



Paddle Wheel Flow Sensor

User Manual



1. Introduction

1.1 Description

The paddle wheel flow sensor is ideally suited for harsh chemical environments, delivering accurate and reliable measurements. A range of configurations, allows for precise selection based on specific field conditions. Its robust construction and mature manufacturing technology ensure long-term stability and consistent high performance.

1.2 Features

- The transducer features a corrosion-resistant housing, delivering exceptional anti-corrosion performance.
- The innovative and practical plug-in structure simplifies on-site installation for enhanced convenience.
- Both split-type long-distance installation and integrated installation are supported, adapting to all complex on-site conditions.
- It provides stable square wave output and an open-collector NPN interface with strong driving capability.
- With an IP68 protection rating, it is suitable for all harsh on-site working environments.
- Boasting excellent compatibility, it can be directly integrated with same-type products from other brands.
- The maintenance-free design ensures hassle-free and reliable operation.



1.3 Technical parameters

Flow Range: 0.15-8m/s

Diameter Range: DN20-DN600

Output Signal: Square Wave and NPN, NPN: 40-50Hz/m/S;

Supply Voltage: DC 5-24V; Recommend DC 24V

Accuracy:

Linearity: 1%

Accuracy of Repeatability: 0.5%

Working Pressure/Temperature:

PP: 12.5bar@25°C-1.7bar@80°C

CPVC: 12.5bar@25°C-1.7bar@80°C

PVDF: 12.5bar@25°C-2.5bar@100°C

PTFE: 12.5bar@25°C-2.5bar@100°C

SS316L: 30bar@100°C

Material of Filtration Parts:

Body of Sensor: PP/CPVC/PTFE/PVDF

Axis/Bearing: Al₂O₃/ZrO₂/SS316L/HC/Ti

O-Ring: FPM/EPDM

Rotor: PP/ABS/PVDF/PTFE

Protection Level:

IP68/IP65

1.4 Model selection

	KF11-11P/12P *Five-blade impeller design for better dynamic balance. *Linear accuracy up to 1%. *Easy to install, long service life, and maintenance-free. *Chemical corrosion resistance.
	KF11-12VZ/22VZ *Resistant to strong acids and alkalis such as sulfuric acid, nitric acid, and sodium hypochlorite. *Both the sensor body and impeller are made of PVDF material. *Applicable pipe diameters range from DN20 to DN600. *DC 5-24V, NPN open collector.



	KF11-H-12VZ *Series H is of push-pull type, compatible with NPN/PNP input terminals. *Special model for PLC, DC 12-24V. *Applied in semiconductor cleaning, printing and dyeing machines, monocrystalline silicon texturing, etc.
	KF11-P10-2VZ *Compact flow sensor with simple structure and easy installation. *Suitable for pipe diameters from DN10 to DN50. *Made of PVDF material, resistant to strong acids and alkalis.
	KF11-S10-12S/22S *316L body with pressure resistance up to 25 bar. *Powered by DC 5-32V, square wave signal, compatible with PLC. *Applied in fire trucks, printing and dyeing machines, heat exchangers, and high-pressure boilers.
	KF11-S10-12C/22C *Brass body material. *Suitable for heat exchangers, high-pressure boilers and other fields.
	KF11-G10-12S/22S *High-pressure flow sensor. *316L body with pressure resistance up to 100 bar. *Applied in high-pressure boilers, heat exchangers, printing and dyeing machines, and pump protection.

1.5 Model selection example for KF11

Diameter	1	DN15-DN100(0.5"- 4")
	2	DN125-DN600(5"- 24")
Rotor	1	PP
	2	PVDF
	3	ABS(only for compact sensor)

