



Operating Instructions

Check the detector for the correct operating conditions. If make-up gas is being used a flow of 30ml/min. of carrier plus make-up is normally recommended. This can most effectively be measured at the exit of the detector after first turning off other gases to the detector.

To ensure correct functioning of the system, the test chromatogram provided with an SGE capillary column should be reproduced. Set up the conditions as given in the computerised test report and inject the test sample provided with the column. A similar result to the test chromatogram should be obtained.

Capillary Conversion System CCS-4/NC & CCS-05/NC

Installation and Operating Instructions

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Introduction

This kit is designed to be a simple and inexpensive system for converting a gas chromatograph configured for packed column to operate with capillary columns. When correctly installed, true high resolution capillary chromatography can be achieved.

Useful Tips

- 1.** The most accurate way of setting the carrier gas flowrate in the column is to inject a volatile solvent while the column is heated to a temperature at which the solvent will not be retained. Measure the time it takes for the solvent peak to first leave the base line and calculate from the column length, the linear gas velocity through the column.
- 2.** The split flow can be used to adjust the sample size onto the column. If the split flow is turned down too low, however, broadening of the peaks will be seen. When the gas flow through the vaporiser tube is too slow, the sample is delayed and thus is unable to enter the column as a sharp band. It is recommended NOT to use a split flow below 20ml/min. measured at the outlet of the split valve.
- 3.** When a new system or column is installed, we recommend that it is conditioned with carrier gas flow for a few hours near the maximum continuous temperature of the capillary column.

NB. Make sure that the carrier gas is clean, dry and free from oxygen. Fit adsorption tubes and oxygen filters to the carrier supply line if not already installed.

See SGE catalogue for:

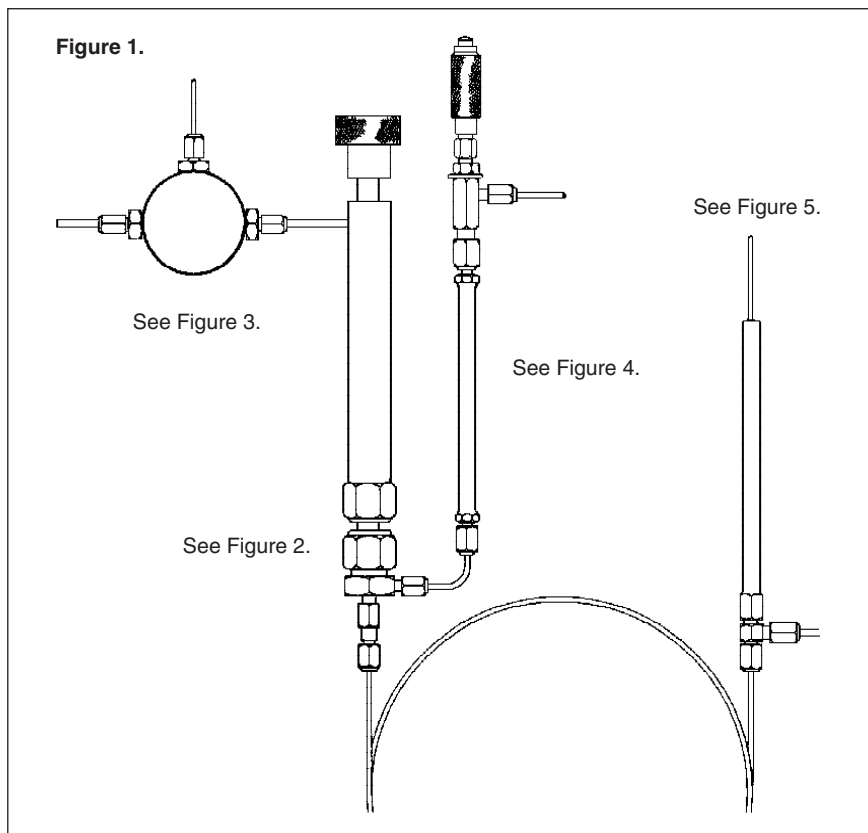
P/N 103486 GFO Oxygen Scrubber

P/N 103486 GFMS Molecular Sieve Absorber.

Installation

Packing List

CCS-4 N/C Capillary Conversion System (1/4" Injection Ports).



1. Remove the existing packed column from the instrument. If 1/8" O.D. packed columns are being used, the 1/8" adaptors should be removed to accommodate the larger CCS capillary injector and detector fittings.

