# PRECISION THERMAL ANALYZERS
## (A.C./D.C./PULSE)

## Introduction:

Precision low temperature thermal analysers are available in 8 different regular models apart from tailor made solutions virtually covering all industrial and research applications meeting all electrical, thermal, mechanical, and environmental specifications. These indicators are first choice for online monitoring of ultra low thermal measurement(upto $10^{-6}$ kelvin) in static/dynamic mode. These finds applications in generation, transmission/distribution, defense, electrical/mechanical m/c testing instrument, industrial electronics, railway, and avionics and solid state physical application like dielectrics characterization, switch gears, MEMS and many research and development activities. These precision instruments are compatible to any standard or RTS/thermocouple sensor and display with very high degree of accuracy/repeatability/reliability and are available in different constructional material like ceramic-coated MS, poly carbonate cabinets.

## Benefits:

- High input impedence/Low input biased current /higher accuracy.
- 5-1/2 & 6-1/2 digit display /consistent performance.
- ce over large temperature/humidity range (70°C and 80 % RH) .
- Scaled directly in mili/micro kelvine with repeatable accuracy.
- Auto/manual zero offset without drift.
- Auto drift tracking
- RS-32 interface/high sample rate – 10,000 sample/second.
- Feed back current measurement technique.

MPTA-0009991

MPTA- 0099991

MPTA-9999992

**Thermal analysers static/dynamic.** **Range<999999 micro kelvin-999999 kelvin**

| Model | Range °C | Pulse/D.C./Pulse Frequency Range | Thermal Burdon | Accuracy Restricted to Resolution level | Resolution Quantified/ optional | Thermal source /optional As demanded | interface |
|---|---|---|---|---|---|---|---|
| MPTA-9999990101 | 05.0/02.0 -999999 mili°C 0009999-0999999 °C | 0.0-20 cycle | < 100 mili °C | 99.99999% | 2/5/10 mili °C | 05.0/02.0 -999999 mili°C 0009999-0999999 °C | RS-232USB |
| MPTA-9999990401 | 05.0/01.0 -999999 mili°C 0999.99-0999999°C | 0.0-20 cycle | < 100 mili °C | 99.99999% | 2/5 /10mili °C | 05.0/02.0 -999999 mili°C 099.999-0999999 °C | RS-232/USB |
| MPTA-9999990102 | 10.0/05.0 -999999mu°C 0.999999-0999999°C | 0.0-20 cycle | < 100 micro °C | 99.99999% | 2/5/10 micro °C | 05.0/02.0 -999999 mili°C 099.999-0999999 °C | RS-232/USB |
| MPTA-9999990402 | 10.0/01.0 -999999mu °C 0.999999-0999999°C | 0.0-20 cycle | < 100 micro °C | 99.99999% | 2/5/10 micro °C | 05.0/02.0 -999999 mili°C 099.9999-0999999 °C | RS-232/USB |

**Six digit after product code indicate count, next, Two digit indicate °C./next two digit indicate least count/last digit indicate Static-01/dynamic-02.**

## General electrical/mechanical specifications:

Operating voltage: 220 volt A.C. (50-20,000 Hz)/ 12 volts D.C.
Measurement range (full scale): as above in different model.
Temperature signal: $10^{-3}/10^{-6}$ **°C** static/dynamic (optional)( differential/point mode)
Thermal source: 0-40/0-100/0-500 degree cel-static/dynamic (pulse mode H.T)-optional
Input themal capacitance: 100 cal.sec/kg/degree k $10^{-6}$
Response time: 1000 sample/sec
Burden: less than 100 micro/mili **°C** /full scales current or better
Accuracy: 0.5/1.0/2.0 % reading
Repeatability: 100 of reading
Resolution: **1/2/5/10 °c or optional and may be altered based on time behaviour of signal**
Range (**°C**):$10^{-06}$-$10^{-0}$ /$10^{+0}$-$10^{+6}$ °C or optional resolution/accuracy
Thermal least count- **5**.0 micro**°C/5.0** mii **°C**
Linearity adjustment: upto 100 micro/mili **°C**
Input imedence: ultra low(<0.01000 micro **°C** /burdon),
Filtering: low pass( adjustable)
Offset: variable upto 10,000 micro/mili **°C** (manual/auto)
CMMR: >80 db at 10-15 thermal Hz
Isolation: > 100 giga ohm
Connector: BNC-9 pinx2 and BNC-25 pinx2
Size: 5X8X8 inches/rack mounted or portable
Interface: RS-232
Option: ADDITIONAL SOFTWARE to plot V/I OR ANY DESIRED INFERENTIAL PARAMETER.
**THESE SPECIFICATIONS OR PART THERE OF MAY BE MODIFIED TO MEET ANY TAILOR MADE SOLUTIONS.**
**NOTES: The numeral after product code indicates the ( ampere meter) range and last digit corresponds to size (5x5x8, 8x8x12)**

MPTA-9999990402


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# CONSTANT VOLTAGE/CURRENT POWER SUPPLIES

***Programmable/Non-programmable*** **MHCLS-Series**

## Introduction:

MHCLS series of precision current/voltage supplies are available in (15.0 to 5000 watts), more than 20 different models working in constant voltage/current mode virtually offering solutions to precision measurement,electrochemical, corrosion, petrochemical industry, organic/inorganic chemical, heavy electrical/mechanical industries, non-conVentional energy, solids state physics application and many uncountable defense/nuclear applications. Updated design topology ensures better controllability and efficiency with additional integrated power/voltage and frequency control/protection. These power supplies may operate in parallel to make it more redundant. Company offers tailor made solution to custom requirement.

