

Handbook for Gas Chromatograph Accessories



Shimadzu Gas Chromatograph

Gas chromatographs require different peripherals and supplies depending on the analytical purpose, especially as it relates to gas management, flow line configuration, column installation, sample injection and data processing. This brochure introduces various accessories and supplies supported by Shimadzu GC instruments.

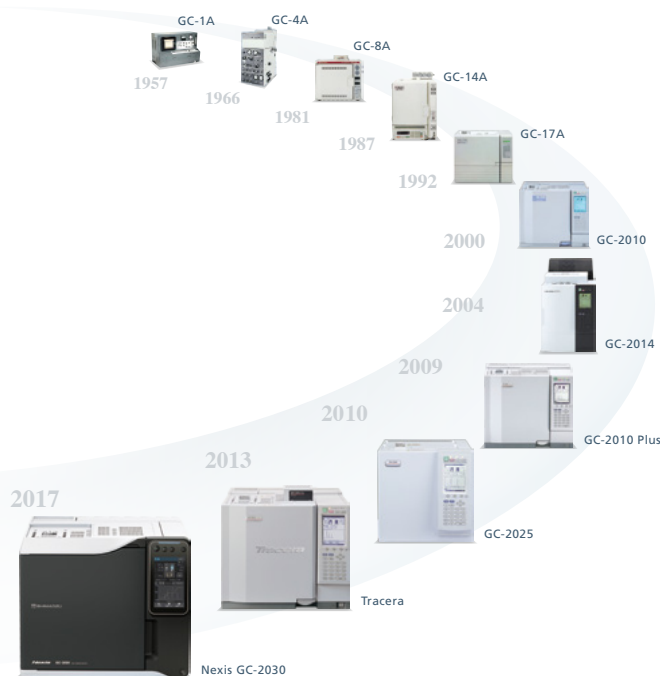


Nexis GC-2030 + AOC-30i/20s U (Option)

Gas Chromatograph Nexis GC-2030

Nexis GC-2030, Shimadzu's high-end gas chromatograph, is a new-generation gas chromatograph that combines improved operation and easier maintenance with the world's highest levels of performance for sensitivity and reproducibility. A color touch-panel interface with clear, intuitive graphics enables all users to monitor the instrument status and set parameters with ease. In addition, Nexis GC-2030 offers excellent usability with tool-free inlet maintenance and column installation and a built-in oven light. It also provides a variety of functions to ensure compliance with GLP/GMP and a self-diagnosis function.

(Detailed product catalog: C184-E043)



GC-2014 + AOC-20i (Option)

Gas Chromatograph GC-2014 Series

The GC-2014 offers high expandability and flexibility with the ability to mount multiple injectors and detectors. Available for both packed and capillary columns, it offers an excellent user interface with a large LCD, digital gas control and auto-diagnostics, and innovative technology for all injectors, detectors and flow controllers.

(Detailed product catalog: C184-E014)



GC-2025 + AOC-20i (Option)

Energy-Saving Gas Chromatograph GC-2025 Series

GC-2025 minimizes environmental impact by reducing power and carrier gas consumption while retaining the performance capabilities required for capillary analysis. The compact GC-2025 incorporates a digital flow controller that controls both the carrier and detector gases and a newly designed energy-saving column oven that features a small volume and less heating loss, realizing a dramatic improvement in operation.

(Detailed product catalog: C184-E026)

Contents

	Description		P/N	Compatible Models				Remarks	Page
				GC-2030	GC-2014	GC-2025	GC-2010 Plus		
Sampling Device	Autoinjector	AOC-30i	221-86000-58	✓				Standalone	6
				221-86002-58	✓				
		AOC-20i Plus	221-86003-58	✓	✓	✓	✓		
	Barcode/2D Code Reader for AOC		221-85900-58	✓				For AOC-30i/AOC-20s U	
	Sample Cooling Fan		221-44995-91	✓	✓	✓	✓	For AOC-20i series	
	Long Turret		221-45622-91	✓	✓	✓	✓	For AOC-20i series	
	Large Vial Holder		221-32949-01	✓	✓	✓	✓	For AOC-20i series	
	4mL Vial Holder, Sampler		221-45182	✓	✓	✓	✓	For AOC-20i series	
	Autosampler	AOC-20s U	221-86001-58	✓	✓	✓	✓		
	Vial Cooling/Heating Unit		221-85189-43	✓	✓	✓	✓	For AOC-20s U (1.5mL vial)	
			221-85189-44	✓	✓	✓	✓	For AOC-20s U (4.0mL vial)	
	Gas Sampler	MGS-2030	221-78990-41	✓					
		MGS-2010	221-75363-41				✓		
		MGS-4	221-42574-02			✓		✓	
221-42868-91					✓				
MGS-5		221-42576-41			✓		✓		
	221-42585-41			✓					
Injection Splitter		221-78280-41	✓						
		221-76252-41				✓			
Headspace Sampler	HS-20 NX	225-41000-41/42/58	✓			✓			
	HS-20 NX Trap	225-41001-41/42/58	✓			✓			
	HS-20 LT	225-22050-41/42/58	✓	✓		✓			
	HS-10	221-76862-11	✓	✓		✓			
Barcode Reader for HS-20		225-23340-41	✓	✓		✓			
Needle		See text	✓	✓		✓			
Sample Loop		See text	✓	✓		✓			
Thermal Desorption System	TD-30	225-30600-58	✓			✓			
	TD-30R	225-30700-58	✓			✓			
Barcode Reader for TD-30		225-32325-41	✓			✓			
Sample Tube		See text	✓			✓			
Trap Tube		See text	✓			✓			
Sample Injection Unit	Split/Splitless Sample Injection Unit	SPL-2030	221-77100-41/44	✓					
		SPL-2030 deactivated	221-77100-62/65	✓					
		SPL-2010 Plus	221-73040-41/48				✓		
		SPL-2014	221-75046-41/44		✓				
	Wide-Bore Injection Unit	WBI-2030	221-78200-41/44	✓					
		WBI-2010 Plus	221-73041-41/48				✓		
		WBI-2014	221-75047-41/44		✓				
		WBI-2014 (AMC)	221-75038-41/44		✓				
	Single Packed Injection Unit	SINJ-2014	221-75037-41/44		✓				
		SINJ-2030	221-85187-41/48	✓					
	Wide-Bore Capillary Column Attachment		See text	✓	✓		✓		
	On-column/ Programmed Temperature Vaporization Injection Unit	OCI-2030	221-78300-41/42/48	✓					
		OCI-2030 NX	221-78580-41/42/48	✓				Not applicable for simple OCI insert	
		PTV-2030	221-78350-41/42/48	✓					
OCI/PTV-2010		221-71042-41/44				✓			
Column Connection Parts		See text	✓	✓	✓	✓			
Septum Nut		See text	✓	✓	✓	✓			
Nut and Graphite Ferrule for Capillary Columns		See text	✓	✓	✓	✓			
Nut and Vespel Ferrule for Capillary Columns		See text	✓	✓	✓	✓			
Nut and ClickTek Ferrule for Capillary Columns		See text	✓		✓	✓			
Prefix Tool		221-76547-43	✓		✓	✓			
Packed Column Connections		See text	✓	✓		✓			
Filter for Flow Controller		221-77580-42	✓						
		221-42559-92	✓	✓	✓	✓			
		221-42595-92	✓	✓	✓	✓	Additional filter for hydrocarbon		
		221-34121-94	✓	✓	✓	✓	Additional filter for moisture		

	Description	P/N	Compatible Models				Remarks	Page
			GC-2030	GC-2014	GC-2025	GC-2010 Plus		
Column Oven	Cryogenic Valve Unit	CRG-2030 CO ₂	221-78900-41	✓				
		CRG-2030 LN ₂	221-80819-41	✓				
		CRG-2010 CO ₂	221-48703-91/42/48		✓	✓	✓	
		CRG-2025 CO ₂	221-73920-41/42/44			✓		CO ₂ only
		CRG-2010 LN ₂	221-49588-91/42/48		✓		✓	
	Oven Light Unit	221-78939-41	✓					
	Oven Insert	221-85807-41	✓					
	Column Hanger	221-47159	✓	✓		✓	For one column	
		221-72849	✓		✓	✓	For two columns	
		221-70200		✓			For one column, vertical orientation	
	Exhaust Duct	221-80955-41	✓					
		221-85232-41	✓				Can be connected directly to spiral duct.	
		221-70675-41		✓				
221-73965-41				✓				
221-47748-41				✓	✓			
Flame Ionization Detector	FID-2030	221-77200-41/44	✓				Capillary/packed	
	FID-2010 Plus	221-73345-41/42/48				✓	Capillary/packed	
	FID-2014 Single	221-75030-41/42/44/46		✓			Capillary/packed	
	FID Nozzle	See text	✓	✓		✓		
	FID Collector	See text	✓	✓		✓		
	FID Custom Kit for Wide Concentration Range	221-88280-41	✓					
	FID Custom Kit for Packed Columns	221-85191-41	✓					
	Capillary Adapter for DFID	221-33193-91		✓				
Thermal Conductivity Detector	TCD	-	Order it factory-installed in the GC main unit.			Capillary/packed		
Capillary Adapter for TCD	221-34012-91		✓					
	221-82865-42	✓				For PTC-2030		
Barrier Discharge Ionization Detector	BID-2030	221-77700-41/44	✓				Capillary	
	BID-2010 Plus	221-76000-41/42/44				✓	Capillary	
Helium Purifier	HP-2	221-75538-41/42	✓			✓		
Methanizer	MTN-1	221-41820-91/92/93	✓	✓		✓	Packed	
ECD Flow Bypass Kit	221-49664-42					✓	For ECD-2010 Exceed (does not need to be ordered for GC-2030)	
	221-49664-41					✓	For ECD-2010 Plus	
Sulfur Chemiluminescence Detector	SCD-2030	221-84085-41/58	✓				Capillary for installation on left side	
		221-84185-41/58	✓				Capillary for installation on right side	
Flame Photometric Detector	FPD-2030	221-77600-41/48	✓				Capillary	
	FPD-2010 Plus	221-73334-41/42/48				✓	Capillary/packed	
	FPD-2014	221-75031-41/42/44		✓			Capillary/packed	
Interference Filter	See text	✓	✓		✓			
Photomultiplier Purge Kit	FPD-2030	221-81010-41	✓				Capillary	
	FPD-2010 Plus	221-72652-43				✓	Capillary/packed	
	FPD-2014	221-72652-44		✓			Packed	
Flame Thermionic Detector	FTD-2030	221-77800-41/48	✓				Capillary	
	FTD-2010 Plus	221-73332-41/42/48				✓	Capillary	
	FTD-2014	221-75033-41/42/44		✓			Packed	
	FTD-2014C	221-75034-41/42/44		✓			Capillary	
FTD Collector Regeneration Kit	221-49079-91	✓	✓		✓	Capillary		

