

## Product Specification Sheet Model: MS3002

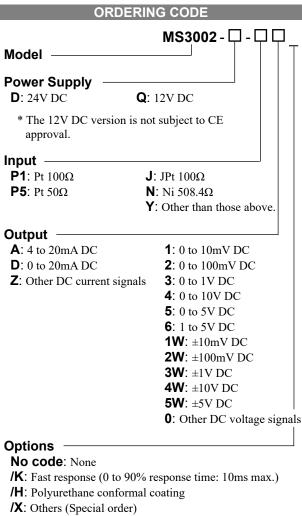
MS3000

Terminal Block Type RTD Temperature Transmitter with Isolated Single Output

CE

#### DESCRIPTION

The MS3002 is a terminal block type RTD temperature transmitter that converts input signals from an RTD into commonly used DC signals and provides an isolated single output.



\* For non-standard options, ask MTT for availability.

#### ORDERING INFORMATION

To place an order, please use the ordering code format as shown above. Also specify a measuring temperature range\*.

(e.g.) MS3002-D-P1A (0 to 150°C)

\* Note that the temperature range should be specified in steps of at least 10 degrees Celsius.

Other Ordering Examples:
For an input code of "Y": MS3002-D-YA (Input: Cu 10Ω at
0°C / 0 to 100°C)
For an output code of "0": MS3002-D-P10 (0 to 150°C /
Output: 2 to 5V)
For an option code of "X": MS3002-D-P1A/X (0 to 150°C/
Response frequency 50Hz)
Note: If you wish to include multiple options in your order,
specify the option codes in series (e.g. /KX).

