

FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY
SOLE SOURCE CERTIFICATION

Requisition Number: 0000260785 Bid # _____

In accordance with authority granted under Florida A & M University Regulation 6.005(10) (b), the following documentation is submitted in support of a request to purchase the items(s) listed below that are only available from one vendor.

Vendor: **Shimadzu Scientific Instruments**

Account Number: **521035956** Cost \$ **58,418.41**

Item(s): **See the Attached quote # SSI-254060-S7B2**

Justification: (Describe efforts made, vendors contacted, prices quoted, specifications required, availability, compatibility, decision/reason for selection). See attached for justification.

This equipment is for the biology department. This equipment will provide support for acquiring and maintaining of modern, state-of-the-art research equipment allowing students to acquire hands-on research experiences and to ensure that they obtain the necessary experiences to be competitive in the workforce.

I, the undersigned, certify the above to be true and correct to the best of my knowledge and belief.

Ukan Latinwo Professor and Chairman Dept of Biology 11/20/2024
Signature Title Date

I, the undersigned designee of the Florida A & M University Purchasing Office, as delegated in Regulation 6.005(10) (b), (or a designee delegated the authority as described in, hereby concur { } do not concur { } with the above justification and recommend { } do not recommend { } the procurement of the above as a sole source. If applicable, the reason(s) for disapproval are:

Antonita Bryant 11/20/2024
Director of Procurement Services Date

I, the undersigned designee, acting for and on behalf of the University President pursuant to the delegation authority approve { }, disapprove { } the procurement of the above as a sole source. If applicable, the reason(s) for disapproval are:

W. Rebecca Brown 11/21/2024
VP, Administrative and Financial Services Date

POSTED FROM 11/21/2024 1:00PM TO 11/25/2024 1:00PM
DATE TIME DATE TIME

FAILURE TO FILE A PROTEST WITHIN THE TIME PRESCRIBED IN REGULATION 6.005(9) (K), SHALL CONSTITUTE A WAIVER OF THE RIGHT TO PROCEEDINGS.



Customer:

Lekan Latinwo
 Florida A&M University - Tallahassee
 1520 S. Martin Luther King Jr. Blvd
 , Old Dyson Pharmacy Building, Rm 200
 Tallahassee, FL 32307
 Phone:
 Fax:
 E-mail: eriola.betiku@fam.u.edu

Sales Engineer:

Debbie Hosein-Khan
 Shimadzu Scientific Instruments
 5429 Beaumont Center Blvd

 Tampa, FL 33634
 Regional Office: Ext.
 Direct Dial:
 E-mail: dnhoseinkhan@shimadzu.com

Sales Proposal

Quotation: SSI-254060-S7B2

Expiration: 9/30/2024

Quote Description:

Quote HPLC for Amino Acids, Alcohols, Sugars and Weak Organic Acids. 3YVP Service plan, and other service plans are optional and maybe selected when ordering. (3YVP: Three years of FULL Warranty coverage with PM visit; during 1st year warranty and Scheduled annual PPM services in years 2 and 3.) The SIL-40 Autosampler and LC-20AD HPLC pump quoted here are from Shimadzu's demonstration inventory and are currently located and operational at the Shimadzu facility. They are offered as 'first come-first served' with an acknowledged purchase order being required to reserve them for shipment. These items are offered with AS IS. This system is shipped without columns or consumables, except as quoted, noted, and paid for as line items on a purchase order. Cosmetic damage which does not affect the functionality of the instrument is not covered during the refurbishment and may be repaired at Shimadzu's discretion.

Demo Equipment:
 SIL- 40C Serial number L22195700282
 LC-20AD HPLC Pump
 New Equipment Promotional Sale:
 COLUMN OVEN CTO-20AC
 CBM -40 System Controller

Proposed Ship Date: 90 Days/ARO **FOB:** COLUMBIA **Ship Method:** BEST WAY

Shipping Terms: PREPAID & ADD **Incoterms:** FOB

Additional Information:

- Demo equipment is subject to availability and is sold on a first come - first serve basis. Please allow 45/60 days for delivery of all demo items.

Quote# SSI-254060-S7B2 offers a Discount exceeding 15% on Hardware and 12% on Services, as per the VASCUPP Contract UVA_AGR_LAB-00085, inclusive of Net 45 Days Payment Terms and Free Shipping as per Approval of Regional Manager

For proposal questions or modifications, please contact your sales representative.

