

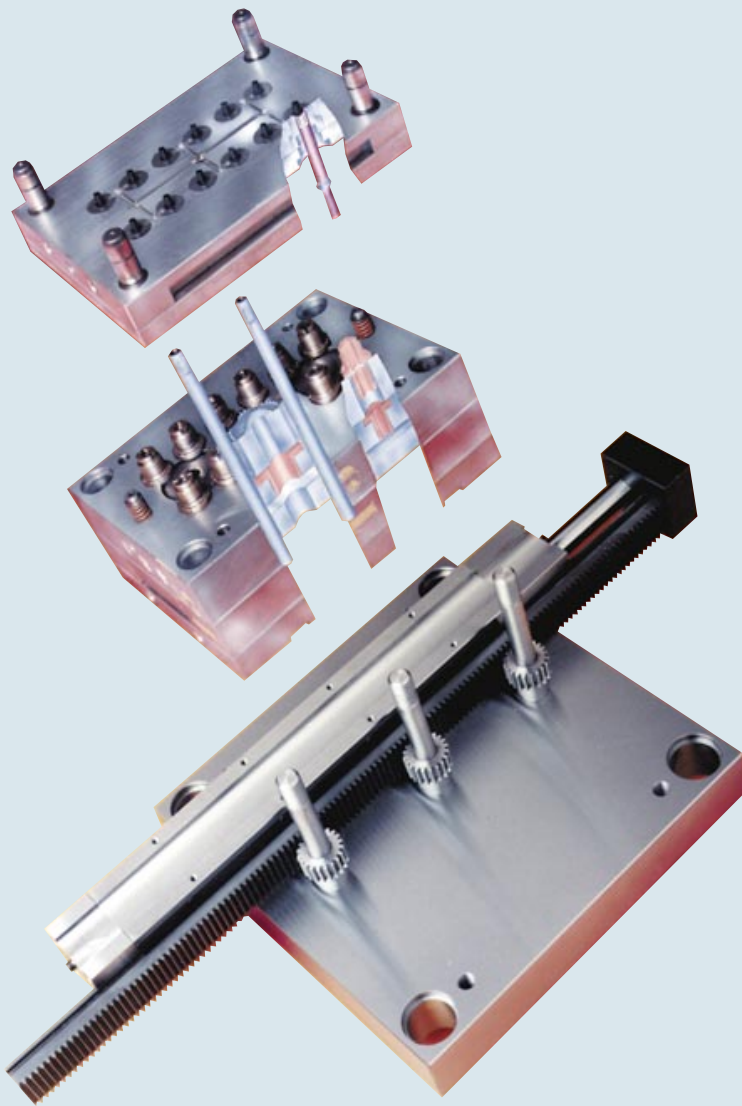
# D-M-E

Viewmold provides simpler and more suitable unscrewing injection mold tooling. Contact [sales@viewmold.com](mailto:sales@viewmold.com)

Brochure HUD1  
(contains catalog  
pages K55-60)

# Hydraulic Unscrewing Device

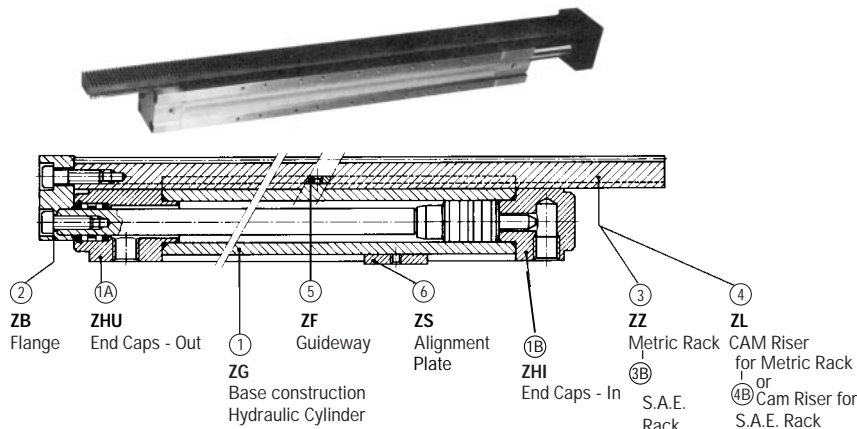
*Standardized System For Molding Internal Threads*



