S Couplers

KKA Series

Stainless steel type

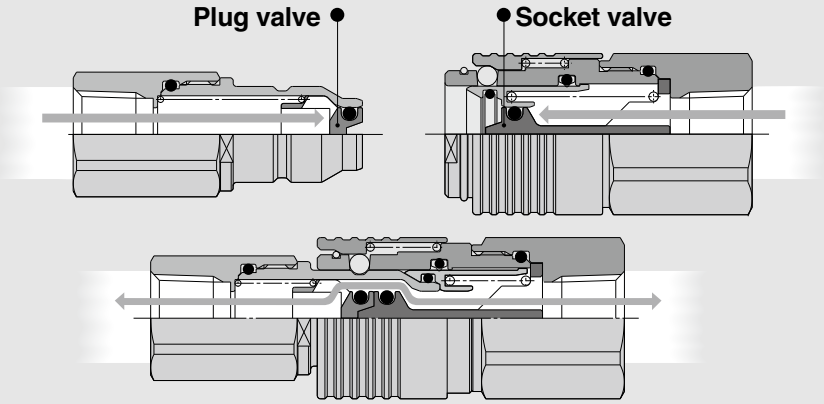
New **An M5 body size has been added.**



RoHS



- **Improved corrosion and environmental resistance due to all stainless steel construction**
  Can be used in environments with high temperatures, water splashing, UV exposure, and where copper and zinc cannot be used
- **Body material: Stainless steel 304**
  Seal material: Fluororubber (Special FKM)
- **Both plug and socket have an integral check valve.**
  Available with and without check valves depending on the operating conditions.
- **Reduces liquid dripping when the plug and socket are uncoupled.**
  Liquid dripping: 0.005 to 0.77 cm^3 at each removal
  Aeration: 0.02 to 2.7 cm^3 at each removal



- **Non-greased specification (standard)**
  Allows smooth installation and removal even without grease
  • O-ring: Fluorine coated
  • Sliding parts of plug and socket: Fluorine coated is used.
- **Fluid: Water, Air**
- **Operating temperature range: –5 to 150°C**
  Note) This product should not be used with steam.

Plug (P)

Male thread type

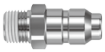
KKA2



KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



With check valve



Without check valve

Body size	Port size	Part no.	
		With check valve	Without check valve
M5	M5	**KKA2P-M5M**	**KKA2P-M5M-1**
	R1/8	**-01M**	**-01M-1**
1/8	R1/8	**KKA3P-01M**	**KKA3P-01M-1**
	R1/4	**-02M**	**-02M-1**
	R3/8	**-03M**	**-03M-1**
1/4	R1/4	**KKA4P-02M**	**KKA4P-02M-1**
	R3/8	**-03M**	**-03M-1**
	R1/2	**-04M**	**-04M-1**
1/2	R3/8	**KKA6P-03M**	**KKA6P-03M-1**
	R1/2	**-04M**	**-04M-1**
	R3/4	**-06M**	**-06M-1**
3/4	R1/2	**KKA7P-04M**	—
	R3/4	**-06M**	—
	R1	**-10M**	—
1	R3/4	**KKA8P-06M**	—
	R1	**-10M**	—
	R1 1/4	**-12M**	—
1 1/4	R1	**KKA9P-10M**	—
	R1 1/4	**-12M**	—
	R1 1/2	**-14M**	—

Female thread type

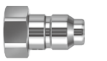
KKA2



KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



With check valve



Without check valve

Body size	Port size	Part no.	
		With check valve	Without check valve
M5	M5	**KKA2P-M5F**	**KKA2P-M5F-1**
1/8	Rc1/8	**KKA3P-01F**	**KKA3P-01F-1**
	Rc1/4	**-02F**	**-02F-1**
	Rc3/8	**-03F**	**-03F-1**
1/4	Rc1/4	**KKA4P-02F**	**KKA4P-02F-1**
	Rc3/8	**-03F**	**-03F-1**
	Rc1/2	**-04F**	**-04F-1**
1/2	Rc3/8	**KKA6P-03F**	**KKA6P-03F-1**
	Rc1/2	**-04F**	**-04F-1**
	Rc3/4	**-06F**	**-06F-1**
3/4	Rc1/2	**KKA7P-04F**	—
	Rc3/4	**-06F**	—
	Rc1	**-10F**	—
1	Rc3/4	**KKA8P-06F**	—
	Rc1	**-10F**	—
	Rc1 1/4	**-12F**	—
1 1/4	Rc1	**KKA9P-10F**	—
	Rc1 1/4	**-12F**	—
	Rc1 1/2	**-14F**	—

