



# STEAM COMPRESSOR

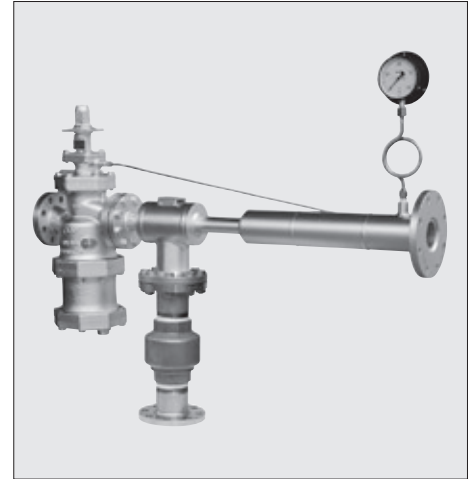
## MODEL SC CARBON STEEL (DUCTILE CAST IRON)

**STEAM COMPRESSOR THAT RECOVERS LOW PRESSURE STEAM AT HIGHER PRESSURE FOR REUSE**

### Features

**Maximizes steam utilization by recovering excess low pressure steam at a higher pressure resulting in reduced energy costs and CO<sub>2</sub> emissions.**

1. Reuses energy from excess steam by increasing it to low/medium pressure.
2. No electricity required, so suitable for explosion-proof areas (with COS pressure control valve).
3. Condensate recovery tank unnecessary with optional condensate recovery package: condensate is first reduced to atmospheric pressure, then repressurized to mid-pressure steam for reuse.
4. Employs a new, independently-designed high efficiency ejector.
5. Pressure control valve has a built-in separator and steam trap, maintaining dry motive steam, thereby ensuring high long-term efficiency and stable discharge pressure.



### Pressure Equipment Directive (PED)



This product fully conforms to the requirements of the Pressure Equipment Directive (PED, 2014/68/EU) and features CE marking where applicable.

### Specifications

Model*	Steam Compressor Unit								High-capacity Steam Compressor		
	SC1-1	SC1-2	SC1-3	SC2-1	SC2-2	SC2-3	SC7-1	SC7-3	SC14	SC21	SC31
Pressure Control Valve	COS	CV-COS	CV10	COS	CV-COS	CV10	COS	CV10	—		
Connection	Motive Inlet	DN 25		DN 50			DN 80		DN 100	DN 150	DN 200
	Discharge Outlet	DN 80		DN 100			DN 150		DN 200	DN 250	DN 300
	Suction Inlet	DN 80					DN 100		DN 150	DN 200	DN 250
Max. Operating Pressure (barg) PMO	16	20	16	10	20	16	20	20			
Motive Steam Pressure Range (barg)	6-16	6-20	6-16	6-10	6-20	6-16	6-20	6-20			
Max. Operating Temperature (°C) TMO	220										
Maximum Steam Suction Capacity	See "Model Selection and Performance Graphs" on pages 3 and 4.										
Discharge Steam Pressure (Attainable Pressure) (barg)	Contact TLV**										
	Maximum	1	0.5	1	0.5	1	0.5	Contact TLV**			
Minimum	Atmospheric pressure or higher***										
Suction Steam Pressure Range	Atmospheric pressure or higher***										
Applicable Fluid	Steam										

\* Products exceeding specifications shown above may be able to be supplied depending on conditions.

1 bar = 0.1 MPa

\*\* Depends on conditions such as the pressure and volume of motive steam and suction steam. See "Model Selection and Performance Graphs" on pages 3 and 4 for an approximate figure. \*\*\* Contact TLV for cases at or lower than atmospheric pressure.

**PRESSURE SHELL DESIGN CONDITIONS (NOT OPERATING CONDITIONS):**

Maximum Allowable Pressure (barg) PMA: Steam Compressor Unit: 16 (COS/CV-COS), 20 (CV10);

High-capacity Steam Compressor: 20

Maximum Allowable Temperature (°C) TMA: 220



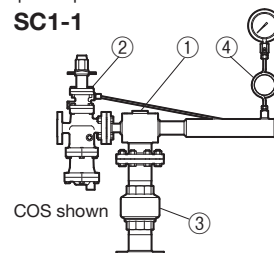
To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

No.	Description	Material	DIN <sup>1)</sup>	ASTM/AISI <sup>1)</sup>
①	Ejector	Carbon Steel S25C	1.1158	AISI1025
②	Pressure Control Valve	COS	Ductile Cast Iron GGG40.3 <sup>2)</sup>	0.7043 A395
		CV-COS	Ductile Cast Iron GGG40.3 <sup>2)</sup>	0.7043 A395
		CV10	Cast Steel A216 Gr.WCC	— —
③	Check Valve <sup>3), 4)</sup>	Cast Stainless Steel A351 Gr.CF8	1.4312	—
④	Pressure Gauge <sup>5)</sup>	—	—	—
⑤	Pressure Transmitter <sup>6), 7)</sup>	—	—	—

