Modular Signal Conditioning System Accepts a Wide Range of Inputs

OM7 Series

Shown with optional KMTSS-125G-6 thermocouple sold separately.

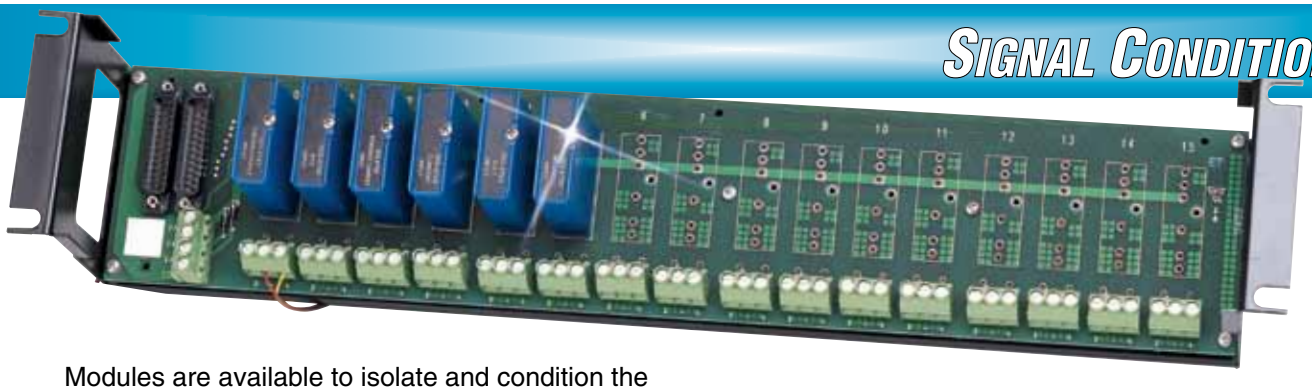
- **Isolated Signal Conditioners for a Wide Range of Process Control Signals: Thermocouples, RTDs, mA, mV, V**
- **Process Current (4 to 20 and 0 to 20 mA) Output Module**
- **Powered mA Input Module Includes Isolated 24 Vdc Power for a Remote Transmitter**
- **Bipolar Voltage Input and Output Modules**
- **Operates From a Single 24 Vdc Power Supply**
- **Provides 1 to 5 V, 0 to 10 V, and ±10 V Output Options**
- **±0.1% Maximum Accuracy, Factory Calibrated**
- **1500 V rms of CMV Isolation and 120 V rms Field Wiring Protection**
- **Compact, 54 x 42 x 14 mm (2.1 x 1.7 x 0.6") Plastic Housing**

The OM7 Series modular isolation-based, single-channel plug-in signal conditioning system accepts inputs from a wide range of process control transducers and signals while providing high-level output voltages. Featuring a maximum nonlinearity of 0.02% and factory calibrated to guarantee maximum accuracy of ±0.1%, the OM7 Series offers superior performance at a lower cost than multipurpose signal conditioners. The modules provide 1500 V rms isolation and 120 V rms of field wiring input protection. The power supplies necessary to drive each individual module's input circuitry are internally isolated, enabling the OM7 modules to offer true channel-to-channel isolation of the input signals. The modules are rated for a nominal power supply input of 24 Vdc and, for maximum flexibility, will accept supply voltages in the 14 Vdc to 35 Vdc range.

All modules are packaged in a compact 54 x 42 x 14 mm (2.1 x 1.7 x 0.6 in) durable plastic case that readily accommodates high channel density applications. Each module may be operated in high humidity (noncondensing) environments and is rated over the extended -40 to 85°C industrial temperature range. All modules feature a simple pinout that allows them to be mixed and matched within a single backplane design. Furthermore, modules are easily serviced since they can be removed and inserted into the backplane with power applied.

OMEGACARE Extended Warranty Program

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE℠ covers parts, labor and equivalent loaners.



