

Liquid Chromatograph

# P-Series Specifications



# Specifications

## P-Series System Controllers



CBM-20A

|                             | CBM-20A   | CBM-20ALite   |
|-----------------------------|---|---|
| Connectable units           | Solvent delivery units: 4 max.;<br>Autosamplers: 1; Column ovens: 1;<br>Detectors: 2 max.; Fraction collectors: 1;<br>Sub-controllers: 2 max. | Solvent delivery units: 4 max.;<br>Autosamplers: 1;<br>Column ovens: 1; Detectors: 2 max. |
| Number of connectable units | 8 (expansion possible up to 12)   | 5 (including the unit incorporating the system controller)                                |
| Data buffering              | Approx. 24 hours for one analysis (at 500-ms sampling rate; available only with LabSolutions)   |   |
| Event I/O                   | 4 inputs, 4 outputs   | 2 inputs, 2 outputs   |
| Analog boards               | Up to 2 boards can be mounted.  | Mounting not supported.   |
| Operating temperature range | 4 to 35°C   |   |
| Dimensions, weight          | W260 × D420 × H140 mm, 5.5 kg   | W120 × D100 × H20 mm, 0.5 kg  |
| Power requirements          | AC 110 V, 230 V, 100 VA, 50/60 Hz   | Supplied from unit  |

## P-Series Pumps



LC-20AD

|                                    | LC-20AD   |
|------------------------------------|---|
| Solvent delivery method            | Parallel-type double plunger                                |
| Plunger capacity                   | 10 µL (with increment of 0.0001 mL/min)                     |
| Maximum Operating Pressure         | 40 MPa  |
| Flow rate setting range            | 0.0001 to 10.0000 mL/min                                    |
| Flow rate accuracy                 | No more than ±1% or ±2 µL/min,<br>whichever is greater      |
| Flow rate precision                | No more than 0.06% RSD or 0.02 min SD, whichever is greater |
| Gradient type                      | High-pressure mixing/low-pressure mixing                    |
| Gradient accuracy                  | +/- 1%  |
| Gradient precision                 | 0.1% RSD max.   |
| Constant-pressure solvent delivery | Supported   |
| Plunger rinsing mechanism          | Automatic rinsing   |
| Safety measures                    | Liquid-leakage sensor, high-pressure/low-pressure limits    |
| Operating temperature range        | 4 to 35°C   |
| Dimensions, weight                 | W260 × D420 × H140 mm, 10 kg                                |
| Power requirements                 | AC 110 V, 230 V, 150 VA, 50/60 Hz                           |

## P-Series Degassing Units



DGU-20A3R/20A5R

|                             | DGU-20A3R                    | DGU-20A5R                  |
|-----------------------------|------------------------------|----------------------------|
| Number of degassed solvents | 3                            | 5                          |
| Degassed flow-line capacity | 400 µL                       |                            |
| Operating temperature range | 4 to 35°C                    |                            |
| Dimensions, weight          | W260 × D421 × H72 mm, 3.9 kg | W260 × D421 × H72 mm, 4 kg |
| Power requirements          | Supplied from LC-20AD        |                            |

## P-Series Autosampler



SIL-20AC<sub>HT</sub>

|                                | SIL-20AC <sub>HT</sub>  |
|--------------------------------|---|
| Injection method               | Total-volume sample injection, variable injection volume  |
| Injection-volume setting range | 0.1 to 100 µL (standard), 0.1 to 2,000 µL (option)  |
| Number of processed samples    | 175 (1 mL vials), 70 (1.5 mL vials), 50 (4 mL vials)<br>192 (two 96-well MTP/DWP), 768 (two 384-well MTP/DWP)<br>Also, ten 1.5 mL vials in addition to each of the above. |
| Injection-volume accuracy      | 1% max (specified conditions)   |
| Injection-volume precision     | RSD: 0.3% max. (specified conditions, typically 0.2% RSD max)   |
| Sample Carryover               | 0.005% max. (specified conditions, typically 0.0025% max)   |
| Number of repeated injections  | 30 per sample   |
| Needle rinsing                 | Set freely before and after sample injection.   |
| Sample cooler                  | Block cooling/heating,<br>used together with dehumidifying function, 4 to 40°C  |
| Operating pH range             | pH1 to pH14   |
| Operating temperature range    | 4 to 35°C   |
| Dimensions, weight             | W260 × D500 × H415 mm, 30 kg  |
| Power requirements             | AC 110 V, 230 V, 300 VA, 50/60 Hz   |

