



Sun FLeX Series Solenoid Valves

HIGH RELIABILITY

1 million on-off operational cycles

LOW INTERNAL LEAKAGE

Less than one drop per minute

USES 740 / 747 SERIES DC COILS

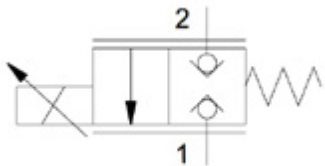
High-power &
hazardous location coils



FPBU

5000 psi (350 bar)
T-162A cavity

2-WAY, DIRECT-ACTING
ELECTRO-PROPORTIONAL,
THROTTLE BLOCKING POPPET VALVE



FPBU-XC*
5000 psi (350 bar)

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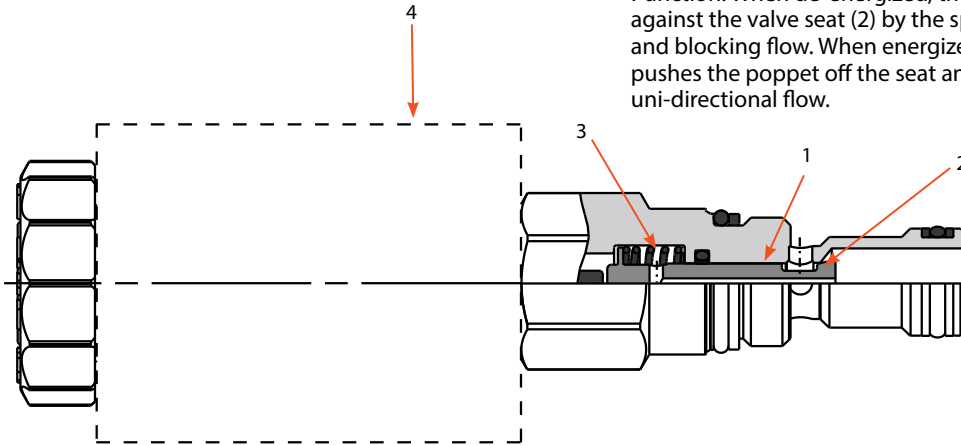
sunhydraulics.com/model/FPBU

FPBU 2-WAY, DIRECT-ACTING ELECTRO-PROPORTIONAL, THROTTLE BLOCKING POPPET VALVE

SERIES 0, CAVITY: T-162A

FPBU

Function: When de-energized, the poppet (1) is pulled against the valve seat (2) by the spring (3), closing the valve and blocking flow. When energized, the solenoid with coil (4) pushes the poppet off the seat and opens the valve, allowing uni-directional flow.



This valve is a normally closed, electro-proportional, throttle blocking poppet that is spring-biased closed. Energizing the coil generates an opening force on the poppet proportional to the command current, and this force is countered by the spring and flow forces. This force balance creates a metering orifice whose effective size is proportional to the current.

The valve exhibits a large degree of self-compensation in the 2-to-1 direction and will provide proportional flow control in the 1-to-2 direction with the addition of an external compensator. Full reverse flow (1-to-2) with 100% command in the 1-to-2 direction is possible without a compensator under all conditions.

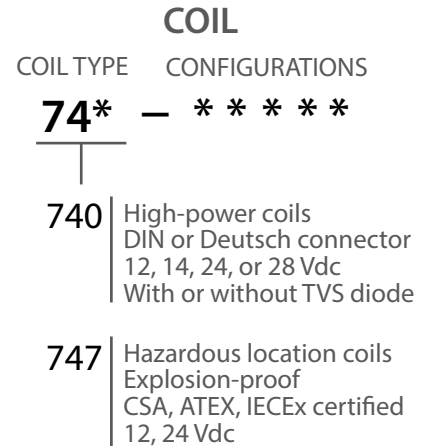
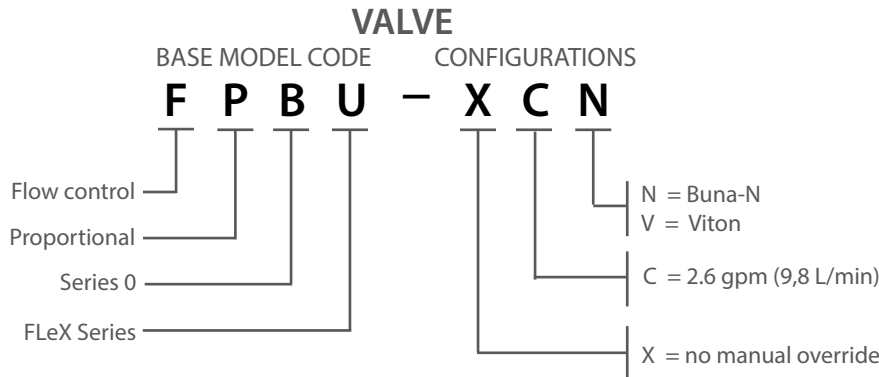
TECHNICAL FEATURES