2. (Refer to Figure 2.)

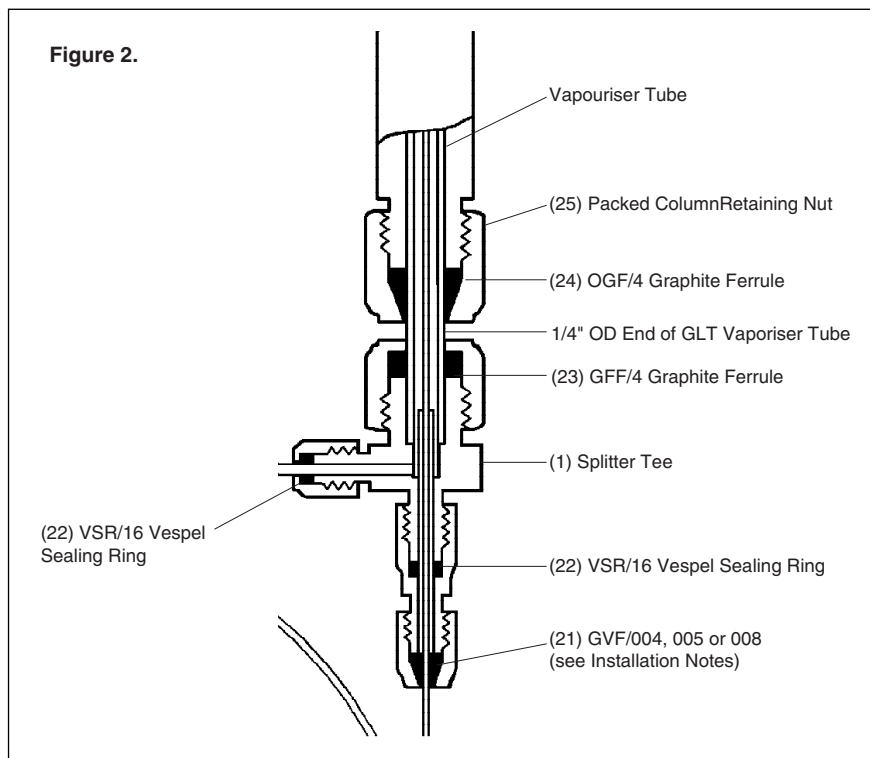
CCS-4 systems are supplied with two 1/4" O.D. GLT vaporiser tubes. Insert the shorter vaporiser tube into the gas chromatograph's existing packed column injector (5). The tube should be inserted the same distance into the injector as the packed column which has been replaced. At least 20mm of the tube should extend into the oven from the injector to leave sufficient room for the splitter tee and other components to be fitted. If there is insufficient room, use the longer (135 mm) GLT tube provided in the kit.

CCS-05 systems are supplied with a vaporiser tube which is 5mm O.D. GLT.

Qty	Description
1	R8286AMBS60 Pressure Regulator
1	Splitter tee
1	1/4" x 4mm ID x 135mm GLT
1	1/4" x 4mm ID x 90mm GLT
1	Molecular Sieve Trap (AT-P) connected to a BMCV-1 Brass Mini Control Valve
1	3SST-16/0.8 Stainless Steel Tubing
1	GVF/004 Vespel Ferrules (Pkt 5)
1	GVF/005 Vespel Ferrules (Pkt 5)
1	GVF/008 Vespel Ferrules (Pkt 5)
1	OGF/4 Graphite Ferrules (Pkt 5)
1	VSR/16 (Pkt 10)
1	GFF/4 Graphite Ferrules (Pkt 10)
1	DC-4 Detector Connector Kit
1	1/4" - 5/16" AF Spanner
1	Piece Carborundum
1	Instructions

Packing List

CCS-05 N/C Capillary Conversion System (5mm Injection Ports).



One end of this tube is bushed up to 1/4" O.D. The split tee (1) is connected to the 1/4" section.

For both the CCS-4 and CCS-05, connect the splitter tee (1) using the 1/4" ferrules provided. First fingertighten and then tighten a further 1 1/4 turns with a spanner.

Place the packed column retaining nut (25) which is normally used with the instrument (not provided in kit) over the vaporiser tube (2). Then slide a ferrule of the type normally provided to hold a packed GC column in the injection port over the vaporiser tube. Do not use metal ferrules as they will damage the glass layer inside the tube.

