

MERCURY

Mercury Instrumentation

Intelligent control of cryogenic and magnetic environments



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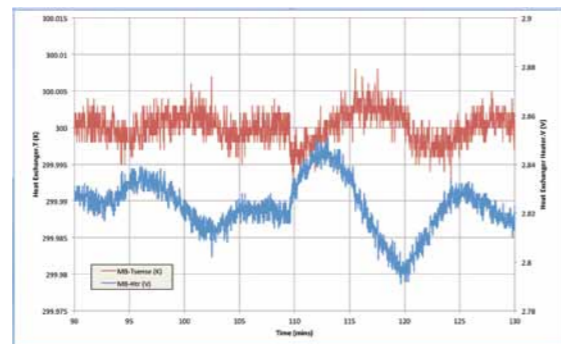
MercuryiTC Intelligent Cryogenic Environment Controller

Accurate, intelligent, upgradable



- Thermometry down to 250 mK
- Heater output up to 80 W per channel
- Cryogen level meters (nitrogen and helium)
- Gas flow control
- Auxiliary control (stepper motors) and TTL I/O
- Up to 4 simultaneous PID control loops
- Calibration upload and sensor error detection
- Multi-channel configuration options

MercuryiTC controlling heat exchanger temperature of an OptistatDN cryostat at 300 K. Sensor PT-100, excitation 100 μ A



Thermometry

Number of inputs	1 incl. as standard, up to 8 extra
A/D Resolution	24-bit analog to digital
Maximum reading rate	Up to 10 readings per sec
Isolation	All sensors independantly isolated
Supported sensor types	All standard types for diode/RTD and thermocouple

Configuration Options*

Sensor input	Up to 9
Heater output	Up to 4
N2 / He level meter	Up to 2
Auxillary control (stepper motor)	Up to 4
GPIB	1

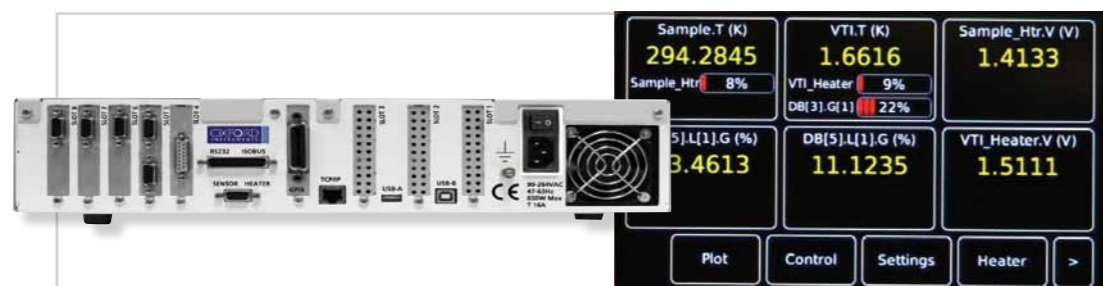
Heater

Number of inputs	1 incl. as standard, up to 3 extra
A/D Resolution	16-bit
Max heater power	80 W
Max current	2 A
Max voltage	40 V
Heater load range	20 Ohms to 120 Ohms
Heater noise (0 - 2MHz)	2 mV

Control

Number of loops	1 incl. as standard, up to 3 extra
PID control	Fixed or zonal
Set point	Programmable
Proportional gain	0 to 200 K (resolution 0.1)
Integral time	0 to 200 s (resolution 0.1)
Derivative rate	0 to 200 s (resolution 0.1)

* Base system includes thermometer and heater control as standard. Additional configuration to a maximum of 8 options can be installed.



MercuryiPS Magnet Power Supply

Accurate, intelligent, upgradable

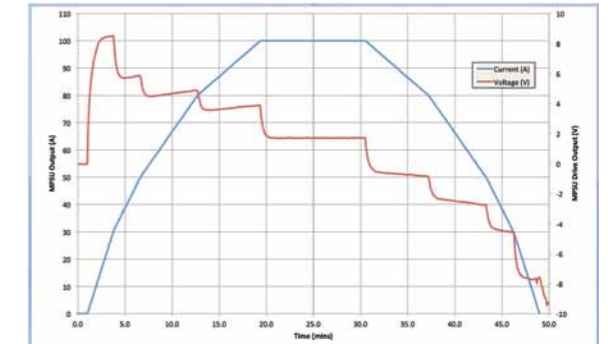


Reliable measurement and control

- Best in class stability performance
- Optimised for accuracy and low noise
- Multi-channel control capability to combine several instruments in one
- **MercuryiTC example:** 4 heater control loops, level sensing, and stepper motor control all in a single instrument!
- Upgradable with plug and play expansion cards
- Programmable
- Remote connectivity (Ethernet, USB, RS232, GPIB)
- Intuitive, user-friendly touch screen interface

