

# D-M-E 2-Stage Ejectors

POSITIVE, PRECISION CONTROL  
OF TWO-STAGE EJECTION



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## Benefits

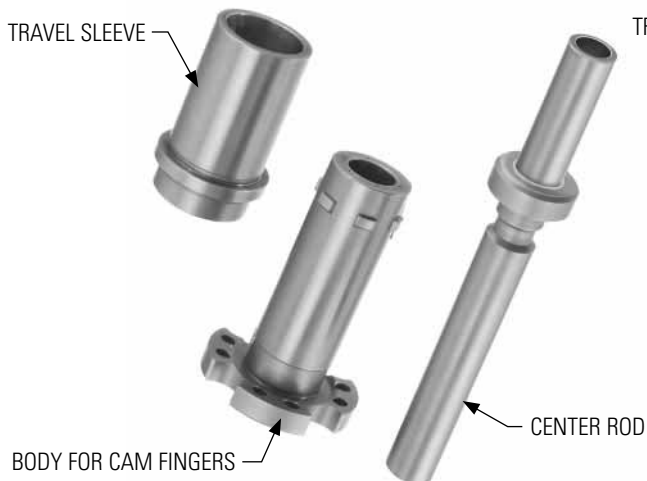
### Positive, Precise Plate Control

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.

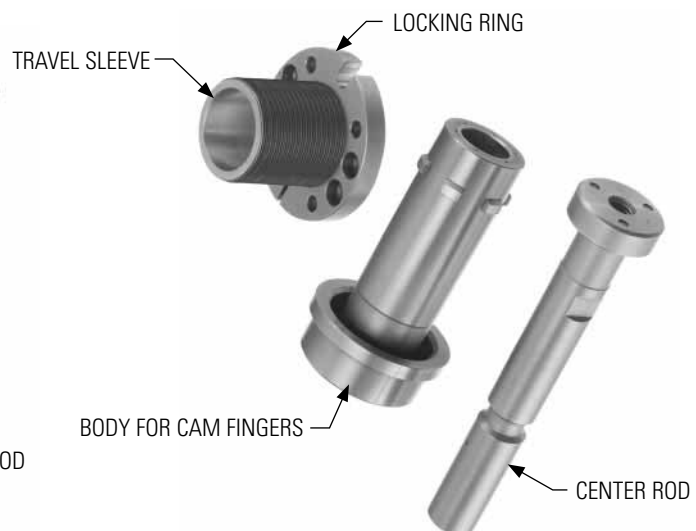
### Benefits

- 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

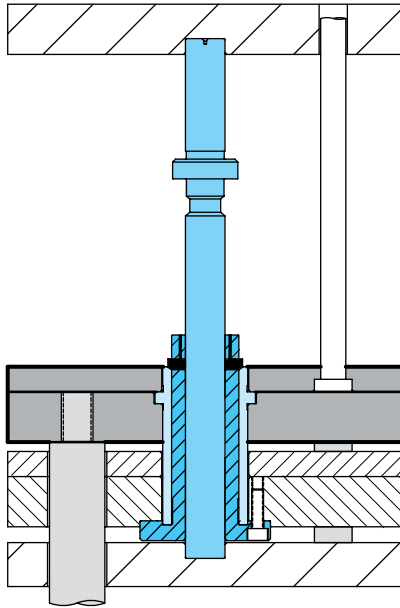
- Select 20mm diameter (small), 26mm diameter (medium), or 32mm diameter (large) 2-Stage Ejector based on the width of the mold base (large molds, thick plates or heavy load applications may require the next size assembly).
- Determine the travel range for each ejection stroke (first and second), being 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](http://www.dme.net/2stage)

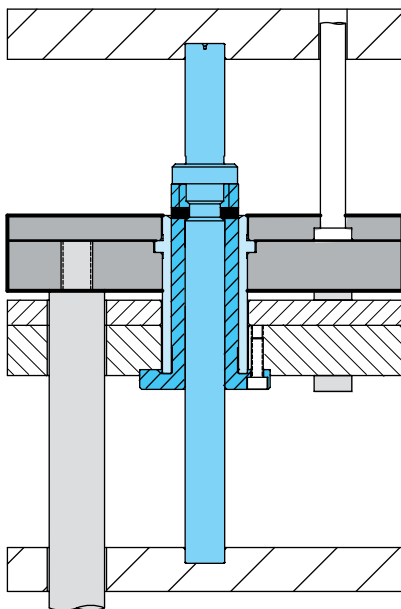
2-STAGE EJECTOR ASSEMBLY ITEM NUMBER	BASIC CENTER ROD DIA	STROKE 1		STROKE 2		RECOMMENDED MAXIMUM MOLD BASE WIDTH	MAXIMUM RECOMMENDED LOAD VALUES (PER ASS'Y)		
		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM		STATIC	DYNAMIC	
<b>2-STAGE EJECTOR TOP LAST (TS TL)</b>									
TS TL 20 A	20mm (Small)	1.0	79.0	4.0	79.0	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
<b>2-STAGE EJECTOR BOTTOM LAST (TS BL)</b>									
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

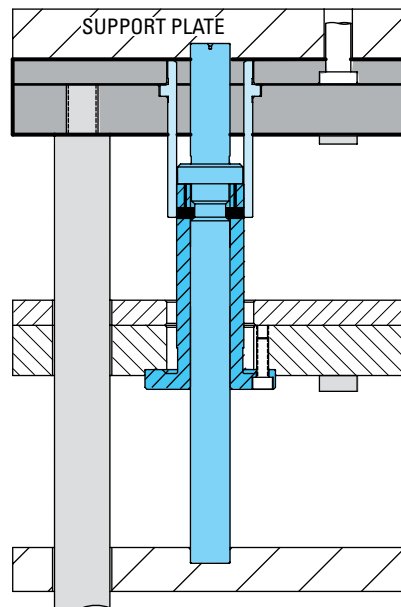


**1. Ejector Plates Back**



**2. First Ejector Stroke**

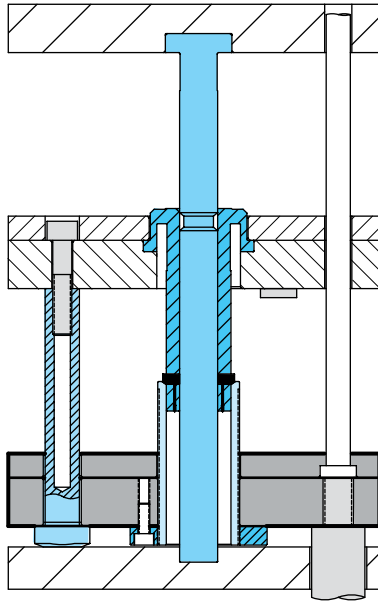
After a predetermined amount of travel, the latch mechanism latches onto the Center Rod, thereby fixing the position of the bottom (moving platen side) ejector plate assembly.