Finger tighten the nut (25) and then tighten a further 1 1/4 turns with a spanner.

3. (Refer to Figure 3.)

For capillary split injection technique it is essential to use a pressure regulated carrier gas system rather than flow controlled. If your instrument is fitted with a pressure regulator, this device can be used. If it is fitted with a mass flow

Qty	Description
1	R8286AMBS60 Pressure Regulator
1	Splitter tee
1	5mm O.D., 135mm x 3mm ID GLT. Bushed to 1/4".
1	Molecular Sieve Trap (AT-P) connected to a BMCV-
1	Brass Mini Control Valve
1	3SST-16/0.8 Stainless Steel Tubing
1	GVF/004 Vespel Ferrules (Pkt 5)
1	GVF/005 Vespel Ferrules (Pkt 5)
1	GVF/008 Vespel Ferrules (Pkt 5)
1	GFF/05 Graphite Ferrules (Pkt 5)
1	GFF/4 Graphite Ferrules (Pkt 10)
1	VSR/16 Vespel Sealing Rings (Pkt 10)
1	DC-05 Detector Connector Kit
1	1/4" - 5/16" AF Spanner
1	Piece Carborundum
1	Instructions

controller, the pressure regulator (12) supplied in the kit must be installed as detailed below:

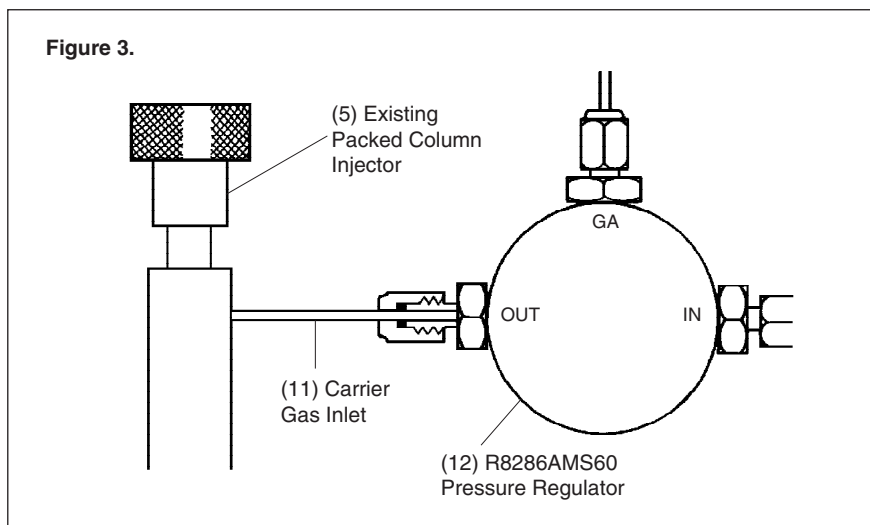
Reordering Part Numbers

This listing details individual parts. The part numbers represent the SGE order numbers for replacement items.

FOR CCS-4/NC KIT

Item	Part No.	Order Code	Description
1	0930042	GISS Tee	1/4" x 1/16" Splitter tee
2A	0827701	1/4" x 4mm ID x 135mm GLT	
2B	0827702	1/4" x 4mm ID x 90mm GLT	
3	103403	SSN/16	Stainless Steel 1/16" nut
4	103405	SSNE 16/012	1/16" S/S extended nut 1.2mm bore
5	0624161	3SST 16/0.8	1/16" x 0.8mm S/Steel tubing
6	103403	SSN/16	1/16" S/S nut
7	0932184	AT-P	Molecular sieve absorption trap
8	1236282	BMCV-1	Micro needle valve
9	103404	BN/16	Brass 1/16" nut
10	0624161	3SST 16/0.8	1/16" x 0.8mm S/Steel tubing
11	175788	PR8286	AMBS60 Pressure regulator
12	0624161	3SST 16/0.8	1/16" x 0.8mm S/Steel tubing (to gauge)
13	0624161	3SST 16/0.8	1/16" x 0.8mm S/Steel tubing (to carrier source)
14	103462	DC-4	1/4" Detector Connector Kit
15		(Part supplies with DC-4-Item 15)	1/16" x 0.8mm ID GLT
16	1034632	SSDUT	Make-up tee (Part of DC-4 Kit)
17	103403	SSN/16	1/16" s/s nut (Part of DC-4)
18	0624161	3SST 16/0.8	1/16" x 0.8mm S/Steel tubing (to make-up source)
19	103405	SSNE 16/012	1/16" S/S extended nut, 1.2mm bore
20	072663	GVF/004	Graphitised Vespel Ferrule (Pkt 10)
OR	072654	GVF/005	Graphitised Vespel Ferrule (Pkt 10)
OR	072655	GVF/008	Graphitised Vespel Ferrule (Pkt 10)
21	072653	VSR/16	Graphitised Vespel Ferrule (Pkt 10)
24	072601	GFF/4	Graphite Ferrule (Pkt 10)
25	072621	OGF/4	Graphite Ferrule (Pkt 10)

Figure 3.



