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ShoWA CATALOGUE

OVERLOAD PROTECTOR



～因技术改良引起的产品尺寸和参数改变，恕不另行通知～

～Due to the continuing innovations, product dimensions subject to change without further notice～

■用途 Usage

本过载保护装置用来保护压力机在冲压作业中，因过载而不被损坏。它与滑块液压缸、供气管路、液压管路及电气线路组成液压保护系统，可达到以下功能：

The Overload Protector protects the press from being damaged in overload operation. The hydraulic protection system consists of the slide's hydraulic cylinder, air piping, hydraulic piping and electric circuit. Its functions are:

1. 压力机正常运转时，滑块液压缸内保持一定的预压力；
Maintain certain preloading slide pressure during normal operation;
2. 压力机过载时，滑块紧急停止；
Emergency stop when overload is detected;
3. 滑块液压缸内的压力小于设定预压力时，压力机不能运转。
Stop press operation when the slide pressure is smaller than the set preload value.

■动作精度 Operation accuracy

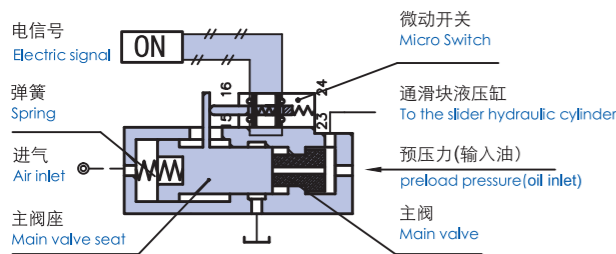
- ◆卸荷压力控制在设定压力的±5%以内；
The unloading pressure is controlled within ±5% of the set tonnage.

■型式分类 Types of Protectors

1. 一体气压式：气动泵和卸荷阀一体，通过调节气压设定卸荷压力；
Integrated Air Type: Integrated design of pneumatic pump and unloading valve. The unloading pressure is set by adjusting air pressure;
2. 一体弹簧式：气动泵和卸荷阀一体，通过调节弹簧设定卸荷压力；
Integrated Spring Type: Integrated design of pneumatic pump and unloading valve. The unloading pressure is set by adjusting the spring;
3. 分体气压式：气动泵和卸荷阀分体，通过调节气压设定预压力及卸荷压力。
Detached Air Type: Detached design of pneumatic pump and unloading valve. The unloading pressure is set by adjusting air pressure.

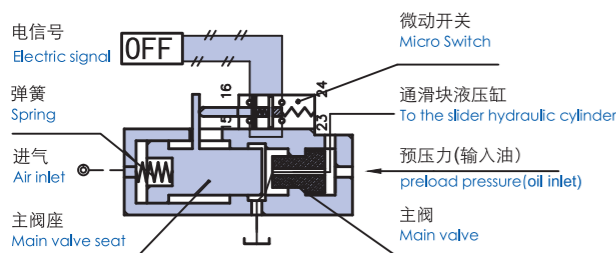
■卸荷阀动作原理 Work Principle of the Unloading Valve

◆正常运转状态 Normal Condition



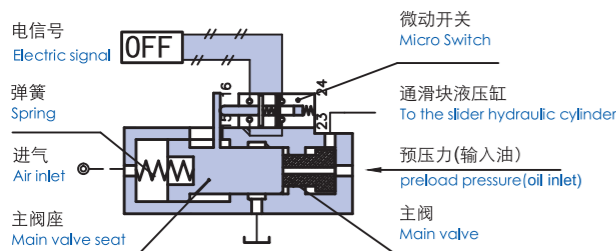
1. 气动泵工作，卸荷阀输入油压力达到设定预压力，主阀关闭；
Pneumatic pump is working, and oil pressure in unloading valve reaches the set preload value. Main valve closes.
2. 微动开关：16-24 ON，
Micro Switch
3. 电信号 ON；
Electric signal
4. 压力机可正常运转；
The press can operate normally;

◆超负荷状态 Overload Condition



1. 压力机过载，滑块液压缸的压力上升至设定卸荷压力以上，主阀座克服气压或弹簧力左移，主阀开启；
Press overload. Slide pressure exceeds the set value. Main valve seat move left against air pressure and spring force. Main valve opens.
2. 微动开关：16-24 OFF，
Micro Switch
3. 电信号 OFF；
Electric signal
4. 压力机不可运转。
The press can not operate.

◆预压力不足状态 Insufficient Pressure Condition



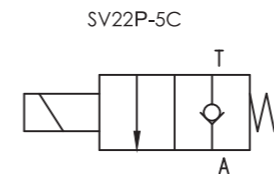
1. 滑块液压缸的压力低于设定预压力，主阀及主阀座被弹簧推动而右移，主阀关闭；
Slide pressure is lower than the set value. The main valve and main valve seat are pushed to the right by spring force. Main valve closes.
2. 微动开关：16-24 OFF，
Micro Switch
3. 电信号 OFF；
Electric signal
4. 压力机不可运转。
The press can not operate.