Thank you for your interest in Shimadzu Scientific Instruments.



Company Name: Florida A&M University - Tallahassee
Quote Number: SSI-254060-S7B2
Activation Date: 9/17/2024
Expiration Date: 9/30/2024

For Order Placement:

Reference Quotation Number on Purchase Order

Please note that state taxes, local taxes and freight, if applicable, will be added at invoicing.
Forward official tax exempt documentation if applicable.

Shimadzu Scientific Instruments
7102 Riverwood Drive, Columbia, MD 21046
Toll Free: 800-477-1227
Local: 410-381-1227 Fax: 410-381-6781
E-mail: customer.service@shimadzu.com

International:
Fax: 410-309-6130
E-mail: icsc@shimadzu.com

Authorization Signature*

A handwritten signature in black ink, appearing to read "Patrick Fromal", written over a horizontal line.

Patrick Fromal

Date: 9/18/2024

*Sales Proposal is not valid without Authorized Signature.



Company Name: Florida A&M University - Tallahassee
 Quote Number: SSI-254060-S7B2
 Activation Date: 9/17/2024
 Expiration Date: 9/30/2024

Sales Quotation - please reference the quotation when submitting purchase order.

Column For Amino Acids

Product #	Qty	Description	Price Per Unit	Ext'd Price
1 228-41624-92	1	Column, LC, Shim-pack XR-ODS II 2.2 micron, 3.0 x 100mm	\$679.00	\$577.15

SIL-40 Installation Kit

Product #	Qty	Description	Price Per Unit	Ext'd Price
2 220-97823-20	1	Surge Protector, CyberPower Rackbar Surge Protector, RKBS20S2F10R, 10 outlets	\$300.00	\$300.00
3 071-60821-08	1	100 - 115V Power Cord	\$26.00	\$26.00
4 228-77025-10	1	Fiber Optic Cable, 1.0 m	\$53.00	\$53.00
5 220-91535-13	1	Caffeine Test Standard, 250 mg/L, 20 mL	\$206.00	\$206.00
6 220-97331-30	1	Vials, 1.5mL Clear Glass Vial w/ Cap & Septa, Short Thread Vial, 12 x 32mm, 9mm opening 100/pk	\$76.00	\$76.00
7 228-71762-46	1	Vial Plate, 1.5 mL	\$83.00	\$83.00
8 220-91394-02	1	Column, LC, Shimadzu Nexcol C18 5µm, 50 x 3.0mm w/ Test Mix	\$587.00	\$587.00

CBM-40 Promotional Sale

Product #	Qty	Description	Price Per Unit	Ext'd Price
9 228-65502-58	1	CBM-40 System Controller	\$3,448.00	\$1,034.40

Column For Alcohol

Product #	Qty	Description	Price Per Unit	Ext'd Price
10 228-17889-91	1	Column, LC, Shim-pack SCR-101C	\$3,581.00	\$3,043.85

BioEthanol Kit

Product #	Qty	Description	Price Per Unit	Ext'd Price
11 220-91478-20	1	BioEthanol Analyzer Resource Kit	\$605.00	\$484.00

Nexera

Product #	Qty	Description	Price Per Unit	Ext'd Price
12 228-65018-58	1	DGU-403 3-channel Degasser	\$2,875.00	\$2,156.25



Company Name: Florida A&M University - Tallahassee
 Quote Number: SSI-254060-S7B2
 Activation Date: 9/17/2024
 Expiration Date: 9/30/2024

13	220-91428-00	1	PEEK Tubing Kit For HPLC Installs	\$393.00	\$353.70
14	220-91441-00	1	5 Gallon Waste Can, Polypropylene Fittings	\$888.00	\$754.80
15	228-45000-32	1	*Demo* LC-20ADHPLCPUMP	\$6,806.00	\$5,104.50
16	228-71767-44	1	Two-Liquid Washing Option, SIL-40	\$1,727.00	\$1,295.25
17	228-71767-45	1	Multi Rinse Option, SIL-40	\$2,879.00	\$2,159.25
18	228-63132-45	1	Sample Loop, 100 uL, SIL-40	\$531.00	\$451.35
19	228-65611-58	1	FCV-11AL Reservoir Selector	\$2,993.00	\$2,244.75
20	228-65306-58	1	RID-20A Refractive Index Detector	\$15,011.00	\$10,531.40
21	228-65304-58	1	RF-20A Fluorescence Detector	\$17,164.00	\$12,038.50
22	220-91545-01	1	Solvents, LC, Honeywell B&J LCMS Grade Solvent Kit for Installations	\$586.00	\$527.40
23	TIER 2 I&F	1	Tier 2 Installation and Customer Familiarization	\$2,613.00	\$0.00
24	1YW	1	1 YEAR WARRANTY	\$0.00	\$0.00

