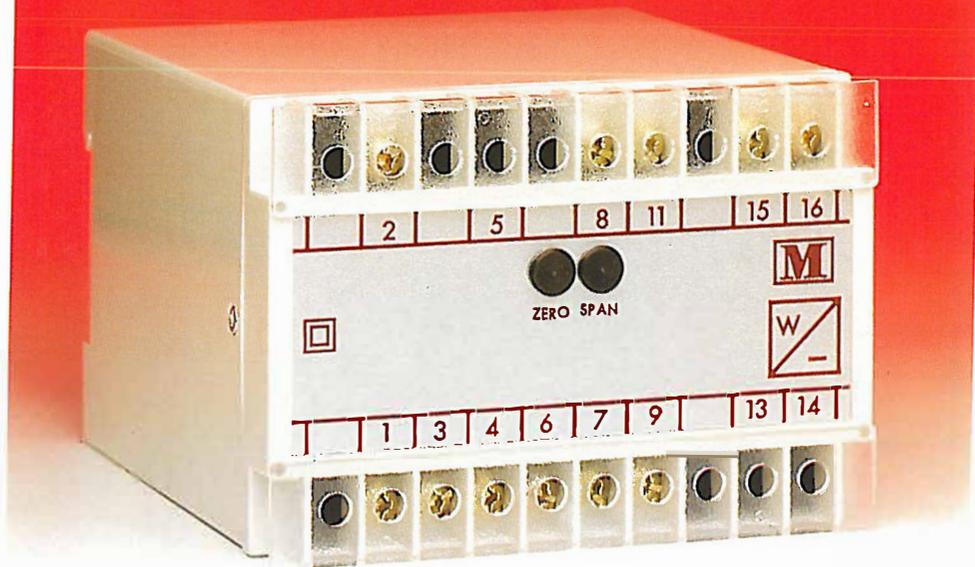


Transducers

Multitek

multitek[®]



TRANSDUCER CATALOGUE

Transducers

Table of Contents

Type	Page No.
General Specifications	3
AC Current	4
AC Voltage	7
Frequency	10
Phase Angle	11
Active Power	12
Reactive Power	14
DC Linear Integrator	16
DC Current or Voltage	17
DC Input Triple Output	18
DC Current Summation	19
Remote Resistance	20
TAP Position	21
RTD Temperature	22
Thermocouple	23

Notes:

GENERAL SPECIFICATIONS

ENVIRONMENTAL

Working temperature	0 to +60 deg C
Functional temperature	-25 to +70 deg C
Storage temperature	-55 to +85 deg C
Temperature coefficient	0.02% per deg C (100 ppm / °C)
Relative humidity	95% non condensing
Class of climate	HSE complying with DIN 40040 -3 complying with VDE/VDI 3540

INSULATION

Test voltage	4kV RMS 50Hz 1min. between Input / Case / Auxiliary
Impulse test	EMC 5kV transient complying with IEC 801 / EN55020
HF interference test	EHF 2.5kV 1MHz complying with IEC 255-4
Protection class	II complying with IEC 348 BS 4753 / DIN 57411 / VDE 0411

APPLIED STANDARDS

General	IEC 688 / BS 6253 / VDE/ VDI 2192
Safety	BS EN61010 DIN 57411 / VDE 0411 ANSI C37
Surge withstand	IEC 801 / EN 55020 ANSI C37-90a
Radio screening	RFI degree N complies with VDE 0875

ACCURACY

Class	± 0.2 % complying with IEC 688
Calibration temperature	23°C
Temperature coefficient	0.01% / °C (100 ppm / °C)
Stability	0.05 % per annum non cumulative
Warm up time	<15 min

OUTPUT

Rated value	See individual product pages
Load resistance mA (Unless otherwise stated)	1mA <15 kOhm 5mA <3 kOhm 10mA <1.5 kOhm 20mA <0.75kOhm 4-20mA <0.75kOhm
Load resistance volts (M100-VA1, VA3 only)	1, 5 & 10 volts >1 kOhm 1, 5 & 10 volts > 50kOhm
Load influence	<0.1 %
Ripple	<0.5% peak-peak at full load
Response time	<200 msec for 0-99 % at full load
Overload	<2 x rated value at full load
No load voltage	<27 V

