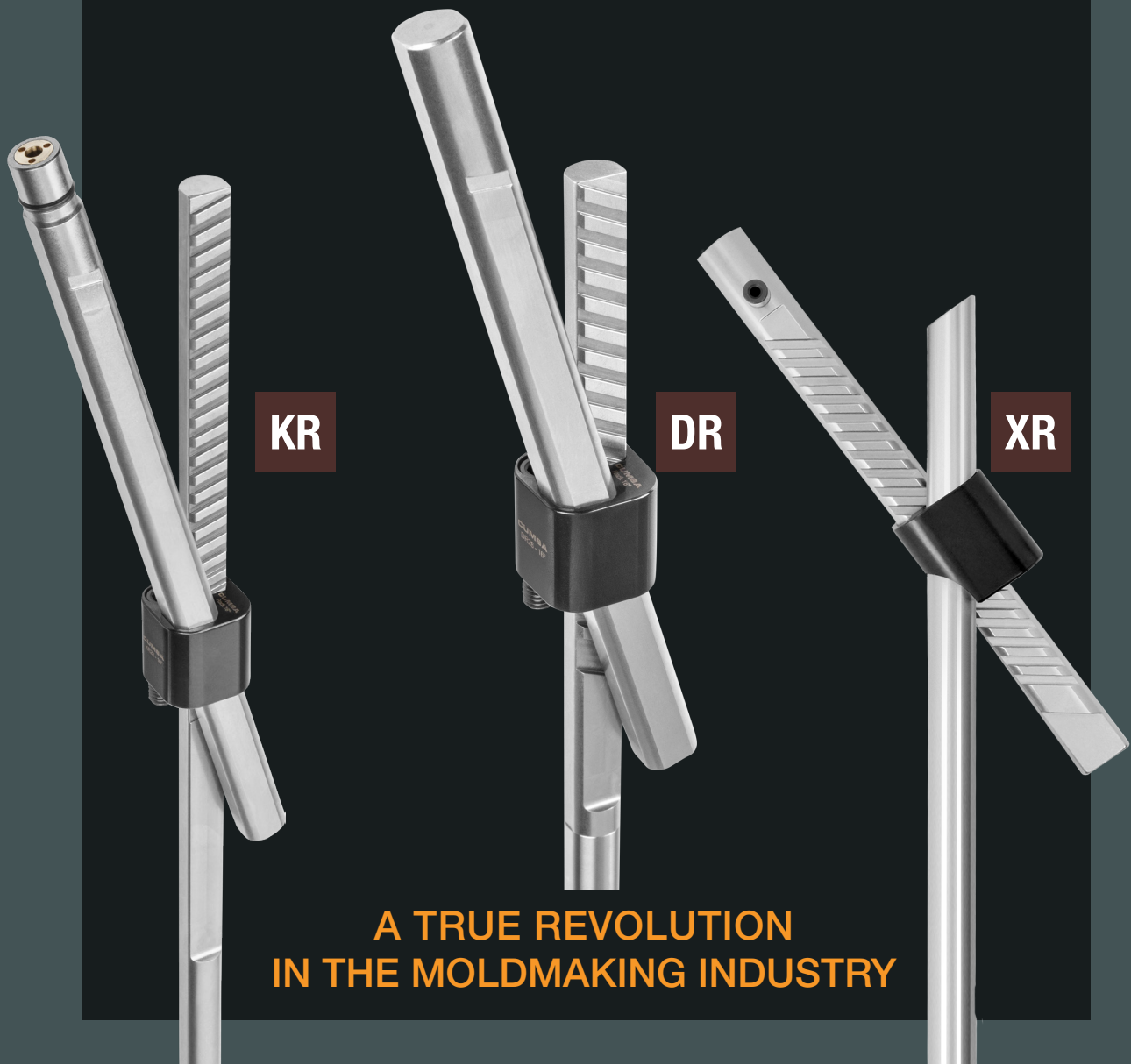


# CUMSA

INNOVATIVE SOLUTIONS  
FOR YOUR MOLDS

## DOUBLE RACK SYSTEM



A TRUE REVOLUTION  
IN THE MOLDMAKING INDUSTRY

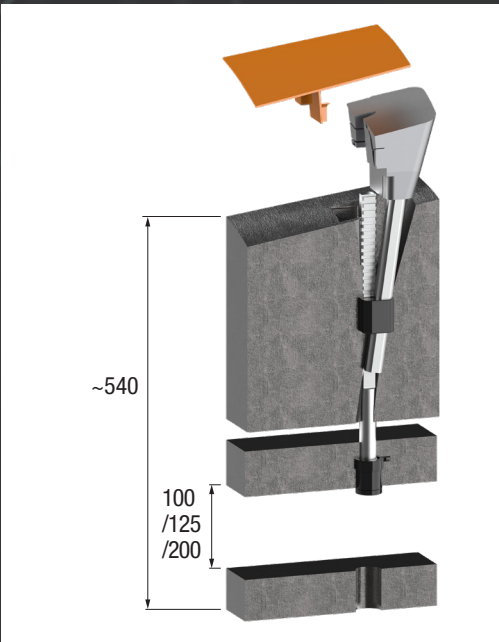
UNDERCUTS

EN

# IMAGINE REDUCING MOLD SIZE, EJECTION STROKE, AND MOLD COST WHILE SIMPLIFYING UNDERCUTS?

Discover all the great benefits of the CUMSA Double Rack Series

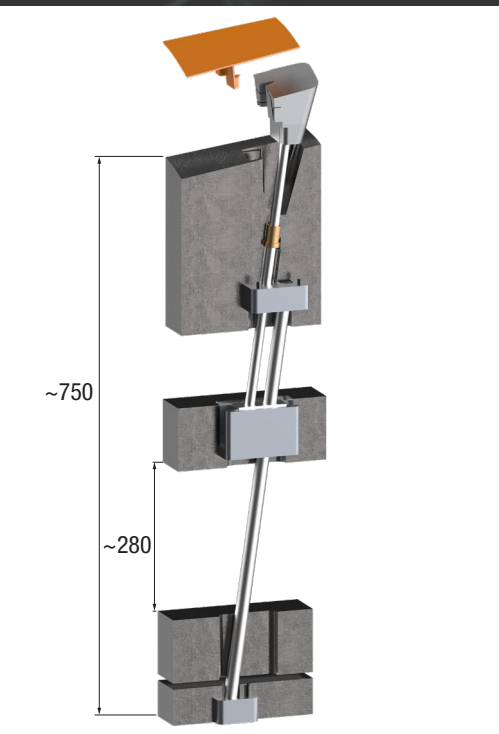
## CUMSA DOUBLE RACK SYSTEM



### CUMSA SOLUTION BENEFITS:

- Demolding strokes from 14mm up to 80mm.
- Vertical function maximizes strength.
- Smart, simple and compact molds.
- 100% mechanical solution.
- Original product with 10 years on the market.
- Over 50,000 units installed!

## CONVENTIONAL SYSTEM



### CONVENTIONAL SYSTEM ISSUES:

- Mold design complexity.
- Extended cycle time.
- Part quality and dimensional accuracy.
- Problematic and bulky cooling.

# GREAT ADVANTAGES



## MULTIPLE OPTIONS

Ejection strokes of 100, 125 or 200mm. as standard, rod diameters of 9, 12, 16, 20, 22, 24, 30 and 40mm. to adapt to most of the customer insert dimensions, as well as 2 included insert mounting options, magnetic or threaded to meet the requirements of the most demanding customers.



## ADAPTABLE TO CUSTOMER NEEDS

Whether a flat or angled profile is required, from +35° to -60° angles are available and ready to use. To facilitate mold design, mirror parts are also available.



## NEED TO COOL THE INSERT?

From an external solution for the DR and XR series with the DK product, to the KR series where the cooling is done directly through the angled shaft, no matter what you need, there is a solution for every problem!



## OVERALL SAVINGS

The main advantage is a smaller mold size, which reduces the required injection machine. Additionally, it cuts costs by eliminating high-precision angle housings and cam actions, requiring less machining, and improving plate stability.



## FIND YOUR PERFECT FIT

Reach out to our free project consulting service for both standard and custom solutions at [technical@cumsa.com](mailto:technical@cumsa.com) or our online calculator for standard options by following this QR code.