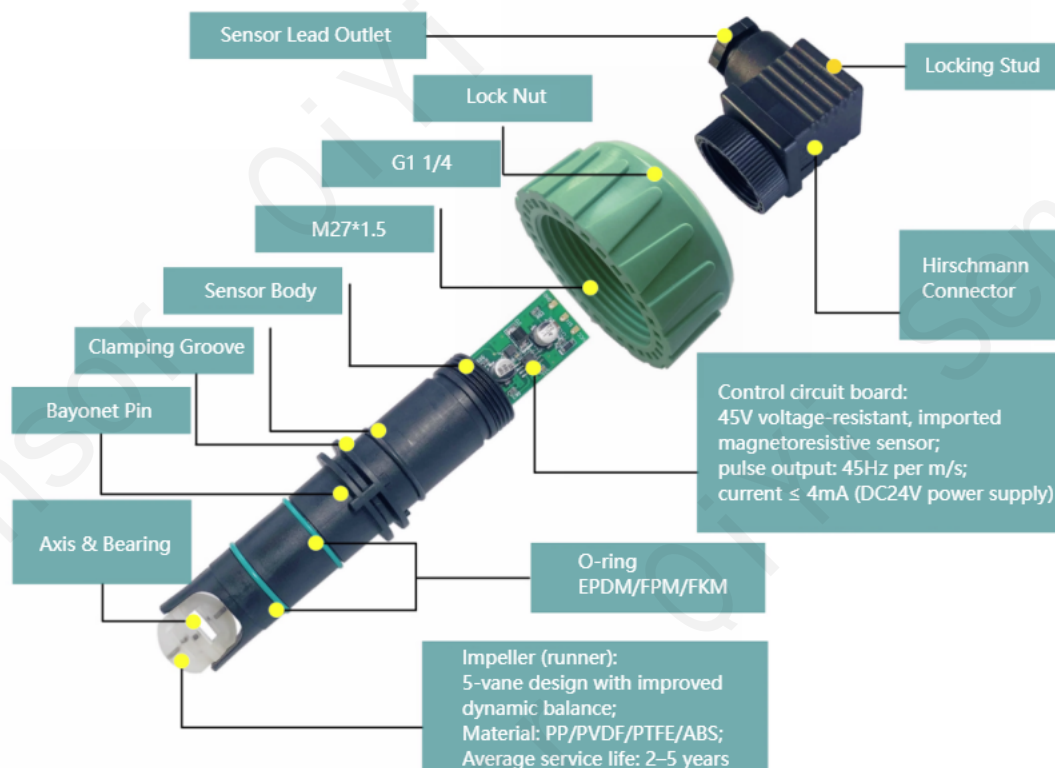


	4	PTFE	
Body Material	P	PP	
	V	PVDF	
	F	PTFE	
	S	SS316	
Axis/Bearing	Z	ZrO2	
	S	SS316L	
	T	Ti	
	C	Ha C	

Example:
KF11-11PZ (DN50)
Caliber: DN50
Rotor: PP
Body Material: PP
Axis/Bearing: ZrO2