电磁换向阀
SOLENOID DIRECTIONAL VALVE

SV

■机能符号 Symbol



■规格参数 Specification

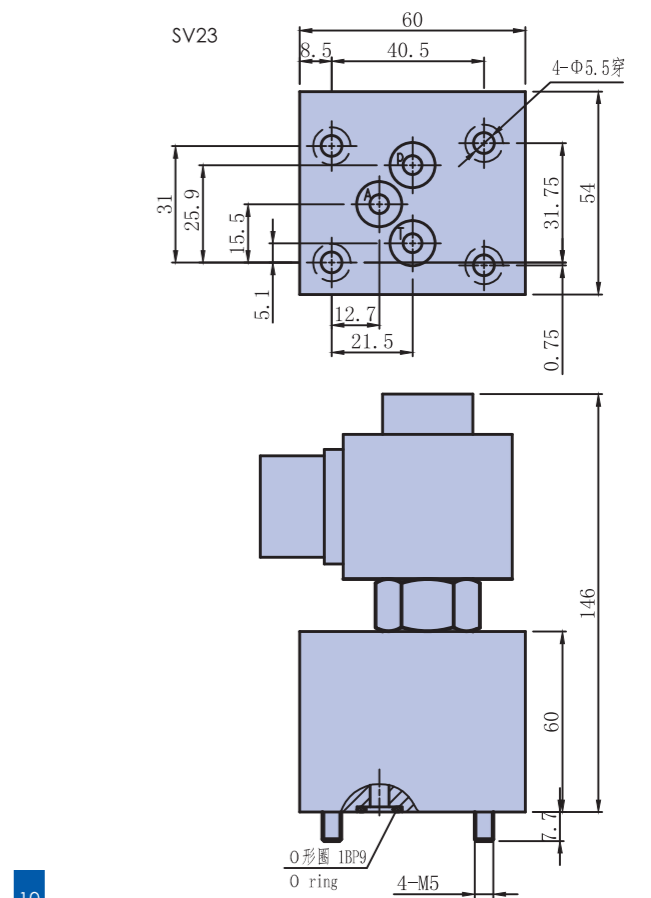
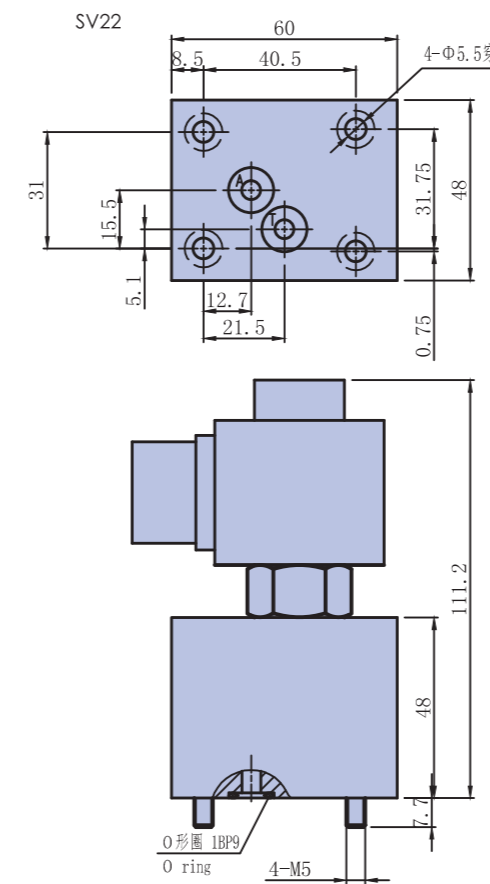
型号 Type	SV22P-5C	SV23P-5C
最高工作压力 Max. working pressure	MPa 35	
耐压 Proof pressure	MPa 60	
电压 voltage	AC110 AC220 DC24	
有效通径 Effective orifice diameter	mm 5	
适用温度范围 Ambient temperatures range	0~60	
使用油 Recommended fluid	一般液压油 general hydraulic fluid	ISO VG32
重量 Weight	kg 1.5	kg 2.0

■型号表示 Model description

SV ① P - 5 ② - ③

- ① 换向类型 direction type
② 常开和常闭 Normal Open and Normal closed
O: 常开 Normal Open C: 常闭 Normal Closed
- ③ 供气电磁阀电压 Air supply valve Voltage
- | A3 | A4 | D2 |
|--------|--------|-------|
| AC110V | AC220V | DC24V |

