

高精度可変抵抗器

HARS-X Series p. 1 of 2

許容誤差に厳しい研究所用グレードの高精度可変抵抗器で、高いコストパフォーマンスが要求されるアプリケーションに適しています。

- 抵抗値: 1 mΩ to 111 MΩ
- パワー 2 倍の新モデルHARS-X2
- 豊富な選択肢: 1~11ディケードユニット
- 高精度: 0.01% (100ppm)
- 非常に小さなゼロ抵抗: < 1m /ディケード
- 高性能な銀合金製スイッチ
- 低温度係数: 5ppm/
- 非誘導あるいは低インダクタンス抵抗
- ラックマウント用もあります。
- 特別なカスタマーに応じた構成も可能



6 Decade **HARS-X** High Accuracy Resistance Substituter

See also:

- Higher accuracy: [HARS-LX Series](#)
- Higher power: [HPRS Series](#)
- Higher resistance: [HRRS Series](#)
- Higher voltage: [HRRS-5kV](#) and [HRRS-10kV Series](#)
- RTD simulators: [RTD Series](#)
- Programmable models: [PRS Series](#)

SPECIFICATIONS

| Resistance per step | Total decade resistance | Stability (±ppm/yr) | Long-term stability (±ppm/3 yrs) | Temperature coefficient (±ppm/°C) | Resistor type | HARS-X | | | HARS-X2 New | | |
|---------------------|-------------------------|---------------------|----------------------------------|-----------------------------------|--------------------------|-------------|------------------------|----------------------|---|------------------------|----------------------|
| | | | | | | Max current | Max voltage (per step) | Max power (per step) | Max current | Max voltage (per step) | Max power (per step) |
| 1 mΩ | 10 mΩ | 50 | 75 | 50 | Resistance wire | 8 A | 5 mV | 0.04 W | 9 A | 9 mV | 0.08 W |
| 10 mΩ | 100 mΩ | 50 | 75 | 20 | | 4 A | 40 mV | 0.16 W | 6.3 A | 63 mV | 0.4 W |
| 100 mΩ | 1 Ω | 50 | 75 | 20 | | 1.6 A | 0.16 V | 0.25 W | 2.2 A | 0.3 V | 0.5 W |
| 1 Ω | 10 Ω | 20 | 25 | 20 | Wirewound, non-inductive | 0.8 A | 0.8 V | 0.6 W | 1.1 A | 1.1 V | 1.2 W |
| 10 Ω | 100 Ω | 20 | 25 | 15 | | 0.25 A | 2.5 V | 0.6 W | 0.35 A | 3.5 V | 1.2 W |
| 100 Ω | 1 kΩ | 20 | 25 | 5 | | 80 mA | 8 V | 0.6 W | 110 mA | 11 V | 1.2 W |
| 1 kΩ | 10 kΩ | 20 | 25 | 5 | | 23 mA | 23 V | 0.5 W | 35 mA | 35 V | 1.2 W |
| 10 kΩ | 100 kΩ | 20 | 25 | 5 | | 7 mA | 70 V | 0.5 W | 11 mA | 110 V | 1.2 W |
| 100 kΩ | 1 MΩ | 20 | 25 | 5 | | 2.3 mA* | 230 V* | 0.5 W* | 3 mA* | 500 V* | 1 W* |
| 1 MΩ | 10 MΩ | 20 | 25 | 10 | | 0.7 mA* | 700 V* | 0.5 W* | 1 mA* | 1000 V* | 1 W* |
| 10 MΩ | 100 MΩ | 50 | 100 | 10 | Metal oxide film | 0.1 mA* | 1000 V* | 0.1 W* | 0.1 mA* | 1000 V* | 0.1 W* |

*Subject to maximum of 2000 V to case.

