# *New Product Announcement!*

sun hydraulics®
A HELIOS COMPANY

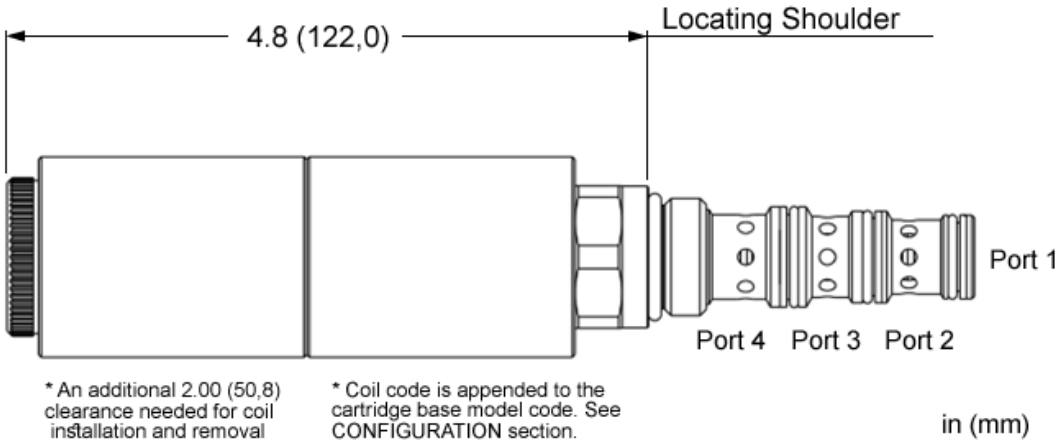
# 3-position, 4-way, Solenoid Operated, Electro-Proportional, Directional Valve 3600 psi (250 bar) Sun Common

Model: FNUC

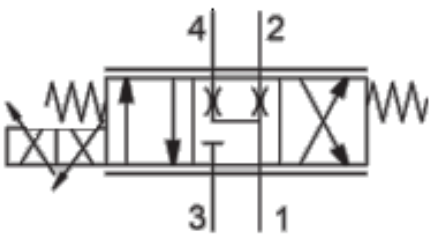
For detailed specifications visit www.sunhydraulics.com

# FNUC

## Cartridge Dimensional Drawing

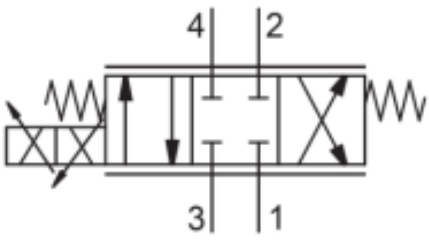



## Functional Symbols




V-spool:
X-spool:
Z-spool:

Motor center




A-spool
C-spool
E-spool

Closed center

# FNUC

## Technical Features

This valve is a solenoid-operated 3-position, 4-way proportional directional valve spring centered to the neutral position. It is available with a Blocked Center condition or an A and B Bleed to T Center condition. The flow from Port 3 (P) to Port 2 (B) and from Port 4 (A) to Port 1 (T) increases proportionally to the current applied to coil A. The flow from Port 3 (P) to Port 4 (A) and from Port 2 (A) to Port 1 (T) increases proportionally to the current applied to coil B.

- Port 1 (Tank) is rated to a maximum of 1000 psi (70 bar).
- All other ports are rated to the max operating pressure of 3600 psi (250 bar).
- This valve utilizes a wet armature design. This means that the working fluid surrounds the armature and is exposed to the heat generated by the coil. This can be a factor if the coil is energized for long periods of time. Some fluids, notably water/glycol mixtures, break down at these temperatures over time and form varnishes that can affect the function of the cartridge.
- This valve is direct-actuated and requires no minimum hydraulic pressure for operation.
- Coil connector options offer ratings up to IP67. See individual coil product pages for details.
- Coils can be mounted on the tube in either direction.
- The cartridge installation torque of 30 lbf-ft (40 Nm)is required for best performance.
- Proper installation of the metal coil nut is important for best performance.
- There are three flow ranges for each center configuration. See performance curves for more information.
- For best performance, an amplifier with current sensing and adjustable dither should be used. Reported performance is at recommended dither.

