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# Type CT88 Backpressure Regulator

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## Introduction

The Type CT88 backpressure regulator (Figure 1) is used to maintain backpressure on Lease Automatic Custody Transfer (LACT) skids. It is designed to allow accurate measurement by the positive displacement pump or coriolis meter and protect other upstream LACT skid equipment. The high flow capability, as compared with other backpressure regulators, maximizes transfer efficiency.

## Features and Benefits

**High Capacity** – Spans a wide range of flow requirements.

**Bleed Plug** – Exhausts air that might have been trapped in the actuator.

**Fully Balanced Plug** – Provides constant pressure control with varying inlet pressure.

**Fast Speed of Response** – Protects served equipment by quickly maintaining set pressure.

**Simple Construction** – For easy maintenance that minimizes operational downtime.

**Easy Installation** – The CL150 flanges bolt directly in line with existing and newly manufactured skids.

**Easily Adjusted Setpoint** – The Type CT88 setpoint is adjusted by rotating the adjusting screw on top of the actuator.

**CL150 Pressure Rating** – The Type CT88 can sustain pressures based on ASME 16.42 guidelines.

## Principle of Operation

See Figure 2. Type CT88 direct-operated backpressure regulator responds to changes in inlet pressure. Inlet pressure is registered on the underside of the diaphragm through an external sensing line that is connected to the lower diaphragm casing.



Figure 1. Type CT88 Backpressure Regulator

As long as the inlet pressure remains below setpoint, control spring keeps the disk against the seat ring providing tight shutoff with no flow through the backpressure regulator.

When inlet pressure rises above the set pressure, the pressure on the diaphragm overcomes the control spring force. This causes the diaphragm to move upward, lifting valve stem together with the valve plug away from seat ring. The flow path through the valve opens and excess pressure is vented. When upstream pressure drops below setpoint, the valve closes.

## Installation

See Figure 2. Vertical installation with the actuator installed directly above the main valve is recommended for optimal performance. The use of the bleed plug is recommended for installations of the actuator mounted above the main valve. The unit will operate in other installation orientations with actuator on its side or directly below the main valve, if the vents are protected from debris, weather, condensation or anything else that might clog it.

Make sure that flow will be in the same direction as indicated by the flow arrow on the body. Installation should be performed by qualified personnel. Overall dimensions are shown in Figure 3 and Table 3.

# Type CT88

## Specifications

The Specifications section lists the specifications for the Type CT88 backpressure regulators. Factory specification is stamped on the nameplate fastened on the backpressure regulator at the factory.

### Body Sizes

NPS 2, 3 and 4 / DN 50, 80 and 100

### End Connection

CL150 RF

### Maximum Working Pressure<sup>(1)(4)</sup>

Based on CL150 RF Flange Pressure Rating,  
See Table 1

### Backpressure Control Range<sup>(1)(2)</sup>

**NPS 2 / DN 50:** 10 to 145 psi / 0.7 to 10 bar  
**NPS 3 and 4 / DN 80 and 100:** 15 to 145 psi / 1.0 to 10 bar

### Wide-Open Flow Coefficients $C_v$

**NPS 2 / DN 50- $C_v$ :** 59  
**NPS 3 / DN 80- $C_v$ :** 148  
**NPS 4 / DN 100- $C_v$ :** 240

### Flow Sizing Coefficients $C_v$

See Table 2

### Flow Characteristic

Quick Open

### Shutoff Classification

ANSI Class VI

### Temperature Capabilities<sup>(1)(3)</sup>

**Fluorocarbon (FKM)<sup>(5)</sup>:**  
20 to 248°F / -7 to 120°C<sup>(6)</sup>

### Construction Materials

**Body:** Carbon steel (WCB)  
**Diaphragm and Seals:** Fluorocarbon (FKM)  
**Trim Parts:** 316 Stainless steel

### Control Line Connection Size

1/4 in. NPT

### Approximate Weight

See Table 3

1. The pressure/temperature limits in this Bulletin and any applicable standard limitation should not be exceeded.
2. For lower set pressures, contact the factory.
3. It may be assumed that the material temperature is the same as the working fluid temperature.
4. Maximum inlet pressure depends on working temperature (Refer to ASME B16.42 or Table 1).
5. Fluorocarbon (FKM) is limited to 200°F / 93°C for hot water.
6. Increased working temperature may reduce the maximum inlet pressure range (Refer to ASME B16.42 or Table 1).