- *SAE-rack design*
- *Off-the-shelf replacement parts*
- *Simplifies mold design*
- *Applicable to different design styles*
- *Technical and application support*
- *Rack sized to provide maximum stroke lengths*

# D-M-E Hydraulic Unscrow

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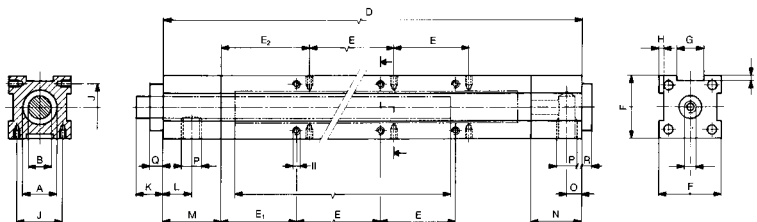


## 1 ZG

Base construction Hydraulic Cylinder



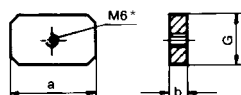
NOTE: End caps 1A and 1B, Internal Seals ZD, and NPT Pipe Thread Adapters are included in Base Construction



A	B	C	D	E	E1	E2	F	G	H	J	K	L	M	N	O	P	Q	R	Metric Threads		REF.
																			I	II	
0.984	0.630	15.748	20.630	3x3.150	2.205	2.598	1.811	.787	.138	1.339	.709	.846	1.693	1.142	.433	1/4" BSPT	.354	.236	M 8x1.25x20	SM 5x.80x10	ZG-25-300 -400 -500
01.575	0.866	15.748	20.945	3x3.150	2.205	2.598	2.205	1.181	1.38	1.732	.866	1.339	2.087	1.063	.512	1/2" BSPT	.354	.315	M 10x1.5x30	SM 5x.80x10	ZG-40-300 -400 -500
02.480	01.417	15.748	21.890	3x3.150	4.488	4.882	3.780	1.969	.315	2.756	1.496	.984	2.047	1.378	.630	1/4" BSPT	.866	.472	M 16x2.0x45	SM 8x1.25x16	ZG-63-400 -500

## 6 ZS

Alignment Plate



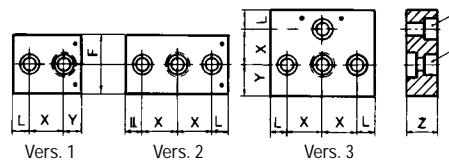
NOTE: Two required per Hydraulic Cylinder

A	G	a	b	REF.
0.984	.787	1.575	.236	ZS-25
01.575	1.181	1.969	.236	ZS-40
02.480	1.969	3.150	.591	ZS-83

\*M6 Metric socket head screw included.

## 2 ZB

Flange



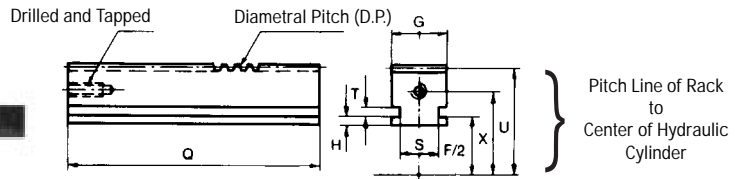
A	X	Y	F	Z	L	Metric Threads		Version	REF.
						I			
0.984	1.063	.492	1.811	.787	.413	2 qty. M 8x1.25x20	Vers. 1	ZB-25-1	
						3 qty. M 8x1.25x20	Vers. 2	-2	
						4 qty. M 8x1.25x20	Vers. 3	-3	
01.575	1.339	.787	2.205	1.181	.433	2 qty. M 10x1.5x30	Vers. 1	ZB-40-1	
						3 qty. M 10x1.5x30	Vers. 2	-2	
						4 qty. M 10x1.5x30	Vers. 3	-3	
02.480	2.165	1.181	3.780	1.575	.591	1 qty. M 12x1.75x40/1 qty. M 16x2.0x45	Vers. 1	ZB-63-1	
						2 qty. M 12x1.75x40/1 qty. M 16x2.0x45	Vers. 2	-2	
						3 qty. M 12x1.75x40/1 qty. M 16x2.0x45	Vers. 3	-3	

\*Metric socket head cap screws included with Flange (see I).