**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.

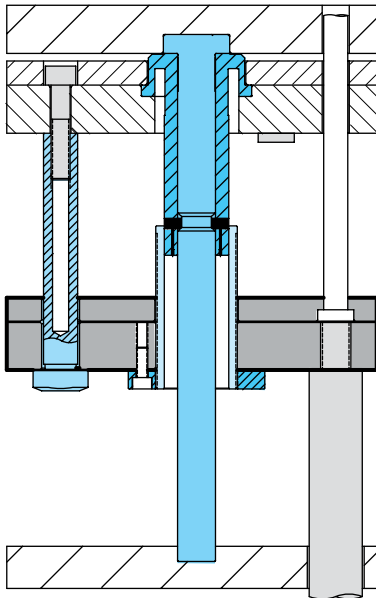
## Bottom Last Sequencing



**1. Ejector Plates Back**

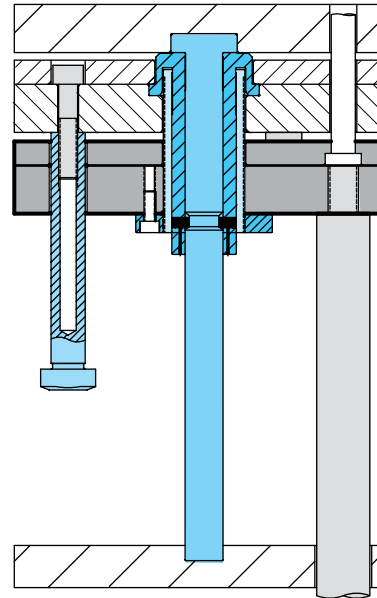


Patent No. 6.575.730  
Patent No. 6.106.271  
(Additional patents pending)



**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.



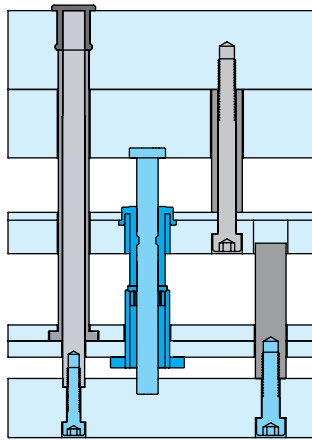
**3. Second Ejector Stroke**

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.

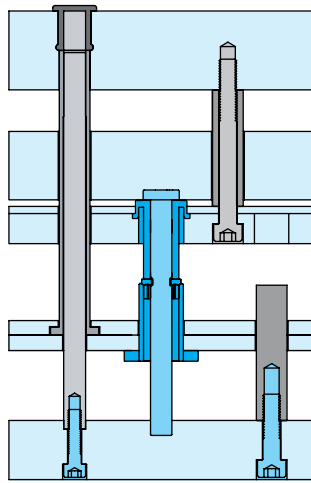
## Application Examples

### 2-Stage Ejector Bottom Last Application Example 1

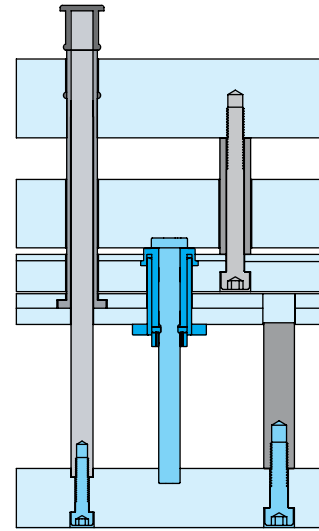
1. First ejector stroke lifts cavity plate and ejector sleeve. Center pin remains back. Part is free to be ejected.
2. Second stroke moves the ejector sleeve, releasing the part from cavity. **This configuration is recommended for parts with outside details with smooth or round edges.**



1. Ejector Plates Back



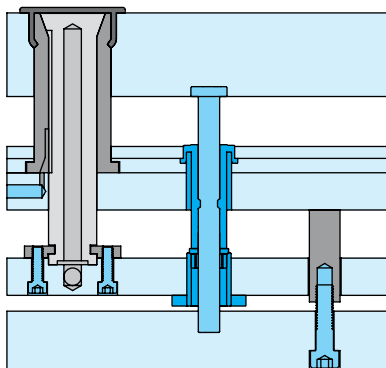
2. First Ejector Stroke



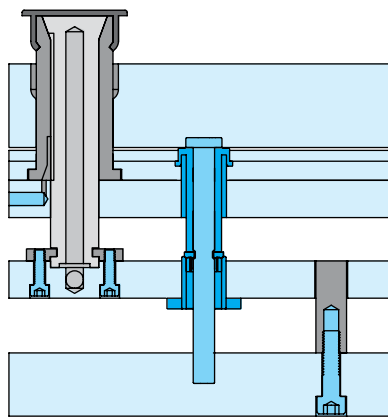
3. Second Ejector Stroke

### 2-Stage Ejector Bottom Last Application Example 2

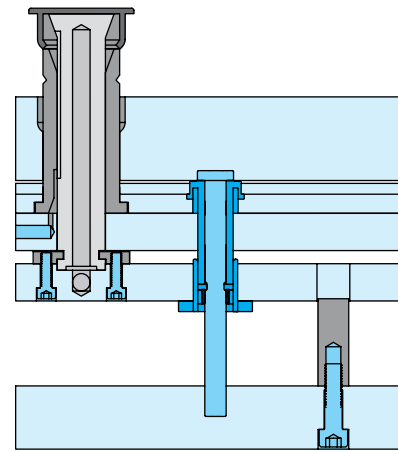
1. First ejector stroke pulls the central core pin and sleeve forward. Part is released from cavity.
2. Second stroke pulls the center pin and part forward. Because of plastic elasticity the part is stripped from core. **Recommended for parts with an inner undercut – a circular detail placed on the edge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



1. Ejector Plates Back



2. First Ejector Stroke

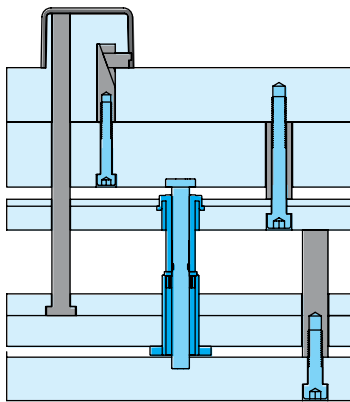


3. Second Ejector Stroke

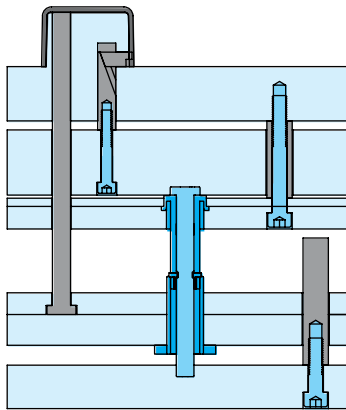
## Application Examples

### 2-Stage Ejector Bottom Last – TSBL Application Example 3

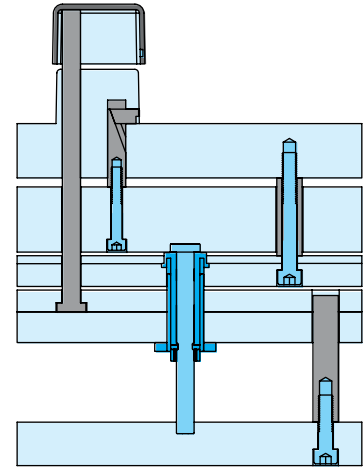
1. First ejector stroke moves forward the cavity plate with inner plate. This movement is forcing the edge to move inward. At the end of the stroke the edge clears the inner undercut.
2. Second stroke actuates the ejector pin. This releases the part from the core. **This configuration is recommended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