ENCLOSURE

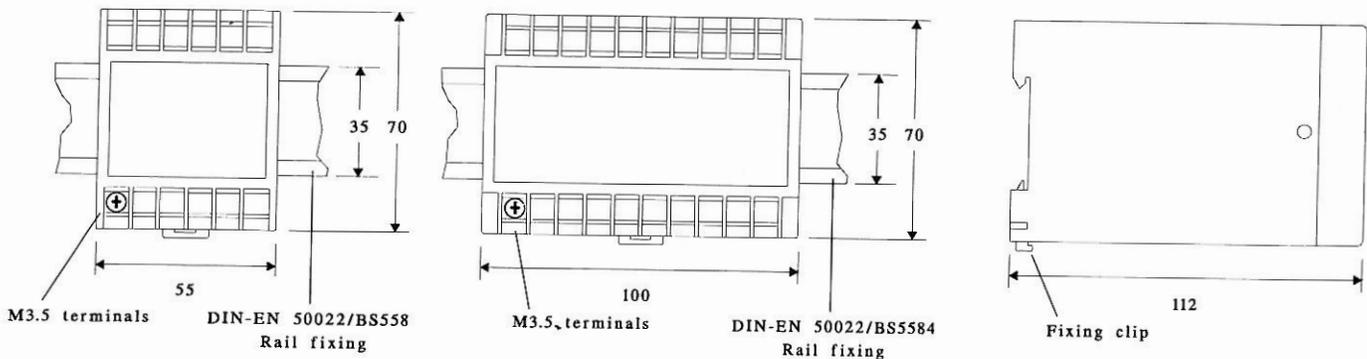
Fixing	Snap on to DIN rail 35 x 7.5 mm complies with DIN-EN 50022 BS 5584
Mounting	Any position
Enclosure Code	Case IP 50 / terminals IP 30 Complies with IEC 529 BS 5490 DIN 40050

APPROVALS

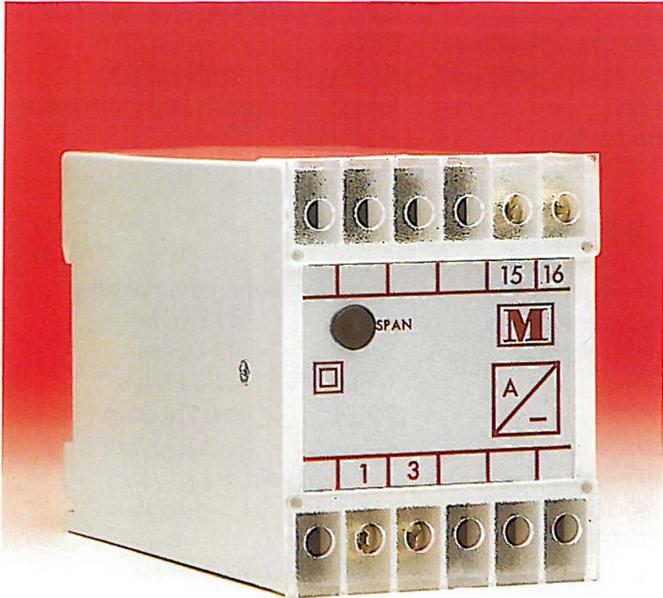
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CASE DIMENSIONS

All Dimensions in mm



AC CURRENT



TECHNICAL SPECIFICATION

INPUT

Rated value In	1 or 5 Amp C.T. connected 0.5-10 Amp direct connected
Power consumption	<1 VA (AA1, AA3) <0.2 VA (AL1, AL3, AR1)
Working range	10-125% In (AA1, AA3) 0-125% In (AL1, AL3, AR1)
Rated Frequency	50 / 60 / 400 Hz
Frequency influence	0.005 % / Hz
Overload continuous	4 x In
Overload for 1 sec.	50 x In

OUTPUT

Rated value mA	0-1/5/10/20mA (AA1, AA3)
Rated value mA	0-1/5/10/20 & 4-20mA (AR1)
Rated value mA	4-20mA (AL1 AL3)
Rated value volts	0-5 / 10 V (AA1 AA3)
Rated value volts	0-5 / 10 & 1-5 V (AR1)
Rated value volts	1-5 V (AL1 AL3)

