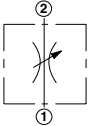
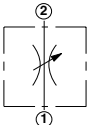
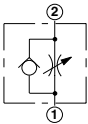
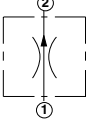
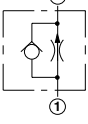
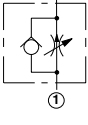
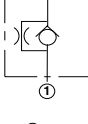
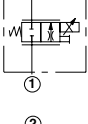

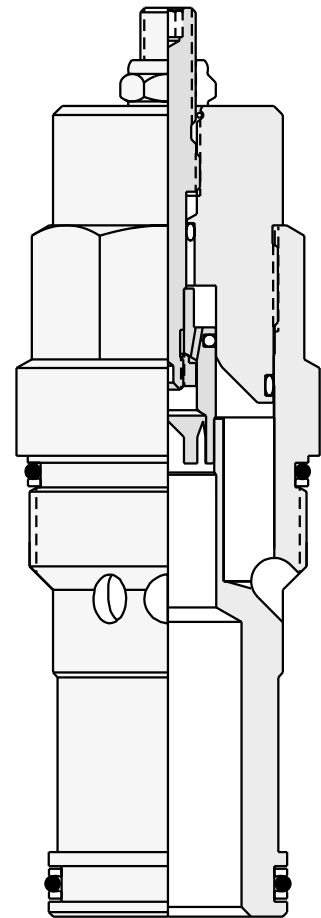
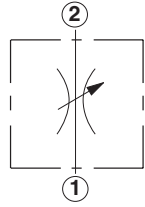
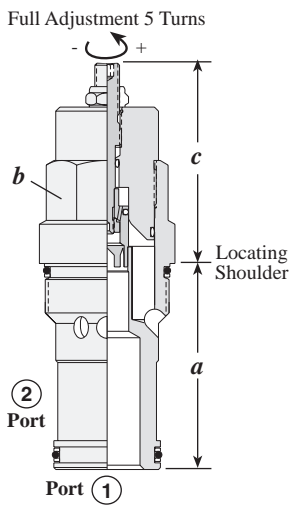


Flow Control Valves

	<i>Cartridge Type</i>	<i>Page</i>
	Fully Adjustable Needle	66
	Fully Adjustable Needle, High Capacity	67
	Fully Adjustable Needle with Reverse Flow Check	68
	Fixed Orifice, Pressure Compensated	69
	Fixed Orifice, Pressure Compensated with Reverse Flow Check	70
	Fully Adjustable Pressure Compensated with Reverse Flow Check	71
	Free Flow Side-to-Nose with Bypass Orifice	72
	Electro-proportional, Normally Closed Throttle	73
	Electro-proportional, Normally Open Throttle	74