■外形尺寸 Shapes and dimensions

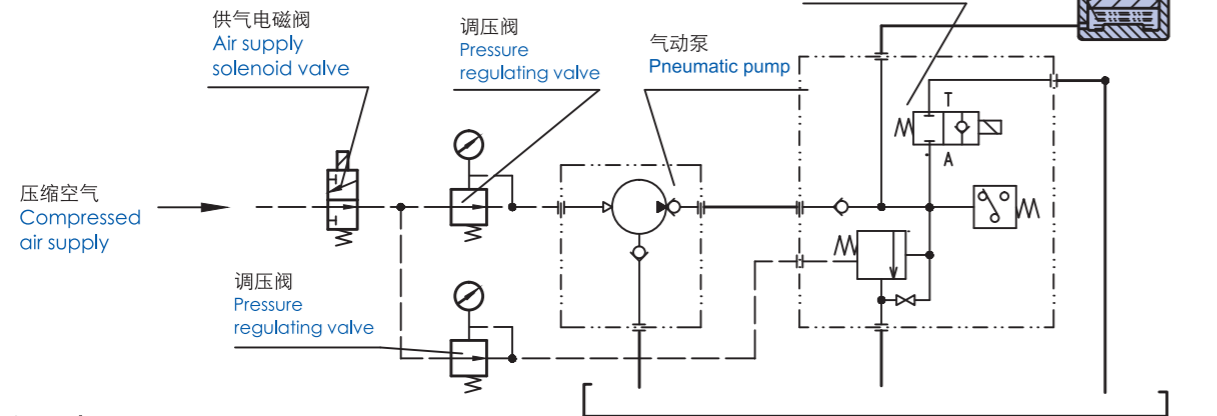




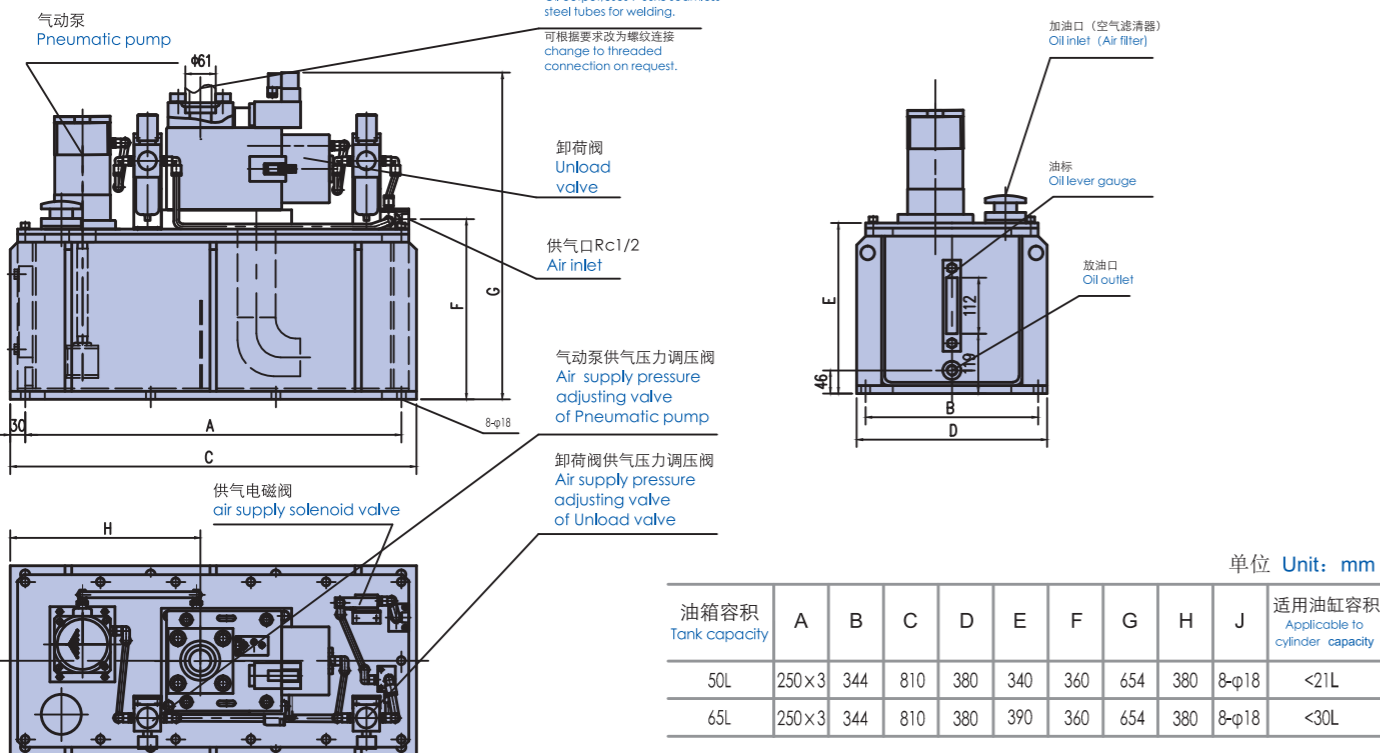
分体式过载保护装置(带油箱)
DETACHED OVERLOAD PROTECTOR
WITH OIL TANK

OLV32

系统回路图 System circuit diagram



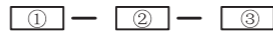
外形尺寸 Shapes and dimensions



■ 特长 Characteristics

- ◆ 分体式结构, 卸荷流量大, 打油速度快, 建议使用在1000吨以上的压力机上;
Detached structure, big relief flow rate, fast oil discharge speed, it is recommend to use on the 1000 T press or above;
- ◆ 卸荷压力控制在设定压力的±5%以内;
The unloading pressure is controlled within ±5% of the set tonnage;
- ◆ 预压力与卸荷压力各自独立调节;
Preload pressure and relief pressure are adjusted independently;

■ 型号表示 Model description



- ① 卸荷阀型号
Unload valve model
- ② 气动泵规格
Pneumatic pump specification
- ③ 油箱容积
Tank capacity

■ 型号选择 Model Selection

◆ 压力机参数 Press parameters

序号 No.	参数 Parameter	符号 Symbol	单位 Unit
1	公称力 Press capacity	T	ton
2	公称力行程 Nominal Force Stroke	y	mm
3	滑块液压缸个数 cylinder number in slide	n	
4	滑块液压缸直径 Slide cylinder diameter	D	mm
5	滑块行程长度 Slide stroke length	d	mm
6	滑块行程次数 Number of slide stroke	N	spm

◆ 计算公式 Calculation formula

1. 卸荷压力
Relief pressure
 $P_H = 1.1 \times 4 \times 10^4 \times T / (n \times \pi \times D^2)$ (MPa)

2. 溢流直径
Relief diameter
 $a = 7 \sim 7.8 \times 10^{-4} \times D \sqrt{n \times N \sqrt{d \times y - y^2}}$ (mm)

◆ 选型原则 Selection principles

1. $a \leq$ 参数表中的溢流孔直径;
 $a \leq$ Relief orifice diameter in Specification table;
2. P_H 在所选型号的参数范围内;
 P_H within parameter range of selected model ;
3. 根据使用条件选用一体气压式、一体弹簧式、分体气压式等不同类型。
Type selection based on usage environment: Integrated Air Type, Integrated Spring Type, or Detached Air Type.

◆ 举例 Example

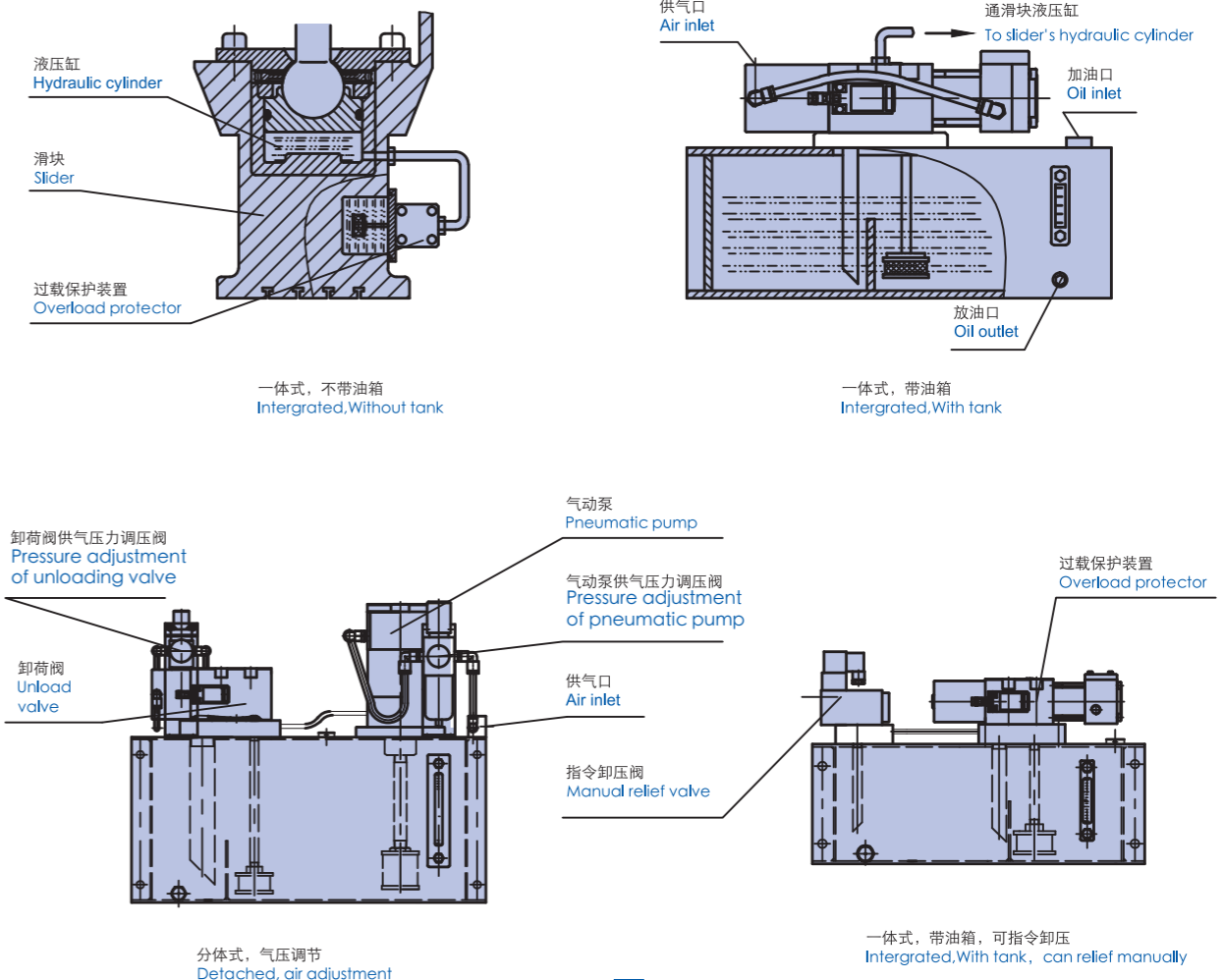
压力机参数:
Press parameters:
T=150 ton n=1 d=250mm y=8mm D=250 mm N=150 spm