ADJUSTMENT

Zero	No adjustment (AA1 AA3)
Zero	± 2% (AR1, AL1 AL3)
Span	± 10% (AA1, AR1, AL1 AA3 AL3)

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V (± 20% / galvanically isolated / < 3 W) Note M100-AA1 AA3 are self powered

WEIGHT & CASE

M100-AA1	Approx. 0.3 kg. 55mm case
M100-AL1,AR1	Approx. 0.4 kg. 55mm case
M100-AA3	Approx. 0.6 kg. 100mm case
M100-AL3	Approx. 0.7 kg. 100mm case

ORDERING INFORMATION

Product Code	Input In	Output	Aux	Freq.	Options
M100-AL1	5A	4-20mA	230V	50Hz	

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23 °C

SELECTION GUIDE

M100-AA1	1 ph. self powered ave. sensing RMS calibrated
M100-AL1	1 ph. aux. powered ave. sensing RMS calibrated
M100-AR1	1 ph. aux powered true RMS sensing RMS cal.
M100-AA3	3 ph. self powered ave. sensing RMS calibrated
M100-AL3	3 ph. aux powered ave. sensing RMS calibrated

TYPICAL APPLICATIONS

The M100 series current transducers are designed to measure A.C. Current in single and 3 phase systems. They convert the A.C. signal to a D.C. Output that is directly proportional to the input signal.

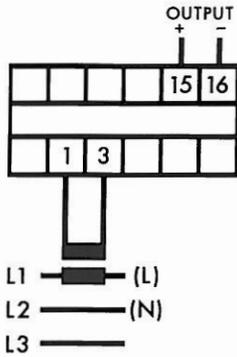
The M100-AA1 AA3 are self powered (i.e. no auxiliary required) average sensing RMS calibrated current transducers, mA and voltage outputs are available.

The M100-AL1 AL3 are average sensing RMS calibrated, live zero current transducers. Auxiliary is required to provide power, so that 4mA output signal is present, when the input is zero.

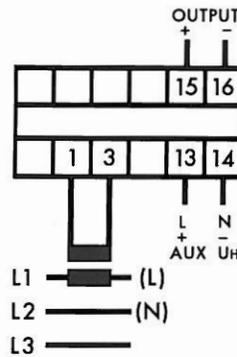
The M100-AR1 is true RMS sensing RMS calibrated allowing measurement of distorted waveforms of up to 9th harmonic with a crest factor of 5. The AR1 is typically used in current measurement where distorted waveform is common, such as thyristor drives

The above units are used to measure current in energy management systems, switchboards, generator and telemetry controls. Isolation of 4kV is provided between the input and output signal, allowing the output to be fed to conventional analogue meters, digital meters, PLC. and computer systems.

