



中压调压阀 FRM Medium Pressure Regulator FRM

供暖
Heating

工业加热
Process Heat

燃气发动机
Gas engines

燃气分配
Gas distribution

减压站
Pressure reduction stations



符合 EN 334 标准的直动式调压器，带可调额定值弹簧和符合 EN 14382 标准的模块化安装的安全截止阀 (SAV)

Direct acting pressure regulator with adjustable setpoint springs and modular mounted safety relief valve (SAV)
In compliance with EN334 and EN14382

中压调压阀 FRM



适用于工商业领域中用于热水或蒸汽生成的工业和大型锅炉设备的压力调节任务。

Suitable for pressure regulation applications in the industrial sector regarding industrial and large boiler plants for hot water and steam generation.



作为初压力调节器，适用于工业炉和金属、食品或建筑材料热处理设备的各种工艺要求。

Suitable as pre-pressure regulator for the multiple process requirements regarding industrial furnaces and installations for the heat treatment of metals, food products or construction material.



适用于燃气发动机，燃气发动机用于所谓的（冷）热电联产的分散式能源供应，也可用作船舶或车辆驱动装置。

Suitable for the use on gas engines which are used for the decentralized energy supply of the so-called combined heat (cold) and power production but also in the area of ship and vehicle propulsion.

功率 / Power [天然气 / Natural gas @ $p_u = 6 \text{ bar}$; $p_d = 300 \text{ mbar}$, AC 10]

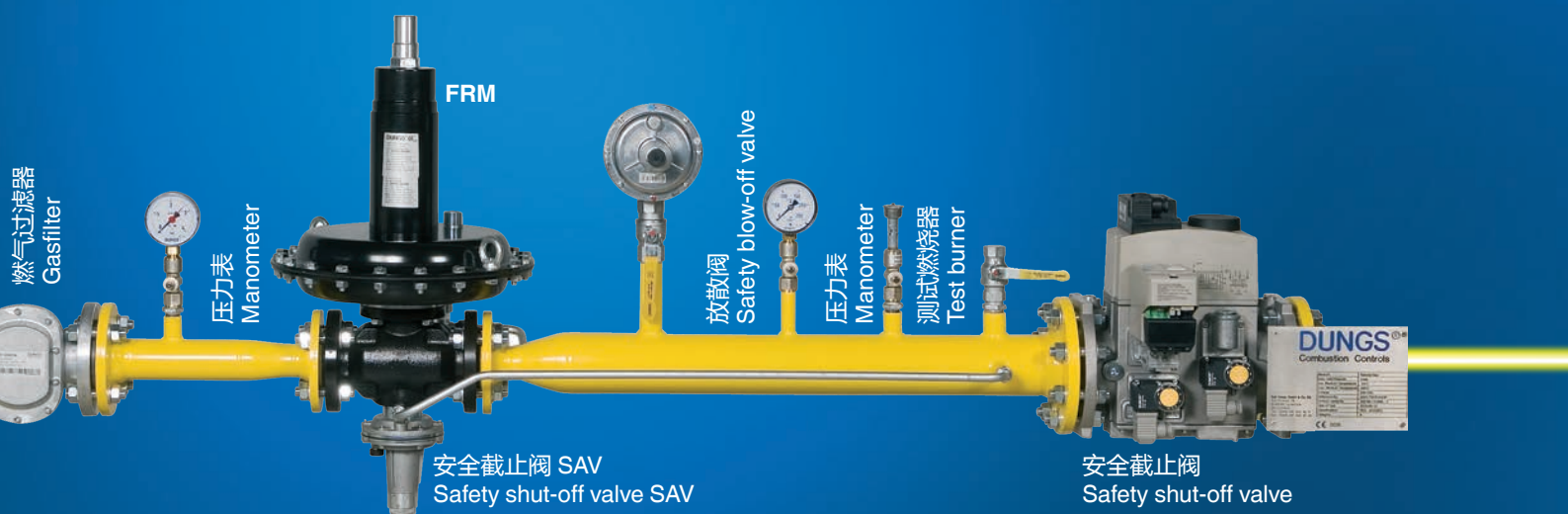
功率 / Power [m³/h]	FRM	FRM NOC	300	450	530	850	1100	1200	1600	1700	3100	4500
Rp 1		●										
Rp 1 ½		●										
Rp 2		●										
DN 25		●										
	●											
DN 40		●										
	●											
DN 50		●										
	●											
DN 65		●										
DN 80		●										