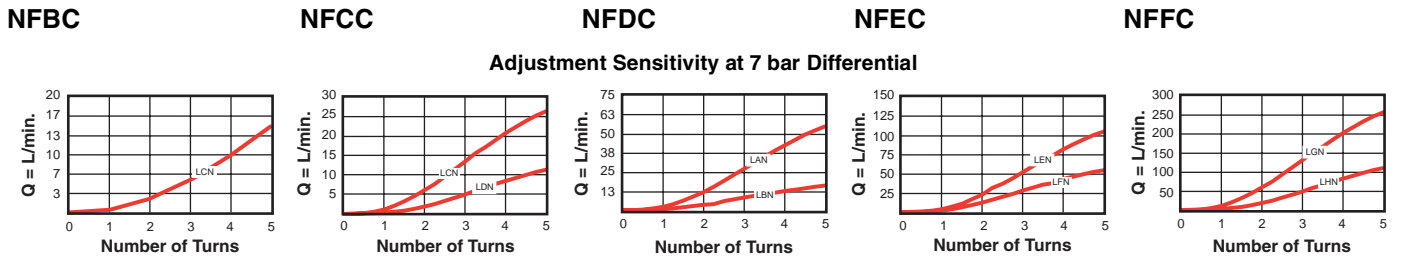


FULLY ADJUSTABLE NEEDLE



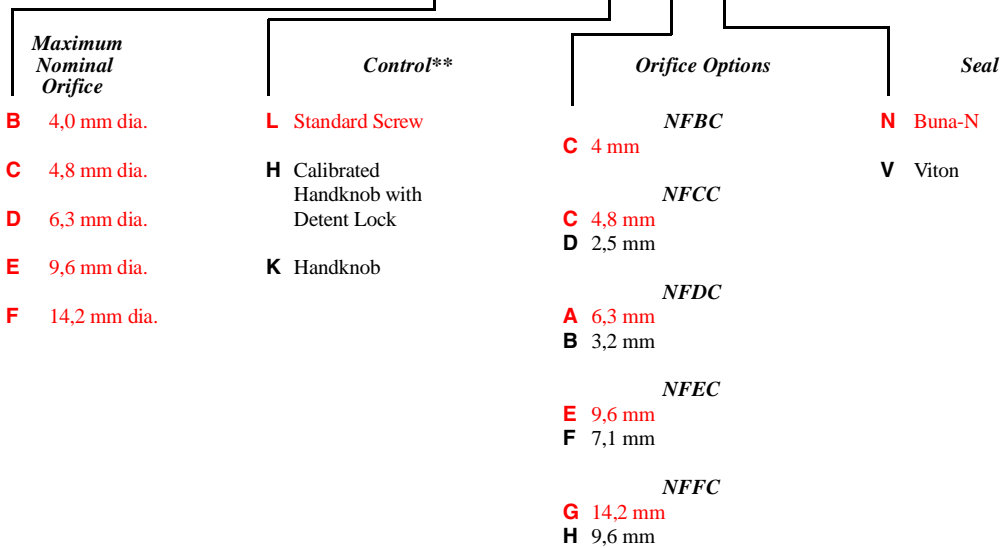
Maximum Nominal Orifice	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	c			
4,0 mm dia.	NFBC – LCN	T - 162A	31	19,1	41	-	45	35/40
4,8 mm dia.	NFCC – LCN	T - 13A	34,9	22,2	58	64	64	40/50
6,3 mm dia.	NFDC – LAN	T - 5A	41,1	28,6	67	72	73	60/70
9,6 mm dia.	NFEC – LEN	T - 16A	61,9	31,8	73	79	79	200/215
14,2 mm dia.	NFFC – LGN	T - 18A	79,4	41,3	84	90	90	465/500

Performance Curves



- Maximum operating pressure = 350 bar
- Maximum valve leakage at shutoff = less than 0,4 cc/min.

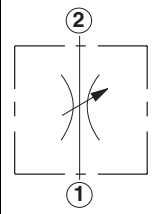
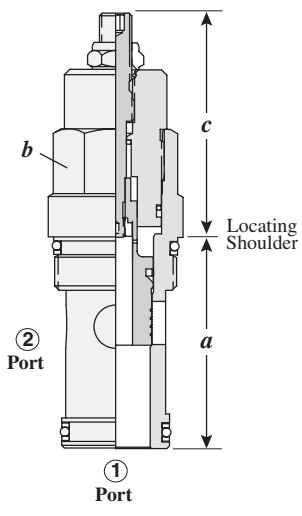
NF * C - * * *



** See page 162 for information on Control Options

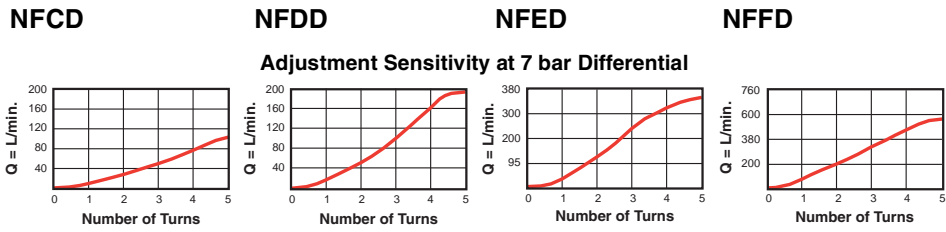
Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

FULLY ADJUSTABLE NEEDLE, HIGH CAPACITY



Nominal Orifice	Typical Cartridge Model Code	Cavity	Cartridge Dimensions						Installation Torque (Nm)
			a	b	c				
8,4 mm dia.	NFCD – LFN	T - 13A	34,9	22,2	L	H	K	40/50	
12,7 mm dia.	NFDD – LGN	T - 5A	41,1	28,6	67	72	73	60/70	
17,5 mm dia.	NFED – LHN	T - 16A	61,9	31,8	73	79	79	200/215	
21,6 mm dia.	NFFD – LIN	T - 18A	79,4	41,3	84	90	90	465/500	

Performance Curves



- Maximum operating pressure = 350 bar
- Maximum valve leakage at shutoff = less than 0,4 cc/min.

