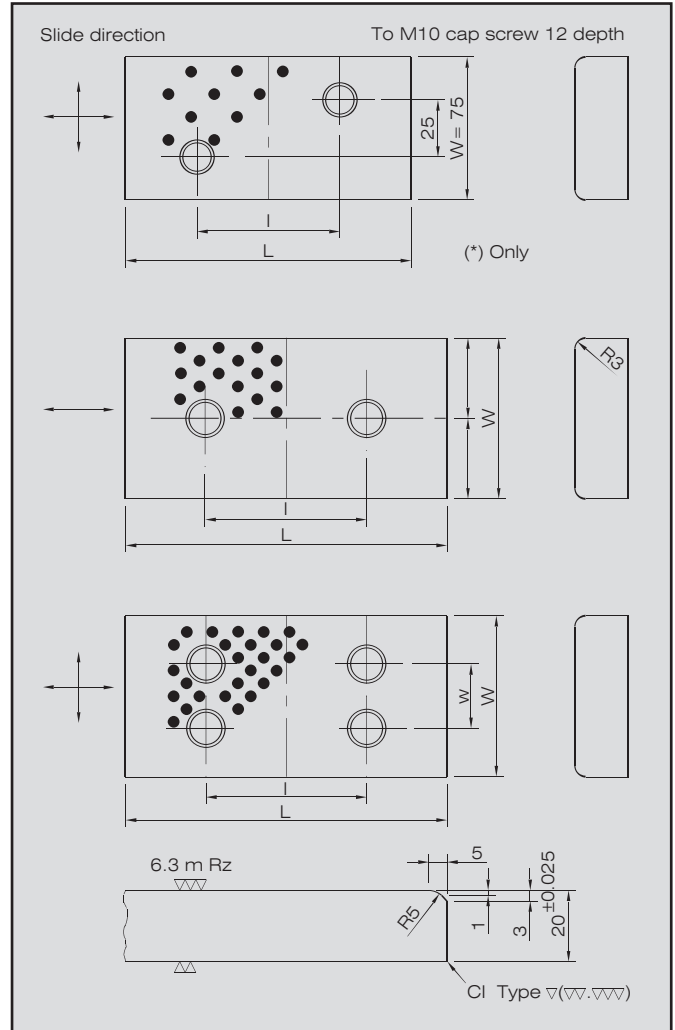
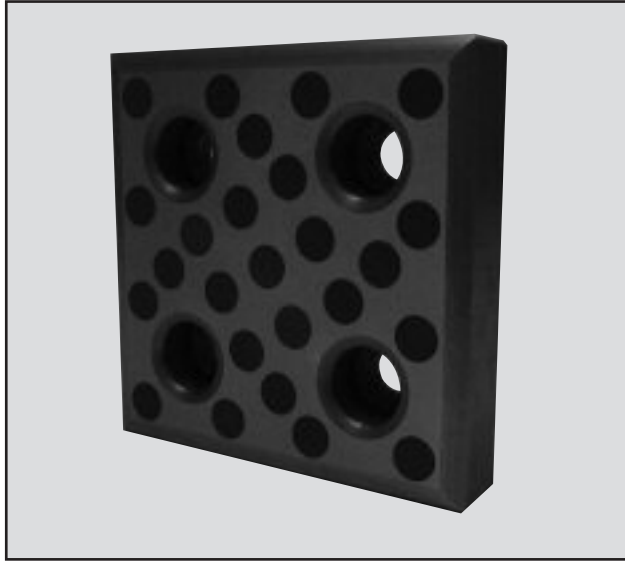


Wear Plates - Cast Iron



| STD. NO. | W | LENGTH | PITCH | | NO. OF SCREWS |
|----------|-----|--------|-------|-----|---------------|
| | | | W | / | |
| HSES-201 | 48 | 75 | - | 45 | 2 |
| HSES-202 | 48 | 100 | - | 50 | 2 |
| HSES-203 | 48 | 125 | - | 75 | 2 |
| HSES-204 | 48 | 150 | - | 100 | 2 |
| HSES-205 | 75 | 75 | 25 | 25 | 2* |
| HSES-206 | 75 | 100 | 25 | 50 | 2* |
| HSES-207 | 75 | 125 | - | 75 | 2 |
| HSES-208 | 75 | 150 | - | 100 | 2 |
| HSES-209 | 75 | 200 | - | 150 | 2 |
| HSES-210 | 100 | 100 | 50 | 50 | 4 |
| HSES-211 | 100 | 125 | 50 | 75 | 4 |
| HSES-212 | 100 | 150 | 50 | 100 | 4 |
| HSES-213 | 100 | 200 | 50 | 150 | 4 |
| HSES-214 | 100 | 250 | 50 | 200 | 4 |
| HSES-215 | 125 | 150 | 50 | 100 | 4 |
| HSES-216 | 125 | 200 | 50 | 150 | 4 |
| HSES-217 | 125 | 250 | 50 | 200 | 4 |
| HSES-218 | 150 | 150 | 100 | 100 | 4 |
| HSES-219 | 150 | 200 | 100 | 150 | 4 |
| HSES-220 | 150 | 250 | 100 | 200 | 4 |

RV - Pneumatic Vibrator

The Raymond Pneumatic Vibrator is an ideal solution for removing punchings, trimmings and scrap produced during press operations. The automatic and continuous removal keeps the press operator from interrupting production to clean away the punchings, trimmings and/or scraps by hand. The vibrator uses a pneumatic power source offering a cost effective alternative to electrically driven conveyor belts.

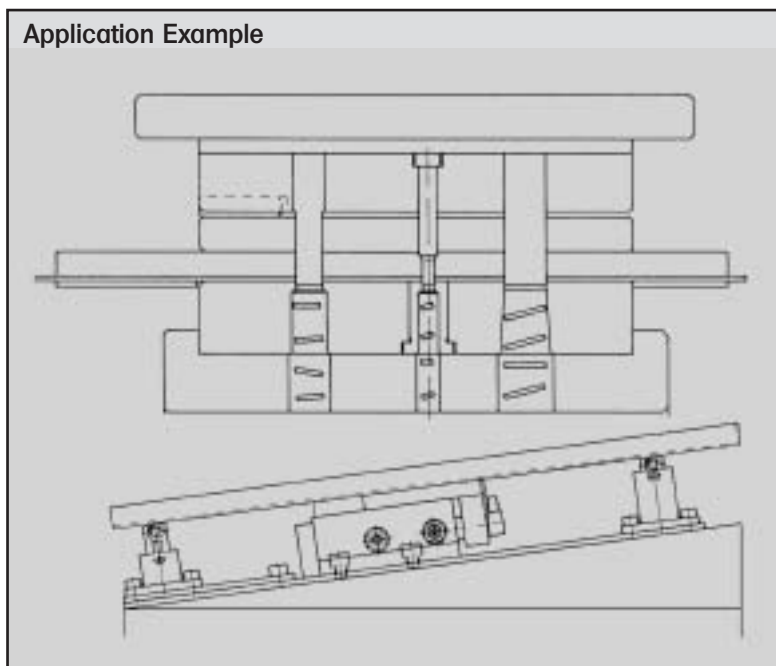
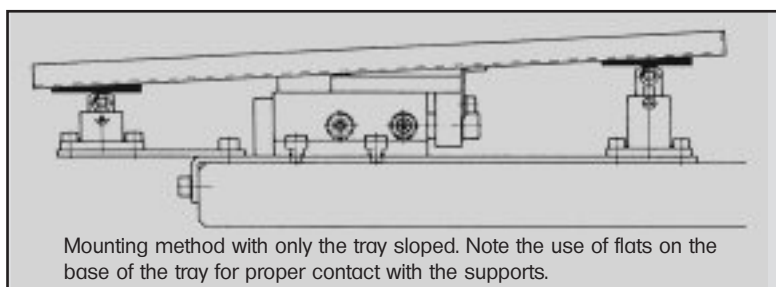
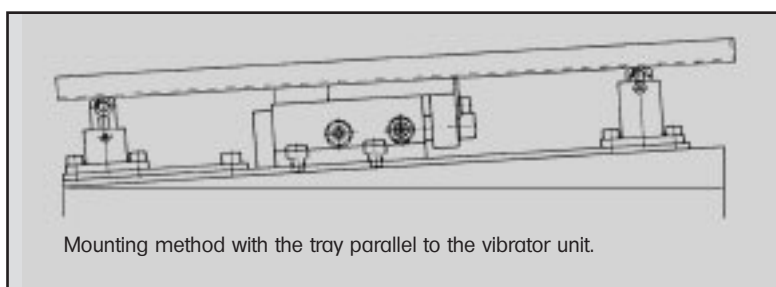
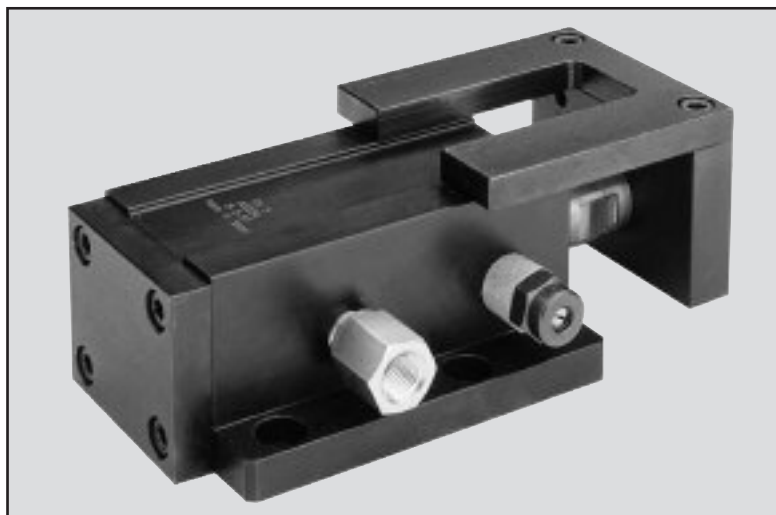
The pneumatic power source allows this unit to work in areas contaminated by lubricating fluids and oils. Unlike electrically driven systems with their inherent shock hazard, the Raymond Pneumatic Vibrator is safe to use as it consumes no electricity.

The compact design of the unit is made for working in the tight areas that are present on some presses. Easy to install, simply select the area for the unit, bolt in place and connect it to your air supply. The low air consumption and silent running Raymond Pneumatic Vibrator is the safe and economical solution for your scrap removal needs.