- All FLeX Series valves incorporate the Sun floating-style construction to minimize the possibility of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.
- FLeX Series proportional valves are fully compatible with the XMD Mobile Drivers from Sun.
- Designed and tested to exceed 1 million on-off operational cycles.
- Meets new NFPA test standard T2.6.1 R2014 for fatigue and burst pressure ratings.
- Improved linearity and resolution over similar competing valves.
- Designed using CFD fluid simulation for optimized geometries.
- For optimum performance, an amplifier with current feedback and adjustable dither (80 - 250 Hz) should be used.
- Capacities rated at 200-psi (14-bar) differential and maximum rated coil current.
- The valve exhibits a large degree of self-compensation in the 2-to-1 direction and will provide proportional flow control in the 1-to-2 direction with the addition of an external compensator. Full reverse flow (1-to-2) with 100% command in the 1-to-2 direction is possible without a compensator under all conditions.
- Zinc-nickel plating standard for 1000-hour salt fog protection.
- The FPBU valves can be used with the 740 Series high-power and 747 Series hazardous location coils.
- A wide variety of coil termination and voltage options are available, with and without surge protection. See the CONFIGURATION section.
- Coil connector options offer ratings up to IP69K. See individual coil product pages for details.
- A 50-psi (3,5-bar) back pressure is recommended.
- The valve is direct actuated and requires no minimum hydraulic pressure for operation.
- Extremely low leakage - 0.004 in³ (0,07 cm³)/min (1 drop/min).

MODEL CODE EXPLANATION

Sun cartridges have a base seven-digit part number. Each of the digits in the sequence has significance as shown in the model code explanation below. Available options and

modifiers for specific cartridges, manifolds, and valve packages are shown on the individual product pages and data sheets. All modifiers are not applicable for every model.



Important Note:

When performing model code searches on www.sunhydraulics.com, do not include setting(s). When ordering, no spaces or dashes are used.

See individual coil data sheets for full coil configuration.

COMPATIBLE COILS

High-Power (25-W) Coils

Voltage	DIN 43650 Form A (IP65/IP67)	Deutsch DT04-2P (IP69K)	Resistance @20°C (ohms) ±10% (with diode*)	TVS Diode (Nominal) Breakdown Voltage (with diode*)
12 Vdc	740-212	740-912	5.8 Ω	68 Vdc
14 Vdc	740-214	740-914	7.8 Ω	68 Vdc
24 Vdc	740-224	740-924	23.0 Ω	68 Vdc
28 Vdc	740-228	740-928	31.4 Ω	68 Vdc

* Above model codes are shown without transient voltage suppression (TVS) diodes. To order FLeX coils with a TVS diode, append model code with "D" (Example: 740-212LD).

Hazardous Location, Explosion-Proof (30-W) Coils

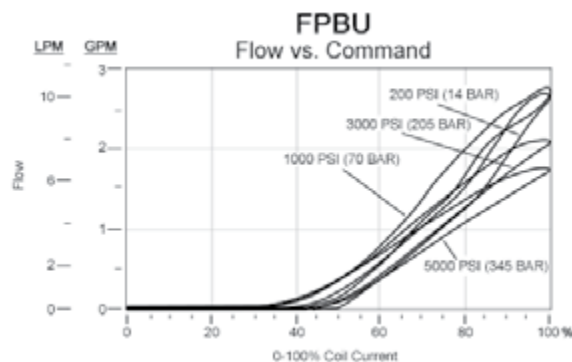
Voltage	M20 x 1.5 180°	M20 x 1.5 90°	1/2" NPT 180°	1/2" NPT 90°	Wattage @ 20°C	Circuitry
12 Vdc	747-JM12BD	747-JM12CD	747-JN12BD	747-JN12CD	29.6 W	With diode
24 Vdc	747-JM24BD	747-JM24CD	747-JN24BD	747-JN24CD	29.9 W	With diode