	Description		P/N	Compatible Models				Remarks	Page
				GC-2030	GC-2014	GC-2025	GC-2010 Plus		
Accessories for Safety and Environmental Friendliness	Hydrogen Carrier Gas Kit		221-85170-43	✓					20
	Hydrogen Option Kit, AFC		221-83785-41	✓	✓	✓	✓		
	Hydrogen Option Kit, APC		221-83780-41	✓	✓	✓	✓	Flow channel resistance limits the APC hydrogen flowrate.	
	Supply Gas Shut-off Solenoid Valve Unit		221-70782-41		✓			For fastening right side	
	Securement Parts	GC	221-78975	✓				For fastening left side	
			221-61192		✓			For fastening the GC unit to the instrument stand.	
			221-61193		✓				
			221-73967-41			✓			
		SCD	221-84168	✓					
		AOC-30i	221-86017-41	✓					
		AOC-20i	221-74090-43	✓		✓	✓	For DFID	
	Flame Monitor	FLM-2	221-41590-91		✓			5m	
			221-42546-91		✓			Only compatible with FIDs	
221-41590-91				✓		✓	55/57 dB (A) at 50/60 Hz		
Vent Tube		221-77174-41	✓	✓	✓	✓	47dB		
Gas Generator	Air Generator	AGE-1000	221-74500-01	✓	✓	✓	✓	21	
	Air Compressor	Oil-less Type	221-72380	✓	✓	✓	✓		
		Oil-less, Quiet Type	042-70041-02	✓	✓	✓	✓		
	Hydrogen Gas Generator	HGE-260	221-75473-01	✓	✓	✓	✓		
		HGE-510	221-75473-02	✓	✓	✓	✓		
	Precision Series	Refer to catalog.	✓	✓	✓	✓			
Gas Filter	Super-Clean Gas Filter		See text	✓	✓	✓	✓	22	
	Filter Regulator		221-56748-01	✓	✓	✓	✓		
	Moisture Trap (Silica gel)		201-36688	✓	✓	✓	✓		
	Filter Joint		201-43969	✓	✓	✓	✓		23
	Oxygen Trap		221-46985-91	✓	✓	✓	✓		
	Syringe for Cleaning		221-35641-91	✓	✓	✓	✓		
Operating Parts	Gas Selector		221-84916-41	✓				24	
	Shimadzu M/G Type Joint		See text	✓	✓	✓	✓		
	Pressure Regulator for High-Purity Gas	PPR-N ₂	221-35999-01	✓	✓	✓	✓	25	
		PPR-H ₂	221-35999-02	✓	✓	✓	✓		
		PPR-He	221-35999-03	✓	✓	✓	✓		
	Gas Supply Tube		See text	✓	✓	✓	✓	26	
	Swagelok Adapter		221-25975-92	✓	✓	✓	✓		
Needle Valve		221-57298	✓	✓	✓	✓			
FID Operation Parts Set	without Regulator	221-38651-90	✓	✓	✓	✓	Hydrogen gas tubing (right-hand threads)		
	with Regulator	221-38651-91	✓	✓	✓	✓			
		221-38651-92	✓	✓	✓	✓	Hydrogen gas tubing (left-hand threads)		
Data Processor	Chromatography Data Acquisition Module CBM-201m		221-80265-58					27	
	PC Peripherals		See text						

Sampling Device

Autoinjector/Autosampler AOC Series

The AOC-30i is a next-generation intelligent autoinjector with Sampler Navigator functionality that is packed with injection expertise. The skip function uses vial-sensing technology to increase throughput and help improve data integrity. The 30-vial sample capacity is large enough to handle most workflows, but can be expanded to 150 vials in combination with an AOC-20s U autosampler. Though the AOC-20i Plus offers exceptional cost-effectiveness for broad market appeal, it also features extensive functionality making it applicable for a variety of applications, such as for co-injecting derivatizing agents.



AOC-20s U

AOC-30i

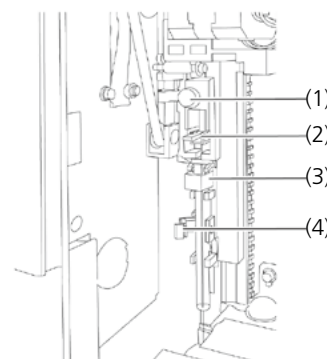
AOC-20i Plus

(Detailed product catalog: C180-E096, C189-E021)

Consumables

These consumables are for both AOC-30 and AOC-20i Plus models. They are used to fasten the syringe to the autoinjector. If replacing a syringe, replacing the plunger holder is recommended.

#	Description	P/N	Remarks
(1)	Plunger Holder Screw	037-02766-06	
(2)	Plunger Holder	221-45177-91	Set of 5
(3)	Barrel Holder	221-45178-91	Set of 5
(4)	Barrel Clip	221-48989-91	



Options

The 2D code reader reads the two-dimensional code or barcode affixed to sample vials and enters that data in the workstation. That improves traceability by eliminating errors from hand-writing information or manual data entry processes.

The sample cooling fan cools samples down close to room temperature.

A cooling/heating unit can be used to cool or warm samples to a temperature other than room temperature.

Cooling/heating units can control the temperature of sample vials to any temperature within the 0 to 60 °C range by circulating temperature-controlled liquid through the racks.

With AOC-20i Plus models, the number of sample, solvent, or liquid waste vials can be increased by installing expansion parts.

#	Description	P/N	Remarks
(5)	Barcode/2D Code Reader for AOC	221-85900-58	Reads barcodes or 2D codes on labels affixed to vials.
-	Sample Cooling Fan	221-45178-91	
-	Long Turret	221-45622-91	
-	Large Vial Holder	221-32949-01	1 case included standard
-	4mL Vial Holder, Sampler	221-45182	1 case included standard
-	Cooling/Heating Unit for 1.5mL Vial	221-85189-43	Only for AOC-20s U models
-	Cooling/Heating Unit for 4.0mL Vial	221-85189-44	Only for AOC-20s U models

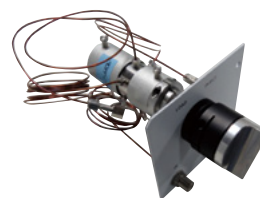


(5) Barcode/2D Code Reader

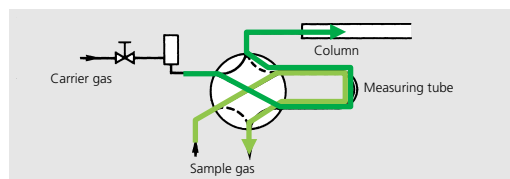
Gas Sampler MGS Series

These are manual injection valves for injecting gas samples. MGS-2030/2010 models include purged housing that reduces the amount of air leakage during switchover. The MGS-5 includes a valve that can switch between three sample quantity levels, whereas the MGS-2030/2010/4 models change the quantity by selecting a measuring tube. The unit is connected between the sample injection unit and AFC unit, so the sample injection unit can continue to be used. A heating function is not included.

Connectors: Shimadzu MM type or 6 mm tubing joint



MGS-2010 Valve Unit



#	Description	P/N	Remarks
-	Sample Loop 0.2mL	225-21889-82	For concentrated or adsorptive components
-	Sample Loop 1mL	225-21889-81	For low to medium concentrations at standard volumes
-	Sample Loop 3mL	225-22046-81	For large injection volumes
(1)	Tubing Joint	201-30254-91	For rubber or plastic tubing with 5 mm I.D.



(1) Pipe Insert

Injection Splitter

This injection unit can split samples without passing them through a standard split/splitless injection port. Air ingress can be reduced by using an injection splitter to connect the gas sampler and column.

Headspace Sampler HS-20 Series

With short transfer lines and patented isolation gas technology, HS-20 NX series headspace samplers reduce carryover to one-tenth the level of previous models and significantly increase laboratory productivity. The ability to overlap processing of up to 12 vials makes the samplers especially useful in fields that require high throughput. Featuring the world's only* electronically-cooled trap, the HS-20 NX Trap enables over ten times higher sensitivity than regular headspace analysis. The product line also includes an HS-20 Long Transfer Line (LT) model compatible with packed columns. The HS-10 is a low-cost entry model with stirring and overlapping functionality for outstanding cost-effectiveness.