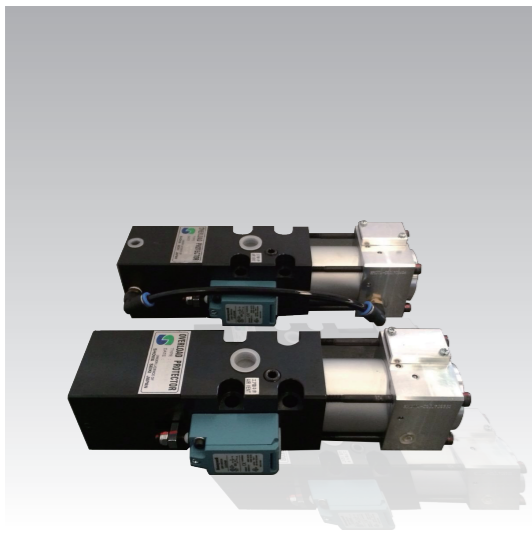
1. $P_H = 1.1 \times 4 \times 10^4 \times 150 / (1 \times \pi \times 250^2) = 33.6$ (MPa)

2. $a = 7 \sim 7.8 \times 10^{-4} \times 250 \sqrt{1 \times 150 \sqrt{250 \times 8 - 8^2}} = 14 \sim 16$ (mm)

3. 选定型号: OLP20-H ($a=20\text{mm}$ $P_H=27 \sim 38\text{MPa}$)
Model Selection

■ 安装图例 Installation examples



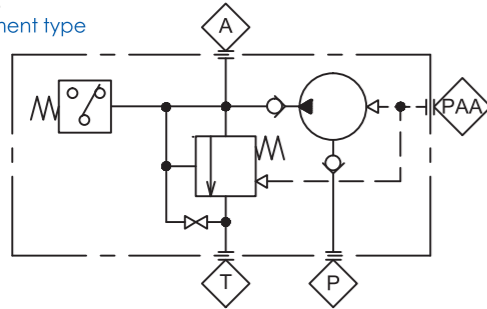


一体式过载保护装置
INTEGRATED OVERLOAD PROTECTOR

OLP

■ 机能符号 Symbol

气压调节型:
Air adjustment type



■ 特长 Characteristics

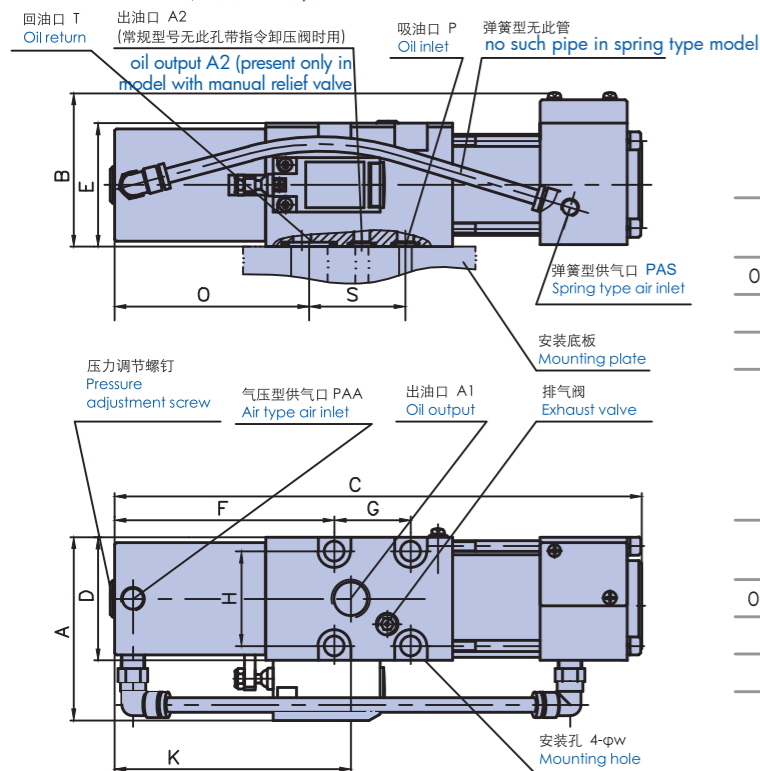
- ◆ 一体式结构, 体积小, 重量轻, 建议使用在1000吨以下的压力机上;
Integrated Design, compact size, light weight, recommended for Press under 1000T;
- ◆ 卸荷压力控制在设定压力的±5%以内;
The unloading pressure is controlled within ±5% of the set tonnage;
- ◆ 根据卸荷压力调节方法不同, 分为气压调节型和弹簧调节型两种型式;
Air type and Spring type are available for selection based on adjustment preference;
- ◆ 安装灵活, 可直接安装在滑块上, 也可带油箱安装在滑块内或机身上。
Flexible installation options: on the slide, inside the slide or on the press body.

