### JAS Gas Injection Control Unit



### GICU

### Table of Contents



#### **General information**

Introduction	3
System Requirements	3
Compatibility	
Specifications	
Schematic.	
Installation	4
Hardware Installation	
Software Installation	

#### Software

User Interface	7
General User Interface	7
Toolbar	7
Progress Bar	7
Element Area	8
Status Bar	
Connection Tool	8
Context Menu	9
Adding a New Element	
Methods Editor	
General Information	
Toolbar	
Method Step	
Buttons	
Sequence Editor	
General Information	
Toolbar	
Adding a Method	
Buttons	
Calibration	
Manual Calibration	
Automatic Calibration	

#### Appendix

List of Elements1	1
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### **General Information**

### Introduction



#### **System Requirements**

- Microsoft Windows XP with Service Pack 3 (SP3) installed
- Microsoft .NET Framework 2.0 or higher
- Intel Pentium 2,6 GHz Dual Core
- 2 GB RAM
- 2 GB of free hard drive space
- DVD-ROM drive

#### Compatibility

- The JAS GICU software is compatible with all Agilent GCs.
- All versions of the ChemStation are supported
- Methods and sequences can be saved independently of the ChemStation

#### **Specifications**

- Loadable up to 2 bar absolute pressure
- The amount of approachable under pressure depends on the used pump
- Response time of the valves are 30ms

#### **Measurement Range**

From 250 mbar up to 1700 mbar

#### **Schematic of GICU**



Page 3

### **User Interface**



#### **Hardware Installation**

- 1. First connect the pumps AC power plug to the connector (A) on the back of the GICU base unit.
- 2. Connect the pressure sensor with the socket (C) and secure the plug with the bayonet fitting.
- 3. Now connect the valve controller to port (B).
- 4. Plug the GCs remote cable to the serial port (D) and tighten the screws.
- 5. Now plug the USB cable into the appropriate socket (E).
- 6. Finally, connect the power cord into the connector (F) and the circuit (WARNING: Only operate at 220V)



#### Hinweis:

The output of the pump can be specified in the order according to customer wishes. By default, a 1/8 inch noise attenuation is used.

### **User Interface**



#### **Software Installation**

#### Stating the Installation

Run the setup and start the installation process by pressing "Next".

#### Terms of Use

Read carefully the Terms of GICU software on the next page and confirm by clicking "I Agree".

#### **Component Selection**

Select the components you need for your GICU installation.

A more detailed description of the function of the individual components can be found on the right side on the field "Description". Notice that the descriptions will only appear after selecting a component.

#### Installation Path

Click on the "Browse ..." button to adjust the pre-selected installation path. This opens a folder selection window where you can select the desired path. Then click on "Install" to begin the installation.

GICU Setup				
joint analytical systems	Welcome to the GICU	Setup Wizard		
	This wizard will guide you through the It is recommended that you dose all before starting Satury. This will make	e installation of GICU. other applications		
	relevant system files without having computer. Click Next to continue.	to reboot your		
I GICU Setup				
License Agreement Please review the license terms	s before installing GICU.	joint analytical systems		
Press Page Down to see the re	st of the agreement.			
END-USER LICENSE AC SYSTEMS GMBH IMPORTANT: PLEASE I LICENSE AGREEMENT THIS PROGRAM INSTA joint analytical systems i a legal agreement betwei joint analytical systems i software product(s) which	Press Page Down to see the rest of the agreement.			
If you accept the terms of the agreement to install GICU.	agreement, click I Agree to continue. )	(ou must accept the		
JAS GICU v1.4.0.0	< Back	Agree Cancel		
I GICU Setup				
Choose Components Choose which features of GICU	J you want to install.	joint analytical systems		
Check the components you wa install. Click Next to continue.	nt to install and uncheck the componer	its you don't want to		
Select components to install:	Image: Constraint of the second se	escription isition your mouse rer a component to re its description.		
Space required: 277.9MB				
JAS GICU v1.4.0.0				
	< <u>B</u> ack <u>N</u> e	xt > Cancel		
GICU Setup				
Choose install Location Choose the folder in which to install GICU.				
Setup will install GICU in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.				
Destination Folder		- Provent		
C:\Program Files (x86)\joint analytical systems GmbH\GICU\ Browse				
Space required: 277.9MB Space available: 83.9GB				
JAS GICU V1.4.0.0	< <u>B</u> ack	nstall Cancel		

### **User Interface**



(jas

#### Installation

Finally, the installation of the software is running. This may take a few minutes. The time varies with the selected components.