# FNUC

## Technical Features

•Recommended dither varies per spool type (see proportional performance data) and may be adjusted to better suit the application.

•For best stability and control, recommended use is with a properly-sized restrictive (LPDC) or bypass (LRDC) compensator. Provisions to dampen the load-sense line of the compensator may be helpful in achieving the best performance.

•Self-compensated use is possible to a degree. Please refer to performance curves for details. For more precise flow control consider a separate compensator.

•Use of this valve with its 12V coil variants (778212 and 778912D) yields a lower rated performance when operating the coil at a 100% duty cycle. See performance curves for details.

## Technical Data

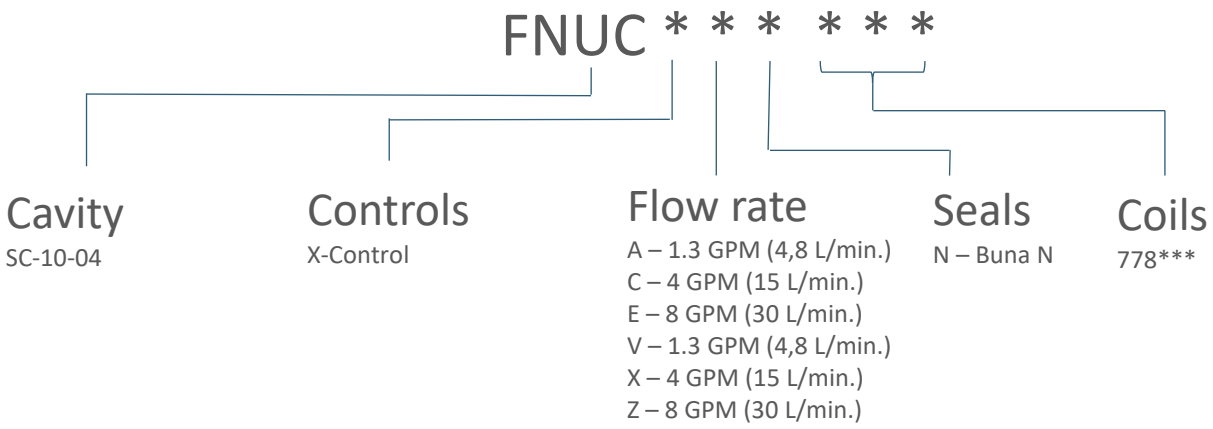
| | | |
|---|---|---|
| Cavity | SC-10-04 | |
| Series | 1C | |
| Capacity | 10 gpm | 40 l/min |
| Maximum Operating Pressure | 3600 psi | 250 bar |
| Typical Valve Leakage at 110 SUS (24 cSt) | 110 ml/min at 3600 psi | |
| Response Time - Typical | 50 ms | |
| Solenoid Tube Diameter | .75 in | 19,05 mm |
| Valve Hex Size | 27 mm | |
| Valve Installation Torque | 28 – 32 lbf ft | 38 Nm – 43 Nm |
| Coil Nut Installation Torque | 3.5 – 3.9 lbf ft | 4,7 Nm – 5,3 Nm |
| Model Weight (without coil) | 1.37 lb. | 0,62 kg |