# **MTT Corporation**

<u>&lt; 25</u>
+0 (mm

### SPECIFICATIONS

POWER SECTIONPower24V DC: 24V DC±10% RequirementsRequirements12V DC: 12V DC±20%Power SensitivityBetter than ±0.1% of span for each power supply range.Power Consumption250mA fuse is installed (standard).Power ConsumptionPower ConsumptionPower Consumption24V DCPower Consumption24V DCPower Consumption200MA max.Power Consumption200MA max.Power Consumption200MA max.Voltage Output20mA max.Voltage Output200M max.Voltage supplied.Excitation CurrentApprox. 1mA with Pt for 0 to 100°CLead Wire200Ω max. per wireRanges Available <standard specifications="">(Temp at 0% input = 0°C)Pt 100ΩSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100Ω, 0 to 150°C).Pt 100ΩSpecifications&gt;Pt 50Ω0 to 100°C<quasi-standard specifications="">RTDTemperature Range (°C)Pt 100Ω-200 to +85050°C min.Jpt 100Ω-200 to +600100°C min.JPt 100Ω-200 to +85050°C min.Up to 4x the input span.Ni 50Ω 4200 to +25030°C min.Nt 100Ω -200 to +25030°C min.Ipt 100Ω -200 to +25030°C min.<td< th=""><th></th><th></th><th></th><th></th></td<></quasi-standard></standard>				
Requirements12V DC: $12V DC \pm 20\%$ Power SensitivityBetter than $\pm 0.1\%$ of span for each power supply range.Power Line Fuse $250mA$ fuse is installed (standard).Power Consumption $24V DC$ $12V DC$ Power Consumption $20mA$ max. $100mA$ max.Power Consumption $20mA$ max. $100mA$ max.Voltage Output $20mA$ max. $45mA$ max.Note: The above figures are in the condition of the rated voltage supplied. $200\Omega$ max.Excitation CurrentApprox. 1mA with Pt for 0 to $100^{\circ}C$ Lead Wire $200\Omega$ max. per wireRanges Available $(Temp at 0\% input = 0^{\circ}C)$ Pt $100\Omega$ Specify between $0-50^{\circ}C$ and $0-500^{\circ}C$ in steps of $50^{\circ}C$ (e.g. Pt $100\Omega$ , 0 to $150^{\circ}C$ ).Pt $100\Omega$ Specify between $0-50^{\circ}C$ and $0-500^{\circ}C$ in steps of $50^{\circ}C$ (e.g. JPt $100\Omega$ , 0 to $250^{\circ}C$ ).Pt $50\Omega$ 0 to $100^{\circ}C$ $$ Input SpanRTDTemperature Range (°C)Input SpanPt $100\Omega$ $-200$ to $+850$ $50^{\circ}C$ min.JPt $100\Omega$ $-200$ to $+850$ $50^{\circ}C$ min.JPt $100\Omega$ $-200$ to $+850$ $50^{\circ}C$ min.Ni $508.4\Omega$ $-50$ to $+250$ $30^{\circ}C$ min.	POWER	SECTION		
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Power SensitivityBetter than $\pm 0.1\%$ of span for each power supply range.Power Line Fuse250mA fuse is installed (standard).Power Consumption24V DC12V DCPower Output50mA max.100mA max.Voltage Output20mA max.45mA max.Note: The above figures are in the condition of the rated voltage supplied.200Ω max.Excitation CurrentApprox. 1mA with Pt for 0 to 100°CLead Wire Resistance200Ω max. per wireRanges Available(Temp at 0% input = 0°C) $Pt 100\Omega$ Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100Ω, 0 to 150°C).JPt 100ΩSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100Ω, 0 to 250°C).Pt 50Ω0 to 100°C $<$ <quasi-standard specifications="">Input BiasRTDTemperature Range (°C)Input SpanPt 100Ω-200 to +85050°C min.JPt 100Ω-200 to +85050°C min.JPt 100Ω-200 to +50050°C min.Input BiasInput BiasPt 50Ω-200 to +50050°C min.JPt 100Ω-200 to +50050°C min.JPt 100Ω-200 to +50050°C min.Input BiasInput BiasPt 50Ω-200 to +600100°C min.Ni 508.4Ω-50 to +25030°C min.</quasi-standard>	Requiremer	nts 12V	DC: 12V DC±209	%