■ 型号表示 Model description

OLP ① ② ③ — ④ — ⑤

- ① 溢流直径 Relief orifice diameter
8, 12, 20, 25 (mm)
- ② 卸荷压力调节方法 Methods of Adjustment of Relief pressure
无记号: 气压调节 S: 弹簧调节
No symbol: air adjustment spring adjustment
- ③ 预压力增压比 Preload pressure ratio
无记号: 标准增压比 B: 42
No symbol: standard pressure ratio
- ④ 卸荷压力范围 Relief pressure range
L: 低压范围 H: 高压范围
Low pressure range High pressure range
- ⑤ 安装方向 Installation direction
L: 气动泵位于左方 Pneumatic pumps at the left
R: 气动泵位于右方 Pneumatic pumps at the Right

■ 外形尺寸 Shapes and dimensions



单位 Unit: mm

型号 Type	A	B	C	D	E	F	G	H	PAA
OLP8/OLP12	102	79.4	282	68	68	112	42	52	Rc1/4
OLP20	121		310	88	88	117	50	70	Rc1/4
OLP25	121		310	88	88	117	50	70	Rc1/4

单位 Unit: mm

型号 Type	PAS	K	A1	A2	W	O	S	P	T
OLP8/OLP12	Rc1/8	121	Rc1/2	8	11	98	53	6~7	15~20
OLP20		135	Rc3/4	20	14	85	82.5	6~7	20~25
OLP25		135	Rc1	25	14	85	82.5	6~7	25~30



分体式过载保护装置(带油箱)
DETACHED OVERLOAD PROTECTOR WITH OIL TANK

OLV25

■ 特长 Characteristics

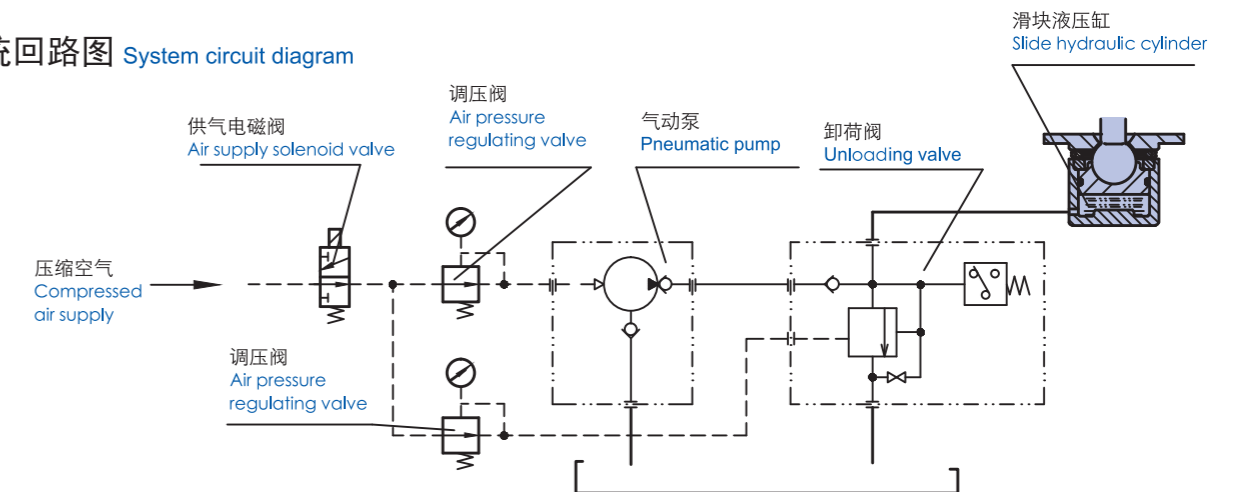
- ◆ 分体式结构, 卸荷流量大, 打油速度快, 建议使用在1000吨以上的压力机上;
Detached structure, big relief flow rate, fast oil discharge speed, it is recommend to use on the 1000 T press or above;
- ◆ 卸荷压力控制在设定压力的±5%以内;
The unloading pressure is controlled within ±5% of the set tonnage;
- ◆ 预压力与卸荷压力各自独立调节;
Preload pressure and relief pressure are adjusted independently;

■ 型号表示 Model description

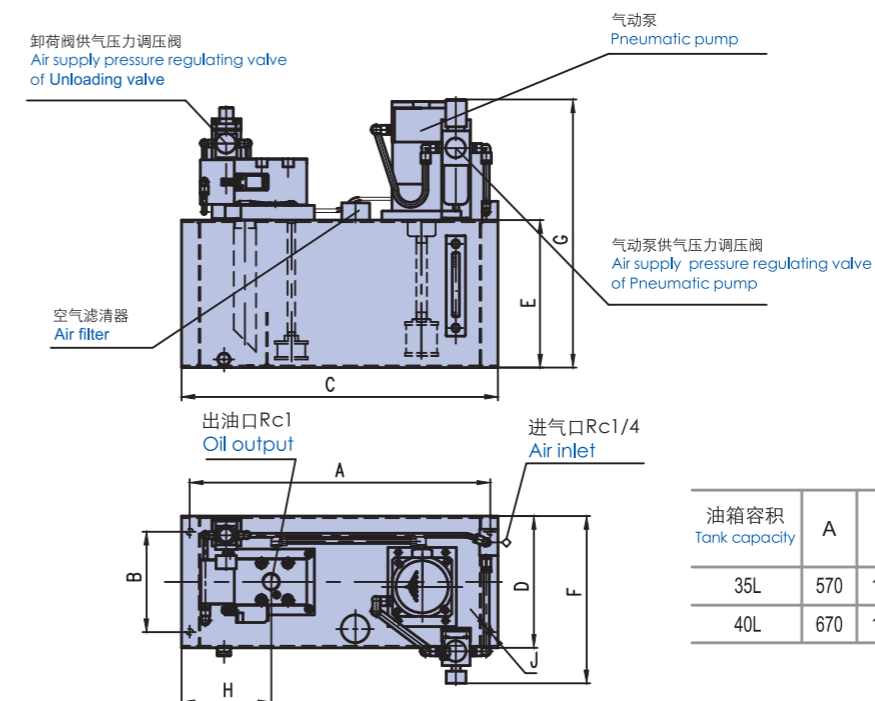
① — ② — ③

- ① 卸荷阀型号 Unload valve model
- ② 气动泵规格 Pneumatic pump specification
- ③ 油箱容积 Tank capacity

