

MODEL 123

BACK PRESSURE RELIEF REGULATOR OVERVIEW

The Model 123 is a relief regulator suitable as a back pressure regulator or bypass valve for controlling inlet pressure between 2 and 350 psig (.14 to 24.2 Barg) (525 psig (36.2 Barg) at 50% build-up). The body has an angle configuration with a side inlet and a bottom outlet. Sizes are 1/2", 3/4", 1", 1-1/2" and 2" (DN15, 20, 25, 40 and 50). Available options include cryogenic construction, NACE construction and a large selection of trim, body and diaphragm materials. It is the most adaptable back pressure/relief regulator Cashco manufactures.



MODEL 123

FEATURES

- Versatile:** Five body materials & twenty three trim material combinations allow compatibility with most fluids.
- Controlled Compression Composition Seats:** Four composition seat materials are available and all use controlled compression with metal to metal back up for long, trouble free life.
- High Capacity:** A large orifice and diaphragm provide sensitivity with high capacity.

APPLICATIONS

Designed for controlling a wide range of fluids including air, inert gases, cryogenic gas or liquids, sour gas, chemicals, water, fuel oil and steam. See Table 1 for more information.

⚠ CAUTION

THIS IS NOT A SAFETY DEVICE AND MUST NOT BE SUBSTITUTED FOR A CODE APPROVED PRESSURE SAFETY RELIEF VALVE OR RUPTURE DISC.



LINE SIZES AVAILABLE

1/2" (DN15), 3/4" (DN20), 1" (DN25), 1-1/2" (DN40), 2" (DN50)



END CONNECTIONS

NPT, FLANGED, EXTENDED NIPPLES



COMMON APPLICATIONS

AIR, INERT GASES, CRYOGENIC GAS OR LIQUIDS, SOUR GAS, CHEMICALS, WATER, FUEL OIL, STEAM



DESIGN PRESSURE

MAXIMUM PRESSURE DROP:
350 psid (24.14 Bard)

STANDARD/GENERAL SPECIFICATIONS

Body Sizes: 1/2", 3/4", 1", 1-1/2" and 2" sizes (DN15, 20, 25, 40 and 50). Includes one side inlet and a bottom outlet, i.e. angle configuration.

End Connections: Standard: NPT female pipe thread.
Alternate: See Opt-30, -31P, -32 or -39 for flanged, extended nipples or socket weld end connections. See Opt -33 for a third body connection.

Body/Spring Chamber Material Combinations: CI/CI, BRZ/CI, BRZ/BRZ, CS/CI, CS/CS, SST/CI, SST/BRZ, SST/CS, SST/SST.
CI – Cast grey iron
BRZ – Cast bronze
CS – Cast carbon steel
SST – Cast stainless steel
All spring chambers furnished with 1/4" (DN8) tapped vent hole. See Table 2 for material specifications.

Operating Temperature: See Tables 2, 3 and 4.

Inlet Pressure: See Tables 2 and 5.

Trim Design: Metal seated or composition seated brass or SST materials. See Figures 1 and 2, and Tables 3 and 4.

Flange Bolting: Standard: Plated Steel
LCC Steel Body material: SST
Cryogenic Construction: SST.

Gaskets: Standard: Graphite/NBR. **NOT SUITABLE FOR OXYGEN SERVICE.**
Alternate Material: See Opt-45, -46G.

Diaphragms: SST, Neoprene (BC), Fluorocarbon Elastomer (FKM), Phosphor Brz., EPDM, TFE Coated SST, Buna-N. (NBR)

Range Springs: Standard: Epoxy coated steel.
LCC Steel Body material: SST
Cryogenic: SST.

Valve Size	Standard Steel Range Spring		Cryogenic SST Range Spring	
	psig	(Barg)	psig	(Barg)
1/2" (DN15)	2 - 30	(.14 - 2.1)	2 - 30	(.14 - 2.1)
	25 - 50	(1.7 - 3.4)	20 - 60	(1.4 - 4.1)
	40 - 100	(2.8 - 6.9)	50 - 110	(3.4 - 7.6)
	80 - 150	(5.5 - 10.3)	90 - 150	(6.2 - 10.3)
	120 - 215	(8.3 - 14.8)	120 - 245	(8.3 - 16.9)
	150 - 350	(10.3 - 24.1)	220 - 300	(15.2 - 20.7)
3/4"-1" (DN20-25)	2 - 20	(.14 - 1.4)	2 - 25	(.14 - 1.7)
	15 - 40	(1.0 - 2.8)	20 - 45	(1.4 - 3.1)
	30 - 80	(2.1 - 5.5)	35 - 100	(2.4 - 6.9)
	65 - 160	(4.5 - 11.0)	80 - 210	(5.5 - 14.5)
	130 - 205	(9.0 - 14.1)	170 - 300	(11.7 - 20.7)
	165 - 350	(11.4 - 24.1)		
1-1/2"-2" (DN40-DN50)	2 - 15	(.14 - 1.0)	2 - 15	(.14 - 1.0)
	10 - 25	(.69 - 1.8)	10 - 30	(.69 - 2.1)
	20 - 55	(1.4 - 3.8)	25 - 55	(1.7 - 3.8)
	45 - 105	(3.1 - 7.2)	45 - 95	(3.1 - 6.6)
	85 - 220	(5.9 - 15.1)	75 - 130	(5.2 - 8.7)
	180 - 350	(12.4 - 24.1)	110 - 300	(7.6 - 20.7)

Capacities: Up to 7 C_v; See Tables 6 and 7 for C_v vs. Set pressure. Use for fluids other than water, air or steam, or when the outlet pressure is other than atmospheric pressure.

See Tables 8, 9 and 10 for water, air or saturated steam, respectively.

Capacities are for 10, 20, 30, 40 and 50% build up over the set pressure. The set pressure is made at approximately 2% of the flow capacity shown in the 20% build up columns. The flow rate is different for each size and set pressure. Example: 100 psig (6.9 Barg) set pressure and a 20% build-up = 120 psig (8.3 Barg) flowing pressure for the capacity listed.

Painting: Standard: All non-corrosion resistant portions to be painted with corrosion resistant epoxy paint per Cashco Spec #S-1606.