# FNUC

## FNUC Proportional Performance Data

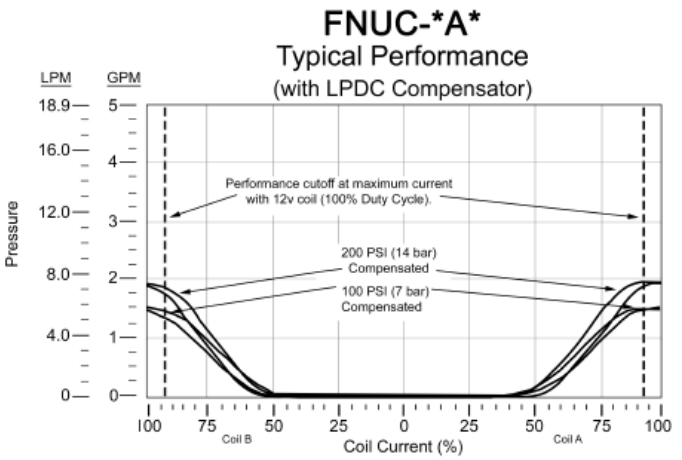
| | |
|---|---|
| Typical Hysteresis (with dither) | <20% |
| Typical Linearity (with dither and compensated) | <8% |
| Recommended dither frequency (Z and E Spool) | 320 Hz |
| Recommended dither frequency (X and C Spool) | 220 Hz |
| Recommended dither frequency (V and A Spool) | 160 Hz |

## Model Code Options

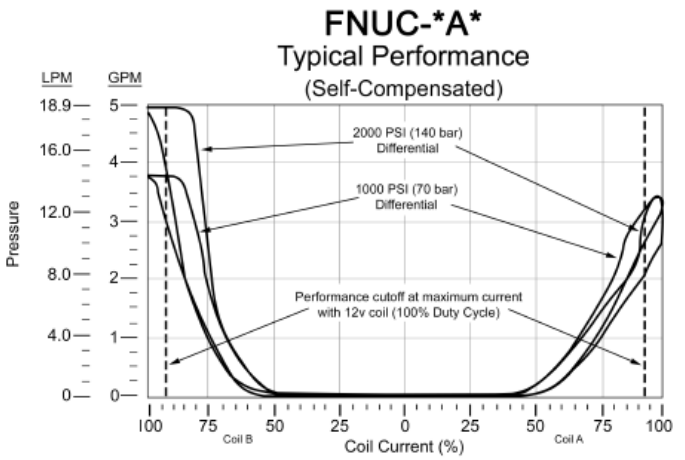


# FNUC

## Performance Data




Performance curves are derived with 4-way operation and symmetrical flow.
For valve applications where asymmetrical flow is present, the performance may vary.

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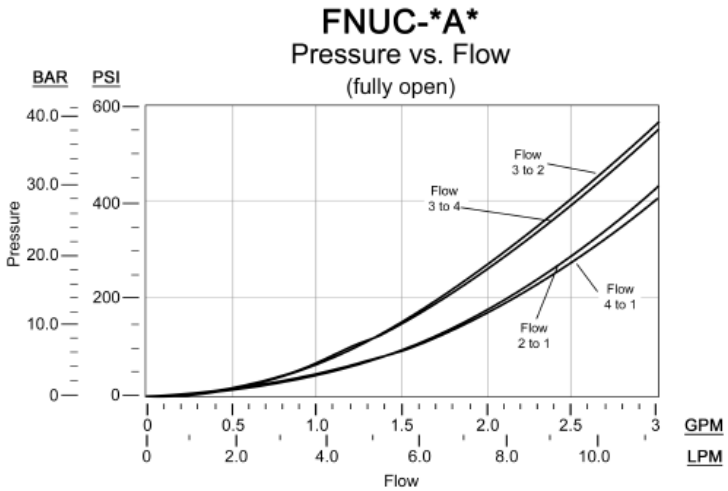