LPGE

Product #	Qty	Description	Price Per Unit	Ext'd Price
25	228-45040-58	1	Prominence LPGE Unit, ROHS-compliant	\$3,575.00 \$2,681.25

Autosampler SIL-40 Promotional Sale

Product #	Qty	Description	Price Per Unit	Ext'd Price
26	228-65101-58	1	SIL-40C HPLC Autosampler	\$17,368.00 \$2,952.56

CBM-40 Installation Kit

Product #	Qty	Description	Price Per Unit	Ext'd Price
27	071-60821-08	1	100 - 115V Power Cord	\$26.00 \$26.00
28	228-70247-41	1	Nexera Series Wiring Kit, A	\$203.00 \$203.00
29	220-91396-00	1	10/100/1000 5-port Network Switch	\$101.00 \$101.00
30	228-65508-58	1	Reservoir Tray, Nexera series	\$576.00 \$576.00

Computers & Software

Product #	Qty	Description	Price Per Unit	Ext'd Price
31	223-62700-51	1	LabSolutions LCGC Single LC License	\$4,037.00 \$2,018.50
32	223-19335-51	1	LabSolutions LCGC WorkStation, Installation Disc	\$601.00 \$0.00
33	220-97317-85	1	Standard PC, 16 GB RAM, 1 TB SSD, MS Office	\$3,603.00 \$3,062.55
34	220-97321-10	1	Dell 24" Widescreen Flat Panel	\$484.00 \$435.60



Company Name: Florida A&M University - Tallahassee
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Column Oven

Product #	Qty	Description	Price Per Unit	Ext'd Price
35 228-45010-54	1	CTO-20AC CL.	\$5,686.00	\$2,274.40

Total List Price: \$100,370.00
Total Line Item Discount: \$41,951.59
Quote Sub-Total: \$58,418.41
Total Amount: \$58,418.41

By placing an Order for any Products related to this Sales Proposal and Quotation, Customer agrees to the terms and conditions at <https://www.ssi.shimadzu.com/terms/General-Terms-Conditions-of-Sale.htm>, which are incorporated herein and applicable hereto. SSI reserves the right to update its Terms and Conditions at any time, however the terms and conditions in effect at the date of delivery of Products related to this Sales Proposal and Quotation shall apply to that purchase.



Company Name: Florida A&M University - Tallahassee
 Quote Number: SSI-254060-S7B2
 Activation Date: 9/17/2024
 Expiration Date: 9/30/2024

Service Agreement Plans Available

As Quoted

Quantity	Plan Name	Plan Price	Disc't %	Ext'd Price	Products Covered
1	Three Year(36 month) Value Plan Service Agreement	\$18,690.00	15.00%	\$15,886.50	DGU-403 3-channel Degasser, SIL-40C HPLC Autosampler, RF-20A Fluorescence Detector, RID-20A Refractive Index Detector, CBM-40 System Controller, FCV-11AL Reservoir Selector, CTO-20AC CL, Prominence LPGE Unit, ROHS-compliant

Descriptions of Service Coverage

Preventative Maintenance

Preventative Maintenance (PM) visits will be scheduled by SSI at the mutual convenience of the buyer and SSI, or performed during any other service visit. PM visits, when provided under this Agreement, may include necessary cleaning, adjustments, verification, lubrication and parts replacement according to the PM checklist. Labor, travel expenses, and selected consumable parts will be included during the PM visit at no additional cost to the buyer.

Premium Preventative Maintenance

Premium Preventative Maintenance visits will be scheduled by SSI at the mutual convenience of the customer and SSI, or performed during any other service visit. This Premium PM will be performed by SSI according to established SSI procedures. Premium PM visits, when performed under this Agreement, will include necessary cleaning, adjustments, verification, lubrication and parts replacement. Labor, travel expenses and selected consumables parts* (list of parts available upon customer request) will be included during the Premium PM visit at no additional cost to the customer. A travel zone fee is added to the agreement to cover travel costs. Purchase of the Premium PM option does not excuse Customer from performing normal daily, weekly or monthly maintenance that may be required.