Socket (S)

Male thread type

KKA2



KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



Body size	Port size	Part no.	
		With check valve	Without check valve
M5	M5	**KKA2S-M5M**	**KKA2S-M5M-1**
	R1/8	**-01M**	**-01M-1**
1/8	R1/8	**KKA3S-01M**	**KKA3S-01M-1**
	R1/4	**-02M**	**-02M-1**
	R3/8	**-03M**	**-03M-1**
1/4	R1/4	**KKA4S-02M**	**KKA4S-02M-1**
	R3/8	**-03M**	**-03M-1**
	R1/2	**-04M**	**-04M-1**
1/2	R3/8	**KKA6S-03M**	**KKA6S-03M-1**
	R1/2	**-04M**	**-04M-1**
	R3/4	**-06M**	**-06M-1**
3/4	R1/2	**KKA7S-04M**	—
	R3/4	**-06M**	—
	R1	**-10M**	—
1	R3/4	**KKA8S-06M**	—
	R1	**-10M**	—
	R1 1/4	**-12M**	—
1 1/4	R1	**KKA9S-10M**	—
	R1 1/4	**-12M**	—
	R1 1/2	**-14M**	—

Female thread type

KKA2



KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



Body size	Port size	Part no.	
		With check valve	Without check valve
M5	M5	**KKA2S-M5F**	**KKA2S-M5F-1**
1/8	Rc1/8	**KKA3S-01F**	**KKA3S-01F-1**
	Rc1/4	**-02F**	**-02F-1**
	Rc3/8	**-03F**	**-03F-1**
1/4	Rc1/4	**KKA4S-02F**	**KKA4S-02F-1**
	Rc3/8	**-03F**	**-03F-1**
	Rc1/2	**-04F**	**-04F-1**
1/2	Rc3/8	**KKA6S-03F**	**KKA6S-03F-1**
	Rc1/2	**-04F**	**-04F-1**
	Rc3/4	**-06F**	**-06F-1**
3/4	Rc1/2	**KKA7S-04F**	—
	Rc3/4	**-06F**	—
	Rc1	**-10F**	—
1	Rc3/4	**KKA8S-06F**	—
	Rc1	**-10F**	—
	Rc1 1/4	**-12F**	—
1 1/4	Rc1	**KKA9S-10F**	—
	Rc1 1/4	**-12F**	—
	Rc1 1/2	**-14F**	—

Refer to pages 343 and 344 for Specific Product Precautions.

S Couplers

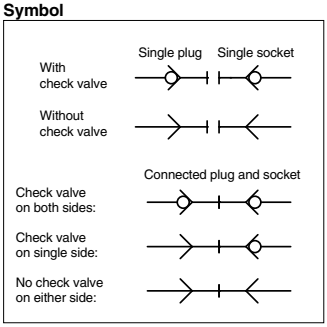
KKA Series

RoHS

Stainless steel type



Symbol



Performance

Plug and socket connection	One-touch connection and release
Check valve	Check valve on both sides, Without check valve

Note) KKA series cannot be connected with KK series or KKH series. There is no KKA7/8/9 option without a check valve.

Characteristics with check valve on both sides

Body size	Liquid dripping cm^3 at each removal	Aeration cm^3 at each removal
KKA2	0.005	0.02
KKA3	0.02	0.1
KKA4	0.04	0.1
KKA6	0.06	0.2
KKA7	0.14	0.5
KKA8	0.27	0.9
KKA9	0.77	2.7

Liquid dripping:
Volume of water leakage at the time when the plug and socket are uncoupled.

Aeration:
Volume of external air entrained when the plug and socket are connected.

