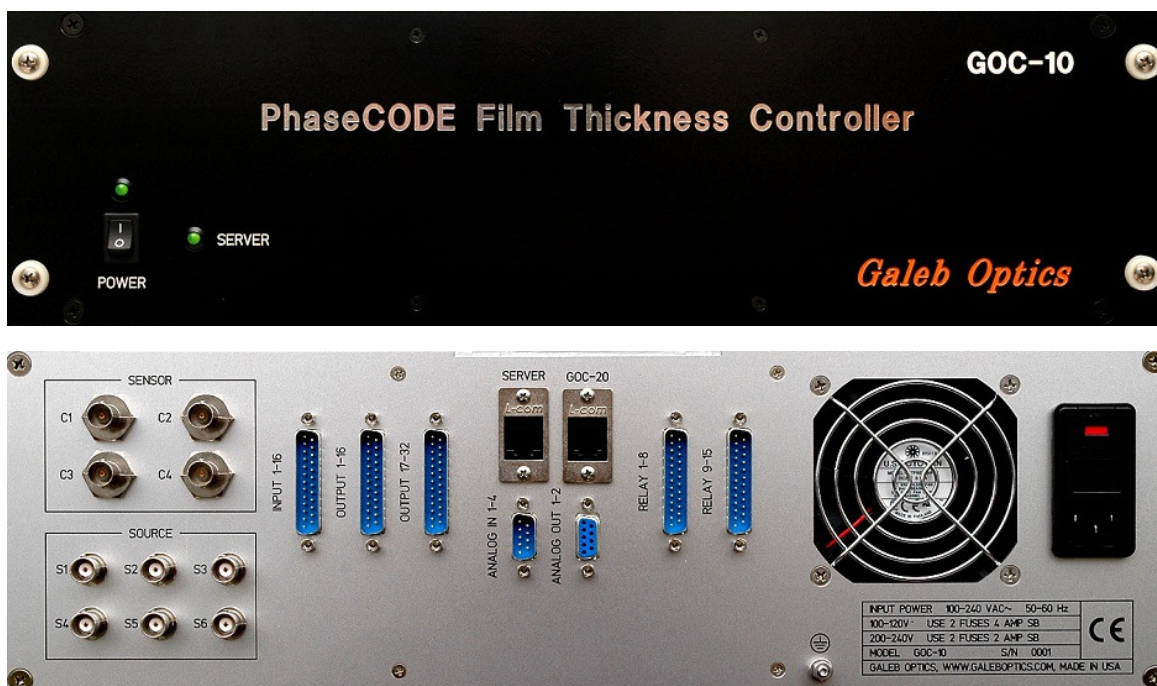


## GOC-10 Specifications

GOC-10 controller is a rack-mount unit, 3U high, 18 inches deep, and 20.5 pounds heavy.



| GOC-10 Back Panel             |                       |
|-------------------------------|-----------------------|
| BNC Female                    | SENSOR C1-C4          |
| Measurement Frequency         | 6.0 to 5.0 MHz        |
| Frequency Resolution          | $\pm 0.03$ Hz @ 6 MHz |
| Measurement Interval          | 100 ms                |
| Reference Frequency Stability | $\pm 2$ ppm           |
| Resolution/Measurement        | $\pm 0.037$ Å         |
| Thickness Display Resolution  | 1 Å                   |

| GOC-10 Back Panel |                     |
|-------------------|---------------------|
| BNC Female        | SOURCE S1-S6        |
| Source Control    | 0-10V, 0-5V, 0-2.5V |
| Resolution        | 12 bit              |
| Output Type       | Voltage sourcing    |
| Update Rate       | 100 ms              |
| Load Impedance    | 1-10 kΩ             |
| Load Capacitance  | 0.01 μF maximum     |

| GOC-10 Back Panel                     |                         |
|---------------------------------------|-------------------------|
| 9-pin D-Sub Male                      | ANALOG IN 1-4           |
| Input Range                           | 0-10V                   |
| Resolution                            | 12 bit                  |
| Active Low-pass Filtering             | -3 dB at 80 Hz, 2 poles |
| Input Impedance                       | > 20 MΩ                 |
| Update Rate                           | 100 ms                  |
| Input 1 pins (Chamber Pressure)       | 1 (-), 2 (+)            |
| Input 2 pins (MFC 1 Flow)             | 3 (-), 4 (+)            |
| Input 3 pins (MFC 2 Flow)             | 5 (-), 6 (+)            |
| Input 4 pins (Optical Monitor Signal) | 7 (-), 8 (+)            |