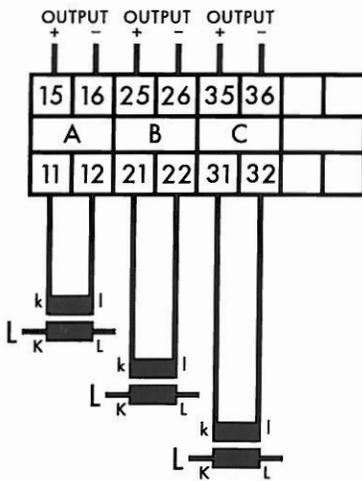
AC CURRENT CONNECTION DIAGRAMS



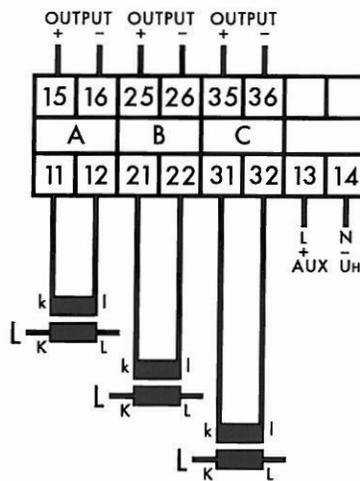
M100AA1



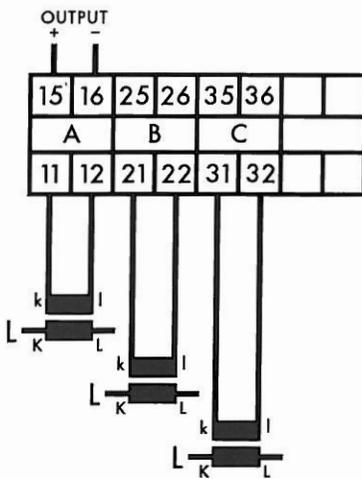
M100AL1/AR1/AX1



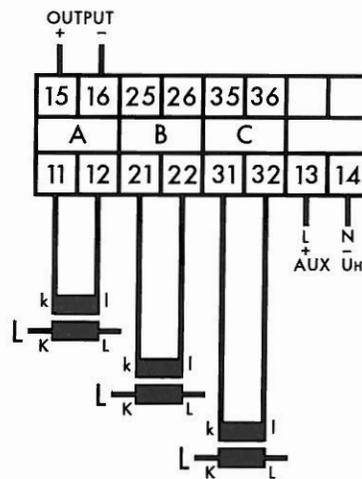
M100AA3



M100AL3/AX3



M100AAS



M100ALS

SPECIAL AC CURRENT

TECHNICAL SPECIFICATION

INPUT

Rated value In	1 or 5 Amp C.T. connected 0.5-10 Amp direct connected
Power consumption	<0.2 VA (AX1, AX3 ALS) <1 VA (AAS)
Working range	0-125% In (AX1, AX3, ALS) 10-125% In (AAS)
Rated Frequency	50 / 60 / 400 Hz
Frequency influence	0.005 % / Hz
Overload continuous	4 x In
Overload for 1 sec.	50 x In

OUTPUT

Rated value mA	0-1/5/10/20mA (AX1,AX3,AAS)
Rated value mA	4-20mA (ALS)
Rated Value Volts	Not available on (AAS)
Rated Value Volts	1-5 V (ALS)
Rated Value Volts	0-5 / 10V (AX1,AX3)

ADJUSTMENT

Zero	No adjustment (AX1, AX3, AAS)
Zero	± 2% (ALS)
Span	± 10% (AX1, AX3, ALS)

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V (± 20% galvanically isolated / <3W) Note M100-AAS is self powered

WEIGHT & CASE SIZE

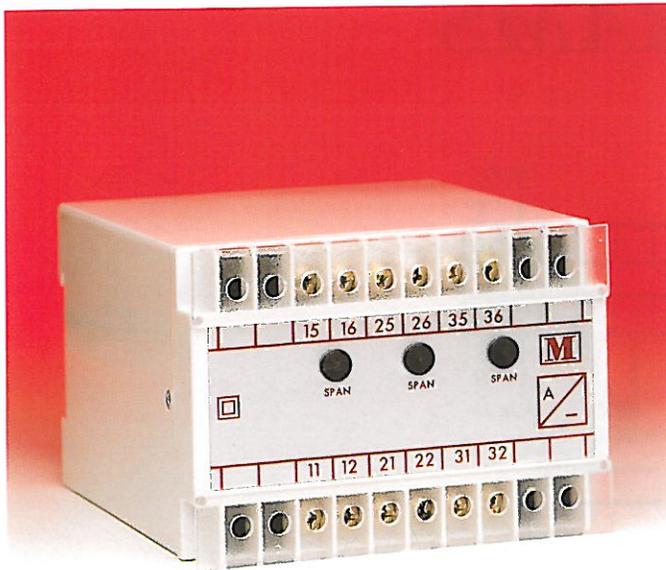
M100-AX1	Approx. 0.4 kg. 55mm case
M100-AAS	Approx. 0.6 kg. 100mm case
M100-ALS,AX3	Approx. 0.7 kg. 100mm case

ORDERING INFORMATION

Product Code	Input	In	Output	Aux	Freq.	Options
M100-ALS	3 x 5A	0-20mA	115V	50Hz	Cal. 40°C	

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23°C



SELECTION GUIDE

M100-AX1	1 ph. aux. powered ave. sensing RMS calibrated
M100-AX3	3 ph. aux powered ave. sensing RMS calibrated
M100-AAS	3 ph. summation self powered
M100-ALS	3 ph. summation auxiliary powered

