

CombiFlash[®]

AUTOMATED CHROMATOGRAPHY SYSTEMS

Featuring EZ Prep



TELEDYNE ISCO
Everywhere you look™

CombiFlash® EZ Prep built on a strong history of chromatography innovations

The CombiFlash EZ Prep system is the latest innovation from Teledyne Isco. Nearly 60 years ago, founder Dr. Allington recognized a need for fraction collection to automate preparative liquid chromatography. He developed a fraction collector which is commonly used in chromatography laboratories worldwide. The company continues its emphasis on innovations resulting in a number of patents and products, especially for the laboratory scale preparative market.

Early Innovations

Early innovations include developing the first absorbance detector that uses Absorbance Units (AU), receiving patents on peak detection to control fraction collection, and creating high pressure gradients for high performance liquid chromatography (HPLC). Through the 1960s and 70s, Teledyne Isco manufactured a variety of pumps and detectors suitable for both low and high pressure liquid chromatography. In the 1980s, Teledyne Isco launched a semi-preparative HPLC system including a large volume auto sampler. In the late 1990s, Teledyne Isco recognized a need for an automated Flash chromatography system to support small molecule research.

Market Leader

Since that time, Teledyne Isco has been a market leader in Flash chromatography equipment, selling thousands of systems. The Flash products include multiple generations of personal Flash gradient systems, parallel and sequential Flash systems, a fully automated large scale laboratory system, and a range of detection technologies including Evaporative Light Scattering Detection (ELSD) and Mass Spectrometry. These products are supported by a full line of RediSep Flash chromatography columns covering a wide range of sizes and separation media.

Reliable Chromatography Expert

Teledyne Isco combines a dedicated work force with a progressive, vertically integrated ISO 9001 manufacturing operation. The facility combines research, engineering, sales, service, and manufacturing including plastic molding, machine shop, automated column packing, and assembly operations.

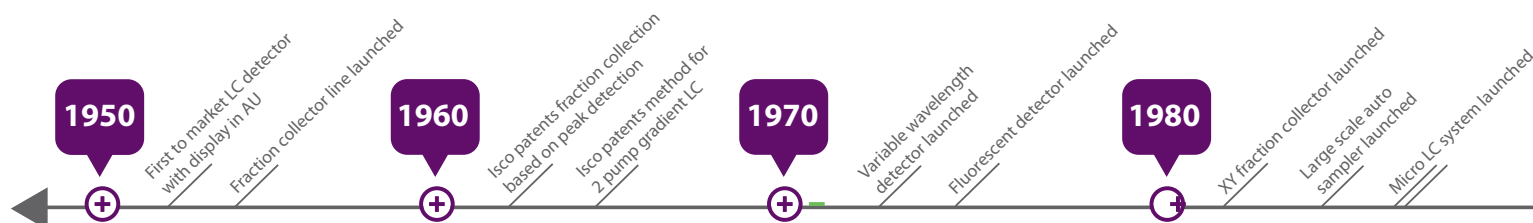
Following Dr. Allington's lead and the ongoing open dialogue with users, Teledyne Isco continues to build upon a rich history of pioneering products leading up to the creation of the EZ Prep system. It is this ongoing tradition of innovation that allows Teledyne Isco to meet your chromatography needs now and well into the future.

Never lose your fraction.

As soon as the collection rack is inserted in the system, the RFID (radio-frequency identification) tag instantly identifies the rack. Tagged racks ensure proper tube fill, enable rack exchange during separation, and viewing last run on detected rack.

Ensure safe operation and ideal methods with RFID tagged columns.

With RFID Flash columns, PeakTrak automatically loads a proper method and exchanges solvents when needed. Safe operating pressures are set for both Flash and Prep HPLC columns.



COMBIFlash EZ PREP



Start a separation in seconds with our PeakTrak® software.

Select a column to load default run, load your sample, and press play. The color-coded screen tells you if the system is in Flash or Prep HPLC mode. You can easily change parameters during the run.

Error-free separation with active level sensing.

Never run out of solvents, overflow the waste container, or damage Prep HPLC columns.

