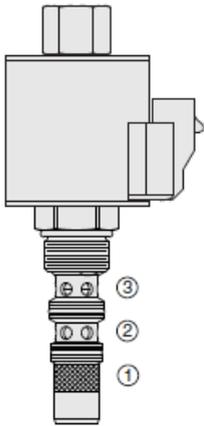




## Overview



### Description

TS90-31 is a pilot operated, spool type, proportional pressure reducing/relieving valve. The regulated pressure is proportional to the input electrical current. Protected by 50 x 50 mesh screen.

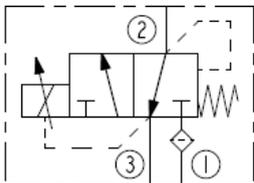
### Operation

Without applied current, the TS90-31 allows bidirectional flow from port 2 to port 3, while blocking port 1. When the coil is energized, port 2 is connected to port 1, and pressure at port 2 is controlled proportional to the amount of current applied to the coil. If pressure at port 2 exceeds the setting induced by the coil, pressure is relieved to port 3.

### Features

- 12 and 24 volt coils standard.
- Optional waterproof E-Coils rated up to IP69K.
- Valve spool protected by a 50x50 mesh screen.

## Symbol



## Ratings

### Pressure Ratings

Pressure rating	206.8 bar (3000 psi)	- <b>Note:</b> Ports 1, 2
	68.9 bar (1000 psi)	- <b>Note:</b> Port 3
Burst pressure	344.7 bar (5000 psi)	
Adjustable pressure range	0 to 137.9 bar (0 to 2000 psi)	
Note	Tank port pressure is additive to valve setting	

### Flow Ratings

Flow rating	37.9 lpm (10 gpm)
Maximum pilot flow	0.85 lpm (0.23 gpm)

### Temperature Ratings

Operating fluid temperature	-40 to 100 °C (-40 to 212 °F)	- <b>Note:</b> With buna N seals
	-26 to 204 °C (-15 to 400 °F)	- <b>Note:</b> With fluorocarbon seals
Storage temperature	-40 to 70 °C (-40 to 160 °F)	
Ambient temperature	-40 to 70 °C (-40 to 160 °F)	

### Other Ratings

Corrosion protection	960 hr salt spray per ASTM b117
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## Operating Parameters

Fluids	Mineral based or synthetic with lubricating properties
Fluid viscosity range	7.4 to 420 cSt
Maximum operating contamination level	18/16/13 per ISO 4406

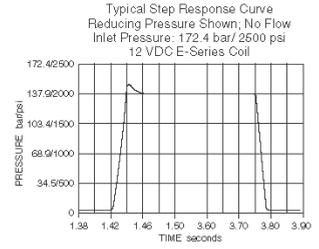
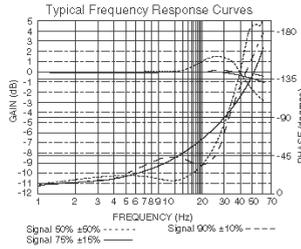
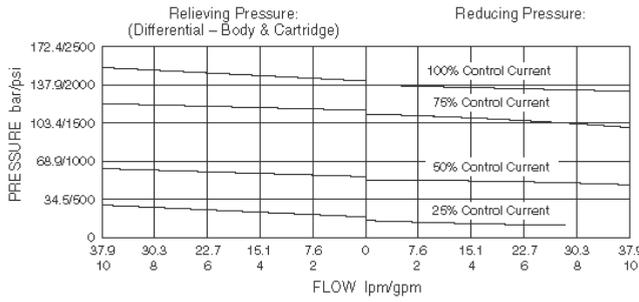
## Properties

Unit weight	0.25 kg (0.55 lb)
Internal wetted surface area	223 cm <sup>2</sup> (34.6 in <sup>2</sup> )

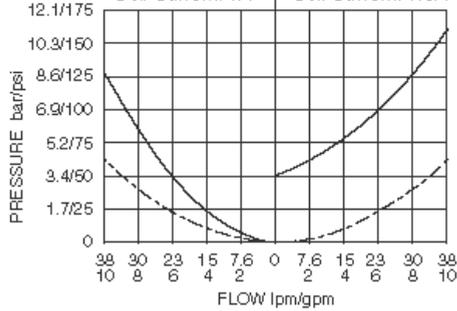


**Performance**

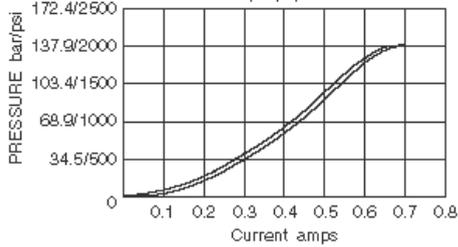
Typical Reducing/Relieving Pressure vs. Flow  
For a Regulated Pressure with 172.4 bar (2500 psi) Inlet Pressure  
for Various Percentages of Nominal Control Currents



Typical Pressure Drop vs. Flow  
Cartridge, Body & Line —; Body & Line - - -  
Relieving Pressure Port 3 to 4  
Reducing Pressure Port 2 to 3  
Coil Current: 0A  
Coil Current: 0.5A

