------|------------------------------|---------|------------------------------|---------|----|
| | | | MINIMUM | MAXIMUM | MINIMUM | MAXIMUM | |
| 2-STAGE EJECTOR TOP-LAST (TS-TL) | | | | | | | |
| TS TL-20 A | 20mm (Small) | 262.96 | 1.0 | 79.0 | 4.0 | 79.0 | mm |
| | | 10.353 | .04 | 3.11 | .16 | 3.11 | in |
| TS TL-26 A | 26mm (Medium) | 285.32 | 1.0 | 84.0 | 6.0 | 84.0 | mm |
| | | 11.233 | .04 | 3.31 | .24 | 3.31 | in |
| TS TL-32 A | 32mm (Large) | 316.68 | 1.0 | 92.0 | 8.0 | 92.0 | mm |
| | | 12.468 | .04 | 3.62 | .31 | 3.62 | in |

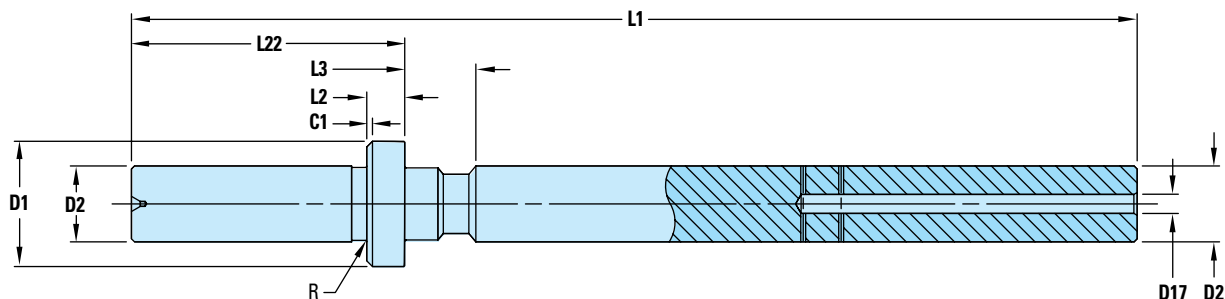
| ITEM NUMBER | CENTER ROD DIA | BEP | BER | TEP | TER | S1 | S2 | S3 | S4 | S5 | |
|---|----------------|-------|-------|-------|-------|-------|-------|-------|------|------|----|
| 2-STAGE EJECTOR TOP-LAST (TS-TL) | | | | | | | | | | | |
| TS TL-20 A | 20mm (Small) | 25.40 | 12.70 | 25.40 | 12.70 | 8.00 | 8.00 | 8.00 | 3.00 | 4.76 | mm |
| | | 1.000 | .500 | 1.000 | .500 | .315 | .315 | .315 | .118 | .188 | in |
| TS TL-26 A | 26mm (Medium) | 28.58 | 12.70 | 28.58 | 12.70 | 10.00 | 10.00 | 10.00 | 4.00 | 4.76 | mm |
| | | 1.125 | .500 | 1.125 | .500 | .394 | .394 | .394 | .157 | .188 | in |
| TS TL-32 A | 32mm (Large) | 28.58 | 15.88 | 28.58 | 15.88 | 15.00 | 12.00 | 12.00 | 4.00 | 4.76 | mm |
| | | 1.125 | .625 | 1.125 | .625 | .591 | .472 | .472 | .157 | .188 | in |

Assembly and Installation Guidelines

- At end of first stroke, Body for Cam Fingers must seat firmly against Center Rod flange.
- The Body must not apply full static pressure against Cam Fingers at end of first stroke.
- The moldmaker must cut and/or grind the Center Rod to the required length prior to installation of the 2-Stage Ejector assembly into the mold base. Do not cut off more than the minimum stroke (H2). The recommended tolerance on the Center Rod length after the customer has cut the Center Rod is +0/-0.02mm or less.
- Stroke 1 (H1) is reduced by cutting and/or grinding the moving platen end of the Center Rod.
- Stroke 2 (H2) is reduced by cutting and/or grinding the stationary platen end of the Center Rod. Minimum H2 specified in table does not include additional stop pins to stationary-side spacer plate. To reduce H2 even further than what is specified in table, add stop pins.
- All 2-Stage Ejectors in a mold must be cut to the same strokes.
- It is recommended that guided ejection be used.
- Ejector speed must be controlled, ensuring that excessive shock loading does not occur.
- 2-Stage Ejectors are not suitable for severe load conditions.
- 2-Stage Ejectors must not be exposed to temperatures that exceed 150°C (300°F) at any time.
- Lubricate all metal-to-metal contact areas initially and periodically as required. A good grade of moldmakers non-melting type grease for the appropriate temperature should be used.

Component Information – Top Last

Center Rod – CR

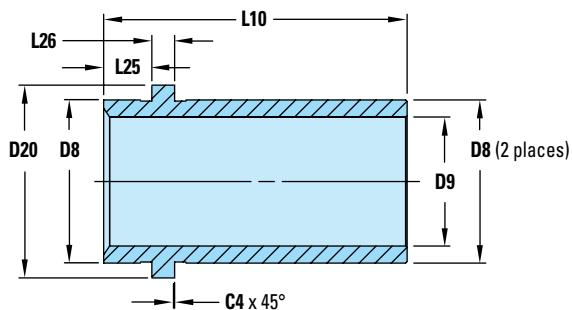


| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D1 DIA | D2 DIA | D17 DIA | L1* LENGTH | L2 THICK | L3 LENGTH | L22** LENGTH | C1 CHAMFER | R RADIUS | |
|----------------------|----------------|-----------------------|--------|-------------------------|---------|------------|----------|-----------|--------------|------------|----------|----|
| TS-TL-20 | 20mm (Small) | TS-TL-20-CR | 33.0 | 20.0 ^{-0.01} | 5.0 | 265 | 10.0 | 18.74 | 72.0 | 1.5 | .4 | mm |
| | | | 1.30 | 0.787 ^{-0.004} | .20 | 10.43 | .39 | .738 | 2.83 | .06 | .02 | in |
| TS-TL-26 | 26mm (Medium) | TS-TL-26-CR | 42.0 | 26.0 ^{-0.01} | 6.0 | 290 | 12.0 | 22.93 | 76.0 | 2.0 | .8 | mm |
| | | | 1.65 | 1.024 ^{-0.004} | 2.4 | 11.42 | .47 | .903 | 2.99 | .08 | .03 | in |
| TS-TL-32 | 32mm (Large) | TS-TL-32-CR | 53.0 | 32.0 ^{-0.01} | 6.0 | 320 | 15.0 | 28.25 | 82.0 | 2.5 | .8 | mm |
| | | | 2.09 | 1.260 ^{-0.004} | .24 | 12.60 | .59 | 1.112 | 3.23 | .10 | .03 | in |

*Cutoff on both ends of Center Rod only per installation data.