1. Ejector Plates Back



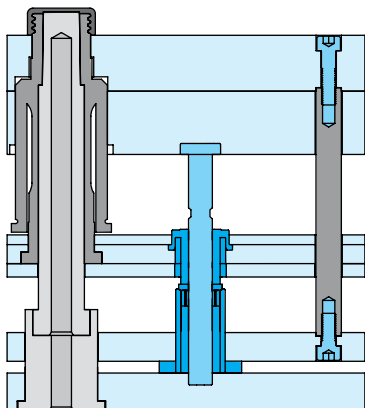
2. First Ejector Stroke



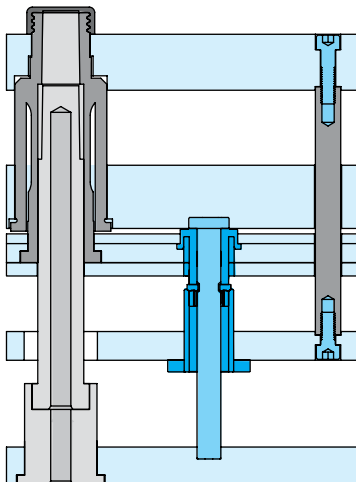
3. Second Ejector Stroke

### 2-Stage Ejector Bottom Last – TSBL Application Example 4

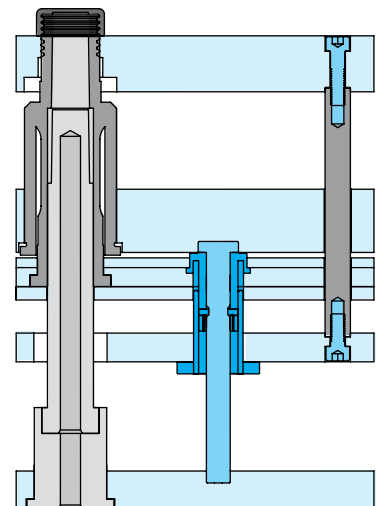
1. First ejector stroke lifts the collapsible core off the center pin. Collapse segments retract. After a certain traveling distance, when puller pin is clearing the inner side of segments, the positive collapse sleeve is actuated for positive collapse.
2. Second stroke moves the stripper plate past 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