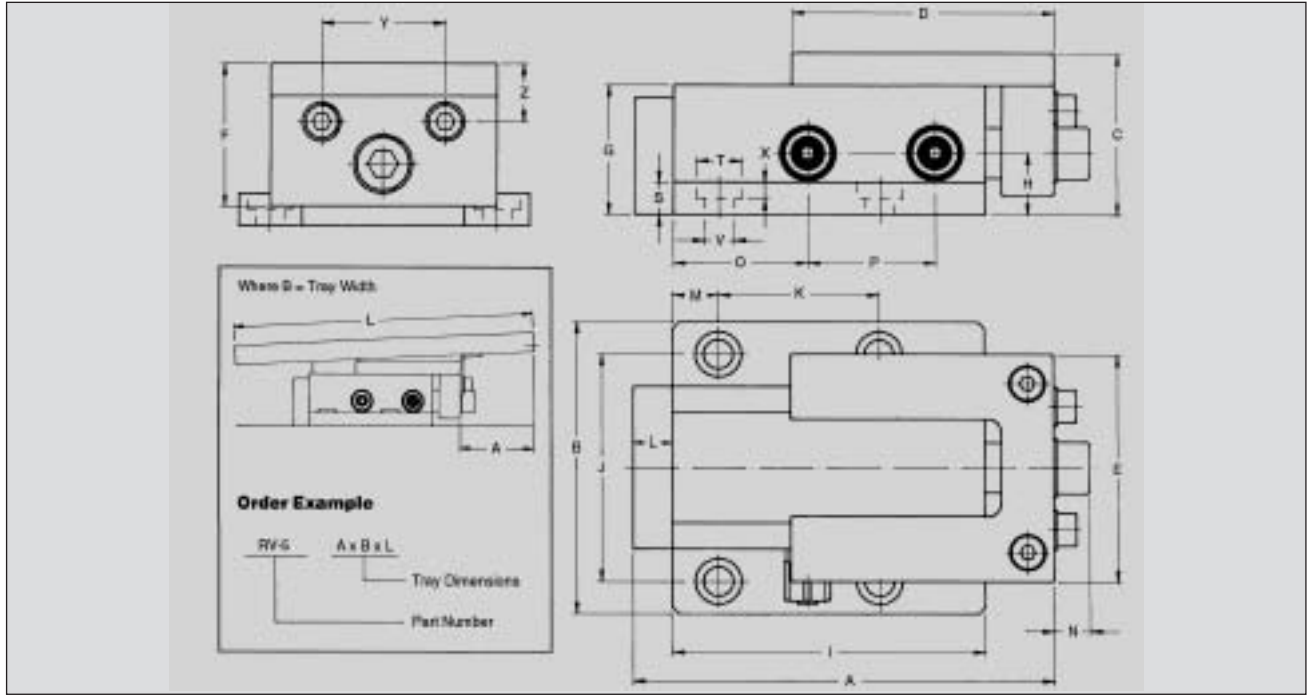
All Units feature a standard NTP connection for easy hookup to lubricated shop air and an adjustable exhaust muffler. By varying the input pressure and exhaust flow, the cycle rate and stroke of the unit can be custom adjusted by the user in each application. Note that if a lubricator is not used in conjunction with the shop air, the piston rod in the vibrator unit should be lubricated monthly.

Standard transport trays are available. For balanced performance, all trays should use the RV12-S or RV50-S adjustable supports shown on page 40. For proper scrap removal, the tray should be sloped at an angle of 8 degrees or greater. The exact amount of inclination should be adjusted on-site based upon the scrap weight and the shape as well as the amount of oil and grease that is likely to be present.

Sloping of the tray can be accomplished by mounting the tray parallel to the vibrator unit and sloping both the vibrator and the tray. Alternately, the tray can be mounted at an angle with respect to the unit. In both cases, care should be taken to assure that the tray supports are used and are in contact with the tray through the entire range of motion.



RV - Pneumatic Vibrator



Ordering Information – RV 3 through RV 9

| Order Number | A | B | C | D | E | F | G | H | I | J | K | L |
|--------------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|---------|---------|
| RV3 | 128/5.04 | 90/3.54 | 48/1.89 | 80/3.15 | 70/2.76 | 44/1.73 | 38/1.50 | 19/0.75 | 95/3.74 | 70/2.76 | 49/1.93 | 12/0.47 |
| RV5 | 155/6.10 | 100/3.94 | 65/2.56 | 90/3.54 | 80/3.15 | 60/2.36 | 55/2.17 | 27/1.06 | 118/4.65 | 82/3.23 | 60/2.36 | 12/0.47 |
| RV7 | 158/6.22 | 122/4.80 | 88/3.47 | 100/3.94 | 100/3.94 | 80/3.15 | 78/3.07 | 36/1.42 | 118/4.65 | 104/4.09 | 60/2.36 | 12/0.47 |
| RV9 | 179/7.05 | 150/5.91 | 108/4.25 | 120/4.72 | 125/4.92 | 98/3.86 | 95/3.74 | 48/1.89 | 130/5.12 | 130/5.12 | 65/2.56 | 14/0.55 |

| Order Number | M | N | O | P | S | T | V | X | Y | Z |
|--------------|---------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| RV3 | 14/0.55 | 12.5/0.49 | 41/1.61 | 39/1.54 | 10/0.39 | 14/0.55 | 9/0.35 | 5/0.20 | 38/1.50 | 16/0.63 |
| RV5 | 15/0.59 | 19/0.75 | 47/1.85 | 49/1.93 | 12/0.47 | 14/0.55 | 9/0.35 | 8/0.32 | 48/1.89 | 16/0.63 |
| RV7 | 15/0.59 | 19/0.75 | 47/1.85 | 49/1.93 | 14/0.55 | 14/0.55 | 9/0.35 | 9/0.35 | 64/2.52 | 16/0.63 |
| RV9 | 20/0.79 | 24/0.95 | 52/2.05 | 56/2.21 | 18/0.71 | 17/0.67 | 11/0.43 | 11/0.43 | 75/2.95 | 23/0.91 |

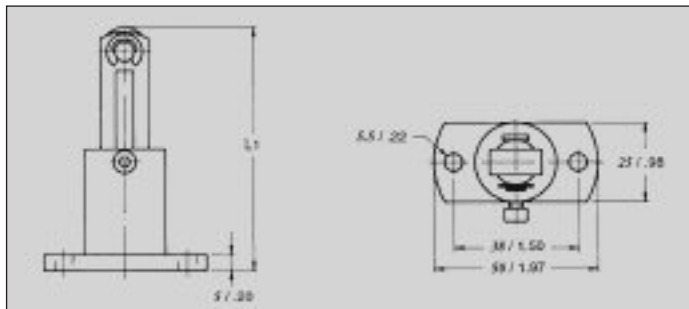
Technical Data

| Order Number | Air Fitting Female NPT | Typical Air Pressure | Air Consumption (ft ³ /min) | Typical Piston Stroke | Piston Speed (ft/min) | Typical Mounting Inclination | Maximum Load Inc. Tray | Noise Level (dB-A) | Working Temp. (°F) |
|--------------|------------------------|----------------------|--|-----------------------|-----------------------|------------------------------|------------------------|--------------------|--------------------|
| RV3 | 1/8 | 70 | 1.1 | 30/1.18 | 26-32 | 8° | 13.2 | 50 | 32-158 |
| RV5 | 1/4 | 70 | 2.1 | 33/1.30 | 26-32 | 8° | 30.9 | 50 | 32-158 |
| RV7 | 1/4 | 70 | 5.1 | 20/0.79 | 26-32 | 8° | 79.4 | 50 | 32-158 |
| RV9 | 3/8 | 70 | 7.6 | 28/1.10 | 26-32 | 8° | 123.5 | 53 | 32-158 |

Dimensions in millimeters/inches

RV Pneumatic Vibrator

Adjustable Supports for trays greater than 2ft. in length.



Ordering Information – RV 12-S through RV 50-S

| Order Number | L1 Min. | L1 Max. |
|--------------|-----------|----------|
| RV 12-S | 38.5/1.52 | 51/2.01 |
| RV 25-S | 51/2.01 | 76/2.99 |
| RV 50-S | 76/2.99 | 126/4.96 |

RV - Pneumatic Vibrator

The Raymond Pneumatic Vibrator is an ideal solution for removing punchings, trimmings and scrap produced during press operations. The automatic and continuous removal keeps the press operator from interrupting production to clean away the punchings, trimmings and/or scraps by hand. The vibrator uses a pneumatic power source offering a cost effective alternative to electrically driven conveyor belts.

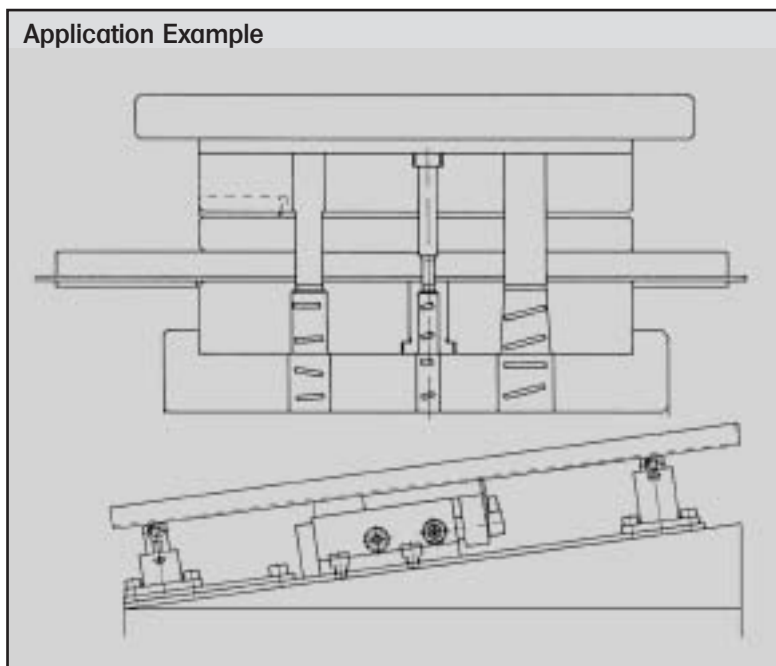
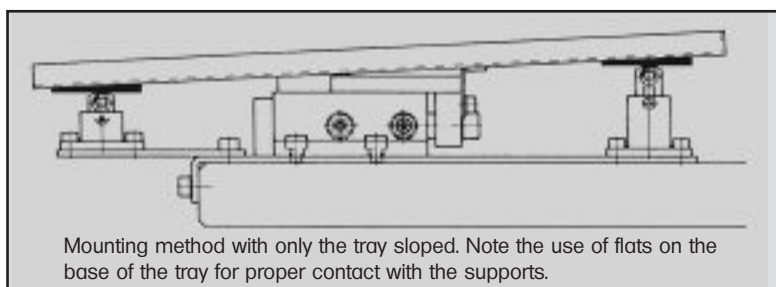
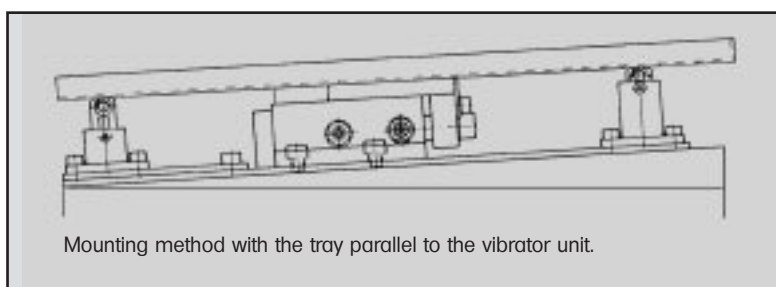
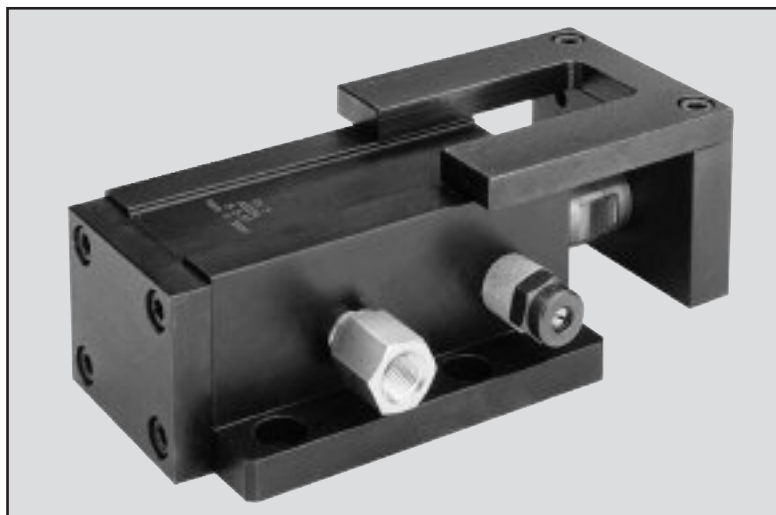
The pneumatic power source allows this unit to work in areas contaminated by lubricating fluids and oils. Unlike electrically driven systems with their inherent shock hazard, the Raymond Pneumatic Vibrator is safe to use as it consumes no electricity.