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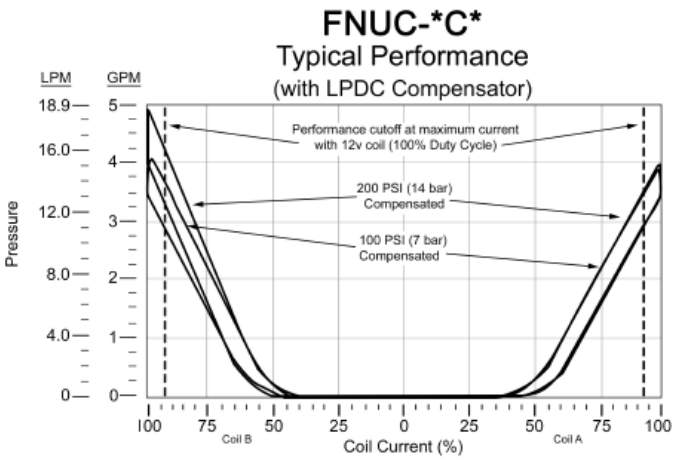


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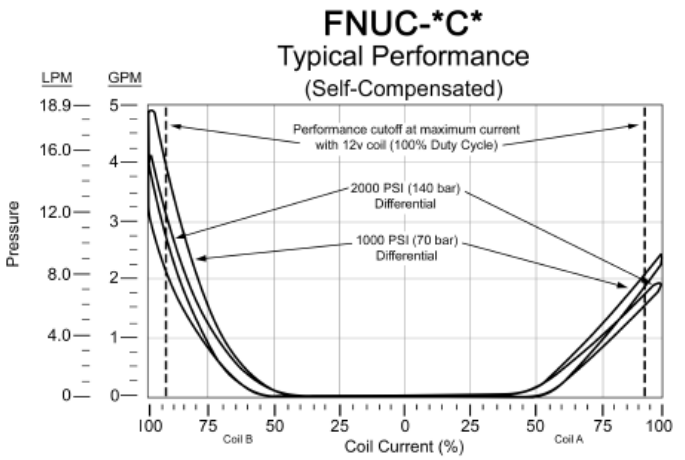


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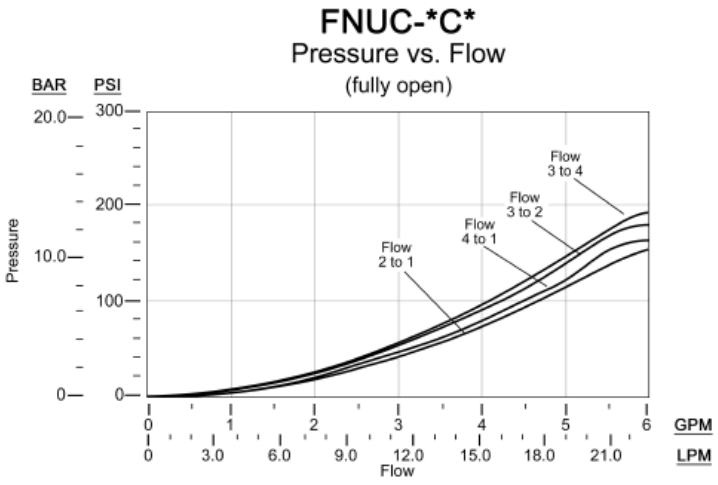


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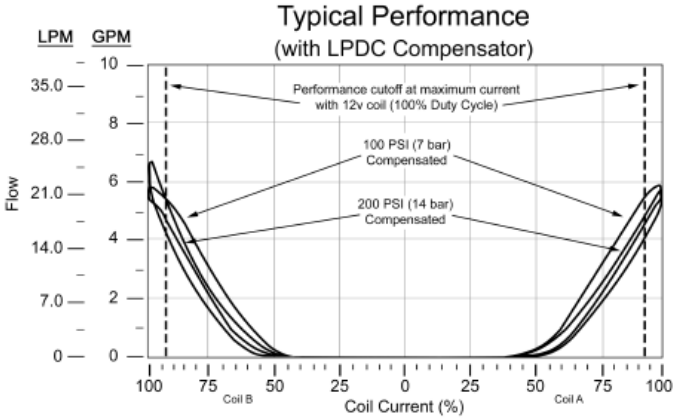
# FNUC