Extended Warranty

Extended Warranty coverage includes all labor and parts (excluding consumables) necessary to restore the products to operating specifications.

This coverage level is not available for MS products and the associated turbo and roughing pumps. The MS products require a coverage level which includes a Premium PM.

Extended Warranty Plus

A combination of one scheduled Premium PM visit and Extended Warranty Coverage. Premium Preventative Maintenance visits will be scheduled by SSI at the mutual convenience of the customer and SSI, or performed during any other service visit. Premium PM visits, when performed under this Agreement, will include necessary cleaning, adjustments, verification, lubrication and parts replacement. Labor, travel expenses and selected consumables parts* (list of parts available upon customer request) will be included during the Premium PM visit at no additional cost to the customer. The extended Warranty Includes all labor and parts (excluding consumables outside of PM) necessary to restore the products to operating specifications. A travel zone charge is added to the contract to cover travel costs. In the event of a covered product failure, SSI will use its best effort to provide on-demand service.

Premium Total Coverage

This level of agreement provides the customer with a level of coverage includes all labor and non-consumable parts, a Premium PM visit, and in addition provides for the replacement of consumable parts outside of a PM visit at no additional cost to the buyer. Use of this level of Service will be monitored by SSI and in the event that the buyer's use does not exceed two visits during the effective dates of the agreement, the buyer will be entitled to an agreed upon rebate at the end of the agreement term. This rebate must be applied to the purchase of future service agreements or other services offered by SSI.



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Activation Date: 9/17/2024
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Three Year Value Plan

Three Year Value Plan Service Agreement:
Following system installation, provides 3 consecutive years of FULL warranty coverage, Customer Care follow-up Year1, and Scheduled Premium Preventative Maintenance (PPM) on-site service during Year2 and Year3.



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Sales Quotation - please reference the quotation when submitting purchase order.
Line Item Descriptions

Product # Description

Column For Amino Acids

228-41624-92 Column, LC, Shim-pack XR-ODS II 2.2 micron, 3.0 x 100mm
 SHIM-PACK XR-ODS II Column 3.0 x 100 mm

SIL-40 Installation Kit

220-97823-20 Surge Protector, CyberPower Rackbar Surge Protector, RKBS20S2F10R, 10 outlets

071-60821-08 100 - 115V Power Cord

228-77025-10 Fiber Optic Cable, 1.0 m

220-91535-13 Caffeine Test Standard, 250 mg/L, 20 mL

Caffeine test standard for calibration, area % reproducibility, and gradient accuracy. 250 mg/L (250 ppm) standard, 20 mL total volume.

220-97331-30 Vials, 1.5mL Clear Glass Vial w/ Cap & Septa, Short Thread Vial, 12 x 32mm, 9mm opening 100/pk

Clear glass vials and caps with pre-inserted PTFE/silicone septa for ease of sample preparation. Vial size is 12x32 mm, with a writing patch on the side.

228-71762-46 Vial Plate, 1.5 mL

1.5 mL rack for the SIL-40 autosampler. 54 vial capacity. Skeletal construction provides increased airflow around vials for more efficient sample cooling. Built in bar code allows the autosampler or Plate Changer to automatically detect the type of plate for injection.

220-91394-02 Column, LC, Shimadzu Nexcol C18 5µm, 50 x 3.0mm w/ Test Mix

A traditional endcapped C18 column (USP L1) ideal for general-purpose use in reversed-phase chromatography. This is the installation checkout column and test mix for HPLC systems. Includes 5 ampules containing a test mixture of Uracil, Toluene, Naphthalene, and Biphenyl and 5 amber 2mL vials with caps and septa.

CBM-40 Promotional Sale

228-65502-58 CBM-40 System Controller

The CBM-40 system controller is the central communication and control module for the Nexera series. System components connect via fiber optic cables for easy configuration. Internal web server offers convenient control and monitoring of the HPLC system through a web browser.

Column For Alcohol

228-17889-91 Column, LC, Shim-pack SCR-101C

Shim-pack SCR-101C

BioEthanol Kit

220-91478-20 BioEthanol Analyzer Resource Kit

The I-Series Bioethanol Analyzer Resource Kit provides customization instructions, methods, batch templates and other resources to aid in fermentation analysis. Combines the ease of use of LabSolutions software with the reliable design of I-Series HPLC. 8GB USB thumb drive format.