## Benefits:

Much lower current/voltage ripple (available in nano/pico range).
Faster control action.
Better repeatability/reproducibility.
Better electrical stability
Serial interface
Five/Six digit display

**MHCLS-024100**

**MHCLS-024100**

**MHCLS-100100**

**SPECIFICATIONs OF CONSTANT VOLTAGE POWER SOURCE** **Power range<400**

| Model | Watts | Vmax | Imax | Repitation rate in case of pulse/sec x10 | Resolution Quantified/ optional | Ripple | Accuracy %-reading | Zout $10^{-6}$ | Step down range | cooling |
|---|---|---|---|---|---|---|---|---|---|---|
| **MHCLS1-012002** | 024.0 | 12.0 | 002.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-012004** | 048.0 | 12.0 | 004.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-012008** | 096.0 | 12.0 | 008.0 | 100-10000 | **5 nV/5pA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-025005** | 050.0 | 25.0 | 002.0 | 100-10000 | **5 nV/5pA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-025010** | 0100.0 | 25.0 | 004.0 | 100-10000 | **5 nV/5pA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-025020** | 0200.0 | 25.0 | 008.0 | 100-10000 | **5 nV/5pA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-025032** | 0325.0 | 25.0 | 015.0 | 100-10000 | **5 nV/5fA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-050020** | 0200.0 | 50.0 | 004.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-050004** | 0400.0 | 50.0 | 008.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-100010** | 0100.0 | 100.0 | 001.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-100020** | 0200.0 | 100.0 | 002.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-200004** | 0400.0 | 200.0 | 002.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-200008** | 0800.0 | 200.0 | 004.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |
| **MHCLS1-400020** | 2000.0 | 400.0 | 005.0 | 100-10000 | **5 nV/5nA** | **0.000001%** | **99.99999%** | **< 10** | 1:1000000 | Air |

**SPECIFICATIONs OF CONSTANT CURRENT POWER SOURCE** **POWER RANGE<200**

| Model | Watts | Vmax | Imax | Repitation rate in case of pulse/sec x10 | Resolution % of FSM | Ripple | Accuracy %-reading | Zout | Step down Range | cooling |
|---|---|---|---|---|---|---|---|---|---|---|
| **MHCLS1-012002** | 024.0 | 12.0 | 002.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | ,$10^{18}$ | 1:1000000 | Air |
| **MHCLS1-025005** | 050.0 | 25.0 | 002.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-025002** | 025.0 | 25.0 | 001.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-025005** | 050.0 | 25.0 | 002.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-050005** | 005.0 | 50.0 | 000.1 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-050005** | 050.0 | 50.0 | 001.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-100001** | 010.0 | 100.0 | 000.1 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-100020** | 100.0 | 100.0 | 001.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-200002** | 020.0 | 200.0 | 000.1 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-200002** | 200.0 | 200.0 | 001.0 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |
| **MHCLS1-200004** | 040.0 | 400.0 | 000.1 | 100-10000 | **0.0000001%** | **0.000001%** | **99.999999%** | $10^{18}$ | 1:1000000 | Air |

Three numerals x 100 after MHCLS indicates voltage of power supply and last three digit Indicates current. All dimensions are in inches.


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# CONSTANT VOLTAGE/CURRENT LINEAR POWER SUPPLIES

***Programmable/Non-programmable*** **MHCLS-Series**

## Constant voltage/ current power source specification:

Operating voltage 220 volts, 1phase, 40-60 Hz
Output current/voltage :as in data sheet(ineare/pulse)
Voltage/current control accuracy: 99.9999% of set point or better for CC/CV
Ripple: 0.000001% of set point for voltage/0.000001% for CC or optional/amended
**Resolution: 1/5 nV & 1/5 nano amps or1/5 nV & 1/5 pico-amp or optional and may be altered based on time behaviour of signal**
Range (V/I): Voltage: $10^{-09}$-$10^{-04}$ volt/$10^{-4}$-$10^{+1}$ volt least count- 5.0 nano volt
Current: $10^{-12}$-$10^{-07}$ amp/$10^{-7}$-$10^{-2}$ amp least count- 5.0 pico ampere or optional
Accuracy: 0.0000001% of set volts for (CV mode/0.0000001% of set current (CC mode)
Interface Signal 0.0-12.0 volts D.C. (proportional to Voltage/current control range)
Step down ratio 0-1000000 or option
Temperature coefficient of variation: < $10^{-9}$12ppm
Control options 1.cascade feedback control with soft start
2. Constant voltage mode with external adjustment.
Display $5_{1/2}$ &$6_{1/2}$ digit LED display
OTHER OPTION: DC/AC/PULSE (100-10000 PULSE/SEC)
Protection over voltage/short ckt
Option: These power supplies may offer in pulse mode.
Interface: RS-232/U.S.B.

## Constant voltage/current power source dimension:

| | | | |
|---|---|---|---|
| **MHCLS-006050** | **08X06X06** | **MHCLS-050150** | **14X12X12** |
| **MHCLS-012050** | **10X06X06** | **MHCLS-050200** | **16X14X14** |
| **MHCLS-012100** | **12X08X08** | **MHCLS-100025** | **18X16X16** |
| **MHCLS-025025** | **12X10X10** | **MHCLS-100050** | **20X18X18** |
| **MHCLS-025050** | **12X10X10** | **MHCLS-100100** | **20X18X18** |
| **MHCLS-025100** | **12X10X10** | **MHCLS-100150** | **20X18X18** |
| **MHCLS-0025200** | **08X06X06** | **MHCLS-100200** | **14X12X12** |
| **MHCLS-050050** | **10X06X06** | **MHCLS-100400** | **16X14X14** |
| **MHCLS-200050** | **18X16X14** | **MHCLS-200100** | **18X16X16** |

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