Modules are available to isolate and condition the following input signals and transducers: voltage, process current, RTD, 2-wire transmitter, and thermocouples. The 2-wire transmitter interface module (OM7-35) accepts a 4-20 mA process input and provides an isolated 24 Vdc supply to power the current loop. In this way, a loop-powered transmitter can be directly connected to the OM7-35 without requiring a separate power supply. All of the isolated input modules, with the exception of the OM7-21, provide a high-level output voltage that is factory configured for either the 1-5 V or 0-10 V range. The OM7-21 is a unity gain, isolated input module with an input/output range of ±10 V.

Modules are also available that provide isolated output signals for process current and bipolar voltage. The OM7-39 process current module converts either a 1-5 V signal to a 4-20 mA output or a 0-10 V input to a 0-20 mA output. The input/output ranges of the OM7-39 are factory configured. The OM7-22 is a unity gain module that provides an isolated ±10 V output signal.

A full line of backplanes and rack-mount hardware complete the OM7 Series signal conditioning system. Each backplane contains screw terminals for field wiring connections and a miniature cold junction compensation (CJC) thermistor that is installed under the terminal blocks of each channel. Due to the pinout of the OM7 Series modules, the CJC thermistor affects only the thermocouple modules. This flexibility permits any module type to be used in any channel on the backplane.

ISOLATED VOLTAGE AND CURRENT INPUT

The OM7 Series feature five isolated voltage/current input modules capable of addressing a wide variety of input voltage ranges and signal dynamics. The OM7-21 is a bipolar unit module featuring a full-scale range of ±10 V. The OM7-30 and OM7-31 accept dc input voltages and provide either a factory configured 1-5 V or 0-10 V output signal. The OM7-32 accepts a 4-20 mA process current input signal and provides an output voltage signal in the 1-5 V range. The OM7-33 isolates a 1-5 V input signal and provides a buffered 1-5 V output signal. The OM7-32 and OM7-33 can also be factory configured to provide a 0-10 V output signal with a 0-20 mA or 0-5 V input, respectively. Both the OM7-32 and OM7-33 have bandwidths of 100 Hz. The OM7-30 and OM7-31 are limited to 3 Hz bandwidth.

ISOLATED THERMOCOUPLE INPUT

The OM7-37 and OM7-47 modules accept inputs from types J, K, T, E, R, S, and B thermocouples and provide a 1-5 V or 0-10 V output signal. The OM7-47 also accepts inputs from type N thermocouples. Both the OM7-37 and OM7-47 have a nominal 3 dB bandwidth of 3 Hz, and they provide for upscale open input detection within 10 sec.

In addition to the signal conditioning capabilities of the OM7-37, the OM7-47 includes an internallinearization circuit that compensates for the inherent nonlinearities of the thermocouple. With this linearizer, the OM7-47 is able to provide an output voltage that is linear with respect to the actual temperatures being measured by the thermocouple.

The thermocouple input modules accomplish CJC by means of an external thermistor mounted under the field wiring screw terminal blocks of the backplane.

ISOLATED LINEARIZED RTD INPUT

The OM7-34 module accepts inputs from 100Ω platinum and 120Ω nickel RTDs and produce an output voltage signal that is proportional with temperature measured by the RTD. The OM7-34 modules are available in a factory-configured 1-5 V or 0-10 V output range. Three-wire lead resistance compensation is provided and 2- or 3-wire RTDs may be used. The OM7-34 RTD input module has a nominal 3 dB bandwidth of 3 Hz and upscale open RTD detection with 10 sec.

ISOLATED 2-WIRE TRANSMITTER INTERFACE

The OM7-35 input module accepts a 4-20 mA process current input, provides a standard 1-5 V output signal, and features an isolated loop power supply for driving the current transmitter. The module has a nominal 3 dB bandwidth of 100 Hz and offers downscale open input detection within 2 sec.

The isolated transmitter loop power supply of the OM7-35 is unregulated and will provide a voltage that is proportional to the voltage used to power the OM7-35 module. The voltage provided by the OM7-35 is between 13 V and 34 V for loop current between 4 mA and 20 mA and supply voltages between 20.4 and 26.4 V. (For nominal +24 V supply, the OM7-35 will supply approximately +24 V to the loop.)