**Final length must have tolerance of -0.02mm (-0.001in) after moldmaker has cut the Center Rod to the desired length.

Travel Sleeve – TS

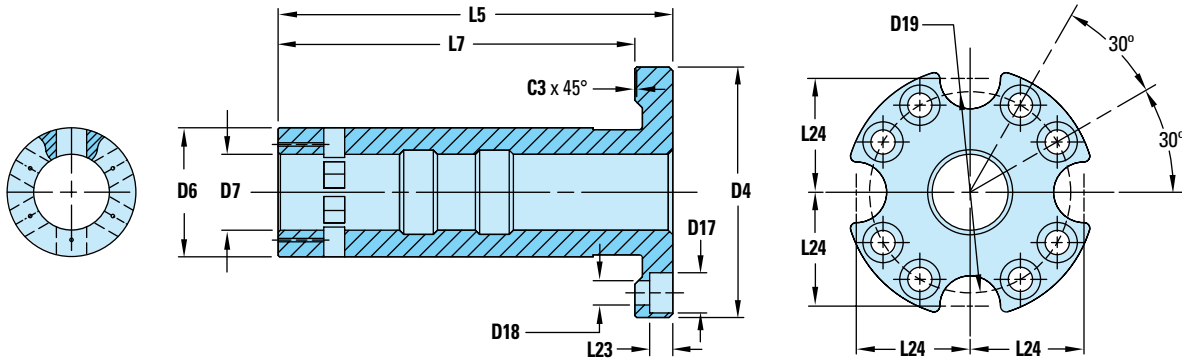


| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D8 DIA | D9 DIA | D20 DIA | L10 LENGTH | L25 LENGTH | L26 THICK | C4 CHAMFER | |
|----------------------|----------------|-----------------------|-------------------------|--------|---------|------------|------------|------------------------|------------|----|
| TS-TL-20 | 20mm (Small) | TS-TL-20-TS | 43.0 ^{-0.03} | 34.0 | 50.8 | 79.96 | 12.70 | 6.00 ^{-0.01} | .5 | mm |
| | | | 1.693 ^{-0.001} | 1.34 | 2.00 | 3.148 | .500 | .236 ^{-0.004} | .02 | in |
| TS-TL-26 | 26mm (Medium) | TS-TL-26-TS | 54.0 ^{-0.03} | 43.0 | 63.0 | 85.32 | 12.70 | 8.00 ^{-0.01} | .5 | mm |
| | | | 2.126 ^{-0.001} | 1.69 | 2.48 | 3.359 | .500 | .315 ^{-0.004} | .02 | in |
| TS-TL-32 | 32mm (Large) | TS-TL-32-TS | 68.0 ^{-0.03} | 54.0 | 78.0 | 93.68 | 15.88 | 10.00 ^{-0.01} | .5 | mm |
| | | | 2.677 ^{-0.001} | 2.13 | 3.07 | 3.688 | .625 | .394 ^{-0.004} | .02 | in |

NOTES: All dimensions shown for components are intended for drawing layout purposes only and in some cases have been rounded off. Also, where the same diameter dimension is shown for parts that fit together, the tolerances create the appropriate clearance or fit.

Component Information – Top Last

Body for Cam Fingers – BD (Body only without Cam Fingers)

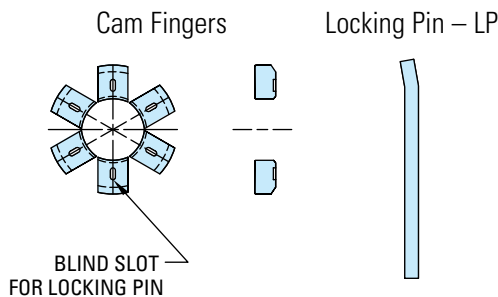


| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D4 DIA | D6 DIA | D7 DIA | D17 DIA | D18 DIA | D19 DIA | |
|----------------------|----------------|-----------------------|-------------------------|--------|--------|---------|---------|---------|----|
| TS-TL-20 | 20mm (Small) | TS-TL-20-BD | 66.00 ^{-0.03} | 34.0 | 20.0 | 10.6 | 6.4 | 53.0 | mm |
| | | | 2.598 ^{-0.001} | 1.34 | .79 | .42 | .25 | 2.09 | in |
| TS-TL-26 | 26mm (Medium) | TS-TL-26-BD | 84.00 ^{-0.03} | 43.0 | 26.0 | 13.8 | 8.7 | 67.0 | mm |
| | | | 3.307 ^{-0.001} | 1.69 | 1.02 | .54 | .34 | 2.64 | in |
| TS-TL-32 | 32mm (Large) | TS-TL-32-BD | 105.00 ^{-0.03} | 54.0 | 32.0 | 16.8 | 10.8 | 85.0 | mm |
| | | | 4.134 ^{-0.001} | 2.13 | 1.26 | .66 | .43 | 3.35 | in |

| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | L5 LENGTH | L7 LENGTH | L23 LENGTH | L24 LENGTH | C3 CHAMFER | |
|----------------------|----------------|-----------------------|-----------|-----------|------------|------------|------------|----|
| TS-TL-20 | 20mm (Small) | TS-TL-20-BD | 104.0 | 94.0 | 6.1 | 30.0 | .5 | mm |
| | | | 4.09 | 3.70 | .24 | 1.18 | .02 | in |
| TS-TL-26 | 26mm (Medium) | TS-TL-26-BD | 116.0 | 103.0 | 8.2 | 37.0 | .5 | mm |
| | | | 4.57 | 4.06 | .32 | 1.46 | .02 | in |
| TS-TL-32 | 32mm (Large) | TS-TL-32-BD | 131.0 | 113.4 | 10.2 | 47.0 | .6 | mm |
| | | | 5.16 | 4.46 | .40 | 1.85 | .02 | in |

