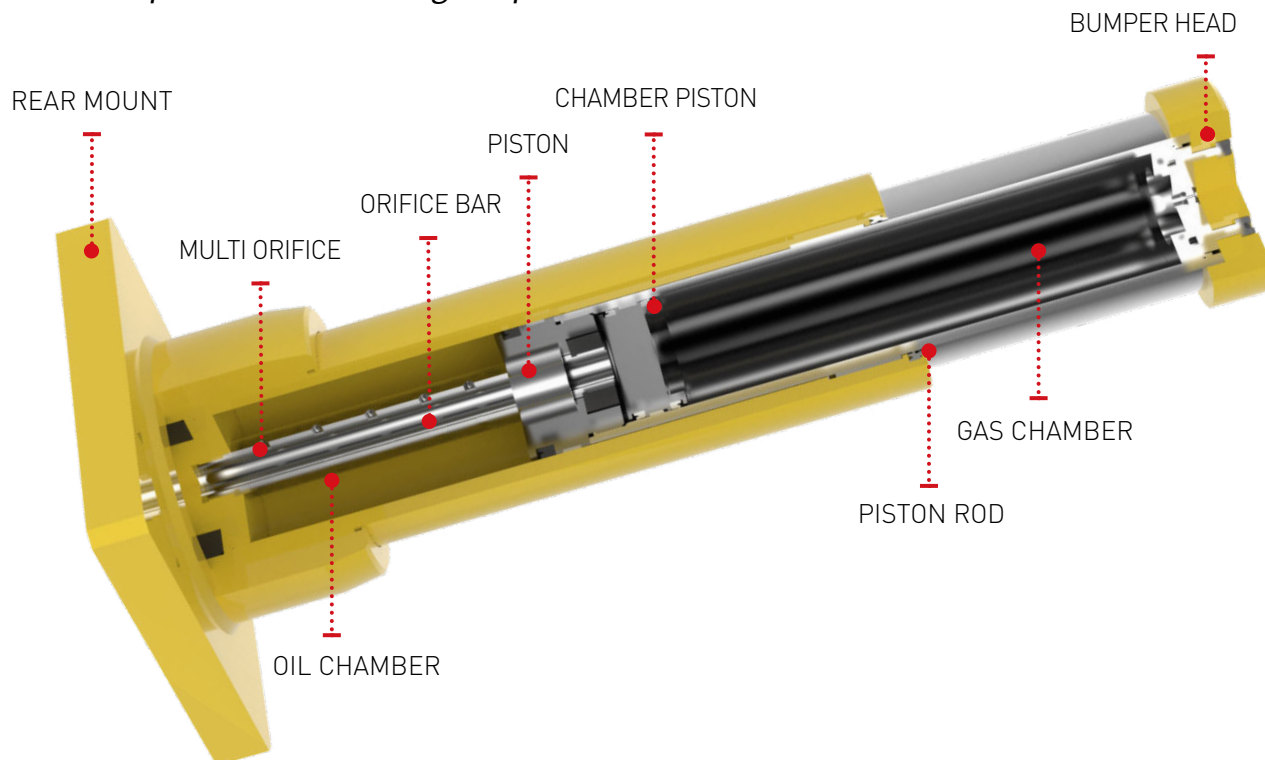


KHG Series Hydraulic Buffer

When the moving object collides with the bumper head, the internal check valve is closed and the oil chamber is compressed. The compressed oil flows into the orifice bar through the multiple orifice hole and it absorbs the shock. In addition, as the piston rod enters the inside of oil chamber, the oil amount as much as the piston rod volume presses the chamber piston to compress the gas chamber (performs the accumulator function), so that the pressure inside the gas chamber is increased, absorbs shock energy over the entire stroke ranges. When the shock absorption is completed, the compressed gas chamber is forced to the oil chamber area, and the check valve installed in the piston is opened to return the piston rod to its original position.



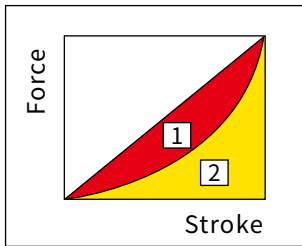
Feature

- KHG buffer safely protect heavy machinery and equipment during transfer of heavy loads. The high-capacity buffer are individually designed to decelerate moving loads under various conditions in compliance with industry mandatory international standards such as OSHA, CMAA, AIST, DIN, FEM etc.
- Adjustment type : Self adjustment type
- Applied fluid : Oil + Nitrogen Gas
- Temperature ranges : Standard (-10~80°C), Special (-30~100°C)
- Return mediator : Nitrogen Gas
- Piston Rod : Hard Chrome (25µm or more)
- Body and Mount : Epoxy Paint Coatings

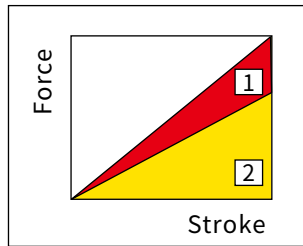
Application

- ✓ Container crane, Overhead crane, Stacker crane, Transfer car, Amusement park, Railway, Steel mill and all other areas of multi purposes.