## Performance Data

**FNUC-*E***
Typical Performance
(with LPDC Compensator)

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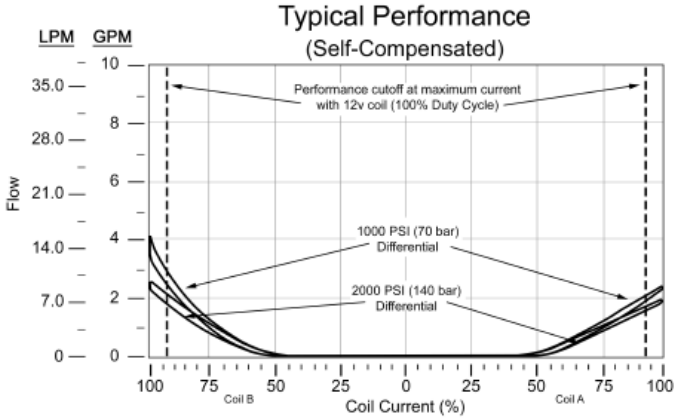
**FNUC-*E***
Typical Performance
(Self-Compensated)

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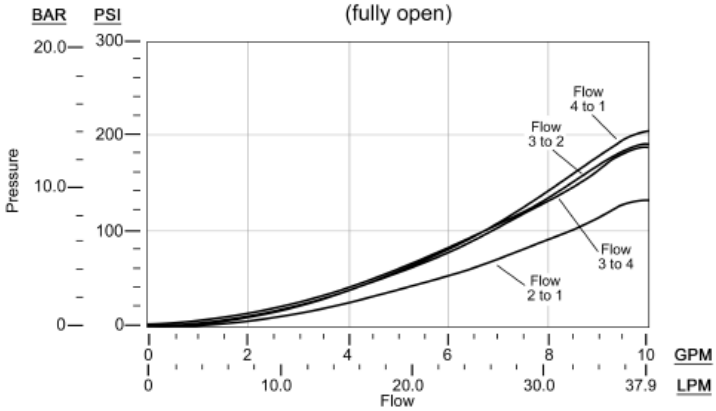
**FNUC-*E***
Pressure Differential
(fully open)

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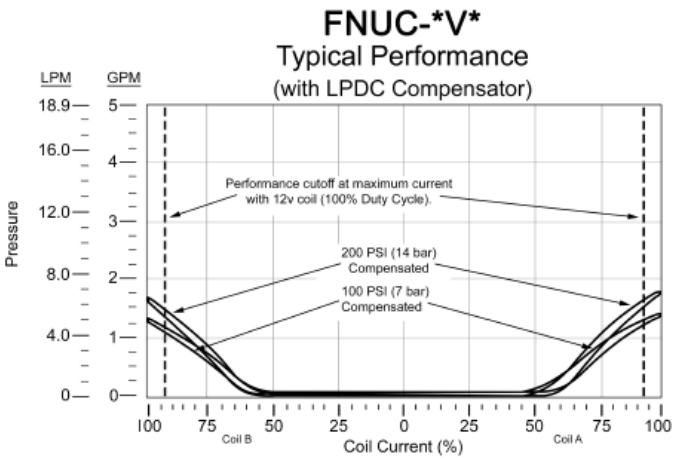


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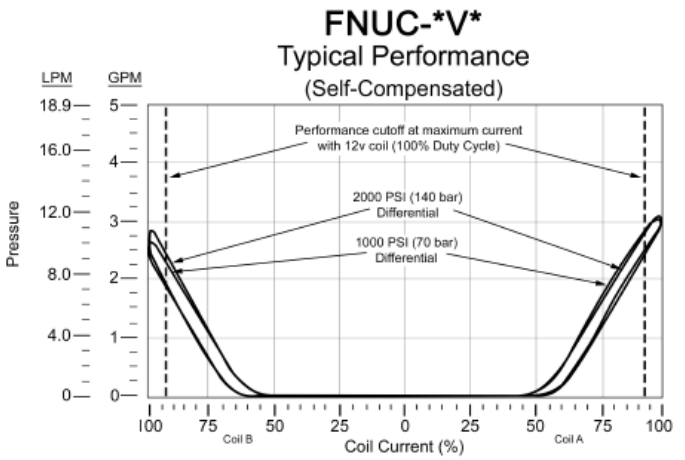


