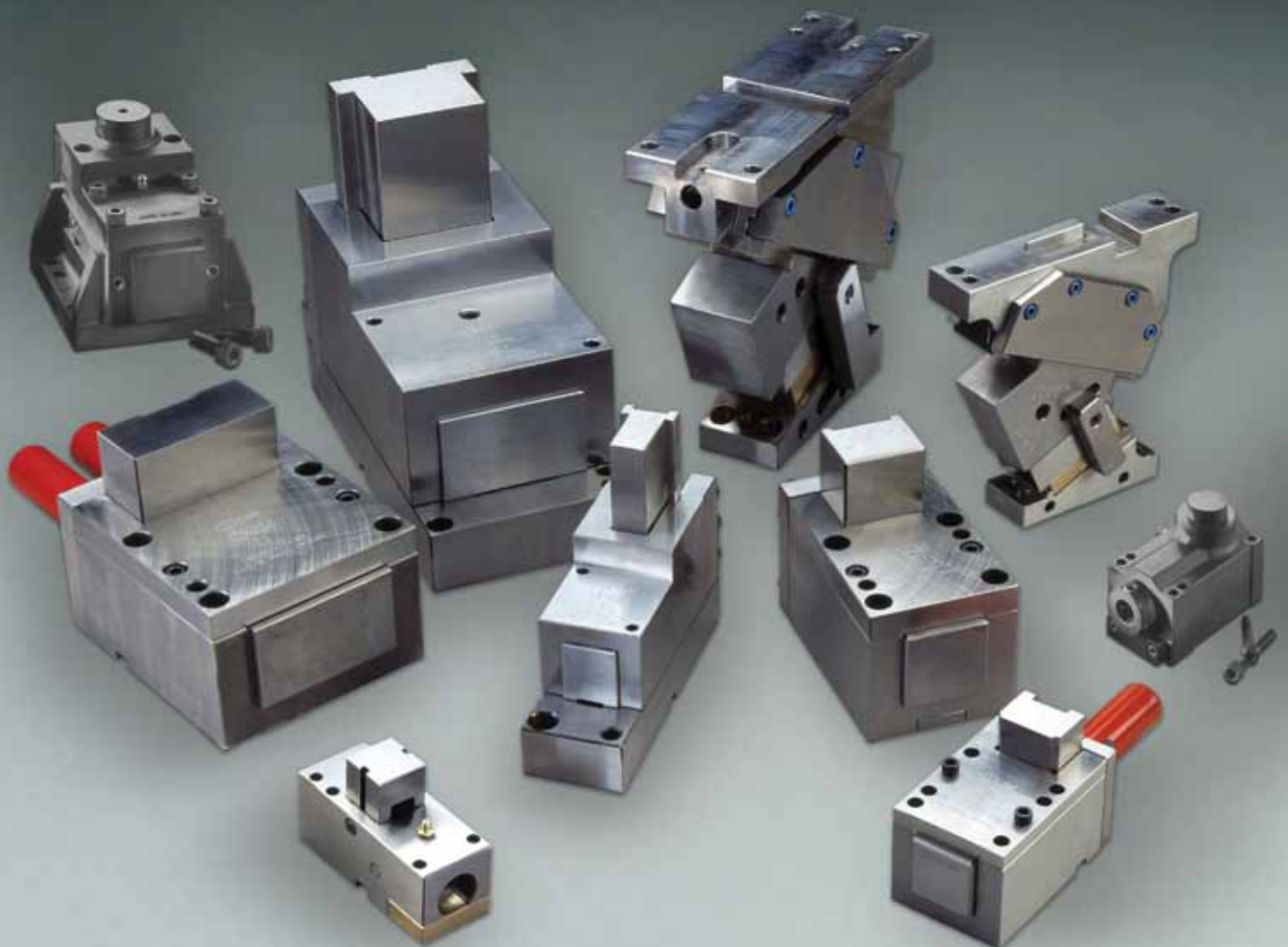


# ITEM<sup>®</sup>

## BOX CAMS & BUMP CAMS



# BOX CAMS AND BUMP CAMS

## SERVICE WE DELIVER AND QUALITY YOU CAN DEPEND ON

**IEM** is a leading manufacturer of die and mold components supplied globally to the parts forming industry. Backed by years of tool and die experience, quality and innovation are some of the reasons why our name is respected throughout the world. We have taken the lead role in creating and bringing new products to customers and helping them find solutions that improve their operations. Based on the capabilities **IEM** offers, we can help you to meet the demands of quick deliveries, technical support, quality products and competitive prices. **IEM** and its' broad distribution channels and direct sales personnel will assist you in any way to make your product a better and more profitable one.

Whether standard or customized products, with our years of experience, customers can be sure the products they receive will meet their expectations for reliability and dependable performance. We understand the demanding schedules of die builders and production personnel and have developed efficient manufacturing processes to shorten product lead times as well as put inventory on our shelves so you can have it in your facility when you need it.

Included in our full line offering are both inch and metric size die components that are designed to die standards including ISO, NAAMS, JIS and many automotive and appliance manufacturers' standards. The complete product offering includes:

- Accu-Bend™ Rotary Benders
- Cams
  - Aerial & Diemount Cams
  - Box & Bump Cams
  - Roller Cams
  - Wide Cams
- Die Accessories
- Guide Posts & Bushings
  - Plain & Ball Bearing Styles
  - Steel, Bronze, Bronze-Plated & Self-Lubricating Bushings
  - Lempcoloy Bushings
  - Special Pins, Bushings & Retainers
- Hydraulics
  - Electronic Die Setters
  - Die Separators
  - Drill & Tap Equipment
  - Hydraulic Motors
- In-Die Tapping Units
- Mold Components
  - Bronze Plated & Self-Lubricated Bushings
  - Leader Pins
  - Bronze & Bronze Plated Wear Strips & Ways
- Punches, Buttons & Retainers
- Springs
  - DieMax L Inch Series Springs
  - DieMax XL Series ISO Springs
  - JIS Series Springs
  - Custom Heavy Duty Springs
  - Marsh Mellow Springs
  - Formathane Urethane
  - Utility Springs
- Wear Products
  - Plates, Strips, Gibs & Blocks
  - Steel, bronze, Bronze-Plated and Self-Lubricating Materials

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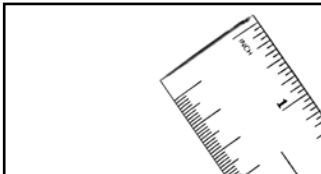
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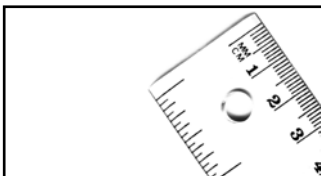
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# Cam Selection Matrix

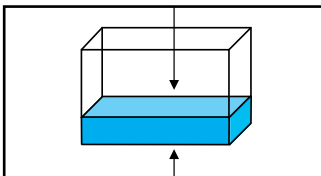
|                               | NAAMS Standards |           |                 |              |                     |                |            |                         |
|-------------------------------|-----------------|-----------|-----------------|--------------|---------------------|----------------|------------|-------------------------|
|                               | Gib Cam™        | Mini Cam™ | Long Travel Box | Standard Box | Max Power™ Box (MP) | NDM Die Mounts | NAC Aerial | Long Reaching Die Mount |
| Inch                          |                 | X         | X               | X            |                     |                |            |                         |
| Metric                        | X               | X         | X               | X            | X                   | X              | X          | X                       |
| Low profile                   | X               |           |                 |              |                     |                |            |                         |
| Narrow width                  |                 | X         | X               |              |                     |                |            |                         |
| Short length                  |                 | X         |                 | X            | X                   |                |            |                         |
| Max. slide travel             |                 |           | X               |              |                     |                |            | X                       |
| Max. stripping force          |                 |           |                 |              | X                   |                |            |                         |
| Nitrogen return               |                 |           |                 |              | X                   | X              |            | X                       |
| Positive return               | X               |           |                 |              |                     | X              |            | X                       |
| Max. piercing force           |                 |           |                 |              | X                   | X              |            | X                       |
| Designed to NAAMS Standards   |                 |           |                 |              |                     | X              |            |                         |
| Special cam designs available | X               | X         | X               | X            | X                   | X              |            | X                       |



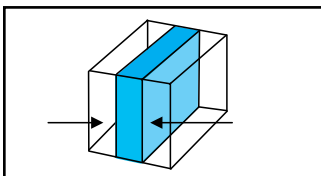
**Inch Design** – Cam is designed around the English or Inch measurement standard. Bolt and dowel holes are standard inch components.



**Metric Design** – Cam is designed around the Metric measurement standard. Bolt and dowel holes are standard metric components. (May require a metric callout when placing an order)

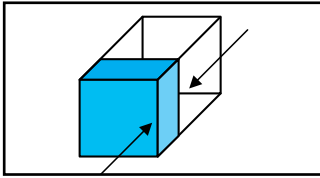


**Low Profile** – The overall height is minimized in a die design. The low profile cams are an excellent choice for short press stroke operations, where die space is limited.

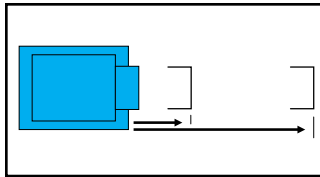


**Narrow Width** – Reduces progression space used in a die design while allowing multiple standard cams to align side-by-side in a die.

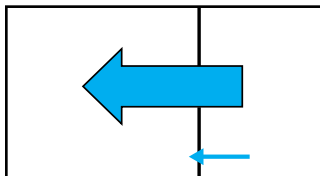
# Cam Selection Matrix



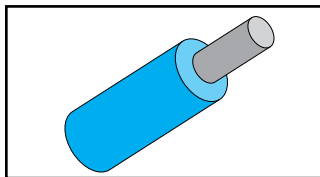
**Short Length** – The short length design is ideal for working at the edge of a die or on the inside of a large part working out. The length of the cam is minimized by an internal spring return.



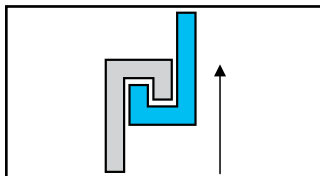
**Maximum Slide Travel/Long Reaching** – The slide travel increases by 30% or more over standard design cams. Cams are good in applications where there is a need to reach over large part flanges or stock material placement limits the proximity of the cam.



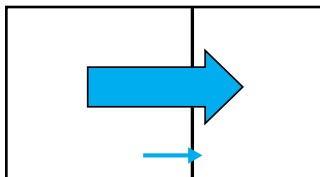
**Maximum Stripping Force** – Return spring force is 10% of working force. May require Nitrogen Return option.



**Nitrogen Return** – Gas springs are designed into the cam to provide higher stripping forces and even slide return. Cams with nitrogen gas springs will either come standard with a gas spring or may be an option to replace or use in combination with standard mechanical springs.



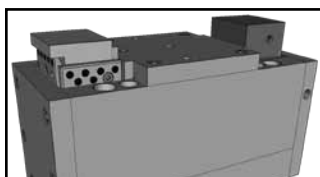
**Positive Return** – A mechanical return designed into the cam to pull the slide and tooling out of the part. Ideal for applications piercing large holes or in sticky materials where there is a chance of die damage due to a stuck punch.



**Maximum Piercing Force** – Large self lubricated surface areas on moving parts provides maximum piercing forces over long extended periods of cam operation.



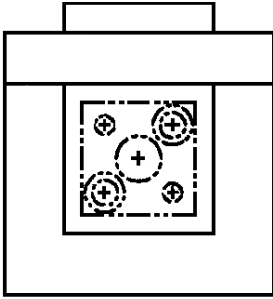
**Designed to NAAMS Standards** – Cams meet or exceed all of the NAAMS Global Standards for Aerial and Die Mount Cam design.



**Special Cam Designs** – If a standard cam design doesn't work for you, then give us your application specifications and we will design a special cam for you.

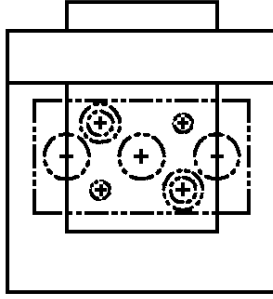
# Retainer Mounting Methods

**STANDARD RETAINER**



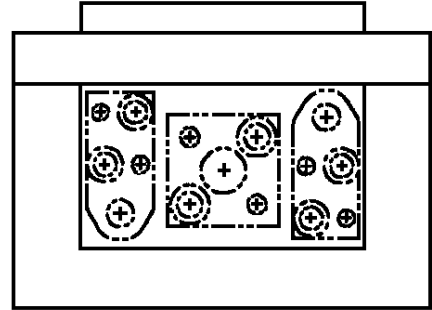
The soft mounting face of the cam slide allows for the mounting of a standard light or heavy duty punch retainer.

**STANDARD RETAINER**



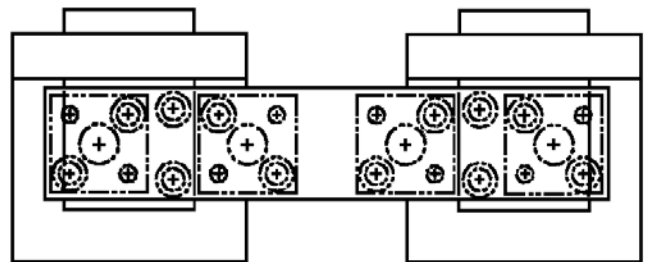
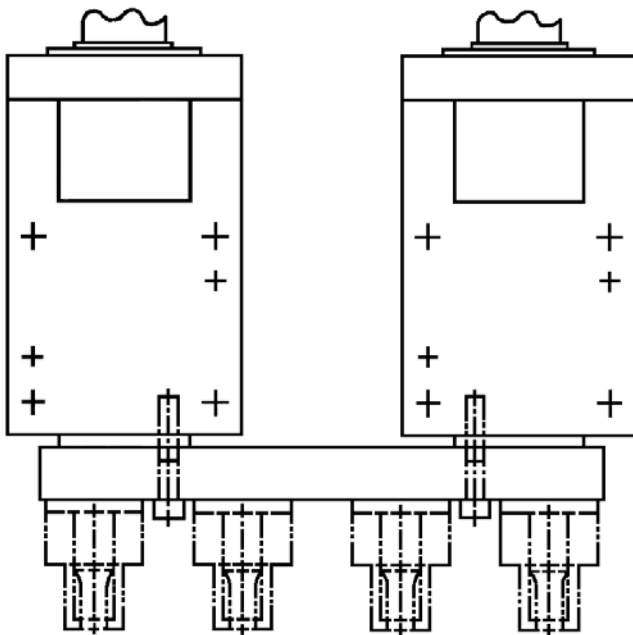
Oversized retainers work well if multiple punches are set in an even load pattern in relation to the center of the slide. Off-center loads will reduce the working tonnage rating of the cam.

**STANDARD RETAINER**



Multiple retainers easily fit our "double wide" #4L and #14L cams. Applications requiring off-center loading of the slide reduces the working tonnage rating of the cam.

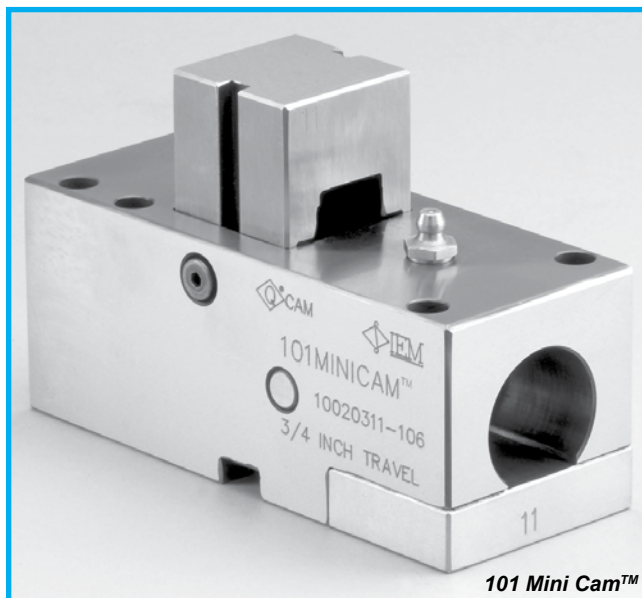
**GANG MOUNTING RETAINERS ON (2) CAMS**



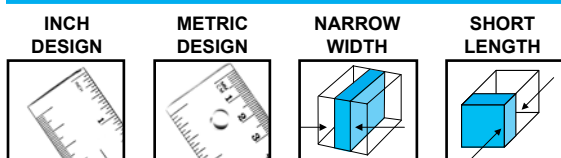
Using a bridge block fastened on the slide face of two of the same cams allows for mounting of multiple retainers. Precise timing of both cam slides ensures load sharing between the cams.