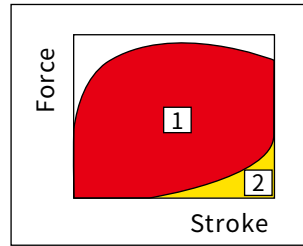
Energy absorption rate comparison



Rubber Damping
1. Low damping
2. High spring



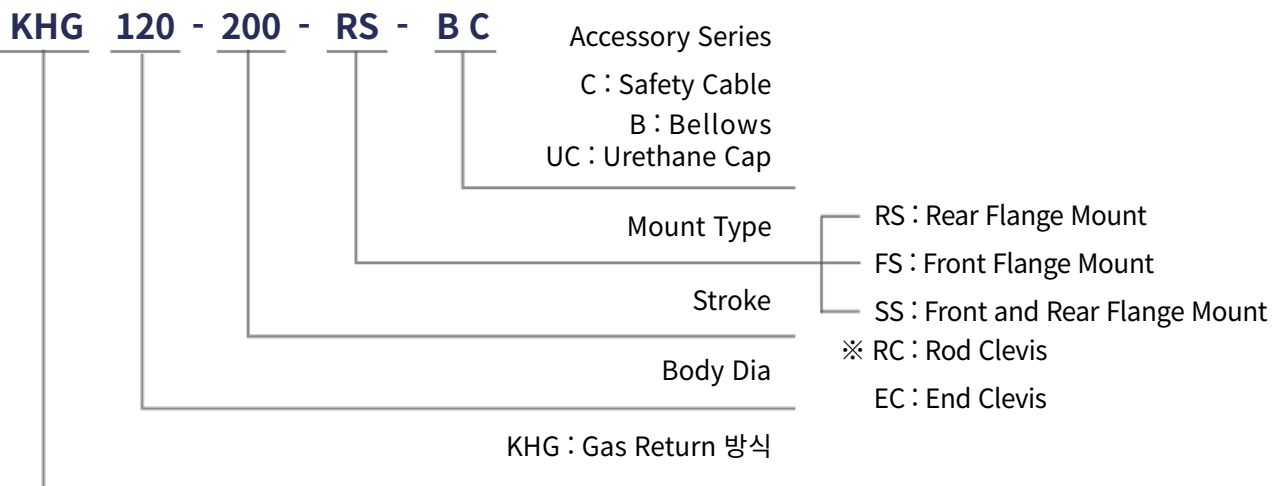
Spring Damping
1. Low damping
2. High spring



Hydraulic Buffer
1. Maximum damping
2. Low gas spring

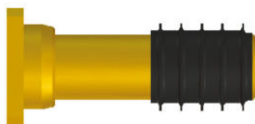
■ Absorption energy
■ Stored energy

KHG Series Ordering Information



Hydraulic Buffer

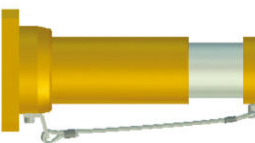
Accessory



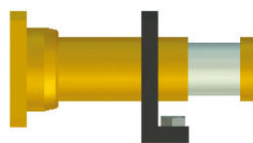
Bellows Cover



Clevis Mounting



Front & Rear Safety Cable



Rear Mount + Front Foot Mount

Special Order

- Temperature : -30~100°C
- Special Coatings
- Body Chrome Plating
- Stainless Steel
- Special Head

KHG Series Hydraulic Buffer

Model selection calculation formula

Symbol description


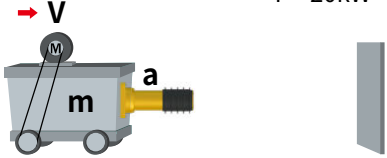

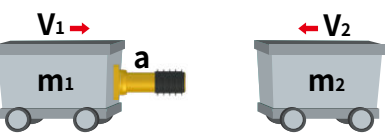
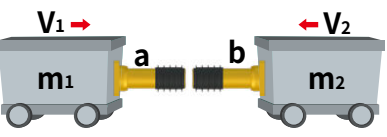
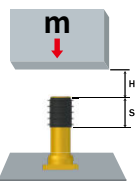
기호	단위	설명
E_K	kJ	Kinetic Energy
E_W	kJ	Work Energy
E_T	kJ	Total Energy
$E_T C$	kJ/h	Total Energy Absorbed Per Hour
F_s	kN	Maximum Buffer Force
V	m/s	Impact Velocity
VE	m/s	Effective Velocity
S	m	Buffer Stroke
S_D	m/s^2	Deceleration
C	Cycle/h	Cycle Per Hour
H	m	Drop Height
p	bar	Operation Pressure
P	kW	Motor Power
g	$m/s^2(9.8m/s^2)$	Accelleration
η	-	Min. Efficiency