TYPICAL APPLICATIONS

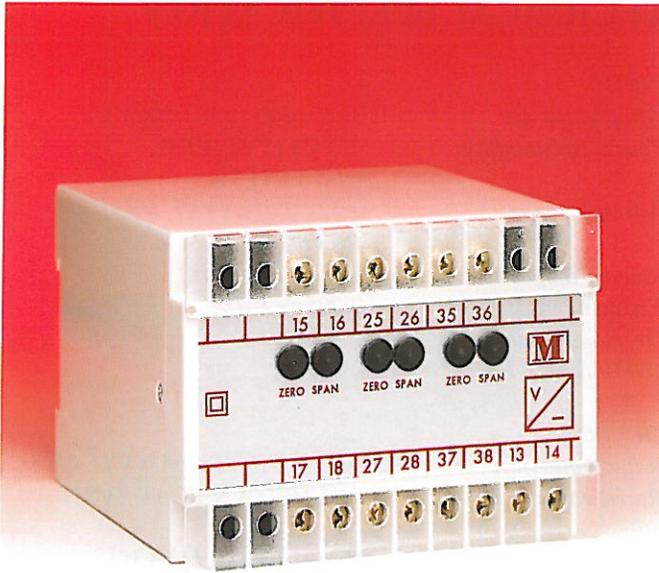
The M100-AX1 and AX3 are essentially the same as the M100-AA1 and AA3, but they have auxiliaries which allows the working range to be 0-125% rather than 10-125%. Used where the average sensing of current is required from 0-125% of the nominal current.

The M100-AAS and M100-ALS are A.C. Current summation transducers. Both can have up to 3 inputs of either 1, 5 or 10 amps. These inputs are summed by the transducer and one D.C. Output is provided, which is proportional to the sum of the inputs.

The M100-AAS is self powered with a range of 10-125%, the M100-ALS is auxiliary powered and provides a 4-20mA output with a working range of 0-125%.

Typical application is to measure the total current in a 3 phase system and display it via one meter. For example, if a 3 phase system has 3 current transformers 2500/5 then a moving coil meter could be connected to a M100-AAS scaled 0-7500. Note the C.T.s must all have the same ratio or the output from the transducer will not be the sum of the total current in the system.

AC VOLTAGE



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8 <100 / 110 <600 V
Power consumption	<1.5 VA (VA1, VA3) <1 VA (VL1, VL3, VR1)
Working range	15-125% U_n (VA1, VA3) 0-125% U_n (VL1, VL3, VR1)
Rated Frequency	50 / 60 / 400 Hz
Frequency influence	0.005 % / Hz
Overload continuous	1.5 x U_n
Overload for 1 sec.	4 x U_n (VL1 VL3 VR1) 2 x U_n (VA1 VA3)

OUTPUT

Rated value mA	0-1/5/10/20mA (VA1, VA3)
Rated value mA	1/5/10/20 & 4-20mA (VR1)
Rated value mA	4-20mA (VL1)
Rated Value volts	0-5 / 10 V (VA1, VA3)
Rated value volts	0-5 / 10 & 1-5 V (VR1)
Rated value volts	1-5 V (VL1 VL3)

ADJUSTMENT

Zero	No adjustment (VA1, VA3)
Zero	± 2% (VR1, VL1)
Span	± 10% (VA1, VA3, VR1, VL1, VL3)

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65Hz / <2 VA)
D.C. Voltage	24 / 48 / 110 V (± 20% / galvanically isolated / < 3 W) Note M100-VA1 & VA3 are self powered.

WEIGHT & CASE SIZE

M100-VA1	Approx. 0.3 kg. 55mm case
M100-VL1, VR1	Approx. 0.4 kg. 55mm case
M100-VA3	Approx. 0.6 kg. 100mm case
M100-VL3	Approx. 0.7 kg. 100mm case

ORDERING INFORMATION

Product Code	Input	In	Output	Aux	Freq.	Options
M100-AL1	5A		4-20mA	230V	50Hz	

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23°C

SELECTION GUIDE

M100-VA1	1 ph. self powered ave. sensing RMS calibrated
M100-VL1	1 ph. aux powered ave. sensing RMS calibrated
M100-VR1	1 ph. aux powered true RMS sensing RMS cal.
M100-VA3	3 ph. self powered ave. sensing RMS calibrated
M100-VL3	3 ph. aux powered ave. sensing RMS calibrated

TYPICAL APPLICATIONS

The M100 series voltage transducers are designed to measure A.C. Voltage in single and 3 phase system. They convert the A.C. Signal to a D.C. Output that is directly proportional to the input signal.