# Mini Cam™

## Technical Information



| STANDARD UNIT<br>(NO RETAINER) | CAM WITH RETAINER |                 |
|--------------------------------|-------------------|-----------------|
|                                | HEADED PUNCH      | BALL LOCK PUNCH |
| 101                            | 101H0875          | 101B250         |
|                                | 101H1125          | 101B375         |
|                                | 101H1375          | —               |
| 101MM                          | 101H0875MM        | 101B250MM       |
|                                | 101H1125MM        | 101B375MM       |
|                                | 101H1375MM        | —               |
| 102                            | 102H1000          | 102B250         |
|                                | 102H1250          | 102B375         |
|                                | 102H1500          | 102B500         |
|                                | —                 | 102B625         |
| 102MM                          | 102H1000MM        | 102B250MM       |
|                                | 102H1250MM        | 102B375MM       |
|                                | 102H1500MM        | 102B500MM       |
|                                | —                 | 102B625MM       |



Calculated stroke, tonnage and wear curves are presented as a guideline for design and maintenance only. No warranty exists, either expressed or implied, as a result of the application, as it may relate to the information provided.

| Standard Metric Models | Slide Diameter in/mm | Travel in/mm | Working Load tons/kN | Spring Force lbs/N | Maximum Tooling Weight lbs/kg | Approx. Cam Weight lbs/kg | Spring Catalog Number | Number of Springs |
|------------------------|----------------------|--------------|----------------------|--------------------|-------------------------------|---------------------------|-----------------------|-------------------|
| 101                    | 1.25                 | .75          | 2                    | 140                | 2                             | 8                         | 9-1012-26             | 1                 |
| 101MM                  | 31.75                | 19.05        | 17.8                 | 24.5               | 0.91                          | 3.63                      |                       |                   |
| 102                    | 1.50                 | 1.00         | 3                    | 308                | 2                             | 12                        | 9-1214-26             | 1                 |
| 102MM                  | 38.10                | 25.40        | 26.7                 | 53.9               | 0.91                          | 5.44                      |                       |                   |

| NUMBERING EXAMPLE | Ball Lock Punches                                                                                                                   | Headed Punches                                                                                                                         |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
|                   | <p>Cam Unit Number<br/>Body diameter of punch<br/>(375 = 3/8")</p> <p><b>101 - B - 375</b></p> <p><b>B</b> = Ball Lock Retainer</p> | <p>Cam Unit Number<br/>Length of retainer<br/>(1250 = 1-1/4")</p> <p><b>102 - H - 1250</b></p> <p><b>H</b> = Headed Punch Retainer</p> |

### RETAINERS FOR BALL LOCK PUNCHES

Ball-lock punches are widely used in the industry because the self-locking feature eliminates the need for keying the punch. The necessity for sharpening or the replacement of a broken punch during production is simplified.

### RETAINERS FOR HEADED PUNCHES

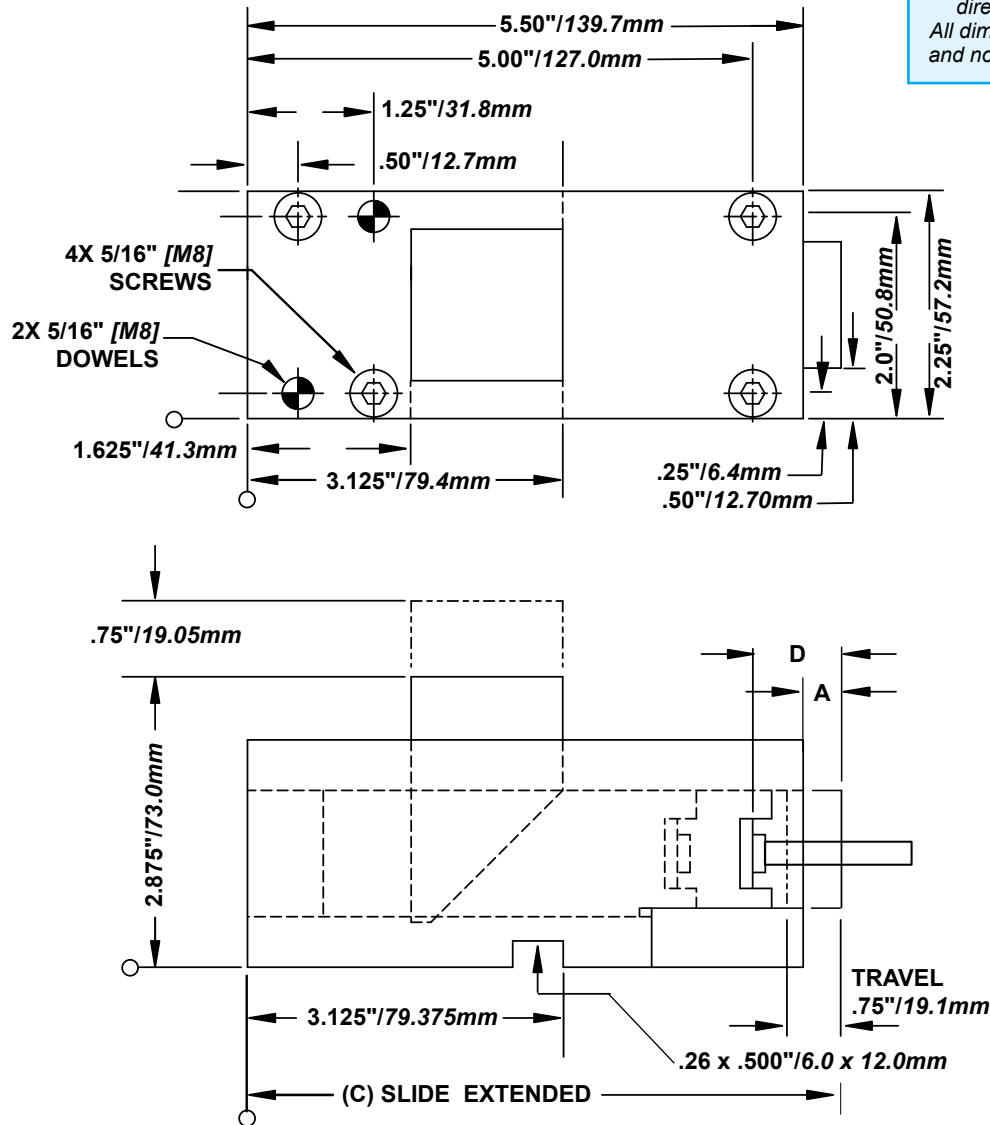
Retainers for headed punches come in three (3) different lengths for each Mini Cam™ unit. The shortest length retainer comes as a standard for each unit and will be suitable for most applications.

However, some applications may require the use of a longer retainer. An example might be an application in which an exceptionally long punch is used, or when perforating a heavy material. A longer retainer allows for greater stability due to increased gripping range on the body of the punch.

# Mini Cam™

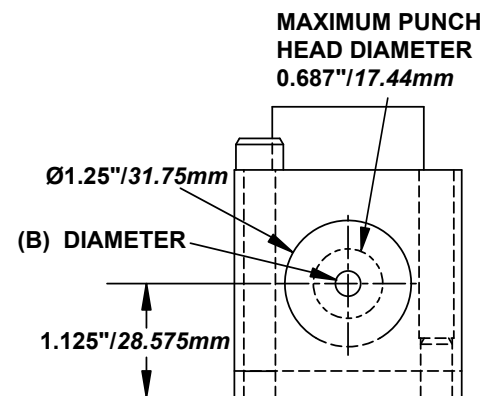
## 101/101MM Slide Unit

Cam models are designed in both inch and metric. Listed dimensions may not convert directly into the other standard. All dimensions are for reference only and no tolerance is stated or implied.



| Catalog Number with Retainer | Retainer Height Dimension D in/mm |
|------------------------------|-----------------------------------|
| 101H0875                     | .875 (22.2)                       |
| 101H1125                     | 1.125 (28.6)                      |
| 101H1375                     | 1.375 (34.9)                      |
| 101B250                      | 1.000 (25.4)                      |
| 101B375                      | 1.000 (25.4)                      |

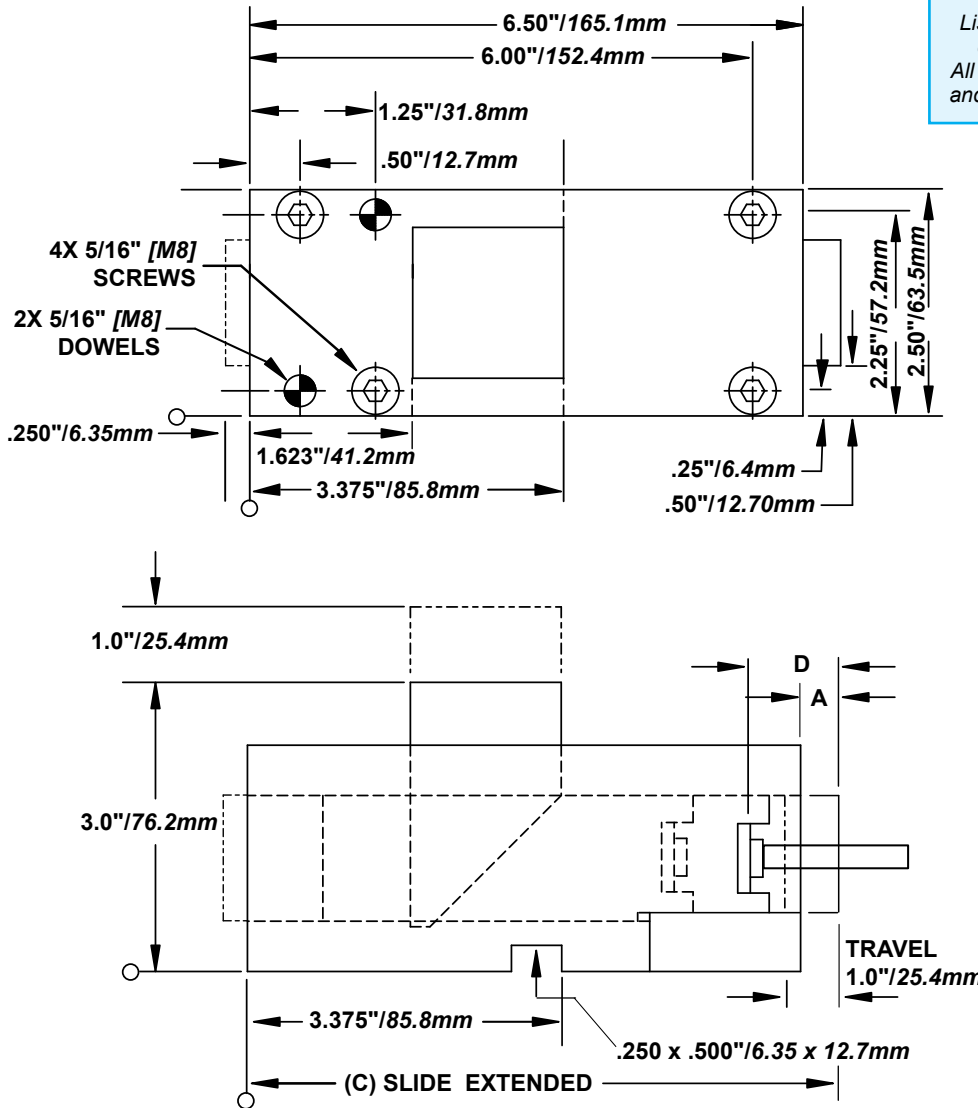
| Catalog Number with Retainer | A in/mm       | B in/mm       | C in/mm         | Headed Punches  |                | Light Duty Ball Lock Punches in |
|------------------------------|---------------|---------------|-----------------|-----------------|----------------|---------------------------------|
|                              |               |               |                 | Shaped Point in | Round Point in |                                 |
| 101H0875                     | 3/8<br>9.5    | .1884<br>4.79 | 5-7/8<br>149.2  | 3/16 – 3/8      | up to 3/8      | —                               |
| 101H1125                     | 5/8<br>15.9   | .1884<br>4.79 | 6-1/8<br>155.6  | 3/16 – 3/8      | up to 3/8      | —                               |
| 101H1375                     | 7/8<br>22.2   | .1884<br>4.79 | 6-3/8<br>161.9  | 3/16 – 3/8      | up to 3/8      | —                               |
| 101B250                      | 11/16<br>17.5 | .2503<br>6.36 | 6-3/16<br>157.2 | —               | —              | 1/4                             |
| 101B375                      | 11/16<br>17.5 | .375<br>9.53  | 6-3/16<br>157.2 | —               | —              | 3/8                             |



# Mini Cam™

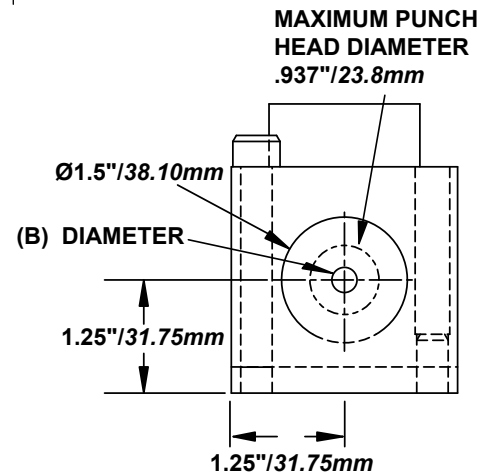
## 102/102MM Slide Unit

Cam models are designed in both inch and metric. Listed dimensions may not convert directly into the other standard. All dimensions are for reference only and no tolerance is stated or implied.