DR

UNDERCUTS

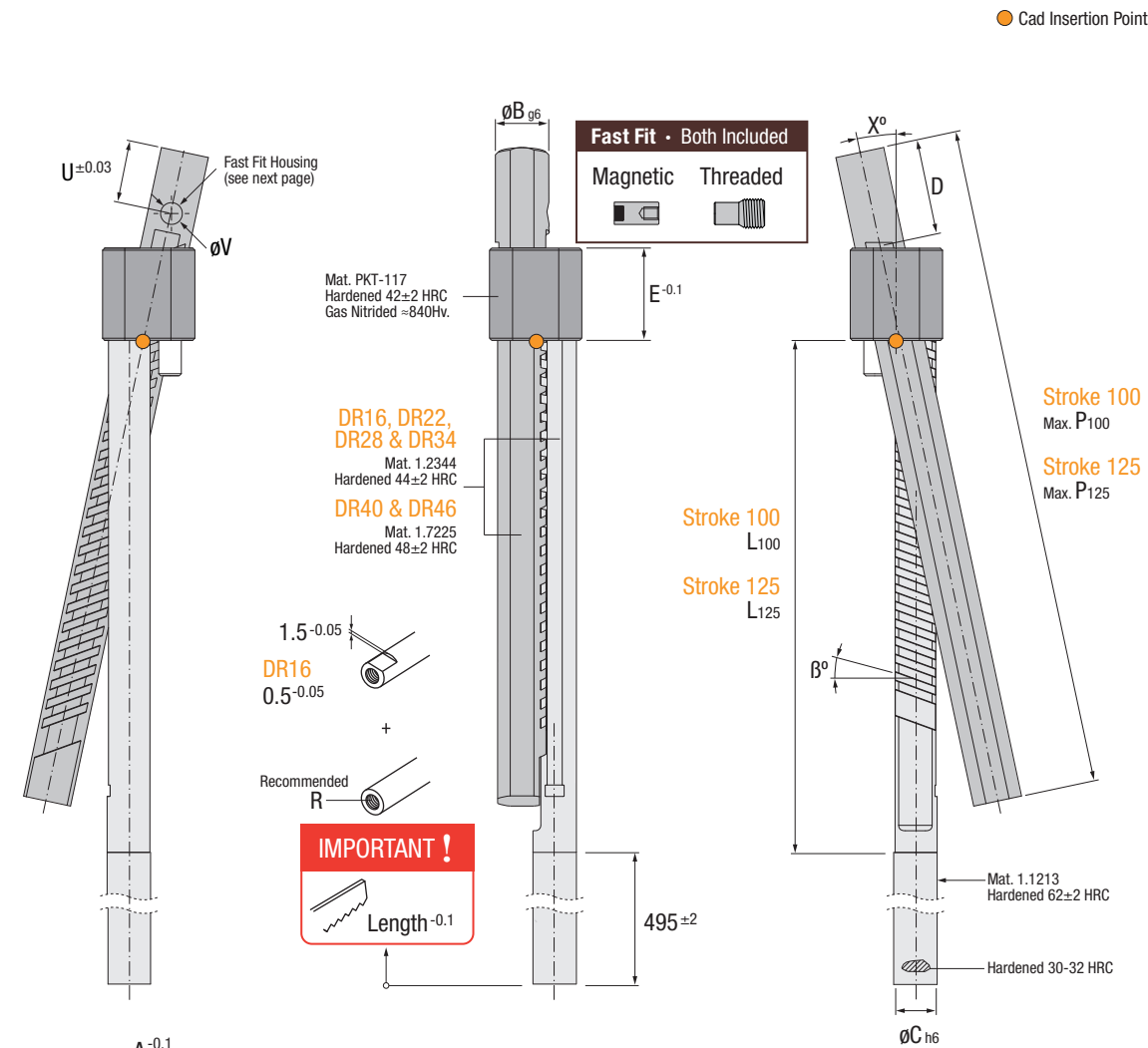


Patented

Max. 150°C

DOUBLE RACK LIFTER

INSTALLATION GUIDELINES



| Stroke 100  | Stroke 125  | X° |    |    |    |    | A  | B  | C  | D  | E     | L100 | P100  | L125 | P125 | Q   | R   | T  | U  | V | Stroke 100-S  | Stroke 125-S  | SWa |
|-------------|-------------|----|----|----|----|----|----|----|----|----|-------|------|-------|------|------|-----|-----|----|----|---|---------------|---------------|-----|
| DR.16100L-x | -           | 8  | 12 | 16 | -  | 16 | 9  | 8  | 20 | 20 | 142   | 178  | -     | -    | 4    | M5  | M5  | 10 | 6  |   | DR.16100L-x-S | -             | 3   |
| DR.22100L-x | DR.22125L-x | 8  | 12 | 16 |    | 22 | 12 | 12 | 30 | 22 | 148   | 202  | 202   | 261  | 6.5  | M6  | M6  | 17 | 8  |   | DR.22100L-x-S | DR.22125L-x-S | 4   |
| DR.28100L-x | DR.28125L-x | 8  | 12 | 16 | 20 | 28 | 16 | 14 | 36 | 28 | 152.5 | 214  | 194.5 | 266  | 8.5  | M8  | M8  | 23 | 8  |   | DR.28100L-x-S | DR.28125L-x-S | 5   |
| DR.34100L-x | DR.34125L-x | 8  | 12 | 16 | 20 | 34 | 20 | 16 | 36 | 34 | 160.5 | 227  | 188.5 | 264  | 10.5 | M8  | M8  | 23 | 8  |   | DR.34100L-x-S | DR.34125L-x-S | 5   |
| DR.40100L-x | DR.40125L-x | 8  | 12 | 16 | 20 | 40 | 22 | 20 | 36 | 40 | 170   | 244  | 204   | 284  | 10.5 | M10 | M10 | 20 | 10 |   | DR.40100L-x-S | DR.40125L-x-S | 6   |
| DR.46100L-x | DR.46125L-x | 8  | 12 | 16 | 20 | 46 | 24 | 24 | 42 | 46 | 175   | 258  | 201   | 289  | 10.5 | M10 | M12 | 26 | 10 |   | DR.46100L-x-S | DR.46125L-x-S | 8   |

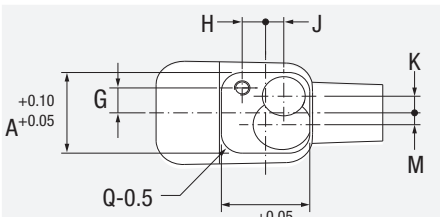
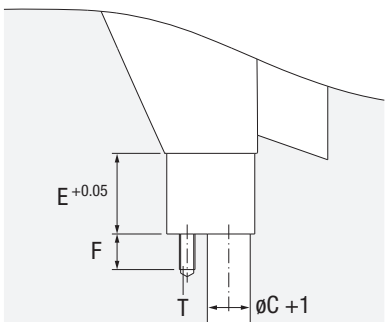
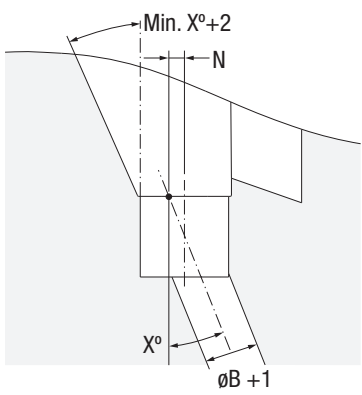
! Check the end of this leaflet for Min / Max  $\beta$  values

$\beta^\circ < 0$  &  $\beta^\circ = 0$   $\beta^\circ > 0$

DR 28 100L - 12 -10 Standard DR 28 100L - 12 +10

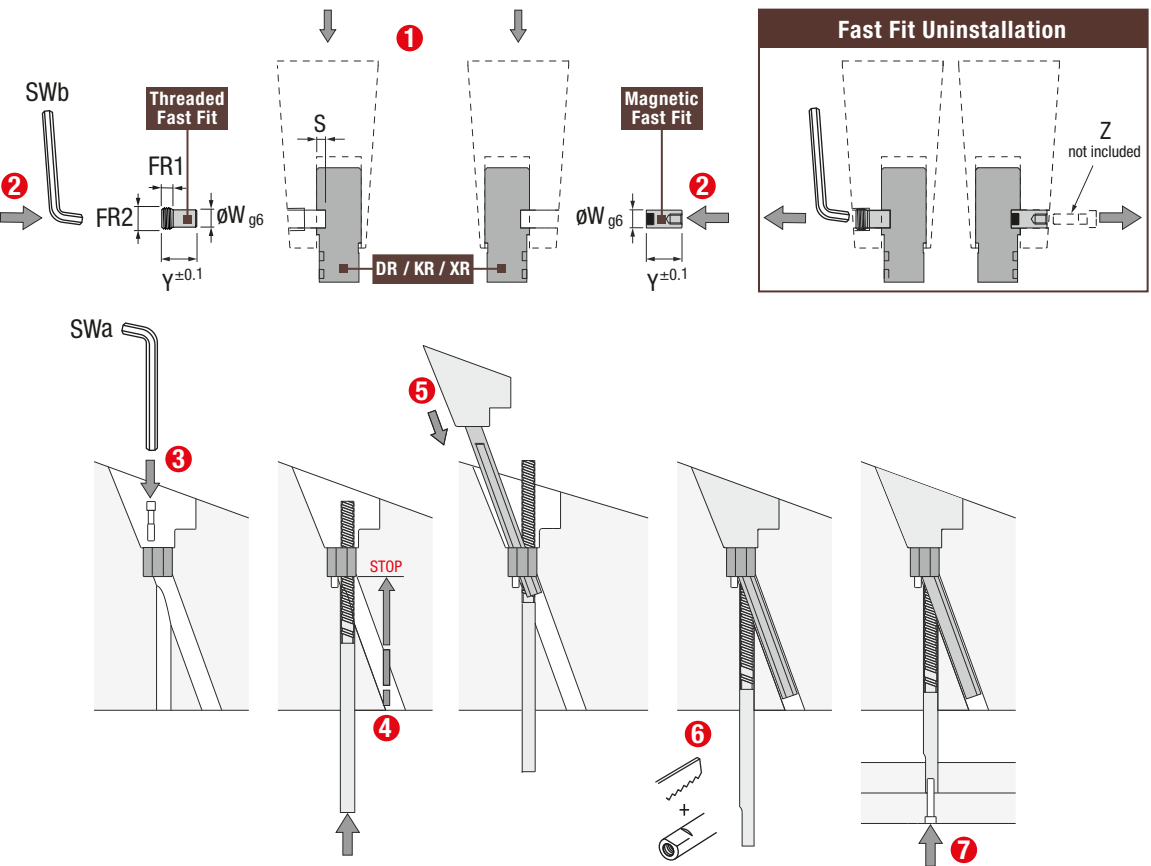
DR 28 100L - 12 -S -10 Symmetrical DR 28 100L - 12 -S +10

Core Housing



| Stroke 100   | Stroke 125                  | Stroke 200   | F  | FR1 | FR2     | G    | H    | J   | K    | M    | N   | S   | T   | W  | Y    | Z  | SWb |
|--------------|-----------------------------|--------------|----|-----|---------|------|------|-----|------|------|-----|-----|-----|----|------|----|-----|
| DR.16100L-.. | -                           | -            | 10 | 4.9 | M8x1    | 4.6  | 4.6  | 3   | 2.35 | 3    | 2.8 | 2.5 | M5  | 6  | 9    | M4 | 4   |
| DR.22100L-.. | DR.22125L-.. / KR.22125L-.. | -            | 13 | 5.3 | M10x1   | 5.6  | 5.6  | 4.2 | 3.7  | 4.2  | 3.5 | 2.5 | M6  | 8  | 12   | M4 | 5   |
| DR.28100L-.. | DR.28125L-.. / KR.28125L-.. | -            | 16 | 5.3 | M10x1   | 7.5  | 7.5  | 5   | 5.4  | 4.8  | 4.8 | 2.5 | M8  | 8  | 13.5 | M4 | 5   |
| DR.34100L-.. | DR.34125L-.. / KR.34125L-.. | -            | 16 | 5.3 | M10x1   | 10.5 | 8    | 7   | 7    | 5    | 6   | 4   | M8  | 8  | 16   | M4 | 5   |
| DR.40100L-.. | DR.40125L-.. / KR.40125L-.. | -            | 20 | 8.5 | M12x1   | 11   | 11   | 7   | 8    | 7    | 7   | 4   | M10 | 10 | 20   | M6 | 6   |
| DR.46100L-.. | DR.46125L-.. / KR.46125L-.. | -            | 25 | 8.5 | M12x1   | 13   | 13   | 8   | 8    | 9    | 9   | 5   | M12 | 10 | 24   | M6 | 6   |
| -            | -                           | KR.58200L-.. | 28 | 8.5 | M16x1.5 | 15.5 | 15.5 | 10  | 12.2 | 11.2 | 10  | 5   | M14 | 12 | 30   | M6 | 8   |
| -            | -                           | KR.76200L-.. | 36 | 14  | M16x1.5 | 21   | 21   | 13  | 15.2 | 15.2 | 12  | 6   | M18 | 12 | 36   | M6 | 8   |