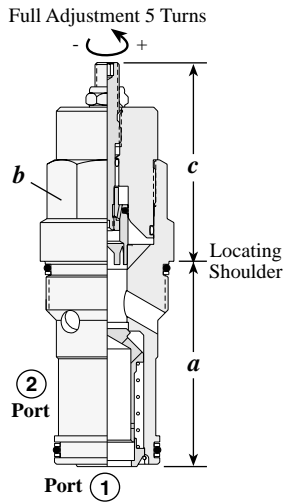
NF * D - * * *

Nominal Orifice	Control**	Orifice Options	Seal
C 8,4 mm dia.	L Standard Screw	NFCD	N Buna-N
D 12,7 mm dia.	H Calibrated Handknob with Detent Lock	F 8,4 mm NFDD	V Viton
E 17,5 mm dia.		G 12,7 mm NFED	
F 21,6 mm dia.	K Handknob	H 17,5 mm NFFD	
		I 21,6 mm	

** See page 162 for information on Control Options

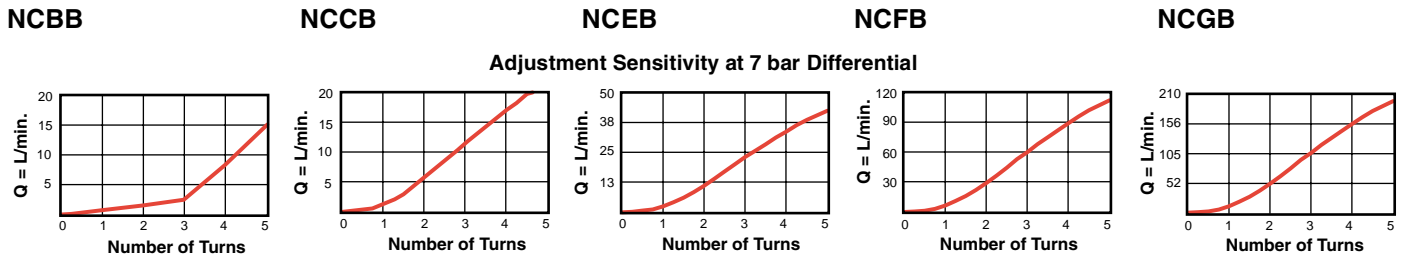
Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

FULLY ADJUSTABLE NEEDLE WITH REVERSE FLOW CHECK



Maximum Nominnal Orifice	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	c			
					L	H	K	
4,0 mm dia.	NCBB – LCN	T - 162A	31	19,1	41	-	45	35/40
4,8 mm dia.	NCCB – LCN	T - 13A	34,9	22,2	58	64	64	40/50
6,3 mm dia.	NCEB – LCN	T - 5A	41,1	28,6	67	72	73	60/70
9,6 mm dia.	NCFB – LCN	T - 16A	61,9	31,8	73	79	79	200/215
14,2 mm dia.	NCGB – LCN	T - 18A	79,4	41,3	84	90	90	465/500

Performance Curves



- Maximum operating pressure = 350 bar
- Maximum valve leakage = 0,4 cc/min.