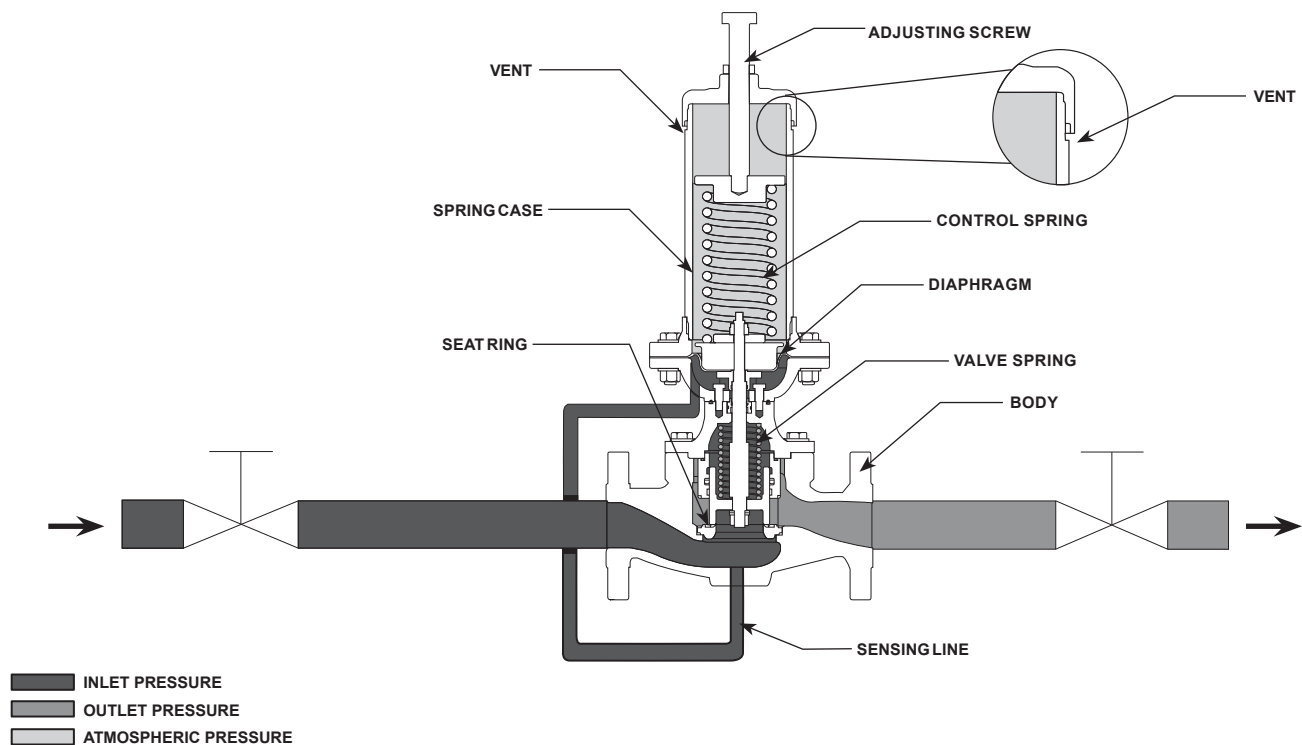


Figure 2. Type CT88 Backpressure Regulator Operational Schematic

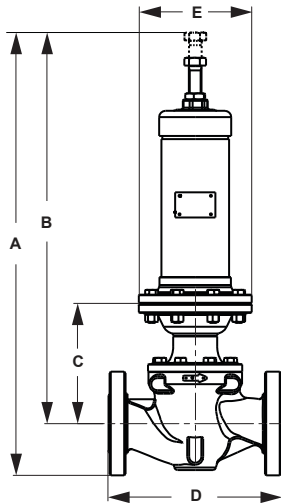


Figure 3. Type CT88 Backpressure Regulator Dimension Drawing

Table 1. Pressure-Temperature Ratings for CL150 Carbon Steel (WCB)

TEMPERATURE <sup>(1)</sup>		MAXIMUM WORKING PRESSURE
°F		psi
20 to 100		285
200		260
248		245
°C		bar
-7 to 38		19.7
50		17.0
100		17.9
120		16.9

