PRODUCT BROCHURE

Direct-Q™

Ultrapure Water Systems

FROM TAP WATER TO TYPE I WATER DIRECTLY

This compact, silent system produces up to 0.6 L/min of ultrapure water on demand, directly from potable tap water, without the need for any additional pre-treatment. The Direct-Q Laboratory Water Purification System is designed for scientists who need 5 to 15 L of ultrapure water per day and do not have easy access to acceptable quality pre-treated water.

The ideal system for the following applications:

MILLIPORE

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Compact and Convenient Source of Ultrapure Water

The Direct-Q System incorporates innovations recently introduced with Millipore's new RiOs™ and Milli-Q® Water Purification Systems in a very compact design:

- **Optimized Progard™ Plug-In Pre-Treatment Pack** designed for a wide range of feed water conditions and optimal protection of the Reverse Osmosis (RO) cartridge. These features increase the lifetime and efficiency of the cartridge.
- **Constant water flow rate** independent of feed water temperature variations. Traditional RO systems are pressure and temperature dependent. At a given pressure, product water flow rate drops typically by 3% for every 1°C decrease in feed water temperature. The Direct-Q System incorporates a unique temperature feedback feature which controls pump pressure, thus maintaining a steady product flow rate throughout the year, regardless of temperature.
- **Significant water savings.** The Direct-Q Water Purification System is designed to minimize the amount of rejected water by recycling a portion of the RO membrane reject. Recycling more than 60% of the reject water also extends the pre-treatment life span.
- **Optimized permeate water quality.** The Direct-Q System has a built-in automatic rinse function which will divert poor quality RO product water to drain at start-up until acceptable quality is reached. This prevents high conductivity water from entering the storage reservoir and increases the lifetime of the Quantum™ Ion-Exchange Cartridge.
- **Automatic refilling of the 10 L reservoir** when the water level drops below 9.5 L.
- **Full range of Quantum Cartridges** for the purity and reproducibility your work demands.
- **Automatic intermittent recirculation** of the ultrapure water in the loop to maintain water purity levels at all times.
- **Display of final product water resistivity** with or without compensation at 25 °C as required by the user.
- **Flexible ultrapure water dispenser** with built-in water quality control for easy operation.

- **Quiet operation** of the Direct-Q System booster and recirculation pumps results in a virtually silent unit, generating less than 40 decibels at a 1 meter distance from the system.
- **Clear digital display** with a choice of languages eliminates guesswork. The Direct-Q System offers a choice of display languages to suit your local needs. System status and performance characteristics are clearly displayed

on a double–line alphanumeric display which also indicates when routine maintenance should be performed.

- **Designed with Good Laboratory Practices (GLP) in mind**, the Direct-Q system includes a built-in RS232 capability which allows the system to be connected to an external printer. Water quality data and system parameters can be printed when ultrapure water is dispensed. The hard copy print out can be filed in your laboratory notebook for future reference.
- **Compact and versatile**, the Direct-Q System can be operated on the bench top or wall mounted. Wall mounting points are built into the system frame, and the 10 L reservoir can be installed on the wall beside the system.

Operating Principle

Several water purification technologies are incorporated into this compact system whose performance is automatically monitored by pressure, temperature, conductivity and resistivity sensors.

The system operation is described in Figure 1 below:

Water enters the Direct-Q System through an inlet solenoid valve (2) and passes through a Progard Pretreatment Cartridge (3). The water is then pumped through the Reverse Osmosis cartridge (6) which removes more than 95% of the ionic contaminants and 99% of the organic contaminants with a molecular weight of over 100 Dalton. Water going through the RO cartridge (permeate) is stored in the 10 L reservoir (14). Permeate water is pumped from the reservoir through the Quantum Cartridge by the recirculation pump (16) in order to produce high resistivity product water. The product water is delivered at 0.6 L/min flow rate through a 0.22 µm final filter (20).