Nexis GC-200 + HS-20 NX (Loop model)

(Detailed product catalog: C180-E094)

* As of August 2021, according to a Shimadzu survey

Option

#	Description	P/N	Remarks
-	Barcode Reader for HS-20	225-23340-41	Reads barcode labels affixed to vials.

Needle for HS-20

#	Description	P/N	Remarks
(1)	Deactivated Needle, 0.4mm ID	225-11238-41	For reducing surface area
-	Deactivated Needle, 0.6mm ID	225-11238-43	Standard needle
-	Deactivated Needle, 0.8mm ID	225-11238-44	Prevents clogging when measuring samples with precipitating salts
-	Acid-resistant Needle, 0.4mm ID	225-32168-42	For analyzing blood with acid added
-	Needle, 0.4mm ID	225-11238-42	Low-cost needle



HS-10 + GC-2014

(Detailed product catalog: C180-E081)

Sample Loop

#	Description	P/N	Remarks
-	Sample Loop 0.2mL	225-21889-82	For concentrated or adsorptive components
-	Sample Loop 0.4mL	225-21889-83	For volume compatibility with HSS-2/4 series models
-	Sample Loop 0.5mL	225-21889-85	For concentrated or adsorptive components
-	Sample Loop 0.8mL	225-21889-84	For volume compatibility with HSS-2/4 series models
(2)	Sample Loop 1mL	225-21889-81	For low to medium concentrations at standard volumes
-	Sample Loop 2mL	223-54697-04	For large injection volumes
-	Sample Loop 3mL	225-22046-81	For large injection volumes



(1) Deactivated Needle, 0.4mm ID



(2) Sample Loop 1mL

Other Consumables

#	Description	P/N	Remarks
(3)	Rotor, SSAC6WT	040-28090-25	This is the standard rotor. The seal material has a tendency to stick to the valve body at 150 °C or lower temperatures (250 °C or higher recommended).
-	Rotor, SSAC6WE	040-28090-50	Use this for temperature ranges not suitable for the SSAC6WT model. The upper limit is 225 °C at 400 psi.



(3) Rotor, SSAC6WT

Thermal Desorption System TD-30 Series

The TD-30 series was developed to offer solutions optimized for gas and material analysis applications. With no cold points along the sample path, it enables trace analysis of high-boiling-point components required for analyzing emission gases. The practical retrapping function supports a wide range of boiling points to reduce the risk of analytical losses when measuring atmospheric air or work environments. Functionality for automatically adding internal standard substances enables higher reproducibility than manual injection. An optional barcode reader can read barcodes printed on tubes. The series includes a TD-30 model with a 60-sample loading capacity and a TD-30R model with a 120-sample capacity and functionality for retrapping and adding internal standard substances. The series supports a wide variety of analysis applications, from R&D to quality control.



Nexis GC-2030 + TD-30

(Detailed product catalog: C146-E349)

Option

#	Description	P/N	Remarks
-	Barcode Reader for TD-30	225-32325-41	Reads barcodes from tubes labeled with a printed barcode.

Sample Tube

#	Description	P/N	Remarks
(1)	Trap Tube TenaxTA 130mg	223-57102-91	For measuring C4 to C44 medium-to-high boiling components and ideal for measuring indoor air or emission gases
-	Trap Tube Carboxen B 130mg+ Carboxen1000 100mg	223-57474-91	For measuring low-boiling components, such as hazardous air pollutants or working environments
-	Trap Tube TenaxTA 100mg+ Carboxen1000 50mg	223-52884-91	Universal model that supports low-to-high boiling points
-	Trap Tube TenaxGR 130mg	223-52284-91	Made of TenaxTA with graphite added for use in the semiconductor industry
-	Glass Tube	223-57119	For direct thermal desorption with the tube filled with plastic or other solid samples
-	Tube Cap	223-54617-41	Caps only for TD-20/30 series, set of 20



(1) Trap Tube TenaxTA 130mg

Note: Shimadzu brand sample tubes are not barcoded. Barcoded sample tubes are available for Shimadzu TD from Sigma-Aldrich (Merck) or GL Sciences (CAMSCO).

Trap Tube for HS-20 and TD-30

#	Description	P/N	Remarks
(2)	Trap Tube TenaxTA	225-23328-41	For measuring C4 to C44 medium-to-high boiling components
-	Trap Tube Carboxen+ CarbosieveS III	225-23328-42	For measuring C2 to C16 low-to-medium boiling components
-	Trap Tube Carboxen1000	223-54144-92	For measuring working environments, including MeOH
-	Trap Tube TenaxTA+ Carboxen1000	223-54144-96	Universal model that supports low-to-high boiling points
-	Trap Tube CarboxenY	223-54144-97	Similar properties to TenaxTA, but fewer decomposition products
-	Nut, 1/8-Inch	035-62902-01	1/8 Swagelok
-	SS-200 Sleeve Set	035-62972-02	1/8 Swagelok
-	Ferrule GV 1/8"	223-54423-91	For traps, set of 2



(2) Trap Tube TenaxTA

Sample Injection Unit

Split/Splitless Sample Injection Unit (SPL)

An AFC digital flow controller accurately controls split ratios and the flowrate and linear velocity through columns. The split analysis allows specifying a linear velocity suitable for separation, but that increases carrier gas consumption due to higher gas flowrates.

However, using the carrier gas saver function can reduce gas consumption by automatically reducing the gas flowrate whenever samples are not being analyzed.

The SPL-2030 model is equipped standard with a ClickTek nut that enables single-step insert replacement and helps shorten downtime.

An SPL-2030 model with deactivated surfaces is also available for samples with highly adsorptive components, such as sulfur-based components.



SPL-2030



Flow Controller AFC-2030

Wide-Bore Injection Unit (WBI)

This capillary column injection unit is used to inject the total volume of samples through a column with a 0.53 mm internal diameter. Injecting larger sample volumes can increase sensitivity. A septum purge line on top of the injection unit reduces contamination and inhibits tailing of large peaks, such as for solvents.

Single Packed Injection Unit (SINJ)

This injection unit is for single flow line type packed columns.

It is used to prevent ghost peaks and contamination by using a specialized sample injection unit for a selective detector (such as an ECD). A capillary column with a 0.53 mm internal diameter can also be attached using a WBC attachment kit.

Dual Packed Injection Unit (DINJ)

This injection unit is for dual flow line type packed columns.

It is included standard with GC-2014 models for packed column analysis.

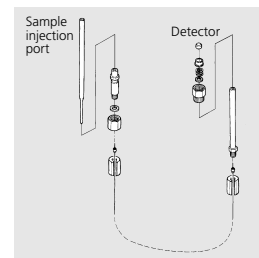
Dual flow lines enable chromatograms to be obtained while reducing baseline impacts during temperature-programmed analysis.

A capillary column with a 0.53 mm internal diameter can also be attached using a WBC attachment kit.

WBC Attachment Kits

These attachment kits are used for total sample volume injection through a 0.53 mm internal diameter capillary column attached to a packed injection unit.

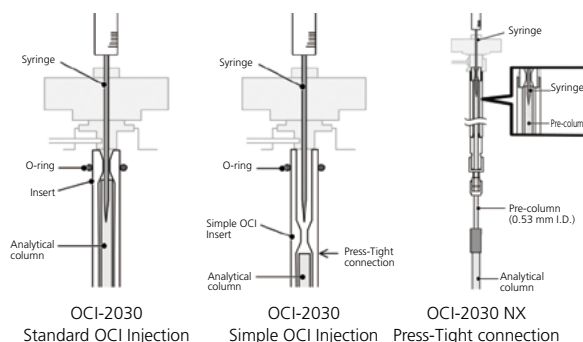
#	Description	P/N	Remarks
-	WBC Attachment Kit, 2010	221-29992-91	For GC-2010 series models. This kit is used to attach a 0.53 mm internal diameter column to SINJ and packed detector units.
-	WBC Attachment Kit, 2014	221-29992-92	For GC-2014 models. This kit is used to attach a 0.53 mm internal diameter column to a DINJ or SINJ unit and packed detector unit. Make-up gas must be supplied by a flow controller.
-	WBC Attachment Kit, 2030	221-29992-93	For Nexis GC-2030 models. This kit is used to attach a 0.53 mm internal diameter column to SINJ and packed detector units.
-	WBC Adapter for Injection Port	221-29676	For all GC models. This adapter is used to attach a 0.53 mm internal diameter column to a DINJ or SINJ unit.
-	WBC Adapter for DFID/DTCD	221-70952-91	For GC-2014 models. This adapter is used to attach a 0.53 mm internal diameter column to a DFID or DTCD unit. It includes tubing for supplying make-up gas from the DAFC unit.



On-column Injection (OCI) Unit

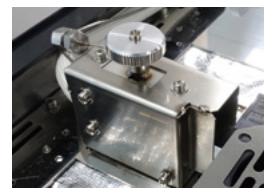
On-column injection units are suitable for analyzing compounds with thermal instability (easily decomposed). A special syringe is used to inject the total volume of liquid sample directly into the column while the injection unit temperature is below the solvent boiling point, and then the injection unit is heated to vaporize the solvent for analysis. It can reduce decomposition or distillation phenomena (discrimination) within the injection unit.

If using a narrow-bore column or concerned about column contamination, a 0.53 mm internal diameter guard column (deactivated) can be connected by Press-Tight connectors. By using an easy OCI insert, a narrow-bore column can be used directly connected by Press-Tight connectors. (OCI-2030NX models do not support easy OCI injection.)



Column Connection Parts

#	Description	P/N	Remarks
-	Press-Tight Connector	221-38102-92	For connecting 0.25 to 0.53 mm I.D. columns
-	Siltite μ Union, 0.8 - 0.8	073565	For connecting a 0.53 mm I.D. column to a 0.53 mm I.D. column
-	Siltite μ Union 0.5-0.8	073564	For connecting a 0.53 mm I.D. column to a 0.32 mm I.D. column
-	Siltite μ Union 0.4-0.8	073562	For connecting a 0.53 mm I.D. column to a 0.25 mm I.D. column



Programmed Temperature Vaporization (PTV) Injection Unit

Programmed temperature vaporization injection units are suitable for analyzing compounds with thermal instability (easily decomposed) because there is no distillation phenomenon (discrimination).

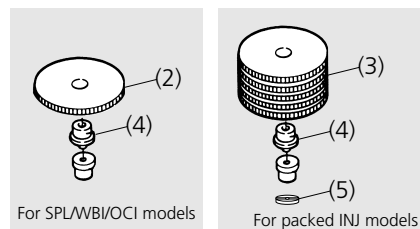
Programmed temperature vaporization (PTV) is an analysis method that injects liquid samples into the insert to enable both split and splitless methods.

Using an insert reduces column contamination.

It can also be used for high-sensitivity analysis by injecting a large sample volume and then concentrating the target components inside the injection unit by heating the solution to a temperature that only vaporizes the solvent and discharging the solvent via the split line.