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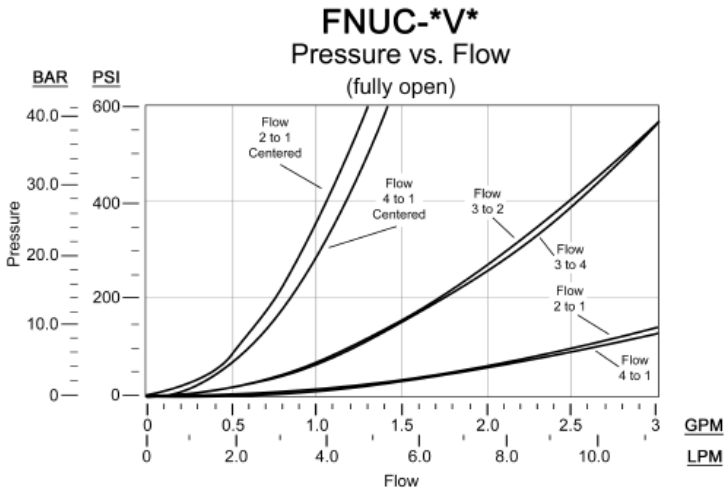


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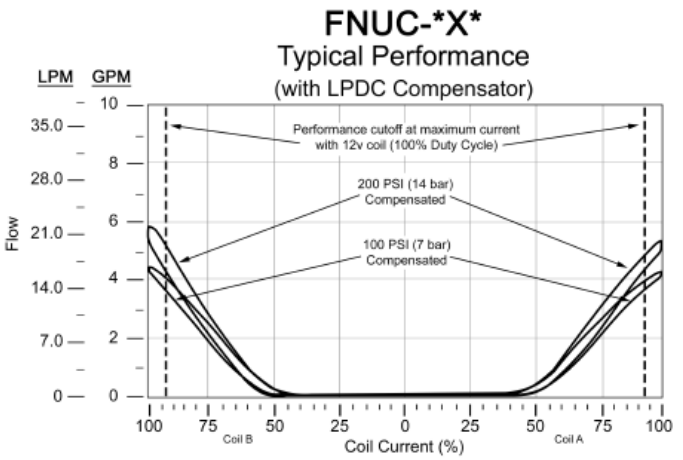


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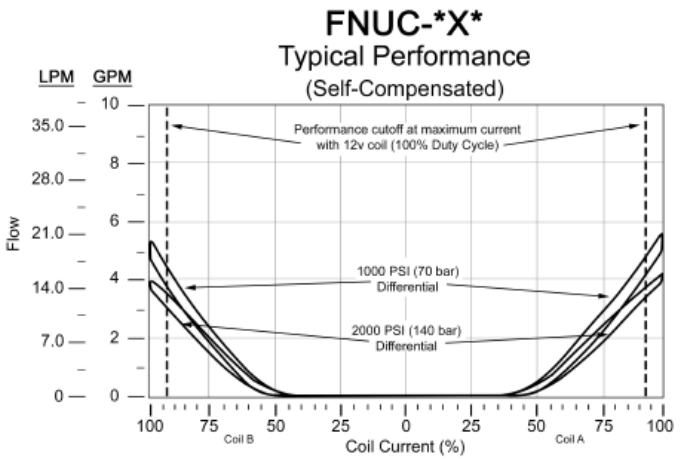