Nexera

228-65018-58 DGU-403 3-channel Degasser

A 3-channel degassing unit for the Nexera Series (U)HPLC. Degassing reduces the occurrence of bubbles in the HPLC which can lead to poor chromatographic outcomes. This degasser provides efficient vacuum degassing for two pump lines plus the rinse line for the autosampler.

220-91428-00 PEEK Tubing Kit For HPLC Installs



Company Name: Florida A&M University - Tallahassee
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This kit includes Blue (0.010" i.d.) and Red (0.005" i.d.) PEEK tubing (two 5 ft rolls of each color) and 2 lengths of one-piece fingertight fittings for HPLC installation convenience. Also included are a PEEK tubing cutter, 2 PEEK unions, PEEK column plugs, and spare nuts and ferrules for the DGU-20A3 or A5 degassers.

220-91441-00

5 Gallon Waste Can, Polypropylene Fittings

Sturdy polyethylene waste can with a solvent vapor filter and tubing manifold to accept waste from 1 autosampler and 1 detector. Additional fittings to allow multiple systems to feed one waste can are sold separately. For reversed-phase solvents only. Use 220-91442-00 (2 gal) or 220-91443-00 (5 gal) for normal phase solvents.

228-45000-32

***Demo* LC-20ADHPLCPUMP**

Utilizes micro-volume plungers for pulse-free HPLC solvent delivery. Ideal for low flow rate (< 1 mL/min) and LCMS applications. Recommended when using RID, CDD, and electrochemical detectors.

228-71767-44

Two-Liquid Washing Option, SIL-40

The Two-Liquid Washing Option adds an active external flush driven by a dedicated pump to the available rinse options.

228-71767-45

Multi Rinse Option, SIL-40

The Multi Rinse option provides three rinse chemistries that are available for external and internal rinsing of the autosampler needle, injection port, and sample loop.

228-63132-45

Sample Loop, 100 uL, SIL-40

100 uL sample loop for all models of SIL-40. Standard accessory on the SIL-40/C, option for SIL-40XR/CXR, SIL-40XS, and SIL-40X3.

228-65611-58

FCV-11AL Reservoir Selector

The FCV-11AL Reservoir Selection Valve provides additional solvent selection capabilities to any analytical (U)HPLC pump. One FCV-11AL can provide 2-solvent selection for up to 3 pumps or 4-solvent selection for a single pump. This selection valve is ideal for automated column washing and storage after analysis is completed.

228-65306-58

RID-20A Refractive Index Detector

The RID-20A differential refractive index detector features a dual temperature-controlled optical compartment for less than 30 min warm-up time and exceptional baseline stability. The temperature controlled flow cell minimizes drift if the ambient temperature changes. Optional flow selection blocks are available for high sensitivity, prep, and large scale prep applications.

228-65304-58

RF-20A Fluorescence Detector

The RF-20A is a high sensitivity fluorescence detector for HPLC. Features a S/N ratio of 1200 for the Raman water peak with fast response and sampling (100 Hz, 10 ms) for HPLC and UHPLC applications including food, pharma, and environmental. Up to 4 independent excitation and emission wavelengths can be simultaneously monitored.

220-91545-01

Solvents, LC, Honeywell B&J LCMS Grade Solvent Kit for Installations

Honeywell B&J brand LCMS grade solvents. Packaged as a case of four 1L bottles. Case contains the following solvents:

- 1L of Acetonitrile
- 1L of Methanol
- 1L of Water
- 1L of 2-propanol

Please note that overnight shipping is not possible for this item due to hazmat restrictions

TIER 2 I&F

Tier 2 Installation and Customer Familiarization

Tier 2 Installation and Customer Familiarization.

1YW

1 YEAR WARRANTY

1 YEAR WARRANTY

LPGE

228-45040-58

Prominence LPGE Unit, ROHS-compliant

Quaternary solenoid valve block for installation in the LC-20AD or LC-20AT, or LC-20ADXR pumps. Operates in two ways: 1) Low pressure quaternary gradient formation, or 2) 4-position solvent selector. Controlled by pump, CBM or software.

Autosampler SIL-40 Promotional Sale

228-65101-58

SIL-40C HPLC Autosampler



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The SIL-40C provides high speed injections (7 sec for 10 µL) with ultra-low carryover achieved through needle in flow path design, advanced material technology and rinse options (if necessary) with up to 4 solvents. Peltier cooled for temp control from 4-40C. An external rinse pump is standard, and provides additional rinsing to the outer surface of the needle. Sample capacity is 162 1.5 mL vials or 3 MTPs. PMax is 44 MPa (6,000 psi).