规格 Version	Rp 1 - Rp 2	DN 25 - DN 50	DN 65 - DN 80	输出压力范围 Outlet pressure range	精度等级* [AC] Accuracy class* [AC]	锁定压力等级* [SG] Lock-up pressure class* [SG]	SAV 低压关闭范围 Under-pressure monitoring SAV	SAV 高压关闭范围 Over-pressure monitoring SAV	响应压力组 Response pressure group
ND	●	●		30 - 100 mbar	AC 10	SG 20	10 - 115 mbar	40 - 240 mbar	AG 10
MD	●	●	●	90 - 420 mbar	AC 5/10**	SG 10/20**	35 - 400 mbar	180 - 800 mbar	AG 10
HD	●	●	●	400 - 1 500 mbar	AC 5	SG 10	150 - 1 400 mbar	500 - 3 500 mbar	AG 5
UHD	●	●	●	1 000 - 4 000 mbar	AC 5	SG 10	150 - 3 000 mbar	1 300 - 5 000 mbar	AG 5

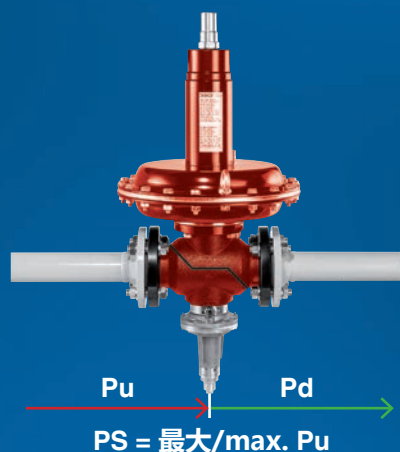
*精度等级/闭锁压力组符合 EN 334 / *Accuracy class / Lock-up pressure class according to EN 334

** $p_d = 80\text{-}180 \text{ mbar}$: AC 10, SG 20 / $p_d = 180\text{-}420 \text{ mbar}$: AC 5, SG 10

Medium Pressure Regulator FRM



型号/Type IS/DS

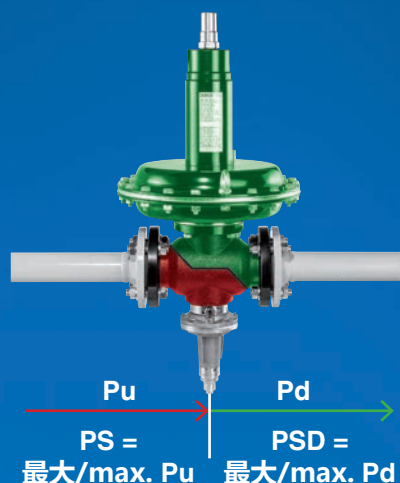


型号 IS 统一强度范围

- 最大压力 (PS) 设定适用于整个调节阀。
- 所有外壳部件必须承受该压力。
- PS = 最大入口压力
- Pd : 输出压力

Type IS Integral Strength

- A maximum pressure (PS) is set for the entire regulator.
- All housing parts must withstand this pressure.
- PS = Max. inlet pressure
- Pd: outlet pressure



型号 DS 可变强度范围

- 根据压力室确定了两个最大允许压力。
- 在 $PSD < PS$ 的位置，特定部件的设计可以承受特定的最大允许压力 (PSD)
- PSD = 最大输出压力
- $Pu > PSD$: 由于安全要求，必须使用安全截止阀。

Type DS Differential Strength

- Depending on the pressure chamber, two maximum permissible pressures are specified.
- Certain components are designed to withstand a certain maximum allowable pressure (PSD) where $PSD < PS$
- PSD = Max. outlet pressure
- $Pu > PSD$: Safety shut-off valve is mandatory due to safety requirements.

故障情况下 FRM 打开，也就是说，入口压力 Pu 流经所有后端串联的部件和设备。

FRM are fail to open. In case of failure, FRM opens and the inlet pressure flows through all parts and devices downstream.

