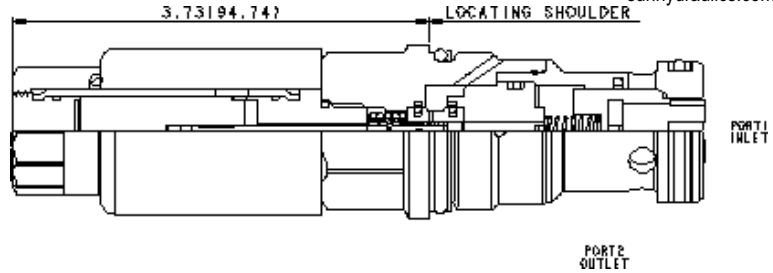


X-Control



## CONFIGURATION

<b>X</b> Control	No Manual Override
<b>C</b> Flow Rate	Nominal 40 gpm @ 200 psi (14 bar) differential (160 L/min.)
<b>N</b> Seal Material	Buna-N
<b>224</b> Coil	DIN 43650-Form A, 24 VDC

This valve is a pilot-operated, normally closed, electro-proportional throttle with reverse free-flow check. Energizing the coil generates an opening force on the pilot stage which vents the main stage poppet to open proportionally. Metered flow is from port 1 to port 2 with reverse free flow from port 2 to port 1.

## TECHNICAL DATA

NOTE: DATA MAY VARY BY CONFIGURATION. SEE CONFIGURATION SECTION.

Cavity	T-16A
Series	3
Capacity	240 L/min.
Recommended dither frequency	100 Hz
Maximum Valve Leakage at 110 SUS (24 cSt)	20 drops/min. @5000 psi
Manual Override Force Requirement	33 N/100 bar @ Port 1
Deadband, nominal (as a percentage of input)	25%
Manual Override Stroke	1,50 mm
Solenoid Tube Diameter	19 mm
Valve Hex Size	31,8 mm
Valve Installation Torque	203 - 217 Nm
Model Weight (with coil)	2.00 lb
Seal kit - Cartridge	Buna: 990016007
Seal kit - Cartridge	EPDM: 990016014
Seal kit - Cartridge	Polyurethane: 990016002
Seal kit - Cartridge	Viton: 990016006
Seal and nut kit - Coil	Viton: 990770006
Model Weight	0.89 kg.