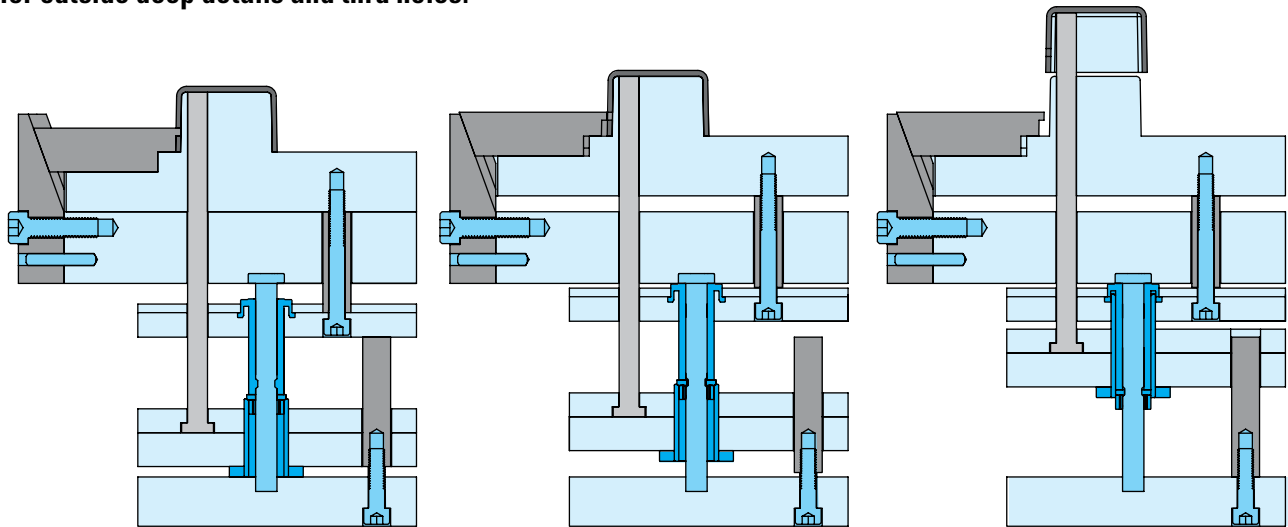


3. Second Ejector Stroke

## 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.**



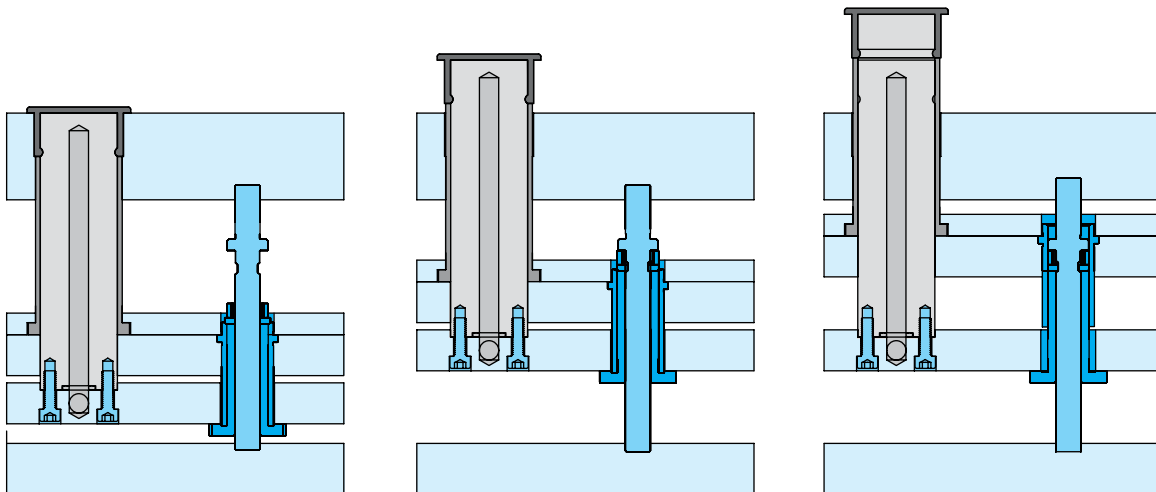
1. Ejector Plates Back

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.**

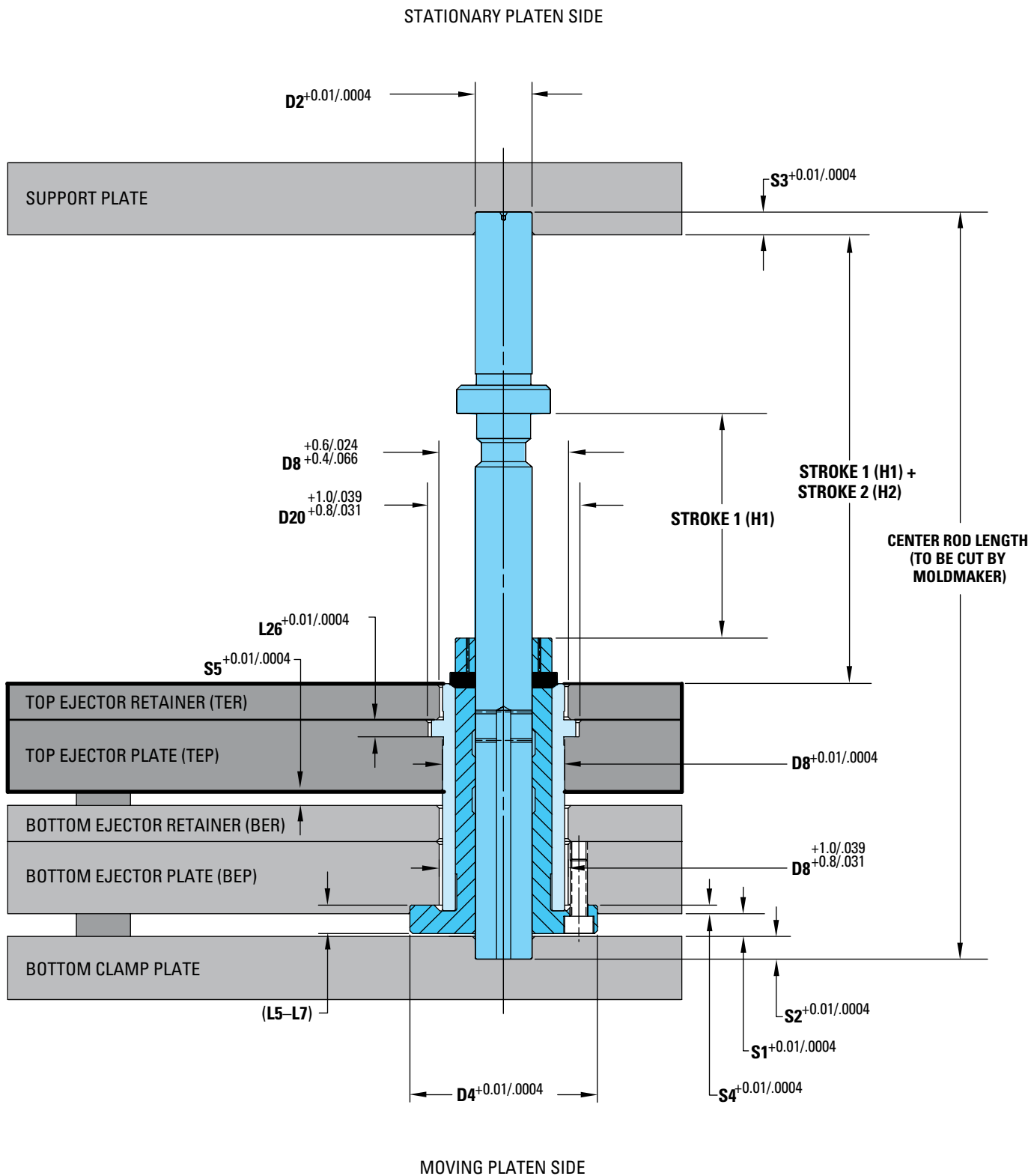


1. Ejector Plates Back

2. First Ejector Stroke

3. Second Ejector Stroke

# Assembly and Installation Information – Top Last



2-Stage Ejectors | 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 <sup>(2)</sup>		H2 – STROKE 2 <sup>(3)</sup>		
			MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
<b>2-STAGE EJECTOR TOP-LAST (TS-TL)</b>							
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

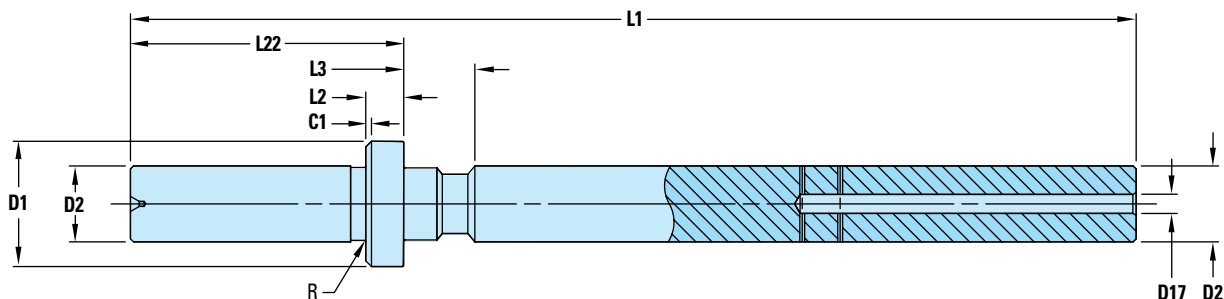
ITEM NUMBER	CENTER ROD DIA	BEP	BER	TEP	TER	S1	S2	S3	S4	S5	
<b>2-STAGE EJECTOR TOP-LAST (TS-TL)</b>											
TS TL-20 A	20mm (Small)	25.40	12.70	25.40	12.70	8.00	8.00	8.00	3.00	4.76	mm
		1.000	.500	1.000	.500	.315	.315	.315	.118	.188	in
TS TL-26 A	26mm (Medium)	28.58	12.70	28.58	12.70	10.00	10.00	10.00	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

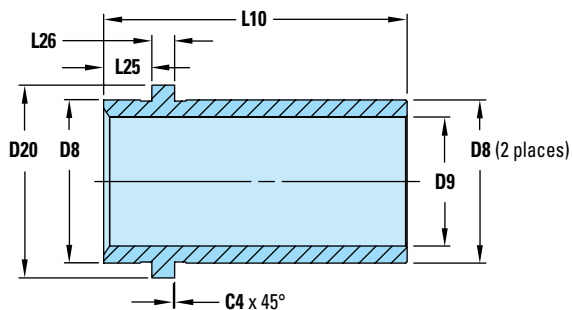


ASSEMBLY ITEM NUMBER	CENTER ROD DIA	COMPONENT ITEM NUMBER	D1 DIA	D2 DIA	D17 DIA	L1* LENGTH	L2 THICK	L3 LENGTH	L22** LENGTH	C1 CHAMFER	R RADIUS	
TS-TL-20	20mm (Small)	TS-TL-20-CR	33.0	20.0 <sup>-0.01</sup>	5.0	265	10.0	18.74	72.0	1.5	.4	mm
			1.30	0.787 <sup>-0.004</sup>	.20	10.43	.39	.738	2.83	.06	.02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

