

Rack Quick Disconnect Module Double-Shutoff Valve Leakage Standards - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The Rack Quick Disconnect Module (RQDM) with integrated Double-Shutoff Valve represents the definitive fluid and coolant management interface for high-density telecom and datacenter rack architectures. Engineered to eliminate the risk of fluid loss during blind-mate connection and disconnection cycles, this module establishes a new benchmark for leakage integrity in mission-critical environments. The double-shutoff valve mechanism ensures that both the supply and return fluid paths are hermetically sealed immediately upon decoupling, preventing any residual media from escaping into the equipment rack or facility floor. This official technical overview defines the leakage standards, mechanical tolerances, and operational protocols governing the RQDM platform, providing network architects and facility engineers with the authoritative specification data required for deployment in carrier-grade liquid-cooled infrastructure.



ARCHITECTURE & CHASSIS DESIGN

The RQDM platform is built around a precision-machined stainless steel valve body housed within a compact, rack-mountable chassis assembly. The architecture employs a dual-plunger, spring-loaded poppet design that activates simultaneously on both the supply and return circuits. Upon insertion, the mating coupler compresses the poppet seals, establishing a full-flow pathway; upon extraction, the spring tension immediately returns both poppets to their closed positions, guaranteeing a zero-drip disconnect. The chassis features a 1RU mounting bracket with integrated cable strain relief, allowing for dense vertical stacking of up to 42 modules per standard 2-meter rack. The valve body is forged from 316L stainless steel with Viton fluoropolymer seals, providing exceptional resistance to glycol-based coolants, deionized water, and dielectric fluids. The external housing incorporates a mechanical keying system

to prevent cross-connection between supply and return lines, as well as a visual engagement indicator that confirms full lock position.

HARDWARE FEATURES

The RQDM incorporates a suite of hardware-level features designed to exceed the most stringent leakage standards. The double-shutoff valve assembly is tested to a maximum leakage rate of 0.05 mL per disconnect cycle, verified under a pressure differential of 6 bar. The module supports a rated operating pressure of 10 bar with a burst pressure tolerance of 40 bar. Each valve port is equipped with a secondary O-ring backup seal, creating a redundant barrier against micro-leakage. The quick disconnect mechanism utilizes a bayonet-style locking collar with a 90-degree twist, providing tactile and audible confirmation of secure engagement. Integrated drip trays with a 15 mL containment capacity capture any residual fluid during maintenance operations. The module operates across a temperature range of -20°C to +90°C, with a fluid compatibility list including propylene glycol, ethylene glycol, and fluorinated dielectric coolants.

COMPLIANCE & STANDARDS

The RQDM Double-Shutoff Valve Leakage Standards are aligned with the

following industry specifications: IEC 60529 (IP65 ingress protection), ISO 16010 (hydraulic fluid power connectors), and Telcordia GR-63-CORE (NEBS physical protection). The leakage performance is validated per ISO 188 (rubber vulcanized adhesion) and ASTM D2000 (rubber classification). The module is RoHS and REACH compliant, and the valve assembly is certified to ANSI/NSF 61 for potable water system components where applicable. Leakage testing is conducted in accordance with a proprietary OEM protocol that simulates 10,000 connect/disconnect cycles under thermal cycling conditions, with zero failure criteria for seal integrity.

TECHNICAL SPECIFICATIONS

The following parameter registry provides the definitive specification envelope for the RQDM platform. All values are nominal unless otherwise stated and are verified through factory acceptance testing.

Parameter	Specification
Form Factor	1RU rack-mount module with integrated drip tray
Valve Type	Double-shutoff poppet valve, spring-loaded, dual-circuit
Material (Valve Body)	316L stainless steel, passivated

Seal Material	Viton fluoropolymer (standard), EPDM (optional)
Maximum Leakage Rate	0.05 mL per disconnect cycle at 6 bar differential
Rated Operating Pressure	10 bar (145 psi)
Burst Pressure	40 bar (580 psi)
Operating Temperature Range	-20°C to +90°C
Fluid Compatibility	Propylene glycol, ethylene glycol, deionized water, dielectric fluids
Connection Type	Bayonet-style quick disconnect, 90-degree locking collar
Tube Compatibility	3/8-inch ID (standard), 10 mm / 12 mm metric (optional)
Ingress Protection	IP65 per IEC 60529
Cycle Life	10,000 connect/disconnect cycles (zero seal failure criteria)
Compliance	RoHS, REACH, Telcordia GR-63-CORE, ISO 16010, ANSI/NSF 61
Mounting	1RU bracket, vertical stackable up to 42 modules per 2-meter rack
Drip Containment Capacity	15 mL integrated tray
Pressure Test Port	Optional field-verification adapter

Ordering Options	NPT, metric tube, sanitary clamp, dielectric seal kit variants
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ORDERING OPTIONS

The RQDM platform is available in multiple configurations to suit diverse rack architectures. The standard model supports 3/8-inch internal diameter tubing with NPT thread connections. Variants include metric tube fittings (10 mm and 12 mm), sanitary clamp fittings for hygienic applications, and dielectric-specific seal kits for fluorinated coolant systems. Each module ships with a factory calibration certificate and a traceability tag. Optional accessories include a rack-mount manifold block for consolidating up to eight module connections, a drip containment pan with fluid sensor integration, and a pressure test port adapter for field verification of seal integrity.