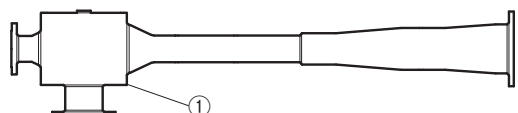
<sup>1)</sup> Equivalent materials <sup>2)</sup> Option: Cast Stainless Steel <sup>3)</sup> Check Valve for SC1/SC2 has screwed-in flange <sup>4)</sup> SC7 comes with connecting bolts, nuts, and gaskets

<sup>5)</sup> COS only <sup>6)</sup> CV-COS/CV10 only <sup>7)</sup> Shown on reverse

SC1-1









SC14/SC21/SC31



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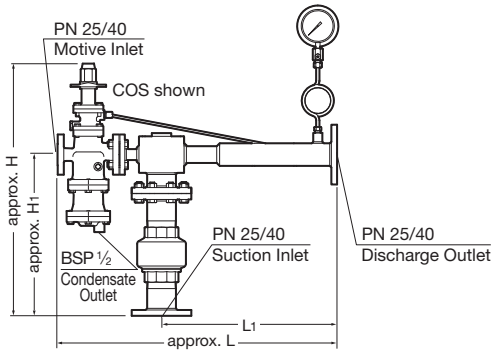
**System Configuration (Steam Compressor Unit)**

Steam Compressor Unit SC1/SC2/SC7		Examples of Connecting Equipment*	
Pressure Control Valve	 <p><b>COS Self-actuating Control Valve</b></p> <ul style="list-style-type: none"> <li>Built-in separator and steam trap</li> <li>No electric instrumentation required</li> </ul>	 <p><b>Non-electric Condensate Recovery Pump System Package</b></p> <ul style="list-style-type: none"> <li>Steam recovery at atmospheric pressure</li> <li>Explosion-proof areas</li> </ul>	
	 <p><b>CV-COS Pneumatic Control Valve</b></p> <ul style="list-style-type: none"> <li>Built-in separator and steam trap</li> <li>High-precision control with no off-set</li> </ul>		 <p><b>Flash Tank</b></p> <ul style="list-style-type: none"> <li>Pressurized flash steam recovery</li> </ul>
	 <p><b>CV10 Pneumatic Control Valve</b></p> <ul style="list-style-type: none"> <li>High-precision control with no off-set</li> </ul>		 <p><b>Condensate Recovery Pump</b></p> <ul style="list-style-type: none"> <li>High pressure condensate recovery</li> </ul>

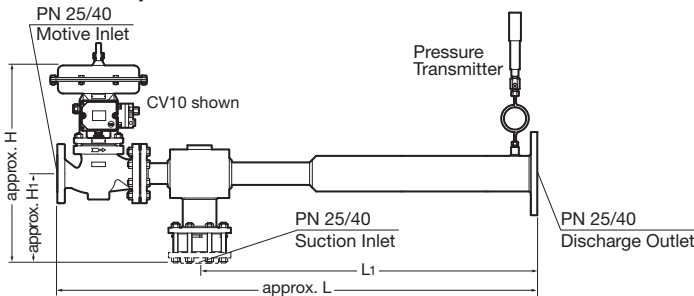
\*Actual available products may differ from those shown. Contact TLV for details.

**Dimensions**

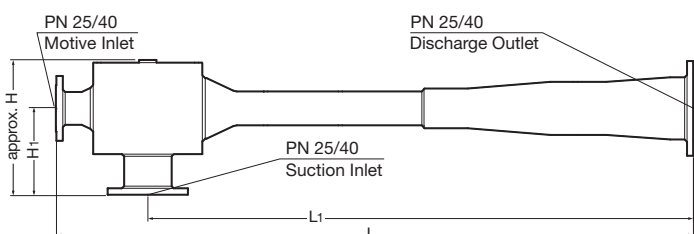
**Steam Compressor Unit SC1-1**



**Steam Compressor Unit SC7-3**



**High-capacity Steam Compressor SC14/SC21/SC31**



**Steam Compressor Unit**

(mm)

Model	DN			L	L <sub>1</sub>	H	H <sub>1</sub>	Weight (kg)
	Motive Inlet	Discharge Outlet	Suction Inlet					
PN 25/40								
SC1-1	25	80	80	836	545	782	500	50
SC1-2						862		
SC1-3						785		
SC2-1	50	100	80	1121	734	845	530	100
SC2-2						921		
SC2-3						835		
SC7-1	80	150	100	1715	1140	710	300	155
SC7-3						645		