Septum Nut

#	Description	P/N	Applicable models and remarks
(1)	Septum Nut with Needle Guide for SPL	221-77117-41	Nexis GC-2030 Needle guide not necessary
(2)	Septum Nut	221-72615	GC-2010 Plus (for SPL)
-	Septum Nut	221-41286	GC-2010 Plus (for WBI/OCI), GC-2014, or GC-2025
(3)	Septum Nut for Packed INJ	221-70466	GC-2014 (for packed INJ units)
(4)	Needle Guide	221-44823-91	For GC-2010/2010 Plus, GC-2014, or GC-2025 Set of 2
(5)	Injection Port Spacer	221-22206	GC-2014 (for packed INJ units)



ClickTek Nuts (For Single-Step Replacement)

ClickTek nuts are included standard with SPL-2030 and WBI-2030 models. They cannot be installed in other injection units.

Parts for Connecting Capillary Columns

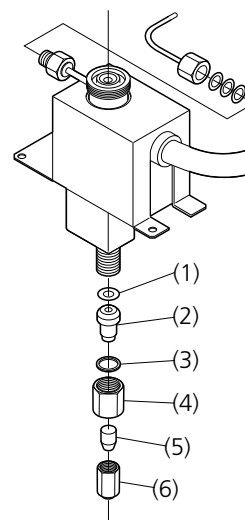
The parts used to connect capillary columns are determined based on the column's internal diameter, whether or not air ingress via the connector would affect analysis, and whether or not ClickTek connectors are used.

	Adapter	Graphite	Vespel	ClickTek
HS-20 NX	Split joint		✓	✓
HS (except HS-20 NX) or TD	Split joint		✓	
Sample Injection Units (when using SCD or GC-MS)	Vespel adapter		✓	
SPL/WBI	Capillary adapter (included standard)	✓	✓	✓
PTV	Capillary adapter (included standard)	✓		
OCI	Not necessary or Press-Tight connector			
SINJ	Stainless steel column adapter (included standard) or WBC adapter	✓		
DINJ	Stainless steel column adapter (included standard) or WBC adapter	✓		
SCD, GCMS	Vespel adapter		✓	
FID, TCD, BID, FPD, FTD, ECD	Capillary adapter (included standard)	✓		✓
PFID, PTC	Stainless steel column adapter (included standard) or WBC adapter	✓		

Nuts and Graphite Ferrules for Capillary Columns

These are typical graphite ferrules. They are easy to use and somewhat reusable. They can be used at temperatures up to 450 °C. Due to oxygen permeability, they are not suitable for GC-MS systems or for analyzing target compounds that contain oxygen.

#	Description	P/N	Remarks
(1)	Gold Gasket	221-49065-91	Set of 5
(2)	Capillary Adapter	221-42998	
-	Deactivated Capillary Adapter	221-82787-04	Deactivated
(3)	Back Washer	201-30051	
(4)	Nut	201-30008	
(5)	Ferrule, 0.5 mm	221-32126-05	For columns with O.D. up to 0.5 mm, set of 10
(5)	Ferrule, 0.5 mm Conditioning	227-35006-01	For columns with O.D. up to 0.5 mm, pre-aged, and suitable for temperature-programmed analysis, set of 10
(5)	Ferrule, 0.8 mm	221-32126-08	For columns with O.D. up to 0.8 mm, set of 10
(5)	Ferrule, 0.8 mm Conditioning	227-35009-01	For columns with O.D. up to 0.8 mm, pre-aged, and suitable for temperature-programmed analysis, set of 10
-	Column Nut with Slit	221-32705-84	For detector, set of 5
(6)	Column Nut without Slit	221-16325-81	For sample injection unit, set of 10



Nuts and Vespel Ferrules for Capillary Columns

If air ingress via the connector could affect analysis, using Vespel ferrules with dedicated adapters/nuts is recommended. Additional tightening is required so they cannot be reused for any other column than the one to which it is initially tightened. Use them at temperatures up to 325 °C.

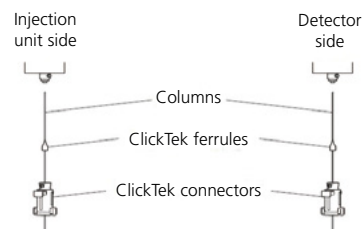
#	Description	P/N	Remarks
(2)	Capillary Adapter	225-10167-91	Nut (for MS injection port), pre-washed
(5)	Ferrule: GVF-004	670-15003-03	For 0.25 mm columns
(5)	Ferrule: GVF-005	670-15003-04	For 0.32 mm columns
(5)	Ferrule: GVF-008	670-15003-07	For 0.53 mm columns
(6)	Column Nut, 1/16"	670-11009-00	Nut (for SCD/MS/HS/TD units), set of 5

Note: Not compatible with metal capillary columns

ClickTek Nuts and Ferrules for Capillary Columns

These parts enable easy tool-free connection/disconnection for compatible sample injection units and detectors. They are not oxygen permeable, will not generate debris, and will not seize to the sample injection unit or detector. Use them at temperatures up to 350 °C.

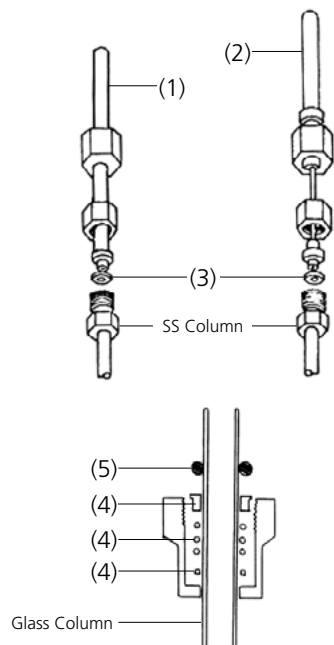
#	Description	P/N	Remarks
-	ClickTek Starter Kit, AF 2030	221-77144-01	This kit is required for newly installing ClickTek connectors on Nexis GC-2030 AF models.
-	ClickTek Starter Kit, AF 2010	221-77144-04	This kit is required for newly installing ClickTek connectors on GC-2010 series AF models.
-	ClickTek Starter Kit, AF 2025	221-77144-05	This kit is required for newly installing ClickTek connectors on GC-2025 AF models.
-	ClickTek Starter Kit, AT 2030	221-77144-42	This kit is required for newly installing ClickTek connectors on Nexis GC-2030 AT models.
-	ClickTek Starter Kit, AT 2010	221-77144-46	This kit is required for newly installing ClickTek connectors on GC-2010 series AT models.
-	ClickTek Starter Kit, ATF 2030	221-77144-43	This kit is required for newly installing ClickTek connectors on Nexis GC-2030 ATF models.
-	ClickTek Starter Kit, ATF 2010	221-77144-47	This kit is required for newly installing ClickTek connectors on GC-2010 series ATF models.
-	ClickTek Starter Kit, SPL 2030	221-77144-11	This kit is for supporting ClickTek connectors on Nexis GC-2030 models with an SPL/WBI unit installed.
-	ClickTek Starter Kit, SPL 2010	221-77144-21	This kit is for supporting ClickTek connectors on GC-2010 series models with an SPL/WBI unit installed.
-	ClickTek Starter Kit, FID 2030	221-77144-12	This kit is for supporting ClickTek connectors on Nexis GC-2030 models with an FID unit installed.
-	ClickTek Starter Kit, FID 2010/2025	221-77144-22	This kit is for supporting ClickTek connectors on GC-2010 series or GC/2025 models with an FID unit installed.
-	ClickTek Starter Kit, BID 2030/2010	221-77144-53	This kit is for supporting ClickTek connectors on Nexis GC-2030/GC-2010 series models with a BID unit installed.
-	ClickTek Starter Kit, FTD 2030/2010	221-77144-57	This kit is for supporting ClickTek connectors on Nexis GC-2030/GC-2010 series models with an FTD unit installed.
-	ClickTek Starter Kit, FPD 2030/2010	221-77144-15	This kit is for supporting ClickTek connectors on Nexis GC-2030/GC-2010 series models with an FPD unit installed.
-	ClickTek Starter Kit, ECD 2030/2010	221-77144-56	This kit is for supporting ClickTek connectors on Nexis GC-2030/GC-2010 series models with an ECDexceed unit installed.
-	ClickTek Ferrules without Holes	221-81162-00	Ferrule for blocking flow (set of 6)
-	ClickTek Ferrule 0.43m	221-81162-01	ClickTek ferrules for columns with up to 0.25 mm I.D. (set of 6)
-	ClickTek Ferrule 0.50m	221-81162-02	ClickTek ferrules for columns with 0.32 mm I.D. (set of 6)
-	ClickTek Ferrule 0.73m	221-81162-03	ClickTek ferrules for columns with 0.45 to 0.53 mm I.D. (set of 6)
-	ClickTek Connector	221-77155-41	To connect multiple columns, two ClickTek connectors are required per column.
-	Prefix Tool for GC	221-76547-43	Tool used to fasten ClickTek ferrules to columns



Parts for Connecting Packed Columns

The parts used to connect packed columns are determined based on the type of column.

#	Description	P/N	Remarks
(1)	Stainless Column Adapter, SINJ	221-14087-92	For stainless steel columns and Nexis GC-2030/GC-2010 series models
(1)	Stainless Column Adapter, INJ	221-14087-91	For stainless steel columns and GC-2014 models
(2)	Stainless Column Adapter, DET, 2030/2010	221-43143-92	For stainless steel columns and Nexis GC-2030/GC-2010 series models
(2)	Stainless Column Adapter, DET, 2014	221-08882-91	For stainless steel columns and GC-2014 models (except TCD)
(2)	Stainless Column Adapter, TCD, 2014	221-10079-93	For stainless steel columns and GC-2014 models (TCD)
(3)	Aluminum Gasket	201-35183-84	For stainless steel columns and high temperatures (250 °C or higher), 5 bags of 100 each
(3)	Silicon Gasket	201-35184	For stainless steel columns used at less than 250 °C, set of 50
(4)	Glass Column Joint Set	221-15561-84	Glass column connection parts, set of 5
(4)	Column Connector, TCD-2014	221-10078-92	For WBC and glass columns
(5)	Graphite Ferrule for Glass Columns	221-15563-91	For glass columns and high temperatures (250 °C or higher), set of 4
(5)	TCD Sleeve Ferrule	221-10076-91	For TCD-2014 glass and stainless steel columns, set of 10
(5)	O-ring Silicon	201-47614	For glass columns used at less than 250 °C, set of 20



Filter for Flow Controller

This filter is for protecting the flow controller (AFC) from contamination by samples discharged into an SPL split line or purge line.