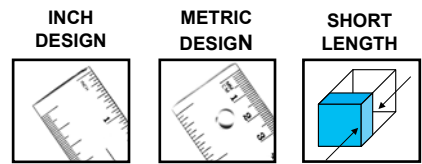
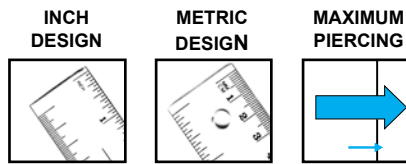
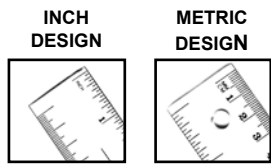
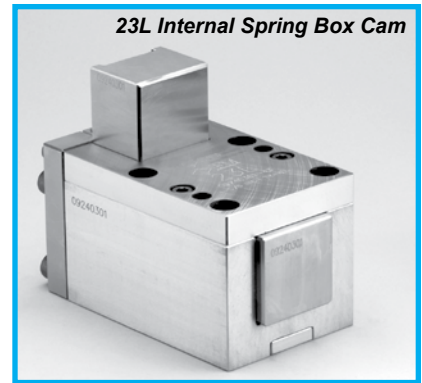
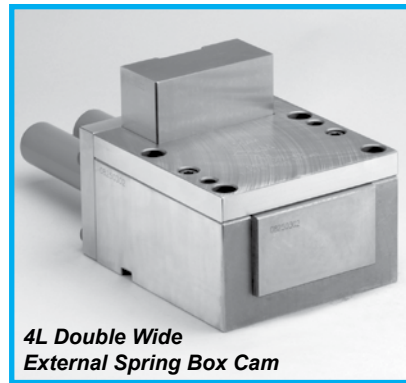
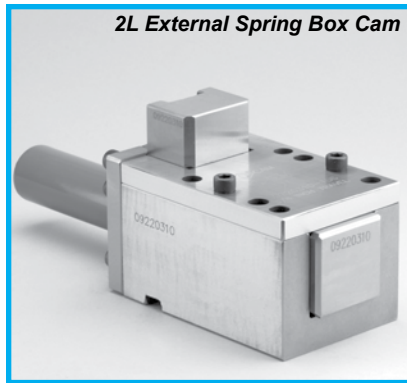
| Catalog Number with Retainer | Retainer Height Dimension D in/mm |
|------------------------------|-----------------------------------|
| 102H1000                     | 1.000 (25.4)                      |
| 102H1250                     | 1.250 (31.8)                      |
| 102H1500                     | 1.500 (38.1)                      |
| 102B250                      | 1.000 (25.4)                      |
| 102B375                      | 1.000 (25.4)                      |
| 102B500                      | 1.000 (25.4)                      |
| 102B625                      | 1.000 (25.4)                      |

| Catalog Number with Retainer | A in/mm     | B in/mm        | C in/mm        | Headed Punches  |                | Light Duty Ball Lock Punches in |
|------------------------------|-------------|----------------|----------------|-----------------|----------------|---------------------------------|
|                              |             |                |                | Shaped Point in | Round Point in |                                 |
| 102H1000                     | 1/4<br>6.35 | .2509<br>6.37  | 6-3/4<br>171.5 | 1/4 – 5/8       | up to 3/4      | —                               |
| 102H1250                     | 1/2<br>12.7 | .2509<br>6.37  | 7<br>177.8     | 1/4 – 5/8       | up to 3/4      | —                               |
| 102H1500                     | 3/4<br>19.0 | .2509<br>6.37  | 7-1/4<br>184.2 | 1/4 – 5/8       | up to 3/4      | —                               |
| 102B250                      | 1/2<br>12.7 | .2503<br>6.37  | 7<br>177.8     | —               | —              | 1/4                             |
| 102B375                      | 1/2<br>12.7 | .3753<br>9.53  | 7<br>177.8     | —               | —              | 3/8                             |
| 102B500                      | 1/2<br>12.7 | .5003<br>12.70 | 7<br>177.8     | —               | —              | 1/2                             |
| 102B625                      | 1/2<br>12.7 | .6253<br>15.88 | 7<br>177.8     | —               | —              | 5/8                             |



# Standard Box Cam

## Technical Information



### EXTERNAL SPRING

| Standard Cam Models | Face Size X in/mm | Travel in/mm | Working Load tons/kN | Spring Force lbs/N | Maximum Tooling Weight lbs/kg | Approx. Cam Weight lbs/kg | Spring Catalog Number | Number of Springs |
|---------------------|-------------------|--------------|----------------------|--------------------|-------------------------------|---------------------------|-----------------------|-------------------|
| 2L                  | 1.875 Sq          | 0.75         | 2.5                  | 216                | 5                             | 17                        | 9-1614-21             | 1                 |
| 2LHM                | 48 Sq             | 19           | 22.2                 | 960                | 2.27                          | 8                         |                       |                   |
| 3L                  | 2.5 Sq            | 1.625        | 4                    | 444                | 8                             | 42                        | 9-2020-21             | 1                 |
| 3LHM                | 63 Sq             | 42           | 35.6                 | 1975               | 3.64                          | 20                        |                       |                   |
| 4L                  | 2.75 x 4.75       | 1.625        | 8                    | 888                | 12                            | 78                        | 9-2020-21             | 2                 |
| 4LHM                | 70 x 121          | 45           | 71.2                 | 3950               | 5.45                          | 36                        |                       |                   |
| 5L                  | 3.25 Sq           | 2.5          | 7                    | 652                | 10                            | 93                        | 9-2428-21             | 1                 |
| 5LHM                | 82 Sq             | 64           | 62.3                 | 2900               | 4.55                          | 43                        |                       |                   |

### INTERNAL SPRING

\* Combination Spring

| Standard Cam Models | Face Size X in/mm | Travel in/mm | Working Load tons/kN | Spring Force lbs/N | Maximum Tooling Weight lbs/kg | Approx. Cam Weight lbs/kg | Spring Catalog Number | Number of Springs |
|---------------------|-------------------|--------------|----------------------|--------------------|-------------------------------|---------------------------|-----------------------|-------------------|
| 22L                 | 1.875 Sq          | .75          | 2.5                  | 258                | 5                             | 15                        | 9-1612-21             | 1                 |
| 22LMM               | 48 Sq             | 19           | 22.2                 | 1148               | 2.27                          | 33.1                      |                       |                   |
| 23L                 | 2.50 Sq           | 1.625        | 4                    | 415                | 8                             | 41                        | 9-2020-21             | 1                 |
| 23LMM               | 63 Sq             | 42           | 35.6                 | 1846               | 3.64                          | 90.4                      |                       |                   |
| 24MP                | 3.0 x 4.75        | 1.625        | 12                   | 2,141              | 12                            | 125                       | C.909.025*            | 2                 |
|                     | 76 x 120          | 41.3         | 106.8                | 9,516              | 5.45                          | 56.7                      | 9-2428-26             | 2                 |
| 24MP-XW             | 3.0 x 8.0         | 1.625        | 20                   | 3,213              | 20                            | 183                       | C.090.025*            | 3                 |
|                     | 76 x 203          | 41.3         | 178                  | 14,280             | 9.09                          | 83                        | 9-2428-26             | 3                 |

Calculated stroke, tonnage and wear curves are presented as a guideline for design and maintenance only. No warranty exists, either expressed or implied, as a result of the application, as it may relate to the information provided.

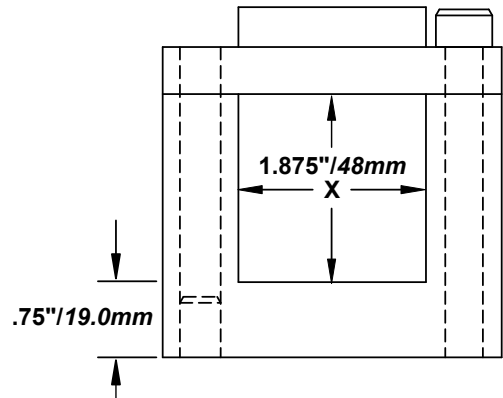
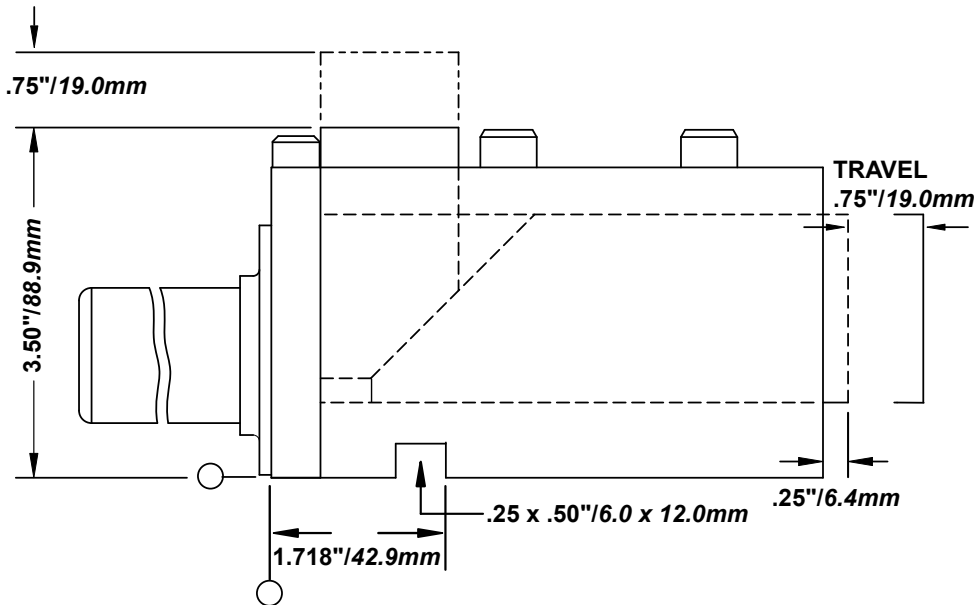
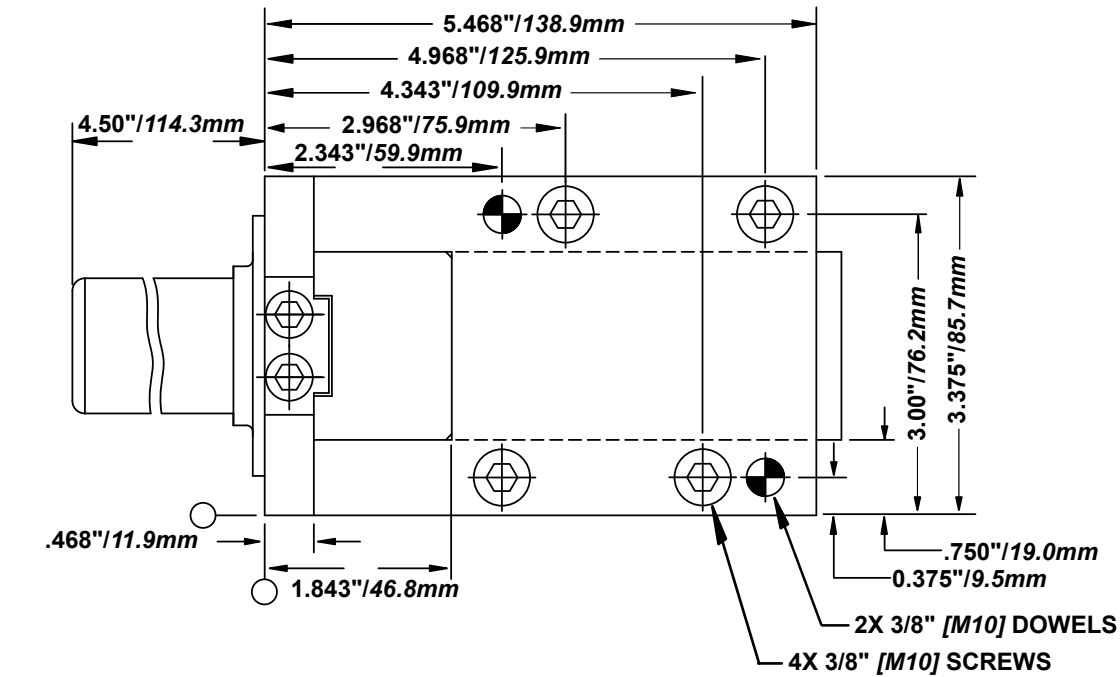
#### NOTE:

- The cam slide has .0005" – .001" (0.0127 – .0254mm) clearance between each side of the slide and body to allow for lubrication and heat dissipation. To request less clearance, add suffix to part number:

For 0.001" total clearance – CL001

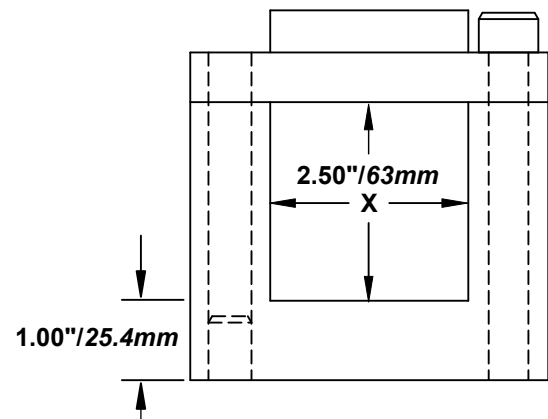
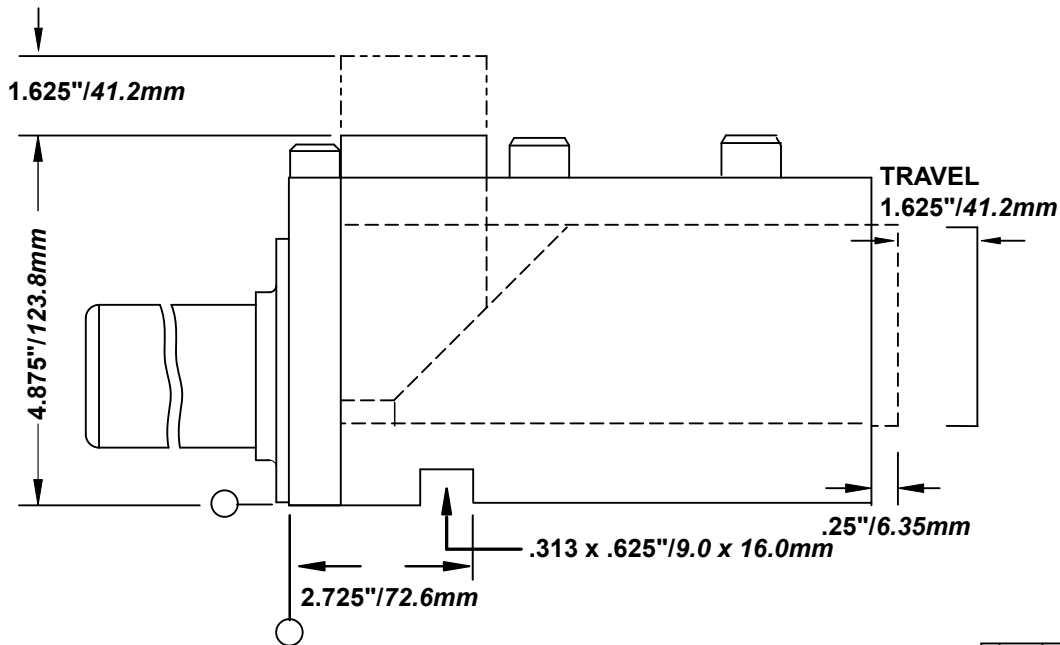
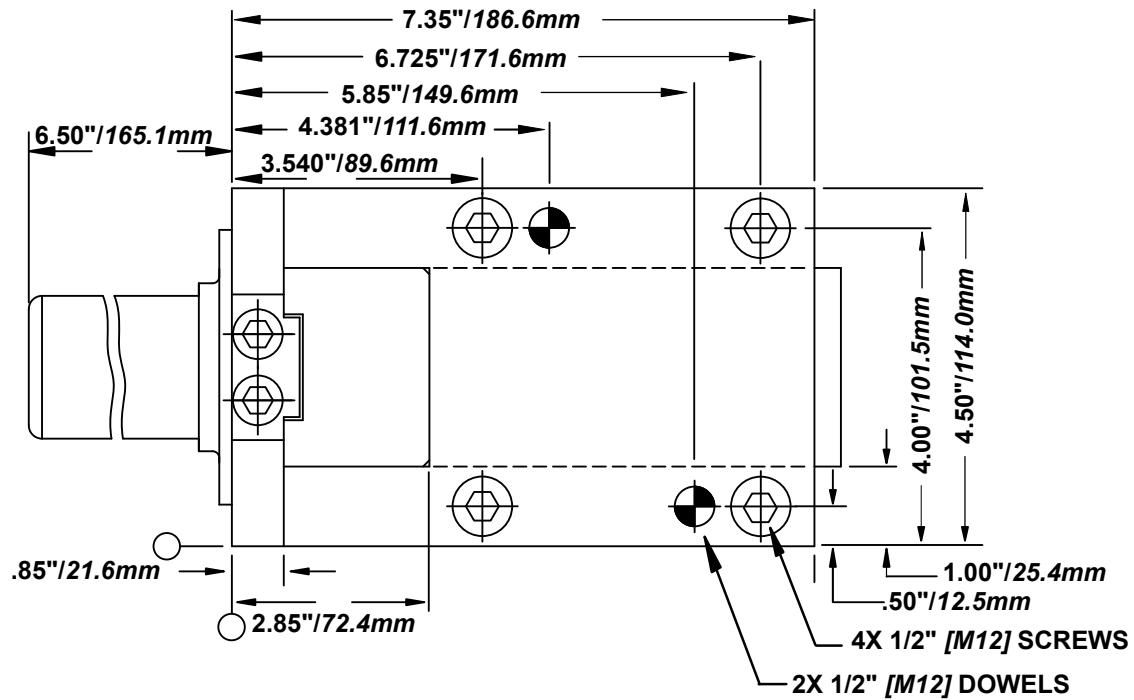
For .0005" total clearance – CL0005

