TIANJIN FREYA AUTOMATION TECHNOLOGY CO., LTD.

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FRY·弗瑞亚
Electric Actuator

Pneumatic Diaphragm Single-seat Control Valve



Product Catalog

TIANJIN FREYA AUTOMATION TECHNOLOGY CO., LTD.

PRODUCT APPLICATIONS



COMPANY PROFILE

Founded in 2014, Freya specializes in fluid control products and services such as valves, actuators, electric valve actuators, and electric valves. It focuses on the process industry and has long been committed to providing services to process industries such as power, steel, building materials, and water treatment to provide professional fluid control solutions. Based on the actual working conditions, through necessary on-site surveying and technical explanations, we provide customers with safe, economical and environmentally friendly selection and design, supply in strict accordance with contract requirements and guide installation and debugging, and hand over for use if standards are met. Thanks to the trust of the vast number of users, through long-term and large-scale on-site services, and the effective accumulation of technical experience, the company has an accurate understanding of the real needs and pain points of users and the market, as well as expectations for equipment manufacturers.

The company based on its own patent R & D and production of intelligent electric actuators, reliable, durable, easy to use, cost-effective and guaranteed service. Being close to users, providing full-process services, cover-all services, repair and maintenance value-added services, and escorting users' production are our differentiating advantages. Freya intelligent electric actuator and electric valve actuator provide a two-year warranty and lifetime free after-sales service after installation and commissioning. Technical quality and commercial credit are the two foundations on which the company relies to survive and drive the development of the company. Users feel reassured, worry-free and happy, which are the only criteria to evaluate the effectiveness of our work and demonstrate the value of our existence.





















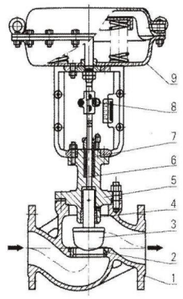


Figure 1 ZJHP normal temperature type
1. Body 2. Seat 3. Core
4. Guide sleeve 5. Bonnet 6. Stem
7. Packing 8. Indicator disc 9. Actuator

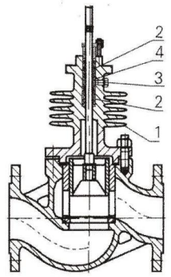


Figure 2 ZJHP high-temperature type
1. Heat dissipator 2. Packing 3. Oil injector port
4. Spacer

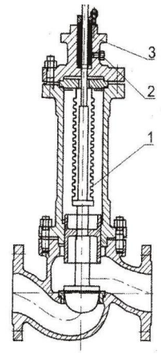


Figure 3 Bellows seal type
1. Bellows 2. Oil filler
3. Upper bonnet

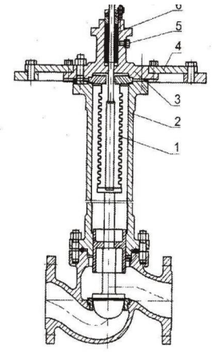


Figure 4 Low-temperature type
1. Bellows 2. Extended bonnet
3. Upper valve bonnet
4. Supporting installation flange
5. Oil filler 6. Packing

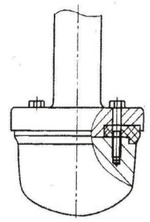


Figure 5 Regulating
and shut-off
soft seal valve core

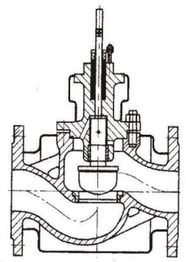


Figure 6 Jacket insulation type

This series of control valves adopts a modular design, allowing for various combinations and accessories.

Overview

The ZJHP series pneumatic diaphragm single-seat control valve adopts a top-guided structure and is paired with a multi-spring actuator, featuring an S-shaped flow channel. It boasts compact structure, light weight, sensitive action, minimal pressure drop loss, large valve capacity, precise flow characteristics, and convenient maintenance, making it suitable for demanding working conditions. It is particularly suitable for applications where small leakage is allowed and the pressure difference between the upstream and downstream of the valve is not significant.