■ 系统回路图 System circuit diagram



■ 外形尺寸 Shapes and dimensions



单位 Unit: mm

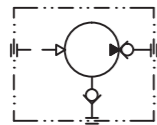
油箱容积 Tank capacity	A	B	C	D	E	F	G	H	J	适用油缸容积 Applicable cylinder capacity
35L	570	190	600	250	280	318	509	170	4-φ13	<15L
40L	670	190	700	250	280	318	509	170	4-φ13	<18L



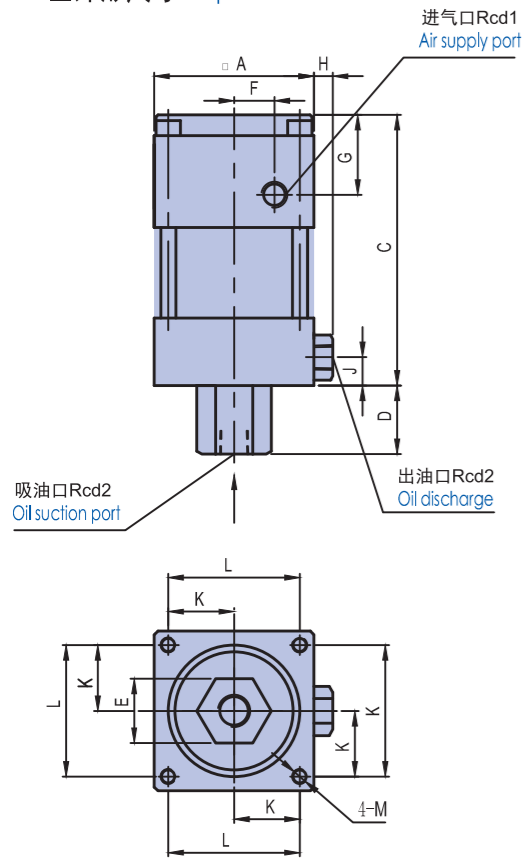
气动泵
PNEUMATIC PUMP

AH

机能符号 Symbol



外形尺寸 Shapes and dimensions



型号 Type	A	B	C	D	E	F	G	H	J	K	L	M	d1	d2	d3	密封圈 Oring
AH 7□	85	180.5	144	43	36	21.5	43	10	15	35	70	M8	1/4	1/4	3/8	G75
AH10□	112	256	208	48	44	27	54	16	26	45	92.5	M10	1/2	3/8	1/2	G65

规格参数 Specification

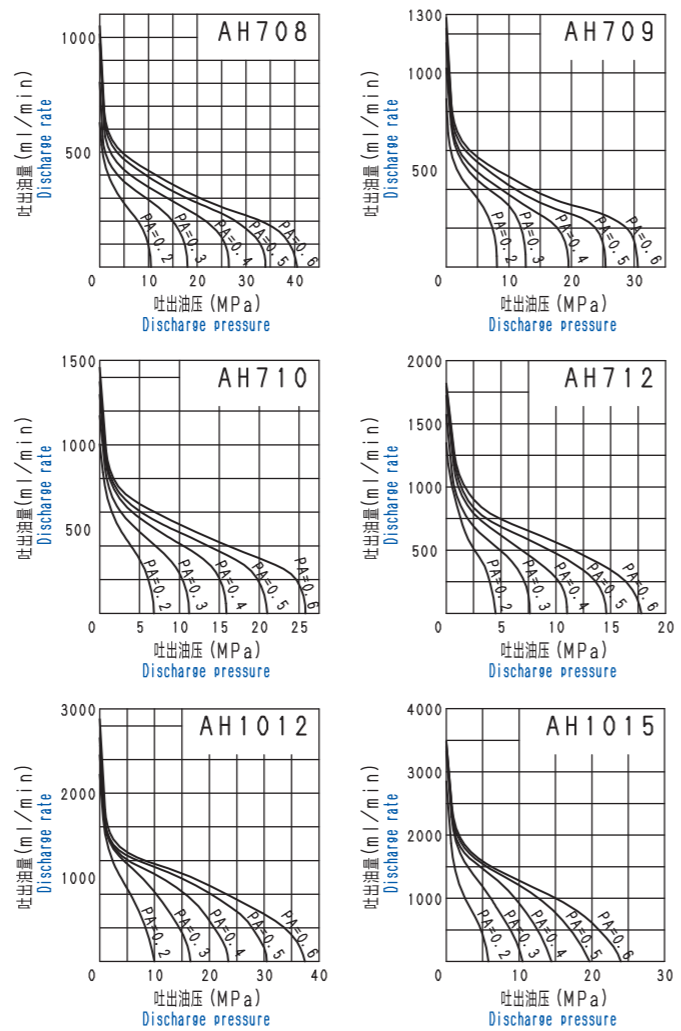
型号 Model	AH708	AH709	AH710	AH712	AH1012	AH1015
驱动流体 Driving fluid	空气·非活性气体 Air·Inert gas					
供气压力范围 Range of supply pressure	2~6 MPa					
增压比 Pressure b.r	65	50	40	28	62	40
自由吐油量* Free discharge volume	900	1100	1200	1300	2400	3400
适用温度范围 Ambient temperatures range	0~60					
使用油 Recommended fluid	一般液压油 general hydraulic fluid			ISO VG32		
重量 Weight	4			9		

型号表示 Model description

AH ① ②

- ①气缸直径
Diameter of air cylinder
- ②活塞杆直径
Diameter of hyd.pressure plunger

特性表 Characteristic graph



单位 Unit: mm

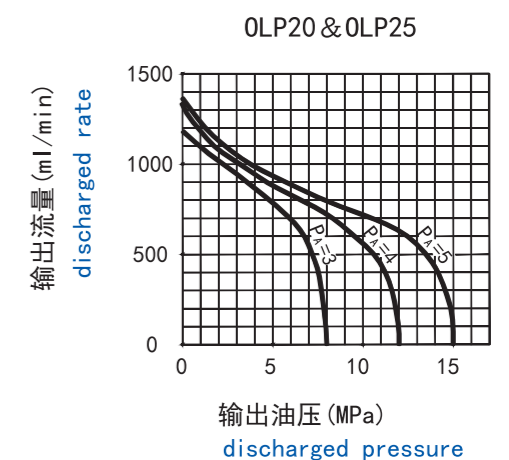
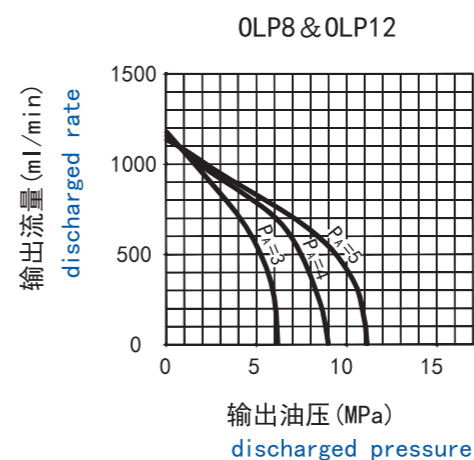
规格参数(气压调节型) Specification(Air pressure adjustment type)