The compact design of the unit is made for working in the tight areas that are present on some presses. Easy to install, simply select the area for the unit, bolt in place and connect it to your air supply. The low air consumption and silent running Raymond Pneumatic Vibrator is the safe and economical solution for your scrap removal needs.

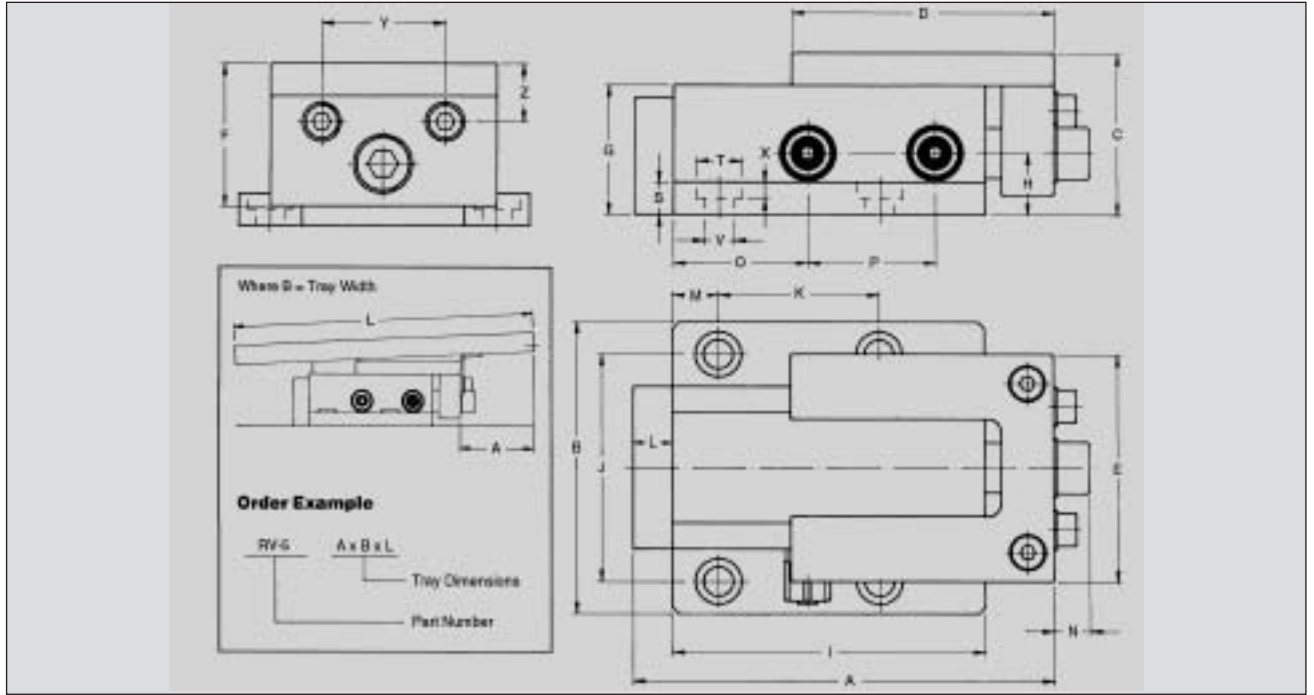
All Units feature a standard NTP connection for easy hookup to lubricated shop air and an adjustable exhaust muffler. By varying the input pressure and exhaust flow, the cycle rate and stroke of the unit can be custom adjusted by the user in each application. Note that if a lubricator is not used in conjunction with the shop air, the piston rod in the vibrator unit should be lubricated monthly.

Standard transport trays are available. For balanced performance, all trays should use the RV12-S or RV50-S adjustable supports shown on page 40. For proper scrap removal, the tray should be sloped at an angle of 8 degrees or greater. The exact amount of inclination should be adjusted on-site based upon the scrap weight and the shape as well as the amount of oil and grease that is likely to be present.

Sloping of the tray can be accomplished by mounting the tray parallel to the vibrator unit and sloping both the vibrator and the tray. Alternately, the tray can be mounted at an angle with respect to the unit. In both cases, care should be taken to assure that the tray supports are used and are in contact with the tray through the entire range of motion.



RV - Pneumatic Vibrator



Ordering Information – RV 3 through RV 9

| Order Number | A | B | C | D | E | F | G | H | I | J | K | L |
|--------------|----------|----------|----------|----------|----------|---------|---------|---------|----------|----------|---------|---------|
| RV3 | 128/5.04 | 90/3.54 | 48/1.89 | 80/3.15 | 70/2.76 | 44/1.73 | 38/1.50 | 19/0.75 | 95/3.74 | 70/2.76 | 49/1.93 | 12/0.47 |
| RV5 | 155/6.10 | 100/3.94 | 65/2.56 | 90/3.54 | 80/3.15 | 60/2.36 | 55/2.17 | 27/1.06 | 118/4.65 | 82/3.23 | 60/2.36 | 12/0.47 |
| RV7 | 158/6.22 | 122/4.80 | 88/3.47 | 100/3.94 | 100/3.94 | 80/3.15 | 78/3.07 | 36/1.42 | 118/4.65 | 104/4.09 | 60/2.36 | 12/0.47 |
| RV9 | 179/7.05 | 150/5.91 | 108/4.25 | 120/4.72 | 125/4.92 | 98/3.86 | 95/3.74 | 48/1.89 | 130/5.12 | 130/5.12 | 65/2.56 | 14/0.55 |

| Order Number | M | N | O | P | S | T | V | X | Y | Z |
|--------------|---------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| RV3 | 14/0.55 | 12.5/0.49 | 41/1.61 | 39/1.54 | 10/0.39 | 14/0.55 | 9/0.35 | 5/0.20 | 38/1.50 | 16/0.63 |
| RV5 | 15/0.59 | 19/0.75 | 47/1.85 | 49/1.93 | 12/0.47 | 14/0.55 | 9/0.35 | 8/0.32 | 48/1.89 | 16/0.63 |
| RV7 | 15/0.59 | 19/0.75 | 47/1.85 | 49/1.93 | 14/0.55 | 14/0.55 | 9/0.35 | 9/0.35 | 64/2.52 | 16/0.63 |
| RV9 | 20/0.79 | 24/0.95 | 52/2.05 | 56/2.21 | 18/0.71 | 17/0.67 | 11/0.43 | 11/0.43 | 75/2.95 | 23/0.91 |

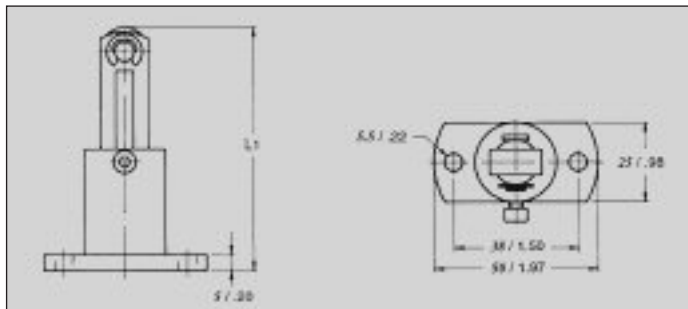
Technical Data

| Order Number | Air Fitting Female NPT | Typical Air Pressure | Air Consumption (ft ³ /min) | Typical Piston Stroke | Piston Speed (ft/min) | Typical Mounting Inclination | Maximum Load Inc. Tray | Noise Level (dB-A) | Working Temp. (°F) |
|--------------|------------------------|----------------------|--|-----------------------|-----------------------|------------------------------|------------------------|--------------------|--------------------|
| RV3 | 1/8 | 70 | 1.1 | 30/1.18 | 26-32 | 8° | 13.2 | 50 | 32-158 |
| RV5 | 1/4 | 70 | 2.1 | 33/1.30 | 26-32 | 8° | 30.9 | 50 | 32-158 |
| RV7 | 1/4 | 70 | 5.1 | 20/0.79 | 26-32 | 8° | 79.4 | 50 | 32-158 |
| RV9 | 3/8 | 70 | 7.6 | 28/1.10 | 26-32 | 8° | 123.5 | 53 | 32-158 |

Dimensions in millimeters/inches

RV Pneumatic Vibrator

Adjustable Supports for trays greater than 2ft. in length.



Ordering Information – RV 12-S through RV 50-S

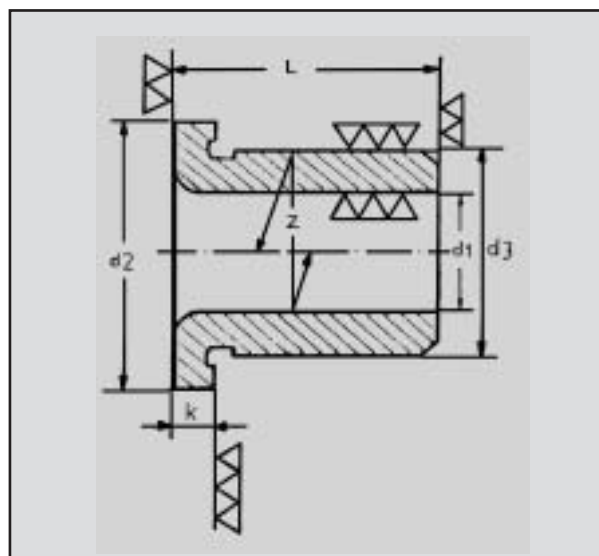
| Order Number | L1 Min. | L1 Max. |
|--------------|-----------|----------|
| RV 12-S | 38.5/1.52 | 51/2.01 |
| RV 25-S | 51/2.01 | 76/2.99 |
| RV 50-S | 76/2.99 | 126/4.96 |

Precision Drill Guides (Headed)

DIN 172
Material:

Precision Drill Guides (Headed)
Case Hardened Steel
Hardness : 62 +/- 2 Hrc

| d1 F7 | d3 n6 | d2 | k | z | Increments | L | |
|-------------|----------|----|-------|------|------------|-------|------|
| | | | | | | Short | Long |
| 0.4 - 1.0 | 3.0 | 6 | 2 | 0.01 | 0.10 | 6 | 9 |
| 1.1 - 1.8 | 4.0 | 7 | 2 | 0.01 | 0.10 | 6 | 9 |
| 1.9 - 2.6 | 5.0 | 8 | 2 | 0.01 | 0.10 | 6 | 9 |
| 2.7 - 3.3 | 6.0 | 10 | 2S/3L | 0.01 | + | 8 | 12 |
| 3.4 - 4.0 | 7.0 | 11 | 2S/3L | 0.01 | 0.25 | 8 | 12 |
| 4.1 - 5.0 | 8.0 | 12 | 2S/3L | 0.01 | + | 8 | 12 |
| 5.1 - 6.0 | 10.0 | 14 | 3 | 0.02 | 0.75 | 10 | 16 |
| 6.1 - 8.0 | 12.0 | 16 | 3 | 0.02 | 0.75 | 10 | 16 |
| 8.1 - 10.0 | 15.0 | 19 | 4 | 0.02 | 0.75 | 12 | 20 |
| 10.1 - 12.0 | 18.0 | 22 | 4 | 0.02 | 0.75 | 12 | 20 |
| 12.1 - 15.0 | 22.0 | 26 | 4 | 0.02 | 0.50 | 16 | 28 |
| 15.1 - 18.0 | 26.0 | 30 | 4 | 0.02 | 0.50 | 16 | 28 |
| 18.1 - 20.0 | 30.0 | 35 | 6 | 0.02 | 0.50 | 20 | 36 |
| 20.1 - 22.0 | 30.0 | 35 | 6 | 0.02 | 1.0 | 20 | 36 |
| 22.1 - 26.0 | 35.0 | 40 | 5 | 0.02 | 1.0 | 20 | 36 |
| 26.1 - 30.0 | 42.0 | 47 | 5 | 0.02 | 1.0 | 20 | 36 |
| 30.1 - 35.0 | 48.0 | 55 | 5 | 0.04 | 1.0 | 25 | 45 |
| 35.1 - 42.0 | 55.0 | 62 | 5 | 0.04 | 1.0 | 25 | 45 |
| 42.1 - 48.0 | 62.0 | 69 | 6 | 0.04 | 1.0 | 30 | 56 |
| 48.1 - 55.0 | 70.0 | 77 | 6 | 0.04 | 1.0 | 30 | 56 |
| 55.1 - 63.0 | 78.0 | 85 | 6 | 0.04 | 1.0 | 35 | 72 |