# External Spring Box Cam 2L/2LHM



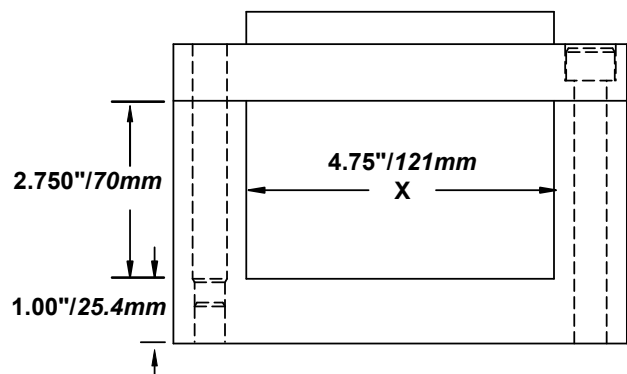
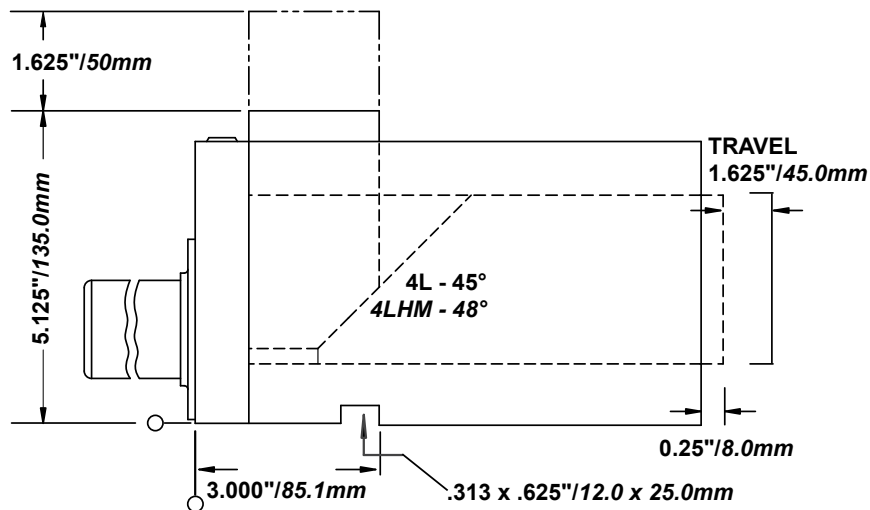
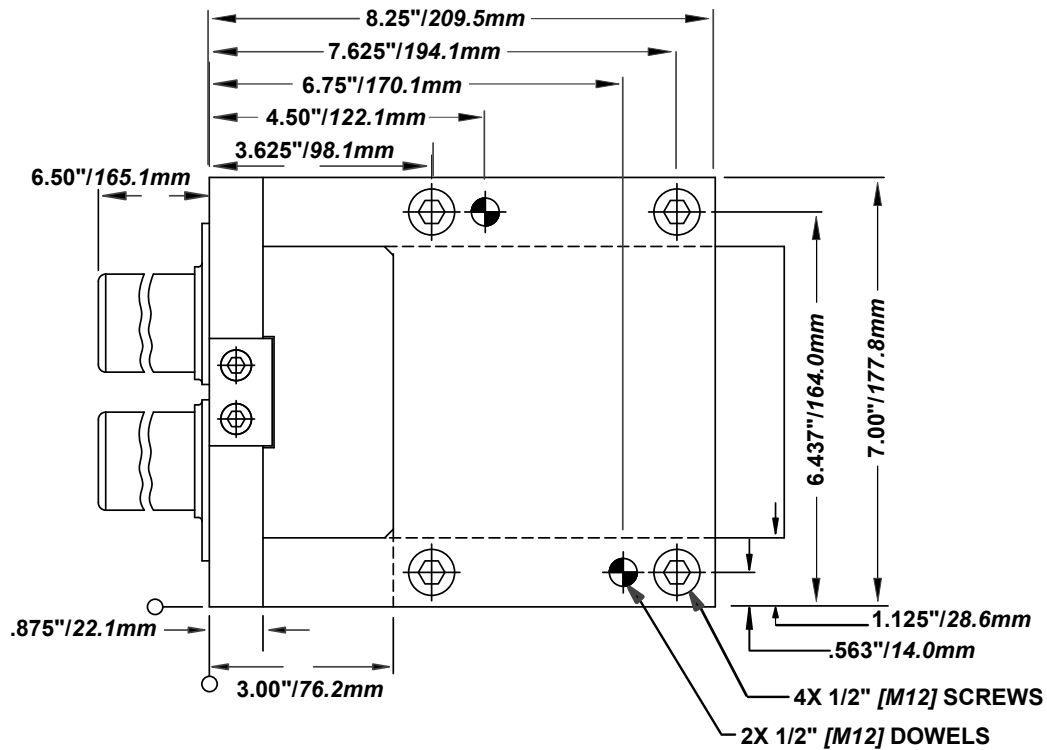
Cam models are designed in both inch and metric. Listed dimensions may not convert directly into the other standard. All dimensions are for reference only and no tolerance is stated or implied.

# External Spring Box Cam 3L/3LHM



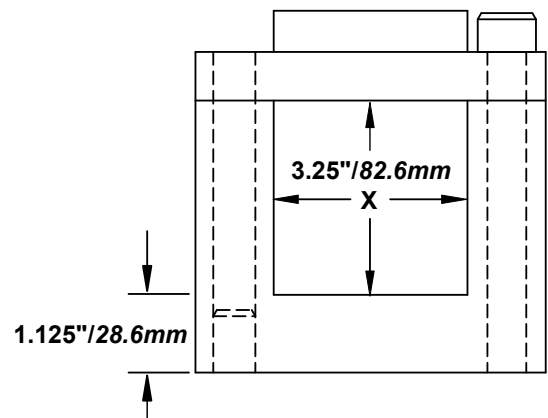
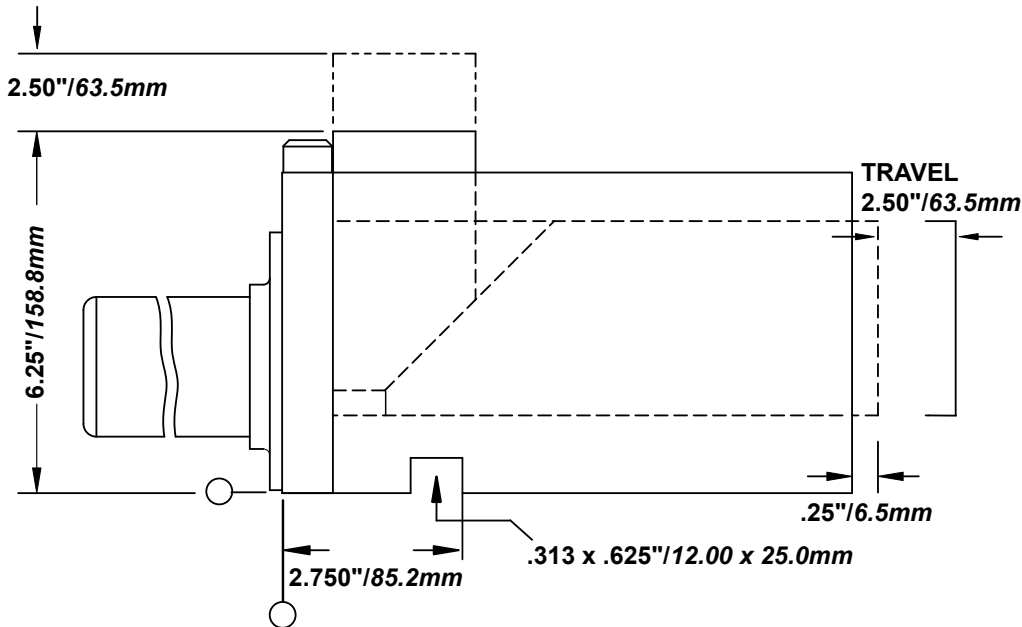
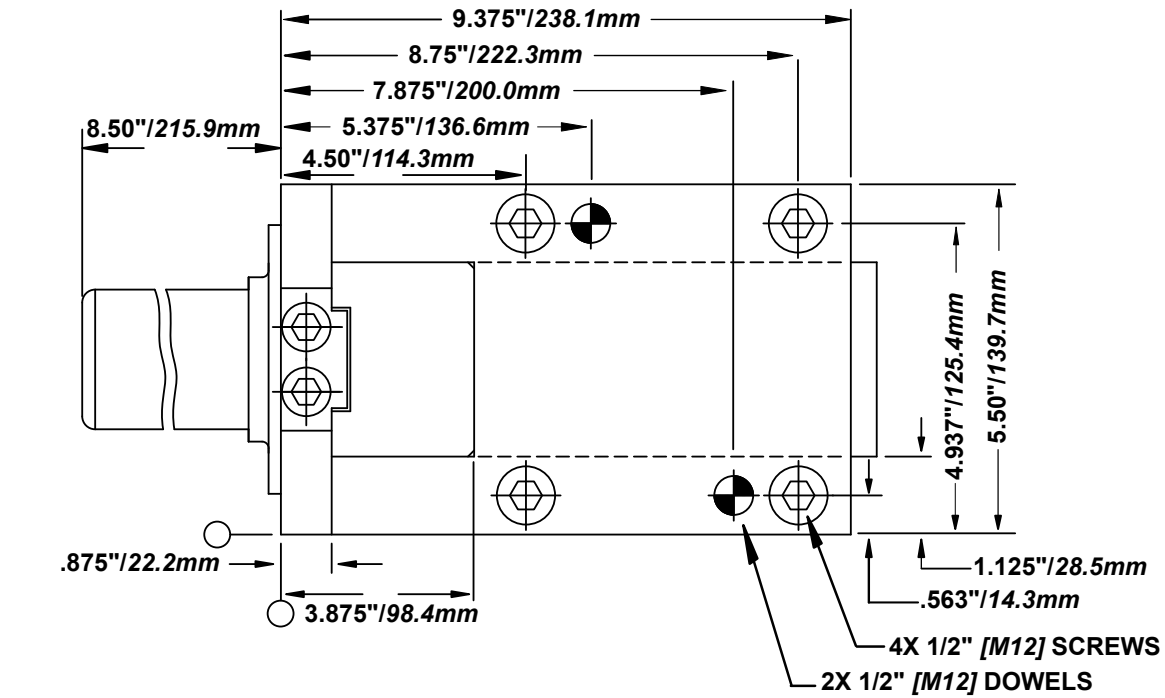
Cam models are designed  
in both inch and metric.  
Listed dimensions may not convert  
directly into the other standard.  
All dimensions are for reference only  
and no tolerance is stated or implied.

# External Spring Box Cam (Double Wide) 4L/4LHM



Cam models are designed  
in both inch and metric.  
Listed dimensions may not convert  
directly into the other standard.  
All dimensions are for reference only  
and no tolerance is stated or implied.

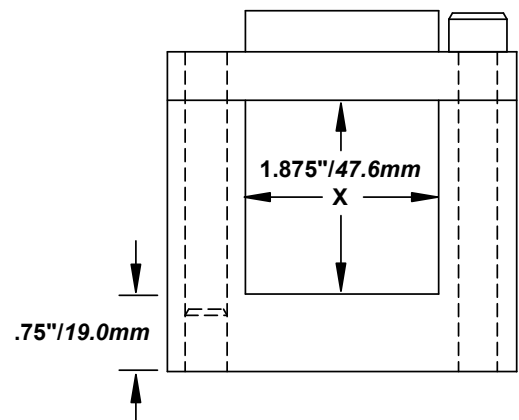
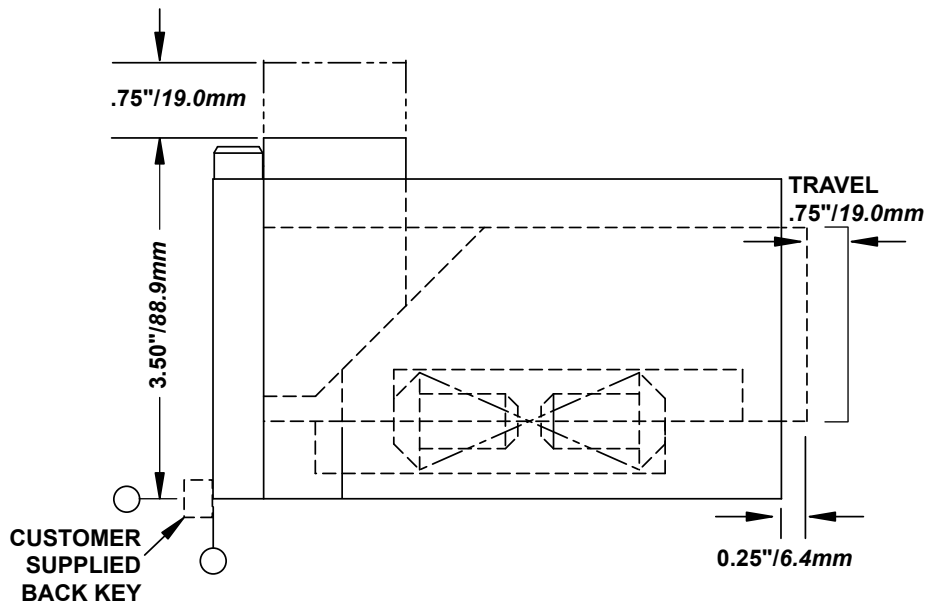
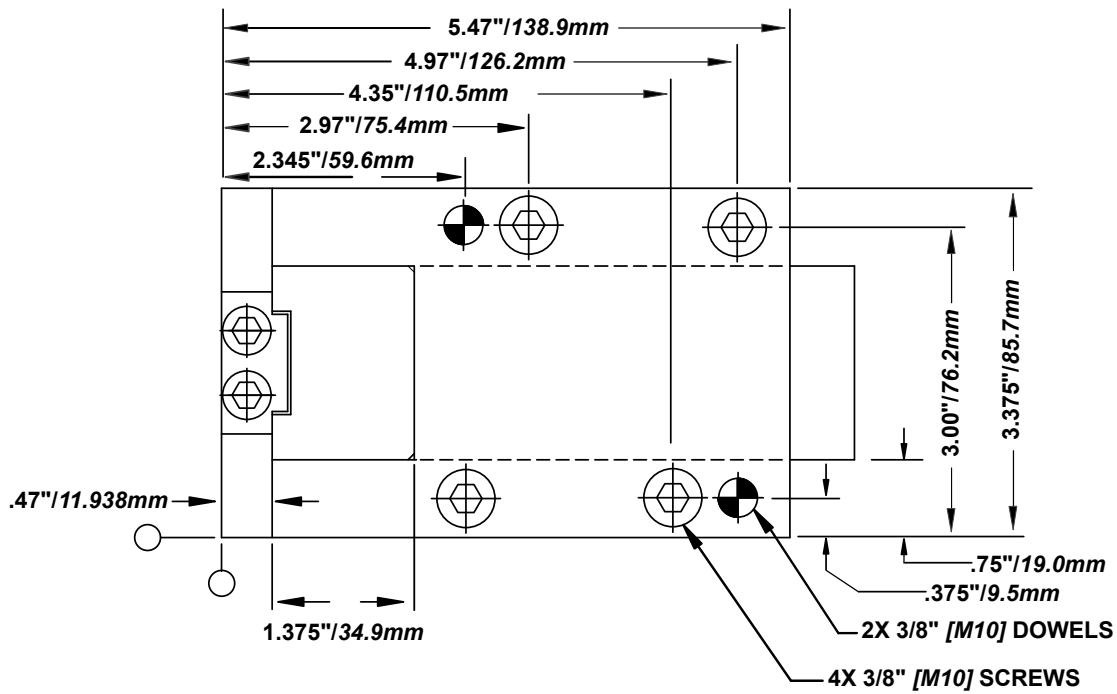
# External Spring Box Cam 5L/5LHM



Cam models are designed  
in both inch and metric.  
Listed dimensions may not convert  
directly into the other standard.  
All dimensions are for reference only  
and no tolerance is stated or implied.