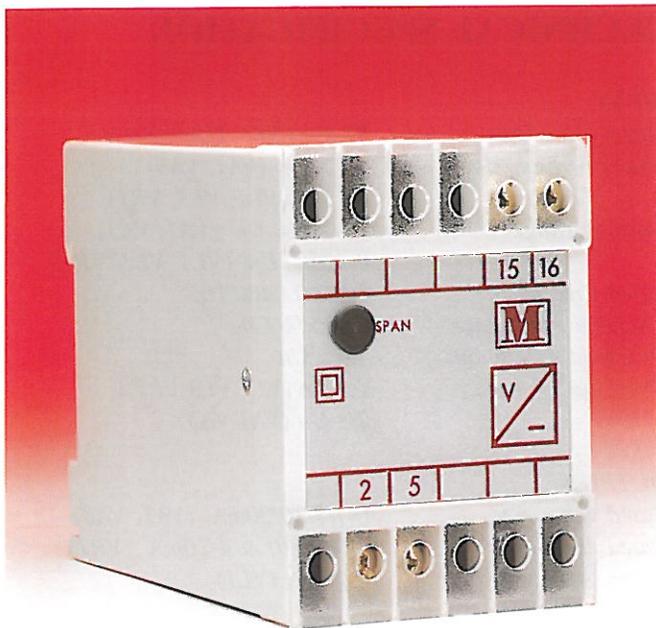
The M100-VA1 VA3 are self powered (i.e. no auxiliary required) average sensing RMS calibrated voltage transducers, mA and voltage outputs are available.

The M100-VL1 VL3 are average sensing RMS calibrated, live zero voltage transducers. Auxiliary is required to provide power so that 4mA output signal is present when the input is zero.

The M100-VR1 is true RMS sensing RMS calibrated allowing measurement of distorted waveforms of up to 9th harmonic with a crest factor of 5. The VR1 is typically used in voltage measurement where distorted waveform is common such as thyristor drives.

The above units are used to measure voltage in energy management systems, switchboards, generator and telemetry controls. Isolation of 4kV is provided between the input and output signal, allowing the output to be fed to conventional analogue meters, digital meters, PLC, and computer systems.

SPECIAL AC VOLTAGE



SELECTION GUIDE

- M100-VS1* Suppressed zero voltage auxiliary powered
M100-VX1 1 ph. aux. powered ave. sensing RMS calibrated
M100-VX3 3 ph. aux. powered ave. sensing RMS calibrated

TYPICAL APPLICATIONS

The M100-VS1 is a self powered voltage transducer. The suppression allows the transducer to accurately measure a voltage sensing over a narrow band either side of a nominal voltage. The range can be between $\pm 10\%$ to $\pm 30\%$ which can be specified when ordering. Typical application is to display the voltage on an analogue meter with an expanded scale. This allows the user to read small changes in the voltage in a single or 3 phase system. The output could also be fed to a computer that could then control the voltage of the system, to ensure that it stays within the narrow band.

The M100-VX1 and VX3 are essentially the same as the M100-VA1 and VA3, but they have auxiliaries which allow the working range to be 0-125% rather than 10-125%. Used where the average sensing of voltage is required from 0 to 125% of the nominal voltage.

TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8 <100 / 110 <600 V
Power consumption	< 1 VA (VX1, VX3) <1.5 VA (VS1)
Working range	0-125% U_n (VX1, VX3) 10-30% U_n (VS1)
Rated Frequency	50 / 60 / 400 Hz
Frequency influence	0.005 % / Hz
Overload continuous	1.5 x U_n
Overload for 1 sec.	2 x U_n

OUTPUT

Rated value mA	0-1 / 5 / 10 / 20mA (VX1, VX3)
Rated value mA	1/5/10/20 & 4-20mA (VS1)
Rated value volts	0-5 / 10 V (VX1, VX3)
Rated value volts	0-5 / 10 V & 1-5 V (VS1)

ADJUSTMENT

Zero	No adjustment (VX1, VX3)
Zero	$\pm 2\%$ (VS1)
Span	$\pm 10\%$ (VX1, VX3, VS1)