This series of products includes various types such as normal temperature type, high temperature type, low temperature type, regulating and shut-off valve, bellows sealed type, and jacket insulation type. The nominal pressure ratings of the products are PN1.6, 4.0, 6.4, and 10.0 (MPa); the valve body diameter range is DN20~300 (mm); the applicable fluid temperature range is -196~+560℃; the leakage levels are Level IV, Level V, and Level VI; and the flow characteristics include linear and equal percentage. A variety of specifications are available for selection.

Type

The ZJHP normal temperature type has an operating temperature range of -20 to +200℃, with a leakage level of IV (Figure 1);
The ZJHG high-temperature valve bonnet is equipped with cooling fins, suitable for applications with medium temperatures ranging from -60 to +450℃ (Figure 2);
The ZJHW bellows seal type forms a complete seal for the valve stem that moves up and down, preventing fluid leakage (Figure 3);
The ZJHD low-temperature model adopts an extended valve bonnet and bellows sealing structure, suitable for use in cryogenic applications down to -196℃ (Figure 4);
The valve core with ZJHQ low-regulating cutoff soft seal structure meets the VI-level leakage standard (Figure 5);
ZJHJ jacketed insulation type is equipped with a stainless steel insulation jacket, suitable for applications where fluid cooling may lead to crystallization, solidification, and subsequent blockage (Figure 6);
The ZJHF fluorine-lined single-seat control valve features F46 at the part in contact with the fluid, and the packing area is sealed with a polytetrafluoroethylene bellows, making it particularly suitable for fluid control of highly corrosive media. The valve core and seat are overlay welded with stellite alloy, suitable for high temperature, deep cold, and other harsh working conditions.

Action mode

In the case of a power-to-close (FO) valve, the actuator spring opens the valve when the air supply fails.
In the case of a power-to-open (FC) valve, the actuator spring closes the valve when the air supply fails.

Technical parameters

Table 1

Nominal diameter DN(mm)		20	25	32	40	50	65	80	100	125	150	200
Rated flow coefficient Kv	Linear	6.9	11	17.6	27.5	44	69	110	176	275	440	690
	Equal percentage	6.3	10	16	25	40	63	100	160	250	400	630
Actuator model	Positive action	ZHA-22		ZHA-23			ZHA-34			ZHA-45		
	Negative effect	ZHB-22		ZHB-23			ZHB-34			ZHB-45		
Rated stroke L(mm)		16		25			40			60		
Diaphragm effective area Ae(cm²)		280		400			600			1000		
Nominal pressure PN (MPa)		1.6、4.0、6.4、10.0										
Inherent flow characteristics		Linear, equal percentage										
Inherent adjustable ratio R		50:1										
Signal range Pr (KPa)		20-60、20-100、40-200、60-100、80-240										
Air source pressure PS (MPa)		0.14、0.25、0.28、0.40										

Main performance indicators

Table 2

No.	Item			Standard control valve		High temperature and low temperature control valve	
				Without positioner	With positioner	Without positioner	With positioner
1	Basic error<(%)			±5	±1	±15	±4
2	Return difference<(%)			3	1	10	3
3	Dead zone<(%)			3	0.4	8	1
4	Starting and ending point deviation <(%)	Air to open	Starting point	±2.5	±1	±6	±2.5
			End point	±5		±15	
		Air to close	Starting point	±5		±15	
			End point	±2.5		±6	
5	Rated stroke deviation<(%)			±2.5	±2.5	±6	±2.5

Operating temperature and pressure range of valve body and valve bonnet materials

Table 3 Unit: kgf/cm²

Pressure / Temperature	PN16		PN40		PN64	
	ZG230-450	ZG1Cr18Ni9Ti	ZG230-450	ZG¹Cr18Ni9Ti	ZG230-450	ZG1Cr18Ni9Ti
-196~-20	-	16.0	-	40.0	-	64.0
-20~-100	16.0	16.0	40.0	40.0	64.0	64.0
150	16.0	16.0	40.0	40.0	64.0	64.0
200	16.0	16.0	40.0	40.0	64.0	64.0
250	14.0	15.0	36.0	38.0	56.0	60.0
300	12.5	14.0	32.0	36.0	50.0	56.0
350	11.0	13.2	28.0	34.0	45.0	53.0
400	10.0	12.5	25.0	32.0	40.0	50.0
425	9.0	12.0	22.0	30.7	36.0	48.4
450	6.7	1.5	17.0	29.5	26.5	46.8
500	-	10.5	-	26.5	-	42.5
525	-	9.9	-	24.6	-	39.2
560	-	9.0	-	22.0	-	36.0