1. For intermediate temperatures, linear interpolation is permitted.

Table 2. Type CT88 Flow Coefficients  $C_v$

SET PRESSURE		WIDE OPEN $C_v$			$C_v$ AT 10% BUILD-UP <sup>(1)</sup>			$C_v$ AT 20% BUILD-UP <sup>(1)</sup>		
		Body Size			Body Size			Body Size		
psi	bar	NPS 2 / DN 50	NPS 3 / DN 80	NPS 4 / DN 100	NPS 2 / DN 50	NPS 3 / DN 80	NPS 4 / DN 100	NPS 2 / DN 50	NPS 3 / DN 80	NPS 4 / DN 100
15	1.0	59	148	240	9.2	19.4	29.1	12.1	23.7	34.2
30	2.1				10.6	21.7	33.0	15.2	29.4	41.8
50	3.4				12.8	25.3	37.0	19.0	35.7	50.4
70	4.8				14.2	29.3	39.2	21.9	40.9	54.4
85	5.9				15.2	30.1	42.0	23.9	43.2	58.3
100	6.9				16.1	31.8	44.1	25.7	45.6	62.8
145	10.0				19.4	34.4	46.7	32.0	52.4	70.3

1. Setpoint made at 10% flow.

Table 3. Type CT88 Backpressure Regulator Dimensions

BODY SIZE		A <sup>(1)</sup>		B <sup>(1)</sup>		C		D		E		APPROXIMATE WEIGHT	
NPS	DN	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	Lbs	kg
2	50	29.1	739	25.8	656	7.56	192	10.0	254	7.09	180	89.3	40.5
3	80	31.3	796	27.2	691	8.86	225	11.7	298	7.09	180	131	59.5
4	100	33.7	855	28.6	727	10.3	262	13.9	352	7.09	180	184	83.5

1. Measured with the adjusting screw extended at maximum length.

## Capacity Information

### Note

Flow capacities are laboratory verified; therefore, regulators may be sized for 100% flow published capacities. It is not necessary to reduce published capacities.

Table 2 shows wide-open flow coefficient and regulating flow coefficient ( $C_v$ ). The regulating capacity information is based on percentage of pressure build-up over setpoint (10 or 20%).

# Type CT88

## Ordering Information

Use the Specifications section on page 2 and carefully review the description to the right of each specification. Use this information to complete the Ordering Guide on this page.

Specify the desired selection wherever there is a choice to be made. Then send the Ordering Guide to your local Sales Office.

## Ordering Guide

### Body Size (Select One)

- NPS 2 / DN 50
- NPS 3 / DN 80
- NPS 4 / DN 100

### Replacement Parts Kit (Optional)

- Yes, send one replacement parts kit to match this order.

Regulators Quick Order Guide	
***	Readily Available for Shipment
**	Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

**Specification Worksheet**

**Application:**  
 Specific Use \_\_\_\_\_  
 Line Size \_\_\_\_\_  
 Fluid Type and Specific Gravity \_\_\_\_\_  
 Temperature \_\_\_\_\_

**Upstream Regulator Specifications:**  
 Brand of upstream regulator? \_\_\_\_\_  
 Orifice size of the upstream regulator? \_\_\_\_\_  
 Wide-open coefficient of the upstream regulator? \_\_\_\_\_  
 Maximum Inlet Pressure ( $P_{1max}$ ) \_\_\_\_\_  
 Downstream Pressure Setting(s) ( $P_2$ ) \_\_\_\_\_  
 Maximum Flow ( $Q_{max}$ ) \_\_\_\_\_

**Backpressure Regulator Specifications:**  
 Backpressure Regulator Setpoint \_\_\_\_\_  
 Accuracy Requirements? \_\_\_\_\_  
 Need for Extremely Fast Response? \_\_\_\_\_

**Other Requirements:** \_\_\_\_\_

 Webadmin.Regulators@emerson.com

 Facebook.com/EmersonAutomationSolutions

 Fisher.com

 LinkedIn.com/company/emerson-automation-solutions

 Twitter.com/emr\_automation

### Emerson Automation Solutions

#### Americas

McKinney, Texas 75070 USA  
 T +1 800 558 5853  
 +1 972 548 3574

#### Europe

Bologna 40013, Italy  
 T +39 051 419 0611

#### Asia Pacific

Singapore 128461, Singapore  
 T +65 6777 8211

#### Middle East and Africa

Dubai, United Arab Emirates  
 T +971 4 811 8100

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