Installation Guidelines



DR

UNDERCUTS



Patented

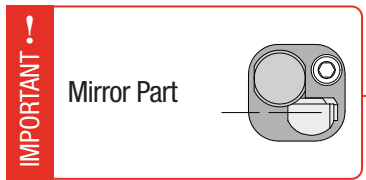
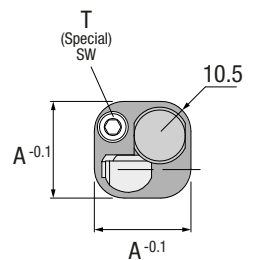
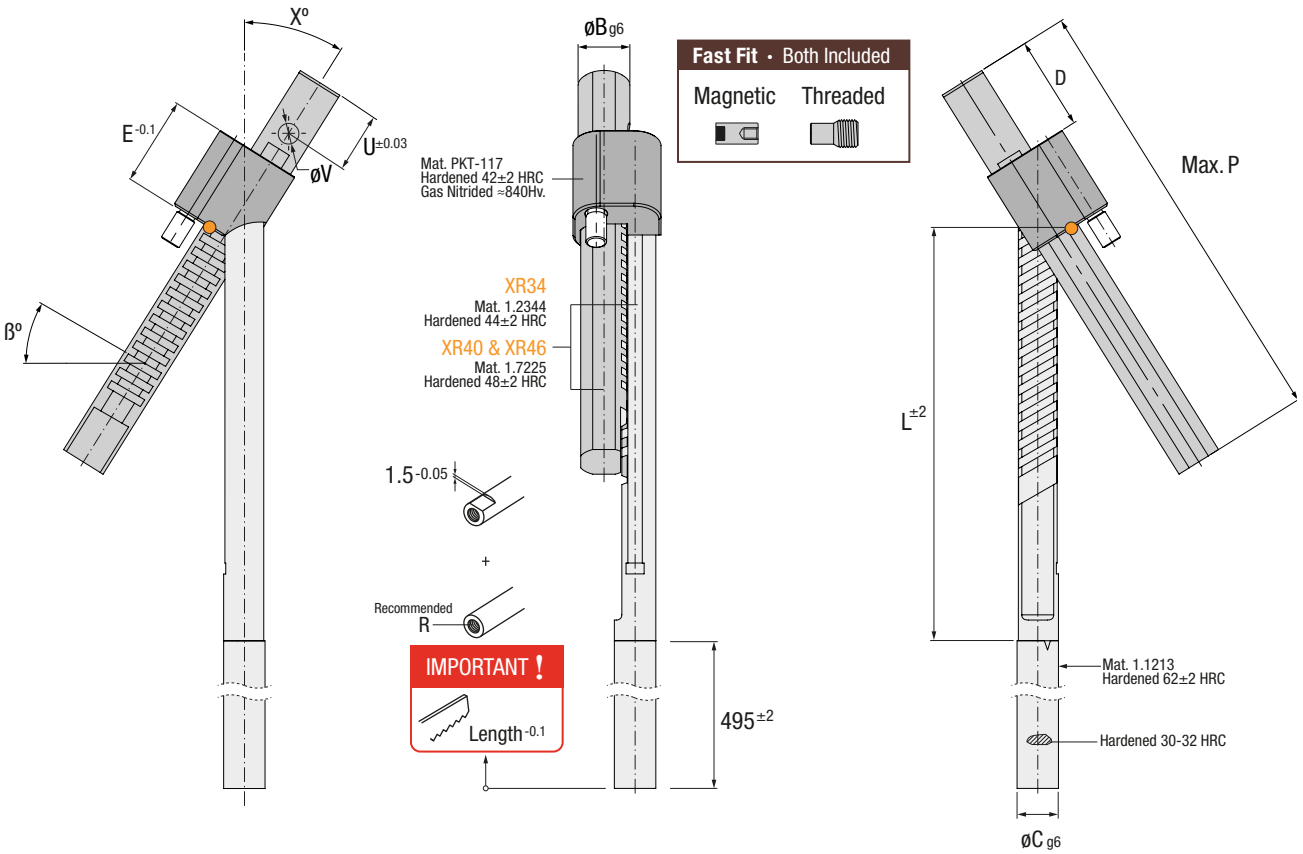
Max. 150°C

XR

UNDERCUTS



Patented  
Max. 150°C



| Stroke 100 | X°          | A  | B  | C  | D  | E  | L   | P   | R   | T   | U  | V  | Stroke 100-S | SWa |
|------------|-------------|----|----|----|----|----|-----|-----|-----|-----|----|----|--------------|-----|
| XR34100L-x | 24 28 32 36 | 34 | 20 | 16 | 36 | 34 | 159 | 225 | M8  | M8  | 23 | 8  | XR34100L-x-S | 5   |
| XR40100L-x | 24 28 32 36 | 40 | 22 | 20 | 36 | 40 | 170 | 240 | M10 | M10 | 20 | 10 | XR40100L-x-S | 6   |
| XR46100L-x | 24 28 32 36 | 46 | 24 | 24 | 42 | 46 | 174 | 255 | M10 | M12 | 26 | 10 | XR46100L-x-S | 8   |

! HOW TO ORDER

Check the end of this leaflet for Min / Max β values

β° < 0 & β° = 0

β° > 0

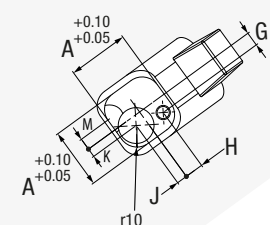
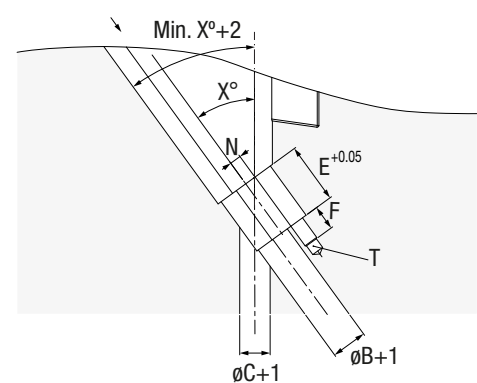
XR 34 100L - 28 -10 — Standard — XR 34 100L - 28 +10

XR 34 100L - 28 -S -10 — Symmetrical — XR 34 100L - 28 -S +10

XTREME DOUBLE RACK

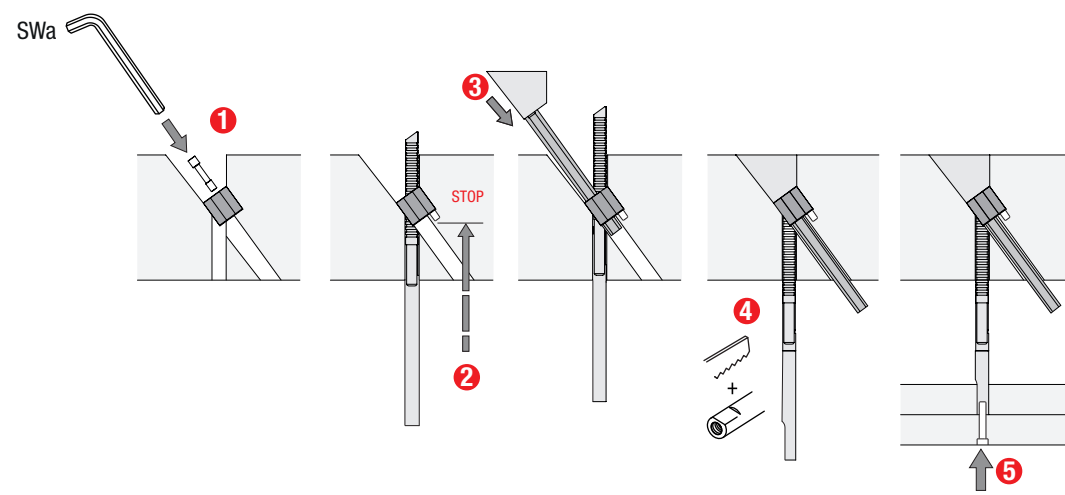
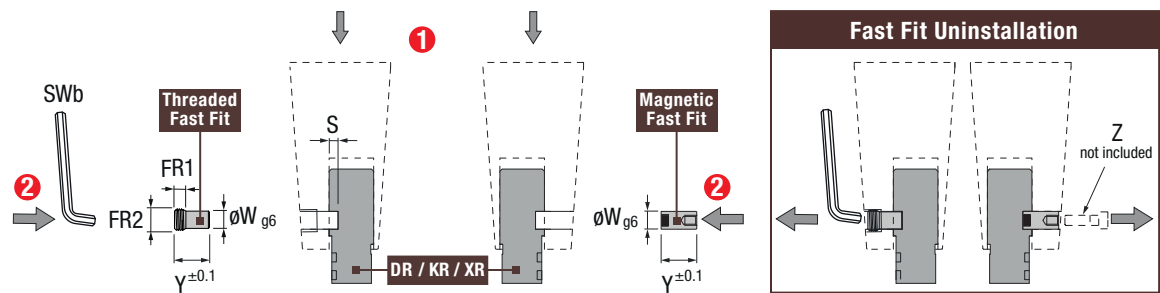
INSTALLATION GUIDELINES

Core Housing



| Stroke 100  | F  | FR1 | FR2   | G  | H    | J | K | M | N | S | T   | W  | Y  | Z  | SWb |
|-------------|----|-----|-------|----|------|---|---|---|---|---|-----|----|----|----|-----|
| XR34100L-.. | 16 | 5.3 | M10x1 | 8  | 10.5 | 6 | 5 | 7 | 6 | 4 | M8  | 8  | 16 | M4 | 5   |
| XR40100L-.. | 20 | 8.5 | M12x1 | 11 | 11   | 7 | 7 | 8 | 7 | 4 | M10 | 10 | 20 | M6 | 6   |
| XR46100L-.. | 25 | 8.5 | M12x1 | 13 | 13   | 9 | 9 | 8 | 8 | 5 | M12 | 10 | 24 | M6 | 8   |