NC ★ ★ - ★ **C** ★

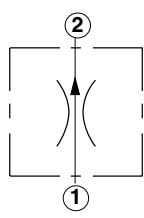
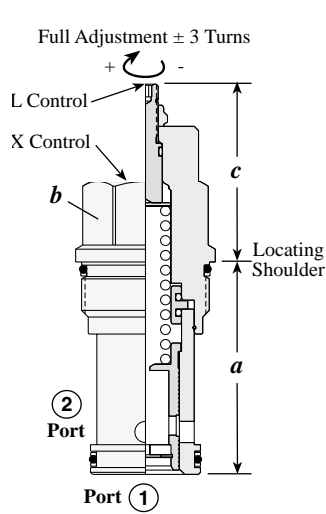
Maximum Nominnal Orifice	Version	Control**	Cracking Pressure*	Seal
NCBB* 4,0 mm dia.	B High Capacity	L Standard Screw	A 0,3 bar	N Buna-N
NCCB 4,8 mm dia.	C Low Capacity	H Calibrated Handknob with Detent Lock	C 2,0 bar	V Viton
NCCC 2,3 mm dia.		K Handknob	E 5,0 bar	
NCEB 6,3 mm dia.				
NCEC 3,2 mm dia.				
NCFB 9,6 mm dia.				
NCFC 7,1 mm dia.				
NCGB 14,2 mm dia.				
NCGC 9,6 mm dia.				

** See page 162 for information on Control Options

*Cracking Pressure Ranges: A and E ranges are not available in T-162A cavity.

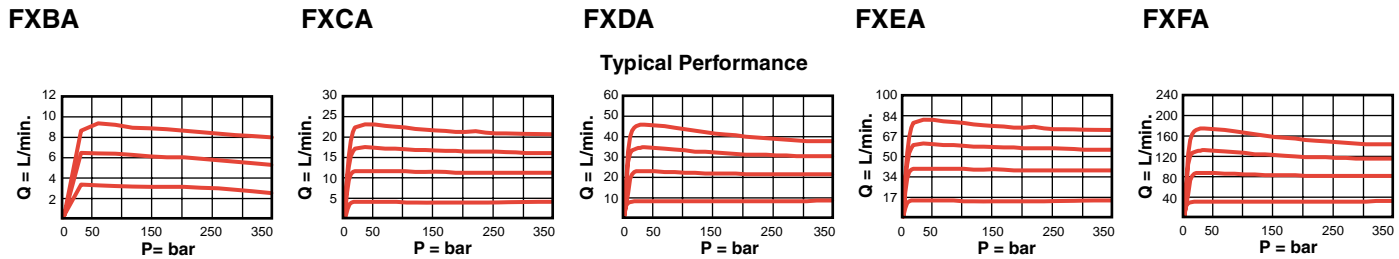
Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

FIXED ORIFICE, PRESSURE COMPENSATED



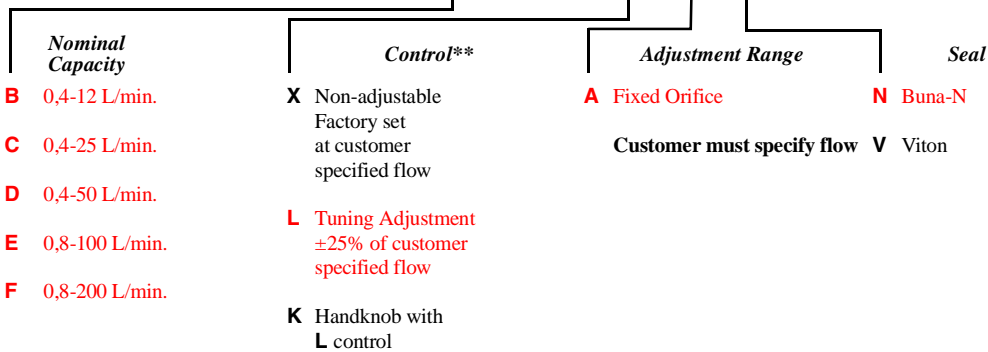
Nominal Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	c			
0,4-12 L/min.	FXBA – XAN	T - 162A	31	19,1	21	54	58	35/40
0,4-25 L/min.	FXCA – XAN	T - 13A	34,9	22,2	19	51	58	40/50
0,4-50 L/min.	FXDA – XAN	T - 5A	41,1	28,6	18	54	61	60/70
0,8-100 L/min.	FXEA – XAN	T - 16A	61,9	31,8	25	62	69	200/215
0,8-200 L/min.	FXFA – XAN	T - 18A	79,4	41,3	31	72	78	465/500

Performance Curves



- Maximum operating pressure = 350 bar
- Customer must specify flow setting
- Accurate pressure compensated control requires that a 14 bar minimum pressure differential be maintained across the valve.
- The tuneable control option provides +/- 25% variation from the nominal factory pre-set flow.