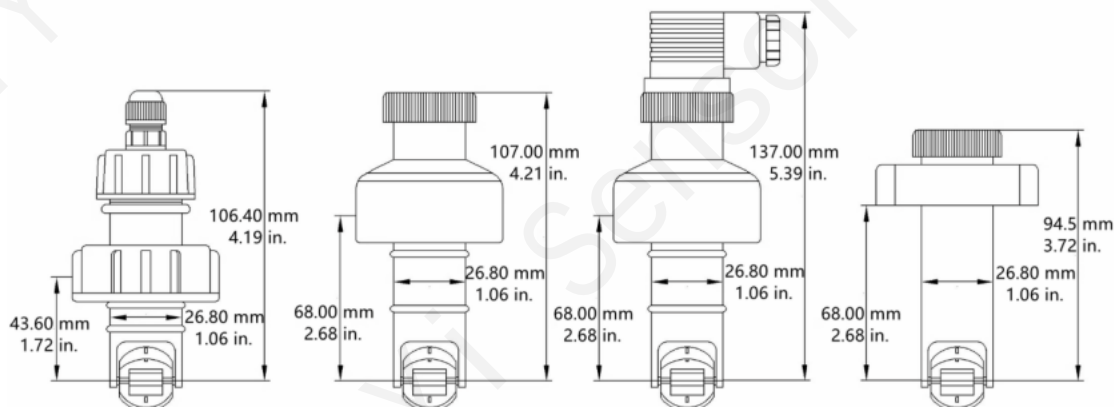
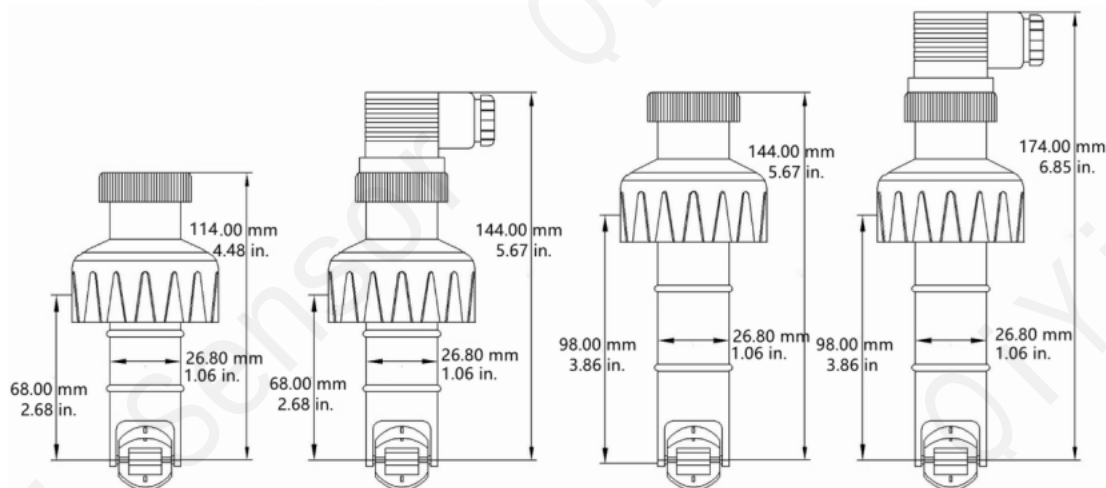
2. Flow Sensor Structure