AUXILIARY

A.C. Voltage	115 / 230 / 400 V ($\pm 25\%$ / 45-65Hz / <2 VA)
D.C. Voltage	24 / 48 / 110 V ($\pm 20\%$ galvanically isolated / < 3 W) Note M100-VS1 is self powered

WEIGHT & CASE SIZE

M100-VS1, VX1	Approx. 0.4 kg. 55mm case
M100-VX3	Approx. 0.7 kg. 100mm case

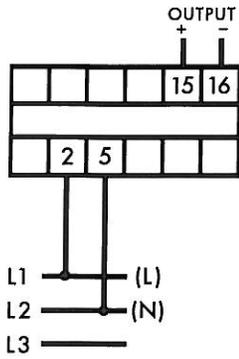
ORDERING INFORMATION

Product Code	Input U_n	Output	Aux	Freq.	Option
M100-VS1	110V $\pm 15\%$	20mA	-	50Hz	

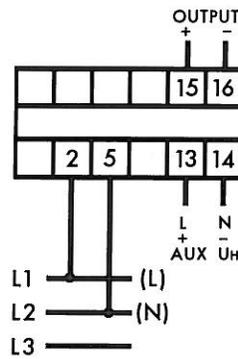
OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23°C

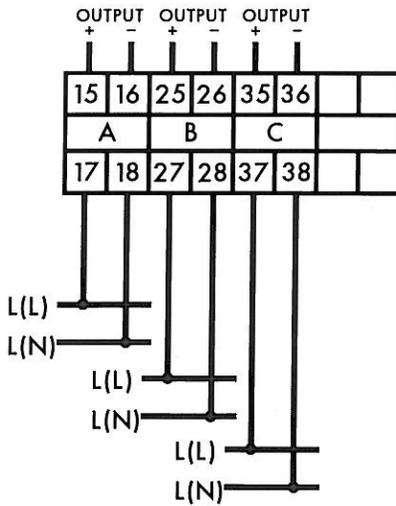
AC VOLTAGE CONNECTION DIAGRAMS



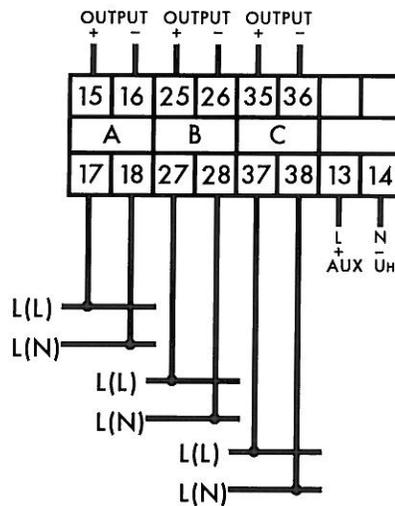
M100VA1/VS1



M100VL1/VR1/VX1

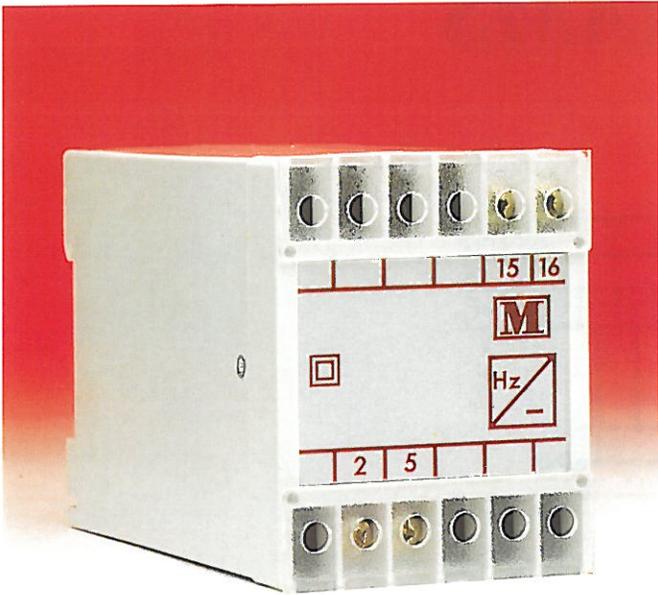


M100VA3



M100VL3/VX3

FREQUENCY



TECHNICAL SPECIFICATION

INPUT

Rated value U_n	57.8 < 600V
Power consumption	<1.5 VA (FA1) <1 VA (FL1 FX1)
Working range	75-125% U_n (FA1) 15-125% U_n (FL1 FX1)
Measuring range	45-55 / 45-65 / 55-65 / 360-440Hz
Overload continuous	1.5 x U_n
Overload for 1 sec.	2 x U_n