FPBU 2-WAY, DIRECT-ACTING
ELECTRO-PROPORTIONAL,
THROTTLE BLOCKING POPPET VALVE

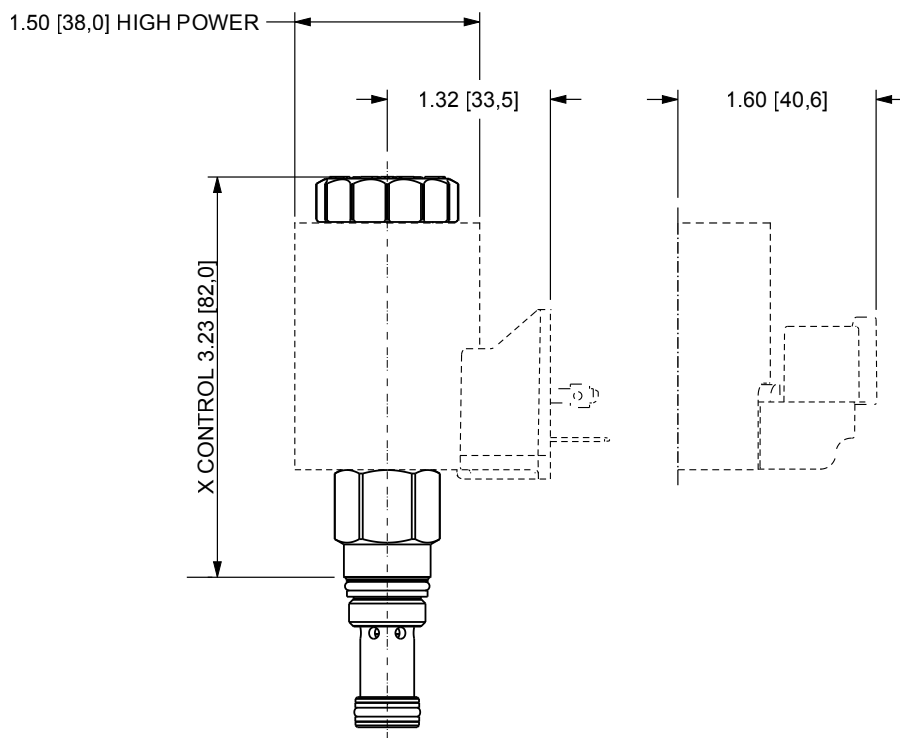
SERIES 0, CAVITY: T-162A

TECHNICAL SPECIFICATIONS	
Sun Cavity	T-162A
Sun Cartridge Series	Series 0
Nominal Flow Rate/Capacity	2.6 gpm (9,8 L/min)
Maximum Operating Pressure	5000 psi (350 bar)
Response Time - Typical	50 ms (open & close)
Maximum Internal Leakage at 110 SUS (24 cSt) at 5000 psi (350 bar)	0.004 in ³ (0.07 cm ³)/min (1 drop/min)
Switching Frequency - Maximum	4.17 Hz (15,000 cycles/hour)
Recommended Dither Frequency	100 Hz
Hysteresis (at Recommended Dither)	14%
Linearity (at Recommended Dither)	5%
Repeatability (at Recommended Dither)	7%
Deadband, Nominal (as Percent of Coil Current)	50%
Manual Override Option	No
Viscosity Range	2,8 to 380 cSt or 35 to 2000 SUS
Filtration	Minimum cleanliness (ISO 4406 1999, 4/6/14 μm) 18/16/13
Valve Hex Size	0.75 in (19,1 mm)
Valve Installation Torque	20–25 lbf ft (27–34 N-m)
Mounting Position	No restrictions
Valve Weight (excluding coil)	5.6 oz (159 g)
Seal Kit - Viton	990-162-006
Seal Kit - Buna	990-162-007