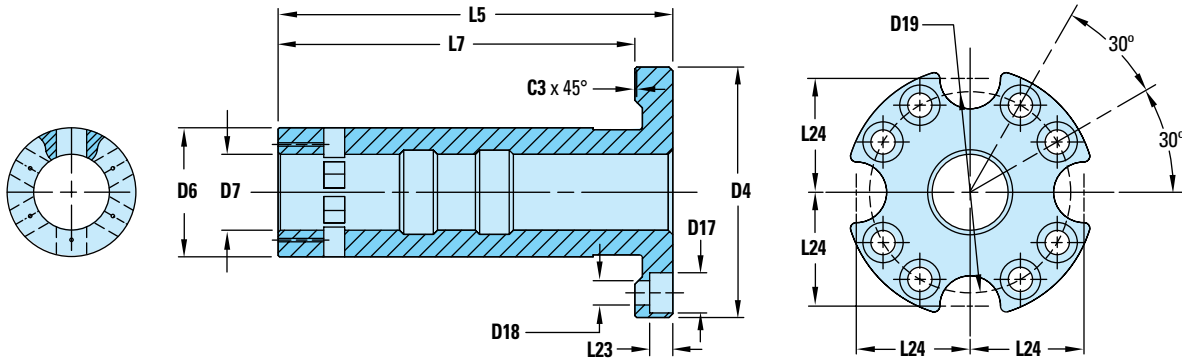


ASSEMBLY ITEM NUMBER	CENTER ROD DIA	COMPONENT ITEM NUMBER	D8 DIA	D9 DIA	D20 DIA	L10 LENGTH	L25 LENGTH	L26 THICK	C4 CHAMFER	
TS-TL-20	20mm (Small)	TS-TL-20-TS	43.0 <sup>-0.03</sup>	34.0	50.8	79.96	12.70	6.00 <sup>-0.01</sup>	.5	mm
			1.693 <sup>-0.001</sup>	1.34	2.00	3.148	.500	.236 <sup>-0.004</sup>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

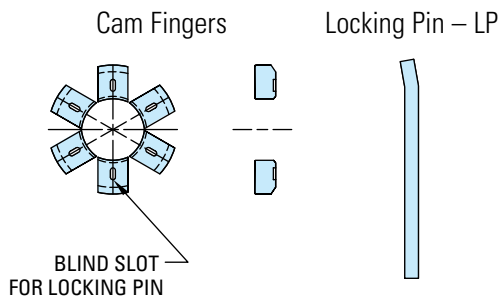


ASSEMBLY ITEM NUMBER	CENTER ROD DIA	COMPONENT ITEM NUMBER	D4 DIA	D6 DIA	D7 DIA	D17 DIA	D18 DIA	D19 DIA	
TS-TL-20	20mm (Small)	TS-TL-20-BD	66.00 <sup>-0.03</sup>	34.0	20.0	10.6	6.4	53.0	mm
			2.598 <sup>-0.001</sup>	1.34	.79	.42	.25	2.09	in
TS-TL-26	26mm (Medium)	TS-TL-26-BD	84.00 <sup>-0.03</sup>	43.0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

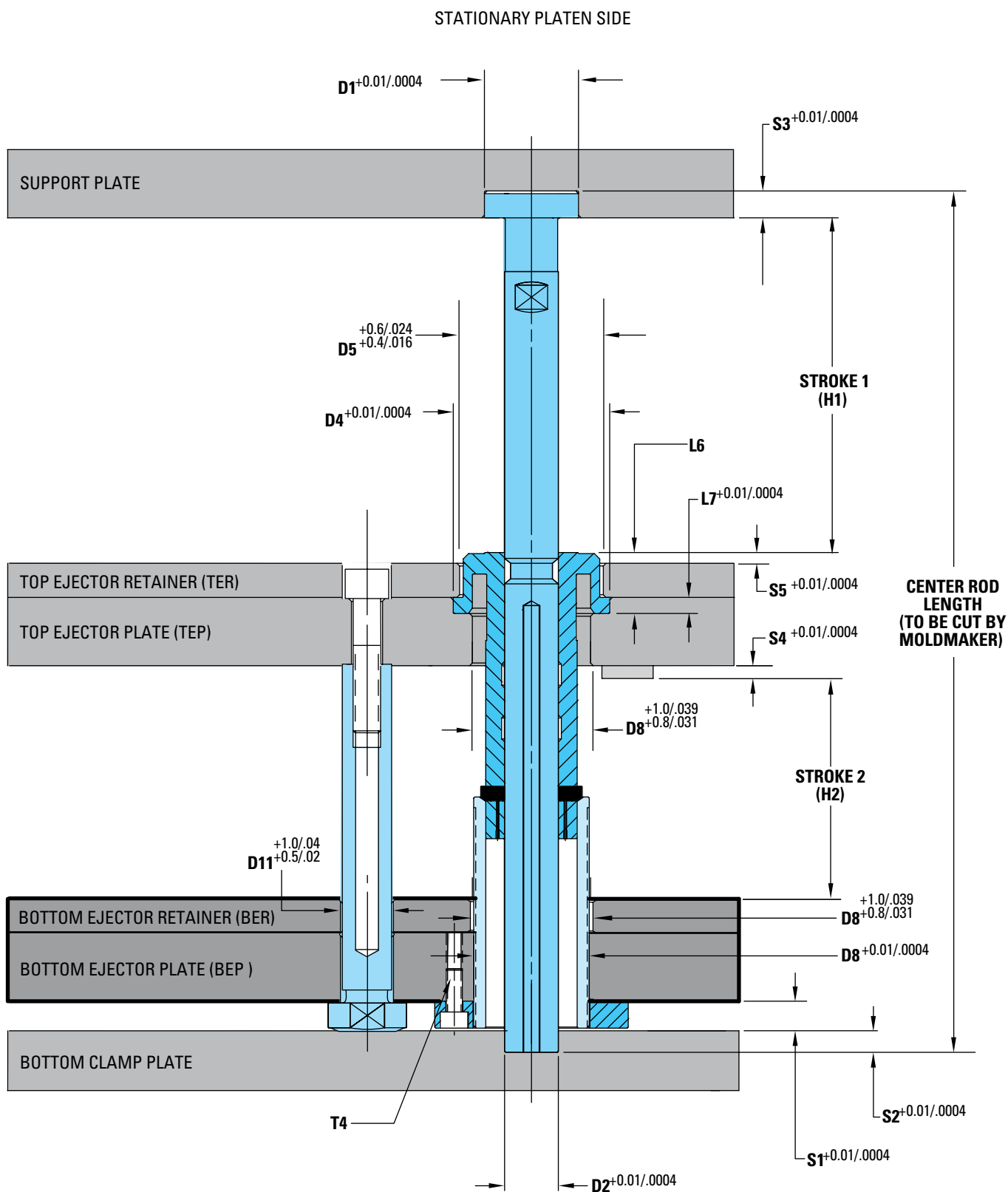
With (6) Cam Fingers, and (8) Locking Pins