1kgf = 9.81N , 1Nm = 1J , 1MPa = 10bar = 10.2kg/cm² , 1g = 9.8m/s²

Main formula (See page 11)

$$E_K = \frac{m \cdot V^2}{2} \quad E_T C = E_T \cdot C \quad E_T = E_K + E_W \quad E_W = F \times S \quad F_M = \frac{E_K}{S \cdot 0.8} \quad S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} \quad S \geq \frac{V^2}{2 \cdot S_D \cdot 0.8}$$

Model selection method

Moving Weight		Example	Buffer Model	
a) 	V=0.6m/s m=80ton	$E_K = \frac{m \cdot V^2}{2} = \frac{80 \times 0.6^2}{2} = 14.4kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{14.4}{0.15 \times 0.8} = 120kN$ $V_E = 0$ $S_D = \frac{V^2}{2 \cdot S \cdot 0.8} = \frac{0.6^2}{2 \times 0.15 \times 0.8} = 1.5m/s^2$ $S = \frac{V^2}{2 \cdot S_D \cdot 0.8} = \frac{0.6^2}{2 \times 1.5 \times 0.8} = 0.15m = 150mm$	pre-selected	KHG85-150 Stroke : 150
			final selection	KHG85-150
b) 	V = 1.2m/s m = 200ton P = 20kW	$E_K = \frac{m \cdot V^2}{2} = \frac{200 \times 1.2^2}{2} = 144kJ$ $F = \frac{2.5 \cdot P}{V} = \frac{2.5 \times 20}{1.2} = 41.7kN$ $E_W = F \cdot S = 41.7 \times 0.3 = 12.5kJ$ $E_T = E_K + E_W = 144 + 12.5 = 156.5kJ$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{156.5}{0.3 \times 0.8} = 652kN$	pre-selected	KHG140-300 Stroke : 300
			final selection	KHG140-300
c) 	V = 1.8m/s m = 150ton	$E_K = \frac{0.5 \cdot m \cdot V^2}{2} = \frac{0.5 \times 150 \times 1.8^2}{2} = 121.5kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{121.5}{0.4 \times 0.8} = 379.69kN$ $V_E = \frac{V}{2} = \frac{1.8}{2} = 0.9m/s$ $S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} = \frac{0.9^2}{2 \times 0.4 \times 0.8} = 1.27m/s^2$	pre-selected	KHG130-400 Stroke : 400
			final selection	KHG130-400
d) 	V ₁ = 1.0m/s m ₁ = 180ton V ₂ = 0.6m/s m ₂ = 250ton	$E_K = \frac{m_1 \cdot m_2 \cdot (V_1 + V_2)^2}{2(W_1 + W_2)} = \frac{180 \times 250 (1.0 + 0.6)^2}{2(180 + 250)} = 133.95kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{133.95}{0.5 \times 0.8} = 334.88kN$ $V_E = V_1 + V_2 = 1.0 + 0.6 = 1.6m/s$ $S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} = \frac{1.6^2}{2 \times 0.5 \times 0.8} = 3.2m/s^2$	pre-selected	KHG120-500 Stroke : 500
			final selection	KHG120-500
e) 	V ₁ = 1m/s m ₁ = 220 ton V ₂ = 0.7m/s m ₂ = 260ton	$E_K = \frac{m_1 \cdot m_2 \cdot (V_1 + V_2)^2}{4(W_1 + W_2)} = \frac{220 \times 260 (1 + 0.7)^2}{4(220 + 260)} = 86kJ$ $E_T = E_K$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{86}{0.25 \times 0.8} = 430.49kN$ $V_E = \frac{V_1 + V_2}{2} = \frac{1 + 0.7}{2} = 0.85m/s$ $S_D = \frac{V_E^2}{2 \cdot S \cdot 0.8} = \frac{0.85^2}{2 \times 0.25 \times 0.8} = 1.806m/s^2$	pre-selected	KHG120-250 Stroke : 250
			final selection	KHG120-250
f) 	m = 2.5ton H = 0.4m	$E_K = g \cdot m \cdot H = 9.81 \times 2.5 \times 0.4 = 9.81kJ$ $E_W = m \cdot g \cdot S = 2.5 \times 9.81 \times 0.15 = 3.67kJ$ $E_T = E_K + E_W = 9.81 + 3.67 = 13.48kJ$ $V = \sqrt{2 \cdot g \cdot H} = \sqrt{2 \times 9.81 \times 0.4} = 2.8m/s$ $F_S = \frac{E_T}{S \cdot 0.8} = \frac{13.48}{0.15 \times 0.8} = 112.33kN$	pre-selected	KHG85-150 Stroke : 150
			final selection	KHG85-150