GICU Setup

Please wait while GDCU is being installed

Output folder: C:'Users'AppData'Local'(Temp\GDCU Runtime

Output folder: CriUsers/AppData/Local/Temp/GICU Runtime/LabVIEW\_Plunts... Output folder: CriUsers/AppData/Local/Temp/GICU Runtime/LabVIEW\_Plunts... Extract: LabVIEW 8.2 RTE PDP.nml... 100%

Extract: h/82runtime.msi... 12%

Extract: drs.mst... 100% Extract: deu.mst... 100% Extract: fra.mst... 100% Extract: fra.mst... 100% Extract: kor.mst... 100%

#### Restart

To complete the installation restart your computer. This is necessary to make sure all components are functional.

#### **First Start**

The first time the GICU software gets started you will get a message that indicates that a connection can be made to the GICU.

Next the Settings menu will open. Please select a GICU from the "Device Number" list and confirm with "Accept". If the Settings menu appears with a warning that no devices were found, please check the USB connection between the PC and the GICU.

🔅 Set	tings
Ger	eral eMail Report Macros Security View
	GICU Settings evice Number:
	5 • 3
5	Sets the Device Number of the GICU
	Pressure Behavior
Т	olerance in %
2	2
to	plerance in percent depending on the targeted pressure
	✓ Accept X Cancel

### **User Interface**



#### **User Interface**

After launching the software you will see the user interface with the recently loaded element view.

- 1. Toolbar
- 2. Progress bar
- 3. Element area

At the bottom in the status bar, you will also find information about the version number (4) and the filename of the loaded sequence (5).



### **User Interface**



#### **Toolbar**

On the toolbar you can easily perform basic functions. From left to right you have the following functions available:

- Method Open the Method editor •
- Sequence Open the Sequence editor •
- Start/Stop the loaded Sequence Start/Stop •
- Open the Settings menu Settings
- Secure
  - Lock the GICU software Recalibrate Calibrate the pressure sensor
- Version information About

#### **Progress Bar**

The progress bar is an important component of the user interface. It is divided into a display for the progress of the sequence, in the upper region and a display for the progress of the method, in the lower region.

In the sequence region the currently running method is highlighted. On the left you see the method name and on the right the number of loops for this method. In order to remove a sequence click the "Unload" button.

While passing though the various methods, the method steps were shown in the lower display. The currently processed step is marked with an arrow.

At the bottom of the progress bar you will find the number of cycles, the sequence will be ongoing.

Current Sequence:	Unload $ imes$	
Methodname	Cycles	
method_Preperation	1	
method_Injection	1	
Current method:		
🗸 LogClear		
🗸 TimerStart		
√ ValveOpen(GasUnit_ValveIn)		
PressureConstant		
MessageBox(close)		
O SetPressure(605;False;	False)	
C TimerStop		
O LogTime		
O LogShow		
Contractor Contractor and	-	
Sequence cycles to go:	5	

### User Interface



#### **Element Area**

Within the Element Area all components of the GICU systems and their status were shown.

User-modifiable elements are provided with an on/off indicator. Green means on (or in open valves), red means off (or closed).

All other elements are merely illustrative of the structure or the display of the current gas pressure.

By double clicking you can open the connection tool for the appropriate grid boxes and lines on or off.