型号 Model	OLP8-L	OLP8-H	OLP20-L	OLP20-H	OLP25-L	OLP25-H
溢流直径 Relief orifice diameter	8		20		25	
额定卸荷流量 Rated unloading flow rate	13.8		68.0		106.0	
供气压力范围 Air supply pressure range	0.3~0.55					0.3~0.5
气液关系式(预压力) The air-liquid relationship(preload pressure)	$P_p=22P_A$			$P_p=28P_A$		
卸荷压力范围 Relief pressure range	17.5~29.0	28.0~40.0	20.0~31.0	27.0~38.0	17.0~27.5	24.0~38.0
气液关系式(卸荷压力) The air-liquid relationship(Relief pressure)	$P_H=47.2P_A+3.2$	$P_H=47.2P_A+14$	$P_H=44.2P_A+7$	$P_H=44.2P_A+14$	$P_H=55.7P_A$	$P_H=78.5P_A$
输出油流量(约) Oil discharge rate(about)	1.15			1.30		
工作油 Recommended fluid	一般液压油 general hydraulic fluid					
工作温度 Ambient temperature	0~60					
重量 Weight	6			11		

规格参数(弹簧调节型) Specification(Spring adjustment type)

型号 Type	OLP8S-L	OLP8S-H	OLP12S-L	OLP12S-H	OLP8SB-H	OLP12SB-L	OLP12SB-H
溢流直径 Relief orifice diameter	8		12		8	12	
额定卸荷流量 Relief rated flow rate	13.8		24.0		13.8	24.0	
供气压力范围 Air supply pressure range	0.4~0.55				0.3~0.50		
气液关系式(预压力) The air-liquid relationship(preload pressure)	$P_p=22P_A$				$P_p=42P_A$		
卸荷压力范围 Relief pressure range	17.5~26.0	25.0~40.0	18.0~33.0	32.0~39.0	25.0~40.0	24.0~33.0	32.0~39.0
卸荷压力调节方法 Adjustment of Relief pressure	弹簧调节 Adjusted by spring						
输出油流量(约) Oil discharge volume(about)	1.15			1.00			
工作油 Recommended fluid	一般液压油 general hydraulic fluid						
工作温度 Ambient temperature	0~60						
重量 Weight	6						