| GOC-10 Back Panel          |                  |
|----------------------------|------------------|
| 9-pin D-Sub Female         | ANALOG OUT 1-2   |
| Output Range               | 0-10V            |
| Resolution                 | 12 bit           |
| Output Type                | Voltage sourcing |
| Load Impedance             | 1-10 kΩ          |
| Load Capacitance           | 0.01 μF maximum  |
| Update Rate                | 100 ms           |
| Output 1 pins (MFC 1 Flow) | 1 (-), 2 (+)     |
| Output 2 pins (MFC 2 Flow) | 3 (-), 4 (+)     |

| Input Power 100-240 VAC 50-60 Hz |                                  |
|----------------------------------|----------------------------------|
| 100 - 120 V                      | 2 x 4A, 5 x 20mm, slow blow fuse |
| 200 - 240 V                      | 2 x 2A, 5 x 20mm, slow blow fuse |

| GOC-10 Communication with Host Computer |        |
|-----------------------------------------|--------|
| RJ45 Female - Ethernet                  | Server |
| RJ12 Female - RS232                     | GOC-20 |

| GOC-10 Back Panel                                           |                          |
|-------------------------------------------------------------|--------------------------|
| 25-pin D-Sub Male                                           | INPUT 1-16               |
| Input Type                                                  | Current sinking/sourcing |
| Input Voltage Range                                         | 20-28 VDC                |
| Peak Voltage                                                | 30 VDC (10 mA)           |
| ON Voltage Level                                            | 19 VDC minimum           |
| OFF Voltage Level                                           | 7 VDC maximum            |
| AC Frequency                                                | N/A                      |
| Input Impedance                                             | 3.9 k $\Omega$           |
| Input Current                                               | 6 mA @ 24 VDC            |
| Minimum ON Current                                          | 3.5 mA                   |
| Maximum OFF current                                         | 1.5 mA                   |
| OFF to ON Response                                          | 3 to 9 ms                |
| ON to OFF Response                                          | 3 to 9 ms                |
| Input 1-16 pins                                             | 1-16                     |
| Common pin for inputs 1-8                                   | 18                       |
| Common pin for inputs 9-16                                  | 19                       |
| For sinking inputs, connect commons to external supply (-)  |                          |
| For sourcing inputs, connect commons to external supply (+) |                          |

| GOC-10 Inputs (total = 16)<br>Configured at <u>Sources, Sensors,</u><br>and <u>I/O Assignment</u> pages of the<br><i>Deposition Monitor</i> | Maximum<br>Number of<br>Inputs | Maximum<br>Number of<br>Binary<br>Combinations | Input Signal<br>Time Duration |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------|-------------------------------|
| SRC 1 READ Pos                                                                                                                              | 6                              | 64                                             | Any                           |
| SRC 2 READ Pos                                                                                                                              | 6                              | 64                                             | Any                           |
| SRC 3 READ Pos                                                                                                                              | 6                              | 64                                             | Any                           |
| SRC 4 READ Pos                                                                                                                              | 6                              | 64                                             | Any                           |
| SRC 5 READ Pos                                                                                                                              | 6                              | 64                                             | Any                           |
| SRC 6 READ Pos                                                                                                                              | 6                              | 64                                             | Any                           |
| Xtal 1 READ Pos                                                                                                                             | 3                              | 8                                              | Any                           |
| Xtal 2 READ Pos                                                                                                                             | 3                              | 8                                              | Any                           |
| Xtal 3 READ Pos                                                                                                                             | 3                              | 8                                              | Any                           |
| Xtal 4 READ Pos                                                                                                                             | 3                              | 8                                              | Any                           |
| Reserved                                                                                                                                    | 16                             | N/A                                            | N/A                           |
| Remote Start                                                                                                                                | 1                              | 2                                              | > 500 ms                      |
| Remote Stop                                                                                                                                 | 1                              | 2                                              | > 500 ms                      |
| Remote Reset                                                                                                                                | 1                              | 2                                              | > 500 ms                      |
| Pump Down                                                                                                                                   | 1                              | 2                                              | Any                           |
| System Standby                                                                                                                              | 1                              | 2                                              | Any                           |
| Ion Gauge                                                                                                                                   | 1                              | 2                                              | Any                           |
| IAD Power                                                                                                                                   | 1                              | 2                                              | Any                           |
| E-Gun 1 Power                                                                                                                               | 1                              | 2                                              | Any                           |
| E-Gun 1 HV                                                                                                                                  | 1                              | 2                                              | Any                           |
| E-Gun 1 Gun                                                                                                                                 | 1                              | 2                                              | Any                           |
| E-Gun 1 Sweep                                                                                                                               | 1                              | 2                                              | Any                           |
| E-Gun 2 Power                                                                                                                               | 1                              | 2                                              | Any                           |
| E-Gun 2 HV                                                                                                                                  | 1                              | 2                                              | Any                           |
| E-Gun 2 Gun                                                                                                                                 | 1                              | 2                                              | Any                           |
| E-Gun 2 Sweep                                                                                                                               | 1                              | 2                                              | Any                           |