Specifications

Fluid	Water, Air, N_2
Operating pressure range Note 1)	KKA2/3:–100 kPa to 1 MPa KKA4/6/7/8/9: 0 to 1 MPa
Proof pressure	10 MPa
Ambient and fluid temperature	–5 to 150°C (No freezing) Note) This product should not be used with steam.
Non-greased specification	No grease is used. (Rubber, Metal sliding parts: Fluorine coated)
Material	Metal part: Stainless steel 304, Rubber material: Fluororubber (Special FKM)
Seal	With male thread sealant

Note 1) Do not use the S couplers with a leak tester or for vacuum retention because they are not guaranteed for zero leakage.

Effective Area

Built-in check valve	Plug	Socket	Effective area mm^2
Plug: With check valve Socket: With check valve	**KKA2P-M5M**	**KKA2S-M5M** **KKA2S-M5F**	3.3
	KKA2P-M5F		
	KKA2P-01M		3.5
	KKA2P-M5M	**KKA2S-01M**	3.5
	KKA2P-M5F		
	KKA2P-01M		4.0
Plug: Without check valve Socket: With check valve	**KKA2P-M5M-1**	**KKA2S-M5M** **KKA2S-M5F**	3.3
	KKA2P-M5F-1		
	KKA2P-01M-1		3.7
	KKA2P-M5M-1	**KKA2S-01M**	3.5
	KKA2P-M5F-1		
	KKA2P-01M-1		4.2
Plug: Without check valve Socket: Without check valve	**KKA2P-M5M-1**	**KKA2S-M5M-1** **KKA2S-M5F-1**	3.7
	KKA2P-M5F-1		
	KKA2P-01M-1		4.0
	KKA2P-M5M-1	**KKA2S-01M-1**	4.1
	KKA2P-M5F-1		
	KKA2P-01M-1		5.4
Plug: With check valve Socket: With check valve	**KKA3P-01F**	**KKA3S-01F**	17.4
	KKA4P-02F	**KKA4S-02F**	26.4
	KKA6P-04F	**KKA6S-04F**	54.2
	KKA7P-06F	**KKA7S-06F**	99.6
	KKA8P-10F	**KKA8S-10F**	168.3
	KKA9P-12F	**KKA9S-12F**	332.1
Plug: Without check valve Socket: With check valve	**KKA3P-01M-1**	**KKA3S-01M**	18.5
	KKA4P-02M-1	**KKA4S-02M**	31.8
	KKA6P-04M-1	**KKA6S-04M**	55.3
Plug: Without check valve Socket: Without check valve	**KKA3P-01M-1**	**KKA3S-01M-1**	22.6
	KKA4P-02M-1	**KKA4S-02M-1**	40.2
	KKA6P-04M-1	**KKA6S-04M-1**	76.0

How to Order

KKA [4] [P] – [02] [M] [ ]

Body size

3	1/8
4	1/4
6	1/2
7	3/4
8	1
9	1 1/4

Socket/Plug designation

P	Plug
S	Socket

Port size

Symbol	Thread size
01	R, Rc 1/8
02	R, Rc 1/4
03	R, Rc 3/8
04	R, Rc 1/2
06	R, Rc 3/4
10	R, Rc 1
12	R, Rc 1 1/4
14	R, Rc 1 1/2

Connection type

Symbol	Type
M	Male thread (with sealant)
F	Female thread

Built-in check valve

Nil	With check valve
-1	Without check valve

Note) KKA7/8/9 is not available without a check valve.

	Plug	Socket	Availability
Built-in check valve	Yes	Yes	○
	No	Yes	○
	No	No	○
	Yes	No	×

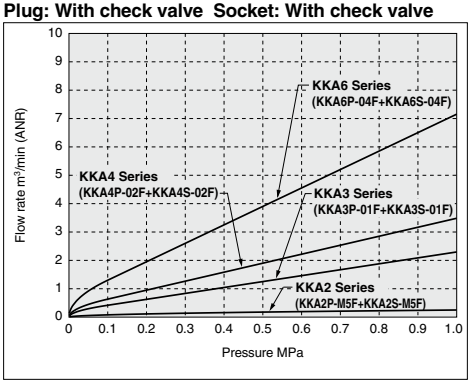
Note) A plug with check valve should be used in combination with a socket with check valve.
If a socket without check valve is used, the check valve of the plug will not open.