CBM-40 Installation Kit

071-60821-08 100 - 115V Power Cord

228-70247-41 Nexera Series Wiring Kit, A

Includes one 600 mm FO cable, one 800 mm FO cable and a wiring cover.

220-91396-00 10/100/1000 5-port Network Switch

A network switch for connecting multiple Ethernet devices into a single wall LAN terminal. Can also be used to connect multiple devices to a network card in a PC for stand-alone control.

228-65508-58 Reservoir Tray, Nexera series

This reservoir tray is used to hold and organize mobile phase bottles for the Nexera Series (U)HPLC. It has convenient slots that can accommodate the Mobile Phase Monitor Controller and up to 3 standard Bottle Holders (or 2 Large Bottle Holders) securely.

Computers & Software

223-62700-51 LabSolutions LCGC Single LC License

This is an electronic license for control of 1 LC instrument in LabSolutions Workstation (WS).

Quote licenses for the number of instruments running concurrently in LabSolutions.

223-19335-51 LabSolutions LCGC WorkStation, Installation Disc

Shimadzu LabSolutions® Workstation Software provides system control, data acquisition and reporting for Shimadzu HPLC and GC systems.

LabSolutions Workstation provides user-friendly workstation software for HPLC and GC instruments. LabSolutions has built in system security and system management functions. Data can be saved, in a proprietary format, to a computers local hard drive or to network location.

LabSolutions Workstation supports digital data acquisition of data through RS-232, USB, or Ethernet connection to Shimadzu and third party instruments. Analog signal acquisition can also be performed when an optional A/D board is used.

220-97317-85 Standard PC, 16 GB RAM, 1 TB SSD, MS Office

Dell computer suitable for most Shimadzu software packages. It is a small form factor computer (approximately 11.5"x11.5"x3.5") and includes an 12th gen Intel i7 processor, 16Gb of RAM, a 1 TB SSD, a DVD+ R/W drive, 2 ethernet ports, Windows 11 Pro, and Microsoft Office Home & Business. Wired keyboard and mouse included.

220-97321-10 Dell 24" Widescreen Flat Panel

24" Widescreen LCD display, resolution to 1920 x 1080, contrast ratio (typical): 1000:1. Brightness (typical): 250 cd/m2, 0.277 mm pixel pitch.

Limited warranty: Three years Advanced Portable Exchange through Dell.

Column Oven

228-45010-54 CTO-20AC CL

The CTO-20AC CL is a Class I Medical Device for in vitro diagnostic use. It is a full-sized oven with forced air temperature control from 10 C below ambient temperature to 85 C. Can accommodate a manual injector, mixer, 2 switching valves and up to 11 columns for method development applications. Linear temperature programming is possible; Optional Column Management Device (228-37281-91) with CMD Cable (228-39991-01) can be used. If IDEX valves are used, a 2 or 6-pos installation kit is required.



Shimadzu Scientific Instruments, 7102 Riverwood Drive, Columbia, MD 21046
Tel: 800.477.1227/410.381.1227; Fax: 410.381.1222; www.ssi.shimadzu.com

September 19, 2024

Sole Source Justification for HPLC Instrumentation

To whom it may concern:

This memo serves to describe the unique features of the High Performance Liquid Chromatography instrument offered for sale exclusively by Shimadzu Scientific Instruments (SSI) in the United States.

The SIL-40C Autosampler offers multiple unique features to ensure best in class chemical identification of sample constituents:

- The autosampler provides a high-throughput option for injection from 42 additional shallow well MTPs or from 21 deep-well microtiter plates or vial racks.
- The autosampler provides optional temperature control from 4 to 45°C with temperature accuracy of $\pm 2^{\circ}\text{C}$.
- The autosampler has an operating pH range of 1-14.
- The sample autosampler has an air-cooled mechanism to reduce condensation in the autosampler.
- The autosampler provides an injection cycle time of ≤ 7 seconds.
- The autosampler has a needle in the flow path design to minimize carryover.
- The autosampler has a maximum pressure rating of 70 MPa (10,152 psi).
- The autosampler uses a total injection, variable volume type injection for zero sample loss.