- a: Find a suitable position on the chromatograph to mount the pressure regulator (12). A 1/2" diameter hole in a panel is required to fix the regulator in place using the locking nuts.
- b: Connect the carrier gas source to the "IN" fitting on the regulator. Use VSR/16 Sealing Ring for making this seal.
- c: There will be a carrier gas inlet line (11) to the packed column injector from the original gas control device. Connect this line to the "OUT" position on the pressure regulator and seal with a VSR/16 vespel sealing ring.
- d: If the pressure gauge in the instrument is already incorporated in the carrier gas line, nothing further is required except to ensure the "GA" position on the pressure regulator is blocked off. If it is not, the line from the pressure gauge (13) should be connected to the "GA" position on the pressure regulator.

4. (Refer to Figure 4.)

Select a suitable position on the chromatograph, outside the oven, to place the absorption trap (8) and splitter control valve (9) assembly. Cut a sufficient length of the 1/16" O.D. x 0.8mm I.D. stainless steel tubing (6) provided and connect from the split outlet (3) on the injector to the end of the absorption trap (7). Use VSR/16 sealing rings for making these connections.

5. (Refer to Figure 5.)

The GC detector connections should be modified to accept capillary columns. 1/4" (CCS-4) or 5mm (CCS-05) detector fittings are provided. Detector connector kits are supplied with a length of 1/16" O.D. x 0.55mm I.D. GLT (fitted) and a spare interchangeable piece of 1/16" O.D. x 0.8mm I.D. GLT. The 0.55mm I.D. GLT should be used for 0.10, 0.15, 0.22 and 0.32mm I.D. capillary columns. The 0.8mm I.D. GLT is suitable for use with 0.53mm I.D. capillary columns.

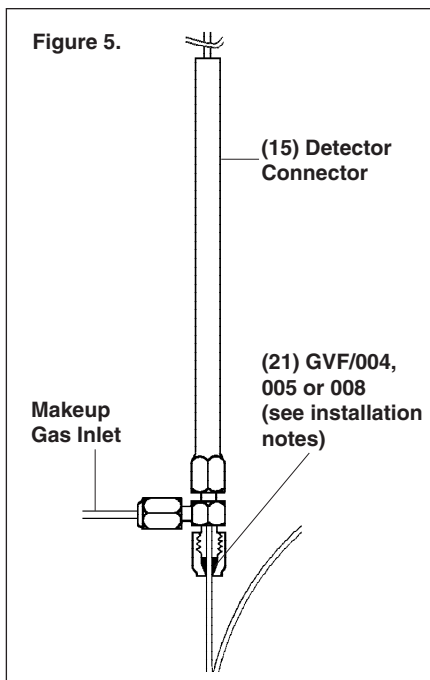
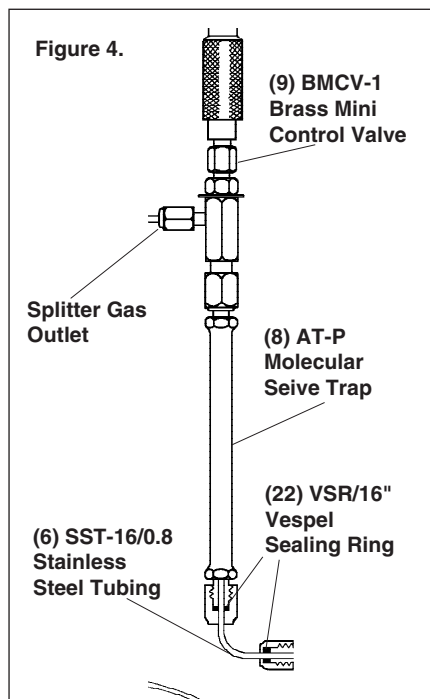
Make-up gas may be required to reduce the effective dead volume and ensure maximum detector sensitivity.