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



- MOVING PLATEN SIDE
- 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 – Bottom Last

## Bottom Last – TSBL

ITEM NUMBER	CENTER ROD DIA	CENTER ROD LENGTH	TRAVEL SLEEVE LENGTH	H1 – STROKE 1 <sup>(3)</sup>		H2 – STROKE 2 <sup>(4)</sup>		
				MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
<b>2-STAGE EJECTOR BOTTOM LAST (TS BL)</b>								
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

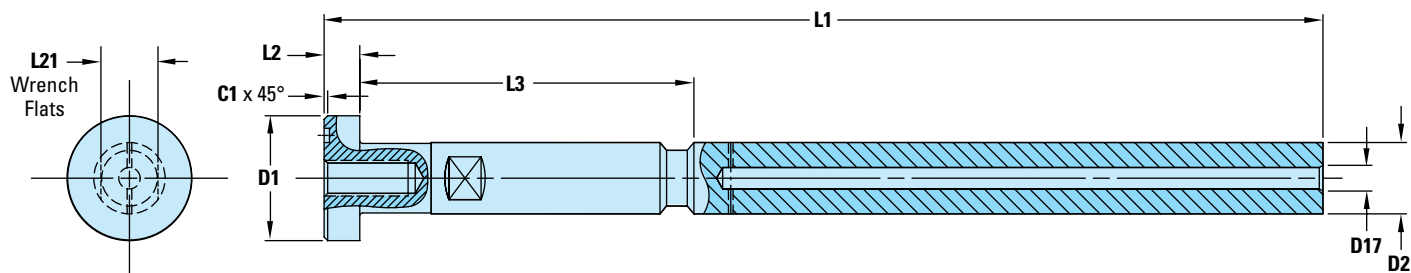
ITEM NUMBER	CENTER ROD DIA	BEP	BER	TEP	TER	T4	S1	S2	S3	S4	S5	
<b>2-STAGE EJECTOR BOTTOM LAST (TS BL)</b>												
TS BL-20 A	20mm (Small)	25.40	12.70	25.40	12.70	M6	11.00	8.00	10.00	4.76	4.00	mm
		1.000	.500	1.000	.500	M6	.433	.315	.394	1.86	.157	in
TS BL-26 A	26mm (Medium)	28.58	12.70	28.58	12.70	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

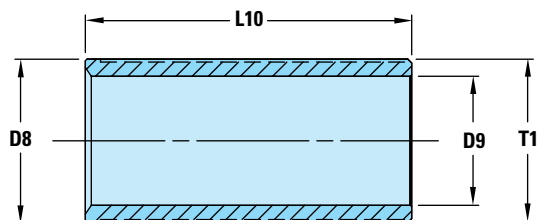
## Center Rod – CR



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 <sup>-0.01</sup>	20.0 <sup>-0.01</sup>	6.0	280.0	10.0 <sup>+0.02</sup>	93.66	16.0	1.0	mm
			1.339 <sup>-0.0004</sup>	.787 <sup>-0.0004</sup>	.24	11.02	.394 <sup>+0.001</sup>	3.687	.63	.04	in
TS-BL-26	26mm (Medium)	TS-BL-26-CR	44.0 <sup>-0.01</sup>	26.0 <sup>-0.01</sup>	6.0	314.0	12.0 <sup>+0.02</sup>	105.67	20.0	1.0	mm
			1.732 <sup>-0.0004</sup>	1.024 <sup>-0.0004</sup>	.24	12.36	.472 <sup>+0.001</sup>	4.160	.79	.04	in
TS-BL-32	32mm (Large)	TS-BL-32-CR	58.0 <sup>-0.01</sup>	32.0 <sup>-0.01</sup>	8.0	354.0	14.0 <sup>+0.02</sup>	118.80	27.0	1.5	mm
			2.283 <sup>-0.0004</sup>	1.260 <sup>-0.0004</sup>	.31	13.94	.551 <sup>+0.001</sup>	4.677	1.06	.06	in

\*Cutoff on small diameter end only per installation data.

## Travel Sleeve – TS



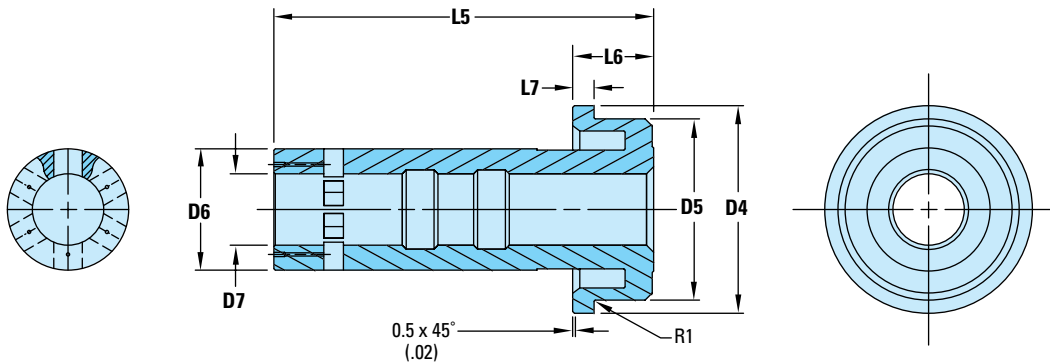
ASSEMBLY ITEM NUMBER	CENTER ROD DIA	COMPONENT ITEM NUMBER	D8 DIA	D9 DIA	L10* LENGTH	T1 THREAD	
TS-BL-20	20mm (Small)	TS-BL-20-TS	43.00 <sup>-0.03</sup>	34.0	86.0	M43.2 x 1.25	mm
			1.693 <sup>-0.001</sup>	1.34	3.39		in
TS-BL-26	26mm (Medium)	TS-BL-26-TS	54.00 <sup>-0.03</sup>	43.0	94.0	M54.2 x 1.25	mm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