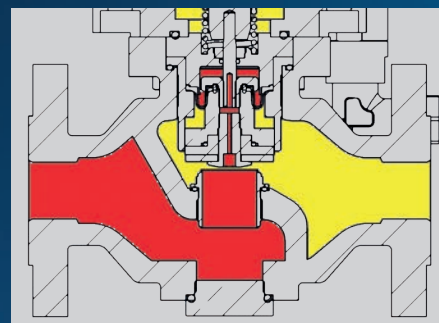
当下游设备需要控制最大入口压力 $< PS$ (或 PSD) 时，SAV 作为第二关闭设备是必须安装的。

When controls downstream rated with max. inlet pressure $< PS$ (or PSD) a safety shut-off valve is mandatory as a second closing device.

符合 EN 334 标准的弹簧式中压调压阀

Spring-loaded medium pressure regulator in compliance with EN 334

型号 Type	FRM 100...IS (统一强度范围) FRM 250...DS (可变强度范围) FRM 100...IS (integral strength range) FRM 250...DS (differential strength range)	
气体种类 Type of gas	系列 1+2+3 Family 1+2+3	
公称尺寸 法兰 Nominal diameters Flanges	连接法兰 PN 25, 符合 EN 1092-1 或 ANSI 150 lbs (B 16.5) DN 25 40 50 65 80 Connecting flange PN 25 according to EN1092-1 or ANSI 150 lbs (B 16.5) DN 25 40 50 65 80	
最大入口压力 Max. inlet pressure	FRM 100...	10 bar (1 000 kPa)
	FRM 250...	25 bar (2 500 kPa)
输出压力范围 DN 25-50 Outlet pressure range DN 25-50	30 mbar ... 4 000 mbar (3 ... 400 kPa)	
输出压力范围 DN 65-80 Outlet pressure range DN 65-80	90 mbar ... 4 000 mbar (9 ... 400 kPa)	
最小压差 (ND) Minimum differential pressure (ND)	270 mbar (27 kPa)	
最小压差 (MD) Minimum differential pressure (MD)	350 mbar (35 kPa)	
最小压差 (HD/UHD) Minimum differential pressure (HD/UHD)	500 mbar (50 kPa)	
失效方式(隔膜破裂) Failure mode (diaphragm rupture)	失效开放 Fail-open	
材料 Materials	执行机构外壳:	铸铁 GJS 400-15
	隔膜外壳:	钢板
	隔膜:	NBR
	Main body housing: cast iron GJS 400-15 Diaphragm housing: steel Diaphragms: NBR	
环境温度 Ambient temperature	-20 °C ... +60 °C -4 °F ... +140 °F	



FRM 初压力平衡

- 通过内置平衡隔膜进行初压力平衡。
- 输出压力 Pd 与入口压力 Pu 无关。
- 调节器尺寸决定阀座开度。
- 经过初压力平衡的调节器对负载变化的反应更慢。

FRM-Inlet pressure compensation

- Inlet pressure compensation by built-in compensation diaphragm.
- Outlet pressure Pd independent of inlet pressure Pu.
- Regulator size determines the valve seat.
- Pressure compensated regulators respond more slowly to load changes.

符合 EN 14382 标准, 等级 A 的安全截止阀

Safety shut-off valve in compliance with EN 14382, class A

型号 Type	FRM 100...IS / FRM 250...DS FRM 100...IS / FRM 250...DS	
响应时间 Response time	< 2 s	
低于 W_{du} 的调节范围 Adjustment range below W_{du}	10 mbar - 3 000 mbar (1-300 kPa)	
高于 W_{do} 的调节范围 Adjustment range above W_{do}	40 mbar - 5 000 mbar (4-500 kPa)	
材料 Materials	执行机构外壳:	铸铁 GJS 400-15
	隔膜外壳:	铝
	隔膜:	NBR
	Main body housing: Cast iron GJS 400-15 Diaphragm housing: Aluminium Diaphragms: NBR	