气动泵特性图 characteristics graph of Pneumatic pump





一体式过载保护装置(带油箱)
INTEGRATED OVERLOAD PROTECTOR WITH OIL TANK

OLP

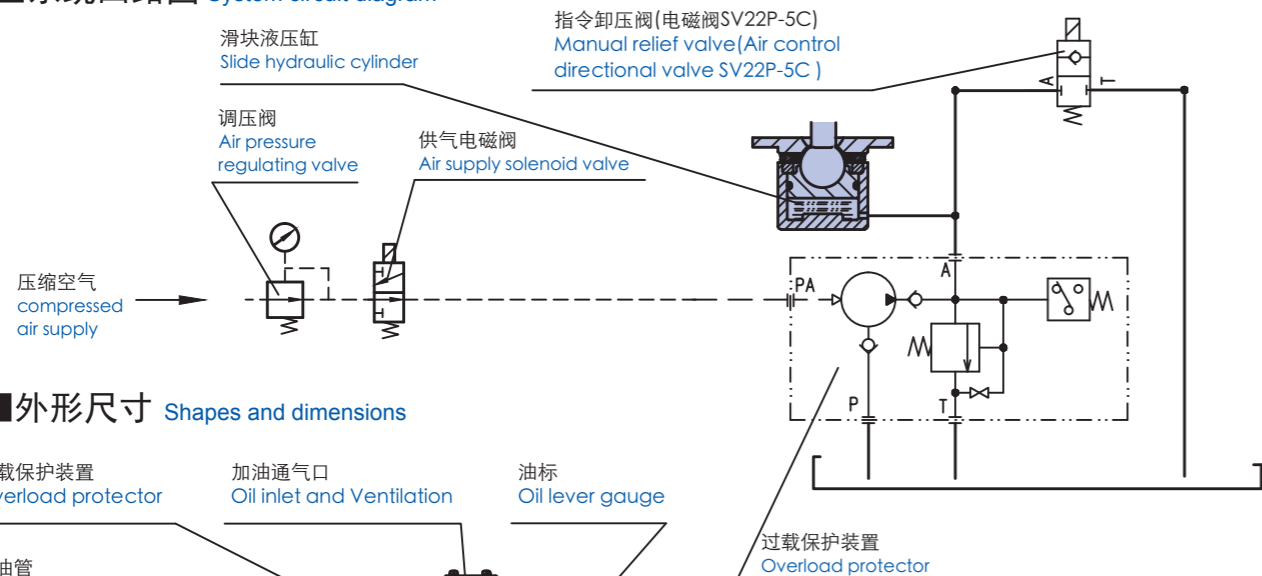
型号表示 Model description

① — ② — ③ — ④ ⑤

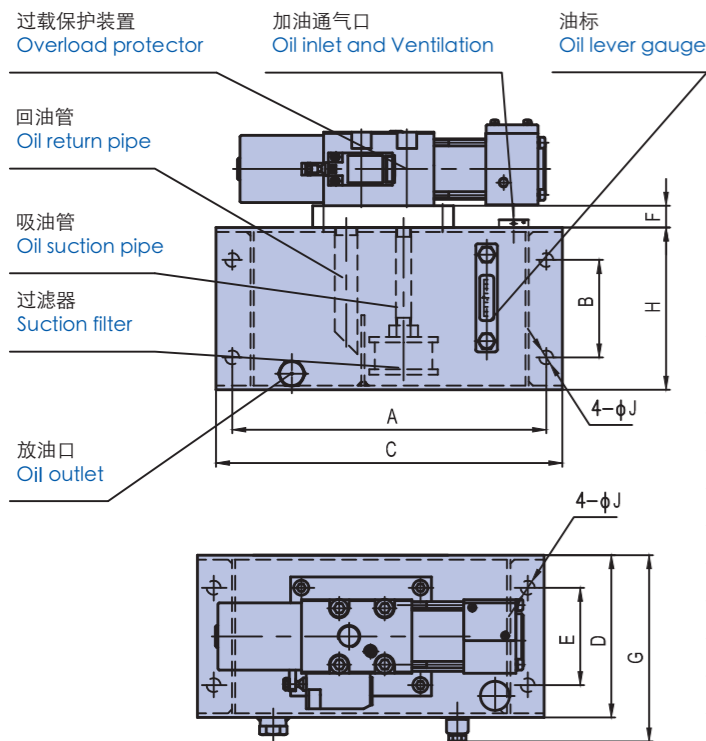
- ① 过载保护装置型号
Overload protector model
- ② 指令卸压阀及位置
Position of Manual Relief Valve
 - ◆ 无记号: 无指令卸压阀
No symbol: Without Manual relief valve
 - ◆ X: 指令卸压阀与过载保护装置左右安装
Manual Relief Valve and Overload Protector installed along left right direction
 - ◆ XA: 指令卸压阀与过载保护装置前后安装
Manual Relief Valve and Overload Protector installed along anterior-posterior direction
- ③ 油箱容积
Tank capacity
- ④ 是否带供气电磁阀及空气调压阀
Air supply solenoid valve and air pressure reducing valve present?
 - ◆ 无记号: 不带
No symbol: Not Present
 - ◆ V: 带
Present
- ⑤ 供气电磁阀电压
Air supply valve Voltage

A3	A4	D2
AC110V	AC220V	DC24V

系统回路图 System circuit diagram



外形尺寸 Shapes and dimensions



单位 Unit: mm

油箱容积 Tank capacity	A	B	C	D	E	F	G	H	J	适用油缸容积 Applicable to cylinder capacity
2.5L	250	60	280	120	60	20	142	120	13	<0.58L
3.9L	290	70	320	120	60	18	142	150	12	<1.4L
5L	290	90	320	150	90	20	172	150	13	<1.5L
6.3L	350	100	380	140	90	18	172	160	12	<2.9L
8L	320	120	350	180	120	20	202	180	13	<3.0L
10L	400	120	430	180	120	20	202	180	13	<3.8L
15L	470	140	500	200	140	20	222	200	13	<7.1L
35L	570	220	600	250	190	20	272	280	13	<20.6L



卸荷阀
UNLOAD VALVE

OLV

规格参数 Specification

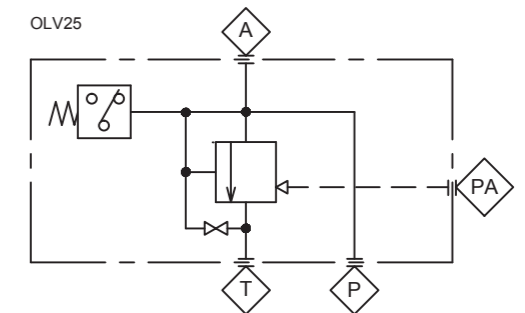
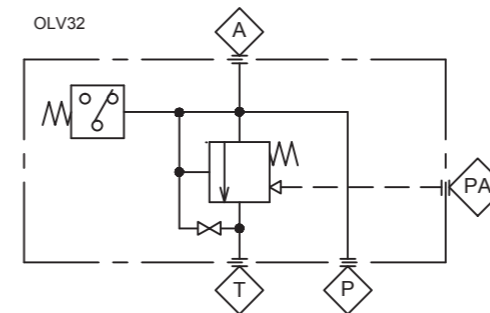
型号 Type	OLV25-L	OLV25-H	OLV32-L	OLV32-H
溢流直径 Relief orifice diameter	25		32	
额定卸荷流量 Rated unloading flow rate	106.0		170.0	
供气压力范围 Air supply pressure range	0.3~0.5		0.3~0.5	
卸荷压力范围 Relief pressure range	17.0~27.5	24.0~38.0	16.0~28.0	26.5~37.0
气液关系式 The air-liquid relationship	$P_H=55.7P_A$	$P_H=78.5P_A$	$P_H=53P_A+1.9$	$P_H=53P_A+10.6$
工作油 Recommended fluid	一般液压油 general hydraulic fluid			
工作温度 Ambient temperature	0~60			
重量 Weight	7		68	

型号表示 Model description

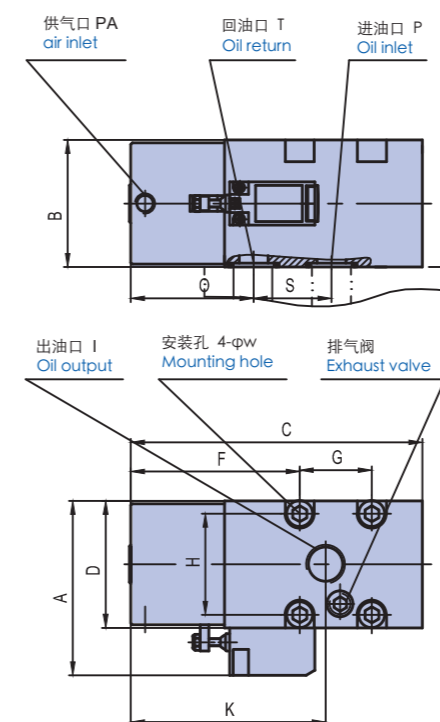
OLV ① — ②

- ① 溢流直径
Relief orifice diameter
- ② 卸荷压力范围
Relief pressure range
- L: 低压范围
Low pressure range
- H: 高压范围
High pressure range

机能符号 Symbol



外形尺寸 Shapes and dimensions



单位 Unit: mm

型号 Type	A	B	C	D	F	G	H	PA
OLV25	121	88	202	88	117	50	70	Rc1/4
OLV32	240	214	325	200	125	160	164	Rc3/8

单位 Unit: mm

型号 Type	K	I	P	W	O	S	T
OLV25	135	Rc1	5~10	14	85	48.5	25~30
OLV32	257	φ61	10	18	145	120	65~70