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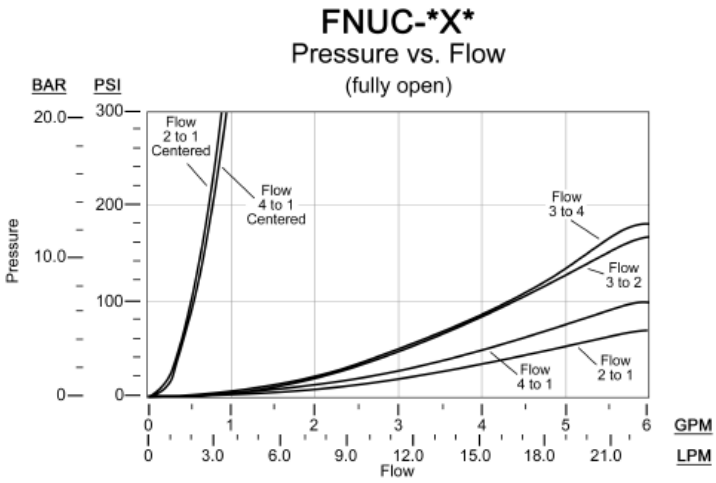


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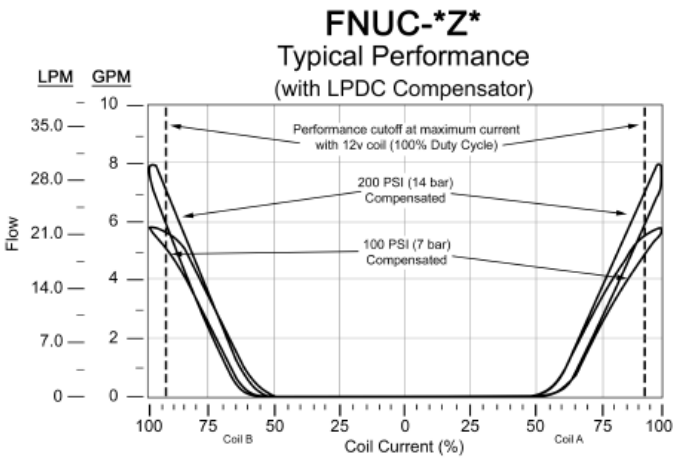


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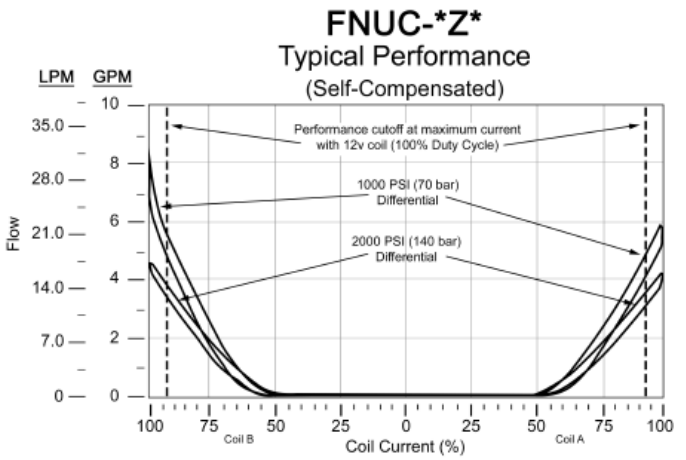