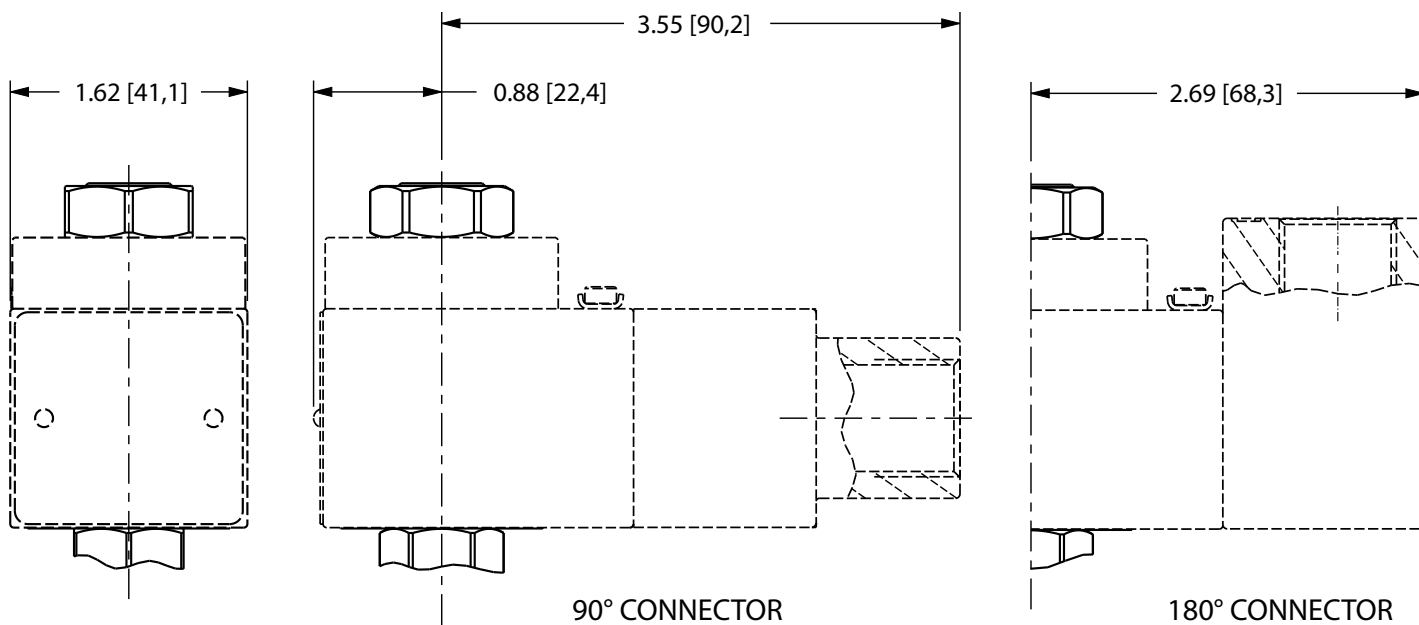
TYPICAL FLOW VS. COMMAND



FPBU WITH 740 SERIES HIGH-POWER COILS

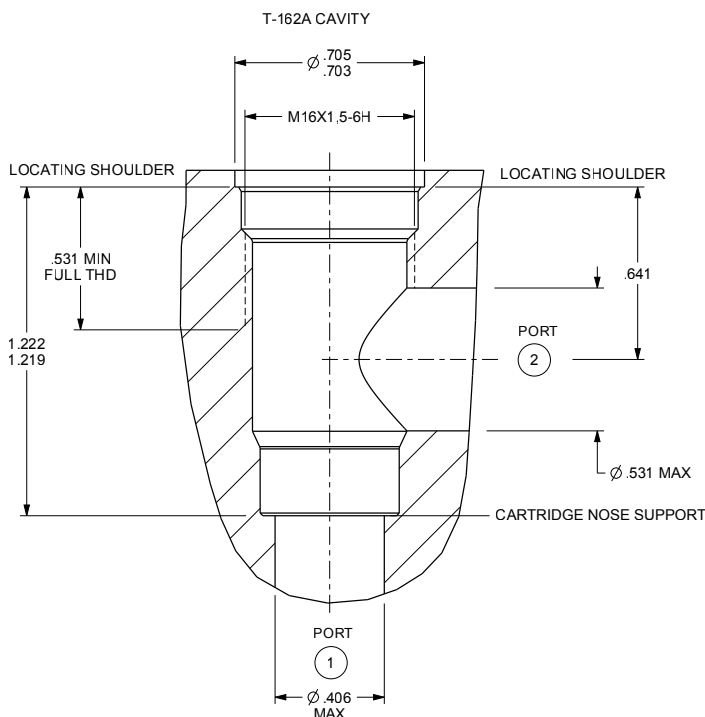


747 SERIES HAZARDOUS LOCATION COILS



NOTE: Please verify cartridge clearance requirements when choosing a Sun manifold. Different valve controls and coils require different clearances. An additional minimum 2.0 in. (50,8 mm) beyond the valve extension is needed for coil installation and removal.

T-162A CAVITY DIMENSIONAL DRAWING



NOTE: For cavity tooling, see table below.

For full cavity detail, download the latest drawings from our website.

www.sunhydraulics.com/cavity/T-162A

DESCRIPTION	HIGH-SPEED STEEL	TITANIUM COATED
M16 X 1.5-6H tap, straight shank	998991	998991101
Series 0 deep hex socket	998100005	
T-162A cavity form drill, morse taper	994162001	994162101
T-162A cavity form drill, straight shank		994162102
T-162A cavity form reamer, morse taper	995162001	995162101
T-162A cavity form reamer, straight shank		995162102

ACCESSORIES

XMD Single- and Dual-Output Drivers

The XMD is a single- or dual-output driver used with solenoid-operated electro-proportional valves for the mobile and industrial hydraulic industries. The driver can be mounted on a manifold using the standard mount clip or directly to the 740 Series low- and high-power coils using an optional coil-mount clip.

DESCRIPTION	PART NUMBER
Single-output PWM driver w/ standard mounting bracket	XMD-01
Dual-output PWM driver w/ standard mounting bracket	XMD-02



Wire Harnesses

DESCRIPTION	PART NUMBER
Wire harness, 2-pin Deutsch-to-Metri-Pack Conversion	991-717
Wire harness, 2-pin Deutsch-to-Amp Jr Timer Conversion	991-718
Wire harness, 2-pin Deutsch-to-Twin-Lead Conversion	991-719



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