Screwed connections are BSP; other standards available

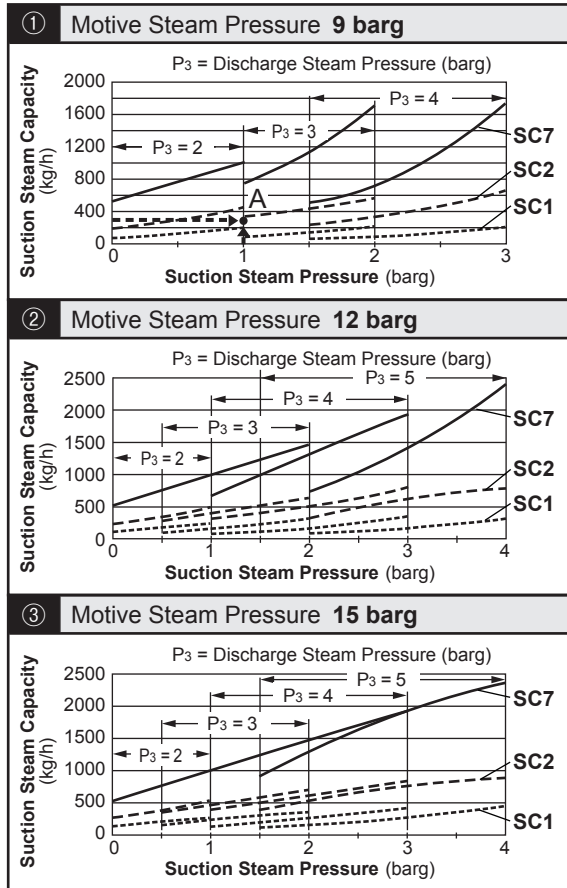
**High-capacity Steam Compressor**

(mm)

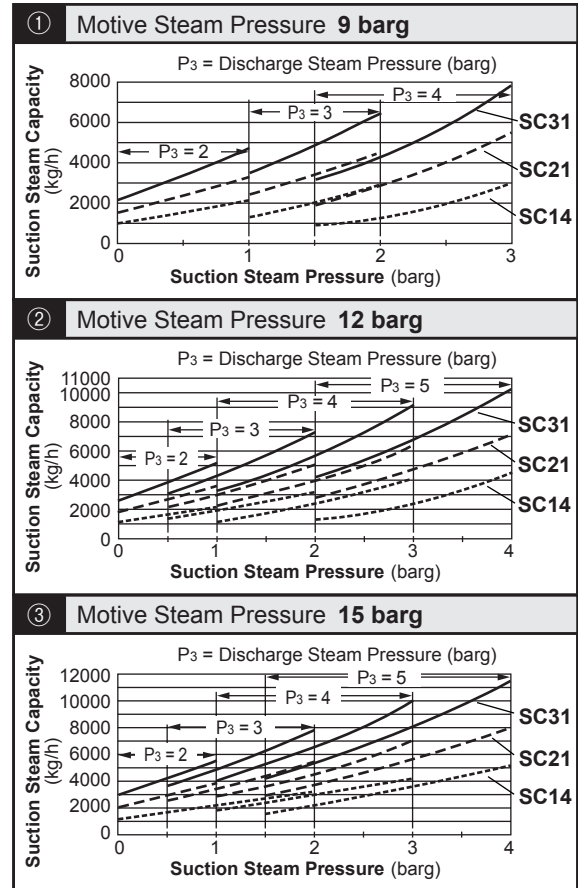
Model	DN			L	L <sub>1</sub>	H	H <sub>1</sub>	Weight (kg)
	Motive Inlet	Discharge Outlet	Suction Inlet					
PN 25/40								
SC14	100	200	150	2220	1900	475	300	240
SC21	150	250	200	2600	2155	620	400	440
SC31	200	300	250	3000	2500	720	450	700