2.1 Structure for KF11





2.2 Product size

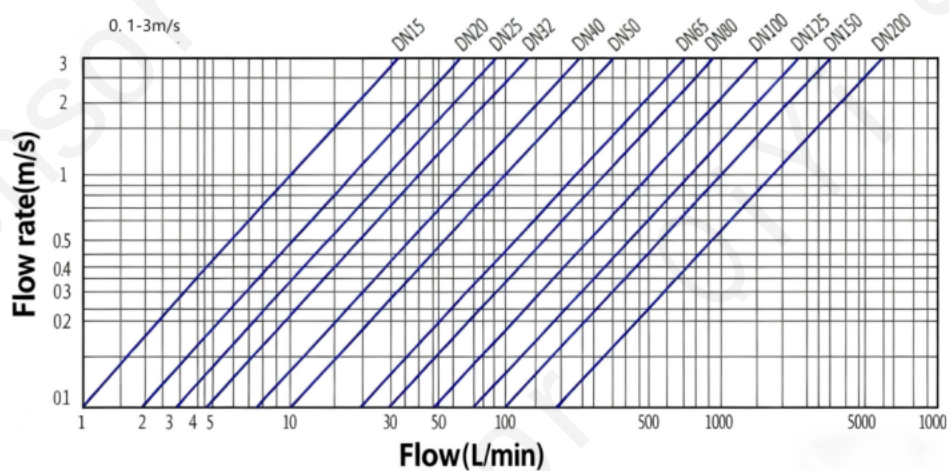


Compact type KF11-P10

Metal type KF11-S10

High pressure type KF11-G10

2.3 Flow curve



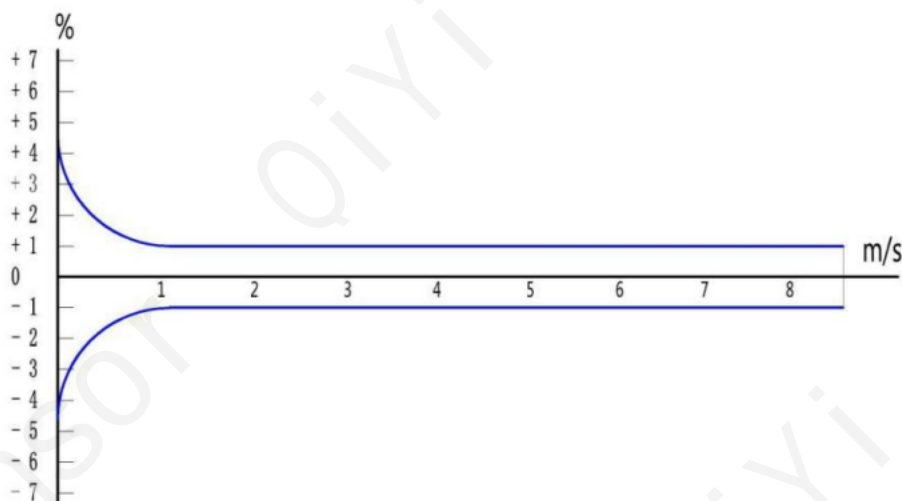


2.4 Check list of velocity& flow

velocity diameter flow	0.3	1.0	2.0	3.0	4.0	5.0	6.0
20	0.3393	1.1310	2.2619	3.3929	4.5239	5.6549	6.8760
25	0.5301	1.7671	3.5243	5.3014	7.0686	8.8357	10.603
40	1.3572	4.5239	9.0478	13.572	18.096	22.616	27.143
50	2.1206	7.0686	14.173	21.206	28.274	35.343	42.412
65	3.5838	11.946	23.892	35.838	47.784	59.730	71.675
80	5.4287	18.096	36.191	54.287	72.382	90.478	108.57
100	8.4823	28.274	56.549	84.823	113.10	141.37	169.65
150	19.085	63.617	127.23	190.85	254.47	318.09	381.70
200	33.929	113.10	226.19	339.29	452.39	565.49	678.58
300	76.340	254.47	508.94	763.41	1017.9	1272.3	1526.8
400	135.72	452.39	904.78	1357.2	1809.6	2261.9	2714.3
500	212.06	706.86	1413.7	2120.6	2827.4	3534.3	4241.1
600	3503.6	1017.9	2035.8	3053.6	4071.5	5089.4	6107.3

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2.5 Curve graph of paddle wheel accuracy



Remarks: the faster the velocity, the higher accuracy of the flow meter.

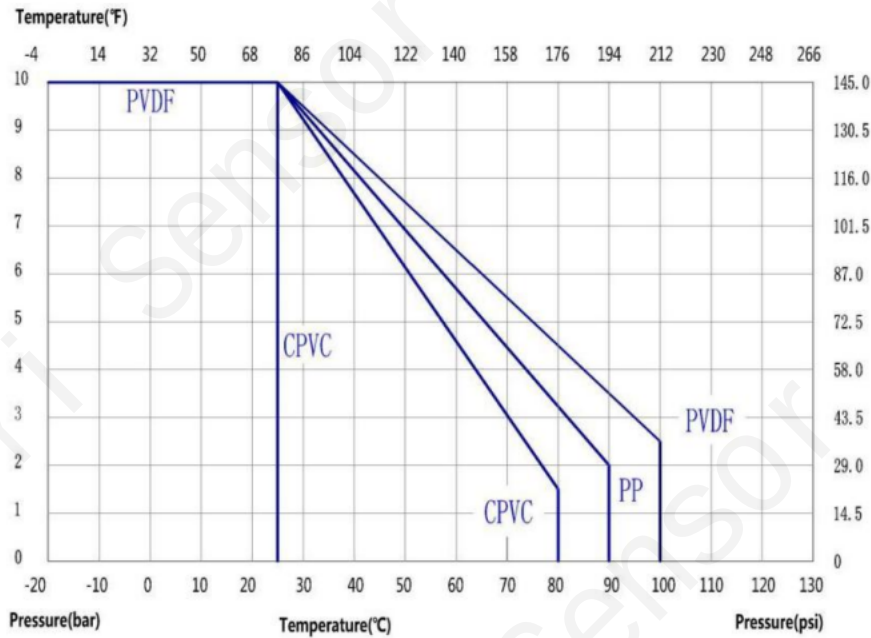
- Ensure full pipe flow and avoid low-velocity zones;
- Comply with the straight pipe section installation requirement- fluid instability in the pipeline will increase measurement errors;
- Do not install at bubble accumulation zones (e.g., the highest point of the pipeline). If



excessive bubbles exist, install an exhaust valve or offset the vertical line by 45° for installation;

- Avoid installing near high magnetic fields and high electric fields (such as large frequency converters and large motors) to reduce interference with the flow meter.