ISOLATED CURRENT OUTPUT

The OM7-39 isolated output module accepts either a factory-configured 1-5 V or 0-10V input signal and provides an isolated 4-20 mA or 0-20 mA output current signal. The module can drive a wide range of resistive loads, depending upon +Vs, the supply voltage. At a nominal +Vs of +24 V, the OM7-39 will drive up to 850Ω.

ISOLATED BIPOLAR VOLTAGE OUTPUT

The OM7-22 is a unity-gain module with an input/output range of ±10 V. The OM7-22 has an input range of ±10 V and provides an isolated bipolar ±10 V output signal to the field. The OM7-22 features 1500 V rms of CMV isolation, 100 dB minimum of common mode rejection, and a 400 Hz bandwidth.

Specifications

Common Input Module Specifications
Common Mode Voltage: 1500 V rms continuous
Input Protection: 120 V rms continuous
Output Protection: Short to ground
Output Resistance: <1 Ω

Common to All Modules
Operating Range: -40 to 85°C (-40 to 185°F)
Storage Range: -40 to 85°C (-40 to 185°F)
Humidity (24 hr): 90% non-condensing
Weight: 60 g (0.2 oz)

Input Module Specifications (typical @23°C and + 24 Vdc)

Model	OM7-21	OM7-30	OM7-31	OM7-32	OM7-33	OM7-34	OM7-35	OM7-37	OM7-47
Input Type	±10 V	±1 mV to ±1V	±1 V to ±10 V	4-20 mA 0-20 mA	1-5 V 0-5 V	RTD	4-20 mA	T/C*	T/C*
Output Range (into 2 kΩ minimum load)	±10 V	1-5 or 0-10 V	1-5 or 0-10 V	1-5 or 0-10 V	1-5 or 0-10 V	1-5 or 0-10 V	1-5 or 2-10 V	1-5 or 0-10 V	1-5 or 0-10 V
Accuracy	±0.1% span maximum	±0.1% span maximum	±0.1% span maximum	±0.1% span maximum	±0.1% span maximum	See table	±0.1% span maximum	±0.1% span maximum	See table
Nonlinearity	±0.02% span maximum	±0.02% span maximum	±0.02% span maximum	±0.02% span maximum	±0.02% span maximum	See table	±0.02% span maximum	0.02% span maximum	N/A
Input Resistance	2 MΩ	10 MΩ	100 kΩ	200 Ω	2 MΩ	N/A	N/A	10 MΩ	10 MΩ
Input Bias Current	3 nA	1 nA	0.2 nA	N/A	0.1 nA	N/A	N/A	25 nA	25 nA
Nominal 3 db Bandwidth	300 Hz	3 Hz	3 Hz	100 Hz	100 Hz	3 Hz	100 Hz	3 Hz	3 Hz
Response Time, 0-90%	1 msec	150 msec	150 msec	10 msec	10 msec	250 msec	5 msec	150 msec	150 msec
CJC Accuracy, Ambient Temp. 5 to 45°C	NA	NA	NA	NA	NA	NA	NA	±1.0°C maximum	±1.0°C maximum
Supply Voltage	19-29 Vdc	14-35 Vdc	14-35 Vdc	14-35 Vdc	14-35 Vdc	14-35 Vdc	18-35 Vdc	14-35 Vdc	14-35 Vdc
Supply Current	35 mA	25 mA	25 mA	20 mA	20 mA	25 mA	60 mA	25 mA	25 mA