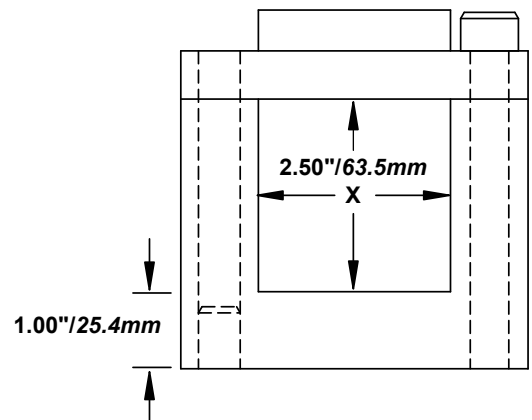
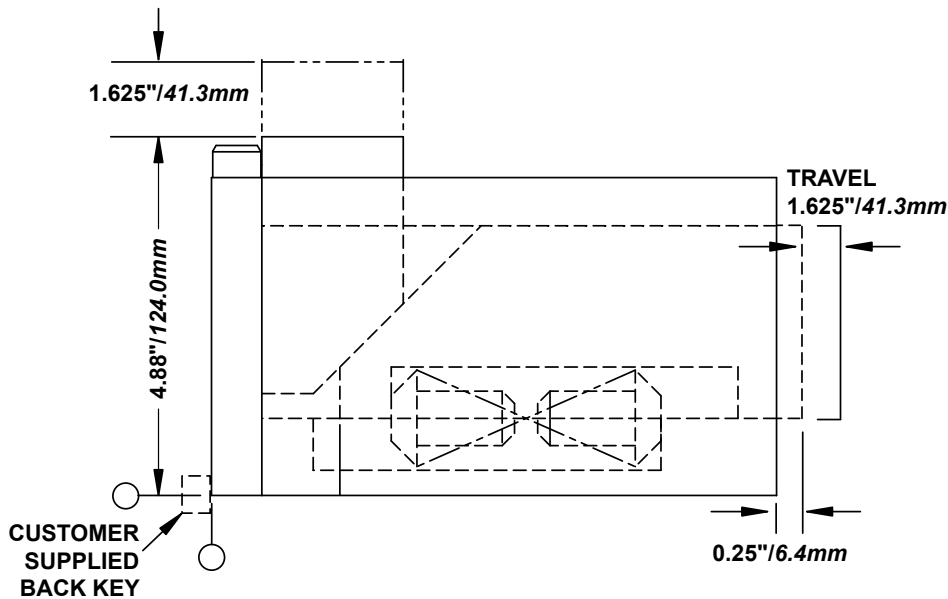
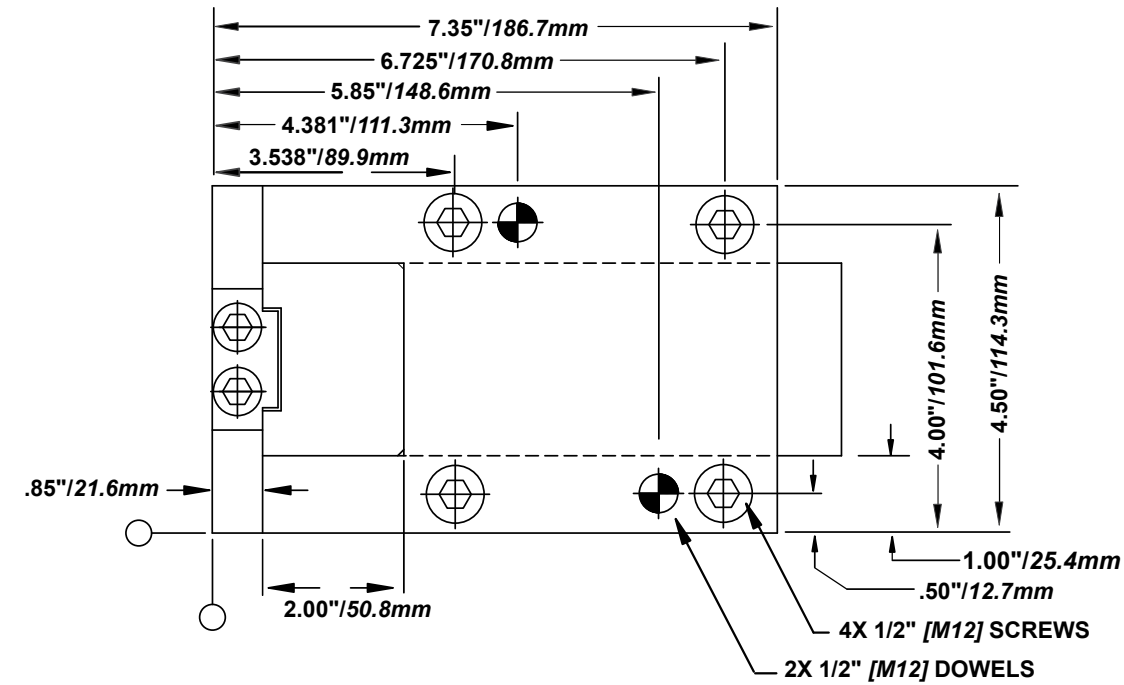
# Internal Spring Box Cam

## 22L/22LMM



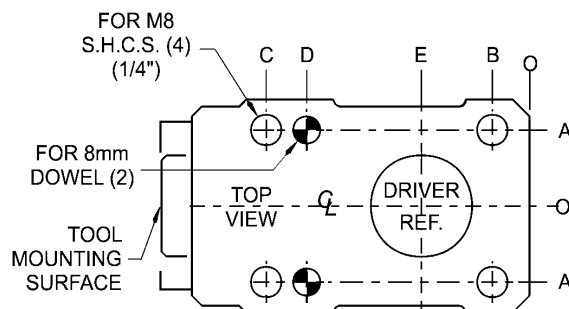
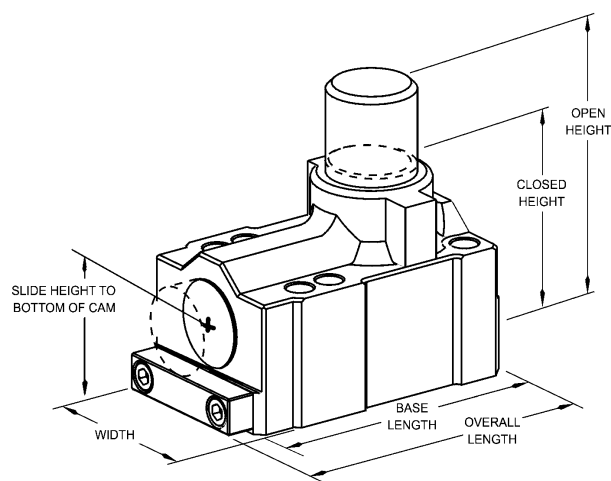
Cam models are designed in both inch and metric.  
Listed dimensions may not convert directly into the other standard.  
All dimensions are for reference only and no tolerance is stated or implied.

# Internal Spring Box Cam 23L/23LMM



Cam models are designed  
in both inch and metric.  
Listed dimensions may not convert  
directly into the other standard.  
All dimensions are for reference only  
and no tolerance is stated or implied.

# Bump Cams – LCM (Mini) Series

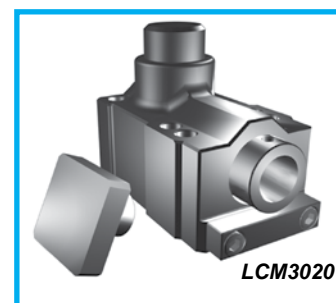


| PART NUMBER | A              | B             | C               | D<br>±0.01      | E              | SLIDE TRAVEL  | OPEN HGT.       | CLOSED HGT.    | SLIDE HGT.     | SLIDE DIA.     | WIDTH          | BASE LENGTH     | OVERALL LENGTH  |
|-------------|----------------|---------------|-----------------|-----------------|----------------|---------------|-----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| LCM3020     | 22.5<br>(.89)  | 11.0<br>(.43) | 78.0<br>(3.07)  | 66.0<br>(2.60)  | 32.0<br>(1.26) | 20.0<br>(.79) | 95.0<br>(3.74)  | 71.0<br>(2.80) | 30.0<br>(1.18) | 30.0<br>(1.18) | 66.0<br>(2.60) | 100.0<br>(3.94) | 109.5<br>(4.31) |
| LCM4025     | 30.0<br>(1.18) | 9.0<br>(.35)  | 118.0<br>(4.65) | 106.0<br>(4.17) | 37.0<br>(1.46) | 25.0<br>(.98) | 119.0<br>(4.69) | 89.0<br>(3.50) | 40.0<br>(1.57) | 40.0<br>(1.57) | 79.0<br>(3.11) | 127.0<br>(5.00) | 136.5<br>(5.37) |

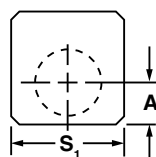
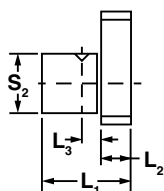
◆ The maximum dynamic load ratings have a 2:1 safety factor to assure optimum service life.

◆ Grease fitting installed for single point lubrication. (Moly fortified NLGI #2 grade Lithium 12 grease.)

| CAM PART NUMBER           |                                                    | LCM3020              | LCM4025               |
|---------------------------|----------------------------------------------------|----------------------|-----------------------|
| Load Rating               | Slide output working force at maximum Dynamic Load | 8.9 kN<br>(1.0 tons) | 13.3 kN<br>(1.5 tons) |
|                           | Part Number                                        | 9-0812-11            | 9-1016-11             |
| Replacement Return Spring | Pre-Load                                           | 38 N<br>(8.5 lbs.)   | 78 N<br>(17.5 lbs.)   |
|                           | Final Load (full stroke)                           | 328 N<br>(73.7 lbs.) | 468 N<br>(105 lbs.)   |



## SQUARE ADAPTERS for LCM SERIES

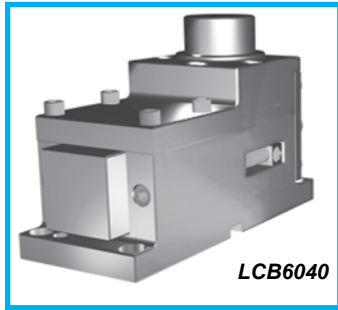


Adapter face will accommodate mounting & dowel holes for standard or special punch retainers.

Adapter hardness: 28-32 Rc.

| PART NUMBER | S <sub>1</sub> | S <sub>2</sub> | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | A             |
|-------------|----------------|----------------|----------------|----------------|----------------|---------------|
| LCM3002     | 38.0<br>(1.50) | 20.0<br>(.79)  | 30.0<br>(1.18) | 10.0<br>(.39)  | 6.5<br>(.26)   | 14.0<br>(.55) |
| LCM4002     | 50.0<br>(1.97) | 30.0<br>(1.18) | 30.0<br>(1.18) | 10.0<br>(.39)  | 6.5<br>(.26)   | 20.0<br>(.79) |

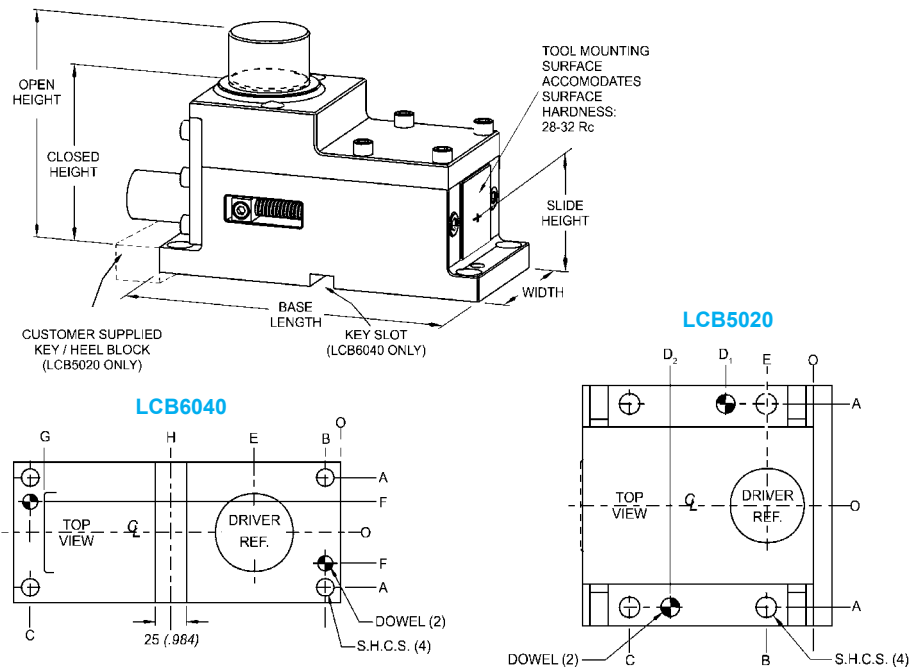
# Bump Cam – LCB Series



LCB6040



LCB5020



| Part Number | A              | B              | C               | D <sub>1</sub> | D <sub>2</sub> | E              | F           | G             | H               | Slide Travel   | Open Height     | Closed Height   | Slide Height   | Slide (sq.)    | Width           | Base Length      |
|-------------|----------------|----------------|-----------------|----------------|----------------|----------------|-------------|---------------|-----------------|----------------|-----------------|-----------------|----------------|----------------|-----------------|------------------|
| LCB6040     | 44.5<br>(1.75) | 12.5<br>(.49)  | 251.5<br>(9.90) | N/A            | N/A            | 70.0<br>(2.76) | 25<br>(.98) | 240<br>(9.45) | 137.5<br>(5.41) | 40.0<br>(1.57) | 195.0<br>(7.68) | 148.0<br>(5.83) | 56.5<br>(2.22) | 63.0<br>(2.48) | 114.0<br>(4.49) | 265.0<br>(10.43) |
| LCB5020     | 55.0<br>(2.17) | 25.5<br>(1.00) | 99.5<br>(3.92)  | 47.5<br>(1.87) | 77.5<br>(3.05) | 25.0<br>(.98)  | N/A         | N/A           | N/A             | 20.0<br>(.79)  | 138.0<br>(5.43) | 114.0<br>(4.49) | 45.0<br>(1.77) | 50.0<br>(1.97) | 130.0<br>(5.12) | 125.0<br>(4.92)  |

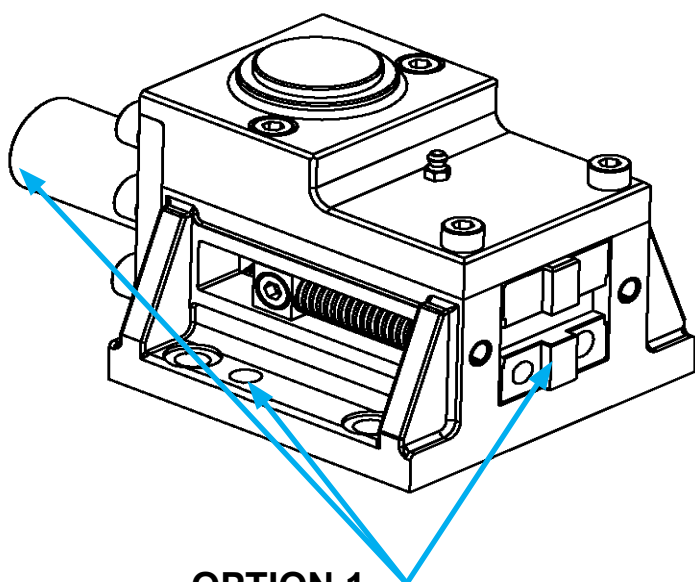
- The maximum dynamic load ratings have a 2:1 safety factor to assure optimum service life.

- Grease fitting installed for single point lubrication. (Moly fortified NLGI #2 grade Lithium 12 grease.)

| CAM PART NUMBER                           |                                                    | LCB6040                | LCB5020                     |                   |
|-------------------------------------------|----------------------------------------------------|------------------------|-----------------------------|-------------------|
| <b>Load Rating</b>                        | Slide output working force at maximum Dynamic Load | 35.6 kN (4 tons)       | 22.2 kN (2.5 tons)          |                   |
| <b>Replacement Return Spring</b>          | Part Number                                        | 9-1012-21 (4 required) | 9-1212-11 (2 required)      |                   |
|                                           | Pre-Load                                           | 213 N (48 lbs.)        | 96 N (21.5 lbs.)            |                   |
|                                           | Final Load (full stroke)                           | 811 N (182 lbs.)       | 730 N (164 lbs.)            |                   |
| <b>Optional Spring Return Booster Kit</b> | Part Number                                        | B6040BSK               | B5020BSK                    | B5020GSK          |
|                                           | Diameter                                           | 41mm (1.61)            | 34.5mm (1.36")              | 19mm (.75")       |
|                                           | Length                                             | 153mm (6.00)           | 89mm (3.50")                | 92mm (3.62")      |
| <b>Replacment Booster Spring</b>          | Part Number                                        | 9-2422-21              | 9-2012-11                   | R19-025Y          |
|                                           | Pre-Load                                           | 218 N (49 lbs.)        | 98 N (22 lbs.)              | 898 N (202 lbs.)  |
|                                           | Final Load (full stroke)                           | 1907 N (428 lbs.)      | 238 N (53.5 lbs.)           | 1150 N (258 lbs.) |
| <b>Mounting Requirements</b>              | Dowels                                             | 2 X 12mm               | 2 X 10mm                    |                   |
|                                           | Screws                                             | 4 X M12 SHCS (1/2")    | 4 X M10 S.H.C.S. (3/8")     |                   |
|                                           | Keyway/Heel Block                                  | 25mm slot (as shown)   | Customer supplied (at rear) |                   |

- To order a standard LCB5020 with nitrogen return, use part #LCB5020NS.