## CONFIGURATION OPTIONS

Model Code Example: FPHKXCN224

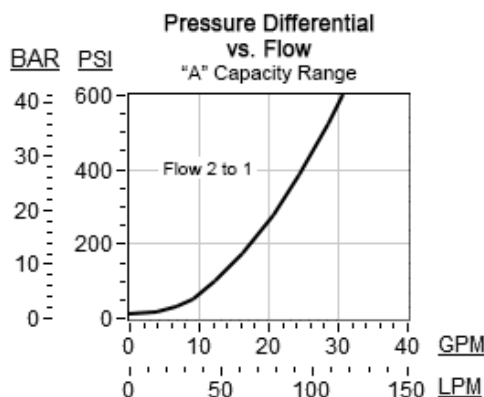
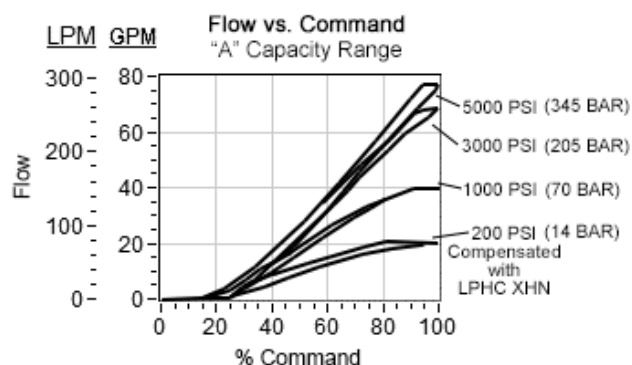
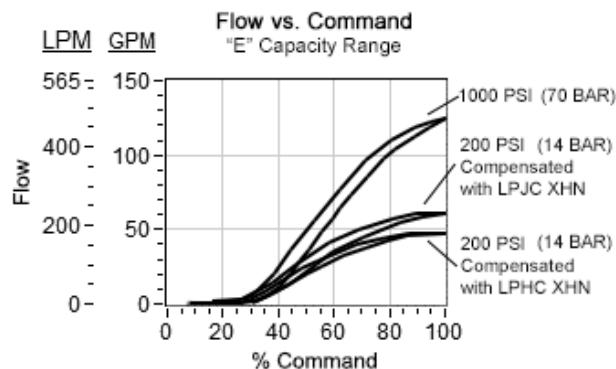
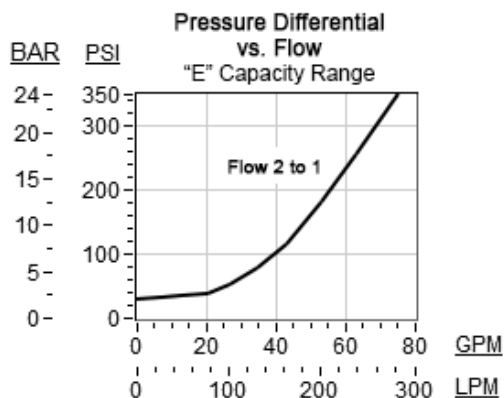
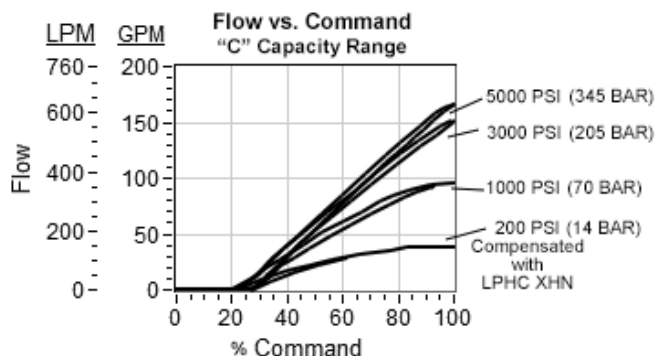
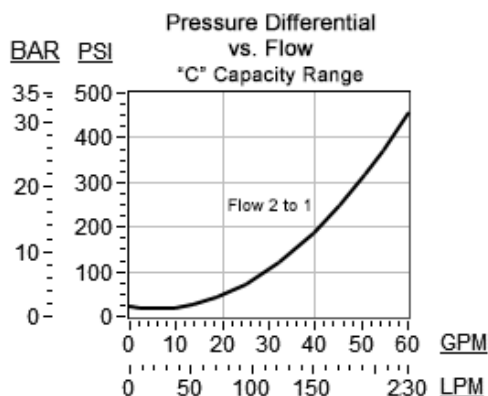
CONTROL	(X) FLOW RATE	(C) SEAL MATERIAL	(N) COIL *	(224)
<b>X</b> No Manual Override	<b>C</b> Nominal 40 gpm @ 200 psi (14 bar) differential (160 L/min.)	<b>N</b> Buna-N	<b>224</b> DIN 43650-Form A, 24 VDC	
<b>E</b> Twist (Extended) Manual Override	<b>A</b> Nominal 20 gpm @ 200 psi (14 bar) differential (80 L/min.)	<b>E</b> EPDM	No coil	
<b>M</b> Manual Override	<b>E</b> Nominal 60 gpm @ 200 psi (14 bar) differential (240 L/min.)	<b>V</b> Viton	<b>212</b> DIN 43650-Form A, 12 VDC	
			<b>912</b> Deutsch DT04-2P, 12 VDC	
			<b>924</b> Deutsch DT04-2P, 24 VDC	