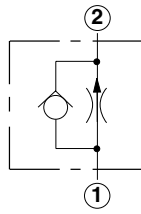
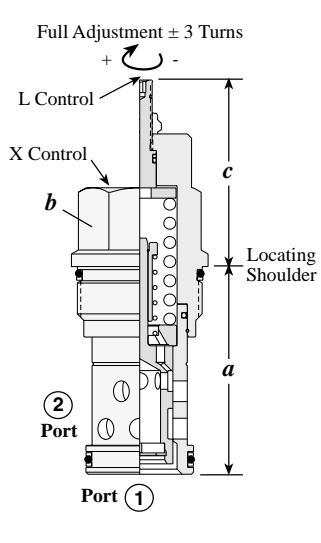
FX ★ A – ★ A ★



** See page 162 for information on Control Options

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

FIXED ORIFICE, PRESSURE COMPENSATED WITH REVERSE FLOW CHECK



Nominal Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	X	L	K	
0,4-12 L/min.	FCBB – XAN	T - 162A	31	19,1	21	54	58	35/40
0,4-25 L/min.	FCCB – XAN	T - 13A	34,9	22,2	19	51	58	40/50
0,4-50 L/min.	FCDB – XAN	T - 5A	41,1	28,6	18	54	61	60/70
0,8-100 L/min.	FCEB – XAN	T - 16A	61,9	31,8	25	62	69	200/215
0,8-200 L/min.	FCFB – XAN	T - 18A	79,4	41,3	31	72	78	465/500

Performance Curves

FCBB

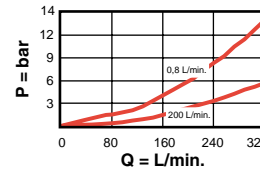
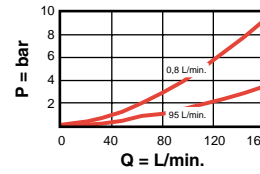
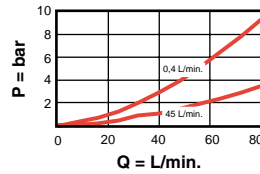
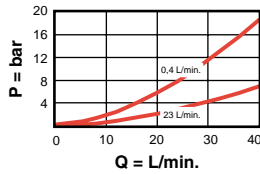
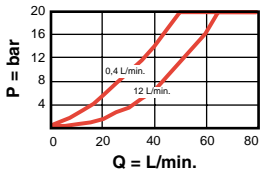
FCCB

FCDB

FCEB

FCFB

Reverse Free Flow Pressure Drop Based on Specified Flow Extremes



- Maximum operating pressure = 350 bar
- Customer must specify flow setting
- Accurate pressure compensated control requires that a 14 bar minimum pressure differential be maintained across the valve.
- The tuneable control option provides +/- 25% variation from the nominal factory pre-set flow.

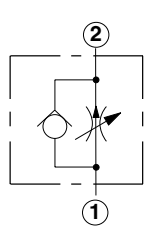
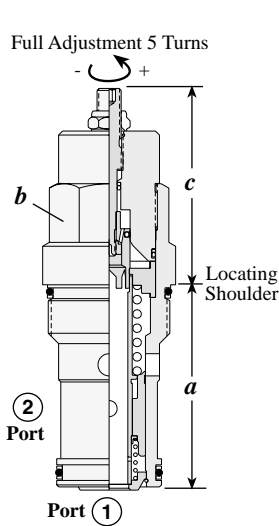
FC ★ B – ★ A ★

Nominal Capacity	Control**	Adjustment Range	Seal
B 0,4-12 L/min.	X Non-adjustable Factory set at customer specified flow	A Fixed Orifice	N Buna-N
C 0,4-25 L/min.	L Tuning Adjustment ±25% of customer specified flow	Customer must specify flow	V Viton
D 0,4-50 L/min.			
E 0,8-100 L/min.	K Handknob with L control		
F 0,8-200 L/min.			

