

# TRANSCAT

35 Vantage Point Drive  
Rochester, NY 14624  
1.800.800.5001

[Visit us at Transcat.com!](http://www.transcat.com)

## HARS-X Series HIGH ACCURACY RESISTANCE SUBSTITUTER

Tight tolerance laboratory grade substituter, for applications requiring a cost effective high performance resistance box.



6 Decade HARS-X Series Substituter

- High Stability
- Excellent frequency characteristics
- Available in single through 10 decade units
- Basic Accuracy of 0.01 %
- Zero resistance under 1 milliohm per decade
- High performance solid silver alloy contact switches with low capacitance and low loss
- Resistance from 1 milliohm to 11 Megaohms (See HRRS Series for higher resistance)
- Noninductive or low inductance resistors used throughout the unit
- High accuracy
- Low zero resistance
- Low temperature coefficient
- Rack mounting available
- Special and custom configurations available

### SPECIFICATIONS

<b>Accuracy:</b>	+/- (0.01% + 2 milliohms) after subtraction of zero resistance, at 23 degrees celsius	
<b>Zero Resistance:</b>	1 milliohm per decade, at dc.	
<b>Resistance Temperature Coefficient:</b>	< +/- 20 ppm/degrees celsius for 10 ohm degree steps and under	< +/- ppm/degrees celsius for 100 ohm steps and over
<b>Maximum Applied Voltage:</b>	1000 V peak, switched dry	
<b>Switch Type:</b>	11 positions; "0" - "10"; multiple solid silver alloy contacts	
<b>Switch Capacitance:</b>	< 4 pF per switch, low loss	
<b>Terminals:</b>	Low thermal emf beryllium copper binding posts with standard 3/4 inch spacing plus shield terminal; connections from the rear of the instrument are available as option RO. Solderable terminals for single decade units	

#### Maximum current per Step:

0.001 ohm steps	0.01 ohm	0.1 ohm	1 ohm
5 A max	4 A	1.6 A	800 mA
10 ohms	100 ohms	1 kilohm	10 kilohms
250 mA	80 mA	23 mA	7 mA
<b>100 kilohm</b>		<b>1 Megaohm*</b>	

<http://www.ietlabs.com/harsx.htm> (1 of 3) [06/14/1999 9:49:49 AM]

#### HARS-X Series

2.3 mA max/1000 V peak	0.7 mA max/1000 V peak
------------------------	------------------------

\* See HRRS series for higher resistance values

Model	Dimensions	Weight
1 decade	7.7 cm W x 7.7 cm H x 8.4 cm D (3" x 3" x 3.3")	.45 kg (1.0 lb)
2-4 decades	37.5 cm W x 8.9 cm H x 10.2 cm D (14.8" x 3.5" x 4")	1.7 kg (3.8 lb)
5 decades		2.0 kg (4.3 lb)
6 decades		2.2 kg (4.8 lb)
7 decades	43.9 cm W x 8.9 cm H x 10.2 cm D (17.3" x 3.5" x 4")	2.4 kg (5.3 lb)
8 decades		2.6 kg (5.7 lb)
9 decades	48.3 cm W x 17.8 cm H x 19.7 cm D (19.0" x 7.0" x 7.8")	5.1 kg (11.2 lb)
10 decades		5.3 kg (11.7 lb)

### SINGLE DECADE UNITS

Single decade units are available with resistance as low as 1 milliohm per step to as high as 1 Megaohm 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 integrated 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 Model

### ORDERING INFORMATION

Model* (0.01% accuracy)	Total Resistance (in ohms)	Number of Decades	Resolution (in ohms)	Model* (0.01% accuracy)	Total Resistance (in ohms)	Number of Decades	Resolution (in ohms)
HARS-X-1-0.001	0.01	1	0.00	HARS-X-4-0.001	11.11	4	0.001
HARS-X-1-0.01	0.1	1	10.01	HARS-X-4-0.01	111.1	4	0.01
HARS-X-1-0.1	1	1	0.1	HARS-X-4-0.1	1 111.1 k	4	0.1
HARS-X-1-1	10	1	1	HARS-X-4-1	11.11 k	4	1
HARS-X-1-10	100	1	10	HARS-X-4-10	111.1 k	4	10
HARS-X-1-100	1 k	1	100	HARS-X-4-100	1.111 M	4	100
HARS-X-1-1K	10 k	1	1 k	HARS-X-4-1K	11.11 M	4	1 k
HARS-X-1-10K	100 k	1	10 k				
HARS-X-1-100K	1 M	1	100 k	HARS-X-5-0.001	111.11	5	0.001
HARS-X-1-1M	10 M	1	1 M	HARS-X-5-0.01	1.111 1 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	1.111 1M	5	10
				HARS-X-5-100	11.111 M	5	100
HARS-X-2-0.001	0.11	2	0.001	HARS-X-6-0.0011	1.111 11 k	6	0.001
HARS-X-2-0.01	1.1	2	0.01	HARS-X-6-0.01	11.111 1 k	6	0.01
HARS-X-2-0.1	11	2	0.1	HARS-X-6-0.1	111.111 k	6	0.1
HARS-X-2-1	110	2	1	HARS-X-6-1	1.111 11 M	6	1
HARS-X-2-10	1.1 k	2	10	HARS-X-6-10	11.111 1 M	6	10
HARS-X-2-100	11 k	2	100				
HARS-X-2-1K	110 k	2	1 k	HARS-X-7-0.001	11.111 11 k	7	0.001
HARS-X-2-10K	1.1 M	2	10 k	HARS-X-7-0.01	111.111 1 k	7	0.01
HARS-X-2-100K	11 M	2	100 k	HARS-X-7-0.1	1.111 111 M	7	0.1
				HARS-X-7-1	11.111 11 M	7	1
HARS-X-3-0.001	1.11	3	0.001	HARS-X-8-0.001	111.111 11 k	8	0.001
HARS-X-3-0.01	11.1	3	0.01	HARS-X-8-0.01	1.111 111 1 M	8	0.01
HARS-X-3-0.1	111	3	0.1	HARS-X-8-0.1	11.111 111 M	8	0.1
HARS-X-3-1	1.11 k	3	1				
HARS-X-3-10	11.1 k	3	10	HARS-X-9-0.001	1.111 111 11 M	9	0.001
HARS-X-3-100	111 k	3	100	HARS-X-9-0.01	11.111 111 1 M	9	0.01
HARS-X-3-1K	1.11 M	3	1 k				
HARS-X-3-10K	11.1 M	3	10 k	HARS-X-10-0.001	11.111 111 11 M	10	0.001

\*For less exacting applications, more economical tolerances are available:

use "A" for "X" in part number for 0.05% basic accuracy, in lieu of .01%  
 use "Q" for "X" in part number for 0.02% basic accuracy, in lieu of .01%  
 use "B" for "X" in part number for 0.1% basic accuracy, in lieu of .01%

#### OPTIONS

- RM Rack mountable case for standard 19" rack
- K Kelvin type 4-terminal binding posts
- H Case handles



[Visit us at Transcat.com!](http://www.transcat.com)

35 Vantage Point Drive // Rochester, NY 14624 // Call 1.800.800.5001