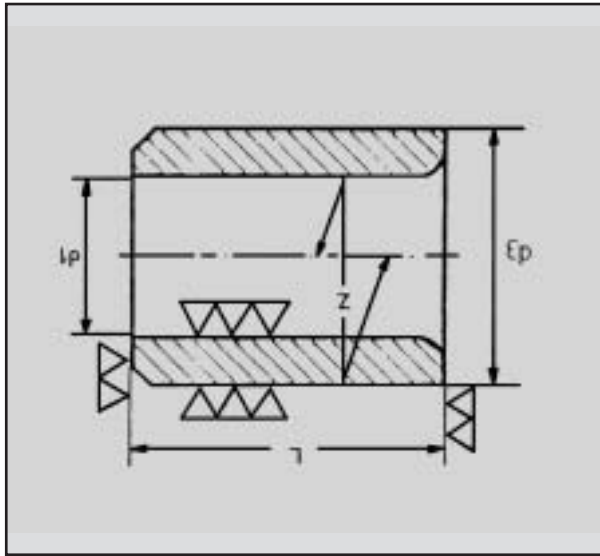


How to Order

Drill Guide d1 x L DIN 172 Short or Long
Eg: Drill Guide 2.6 x 9 DIN 172 Long
Drill Guide 15.0 x 16 DIN 172 Short

Precision Drill Guides (Headless)

DIN 179 Precision Drill Guides (Headless)
 Material: Case Hardened Steel
 Hardness : 62 +/- 2 Hrc



| d1 F7 | d3 n6 | z | Increments | L | |
|-------------|----------|------|------------|-------|------|
| | | | | Short | Long |
| 0.4 - 1.0 | 3.0 | 0.01 | 0.10 | 6 | 9 |
| 1.1 - 1.8 | 4.0 | 0.01 | 0.10 | 6 | 9 |
| 1.9 - 2.6 | 5.0 | 0.01 | 0.10 | 6 | 9 |
| 2.7 - 3.3 | 6.0 | 0.01 | + | 8 | 12 |
| 3.4 - 4.0 | 7.0 | 0.01 | 0.25 | 8 | 12 |
| 4.1 - 5.0 | 8.0 | 0.01 | + | 8 | 12 |
| 5.1 - 6.0 | 10.0 | 0.02 | 0.75 | 10 | 16 |
| 6.1 - 8.0 | 12.0 | 0.02 | 0.75 | 10 | 16 |
| 8.1 - 10.0 | 15.0 | 0.02 | 0.75 | 12 | 20 |
| 10.1 - 12.0 | 18.0 | 0.02 | 0.75 | 12 | 20 |
| 12.1 - 15.0 | 22.0 | 0.02 | 0.50 | 16 | 28 |
| 15.1 - 18.0 | 26.0 | 0.02 | 0.50 | 16 | 28 |
| 18.1 - 20.0 | 30.0 | 0.02 | 0.50 | 20 | 36 |
| 20.1 - 22.0 | 30.0 | 0.02 | 1.0 | 20 | 36 |
| 22.1 - 26.0 | 35.0 | 0.02 | 1.0 | 20 | 36 |
| 26.1 - 30.0 | 42.0 | 0.02 | 1.0 | 20 | 36 |
| 30.1 - 35.0 | 48.0 | 0.04 | 1.0 | 25 | 45 |
| 35.1 - 42.0 | 55.0 | 0.04 | 1.0 | 25 | 45 |
| 42.1 - 48.0 | 62.0 | 0.04 | 1.0 | 30 | 56 |
| 48.1 - 55.0 | 70.0 | 0.04 | 1.0 | 30 | 56 |
| 55.1 - 63.0 | 78.0 | 0.04 | 1.0 | 35 | 72 |

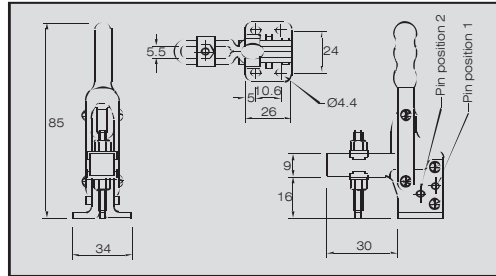
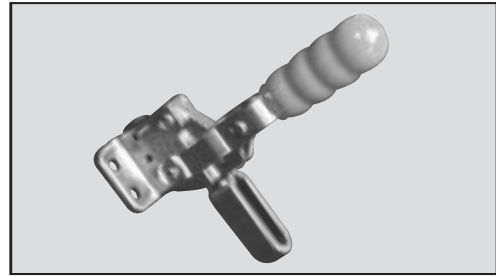
How to Order

Drill Guide d1 x L DIN 179 Short or Long
 Eg: Drill Guide 2.6 x 9 DIN 179 Long
 Drill Guide 15.0 x 16 DIN 179 Short

Vertical Toggle Clamps

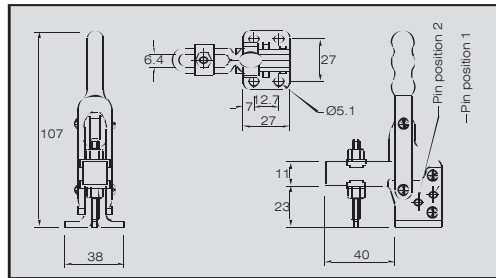
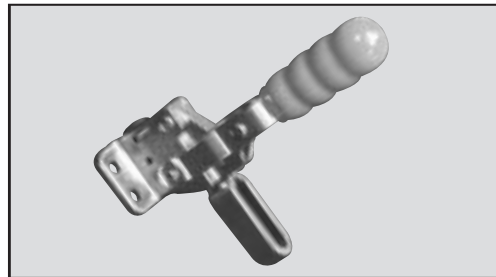
| Part Number | | V75/2B |
|----------------------------|--|--------|
| HOLDING FORCE | | 150kg |
| WEIGHT | | 70g |
| STANDARD SPINDLE MODEL NO. | | M0535 |
| ARM | | |
| OPENING ANGLE | | 120° |
| - PIN REMOVED | | 160° |
| HANDLE | | |
| OPENING ANGLE | | 85° |
| - PIN REMOVED | | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM1.



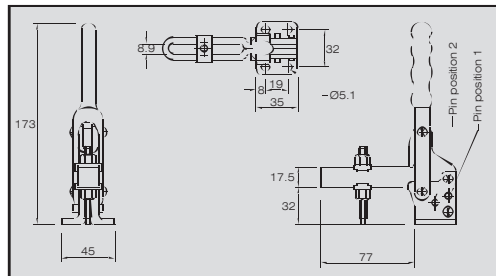
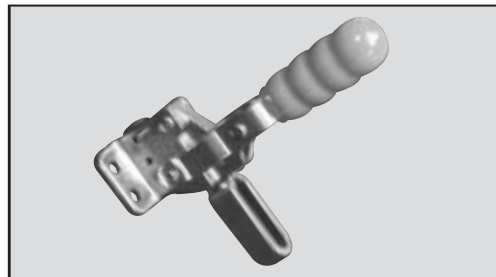
| Part Number | | V150/2B |
|----------------------------|--|---------|
| HOLDING FORCE | | 150kg |
| WEIGHT | | 170g |
| STANDARD SPINDLE MODEL NO. | | M0650 |
| ARM | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 90° |
| - PIN POSITION 2 | | 120° |
| - PIN REMOVED | | 160° |
| HANDLE | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 70° |
| - PIN POSITION 2 | | 85° |
| - PIN REMOVED | | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM1.

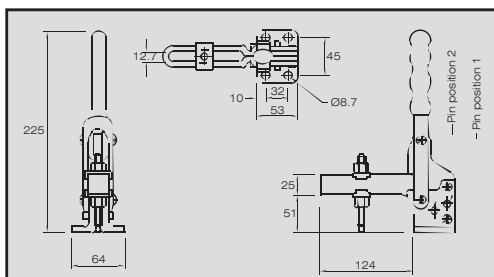
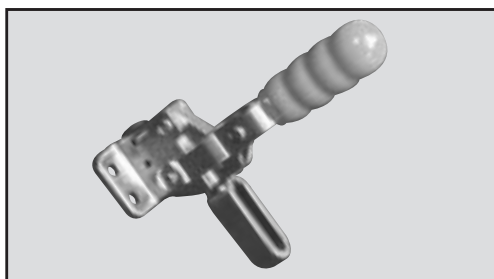
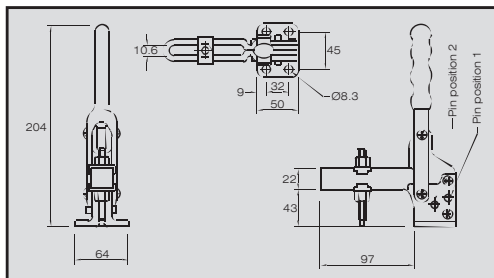
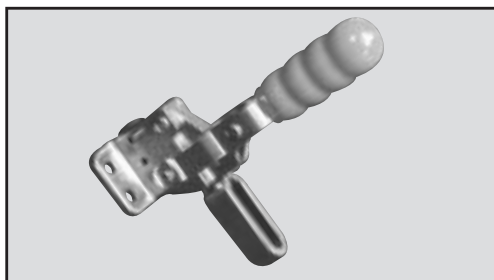


| Part Number | | V250/2B |
|----------------------------|--|---------|
| HOLDING FORCE | | 250kg |
| WEIGHT | | 380g |
| STANDARD SPINDLE MODEL NO. | | M0865 |
| ARM | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 90° |
| - PIN POSITION 2 | | 120° |
| - PIN REMOVED | | 160° |
| HANDLE | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 70° |
| - PIN POSITION 2 | | 85° |
| - PIN REMOVED | | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM2.



Vertical Toggle Clamps



Part Number V350/2B

| | |
|----------------------------|-------|
| HOLDING FORCE | 350kg |
| WEIGHT | 670g |
| STANDARD SPINDLE MODEL NO. | M1085 |
| ARM | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 90° |
| - PIN POSITION 2 | 120° |
| - PIN REMOVED | 160° |
| HANDLE | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 70° |
| - PIN POSITION 2 | 85° |
| - PIN REMOVED | 105° |

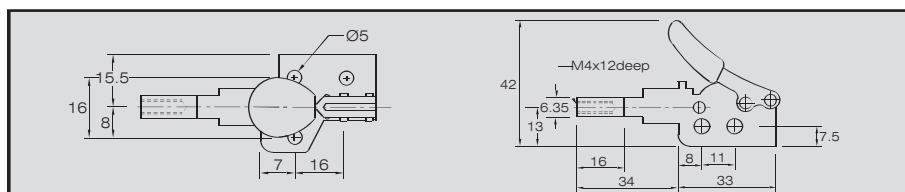
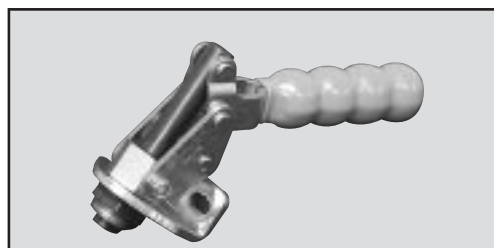
Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM3.