**3B ZZ**

**S.A.E. Rack**

20 Degree Pressure Angle Gear Teeth



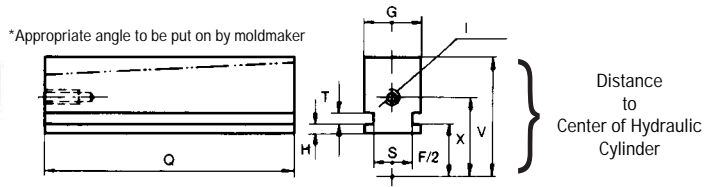
NOTE: Mating Gear to be supplied by moldmaker.

A	F/2	G	H	Q	S.A.E. Diametral Pitch	S	T	U	X	Metric I	REF.
0.984	.906	.772	.118	48	12	.551	.250	1.500	1.063	M 8x1.25x20	ZZ2501
01.575	1.102	1.166	.118	48	12	.945	.250	1.750	1.339	M 10x1.5x30	ZZ4001
02.480	1.890	1.953	.295	48	12	1.654	.312	2.625	2.165	M 12x1.75x40	ZZ6301

**4B ZL**

**CAM Riser**

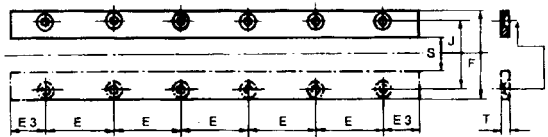
(for use with S.A.E. Racks)



A	F/2	G	H	Q	S	T	V	X	Metric I	REF.
0.984	.906	.772	.118	48	.551	.177	1.949	1.063	M 8x1.25x20	ZL2501
01.575	1.102	1.166	.118	48	.945	.177	2.539	1.339	M 10x1.5x30	ZL4001
02.480	1.890	1.953	.295	48	1.654	.256	3.937	2.165	M1 2x1.75x40	ZL6301

**5 ZF**

**Guideway**



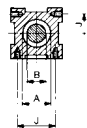
A	C	E	E3	F	J	S	T	Metric II	REF.
0.984	19.685	5x3.150	2.599	1.811	1.339	.551	.188	SM 5x.80x10	ZF0001
01.575	19.685	5x3.150	2.599	2.205	1.732	.945	.188	SM 5x.80x10	ZF0001
02.480	19.685	5x3.150	1.913	3.780	2.756	1.654	.250	SM 8x1.25x16	ZF0002

NOTE: Two guideways are required per Rack or per Cam Riser.  
 NOTE: Only one length is stocked and must be cut to length to fit for shorter Hydraulic Cylinders.  
 NOTE: Metric flat head screws are included with Guideway (see II).

**MAINTENANCE REPLACEMENT PARTS ONLY**

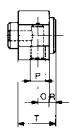
**1A ZHU**

- End Caps - out



**1B ZHI**

- End Caps - in



**ZD**

- Seals - Kit



**PipeThread Adapters**

Adapter converts male BSPT to female NPT.

L	Q	P	S	REF.	O	R	P	T	REF.
.846	.354	1/4" BSPT	2.047	<b>ZHU-25</b>	.433	.236	1/4" BSPT	1.378	<b>ZHI-25</b>
1.339	.354	1/2" BSPT	2.441	<b>-40</b>	.512	.315	1/2" BSPT	1.378	<b>-40</b>
.984	.866	3/4" BSPT	2.913	<b>-63</b>	.630	.472	3/4" BSPT	1.850	<b>-63</b>

NOTE: BSPT = British Standard Pipe Taper    M = Metric Socket Head Cap Screw    NOTE: All other dimensions in Inches unless otherwise specified  
 Ø = Diameter in Inches    SM = Metric Flat Head Socket Cap Screw

REF.
<b>ZD-25</b>
<b>ZD-40</b>
<b>ZD-63</b>

ZG2501	1/4" BSPT - 1/4" NPT
ZG4001	1/2" BSPT - 1/2" NPT
ZG6301	3/4" BSPT - 3/4" NPT

# D-M-E Hydraulic Unscrewing Device

Thread Lead = 1/(Threads per inch) = 1/Pitch = Inches/Thread  
 Thread Length = Length of threads to be removed from the cap

## A. Stroke (Inches)

{Note: Limit switches should be used if possible to limit full cylinder travel.  
 This will extend the seal life inside the hydraulic cylinder.}