\* Additional coil options are available

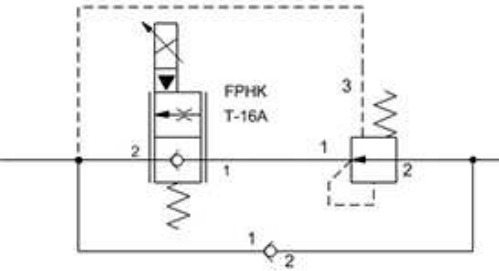
## TECHNICAL FEATURES

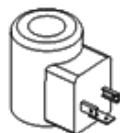
- Capable of operating with pressures up to 5000 psi (350 bar).
- Coils are interchangeable with Sun's other full flow, solenoid-operated valves and can be mounted on the tube in either direction.
- This cartridge has several manual override choices, including no manual override. See Option Configuration.
- For optimum performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.
- The momentary/twist override option "E" allows the operator to shift the valve by twisting the manual override clockwise 90 degrees.
- Cartridges configured with EPDM seals are for use in systems with phosphate ester fluids. Exposure to petroleum based fluids, greases and lubricants will damage the seals.
- Capacities rated at 200 psi (14 bar) differential and maximum rated coil current.
- Maximum Deadband (as a percentage of command) A Flow Rate = 39% C Flow Rate = 30% E Flow Rate = 46%
- Maximum Hysteresis at 200 psid (14 bar) A Flow Rate = 5 gpm (20 L/min.) C Flow Rate = 6 gpm (23 L/min.) E Flow Rate = 13 gpm (49 L/min.)
- Minimum Capacity at 1000 psid (70 bar) A Flow Rate = 35 gpm (140 L/min.) C Flow Rate = 80 gpm (320 L/min.) E Flow Rate = 110 gpm (416 L/min.)
- Depending on circuit requirements, a reverse free flow check bypassing the compensator may be needed when using the FPHK with an external compensator.
- Incorporates the Sun floating style construction to minimize the possibility of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.

## PERFORMANCE CURVES

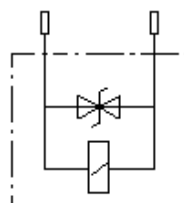


Example Circuit Using External Compensator

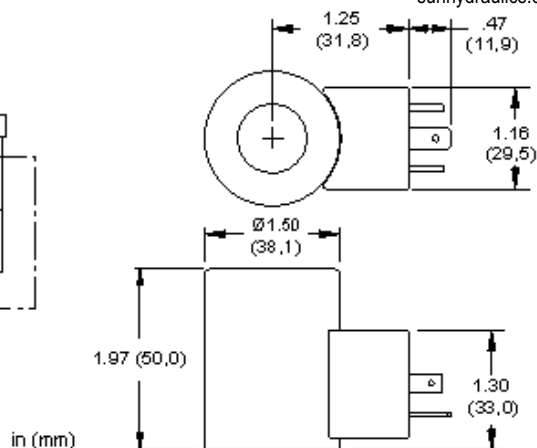




## CONFIGURATION



DC COIL



## TECHNICAL DATA

Maximum Coil Temperature at 68°F (20°C) Ambient	218°F (105°C)
Arc Suppression (TVS)	Included
Power Consumption (cold) - at rated voltage	22 watts
Maximum Ambient Temperature	50 °C
Voltage/Frequency	24 VDC
Operating Voltage Range	+/- 10% nominal
Duty Cycle Rating	100 %
Connector	ISO4400 - EN/DIN175301-803, Form A (ISO/DIN 43650) 3-pin
Connector Environment Rating	IP65/IP67
Solenoid Tube Diameter	19 mm
Coil Nut Torque	0,5 Nm
Model Weight	0.23 kg.

## PROPORTIONAL PERFORMANCE DATA

Maximum Current	590 mA
Nominal Coil Resistance at 122°F (50°C) Stabilized	37.2 ±5% ohms
Nominal Coil Resistance at 68°F (20°C) Cold	26.2 ±5% ohms

## USED WITH

DAAL	DAALS	DBAL	DBALS	DFCA	DFCB	DFDA	DFDB	DFEA	DFEB
DFFA	DFFB	DLDA	DLDAS	DLDAZ	DMDA	DMDAS	DMDAZ	DNCA	DNCAZ
DNDA	DNDAS	DNDC	DNDY	DNDYS	DTCA	DTCAZ	DTDA	DTDAS	DWDA
FMDA	FMDB	FPCC	FPCH	FPFK	FPHK	HDDA	PRDL	PRDM	PRDN
PRDP	PSDL	PSDP	RBAN	RBAP					

## TECHNICAL FEATURES

- Coil windings utilize Class N, (392° F [200 °C] rated) magnet wire.
- A TVS surge suppression diode is built into DC coils. Nominal breakdown voltage: 68V. Model code 1.5 KE68CA Steady state power dissipation @ 75°C is 6.5 W and peak pulse dissipation is 1500 W for 1 ms, nonrepetitive.
- Power cable with mating connector is required and is not included with product.
- This coil is CE compliant. It meets the requirements of the Low Voltage Directive (2006/95/EC) and EN 60204-1:2006.
- The coil is magnetically symmetrical and can be mounted in either direction on the solenoid tube without affecting performance.
- For optimum proportional performance, an amplifier with current sensing and adjustable dither should be used. Dither should be adjustable between 100 - 250 Hz.
- IP rating is dependent on the coil connector and the mating connector used.
- RoHS compliant. Restricted materials less than 0.1% total by weight.
- The external steel shell is plated with clear zinc trivalent.