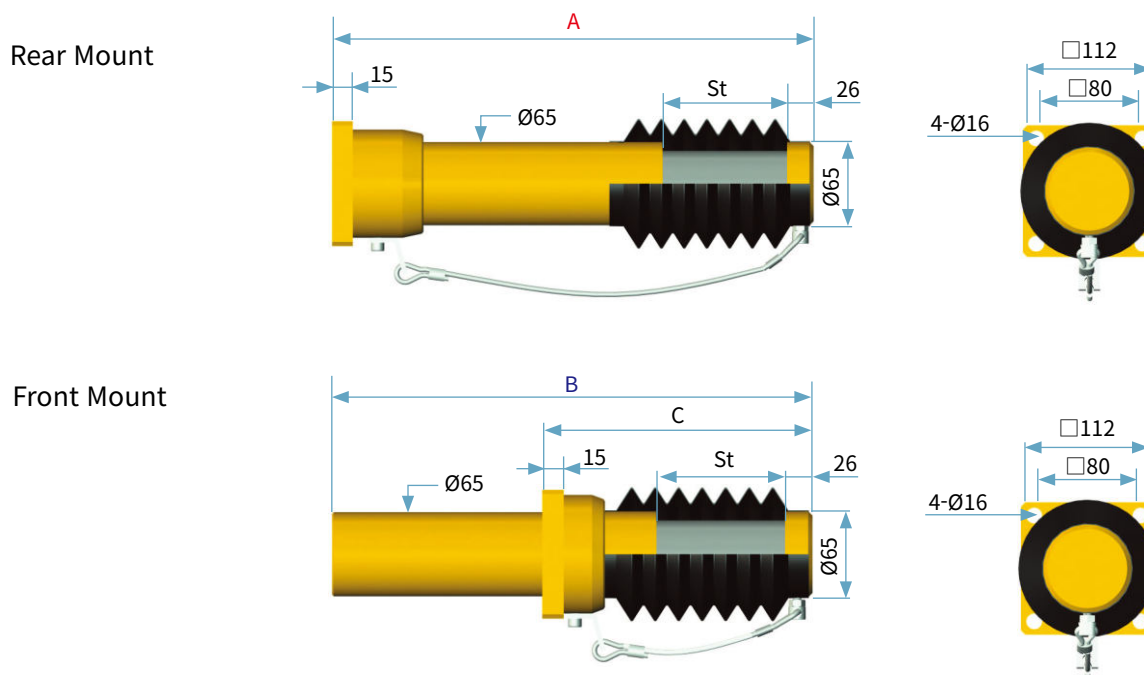
Hydraulic Buffer

KHG Series Hydraulic Buffer

KHG65 Series

Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E_T	Max Buffer Force (kN) F_S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG65-25	25	2	100		3.2	3.5	3.5	6
-50	50	4	100		4.7	3.5	3.5	7
-75	75	6	100		5.3	3	3	8
-100	100	8	100	1.0	6.6	3	3	9
-125	125	10	100		6.6	2.5	2.5	9
-150	150	12	100		6.6	2	2	10
-200	200	16	100		9.0	2	2	11



Dimensions (unit : mm)

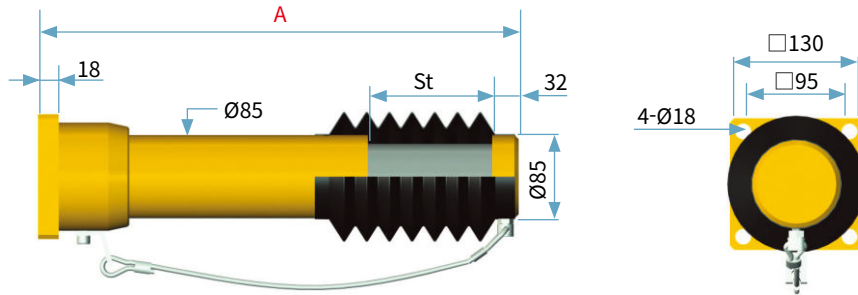
Model	Stroke (mm) St	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
KHG65-25	25	262	250	126	14
-50	50	312	300	151	
-75	75	372	360	176	
-100	100	432	420	231	
-125	125	497	485	256	
-150	150	552	540	281	
-200	200	682	670	371	

KHG85 Series

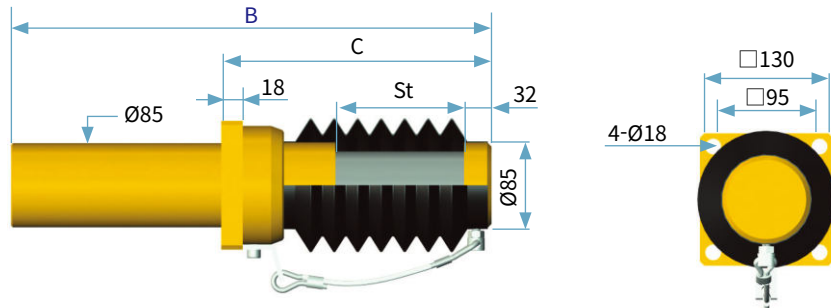
Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle(kJ) E_T	Max Buffer Force(kN) F_S	Recoil Force(kN)		Max Side Load Angle(°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG85-50	50	8	200		10	4	3.5	10
-100	100	16	200		13	3	3	13
-150	150	24	200	1.5	17	2	2	15
-200	200	32	200		19	1.8	1.5	17
-250	250	40	200		20	1.5	1.2	19