### a) Required Revolutions (thread core)

$$= \frac{\text{Thread Length}}{\text{Thread Lead}} + \text{Safety (.5 revolutions minimum)}$$

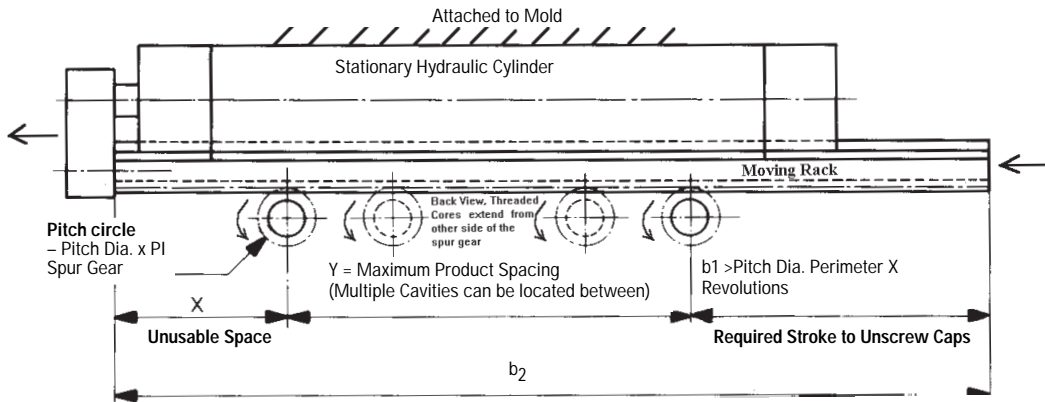
### b) 1. Required Stroke - Inches

$$= \text{Gear Pitch Diameter} \times \pi \times \text{Required Revolutions}$$

If required stroke is too long, a cogwheel transmission should be used.

### 2. Length of Rack

$$b_2 = x + y + b_1$$



### c) Stripper Stroke (Inches)

$$= \text{Cylinder Stroke} - \text{Required Rack Stroke}$$

## B. Control Cam Calculation

### d) Moving Cam ( $\alpha$ )

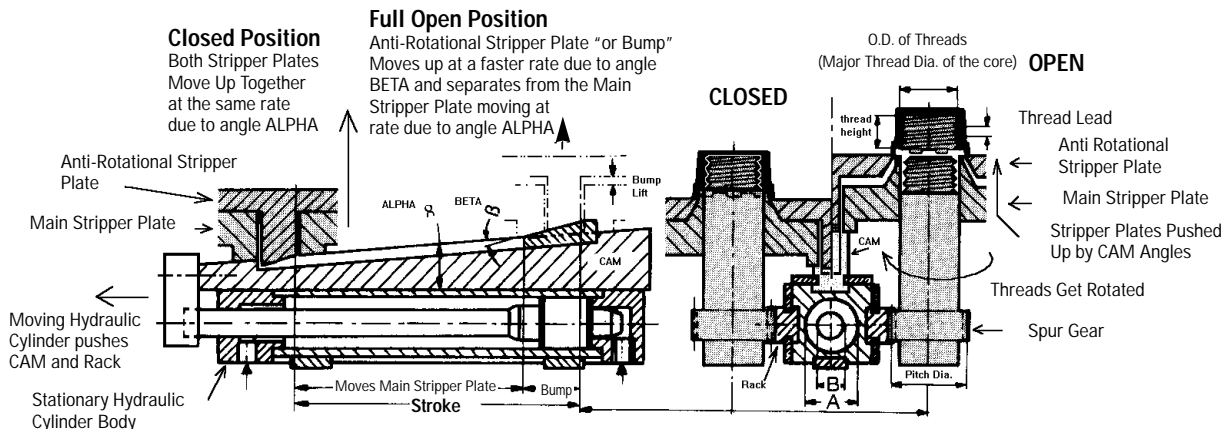
{Note: Moves Main Stripper Plate in sync. with unscrewing thread}

$$\tan \alpha = \frac{\text{Thread Lead}}{\text{Gear Pitch Diameter} \times \pi}$$

