

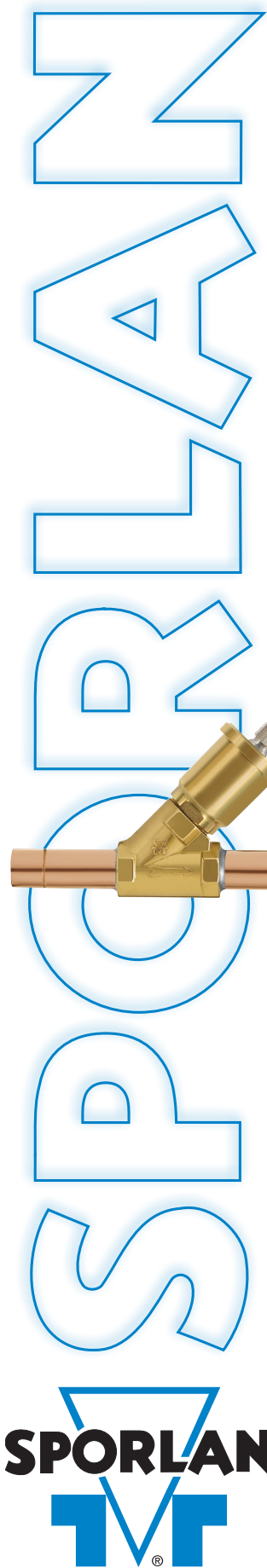
CLEAN.
NATURAL.
SMART. CO₂

Sporlan CO₂ Solutions

Refrigeration Flow Control Products for R-744



ENGINEERING YOUR SUCCESS.



Sporlan's growing line of products for **CO₂** set new standards for robust design and advanced technology.



As a world leader in refrigerant flow controls, Sporlan Division of Parker Hannifin continues to meet the challenges of the future.

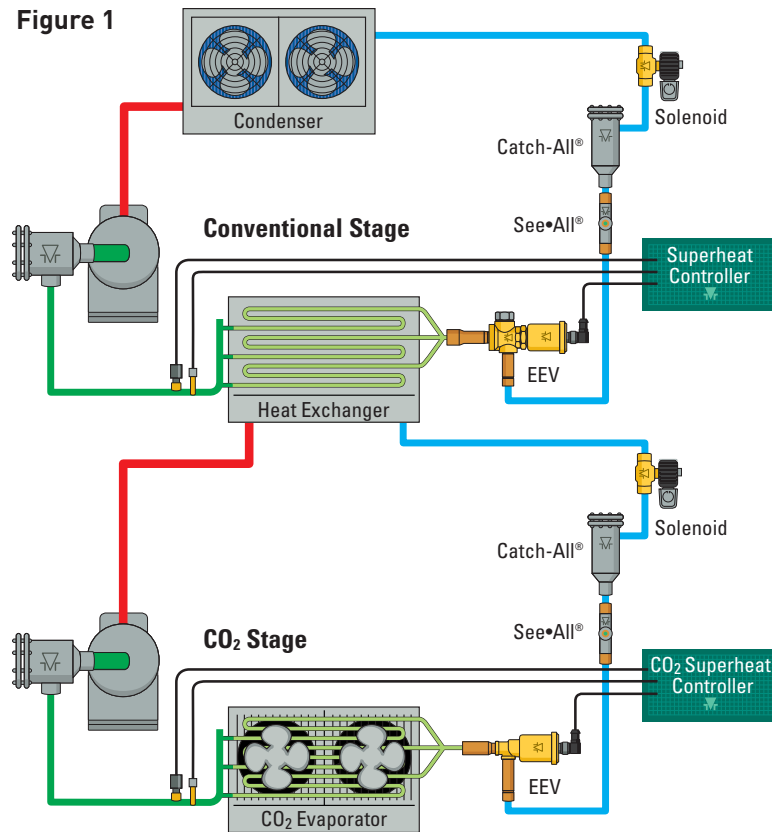
Sporlan is maintaining its state of the art position by reacting to the demands of new refrigerants, including Carbon Dioxide (CO₂). As a green alternative to other refrigerants, CO₂ makes sense. However, there are technical challenges for some CO₂ applications.