Rear Mount



Front Mount



Dimensions (unit : mm)

Model	Stroke (mm) St	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
KHG85-50	50	323	310	183	
-100	100	463	450	242	
-150	150	603	590	305	16
-200	200	743	730	367	
-250	250	883	870	430	

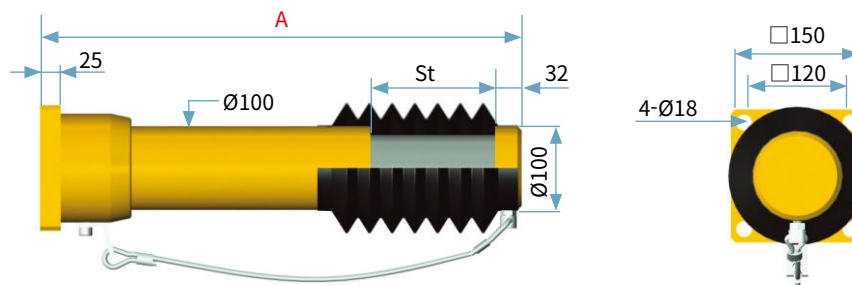
KHG Series Hydraulic Buffer

KHG100 Series

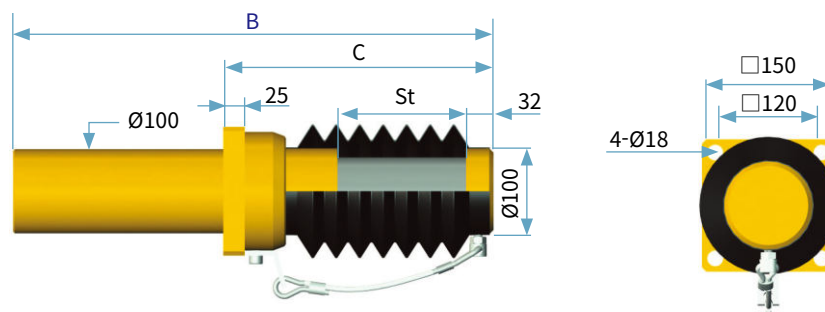
Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E _T	Max Buffer Force (kN) F _S	Recoil Force(kN)		Max Side Load Angle(°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG100-50	50	11	280	2.4	16	5	4	17
-80	80	18	280		16	4.5	4	19
-100	100	23	280		16	5	4	20
-120	120	27	280		20	4.5	3.5	22
-150	150	34	280		20	4.5	3.5	23
-200	200	46	280		20	4	3	26
-250	250	58	280		25	3.5	2.5	30
-300	300	69	280		25	3	2	34
-400	400	90	280		25	2.5	2	43
-500	500	110	275		25	2.5	2	53
-600	600	125	260		25	2	1.5	60
-800	800	140	210		25	2	1.5	73

Rear Mount



Front Mount



Dimensions (unit : mm)

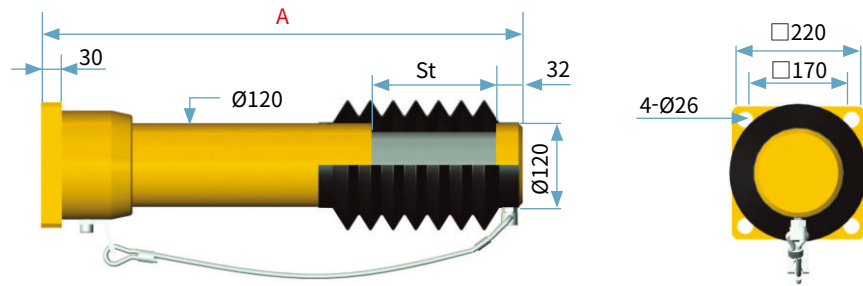
Model	Stroke (mm) St	Rear Type			Front Type			Mounting Bolt Size
		A	B	C	B	C		
KHG100-50	50	332	312	175			16	
-80	80	423	403	215				
-100	100	450	430	252				
-120	120	529	509	270				
-150	150	580	560	315				
-200	200	720	700	377				
-250	250	865	845	440				
-300	300	1,010	990	502				
-400	400	1,349	1,329	645				
-500	500	-	1,616	890				
-600	600	-	1,888	1,010				
-800	800	-	2,426	1,345				