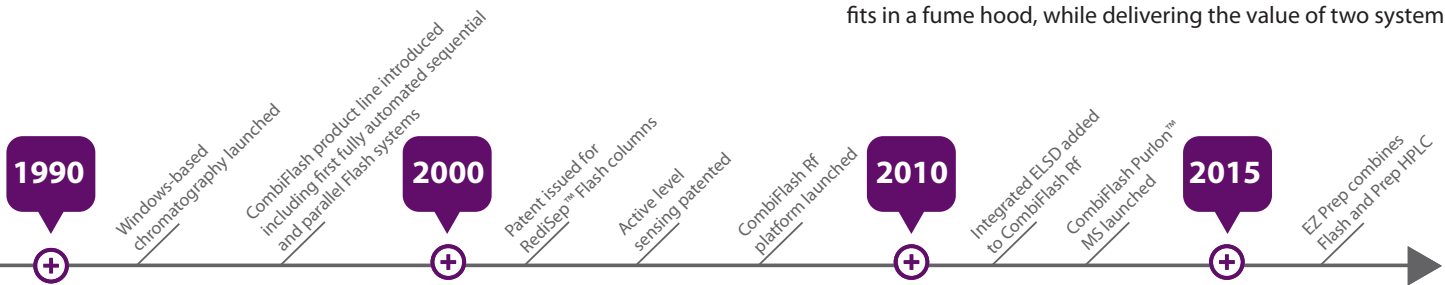
Achieve greatest purity with Prep HPLC capacity.

3500 psi pressure and 200 mL/min binary gradient allow you to run diverse types of Flash and Prep HPLC columns.

Save time by running any Prep HPLC column faster with greater pressure capability.

Get two systems in less space than most single systems.

The EZ Prep Flash and Prep HPLC chromatography system easily fits in a fume hood, while delivering the value of two systems.



Performance meets simplicity.

Flash + Prep HPLC in one system

Intuitive PeakTrak[®] software

Small footprint

Supports widest column range

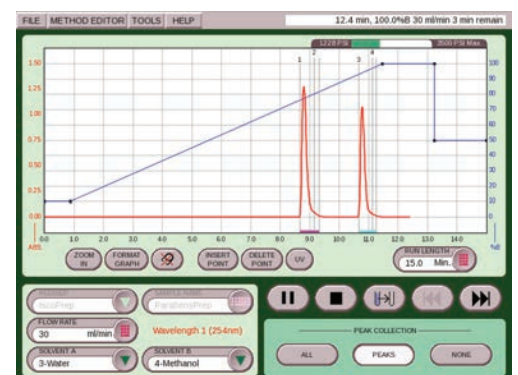
Active error prevention

The CombiFlash EZ Prep system from Teledyne Isco is a dual function purification system that enables the user to perform both Flash and Preparative (Prep) purifications on the same instrument. Eliminating the need for two separate systems, the EZ Prep system provides the flexibility to seamlessly switch between Flash and Prep HPLC modes without compromising performance.

The intuitive user interface of the PeakTrak software minimizes any learning curve, enabling the user to efficiently complete their purification, saving time and solvent consumption. The simple, single screen control of critical operating parameters and detection modes is finally available in Prep HPLC. PeakTrak software is easy to use, yet powerful enough to offer the control needed to purify compounds. The same PeakTrak software platform for both Flash and Prep HPLC allows anyone, regardless of their Prep HPLC experience, to easily complete a purification.

It's ideal for Flash users who occasionally need the resolving power provided by Prep HPLC and who need the ability to separate a wide range of diverse sample amounts. Meeting varying purity requirements using multiple detection options is something the EZ Prep is well suited for. These multiple detection options include: UV, UV-Vis, ELSD, and MS.

Whether you have a limited budget or limited lab space, the first choice for your purification needs is the CombiFlash EZ Prep.



All key parameters, located on one screen, can be changed on the fly.

Simplify your separation in 3 easy steps.

Load a RediSep® column or select the installed Prep HPLC column.