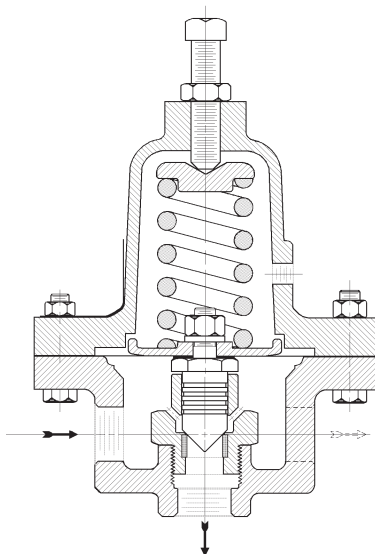


Figure 1: Model 123-33 – Metal Seat Design

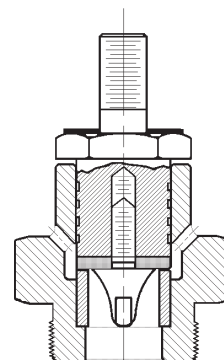


Figure 2: Composition Seat

OPTION SPECIFICATIONS

OPTION-1: CLOSING CAP. Covers the adjusting screw to discourage tampering with the spring setting or for remote venting of the spring chamber. Includes a cast iron or steel spring chamber, a ductile iron closing cap, a gasket for sealing the closing cap to the spring chamber, a sealing lock nut on the adjusting screw and an NPT vent connection in the spring chamber.

OPTION-1+6: DIFFERENTIAL CONSTRUCTION: For differential pressure service. NOT available in body/spring chamber material combinations of BRZ/BRZ, SST/BRZ or SST/SST. Includes closing cap, larger pusher plate, an extra diaphragm gasket (for metal diaphragms), a special grooved adjusting screw, a 1/4" (DN8) NPT female loading pressure connection in spring chamber, and an adjusting screw sealing lock nut. Limited for use on lower range springs indicated below and maximum pressure containment levels indicated in Table 2. (See Model 123-1+6+S Technical Bulletin for alternate design.)

Body Size inches (DN)	Range Spring psid (Bard)
1/2"	2-30, 25-50, 40-100, 80-150
(15)	(.14-2.1, 1.7-3.4, 2.7-6.9, 5.5-10.3)
3/4" & 1"	2-20, 15-40, 30-80, 65-160
(20 & 25)	(.14-1.4, 1.0-2.7, 2.1-5.5, 4.5-11.0)
1-1/2" & 2"	2-15, 10-25, 20-55, 45-105
(40 & 50)	(.14-1.0, .69-1.7, 1.4-3.8, 3.1-7.2)
• Consult factory for sizing and selection of Differential Model 123's. •	

OPTION-5: CRYOGENIC CONSTRUCTION. For cryogenic service. Available in 1/2", 3/4", 1", 1-1/2" and 2" (DN15, 20, 25, 40, and 50) sizes with NPT end connections. Trim B5 is standard with this construction. All other wetted parts are brass. Non-wetted metal parts are of brass or SST to operate at temperatures from -325° to +150°F (-198° to +66°C). The spring chamber has a 1/4" (DN8) NPT vent connection for purge gas and a 1/8" (3.2mm) diameter drain hole. Mount in horizontal piping with adjusting screw below the piping. Cleaned and packaged for oxygen service per Cashco specification #S-1134.

OPTION-15: STELLITED SEAT SURFACES. Stellite faced seating. Available only on 316 SST metal seat with S1 trim. Includes a stellite faced valve seat pressed into the cylinder plus a stellite faced seat cone screwed into the piston. NOT SUITABLE FOR NACE SERVICE.

OPTION-25P: PLASTIC RAIN PROOF BUG VENT. 1/4" NPT(DN8) for spring chamber vent.

OPTION-25S: SST RAIN PROOF BUG VENT. 1/4" NPT(DN8) for spring chamber vent.

OPTION-30: FLANGED END CONNECTIONS. 150# or 300# raised face flanges available on all sizes. Schedule 80 pipe nipples. The raised face flange is welded to the nipple using a socket weld connection. Steel bodies have steel nipples and flanges. 316 SST bodies have 316 SST nipples and flanges. See Tables 2, 3, and 4 for maximum operating temperatures and pressures. With 150# flanges, the flange pressure rating is the pressure limiting factor. For 300# flanges, the body rating is the pressure limiting factor. Standard is two flanges; with Opt-30+33, a third flange is available.

OPTION-31P: BSPP END CONNECTIONS. British Standard Parallel Pipe threads per ISO 7/1; used as an alternate to NPT ends.

OPTION-32: EXTENDED P.E. NIPPLES. Schedule 80 plain end pipe nipples used for field butt or socket welding into pipeline. Pipe nipples of same general chemistry as body material. Short threaded pipe nipples seal welded to body. Use for socket weld pipe systems. Available on all sizes of CS and 316 SST bodies.

OPTION-33: THIRD BODY CONNECTION. This option eliminates a pipe tee when the Model 123 is installed in the pump outlet piping. The bottom connection handles the discharge fluid. NPT and Opt -30, -32 and -39 can be furnished on the third body connection.

OPTION-36: SST CRYOGENIC CONSTRUCTION. Same specifications as Opt.-5 except:

- For SST/SST body/spring chamber materials with S1 and S36 trim only.
- Opt-30 flanged ends available.

OPTION-39: SOCKET WELD END CONNECTIONS. Available on all sizes of CS and 316 SST bodies.

OPTION-40: NACE CONSTRUCTION: Internal wetted portions meet NACE standard MR0175 for application in sour gas service. Exterior of the unit not to be directly exposed to a sour gas environ-

ment, buried, insulated or otherwise denied direct atmospheric exposure. CS/CS body/spring chamber materials ONLY. Acceptable ONLY with S40, S40T and S40V trim. (Alternate LCC body/spring chamber material with S40B and S40C only trim.) Opt-30 and -32 require post-weld stress relieving by heat treating.

OPTION-40SST: SST NACE CONSTRUCTION. Same as Opt.-40, except uses SST/SST or SST/CS body/spring chamber construction.

OPTION-45: TFE GASKETS. Primarily for oxygen service. Utilizes TFE/Silicate diaphragm gaskets and closing cap (Opt-1) gaskets. Limits temperature range to -20° to +400°F (-29° to +205°C). Not required when using a composition diaphragm.