Model Selection Graphs

Steam Compressor Unit  
SC1/SC2/SC7



High-capacity Steam Compressor  
SC14/SC21/SC31

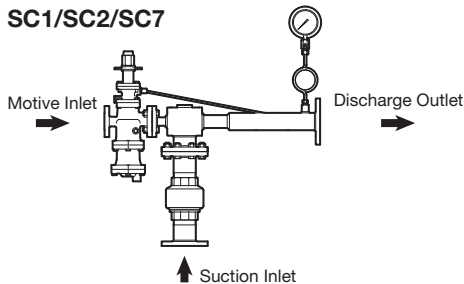


● Model Selection

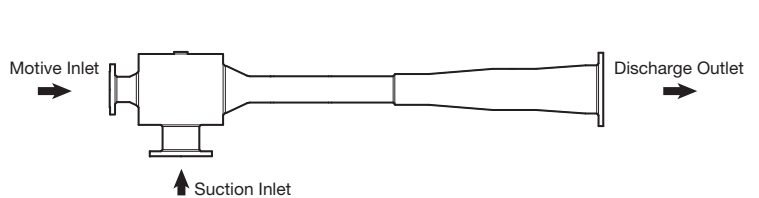
Sample Selection Conditions

Motive Steam Pressure: 9 barg  
 Discharge Steam Pressure: 3 barg  
 Suction Steam Pressure: 1 barg  
 Suction Steam Capacity: 300 kg/h

SC1/SC2/SC7



SC14/SC21/SC31



Using Model Selection Graph ① for 9 barg motive steam pressure, point A represents the sample suction steam pressure and capacity conditions for the desired discharge steam pressure ( $P_3$ ) of 3 barg.

In the 3 barg discharge steam pressure range, point A falls slightly below the SC2 line, therefore Model SC2 or SC7 should be chosen.

For suction steam capacities greater than that of SC31, contact TLV.

Performance Graphs

● Capacity Check (Motive Steam Quantity and Discharge Steam Quantity)

At 9 barg motive steam pressure, according to Performance Graph ①, the entrainment ratio is approximately 3.9\*. The motive steam quantity and discharge steam quantity can be calculated using the formulas A) and B) below.

\*Entrainment Ratio = Motive Steam Quantity (kg/h) / Suction Steam Quantity (kg/h)

If motive steam pressure is between those given in Performance Graphs ① - ③, calculate using the higher and lower pressure graphs and estimate using the mean entrainment ratio.

**Sample Calculation** (For motive steam pressure of 10 barg)

At 9 barg motive steam pressure, according to Performance Graph ①, the entrainment ratio is approximately 3.9. At 12 barg motive steam pressure, according to Performance Graph ②, the entrainment ratio is approximately 2.8. The calculation in C) gives an approximate entrainment ratio of 3.5.

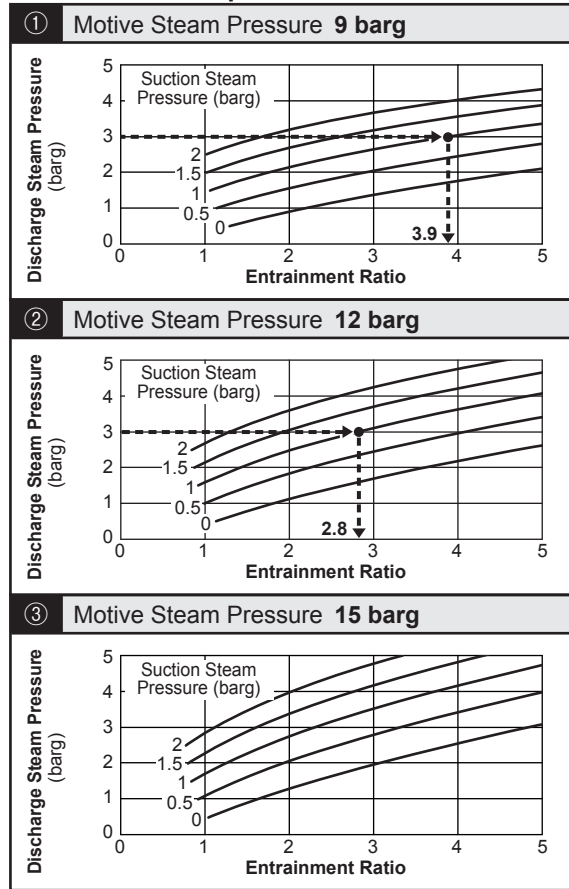
**A) Motive steam quantity = Entrainment ratio × Suction steam quantity**  
 = 3.9 × 300 kg/h  
 = 1170 kg/h

**B) Discharge steam quantity = Motive steam quantity + Suction steam quantity**  
 = 1170 kg/h + 300 kg/h  
 = 1470 kg/h

**C) Sample Calculation** (For motive steam pressure of 10 barg)

$$3.9 - \frac{(10 - 9 \text{ barg})}{(12 - 9 \text{ barg})} \times (3.9 - 2.8) = 3.5$$

Performance Graphs



NOTE: The type-selection and capacity values from the above procedures are only approximations. Contact TLV for actual selection and performance data.

Manufacturer  
**TLV** CO., LTD.  
 Kakogawa, Japan  
 is approved by LRQA Ltd. to ISO 9001/14001