Installation Guidelines



XR

UNDERCUTS



Patented  
Max. 150°C



PLAY

KR

UNDERCUTS



Patented  
Max.  
80°C

COOLED RACK LIFTER

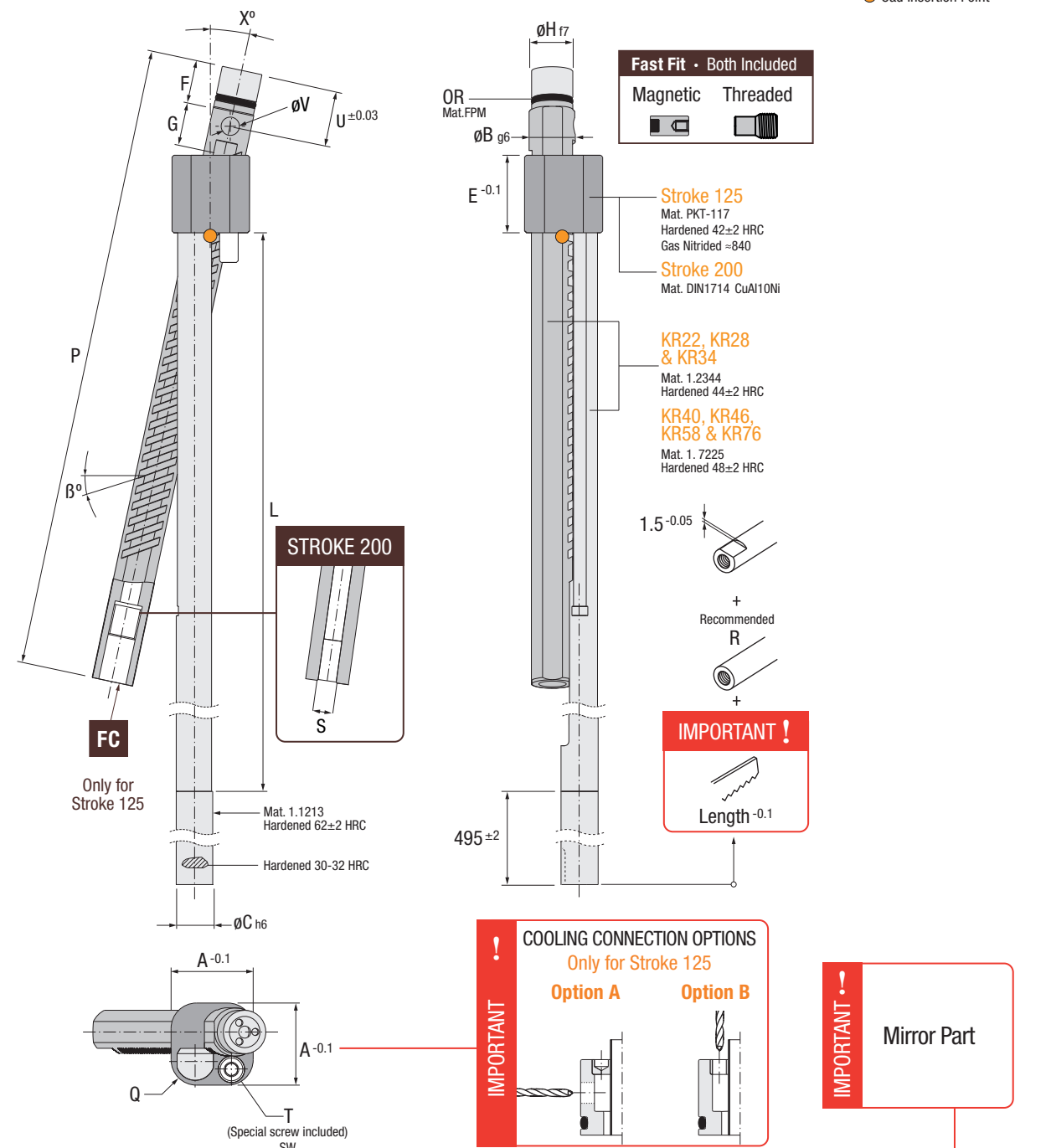
KR COOLING HOSE

FC

UNDERCUTS



Max.  
80°C



|            | Ref.        | X° |    |    |    | A  | B  | C  | E  | F  | G  | H    | L     | P   | Q    | R   | S       | T   | U  | V  | OR      | Mirror Ref. -S | SW |
|------------|-------------|----|----|----|----|----|----|----|----|----|----|------|-------|-----|------|-----|---------|-----|----|----|---------|----------------|----|
| Stroke 125 | KR.22125L-x | 8  | 12 | 16 | 20 | 22 | 12 | 12 | 22 | 16 | 20 | 10.8 | 282   | 260 | 6.5  | M6  | -       | M6  | 23 | 8  | 8x1.25  | KR.22125L-x-S  | 4  |
|            | KR.28125L-x | 8  | 12 | 16 | 20 | 28 | 16 | 14 | 28 | 16 | 20 | 13.8 | 294.5 | 272 | 8.5  | M8  | -       | M8  | 23 | 8  | 11x1.3  | KR.28125L-x-S  | 5  |
|            | KR.34125L-x | 8  | 12 | 16 | 20 | 34 | 20 | 16 | 34 | 18 | 20 | 17.8 | 311.5 | 275 | 10.5 | M8  | -       | M8  | 25 | 8  | 14x1.78 | KR.34125L-x-S  | 5  |
|            | KR.40125L-x | 8  | 12 | 16 | 20 | 40 | 22 | 20 | 40 | 20 | 25 | 19.8 | 342   | 350 | 10.5 | M10 | -       | M10 | 28 | 10 | 16x2    | KR.40125L-x-S  | 6  |
|            | KR.46125L-x | 8  | 12 | 16 | 20 | 46 | 24 | 24 | 46 | 22 | 25 | 21.8 | 361   | 350 | 10.5 | M12 | -       | M12 | 30 | 10 | 18x2    | KR.46125L-x-S  | 8  |
| Stroke 200 | KR.58200L-x | 8  | 12 | 16 | -  | 58 | 30 | 30 | 66 | 25 | 55 | 26   | 362   | 430 | 13.5 | M20 | 1/4"Gas | M14 | 60 | 12 | 21x2.5  | KR.58200L-x-S  | 12 |
|            | KR.76200L-x | 8  | 12 | 16 | -  | 76 | 40 | 40 | 80 | 30 | 60 | 34   | 392   | 470 | 17   | M24 | 3/8"Gas | M18 | 70 | 12 | 28x3    | KR.76200L-x-S  | 14 |

**HOW TO ORDER**

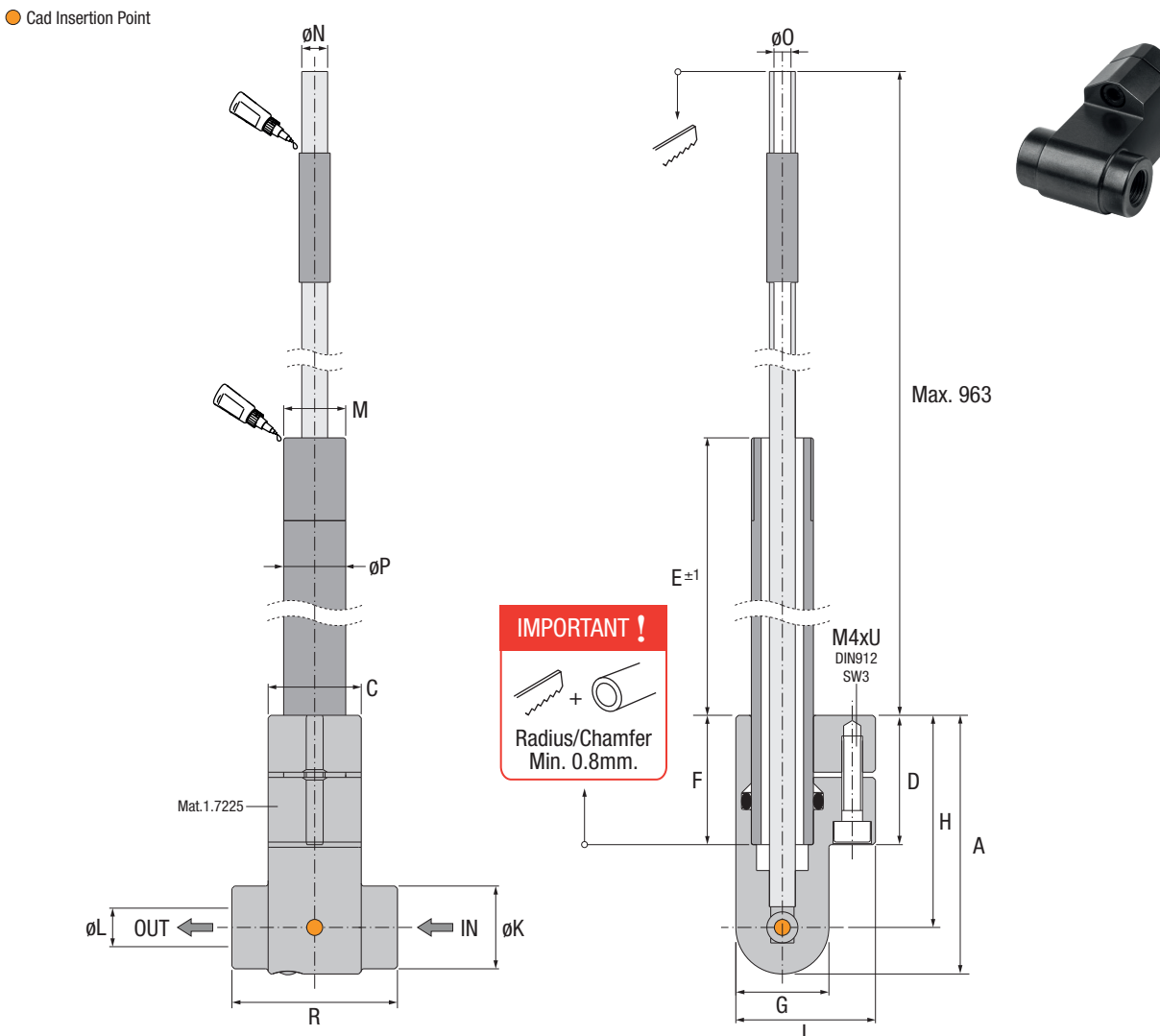
Check the end of this leaflet for Min / Max β values

β° < 0 & β° = 0      β° > 0

A    Stroke    X°    β      A    Stroke    X°    β

KR 28 125L - 12 -10 — Standard — KR 28 125L - 12 +10

KR 28 125L - 12 -S -10 — Symmetrical — KR 28 125L - 12 -S +10



| Ref.      | A  | C  | D  | E     | F    | G  | H  | J  | K  | L        | M     | N   | O   | P  | R  | U  | Compatible With       |
|-----------|----|----|----|-------|------|----|----|----|----|----------|-------|-----|-----|----|----|----|-----------------------|
| FC.220500 | 40 | 15 | 18 | 483.5 | 16.5 | 18 | 31 | 27 | 16 | 1/8" GAS | M8x1  | 3.5 | 3   | 8  | 32 | 10 | KR.22125L             |
| FC.280500 | 50 | 18 | 25 | 475   | 25   | 18 | 41 | 27 | 16 | 1/8" GAS | M10x1 | 4.5 | 4   | 10 | 32 | 16 | KR.28125L             |
| FC.340500 | 50 | 18 | 25 | 475   | 25   | 18 | 41 | 27 | 16 | 1/8" GAS | M12x1 | 5   | 4.5 | 12 | 32 | 16 | KR.34125L             |
| FC.400500 | 54 | 20 | 25 | 475   | 25   | 20 | 44 | 30 | 18 | 1/4" GAS | M14x1 | 7   | 6.5 | 14 | 40 | 16 | KR.40125L / KR.46125L |

Installation Guidelines

**IMPORTANT**

KR

β°

Q

| Ref.         | β≤0° | 0°<β≤10° | 10°<β≤20° | 20°<β≤25° | 25°<β≤30° | 30°<β≤35° |
|--------------|------|----------|-----------|-----------|-----------|-----------|
| KR.xx125L-8  | 10   | 15       | 18        | 20        | 23        | 25        |
| KR.xx125L-12 | 10   | 16       | 22        | 25        | 29        | -         |
| KR.xx125L-16 | 10   | 18       | 26        | 31        | -         | -         |
| KR.xx125L-20 | 10   | 20       | 31        | -         | -         | -         |