Cam Finger Replacement Kit – KT

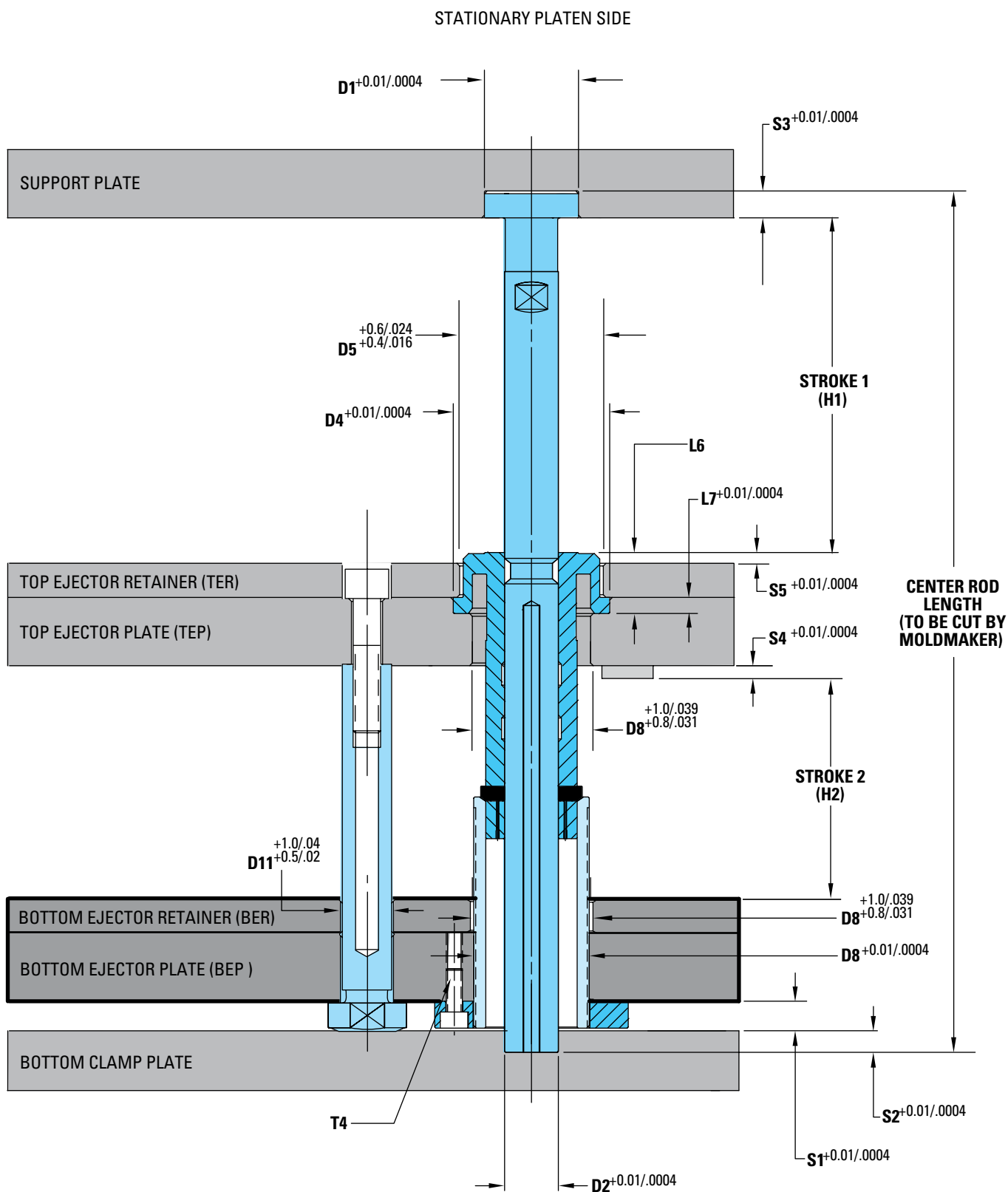
With (6) Cam Fingers, and (8) Locking Pins



| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | KIT ITEM NUMBER |
|----------------------|----------------|-----------------|
| TS-TL-20 | 20mm (Small) | TS-TL-20-KT |
| TS-TL-26 | 26mm (Medium) | TS-TL-26-KT |
| TS-TL-32 | 32mm (Large) | TS-TL-32-KT |

NOTES: All dimensions shown for components are intended for drawing layout purposes only and in some cases have been rounded off. Also, where the same diameter dimension is shown for parts that fit together, the tolerances create the appropriate clearance or fit.

Assembly and Installation Information – Bottom Last



2-Stage Ejectors | Assembly and Installation Information – Bottom Last

Assembly and Installation Information – Bottom Last

Bottom Last – TSBL

| ITEM NUMBER | CENTER ROD DIA | CENTER ROD LENGTH | TRAVEL SLEEVE LENGTH | H1 – STROKE 1 ⁽³⁾ | | H2 – STROKE 2 ⁽⁴⁾ | | |
|--|----------------|-------------------|----------------------|------------------------------|---------|------------------------------|---------|----|
| | | | | MINIMUM | MAXIMUM | MINIMUM | MAXIMUM | |
| 2-STAGE EJECTOR BOTTOM LAST (TS BL) | | | | | | | | |
| TS BL-20 A | 20mm (Small) | 277.96 | 86.00 | 8.0 | 82.0 | 12.0 | 82.0 | mm |
| | | 10.943 | 3.386 | .32 | 3.23 | .47 | 3.23 | in |
| TS BL-26 A | 26mm (Medium) | 311.32 | 94.00 | 10.0 | 92.0 | 18.0 | 92.0 | mm |
| | | 12.257 | 3.701 | .39 | 3.62 | .71 | 3.62 | in |
| TS BL-32 A | 32mm (Large) | 352.21 | 105.00 | 12.0 | 102.0 | 24.0 | 102.0 | mm |
| | | 13.867 | 4.134 | .47 | 4.02 | .94 | 4.02 | in |