SPL-2030 filters can be replaced by hand.

Also, visibility inside enables determining the filter contamination level at a glance.

Installing an additional filter is recommended if using aqueous solvents or discharging large quantities of sample from the split line.



(1) Filter, Split Line (2) Filter, Split/Purge Line

#	Description	P/N	Remarks
(1)	Filter, Split Line	221-77580-42	Split line for Nexis GC-2030 models
(2)	Filter, Split/Purge Line	221-42559-92	For adding a hydrocarbon filter to split or purge lines
(3)	Filter, Carrier Line	221-34121-94	For adding a moisture filter to the carrier line



(3) Filter, Carrier Line

Column Oven Accessories

Cryogenic Valve Unit (CRG)

The CRG unit supplies refrigerant (liquified carbon dioxide gas or liquid nitrogen) to the GC for controlling the column oven temperature below room temperature. Refrigerant supply is controlled by switching an electromagnetic valve ON or OFF. Temperature is controlled to -50 °C if using liquified carbon dioxide as a refrigerant or to -99 °C if using liquid nitrogen.

It is used for detailed analysis of hydrocarbons (DHA) or cryogenic separation of inorganic gases (argon, oxygen, etc.) as specified by ASTM and JIS standards. Placing the refrigerant container near the GC is recommended.

Oven Light

Illuminating the GC column oven interior makes it easier to see connections when routing the column to the injection port or detector. It helps prevent damage from hitting the column tip against objects.



Column Hanger

These parts are used to secure columns inside the column oven. They can secure 1 to 3 columns, depending on the column shape.



Oven Insert

The heating rate can be increased by installing an oven insert inside the column oven. Due to the shorter analysis times resulting from faster heating, the insert is used for applications such as simulated distillation (SimDis) gas chromatography and total petroleum hydrocarbons (TPH) analysis.

Note: Some restrictions apply regarding where the sample injection unit or detector can be installed and how many columns can be installed.

Exhaust Duct

Due to the hot gases discharged from the back of the GC, the back of the GC must be kept a certain distance from any wall in order to prevent trapping heat. If the required space cannot be provided, install an L-shaped exhaust duct. If an exhaust duct that can be connected directly to a 100 mm diameter spiral duct is used, then the oven exhaust can be discharged directly into an exhaust ventilation system to minimize any increase in room temperature.



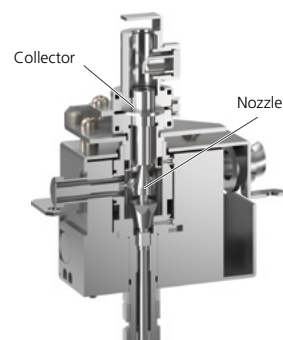
Detectors

Flame Ionization Detector (FID)

This general-purpose detector can detect almost all organic compounds (except formaldehyde and formic acid). Sensitivity to changes in temperature or gas flowrates is poor, but it offers high S/N ratios, a wide dynamic range, and is easy to use for a wide range of applications.

FID Nozzles and Collectors

If using an FID, better or more reliable analysis results can be obtained for some samples by replacing the nozzle or collector. The larger the nozzle bore diameter, the less prone it is to sample clogging and the more linear the results, but the lower the sensitivity. Nozzle designs are optimized for the main analytical target.



Flame Ionization Detector (FID-2030)

#	Description	P/N	Remarks
(1)	Nozzle, Capillary, FID-2030	221-75597-03	For Nexis GC-2030 models. This standard nozzle is used for capillary columns.
	Nozzle, Wide, FID-2030	221-75597-05	For Nexis GC-2030 models. It is used to measure a wide range of concentrations via a capillary column with a 0.53 mm I.D.
	Nozzle, Aqueous, FID-2030	221-75597-08	For Nexis GC-2030 models. It is used if the hydrogen flame is prone to extinguishing when analyzing aqueous or other solutions via a capillary column or if the nozzle is prone to clogging when analyzing high-boiling components.
(2)	Nozzle, Capillary, FID-2010/2025	221-48258-91	For GC-2010 series or GC-2025 models. This standard nozzle is used for capillary columns.
	Nozzle, Wide, FID-2010/2025	221-48258-92	For GC-2010 series or GC-2025 models. It is used to measure a wide range of concentrations via a capillary column with a 0.53 mm I.D.
	Nozzle, Aqueous, FID-2010/2025	221-49373-91	For GC-2010 series or GC-2025 models. It is used if the hydrogen flame is prone to extinguishing when analyzing aqueous or other solutions via a capillary column or if the nozzle is prone to clogging when analyzing high-boiling components.
(3)	Nozzle, Packed, FID-2030	221-85179-41	For Nexis GC-2030 models. This standard nozzle is used for packed columns.
	Nozzle, Packed Aqueous, FID-2030	221-85179-42	For Nexis GC-2030 models. It is used if the hydrogen flame is prone to extinguishing when analyzing aqueous or other solutions via a packed column.
(4)	Nozzle, Packed, FID-2014	221-70162-95	For GC-2014 models. This standard nozzle is used for packed columns.
	Nozzle, Aqueous, FID-2014	221-70162-96	For GC-2014 models. It is used if the hydrogen flame is prone to extinguishing when analyzing aqueous or other solutions via a packed column.
(5)	Nozzle, Capillary, FID-2014	221-70162-93	For GC-2014 models. It is used for high-sensitivity measurements using a capillary column.
	Nozzle, Wide, FID-2014	221-70162-92	For GC-2014 models. This standard nozzle is used for capillary columns.
	Nozzle, Aqueous, FID-2014	221-70162-94	For GC-2014 models. It is used if the hydrogen flame is prone to extinguishing when analyzing aqueous or other solutions or if the nozzle is prone to clogging when analyzing high-boiling components.
(6)	Nozzle, Packed, FID-2010	221-48885-91	For GC-2010 series models. This standard nozzle is used for packed columns.
(7)	Collector, FID-2030	221-72322-95	For Nexis GC-2030 models.
(7)	Collector, Wide, FID-2030	221-72322-96	For Nexis GC-2030 models. Used with an FID nozzle collector kit.
(7)	Collector, FID-2010/2025	221-72322-91	For GC-2010 series or GC-2025 models.
(8)	Collector, FID-2014	221-81021-41	For GC-2014
	FID Custom Kit for Wide Concentration Ranges	221-88280-41	For Nexis GC-2030 models. It is used to measure a wide range of concentrations. Configured with a 0.5 mm diameter capillary nozzle and FID-2030 wide collector.
	FID Custom Kit for Packed Columns	221-85191-41	For Nexis GC-2030 models. It is used to connect a packed column to an FID-2030 detector.
	Capillary Adapter for DFIDs	221-33193-91	For GC-2014 models. It is used to connect a capillary column to an FID-2014 detector.



(1) Capillary Nozzle for GC-2030



(2) Capillary Nozzle for GC-2010 and GC-2025



(3) Packed Nozzle for GC-2030



(4) Packed Nozzle for GC-2014



(5) Capillary Nozzle



(6) Packed Nozzle



(7) FID-2030 Collector



(8) FID-2014 Collector

Thermal Conductivity Detector (TCD)

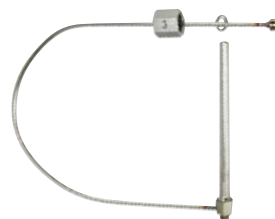
Featuring simple construction and operability, in principle this general-purpose detector should be able to detect all substances with a thermal conductivity that is different from the carrier gas.

It is mainly used to detect inorganic gases or components without FID detection sensitivity. Because it is a non-destructive detector, it can be connected in series with other detectors.

Helium is primarily used as the carrier gas. (N₂ or Ar is used to analyze He or H₂.)

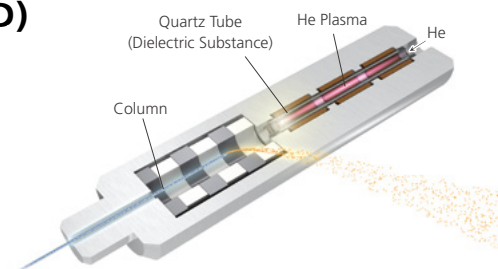
Capillary Adapter for TCD

This is used to supply make-up gas, such as via a split tube connected to a packed column injection port. It is used to connect a capillary column to a packed column TCD unit.



Barrier Discharge Ionization Detector (BID)

BIDs enable detecting every compound except Ne (neon) and He, which is plasma gas, with high sensitivity (ppm). Therefore, BIDs enable analyses of CO, CO₂ and light hydrocarbons simultaneously with high sensitivity, while these mixed gas samples require multiple detectors using conventional analytical methods.



Helium Purifier HP-2

This purifier can purify helium supplies with up to 10 ppm impurities (equivalent to a G2 helium cylinder) to achieve a high purity level of up to 10 ppb impurities.

That means it can supply helium for BID units that require a minimum 99.9999 % purity.

It can purify helium at flowrates up to 1000 mL/min.

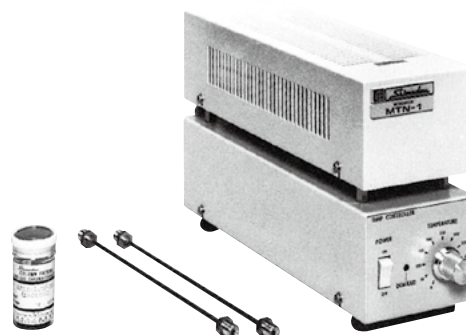


Methanizer MTN-1 (For Packed Columns only)

The MTN-1 reduces CO and CO₂ into CH₄ using a nickel catalyzer. Adding this device between a column and FID allows CO and CO₂ to be detected at a high sensitivity through simple operation. It enables detecting CO and CO₂ below 10ppm, which is impossible with a TCD.