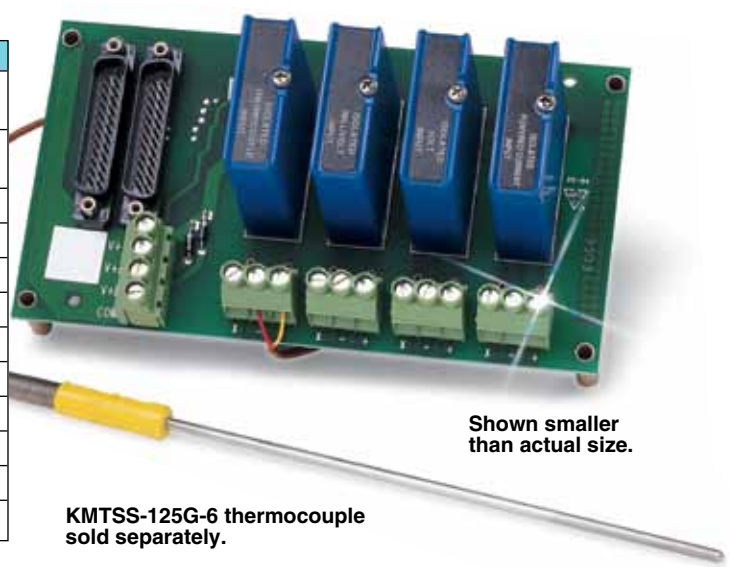
** T/C is thermocouple*

Output Module Specifications

Model	OM7-22	OM7-39
Output Range	±10 V	0-20 mA 4-20 mA
Input Range	±10 V	0-10 V 1-5 V
Accuracy	±0.1% Span	±0.1% Span
Nonlinearity	±0.02% Span	±0.02% Span
Output Offset	±0.001% Span/C	±0.0035% Span/C
Maximum Output	±14 Vdc	30 Ma
Load Resistance*	5 KΩm minimum	0-850Ω
Nominal 3 db Bandwidth	400 Hz	100 Hz
Response Time, 0-90%	1 ms	3 ms
Common Mode Voltage	1500 V rms	1500 V rms
Supply Voltage	19-29 Vdc	14-35 Vdc
Supply Current	20 mA maximum	60 mA maximum

**Load resistance of OM7-39 dependent on power supply*

OM7 modules shown mounted on OM7-BP-4-C 4-channel backplane.



Shown smaller than actual size.

KMTSS-125G-6 thermocouple sold separately.

OM7-BP-8-C shown with OM7 modules.
KMTSS-125G-6 thermocouple sold separately.

OM7-47 Linearized Thermocouple Input Module (@ +23°C ±5°C and V_s = +24Vdc)

Model	Input Range	Accuracy[1,2] (typical)	Accuracy[1] (max)
OM7-47-J-01-1-C	0 to +760°C	0.15% span	0.38% span
OM7-47-J-01-2-C	0 to +760°C	0.13% span	0.32% span
OM7-47-J-02-1-C	-100 to +300°C	0.16% span	0.35% span
OM7-47-J-02-2-C	-100 to +300°C	0.14% span	0.30% span
OM7-47-K-03-1-C	0 to +1300°C	0.15% span	0.35% span
OM7-47-K-03-2-C	0 to +1300°C	0.15% span	0.32% span
OM7-47-K-04-1-C	0 to +600°C	0.09% span	0.20% span
OM7-47-K-04-2-C	0 to +600°C	0.08% span	0.18% span
OM7-47-T-05-1-C	0 to +400°C	0.24% span	0.50% span
OM7-47-T-05-2-C	0 to +400°C	0.19% span	0.38% span
OM7-47-T-06-1-C	-100 to +200°C	0.29% span	0.57% span
OM7-47-T-06-2-C	-100 to +200°C	0.25% span	0.47% span
OM7-47-E-07-1-C	0 to +900°C	0.18% span	0.41% span
OM7-47-E-07-2-C	0 to +900°C	0.15% span	0.34% span
OM7-47-R-08-1-C	+500 to +1750°C	0.15% span	0.36% span
OM7-47-R-08-2-C	+500 to +1750˚C	0.13% span	0.30% span
OM7-47-S-09-1-C	+700 to +1750˚C	0.13% span	0.31% span
OM7-47-S-09-2-C	+700 to +1750˚C	0.11% span	0.25% span
OM7-47-B-10-1-C	+800 to +1800˚C	0.19% span	0.41% span
OM7-47-B-10-2-C	+800 to +1800˚C	0.17% span	0.35% span
OM7-47-N-11-1-C	+200 to +1300˚C	0.14% span	0.31% span
OM7-47-N-11-2-C	+200 to +1300˚C	0.09% span	0.27% span

1) The CJC sensor accuracy should be added to the module accuracy listed in this table in order to compute the overall measurement accuracy.