#### Toolbar

The toolbar contains the following tools:

- Save element area
- Load an saved element area
- ÷ Add a new element to the current area

In addition, you will see the currently loaded GUI and the status of GICU

The different status colors stand for:

- Red - Idle
- Yellow
- Preparing Green - Run
- (Waiting state) (GICU is matching the pressure)
- (GC is running).
- **Connection Tool**



You can open the connection tool by double clicking on one of the grid boxes. It can displayed horizontal, vertical and diagonal lines. By clicking on the greyed out corresponding line, it gets activated. On another click it gets deactivated.

Using the two buttons on the right side you can accept the changes by clicking the green mark or reject by

clicking on the red X.

Move the connection tool during operating with a double click on another field and all changes will applied automatically.



### **User Interface**

#### **Context Menu**

Each control in the element area has a context menu that can be opened by right-clicking. In this menu, the edit mode can be activated for this element, the settings menu can be opened or the item can be deleted.

The edit mode is indicated by a green border around the object. As long as this mode is active, the position and the size of the element can be changed.

When deleting, the item is displayed with a red border and a dialog appears to confirm the operation.

With the "Settings" menu item you have access to the following settings:

There are four standard settings for each object:.

- Name For a individual name
- Top Indicates the distance between the top border and the object
- Left Indicates the distance between the left border and the object
- Size Size and height of the object

In the lower section you will maybe find individual settings, mostly Port and Channel settings.

#### **Adding a New Element**

Open the Create dialog by clicking on the third button in the toolbar (green plus symbol), located on the lower border.

Pick your new element from the selection box on top and add a name into the "Name" field. You can also use the standard name for this element.

You can also add the distance to the top and left border by adding values to the "Top" and "Left" fields. Same on the "Size" and "Height" field. All four settings can be changed later via the edit mode.

Depending on the chosen type of object you might have to fill out specific settings. A short description for each setting is located on the lower section.

A standard element view can be found at the installation path. Easily open the "Standard.gui" or, If you use your GICU with a MPV use the "StandardWithMPV.gui".

Using the toolbar on the element area you can save and load your GUI. All GICU GUI-files are using the ".gui" file ending.

#### Notice:

A list of all elements can be found in the appendix.

Edit Control RemoteG( Nam RemoteGC\_1 Тор 400 \* Left 100 \* Size 50 \* Port Star 0 Channel Star 0 Port Stop 1 Channel Stop 0 Channel Ready OK Abbrechen

÷

×

Add Control		
Valve 👻		
Name	myValve	
Тор	150 🚖	
Left	200 🜲	
Size	50 🖨	
Port	0	
Channel	5	
Name		
Name of the control that will be shown in Tooltip.		
	OK Abbrechen	

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	systems

Edit Mode

Settings...

Delete

### **Method Editor**

#### **General Information**

The method editor is for creating and editing procedures that are later stored at sequences. Here you can use some basic commands to operate your system. The editor is divided into three sections:

#### Toolbar

Using the "file" menu, you can save, load and print methods.

In the "edit" menu, you can edit the individual steps and change their positions. You have also the ability to copy, cut and paste them.

With the method updater you can update methods that were created before version 1.4.4.0. Is step is necessary if you want to run older methods on the latest software version.

#### **Method Steps**

To add a new method step choose a command from the "method step" list. Some commands may require some additional parameters, which can be given below the list. Click on the "Add" button to apply the settings and add this step to your method.

Methodstep:			
MPV - Set to Position			▼ 4dd
Position:			
1,0	*	With intermediate Steps	

The available commands may vary depending on which elements were added to the element area. To obtain additional information about a step, move your mouse over the list. A tooltip box will appear shortly.

#### Notice:

A list of all available steps can be found in the appendix.

