

# KVT ORIFICE RESTRICTORS PRECISION FLOW CONTROL



SOLUTIONEERING GROUP



JOINED TO LAST.



# ORIFICE RESTRICTORS - EXPANSION

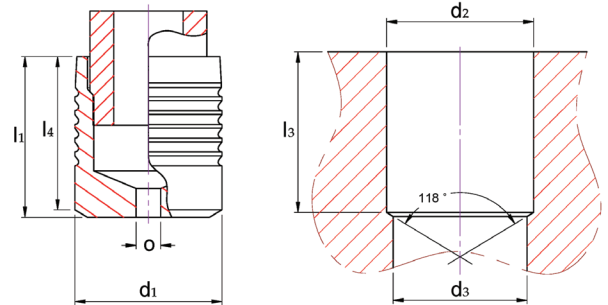
## EXPANSION TYPE

Part number key:

XXX is orifice size, for example 127  
(for 1.27 mm) or 050 (for .050")

All Threaded Expansion Restrictors are made of  
300 Series stainless steel material

Dimensions must be referred to in all Metric or  
all Standard, as seen below.



## METRIC SERIES (Dimensions listed in millimeters)

Part Number	d <sub>1</sub>	l <sub>1</sub> +/- .15mm	l <sub>4</sub> +/- .15mm	0 +/- .025mm Orifice Size	d <sub>2</sub> + .10 / -0mm	l <sub>3</sub> min.	d <sub>3</sub> max.
RE-040-XXX	4.00/-03	4.01	3.71	0.50 – 1.25	4.00	3.86	3.3
RE-050-XXX	5.00/-03	5.51	5.21	0.50 – 1.90	5.00	5.36	4.3
RE-060-XXX	6.00/-03	6.51	6.20	0.50 – 2.50	6.00	6.35	5.3
RE-070-XXX	7.00/-04	7.51	7.21	0.50 – 3.30	7.00	7.36	6.2
RE-080-XXX	8.00/-04	8.51	8.20	0.50 – 3.80	8.00	8.35	7.2
RE-090-XXX	9.00/-04	10.01	9.70	0.50 – 4.30	9.00	9.85	8.2
RE-100-XXX	10.00/-04	11.02	10.72	0.50 – 4.95	10.00	10.87	9.2
RE-120-XXX	12.00/-04	13.00	12.70	0.50 – 6.10	12.00	12.87	11.0
RE-140-XXX	14.00/-04	15.01	14.40	0.50 – 7.10	14.00	14.55	13.0

## ENGLISH SERIES (Dimensions listed in inches)

Part Number	d <sub>1</sub>	l <sub>1</sub> +/- .008"	l <sub>4</sub> +/- .008"	0 +/- .001" Orifice Size	d <sub>2</sub> + .004 / -0"	l <sub>3</sub> min.	d <sub>3</sub> max.
RE-156-XXX	.1563/-0013	0.158	0.146	0.020 – 0.050	0.1563	0.154	0.130
RE-187-XXX	.1875/-0013	0.217	0.205	0.020 – 0.070	0.1875	0.213	0.160
RE-218-XXX	.2188/-0013	0.217	0.205	0.020 – 0.085	0.2188	0.213	0.190
RE-250-XXX	.2500/-0013	0.256	0.244	0.020 – 0.105	0.2500	0.252	0.220
RE-281-XXX	.2813/-0015	0.296	0.284	0.020 – 0.130	0.2813	0.292	0.250
RE-312-XXX	.3125/-0015	0.335	0.323	0.020 – 0.150	0.3125	0.331	0.281
RE-343-XXX	.3438/-0015	0.394	0.382	0.020 – 0.160	0.3438	0.390	0.312
RE-375-XXX	.3750/-0015	0.394	0.382	0.020 – 0.180	0.3750	0.390	0.343
RE-406-XXX	.4063/-0015	0.434	0.422	0.020 – 0.195	0.4063	0.430	0.375
RE-437-XXX	.4375/-0015	0.512	0.500	0.020 – 0.220	0.4375	0.508	0.406
RE-468-XXX	.4688/-0018	0.512	0.500	0.020 – 0.240	0.4688	0.508	0.437
RE-562-XXX	.5625/-0018	0.591	0.567	0.020 – 0.290	0.5625	0.575	0.510



## ORIFICE RESTRICTORS - THREADED

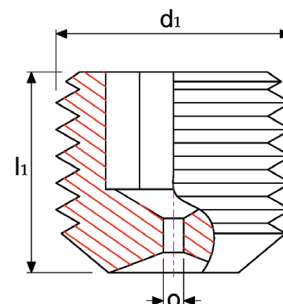
### THREADED TYPE

Part number key:

XXX is orifice size, for example 127  
(for 1.27 mm) or 050 (for .050")

All Threaded Expansion Restrictors are made of  
300 Series stainless steel material.

Dimensions must be referred to in all Metric or  
all Standard, as seen below.