2) Accuracy includes the effects of repeatability, hysteresis, and conformity.

OM7-34 Linearized RTD Input Module

(@ +23°C ±5°C and V_s = +24Vdc)

Model	Input Range	Accuracy	Nonlinearity
OM7-34-01-X-C	-100 to +100°C	±0.15%	±0.05%
OM7-34-02-X-C	0 to +100°C	±0.2%	±0.05%
OM7-34-03-X-C	0 to +200°C	±0.15%	±0.05%
OM7-34-04-X-C	0 to +600°C	±0.1%	±0.05%
OM7-34-N-01-X-C	0 to +300°C	±0.3%	±0.012%
OM7-34-N-02-X-C	0 to +200°C	±0.3%	±0.14%

NOTES:
The X in the OM7-34 model number designations in the above table is used to identify the output voltage range option. If X=1, then the OM7-34 is factory configured for a 1-5 V output; and if X=2, then the OM7-34 is factory configured for a 0-10 V output. The Standard Range OM7-34s (i.e., OM7-34-01, OM7-34-02, OM7-34-03, OM7-34-04) are configured for a Platinum RTD with the DIN standard alpha of 0.00385.
The OM7-34-N Series is configured for Nickel RTDs.

Backplane Specifications

	OM7-BP-1-C (DIN-C)	OM7-BP-2-C (DIN-C)	OM7-BP-4-C (DIN-C)	OM7-BP-8-C (DIN-C)	OM7-BP-16-C (DIN-C)
Channels	**1**	**2**	**4**	**8**	**16**
Size	4.25 x 1.37"	4.25 x 1.37"	3.47 x 6.3"	3.47 x 10"	3.47 x 17.4"

Connectors: *Three screw terminals are provided for field connection to sensors/signals. 25-pin D-type male connector provided for interface to user's system.*

Millivolt Input - Unipolar

Model No.	Input Range	Output Range
OM7-30-01-1-C	0-10 mV	1-5 V
OM7-30-01-2-C	0-10 mV	0-10 V
OM7-30-02-1-C	0-100 mV	1-5 V
OM7-30-02-2-C	0-100 mV	0-10 V

Millivolt Input - Bipolar

Model No.	Input Range	Output Range
OM7-30-06-1-C	±10 mV	1-5 V
OM7-30-06-2-C	±10 mV	0-10 V
OM7-30-07-1-C	±100 mV	1-5 V
OM7-30-07-2-C	±100 mV	0-10 V

Voltage Input - Unipolar

Model No.	Input Range	Output Range
OM7-30-03-1-C	0-1 V	1- 5 V
OM7-30-03-2-C	0-1 V	0-10 V
OM7-31-04-1-C	0-5 V	1-5 V
OM7-31-04-2-C	0-5 V	0-l0 V
OM7-30-05-1-C	1-5 V	1-5 V
OM7-30-05-2-C	1-5 V	0-10 V
OM7-31-01-1-C	0-10 V	1-5 V
OM7-31-01-2-C	0-10 V	0-10 V

Voltage Input - Bipolar

Model No.	Input Range	Output Range
OM7-30-08-1-C	±1 V	1-5 V
OM7-30-08-2-C	±1 V	0-10 V
OM7-31-02-1-C	±5 V	1-5 V
OM7-31-02-2-C	±5 V	0-10 V
OM7-31-03-1-C	±10 V	1-5 V
OM7-31-03-2-C	±10 V	0-10 V
OM7-21-C	±10 V	±10 V

Process Voltage Inputs

Model No.	Input Range	Output Range
OM7-33-01-1-C	1-5 V	1-5 V
OM7-33-01-2-C	1-5 V	0-10V
OM7-33-02-1-C	0-5 V	1-5 V
OM7-33-02-2-C	0-5 V	0-10 V