** See page 162 for information on Control Options

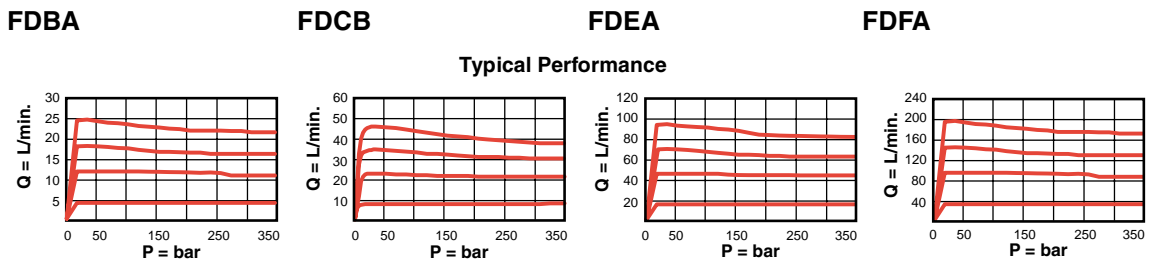
Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

FULLY ADJUSTABLE, PRESSURE COMPENSATED WITH REVERSE FLOW CHECK



Nominal Flow Range	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	c			
					L	H	K	
0,4-23 L/min.	FDBA - LAN	T - 13A	34,9	22,2	58	64	64	40/50
0,4-45 L/min.	FDCB - LAN	T - 5A	41,1	28,6	67	72	73	60/70
1-95 L/min.	FDEA - LAN	T - 16A	61,9	31,8	73	79	79	200/215
1-200 L/min.	FDFA - LAN	T - 18A	79,4	41,3	84	90	90	465/500

Performance Curves



- Maximum operating pressure = 350 bar
- Accurate pressure compensated control requires that a 14 bar minimum pressure differential be maintained across the valve.

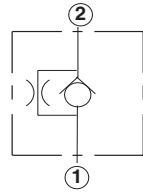
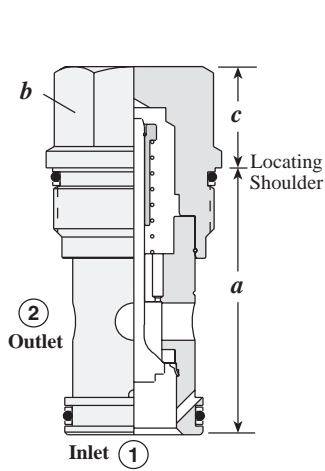
FD * * - * A *

Nominal Flow Range	Control**	Adjustment Range	Seal
BA 0,4-23 L/min.	L Standard Screw	FDBA	N Buna-N
CB 0,4-45 L/min.	H Calibrated Handknob with Detent Lock	A 0,4 - 23 L/min.	V Viton
EA 1-95 L/min.	K Handknob	FDCB	
FA 1-200 L/min.		A 0,4 - 45 L/min.	
		FDEA	
		A 1 - 95 L/min.	
		FDFA	
		A 1 - 200 L/min.	

** See page 162 for information on Control Options

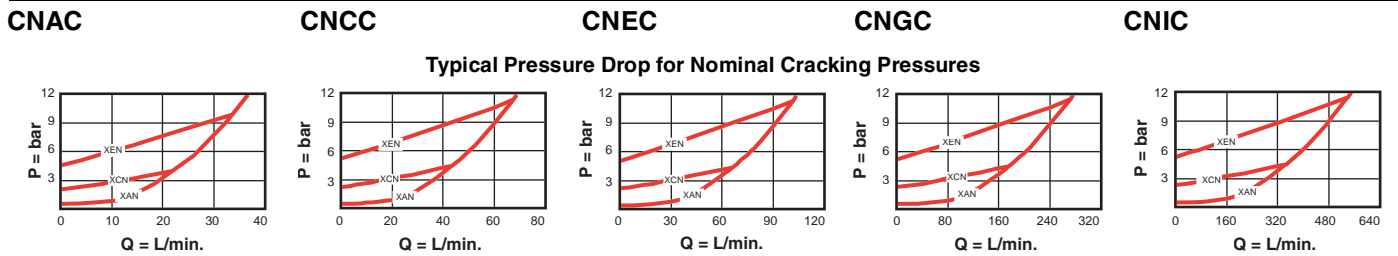
Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