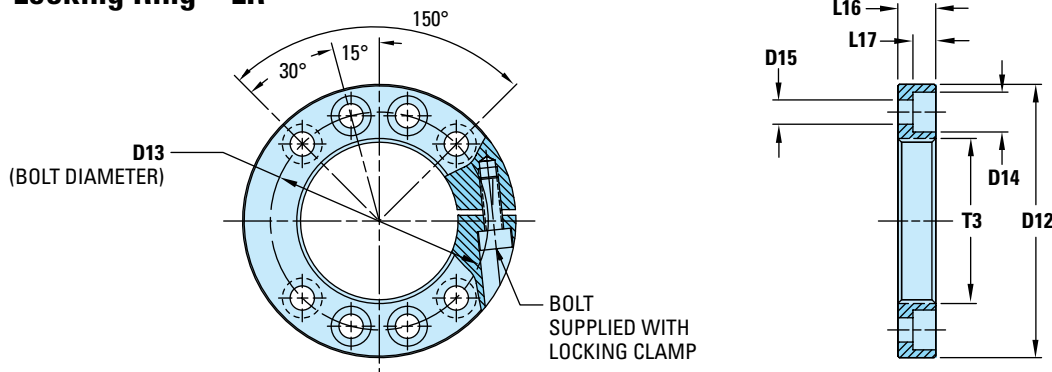
# Component Information – Bottom Last

## 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 <sup>-0.03</sup>	50.8 <sup>-0.2</sup>	34.00	20.00	106.46	22.70	6.0 <sup>-0.01</sup>	.4	mm
			2.291 <sup>-0.001</sup>	2.00 <sup>-0.008</sup>	1.339	.787	4.191	.894	.236 <sup>-0.0004</sup>	.02	in
TS BL 26	26mm (Medium)	TS BL-26-BD	70.00 <sup>-0.03</sup>	62.6 <sup>-0.2</sup>	43.00	26.00	121.22	22.70	6.0 <sup>-0.01</sup>	.4	mm
			2.756 <sup>-0.001</sup>	2.46 <sup>-0.008</sup>	1.693	1.024	4.772	.894	.236 <sup>-0.0004</sup>	.02	in
TS BL 32	32mm (Large)	TS BL-32-BD	87.00 <sup>-0.03</sup>	78.0 <sup>-0.2</sup>	54.00	32.00	139.70	28.88	7.0 <sup>-0.01</sup>	.4	mm
			3.425 <sup>-0.001</sup>	3.07 <sup>-0.008</sup>	2.126	1.260	5.500	1.137	.276 <sup>-0.0004</sup>	.02	in

## Locking Ring – LR



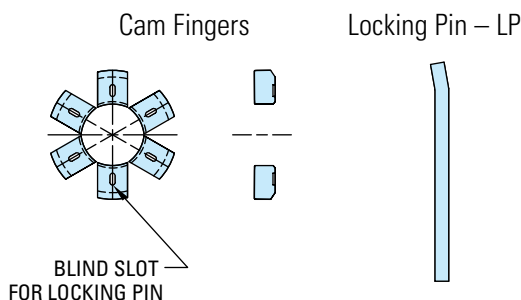
ASSEMBLY ITEM NUMBER	CENTER ROD DIA	COMPONENT ITEM NUMBER	D12 DIA	D13 DIA	D14 DIA	D15 DIA	L16 LENGTH	L17 LENGTH	T3 THREAD	
TS-BL-20	20mm (Small)	TS-BL-20-LR	72.0	57.4	10.5	6.4	10.0	6.0	M43.2 x 1.25	mm
			2.83	2.26	.41	.25	.39	.24		in
TS-BL-26	26mm (Medium)	TS-BL-26-LR	90.0	72.0	13.8	8.6	13.0	8.1	M54.2 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

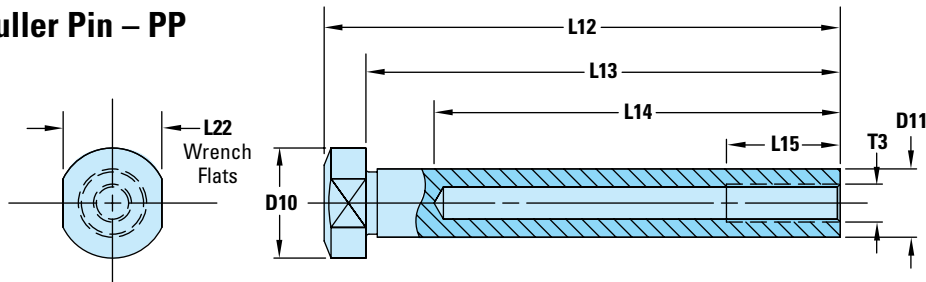
## Cam Finger Replacement Kit – KT

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

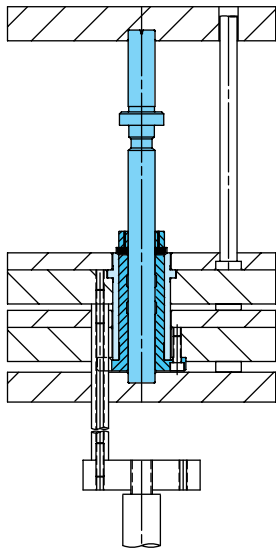
\*Puller Pins are **not** included with BL Assemblies and must be ordered separately.

# Component Information

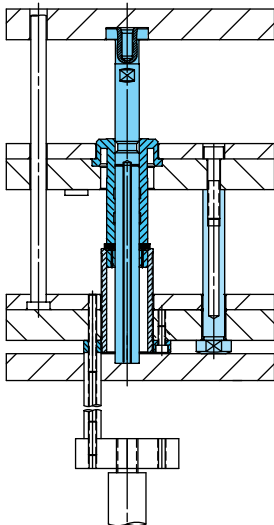
## Alternate Configurations System Configuration for Central Ejector Rod Location

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

### TL Assembly

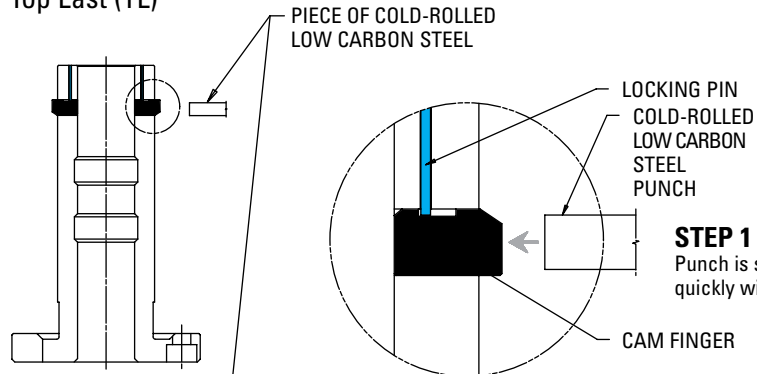


### BL Assembly



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

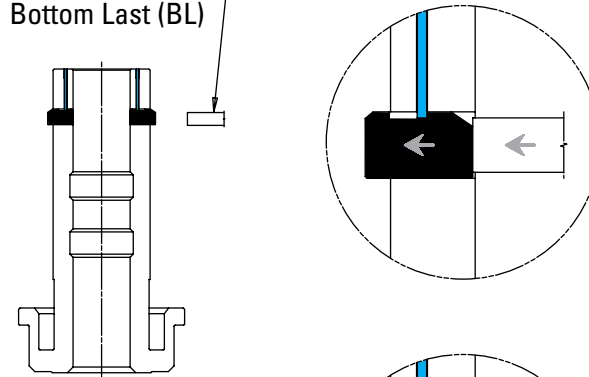
### Top Last (TL)



#### STEP 1

Punch is struck firmly and quickly with a hammer.