Option -46G: HIGH TEMPERATURE GASKETS. CS or SST body/spring chamber materials, S1 or S2 Trim only. Standard diaphragm and pusher plate gasket for units with metal diaphragms replaced with carbon graphite gaskets. Operating temperature -20° to +600° F (-29° to +315°C).

OPTION-55:

SPECIAL CLEANING: BRZ or SST body materials only. Cleaning per Cashco Spec. #S-1134 for oxygen service. **NOTE:** Design Pressure Rating shall not exceed 375 psig (25.8 Barg) when body material is SST and process medium is oxygen.

OPTION-56:

SPECIAL CLEANING: All body materials. Cleaning per Cashco Spec. #S-1542. Not suitable for oxygen service.

TECHNICAL SPECIFICATIONS

TABLE 1- Applications		
Fluid	Recommended Construction	Trim Designation Number
Air or Inert Gases	Composition Seat and Diaphragm	B2, B3, B4, BB, S3, S3N, SB
	Metal Seat and Composition Diaphragm	S2N
Chemicals	Metal Seat and Diaphragm	S0, S1, S2
	Metal Seat and Composition Diaphragm	S2N, S5, S40
	Composition Seat and Diaphragm	S3, S3N, SB, S40T, S40V
	Composition Seat and Metal Diaphragm	S9, S36
Sour Gas	Metal Seat and Composition Diaphragm	S40
	Composition Seat and Diaphragm	S40T, S40V
Cryogenic Gas or Liquids	Metal Seat and Diaphragm	S1
	Composition Seat and Metal Diaphragm	B5 or S36
Fuel Oil [‡]	Composition Seat and Diaphragm	BB, B4, B7, S3, S3N, SB
Hydrocarbon Gas or Liquids [‡]	Composition Seat and Diaphragm	BB, B4, B7, S3, S3N, SB
Saturated Steam, Low Pressures up to 50 psig (3.4 Barg)	Metal Seat and Diaphragm	B1, S1, S2
	Composition Seat and Diaphragm	B6
	Composition Seat and Metal Diaphragm	B5, S36
Saturated Steam, Pressures up to 100 psig (6.8 Barg), 50 psid	Metal Seat and Diaphragm	B1, S1, S2
	Composition Seat and Metal Diaphragm	B5, S36
Steam Pressures above 100 psig (6.9 Barg) Saturated or Superheated	Metal Seat and Diaphragm	S1 or S2
Water and Condensate, Low Temperature 32-180°F (0-83°C)	Metal Seat and Composition Diaphragm	S2N
	Composition Seat and Diaphragm	BB, B2, B3, S3, S3N, SB
Water and Condensate, High Temperature 180-300°F (83-149°C)	Metal Seat and Diaphragm	B1, S1, S2
	Composition Seat and Diaphragm	B6
[‡] In accordance with ASME B31.3 "process piping", do not use Cast Iron Body for hydrocarbon or flammable fluid service with inlet pressures greater than 150 psig (10.3 Barg) or temperatures greater than 300° F (149° C).		

TABLE 2
BODY AND SPRING CHAMBER
MAXIMUM PRESSURE WITH TEMPERATURE RATINGS

Material Specifications (Body / Spring Chamber)		Inlet			
Description (Abbr.)	ASTM No.	Pressure		Temperature	
		psig	(barg)	°F	(°C)
CI/CI	A126, Class B	300 ** 250	(20.7) (17.2)	-20 to +400 -20 to +450	(-29 to +205) (-29 to +232)
BRZ/CI	B62 Alloy C83600/ A126, Class B	300 **	(20.7)	-20 to +350	(-29 to +177)
BRZ/BRZ *	B62, Alloy C83600	400	(27.6)	-20 to +200	(-29 to +93)
		300	(20.7)	-20 to +350	(-29 to +177)
		250	(17.2)	-20 to +400	(-29 to +205)
CS/CI	A216, Gr. WCB/ A126, Class B	300 ** 250	(20.7) (17.2)	-20 to +400 -20 to +450	(-29 to +205) (-29 to +232)
CS/CS ***	A216, Gr. WCB/ A216, Gr. WCB	525	(36.1)	-20 to +450	(-29 to +232)
SST/CI	A351, Gr. CF8M/ A126, Class B	300 ** 250	(20.7) (17.2)	-20 to +400 -20 to +450	(-29 to +205) (-29 to +232)
SST/BRZ	A351, Gr. CF8M/ B62, Alloy C83600	400	(27.6)	-20 to +200	(-29 to +93)
		300	(20.7)	-20 to +350	(-29 to +177)
		250	(17.2)	-20 to +400	(-29 to +205)
SST/CS	A351, Gr. CF8M/ A216, Gr. WCB	525	(36.1)	-20 to +450	(-29 to +232)
SST/SST *	A351, Gr. CF8M/ A351, Gr. CF8M				

* For operating temperatures between -325 to +150°F (-198 to +66°C), specify Opt -5 with trim B5 or Opt-36 with trim S1 or S36.

** For Opt-1+6 with Cast Iron Spring Chamber - Max. Inlet Pressure Rating is de-rated to 250 psig (17.2 Barg).

*** Alternate "CS" material - LCC -Steel - ASTM A352 Gr. LCC - minimum temperature -50 °F (-46 °C) with S1 or S36 Trim.

TABLE 3
BRASS TRIM MATERIAL COMBINATIONS

Brass Trim Designations								
Part	Metal Seat	Composition Seat						
	B1	B2	B3	B4	*B5	B6	B7	BB
Diaphragm	302 SST	BC	BC	FKM	Phosphor Brz	EPDM	FKM	NBR
Cylinder	Brass	Brass	Brass	Brass	Brass	Brass	Brass	Brass
Valve Seat	316 SST	Brass	Brass	Brass	Brass	Brass	Brass	Brass
Plug	416 SST	Brass	Brass	Brass	Brass	Brass	Brass	Brass
Seat Disc	None (metal)	NBR	TFE	TFE	TFE	EPR	FKM	NBR
Seat Disc Screw	None	Brass	Brass	Brass	Brass	Brass	Brass	Brass
Temperature °F (°C)	-20 to +400 (-29 to 205)	-20 to +180 (-29 to +83)	-20 to 180 (-29 to +83)	-20 to +300 (-29 to 205)	-20 to +200 (-29 to +93)	-20 to +300 (-29 to +149)	-20 to +300 (-29 to 149)	-20 to +180 (-29 to +83)

* For operating temperatures between -325° and +150°F (-198 and +66°C), specify Opt-5 and trim designation B5.

