NGC Chromatography Systems

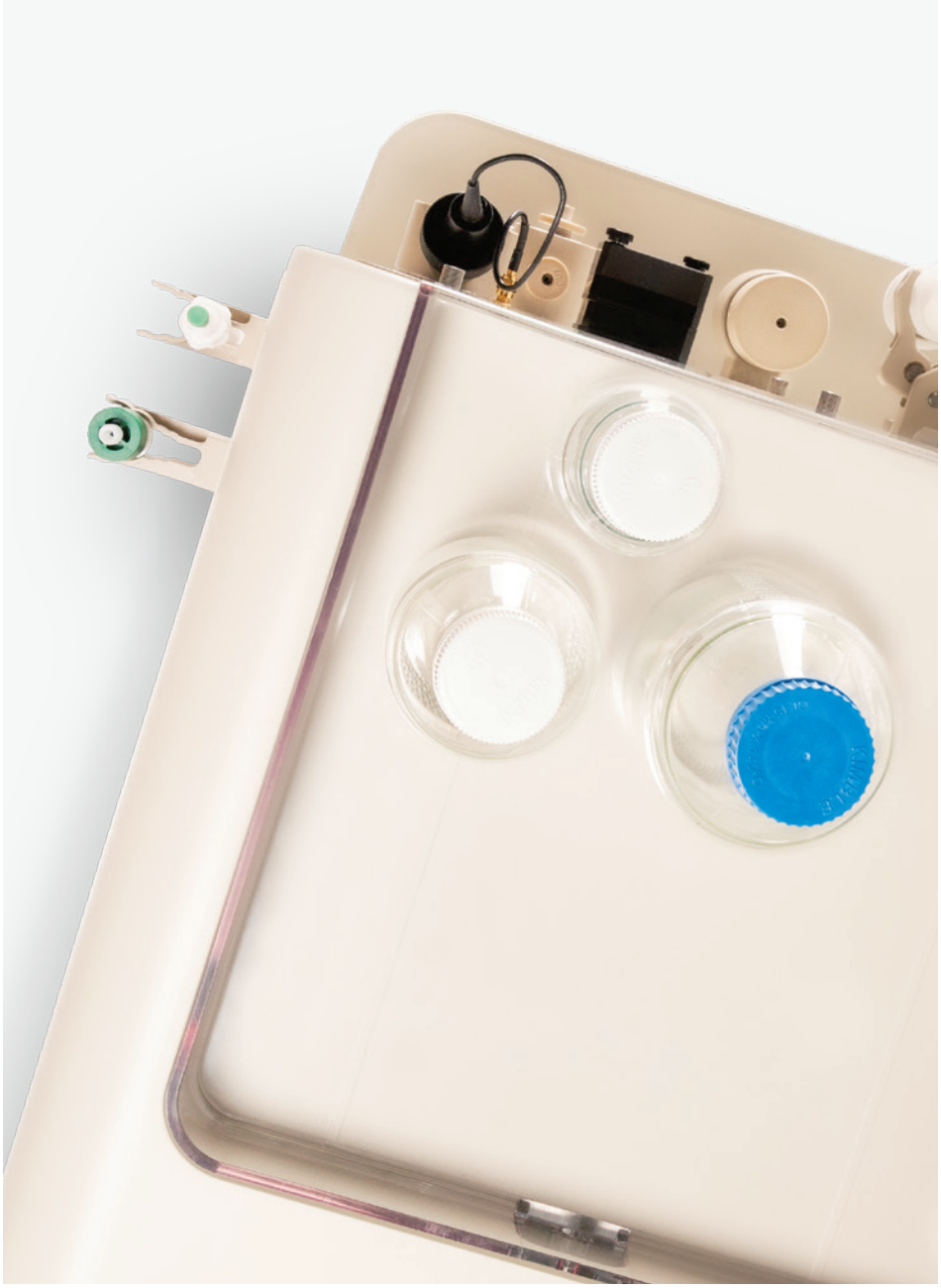
Comprehensive Solutions for Protein Purification

Visit **bio-rad.com/NGC** for more information.

Designed by You. Built by Bio-Rad.

NGC Medium-Pressure Chromatography Systems

The NGC instrument is an automated liquid chromatography system designed for biomolecule purification at the research, process development, and laboratory-scale levels. At the core of the NGC platform is a fully customizable and scalable system combined with a single, intuitive software package for system control and evaluation. Together, the NGC Systems provide a complete laboratory solution.



ALIGNS

A single solution that aligns to your needs today and expands to support your future discoveries and throughput requirements.

ADAPTS

A flexible system that adapts to your requirements and can be easily customized to suit your application needs.

ENSURES

An intelligent design that ensures functional simplicity and guides you from experimental setup to analysis and support.

ALIGNS | A single laboratory chromatography solution that aligns and scales to fit your throughput requirements

NGC Systems can be selected based on your needs and can be further customized to fit your changing requirements through the addition of more modules and capabilities.

Capabilities Included in All NGC Systems

Choice of 10 ml/min or 100 ml/min system pumps, mixer module with multiple mixer barrel options (750 µl, 2 ml, 5 ml, 12 ml), automated sample inject valve, ChromLab Software, and a touch screen.

Enhancements Available for All Systems

Increase automation and functionality by adding modules for different phases of your purification scheme. All systems are compatible with the versatile, high-capacity NGC Fraction Collector and BioFrac Fraction Collector for automated fraction collection (analytical- to preparative-scale). See bulletin 6326 for more details.

NGC Quest Plus System

Designed for the all-purpose purification of biomolecules and simultaneous detection of proteins, peptides, nucleic acids, and other chromogenic molecules. This system enables accurate gradients and high-resolution separations.

System capability includes:

- Multi-wavelength (ultraviolet/visible [UV/Vis]) detection of up to 4 wavelengths simultaneously
- ChromLab Software, for fast and easy automated and manual control — a single platform compatible with all NGC Systems

NGC Scout Plus System

Designed for the simultaneous detection of proteins, peptides, nucleic acids, and other chromogenic molecules with expanded automation and scouting. This system enables rapid scouting of protein purification conditions with automated gradients and buffer preparation.

Includes NGC Quest Plus capability, plus:

- Buffer blending valve for automated inline buffer preparation
- pH valve to monitor buffer pH and separation by pH gradients

NGC Discover System

Designed for higher throughput, rapid and secure methods, and process development. Provides expanded scouting options with the simultaneous detection of proteins, peptides, nucleic acids, and other chromogenic molecules.