Part Number V450/2B

| | |
|----------------------------|--------|
| HOLDING FORCE | 450kg |
| WEIGHT | 1.3kg |
| STANDARD SPINDLE MODEL NO. | M12100 |
| ARM | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 90° |
| - PIN POSITION 2 | 120° |
| - PIN REMOVED | 160° |
| HANDLE | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 70° |
| - PIN POSITION 2 | 85° |
| - PIN REMOVED | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM3.

Straight Line Clamps



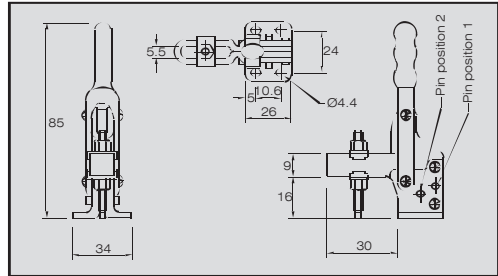
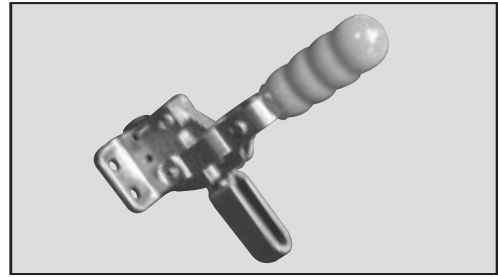
Part Number P50

| | |
|---------------|------|
| HOLDING FORCE | 50kg |
| WEIGHT | 45g |
| HANDLE | |
| OPENING ANGLE | 180° |

Vertical Toggle Clamps

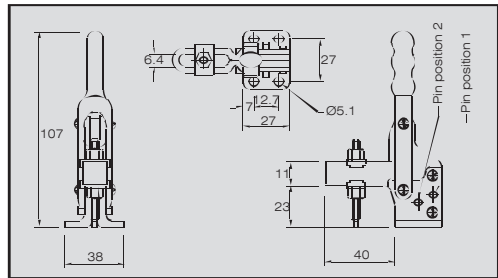
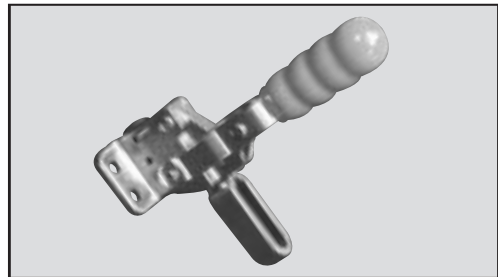
| Part Number | | V75/2B |
|----------------------------|--|--------|
| HOLDING FORCE | | 150kg |
| WEIGHT | | 70g |
| STANDARD SPINDLE MODEL NO. | | M0535 |
| ARM | | |
| OPENING ANGLE | | 120° |
| - PIN REMOVED | | 160° |
| HANDLE | | |
| OPENING ANGLE | | 85° |
| - PIN REMOVED | | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM1.



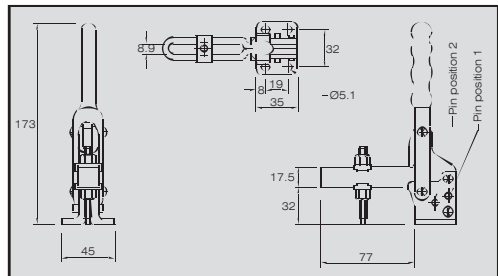
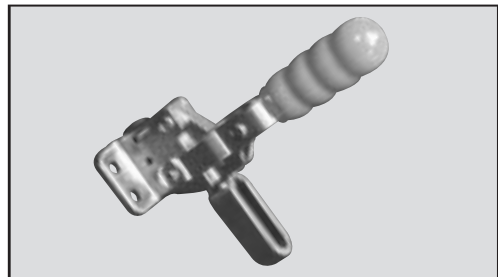
| Part Number | | V150/2B |
|----------------------------|--|---------|
| HOLDING FORCE | | 150kg |
| WEIGHT | | 170g |
| STANDARD SPINDLE MODEL NO. | | M0650 |
| ARM | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 90° |
| - PIN POSITION 2 | | 120° |
| - PIN REMOVED | | 160° |
| HANDLE | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 70° |
| - PIN POSITION 2 | | 85° |
| - PIN REMOVED | | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM1.

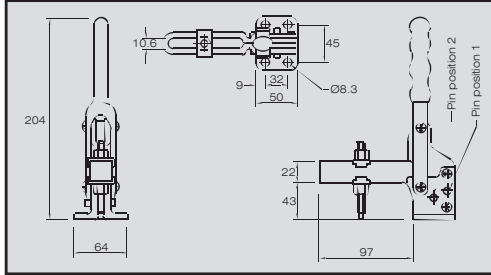
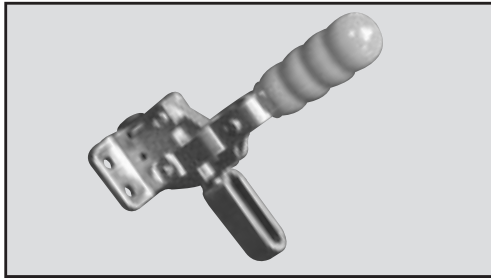


| Part Number | | V250/2B |
|----------------------------|--|---------|
| HOLDING FORCE | | 250kg |
| WEIGHT | | 380g |
| STANDARD SPINDLE MODEL NO. | | M0865 |
| ARM | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 90° |
| - PIN POSITION 2 | | 120° |
| - PIN REMOVED | | 160° |
| HANDLE | | |
| OPENING ANGLE | | |
| - PIN POSITION 1 | | 70° |
| - PIN POSITION 2 | | 85° |
| - PIN REMOVED | | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM2.

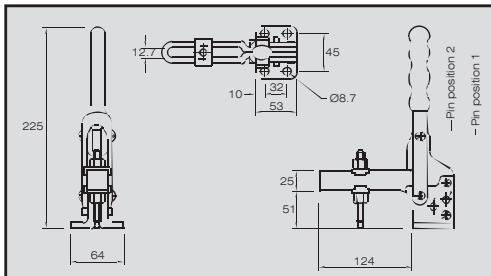
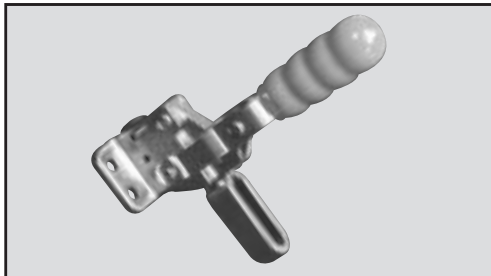


Vertical Toggle Clamps



| Part Number V350/2B | |
|----------------------------|-------|
| HOLDING FORCE | 350kg |
| WEIGHT | 670g |
| STANDARD SPINDLE MODEL NO. | M1085 |
| ARM | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 90° |
| - PIN POSITION 2 | 120° |
| - PIN REMOVED | 160° |
| HANDLE | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 70° |
| - PIN POSITION 2 | 85° |
| - PIN REMOVED | 105° |

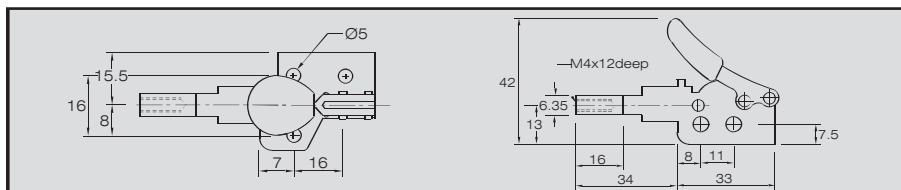
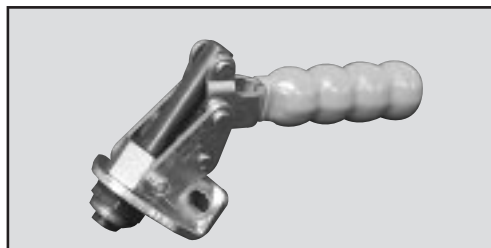
Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM3.



| Part Number V450/2B | |
|----------------------------|--------|
| HOLDING FORCE | 450kg |
| WEIGHT | 1.3kg |
| STANDARD SPINDLE MODEL NO. | M12100 |
| ARM | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 90° |
| - PIN POSITION 2 | 120° |
| - PIN REMOVED | 160° |
| HANDLE | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 70° |
| - PIN POSITION 2 | 85° |
| - PIN REMOVED | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM3.

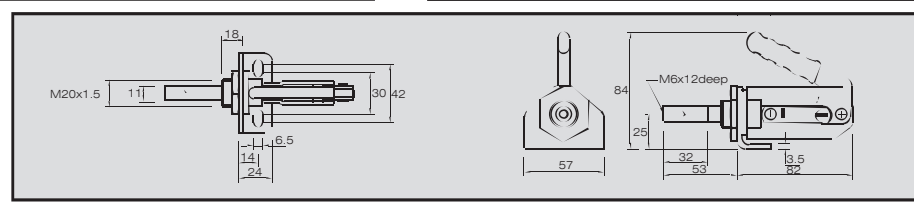
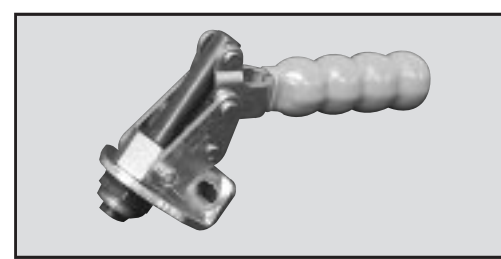
Straight Line Clamps



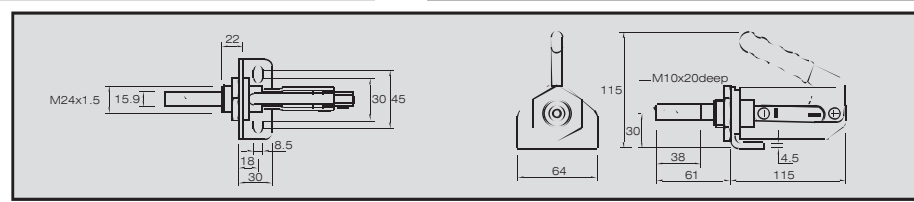
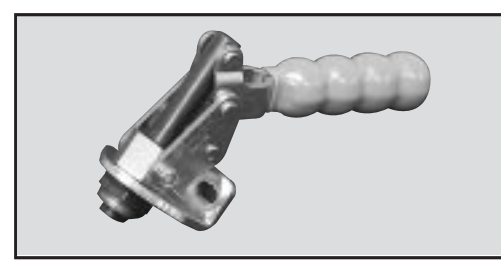
| Part Number P50 | |
|-----------------|------|
| HOLDING FORCE | 50kg |
| WEIGHT | 45g |
| HANDLE | |
| OPENING ANGLE | 180° |

Straight Line Clamps

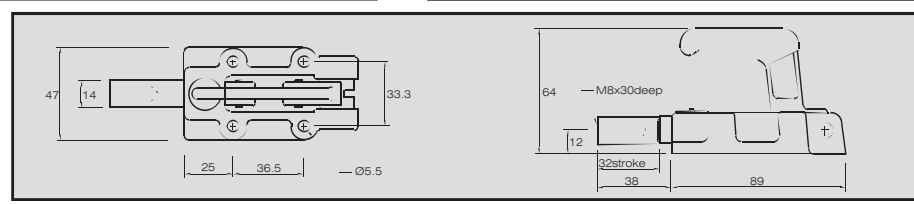
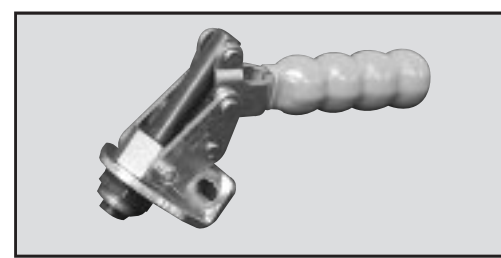
| | | |
|--------------------|---------------|-------|
| Part Number | P250 | |
| | HOLDING FORCE | 250kg |
| | WEIGHT | 350g |
| HANDLE | | |
| | OPENING ANGLE | 180° |