#### **Buttons**

If editing an already existing method, simply click on "Save and Exit" to apply your changes and close the method editor. By clicking on the "Cancel" button the method editor quits.

ile Edit Method Updater			
8 🖬 🐵 😒 🕂 😾 🕌 🛍 🔊			
Methodstep:			
V 🕂 Add			
MDV/ Set to Desition (1)			
Pump - Start the Pump			
Valves - Open a Valve (GasUnit Valveln)			
Valves - Open a Valve (GasUnit ValveOutBig)			
Valves - Open a Valve (GasUnit_ValveOutSmall)			
GC - Wait for the GC-Ready Signal			
Conditions - Wait for a timespan (60 & sec)			
Valves - Close a Valve (GasUnit_ValveOutBig)			
MPV - Set to Position (2)			
Conditions - Wait for a constant Pressure			
Conditions - Wait for a timespan (10 & sec)			
MPV - Set to Position (3)			
Set pressure in mbar to (900 & False)			
Conditions - Wait for a timespan (5 & sec)			
GC - Short the GC			
Conditions - Wait for a timesnan (1 & min)			
Valves - Open a Valve (GasUnit Valveln)			
Valves - Open a Valve (GasUnit ValveOutBig)			
Valves - Open a Valve (GasUnit_ValveOutSmall)			
Pump - Start the Pump			
Conditions - Wait for a timespan (60 & sec)			
Valves - Close a Valve (GasUnit_ValveOutBig)			
Save and Evit			

Method Editor

Loaded method: 01-01 Sample.mth



### Sequence Editor



#### **General Information**

The sequence editor allows you to create and edit sequences. Here methods get summarized for later processing. The sequence editor is divided into three sections, too.

#### Toolbar

In the "file" menu you can load, store and print sequences

With the "methods" menu you can add and remove methods and change their position in the sequence.

#### **List of Methods**

Click on the "Add" button (green plus symbol) to open the selection dialog. Here you can see all available methods. Select the method you would like to add and load it by clicking on the "Load" button or double click the method itself.

To set repetitions you can change the amount in the "Repeat" column.

If you wish to cycle the hole sequence change the number at the bottom.

Sequence Editor	×
File Methods	
🎦 🖡 🗐   🕈 🖒 🗸	
No Method File	repeat
1 method_Preperation.mth	1
2 method_Injection.mth	1
Sequence cycles: 3	
Save and Install	Cancel
Loaded sequence: sequenceAlpha.sqc	

#### **Buttons**

If editing an already existing sequence, simply click on "Save and Install" to apply your changes and close the sequence editor. After closing, the sequence will be loaded automatically.

by clicking on the "Cancel" button the sequence editor quits. A confirmation prompt may be displayed when changes has been made to previously loaded sequences.

Notice:

Since the GICU has no direct connection to the GC ChemStation, you have to start GC methods parallel or called by the macro from the ChemStation out of the GICU.

### Calibration

#### **Manual Calibration**

In the unlikely event that the calibration data has been lost, a coarse calibration can be made. Proceed as follows:

- Make sure that no gas is connected at the sample-in and the entrance is not locked.
- Open the inlet valve and wait a few minutes until you have an atmospheric pressure in the system.
- Open the calibration menu on the toolbar.
- Enter the current atmospheric pressure into the text box under "High Pressure"
- Click on "Apply" next to that box.
- Close the inlet valve and open both valves to the pump.
- Start the pump.
- Wait at least five minutes until it reaches the minimum pressure.
- Next click on the bottom "Apply" next to the "Low Pressure (mbar)".
- Enter the minimum pressure which can be reached by your pump according to the specifications. Enter this value into the lower text box.
- Finally, click on "Calibrate".

#### Notice:

This calibration is only for emergency cases! You have still to recalibrate your pressure sensor as soon as possible.

#### **Automatic Calibration**

Together with your GICU you should also received data for calibration. With these you can repair faulty calibrations and recalibrate the pressure sensor. You will find the calibration data on a sticker on the bottom of the pneumatic unit of your GICU.

To perform a calibration, proceed as follows:

- Enter the first calibration value into the "Val 1" field.
- Enter the second calibration value into the "Val 2" field.
- When finished, click "Save and Exit".

#### Notice:

Additional help can be displayed by clicking the "Show help" button.