Includes NGC Scout Plus capability, plus:

- Integrated sample pump, 100 ml/min
- Buffer inlet valves
- Column switching valve, 10 ml or 100 ml option

NGC Discover Pro System

Designed for higher throughput, rapid and secure methods, and process development.

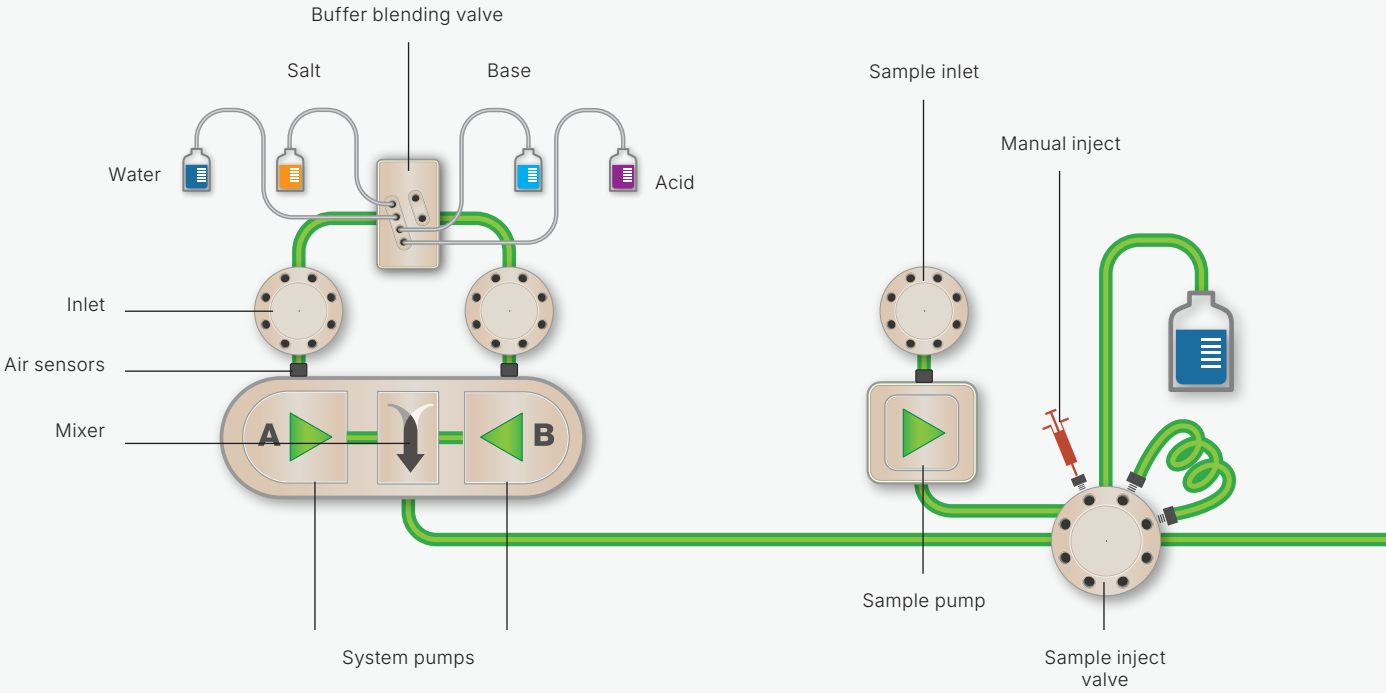
Includes NGC Discover capability, plus:

- Sample inlet valve
- Outlet valve

Option:

Tandem purification with additional column switching valve

NGC System Capabilities



System Pumps

Pump selection of up to 10 ml/min or 100 ml/min flow rate with the option to switch out pumps to meet your application requirements.

F10 Pumps

- Flow rate of 0.001–10 ml/min at 3,650 psi (25.2 MPa)
- Ideal for small-scale preparative purifications

F100 Pumps

- Flow rate of 0.01–100 ml/min at 1,450 psi (10 MPa)
- Flexible flow rate range
- Ideal for scale-up applications

Sample Pump

For automated sample application with the ability to load large sample volumes. Includes an integrated pressure sensor. Add a sample inlet valve or connect a third-party autosampler with a signal import module for increased automated sample loading capabilities.

Mixer

Homogenizes buffers from two system pumps and can accommodate varying volumes (different sized barrels are available). Includes a mixer motor and integrated pressure sensor.

Detectors

Ensure accurate detection of biomolecules such as proteins, peptides, nucleic acids, and chromophores. Include an integrated conductivity monitor (0.01–999 mS/cm) and an optional pH monitor (pH 1–14).

Multi-Wavelength Detector II Module

For greater sensitivity and flexible detection of any biomolecules and chromophores (190–800 nm). Simultaneous multi-wavelength (UV/Vis) detection of up to four wavelengths.

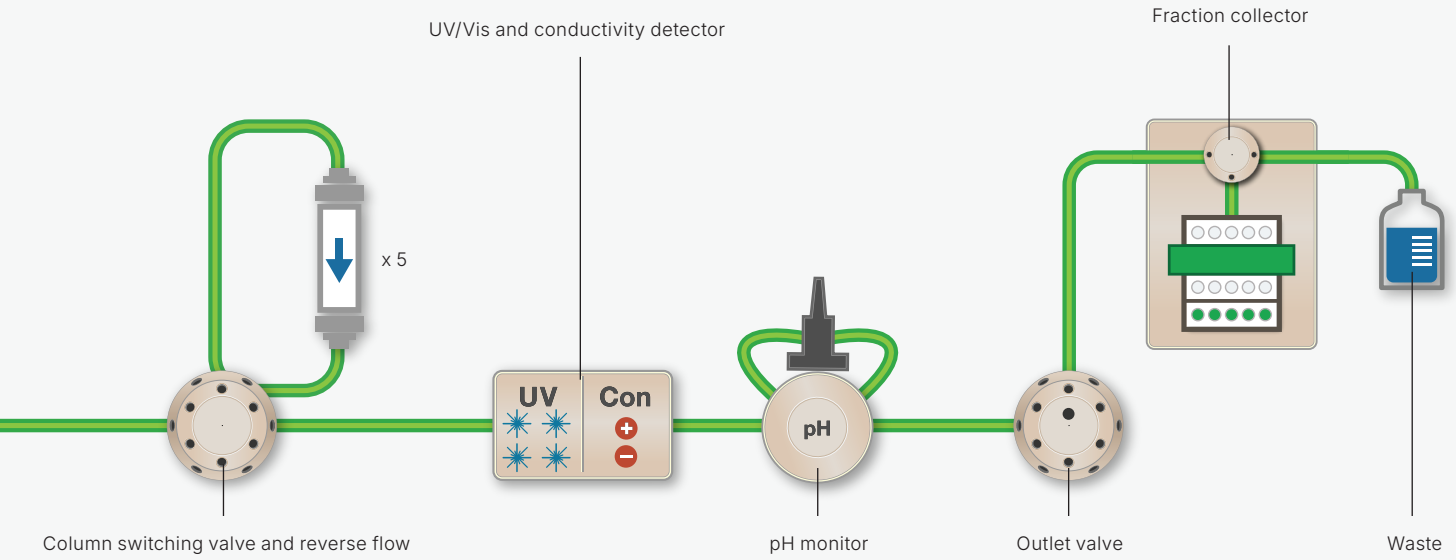
Connect external detectors to the NGC System via the signal import module.