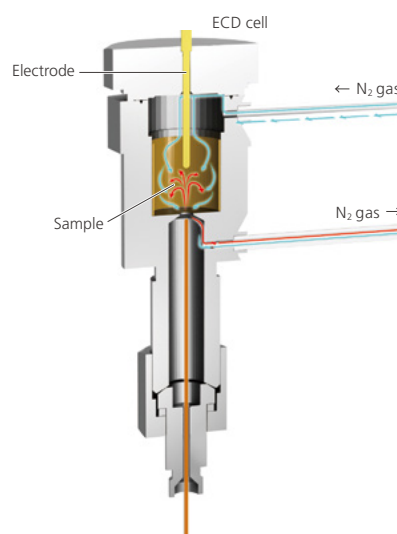
A nickel catalyzer (5mL) is included.

Note: Nickel catalysts are deactivated by oxygen. Therefore, when analyzing samples containing oxygen, an additional system is required to prevent the introduction of oxygen to the methanizer. Please contact your local Shimadzu representative for details.



Electron Capture Detector (ECD)

ECDs provide extremely high selective sensitivity to halogen and nitro compounds by using a radioisotope. They offer especially high sensitivity for chlorinated compounds, enabling detection at the picogram quantity level, making them ideal for the trace analysis of chlorinated pesticide residues. To ensure a stable baseline, supply gas (especially nitrogen) must be free of oxygen.



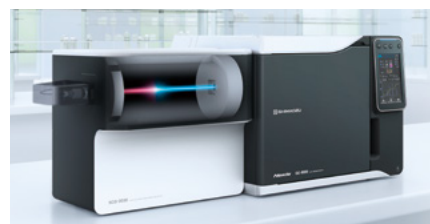
ECD Flow Bypass Kit

This option is used to continuously pump gas through the ECD cell even when the power supply is OFF, so that the baseline stabilizes more quickly after switching the power ON.



Sulfur Chemiluminescence Detector (SCD)

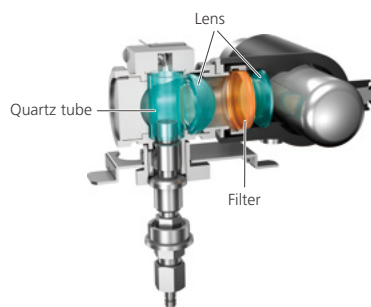
This selective high-sensitivity detector measures the sulfur content in samples based on its chemiluminescence. It enables about one order of magnitude higher sensitivity than FPD detectors that selectively detect sulfur compounds in a similar way; however, it differs from FPD detectors in that sensitivity is linearly proportional to sample concentration. (FPD sensitivity is quadratically proportional to concentration.) SCD detectors also offer similar molar sensitivity, which enables sulfur compounds to be measured with the same relative sensitivity regardless of their structures. That characteristic means that a calibration curve for a different compound can be used to determine an approximate concentration, even for compounds without a standard sample available. It is ideal for analyzing sulfur compounds in natural gas or gasoline or trace flavor components in beverages.



#	Description	P/N	Remarks
-	SCD Consumables Set	221-84141-41	This is a set of consumables for six months of operation.
-	Ozone Scrubber Set	221-84384-41	Ozone scrubber is pre-filled.
-	Ozone Scrubber Filter	221-84142-41	
-	DAU-20 Maintenance Kits	221-82894-50	Pump maintenance kit

Flame Photometric Detector (FPD)

The characteristic light emitted from the combustion of sulfur or phosphorus compounds is selected with an optical filter and detected by a photomultiplier to permit selective detection. FPDs are now extensively used for determination of malodorous compounds such as hydrogen sulfide and methyl sulfide, and determination of residual phosphoric pesticides.



Interference Filter

Use an appropriate filter (sold separately) for your detection target. Three types, for detecting sulfur, phosphorus, and tin, are available.

#	Description	P/N	Remarks
(1)	FPD Filter for S, 2030	221-80888-01	For Nexis GC-2030
(2)	FPD Filter for P, 2030	221-80888-02	For Nexis GC-2030
(3)	FPD Filter for Sn, 2030	221-80888-03	For Nexis GC-2030
(4)	FPD Filter for S, 2010	221-73354-01	For GC-2010 Series
(5)	FPD Filter for P, 2010	221-73354-02	For GC-2010 Series
(6)	FPD Filter for Sn, 2010	221-73354-03	For GC-2010 Series
-	FPD Filter for S, 2014	221-46310-01	For GC-2014
-	FPD Filter for P, 2014	221-46310-02	For GC-2014
-	FPD Filter for Sn, 2014	221-46310-03	For GC-2014



Photomultiplier Purge Kit

The service life of expensive photomultipliers can be extended by reducing the amount of helium or other gases entering the photomultiplier to prevent deterioration. The kit is useful for installing a detector that uses helium (FID or FTD) or for simultaneously installing an FPD.



Note: A photomultiplier purge kit is not included standard with FPD-2030 detectors.

Flame Thermionic Detector (FTD)

This selective high-sensitivity detector detects compounds that contain nitrogen or phosphorus by ionizing the compounds and detecting alkali metal ions in a hydrogen flame. (FPD detectors offer higher selectivity for phosphorus compounds.)

It does not respond to inorganic nitrogen compounds. These detectors can be used for analyzing organic phosphorus compounds or organic nitrogen compounds, such as residual pesticides.

FTD Nozzles and Collectors

#	Description	P/N	Remarks
-	Nozzle, Capillary, FTD-2030/2010Plus/2014C	221-48258-91	For FTD-2030, FTD-2010 Plus, and FTD-2014C models
-	Nozzle, Packed, FTD-2014	221-70162-92	For FTD-2014 models using a packed column
-	Nozzle, Capillary, FTD-2014	221-70162-93	For FTD-2014 models using a capillary column
-	Collector Bead (capillary)	221-71513-91	For FTD-2030, FTD-2010 Plus, and FTD-2014C models
-	Collector Bead (packed)	221-18704-91	For FTD-2014
-	Collector Bead (pesticides)	221-42512-91	For FTD-2014. Collector for packed analysis suitable for pesticide analysis
-	FTD Collector Regeneration Kit	221-49079-91	For FTD-2030, FTD-2010 Plus, and FTD-2014C models This kit is for reusing FTD collectors with decreased sensitivity by adding an alkali source.
-	FTD Collector Regeneration Adapter	221-70846-91	Using an FTD collector regeneration kit improves productivity.

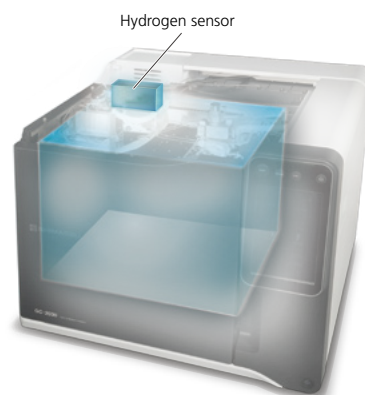
Safety and Environmental Accessories

Hydrogen Carrier Gas Kit

The hydrogen carrier gas kit includes a hydrogen sensor, optional AFC hydrogen assembly, and vent tube. The hydrogen sensor enables early detection of potential hydrogen leaks inside column ovens and switches to a safe standby mode. It also shuts OFF the main power supply if the hydrogen leak rate increases to prevent accidents.

The optional AFC hydrogen assembly applies flow resistance to prevent the flow controller from releasing a hydrogen flowrate that exceeds the specified range.

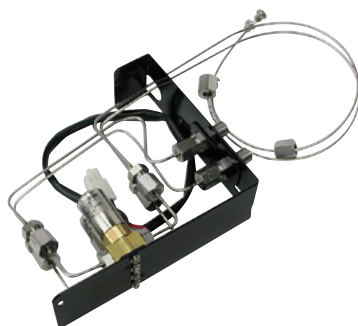
This optional product ensures hydrogen carrier gas can be used more safely.



Supply Gas Shut-off Solenoid Valve Unit

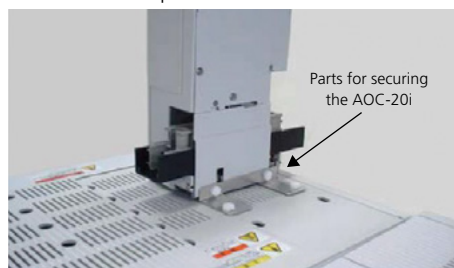
This Solenoid Valve Unit is connected to the detector's supply gas (hydrogen, air). It not only can shut off the supply gas according to instrument power supply or system ON/OFF operation, but also enables automatic startup and shutdown after analysis ends.

Note: Not applicable for FID.



Parts for Securing Instruments

Securing the instrument with these parts can reduce the risk of the instrument tipping over or falling. GC, SCD, and HS units are secured to a table or stand. AOC units are secured to the top of a GC unit.



Flame Monitor FLM-2

If the FID detector gas flow is controlled manually, unburned hydrogen gas can be discharged when the flame is extinguished. This instrument monitors the ignition status independently from the GC system and closes the solenoid valve to shut OFF hydrogen flow when the flame is extinguished.

Vent Tube

If a hazardous gas or hydrogen gas is discharged from the split vent or detector vent, use this silicone rubber tube (6 mm I.D. and 8 mm O.D.) to exhaust the gas into a local exhaust system.



Gas Generators

Air Generator AGE-1000

This purifier can purify air supplies with up to 100 ppm impurities to achieve a purity level of up to 100 ppb impurities.

That enables high-sensitivity capillary FID analysis equivalent to using high-purity air supplied from a gas cylinder.

With a maximum air flowrate of 1000 mL/min, it can supply air for two FIDs.

Note: For the AGE-1000, use an oilless air compressor to supply air with microparticles and water moisture removed, such as by using an air filter regulator and silica gel.