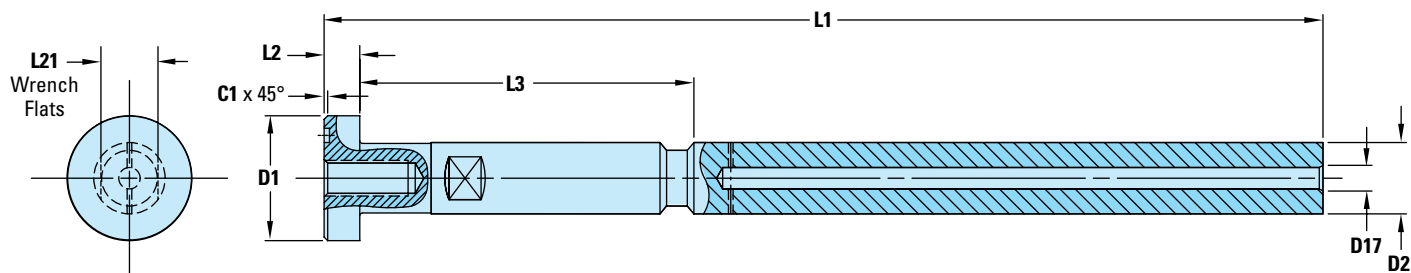
| ITEM NUMBER | CENTER ROD DIA | BEP | BER | TEP | TER | T4 | S1 | S2 | S3 | S4 | S5 | |
|--|----------------|-------|-------|-------|-------|-----|-------|-------|-------|------|------|----|
| 2-STAGE EJECTOR BOTTOM LAST (TS BL) | | | | | | | | | | | | |
| TS BL-20 A | 20mm (Small) | 25.40 | 12.70 | 25.40 | 12.70 | M6 | 11.00 | 8.00 | 10.00 | 4.76 | 4.00 | mm |
| | | 1.000 | .500 | 1.000 | .500 | M6 | .433 | .315 | .394 | 1.86 | .157 | in |
| TS BL-26 A | 26mm (Medium) | 28.58 | 12.70 | 28.58 | 12.70 | M8 | 14.00 | 10.00 | 12.00 | 4.76 | 4.00 | mm |
| | | 1.125 | .500 | 1.125 | .500 | M8 | .551 | .394 | .472 | 1.86 | .157 | in |
| TS BL-32 A | 32mm (Large) | 28.58 | 15.88 | 28.58 | 15.88 | M10 | 17.00 | 12.00 | 14.00 | 6.29 | 6.00 | mm |
| | | 1.125 | .625 | 1.125 | .625 | M10 | .669 | .472 | .551 | .248 | .238 | in |

Assembly and Installation Guidelines

- At end of second stroke, Body for Cam Fingers must seat firmly against Center Rod head or spacer plate.
- The moldmaker must cut and/or grind the Center Rod to the required length prior to installation of the 2-Stage Ejector assembly into the mold base. The recommended tolerance on the Center Rod length after the customer has cut the Center Rod is +0/-0.02mm or less.
- The moldmaker must cut and/or grind the Travel Sleeve to the required length prior to installation of the 2-Stage Ejector assembly into the mold base.
- Stroke 1 (H1) is reduced by cutting and/or grinding the moving platen end of the Center Rod.
- Stroke 2 (H2) is reduced by cutting and/or grinding the moving platen end of both the Center Rod and the Travel Sleeve.
- All 2-Stage Ejectors in a mold must be cut to the same strokes.
- It is recommended that guided ejection be used.
- Ejector speed must be controlled, ensuring that excessive shock loading does not occur.
- 2-Stage Ejectors are not suitable for severe load conditions.
- 2-Stage Ejectors must not be exposed to temperatures that exceed 150°C (300°F) at any time.
- Lubricate all metal-to-metal contact areas initially and periodically as required. A good grade of moldmakers non-melting type grease for the appropriate temperature should be used.
- A minimum of (4) Puller Pins should be used with each mold. Larger molds may require additional Puller Pins.
- The moldmaker must cut and/or grind the Puller Pins to the required length.
- Puller Pins are **not** included with Bottom Last Assemblies and must be ordered separately.

Component Information – Bottom Last

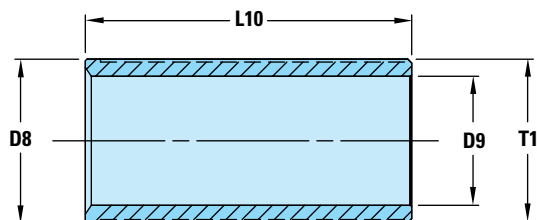
Center Rod – CR



| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D1 DIA | D2 DIA | D17 DIA | L1* LENGTH | L2 THICK | L3 LENGTH | L21 FLATS | C1 CHAMFER | |
|----------------------|----------------|-----------------------|--------------------------|--------------------------|---------|------------|------------------------|-----------|-----------|------------|----|
| TS-BL-20 | 20mm (Small) | TS-BL-20-CR | 34.0 ^{-0.01} | 20.0 ^{-0.01} | 6.0 | 280.0 | 10.0 ^{+0.02} | 93.66 | 16.0 | 1.0 | mm |
| | | | 1.339 ^{-0.0004} | .787 ^{-0.0004} | .24 | 11.02 | .394 ^{+0.001} | 3.687 | .63 | .04 | in |
| TS-BL-26 | 26mm (Medium) | TS-BL-26-CR | 44.0 ^{-0.01} | 26.0 ^{-0.01} | 6.0 | 314.0 | 12.0 ^{+0.02} | 105.67 | 20.0 | 1.0 | mm |
| | | | 1.732 ^{-0.0004} | 1.024 ^{-0.0004} | .24 | 12.36 | .472 ^{+0.001} | 4.160 | .79 | .04 | in |
| TS-BL-32 | 32mm (Large) | TS-BL-32-CR | 58.0 ^{-0.01} | 32.0 ^{-0.01} | 8.0 | 354.0 | 14.0 ^{+0.02} | 118.80 | 27.0 | 1.5 | mm |
| | | | 2.283 ^{-0.0004} | 1.260 ^{-0.0004} | .31 | 13.94 | .551 ^{+0.001} | 4.677 | 1.06 | .06 | in |

*Cutoff on small diameter end only per installation data.