BC = Neoprene; NBR = Buna-N; FKM = Fluorocarbon elastomer; EPR = Ethylene Propylene; EPDM = Ethylene Propylene Diene;
TFE = Polytetrafluoroethylene

TABLE 4 (a)
STAINLESS STEEL TRIM MATERIAL COMBINATIONS – METAL SEAT

Stainless Steel Trim Designations - Metal Seat							
Part	S0	*S1	S2	S2N	S5	S40 (NACE)	S40B (NACE)
Diaphragm	TFE Coated 302SST	302SST	302SST	BC	FKM	BC	BC **
Cylinder	316SST	316SST	316SST	316SST	316SST	316SST	316SST
Valve Seat	316SST	316SST	316SST	316SST	316SST	316SST	316SST
Plug	316SST	316SST	416SST	416SST	416SST	316SST	316SST
Seat Disc	None (metal)	None (metal)	None (metal)	None (metal)	None (metal)	None (metal)	None (metal)
Seat Disc Screw	None	None	None	None	None	None	None
Temperature °F (°C)	-20 to +450 (-29 to +232)			-20 to +180 (-29 to +83)	-20 to +300 (-29 to +149)	-20 to +180 (-29 to +83)	-50 to +200 (-46 to +93)
* Available with stellited plug and valve seat (see Opt-15). Includes a screwed in seat cone. *For Operating temperatures between -325° and +150°F (-198 and +66°C), specify Opt-36, S1trim. ** Special BC Material for Low Temperature.							

TABLE 4 (b)
STAINLESS STEEL TRIM MATERIAL COMBINATIONS – COMPOSITION SEAT

Stainless Steel Trim Designations - Composition Seat								
Part	S3	S3N	S9	*S36	S40T (NACE)	S40V (NACE)	S40C (NACE)	SB
Diaphragm	BC	BC	TFE Coated 302SST	302SST	FKM	FKM	BC **	NBR
Cylinder	316SST	316SST	316SST	316SST	316SST	316SST	316SST	316SST
Valve Seat	316SST	316SST	316SST	316SST	316SST	316SST	316SST	316SST
Plug	316SST	316SST	316SST	316SST	316SST	316SST	316SST	316SST
Seat Disc	TFE	NBR	TFE	TFE	TFE	FKM	TFE	NBR
Seat Disc Screw	316SST	316SST	316SST	316SST	316SST	316SST	316SST	316SST
Temperature °F (°C)	-20 to +180 (-29 to +83)		-20 to +400 (-29 to +205)		-20 to +300 (-29 to +149)		-50 to +200 (-46 to +93)	-20 to +180 (-29 to +83)
* For operating temperatures between -325° and +150°F (-198 and +66°C), specify Opt-36, S36 trim.								
** Special BC Material for Low Temperature.								

BC = Neoprene; NBR = Buna-N; FKM = Fluorocarbon elastomer; EPDM = Ethylene Propylene-Diene; EPR = Ethylene Propylene; TFE = Polytetrafluoroethylene

TABLE 5
MAXIMUM ALLOWABLE PRESSURE DROPS

Fluid	Pressure Drop ¹		Seat Material	Trim Material	Trim Designation No.
	psid	(Bard)			
Liquid	350	(24.14)	Stellite	SST	S1
	350	(24.14)	Comp	SST	S9 or S36
	350	(24.14)	Comp	SST - COMP	S3, S3N, SB, S40T,V or C
	250	(17.25)	Metal	BR	B1
	250	(17.25)	Comp	BR - Comp	B2, B3, B4, B6, B7 or BB
Gases	350	(24.14)	Metal	BR or SST	B1, S0, S1 or S2
			Metal	SST - Comp	S2N, S5 or S40 or S40B
			Comp	SST	S9 or S36
			Comp	SST -Comp	S3, S3N, SB,S40T,V or C
			Comp	BR - Comp	B2, B3, B4, B6, B7 or BB
Steam	350	(24.14)	Stellite	SST	S1
	300	(20.7)	Metal	SST	S1 or S2
	200	(13.8)	Metal	BR	B1
	50	(3.45)	Comp	BR - Comp	B6
¹ Maximum pressure drops are with the plug on the seat; i.e. no flow					

TABLE 6
CAPACITY TABLES - Cv — METAL DIAPHRAGM

Set Point (Inlet) Pressure P ₁		1/2" (DN15) Body					3/4" (DN20) Body					1" (DN25) Body					1-1/2" (DN40) Body					2" (DN50) Body				
		% Build					% Build					% Build					% Build					% Build				
psig	(Barg)	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%
5	(.34)	0.22	0.44	0.67	0.89	1.11	0.50	1.00	1.44	1.77	2.05	0.50	1.00	1.44	1.77	2.05	1.50	2.89	3.57	3.92	4.28	1.74	3.32	4.11	4.59	4.90
10	(.69)	0.37	0.76	1.14	1.52	1.90	0.72	1.45	2.05	2.56	3.07	0.72	1.45	2.05	2.56	3.07	1.55	2.94	3.84	4.38	4.40	1.78	3.36	4.47	5.10	5.15
15	(1.0)	0.41	0.84	1.26	1.67	2.09	0.80	1.64	2.38	2.95	3.54	0.80	1.64	2.38	2.95	3.54	1.60	3.02	4.00	4.40	4.40	1.81	3.44	4.66	5.15	5.15
25	(1.7)	0.49	0.98	1.50	2.00	2.14	0.77	1.57	2.31	2.84	3.34	0.77	1.57	2.31	2.84	3.34	1.71	3.18	4.21	4.40	4.40	1.94	3.62	4.90	5.15	5.15
35	(2.4)	0.54	1.09	1.63	2.14	2.14	0.80	1.79	2.61	3.18	3.78	0.80	1.79	2.61	3.18	3.78	0.93	1.78	2.70	3.48	4.20	1.04	2.10	2.85	4.10	4.93
50	(3.4)	0.67	1.32	1.98	2.14	2.14	0.72	1.43	2.15	2.84	3.38	0.72	1.43	2.15	2.84	3.38	1.15	2.25	3.36	4.28	4.40	1.33	2.62	3.95	5.00	5.15
75	(5.2)	0.59	1.19	1.78	2.14	2.14	1.07	2.15	3.04	3.38	3.38	1.07	2.15	3.04	3.38	3.38	1.28	2.44	3.56	4.40	4.40	1.42	2.80	4.17	5.15	5.15
100	(6.9)	0.74	1.45	2.14	2.14	2.14	0.69	1.25	1.88	2.52	3.38	0.69	1.25	1.88	2.52	3.38	1.40	2.65	3.83	4.40	4.40	1.56	3.05	4.47	5.15	5.15
150	(10.3)	0.59	1.19	1.78	2.14	2.14	0.88	1.76	2.66	3.38	3.10	0.88	1.76	2.66	3.38	3.10	1.28	2.52	3.64	4.40	4.40	1.48	2.90	4.14	5.15	5.15
200	(13.8)	0.74	1.45	2.14	2.14	2.14	0.98	1.90	2.81	3.38	3.38	0.98	1.90	2.81	3.38	3.38	1.69	3.26	4.40	4.40	4.40	1.95	3.2	5.15	5.15	5.15
300	(20.7)	0.81	1.62	2.14	2.14	2.14	1.11	2.15	3.33	3.38	3.38	1.11	2.15	3.33	3.38	3.38	1.62	3.14	4.40	4.40	4.40	1.77	3.61	5.15	5.15	5.15
350	(24.1)	0.85	1.70	2.14	2.14	2.14	1.27	2.55	3.38	3.38	3.38	1.27	2.55	3.38	3.38	3.38	1.80	3.50	4.40	4.40	4.40	2.08	4.00	5.15	5.15	5.15