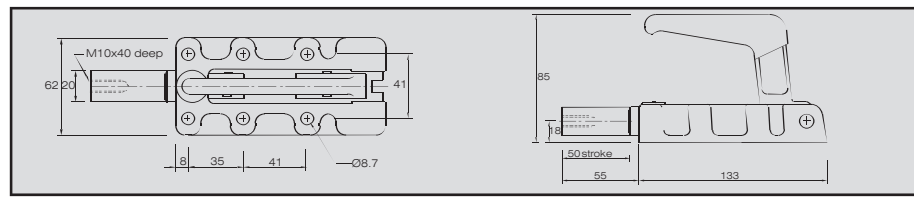
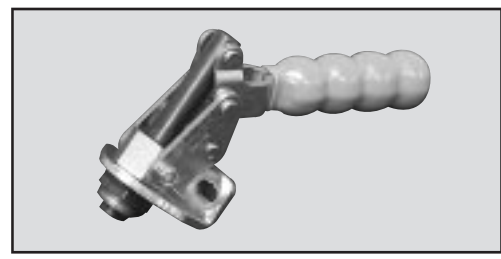
| | | |
|--------------------|---------------|-------|
| Part Number | P450 | |
| | HOLDING FORCE | 450kg |
| | WEIGHT | 755g |
| HANDLE | | |
| | OPENING ANGLE | 180° |



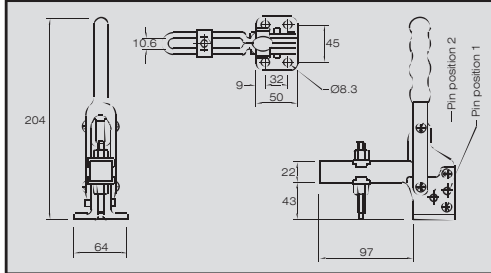
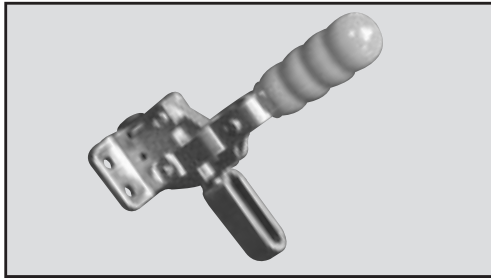
| | | |
|--------------------|---------------|-------|
| Part Number | P600 | |
| | HOLDING FORCE | 600kg |
| | WEIGHT | 480g |
| HANDLE | | |
| | OPENING ANGLE | 180° |



| | | |
|--------------------|---------------|--------|
| Part Number | P1200 | |
| | HOLDING FORCE | 1200kg |
| | WEIGHT | 1.5kg |
| HANDLE | | |
| | OPENING ANGLE | 180° |

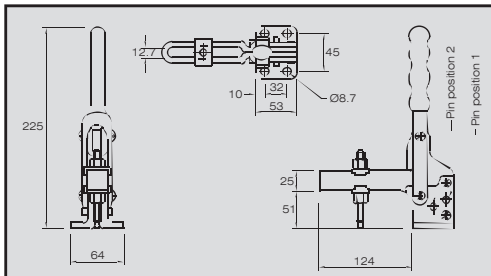
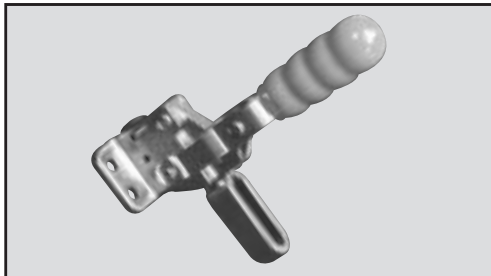


Vertical Toggle Clamps



| Part Number | V350/2B |
|----------------------------|---------|
| HOLDING FORCE | 350kg |
| WEIGHT | 670g |
| STANDARD SPINDLE MODEL NO. | M1085 |
| ARM | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 90° |
| - PIN POSITION 2 | 120° |
| - PIN REMOVED | 160° |
| HANDLE | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 70° |
| - PIN POSITION 2 | 85° |
| - PIN REMOVED | 105° |

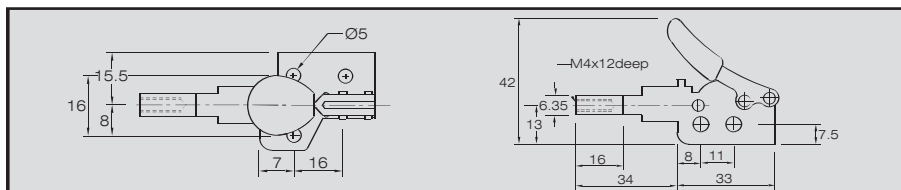
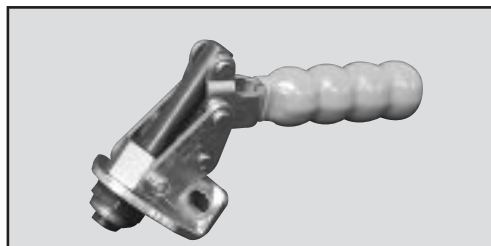
Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM3.



| Part Number | V450/2B |
|----------------------------|---------|
| HOLDING FORCE | 450kg |
| WEIGHT | 1.3kg |
| STANDARD SPINDLE MODEL NO. | M12100 |
| ARM | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 90° |
| - PIN POSITION 2 | 120° |
| - PIN REMOVED | 160° |
| HANDLE | |
| OPENING ANGLE | |
| - PIN POSITION 1 | 70° |
| - PIN POSITION 2 | 85° |
| - PIN REMOVED | 105° |

Supplied with standard spindle, nuts and flanged washers.
For front mounting use bracket Model FM3.

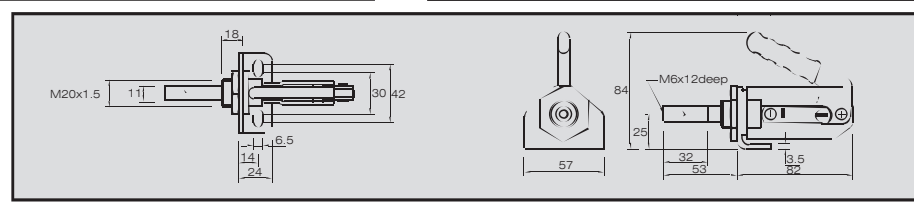
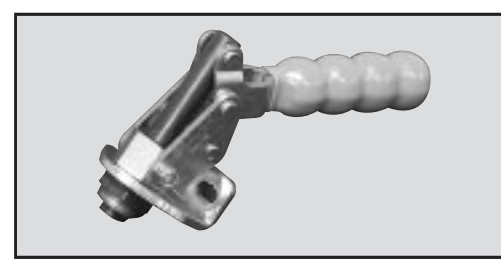
Straight Line Clamps



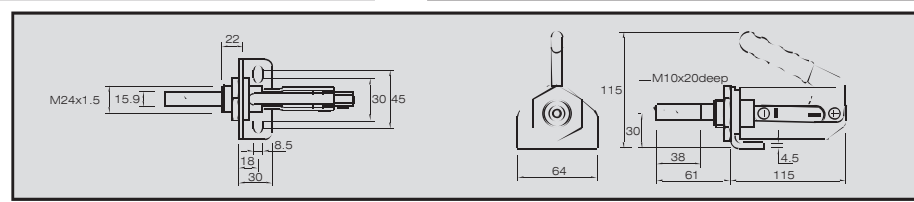
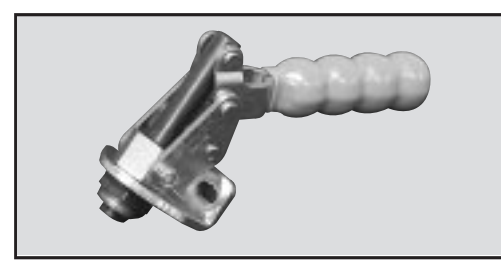
| Part Number | P50 |
|---------------|------|
| HOLDING FORCE | 50kg |
| WEIGHT | 45g |
| HANDLE | |
| OPENING ANGLE | 180° |

Straight Line Clamps

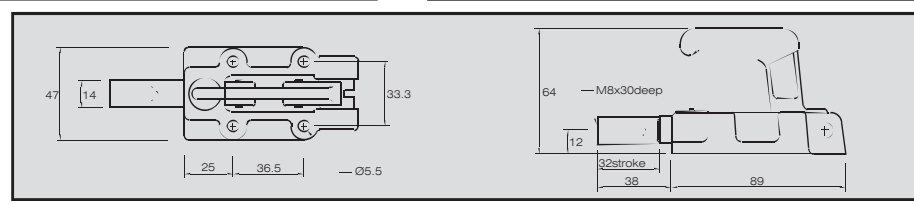
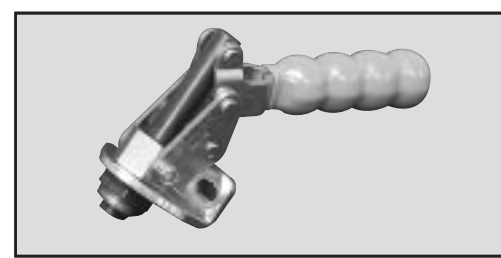
| | | |
|--------------------|-------------|--|
| Part Number | P250 | |
| HOLDING FORCE | 250kg | |
| WEIGHT | 350g | |
| HANDLE | | |
| OPENING ANGLE | 180° | |



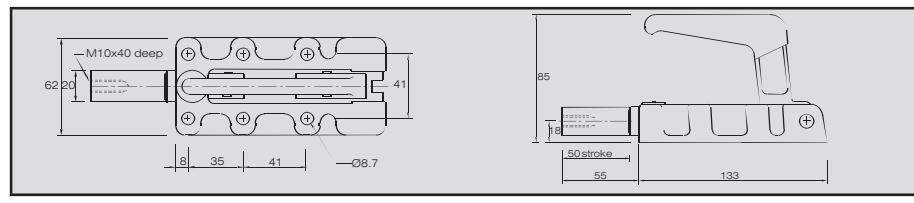
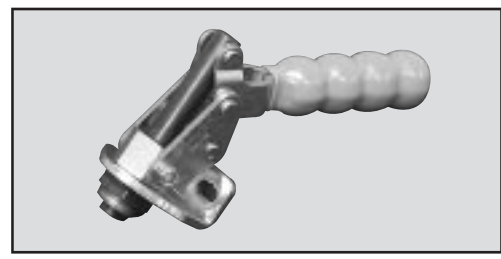
| | | |
|--------------------|-------------|--|
| Part Number | P450 | |
| HOLDING FORCE | 450kg | |
| WEIGHT | 755g | |
| HANDLE | | |
| OPENING ANGLE | 180° | |