## P-Series Column Oven



CTO-10AS v<sub>P</sub>

|                               | CTO-10AS v <sub>P</sub>                                |
|-------------------------------|--|
| Type                          | Block heating  |
| Cooling method                | Electronic cooling                                     |
| Temperature setting range     | 4 to 80°C  |
| Temperature control precision | ±0.1°C   |
| Applicable columns            | 25 cm (2 column max, Optional column switching)        |
| Function                      | Change of temperature setting                          |
| Safety features               | Leak sensor, temperature fuse, temperature upper limit |
| Dimensions, weight            | W130 × D420 × H415 mm, 12 kg                           |
| Power requirements            | AC 110 V, 230 V, 120 VA, 50/60 Hz                      |

## P-Series Detector



SPD-40

|                                | SPD-20A  | SPD-40                            | SPD-M40  |
|--------------------------------|--|-----------------------------------|--|
| Light source                   | Deuterium (D2) lamp  | Deuterium (D2) lamp               | Deuterium (D2) lamp, Tungsten lamp                             |
| Number of diode elements       | –  |                                   | 1024   |
| Wavelength range               | 190 to 700 nm  |                                   | 190 to 800 nm  |
| Bandwidth, slit width          | 8 nm   |                                   | 1.2 nm (high-resolution mode),<br>8 nm (high-sensitivity mode) |
| Wavelength accuracy            | ± 1 nm max.  |                                   |  |
| Wavelength precision           | ± 0.1 nm max.  |                                   |  |
| Noise                          | 0.5 × 10 <sup>-5</sup> AU  | 4.0 × 10 <sup>-6</sup> AU         | 4.5 × 10 <sup>-6</sup> AU                                      |
| Drift                          | 1 × 10 <sup>-4</sup> AU/h  | 0.1 × 10 <sup>-3</sup> AU/h       | 0.4 × 10 <sup>-3</sup> AU/h                                    |
| Linearity                      | 2.5 AU (ASTM standard)   |                                   |  |
| Functions                      | Dual-wavelength detection in the range 190 to 370 nm and upwards of 371 nm, ratio-chromatogram output, wavelength scanning |                                   |  |
| Cell                           | Optical wavelength: 10 mm, Capacity: 12 µL, Pressure: 12 MPa<br>Optional Cells Available                                   |                                   |  |
| Cell temperature control range | 5°C above room temperature to 50°C   | 19 to 50°C, 1°C Step (up to 50°C) |  |
| Operating temperature range    | 4 to 35°C  |                                   |  |
| Dimensions, weight             | W260 × D420 × H140 mm, 13 kg   | W260 × D500 × H140 mm, 11 kg      | W260 × D500 X H140 mm, 12 kg                                   |
| Power requirements             | AC 110 V, 230 V, 160 VA, 50/60 Hz  | AC 100–240 V, 150 VA, 50/60 Hz    | AC 110 V, 230 V, 150 VA, 50/60 Hz                              |



Shimadzu (Asia Pacific) Pte Ltd.

[www.shimadzu.com.sg/an](http://www.shimadzu.com.sg/an)

**For Research Use Only. Not for use in diagnostic procedures.**

This publication may contain references to products that are not available in your country. Please contact us to check the availability of these products in your country.

Company names, products/service names and logos used in this publication are trademarks and trade names of Shimadzu Corporation, its subsidiaries or its affiliates, whether or not they are used with trademark symbol "TM" or "®".

Third-party trademarks and trade names may be used in this publication to refer to either the entities or their products/services, whether or not they are used with trademark symbol "TM" or "®".

Shimadzu disclaims any proprietary interest in trademarks and trade names other than its own.

Shimadzu does not assume any responsibility or liability for any damage, whether direct or indirect, relating to the use of this publication.

Shimadzu (Asia Pacific) Pte Ltd., August 2020