For details on body size and port size combinations for each model, refer to the charts on the Dimensions page.

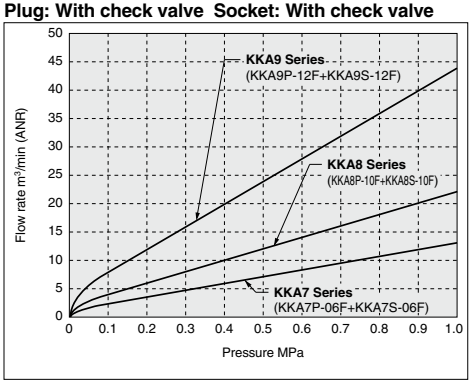
Flow Rate Characteristics

Air

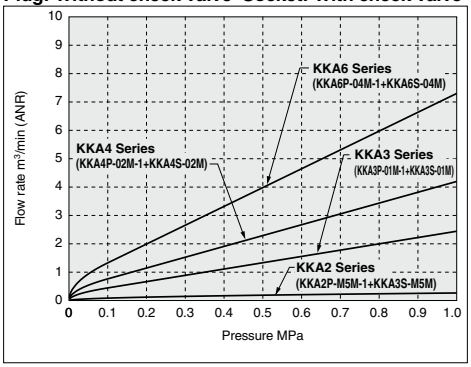
Plug: With check valve Socket: With check valve



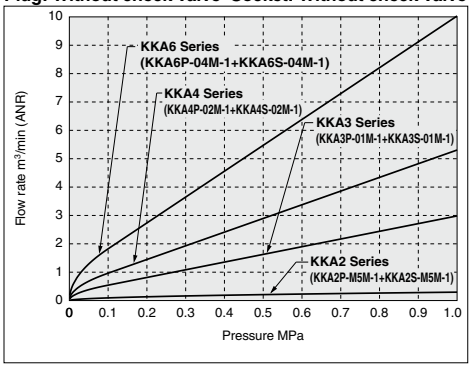
Plug: With check valve Socket: With check valve



Plug: Without check valve Socket: With check valve



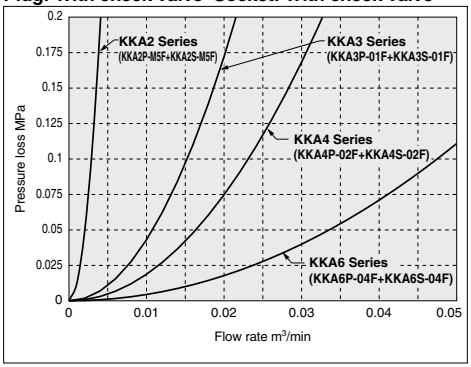
Plug: Without check valve Socket: Without check valve



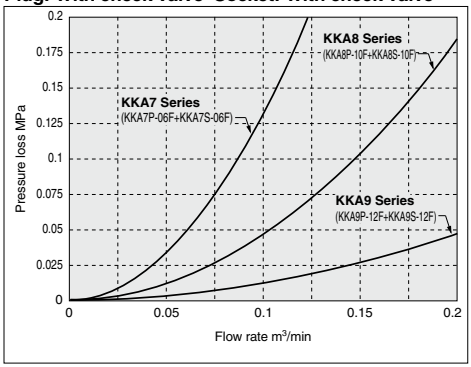
Pressure Loss

Water

Plug: With check valve Socket: With check valve

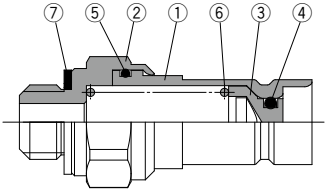


Plug: With check valve Socket: With check valve

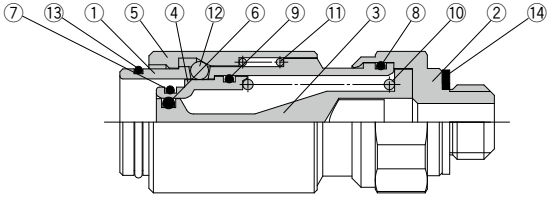


Construction

KKA2



Plug



Socket

Plug

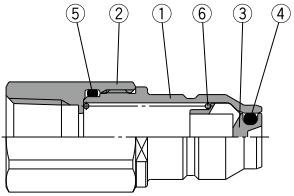
No.	Description	Material	Note
1	**Stem**	Stainless steel 304	Fluorine coated
2	**Rear stem**	Stainless steel 304	
3	**Plug valve**	Stainless steel 304	
4	**Valve O-ring**	Special FKM	Fluorine coated
5	**Stem O-ring**	Special FKM	Fluorine coated
6	**Plug valve spring**	Equivalent to Stainless steel 304	
7	**Gasket**	Stainless steel 316, Special FKM	