pH Valve

For accurate inline pH monitoring (pH 1–14). Includes integrated bypass valve and calibration port for in situ calibration.

Air Sensors

Detect end of buffer and sample to protect against column damage. Air sensor mapping and real-time status displays on fluidic scheme. Air sensor extension enables use of up to four additional air sensors (eight total).



Valves

Sample Inject Valve

For accurate sample loading (µl to L volumes) with a low internal volume for minimal sample loss.

Buffer Blending Valve

For fast pH scouting with automated inline buffer preparation and the ability to double the fluid output to 20 ml/min or 200 ml/min.

Inlet Valve

Automated switching between buffers (up to eight inlets per valve) for accelerated method development, column cleaning, and regeneration. Option to include two inlet valves, one for each system pump. Inlet valves can also be used with the sample pump for automated sample loading and cleaning between runs.

Column Switching Valve and Reverse Flow

Automated column/media scouting of up to five columns without replumbing. Includes reverse flow for rapid elution, sample concentration, and column cleaning. Internal bypass allows automated system priming and cleaning with integrated pressure sensors that measure pre- and delta-column pressures.

Outlet Valve

For enhanced automated fraction collection of large- volume fractions with up to 12 vessels.

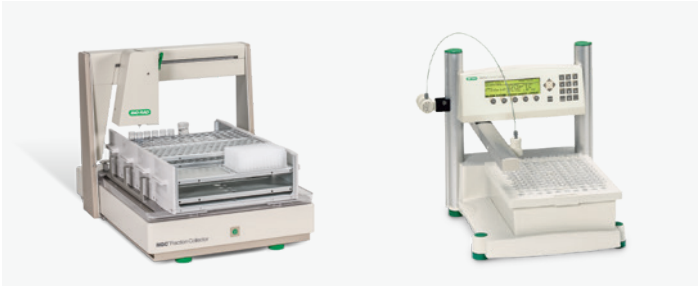
Accessories

NGC Fraction Collector (catalog #17002070)

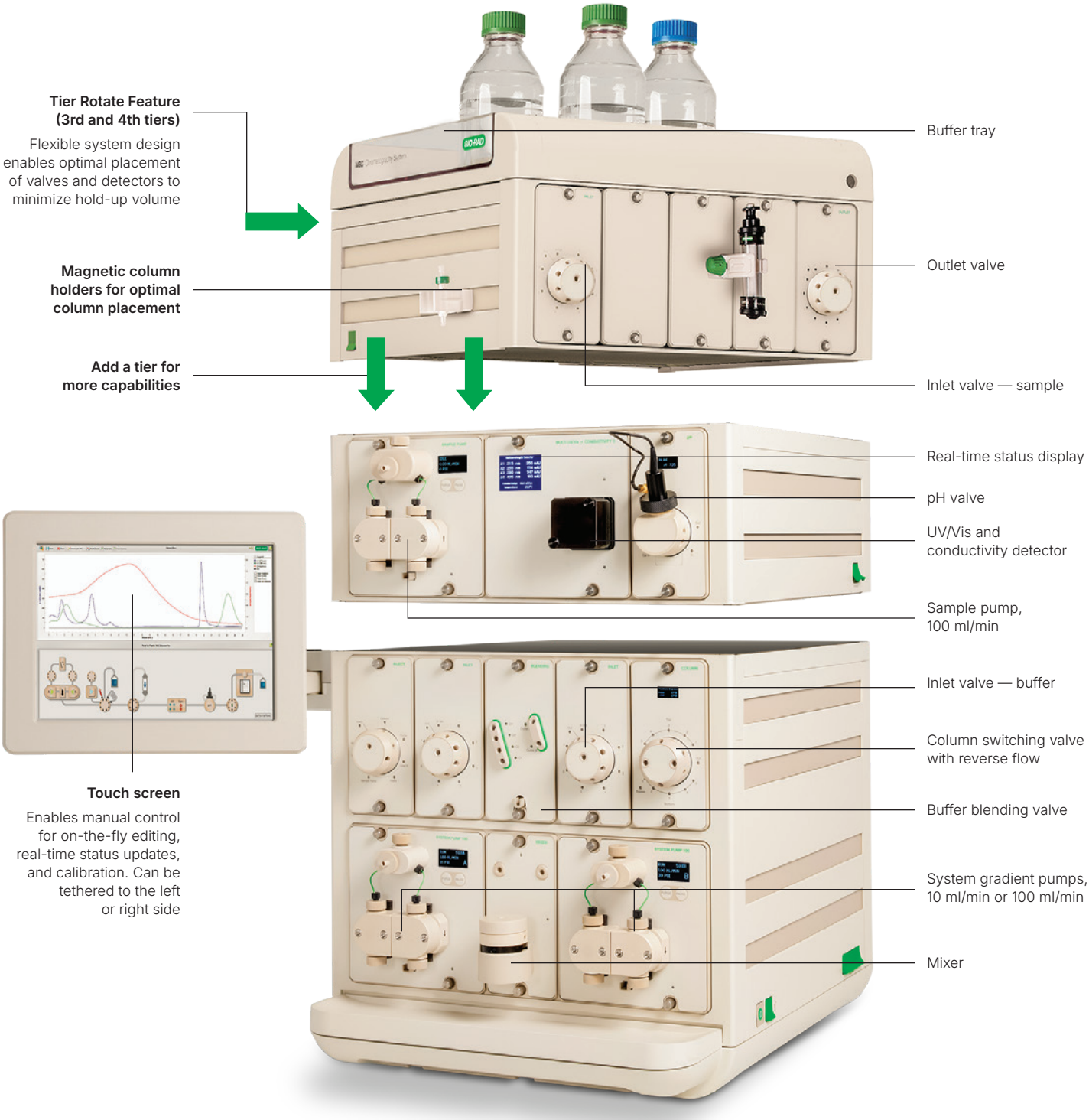
Provides automated collection options for discovery to small-scale batch production at flow rates up to 200 ml/min. It supports multiple rack and vessel collection combinations from microplates and tubes to bottles and carboys.