### e) Stripper Cam ( $\beta$ )

{Note: Moves Anti-Rotational Stripper Plate or Provides "BUMP" to shake part off}

$$\tan \beta = \frac{\text{Stripper Height}}{\text{Stripper Stroke}}$$



### C. Unscrewing Force

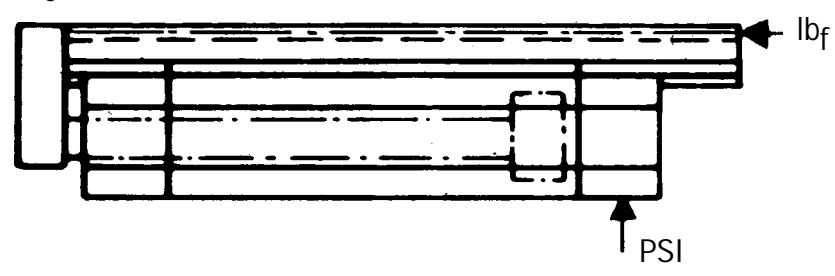
These figures should only be used as a guideline, as many other factors will affect the calculation. (Material, variation of dimensions, material shrinkage, core surface area, temperature, lubricants, friction, etc.)

- f) Residual Pressure (PSI)
  - = 1/100 of maximum injection pressure
- g) Effective core surface area (Square Inches or in<sup>2</sup>; Outer Core Cylinder Shell)
  - Flat end of Threaded core neglected, x 2 value for 45° Triangle Thread Shape
  - = major thread dia. of the core x π x thread height x 2
- h) Unscrewing torque (in-lb<sub>f</sub>)
  - = Residual Press. x Effective core surface area x major thread radius of core
- i) Unscrewing force rack (lb<sub>f</sub>)
  - =  $\frac{\text{Unscrewing Torque}}{\text{Gear Pitch Radius}}$  x number of cavities
- k) Hydraulic force (lb<sub>f</sub>)
  - (Note: x 1.5 is 50% Safety Factor, if x 1.0 there would be no safety factor)
  - = Unscrewing Force x 1.5

### Working Cylinder Stroke

Unscrewing force available at different hydraulic pressures (PSI).

Working Stroke

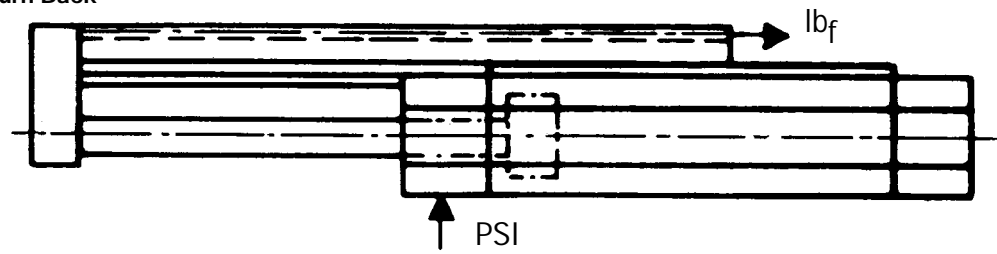


A (piston)	B (shaft)	1,160 PSI	1,450 PSI	1,740 PSI	2,030 PSI	2,175 PSI
Ø.984"	Ø.630"	887 lb <sub>f</sub>	1,102 lb <sub>f</sub>	1,326 lb <sub>f</sub>	1,529 lb <sub>f</sub>	1,664 lb <sub>f</sub>
Ø1.575"	Ø.866"	2,248 lb <sub>f</sub>	2,810 lb <sub>f</sub>	3,395 lb <sub>f</sub>	3,957 lb <sub>f</sub>	4,204 lb <sub>f</sub>
Ø2.480"	Ø1.417"	5,598 lb <sub>f</sub>	6,992 lb <sub>f</sub>	8,409 lb <sub>f</sub>	9,802 lb <sub>f</sub>	10,476 lb <sub>f</sub>

### Returning Cylinder Stroke

Force available at different hydraulic pressures (PSI)

Return Back



A (piston)	B (shaft)	1,160 PSI	1,450 PSI	1,740 PSI	2,030 PSI	2,175 PSI
Ø.984"	Ø.630"	517 lb <sub>f</sub>	652 lb <sub>f</sub>	787 lb <sub>f</sub>	922 lb <sub>f</sub>	989 lb <sub>f</sub>
Ø1.575"	Ø.866"	1,574 lb <sub>f</sub>	1,978 lb <sub>f</sub>	2,361 lb <sub>f</sub>	2,743 lb <sub>f</sub>	2,967 lb <sub>f</sub>
Ø2.480"	Ø1.417"	3,777 lb <sub>f</sub>	4,721 lb <sub>f</sub>	5,665 lb <sub>f</sub>	6,587 lb <sub>f</sub>	7,081 lb <sub>f</sub>