Socket

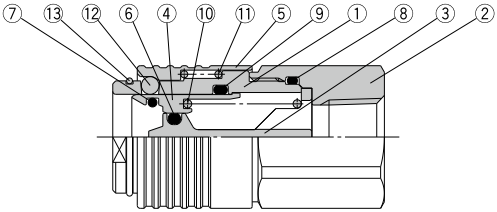
No.	Description	Material	Note
1	**Body**	Stainless steel 304	Fluorine coated
2	**Rear body**	Stainless steel 304	
3	**Socket valve**	Stainless steel 304	
4	**Collar**	Stainless steel 304	
5	**Sleeve**	Stainless steel 304	
6	**Valve O-ring**	Special FKM	Fluorine coated
7	**Plug O-ring**	Special FKM	Fluorine coated
8	**Body O-ring**	Special FKM	Fluorine coated
9	**Collar O-ring**	Special FKM	Fluorine coated
10	**Collar spring**	Equivalent to Stainless steel 304	
11	**Sleeve spring**	Stainless steel 304	
12	**Steel ball**	Stainless steel 304	
13	**Stopper ring**	Stainless steel 304	
14	**Gasket**	Stainless steel 316, Special FKM	

Construction

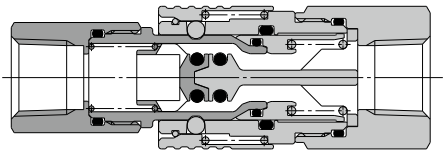
KKA3, 4, 6, 7, 8, 9



Plug



Socket



Plug

No.	Description	Material	Note
1	**Stem**	Stainless steel 304	Fluorine coated
2	**Rear stem**	Stainless steel 304	
3	**Plug valve**	Stainless steel 304	
4	**Valve O-ring**	Special FKM	Fluorine coated
5	**Stem O-ring**	Special FKM	Fluorine coated
6	**Plug valve spring**	Equivalent to Stainless steel 304	KKA3
		Stainless steel 304	KKA4, 6, 7, 8, 9

Socket

No.	Description	Material	Note
1	**Body**	Stainless steel 304	
2	**Rear body**	Stainless steel 304	
3	**Socket valve**	Stainless steel 304	
4	**Collar**	Stainless steel 304	Fluorine coated
5	**Sleeve**	Stainless steel 304	Plated with fluorine-contained material
6	**Valve O-ring**	Special FKM	Fluorine coated
7	**Plug O-ring**	Special FKM	Fluorine coated
8	**Body O-ring**	Special FKM	Fluorine coated
9	**Collar seal**	Special FKM	Fluorine coated
10	**Collar spring**	Equivalent to Stainless steel 304	KKA3, 4, 6
		Stainless steel 304	KKA7, 8, 9
11	**Sleeve spring**	Stainless steel 304	
12	**Steel ball**	Stainless steel 304	
13	**Stopper ring**	Stainless steel 304	

KKA Series Spare Parts

Description	Product no.	No.
Plug O-ring	KKA3S-P01	Socket ⑦
	KKA4S-P01	
	KKA6S-P01	
	KKA7S-P01	
	KKA8S-P01	
	KKA9S-P01	

Dimensions/Plug (P)

With check valve

Male thread type (mm)