| GOC-10 Inputs (total = 16)<br>Configured at <u>Sources</u> , <u>Sensors</u> ,<br>and <u>I/O Assignment</u> pages of the<br><i>Deposition Monitor</i> | Maximum<br>Number of<br>Inputs | Maximum<br>Number of<br>Binary<br>Combinations | Input Signal<br>Time Duration |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------|-------------------------------|
| E-Gun 3 Power                                                                                                                                        | 1                              | 2                                              | Any                           |
| E-Gun 3 HV                                                                                                                                           | 1                              | 2                                              | Any                           |
| E-Gun 3 Gun                                                                                                                                          | 1                              | 2                                              | Any                           |
| E-Gun 3 Sweep                                                                                                                                        | 1                              | 2                                              | Any                           |
| User Input 1                                                                                                                                         | 1                              | 2                                              | Any                           |
| User Input 2                                                                                                                                         | 1                              | 2                                              | Any                           |
| User Input 3                                                                                                                                         | 1                              | 2                                              | Any                           |
| User Input 4                                                                                                                                         | 1                              | 2                                              | Any                           |
| User Input 5                                                                                                                                         | 1                              | 2                                              | Any                           |
| User Input 6                                                                                                                                         | 1                              | 2                                              | Any                           |

| GOC-10 Back Panel                      |                  |              |
|----------------------------------------|------------------|--------------|
| 25-pin D-Sub Male                      | OUTPUT 1-16      | OUTPUT 17-32 |
| Output Type                            | Current sourcing |              |
| Operating Voltage                      | 10.2-26.4 VDC    |              |
| Peak Voltage                           | 30 VDC           |              |
| ON Voltage Drop                        | 1.0 VDC maximum  |              |
| AC Frequency                           | N/A              |              |
| Minimum Load Current                   | 0.2 mA           |              |
| Maximum Load Current                   | 0.1 A/point      |              |
| Maximum Leakage Current                | 0.1 mA @ 30 VDC  |              |
| Maximum Inrush Current                 | 150 mA for 10 ms |              |
| OFF to ON Response                     | 0.5 ms           |              |
| ON to OFF Response                     | 0.5 ms           |              |
| Output 1-16 pins                       | 1-16             |              |
| Output 17-32 pins                      |                  | 1-16         |
| Common pin for outputs 1-8             | 18               |              |
| Common pin for outputs 9-16            | 19               |              |
| Common pin for outputs 17-24           |                  | 18           |
| Common pin for outputs 25-32           |                  | 19           |
| Fuses                                  | None             |              |
| Connect commons to external supply (+) |                  |              |

| GOC-10 Outputs (total = 32)<br>Configured at <u>Sources</u> , <u>Sensors</u> ,<br>and <u>I/O Assignment</u> pages of the<br><i>Deposition Monitor</i> | Maximum<br>Number of<br>Outputs | Maximum<br>Number of<br>Binary<br>Combinations | Output Signal<br>Time Duration |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------|--------------------------------|
| SRC 1 SET Pos                                                                                                                                         | 6                               | 64                                             | Any                            |
| SRC 2 SET Pos                                                                                                                                         | 6                               | 64                                             | Any                            |
| SRC 3 SET Pos                                                                                                                                         | 6                               | 64                                             | Any                            |
| SRC 4 SET Pos                                                                                                                                         | 6                               | 64                                             | Any                            |
| SRC 5 SET Pos                                                                                                                                         | 6                               | 64                                             | Any                            |
| SRC 6 SET Pos                                                                                                                                         | 6                               | 64                                             | Any                            |
| Xtal 1 SET Pos                                                                                                                                        | 3                               | 8                                              | Any                            |
| Xtal 2 SET Pos                                                                                                                                        | 3                               | 8                                              | Any                            |
| Xtal 3 SET Pos                                                                                                                                        | 3                               | 8                                              | Any                            |
| Xtal 4 SET Pos                                                                                                                                        | 3                               | 8                                              | Any                            |