Travel Sleeve – TS



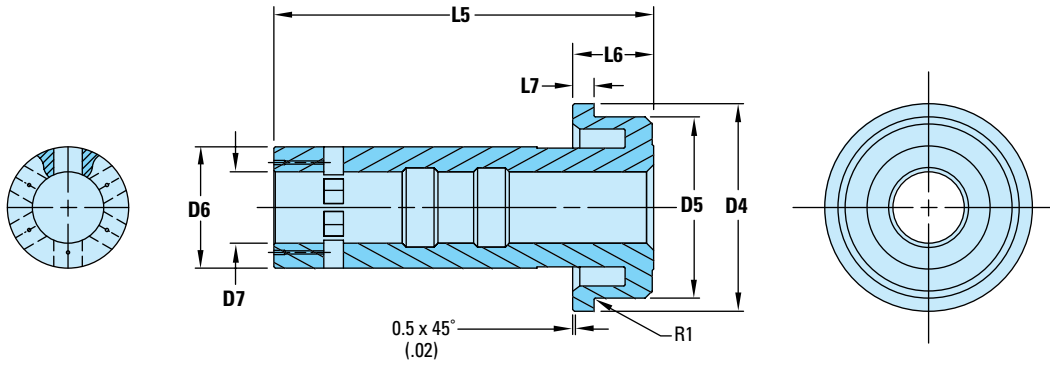
| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D8 DIA | D9 DIA | L10* LENGTH | T1 THREAD | |
|----------------------|----------------|-----------------------|-------------------------|--------|-------------|--------------|----|
| TS-BL-20 | 20mm (Small) | TS-BL-20-TS | 43.00 ^{-0.03} | 34.0 | 86.0 | M43.2 x 1.25 | mm |
| | | | 1.693 ^{-0.001} | 1.34 | 3.39 | | in |
| TS-BL-26 | 26mm (Medium) | TS-BL-26-TS | 54.00 ^{-0.03} | 43.0 | 94.0 | M54.2 x 1.25 | mm |
| | | | 2.126 ^{-0.001} | 1.69 | 3.70 | | in |
| TS-BL-32 | 32mm (Large) | TS-BL-32-TS | 68.00 ^{-0.03} | 54.0 | 105.0 | M68.25 x 1.5 | mm |
| | | | 2.677 ^{-0.001} | 2.13 | 4.13 | | in |

*Supplied to provide maximum travel with no cutoff. To reduce travel in Stroke 2 (H2), cut threaded end per installation data.

NOTES: All dimensions shown for components are intended for drawing layout purposes only and in some cases have been rounded off. Also, where the same diameter dimension is shown for parts that fit together, the tolerances create the appropriate clearance or fit.

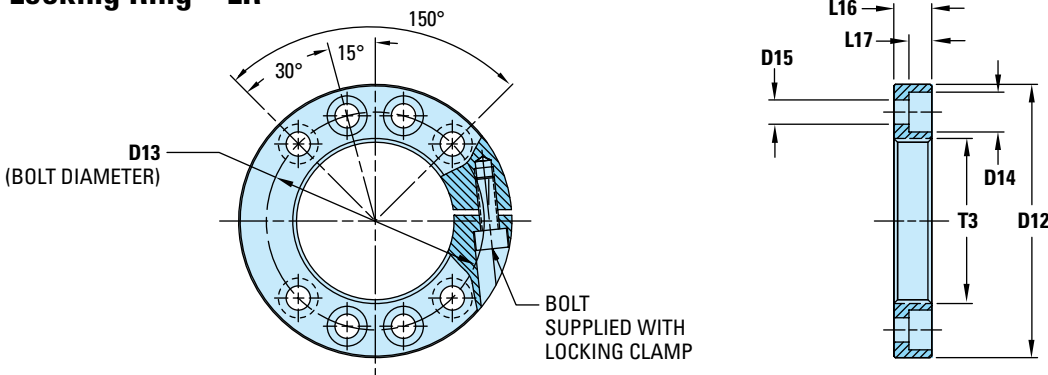
Component Information – Bottom Last

Body for Cam Fingers – BD (Body only without Cam Fingers)



| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D4 DIA | D5 DIA | D6 DIA | D7 DIA | L5 LENGTH | L6 THICK | L7 THICK | R1 RADIUS | |
|----------------------|----------------|-----------------------|-------------------------|------------------------|--------|--------|-----------|----------|-------------------------|-----------|----|
| TS BL 20 | 20mm (Small) | TS BL-20-BD | 58.20 ^{-0.03} | 50.8 ^{-0.2} | 34.00 | 20.00 | 106.46 | 22.70 | 6.0 ^{-0.01} | .4 | mm |
| | | | 2.291 ^{-0.001} | 2.00 ^{-0.008} | 1.339 | .787 | 4.191 | .894 | .236 ^{-0.0004} | .02 | in |
| TS BL 26 | 26mm (Medium) | TS BL-26-BD | 70.00 ^{-0.03} | 62.6 ^{-0.2} | 43.00 | 26.00 | 121.22 | 22.70 | 6.0 ^{-0.01} | .4 | mm |
| | | | 2.756 ^{-0.001} | 2.46 ^{-0.008} | 1.693 | 1.024 | 4.772 | .894 | .236 ^{-0.0004} | .02 | in |
| TS BL 32 | 32mm (Large) | TS BL-32-BD | 87.00 ^{-0.03} | 78.0 ^{-0.2} | 54.00 | 32.00 | 139.70 | 28.88 | 7.0 ^{-0.01} | .4 | mm |
| | | | 3.425 ^{-0.001} | 3.07 ^{-0.008} | 2.126 | 1.260 | 5.500 | 1.137 | .276 ^{-0.0004} | .02 | in |

Locking Ring – LR



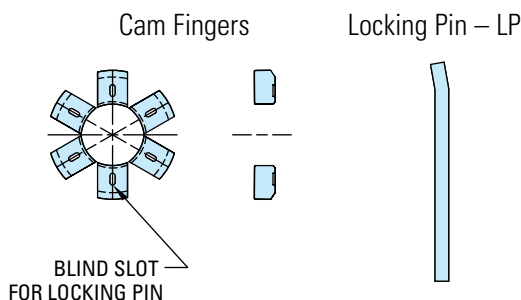
| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D12 DIA | D13 DIA | D14 DIA | D15 DIA | L16 LENGTH | L17 LENGTH | T3 THREAD | |
|----------------------|----------------|-----------------------|---------|---------|---------|---------|------------|------------|--------------|----|
| TS-BL-20 | 20mm (Small) | TS-BL-20-LR | 72.0 | 57.4 | 10.5 | 6.4 | 10.0 | 6.0 | M43.2 x 1.25 | mm |
| | | | 2.83 | 2.26 | .41 | .25 | .39 | .24 | | in |
| TS-BL-26 | 26mm (Medium) | TS-BL-26-LR | 90.0 | 72.0 | 13.8 | 8.6 | 13.0 | 8.1 | M54.2 x 1.25 | mm |
| | | | 3.54 | 2.83 | .54 | .34 | .51 | .32 | | in |
| TS-BL-32 | 32mm (Large) | TS-BL-32-LR | 112.0 | 90.0 | 16.8 | 10.8 | 16.0 | 10.1 | M68.25 x 1.5 | mm |
| | | | 4.41 | 3.54 | .66 | .43 | .63 | .40 | | in |

NOTES: All dimensions shown for components are intended for drawing layout purposes only and in some cases have been rounded off. Also, where the same diameter dimension is shown for parts that fit together, the tolerances create the appropriate clearance or fit.