1

PeakTrak® automatically loads a suitable method, ensures you have sufficient solvent available, and flushes the plumbing to switch between Flash and Prep HPLC. Don't worry about the collection rack; the EZ Prep system recognizes mixed rack sizes and adjusts accordingly.

Load your sample.

2

A wide variety of sample loading options allow you to load your compound onto the column for the best separation.

Press play.

3

That's it. If needed, you can edit any parameter "on the fly".

COMBIFlash **EZ** PREP



Combine Flash and Prep HPLC functionality in only 17"

The CombiFlash® EZ Prep purification system is the slimmest of its kind, enabling you to fit a Flash and Prep HPLC in a space similar to an analytical HPLC. Additionally, you can increase system flexibility with an Evaporative Light Scattering Detector (ELSD) with no increase in size. You have the freedom to place solvents anywhere, from on top of the instrument to the floor.

Achieve the highest compound purity

The CombiFlash EZ Prep is compatible with the highest resolution Prep HPLC columns, providing maximum purity over a wide range of column chemistry. The system can purify <10 mg to 30 g with purity up to 99% with proper column selection. The high pressure capability allows reduced run time at higher flow rates. In Prep HPLC mode, columns up to 50 mm in diameter with particle size down to 5 µm can be used at flows up to 200 mL/min and pressure up to 3500 psi (241 bar).

Easily switch between Flash and Prep HPLC

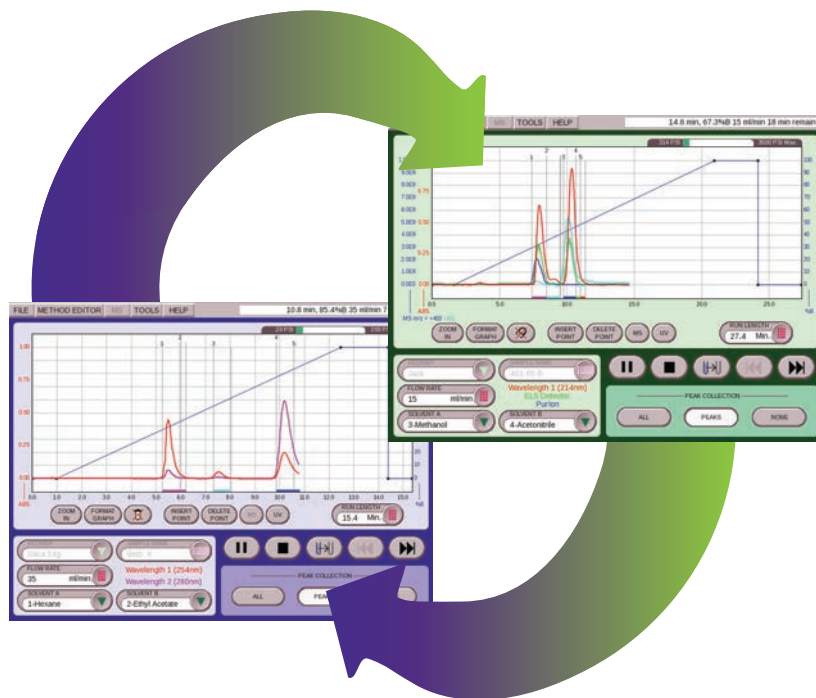
The CombiFlash EZ Prep purification system introduces an Automatic Phase Change option that seamlessly switches from normal phase Flash chromatography solvents to reverse phase Prep HPLC solvents. Intuitive PeakTrak® makes it easy to tell at a glance whether the CombiFlash EZ Prep system is in Flash or Prep HPLC mode. The display screen is blue if the system is in Flash mode and green if in Prep HPLC mode. (See right.)

Never run out of solvents

With Teledyne Isco's patented active level sensing, you can walk away from your purification run with confidence. The system will not run out of solvent before the separation is complete, overflow the waste reservoir, or damage valuable Prep HPLC columns.

PeakTrak displays a message prior to beginning the run if there are insufficient solvents to complete the separation, so you never need to stop midway through the separation. Additionally, waste level sensing eliminates hazardous waste reservoir overflow by pausing the run and displaying a message.