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Voltage Output20mA max.45mA max.Note: The above figures are in the condition of the rated voltage supplied. $45mA$ max.Note: The above figures are in the condition of the rated voltage supplied. <b>eINPUT SECTION</b> Excitation CurrentApprox. 1mA with Pt for 0 to 100°CLead Wire ResistanceRanges AvailableStandard specifications>(Temp at 0% input = 0°C)Pt 100QSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100Q, 0 to 150°C).JPt 100QSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100Q, 0 to 250°C).Pt 50Q0 to 100°C <quasi-standard specifications="">Input BiasRTDTemperature Range (°C)Input SpanInput BiasPt 100Q-200 to +85050°C min.Up to 4x the input span.JPt 100Q-200 to +600100°C min.Up to 4x the input span.</quasi-standard>	Power	2	4V DC	12V DC
Note: The above figures are in the condition of the rated voltage supplied. <b>●INPUT SECTION</b> Excitation Current Approx. 1mA with Pt for 0 to 100°CLead Wire Resistance $200\Omega$ max. per wireRanges Available <standard specifications="">(Temp at 0% input = 0°C)Pt 100ΩSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100Ω, 0 to 150°C).JPt 100ΩSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100Ω, 0 to 250°C).Pt 50Ω0 to 100°C<quasi-standard specifications="">RTDTemperature Range (°C)Pt 100Ω-200 to +850S0°C min.JPt 100Ω-200 to +50050°C min.JPt 100Ω-200 to +500S0°C min.Up to 4x the input span.Ni 508.4Ω-50 to +25030°C min.</quasi-standard></standard>	Current Out	tput 50	mA max.	100mA max.
voltage supplied.excitation CurrentApprox. 1mA with Pt for 0 to 100°CExcitation CurrentApprox. 1mA with Pt for 0 to 100°CLead Wire200 $\Omega$ max. per wireResistanceRanges AvailableSpecify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100 $\Omega$ , 0 to 150°C).Pt 100 $\Omega$ Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100 $\Omega$ , 0 to 250°C).Pt 50 $\Omega$ 0 to 100°CRTDTemperature Range (°C)Input SpanInput BiasPt 100 $\Omega$ -200 to +85050°C min.JPt 100 $\Omega$ -200 to +500S0°C min.Input BiasPt 100 $\Omega$ -200 to +500S0°C min.JPt 100 $\Omega$ -200 to +500S0°C min.JPt 100 $\Omega$ -200 to +600100°C min.Input BiasPt 50 $\Omega$ -200 to +500S0°C min.JPt 100 $\Omega$ -200 to +600100°C min.Ni 508.4 $\Omega$ -50 to +25030°C min.				
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$\begin{tabular}{ c c c c } \hline Excitation Current Approx. 1mA with Pt for 0 to 100°C \\ \hline Lead Wire 200\Omega max. per wire \\ \hline Resistance & 200\Omega max. per wire \\ \hline Ranges Available \\  (Temp at 0% input = 0°C) \\ \hline Pt 100\Omega & Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100\Omega, 0 to 150°C). \\ \hline Pt 100\Omega & Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100\Omega, 0 to 250°C). \\ \hline JPt 100\Omega & 0 to 100°C \\  \\ \hline RTD & Temperature Range (°C) & Input Span Input Bias \\ \hline Pt 100\Omega & -200 to +850 & 50°C min. \\ \hline JPt 100\Omega & -200 to +500 & 50°C min. \\ \hline JPt 100\Omega & -200 to +500 & 50°C min. \\ \hline JPt 100\Omega & -200 to +500 & 50°C min. \\ \hline JPt 100\Omega & -50 to +250 & 30°C min. \\ \hline Ni 508.4\Omega & -50 to +250 & 30°C min. \\ \hline \end{tabular}$	voltag	ge supplied.		
$\begin{tabular}{ c c c c } \hline Lead Wire & 200\Omega max. per wire \\ \hline Resistance & & & & \\ \hline Ranges Available & & & & \\ \hline Standard specifications & & & & \\ \hline Pt 100\Omega & Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. Pt 100\Omega, 0 to 150°C). & & \\ \hline JPt 100\Omega & Specify between 0-50°C and 0-500°C in steps of 50°C (e.g. JPt 100\Omega, 0 to 250°C). & \\ \hline JPt 50\Omega & 0 to 100°C & & & \\ \hline Cquasi-standard specifications & & \\ \hline RTD & Temperature & Input Span & Input Bias \\ \hline Pt 100\Omega & -200 to +850 & 50°C min. & \\ JPt 100\Omega & -200 to +500 & 50°C min. & \\ JPt 100\Omega & -200 to +600 & 100°C min. & \\ \hline Ni 508.4\Omega & -50 to +250 & 30°C min. & \\ \hline \end{tabular}$		SECTION		