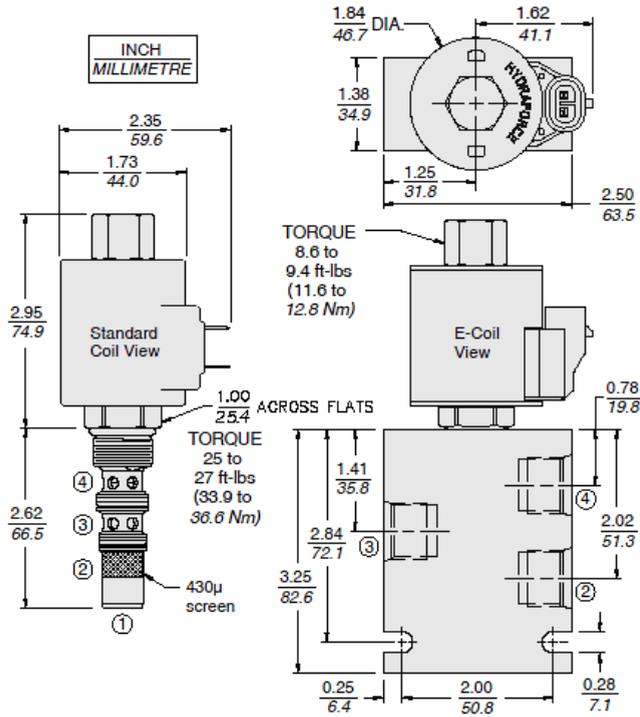


Reducing Pressure vs. Current  
Inlet Pressure 172 bar (2500 psi) at No Flow  
Control Current (amps) with 100 Hz Dither





Dimensions



Installation Specifications

Cavity	VC98-3
Cartridge installation torque	32.5 to 33.9 N-m (24 to 25 ft-lb)
Coil nut torque	6.8 to 9.5 N-m (5 to 7 ft-lb)
Orientation restriction	None

Accessories

Seal kit SK90-3X-BM - **Note:** X = seal option

Order Code

TS90-31 -			
<u>Porting</u>		<u>Termination Std. D-Coil</u>	
Cartridge Only	0	DS	Dual Spades
SAE 6	6T	DG	DIN 43650
SAE 8	8T	DL	Leadwires (2)
		DL/W	Leads w/Weatherpak® Connectors
<u>Seals</u>		DR	Deutsch DT04-2P
Buna	N	<u>Termination E-Coil</u>	
Fluorocarbon	V	EG	DIN 43650 (IP65 Rated)
		EL	Leadwires (2) (IP69K Rated)
<u>Voltage</u>		ER	Deutsch DT04-2P (IP69K Rated)
Less Coil	0	EY	Metri-Pack® 150 (IP69K Rated)
12 VDC (0.88 amps max.)	12	EJ	Amp Jr. Timer (IP69K Rated)
24 VDC (0.44 amps max.)	24		
Consult factory for other voltages		Coils with internal diode are available. Consult factory.	

Note: This valve uses a 10-size coil and the VC98-3 cavity, which is a variation of a 10-size cavity.

Model Options

TS90-31-H-J-L

H Line Body

CODE	DESCRIPTION
0	No Body

J Seal

CODE	DESCRIPTION
N	Buna-N



CODE	DESCRIPTION
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V	Fluorocarbon
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### L Coil

CODE	DESCRIPTION
0	No Coil
10DG	10 VDC, D-Coil, DIN 43650
10DL	10 VDC, D-Coil, Dual Lead Wires
10DS	10 VDC, D-Coil, Dual Spade
10EL	10 VDC, E-Coil, Dual Lead Wires
10ER	10 VDC, E-Coil, Deutsch
12DG	12 VDC, D-Coil, DIN 43650
12DL	12 VDC, D-Coil, Dual Lead Wires, 18 inches long
12DL/36	12 VDC, D-Coil, Dual Lead Wires, 36 inches long
12DL/W	12 VDC, D-Coil, Dual Lead Wires with Weatherpak
12DR	12 VDC, D-Coil, Deutsch
12DS	12 VDC, D-Coil, Dual Spade
12EG	12 VDC, E-Coil, DIN 43650
12EJ	12 VDC, E-Coil, AMP Jr.
12EL	12 VDC, E-Coil, Dual Lead Wires, 18 inches long
12EL/36	12 VDC, E-Coil, Dual Lead Wires, 36 inches long
12ER	12 VDC, E-Coil, Deutsch
12EY	12 VDC, E-Coil, Metri-Pack 150
20DS	20 VDC, D-Coil, Dual Spade
20ER	20 VDC, E-Coil, Deutsch
24AG	24 VDC, D-Coil, DIN 43650
24AP	24 VDC, D-Coil, 1/2" Conduit and Dual Lead Wires
24DG	24 VDC, D-Coil, DIN 43650
24DL	24 VDC, D-Coil, Dual Lead Wires
24DL/W	24 VDC, D-Coil, Dual Lead Wires with Weatherpak
24DP	24 VDC, D-Coil, 1/2" Conduit and Dual Lead Wires
24DR	24 VDC, D-Coil, Deutsch
24DS	24 VDC, D-Coil, Dual Spade
24EG	24 VDC, E-Coil, DIN 43650
24EJ	24 VDC, E-Coil, AMP Jr.
24EL	24 VDC, E-Coil, Dual Lead Wires, 18 inches long
24EL/36	24 VDC, E-Coil, Dual Lead Wires, 36 inches long
24ER	24 VDC, E-Coil, Deutsch
24EY	24 VDC, E-Coil, Metri-Pack 150
36DS	36 VDC, D-Coil, Dual Spade