FLASH



PREP

Best-in-class fraction collection prevents sample loss and solvent spills

Teledyne Isco's best-in-class RFID-encoded collection racks ensure proper loading every time; preventing errors, solvent spills and sample loss. When the collection rack is inserted in the EZ Prep system, PeakTrak identifies tube size and sets the appropriate volume. Additionally, users can mix and match rack sizes and replace filled racks even during separation for virtually limitless fraction collection capability. Collection racks range in size from 13 mm test tubes to bottles. PeakTrak also prevents inadvertent operation if a Flash column or collection rack is not present, eliminating spillage.

Intuitive PeakTrak makes purifications simple

Locating compounds is easy with color-coding on the chromatogram and the collection rack display. Tube numbers or physical locations can be used to identify peaks of interest. If you have analyzed your fractions and the compound is still on the column, you may load the column back on the Rf system and resume the separation. To confirm which rack contains your compound, load the rack into the EZ Prep system to review the rack's contents. After recognizing the RFID tag, the system will display the chromatogram for the compounds in that rack.

Simple control options to meet your specific needs

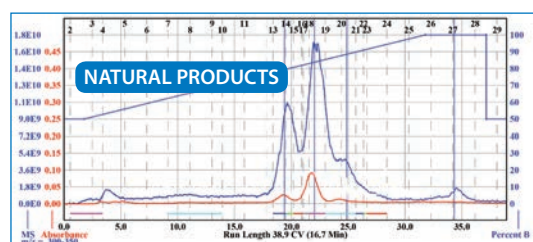
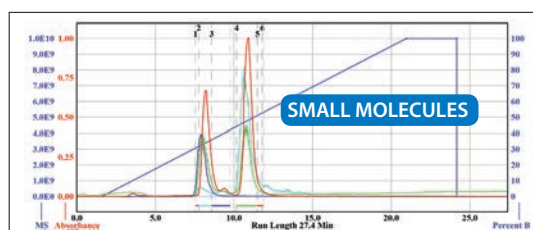
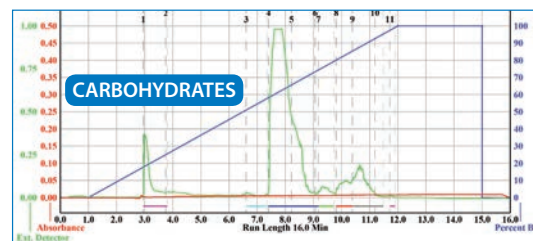
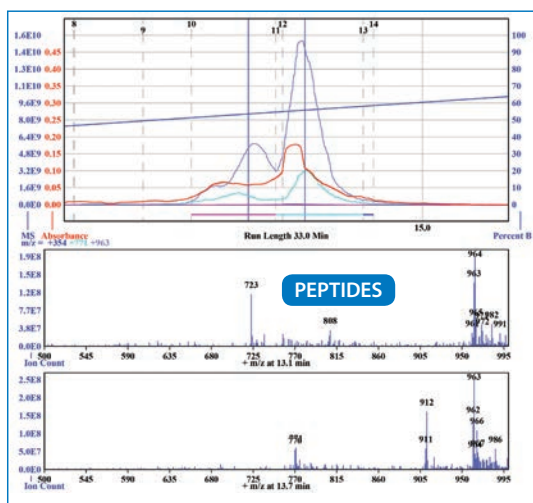
As with all CombiFlash systems, the EZ Prep saves you time and increases separation success. An intuitive touch screen display provides fast access and virtually eliminates errors, as users select from clearly defined menus and prompts on a single screen. Methods and results can be saved to a USB device as raw data or a PDF file to be managed later.

Network capabilities save time inside and outside of the laboratory. Simultaneous users can control and monitor purifications via web browser on a network computer or smart device (e.g., tablet), reducing time spent in the laboratory. For the ultimate in data accessibility, files are automatically saved to the instrument or may be saved to the network or printed.