BioFrac Fraction Collector (#7410002)

Reliable fraction collection from analytical to preparative scale with versatile capability to collect from 96-well plates to 30 mm tubes.



Personalize and Expand Your System Capabilities to Suit Your Application Needs and Workflow



ADAPTS

Powerful ChromLab Software control, transferable across all NGC Systems, enables minimal training and fast setup to analysis

Easy Instrument Setup

1 Select Fluidic Scheme

Guided fluidics selection allows application-based system setup

2 Plumb System

Point-to-Plumb lighting provides step-by-step LED-guided setup for easy plumbing and eliminates the potential loss of precious sample or waste of expensive columns

Quick Experiment Setup and Operation

3 Design Experiment

Quick and easy method setup and design using the powerful, intuitive ChromLab Software

4 Control Experiment

Real-time flow path display controls buffer, sample, and valve position for easy identification of system status

Analysis Made Easy

5 Analyze Data

Integrated data analysis with easy integration of multiple peaks and runs

6 Confirm Purification and Separation

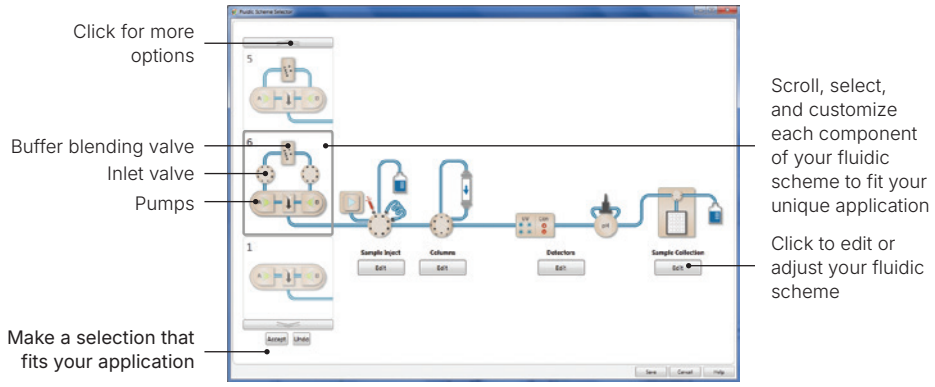
Stain-Free technology allows protein separation, gel imaging, and analysis in less than 30 min

EASY INSTRUMENT SETUP

1 Select Fluidic Scheme

Select the fluidic scheme that best fits your application, set a default path, and optimize your module placement

To view the complete module library see bulletin 6326 or visit **bio-rad.com/NGC**.



2 Plumb System

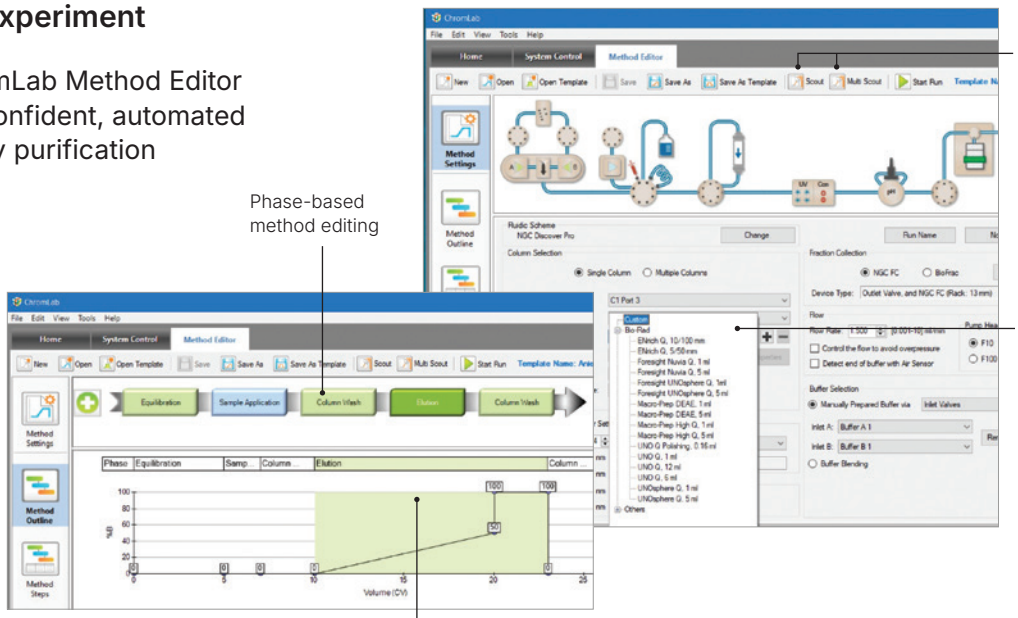
Point-to-Plumb intuitive graphical indicators for simple, guided LED plumbing setup

Click on each step in the flow path to guide system plumbing. Then, appropriate LEDs will light up to guide plumbing connection points.