A tee-piece (17) is already connected to the stainless steel stem when supplied. This is used when make-up gas is required. The tee-piece (17) should be removed and replaced with the straight through union (supplied) if make-up gas is not required.

A length of 1/16" O.D. glass lined tubing (GLT) bevelled at one end, passes through the stainless steel stem to the base of the union and is locked into the connector with a high temperature graphite ferrule (GFF/16).

The GLT is supplied longer than may be necessary in order that it can be positioned as close to the base of the detector as possible.

If necessary, both the stainless steel stem and the GLT liner may be cut to a more convenient length. The GLT can be cut using a wet silicon carbide cut-off wheel or the SGE "Terry Tool" (P/N 082780). A simple, although less effective method is to



Reordering Part Numbers

FOR CCS-05/NC KIT

Item	Part No.	Order Code	Description
1	0930042	GISS Tee	1/4" x 1/16" Splitter tee
2	0827704	5mm x 3mm ID x 135mm GLT Vaporiser tube	bushed to 1/4" at one end.
3	103403	SSN/16	Stainless Steel 1/16" nut
4	103405	SSNE 16/012	1/16" S/S extended nut 1.2mm bore
5	0624161	3SST 16/0.8	1/16" x 0.8mm s/steel tubing
6	103403	SSN/16	1/16" S.S. nut
7	0932184	AT-P	Molecular sieve absorption trap
8	1236282	BMCV-1	Micro needle valve
9	103404	BN/16	Brass 1/16" nut
10	0624161	3SST 16/0.8	1/16" x 0.8mm s/steel tubing
11	175788	PR8286	AMBS60 Pressure regulator
12	0624161	3SST 16/0.8	1/16" x 0.8mm s/steel tubing (to gauge)
13	0624161	3SST 16/0.8	1/16" x 0.8mm s/steel tubing (to carrier source)
14	103462	DC-05,	5mm detector connector kit
15		(Part supplied with DC-05 Item 15)	1/16" x 0.8mm ID GLT
16	1034632	SSDUT	Make-up tee (Part of DC-4 Kit)
17	103403	SSN/16	1/16" s/s nut (Part of DC-4)
18	0624161	3SST 16/0.8	1/16" x 0.8mm s/steel tubing (to make-up source)
19	103405	SSNE 16/012	1/16" s/s extended nut, 1.2mm bore
20	072663	GVF/004	Graphitised Vespel Ferrule (Pkt 10)
OR	072654	GVF/005	Graphitised Vespel Ferrule (Pkt 10)
OR	072655	GVF/008	Graphitised Vespel Ferrule (Pkt 10)
21	072653	VSR/16	Graphitised Vespel Ferrule (Pkt 10)
22	072601	GFF/4	Graphite Ferrule (Pkt 10)
23	072621	OGF/4	Graphite Ferrule (Pkt 10)

score the GLT in a deep line all around using a fine file then snap the tubing. It should then be filed square on the end, deburred, washed, dried and then flame polished by heating to a medium red colour in a bunsen flame.

Use the standard packed column detector retaining nut and ferrule supplied with the gas chromatograph to fix the detector connector (15) into the GC detector inlet.

If make-up gas is being used, connect a line from the make-up tee (17) on the detector connector to a controlled supply of make-up gas. The existing flow controller in the gas chromatograph which has been replaced by the pressure regulator, can be used for this purpose.

6. At this stage the capillary column can be installed. It is recommended the column and cage is supported in some way in the centre of the GC oven. Unwind approximately 20cm of fused silica from each end of the column. Insert the column through the nut (4) and then through a suitable ferrule (refer to table 1. for the selection of the correct ferrule). The tapered end of the vespel ferrule is reversed into the nut as shown. Be very careful not to get pieces of ferrule or any other material inside the column. It is good practise at this stage to break a small piece from the column end by scratching the column approximately 2cm from its ends. Bend the column away from the scratch and it will break cleanly.

TABLE 1.

Column I.D. (mm)	Ferrule Type
0.10	GVF/004
0.15	GVF/004
0.22	GVF/004
0.32	GVF/005
0.53	GVF/008

The column is inserted into the injector so that the end of the column is approximately 1cm past the nut (25) holding the capillary injector into the packed injector. Do not insert the column too far into the injector. The procedure for connecting the column into the detector connector is the same as for the injector except the end of the column should be inserted as close to the flame jet as possible.

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