KHG120 Series

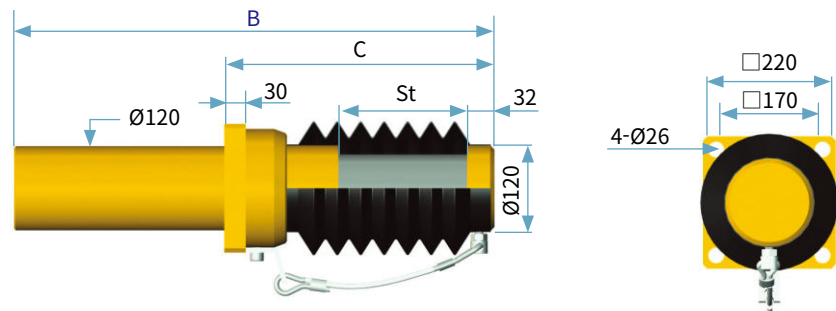
Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E _T	Max Buffer Force (kN) F _S	Recoil Force(kN)		Max Side Load Angle(°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG120-100	100	45	570	3.5	38	4	4.5	34
-150	150	70	570		38	4	3.5	39
-200	200	92	570		38	3.5	3.5	45
-250	250	114	570		40	3	3	50
-300	300	130	450		40	3	2.5	58
-400	400	160	450		40	2.5	2	66
-500	500	180	450		40	2	1.5	82
-600	600	200	450		40	2	1.5	94
-800	800	240	375		40	2	1.3	112
-1000	1,000	280	350		40	2	1.3	134

Rear Mount



Front Mount



Dimensions (unit : mm)

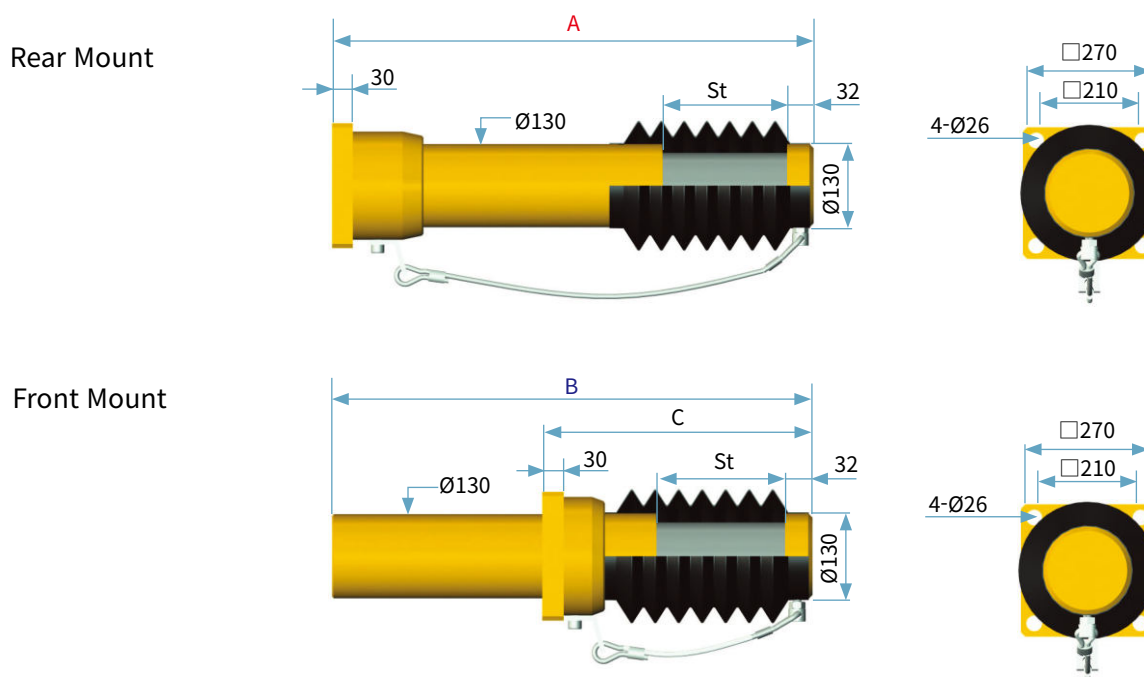
Model	Stroke (mm) St	Rear Type			Front Type			Mounting Bolt Size
		A	B	C	B	C		
KHG120-100	100	470	450	277			24	
-150	150	610	590	340				
-200	200	760	740	402				
-250	250	900	880	465				
-300	300	1,050	1,030	527				
-400	400	1,340	1,320	680				
-500	500	1,620	1,600	815				
-600	600	1,920	1,900	950				
-800	800	-	2,400	1,290				
-1000	1,000	-	2,960	1,360				

KHG Series Hydraulic Buffer

KHG130 Series

Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E _T	Max Buffer Force (kN) F _S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG130-250	250	120	550	4.5	40	4.5	4	62
-300	300	140	550		40	4.5	4	68
-400	400	180	550		50	4	3.5	79
-500	500	220	550		50	3.5	3.5	93
-600	600	260	550		50	2	1.5	107
-800	800	300	460		50	2	1.5	129