→ Manom	eter calibration	×
- Manual ·	Pressure Sensor	
High Pre	ssure (mbar)	
1024	÷ 🗸	🔁 Apply
Low Pres	ssure (mbar)	
10	÷ 🔾	🕂 Apply
		🕀 Calibrate
Automati	ic - Pressure Sens	or
Val 1	501.7976922109	98683
Val 2	-5.10100137626	27295
		+ Autocalibrate
		Show help

### Settings



#### **General Information** х Settings General eMail Report Macros Security View Using the GICU Settings menu you can select the GICU device number. If GICU Settings the Settings menu appears with a warning that no devices were found, Device Number: please check the USB connection between the PC and the GICU. 5 - 6 Sets the Device Number of the GICU In the "Pressure Behavior" section you can change the tolerance for your pressures. The default value is 2% tolerance. Pressure Behavior Tolerance in % 2 tolerance in percent depending on the targeted pressure 🗸 Accept X Cancel **E-Mail Report** × Settings General eMail Report Macros Security View A bug report can be sent via e-mail when no GC-ready signal can be SMTP Settings received (usually due to an error on the GC). Server Host Port e2k7.jas.de 21 To enable the reporting check the box for "Reports Activated". Password Account: info@jas.de Then you have to enter your authentication data into the "SMTP Settings" eMail Settings field. info@jas.de Sender: To specify sender and recipient addresses, enter this information into the Reciever: anwender@jas.de "Email Settings" field Reports Activated 🗸 Accept X Cancel Macros X Settings If the ChemStation macros have been installed, you can now change their settings here. General eMail Report Macros Security View Macro Settings "Write data to chemstation datafile" allows you to add the a method step Write data to chemstation datafile with that you are able to write the pressure and MPV position into the Writes data to file if filename is written by macro chemstation.ini. Allow sequence start by macros Allows the loading and starting of sequences out of chemstation macros. "Allow sequence start by macros" allows you to match the start out of ChemStation macros. 🗸 Accept 💦 🔀 Cancel

## Settings

#### Security

To protect your GICO software against unwanted changes, you can lock certain functions with a password.

To set a password, enter your new password into the "New Password" field and the "Repeat New Password" field.

If you already set a password you will have to authorize the change by entering the old password as well.

Click on "Accept" to save your new password.

#### View

Use the "View" tab to adjust the display properties of the grid.

By double clicking on the colored boxes you can set the colors for the background, the grid lines and the connection lines.

(c) Settings				
General eMail Report Macros Security View Password Settings Old Password (Leave empty on first set) :				
New Password:     Repeat New Password:  Enter the desired password for securing the GICU				
🔅 Settings				
Settings     General eMail Report Macros Security View     Color Settings				
Settings     General eMail Report Macros Security View     Color Settings     Background Color     Doubleclick to change color				
Settings     General eMail Report Macros Security View     Color Settings     Background Color     Doubleclick to change color     Grid Color     Doubleclick to change color				
<ul> <li>Settings</li> <li>General eMail Report Macros Security View</li> <li>Color Settings</li> <li>Background Color</li> <li>Doubleclick to change color</li> <li>Grid Color</li> <li>Doubleclick to change color</li> <li>Connection lines Color</li> <li>Doubleclick to change color</li> </ul>				



### Table of Elements



#### **Basic Elements**

Name	Symbol	Description	Method step
AUX	AUX 3	Used to illustrate, the displayed number is modifiable	
Gas Bottle	ĺ	Used to illustrate	
Gas Mouse	•	Used to illustrate	
Remote GC		This element takes the remote control of the GC. The user is able to start and stop the GC.	<ul><li>start GC</li><li>wait GC Ready</li><li>wait GC Stop</li></ul>
Pump		The pump can be started and stopped by the user.	<ul><li>pump start</li><li>pump stop</li></ul>
Reactor		Used to illustrate	
Secure Valve		Used to illustrate	
Valve	T	The valve can assume two states: open and closed. It can be controlled by the user.	<ul><li>valve open</li><li>valve close</li></ul>
Gauge	55 mbar	The gauge displays the current pressure in the system. It is also part of the gas unit.	Wait constant     pressure