Metric Conversion Factor: Cv / 1.16 = kv

TABLE 7
CAPACITY TABLES - Cv — COMPOSITION DIAPHRAGM

Set Point (Inlet) Pressure P ₁		1/2" (DN15) Body					3/4" (DN20) Body					1" (DN25) Body					1-1/2" (DN40) Body					2" (DN50) Body				
		% Build					% Build					% Build					% Build					% Build				
psig	(Barg)	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%	10%	20%	30%	40%	50%
5	(.34)	0.37	0.73	1.12	1.48	1.85	0.83	1.67	2.40	2.95	3.42	0.83	1.67	2.40	2.95	3.42	2.50	4.82	5.95	6.53	6.70	2.90	5.53	6.85	7.00	7.00
10	(.69)	0.62	1.27	1.90	2.53	3.04	1.20	2.42	3.42	4.27	5.10	1.20	2.42	3.42	4.27	5.10	2.58	4.90	6.40	6.70	6.70	2.97	5.60	7.00	7.00	7.00
15	(1.0)	0.68	1.40	2.10	2.78	3.04	1.33	2.73	3.97	4.92	5.10	1.33	2.73	3.97	4.92	5.10	2.67	5.00	6.67	6.70	6.70	3.02	5.73	7.00	7.00	7.00
25	(1.7)	0.82	1.63	2.50	3.04	3.04	1.28	2.62	3.85	4.73	5.10	1.28	2.62	3.85	4.73	5.10	2.85	5.30	6.70	6.70	6.70	3.23	6.03	7.00	7.00	7.00
35	(2.4)	0.90	1.82	2.72	3.04	3.04	1.33	2.98	4.35	5.10	5.10	1.33	2.98	4.35	5.10	5.10	1.55	2.97	4.50	5.80	6.70	1.73	3.50	4.75	7.00	7.00
50	(3.4)	1.12	2.20	3.04	3.04	3.04	1.20	2.38	3.58	4.73	5.10	1.20	2.38	3.58	4.73	5.10	1.92	3.75	5.60	6.70	6.70	2.22	4.37	6.58	7.00	7.00
75	(5.2)	0.98	1.98	2.97	3.04	3.04	1.78	3.58	5.07	5.10	5.10	1.78	3.58	5.07	5.10	5.10	2.13	4.07	5.93	6.70	6.70	2.37	4.67	6.95	7.00	7.00
100	(6.9)	1.23	2.42	3.04	3.04	3.04	0.99	1.79	2.69	3.60	4.43	0.99	1.79	2.69	3.60	4.43	2.00	3.79	5.47	6.70	6.70	2.23	4.36	6.39	7.00	7.00
150	(10.3)	0.84	1.70	2.54	3.04	3.04	1.26	2.51	3.80	4.96	5.10	1.26	2.51	3.80	4.96	5.10	1.83	3.60	5.20	5.63	6.70	2.11	4.14	5.91	7.00	7.00
200	(13.8)	1.06	2.07	3.04	3.04	3.04	1.40	2.71	4.01	5.10	5.10	1.40	2.71	4.01	5.10	5.10	2.41	4.66	6.47	6.70	6.70	2.79	5.31	7.00	7.00	7.00
300	(20.7)	1.16	2.31	3.04	3.04	3.04	1.59	3.07	4.75	5.10	5.10	1.59	3.07	4.75	5.10	5.10	2.31	4.49	6.36	6.70	6.70	2.53	5.16	7.00	7.00	7.00
350	(24.1)	1.21	2.43	3.04	3.04	3.04	1.81	3.64	5.10	5.10	5.10	1.81	3.64	5.10	5.10	5.10	2.57	5.00	6.70	6.70	6.70	2.97	5.71	7.00	7.00	7.00

Metric Conversion Factor: Cv / 1.16 = kv

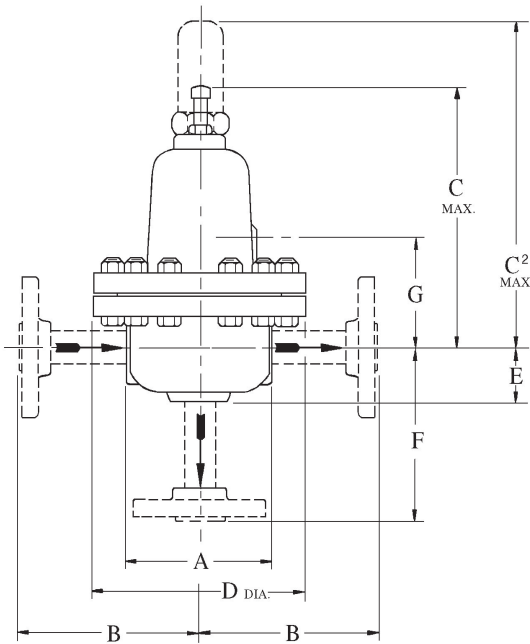
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123-TB