# Bump Cam Options



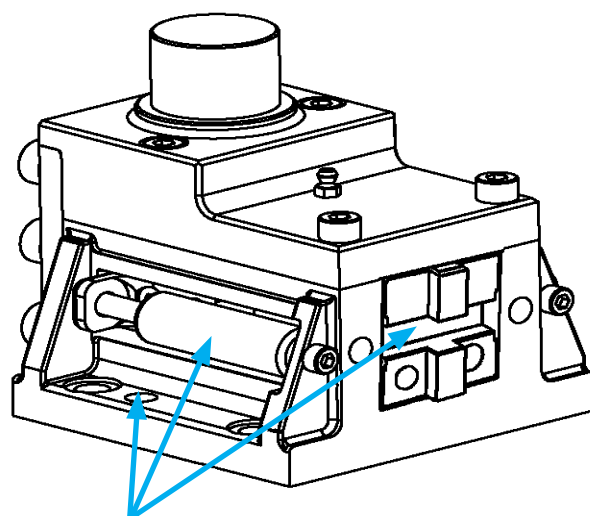
## OPTION 1

### Customized Bump Cam (Imperial)

Part #LCB5020D

Complete with (2) 1/2" Dowel Holes, (4) 3/8 S.H.C.S., Special Slide and additional booster kit.

To retrofit a standard LCB5020, order kit #B5020BSK.



## OPTION 2

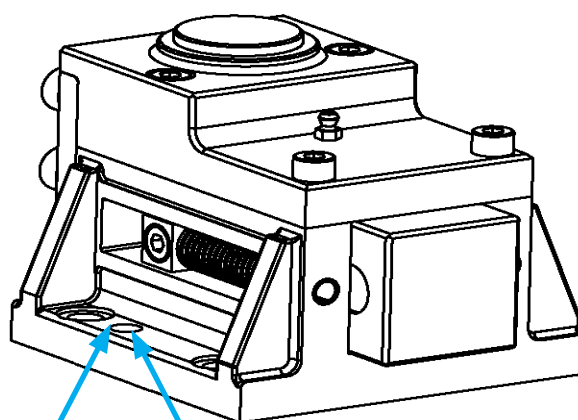
Part #LCB5020DNS

Similar to LCB5020D, except with Nitrogen Gas Springs.

Complete with (2) 1/2" Dowel Holes, (4) 3/8" S.H.C.S. and Special Slide.

To retrofit a standard LCB5020, order kit #B5020GSK.

To order a standard LCB5020 with nitrogen return, use part #LCB5020NS



### Standard Bump Cam (Metric)

Part #LCB5020

(2) 10mm Dowel Holes with (4) 10mm S.H.C.S.

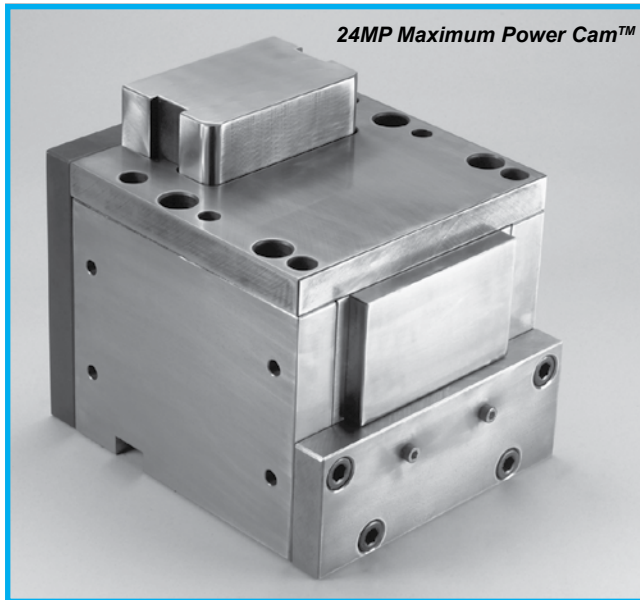
### Standard Bump Cam (Imperial)

Part #LCB5020I

(2) 1/2" Dowel Holes with (4) 3/8 S.H.C.S.

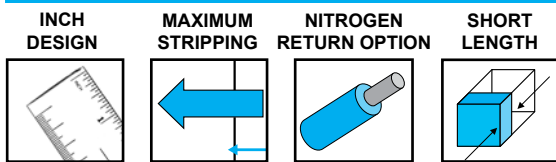
# Maximum Power Heavy Duty Cam™ (MP)

## Technical Information



### Product Features

The Maximum Power Cam™ is designed for tight spaces where length and height is limited. It's a compact high power cam with a maximum working load for applications requiring pierced holes through thicker steel like automotive chassis frame rails. You will find the bronze wear plates with graphite inserts provide a premium wear surface for the slide to move along. The maximum stripping power is derived from a combination mechanical and nitrogen spring slide return design. The Maximum Power Cam™ is a cam with everything a large automotive type cam has except the large size.



\* Combination Spring

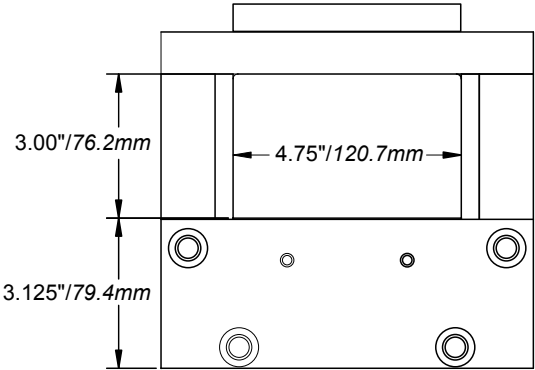
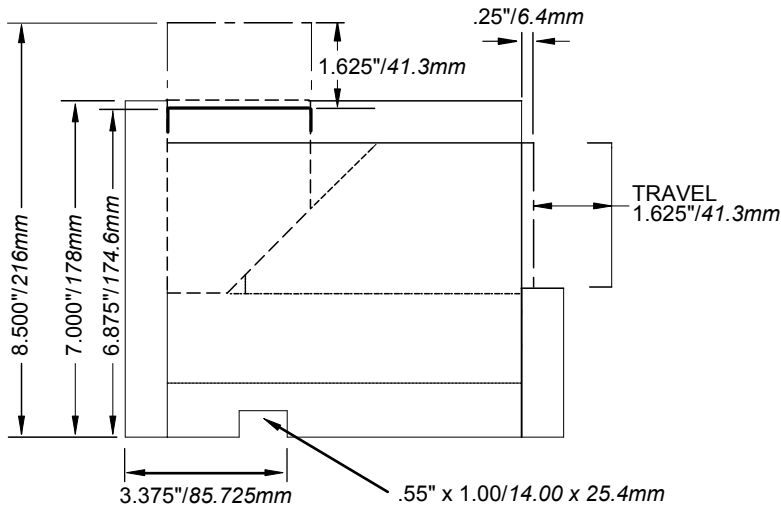
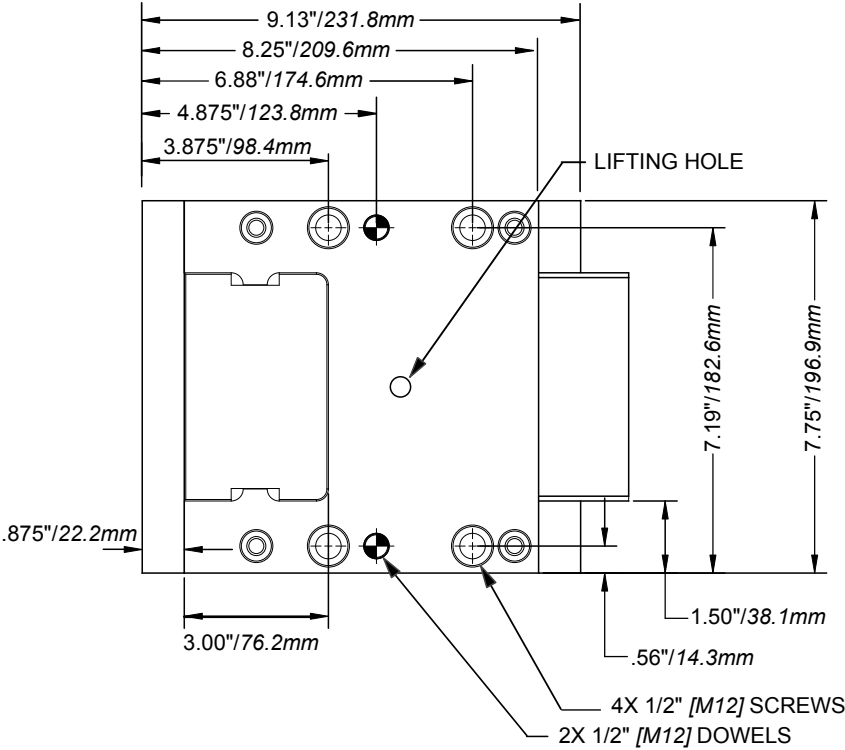
| Standard Cam Models | Face Size<br>X<br>in/mm | Travel<br>in/mm | Working Load<br>tons/kN | Spring Force<br>lbs/N | Maximum Tooling Weight<br>lbs/kg | Approx. Cam Weight<br>lbs/kg | Spring Catalog Number | Number of Springs |
|---------------------|-------------------------|-----------------|-------------------------|-----------------------|----------------------------------|------------------------------|-----------------------|-------------------|
| 24MP                | 3.0 x 4.75              | 1.625           | 12                      | 2,141                 | 12                               | 125                          | C.909.025*            | 2                 |
|                     | 76 x 120                | 41.3            | 106.8                   | 9,516                 | 5.45                             | 56.7                         | 9-2428-26             | 2                 |
| 24MP-XW             | 3.0 x 8.0               | 1.625           | 20                      | 3,213                 | 20                               | 183                          | C.090.025*            | 3                 |
|                     | 76 x 203                | 41.3            | 178                     | 14,280                | 9.09                             | 83                           | 9-2428-26             | 3                 |

### NOTES:

- <sup>1</sup> Nitrogen and mechanical spring combination.
- ◆ Cam is designed in hard inch. Metric dimensions are for reference only.
- ◆ The cam slide has .0005" – .001" (0.0127 – .0254mm) clearance between each side of the slide and body to allow for lubrication and heat dissipation. To request less clearance, add suffix to part number:  
For 0.001" total clearance – CL001

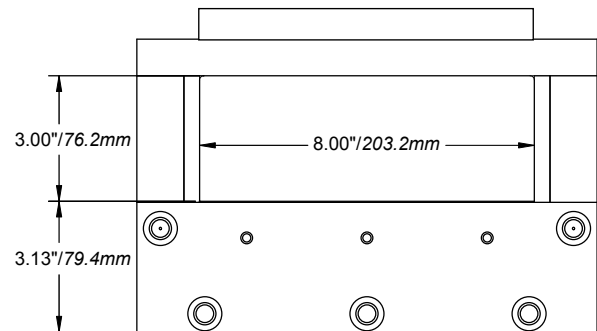
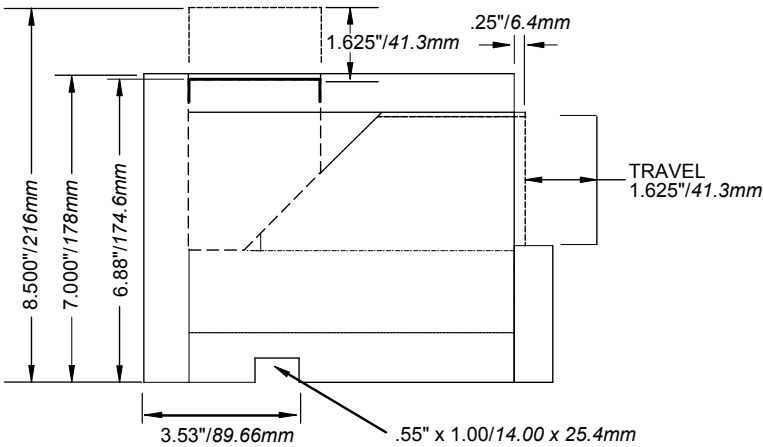
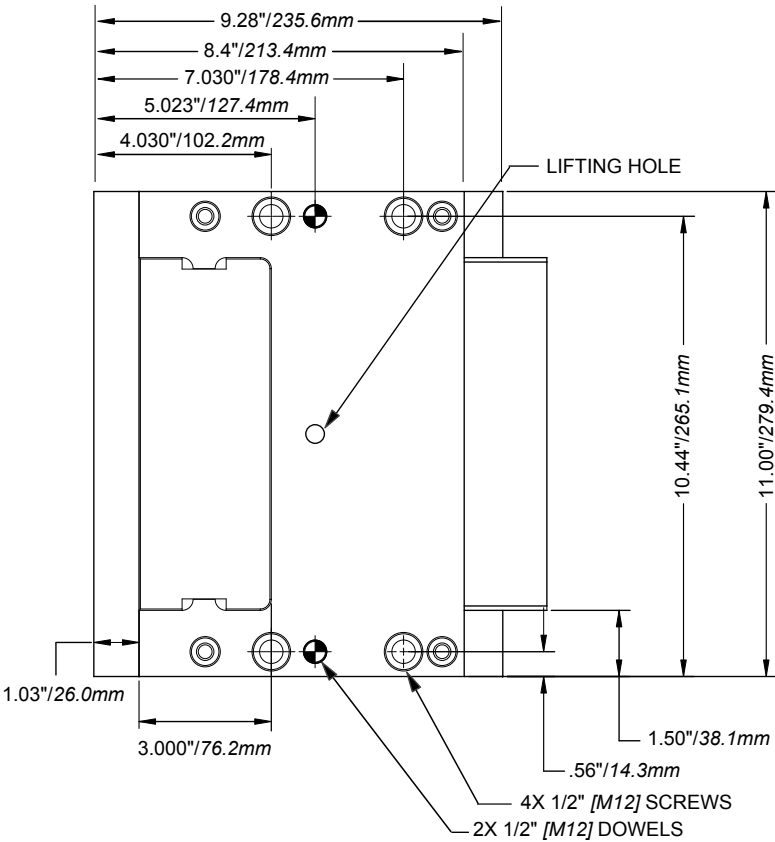
*Calculated stroke, tonnage and wear curves are presented as a guideline for design and maintenance only. No warranty exists, either expressed or implied, as a result of the application, as it may relate to the information provided.*

# Maximum Power Heavy Duty Cam™ (MP) 24MP



All dimensions are for reference only  
and no tolerance is stated or implied.