# D-M-E Hydraulic Unscrewing Device

## APPLICATIONS

### Application:

#### Required D-M-E Component List

#### Application A

Cat.#	Qty	Description
ZG-xx-yyy	1	Hydraulic Cylinder
ZS-xx	2	Alignment Plate
ZB-xx-y	1	Flange-Version 3
<td>2</td> <td>S.A.E. Rack</td>	2	S.A.E. Rack
ZL-xx-yy	1	Cam Riser
ZF-yyy	6	Guideways for Racks & Cam

#### Application B

Cat.#	Qty	Description
ZG-xx-yyy	1	Hydraulic Cylinder
ZS-xx	4	Alignment Plate
ZB-xx-y	1	Flange-Version 1
ZZ-xx-yy	1	S.A.E. Rack
ZF-yyy	2	Guideways for Rack

#### Application C

Cat.#	Qty	Description
ZG-xx-yyy	2	Hydraulic Cylinder
ZS-xx	4	Alignment Plate
ZB-xx-y	2	Flange-Version 1
ZZ-xx-yy	2	S.A.E. Rack
ZF-yyy	4	Guideways for Racks

#### Application D

Cat.#	Qty	Description
ZG-xx-yyy	1	Hydraulic Cylinder
ZS-xx	2	Alignment Plate
ZB-xx-y	1	Flange-Version 2
ZZ-xx-yy	1	Cam Riser
ZF-yyy	2	Guideways for Cam

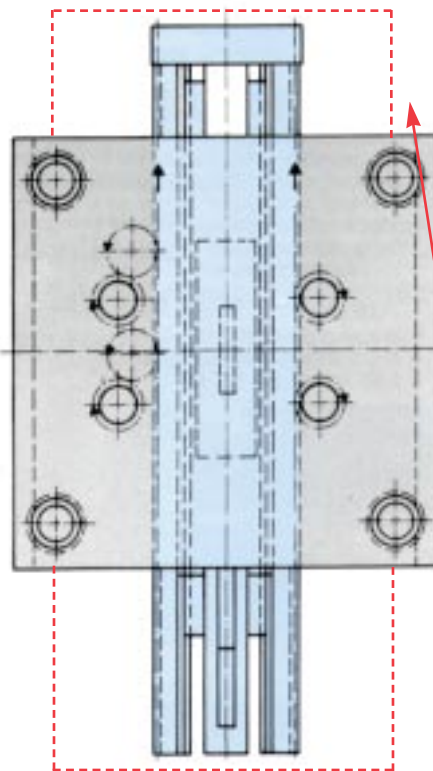
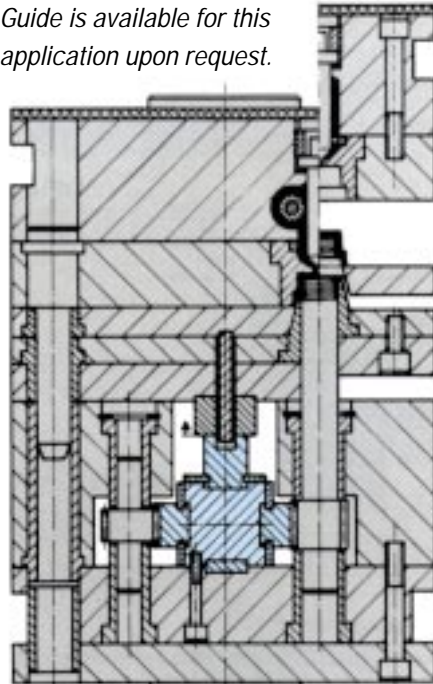
### NOTE:

Mold maker should provide limit switches for fully closed and for cylinder extended. Full cylinder extension should be avoided to improve internal cylinder seal life.