Quality Customer Service

Teledyne Isco employees, sales representatives, and distribution network put customers first to ensure they have the products and support needed to succeed. We take pride in developing and manufacturing quality, innovative products that are built to last. An ISO 9001:2008 certified company, Teledyne Isco uses lean manufacturing to produce CE compliant and shipment-tested products to the purification market. Furthermore, global service coverage with certified field technicians and convenient depot repair for remote locations is available.





High-resolution purification for a wide range of applications

The CombiFlash EZ Prep can be used in a variety of applications, including organic synthesis, drug discovery, natural products, food additives, dyes, small molecules, peptides, agrochemicals, inorganic ligands, and other research applications.

Peptides

The EZ Prep with RediSep Prep C4 column separated these peptides to 98% purity based on small differences in their structures. Although both peptides have the same molecular weight, the Purlon mass spectra fragmentation patterns show the compounds are different.

Carbohydrates

Compounds without chromophores are easily seen with the optional built-in ELSD. Carbohydrates can be purified in either Flash or Prep HPLC mode of the EZ Prep. Refer to chromatography application note (AN80), "Evaporative Light Scattering Detectors as an Alternative Detection Method for Flash Chromatography".

Small Molecules

Synthesized compounds are easily resolved using a Prep HPLC column with UV, ELSD or mass-directed fractionation, ensuring compounds are not missed. 3500 psi (241 bar) saves time with the ability to increase flow on your Prep HPLC column.

Natural Products

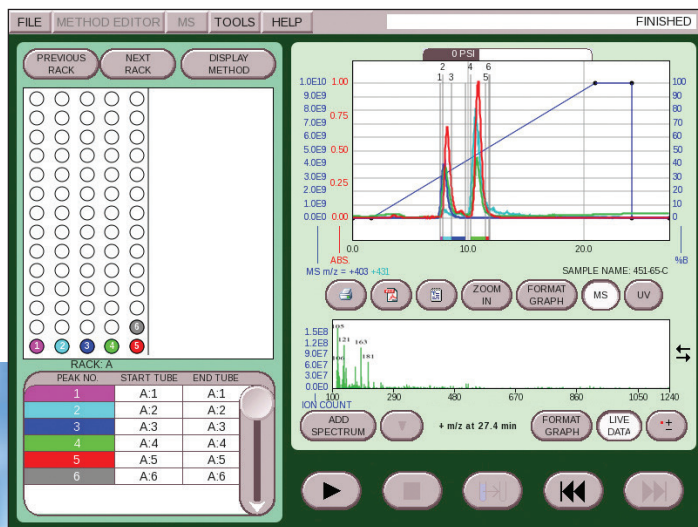
Crude mixtures of natural products can be isolated with Flash, and a higher purity achieved with Prep HPLC. Capsaicins are purified on the RediSep® Prep C18 column from fractions of an alumina Flash column.

For a complete listing of application notes and more information on the notes referenced above, refer to the Liquid Chromatography page of the Teledyne Isco website, www.isco.com.

A CombiFlash® system to meet your specific needs

You can always meet your purification needs with the CombiFlash family of products. Teledyne Isco offers a variety of configurations to best detect your compounds: UV, UV-Vis, (both include Spectra and All Wavelength), ELSD and mass-directed purification. The newest member, the affordable and versatile EZ Prep system, offers multiple detection options and a wide range of columns. For example, start with a UV or UV-Vis detector, then add an ELSD to detect non-chromophoric compounds as the need arises. Or, combine with the CombiFlash® Purlon mass spectrometer module to obtain maximum detection selectivity and improve efficiency with mass-directed fractionation.

Teledyne Isco's easy-to-use PeakTrak software provides "on the fly" gradient editing, enabling you to optimize the separation as it is happening, even during a Prep HPLC separation. For the ultimate time and solvent-saving process, combine the EZ Prep with the Purlon mass spectrometer with "Terminate on Target" to stop the purification when your desired compound has eluted.



There are many benefits when you select the EZ Prep system with the detection technology to meet your needs.

