SHIMADZU APPLICATION NEWS

LAAN-A-G-E001

● GAS CHROMATOGRAPHY

No.G233

Convenient Functions of GC-2014

The GC-2014, melding the performance and ease-of-operation of our flagship model GC-2010 and the flexibility of the GC-14 series, is now available in the market. Here we introduce the convenient functions and options of the GC-2014.

■ Automatic System Startup and Shutdown

The GC-2014 is equipped with AFC as standard, providing automatic control of carrier gas supply in either capillary or packed column analysis, and the temperature of each unit and carrier gas control can be started up and shut down automatically. Although a manual flow controller is provided as standard for detector gases, an optional accessory is required to provide automatic flame ignition and extinction at automatic startup and shutdown, respectively. (A filament for automatic flame ignition is provided as standard for FID and FPD, however, the detector gases must be flowing beforehand.)

If detector gas log management is required, installing APC as in the GC-2010 enables automatic setting of all gas controls, to say nothing of automatic flame ignition and extinction. If detector gas flow rate log management is not required but automatic startup and shutdown are desired, this can be achieved at very low cost by connecting a gas shut-off solenoid valve unit (P/N 221-70782-91) upstream from the detector gas manual flow controller, as shown in Fig.1. The gas shut-off solenoid valve unit can control the supply and shutoff of 2 types of gases (e.g., hydrogen, air). If the gas shutoff solenoid valve unit is installed, by setting [Detector=ON], [Auto Ignition=ON] in the GC Startup Procedure, gas supply is started and ignition is performed when all the parameters reach their set values. By setting the [Stop time], [Flow off time] and [Sleep time] parameters in the GC Shutdown Procedure, the detector gasses are stopped and the flame is extinguished at automatic shutdown, and following the sleep time interval, the GC can be started automatically. Additionally, the gas supply is stopped when the detector is turned off or when the system is turned off, so that when power is interrupted, such as during a power outage or other contingency, the solenoid valve closes automatically to shut off the gas supply.

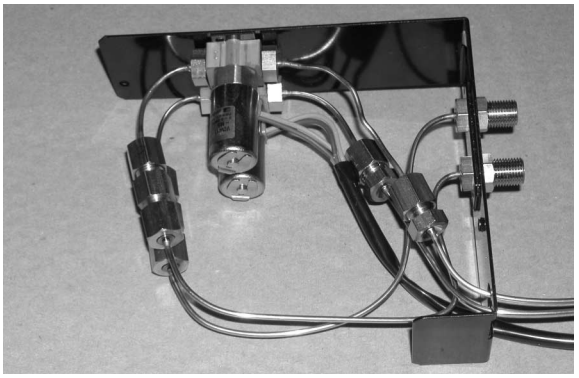


Fig.1 Gas Shutdown Solenoid Valve Unit

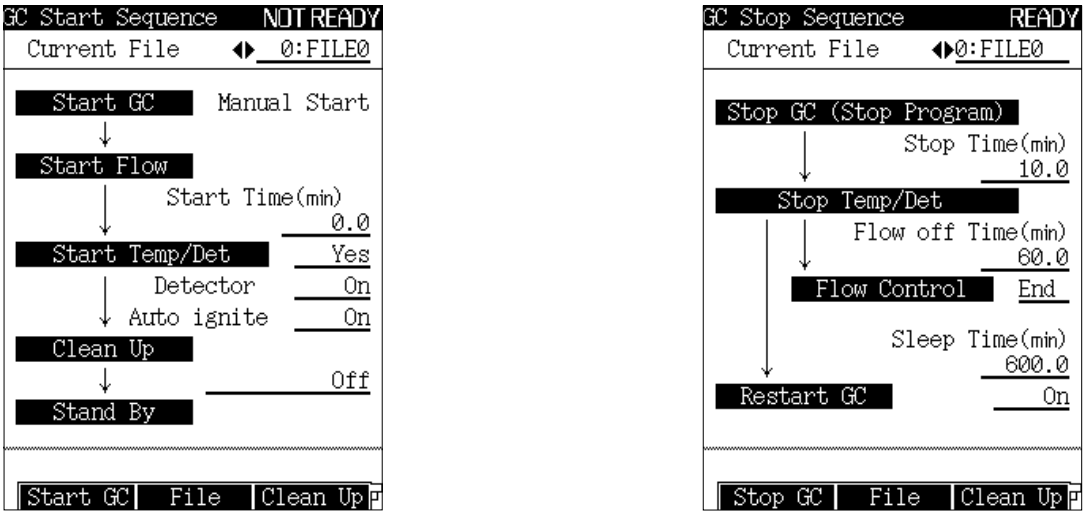


Fig.2 GC Startup Procedure, GC Shutdown Procedure

To conduct capillary analysis using the model equipped with an injection unit for packed column and an injection unit for capillary column, a branch tube adapter can be connected inside the column oven to the packed column injection unit and the detector without performing complex tubing changes, as shown in Fig.3, and by changing the AFC settings (see Fig.4) for the unused packed column injection unit, the AFC can be used for the makeup gas. With this change, not only can the gas supply be switched on and off, digital setting of the makeup gas flow rate also becomes possible. To once again conduct analysis using the packed column, care must be taken to return the AFC settings to their original state using the reverse procedure of that shown in Fig.4, or the packed column injection unit will not be included in the LINE setting.