QUICK EXPERIMENT SETUP AND OPERATION

3 Design Experiment

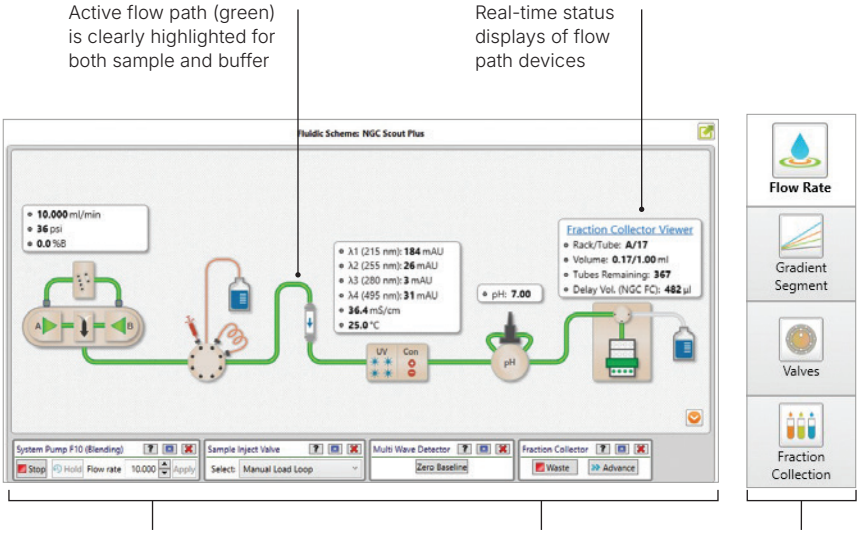
The ChromLab Method Editor enables confident, automated walk-away purification



4 Control Experiment

Manual controls, conveniently located for quick and easy access, provide total graphical user control of the NGC System with a coldroom-compatible touch screen or a computer

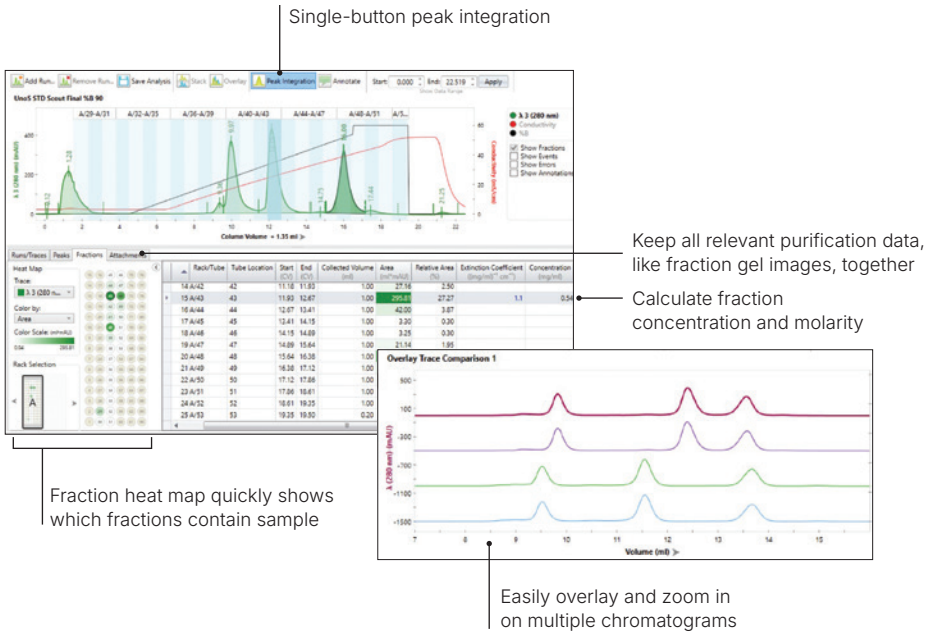
For further details visit **bio-rad.com/NGC**.



ANALYSIS MADE EASY

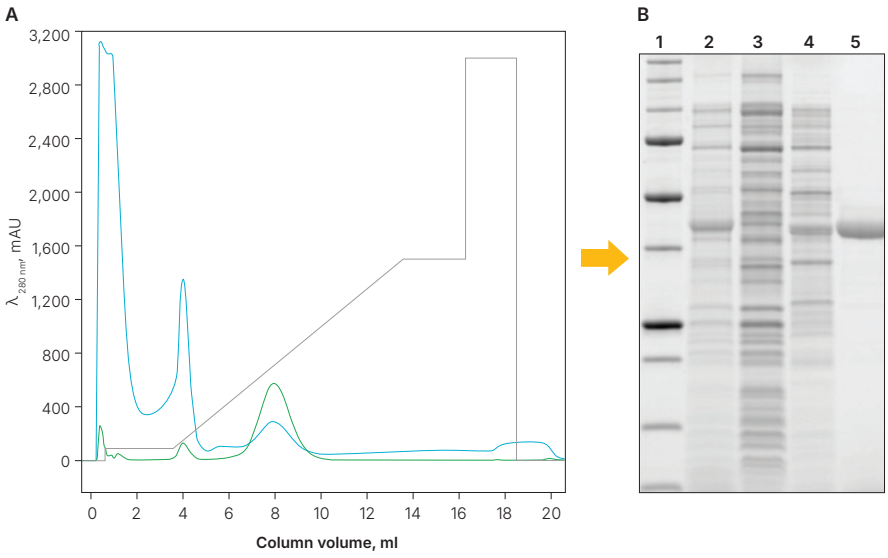
5 Analyze Data

Comprehensive data analysis that enables fast, accurate data comparison



6 Confirm Purification and Separation

Stain-Free technology allows protein separation, gel imaging, and analysis in less than 30 min

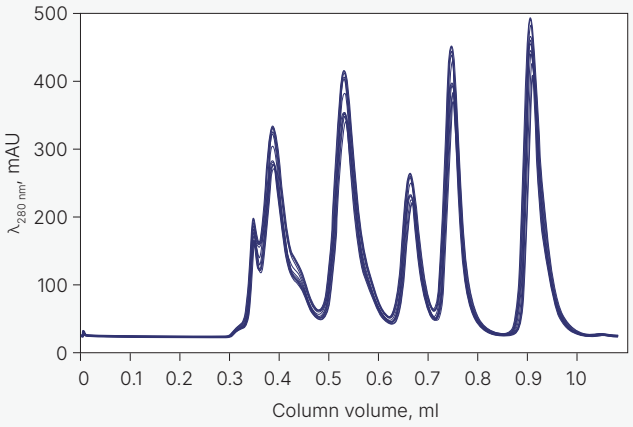


Visual confirmation of chromatography results using Stain-Free gels and imaging. A, isolation of a histidine-tagged green fluorescent protein (GFP) from a crude Escherichia coli lysate by affinity chromatography using an IMAC column; **B**, purification was confirmed by SDS-PAGE using a Criterion TGX Stain-Free Gel run for 20 min and directly visualized on the Gel Doc EZ Imaging System without the need for Coomassie staining. Samples in lanes 2 (crude E. coli lysates), 3 (flowthrough from the IMAC column), 4 (10% imidazole column wash), and 5 (purified histidine-tagged GFP) were compared against Precision Plus Protein Unstained Standards (lane 1).