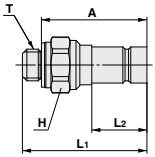
KKA2

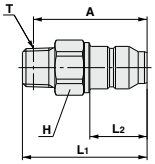


KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



Body size	Model	T Connection port size	H Width across flats	L_1	L_2	A	Min. bore size	Effective area mm²	Weight g
M5	**KKA2P-M5M**	M5	8	19.7	8.7	16.7	2.5	*	2.6
	-01M	R 1/8	10	22.1		19.0	3.3		4.7
1/8	**KKA3P-01M**	R 1/8	14	35.4	16.0	31.4	5.6	17.4	15.4
	-02M	R 1/4		38.4		32.4			19.8
	-03M	R 3/8		39.4		32.9			32.9
1/4	**KKA4P-02M**	R 1/4	17	42.2	18.9	36.2	6.9	26.4	28.3
	-03M	R 3/8		43.2		36.7			36.6
	-04M	R 1/2	22	46.2		38.2			65.9
1/2	**KKA6P-03M**	R 3/8	24	47.1	20.4	40.6	10.0	54.2	60.3
	-04M	R 1/2		47.9		39.9			69.2
	-06M	R 3/4	30	49.9		40.4			119.0
3/4	**KKA7P-04M**	R 1/2	32	66.3	27.6	58.1	13.5	99.6	173.9
	-06M	R 3/4		69.4		59.9			209.6
	-10M	R 1	36	69.9		59.5			275.0
1	**KKA8P-06M**	R 3/4	41	82.9	35.6	73.4	17.5	168.3	362.8
	-10M	R 1		85.4		75.0			403.9
	-12M	R 1 1/4	46	85.4		72.7			538.6
1 1/4	**KKA9P-10M**	R 1	55	109.5	49.1	99.1	24.6	332.1	824.1
	-12M	R 1 1/4		109.0		96.3			861.4
	-14M	R 1 1/2		109.0		96.3			936.3





Female thread type (mm)

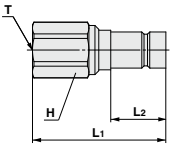
KKA2

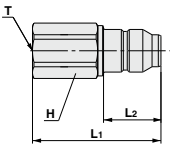


KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



Body size	Model	T Connection port size	H Width across flats	L_1	L_2	Min. bore size	Effective area mm²	Weight g
M5	**KKA2P-M5F**	M5	8	21.1	8.7	3.3	*	3.9
1/8	**KKA3P-01F**	Rc 1/8	14	36.0	16.0	5.6	17.4	20.2
	-02F	Rc 1/4	17	39.6				31.8
	-03F	Rc 3/8	19	40.4				35.8
1/4	**KKA4P-02F**	Rc 1/4	17	43.4	18.9	6.9	26.4	36.1
	-03F	Rc 3/8	19	44.4				40.2
	-04F	Rc 1/2		48.6				69.7
1/2	**KKA6P-03F**	Rc 3/8	24	48.7	20.4	10.0	54.2	84.1
	-04F	Rc 1/2		52.9				79.7
	-06F	Rc 3/4	30	54.6				123.8
3/4	**KKA7P-04F**	Rc 1/2	32	67.7	27.6	13.5	99.6	217.1
	-06F	Rc 3/4		69.4				196.8
	-10F	Rc 1		72.4				325.9
1	**KKA8P-06F**	Rc 3/4	41	82.0	35.6	17.5	168.3	420.5
	-10F	Rc 1		85.0				391.3
	-12F	Rc 1 1/4	50	87.3				552.8
1 1/4	**KKA9P-10F**	Rc 1	55	107.8	49.1	24.6	332.1	986.9
	-12F	Rc 1 1/4		110.1				925.6
	-14F	Rc 1 1/2		110.1				848.2





* Refer to page 553 for the effective area of the KKA2.

Dimensions/Socket (S)

With check valve

Male thread type (mm)