2.6 Working Pressure/Temperature



Working Pressure/Temperature:

PP: 12.5bar@25°C-1.7bar@80°C

CPVC: 12.5bar@25°C-1.7bar@80°C

PVDF: 12.5bar@25°C-2.5bar@100°C

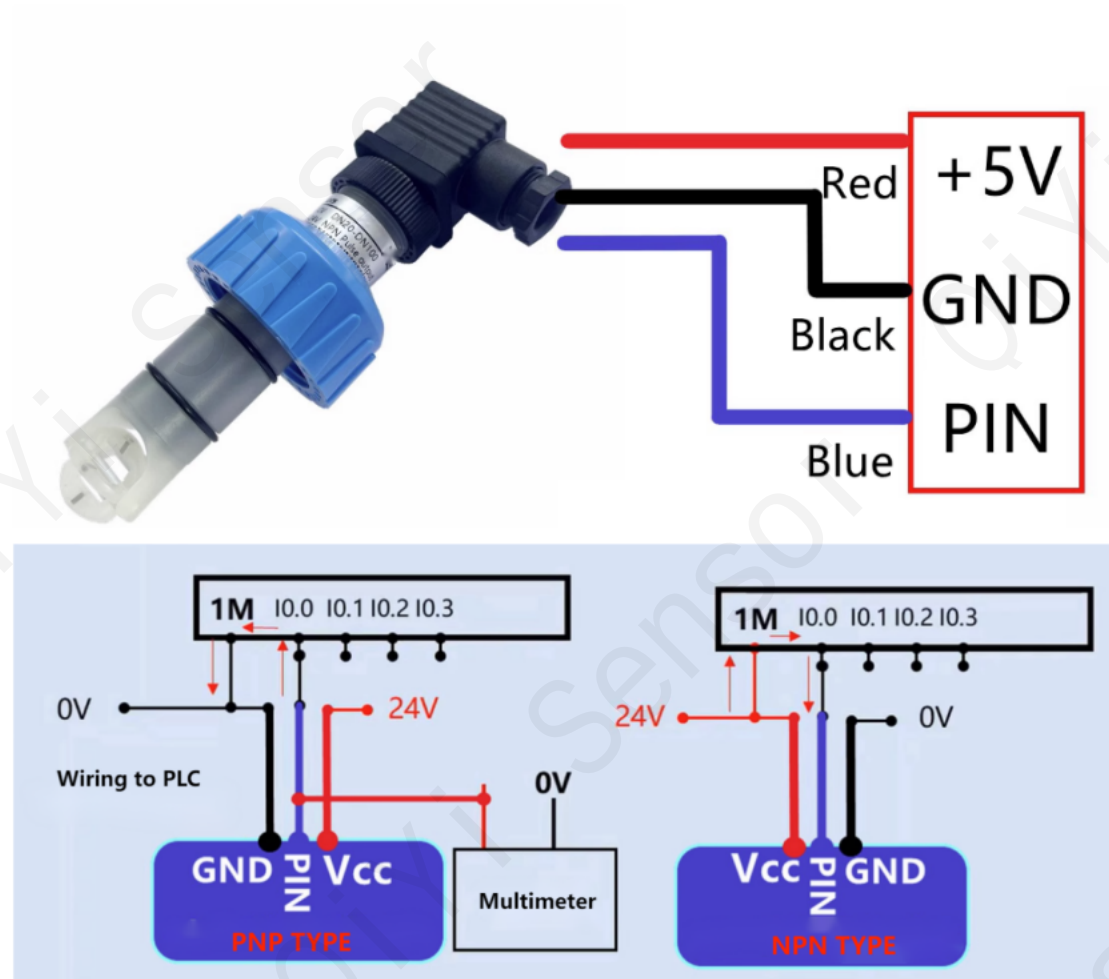
PTFE: 12.5bar@25°C-2.5bar@100°C

SS: 30bar@100°C



3. Installation and wiring

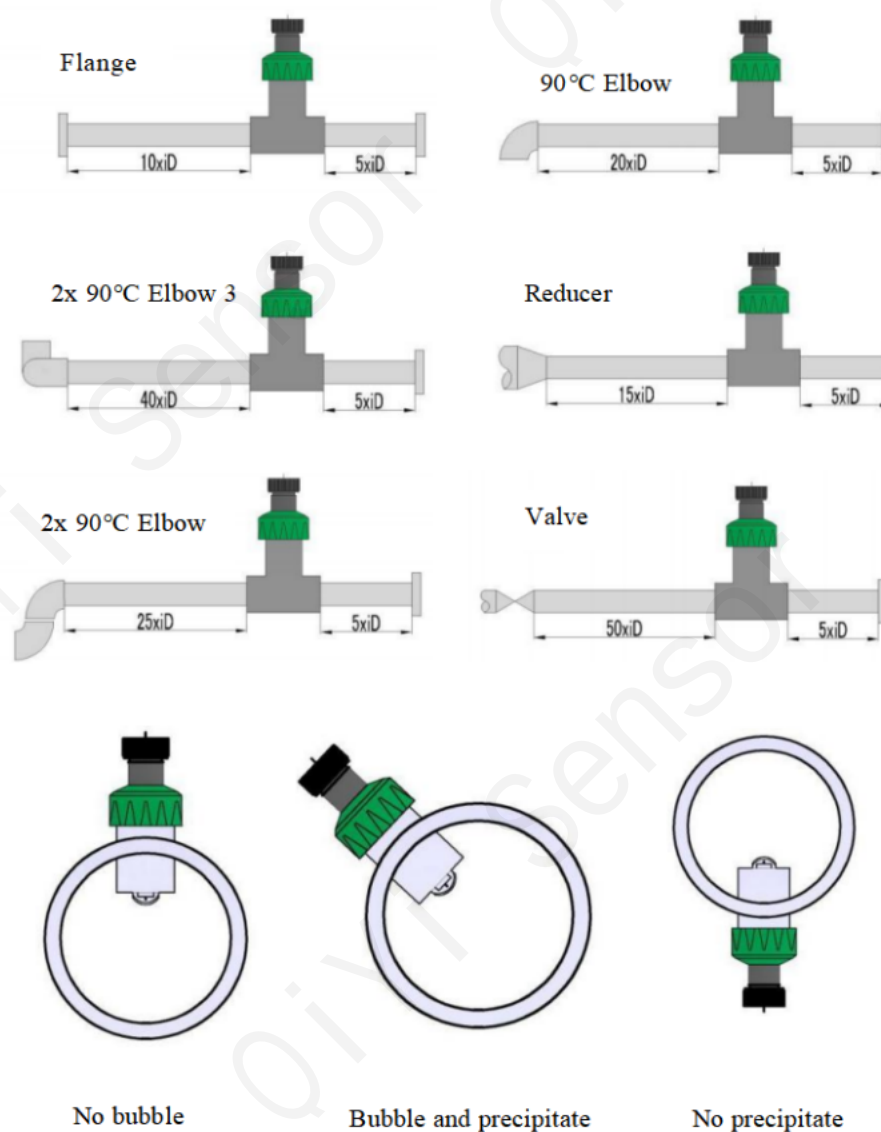
3.1 Wiring



Note: Please check the order of connecting wires after the above mentioned. Make sure the order is right or it will cause damage of transducer. Damage caused by human factors is not within the scope of warranty.



3.2 Installation



4. K-Factor

The K-factor refers to the number of pulses generated by a unit volume of fluid. Prior to commissioning, the instrument must be calibrated using other precision-compliant measuring devices to calculate this coefficient.