## Application A

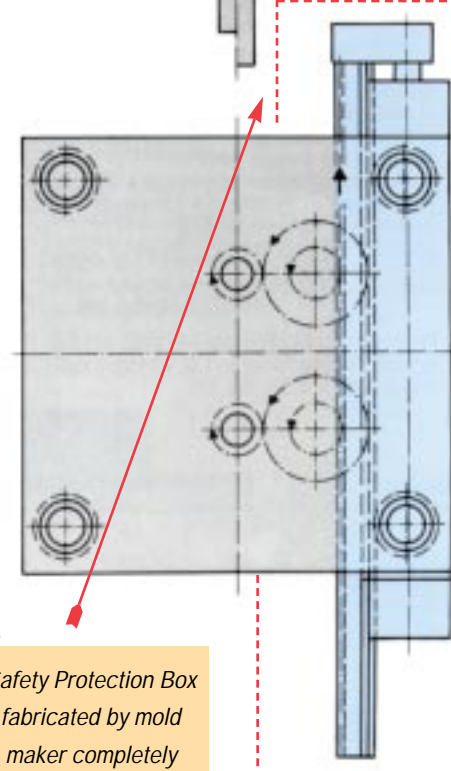
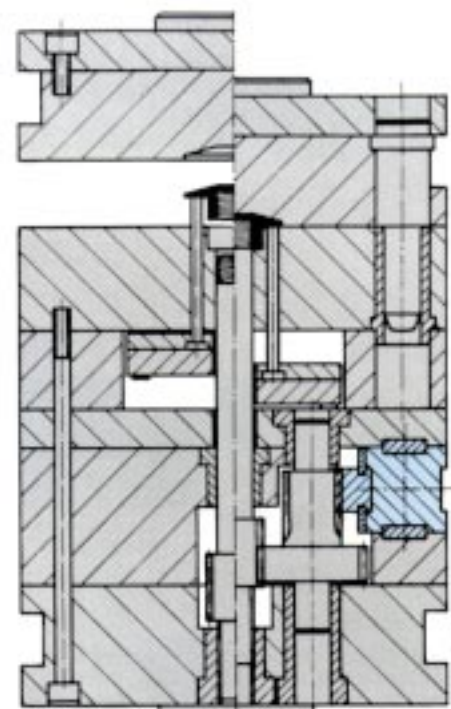
### Without guiding thread with cam

A complete Engineering Design Guide is available for this application upon request.