CO₂ is generally applied in three ways:

- 1** Direct Expansion (Subcritical DX)
- 2** Liquid CO₂ (Secondary)
- 3** Transcritical

1 Direct Expansion (Subcritical DX)

In CO₂ DX applications, the CO₂ liquid enters an Electric Expansion Valve (EEV) to feed the liquid into an evaporator in the same way as other refrigeration systems. To prevent the CO₂ from reaching extremely high pressures and damaging the system, this type of system is applied as the low stage of a cascade system. Figure 1 is a schematic of a cascade system that shows that the evaporator of the high stage is used to cool the condenser of the CO₂ system. This will ensure that the liquid CO₂ remains below its critical temperature, hence the name Subcritical. Sporlan supplies EEVs, controllers and accessories for subcritical systems and has many successful field installations.



2 Liquid CO₂ (Secondary)

Liquid CO₂ can be used as a very efficient heat transfer fluid. Essentially, a chiller using traditional refrigerants is used to cool liquid CO₂, which is then pumped through coils, similar to water or brine coils. The product or space is cooled and little, if any, liquid CO₂ is allowed to change state to a vapor. The low viscosity and high heat transfer coefficient of liquid CO₂ increases system efficiency. Sporlan has provided liquid control valves for these applications, as well.

3 Transcritical

The final system design is Transcritical, in which the CO₂ is working above its critical point, that is, above 87°F (31°C). In this realm, the pressures are at least 1000 psig (69 bar) and usually much higher. Components for these applications require close attention to design to withstand the pressures involved and to ensure a generous safety margin.

Sporlan has invested significant resources in the development of products that meet the requirements of these systems.

Table 1 summarizes Sporlan products available for CO₂ systems.*

SPORLAN Products for CO ₂				
Product Type	Model Family	MRP/MOPD		Application
		psig	barg	
Electric Expansion Valves	SER-HP (AA, A)	1305/580	90/40	Subcritical DX, Secondary
	SER	1015/580	70/40	Subcritical DX, Secondary
	SERI	700/500	48/34	Subcritical DX, Secondary
	GC	2030/1305	140/90	Transcritical
	FGB	2030/725	140/50	Transcritical
Pressure Control and Secondary Refrigerant Valves	SER	1015/580	70/40	Subcritical DX, Secondary
	CDS	70/*	48/*	Subcritical DX, Secondary
	GC	2030/1305	140/90	Transcritical
	FGB	2030/725	140/50	Transcritical
Controllers and Accessories	Pressure Control	—	—	Subcritical DX, Secondary
	Temperature Control	—	—	Subcritical DX, Secondary
	Superheat Control	—	—	Subcritical DX, Secondary
	Temperature Sensor	-40 – 210°F	-40 – 100°C	Subcritical DX, Secondary
	Pressure Transducer	500	34	Subcritical DX, Secondary
	Pressure Transducer	2000	138	Transcritical
Sightglass and Filter-Driers	See•All® Sightglass	650	45	Subcritical DX, Secondary
	Catch-All® Filter-Drier	650	45	Subcritical DX, Secondary
	CO Series Filter-Drier	2250	155	Transcritical
Solenoid Valves	E2S120-HP	1015/450	70/31	Subcritical DX
	E5S130-HP	1015/450	70/31	Subcritical DX
	E6S130-HP	1015/450	70/31	Subcritical DX
	E8S140-HP	1015/450	70/31	Subcritical DX
	E10S150-HP	1015/450	70/31	Subcritical DX
	E14S250-HP	700/450	48/31	Subcritical DX
	E19S270-HP	700/450	48/31	Subcritical DX
	XSP2S120	700/300	48/21	Secondary
	XSP3S130	700/100	48/7	Secondary
	XSP5S140	700/50	48/3.4	Secondary
Ball Valves	EBV, EBVT	700	48	Subcritical DX, Secondary
	EBV-PR, EBVT-PR	1015	70	Subcritical DX, Secondary

*Contact Sporlan Product Management for specific applications.

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