

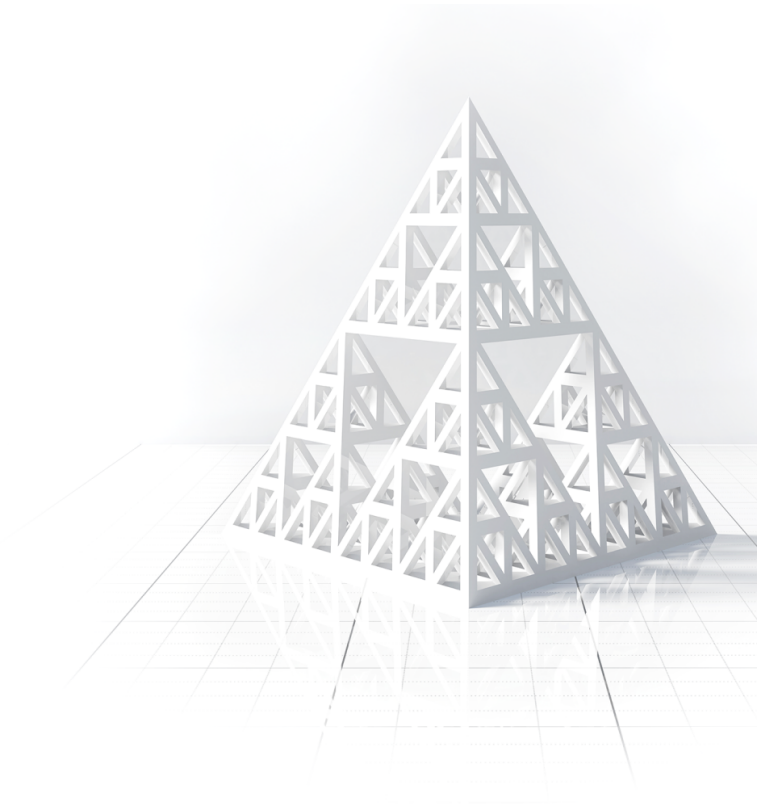
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HC80

# HC80 - Programmer Manual

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# 1 Introduction

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<b>Owner</b>	Project Lead
<b>Purpose</b>	Explain the programming concepts necessary to use the API and extend the product through external applications.
<b>Scope</b>	HC80 related programming concepts.
<b>Intended Audience</b>	Software developers interested in using the product.
<b>Process</b>	Standard Manual Creation Process
<b>Training</b>	<b>NOT APPLICABLE</b>

## 1.1 References

Document	Document ID	Author	Version
IGX - Programmer Manual	2439249921	@Matthew Nichols	2

## 2 HC80 Programming

The concepts and methods described in this manual build on the concepts established in the IGX - Programmer Manual. Please see that document for explanation and examples of how basic IGX programming and interfaces work. This manual will only cover the device-specific IO and functionality that is unique to the HC80.

### 2.1 Remote Sensor IO

These IO are associated with the HC80s remove chamber sensor module. This module is separate from the HC80 unit itself and connected by a cable that goes to the helium chamber. If the cable is disconnected, these IO will no longer accurately reflect the chamber state.

IO Path	Description
<code>/hc80/remote_sensor/luminox/oxygen_percent</code>	<b>READONLY</b> <b>NUMBER</b> Chamber oxygen concentration as a percentage.
<code>/hc80/remote_sensor/pressure</code>	<b>READONLY</b> <b>NUMBER</b> Chamber pressure in PSI. This is a differential pressure sensor that measures the difference between the chamber and atmospheric pressure.
<code>/hc80/remote_sensor/temperature</code>	<b>READONLY</b> <b>NUMBER</b> Chamber temperature in °C. This temperature is measured from the exhaust gas outlet and may not exactly reflect the chamber temperature.

### 2.2 Mass Flow Controller IO

These IO relate to the two mass flow controllers inside the HC80. One MFC is used for purging the chamber at a high flow rate, and the other is used to maintain the chamber with a very small flow rate. These flow rates are analog signals and are measured inside the controller. The reported flow rate has a latency and potentially an offset from zero. The HC80s software automatically compensates for these error sources internally.

IO Path	Description
<code>/hc80/mfc_large/flow_rate</code>	<b>READONLY</b> <b>NUMBER</b> The large flow controller flow rate in SCCM.
<code>/hc80/mfc_small/flow_rate</code>	<b>READONLY</b> <b>NUMBER</b> The small flow controller flow rate in SCCM.

### 2.3 Relay IO

IO Path	Description
<code>/hc80/relay/state</code>	<b>READONLY</b> <b>STRING</b> The state of the HC80 relay. Locked relays are open but cannot be closed due to an interlock. States: "opened", "closed", or "locked"

## 2.4 Version Control

Version	Description	Saved by	Saved on	Status
v1	Initial Version	Matthew Nichols	Apr 12, 2024 5:47 PM	APPROVED



### Document Control

Current document version: v.1

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#### 2.4.1 Signatures

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[Matthew Nichols](#) signed with meaning **Review**