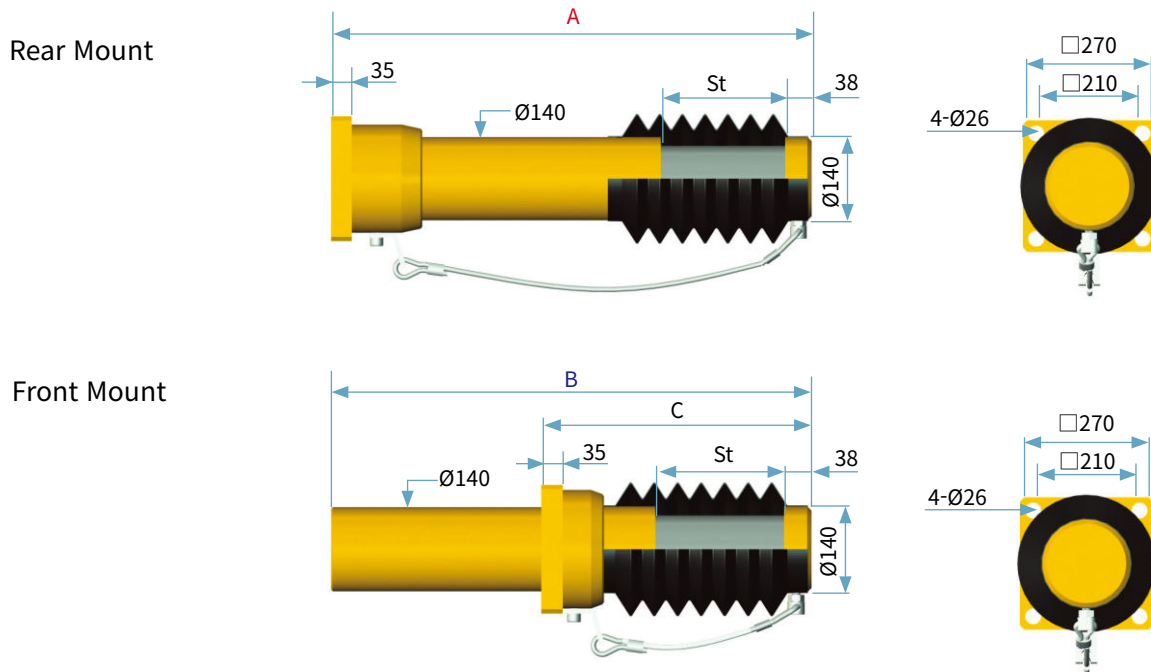
Dimensions (unit : mm)

Model	Stroke (mm) St	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
KHG130-250	250	897	877	545	24
-300	300	1,029	1,009	605	
-400	400	1,293	1,273	735	
-500	500	1,602	1,582	820	
-600	600	-	1,917	1,060	
-800	800	-	2,445	1,350	

KHG140 Series

Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E _T	Max Buffer Force (kN) F _S	Recoil Force(kN)		Max Side Load Angle(°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG 140-100	100	62	760	5.5	38	4.5	4	49
-150	150	91	760		65	4.5	4	55
-200	200	124	730		70	4	3.5	62
-300	300	175	730		70	3.5	2.5	74
-400	400	234	730		78	2.5	1.5	76
-500	500	270	680		78	2	1.3	98
-600	600	300	630		78	2	1.3	111
-800	800	325	510		78	2	1.3	138
-1000	1,000	360	450		78	1.6	1.2	163



Dimensions (unit : mm)

Model	Stroke (mm) St	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
KHG140-100	100	480	460	297	24
-150	150	620	600	360	
-200	200	770	750	422	
-300	300	1,060	1,040	547	
-400	400	1,350	1,330	712	
-500	500	1,630	1,610	847	
-600	600	1,930	1,910	982	
-800	800	2,350	2,330	1,252	
-1000	1,000	-	2,880	1,595	