## Application B

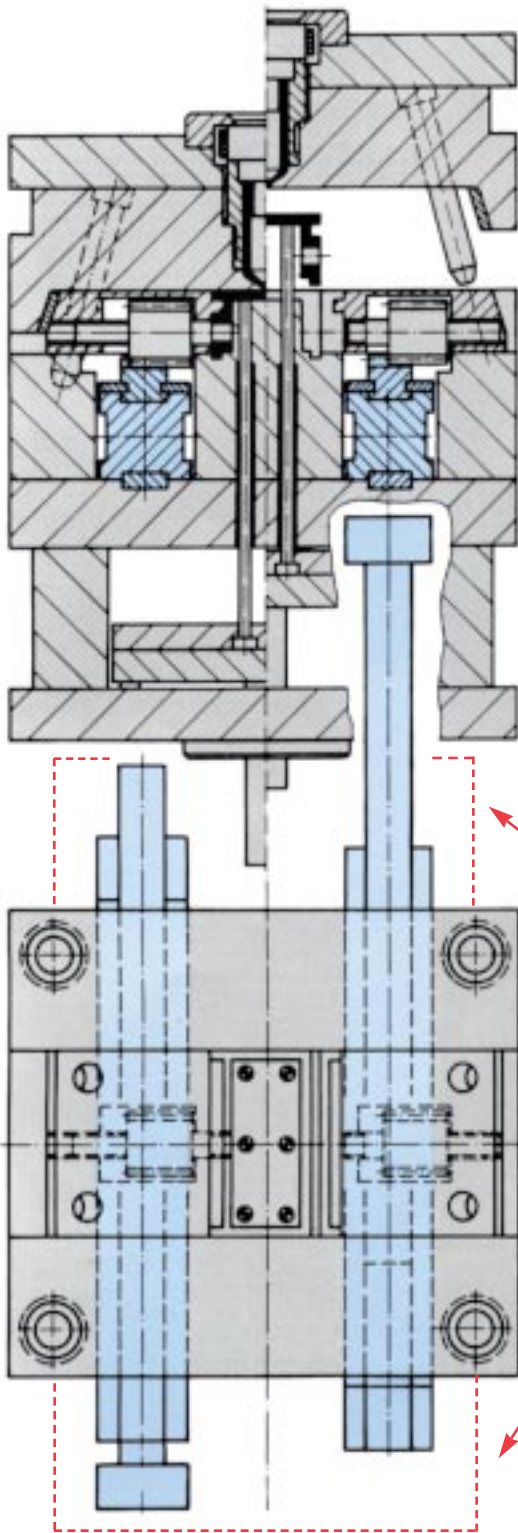
### With guiding thread



Safety Protection Box fabricated by mold maker completely covering full movement of Unscrewing Device.

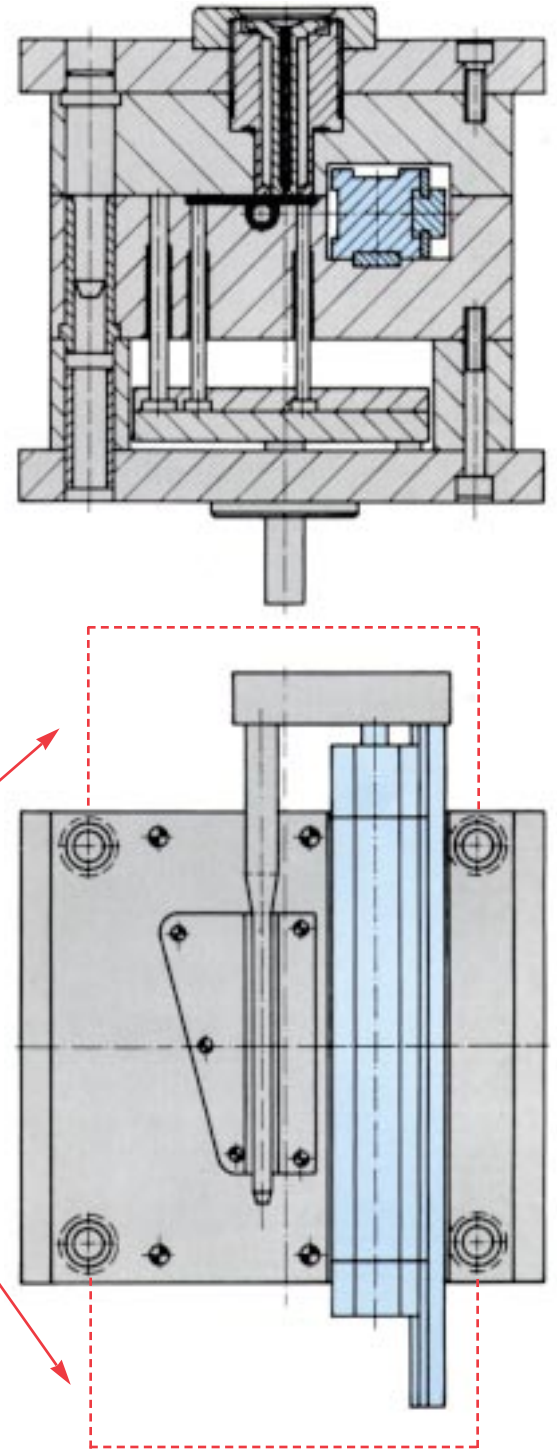
### Application C

#### *With guiding thread*



### Application D

#### *Long guiding cores*



Safety Protection Box  
fabricated by mold  
maker completely  
covering full  
movement of  
Unscrewing Device.

#### **SAFETY CONSIDERATIONS:**

Mold maker must fabricate boxes over the rack areas which move to protect against injury to personnel. Mold maker must also put safety interlocks to prevent movement of unscrewing device if these protection boxes are removed for any reason. Also, sheet metal should be used to cover areas where the gears are, to prevent gear damage from loose debris falling between the gears and racks.

***D-M-E COMPANY (WORLD HEADQUARTERS)***

29111 Stephenson Hwy.  
Madison Heights, MI 48071  
(800) 626-6653 (248) 398-6000  
FAX (248) 398-6174



***D-M-E of CANADA, LTD.***

6210 Northwest Drive  
Mississauga, Ontario L4V1J6  
(800) 387-6600 Toll Free  
FAX (905) 677-5280