### METRIC SERIES (Dimensions listed in millimeters)

Part Number	Screw Thread Sizes	0 +/- .025mm Orifice Size	Nominal $d_1$	Nominal $l_1$	Hex Key Size
RT-040-XXX	M4 x .7	0.50 – 0.90	4.00	4.00	2
RT-050-XXX	M5 x .8	0.50 – 1.40	5.00	5.00	2.5
RT-060-XXX	M6 x 1	0.50 – 1.90	6.00	6.00	3
RT-080-XXX	M8 x 1.25	0.50 – 2.90	8.00	8.00	4
RT-100-XXX	M10 x 1.5	0.50 – 3.95	10.00	10.00	5
RT-120-XXX	M12 x 1.75	0.50 – 4.95	12.00	12.00	6

### ENGLISH SERIES (Dimensions listed in inches)

Part Number	Screw Thread Sizes	0 +/- .001" Orifice Size	Nominal $d_1$	Nominal $l_1$	Hex Key Size
RT-164-XXX	8 – 32	0.020 – 0.035	0.164	0.188	5/64
RT-190-XXX	10 – 32	0.020 – 0.050	0.190	0.188	3/32
RT-250-XXX	1/4" – 28	0.020 – 0.085	0.250	0.250	1/8
RT-312-XXX	5/16" – 24	0.020 – 0.115	0.312	0.313	5/32
RT-375-XXX	3/8" – 24	0.020 – 0.145	0.375	0.375	3/16
RT-437-XXX	7/16" – 20	0.020 – 0.175	0.437	0.375	7/32
RT-500-XXX	1/2" – 20	0.020 – 0.210	0.500	0.500	1/4

### NPTF SERIES: PER SAE J531 (Dimensions listed in inches)

Part Number	NPTF Pipe Thread Sizes	0 +/- .001" Orifice Size	Nominal $d_1$	Nominal $l_1$	Hex Key Size
RP-062-XXX	1/16" – 27 NPTF	0.020 – 0.115	0.312	0.300	5/32
RP-125-XXX	1/8" – 27 NPTF	0.020 – 0.145	0.405	0.300	3/16
RP-250-XXX	1/4" – 18 NPTF	0.020 – 0.210	0.540	0.460	1/4
RP-375-XXX	3/8" – 18 NPTF	0.020 – 0.270	0.675	0.460	5/16

KVT threaded and expansion restrictors are currently used in numerous diverse applications such as consumer goods, robotics, agriculture equipment, and various fluid power and hydraulic applications. The Innovative expansion restrictor is designed for tamper-proof performance, and KVT threaded restrictors are conveniently available in various sizes to seamlessly integrate with any design. And while KVT offers restrictors in a wide variety of sizes and styles, your application may require special attention – please contact one of our Application Engineers to discuss your custom requirements.

KVT provides several restrictor options for different application requirements and you determine the orifice size in the restrictor. This allows you to have complete design control – expansion and threaded restrictors are custom-made to meet your orifice

performance requirements. As with any component in your system design, there are many technical factors to consider. This is one method for calculating orifice diameter for the KVT restrictor products.

- › This equation was derived by rearranging Bernoulli's Equation and using a Coefficient of Discharge (Cd)
- › The Coefficient of Discharge (Cd) accounts for pressure losses resulting from factors such as orifice geometry, turbulence near the orifice hole, the length of the orifice hole, and flow dynamics.
- › This equation for calculating the restrictor orifice diameters should be used as reference only. KVT recommends that you perform testing in the actual application environment to determine the flow constant.
- › This equation is intended as a guide for fluid applications only; it is not applicable for gas flow applications.

## Metric

To calculate restrictor orifice diameter in mm:

$$d_{\text{orifice}} \sim \sqrt{2.144Q \left( \sqrt{\frac{SG}{\Delta P}} \right)}$$

Where:

- $d_{\text{orifice}}$  › Orifice diameter, measured in mm
- Q › Fluid flowrate, measured in liters / minute
- $\Delta P$  › Fluid pressure difference across the restrictor, measured in bar
- SG › Specific gravity of the fluid
- 2.144 › Constant = Unit conversion factor x Cd

## English

To calculate restrictor orifice diameter in inches:

$$d_{\text{orifice}} \sim \sqrt{\frac{Q}{20.89} \left( \sqrt{\frac{SG}{\Delta P}} \right)}$$

Where:

- $d_{\text{orifice}}$  › Orifice diameter, measured in inches
- Q › Fluid flow rate, measured in gallons per minute (GPM)
- $\Delta P$  › Fluid pressure difference across the restrictor, measured in PSI
- SG › Specific gravity of the fluid
- 20.89 › Constant = Unit conversion factor x Cd



**KVT-Koenig AG**  
Zürich | Switzerland



**KVT-Koenig Sp. z o.o.**  
Gdańsk | Poland



**KVT-Koenig d.o.o.**  
Ljubljana | Slovenia



**KVT-Koenig GmbH**  
Illerrieden | Germany



**KVT-Koenig S.R.L.**  
Bucharest | Romania



**KVT-Koenig s.r.o.**  
Brno | Czech Republic



**KVT-Koenig GmbH**  
Linz | Austria



**KVT-Koenig spol. s.r.o.**  
Bratislava | Slovakia



**KVT-Koenig Kft.**  
Budapest | Hungary



**KVT-Koenig China**  
Beijing | P.R.C.



**KVT-Koenig Brazil Ltda**  
São Paulo | Brazil



**KVT-Koenig LLC**  
73 Defco Park Road  
North Haven, CT 06473 | USA  
Phone +1 203 245 1100  
Fax +1 203 245 3072  
info-US@kvt-koenig.com

› [www.kvt-koenig.com](http://www.kvt-koenig.com)

**JOINED TO LAST.**