UNIVERSAL MATH MODULE
UMM-1, UMM-2 SERIES

DESCRIPTION

The **Kele UMM Series** universal math module is a unique multifunction micro-computer based interface that can be utilized to solve a variety of signal selection and manipulation applications. The **UMM-1** is furnished in a unique slim-line design housing, which saves panel space, and can be ordered with an optional DIN rail-mounting adapter. The **UMM-2** is a snap-track mounted version with operation identical to the **UMM-1**. The **UMM** models accept up to four analog inputs, providing a single analog output according to the operating mode selected. This versatile product allows the user to select from many operating modes.

UMM-1
UMM-1-SQ

USER-SELECTABLE OPERATING MODES

- **Highest or lowest signal selection**
- **Minimum or peak signal hold selection**
- **Multiple signal averaging**
- **High and low limit control**
- **Action reversal**
- **Square root extraction (SQ model)**

FEATURES

- **DIP switch-selectable operating modes**
- **Accepts voltage or milliamp input signals**
- **LED status indication**
- **User-selectable direct or reverse acting**
- **Accepts 24 VAC/VDC power**
- **Slim-line design housing or snap-track mounted models**
- **Furnished with detailed setup instructions**

UMM-2
UMM-2-SQ

SPECIFICATIONS

Supply Voltage	24 VAC ±10%, half-wave; or 24 VDC ±10%	**Output Burden**	500 minimum @ 5 VDC; 1000 minimum @ 10 VDC; 650 maximum @ 20 mA
Supply Current	50 mA maximum @ 24 VDC; 100 mA maximum @ 24 VAC	**Output Current**	Selectable: 0-20 mA or 4-20 mA
Accuracy		**Output Voltage**	Selectable: 0-5 VDC, 1-5 VDC, 0-10 VDC or 2-10 VDC
Standard	±1% of full scale	**Wiring Terminations**	Screw terminals
SQ Model	1% FS @ 25%-100% of range, 1.5% FS @ 10%-25% of range, 2% FS @ 5%-10% of range, 5% FS @ 0%-5% of range	**Operating Temperature**	32° to 158°F (0° to 70°C)
		Operating Humidity	5% to 95% RH (non-condensing)
		Dimensions	
Input	4 analog inputs	UMM-1	3.4"H x 2.0"W x 4.8"D (8.6 x 5.1 x 12.4 cm)
Input Signal	0-5 VDC, 1-5 VDC, 0-10 VDC, 2-10 VDC, 0-20 mA, or 4-20 mA	UMM-2	3.3"H x 4.6"W x 1.0"D (8.3 x 11.8 x 2.5 cm)
Input Impedance	70 kΩ with voltage input; 250Ω with current input	**Weight**	
Wiring Terminations	Screw terminals	UMM-1	0.88 lb (0.4 kg)
Action	Direct or reverse, DIP switch selectable	UMM-2	0.44 lb (0.2 kg)
Output	1 analog output, voltage or current	**Approvals**	RoHS
		Warranty	1 year

TRANSDUCERS

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USER-SELECTABLE OPERATING MODES

High and Low Signal Selection
The UMM configured for this mode will accept two, three, or four analog input signals and output the signal that is either the highest or lowest of the input signals. To increase the number of input signals, UMMs may be cascaded by wiring the output of one UMM to the input of another UMM. Two UMMs wired in this fashion would allow up to seven input signals. No calibration is required; however, high and low limits can be set on the output.

Minimum and Peak Hold Signal Selection
In the peak hold operating mode, up to three analog inputs are monitored. The highest (peak) input signal is remembered, passed to the output, and held until a higher input signal level occurs. In the minimum hold mode, up to three inputs are monitored. The lowest input signal is remembered, passed to the output, and held until a lower input signal level occurs. A contact closure will reset the output signal.

Multiple Signal Averaging
The UMM configured for this operating mode will accept two, three, or four analog input signals and output a signal that is the average of the input signals. To average up to seven inputs, the primary UMM accepts four inputs, and its output is wired to the first input of the secondary UMM. The output of the secondary UMM is the average of up to seven inputs. The sum can be derived by multiplying the signal average by the number of inputs.

High/Low Limit Control and Signal Reversal
The UMM may be used as a single input limit control, allowing the output to be limited to an adjustable upper and/or lower limit. When the input signal reaches the upper or lower limit setting, the output will remain at that particular limit setting. The high/low limit function can also be combined with other operating modes such as high/low signal selection, peak/minimum hold selection, or signal averaging. The output of the UMM can be selected to increase as the input increases (direct action), or the output can be reversed to decrease as the input increases (reverse action).

Square Root Extraction
When the UMM is ordered with the optional square root function (SQ option), it may be used as a single input square root extractor, providing an output proportional to the square root of the input signal. The square root function can also be combined with other operating modes such as high/low signal selection, peak/minimum hold selection, or signal averaging.

WIRING (TYPICAL)

UMM
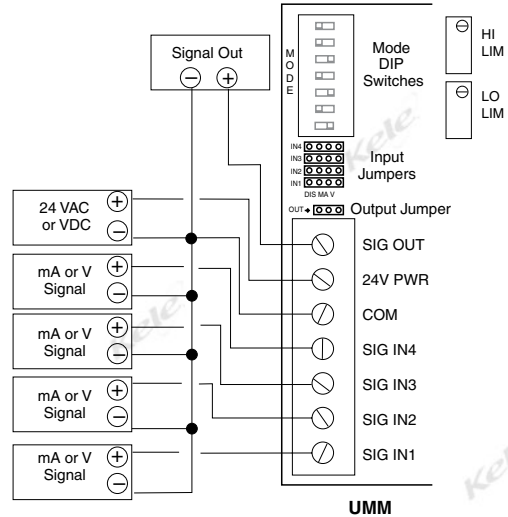
* In the minimum and peak hold operating modes, a normally open momentary switch is wired to SIG IN4 and 24V PWR to allow reset of the output.

- All input signals wired to the SIG IN terminals must be of the same type and range.
- The output signal from the SIG OUT terminal must be of the same type and range as the input signals.
- Always disable (jumper to DIS position) any input that is not to be used.

ORDERING INFORMATION

MODEL	DESCRIPTION
UMM-1	Universal math module enclosed in slim-line housing
UMM-2	Universal math module snap-track mounted
	OPTIONS (factory installed only)
SQ	Square root extractor
47	DIN rail mounting adapter (**UMM-1** and **UMM-1-SQ** only)

Example: **UMM-1-SQ-47** Universal math module with square root option and DIN rail mounting adapter