Component Information – Bottom Last

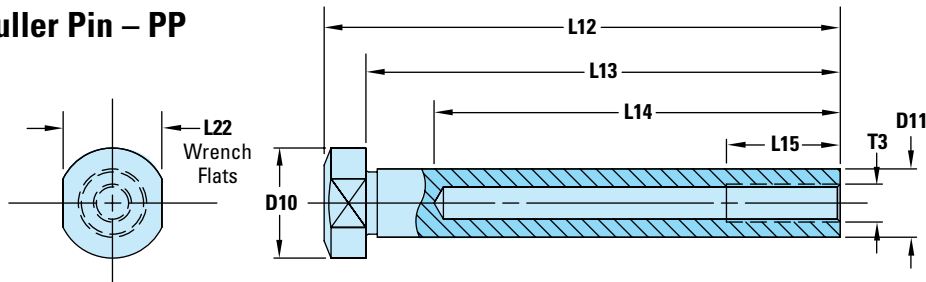
Cam Finger Replacement Kit – KT

With (6) Cam Fingers, and
(8) Locking Pins



| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | KIT ITEM NUMBER |
|----------------------|----------------|-----------------|
| TS-BL-20 | 20mm (Small) | TS-BL-20-KT |
| TS-BL-26 | 26mm (Medium) | TS-BL-26-KT |
| TS-BL-32 | 32mm (Large) | TS-BL-32-KT |

Puller Pin – PP



| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | COMPONENT ITEM NUMBER | D10 DIA | D11 DIA | L12 LENGTH | L13 LENGTH | L14 LENGTH | L15 LENGTH | L22 FLATS | T3 THREAD |
|----------------------|----------------|-----------------------|---------|---------|------------|------------|------------|------------|-----------|-----------|
| TS-BL-20 | 20mm (Small) | TS-BL-20-PP | 29.0 | 18.0 | 136.0 | 125.0 | 107.0 | 30.0 | 26.0 | M10 |
| | | | 1.14 | .71 | 5.35 | 4.92 | 4.21 | 1.18 | 1.02 | |
| TS-BL-26 | 26mm (Medium) | TS-BL-26-PP | 34.0 | 21.0 | 153.0 | 139.0 | 120.0 | 40.0 | 30.0 | M12 |
| | | | 1.34 | .83 | 6.02 | 5.47 | 4.72 | 1.57 | 1.18 | |
| TS-BL-32 | 32mm (Large) | TS-BL-32-PP | 43.0 | 26.0 | 171.0 | 154.0 | 138.0 | 50.0 | 36.0 | M16 |
| | | | 1.69 | 1.02 | 6.73 | 6.06 | 5.43 | 1.97 | 1.42 | |

NOTE: A minimum of (4) Puller Pins should be used with each mold. Larger molds may require additional Puller Pins. Puller Pins are **not** included with BL Assemblies and must be ordered separately.

Top Last Replacement Component Item Numbers

| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | CENTER ROD | TRAVEL SLEEVE | BODY FOR CAM FINGERS | CAM FINGER REPLACEMENT KIT |
|----------------------|----------------|-------------|---------------|----------------------|----------------------------|
| TS-TL-20 A | 20mm (Small) | TS-TL-20 CR | TS-TL-20-TS | TS-TL-20-BD | TS-TL-20-KT |
| TS-TL-26 A | 26mm (Medium) | TS-TL-26 CR | TS-TL-26-TS | TS-TL-26-BD | TS-TL-26-KT |
| TS-TL-32 A | 32mm (Large) | TS-TL-32 CR | TS-TL-32-TS | TS-TL-32-BD | TS-TL-32-KT |

NOTES: All dimensions shown for components are intended for drawing layout purposes only and in some cases have been rounded off. Also, where the same diameter dimension is shown for parts that fit together, the tolerances create the appropriate clearance or fit.

Bottom Last Replacement Component Item Numbers

| ASSEMBLY ITEM NUMBER | CENTER ROD DIA | CENTER ROD | TRAVEL SLEEVE | BODY FOR CAM FINGERS | LOCKING RING | CAM FINGER REPLACEMENT KIT | PULLER PIN* |
|----------------------|----------------|-------------|---------------|----------------------|--------------|----------------------------|-------------|
| TS-BL-20 A | 20mm (Small) | TS-BL-20-CR | TS-BL-20-TS | TS-BL-20-BD | TS-BL-20-LR | TS-BL-20-KT | TS-BL-20-PP |
| TS-BL-26 A | 26mm (Medium) | TS-BL-26-CR | TS-BL-26-TS | TS-BL-26-BD | TS-BL-26-LR | TS-BL-26-KT | TS-BL-26-PP |
| TS-BL-32 A | 32mm (Large) | TS-BL-32-CR | TS-BL-32-TS | TS-BL-32-BD | TS-BL-32-LR | TS-BL-32-KT | TS-BL-32-PP |

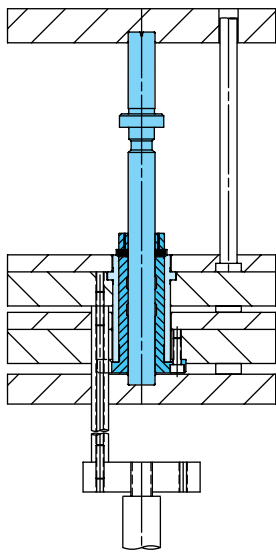
*Puller Pins are **not** included with BL Assemblies and must be ordered separately.

Component Information

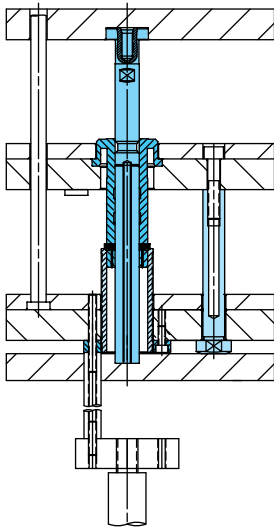
Alternate Configurations System Configuration for Central Ejector Rod Location

The illustrations below show one 2-Stage Ejector assembly that has been centrally located on the ejector plates.