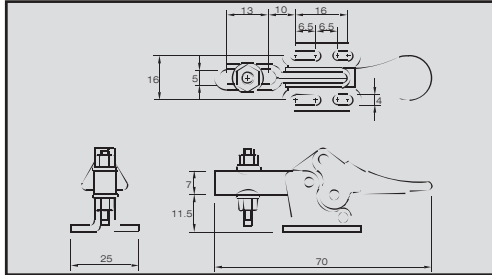
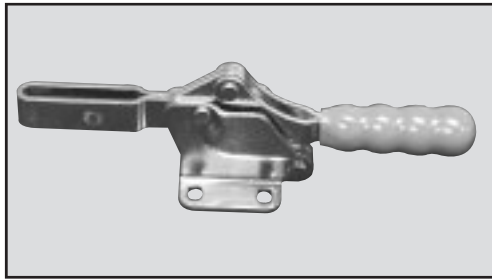
| | | |
|--------------------|-------------|--|
| Part Number | P600 | |
| HOLDING FORCE | 600kg | |
| WEIGHT | 480g | |
| HANDLE | | |
| OPENING ANGLE | 180° | |



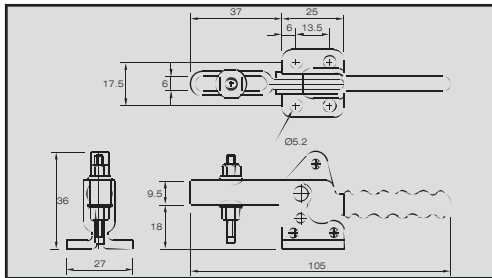
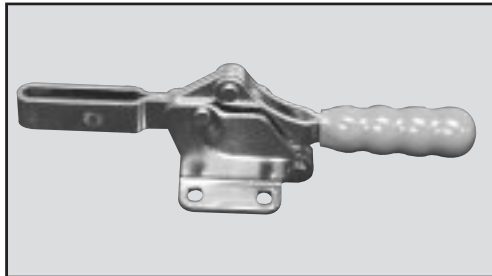
| | | |
|--------------------|--------------|--|
| Part Number | P1200 | |
| HOLDING FORCE | 1200kg | |
| WEIGHT | 1.5kg | |
| HANDLE | | |
| OPENING ANGLE | 180° | |



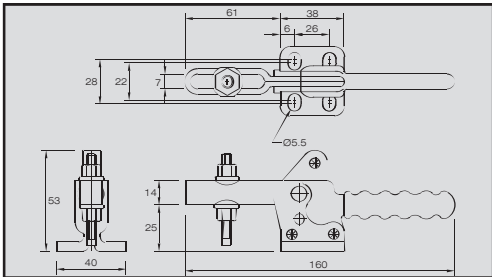
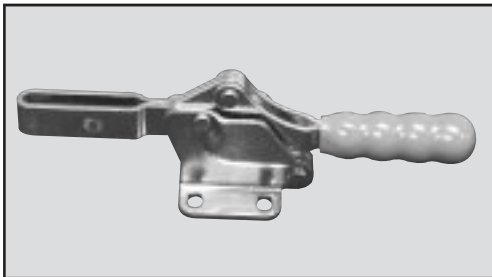
Horizontal Toggle Clamps



| Part Number | H50/2B |
|---|--------|
| HOLDING FORCE | 50kg |
| WEIGHT | 31g |
| STANDARD SPINDLE MODEL NO. | MO525 |
| ARM OPENING ANGLE | 86° |
| HANDLE | |
| OPENING ANGLE | 76° |
| Supplied with standard spindle, nuts and flanged washers. | |



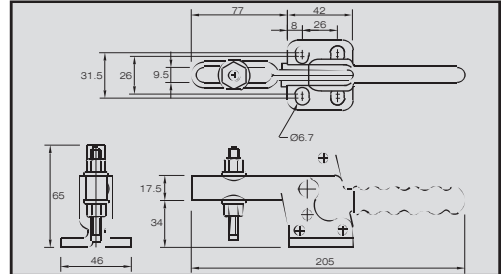
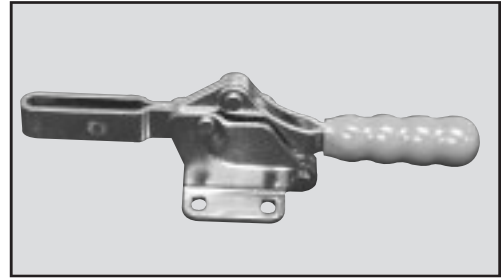
| Part Number | H75/2B |
|--|--------|
| HOLDING FORCE | 75kg |
| WEIGHT | 60g |
| STANDARD SPINDLE MODEL NO. | MO535 |
| ARM OPENING ANGLE | 92° |
| HANDLE | |
| OPENING ANGLE | 68° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM1. | |



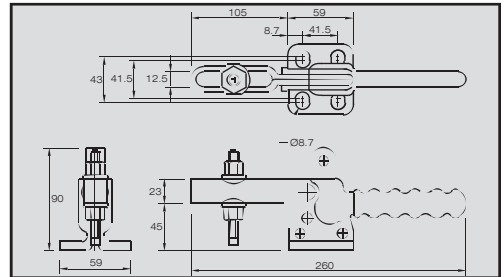
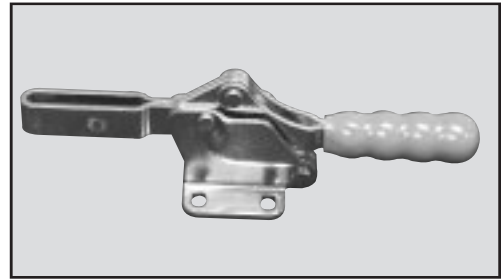
| Part Number | H150/2B |
|--|---------|
| HOLDING FORCE | 150kg |
| WEIGHT | 195g |
| STANDARD SPINDLE MODEL NO. | MO650 |
| ARM OPENING ANGLE | 94° |
| HANDLE | |
| OPENING ANGLE | 74° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM2. | |

Horizontal Toggle Clamps

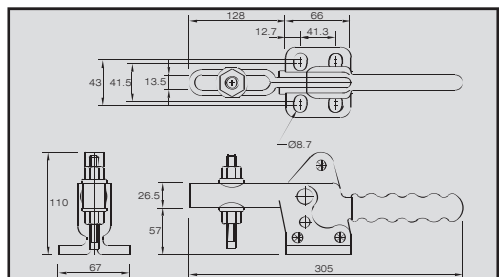
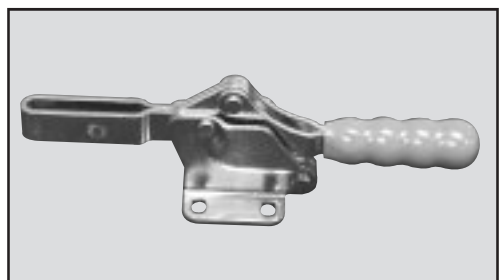
| Part Number | | H250/2B |
|--|--|---------|
| HOLDING FORCE | | 250kg |
| WEIGHT | | 375g |
| STANDARD SPINDLE MODEL NO. | | MO865 |
| ARM OPENING ANGLE | | 92° |
| HANDLE | | |
| OPENING ANGLE | | 70° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM2. | | |



| Part Number | | H350/2B |
|--|--|---------|
| HOLDING FORCE | | 350kg |
| WEIGHT | | 900g |
| STANDARD SPINDLE MODEL NO. | | M1085 |
| ARM OPENING ANGLE | | 91° |
| HANDLE | | |
| OPENING ANGLE | | 68° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM3. | | |

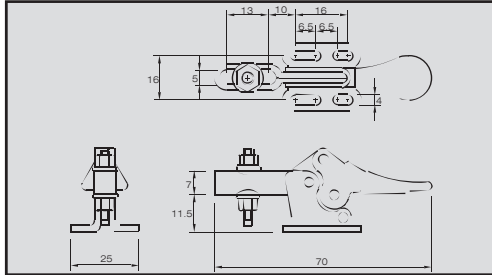
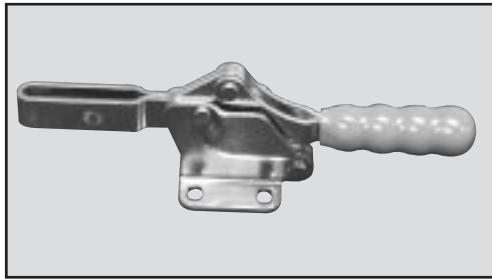


| Part Number | | H450/2B |
|--|--|---------|
| HOLDING FORCE | | 450kg |
| WEIGHT | | 1.5kg |
| STANDARD SPINDLE MODEL NO. | | M121 |
| ARM OPENING ANGLE | | 91° |
| HANDLE | | |
| OPENING ANGLE | | 68° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM3. | | |

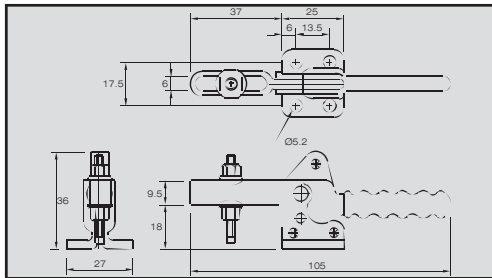
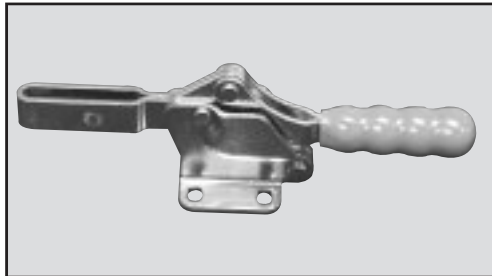


Horizontal Toggle Clamps

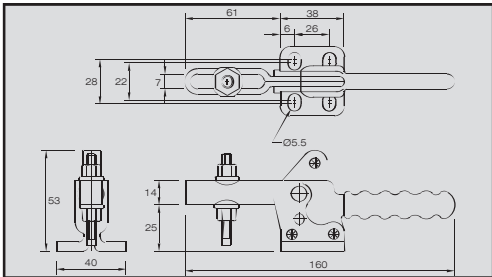
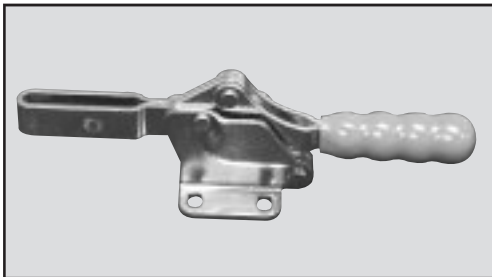
Accessories



| Part Number | H50/2B |
|---|--------|
| HOLDING FORCE | 50kg |
| WEIGHT | 31g |
| STANDARD SPINDLE MODEL NO. | MO525 |
| ARM OPENING ANGLE | 86° |
| HANDLE | |
| OPENING ANGLE | 76° |
| Supplied with standard spindle, nuts and flanged washers. | |



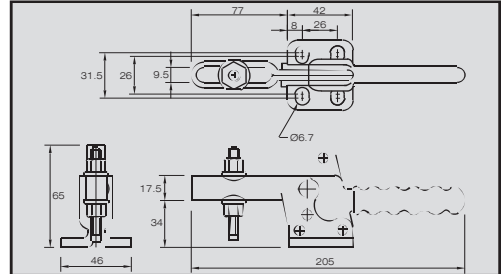
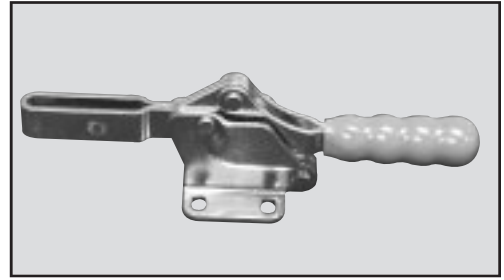
| Part Number | H75/2B |
|--|--------|
| HOLDING FORCE | 75kg |
| WEIGHT | 60g |
| STANDARD SPINDLE MODEL NO. | MO535 |
| ARM OPENING ANGLE | 92° |
| HANDLE | |
| OPENING ANGLE | 68° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM1. | |