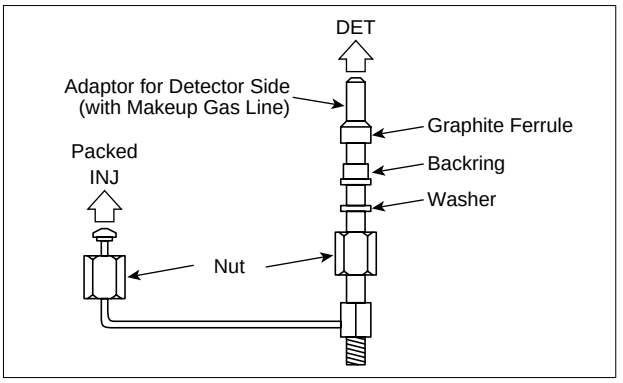
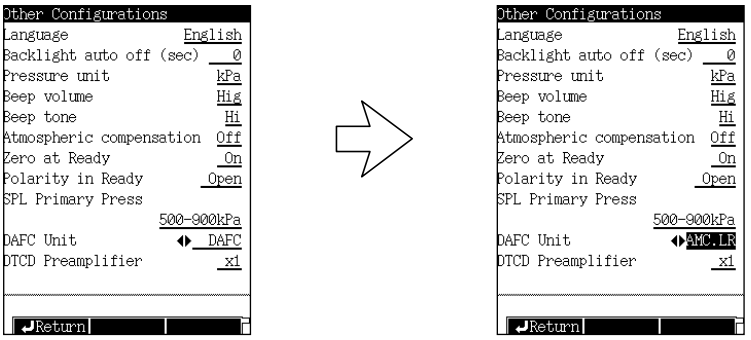


Fig.3 Structure of Branch pipe



Press the [FUNC] key on the GC main unit to display the Function screen, and select “6. System Configuration”. In the Configuration screen, select “9. Other System Configuration” to display the left-hand screen shown above. Use the △ key to move the cursor to the “DAFC Unit” item, and change the setting from [DAFC]→[AMC.LR]. (Right-hand screen above. This changes the dual AFC operation setting from carrier gas flow controller to makeup gas flow controller.)

- Setting parameters from GC Main Unit

In the screen displayed after pressing the [OPTION] key, set the adapter-connected packed column injection port channel (L or R) to ON, and set the flow rate. Then set the unused channel to OFF.

- Setting parameters using GCsolution

After changing the settings on the GC main unit screen shown above, add the packed column injection port channel (AMC.L or R) to the additional flow of the instrument using [System Configuration].

Settings and monitoring can be made from the Additional Flow tab.

The packed column injection unit cannot be used in its current condition to conduct packed column analysis. The DAFC unit setting must be returned from AMC.L or R to DAFC using the reverse procedure of that in the above screen, and then select DAFC as an injection unit for the analysis line. Only one injection unit (AFC) can be selected for one analysis line. To perform capillary analysis using AFC for SPL to control the carrier gas, two AFCs cannot be selected simultaneously, even if the makeup gas is to be controlled using DAFC. For that reason, if DAFC is to be used for controlling the makeup gas, set “Not using DAFC as AFC” as in the above screen so that simultaneous selection can be performed in exceptional cases.

Fig.4 Changing Dual AFC Control Mode

■ Exhaust Duct, High Speed Cooling Unit

One of the installation requirements for the GC-2014 is to provide a distance of at least 40cm between the rear of the instrument and the wall, for a total space requirement of about 1m.

If sufficient space between the rear of the instrument and the wall cannot be secured, there may be a slight reduction in cooling speed. However, by using an exhaust duct (P/N 221-70675-91) (see Fig.5), exhausted hot air can be directed upward. With a space of 5cm between the rear of the exhaust duct and the wall, the required instrument installation space becomes about 80cm. To improve the cooling efficiency when the exhaust duct is installed and to shorten the analysis cycle when performing temperature-programmed analysis, the high speed cooling unit (P/N 221-70676-38) is an effective option.

Fig.5 Exhaust Duct

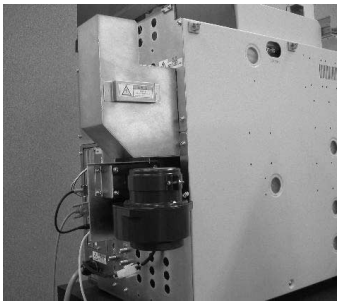


Fig.6 High Speed Cooling Unit

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