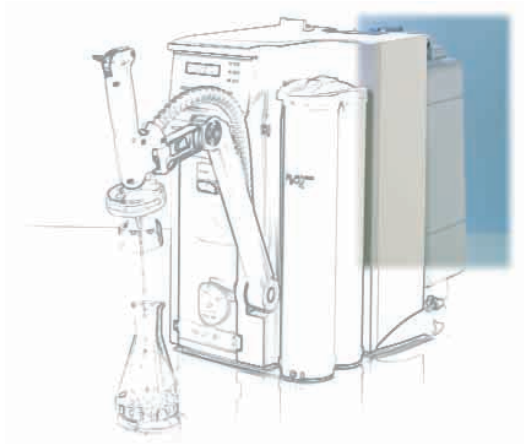
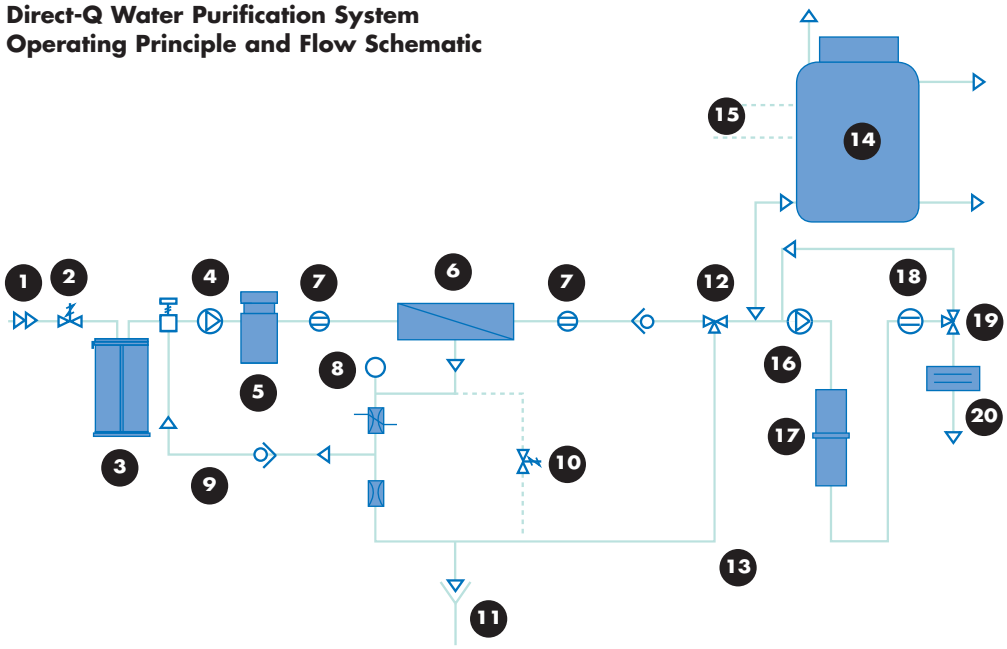


FIGURE 1.

Direct-Q Water Purification System
Operating Principle and Flow Schematic



1. *Potable Tap Water Feed*
2. *Inlet Solenoid Valve*
3. *Progard Pack*
4. *Booster Pump*
5. *Sanitization Port*
6. *RO Cartridge*
7. *Inlet and Outlet Conductivity Sensors*
8. *Pressure Sensor*
9. *Reject Recycling Loop*
10. *Reject Solenoid Valve*
11. *Drain*
12. *Three-Way Permeate Divert Valve*
13. *Permeate Divert Valve Reject*
14. *Reservoir (12 L total volume)*
15. *Water Level Sensor (Min = 8 L/Max = 10 L)*
16. *Recirculation Pump*
17. *Quantum Cartridge*
18. *Resistivity and Temperature Sensors*
19. *Three-Way Valve*
20. *Millipak® 0.22 µm End Filter*

Specifications

System Performance

Product Water Quality

Resistivity: 18.2 MΩ-cm at 25 °C

TOC: Typically < 30 ppb with Quantum IX Cartridge and < 10 ppb with Quantum EX Cartridge

Particulates: 0.22 µm sterilizing filter

System Hydraulic Performance

Direct-Q System with built-in booster pump:

Min Inlet P: 1.0 bar

Water Use: 20 L/hour

RO Permeate Water Flow Rate: 5 L/hour; 100 L/day

Product Water Instant Flow Rate: 0.6 L/min

Feedwater Requirements

Quality: Potable mains (tap) water

Temperature: 2 to 35 °C

Maximum fouling index (SDI 5): Progard 1 Cartridge: < 5; Progard 2 Cartridge: < 12*

Maximum Total Chlorine Level: Progard 1 Cartridge: < 1 ppm; Progard 2 Cartridge: < 3 ppm

Minimum Inlet Pressure: 1.0 bar

Maximum Inlet Pressure: 6.0 bar

*If SDI index is > 12, a 12" Rogard™ Cartridge is recommended upstream

Dimensions

Height: 455 mm (18 in)

Width: 255 mm (10 in)

Depth: 315 mm (12 in), without 10 L reservoir attached; 500 mm (20 in), with 10 L reservoir attached

Operating Weight

29.6 kg (with full reservoir)

Ordering Information

Description	*Catalogue No.*
Direct-Q Systems	
Direct-Q System (230V/50Hz) with RO pump	**ZRQS 500 5Y**
Direct-Q System (120V/60Hz) with RO pump	**ZRQS 600 5Y**
Direct-Q System Consumables	
Progard 1 Pre-Treatment Pack (short), 1/pk	**PR0G 000 01**
Progard 2 Pre-Treatment Pack (long),1/pk	**PR0G 000 02**
Chlorine Tablets (45/pk)	**ZWCL 01F 50**
Reverse Osmosis Cartridge	**CDRC 002 01**
Quantum IX (Ionex™) Cartridge	**QTUM 000 IX**
Quantum EX (Organex™) Cartridge	**QTUM 000 EX**
Quantum VX (Vionex) Cartridge	**QTUM 000 VX**
Millipak 40 Filter Unit, Sterile, 2/pk	**MPGL 04S K2**
Quantum IX Cartridge with Non-Sterile Millipak Filter Unit	**QTUM MPK IX**
Quantum EX with Non-Sterile Millipak Filter Unit	**QTUM MPK EX**
Direct-Q System Accessories	
Printer Cable	**PRNT CBL 01**
Wall Mounting Bracket	**SYST FIX 01**

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In the U.S., Canada and Puerto Rico, fax orders toll-free to 1-800-MILLIFX (1-800-645-5439)
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IN ALL OTHER COUNTRIES
Millipore Intertech (U.S.A.)
Tel. +1 (781) 533-8622
Fax +1 (781) 533-8630

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