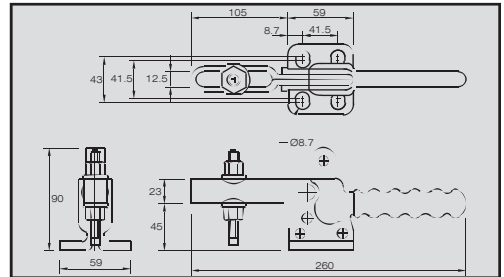
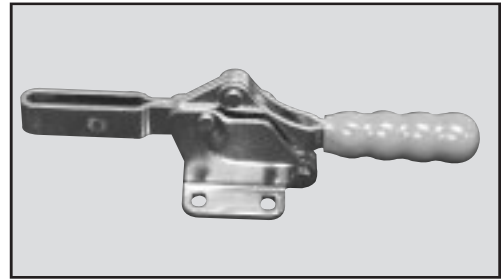
| Part Number | H150/2B |
|--|---------|
| HOLDING FORCE | 150kg |
| WEIGHT | 195g |
| STANDARD SPINDLE MODEL NO. | MO650 |
| ARM OPENING ANGLE | 94° |
| HANDLE | |
| OPENING ANGLE | 74° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM2. | |

Horizontal Toggle Clamps

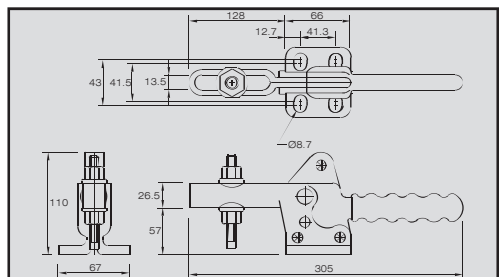
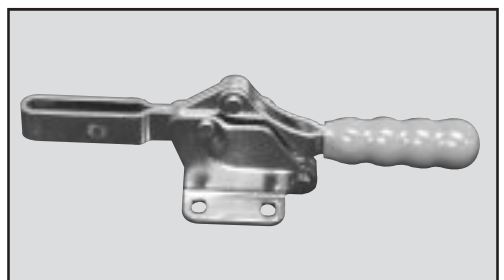
| Part Number | H250/2B | |
|--|---------|-------|
| HOLDING FORCE | | 250kg |
| WEIGHT | | 375g |
| STANDARD SPINDLE MODEL NO. | | MO865 |
| ARM OPENING ANGLE | | 92° |
| HANDLE | | |
| OPENING ANGLE | | 70° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM2. | | |



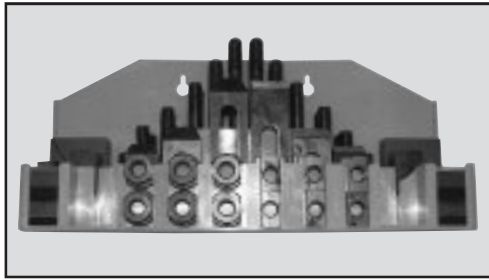
| Part Number | H350/2B | |
|--|---------|-------|
| HOLDING FORCE | | 350kg |
| WEIGHT | | 900g |
| STANDARD SPINDLE MODEL NO. | | M1085 |
| ARM OPENING ANGLE | | 91° |
| HANDLE | | |
| OPENING ANGLE | | 68° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM3. | | |



| Part Number | H450/2B | |
|--|---------|-------|
| HOLDING FORCE | | 450kg |
| WEIGHT | | 1.5kg |
| STANDARD SPINDLE MODEL NO. | | M121 |
| ARM OPENING ANGLE | | 91° |
| HANDLE | | |
| OPENING ANGLE | | 68° |
| Supplied with standard spindle, nuts and flanged washers. For front mounting use bracket Model FM3. | | |



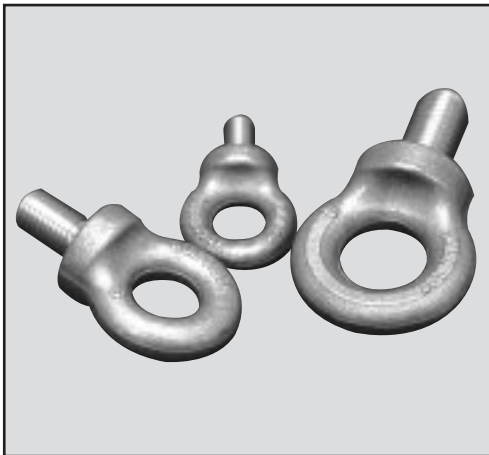
Clamping Kits



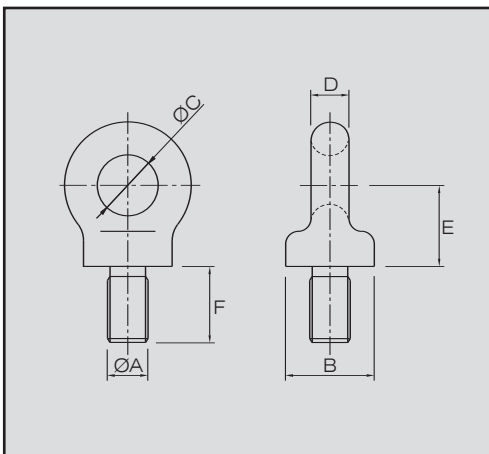
| Part Number | Description |
|-------------|----------------------------|
| PK-104 | 1/2 Clamping Kit (52 pcs) |
| PK-105 | 5/8 Clamping Kit (52 pcs) |
| PKM12 | 12mm Clamping Kit (52 pcs) |
| PKM16 | 16mm Clamping Kit (52 pcs) |

Collard Lifting Eyebolts

Metric & Imperial



| Part No. | AØ | B | CØ | D | E | F |
|----------|-----|-----|-----|----|-----|-----|
| EYE10 | M10 | 21 | 14 | 9 | 20 | 18 |
| EYE12 | M12 | 28 | 19 | 11 | 25 | 23 |
| EYE16 | M16 | 35 | 24 | 15 | 32 | 30 |
| EYE20 | M20 | 42 | 29 | 16 | 37 | 40 |
| EYE22 | M22 | 50 | 33 | 20 | 44 | 41 |
| EYE24 | M24 | 57 | 38 | 22 | 51 | 46 |
| EYE30 | M30 | 71 | 48 | 28 | 66 | 50 |
| EYE33 | M33 | 71 | 48 | 28 | 65 | 50 |
| EYE38 | M38 | 86 | 55 | 33 | 75 | 66 |
| EYE39 | M39 | 86 | 55 | 33 | 75 | 66 |
| EYE42 | M42 | 102 | 66 | 40 | 92 | 77 |
| EYE48 | M48 | 115 | 72 | 49 | 102 | 89 |
| EYE56 | M56 | 143 | 95 | 56 | 127 | 111 |
| EYE64 | M64 | 143 | 95 | 56 | 127 | 111 |
| EYE76 | M76 | 163 | 106 | 66 | 144 | 125 |



| Part No. | AØ | B | CØ | D | E | F |
|----------|--------|-----|----|----|-----|-----|
| EYE24 | 3/8" | 21 | 14 | 9 | 20 | 18 |
| EYE32 | 1/2" | 28 | 19 | 11 | 25 | 23 |
| EYE40 | 5/8" | 35 | 24 | 15 | 32 | 30 |
| EYE48 | 3/4" | 42 | 29 | 16 | 37 | 40 |
| EYE56 | 7/8" | 50 | 33 | 20 | 44 | 41 |
| EYE64 | 1" | 57 | 38 | 22 | 51 | 46 |
| EYE72 | 1 1/8" | 71 | 48 | 28 | 66 | 50 |
| EYE80 | 1 1/4" | 71 | 48 | 28 | 65 | 50 |
| EYE96 | 1 1/2" | 86 | 55 | 33 | 75 | 66 |
| EYE112 | 1 3/4" | 86 | 55 | 33 | 75 | 66 |
| EYE128 | 2" | 102 | 66 | 40 | 92 | 77 |
| EYE160 | 2 1/2" | 115 | 72 | 49 | 102 | 89 |
| EYE192 | 3" | 143 | 95 | 56 | 127 | 111 |

Table of ISA Standard Tolerances in Microns

(1 micron = 0.001mm / 25.4 micron = 0.001 inches)

| Designation | Application | up to 3mm. | 3 to 6mm. | 6 to 10mm. | 10 to 18mm. | 18 to 30mm. | 30 to 50mm. |
|-------------|--|------------|------------|------------|-------------|-------------|-------------|
| d 9 | | -20 -45 | -30 -60 | -40 -76 | -50 -93 | -65 -117 | -80 -142 |
| f 7 | Ground surfaces | -6 -16 | -10 -22 | -13 -28 | -16 -34 | -20 -41 | -25 -50 |
| F 7 | Drill guides-I.D. | +16 +7 | +22 +10 | +28 +13 | +34 +16 | +41 +20 | +50 +25 |
| g 5 | | -2 -6 | -4 -9 | -5 -11 | -6 -14 | -7 -16 | -9 -20 |
| g 6 | Ejector pins | -2 -8 | -4 -12 | -5 -14 | -6 -17 | -7 -20 | -9 -25 |
| h 4 | Guide pins (die sets) | 0 -3 | 0 -4 | 0 -4 | 0 -5 | 0 -6 | 0 -7 |
| h 5 | | 0 -4 | 0 -5 | 0 -6 | 0 -8 | 0 -9 | 0 -11 |
| h 6 | Punches D.C. F(pt) | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 | 0 -16 |
| h 7 | | 0 -10 | 0 -12 | 0 -15 | 0 -18 | 0 -21 | 0 -25 |
| h 9 | | 0 -25 | 0 -30 | 0 -36 | 0 -43 | 0 -52 | 0 -62 |
| h 11 | | 0 -60 | 0 -75 | 0 -90 | 0 -110 | 0 -210 | 0 -250 |
| H 5 | | +4 0 | +5 0 | +6 0 | +8 0 | +9 0 | +11 0 |
| H 7 | Punch guides-I.D Reamers | +10 0 | +12 0 | +15 0 | +18 0 | +21 0 | +25 0 |
| H 8 | Die inserts or buttons- I.D.(A&B) | +14 0 | +18 0 | +22 0 | +27 0 | +33 0 | +39 0 |
| j 5 | | +2 -2 | +3 -2 | +4 -2 | +5 -3 | +5 -4 | +6 -5 |
| j 6 | | +4 -2 | +6 -2 | +7 -2 | +8 -3 | +9 -4 | +11 -5 |
| j 7 | | +7 -2 | +9 -3 | +10 -5 | +12 -6 | +13 -8 | +15 -10 |
| k 6 | Die inserts-O.D(B) | +10 +1 | +12 +1 | +15 +2 | +18 +2 | | |
| m 5 | | +7 +2 | +9 +4 | +12 +6 | +15 +7 | +17 +8 | +20 +9 |
| m 6 | Punches E,F(shk) Dowels | +9 +2 | +12 +4 | +15 +6 | +18 +7 | +21 +8 | +25 +9 |
| n 6 | Die inserts-O.D.(A) Guide bushes-O.D. | +13 +6 | +16 +8 | +19 +10 | +23 +12 | +28 +15 | +32 +17 |
| p 6 | | +16 +9 | +20 +12 | +24 +15 | +29 +18 | +35 +22 | +42 +26 |
| r 6 | | +19 +12 | +23 +15 | +28 +19 | +34 +23 | +41 +28 | +50 +34 |
| s 5 | | +18 +14 | +24 +19 | +29 +23 | +36 +28 | +44 +35 | +54 +43 |
| s 6 | | +22 +15 | +27 +19 | +32 +23 | +39 +28 | +48 +35 | +59 +43 |