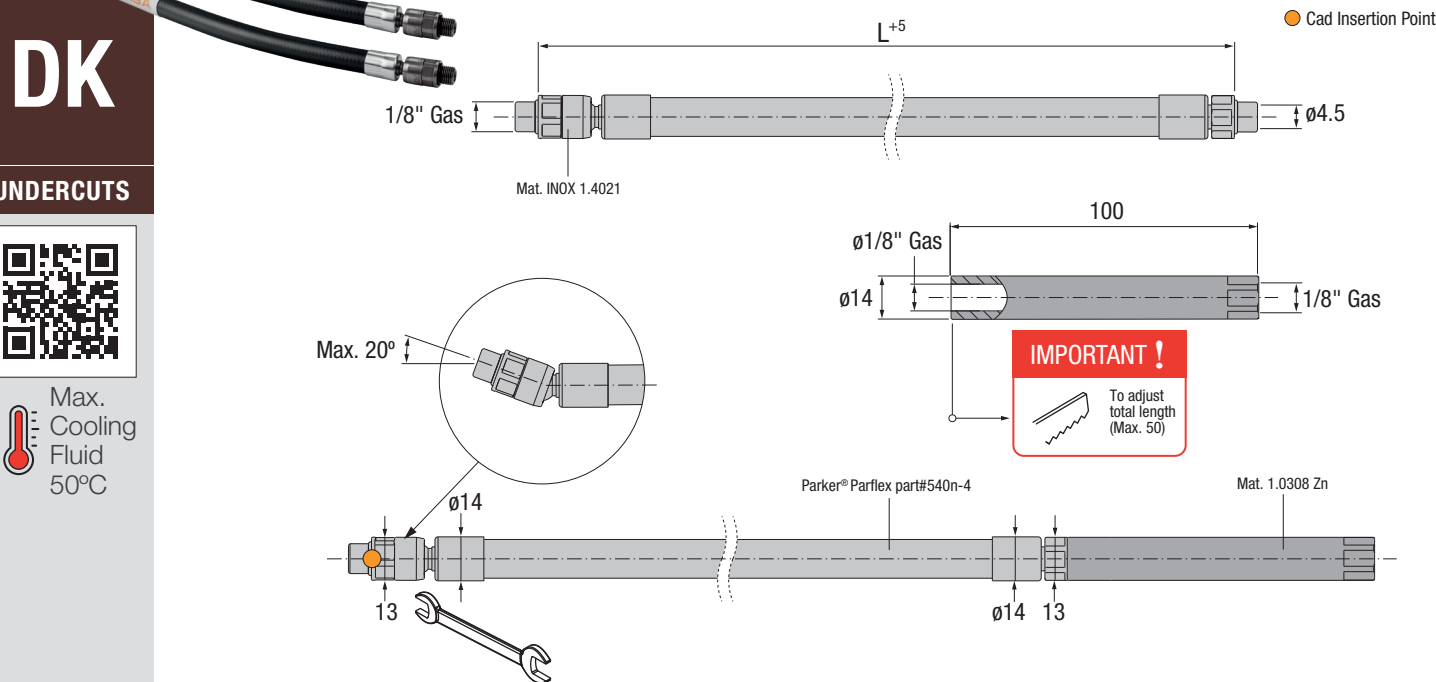
DK

UNDERCUTS



Max. Cooling Fluid 50°C

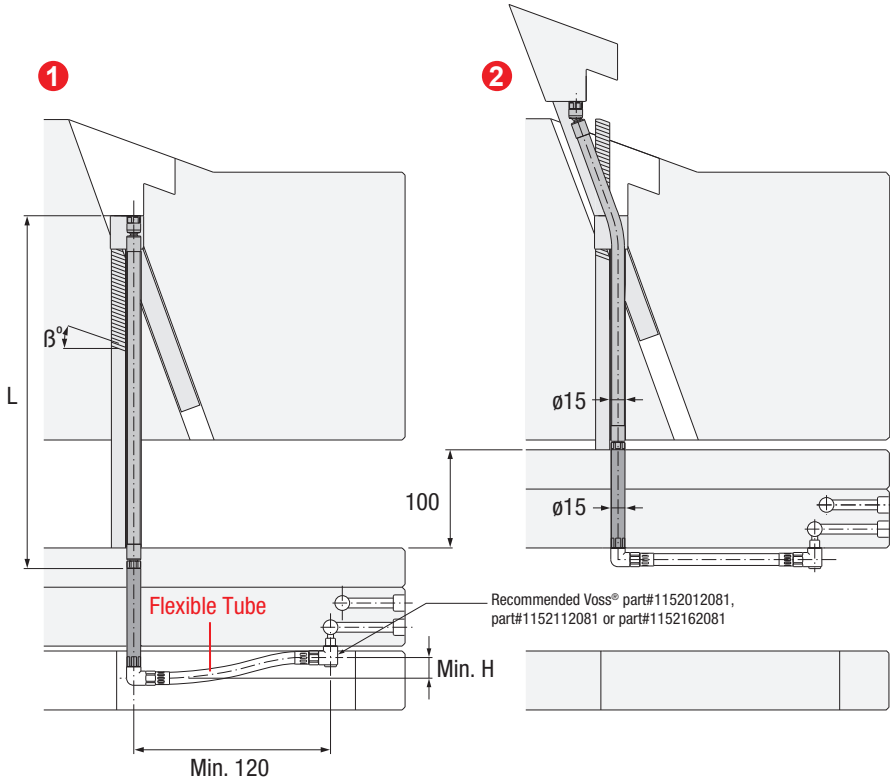
DR COOLING HOSE



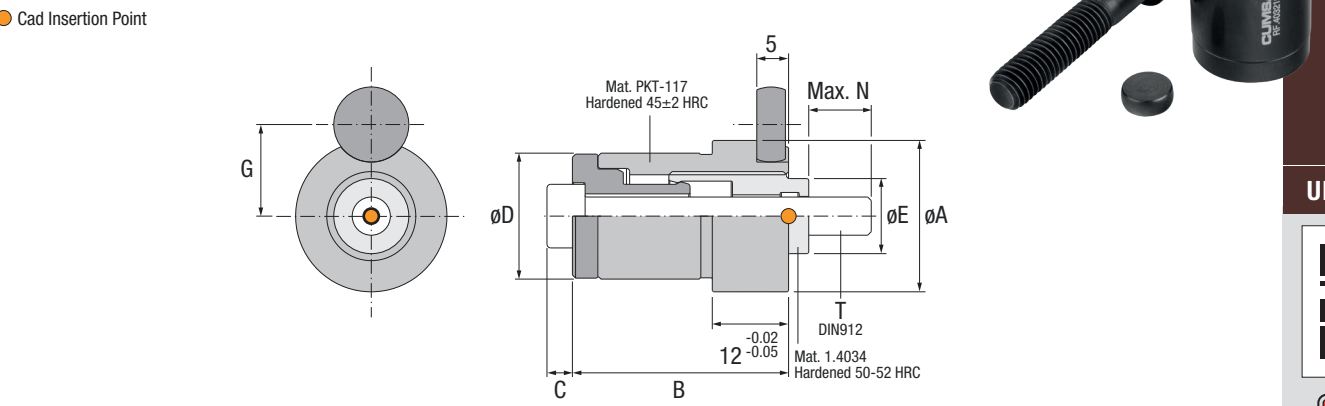
| Ref.          | β°             | H           |              |              |              |
|---------------|----------------|-------------|--------------|--------------|--------------|
|               |                | DR.xxxxxx-8 | DR.xxxxxx-12 | DR.xxxxxx-16 | DR.xxxxxx-20 |
| DK.141818-... | Negative to 0° | 10          | 10           | 10           | 10           |
|               | +1° to +9°     | 10          | 10           | 10           | 15           |
|               | +10° to +20°   | 10          | 15           | 20           | 25           |
|               | >+20°          | 15          | 20           | 25           | 30           |

**IMPORTANT !** Indicate the required **L** dimension; the length will be rounded up to the next multiple of 25mm.

Installation Guidelines

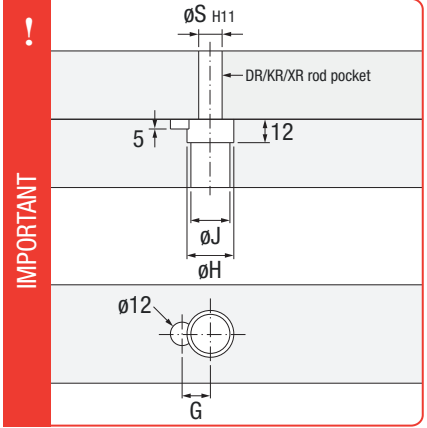
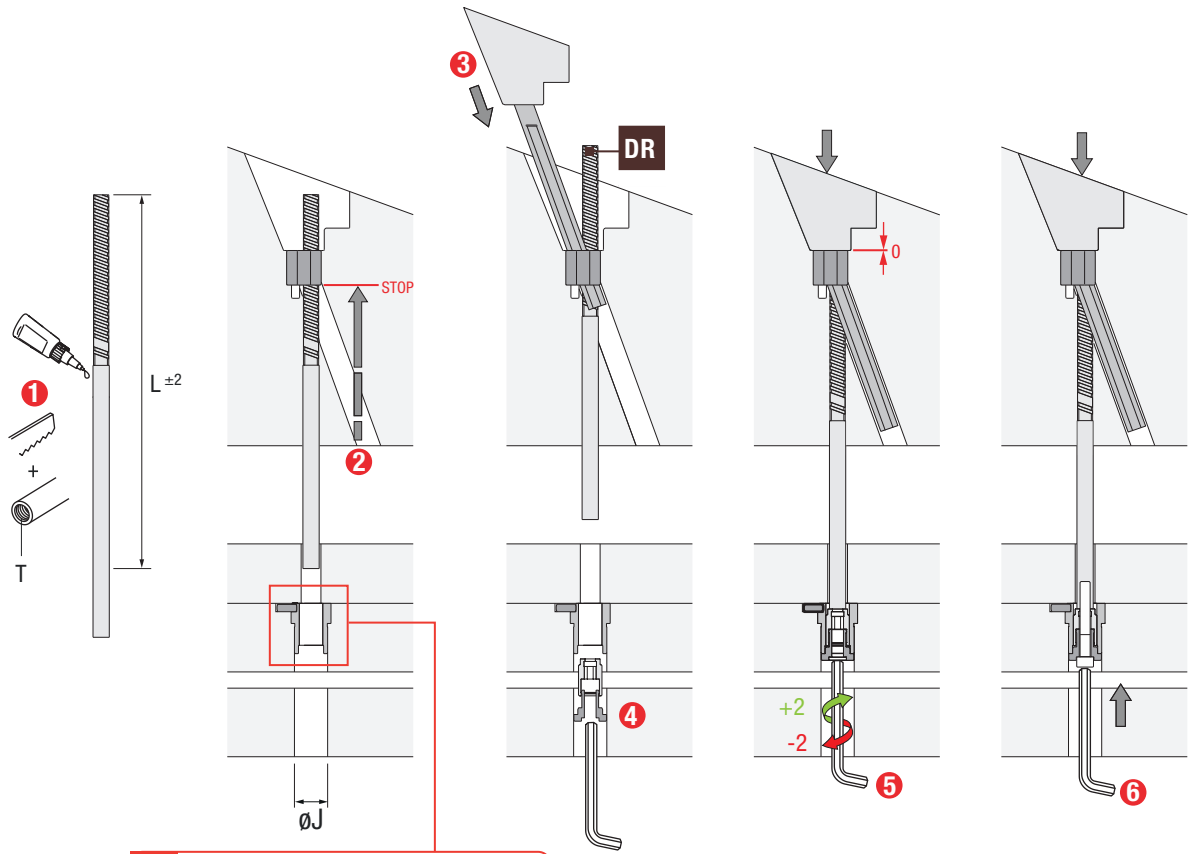