(Detailed product catalog: C184-E029)

Air Compressor

This supplies compressed air with no oil mist for supplying air as auxiliary gas for FID, FPD, or other instruments. In addition to the standard model (55 to 57 dB), a quiet model (47 dB) is available. The recommended flowrate when connected to a GC is 2.5 L/min. It can reliably supply up to four FIDs. However, the actual maximum number of units depends on the given combination, due to differences in the air flowrate required for different detectors. If used for an FTD, the baseline will not stabilize and the specified performance level cannot be guaranteed.



Standard Compressor
(0.2LE-55B)



Quiet-type Compressor
(P00.4-LESN)

H₂ Generator

This compact hydrogen gas generator generates hydrogen by water electrolysis of an ion-exchange membrane.

By simply supplying purified water, this unit can conveniently generate high-purity water by electrolysis.

However, the purified water supply must be deionized to a specific resistance of 1.0 MΩ·cm or higher.

Description	Output Flowrate	Output Pressure
Precision SL (100 mL/min)	100mL/min	Constant 689 kPa
Precision SL (200 mL/min)	200mL/min	
Precision (100 mL/min)	100mL/min	Up to 689 kPa
Precision (200 mL/min)	200mL/min	
Precision (300 mL/min)	300mL/min	
Precision (450 mL/min)	450mL/min	



Precision



Precision SL
(Space-saving type)

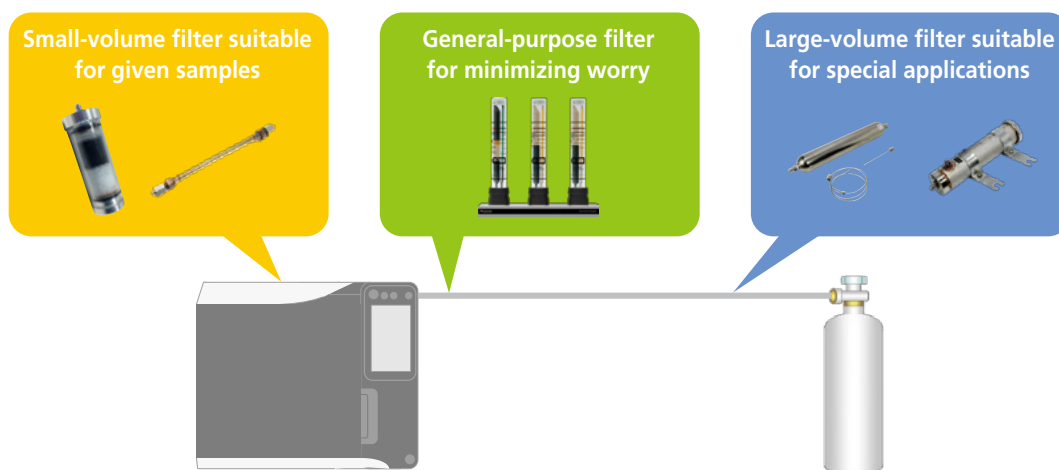
Gas Filter

If a gas supplied to the GC contains impurities, the impurities could damage the column or detector or cause detrimental effects to analytical results.

Though supplying high-purity gas is important, impurities can also be introduced from the flow lines or other sources between the gas cylinder and GC. Installing an appropriate gas filter can help maximize performance from instruments and ensure reliable analysis.

For split analysis, the split sample flows that bypass the flow controller can cause valve problems. Selecting a suitable filter for the given sample can help ensure worry-free operation in such cases.

Application	Impurities	Effects
Column	Oxygen/moisture	Shortens life of liquid phases. Large impact on polar columns and during high-temperature analysis
FID	Hydrocarbons/moisture	Elevates baseline and increases noise.
TCD	Oxygen	Shortens filament life.
BID	Oxygen/nitrogen	Causes plasma ignition failure. Elevates baseline and decreases sensitivity.
FPD	Hydrocarbons/moisture	Elevates baseline and increases noise.
ECD	Oxygen	Decreases linearity and sensitivity.



Super-Clean Gas Filter

These filters can purify supplied gas to 99.9999 % or higher purity levels by adsorbing and removing impurities (such as organic components, moisture, and oxygen) in the gas. They can help reduce analytical instrument downtime by preventing column deterioration due to oxygen, preventing ghost peaks and baseline fluctuations, eliminating excessive detector noise, and so on.

#	Description	P/N	Remarks
(1)	Shimadzu Gas Filter Kit for GC-FID/FPD	227-37036-01	3 ports for FID, FPD, FTD, or SCD units
-	Shimadzu Gas Filter Kit for Compressed Air	227-37036-02	3 ports for FID units with compressor air supplies
-	Shimadzu Carrier Gas Filter Kit	227-37034-02	1 port for carrier gas (TCD or ECD detector gas)
-	Shimadzu Carrier Gas Filter Kit (Helium Replaced)	227-37034-03	1 port for BID units
-	Shimadzu Makeup Gas Filter Kit for Separate Makeup Gas	227-37034-01	1 port for make-up gas (FID, FTD, or ECD) if carrier gas is not used as detector gas
-	Shimadzu Carrier Gas Filter	227-37037-01	
-	Shimadzu Carrier Gas Filter (Helium Replaced)	227-37037-05	
-	Shimadzu Makeup Gas Filter	227-37037-02	
-	Compressed Air Gas Filter	227-37037-03	
-	Gas Filter Kit	227-37038-01	
-	Compressed Air Gas Filter Kit	227-37038-02	
-	O-ring for Base Plate	227-37031-02	



(1) General-Purpose Gas Filter Kit Filter can be installed easily.

Check Valve
The base plate keeps gas flow blocked unless a filter is installed.



(Detailed product catalog: C180-E083)

Filter Regulator

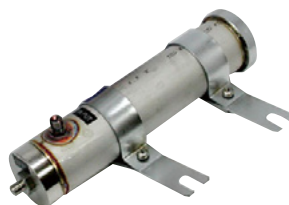
For high-sensitivity analysis, this regulator reduces baseline fluctuations caused by compressor pressure pulsation or supplied pressure fluctuations when using a central piping system.

It also removes water and contaminant particles from gas supplies. It can be used repeatedly by manually discharging collected substances.



Moisture Trap (Silica gel)

This absorbs moisture contained in gas supplies. If air from a compressor or other gas with high moisture levels is supplied, installing a filter regulator upstream from this moisture trap is recommended. Part of the silica gel will become discolored around the replacement period.



Filter Joint

This is a sintered filter in the form of a union joint. Its ability to remove foreign matter is useful for connecting to new pipes or other situations where cleanliness is not ensured.



Oxygen Trap

This trap can reduce the oxygen content in gas supplies to a 0.1 ppm level, with a capacity for absorbing about 2.5 L of oxygen.

Reliability decreases if oxygen gets inside the ECD. Therefore, it is recommended that an oxygen trap be installed in the carrier and make-up gas lines. If a column prone to degradation by oxygen is used, it can also be helpful to install the trap in the carrier gas line.



Syringe for Cleaning

An M-type joint is included on the tip of 10 mL syringes. This tool is useful when cleaning the interior of flow lines with solvent.



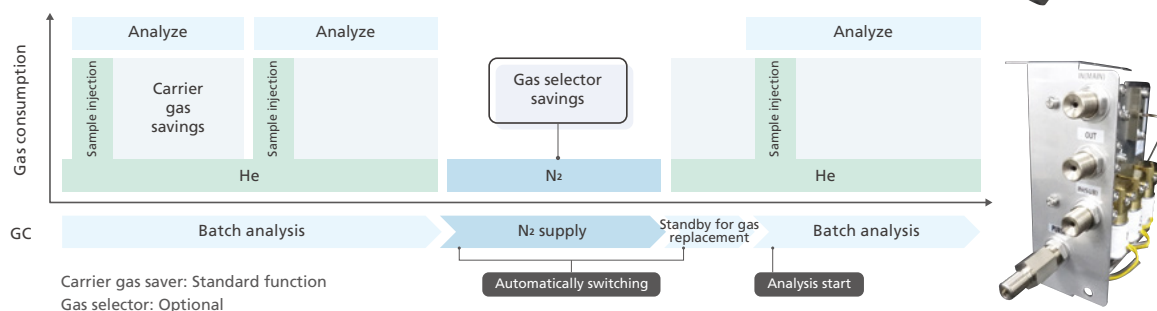
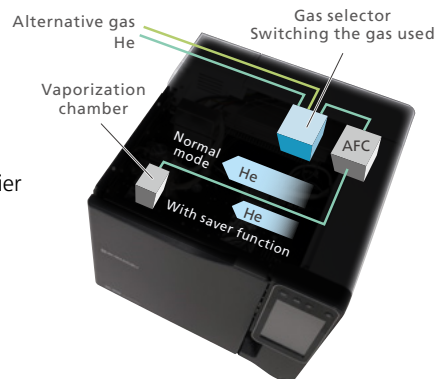
Operating Parts

Gas Selector

Reconnecting flow lines to switch between gases requires shutting OFF the system. Even systems for manually switching between gases require purging lines thoroughly in the correct order in order to prevent the risk of different gases mixing inside gas cylinders.

The gas selector enables automatically and safely switching between the carrier gases being used.

In addition to enabling successive analyses using different carrier gases, the selector can also help reduce running costs by switching to an inexpensive carrier gas when no analysis is being performed.

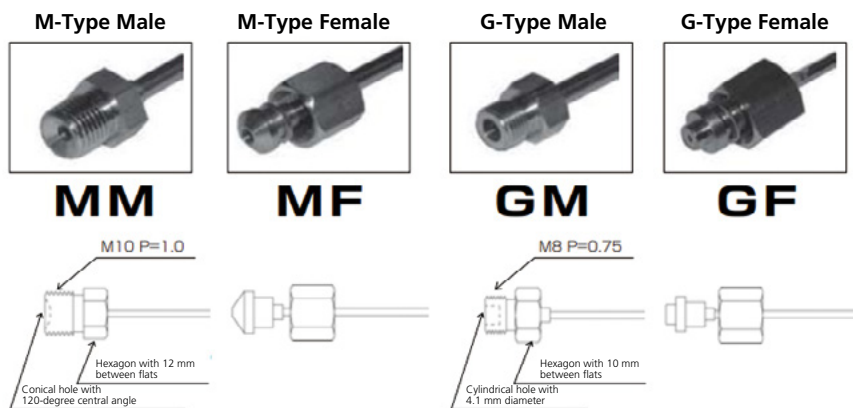


Shimadzu M/G Type Joint

M and G-type tubing joints are used in Shimadzu chromatography systems.