TL Assembly

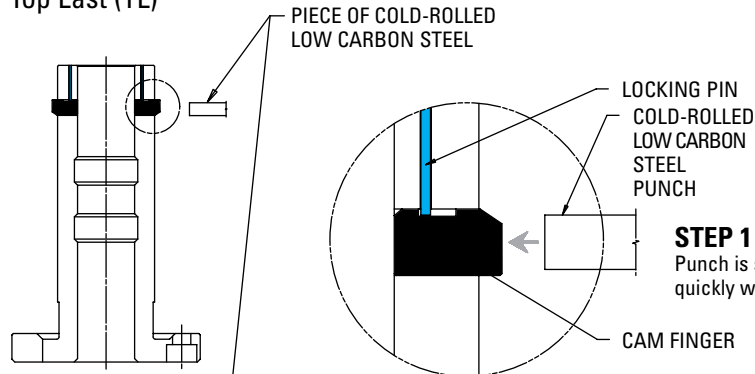


BL Assembly

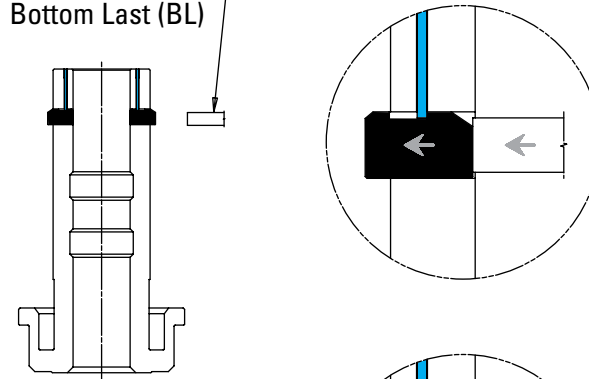


TL & BL 2-Stage Ejectors – Cam Finger Removal Guide

Top Last (TL)



Bottom Last (BL)



STEP 2

Cam Finger is knocked toward the inside diameter region of the Body for Cam Fingers. The Cam Finger pushes against the Locking Pin.

STEP 3

A portion of Locking Pin breaks cleanly away and travels with the moving Cam Finger toward the inside diameter of the Body for Cam Fingers.

STEP 4

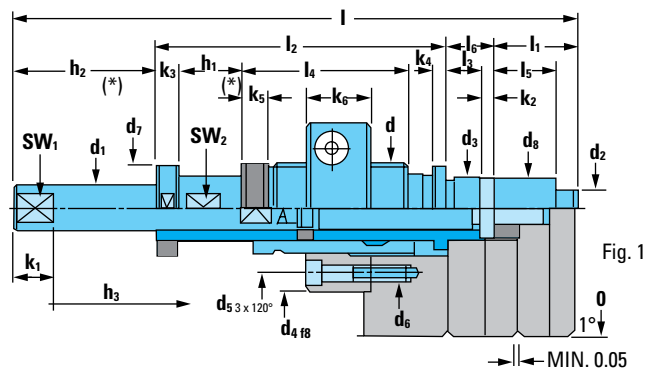
Both the Cam Finger and broken piece of Locking Pin drop into the inside diameter of the Body for Cam Fingers.

NOTES:

- Cold rolled, low carbon steel must be used as a removal punch to avoid damaging the Cam Fingers and/or Body.
- The contact surface of the punch (where it rests against the Cam Finger) should be profiled with a curved surface that matches the exposed surface of the Cam Finger.
- Ensure that Body for Cam Fingers is firmly retained before attempting Cam Finger removal.

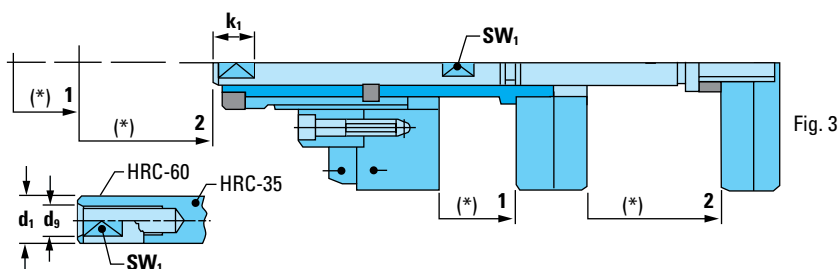
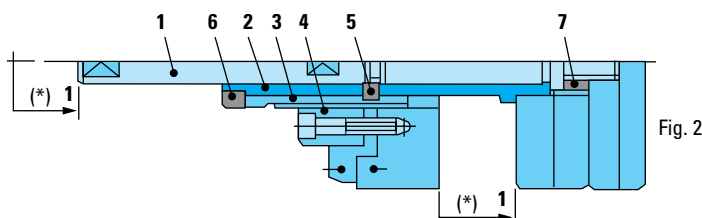
Two-Stage Ejectors – Installation

Two-Stage Ejector – FW 1800



| REF | d | STROKE(*) | | | | | | | | | | | | | | | | | | | | A mm ² | | | | | | | | |
|---------|---------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| | | d ₁ | d ₂ | d ₃ | d ₄ | d ₅ | d ₆ | d ₇ | d ₈ | d ₉ | *l ₀ | l | l ₁ | l ₂ | l ₃ | l ₄ | l ₅ | l ₆ | h ₁ | h ₂ | h ₃ | | k ₁ | k ₂ | k ₃ | k ₄ | k ₅ | k ₆ | SW ₁ | SW ₂ |
| FW 1800 | M32X1.5 | 16 | M12X1 | M22X1 | 60 | 46 | M5 | 32 | 20.6 | M10 | 160 | 200 | 30 | 101 | 11 | 56 | 20 | 16 | 5-30 | 50 | 80 | 16 | 5 | 9.0 | 5 | 8 | 24 | 13 | 20 | 56 |
| FW 1800 | M42X1.5 | 22 | M16X1.5 | M30X1.5 | 80 | 62 | M6 | 42 | 28.0 | M14 | 200 | 266 | 40 | 132 | 16 | 75 | 30 | 22 | 10-40 | 70 | 110 | 20 | 6 | 9.0 | 6 | 10 | 30 | 17 | 27 | 100 |
| FW 1800 | M52X1.5 | 28 | M20X1.5 | M38X1.5 | 90 | 72 | M8 | 53 | 36.0 | M16 | 350 | 285 | 45 | 134 | 16 | 75 | 35 | 22 | 10-40 | 80 | 120 | 22 | 6 | 10.5 | 8 | 12 | 30 | 22 | 35 | 152 |
| FW 1800 | M62X1.5 | 37 | M24X1.5 | M48X1.5 | 120 | 80 | M8 | 63 | 44.0 | M20 | 500 | 300 | 50 | 140 | 16 | 80 | 40 | 22 | 10-40 | 80 | 120 | 22 | 6 | 10.5 | 8 | 12 | 30 | 30 | 44 | 215 |

*l₀: Length of ejector plate



1. Ejector rod
2. Ejector sleeve
3. Adjusting bush
4. Assembly flange
5. Segments
6. Stopring
7. Spacer

Fitting:

1. Mount ejector rod #1 together with ejector plate. For safety please use LOCTITE C 242.
2. Move over parts #2, 3 and 4 together and tighten up part #3 (SW2 see chart).
3. Tighten up adjusting bush #3 with assembly flange #4.
4. Fix assembly flange.