ADJUSTABLE FIXING



| Ref.      | A    | B  | C | D    | E    | G    | H  | J  | N  | T      | S     | Compatible with     |
|-----------|------|----|---|------|------|------|----|----|----|--------|-------|---------------------|
| RF.161605 | 19.8 | 34 | 3 | 15.8 | 7.8  | 12.5 | 20 | 16 | 18 | M5x45  | 8     | DR16                |
| RF.222006 | 23.8 | 34 | 4 | 19.8 | 11.8 | 14.5 | 24 | 20 | 18 | M6x45  | 12    | DR22/KR22           |
| RF.282408 | 27.8 | 42 | 0 | 23.8 | 13.8 | 16.5 | 28 | 24 | 20 | M8x50  | 14-16 | DR28/DR34/KR28/KR34 |
| RF.403210 | 35.8 | 42 | 0 | 31.8 | 19.8 | 20.5 | 36 | 32 | 24 | M10x50 | 20-24 | DR40/DR46/KR40/KR46 |

Installation Guidelines



RF

UNDERCUT



Max. 150°C



PLAY



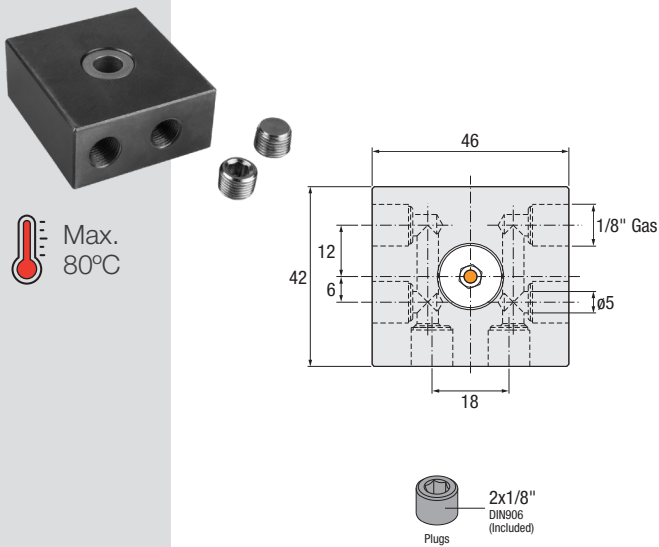
PLAY

RD

COOLING DISTRIBUTOR

UNDERCUTS

Cad Insertion Point



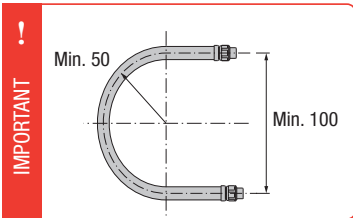
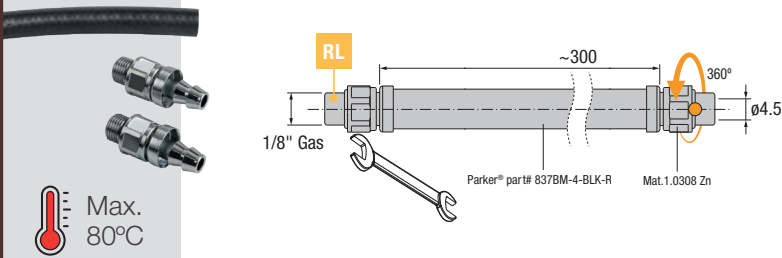
Ref.  
RD.182012

MK

CONNECTION HOSE

UNDERCUTS

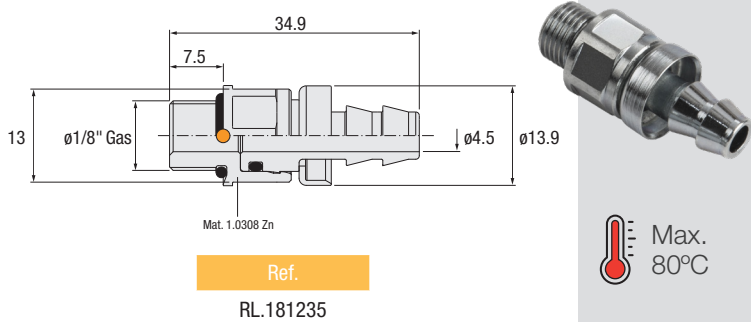
Cad Insertion Point



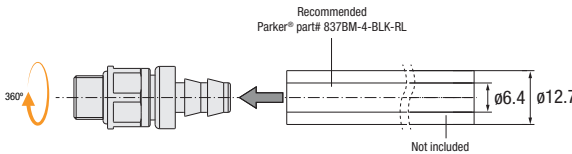
Ref.  
MK.120300

COOLING CONNECTOR

Cad Insertion Point



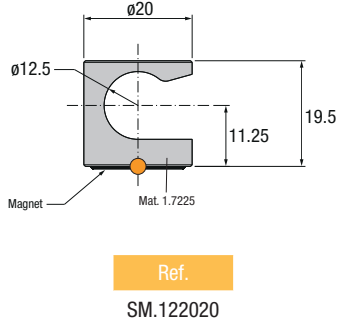
Installation Guidelines



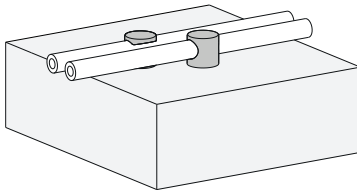
RL

HOSE RETAINER

Cad Insertion Point



Installation Guidelines



SM

ACCESSORIES

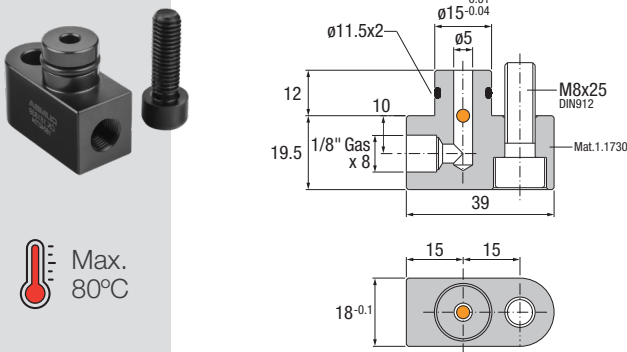


CK

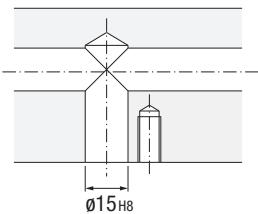
90° PLATE CONNECTOR

UNDERCUTS

Cad Insertion Point



Ref.  
CK.181839

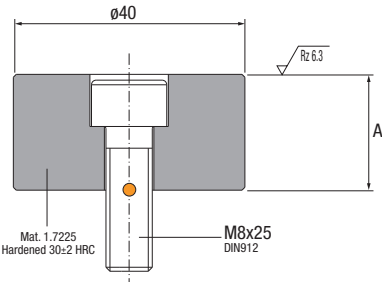


TR

EJECTOR PLATE SPACER

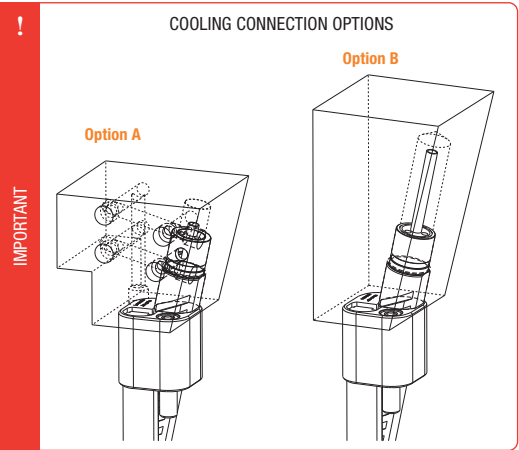
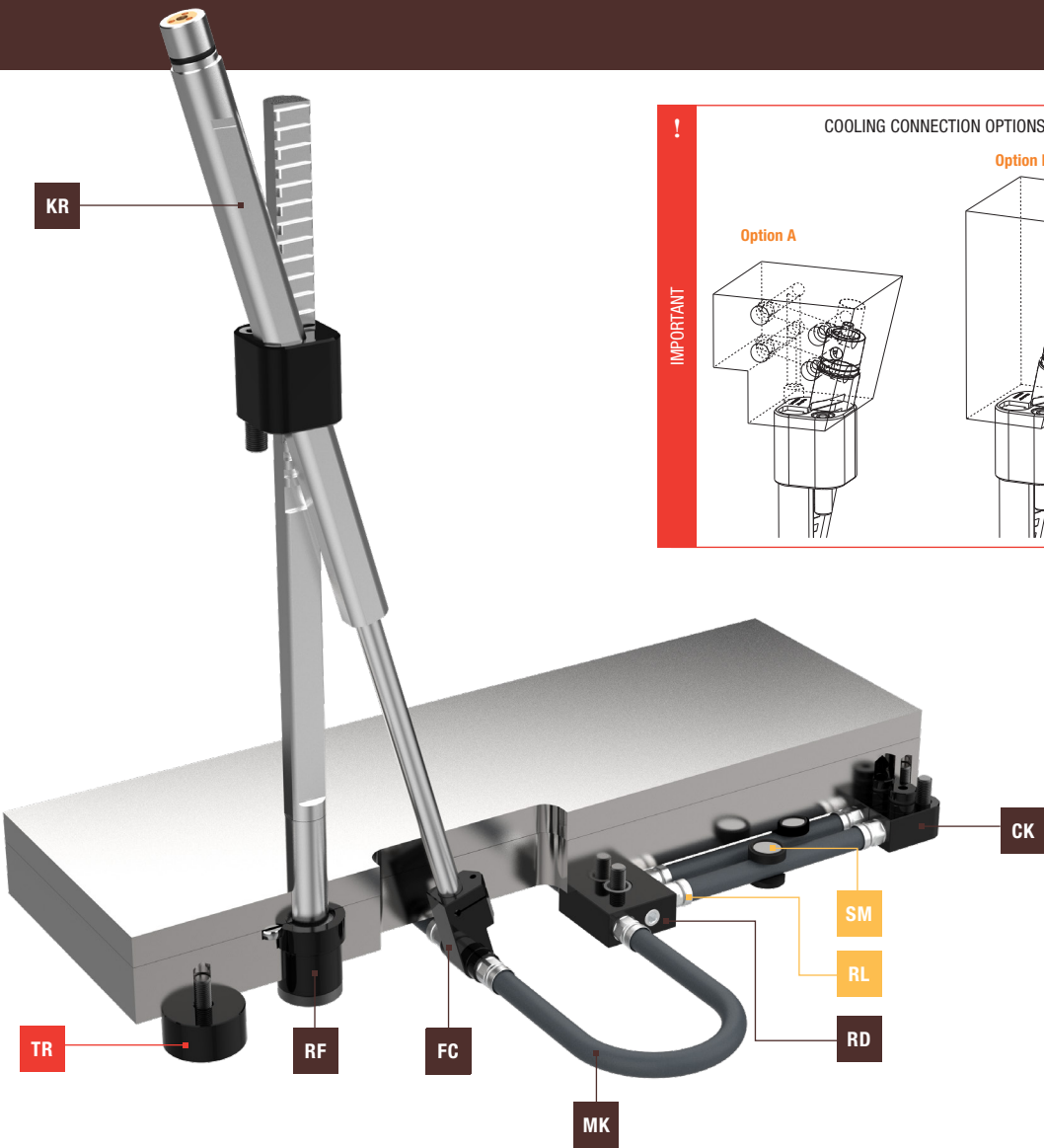
EJECTION

Cad Insertion Point



| Ref.      | A  |
|-----------|----|
| TR.204008 | 20 |
| TR.404008 | 40 |

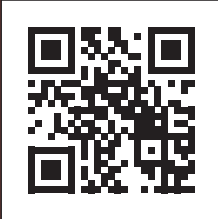
KR INSTALLATION GUIDELINES



DOUBLE RACK SYSTEM

by CUMSA

SELECTION TABLE: WHICH DR / KR / XR DO I NEED?