| GOC-10 Outputs (total = 32)<br>Configured at <u>Sources</u> , <u>Sensors</u> ,<br>and <u>I/O Assignment</u> pages of the<br><i>Deposition Monitor</i> | Maximum<br>Number of<br>Outputs | Maximum<br>Number of<br>Binary<br>Combinations | Output Signal<br>Time Duration |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------|--------------------------------|
| Reserved                                                                                                                                              | 32                              | N/A                                            | N/A                            |
| Material#                                                                                                                                             | 8                               | 256                                            | Any                            |
| Layer#                                                                                                                                                | 10                              | 1024                                           | Any                            |
| SRC 1 Sweep#                                                                                                                                          | 5                               | 32                                             | Any                            |
| SRC 2 Sweep#                                                                                                                                          | 5                               | 32                                             | Any                            |
| SRC 3 Sweep#                                                                                                                                          | 5                               | 32                                             | Any                            |
| SRC 4 Sweep#                                                                                                                                          | 5                               | 32                                             | Any                            |
| SRC 5 Sweep#                                                                                                                                          | 5                               | 32                                             | Any                            |
| SRC 6 Sweep#                                                                                                                                          | 5                               | 32                                             | Any                            |
| IAD Power#                                                                                                                                            | 5                               | 32                                             | Any                            |
| Standby                                                                                                                                               | 1                               | 2                                              | Any                            |
| Deposit                                                                                                                                               | 1                               | 2                                              | Any                            |
| Process Running                                                                                                                                       | 1                               | 2                                              | Any                            |
| Process Stop                                                                                                                                          | 1                               | 2                                              | Any                            |
| Process End                                                                                                                                           | 1                               | 2                                              | Any                            |
| Layer End                                                                                                                                             | 1                               | 2                                              | Any                            |
| Alarm                                                                                                                                                 | 1                               | 2                                              | Any                            |
| Gas 1 On/Off                                                                                                                                          | 1                               | 2                                              | Any                            |
| Gas 2 On/Off                                                                                                                                          | 1                               | 2                                              | Any                            |
| Pump Down                                                                                                                                             | 1                               | 2                                              | 300 ms                         |
| System Standby                                                                                                                                        | 1                               | 2                                              | 300 ms                         |
| Ion Gauge                                                                                                                                             | 1                               | 2                                              | 300 ms                         |
| IAD Power                                                                                                                                             | 1                               | 2                                              | Any                            |
| E-Gun 1 Power                                                                                                                                         | 1                               | 2                                              | Any                            |
| E-Gun 1 HV-OFF-E                                                                                                                                      | 1                               | 2                                              | 300 ms                         |
| E-Gun 1 HV-ON                                                                                                                                         | 1                               | 2                                              | 300 ms                         |
| E-Gun 1 Gun-OFF-E                                                                                                                                     | 1                               | 2                                              | 300 ms                         |
| E-Gun 1 Gun-ON                                                                                                                                        | 1                               | 2                                              | 300 ms                         |
| E-Gun 1 Sweep                                                                                                                                         | 1                               | 2                                              | Any                            |
| E-Gun 2 Power                                                                                                                                         | 1                               | 2                                              | Any                            |
| E-Gun 2 HV-OFF-E                                                                                                                                      | 1                               | 2                                              | 300 ms                         |
| E-Gun 2 HV-ON                                                                                                                                         | 1                               | 2                                              | 300 ms                         |
| E-Gun 2 Gun-OFF-E                                                                                                                                     | 1                               | 2                                              | 300 ms                         |
| E-Gun 2 Gun-ON                                                                                                                                        | 1                               | 2                                              | 300 ms                         |
| E-Gun 2 Sweep                                                                                                                                         | 1                               | 2                                              | Any                            |
| E-Gun 3 Power                                                                                                                                         | 1                               | 2                                              | Any                            |
| E-Gun 3 HV-OFF-E                                                                                                                                      | 1                               | 2                                              | 300 ms                         |
| E-Gun 3 HV-ON                                                                                                                                         | 1                               | 2                                              | 300 ms                         |
| E-Gun 3 Gun-OFF-E                                                                                                                                     | 1                               | 2                                              | 300 ms                         |
| E-Gun 3 Gun-ON                                                                                                                                        | 1                               | 2                                              | 300 ms                         |
| E-Gun 3 Sweep                                                                                                                                         | 1                               | 2                                              | Any                            |
| User Output 1                                                                                                                                         | 1                               | 2                                              | Any                            |
| User Output 2                                                                                                                                         | 1                               | 2                                              | Any                            |
| User Output 3                                                                                                                                         | 1                               | 2                                              | Any                            |
| User Output 4                                                                                                                                         | 1                               | 2                                              | Any                            |
| User Output 5                                                                                                                                         | 1                               | 2                                              | Any                            |
| User Output 6                                                                                                                                         | 1                               | 2                                              | Any                            |