TABLE 10
STEAM CAPACITY - LBS/HR
S.G. = Actual T = Saturated F_L = 0.945
All Sizes - METAL DIAPHRAGM

Outlet Pressure (psig)	Set Point Pressure (psig)	1/2" (DN15) Body						3/4" (DN20) Body						1" (DN25) Body						1-1/2" (DN40) Body						2" (DN50) Body					
		% Build						% Build						% Build						% Build						% Build					
		10%	20%	30%	40%	50%		10%	20%	30%	40%	50%		10%	20%	30%	40%	50%		10%	20%	30%	40%	50%		10%	20%	30%	40%	50%	
0	5	6	13	20	26	33		14	29	42	52	61		14	29	42	52	61		43	83	104	115	128		49	96	120	135	146	
	10	15	32	49	67	85		30	61	89	112	137	160		30	61	89	112	137		64	125	166	192	197	74	142	193	224	230	
	15	22	45	70	94	120	42	89	131	166	204	241	274		89	131	166	204	241		84	163	221	248	253	95	186	257	291	297	
	25	36	73	116	158	173	56	118	178	225	271	318	365		56	118	178	225	271		125	238	324	348	357	141	271	378	407	417	
	35	50	103	159	215	221	73	170	255	319	390	437	484		73	170	255	319	390		85	169	263	349	433	95	199	278	412	508	
	50	80	163	252	281	289	86	176	274	373	457	541	625		86	176	274	373	457		137	277	428	562	595	158	323	503	657	696	
	75	97	203	314	389	401	175	366	536	615	634	653	672		175	366	536	615	634		210	415	627	801	825	233	476	735	937	966	
	100	154	314	481	497	513	144	271	422	585	810	144	271		144	271	422	585	810		292	574	861	1022	1055	325	661	1004	1196	1235	
	150	175	368	572	712	735	262	545	855	1124	1065	262	545		262	545	855	1124	1065		381	780	1169	1463	1511	440	898	1330	1713	1769	
	200	286	583	894	926	956	378	764	1173	1462	1511	378	764		378	764	1173	1462	1511		652	1311	1837	1903	1966	753	1496	2150	2227	2302	
2.5	300	463	966	1327	1375	1422	635	1282	2064	2172	2245	635	1282		635	1282	2064	2172	2245		927	1873	2728	2827	2923	1013	2153	3193	3309	3421	
	350	555	1157	1514	1569	1623	829	1735	2391	2479	2563	829	1735		829	1735	2391	2479	2563		1175	2382	3113	3226	3336	1357	2722	3643	3779	3905	
	5	5	10	15	20	25	11	22	32	39	46	11	22		11	22	32	39	46		32	62	78	87	96	37	72	90	102	110	
	10	14	29	45	61	78	27	56	81	103	125	27	56		81	103	125	27	56		114	151	176	180	180	68	130	176	205	210	
	15	21	43	67	90	115	40	85	126	159	195	40	85		126	159	195	40	85		156	211	237	242	242	91	178	246	278	284	
	25	35	72	114	156	171	55	116	175	221	267	55	116		175	221	267	55	116		233	319	343	351	351	339	267	372	401	411	
	35	49	103	158	214	219	73	169	253	317	388	73	169		253	317	388	73	169		288	385	462	502	502	431	598	477	499	505	
	50	80	163	252	281	289	86	176	274	373	457	86	176		274	373	457	86	176		437	873	1262	1652	1652	594	1022	1055	1235	1235	
	75	97	203	314	389	401	175	366	536	615	634	175	366		536	615	634	175	366		615	1214	1703	2192	2192	825	1581	2000	2277	2302	
	100	154	314	481	497	513	144	271	422	585	810	144	271		422	585	810	144	271		810	1620	2331	2820	2820	1055	2000	2661	3193	3309	
5	150	175	368	572	712	735	262	545	855	1124	1065	262	545		262	545	855	1124	1065		1065	2130	3041	3730	3730	1440	2882	3813	4643	4843	
	200	286	583	894	926	956	378	764	1173	1462	1511	378	764		378	764	1173	1462	1511		652	1311	1837	1903	1966	753	1496	2150	2227	2302	
	300	463	966	1327	1375	1422	635	1282	2064	2172	2245	635	1282		635	1282	2064	2172	2245		927	1873	2728	2827	2923	1013	2153	3193	3309	3421	
	350	555	1157	1514	1569	1623	829	1735	2391	2479	2563	829	1735		829	1735	2391	2479	2563		1175	2382	3113	3226	3336	1357	2722	3643	3779	3905	
	10	9	19	29	39	49	17	36	51	65	80	17	36		51	65	80	17	36		37	72	96	112	114	43	83	112	130	134	
	15	17	37	56	76	97	34	72	106	134	165	34	72		106	134	165	34	72		68	132	178	201	205	77	150	208	235	240	
	25	33	69	108	147	162	52	110	166	209	252	52	110		166	209	252	52	110		116	222	302	324	332	132	253	352	380	389	
	35	48	100	154	209	214	71	165	247	310	379	71	165		247	310	379	71	165		83	164	256	339	421	93	193	270	400	494	
	50	79	162	250	279	287	85	175	272	370	453	85	175		272	370	453	85	175		136	275	425	558	590	157	321	499	652	691	
	75	97	202	314	389	401	175	366	536	615	634	175	366		536	615	634	175	366		615	1214	1703	2192	2192	825	1581	2000	2277	2302	
7.5	100	154	314	481	497	513	144	271	422	585	810	144	271		422	585	810	144	271		810	1620	2331	2820	2820	1055	2000	2661	3193	3309	
	150	175	368	572	712	735	262	545	855	1124	1065	262	545		262	545	855	1124	1065		1065	2130	3041	3730	3730	1440	2882	3813	4643	4843	
	200	286	583	894	926	956	378	764	1173	1462	1511	378	764		378	764	1173	1462	1511		652	1311	1837	1903	1966	753	1496	2150	2227	2302	
	300	463	966	1327	1375	1422	635	1282	2064	2172	2245	635	1282		635	1282	2064	2172	2245		927	1873	2728	2827	2923	1013	2153	3193	3309	3421	
	350	555	1157	1514	1569	1623	829	1735	2391	2479	2563	829	1735		829	1735	2391	2479	2563		1175	2382	3113	3226	3336	1357	2722	3643	3779	3905	
	10	9	19	29	39	49	17	36	51	65	80	17	36		51	65	80	17	36		37	72	96	112	114	43	83	112	130	134	
	15	17	37	56	76	97	34	72	106	134	165	34	72		106	134	165	34	72		68	132	178	201	205	77	150	208	235	240	
	25	33	69	108	147	162	52	110	166	209	252	52	110		166	209	252	52	110		116	222	302	324	332	132	253	352	380	389	
	35	48	100	154	209	214	71	165	247	310	379	71	165		247	310	379	71	165		83	164	256	339	421	93	193	270	400	494	
	50	79	162	250	279	287	85	175	272	370	453	85	175		272	370	453	85	175		136	275	425	558	590	157	321	499	652	691	
10	75	97	202	314	389	401	175	366	536	615	634	175	366		536	615	634	175	366		615	1214	1703	2192	2192	825	1581	2000	2277	2302	
	100	154	314	481	497	513	144	271	422	585	810	144	271		422	585	810	144	271		810	1620	2331	2820	2820	1055	2000	2661	3193	3309	
	150	175	368	572	712	735	262	545	855	1124	1065	262	545		262	545	855	1124	1065		1065	2130	3041	3730	3730	1440	2882	3813	4643	4843	
	200	286	583	894	926	956	378	764	1173	1462	1511	378	764		378	764	1173	1462	1511		652	1311	1837	1903	1966	753	1496	2150	2227	2302	
	300	463	966	1327	1375	1422	635	1282	2064	2172	2245	635	1282		635	1282	2064	2172	2245		927	1873	2728	2827	2923	1013	2153	3193	3309	3421	
	350	555	1157	1514	1569	1623	829	1735	23																						