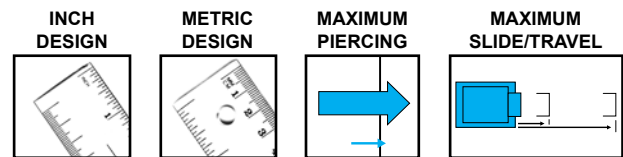
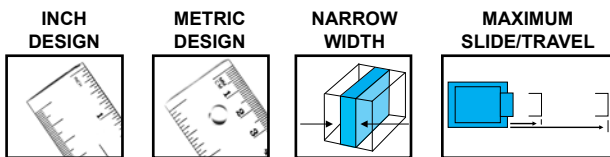
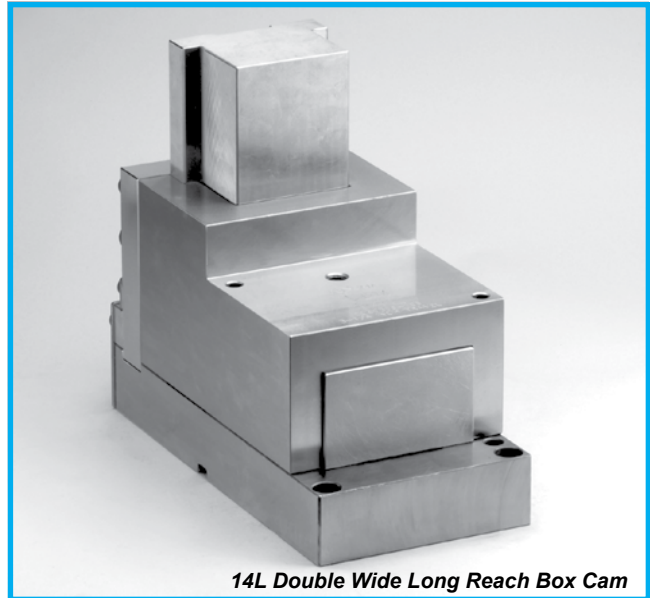
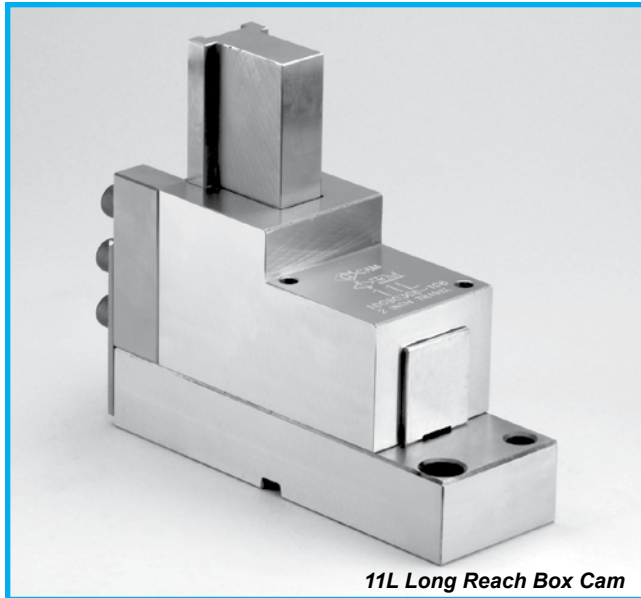
# Maximum Power Heavy Duty Cam™ (MP) 24MP-XW



All dimensions are for reference only  
and no tolerance is stated or implied.

# Long Travel Box Cam

## Technical Information



| Standard Cam Models | Face Size X in/mm          | Travel in/mm | Working Load tons/kN | Spring Force lbs/N | Maximum Tooling Weight lbs/kg | Approx. Cam Weight lbs/kg | Spring Catalog Number | Number of Springs |
|---------------------|----------------------------|--------------|----------------------|--------------------|-------------------------------|---------------------------|-----------------------|-------------------|
| 11 L<br>11LMM       | 1.875 Sq<br>47.6 Sq        | 2<br>51      | 5<br>44.5            | 199<br>885         | 4<br>1.82                     | 29<br>13.16               | 9-1632-21             | 1                 |
| 12L<br>12LMM        | 2.125 Sq<br>54 Sq          | 2.50<br>64   | 7<br>62.3            | 314<br>1397        | 5<br>2.27                     | 50<br>22.68               | 9-2040-21             | 1                 |
| 13L<br>13LMM        | 2.50 Sq<br>63.5 Sq         | 3.25<br>83   | 11<br>97.9           | 476<br>2117        | 8<br>3.64                     | 100<br>45.37              | 9-2448-21             | 1                 |
| 14L<br>14LMM        | 2.875 x 4.75<br>73 x 120.7 | 3.25<br>83   | 16<br>142.3          | 952<br>4234        | 12<br>5.45                    | 153<br>69.42              | 9-2448-21             | 2                 |
| 15L<br>15LMM        | 3.25 Sq<br>82.6 Sq         | 3.25<br>83   | 12<br>106.8          | 738<br>3283        | 10<br>4.55                    | 140<br>63.52              | 9-3248-21             | 1                 |

### NOTE:

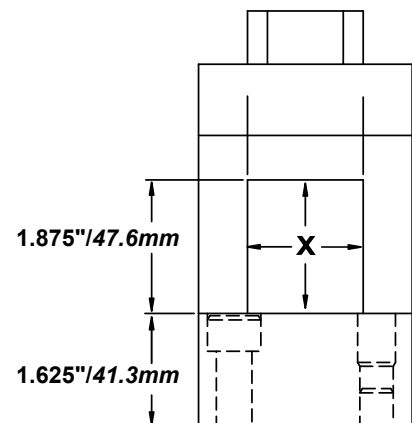
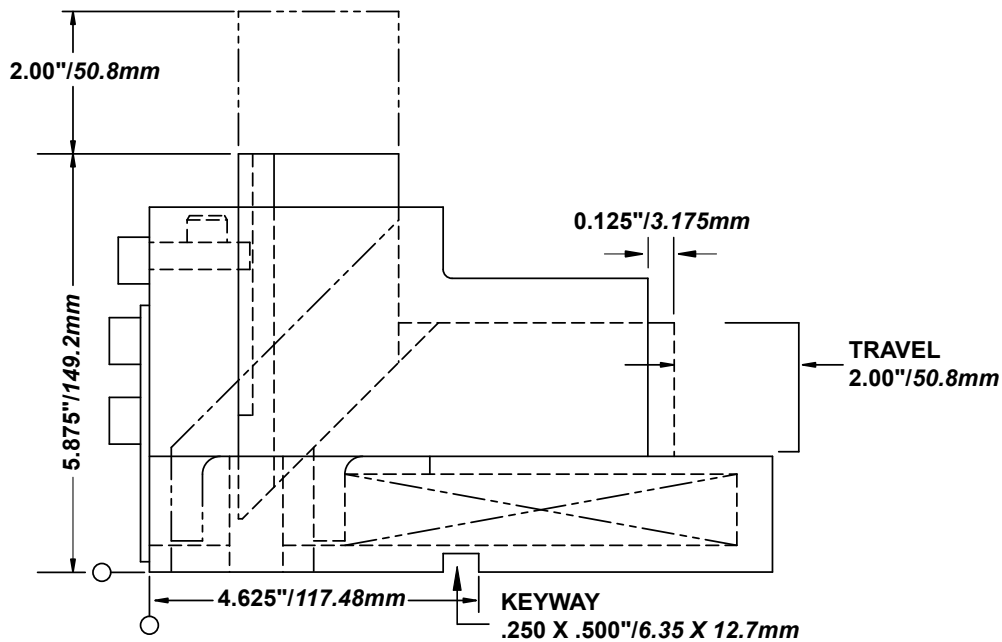
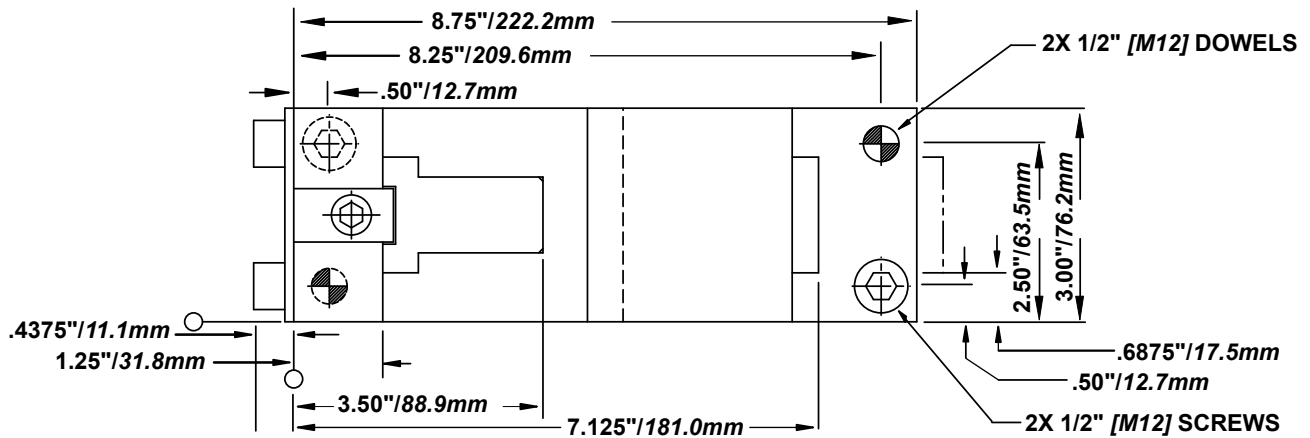
- The cam slide has .0005" – .001" (0.0127 – .0254mm) clearance between each side of the slide and body to allow for lubrication and heat dissipation. To request less clearance, add suffix to part number:

For 0.001" total clearance – CL001  
For .0005" total clearance – CL0005

*Calculated stroke, tonnage and wear curves are presented as a guideline for design and maintenance only. No warranty exists, either expressed or implied, as a result of the application, as it may relate to the information provided.*

# Long Travel Box Cam

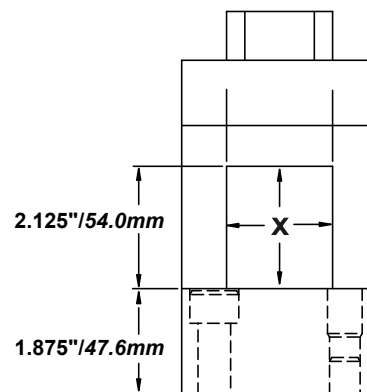
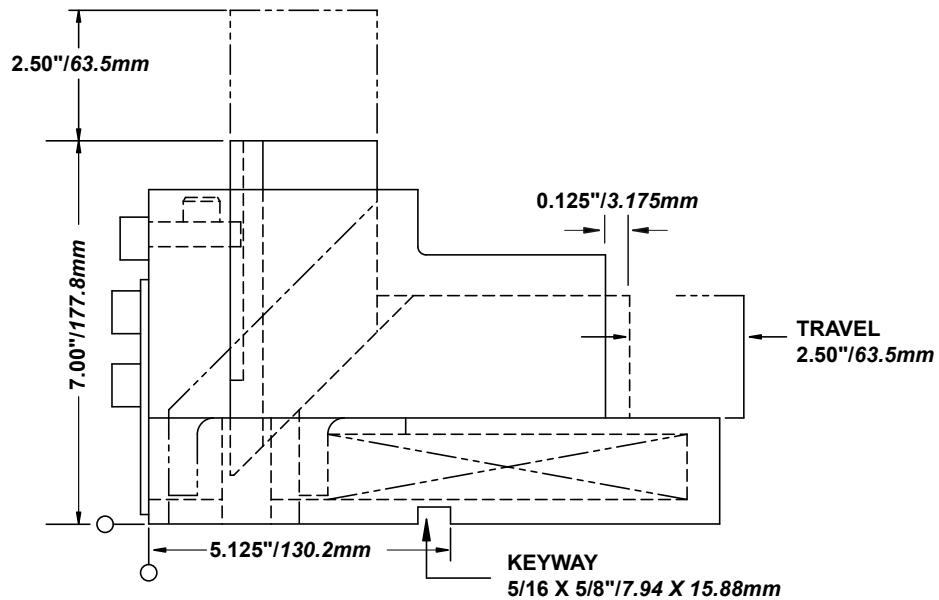
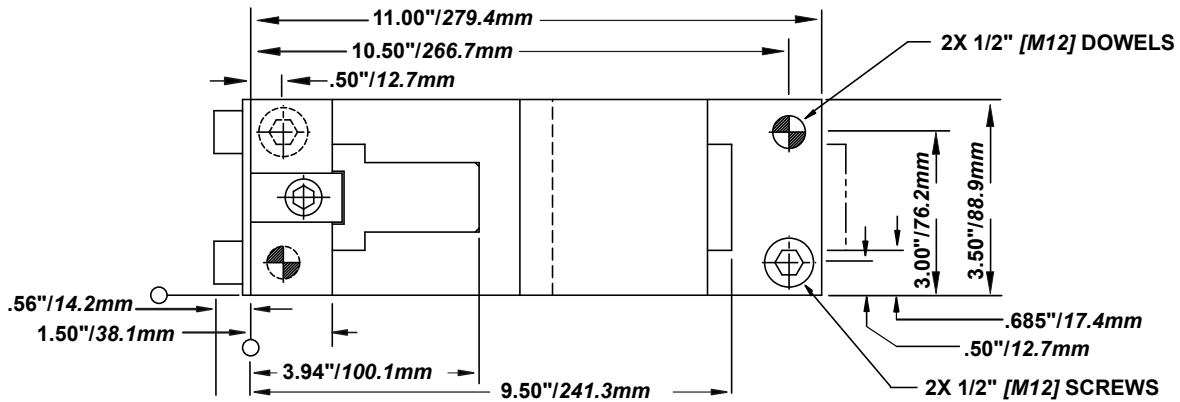
## 11L/11LMM



Cam models are designed in both inch and metric. Listed dimensions may not convert directly into the other standard. All dimensions are for reference only and no tolerance is stated or implied.

# Long Travel Box Cam

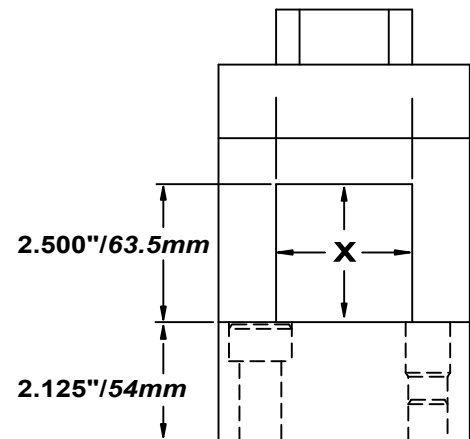
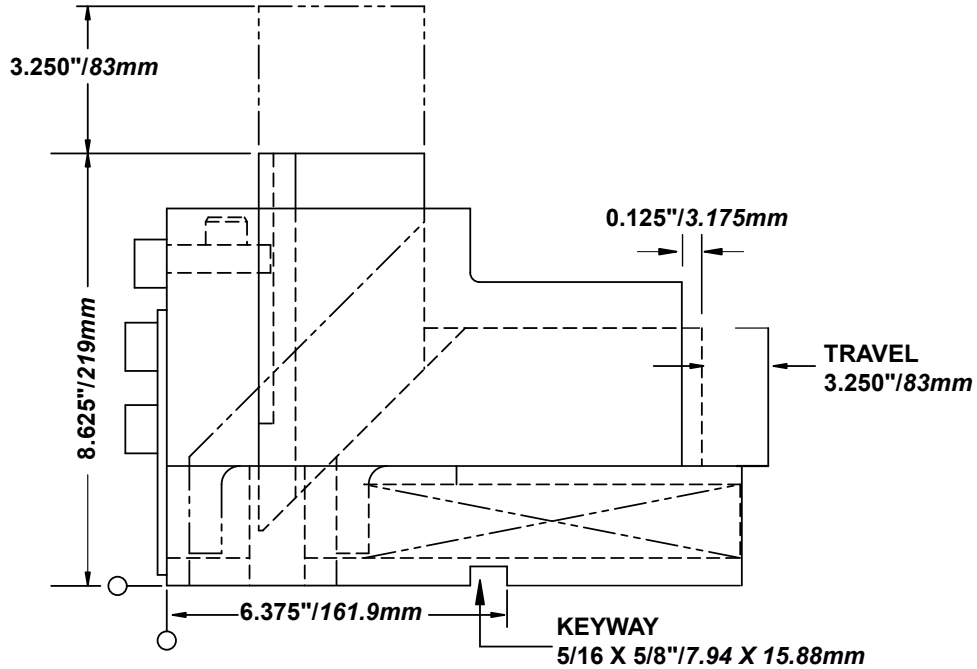
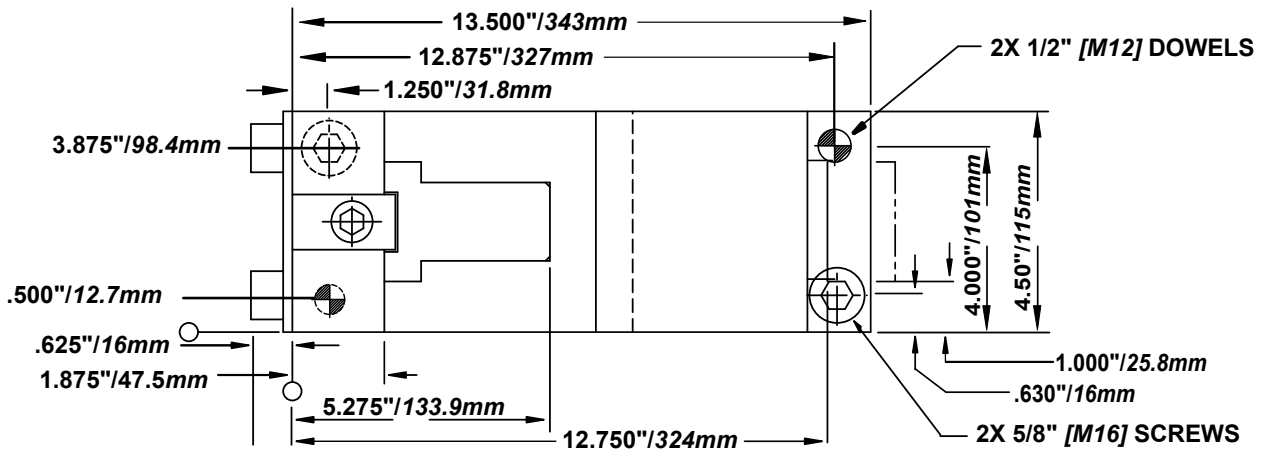
## 12L/12LMM