ENSURES | Intelligent design that guides your setup and operation

Preplumbed System

Quality control (QC)–validated performance optimized for low hold-up volume translates to more reproducible results and sharper peaks.



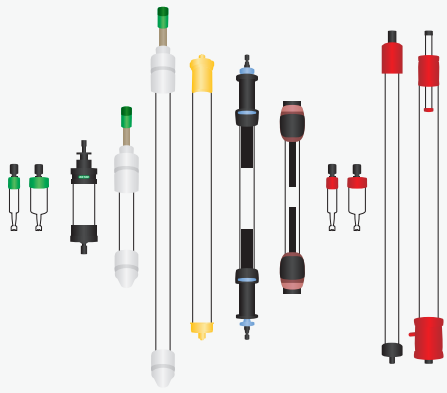
High-quality results with reproducible separations. Eleven overlaid separations of a Bio-Rad size exclusion standard — composed of thyroglobulin, b-globulin, ovalbumin, myoglobin, and vitamin B_{12} — performed on the NGC Quest Plus System with a 10 x 300 mm size exclusion column.

Real-Time Status Displays

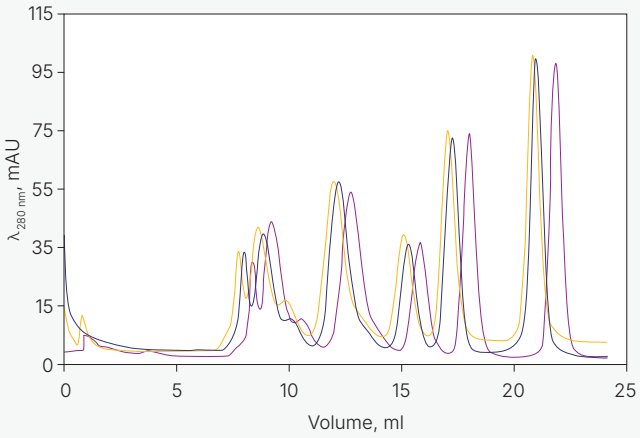
Provide immediate status of important parameters for clear diagnostics of key NGC instrument modules.

Open Platform

Compatible with all medium-pressure columns and ChromLab Software, includes method templates with column libraries.



Validated column applications on the NGC System.

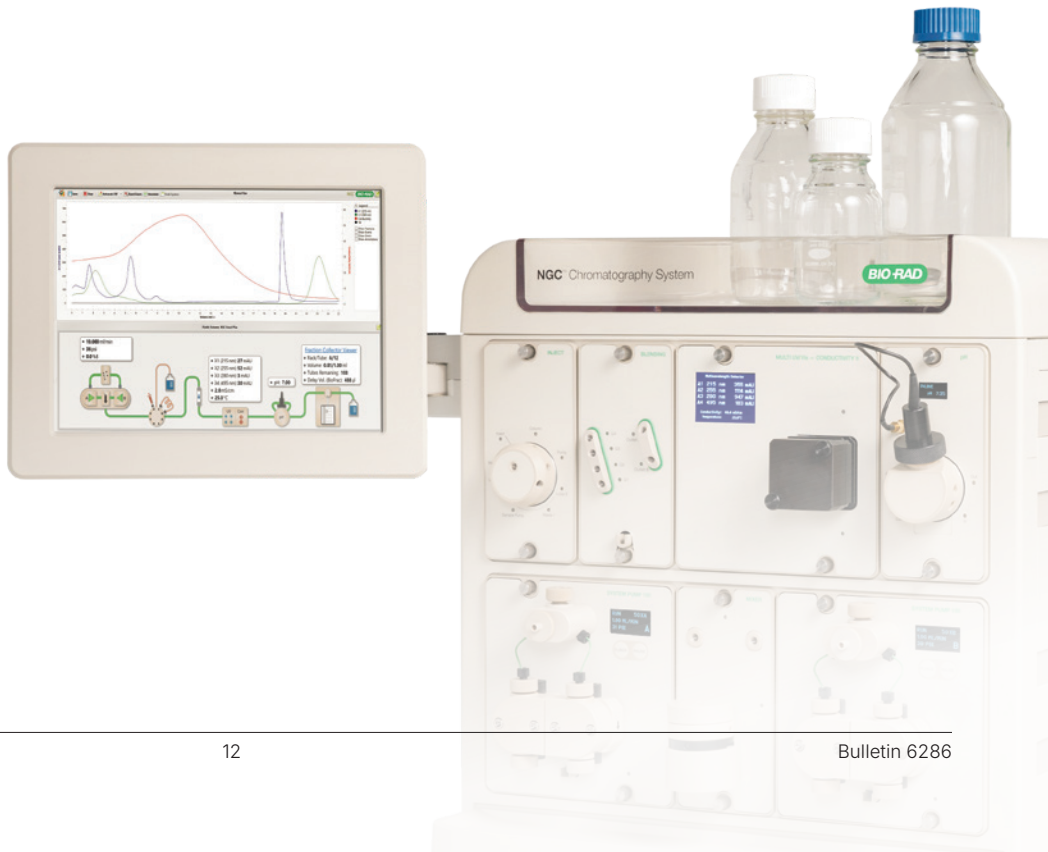


Completely transferable applications. Identical comparisons of a Bio-Rad Gel Filtration Standard (#1511901) performed on a Superdex 200 10/300 GL Size Exclusion Column with separations performed on the NGC Quest Plus (—), ÄKTApurifier (—), and ÄKTA avant (—) Systems.