AA/ICP • Balances • Biotech/MALDI • EDX/XRF/XRD • Fluorescence • FTIR • GC • GC/MS
HPLC/UHPLC • LC/MS/MS • Software • Testing Machines • Thermal • TOC/TN/TP • UV-VIS-NIR
Boston • New Jersey • Washington, DC • Raleigh/Durham • Chicago • Houston • Kansas City • San Francisco • Carlsbad • Puerto Rico



Shimadzu Scientific Instruments, 7102 Riverwood Drive, Columbia, MD 21046
Tel: 800.477.1227/410.381.1222; Fax: 410.381.1222; www.ssi.shimadzu.com

- The autosampler achieves the following injection volume repeatability values:
 - 1) RSD \leq 1.0% for injections 0.5-0.9 μ L.
 - 2) RSD \leq 0.5% for injections 1.0-1.9 μ L.
 - 3) RSD \leq 0.25% for injections 2.0-4.9 μ L.
 - 4) RSD \leq 0.15% for injections \geq 5.0 μ L.
- The autosampler achieves an injection volume accuracy of \pm 1% for 5 μ L injections (n=20).
- The autosampler achieves the following carryover performance:
 - 1) 0.0015% (no needle rinsing)
 - 2) 0.0003% (with rinse)
- The autosampler can perform sample pretreatment including dilution, reagent addition, co-injection of samples, stacked injection, and overlapped injection.
- The autosampler monitors and controls with Internet Explorer through a system controller and must be able to house an internal system controller if desired.
- The autosampler provides a repeat injection mode that allows injection of a predetermined number of samples repeatedly at periodic intervals.
- The autosampler has a leak sensor as a safety feature.
- The autosampler performs an automatic purge cycle.
- The autosampler displays total operating time, needle and rotor seal usage, and maintenance, error and operation logs.

The CBM-40 System Controller offers multiple unique features to ensure best in

class chemical identification of sample constituents:

- The system controller has the option to be monitored through a smart device such as an iPad or smart phone on the network.



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- The system controller controls 8 HPLC components with optional expansion to 12 components.
- The system controller indicates when an error has occurred.
- The system controller can be connected to a PC via an ethernet cord.
- The system controller has an enhanced auto purge function.
- The system controller has an automated startup and shutdown function.

The LC-20ADHPLCPUMP Solvent Delivery Unit offers multiple unique features to ensure best in class chemical identification of sample constituents:

- The HPLC solvent delivery unit delivers 0.1 $\mu\text{L}/\text{min}$ to 10.0000 mL/min with accuracy of $\pm 1\%$ or $\pm 0.5\ \mu\text{L}/\text{min}$ whichever is larger, and precision within $\pm 0.3\%$, to be operable in constant flow or constant pressure modes, and isocratic, binary high-pressure gradient, ternary high-pressure gradient and quaternary low pressure gradient modes.
- The solvent delivery unit houses a low-pressure gradient unit to perform quaternary gradients, controlled by the solvent delivery unit or by the System Controller via fiber optic cable.
- The back of the plunger seal may be rinsed manually using a syringe and/or automatically using an optional rinse kit.
- The solvent delivery unit is of parallel dual plunger micro-volume (10 μL stroke) construction and have a flow rate resolution of 3 nL/min .
- The solvent delivery unit has a leak sensor as a safety feature.
- The solvent delivery unit monitors and controls with Internet Explorer through a system controller.
- The solvent delivery unit includes validation firmware that checks pump memory,

pulsation, flow rate, gradient accuracy, and leakage.

- The solvent delivery unit has a system protection feature that reduces the flow rate until the maximum pressure is not exceeded.



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- The solvent delivery unit displays total operating time, volume of solvent delivered for each seal, and maintenance, error and operation logs.
- The solvent delivery unit has an internal volume of less than 200 μ L

The CTO-20AC Column Oven offers multiple unique features to ensure best in class chemical identification of sample constituents:

- The column oven is uses a forced hot-air/Peltier cooling circulation unit with automatic fan speed control which varies with the set temperature and with a quick feedback mechanism to maintain constant temperature even with power source voltage fluctuations.
- The column oven temperature control range is (ambient - 10) $^{\circ}$ C to 85 $^{\circ}$ C and the temperature setting range is 4 $^{\circ}$ C to 85 $^{\circ}$ C in 1 $^{\circ}$ C steps.
- The column oven temperature control precision is \pm 0.1 $^{\circ}$ C.
- The column oven can be monitored and controlled with Internet Explorer through a CBM-20A or CBM-20ALite system controller.
- The column oven has time programming capability in stand-alone (320 steps) or system-controlled configuration for setting temperature ranges and oven ON / OFF.
- The column oven stores at least 6 columns of 25 cm length in addition to 2 manual injectors, 2 flow-channel selection valves, a gradient mixer and a cell block of the conductivity or electrochemical detector.
- The column oven has a safety feature which includes a temperature limit device which sets a maximum temperature, a thermal fuse, and a flammable solvent leak sensor.
- The column oven monitors room temperature.
- The column oven performs linear temperature regulation.