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in both inch and metric.  
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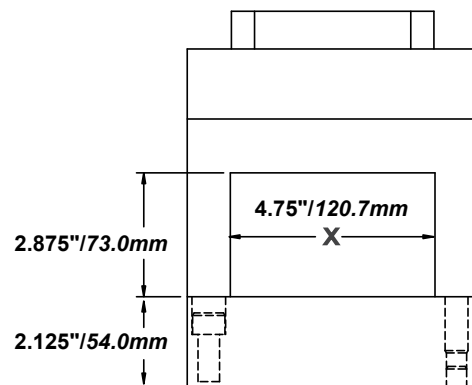
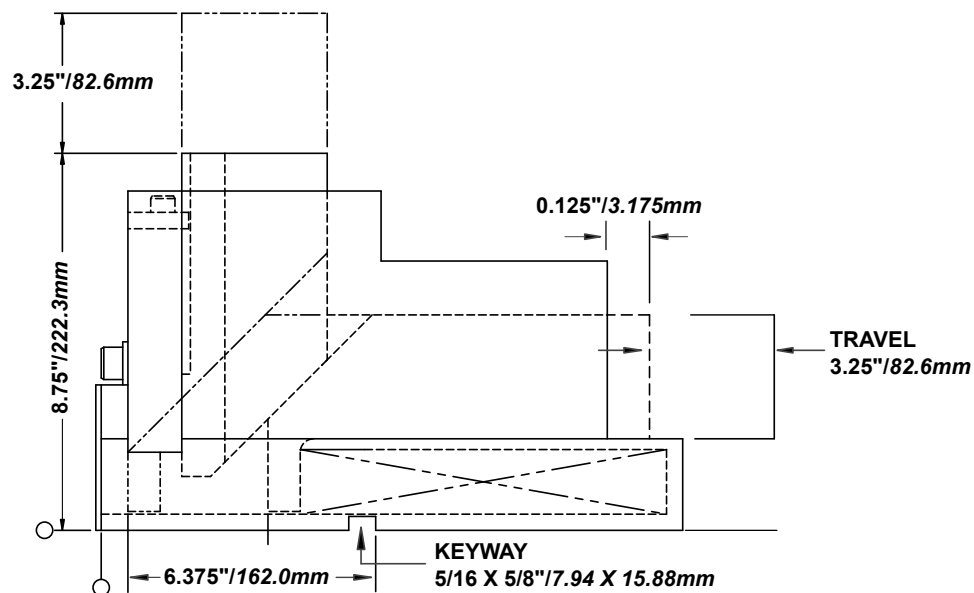
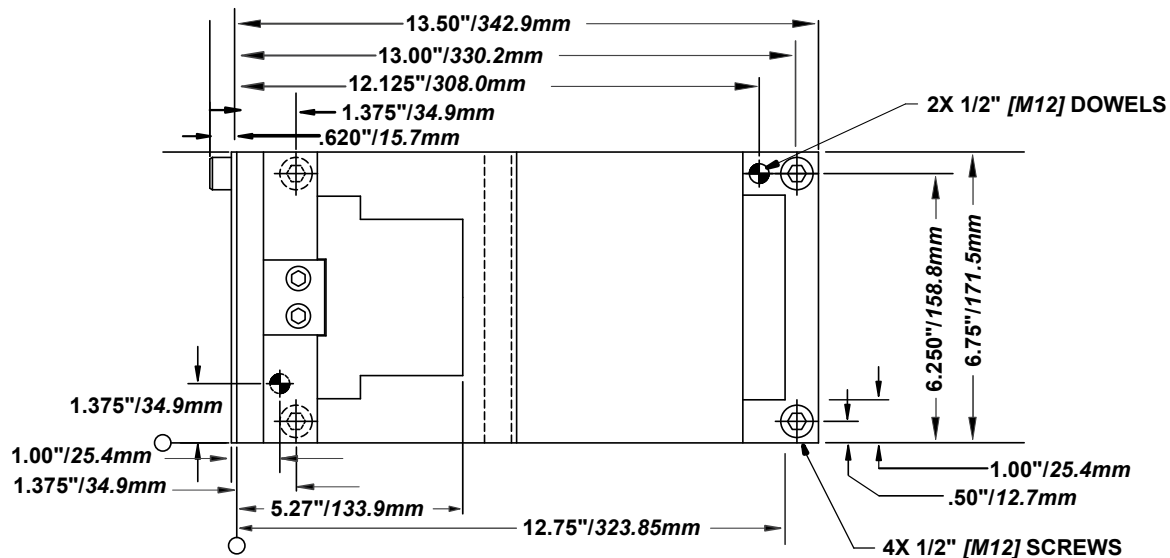
# Long Travel Box Cam

## 13L/13LMM



Cam models are designed in both inch and metric. Listed dimensions may not convert directly into the other standard. All dimensions are for reference only and no tolerance is stated or implied.

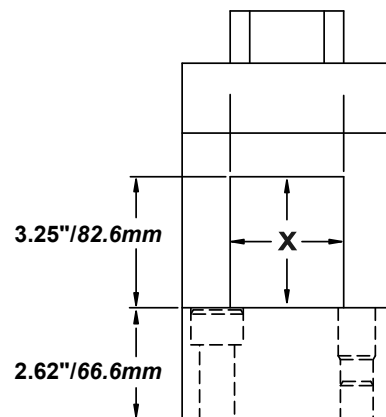
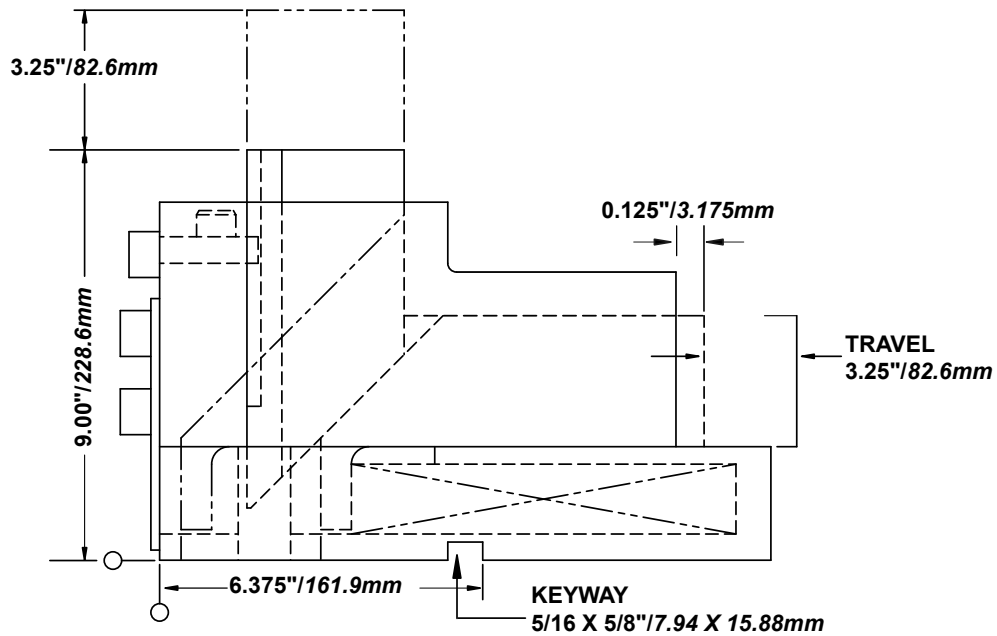
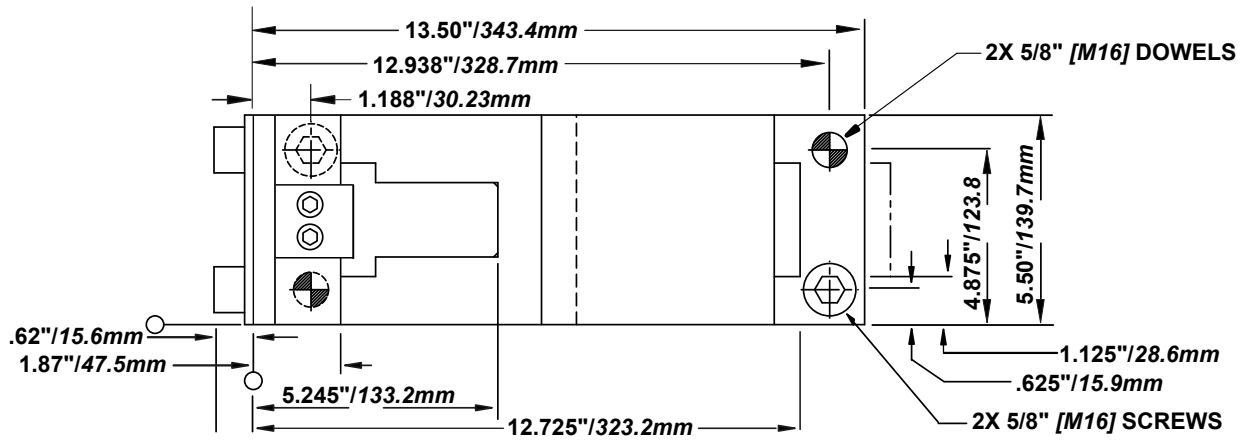
# Long Travel Box Cam (Double Wide) 14L/14LMM



Cam models are designed  
in both inch and metric.  
Listed dimensions may not convert  
directly into the other standard.  
All dimensions are for reference only  
and no tolerance is stated or implied.

# Long Travel Box Cam

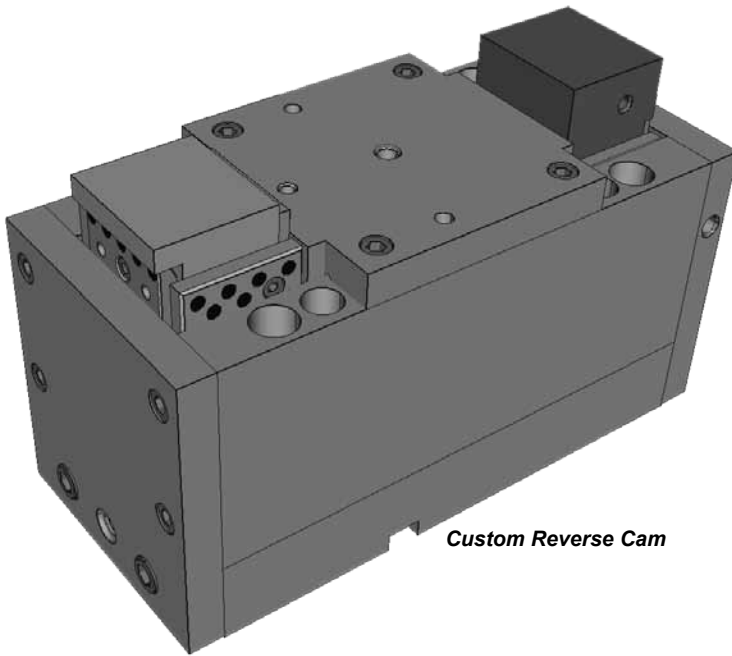
## 15L/15LMM



Cam models are designed in both inch and metric. Listed dimensions may not convert directly into the other standard. All dimensions are for reference only and no tolerance is stated or implied.

# Custom Cams

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*Custom Reverse Cam*

## Product Features

Although **IEM** has a large offering of catalog cams, we realize that in today's competitive environment, a catalog cam doesn't always fit all applications.

Custom cams include:

- ◆ Cams engineered by **IEM** specifically for your application
- ◆ Cams machined to your design

## CUSTOM CAM CAPABILITIES:

### ◆ CAM DESIGN

- **IEM's** engineering team designs for most applications

### ◆ CAM MANUFACTURING

- **IEM** can build your cam design
  - Machining – components up to 900mm
  - Flame hardening with minimal distortion

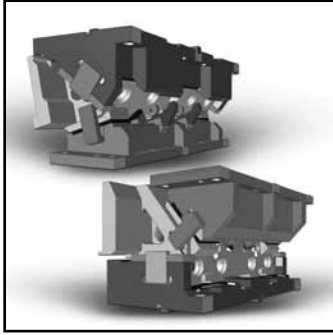
## BENEFITS:

- ◆ Frees up your design resources
- ◆ Frees up your machine capacity
- ◆ Provides the best solution for your application
- ◆ Can improve your project scheduling
- ◆ Saves you money as compared to in-house costs
- ◆ Lets you focus on your core competencies

# Additional Cam Products

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## ***MEETS OR EXCEEDS ALL OF NAAMS CAM REQUIREMENTS***



### **IEM® Aerial & Diemount Wide Cams**

- Heavy duty high volume and completely hard metric
- Angles are in 5° increments – Aerial from 0° to 60° and Diemount from 0° to 20°
- Face widths in eight size widths from 500mm to 1200mm



### **LamCam™ Aerial & Diemount Cams**

- Cams to fit your press stroke length, work angle and slidewidth
- Die cam slidewidths are available from 50mm to 300mm
- 13 different work angles



### **LamCam™ Slim Cams**

- Robust cam for light and medium duty applications
- Dynamic load rating of 4 tons (35.6kN)
- Dual external positive return systems



### **LamCam™ Roller Cams**

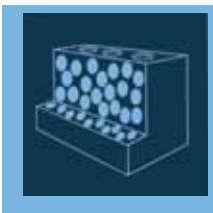
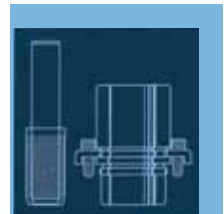
- Designed to function at one million hits plus
- Increased slide surfaces
- Adaptable to any angle

# Cam Products

## The IEM Value Proposition

- I. **IEM** is recognized as the leader in manufacturing quality die components to the global parts forming industry. Our reputation has been built by satisfying customer needs, and we are very strong in the automotive and appliance industries.
- II. **IEM** offers outstanding delivery on a consistent basis. Choosing us as a supplier means that our customers have a competitive advantage in delivering their products to the market.
- III. **IEM** has complex machining capabilities on die components at several facilities. With extensive machining capabilities in the USA and China, we have taken the lead role in creating and bringing new products to customers and helping them find solutions that improve their operations.
- IV. **IEM's** vast breadth of products assures innovative solutions. We strive to address customer problems by utilizing our research and development department as well as other technical professionals.
- V. **IEM** has a technically trained sales force and distributor channels with Engineering support. Sales, Marketing and Engineering professionals are available to support our product lines.

- **Competitive Prices**
- **Reliability and Performance**



**...A LEADING MANUFACTURER  
AND INNOVATOR OF DIE  
COMPONENTS SUPPLIED  
GLOBALLY TO THE METAL  
FORMING INDUSTRY...**

- **High Quality Design & Construction**
- **Outstanding Service & Support**

## Commitment to Quality & Customer Satisfaction

*Dayton Lamina is a leading manufacturer of tool, die and mold components for the metal-working and plastics industries. As a customer-focused, world-class supplier of choice, we provide the brands, product breadth, distribution network and technical support for all your metal forming needs.*

*Our goal is to give our customers the most innovative and value-added products and services.*



# DAYTON Lamina™

a MISUMI Group Company



Lamina® LEMPCO

\*Dayton Lamina's line of Danly products is available only to North America.

**[www.daytonlamina.com](http://www.daytonlamina.com)**