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	Resistance		_	
$\begin{array}{c} \mbox{Pt 100} \\ \mbox{Pt 100} \\ \mbox{JPt 100} \\ \mbox{JPt 100} \\ \mbox{JPt 100} \\ \mbox{Specify between 0-50°C and 0-500°C in steps} \\ \mbox{of 50°C (e.g. Pt 100\Omega, 0 to 250°C).} \\ \mbox{JPt 100} \\ \mbox{Ot 00°C} \\ \mbox{Specify between 0-50°C and 0-500°C in steps} \\ \mbox{of 50°C (e.g. JPt 100\Omega, 0 to 250°C).} \\ \mbox{Pt 50} \\ \mbox{Ot 0 100°C} \\ \mbox{Specify between 0-50°C and 0-500°C in steps} \\ \mbox{of 50°C (e.g. JPt 100\Omega, 0 to 250°C).} \\ \mbox{Specify between 0-50°C and 0-500°C in steps} \\ \mbox{Specify between 0-50°C and 0-50°C and 0-50°C in steps} \\ Specify between 0-50°C and 0-50°C a$	Ranges Ava	ilable		
$\begin{array}{c c} Pt \ 100\Omega & of \ 50^{\circ}C \ (e.g. \ Pt \ 100\Omega, \ 0 \ to \ 150^{\circ}C). \\ \hline \\ JPt \ 100\Omega & \\ Specify \ between \ 0-50^{\circ}C \ and \ 0-500^{\circ}C \ in \ steps \\ of \ 50^{\circ}C \ (e.g. \ JPt \ 100\Omega, \ 0 \ to \ 250^{\circ}C). \\ \hline \\ Pt \ 50\Omega & 0 \ to \ 100^{\circ}C \\ \hline \\ \hline \\ Cquasi-standard \ specifications \\ \hline \\ \\ \hline \\ RTD & \hline \\ \hline \\ RTD & \hline \\ \hline \\ Range \ (^{\circ}C) & \\ \hline \\ \\ Range \ (^{\circ}C) & \\ \hline \\ \\ Range \ (^{\circ}C) & \\ \hline \\ \\ \\ Pt \ 100\Omega & -200 \ to \ +850 & \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	<pre>Standard sp</pre>		(Temp at 0%	% input = 0°C)
$\begin{array}{c c} \mbox{JPt 100}\Omega & \mbox{Specify between $0-50^{\circ}C$ and $0-500^{\circ}C$ in steps} \\ \mbox{of } 50^{\circ}C$ (e.g. JPt 100\Omega, 0 to 250^{\circ}C). \\ \hline \mbox{Pt } 50\Omega & 0 to 100^{\circ}C \\ \hline \mbox{-} \m$	Pt 100Ω	Specify betwee	en 0-50°C and 0-3	500°C in steps
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				
$ \begin{array}{c c c c c c c } Pt 50\Omega & 0 \ to \ 100 \ ^{\circ}\ C & \\ \hline & < Quasi-stand specifications \\ \hline & \\ RTD & Temperature \\ Range (^{\circ}\ C) & Input Span \\ Range (^{\circ}\ C) & 50 \ ^{\circ}\ C \ min. \\ \hline Pt \ 100\Omega & -200 \ to \ +850 & 50 \ ^{\circ}\ C \ min. \\ \hline & \\ JPt \ 100\Omega & -200 \ to \ +500 & 50 \ ^{\circ}\ C \ min. \\ \hline & \\ Pt \ 50\Omega & -200 \ to \ +600 & 100 \ ^{\circ}\ C \ min. \\ \hline & \\ Ni \ 508.4\Omega & -50 \ to \ +250 & 30 \ ^{\circ}\ C \ min. \\ \end{array} $	JPt 100Ω			
	Pt 500			
$\begin{array}{ c c c c c c c c } \hline RTD & Temperature \\ Range (^{\circ}C) & Input Span & Input Bias \\ \hline Pt 100\Omega & -200 \ to +850 & 50^{\circ}C \ min. \\ \hline JPt 100\Omega & -200 \ to +500 & 50^{\circ}C \ min. \\ \hline Pt 50\Omega & -200 \ to +600 & 100^{\circ}C \ min. \\ \hline Ni 508.4\Omega & -50 \ to +250 & 30^{\circ}C \ min. \\ \hline \end{array} \qquad Up \ to \ 4x \ the input span. \\ \hline \end{array}$				
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$				
JPt 100Ω -200 to +500 50°C min. Up to 4x the input span.   Pt 50Ω -200 to +600 100°C min. input span.   Ni 508.4Ω -50 to +250 30°C min. $-200 to +200 to$	RTD		Input Span	Input Bias
JPt 100Ω -200 to +500 50°C min. Up to 4x the input span.   Pt 50Ω -200 to +600 100°C min. input span.   Ni 508.4Ω -50 to +250 30°C min. $-200 to +200 to$	Pt 100Ω	-200 to +850	50°C min.	
Pt 50Ω -200 to +600 100°C min. input span.   Ni 508.4Ω -50 to +250 30°C min. $30^{\circ}$ C min.	JPt 100Ω	-200 to +500		Up to 4x the
Ni 508.4 $\Omega$ -50 to +250 30°C min.	Pt 50Ω	-200 to +600	100°C min.	
Innut Snap Ex., Ean Dt 1000 (150 to 2009C), the innut snap	Ni 508.4Ω	-50 to +250	30°C min.	. –
Input Spec Ex.: For Pt 100Ω (150 to 200°C), the input span	Input Spec E	x.: For Pt 100Ω	(150 to 200°C), t	he input span