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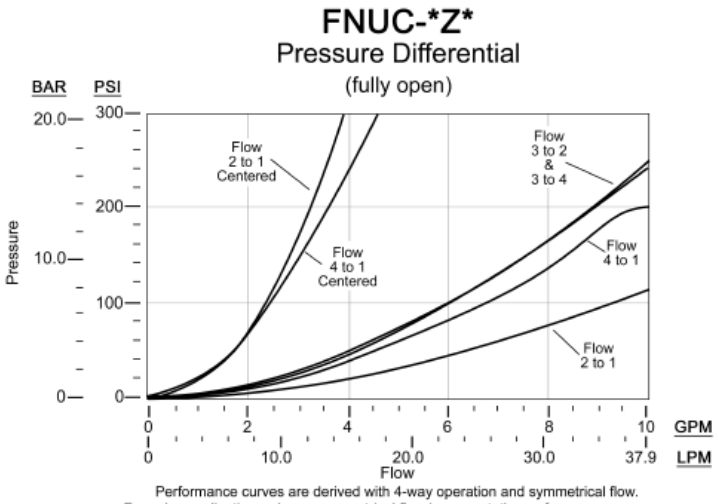


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# FNUC

## Coil Options

| Voltage | Connector | Sun Model Code | Resistance 20°C (OHMS) ±7% | With Diode |
|---|---|---|---|---|
| 12 VDC | DIN | 778-212 | 3.9 | No |
| 24 VDC | DIN | 778-224 | 14.5 | No |
| 12 VDC | Deutsch | 778-912D | 3.9 | Yes |
| 24 VDC | Deutsch | 778-924D | 14.5 | Yes |

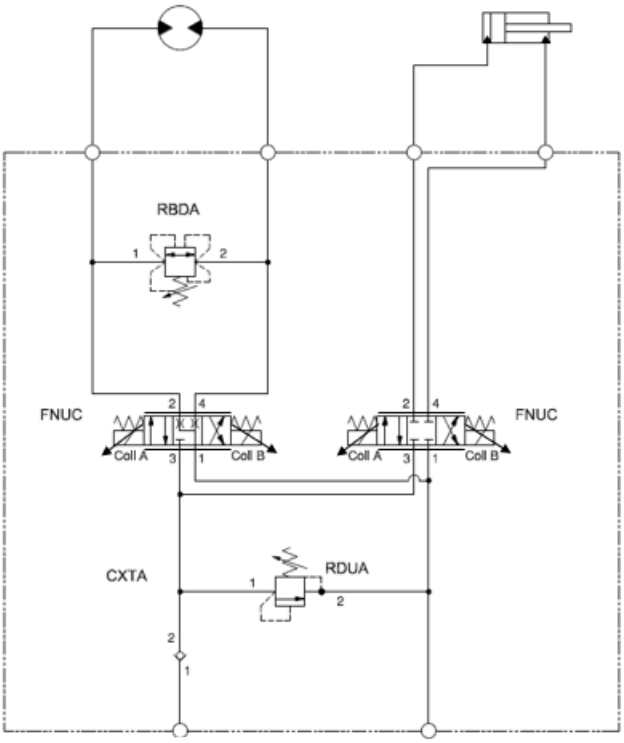
## Coil Performance Data

| | |
|---|---|
| Power Consumption (cold) – at rated voltage | 36.9 W (12 VDC), 39.7 W (24 VDC) |
| Weight | 0.62 lb (0.28 kg) |
| Duty Cycle | 100% |
| TVS Diode | Included in Deutsch DT04-2P Version |
| Operating Voltage Range | +/- 10% |
| Maximum Coil Temperature at 104°F (40°C) Ambient | 284°F (140°C) |
| Maximum Current (100% Duty Cycle at Maximum Ambient Temperature) | 1660 mA (12 VDC), 900 mA (24 VDC) |

100% duty cycle DC coils available in both DIN and Deutsch connectors
Deutsch coils contain a diode. DIN coils do not have a diode.

# FNUC

## Application Example




This FNUC cartridge valve is a proportional 3-position, 4-way directional/flow control valve. With proportional command to the solenoid, this valve will throttle flow from the P port (3) to the work ports, A and B (2 and 4). Tank is connected to port 4. This product is available in 3 flow resolutions, to optimize your control for each working section of your mobile machine. On this aerial work platform, the FNUC provides fine speed control of the working cylinders in a compact, lightweight, cartridge valve solution.

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