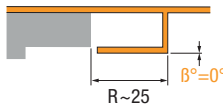
Stroke 100 (DR) Stroke 200 (KR)  
(Multiply S value x2)

| $\beta^\circ$ | DR.xx100L-8          |                      | DR.xx100L-12         |                      |
|---------------|----------------------|----------------------|----------------------|----------------------|
|               | KR.xx200L-8          |                      | KR.xx200L-12         |                      |
|               | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) |
| 0             | 14.0                 |                      | 21.2                 |                      |
| 1             | 14.0                 | 14.0                 | 21.1                 | 21.3                 |
| 2             | 13.9                 | 14.1                 | 21.1                 | 21.4                 |
| 3             | 13.9                 | 14.1                 | 21.0                 | 21.5                 |
| 4             | 13.9                 | 14.1                 | 20.9                 | 21.5                 |
| 5             | 13.8                 | 14.2                 | 20.8                 | 21.6                 |
| 6             | 13.8                 | 14.2                 | 20.7                 | 21.7                 |
| 7             | 13.8                 | 14.3                 | 20.7                 | 21.8                 |
| 8             | 13.7                 | 14.3                 | 20.6                 | 21.9                 |
| 9             | 13.7                 | 14.3                 | 20.5                 | 22.0                 |
| 10            | 13.7                 | 14.4                 | 20.4                 | 22.0                 |
| 11            | 13.6                 | 14.4                 | 20.4                 | 22.1                 |
| 12            | 13.6                 | 14.4                 | 20.3                 | 22.2                 |
| 13            | 13.6                 | 14.5                 | 20.2                 | 22.3                 |
| 14            | 13.5                 | 14.5                 | 20.1                 | 22.4                 |
| 15            | 13.5                 | 14.6                 | 20.1                 | 22.5                 |
| 16            | 13.5                 | 14.6                 | 20.0                 | 22.6                 |
| 17            | 13.4                 | 14.6                 | 19.9                 | 22.7                 |
| 18            | 13.4                 | 14.7                 | 19.8                 | 22.8                 |
| 19            | 13.4                 | 14.7                 | 19.8                 | 22.9                 |
| 20            | 13.3                 | 14.8                 | 19.7                 | 23.0                 |
| 21            | 13.3                 | 14.8                 | 19.6                 | 23.1                 |
| 22            | 13.2                 | 14.9                 | 19.5                 | 23.2                 |
| 23            | 13.2                 | 14.9                 | 19.4                 | 23.3                 |
| 24            | 13.2                 | 14.9                 | 19.4                 | 23.4                 |
| 25            | 13.1                 | 15.0                 | 19.3                 | 23.5                 |
| 26            | 13.1                 | 15.0                 | 19.2                 | 23.7                 |
| 27            | 13.1                 | 15.1                 | 19.1                 | 23.8                 |
| 28            | 13.0                 | 15.1                 | 19.0                 | 23.9                 |
| 29            | 13.0                 | 15.2                 | 19.0                 | 24.0                 |
| 30            | 12.9                 | 15.2                 | 18.9                 | 24.2                 |
| 31            | 12.9                 | 15.3                 | 18.8                 |                      |
| 32            | 12.9                 | 15.4                 | 18.7                 |                      |
| 33            | 12.8                 | 15.4                 | 18.6                 |                      |
| 34            | 12.8                 | 15.5                 | 18.5                 |                      |
| 35            | 12.7                 | 15.5                 | 18.5                 |                      |
| 36            | 12.7                 |                      | 18.4                 |                      |
| 37            | 12.7                 |                      | 18.3                 |                      |
| 38            | 12.6                 |                      | 18.2                 |                      |
| 39            | 12.6                 |                      | 18.1                 |                      |
| 40            | 12.5                 |                      | 18.0                 |                      |
| 45            | 12.3                 |                      | 17.5                 |                      |
| 50            | 12.0                 |                      | 16.9                 |                      |
| 55            | 11.7                 |                      | 16.3                 |                      |
| 60            | 11.3                 |                      | 15.5                 |                      |

Stroke 100 (DR) Stroke 200 (KR)  
(Multiply S value x2)

| $\beta^\circ$ | DR.xx100L-16         |                      | DR.xx100L-20         |                      |
|---------------|----------------------|----------------------|----------------------|----------------------|
|               | KR.xx200L-16         |                      | S (- $\beta^\circ$ ) |                      |
|               | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) |
| 0             | 28.6                 |                      | 36.4                 |                      |
| 1             | 28.5                 | 28.8                 | 36.1                 | 36.6                 |
| 2             | 28.3                 | 28.9                 | 35.9                 | 36.8                 |
| 3             | 28.2                 | 29.1                 | 35.7                 | 37.1                 |
| 4             | 28.1                 | 29.2                 | 35.4                 | 37.3                 |
| 5             | 27.9                 | 29.4                 | 35.2                 | 37.5                 |
| 6             | 27.8                 | 29.5                 | 35.0                 | 37.8                 |
| 7             | 27.7                 | 29.7                 | 34.8                 | 38.1                 |
| 8             | 27.5                 | 29.8                 | 34.6                 | 38.3                 |
| 9             | 27.4                 | 30.0                 | 34.4                 | 38.6                 |
| 10            | 27.2                 | 30.2                 | 34.2                 | 38.8                 |
| 11            | 27.1                 | 30.3                 | 33.9                 | 39.1                 |
| 12            | 27.0                 | 30.5                 | 33.7                 | 39.4                 |
| 13            | 26.8                 | 30.7                 | 33.5                 | 39.7                 |
| 14            | 26.7                 | 30.8                 | 33.3                 | 40.0                 |
| 15            | 26.6                 | 31.0                 | 33.1                 | 40.3                 |
| 16            | 26.5                 | 31.2                 | 32.9                 | 40.6                 |
| 17            | 26.3                 | 31.4                 | 32.7                 | 40.9                 |
| 18            | 26.2                 | 31.6                 | 32.5                 | 41.2                 |
| 19            | 26.1                 | 31.8                 | 32.3                 | 41.6                 |
| 20            | 25.9                 | 32.0                 | 32.1                 | 41.9                 |
| 21            | 25.8                 | 32.2                 | 31.9                 |                      |
| 22            | 25.6                 | 32.4                 | 31.7                 |                      |
| 23            | 25.5                 | 32.6                 | 31.5                 |                      |
| 24            | 25.4                 | 32.8                 | 31.3                 |                      |
| 25            | 25.2                 | 33.1                 | 31.1                 |                      |
| 26            | 25.1                 |                      | 30.9                 |                      |
| 27            | 25.0                 |                      | 30.7                 |                      |
| 28            | 24.8                 |                      | 30.4                 |                      |
| 29            | 24.7                 |                      | 30.2                 |                      |
| 30            | 24.6                 |                      | 30.0                 |                      |
| 31            | 24.4                 |                      | 29.8                 |                      |
| 32            | 24.3                 |                      | 29.6                 |                      |
| 33            | 24.1                 |                      | 29.4                 |                      |
| 34            | 24.0                 |                      | 29.2                 |                      |
| 35            | 23.8                 |                      | 29.0                 |                      |
| 36            | 23.7                 |                      | 28.7                 |                      |
| 37            | 23.5                 |                      | 28.5                 |                      |
| 38            | 23.4                 |                      | 28.3                 |                      |
| 39            | 23.2                 |                      | 28.1                 |                      |
| 40            | 23.1                 |                      | 27.8                 |                      |
| 45            | 22.2                 |                      | 26.6                 |                      |
| 50            | 21.3                 |                      | 25.1                 |                      |
| 55            | 20.3                 |                      | 23.9                 |                      |
| 60            | 19.1                 |                      | 22.3                 |                      |

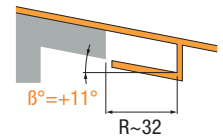
Neutral angles ( $\beta^\circ=0^\circ$ )



$S \geq R$

DR.xx100L-16  
KR.xx200L-16  
DR.xx125L-12  
KR.xx125L-12  
XR.xx100L-24

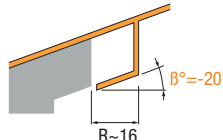
Positive Angles ( $\beta^\circ>0^\circ$ )



$S \geq R$

DR.xx100L-20  
DR.xx125L-16  
KR.xx125L-16  
XR.xx100L-24

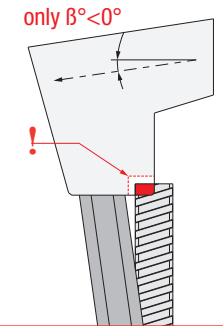
Negative Angles ( $\beta^\circ<0^\circ$ )



$S \geq R$

DR.xx100L-12  
KR.xx200 L-12  
DR.xx125L-8  
KR.xx125L-8  
XR.xx100L-24

IMPORTANT !