### Table of Elements

#### **Special Elements**

#### Gas Unit

The gas unit is the heart of GICU. It includes all important elements to adjust the pressure. After inserting the gas unit to your element are you will have access to the following special commands:

- Set Pressure to
- Set Pressure higher or equal to
- Set Pressure lower or equal to
- Flush

#### MPV (Multi-position valve)

The MPV element controls a MPV via Ethernet or serial port. The user can click on each port to change the MPVs position state. With the MPV you have access to this commands:

- Set MPV position
- Set MPV to next position
- Set MPV to previous position

the MPV can be controlled either via a serial interface or via Ethernet. For a serial control, enter the settings dialog of the element and enter the MPVs Com Port number into the "Com Port" field. If you wish to control the MPV via Ethernet, enter the IP address into the "IP" field.







### Table of Method Steps



#### **Table of Available Commands**

Method step name	Description
Chemstation.ini – Write current pressure	Writes the currently measured pressure in the
	ChemStation.ini so that it can be written in the data file.
Chemstation.ini – Write MPV Position	Writes the position of MPVs in the ChemStation.ini.
Conditions – Wait for a constant Pressure	The method is malted until a constant pressure within the
	tolerance is present.
Conditions – Wait for a timespan	The method is stopped for a specified period of time. As
	the units are available milliseconds (ms), seconds (sec)
	and minutes (min)
Flush the GICU	Flushes the GICU. First it opens the inlet valve until the
	specified pressure is reached. Then the inlet valve closes
	and the opens the outlet valve. Next the pump starts until
	the under pressure is achieved.
GC – Start the GC	Starts the GC via the remote cable (takes no
	consideration for GC-Ready).
GC – Wait for the GC-Ready Signal	The method is halted until the GC sends a ready signal.
	Wait longer than eight minutes and an error message will
	come up and abort the method.
GC – Wait for the GC-Stop Signal	The method is halted until the GC sends a stop signal.
	This is done after the end of a run or by manual stopping.
Logfile – Clear the Logfile	Clears the log file.
Logfile – Show the logfile	Displays the log file in a separate window. The method is
	stopped until the window is closed again.
Logfile – Write the current pressure	Writes the current pressure in the log file.
Logfile – Write time duration	Writes the measured time interval of the timer.
MPV – Move to next Position	Driving the MPV to the next position.
MPV – Move to Previous Position	Driving the MPV a position back.
MPV – Set to Position	Driving the MPV at the specified position. If the MPV has
	increment step, these can be used by using x.5 steps.
Pump – Start the Pump	Starts the pump.
Pump – Stop the Pump	Stops the pump.
Set pressure in mbar higher or equal to	Open the inlet valve and wait until the pressure reaches
	or exceeds the target pressure.
Set pressure in mbar lower or equal to	Opens the outlet valves, starts the pump and waits until
	the target pressure is reached.
Set pressure in mbar to	Set the target pressure within the tolerance. The initial
	pressure must be higher than the target pressure. By
	activating the "Keep pump on" function this prevents the
	pump is swithed off during adjustment. "Use Sample-in"
	serves for adminitting if the target pressure is reached.

### Table of Method Steps



#### **Table of Available Commands**

Show a message	Displays a message. Method will be halted until message box was closed
Timer – Start the timer	Starts a timer.
Timer – Stop the timer	Stops the timer and saves the value.
Valve – Close a Valve	Closes the chosen valve
Valve – Open a Valve	Opens the chosen valve

# Port Assignment



#### Port assignment of the default GICU

Function	Port	Channel
Outlet valve (tight capillary)	0	4
Outlet valve (wide capillary)	0	5
Pump	0	6
GC Start Signal	0	7
GC Stop Signal	1	0
Inlet valve	1	2
Pressure sensor	0	-
GC Ready Signal	1	-

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