FREE FLOW SIDE-TO-NOSE WITH BYPASS ORIFICE

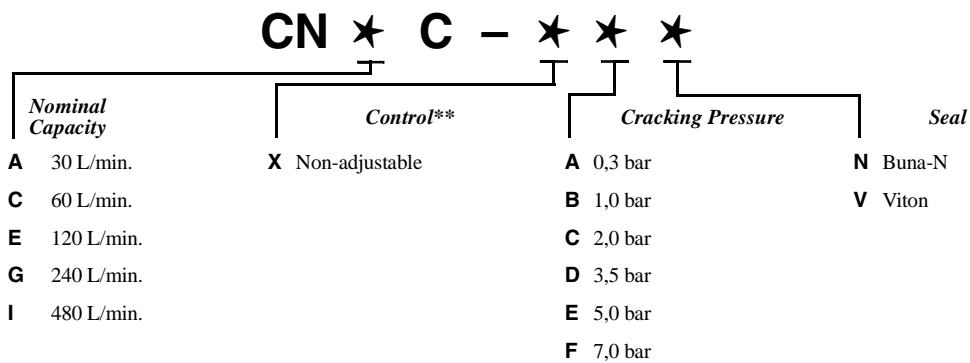


Nominal Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions			Installation Torque (Nm)
			a	b	c X	
30 L/min.	CNAC – XCN	T - 162A	31	19,1	21	35/40
60 L/min.	CNCC – XCN	T - 13A	34,9	22,2	19	40/50
120 L/min.	CNEC – XCN	T - 5A	41,1	28,6	18	60/70
240 L/min.	CNGC – XCN	T - 16A	61,9	31,8	25	200/215
480 L/min.	CNIC – XCN	T - 18A	79,4	41,3	31	465/500

Performance Curves



- Maximum operating pressure = 350 bar
- Will accept 350 bar at ports 1 and 2.
- * Orifice range = CNAC, CNCC: 0,4 - 1,6 mm, CNEC: 0,4 - 2,0 mm, CNGC: 0,4 - 2,4 mm, CNIC: 0,4 - 3,2 mm.

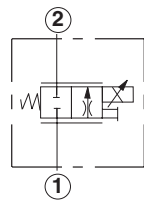
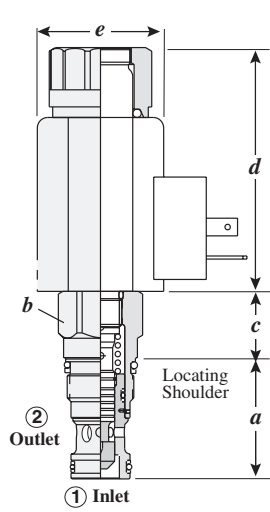


* Customer specified orifice setting range:
 CNAC: 0,4 - 1,6 mm
 CNCC: 0,4 - 1,6 mm
 CNEC: 0,4 - 2,0 mm
 CNGC: 0,4 - 2,4 mm
 CNIC: 0,4 - 3,2 mm

** See page 162 for information on Control Options

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.

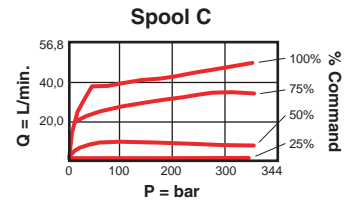
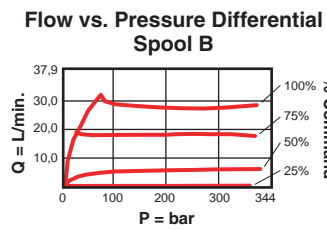
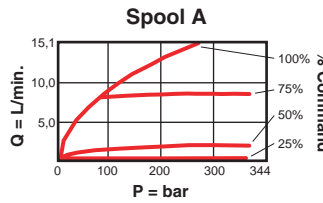
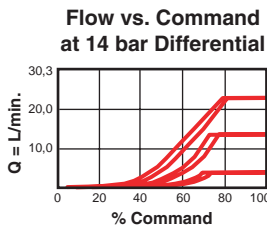
ELECTRO-PROPORTIONAL, NORMALLY CLOSED THROTTLE