- Output current to ± 480 A
- Output voltage ± 10 V
- Full range of bi-polar output
- Highly accurate to ≤ 3 mA current stability
- Low noise
- iSense intelligent magnet monitoring
 - Quench protection
 - Temperature and cryogen level monitoring
- Configurable as Master and Slave modules
- Supports vector rotate magnets

MercuryiPS MPSU Master + 1 x Slave: Parallel Mode. Ramping* 43H magnet



*Target ramp rate is set to 12 A/min. As a demonstration the positive current ramp is limited by a multi-zone ramp rate limit table. For the ramp from 0 to 30 A the rate is limited to 11 A/min, then 7 A/min from 30 A to 50 A, then 5 A/min from 50 A to 80 A, then 3 A/min from 80 A to 100 A. The ramp back to 0 mirrors the ramp up.

Configurable Module Specifications (typical)

Output current	± 60 A via rear panel busbar per module
Output voltage	± 10 V
Output polarity	Bi-polar
Current resolution	0.15 mA
Current stability	± 2 mA or 0.005% per $^{\circ}$ C
Current ripple	<0.001%
Max sweep rate	300 A/min
Resolution	0.01 A/min
Load inductance	Up to 1000H
Switch heater output	0 to 120 mA into 0 – 100 ohms. 12 V max
Max steady state power	600 W

Input

Mains input	3 pin UL/CSA compliant. Auto range setting
Supply voltage	90 to 264 VAC
Frequency	47 to 63Hz

Interface

RS232	With isobus support. Configured as DCE
Ethernet	10/100 RS422 IEEE802.3
USB	Serial port
GPIB	IEEE-488 (Option)
SPI bus	Control between Master and Slave

Supported by the new Oxsoft IDK software

MercuryiTC – Intelligent cryogenic environment controller

- Thermometry down to 250 mK
- Accurate multi-channel PID control

MercuryiPS – Programmable magnet power supply

- Fully bipolar supplies ± 10 V, ± 60 A to ± 480 A
- iSense intelligent magnet monitoring

Compatible with Oxford Instruments and third party products

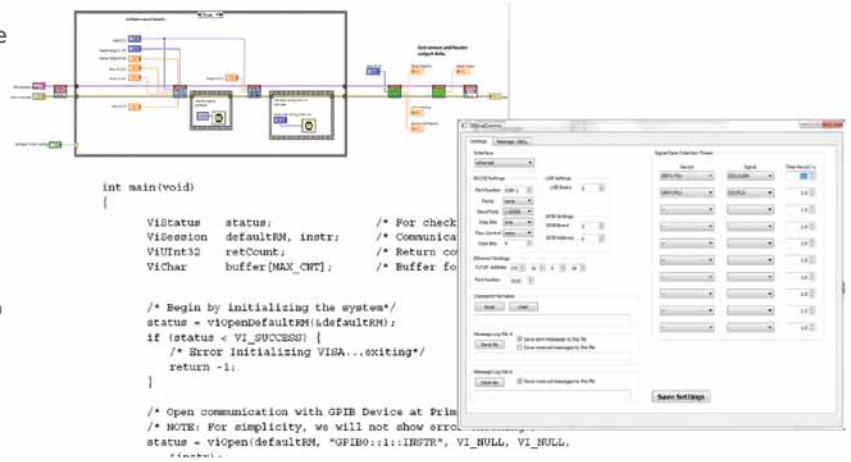


Mercury System Instrumentation

System integration

Oxsoft IDK instrument development kit software

- Design remote control and configuration programs
- Integrate into your preferred experiment control architecture
- Graphical (Labview) and language (C/C++) programming
- Tools/utilities - diagnostics, calibration and backup
- Examples and full documentation
- Open and extensible, supporting standards (VISA, SCPI, LXI)
- MS Windows (XP Pro / 7), Linux (ask)



Configurable examples

Examples	Features	Temperature Controller				Magnet Power Supply		
		ITC Unit	Card options			60 A Master	Options	
			Temp Sensor	Heater	Flow Control	GPIB	60 A Slave	Level Meter
Optistat DN	Control channel on heat exchanger + GPIB	1				1		
Spectromag (Wet)	Control channel on heat exchanger + sample temp	1	1					
	120 A Power supply with level meter						1	1
Microstat He	Control channel on heat exchanger + extra control loop + gas flow control	1	1	1	1			
Heliox VL + 12 T Superconducting Magnet	Control channel on heat exchanger + sample temp + gas flow control	1	1		1			
	120 A Power supply with level meter						1	1
Cryofree VTI with 8/1/1 Vector Magnet	Control channel on heat exchanger + sample temp	1	1					
	120 A Power supply for main magnet + magnet temp sense 2 vectors < 60 A						1	3

www.oxford-instruments.com/nanoscience for more information or email nanoscience@oxinst.com

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