Photodiode Array (PDA) Detector (Standard)

- Detect with either UV (200-400 nm) or optional UV-Vis (200-800 nm)
- Fractionate peaks by slope, thresholds, time windows or changes in spectral purity to maximize purity and recovery
- Change sensitivity with multiple flow cells (optional) and PeakTrak gain settings

Optional ELSD

- Detect compounds with no chromophore
- Integrate ELSD into PeakTrak software for ease of use
- Add to EZ Prep with no increase in footprint

Optional Mass Spectrometer

- Provide easy-to-use PeakTrak user interface for mass directed collection
- Stop purification with "Terminate on Target" once the target compounds are detected to save time and solvent
- Trigger fraction collection for up to four different masses or range of masses
- Provide mass summary spectra for contents of any fraction tube to determine fraction purity
- Detect the widest variety of compounds with electrospray ionization (ESI) or atmospheric pressure chemical ionization (APCI), detecting a mass range of 50-2000 Da
- Inject your sample prior to separation to verify ionization of the sample and select the ion of interest for peak detection and fractionation
- Automatically clean mass spectrometer interface

Left: Purification using UV, ELSD, and mass-directed detection and fractionation.

CombiFlash[®] Rf⁺

Industry Leader

The industry leading CombiFlash Rf⁺ with PeakTrak[®] software increases productivity whether you're purifying synthetic compounds, natural products, or peptides. With flow rates up to 200 mL/min at 200 psi (13.8 bar), the CombiFlash Rf⁺ is capable of normal and reverse phase purifications from a few milligrams up to over 30 g.

Save valuable bench space with the smallest footprint of any automated Flash system. This network-compatible system saves you time by allowing remote monitoring from almost anywhere.



- Eliminate errors using RFID with RediSep[™] columns and racks to load optimal parameters
- Avoid poor separations or a hazardous waste spill with the Rf⁺'s active solvent and waste level sensing
- Scale up successful separations using automatic method scaling, even export to the CombiFlash Torrent[®]
- Get the purest peak possible using the purity indicator to cut close eluting peaks
- Load your samples and walk away, with the automated injection valve
- Purify a wide range of compounds using any of four solvents in a binary gradient
- Achieve best-separation possible using solid load cartridges
- Predict optimal purification conditions with gradient optimizer software

CombiFlash[®] Rf⁺ Lumen[™]

Universal Flash Chromatography

Detection of compounds with minimal or no UV absorption such as carbohydrates, steroids, and lipids require more than just UV absorbance detection. The CombiFlash[®] Rf⁺ Lumen[™] with integrated Evaporative Light Scattering Detector (ELSD) compliments UV or UV-Vis detection to deliver the widest compound detection range in the industry.



- Add ELSD with no increase in footprint
- Detect even light-sensitive compounds by turning off the UV detection and relying on the ELSD
- Turn off the ELSD when it is not needed for zero sample loss

CombiFlash[®] Rf⁺ PurIon

Selective Flash Chromatography



CombiFlash[®] Rf⁺ PurIon takes the guesswork out of your purification routine with mass directed fractionation. Collect only the peaks of interest by selecting target masses for collection. This eliminates the need for further analysis and saves time with fewer fractions, so you can quickly move on to the next step.

- Minimize learning curve with integrated mass spectrometer control
- Verify ionization and identify possible adducts using the ion finder in method development
- Save time and solvents with “Terminate on Target” which stops the separation once the peaks of interest are collected
- Detect a wide range of compounds with 2000 Dalton mass range, easily change ESI and APCI interfaces, and select ionization polarity
- Locate your compound real-time and post-run with mass spectral data display

CombiFlash[®] Torrent[®]







Large Scale Chromatography

Get the ease of use and reliability provided by CombiFlash Rf⁺ systems and RediSep columns for development scale purification with the CombiFlash Torrent[®] purification system. The system can be adapted to a variety of large scale purification needs.