| GOC-10 Back Panel  |                                 |           |            |           |
|--------------------|---------------------------------|-----------|------------|-----------|
| 25-pin D-Sub Male  | RELAY 1-8                       |           | RELAY 9-15 |           |
|                    | NO Switch                       | NC Switch | NO Switch  | NC Switch |
| Relay Type         | SPDT (single pole double throw) |           |            |           |
| Current Rating     | 2.5 A @ 30 VDC or 30 VAC        |           |            |           |
| OFF to ON Response | 0.5 ms                          |           |            |           |
| ON to OFF Response | 0.5 ms                          |           |            |           |
| Relay 1 pins       | 1, 2                            | 1, 3      | N/A        |           |
| Relay 2 pins       | 4, 5                            | 4, 6      |            |           |
| Relay 3 pins       | 7, 8                            | 7, 9      |            |           |
| Relay 4 pins       | 10, 11                          | 10, 12    |            |           |
| Relay 5 pins       | 13, 14                          | 13, 15    |            |           |
| Relay 6 pins       | 16, 17                          | 16, 18    |            |           |
| Relay 7 pins       | 19, 20                          | 19, 21    |            |           |
| Relay 8 pins       | 22, 23                          | 22, 24    |            |           |
| Relay 9 pins       | N/A                             |           | 1, 2       | 1, 3      |
| Relay 10 pins      |                                 |           | 4, 5       | 4, 6      |
| Relay 11 pins      |                                 |           | 7, 8       | 7, 9      |
| Relay 12 pins      |                                 |           | 10, 11     | 10, 12    |
| Relay 13 pins      |                                 |           | 13, 14     | 13, 15    |
| Relay 14 pins      |                                 |           | 16, 17     | 16, 18    |
| Relay 15 pins      |                                 |           | 19, 20     | 19, 21    |

| GOC-10 Relays (total = 15)<br>Configured at <u>Sources</u> , <u>Sensors</u> ,<br>and <u>I/O Assignment</u> pages of the<br><i>Deposition Monitor</i> | Maximum<br>Number of<br>Relays | Switch ON<br>Time Duration |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------|
| SRC 1 Shutter                                                                                                                                        | 1                              | Any                        |
| SRC 2 Shutter                                                                                                                                        | 1                              | Any                        |
| SRC 3 Shutter                                                                                                                                        | 1                              | Any                        |
| SRC 4 Shutter                                                                                                                                        | 1                              | Any                        |
| SRC 5 Shutter                                                                                                                                        | 1                              | Any                        |
| SRC 6 Shutter                                                                                                                                        | 1                              | Any                        |
| Xtal 1 Shutter                                                                                                                                       | 1                              | Any                        |
| Xtal 2 Shutter                                                                                                                                       | 1                              | Any                        |
| Xtal 3 Shutter                                                                                                                                       | 1                              | Any                        |
| Xtal 4 Shutter                                                                                                                                       | 1                              | Any                        |
| Xtal 1&2 Shutter                                                                                                                                     | 1                              | Any                        |
| Xtal 3&4 Shutter                                                                                                                                     | 1                              | Any                        |
| Xtal 1 Actuator                                                                                                                                      | 1                              | 0.1 to 8.0 s               |
| Xtal 2 Actuator                                                                                                                                      | 1                              | 0.1 to 8.0 s               |
| Xtal 3 Actuator                                                                                                                                      | 1                              | 0.1 to 8.0 s               |
| Xtal 4 Actuator                                                                                                                                      | 1                              | 0.1 to 8.0 s               |
| OM Actuator                                                                                                                                          | 1                              | 0.1 to 8.0 s               |
| Reserved                                                                                                                                             | 15                             | N/A                        |
| Gas 1 On/Off                                                                                                                                         | 1                              | Any                        |
| Gas 2 On/Off                                                                                                                                         | 1                              | Any                        |
| Ion Gauge                                                                                                                                            | 1                              | 300 ms                     |
| IAD Power                                                                                                                                            | 1                              | Any                        |