Maximum Nominal Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	c	d	e	
28 L/min.	FPCC – MCN	T - 13A	35,1	22,2	19,1	70,1	37,3	40/50

Performance Curves

FPCC



- Maximum operating pressure = 350 bar
- Maximum valve leakage = 100 cc/min. at 210 bar
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.

FP C C - * * *

Maximum Nominal Capacity	Control**	Nominal Capacity	Seal
C 28 L/min.	M Manual Override (Standard)	A 6 L/min. B 14 L/min. C 28 L/min.	N Buna-N V Viton

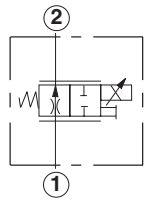
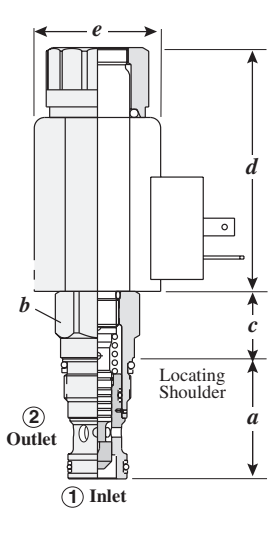
NOTE: Coil must be ordered separately. Use 12V DC or 24V DC (Series 770-***) coils only. See page 167.

** See page 162 for information on Control Options

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.



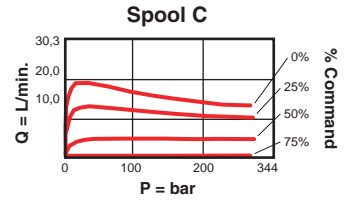
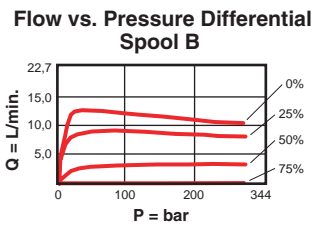
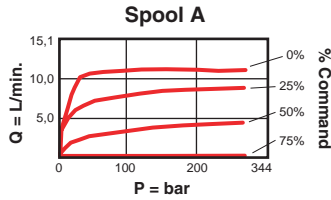
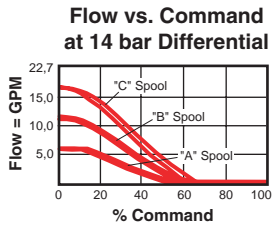
ELECTRO-PROPORTIONAL, NORMALLY OPEN THROTTLE



Maximum Nominal Capacity	Typical Cartridge Model Code	Cavity	Cartridge Dimensions					Installation Torque (Nm)
			a	b	c	d	e	
28 L/min.	FPCH – MCN	T - 13A	35,1	22,2	19,1	70,1	1,47	40/50

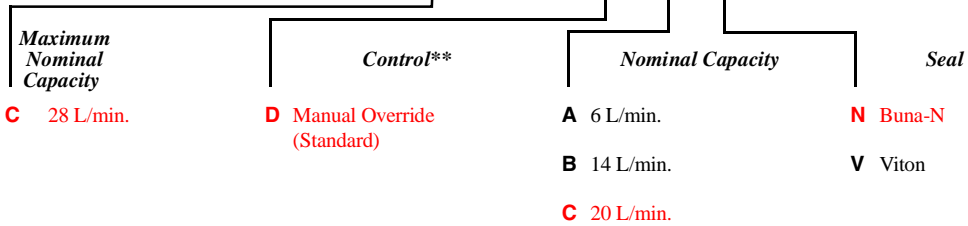
Performance Curves

FPCH



- Maximum operating pressure = 350 bar
- Maximum valve leakage = 100 cc/min. at 210 bar
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.

FPCH – ★★



** See page 162 for information on Control Options

Visit www.sunhydraulics.com for detailed and complete technical information on our full line of products.