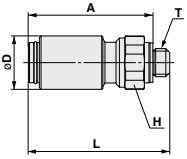
KKA2

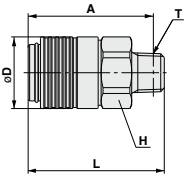


KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



Body size	Model	T Connection port size	H Width across flats	øD	L	A	Min. bore size	Effective area mm²	Weight g
M5	**KKA2S-M5M**	M5	9	9.5	25.2	22.2	2.5	*	6.8
	-01M	R 1/8	10		27.1	24	3.3		8.4
1/8	**KKA3S-01M**	R 1/8	17	18.5	38.1	34.1	5.9	18.5	38.5
	-02M	R 1/4			41.1	35.1			41.8
	-03M	R 3/8			42.1	35.6			46.3
1/4	**KKA4S-02M**	R 1/4	22	24.2	46.0	40.0	7.7	31.8	76.8
	-03M	R 3/8			47.0	40.5			78.5
	-04M	R 1/2			50.0	42.0			86.6
1/2	**KKA6S-03M**	R 3/8	30	30.7	51.4	44.9	10.2	55.3	149.1
	-04M	R 1/2			54.4	46.4			160.4
	-06M	R 3/4			56.4	46.9			184.8
3/4	**KKA7S-04M**	R 1/2	36	42.5	76.3	68.1	13.6	101.5	426.1
	-06M	R 3/4			79.3	69.8			457.8
	-10M	R 1			82.8	72.4			514.0
1	**KKA8S-06M**	R 3/4	46	55	94.9	85.4	17.6	169.9	873.5
	-10M	R 1			98.4	88.0			931.1
	-12M	R 1 1/4			100.4	87.7			1012.9
1 1/4	**KKA9S-10M**	R 1	63	69	125.5	115.1	22.0	264.9	1680.7
	-12M	R 1 1/4			127.5	114.8	25.1	344.9	1758.1
	-14M	R 1 1/2			127.5	114.8			1819.4





Female thread type (mm)

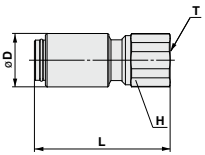
KKA2

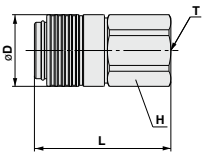


KKA3, KKA4, KKA6, KKA7, KKA8, KKA9



Body size	Model	T Connection port size	H Width across flats	øD	L	Min. bore size	Effective area mm²	Weight g
M5	**KKA2S-M5F**	M5	9	9.5	24.2	2.5	*	7.5
1/8	**KKA3S-01F**	Rc 1/8	17	18.5	37.6	5.9	18.5	46.9
	-02F	Rc 1/4			41.2			47.2
	-03F	Rc 3/8	19		43.1			52.3
1/4	**KKA4S-02F**	Rc 1/4	22	24.2	46.1	7.7	31.8	97.1
	-03F	Rc 3/8			46.9			91.1
	-04F	Rc 1/2	24		52.3			104.3
1/2	**KKA6S-03F**	Rc 3/8	30	30.7	50.5	10.2	55.3	189.6
	-04F	Rc 1/2			56.2			202.0
	-06F	Rc 3/4			57.9			180.6
3/4	**KKA7S-04F**	Rc 1/2	36	42.5	75.1	13.6	101.5	477.2
	-06F	Rc 3/4			76.5			457.4
	-10F	Rc 1	41		82.3			550.9
1	**KKA8S-06F**	Rc 3/4	46	55	90.9	17.6	169.9	935.2
	-10F	Rc 1			93.9			914.7
	-12F	Rc 1 1/4	50		99.2			1002.1
1 1/4	**KKA9S-10F**	Rc 1	63	69	121.8	25.1	344.9	1919.1
	-12F	Rc 1 1/4			121.8			1810.0
	-14F	Rc 1 1/2			121.8			1732.6





* Refer to page 553 for the effective area of the KKA2.

Dimensions/Plug (P)

Without check valve

Male thread type

(mm)

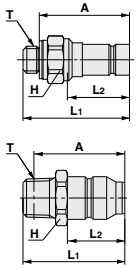
KKA2



KKA3, KKA4, KKA6



Body size	Model	T Connection port size	H Width across flats	L_1	L_2	A	Min. bore size	Effective area mm²	Weight g
M5	**KKA2P-M5M-1**	M5	8	19.7	8.7	16.7	2.5	*	2.3
	-01M-1	R 1/8	10	22.1		19.0	3.3		4.4
1/8	**KKA3P-01M-1**	R 1/8	12	28.5	16.0	24.5	6.0	22.6	9.8
	-02M-1	R 1/4	14	31.5		25.5			14.6
	-03M-1	R 3/8	17	32.5		26.0			23.6
1/4	**KKA4P-02M-1**	R 1/4		34.4	18.9	28.4	8.0	40.2	21.0
	-03M-1	R 3/8		35.4		28.9			27.9
	-04M-1	R 1/2		39.4		31.4			50.2
1/2	**KKA6P-03M-1**	R 3/8	22	37.9	20.4	31.4	11.0	76.0	41.9
	-04M-1	R 1/2		40.9		32.9			56.0
	-06M-1	R 3/4	30	42.9		33.4			98.7