Process Current Inputs

Model No.	Input Range	Output Range
OM7-32-01-1-C	4-20 mA	1-5 V
OM7-32-01-2-C	4-20 mA	0-10 V
OM7-32-02-1-C	0-20 mA	1-5V
OM7-32-02-2-C	0-20 mA	0-10V

Linearized Thermocouple

Model No.	Input PriceRange	Output Range	Thermocouple Type
OM7-47-J-01-1-C	0 to +760°C	1-5 V	J
OM7-47-J-01-2-C	0 to +760°C	0-10 V	J
OM7-47-J-02-1-C	-100 to +300°C	1-5 V	J
OM7-47-J-02-2-C	-100 to +300°C	0-10 V	J
OM7-47-K-03-1-C	0 to +1300°C	1-5 V	K
OM7-47-K-03-2-C	0 to +1300°C	0-10 V	K
OM7-47-K-04-1-C	0 to +600°C	1-5 V	K
OM7-47-K-04-2-C	0 to +600°C	0-10 V	K
OM7-47-T-05-1-C	0 to +400°C	1-5 V	T
OM7-47-T-05-2-C	0 to +400°C	0-10 V	T
OM7-47-T-06-1-C	-100 to +200°C	1-5 V	T
OM7-47-T-06-2-C	-100 to +200°C	0-10 V	T
OM7-47-E-07-1-C	0 to +900°C	1-5 V	E
OM7-47-E-07-2-C	0 to +900°C	0-10 V	E
OM7-47-R-08-1-C	+500 to +1750°C	1-5 V	R
OM7-47-R-08-2-C	+500 to +1750°C	0-10 V	R
OM7-47-S-09-1-C	+700 to +1750°C	1-5 V	S
OM7-47-S-09-2-C	+700 to +1750°C	0-10 V	S
OM7-47-B-10-1-C	+800 to +1800°C	1-5 V	B
OM7-47-B-10-2-C	+800 to +1800°C	0-10 V	B
OM7-47-N-11-1-C	+200 to +1300°C	1-5 V	N
OM7-47-N-11-2-C	+200 to +1300°C	0-10 V	N

RTD Inputs (Linearized 100Ω Pt 2-Wire or 3-Wire, Alpha = 0.00385)

Model No.	Input Range	Output Range
OM7-34-01-1-C	-100 to 100°C	1-5 V
OM7-34-01-2-C	-100 to 100°C	0-10 V
OM7-34-02-1-C	0 to 100°C	1-5 V
OM7-34-02-2-C	0 to 100°C	0-10 V
OM7-34-03 -1-C	0 to 200°C	1-5 V
OM7-34-03-2-C	0 to 200°C	0- 10 V
OM7-34-04-1-C	0 to 600°C	1-5 V
OM7-34-04-2-C	0 to 600°C	0-10 V
OM7-34-05-1-C	-50 to 350°C	1-5 V
OM7-34-05-2-C	-50 to 350°C	0-10 V

RTD Inputs (Linearized 120 Ω Ni 2-Wire or 3-Wire)

Model No.	Input Range	Output Range
OM7-34-N-01-1-C	0 to +300°C	1-5 V
OM7-34-N-01-2-C	0 to +300°C	0-10 V
OM7-34-N-02-1-C	0 to +200°C	1-5 V
OM7-34-N-02-2-C	0 to +200°C	0-10 V