符合 EN 334 标准的弹簧式中压调压阀

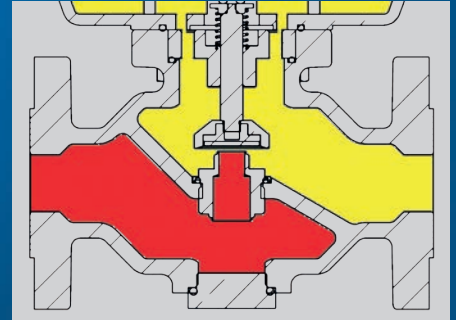
Spring-loaded medium pressure regulator in compliance with EN 334

型号 Type	FRM-NOC 100...DS (可变强度范围) FRM-NOC 100...DS (differential strength range)
气体种类 Type of gas	系列 1+2+3 Family 1+2+3
公称尺寸 法兰 Nominal diameters Flanges	连接法兰 PN 25, 符合 EN 1092-1 或 ANSI 150 lbs (B 16.5) DN 25 40 50 Connecting flange PN 25 according to EN1092-1 or ANSI 150 lbs (B 16.5) DN 25 40 50
公称尺寸 螺纹 Nominal diameters Threads	螺纹连接 Rp (ISO 228/1) 或 NPT (ASME B1.20.1) Rp 1 1 1/2 2 Connecting thread Rp (ISO 228/1) or NPT (ASME B1.20.1) Rp 1 1 1/2 2
最大入口压力 Max. inlet pressure	FRM-NOC 100...DS 10 bar (1 000 kPa)
输出压力范围 Outlet pressure range	20 mbar ... 4 000 mbar (2 ... 400 kPa)
最小压差 (ND) Minimum differential pressure (ND)	20 mbar (2 kPa)
最小压差 (MD) Minimum differential pressure (MD)	80 mbar (8 kPa)
最小压差 (HD/UHD) Minimum differential pressure (HD/UHD)	250 mbar (25 kPa)
失效方式(隔膜破裂) Failure mode (diaphragm rupture)	失效开放 Fail-open
材料 Materials	执行机构外壳: 铸铁 GJS 400-15 隔膜外壳: 钢板 隔膜: NBR Main body housing: cast iron GJS 400-15 Diaphragm housing: steel Diaphragms: NBR
环境温度 Ambient temperature	-20 °C ... +60 °C -4 °F ... +140 °F

符合 EN 14382 标准, 等级 A 的安全截止阀

Safety shut-off valve in compliance with EN 14382, class A

型号 Type	FRM 100...DS FRM 100...DS
响应时间 Response time	< 2 s
低于 W_{du} 的调节范围 Adjustment range below W_{du}	10 mbar - 3 000 mbar (1-300 kPa)
高于 W_{do} 的调节范围 Adjustment range above W_{do}	40 mbar - 5 000 mbar (4-500 kPa)
材料 Materials	执行机构外壳: 铸铁 GJS 400-15 隔膜外壳: 铝 隔膜: NBR Main body housing: Cast iron GJS 400-15 Diaphragm housing: Aluminium Diaphragms: NBR



FRM-NOC „Not Compensated“

- 无平衡隔膜。
- 输出压力 P_d 取决于入口压力 P_u 。
- $\Delta p/V$ 决定阀座开度。
- 每种尺寸可以有 4 到 6 种不同的阀座直径。
- FRM-NOC 对负载变化快速反应。
- 调节范围大, 最大可达 1:30
- FRM-NOC 适用于入口压力 P_u 几乎恒定的应用。
- $\Delta p/V$ 较低时振动较小。
- 压力越高, 阀座开度越小。
- 在高压和高流量下有应用限制。