Operating temperature range of the complete machine • Valve seat leakage Material: cast steel

Table 4

Valve body	ZG230~450						
Valve core	1Cr18Ni9Ti	1Cr18Ni9Ti+ Reinforced PTFE	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti+Stellite alloy
Valve seat	1Cr18NI9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Crt8Ni9Ti+Stellite alloy
Packing	PTFE	PTFE/graphite+PTFE	Graphite+PTFE	Graphite+PTFE	Bellows+PTFE	Bellows + graphite	Bellows + graphite
Gasket	F4/V6590	F4/V6590	V6590②	V6590	F4/V6590	V6590	V6590
Upper bonnet form	Standard	Standard	Standard	High temperature type	Bellows sealed type	Bellows sealed type	High temperature type
Leakage level	Ⅳ	Ⅵ	Ⅳ	Ⅳ	Ⅳ	Ⅳ	Ⅴ
Valve seat leakage (L/h)	10^{-4}xKv	Micro bubble ①	10^{-4}xKv	10^{-4}xKv	10^{-4}xKv	10^{-4}xKv	$1.8x10^{-7}$ X $\triangle$PXD
Temperature range (℃)	-20~160	-20~180	-20~200	-20~450	-20~200	-20~450	-20~450

Material: stainless steel

Table 5

Valve body	1Cr18Ni9Ti								
Valve core	1Cr18Ni9Ti	1Cr18Ni9Ti +Reinforced PTFE	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti +Stellite alloy	1Cr18Ni9Ti	1Cr18Ni9Ti +Stellite alloy
Valve seat	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti	1Cr18Ni9Ti +Stellite alloy	1Cr18Ni9Ti	1Cr18Ni9Ti +Stellite alloy
Packing	PTFE	PTFE/graphite +PTFE	Graphite +PTFE	Graphite +PTFE	Bellows +PTFE	Bellows +graphite	Bellows +graphite	Bellows +graphite	Bellows +graphite
Gasket	F4/V6590	F4/V6590	V6590②	V6590	F4/V6590	V6590	V6590	LF2	LF2
Upper bonnet form	Standard	Standard	Standard	High temperature	Bellows sealed type	Bellows sealed type	High temperature	Low temperature	Low temperature
Leakage level	IV	VI	IV	IV	IV	IV	V	IV	V
Valve seat leakage (L/h)	10^{-4}xKv	Micro bubble ①	10^{-4}xKv	10^{-4}xKv	10^{-4}xKv	10^{-4}xKv	$1.8x10^{-7}$X △PXD	10^{-4}xKv	$1.8x10^{-7}$ X △PXD
Temperature range (℃)	-20~160	-20~180	-40~200	-60~450	-20~200	-60~450	-60~560	-196~60	-196~60

Notes: 1.① for details on bubble count, see GB/T4213-92;
2. △P is the pressure differential across the valve, in kPa; D is the valve seat diameter, in mm;
3.② V6590 material: Stainless steel tape filled with flexible graphite.

Relative flow value under inherent flow characteristic relative stroke R50:1

Table 6 unit: %

L/Lmax / Characteristis / Q/Omax	0	10	20	30	40	50	60	70	80	90	100
Linear	2	11.8	21.6	31.4	41.2	51	60.8	70.6	80.4	90.2	100
Equal percentage	2	3	4.37	6.5	9.6	14.1	20.9	30.9	45.7	67.6	100

Allowable differential pressure
Air-to-close (positive action) metal-seal allowable differential pressure