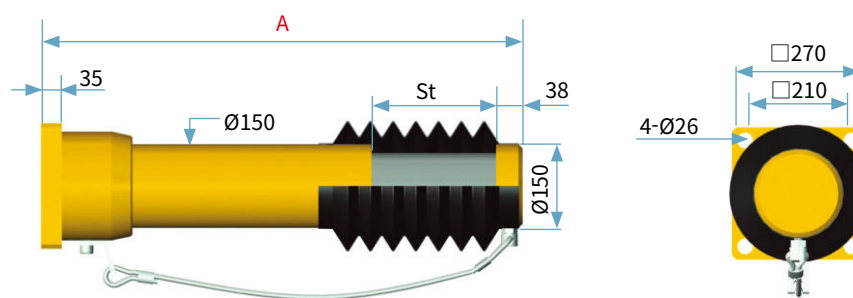
KHG Series Hydraulic Buffer

KHG150 Series

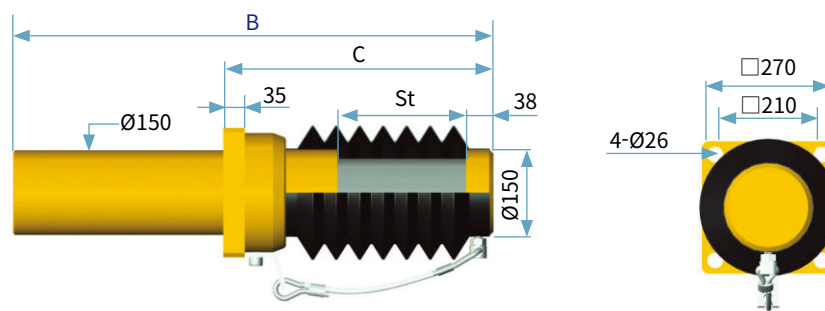
Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E_T	Max Buffer Force (kN) F_S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG150-100	100	70	880	6.2	45	4	4.5	57
-200	200	136	850		75	4	3.5	71
-300	300	183	770		75	3.5	3.5	85
-400	400	243	760		75	3	3	93
-500	500	297	740		85	3	2.5	113
-600	600	323	670		85	2.5	2	127
-800	800	448	700		85	2	1.5	150
-1000	1,000	550	689		85	2	1.5	176

Rear Mount



Front Mount



Dimensions (unit : mm)

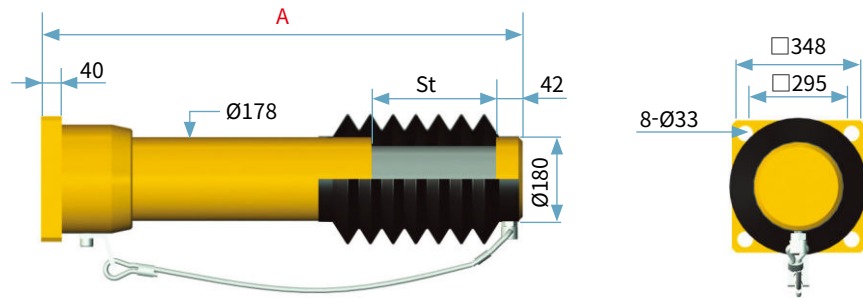
Model	Stroke (mm) St	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
KHG150-100	100	510	490	327	24
-200	200	800	780	452	
-300	300	1,090	1,070	577	
-400	400	1,280	1,260	740	
-500	500	1,660	1,640	800	
-600	600	1,960	1,940	905	
-800	800	2,360	2,340	1,270	
-1000	1,000	2,910	2,890	1,625	

KHG180 Series

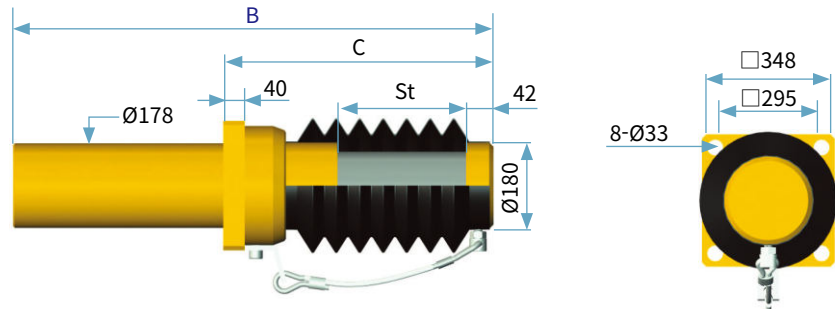
Engineering Data

Model	Stroke (mm) St	Max. Energy / Cycle (kJ) E_T	Max Buffer Force (kN) F_S	Recoil Force (kN)		Max Side Load Angle (°)		Weight (kg)
				Ext	Comp	R Type	F Type	
KHG 180-100	100	80	980	8	75	4.5	4	87
-200	200	160	980		80	4.5	4	105
-250	250	200	980		80	4.5	4	110
-400	400	280	880		90	4.5	4	165
-500	500	350	880		100	4	3.5	185
-600	600	430	890		100	3.5	3	206
-800	800	570	890		100	3	2.5	248
-1000	1,000	720	890		110	2.5	2	287

Rear Mount



Front Mount



Dimensions (unit : mm)

Model	Stroke (mm) St	Rear Type	Front Type		Mounting Bolt Size
		A	B	C	
KHG180-100	100	491	471	350	30
-200	200	760	740	450	
-250	250	850	830	550	
-400	400	1,486	1,466	804	
-500	500	1,766	1,746	939	
-600	600	2,066	2,046	1,074	
-800	800	2,666	2,646	1,344	
-1000	1,000	3,226	3,206	1,614	