DIMENSIONS AND WEIGHTS



Regulator Size (inch)	ENGLISH (in)										Shipping Weight lbs. ⁴
	A	B	B ¹	C	C ²	D	E	F	F ³	G	
1/2	4.32	5.16	8.16	9.00	9.59	6.00	1.88	4.88	7.88	2.50	20
3/4	5.00	6.19	8.50	9.75	10.28	7.38	1.75	5.56	7.75	3.50	30
1	5.00	6.19	8.50	9.75	10.28	7.38	1.75	5.56	7.75	3.50	30
1-1/2	6.24	6.88	9.12	9.87	10.78	8.50	2.19	5.94	8.19	3.88	38
2	6.00	7.19	9.00	9.75	10.85	8.50	2.19	6.38	8.19	4.31	48

Regulator Size DN	METRIC (mm)										Shipping Weight kgs. ⁴
	A	B	B ¹	C	C ²	D	E	F	F ³	G	
15	110	131	207	229	243	152	48	124	200	63	9.1
20	128	157	216	248	261	187	44	141	197	89	13.6
25	128	157	216	248	261	187	44	141	197	89	13.6
40	158	175	232	250	273	216	56	151	208	98	17.2
50	152	183	229	247	275	216	56	162	208	109	21.2

¹ CL of body to extended P.E. nipple (not shown), Opt-32

² CL of body to top of Closing Cap, Opt-1

³ CL of body to end of extended P.E. nipple (not shown), Opt.-32

⁴ Weights do not include flanges.

Cryogenic OPT-5 or -36 BRZ or SST Body Mat'l OR For LCC Body Mat'l to -50°F(-46°C)

An "X" in POS 12 followed by a 5-digit control number overrides remaining selections.

8C

POS 3

—

POS 5

—

POS 6 & 7

7

—

POS 10

POS 11

POS 12

000

POS 16

0C

POSITION 3 - SIZE		
Size		CODE
inch	(DN)	
1/2"	(15)	4
3/4"	(20)	5
1"	(25)	6
1-1/2"	(40)	8
2"	(50)	9

POSITION 5 - BODY & SPRING CHAMBER MATERIALS		
Body/Sp.Ch.	Option	CODE
BRZ/BRZ	-5 *	3
SST/SST	-36 *	A
CS/CS (LCC)	**	D

* Cleaned per Spec #S-1134 (Opt. -55).
** Minimum temperature -50 °F (-46 °C).

POSITION 6 & 7 - TRIM DESIGNATION NO.			
Brass Trim (For Brass Body)		Stainless Steel Trim (For SST & LCC Body)	
Desig.	CODE	Desig.	CODE
B5	B5	S1	S1
		S36	36
		S40B *	4B
		S40C *	4C

* NACE Trim use w/ CS Body down to -50° F (-46° C).

POSITION 10 - END CONNECTIONS	
Description	CODE
NPT Screwed	1
OPT-30 - 150 LB RF Flg * (2)	6
OPT-30 - 300 LB RF Flg * (2)	7

* SST or LCC Body Material ONLY.
(Nipples & Flanges same Material as Body)

POSITION 11 - RANGE SPRING			
SST Range Spring			
Size	Range		CODE
	psig	(Barg)	
1/2" (DN15)	2-30	(.14-2.1)	3
	20-60	(1.4-4.1)	6
	50-110	(3.4-7.6)	A
	90-150	(6.2-10.3)	C
	120-245	(8.3-16.9)	E
	220-300	(15.2-20.7)	H
3/4" & 1" (DN20) (DN25)	2-25	(.14-1.7)	2
	20-45	(1.4-3.1)	5
	35-100	(2.4-6.9)	9
	80-210	(5.5-14.5)	D
1 1/2" & 2" (DN40) (DN50)	170-300	(11.7-20.7)	G
	2-15	(.14-1.0)	1
	10-30	(.69-2.1)	4
	25-55	(1.7-3.8)	7
	45-95	(3.1-6.6)	8
	75-130	(5.2-9.0)	B
	110-300	(7.6-20.6)	F

POSITION 12 - TRIM OPTIONS		
Description	Option	CODE
No Option	—	0
For Special Construction Contact Cashco for Special Product Code.	SPQ	X

POSITION 16 - CERTIFICATE OPTIONS		
Description	Option	CODE
No Option	—	0
NACE Const: CS/CS/XX Per MR0175, S40B, S40C *	-40	J

* Not Available for OPT-5 or -36.

* For information on ATEX see pages 8 & 9 on the IOM.

MODEL 123 Basic & Differential PRODUCT CODER 02/07/20

An "X" in POS 12 followed by a 5-digit control number overrides remaining selections.