FRM-NOC „Not Compensated“

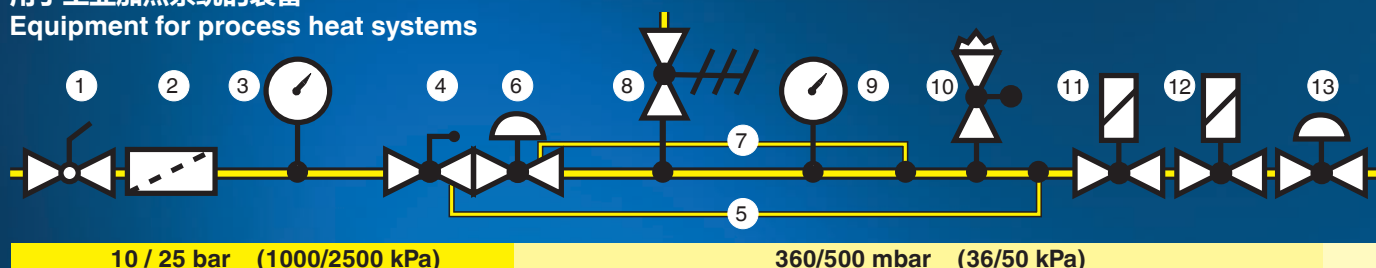
- No compensation diaphragm.
- Outlet pressure P_d dependent on inlet pressure P_u .
- $\Delta p / V$ determines the valve seat.
- 4 to 6 valve seats per size
- FRM-NOC respond fast to load changes.
- High controller ration up to 1:30
- FRM-NOC for applications with nearly constant inlet pressure P_u .
- Less oscillations at low $\Delta p / V$.
- The higher the pressure, the smaller the valve seat.
- Application limits at high pressures and high flow rates.



ISO 13577-2 | EN 746-2

用于工业加热系统的装备

Equipment for process heat systems



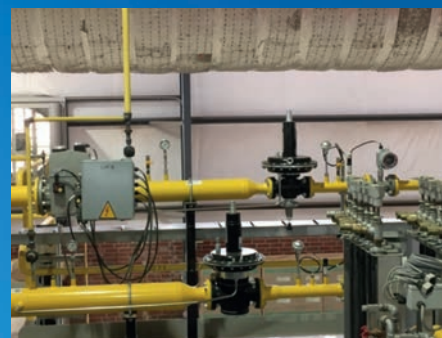
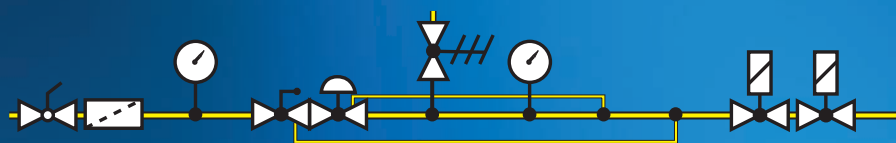
1. 球阀/高压
Ballvalve/high pressure
2. 燃气过滤器
Gasfilter
3. 压力表
Manometer
4. 安全截止阀
Slam shut valve

5. 补偿管
Pulse line
6. 中压调压阀 FRM
Medium pressure regulator FRM
7. 补偿管
Pulse line
8. 放散阀 SBV
Safety blow-off valve SBV

9. 压力表
Manometer
10. 测试燃烧器
Test burner
11. 安全截止阀
Safety shut-off valve
12. 安全截止阀
Safety shut-off valve
13. 调压阀 FRS
Pressure regulator FRS

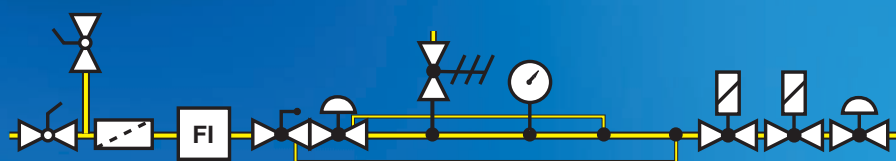
工业加热：用于砖窑/美国的装备

Process heat: Equipment for a brick oven/U.S.A.