### 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

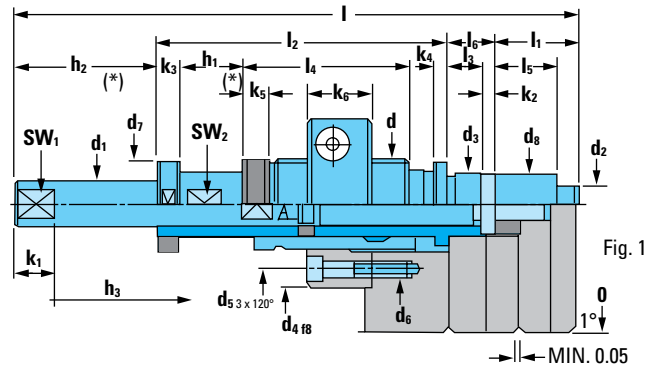


Fig. 1

REF	d	STROKE(*)																				A mm <sup>2</sup>								
		d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>	d <sub>8</sub>	d <sub>9</sub>	*l <sub>0</sub>	l	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>	h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>		k <sub>1</sub>	k <sub>2</sub>	k <sub>3</sub>	k <sub>4</sub>	k <sub>5</sub>	k <sub>6</sub>	SW <sub>1</sub>	SW <sub>2</sub>
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

\*l<sub>0</sub>: Length of ejector plate

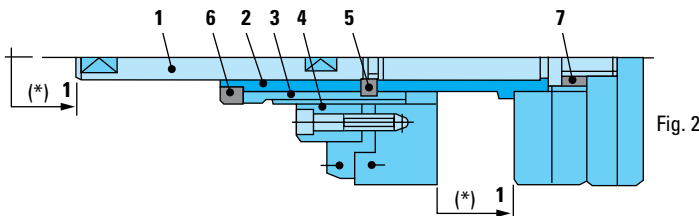


Fig. 2

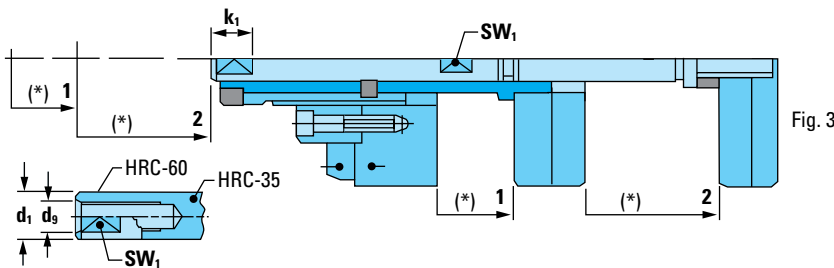


Fig. 3

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:

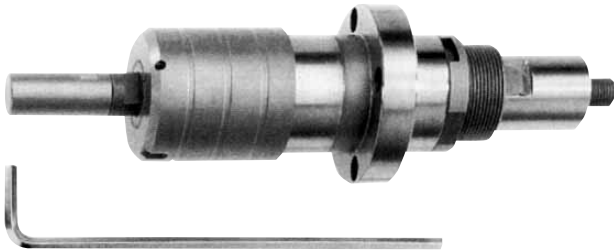
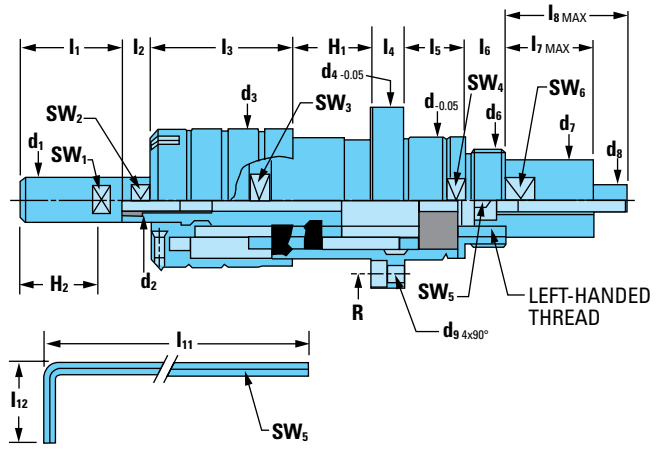
This device is preferably screwed together with the hydraulic machine ejector. The required internal or external thread of part #1 has to be made adequately. The ejector rod #1 may not be shortened by more than length k<sub>1</sub>, if the total stroke h<sub>3</sub>, including a possible deeper run in of part #1 into part #2, is not maintained. By rotating adjustment of bush #3 the first stroke h<sub>1</sub> is continuously adjusted. With stroke h<sub>1</sub> both ejector pin plates are moved simultaneously. On the following stroke h<sub>2</sub> 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.

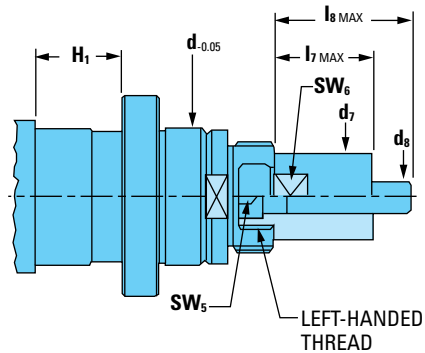
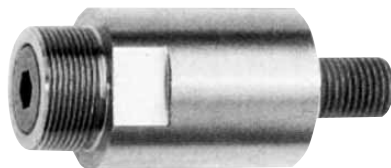


REF	d X H <sub>1</sub> MAX	H <sub>1</sub> MIN	H <sub>2</sub>	d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>	d <sub>4</sub>	d <sub>6</sub>	d <sub>7</sub>	d <sub>8</sub>	d <sub>9</sub>	R	l <sub>1</sub>	l <sub>2</sub>
FW 1850 50X32		5	12-32	18	M12	56	75	M40X1.5	31.5	M12X1.25	M6X16	31	42	12
FW 1850 58X40		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 <sub>1</sub> MAX	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>	l <sub>7</sub> MAX	l <sub>8</sub> MAX	l <sub>11</sub>	l <sub>12</sub>	SW <sub>1</sub>	SW <sub>2</sub>	SW <sub>3</sub>	SW <sub>3</sub> Nm	SW <sub>4</sub>	SW <sub>5</sub>	SW <sub>6</sub>
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 <sub>1</sub> MAX	d <sub>7</sub>	d <sub>8</sub>	l <sub>7</sub> MAX	l <sub>8</sub> MAX	SW <sub>5</sub>	SW <sub>6</sub>
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