Input Spec EX.: For Pt 1002 (150 to 200°C), the input span is 50°C and the bias 150°C (3x the span). Note: Any specification out of the temperature range or bias requirement listed above is handled as a special order.

ITDIIT	SECTION	

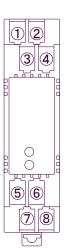
OUTPUT SECT		
Allowable Output Lo		
Voltage Output (DC)	1V span and up	2mA max.
	10mV	$10k\Omega$ min.
	100mV	$100k\Omega$ min.
Current Output (DC)		550Ω max.
Zero Adjustment	Approx. ±2.5% of s	span.
	(Adjustable by the	front-accessible
	trimmer.)	
Span Adjustment	Approx. $\pm 2.5\%$ of s	span.
	(Adjustable by the	front-accessible
	trimmer.)	
Burnout Protection	Upscale (even if an	y of the three
	wires, A, B, and B' is opened)	
Ranges Available		
	Current Signal	Voltage Signal
Output Range (DC)	0 to 20mA	-10 to 10V
Output Span (DC)	4 to 20mA	10mV to 20V
Output Bias	0 to 100%	-100 to 100%
* For current output si	ignals, the accuracy of	of any current
output smaller than (	0.1mA is not guarante	eed.
Output Spec Ex. 1: Fo	or 4 to 20mA output,	the output span is
16mA and the bias $+25%$ .		
Output Spec Ex. 2: For -1 to 4V output, the output span is		
	and the bias -20%.	
PERFORMANC	`E	

PERFORMANC	E
Accuracy Rating	Better than $\pm [0.15\% \text{ of span} +$
	0.1°C] (at 25°C±5°C).
Temperature	Better than $\pm 0.2\%$ of span per 10°C
Effect	change in ambient.
Response Time	170ms max. (0 to 90%) with a step
	input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	3-way isolation between input,
	output, and power.
Insulation	$100M\Omega$ min. (@ 500V DC) between
Resistance	input, output, and power.
Dielectric Strength	Input / Output / Power: 1500V AC
	for 1 minute (Cutoff current: 0.5mA)
Surge Withstand	Tested as per ANSI/IEEE
Capability	C37.90.1-1989.
Operating	Ambient temperature: -5 to 55°C
Environment	Humidity: 5 to 90% RH
	(non-condensing)
Storage	-10 to 60°C
Temperature	

PHYSICAL		
Installation	DIN rail mounting	
Wiring	M3.5 screw terminal connection	
	(with drop-proof screws)	
Screwing Torque	0.8 to 1.0 [Nm] * Recommended	
External	$W25.0 \times H94.0 \times D40.0 mm$	
Dimensions		
Weight	90g max.	
MATERIAL		
Housing	ABS resin (UL 94V-0)	
Screw Terminal	Nickel-plated steel	
Printed Circuit	Glass fabric, epoxy resin	
Board	(FR-4: UL 94V-0)	
<b>●STANDARDS CONFORMITY</b>		

EC Directive	EMC Directive (2014/30/EU)
Conformity	EN61326-1:2013

**TERMINAL ASSIGNMENTS** 



(1)	N.C.
2	В'
3	В
4	А
(5)	OUTPUT +
6	OUTPUT -
$\bigcirc$	+ POWER
8	- POWER

# **MTT Corporation**

### **BLOCK DIAGRAM**