The K-factor is a fixed value—specifically, it is the actual coefficient obtained by the flow meter manufacturer through individual calibration for each instrument, independent of the initial design. Additionally, the sensor's K-factor varies with the material of the pipeline.



FITTING	PIPE SIZE		K-Factor
	DN	d	
TEE-PVC (PVC-U)			
TEE-PVC-15	15	20	198488
TEE-PVC-20	20	25	120113
TEE-PVC-25	25	32	77165
TEE-PVC-32	32	40	43498
TEE-PVC-40	40	50	36176
TEE-PVC-50	50	63	23114
TEE-PVC-65	65	75	15522
TEE-PVC-80	80	90	9578
TEE-PVC-100	100	110	5644
TEE-PP (PP)			
TEE-PP-15	15	20	178859
TEE-PP-20	20	25	114461
TEE-PP-25	25	32	75520
TEE-PP-32	32	40	41548
TEE-PP-40	40	50	35682
TEE-PE (PE)			
TEE-PE-20	20	25	114461
TEE-PE-25	25	32	75520
TEE-PE-32	32	40	41548
TEE-PE-40	40	50	35682

FITTING	PIPE SIZE		K-Factor
	DN	d	
TEE-PVC (CPVC)			
TEE-PVC-15	15	20	198488
TEE-PVC-20	20	25	120113
TEE-PVC-25	25	32	77165
TEE-PVC-32	32	40	43498
TEE-PVC-40	40	50	36176
TEE-PVC-50	50	63	23114
TEE-PVC-65	65	75	15522
TEE-PVC-80	80	90	9578
TEE-PVC-100	100	110	5644
TEE-SS (SS-316L)			
TEE-SS-15	15	20	-----
TEE-SS-20	20	25	13220
TEE-SS-25	25	32	77342
TEE-SS-32	32	40	43876
TEE-SS-40	40	50	34456
TEE-SS-50	50	63	23332
TEE-SS-65	65	80	14980



K-Factor for welding installation

FITTING	PIPE SIZE		K-Factor
	DN	d	
SS-WELDING (304)			
SS-WEL-40	40	50	36176
SS-WEL-50	50	63	23114
SS-WEL-65	65	75	15522
SS-WEL-80	80	90	9578
SS-WEL-100	100	110	5644
SS-WEL-125	125	140	3312
SS-WEL-150	150	160	2221
SS-WEL-200	200	225	1237
SS-WEL-250	250	280	730
SS-WEL-300	300	315	510
SS-WEL-350	350	377	402
SS-WEL-400	400	426	295
SS-WEL-500	500	529	200
SS-WEL-600	600	630	132
SS-WELDING (SS316L)			
SS-WEL-40	40	50	36176
SS-WEL-50	50	63	23114
SS-WEL-65	65	75	15522
SS-WEL-80	80	90	9578
SS-WEL-100	100	110	5644
SS-WEL-125	125	140	3312
SS-WEL-150	150	160	2221
SS-WEL-200	200	225	1237

FITTING	PIPE SIZE		K-Factor
	DN	d	
PVC-WELDING (PVC-U)			
PVC-WEL-40	40	50	36176
PVC-WEL-50	50	63	23114
PVC-WEL-65	65	75	15522
PVC-WEL-80	80	90	9578
PVCWEL-100	100	110	5644
PVCWEL-125	125	140	3312
PVCWEL-150	150	160	2221
PVCWEL-200	200	225	1237
PVCWEL-250	250	280	730
PVCWEL-300	300	315	510
PVCWEL-350	350	377	402
PVCWEL-400	400	426	295
PVCWEL-450	450	478	243
PVCWEL-500	500	529	200
PVCWEL-600	600	630	132