- Purify hundreds of grams in a few hours
- Collect large fractions with up to 72 bottles or 6-port fraction valve
- Load difficult compounds with a choice of solid load cartridges or liquid loading with optional sample pump
- Safely work with large quantities of solvents with fully grounded fluid paths and active level sensing



Choose the CombiFlash® system that's right for you

	CombiFlash Torrent	CombiFlash Rf 150	CombiFlash Rf ⁺	CombiFlash Rf ⁺ Lumen	CombiFlash Rf ⁺ Purlon	CombiFlash EZ Prep
						
Flow Range	50 mL - 1 L/min	10 – 100 mL/min	1 – 200 mL/min	1 – 200 mL/min	1 – 200 mL/min	5-200 mL/min (Flash & Prep)
Maximum Pressure	100 psi, 6.9 bar	150 psi, 10.3 bar	200 psi, 13.8 bar	200 psi, 13.8 bar	200 psi, 13.8 bar	3500 psi, 240 bar
Add On 4X Module	No	No	Yes	Yes	Yes	Yes
Sample Sizes	1 - 300 g	4 mg – 33 g	4 mg – 33 g	4 mg – 33 g	4 mg – 33 g	4 mg – 33 g
Column Sizes	80 g up to 3 kg	4 g – 330 g, up to 3 kg with adapters	4 g – 330 g, up to 3 kg with adapters	4 g – 330 g, up to 3 kg with adapters	4 g – 330 g, up to 3 kg with adapters	4 g – 330 g, up to 3 kg with adapters; Prep: 10-50 mm, up to 250 mm
Gradient Optimization Software	Standard	Standard	Standard	Standard	Standard	Standard
RediSep Rf Column Detection	Automatic	None	Automatic	Automatic	Automatic	Automatic
Pumping System	Dual piston pumps with active valve	Ceramic single piston with active valve	Dual syringe pumps	Dual syringe pumps	Dual syringe pumps	Dual head HPLC Pumps
Standard Detection	Variable UV	Variable UV	Variable UV	Variable UV and ELSD	Variable UV and Mass Spectrometer	Variable UV
Optional Detection	UV-Vis and ELSD	UV-Vis	UV-Vis	UV-Vis	UV-Vis and ELSD	UV-Vis, ELSD, and Mass Spectrometer
Spectral Display	UV or UV-Vis	UV or UV-Vis	UV or UV-Vis	UV or UV-Vis	Mass and UV or UV-Vis	UV or UV-Vis
External Detector Input	Standard through Fraction Collector	None	Standard	Standard	Standard	Standard
Programmable Gradients	Linear, Step, Isocratic	Linear, Step, Isocratic	Linear, Step, Isocratic	Linear, Step, Isocratic	Linear, Step, Isocratic	Linear, Step, isocratic
Gradients	Two solvent, binary	Two solvent, binary	Four solvent binary with isocratic third solvent as modifier	Four solvent binary with isocratic third solvent as modifier	Four solvent binary with isocratic third solvent as modifier	Four solvent binary
Sample Injections	Multiple Options	Manual Load	Automated, self-cleaning injection valve	Automated, self-cleaning injection valve	Automated, self-cleaning injection valve	Automated, self-cleaning Flash injection valve; Prep HPLC injection valve with loop
Controller	10.4" (26.4 cm) touchscreen	10.4" (26.4 cm) touchscreen	10.4" (26.4 cm) touchscreen	10.4" (26.4 cm) touchscreen	10.4" (26.4 cm) touchscreen	10.4" (26.4 cm) touchscreen
Dimensions (W x D x H)	18.5 x 17.9 x 28.1 in., 47 x 43.5 x 71.4 cm	14.1 x 17 x 24 in., 35.8 x 43.2 x 61.0 cm	14.1 x 17 x 24 in., 35.8 x 43.2 x 61.0 cm	14.1 x 17 x 24 in., 35.8 x 43.2 x 61.0 cm	14.1 x 17 x 24 in., 35.8 x 43.2 x 61.0 cm (excluding MS)	17 x 17 x 26.5 in., 52.4 x 52.4 x 82.5 cm
Ionization Probe Options	N/A	N/A	N/A	N/A	ESI or APCI	N/A
Mass Range	N/A	N/A	N/A	N/A	50 - 1200 Dalton Purlon + Purlon S 50 - 2000 Dalton Purlon L	N/A

Teledyne Iso reserves the right to improve products and change specifications at any time.



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