- The column oven performs linear temperature regulation.
- The column oven communicates with an optional column management device to track column history.



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- The column oven allows adjustment of leak sensor sensitivity.
- The column oven displays total operating time, part replacements, and maintenance, error, and operation logs.

The RID-20A Refractive Index Detector offers multiple unique features to ensure best in class chemical identification of sample constituents:

- The refractive index detector possesses unique 4-partition photodiode detection as protected under U.S. Patent No. 5398,110.
- The refractive index detector monitors and controls with Internet Explorer through a TCP/IP interface using a CBM.
- The refractive index detector exhibits rapid temperature equilibration with dual stage temperature-controlled optics.
- The refractive index detector permits operation in three modes with a wide dynamic operating range including A Mode (Analytical to 20 mL/min), P Mode (Preparative to 20 mL/min) and L Mode (Preparative to 150 mL/min, with optional flow selection block).
- The refractive index detector possesses safety features including a standard leak sensor and a bimetallic thermal breaker, as well as an optional cell relief valve.
- The refractive index detector has a refractive index range of 1 to 1.75 RIU, with a measurement range of 0.01×10^{-6} to 500×10^{-6} in Analysis Mode and 1×10^{-6} to 5,000 in 10^{-6} in Preparative and Large-Scale Preparative Modes.
- The refractive index detector demonstrates linearity of 5×10^{-4} RIU in Analysis Mode, and 5×10^{-3} in Preparative and Large-Scale Preparative Modes.
- The refractive index detector has a maximum operating flow rate of 20 mL/min and a maximum flow rate of 150 mL/min with optional flow selection block.
- The refractive index detector exhibits baseline noise below 0.25×10^{-8} RIU or less with water in the flow cell at room temperature of 25°C, at a time constant of 3.0 seconds.
- The refractive index detector exhibits drift of 1×10^{-7} RIU/hr or less with water in the flow cell at room temperature of 25°C, at a time constant of 3.0 seconds.

flow cell at room temperature of 25 °C, at a time constant of 0.5 seconds.

- The refractive index detector can withstand flow cell back pressure of 1.9MPa.



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- The refractive index detector possesses a cell temperature setting range of 30-60°C in 0.1°C increments.
- The refractive index detector can be used standalone via front keypad and will enable time programming on the unit itself for independent control or programming via a system controller or CBM.
- The refractive index detector offers both a 1 mV and 10mV recorder output as well as an integrator output which is selectable in 4 steps of 1×10^{-4} , 1×10^{-3} , 1×10^{-2} , and 2.5×10^{-4} RIU/Volt

The RF-20A Fluorescence Detector offers multiple unique features to ensure best in class chemical identification of sample constituents:

- The RF-20A uses a self-aligning Xe lamp with a lifetime of 2000 hours.
- Both the lamp and the flow cell require no tools, alignment, or adjustment and are installed from the front panel of the detector.
- The wavelength ranges for each detector are as follows: EX: 200-650, EM 200-650
 - Optional photomultiplier tubes will be available to extend the detection range of the RF-20A to 900 nm.
- Wavelength accuracy for the RF-20A is ± 2 nm.
- Wavelength reproducibility for the RF-20A is 0.2 nm.
- Bandwidth for the RF-20A is 20 nm.
- Data acquisition rate (sampling) and response are 100 Hz.
- Simultaneous measurement of 2 wavelengths is standard with the RF-20A.
- Sensitivity, determined by the S/N ratio of the Raman peak for water at EX 350 nm and 1.5 sec time constant, is greater than or equal to 1200 for the RF-20A
- The standard flow cell for the RF-20A has a volume of 12 μ L. Optional semi-micro cell (3 μ L) with temperature control and an inert (12 μ L) cell are available.
- The RF-20A has validation support functions to track lamp and total operation time, and log consumable part replacement dates