SELECTION GUIDE

Catalog #	Product Description	NGC Quest 10 Plus 7880003	NGC Quest 100 Plus 7880004	NGC Scout 10 Plus 7880007	NGC Scout 100 Plus 7880008	NGC Discover 10 7880009	NGC Discover 100 7880010	NGC Discover 10 Pro 7880011	NGC Discover 100 Pro 7880012
		NGC Chromatography Systems							
7884002	NGC F10 Pump Module	●●		●●		●●		●●	
7884003	NGC F100 Pump Module		●●		●●		●●		●●
7884018	NGC Mixer Module	●	●	●	●	●	●	●	●
7884007	NGC Sample Inject Valve Module	●	●	●	●	●	●	●	●
12010343	NGC Multi-Wavelength Detector II Module, includes conductivity monitor	●	●	●	●	●	●	●	●
7884010	NGC Buffer Blending Valve Module	○	○	●	●	●	●	●	●
7884011	NGC pH Valve Module, includes pH probe	○	○	●	●	●	●	●	●
7884004	NGC Sample Pump Module, integrated	○	○	○	○	●	●	●	●
7884006	NGC Inlet Valve Module	○	○	○	○	●●	●●	●●●	●●●
7884012	NGC Column Switching Valve Module, 10 ml	○		○		●		●	
7884026	NGC Column Switching Valve Module, 100 ml		○		○		●		●
7884013	NGC Outlet Valve Module	○	○	○	○	○	○	●	●
12009390	ChromLab Software	●	●	●	●	●	●	●	●

● Standard ○ Optional
More than one dot indicates that a system comes with more than one module.
Note: All NGC Systems include a touch screen and NGC Fittings Kit (#7884017) and are compatible with the NGC Fraction Collector and BioFrac Fraction Collector.



Visit **bio-rad.com/NGC** for more information.

Specifications

System Specifications	
Control system	ChromLab Software (compatible across all NGC Systems)
Dimensions (W x D x H)	49 x 49 x 56 cm (NGC Quest Plus and NGC Scout Plus Systems) 49 x 49 x 74 cm (NGC Discover System)
Weight (excluding computer)	41–46 kg (NGC Quest Plus and NGC Scout Plus Systems) 64 kg (NGC Discover System)
Power supply	100–240 V, 50–60 Hz
Power consumption	750 W maximum

System Pump	
Pump type	Reciprocating piston
Flow rate setting	10 ml/min pumps: 0.001–10 ml/min (normal range) 100 ml/min pumps: 0.01–100 ml/min (normal range)
Flow rate accuracy	±2% (conditions: F10 pump — 0.1–10 ml/min, F100 pump — 1.0–100 ml/min; pressure: <600 psi [4.1 MPa, 41 bar]; viscosity: 0.5–3.7 cP)
Pressure range	10 ml/min pumps: 0–25.2 MPa (3,650 psi) 100 ml/min pumps: 0–10 MPa (1,450 psi)
Viscosity range	0.5–10.8 cP (for 10 ml/min and 100 ml/min pumps)

Sample Pump	
Pump type	Piston pump, metering type
Flow rate setting	0.01–100 ml/min
Flow rate accuracy	±2%
Pressure range	0–10 MPa (1,450 psi)
Viscosity range	0.5–10.8 cP

Mixer	
Mixing principle	Chamber with magnetic stirrer
Mixer volume	263 µl (included), 750 µl (included), 2 ml, 5 ml (F10) 750 µl (included), 2 ml (included), 5 ml, 12 ml (F100)
Gradient composition accuracy	±0.5% (conditions: 3–97%B, 0.25–10 ml/min F10 pumps) ±0.8% (conditions: 5–95%B, 1–100 ml/min F100 pumps)

Valves	
Type	Rotary valves and rocker solenoid
Number of valves	1 inject valve, up to 2 x 8-port sample inlet valves, and 2 x 8-port buffer inlet, 2 x 12-port outlet, and 3 x 5-port column switching valves
Functions	Loop selection (PEEK Loop and DynaLoop offerings)

Pressure Sensors	
Placement of sensors	Standard: after system pump Options: precolumn, postcolumn, sample pump
Range	0–3,650 psi
Accuracy	±2 psi or 2%, whichever is greater

Inlet Valves	
Inlet A	8 inlets
Inlet B	8 inlets
Sample inlet	8 or 15 inlets

Multi-Wavelength Detector II Module	
Wavelength	190–800 nm, up to 4 simultaneously
Absorbance range	0–3.0 AU
Linearity	0–2.5 AU within ±5%
Operating pressure	700 psi (4.8 MPa)
Flow cells	Preparative: 2 mm (volume: 140 µl) Analytical: 5 mm (volume: 51 µl) Analytical: 10 mm (volume: 24 µl)
Conductivity reading range	0.01–999.9 mS/cm
Accuracy	±2%
Operating pressure	0–700 psi (0–4.8 MPa)
Conductivity cell volume	Included in flow cell volume
Temperature monitor range	4–60°C
Temperature monitor accuracy	±2%

pH Monitor	
pH reading range	0–14
Accuracy	±0.1 pH unit within pH 2–12
Operating pressure	0–70 psi with pH probe inline and 0–500 psi in bypass mode
Flow cell volume	100 µl (210 µl including internal flow paths)

NGC Fraction Collector	
Collection modes	
Collect All, Threshold, and Time/Volume windows	
Flow rate	0.01–200 ml/min
Collection rack options (each NGC Fraction Collector can accommodate 4 racks)	
	96 x 13 mm tubes, 75 x 16 mm tubes, 75 x 18 mm tubes, 27 x 50 ml tubes, 2 x deep well microplates (24-/48-/96-well), 96 x 1.5–2 ml capless tubes, 16 x 250 ml bottles, and 40 x unlimited volume prep-rack adaptors
Operating temperature	4–40°C
Dimensions (W x D x H)	42 x 60 x 54.5 cm

Note: All NGC Systems include a touch screen and are compatible with the NGC Fraction Collector and BioFrac Fraction Collector.

Specifications (cont.)

BioFrac Fraction Collector	
Collection modes	
Time	0.02–99,999 min
Volume	0.02–99,999 ml
Flow rate	0.01–100 ml/min
Collection rack options	
	180 x 12–13 mm tubes, 120 x 15–16 mm tubes, 80 x 18–20 mm tubes, 168 x 1.5 ml microtubes, 24 x 30 mm tubes, 4 x 96-, 48-, 24-, or 12-position microplates, 4 x 250 ml bottles, and 20 x unlimited volume prep-rack adaptors
Operating temperature	4–40°C
Dimensions (W x D x H)	44.5 x 35.6 x 38.7 cm
Column Switching Valve	
Five-column valve	Can connect up to 5 columns with forward and reverse flow, column bypass capability, and column pressure readings
Buffer Blending Valve	
Blending valve	Standard in the NGC Scout Plus and NGC Discover Systems Automated inline buffer preparation from concentrated buffer and salt stocks Double the fluid output to 20 ml/min or 200 ml/min
Air Sensor Module	
Number of sensors	Up to 8 total air sensors (1 for end of sample detection, remaining are buffer)
Placement of built-in sensors	End of buffer, end of sample
Sensing principle	Acoustic