Recommended lubricants: C 135, C 160, C 170, etc.

Installation Instructions:

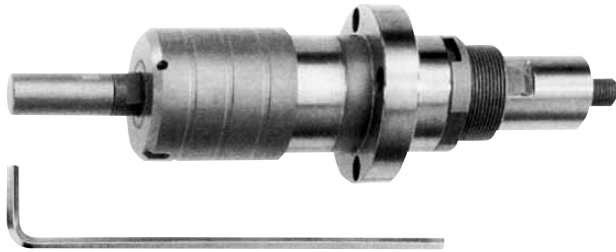
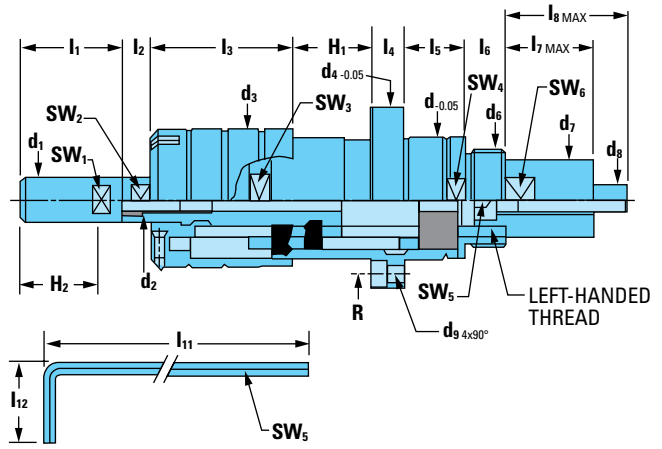
This device is preferably screwed together with the hydraulic machine ejector. The required internal or external thread of part #1 has to be made adequately. The ejector rod #1 may not be shortened by more than length k₁, if the total stroke h₃, including a possible deeper run in of part #1 into part #2, is not maintained. By rotating adjustment of bush #3 the first stroke h₁ is continuously adjusted. With stroke h₁ both ejector pin plates are moved simultaneously. On the following stroke h₂ only the second ejector pin plate movement is continued. Choose the thickness of the spacer ring #7 so that there is at least 0.05mm clearance between the ejector pin plates (see Fig. 1).

Two-Stage Single-Stroke Ejector | Adapter with Screw

Two-Stage Single-Stroke Ejector – FW 1850

The two-stage single-stroke ejector can be integrated into ejection molding tools. This ejector automatically divides the motion into two sequential strokes.

The functional sequence associated with this makes it possible to create new mold ejection mechanisms.

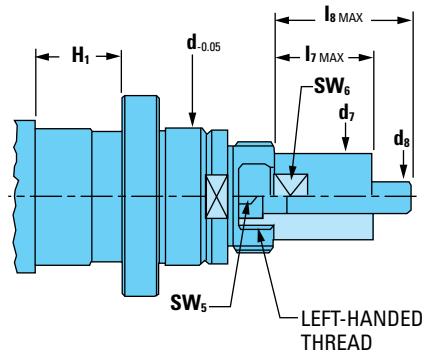
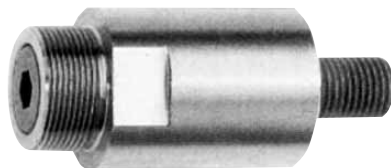


| REF | d X H ₁ MAX | H ₁ MIN | H ₂ | d ₁ | d ₂ | d ₃ | d ₄ | d ₆ | d ₇ | d ₈ | d ₉ | R | l ₁ | l ₂ |
|---------------|------------------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----------------|----------------|
| FW 1850 50X32 | | 5 | 12-32 | 18 | M12 | 56 | 75 | M40X1.5 | 31.5 | M12X1.25 | M6X16 | 31 | 42 | 12 |
| FW 1850 58X40 | | 5 | 15-40 | 22 | M16 | 64 | 90 | M45X1.5 | 36 | M14X1.5 | M8X20 | 36 | 42 | 15 |
| FW 1850 58X56 | | 5 | 25-65 | 22 | M16 | 64 | 90 | M45X1.5 | 36 | M14X1.5 | M8X20 | 36 | 58 | 15 |
| FW 1850 70X71 | | 10 | 20-71 | 26 | M20 | 79 | 100 | M55X1.5 | 44 | M16X1.5 | M8X25 | 42 | 75 | 18 |

| REF | d X H ₁ MAX | l ₃ | l ₄ | l ₅ | l ₆ | l ₇ MAX | l ₈ MAX | l ₁₁ | l ₁₂ | SW ₁ | SW ₂ | SW ₃ | SW ₃ Nm | SW ₄ | SW ₅ | SW ₆ |
|---------------|------------------------|----------------|----------------|----------------|----------------|--------------------|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------|-----------------|-----------------|-----------------|
| FW 1850 50X32 | | 58 | 14 | 25 | 17 | 36 | 50 | 180 | 37 | 14 | 14 | 36 | 120 | 46 | 6 | 27 |
| FW 1850 58X40 | | 68 | 16 | 25 | 17 | 45 | 66 | 200 | 44 | 18 | 18 | 41 | 160 | 55 | 8 | 32 |
| FW 1850 58X56 | | 84 | 16 | 25 | 17 | 45 | 66 | 250 | 44 | 18 | 18 | 41 | 120 | 55 | 8 | 32 |
| FW 1850 70X71 | | 107 | 22 | 30 | 22 | 56 | 80 | 270 | 50 | 22 | 24 | 50 | 200 | 65 | 10 | 38 |

Adapter with Screw – FW 1851

Material: 1.6582



| REF | d X H ₁ MAX | d ₇ | d ₈ | l ₇ MAX | l ₈ MAX | SW ₅ | SW ₆ |
|--------------|------------------------|----------------|----------------|--------------------|--------------------|-----------------|-----------------|
| FW1851 50x32 | | 31.5 | M12X1.25 | 36 | 50 | 6 | 27 |
| FW1851 58x40 | | 36 | M14X1.5 | 45 | 66 | 8 | 32 |
| FW1851 58x56 | | 36 | M14X1.5 | 45 | 66 | 8 | 32 |
| FW1851 70x71 | | 44 | M16X1.5 | 56 | 80 | 10 | 38 |