Special  $\beta^\circ$   
angles  
possible  
under request

Stroke 125 (DR / KR)

| $\beta^\circ$ | DR.xx125L-8          |                      | DR.xx125L-12         |                      | DR.xx125L-16         |                      | DR.xx125L-20         |                      |
|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|               | KR.xx125L-8          |                      | KR.xx125L-12         |                      | KR.xx125L-16         |                      | KR.xx125L-20         |                      |
|               | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) | S (- $\beta^\circ$ ) | S (+ $\beta^\circ$ ) |
| 0             | 17.5                 |                      | 26.5                 |                      | 35.8                 |                      | 45.4                 |                      |
| 1             | 17.5                 | 17.6                 | 26.4                 | 26.6                 | 35.6                 | 36.0                 | 45.2                 | 45.7                 |
| 2             | 17.4                 | 17.6                 | 26.3                 | 26.7                 | 35.4                 | 36.2                 | 44.9                 | 46.0                 |
| 3             | 17.4                 | 17.6                 | 26.2                 | 26.8                 | 35.3                 | 36.3                 | 44.6                 | 46.3                 |
| 4             | 17.3                 | 17.7                 | 26.1                 | 26.9                 | 35.1                 | 36.5                 | 44.3                 | 46.6                 |
| 5             | 17.3                 | 17.7                 | 26.0                 | 27.0                 | 34.9                 | 36.7                 | 44.0                 | 46.9                 |
| 6             | 17.3                 | 17.8                 | 25.9                 | 27.1                 | 34.7                 | 36.9                 | 43.8                 | 47.3                 |
| 7             | 17.2                 | 17.8                 | 25.8                 | 27.2                 | 34.6                 | 37.1                 | 43.5                 | 47.6                 |
| 8             | 17.2                 | 17.9                 | 25.7                 | 27.3                 | 34.4                 | 37.3                 | 43.2                 | 47.9                 |
| 9             | 17.1                 | 17.9                 | 25.7                 | 27.4                 | 34.2                 | 37.5                 | 43.0                 | 48.2                 |
| 10            | 17.1                 | 18.0                 | 25.6                 | 27.6                 | 34.1                 | 37.7                 | 42.7                 | 48.6                 |
| 11            | 17.1                 | 18.0                 | 25.5                 | 27.7                 | 33.9                 | 37.9                 | 42.4                 | 48.9                 |
| 12            | 17.0                 | 18.1                 | 25.4                 | 27.8                 | 33.7                 | 38.1                 | 42.2                 | 49.3                 |
| 13            | 17.0                 | 18.1                 | 25.3                 | 27.9                 | 33.6                 | 38.3                 | 41.9                 | 49.6                 |
| 14            | 16.9                 | 18.2                 | 25.2                 | 28.0                 | 33.4                 | 38.6                 | 41.7                 | 50.0                 |
| 15            | 16.9                 | 18.2                 | 25.1                 | 28.1                 | 33.2                 | 38.8                 | 41.4                 | 50.4                 |
| 16            | 16.8                 | 18.3                 | 25.0                 | 28.2                 | 33.1                 | 39.0                 | 41.1                 | 50.7                 |
| 17            | 16.8                 | 18.3                 | 24.9                 | 28.4                 | 32.9                 | 39.2                 | 40.9                 | 51.1                 |
| 18            | 16.8                 | 18.4                 | 24.8                 | 28.5                 | 32.7                 | 39.5                 | 40.6                 | 51.5                 |
| 19            | 16.7                 | 18.4                 | 24.7                 | 28.6                 | 32.6                 | 39.7                 | 40.4                 | 52.0                 |
| 20            | 16.7                 | 18.5                 | 24.6                 | 28.7                 | 32.4                 | 40.0                 | 40.1                 | 52.4                 |
| 21            | 16.6                 | 18.5                 | 24.5                 | 28.9                 | 32.2                 | 40.2                 | 39.9                 |                      |
| 22            | 16.6                 | 18.6                 | 24.4                 | 29.0                 | 32.1                 | 40.5                 | 39.6                 |                      |
| 23            | 16.5                 | 18.6                 | 24.3                 | 29.2                 | 31.9                 | 40.8                 | 39.4                 |                      |
| 24            | 16.5                 | 18.7                 | 24.2                 | 29.3                 | 31.7                 | 41.0                 | 39.1                 |                      |
| 25            | 16.4                 | 18.7                 | 24.1                 | 29.4                 | 31.6                 | 41.3                 | 38.8                 |                      |
| 26            | 16.4                 | 18.8                 | 24.0                 | 29.6                 | 31.4                 |                      | 38.6                 |                      |
| 27            | 16.3                 | 18.9                 | 23.9                 | 29.7                 | 31.2                 |                      | 38.3                 |                      |
| 28            | 16.3                 | 18.9                 | 23.8                 | 29.9                 | 31.1                 |                      | 38.1                 |                      |
| 29            | 16.2                 | 19.0                 | 23.7                 | 30.1                 | 30.9                 |                      | 37.8                 |                      |
| 30            | 16.2                 | 19.1                 | 23.6                 | 30.2                 | 30.7                 |                      | 37.5                 |                      |
| 31            | 16.1                 | 19.1                 | 23.5                 |                      | 30.5                 |                      | 37.3                 |                      |
| 32            | 16.1                 | 19.2                 | 23.4                 |                      | 30.3                 |                      | 37.0                 |                      |
| 33            | 16.0                 | 19.3                 | 23.3                 |                      | 30.2                 |                      | 36.7                 |                      |
| 34            | 16.0                 | 19.4                 | 23.2                 |                      | 30.0                 |                      | 36.5                 |                      |
| 35            | 15.9                 | 19.4                 | 23.1                 |                      | 29.8                 |                      | 36.2                 |                      |
| 36            | 15.9                 |                      | 23.0                 |                      | 29.6                 |                      | 35.9                 |                      |
| 37            | 15.8                 |                      | 22.9                 |                      | 29.4                 |                      | 35.7                 |                      |
| 38            | 15.8                 |                      | 22.7                 |                      | 29.2                 |                      | 35.4                 |                      |
| 39            | 15.7                 |                      | 22.6                 |                      | 29.0                 |                      | 35.1                 |                      |
| 40            | 15.7                 |                      | 22.5                 |                      | 28.8                 |                      | 34.8                 |                      |
| 45            | 15.4                 |                      | 21.9                 |                      | 27.8                 |                      | 33.3                 |                      |
| 50            | 15.0                 |                      | 21.1                 |                      | 26.7                 |                      | 31.7                 |                      |
| 55            | 14.6                 |                      | 20.3                 |                      | 25.4                 |                      | 29.9                 |                      |
| 60            | 14.1                 |                      | 19.4                 |                      | 23.9                 |                      | 27.9                 |                      |

Stroke 100 (XR)

| β° | XRxx100L-24 |            | XRxx100L-28 |            | XRxx100L-32 |            | XRxx100L-36 |            |
|----|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
|    | S<br>(-β°)  | S<br>(+β°) | S<br>(-β°)  | S<br>(+β°) | S<br>(-β°)  | S<br>(+β°) | S<br>(-β°)  | S<br>(+β°) |
| 0  | 44.5        |            | 53.2        |            | 62.5        |            | 72.7        |            |
| 1  | 44.2        | 44.9       | 52.7        | 53.7       | 61.8        | 63.2       | 71.7        | 73.6       |
| 2  | 43.8        | 45.2       | 52.2        | 54.2       | 61.2        | 63.9       | 70.9        | 74.5       |
| 3  | 43.5        | 45.6       | 51.7        | 54.7       | 60.5        | 64.6       | 70.0        | 75.5       |
| 4  | 43.2        | 46.0       | 51.3        | 55.2       | 59.9        | 65.3       | 69.1        | 76.5       |
| 5  | 42.9        | 46.3       | 50.8        | 55.8       | 59.2        | 66.1       | 68.3        | 77.6       |
| 6  | 42.5        | 46.7       | 50.4        | 56.3       | 58.6        | 66.9       | 67.5        | 78.7       |
| 7  | 42.2        | 47.1       | 49.9        | 56.9       | 58.0        | 67.7       | 66.7        | 79.8       |
| 8  | 41.9        | 47.5       | 49.5        | 57.5       | 57.4        | 68.5       | 65.9        |            |
| 9  | 41.6        | 47.9       | 49.0        | 58.1       | 56.9        | 69.4       | 65.2        |            |
| 10 | 41.3        | 48.3       | 48.6        | 58.7       | 56.3        | 70.2       | 64.4        |            |
| 11 | 41.0        | 48.7       | 48.2        | 59.3       | 55.7        | 71.1       | 63.7        |            |
| 12 | 40.7        | 49.2       | 47.8        | 59.9       | 55.2        |            | 62.9        |            |
| 13 | 40.4        | 49.6       | 47.4        | 60.6       | 54.6        |            | 62.2        |            |
| 14 | 40.1        | 50.1       | 46.9        | 61.3       | 54.1        |            | 61.5        |            |
| 15 | 39.8        | 50.6       | 46.5        | 62.0       | 53.5        |            | 60.8        |            |
| 16 | 39.5        | 51.0       | 46.1        |            | 53.0        |            | 60.1        |            |
| 17 | 39.2        | 51.5       | 45.7        |            | 52.5        |            | 59.4        |            |
| 18 | 38.9        | 52.1       | 45.3        |            | 51.9        |            | 58.8        |            |
| 19 | 38.6        | 52.6       | 44.9        |            | 51.4        |            | 58.1        |            |
| 20 | 38.3        |            | 44.5        |            | 50.9        |            | 57.5        |            |
| 21 | 38.0        |            | 44.2        |            | 50.4        |            | 56.8        |            |
| 22 | 37.7        |            | 43.8        |            | 49.9        |            | 56.2        |            |
| 23 | 37.4        |            | 43.4        |            | 49.4        |            | 55.5        |            |
| 24 | 37.2        |            | 43.0        |            | 48.9        |            | 54.9        |            |
| 25 | 36.9        |            | 42.6        |            | 48.4        |            | 54.3        |            |
| 26 | 36.6        |            | 42.2        |            | 47.9        |            | 53.6        |            |
| 27 | 36.3        |            | 41.8        |            | 47.4        |            | 53.0        |            |
| 28 | 36.0        |            | 41.5        |            | 46.9        |            | 52.4        |            |
| 29 | 35.7        |            | 41.1        |            | 46.4        |            | 51.8        |            |
| 30 | 35.4        |            | 40.7        |            | 45.9        |            | 51.2        |            |
| 31 | 35.1        |            | 40.3        |            | 45.4        |            | 50.6        |            |
| 32 | 34.8        |            | 39.9        |            | 44.9        |            | 50.0        |            |
| 33 | 34.5        |            | 39.5        |            | 44.4        |            | 49.4        |            |
| 34 | 34.2        |            | 39.1        |            | 44.0        |            | 48.8        |            |
| 35 | 33.9        |            | 38.7        |            | 43.5        |            | 48.2        |            |
| 36 | 33.6        |            | 38.4        |            | 43.0        |            | 47.6        |            |
| 37 | 33.3        |            | 38.0        |            | 42.5        |            | 46.9        |            |
| 38 | 33.0        |            | 37.6        |            | 42.0        |            | 46.3        |            |
| 39 | 32.7        |            | 37.2        |            | 41.5        |            | 45.7        |            |
| 40 | 32.4        |            | 36.8        |            | 41.0        |            | 45.1        |            |
| 45 | 30.8        |            | 34.7        |            | 38.4        |            | 42.0        |            |
| 50 | 29.0        |            | 32.5        |            | 35.8        |            | 38.9        |            |
| 55 | 27.2        |            | 30.2        |            | 33.0        |            | 35.6        |            |
| 60 | 25.1        |            | 27.6        |            | 30.0        |            | 32.1        |            |

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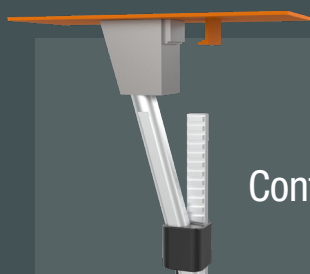
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