Both types are connected by inserting a nipple into a socket welded (or soldered) to the ends of tubing and tightened by screwing a nut included with the nipple onto the male socket threads.

The M-type, fastened by crimping metal surfaces together (metal-to-metal contact), is mainly used for external gas chromatograph connections (such as for supplying gas to the flow controller). The G-type is tightened against a silicone or aluminum gasket in the joint. It is mainly used for internal gas chromatograph connections (such as to connect tubing or stainless steel columns to the sample injection unit).



#	Description	P/N	Remarks
-	Pipe, MF-MM, 2m	221-26171-20	MF-MM tubing. Used to extend tubing length.
-	Pipe, MF-MM, 5m	201-48069-50	MF-MM tubing. Used to extend tubing longer distances. Requires using a socket for connections.
-	Socket	201-30219	MM-MM socket. Used to connect MF tubes.
-	Pipe, MM-LMF	221-73356-91	MM-MM tubing with left-hand threads. Used to convert from MF (right-hand threads) to left-hand threads.
-	Pipe, MF-MM-MF, 1m	221-72658-91	Pre-cleaned MF-MM-MF tubing. Used to connect tubing splits/branches.

Pressure Regulator for High-Purity Gas PPR Series

For high-sensitivity analysis, in addition to the purity of gases used, of course, contaminants originating from the pressure regulator can also cause problems. PPR series pressure regulators release extremely low contamination levels, making them ideal for high-sensitivity analysis. PPR series pressure regulators feature an air purge valve for purging any air trapped during cylinder replacement before supplying air.



(1) PPR-He

#	Description	P/N	Remarks
-	PPR-N ₂	221-35999-01	For nitrogen, air, or argon (blue) with right-handed threads on the cylinder side and gas tubing side
-	PPR-H ₂	221-35999-02	For hydrogen (red) with left-handed threads on the cylinder side and gas tubing side
(1)	PPR-He	221-35999-03	For helium (yellow) with left-handed threads on the cylinder side and right-handed threads on the gas tubing side
(2)	Inlet Gasket, PPR	221-35999-11	



(2) Inlet Gasket, PPR

Gas Supply Tube

This stainless steel tube has a 3 mm outer diameter and 2 mm internal diameter. It is used to connect the pressure regulator and the flow controller on the gas chromatograph.

#	Description	P/N	Remarks
(1)	Gas Supply Tube, 2.5m	201-48067	Right-handed threads on pressure regulator side and GC side
-	Gas Supply Tube, 5m	201-48067-05	
-	Gas Supply Tube, 10m	201-48067-10	
-	Gas Supply Tube, 15m	201-48067-15	Left-handed threads on pressure regulator side and right-handed threads on GC side
-	Hydrogen Supply Tube for Carrier, 2.5m	221-18990-25	
-	Hydrogen Supply Tube for Carrier, 5m	221-18990-50	
-	Hydrogen Supply Tube for Carrier, 10m	221-18990-00	Left-handed threads on pressure regulator side and GC side
-	Hydrogen Supply Tube for Detector, 2.5m	221-73474-25	
-	Hydrogen Supply Tube for Detector, 5m	221-73474-50	
-	Hydrogen Supply Tube for Detector, 10m	221-73474-00	

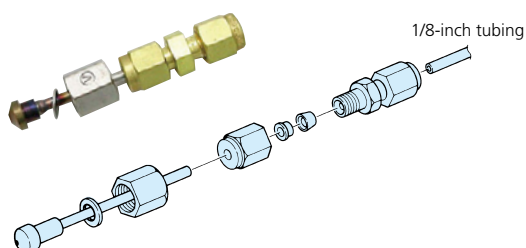


(1) Gas Supply Tube, 2.5m

Swagelok Adapter

This adapter is used to connect 1/8-inch O.D. stainless steel tubing to a Shimadzu M-type joint (also includes a Swagelok joint).

P/N	221-25975-92
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Needle Valve

This valve is used to adjust gas flowrate. The adjustment range for nitrogen gas with an inlet pressure of 300 kPa is 0 to 0.7 L/min. Shimadzu M-type joints are used on both inlet and outlet ends.

P/N	221-57298
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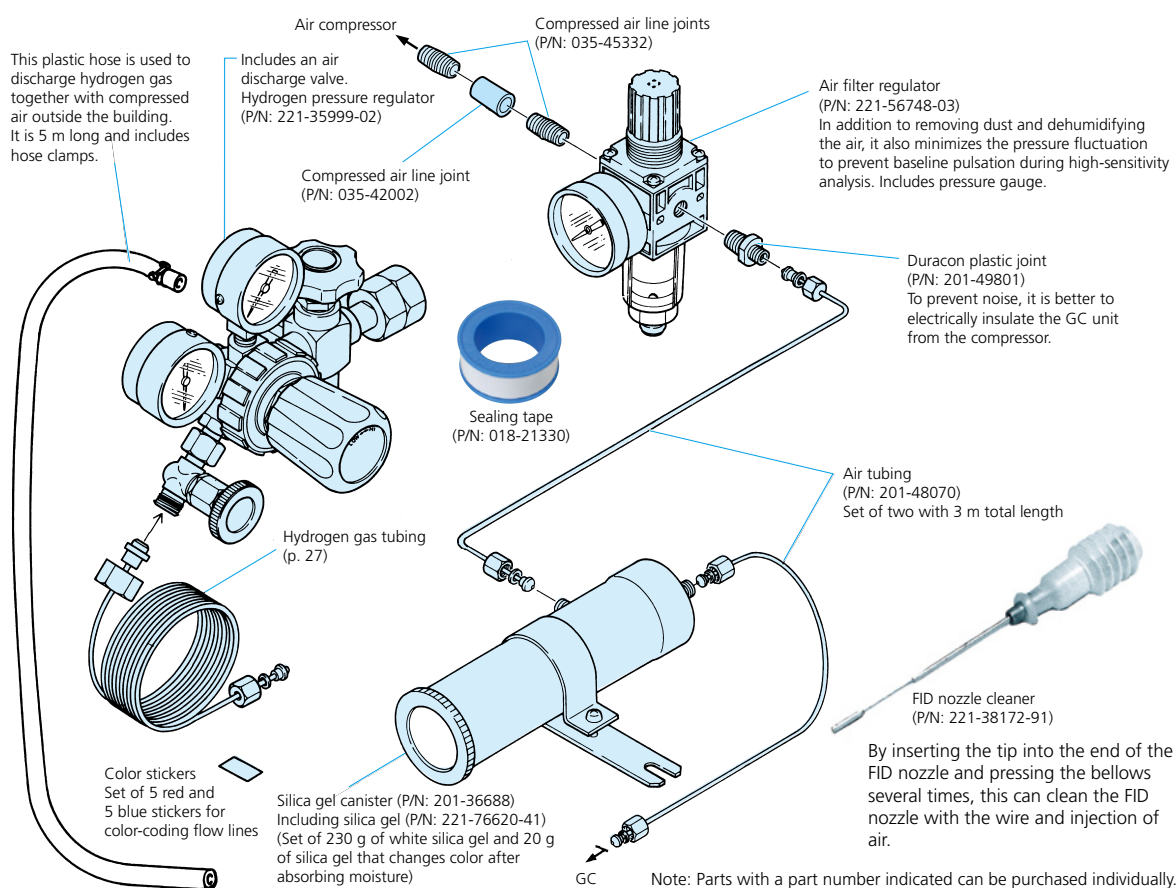


FID Operation Parts Set

These are sets of parts for supplying hydrogen gas and auxiliary air to FID and FPD units. Because a compressor cannot be used for FTDs, parts other than for hydrogen gas cannot be used.

For FTDs, use a PPR-H₂ pressure regulator with hydrogen gas tubing for the hydrogen gas and a PPR-N₂ pressure regulator and gas tubing (p. 25) for high-purity compressed air. If high-sensitivity analysis is required with an FID or FPD, it is recommended to use those items just like for an FTD.

Description	P/N
Without a Pressure Regulator	221-38651-90
With a Pressure Regulator and Hydrogen Gas Tubing (right-handed threads)	221-38651-91
With a Pressure Regulator and Hydrogen Gas Tubing (left-handed threads)	221-38651-92



Data Processor

Chromatography Data Acquisition Module CBM-201m

The CBM-201m is a compact data acquisition module that is designed specifically for use with LabSolutions. It converts up to two analog chromatogram signals output from LC/GC systems into digital signals and sends them to LabSolutions. It supports connection to a computer via either a USB or Ethernet LAN connection.



PC Peripherals

RS-232C

#	Description	P/N	Remarks
-	RS-232C Cable, 2m	AK0198	9-pin to 9-pin crossover cable
-	RS-232C Cable, 4m	AK0198-010	9-pin to 9-pin crossover cable
-	RS-232C Cable, 10m	228-35397-90	9-pin to 9-pin crossover cable
-	2-port Expansion Port	088-50877-91	An RS-232C port can be added via a computer PCI bus.
-	4-port Expansion Port	088-50877-92	An RS-232C port can be added via a computer PCI bus.
-	USB-Serial Converter	AK0197	GC-2010 Plus or GC-2014 models can be connected by USB.
-	Serial Device Server	AK0560	GC-2010 Plus or GC-2014 models can be connected by Ethernet.

Ethernet/USB

#	Description	P/N	Remarks
-	Switching Hub	088-54304-02	8 ports
-	LAN Cable, 2m	228-61083-41	Cat 5e compatible
-	LAN Cable, 5m	088-81104-86	Cat 5e compatible
-	LAN Cable, 10m	088-81104-87	Cat 5e compatible
-	USB Cable, 2m	088-50825-50	USB2.0

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