Accuracy:

≤1 MΩ steps: ±(0.01% + 2 mΩ)
 10 MΩ steps: ±0.03%
 after subtraction of zero resistance, at 23°C; traceable to SI

Zero Resistance:

≤1 MΩ decades: <1 mΩ per decade at dc
 10 MΩ decade: ≈3 mΩ at dc

Maximum Voltage to Case:

2000 V peak

Environment:

Operating: +10 to +40°C, <80% RH
 Storage: -20 to +65°C

Switches:

Continuous rotation
 11 positions marked "0"- "10"
 Multiple solid silver-alloy contacts

Switch Capacitance:

<1 pF between contacts

Terminals:

Gold-plated, tellurium-copper, low-thermal-emf binding posts on standard 3/4 inch spacing; shield terminal provided.

Mechanical:

| Model | Dimensions | Weight |
|------------|--|-----------------|
| 1 decade | 9.5 cm W x 8.3 cm H x 11.0 cm D (3.75" x 3.25" x 4.33") | 0.45 kg (1 lb) |
| 2-3 decade | 31 cm W x 8.9 cm H x 10.2 cm D (12.2" x 3.5" x 4") | 1.7 kg (3.8 lb) |
| 4-5 decade | 37.6 cm W x 8.9 cm H x 10.2 cm D (14.8" x 3.5" x 4") | 2.0 kg (4.3 lb) |
| 6 decades | 43.9 cm W x 8.9 cm H x 10.2 cm D (17.3" x 3.5" x 4") | 2.2 kg (4.8 lb) |
| 7 decades | | 2.4 kg (5.3 lb) |
| 8 decades | 48.3 cm W x 17.8 cm H x 17.8 cm D (19" x 7" x 7") | 3.4 kg (7.5 lb) |
| 9 decades | | 3.5 kg (7.7 lb) |
| 10 decades | | 3.6 kg (7.9 lb) |
| 11 decades | | 3.7 kg (8.1 lb) |



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High Accuracy Decade Resistance Substituter

HARS-X Series p. 2 of 2

SINGLE DECADE UNITS

Single-decade units are available with resistance from as low as 1 mΩ per step to as high as 10 MΩ per step. These units satisfy many system applications requiring only a single decade while maintaining all the quality features of the HARS series.

Each decade is enclosed in an aluminum case which can serve as a shield.

It may be panel-mounted and combined with additional units to form potentiometer circuits or other configurations.

Each unit consists of low-inductance resistors in series, with a high performance solid silver alloy contact switch.



Single-Decade HARS-X Unit

ORDERING INFORMATION

| Model* | Total resistance (Ω) | No of Dials | Resolution (Ω) |
|----------------|----------------------|-------------|----------------|
| HARS-X-1-0.001 | 0.01 | 1 | 0.001 |
| HARS-X-1-0.01 | 0.1 | 1 | 0.01 |
| HARS-X-1-0.1 | 1 | 1 | 0.1 |
| HARS-X-1-1 | 10 | 1 | 1 |
| HARS-X-1-10 | 100 | 1 | 10 |
| HARS-X-1-100 | 1 k | 1 | 100 |
| HARS-X-1-1K | 10 k | 1 | 1 k |
| HARS-X-1-10K | 100 k | 1 | 10 k |
| HARS-X-1-100K | 1 M | 1 | 100 k |
| HARS-X-1-1M | 10 M | 1 | 1 M |
| HARS-X-1-10M | 100 M | 1 | 10 M |
| HARS-X-2-0.001 | 0.11 | 2 | 0.001 |
| HARS-X-2-0.01 | 1.1 | 2 | 0.01 |
| HARS-X-2-0.1 | 11 | 2 | 0.1 |
| HARS-X-2-1 | 110 | 2 | 1 |
| HARS-X-2-10 | 1.1 k | 2 | 10 |
| HARS-X-2-100 | 11 k | 2 | 100 |
| HARS-X-2-1K | 110 k | 2 | 1 k |
| HARS-X-2-10K | 1.1 M | 2 | 10 k |
| HARS-X-2-100K | 11 M | 2 | 100 k |
| HARS-X-2-1M | 110 M | 2 | 1 M |
| HARS-X-3-0.001 | 1.11 | 3 | 0.001 |
| HARS-X-3-0.01 | 11.1 | 3 | 0.01 |
| HARS-X-3-0.1 | 111 | 3 | 0.1 |
| HARS-X-3-1 | 1.11 k | 3 | 1 |
| HARS-X-3-10 | 11.1 k | 3 | 10 |
| HARS-X-3-100 | 111 k | 3 | 100 |
| HARS-X-3-1K | 1.11 M | 3 | 1 k |
| HARS-X-3-10K | 11.1 M | 3 | 10 k |
| HARS-X-3-100K | 111 M | 3 | 100 k |
| HARS-X-4-0.001 | 11.11 | 4 | 0.001 |
| HARS-X-4-0.01 | 111.1 | 4 | 0.01 |
| HARS-X-4-0.1 | 1.111 k | 4 | 0.1 |
| HARS-X-4-1 | 11.11 k | 4 | 1 |
| HARS-X-4-10 | 111.1 k | 4 | 10 |
| HARS-X-4-100 | 1.111 M | 4 | 100 |
| HARS-X-4-1K | 11.11 M | 4 | 1 k |
| HARS-X-4-10K | 111.1 M | 4 | 10 k |