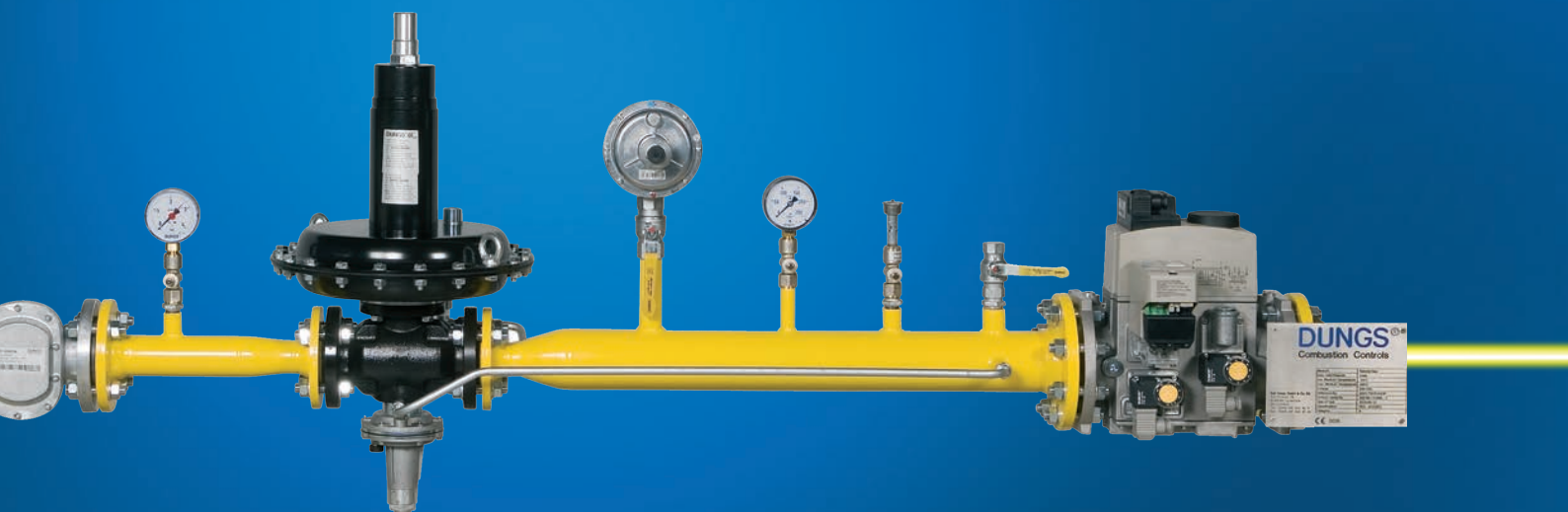


供暖加热：用于带流量计的锅炉

Heating: Boiler equipment with flow meter

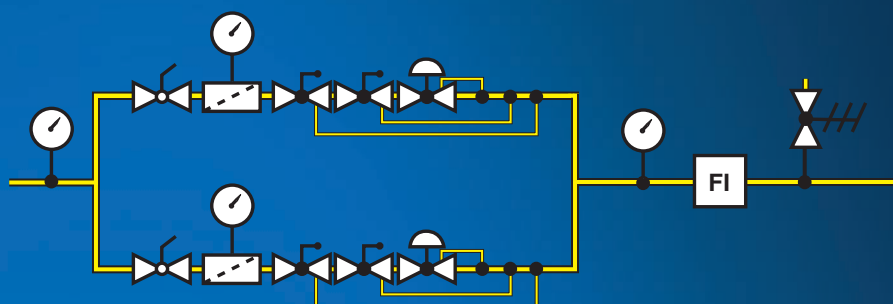


Applications



燃气分配：减压站（EN 12186 和当地法规）

Gas distribution: Pressure reducing station (acc. EN 12186 and local regulations)



许可/特殊规格

Approvals/Special versions



弹簧式中压调压阀符合 ...

Spring-loaded medium pressure regulator in compliance with ...

许可/特殊规格 Approvals/Special versions	CE	EAC	CRN	Marine German Lloyd	ATEX	Outdoor
FRM 100 ... / SAV	●	●	申请 pending	根据要求提供特殊规格		
FRM 250 ... / SAV	●	●		Special versions on request		
FRM-NOC ... / SAV	●	●				



卡尔冬斯贸易（上海）有限公司
卡尔冬斯燃烧自控（上海）有限公司
Karl Dungs Trading (Shanghai) Co., Ltd
Karl Dungs Combustion Controls (Shanghai) Co., Ltd
地址：上海市闵行区朱建路333弄优乐加城市工业园8号楼

Add: Plant 8, Lane 333, Zhujian Road,
Eureka City Industrial Park, Shanghai 201107
电话 Phone : +86 52217800
传真 Fax : +86 52217600
邮箱 E-mail : info.cn@dungs.com
网址 Website : www.dungs.com/cn