Ordering Information

NGC Medium-Pressure Chromatography Systems

Catalog #	Description
	NGC Quest Plus Chromatography Systems, for all-purpose purification of biomolecules
7880003	**NGC Quest 10 Plus System**
7880004	**NGC Quest 100 Plus System**
	NGC Scout Plus Chromatography Systems, for rapid scouting of proteins, peptides, and nucleic acids
7880007	**NGC Scout 10 Plus System**
7880008	**NGC Scout 100 Plus System**
	NGC Discover Chromatography Systems, for method development
7880009	**NGC Discover 10 System**
7880011	**NGC Discover 10 Pro System**
7880010	**NGC Discover 100 System**
7880012	**NGC Discover 100 Pro System**
	ChromLab Software
12009390	**ChromLab Software**
17000099	**ChromLab Software, User Management Edition**, allows networking of all NGC Systems to a centralized database, 1 license
17000098	**ChromLab Software, User Management Edition**, 3 licenses
17000097	**ChromLab Software, User Management Edition**, 5 licenses
7886001	**ChromLab Software, Security Edition**, U.S. FDA 21 CFR Part 11 module for ChromLab Software, maintains security logs and allows networking of all NGC Systems to a centralized database, 1 license
7886003	**ChromLab Software, Security Edition**, 3 licenses
7886005	**ChromLab Software, Security Edition**, 5 licenses

Ordering Information (con't)

NGC System Modules and Accessories

All NGC pumps, modules, and accessories include necessary tubing and fittings.

Catalog #	Description
System Pumps	
7884002	**NGC F10 Pump Module**, pkg of 1, includes 10 ml/min system pump kit with the necessary tubing and fittings, for creating buffer gradients
7884003	**NGC F100 Pump Module**, pkg of 1, 100 ml/min system pump kit for creating buffer gradients; for use with the buffer blending valve to generate flow rates of up to 200 ml/min
Sample Pump	
7884004	**NGC Sample Pump Module**, pkg of 1, 100 ml/min sample pump kit for automated large-volume sample application via sample inject valve
Detector	
12010343	**NGC Multi-Wavelength Detector II Module**, pkg of 1, UV/Vis and conductivity detector kit for simultaneous 4-wavelength monitoring of elution fractions between 190 and 800 nm and salt gradient generation
7884011	**NGC pH Valve Module**, pkg of 1, kit includes pH valve kit, pH probe, tubing, and fittings, for accurate inline pH measurement
12012533	**NGC UV and Conductivity Flow Cell**, 2 mm, for NGC Multi-Wavelength Detector II Module
12012532	**NGC UV and Conductivity Flow Cell**, 5 mm, for NGC Multi-Wavelength Detector II Module
12012531	**NGC UV and Conductivity Flow Cell**, 10 mm, for NGC Multi-Wavelength Detector II Module
Valves	
7884010	**NGC Buffer Blending Valve Module**, pkg of 1, for inline buffer preparation and generating pH gradients for quick pH scouting and flow rate doubling
7884006	**NGC Inlet Valve Module**, pkg of 1, for automated switching between multiple buffers and samples during method development
7884012	**NGC Column Switching Valve Module (10 ml),** holds 5 columns or sample loops; for use with F10 systems for quick column scouting, automated multicolumn, and reverse flow applications
7884026	**NGC Column Switching Valve Module (100 ml)**, holds 5 columns or sample loops; for use with F100 systems for quick column scouting, automated multicolumn, and reverse flow applications
7884013	**NGC Outlet Valve Module**, pkg of 1, for automated fraction collection of large-volume fractions with up to 12 vessels
7884016	**NGC Signal Import Module**, pkg of 1, enables analog to digital signal conversion and connection to third-party autosamplers and detectors
Air Sensors	
7885017	**NGC Air Sensor Module**, pkg of 1, kit includes 2 large-bore air sensors to detect end of buffer and sample to protect against air entering pumps and columns; supports up to 4 large- and small-bore air sensors
7885018	**NGC Air Sensor Extension Module**, pkg of 1, connects to the base air sensor module to support 4 additional air sensors; does not include any air sensors, optional part
7885020	**NGC Small Air Sensor**, pkg of 1 air sensor to exclude air from system and columns; detects air in small-diameter PEEK Tubing
7885021	**NGC Large Air Sensor**, pkg of 1 air sensor to exclude air from system and columns; detects air in large-diameter PTFE tubing
Fraction Collectors, compatible with all NGC Systems	
17002070	**NGC Fraction Collector with Racks**, 100/240 V, includes power cord, rack set (two 13 mm tube racks), tubing, union
7410002	**BioFrac Fraction Collector**, 100/240 V, includes power cord, rack set F1 (2 x flatpack, 13 mm), BioFrac Diverter Valve, PEEK Tubing, standard dropper head
Mixers	
7884018	**NGC Mixer Module**, pkg of 1, includes a mixer motor assembly and an integrated system pressure sensor; can be extended with mixing barrels of various sizes; does not include mixer base or barrels
7884019	**NGC F100 Mixer**, pkg of 1, 750 µl base and top assembly, included with all 100 ml/min NGC Systems
7884020	**NGC F10 Mixer**, pkg of 1, 263 µl base and top assembly, included with all 10 ml/min NGC Systems
7884021	**NGC F10 Mixer Barrel Kit**, pkg of 1, 750 µl extension barrel for F10 263 µl mixer, part of NGC Scout 10 Plus and NGC Discover 10 Systems
7884022	**NGC F10 Mixer Barrel Kit**, pkg of 1, 2 ml extension barrel for F10 263 µl mixer, optional part
7884028	**NGC F100 Mixer Barrel Kit**, pkg of 1, 2 ml extension barrel for F100 750 µl mixer, part of NGC Scout 100 Plus and NGC Discover 100 Systems
7884023	**NGC F100 Mixer Barrel Kit**, pkg of 1, 5 ml extension barrel for F100 750 µl mixer, optional part
7884024	**NGC F100 Mixer Barrel Kit**, pkg of 1, 12 ml extension barrel for 750 µl mixer, optional part
7885171	**NGC High Flow Tubing Kit**, pkg of 1, for operating NGC Systems >80 ml/min

Visit **bio-rad.com/NGC** for more information.

Bio-Rad Laboratories, Inc.

Life Science Group

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