| Model* | Total resistance (Ω) | No of Dials | Resolution (Ω) |
|-----------------|----------------------|-------------|----------------|
| HARS-X-5-0.001 | 111.11 | 5 | 0.001 |
| HARS-X-5-0.01 | 1.1111 k | 5 | 0.01 |
| HARS-X-5-0.1 | 11.111 k | 5 | 0.1 |
| HARS-X-5-1 | 111.11 k | 5 | 1 |
| HARS-X-5-10 | 1.1111 M | 5 | 10 |
| HARS-X-5-100 | 11.111 M | 5 | 100 |
| HARS-X-5-1K | 111.11 M | 5 | 1 k |
| HARS-X-6-0.001 | 1.111 11 k | 6 | 0.001 |
| HARS-X-6-0.01 | 11.1111 k | 6 | 0.01 |
| HARS-X-6-0.1 | 111.111 k | 6 | 0.1 |
| HARS-X-6-1 | 1.111 11 M | 6 | 1 |
| HARS-X-6-10 | 11.1111 M | 6 | 10 |
| HARS-X-6-100 | 111.111 M | 6 | 100 |
| HARS-X-7-0.001 | 11.111 11 k | 7 | 0.001 |
| HARS-X-7-0.01 | 111.1111 k | 7 | 0.01 |
| HARS-X-7-0.1 | 1.111 111 M | 7 | 0.1 |
| HARS-X-7-1 | 11.111 11 M | 7 | 1 |
| HARS-X-7-10 | 111.1111 M | 7 | 10 |
| HARS-X-8-0.001 | 111.111 11 k | 8 | 0.001 |
| HARS-X-8-0.01 | 1.111 111 1 M | 8 | 0.01 |
| HARS-X-8-0.1 | 11.111 111 M | 8 | 0.1 |
| HARS-X-8-1 | 111.111 11 M | 8 | 1 |
| HARS-X-9-0.001 | 1.111 111 11 M | 9 | 0.001 |
| HARS-X-9-0.01 | 11.111 111 1 M | 9 | 0.01 |
| HARS-X-9-0.1 | 111.111 111 M | 9 | 0.1 |
| HARS-X-10-0.001 | 11.111 111 11 M | 10 | 0.001 |
| HARS-X-10-0.01 | 111.111 111 1 M | 10 | 0.01 |
| HARS-X-11-0.001 | 111.111 111 11 M | 11 | 0.001 |

* Use "X2" for higher power model

OPTIONS

- RM Rack mountable case for standard 19" rack
- K Kelvin type 4-terminal binding posts
- RO Rear output binding posts



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