Table 7 Unit: MPa

Actuator model	Spring range (KPa)	Air source (MPa)	Positioner (Yes/No)	Valve seat diameter (mm)										
				20	25	32	40	50	65	80	100	125	150	200
ZHA-22	20-100	0.14	No	0.95	0.61									
			Yes	2.55	1.63									
	40-200	0.25	Yes	3.34	2.14									
	80-240	0.4	Yes	6.52	4.17									
ZHA-23	20-100	0.14	No			0.49	0.32	0.20						
			Yes			1.31	0.84	0.54						
	40-200	0.25	Yes			1.72	1.10	0.71						
	80~240	0.4	Yes			3.36	2.15	1.37						
ZHA-34	20-100	0.14	No						0.18	0.12	0.08			
			Yes						0.49	0.32	0.21			
	40-200	0.25	Yes						0.65	0.43	0.27			
	80-240	0.4	Yes						1.26	0.83	0.53			
ZHA-45	20-100	0.14	No									0.09	0.06	0.03
			Yes									0.23	0.16	0.09
	40-200	0.25	Yes									0.30	0.21	0.12
	80-240	0.4	Yes									0.58	0.40	0.22

Air-to-open (reverse action) metal-seal allowable differential pressure

Table 8 Unit: MPa

Actuator model	Spring range (KPa)	Air source (MPa)	Positioner Yes/No	Valve seat diameter (mm)										
				20	25	32	40	50	65	80	100	125	150	200
ZHA-22	20-100	0.14	Yes, no	0.95	0.61									
	40-200	0.25	Yes	2.55	1.63									
	80-240	0.28	Yes	3.34	3.67									
ZHA-23	20-100	0.14	Yes, no			0.49	0.32	0.20						
	40-200	0.25	Yes			1.31	0.84	0.54						
	80-240	0.28	Yes			2.95	1.89	1.21						
ZHA-34	20-100	0.14	Yes, no						0.18	0.12	0.08			
	40-200	0.25	Yes						0.49	0.32	0.21			
	80-240	0.28	Yes						1.11	0.73	0.47			
ZHA-45	20-100	0.14	Yes, no									0.09	0.06	0.03
	40-200	0.25	Yes									0.23	0.16	0.09
	80-240	0.28	Yes									0.52	0.36	0.20

Air-to-close (reverse action) soft-seal allowable differential pressure

Table 9 Unit: MPa

Actuator model	Spring range (KPa)	Air source (MPa)	Positioner Yes/No	Valve seat diameter (mm)										
				20	25	32	40	50	65	80	100	125	150	200
ZHA-22	20-100	0.14	No	1.20	0.76									
			Yes	2.78	1.78									
	40-200	0.25	Yes	3.00	2.29									
	80-240	0.4	Yes	3.00	3.00									
ZHA-23	20-100	0.14	No			0.62	0.39	0.25						
			Yes			1.44	0.92	0.59						
	40-200	0.25	Yes			1.85	1.18	0.76						
	80-240	0.4	Yes			3.00	2.23	1.42						
ZHA-34	20-100	0.14	No						0.23	0.15	0.10			
			Yes						0.54	0.38	0.23			
	40-200	0.25	Yes						0.69	0.48	0.29			
	80-240	0.4	Yes						1.30	0.86	0.55			
ZHA-45	20-100	0.14	No									0.11	0.08	0.04
			Yes									0.25	0.17	0.10
	40-200	0.25	Yes									0.32	0.22	0.13
	80-240	0.4	Yes									0.60	0.42	0.23

Air-to-open (reverse action) metal-seal allowable differential pressure

Table 10 Unit: MPa

Actuator model	Spring range (KPa)	Air source (MPa)	Positioner Yes/No	Valve seat diameter (mm)										
				20	25	32	40	50	65	80	100	125	150	200
ZHB-22	20-100	0.14	Yes, no	1.19	0.76									
	40-200	0.25	Yes	2.78	1.78									
	80-240	0.28	Yes	3.00	3.00									
ZHB-23	20-100	0.14	Yes, no			0.62	0.39	0.25						
	40-200	0.25	Yes			1.44	0.92	0.59						
	80-240	0.28	Yes			3.00	1.97	1.26						
ZHB-34	20-100	0.14	Yes, no						0.23	0.15	0.10			
	40-200	0.25	Yes						0.54	0.36	0.23			
	80-240	0.28	Yes						1.15	0.76	0.49			
ZHB-45	20-100	0.14	Yes, no									0.11	0.07	0.04
	40-200	0.25	Yes									0.25	0.17	0.10
	80-240	0.28	Yes									0.54	0.37	0.21

Connection dimensions and standards

Connection methods: Flange, thread, welding

Flange standards: PN16 steel flanges comply with GB/T9113.1

PN40, 64, and 100 steel flanges comply with GBT9113.2

Seal Type: PN16 raised flange; PN40, 64, and 100 concave-convex flange, valve body concave flange

Flange ends: GB12221-89

Actuator: Diaphragm actuator air signal port, female thread RC1/8, RC1/4, or RC1/2

Connection method: The valve body flange and flange face-to-face distance can be manufactured to user-specified standards, such as ANSI, DIN, and JIS.