K-Factor for flange installation

FITTING	PIPE SIZE		K-Factor
	DN	d	
FLANGE-PVC (PVC-flange)			
FLA-PVC-50	50	63	22225
FLA-PVC-65	65	75	14955
FLA-PVC-80	80	90	8270
FLA-PVC100	100	110	4669
FLA-PVC125	125	140	2769
FLA-PVC150	150	160	2081
FLA-PVC200	200	225	995
FLA-PVC250	250	280	615
FLA-PVC300	300	315	450
FLANGE-PP (PP-flange)			
FLA-PP-50	50	63	22348
FLA-PP-65	65	75	15078
FLA-PP-80	80	90	8320
FLA-PP-100	100	110	4699
FLA-PP-125	125	140	2785
FLA-PP-150	150	160	2112
FLA-PP-200	200	225	1022
FLA-PP-250	250	280	623
FLA-PP-300	300	315	455

FITTING	PIPE SIZE		K-Factor
	DN	d	
FLANGE-PE (PE -flange)			
FLA-PE-50	50	63	22225
FLA-PE-65	65	75	14955
FLA-PE-80	80	90	8270
FLA-PE-100	100	110	4669
FLA-PE-125	125	140	2769
FLA-PE-150	150	160	2081
FLA-PE-200	200	225	995
FLA-PE-250	250	280	615
FLA-PE-300	300	315	450
FLANGE-PTFE (PTFE-flange)			
FLA-PTFE-50	50	63	22348
FLA-PTFE-65	65	75	15078
FLA-PTFE-80	80	90	8320
FLA-PTFE100	100	110	4699
FLA-PTFE125	125	140	2785
FLA-PTFE150	150	160	2112
FLA-PTFE200	200	225	1022
FLA-PTFE250	250	280	623
FLA-PTFE300	300	315	455



K- Factor for Gap frame installation

FITTING	PIPE SIZE		K-Factor
	DN	d	
Gap frame installation parts			
K-Factor			
SAD-80	80		9608
SAD-100	100		5222
SAD-125	125		3300
SAD-150	150		2221
SAD-200	200		1234
SAD-250	250		759
SAD-300	300		523
SAD-350	350		432
SAD-400	400		312
SAD-450	450		----

Other installation types

FITTING	PIPE SIZE		K-Factor
	DN	d	
Miniaturized PVC			
TEE-PVC-20	20	25	120113
TEE-PVC-25	25	32	77165
TEE-PVC-32	32	40	43498
TEE-PVC-40	40	50	36176

FITTING	PIPE SIZE		K-Factor
	DN	d	
SS-welding installation parts			
SS-WEL-80	80	90	9578
SS-WEL-100	100	110	5644
SS-WEL-125	125	140	3312
SS-WEL-150	150	160	2221
SS-WEL-200	200	225	1237
SS-WEL-300	300	315	555



5. Optional Accessories

Pipe base	Name	Diameter
	PVC three way type	DN15 DN20 DN25 DN32 DN40 DN50 DN65 DN80 DN100
	SS three way type	DN15 DN20 DN25 DN32 DN40
	SS-welding installation parts	DN40 DN50 DN65 DN80 DN100 DN125 DN150 DN200 DN250 DN300 DN350 DN400 DN450 DN500 DN600
	PVC-welding installation parts	DN40 DN50 DN65 DN80 DN100 DN125 DN150 DN200 DN250 DN300 DN350
	Flange installation parts	DN50 DN65 DN80 DN100 DN125 DN150 DN200 DN250 DN300 DN400
	Gap frame installation parts	DN100 DN125 DN150 DN200 DN250 DN300 DN400 DN450



6. Attentions

Safety Warning

After unpacking, read all contents of this manual thoroughly before installation and operation—pay special attention to all hazard warnings and precautions.

Quality Assurance

From the date of delivery, the product is guaranteed to be free from defects caused by unqualified materials or factory manufacturing for a period of at least one year. During the warranty period, the company shall be responsible for free replacement or repair of the product.

Warranty Exclusions

The following situations are not covered by the quality assurance:

Damage caused by force majeure, including natural disasters, wars (declared or undeclared), terrorism, strikes, or changes in statutory regulations.

Damage resulting from misuse, negligence, accidents, or improper installation and operation.

Damage incurred due to unauthorized repair, attempted repair, or modification of the product.

Damage caused by failure to follow the product's operating instructions.

Travel expenses associated with on-site maintenance services.

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Technical data subject to change without notice.



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