Female thread type

(mm)

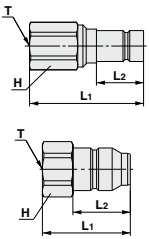
KKA2



KKA3, KKA4, KKA6



Body size	Model	T Connection port size	H Width across flats	L_1	L_2	Min. bore size	Effective area mm²	Weight g
M5	**KKA2P-M5F-1**	M5	8	21.1	8.7	3.3	*	3.6
1/8	**KKA3P-01F-1**	Rc 1/8	14	23.2	16.0	6.0	22.6	9.6
	-02F-1	Rc 1/4	17	30.3				20.2
	-03F-1	Rc 3/8	19	32.0				26.2
1/4	**KKA4P-02F-1**	Rc 1/4	17	29.7	18.9	8.0	40.2	20.0
	-03F-1	Rc 3/8	19	34.0				25.8
	-04F-1	Rc 1/2	24	39.4				46.1
1/2	**KKA6P-03F-1**	Rc 3/8	22	30.9	20.4	11.0	76.0	34.3
	-04F-1	Rc 1/2	24	39.6				50.0
	-06F-1	Rc 3/4	30	42.8				78.6



Dimensions/Socket (S)

Without check valve

Male thread type

(mm)

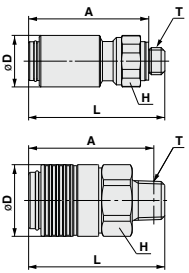
KKA2



KKA3, KKA4, KKA6



Body size	Model	T Connection port size	H Width across flats	øD	L	A	Min. bore size	Effective area mm²	Weight g
M5	**KKA2S-M5M-1**	M5	9	9.5	25.2	22.2	2.5	*	6.1
	-01M-1	R 1/8	10		27.1	24.0	3.3		7.8
1/8	**KKA3S-01M-1**	R 1/8	17	18.5	38.1	34.1	6.1	23.4	36.1
	-02M-1	R 1/4			41.1	35.1			39.4
	-03M-1	R 3/8			42.1	35.6			43.9
1/4	**KKA4S-02M-1**	R 1/4	22	24.2	46.0	40.0	8.1	41.2	71.9
	-03M-1	R 3/8			47.0	40.5			73.6
	-04M-1	R 1/2			50.0	42.0			81.7
1/2	**KKA6S-03M-1**	R 3/8	30	30.7	51.4	44.9	11.4	81.6	138.3
	-04M-1	R 1/2			54.4	46.4			149.6
	-06M-1	R 3/4			56.4	46.9			174.0



Female thread type

(mm)

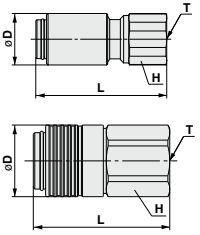
KKA2



KKA3, KKA4, KKA6



Body size	Model	T Connection port size	H Width across flats	øD	L	Min. bore size	Effective area mm²	Weight g
M5	**KKA2S-M5F-1**	M5	9	9.5	24.2	2.5	*	6.9
1/8	**KKA3S-01F-1**	Rc 1/8	17	18.5	37.6	6.1	23.4	44.5
	-02F-1	Rc 1/4			41.2			44.8
	-03F-1	Rc 3/8	19		43.1			49.9
1/4	**KKA4S-02F-1**	Rc 1/4	22	24.2	46.1	8.1	41.2	92.2
	-03F-1	Rc 3/8			46.9			86.2
	-04F-1	Rc 1/2	24		52.3			99.4
1/2	**KKA6S-03F-1**	Rc 3/8	30	30.7	50.5	11.4	81.6	178.8
	-04F-1	Rc 1/2			56.2			191.2
	-06F-1	Rc 3/4			57.9			169.8



* Refer to page 553 for the effective area of the KKA2.