Notes on the allowable differential pressure table:

Packing material is PTFE;

The flow direction of the medium is opposite to the direction of valve core closing;

Metal-seal models have a Class IV leakage rating;

Values are limited by the nominal pressure, and temperature gauges;

For bellows seals, recheck if P2 = 0.

Special requirements

Special inspection;

Complete degreasing and dewatering treatment;

Copper-free treatment;

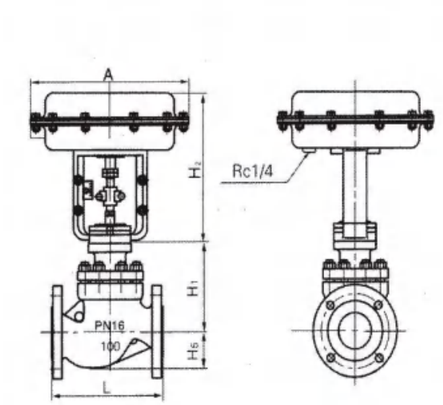
Special connections and piping;

Use under vacuum conditions;

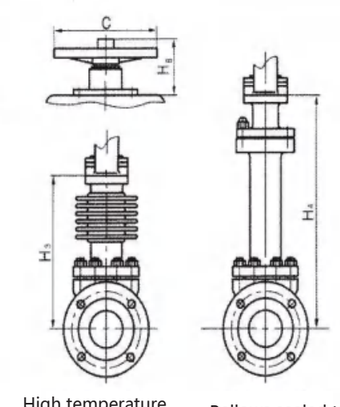
Specified coating color;

Special media (oxygen, chlorine, hydrogen);

Use of stainless steel connectors.

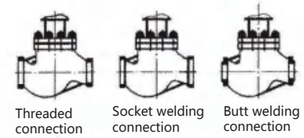


Normal temperature type



High temperature heat dissipation type

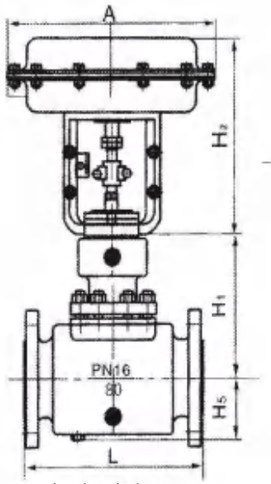
Bellows sealed type



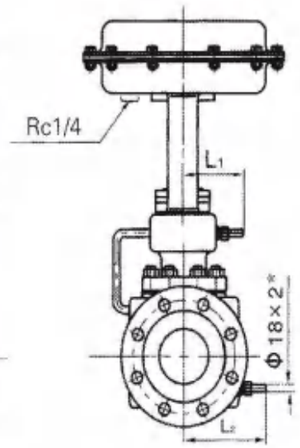
Dimensions and weights of normal temperature type, high temperature type and bellows sealed type PN16/40

Table 11 Unit: mm

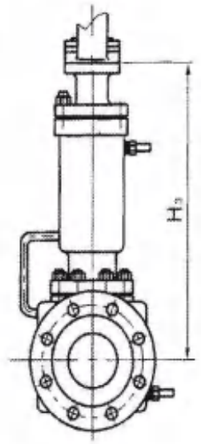
DN		20	25	32	40	50	65	80	100	125	150	200
L	PN16	185	200	205	222	254	276	298	352	410	451	600
	PN40	194	205	210	230	267	292	310	368	425	460	615
A		285	285	285	285	285	360	360	360	470	470	470
H1		128	128	152	152	160	205	200	208	273	333	364
H2		298	298	298	298	298	380	380	380	510	510	510
H3		208	208	224	228	228	334	334	342	408	453	482
H4		338	338	402	402	405	627	628	635	698	702	728
H5		53	58	68	73	80	90	98	108	123	140	168
C		220	220	220	220	220	270	270	270	320	320	320
H6		180	180	180	180	180	236	236	236	310	310	310
WT. (kg)		21	22	24	32	38	62	67	83	132	160	245