Non-Linearized Thermocouple

Model No.	Input Range	Output Range	Thermocouple Type
OM7-37-J-01- 1-C	-100 to 760°C	1-5 V	J
OM7-37-J-01-2-C	-100 to 760°C	0-10 V	J
OM7-37-J-10-1-C	0 to 200°C	1-5 V	J
OM7-37-J-10-2-C	0 to 200°C	0-10 V	J
OM7-37-J-11-1-C	0 to 400°C	1- 5 V	J
OM7-37-J-11-2-C	0 to 400°C	0-10 V	J
OM7-37-J-12-1-C	0 to 600°C	1-5 V	J
OM7-37-J-12-2-C	0 to 600°C	0-10 V	J
OM7-37-J- 13-1-C	300 to 600°C	1-5 V	J
OM7-37-J-13-2-C	300 to 600°C	0-10 V	J
OM7-37-K-02-1-C	-100 to 1350°C	1-5 V	K
OM7-37-K-02-2-C	-100 to 1350°C	0-10 V	K
OM7-37-K-20-1-C	0 to +300°C	1-5 V	K
OM7-37-K-20-2-C	0 to +300°C	0-10 V	K
OM7-37-K-21-1-C	0 to +600°C	1-5 V	K
OM7-37-K-21-2-C	0 to +600°C	0-10 V	K
OM7-37-K-22-1-C	0 to +1200°C	1-5 V	K
OM7-37-K-22-2-C	0 to +1200°C	0-10 V	K
OM7-37-K-23-1-C	600 to 1200°C	1-5 V	K
OM7-37-K-23-2-C	600 to 1200°C	0-10 V	K
OM7-37-T-03-1-C	-100 to 400°C	1-5 V	T
OM7-37-T-03-2-C	-100 to 400°C	0-10 V	T
OM7-37-E-04-1-C	0 to 900°C	1- 5 V	E
OM7-37-E-04-2-C	0 to 900°C	0-10 V	E
OM7-37-R-05-1-C	0 to 1750°C	1-5 V	R
OM7-37-R-05-2-C	0 to 1750°C	0-10 V	R
OM7-37-S-06-1-C	0 to 1750°C	1-5 V	S
OM7-37-S-06-2-C	0 to 1750°C	0-10 V	S
OM7-37-B-07-1-C	0 to 1800°C	1-5 V	B
OM7-37-B-07-2-C	0 to 1800°C	0-10 V	B

Accessories

Model No.	Description
U24Y175	Power supply 105 to 125/210 to 250 Vac input, 24 Vdc @ 175 mA output
OM7-PROTO	OM7 Breadboard kit
OM7-BP-EV	1-Channel evaluation
OM7-IF	Universal interface board
OM7-RK002	19" rack for mounting backplane
OM7-RI	250 Ω current conversion resistor
OM7-DIN-SF	DIN Base element with snap foot
OM7-DIN-WSF	DIN Side element without snap foot
OM7-DIN-SE	DIN Side elements
OM7-DIN-CP	DIN Connector pins

2-Wire Transmitter Inputs with Loop Power (with Sense Resistor)

Model No.	Input Range	Output Range
OM7-35-01-1-C	4-20 mA	1 -5 V
OM7-35-01-2-C	4-20 mA	2-10 V

Output Modules

Model No.	Input Range	Output Range
OM7-22-C	±10 V	±10 V
OM7-39-01-C	1-5 V	4-20 mA
OM7-39-02-C	0-10 V	0-20 mA

Backplanes

Model No.	Description
OM7-BP-1-C	1-Channel backplane
OM7-BP-1-DIN-C	1-Channel backplane DIN Rail
OM7-BP-2-C	2-Channel backplane
OM7-BP-2-DIN-C	2-Channel backplane DIN Rail
OM7-BP-4-C	4-Channel backplane
OM7-BP-4-DIN-C	4-Channel backplane DIN rail
OM7-BP-8-C	8-Channel backplane
OM7-BP-8-DIN-C	8-Channel backplane DIN rail
OM7-BP-16-C	16-Channel backplane
OM7-BP-16-DIN-C	16-Channel backplane DIN rail
RAIL-35-2	35 mm DIN rail, 2 m length

Cables

Model No.	Description
OM7-CA-01	6" cable (25-pin, D-type connector to 26-pin maleheader connector) converts OM7 backplane connector to an OM5 backplane connector pin out
OM7-CA-02	3' cable (25 pin, D-type connector on both ends)

System Example

Qty	Model No.
4	OM7-37-K-02-1-C non-linearized Type K thermocouple inputs
4	OM7-34-02-2-C linearized 100 Ω RTD inputs
1	OM7-BP-8-C 8-channel backplane
1	OM7-CA-02 3' cable
1	OM7-RK002 19" rack mount kit for backplane
2	U24Y175 power supply