POS 1	POS 2	POS 3	POS 5	POS 6 & 7	7	POS 10	POS 11	POS 12	POS 13	POS 14	0	POS 16	0	C
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POSITION 1 - MODEL	
CODE	Description
8	MODEL "123" BACK PRESSURE RELIEF
9	MODEL "123-1+6" Differential BACK PRESS. W/ CLOSING CAP

POSITION 2 - GASKETS * & SERVICE		
Gasket - Service	Options	CODE
Standard: Graphite/NBR - Non-Oxygen	--	B
TFE - Primarily for Oxygen	-45 **	D
Carbon graphite - High Temperature	-46G ***	G

* Refer to Tech bulletin for temperature limits.
 ** Not available with Option -1+6. Comp. Diaphragm does not require gaskets.
 *** Only Available with CS(WCB) or SST Body & Sprg Chamber, S1 or S2 Trim.

POSITION 3 - SIZES		
Size	(DN)	CODE
1/2"	(15)	4
3/4"	(20)	5
1"	(25)	6
1-1/2"	(40)	8
2"	(50)	9

POSITION 5 - BODY & SPRING CHAMBER MATERIALS	
Body/Sp. Ch.	CODE
CI/CI	1
BRZ/CI	2
BRZ/BRZ *	3
CS/CI	4
CS/CS (WCB)	5
SST/CI	7
SST/BRZ *	8
SST/CS	9
SST/SST *	A

* Not available w/ 1+6 variation.

POSITION 6 & 7 - TRIM DESIGNATION NUMBERS					
Brass Trim			Stainless Steel Trim		
Desig.	Body Material		Desig.	Body Mat'l	
	CI OR BRZ CODE	CS CODE		CI, CS & SST CODE	
B1	B1	B1	S0	S0	
B2	B2	B2	S1	S1	
B3	B3	--	S2	S2	
B4	B4	--	S2N	SN	
B5	B5	--	S3	S3	
B6	B6	--	S3N	SC	
B7	B7	--	S5	S5	
BB	BB	BB	S9	S9	
			S36	36	
			S40	40	
			S40T	4T	
			S40V	4V	
			SB	SB	

POSITION 10 - END CONNECTIONS	
Description	CODE
NPT Screwed	1
OPT-30 - 150 LB RF Flgs (2) *	6
OPT-30 - 300 LB RF Flgs (2) *	7
OPT-31P - BSPP Screwed Parallel Pipe Thread	P
OPT-32 - SCH. 80 PE EXT. Nipples (2) *	E
OPT-33 - Third Body CONN (NPT)	4
OPT-39 - Socket Weld (2 CONN)	2
OPT-30 +33 - 150 LB RF Flgs (3 CONN) *	C
OPT-30 +33 - 300 LB RF Flgs (3 CONN) *	D
OPT-32 +33 - SCH. 80 PE EXT. Nipples(3 CONN) *	F
OPT-39 +33 - Socket Weld (3 CONN)	G

* Nipples & Flanges of same material as body. Flanges not available with CI body.

POSITION 11 - RANGE SPRINGS			
Range Spring - STD & "1+6" Option			
SIZE	Range		CODE
	psig	(Barg)	
1/2" (DN15)	2-30 *	(.14-2.1)	3
	25-50 *	(1.7-3.4)	6
	40-100 *	(2.8-6.9)	9
	80-150 *	(5.5-10.3)	C
	120-215	(8.3-14.8)	F
3/4" & 1" (DN20) (DN25)	150-350 **	(10.3-24.1)	G
	2-20 *	(.14-1.4)	2
	15-40 *	(1.0-2.8)	5
	30-80 *	(2.1-5.5)	8
	65-160 *	(4.5-11.0)	B
1-1/2" & 2" (DN40) (DN50)	130-205	(9.0-14.1)	E
	165-350 **	(11.4-24.1)	H
	2-15 *	(.14-1.0)	1
	10-25 *	(.69-1.7)	4
	20-55 *	(1.4-3.8)	7
	45-105 *	(3.1-7.2)	A
	85-220	(5.9-15.1)	D
	180-350 **	(12.4-24.1)	J

* Range springs for use with Opt-1+6.

** Not available for any body-spring chamber material combinations with CI. Must select BRZ, CS or SST spring chamber material from Position 5.

POSITION 13 - FEATURE OPTIONS		
Description	Option	CODE
No Option	—	0
DI Closing Cap CI or CS Spring Chamber. (Included with "1+6" Variation).	-1	1

POSITION 14 - SPRING CHAMBER OPTIONS		
Description	Option	CODE
No Option	—	0
Plastic Rain-proof Bug Vent.	-25P	P
SST Rain-proof Bug Vent.	-25S	H

POSITION 16 - CERTIFICATE OPTIONS		
Description	Option	CODE
No Option	—	0
NACE Construction: CS/CS/XX Per MR0175, S40, S40T, or S40V Trims (NOT Available with "1+6" Variation).	-40	J
NACE Construction: SS/SS/XX OR SS/CS/XX Per MR0175, S40, S40T, or S40V Trims. (NOT Available with "1+6" Variation).	-40SST	K
Special Cleaning: Per Cashco Spec #S-1134. BRZ or SST body/sp.ch. mat'ls only. Suitable for oxygen service. (Not Available w/ "1+6" Variation).	-55	M
Special Cleaning: Per Cashco Spec #S-1542.	-56	N

POSITION 12 - TRIM OPTIONS		
Description	Option	CODE
No Option	—	0
Stellited Seat Surface - S1 Trim Only.	-15	A
For Special Construction Contact Cashco for Special Product Code.	SPQ	X

*** For information on ATEX see pages 8 & 9 on the IOM.**

Cashco
P.O. Box 6
Ellsworth, KS 67439-0006
PH (785) 472-4461
Fax. # (785) 472-3539
www.cashco.com
email: sales@cashco.com
Printed in U.S.A. 123-TB

Cashco GmbH
Handwerkerstrasse 15
15366 Hoppegarten, Germany
PH +49 3342 30968 0
Fax. No. +49 3342 30968 29
www.cashco.com
email: germany@cashco.com

Cashco do Brasil, Ltda.
Al.Venus, 340
Indaiatuba - Sao Paulo, Brazil
PH +55 11 99677 7177
Fax. No.
www.cashco.com
email: brazil@cashco.com