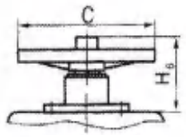
Jacket insulation type



Bellows sealed type



Jacket insulation type



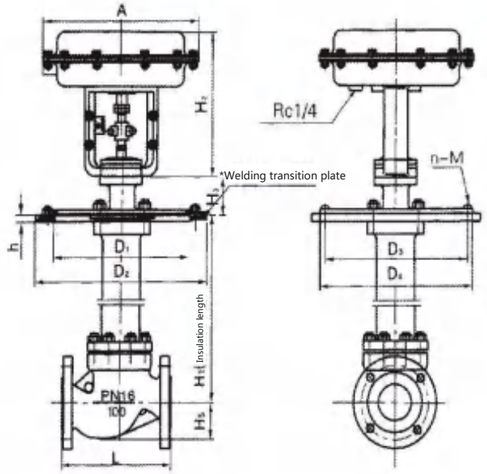
Top handwheel

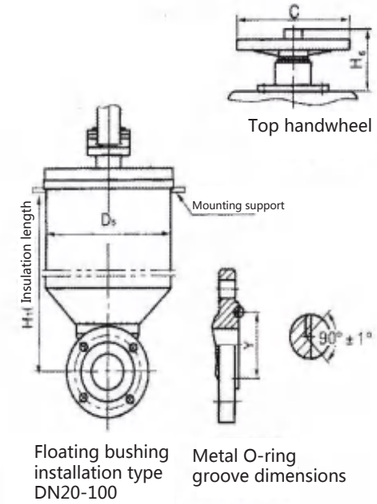
Note: The jacket body interface can be made into flange, ferrule, thread and other forms according to user requirements.

Dimensions and weight of jacket insulation type PN16/40

Table 12 Unit: mm

DN		20	25	32	40	50	65	80	100	125	150	200
L	PN16	185	200	205	222	254	276	298	352	410	451	600
	PN40	194	205	210	230	267	292	310	368	425	460	615
A		285	285	285	285	285	360	360	360	470	470	470
H1		152	152	177	177	183	221	221	230	315	355	385
H2		298	298	296	298	298	380	380	380	510	510	510
H3		220	220	240	240	240	350	350	360	420	470	500
H5		75	81	89	95	109	121	33	146	160	180	210
L1		101	101	108	108	108	128	123	123	140	140	140
L2		126	126	126	130	141	156	170	180	200	220	265
C		220	220	220	220	220	270	270	270	320	320	320
H6		180	180	180	180	180	236	236	236	310	310	310
Flange		40	40	50	65	80	100	125	150	200	250	300
WT. (kg)		26	27	35	44	56	84	88	109	185	202	305





Floating bushing installation type DN20-100

Metal O-ring groove dimensions

Dimensions and weight low-temperature type PN16/40

Table 13 Unit: mm

DN		20	25	32	40	50	65	80	100	125	150	200
L	PN16	185	200	205	222	254	276	298	352	410	451	600
	PN40	194	205	210	230	267	292	310	368	425	460	615
A		285	285	285	285	285	360	360	360	470	470	470
H1		700										
H2		298	298	298	298	298	380	380	380	510	510	510
H3		88	88	88	88	88	94	94	94	110	110	110
H5		42	48	56	64	76	89	100	122	133	160	197
D1		230	230	250	270	305	342	375	430	490	556	665
D2		310	310	335	355	390	430	465	520	585	660	770
h		15	15	15	15	15	18	18	18	20	20	20
D3		260	260	285	305	340	370	405	460	525	590	700
D4		290	290	315	335	370	400	435	490	555	630	740
n-M		8-M12	8-M12	8-M12	8-M14	8-M14	10-M14	10-M14	12-M16	14-M16	16-M16	18-M16
D5		285					470					
Y		45	45	60	65	75	90	104	135	165	195	245
C		220	220	220	220	220	270	270	270	320	320	320
H6		180	180	180	180	180	236	236	236	310	310	310
WT. (kg)		40	48	52	60	68	90	105	143	210	282	315