OUTPUT

Rated value mA	0-1 / 5 / 10 / 20mA (FA1 FX1)
Rated value mA	4-20mA (FL1)
Rated value volts	0-5 / 10 V (FA1 FX1)
Rated value volts	1-5 V (FL1)

ADJUSTMENT

Zero	No adjustment
Span	No adjustment

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65 Hz / < 2 VA)
D.C. Voltage	24 / 48 / 110 V (± 20% / galvanically isolated / < 3W)

Note M100-FA1 is self powered

WEIGHT & CASE SIZE Approx. 0.4kg. 55mm case

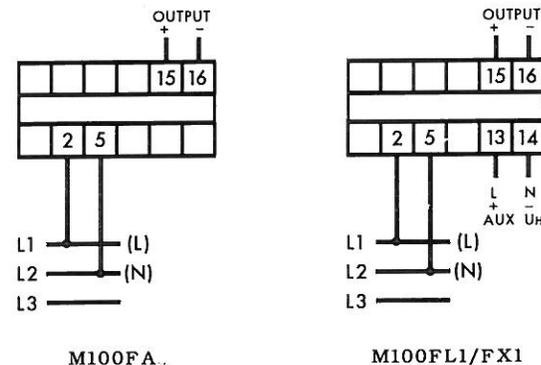
ORDERING INFORMATION

Product code	Input Hz	Output	Aux	Freq.	Options
M100-FL1	45-55Hz	4-20mA	230V	50Hz	

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

CONNECTION DIAGRAMS



SELECTION GUIDE

M100-FA1	Self powered true zero outputs
M100-FL1	Auxiliary powered live zero outputs
M100-FX1	Auxiliary powered true zero outputs

TYPICAL APPLICATIONS

The M100 series of frequency transducers are designed to measure frequency in single and 3 phase systems. The A.C. Input is converted to a D.C. Output, that is directly proportional to the change in input frequency within a specified span.

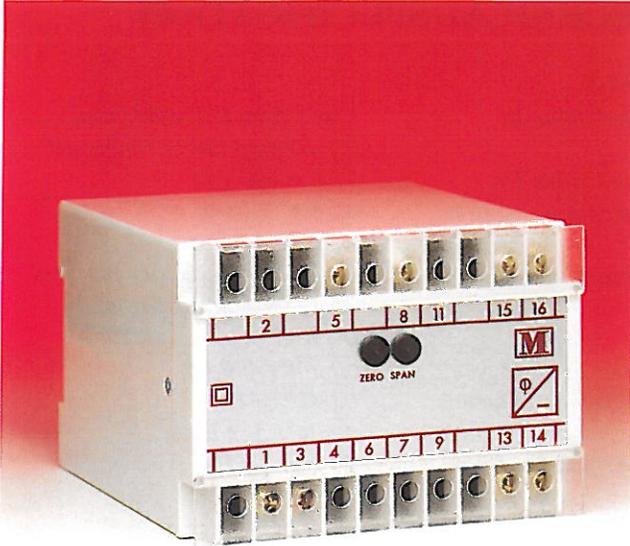
The M100-FA1 is self powered. (No auxiliary required)
The working voltage range is 75-125% of the nominal voltage.

The M100-FL1 is auxiliary powered. The outputs are live zero either 4mA or 1 volt. The auxiliary enables the working voltage range to be 15-125%.

The M100-FX1 is essentially the same as the FA1 but an auxiliary is provided to enable the unit to have a working voltage range of 15-125%.

All types of the above frequency transducers are typically used to monitor and control frequency in such applications as 3 phase mains supplies, A.C. Generating sets and process control etc.

PHASE ANGLE



TECHNICAL SPECIFICATION

INPUT

Rated value I_n	1 or 5 Amp C.T. connected 0.5-10 Amp direct connected
Rated value U_n	57.8 < 600 volt
Power consumption	<1 VA voltage (aux powered) <2.5 VA voltage (self powered) <0.2 VA current

Working range	15-125% U_n auxiliary powered 75-125% U_n self powered 10-150% I_n
---------------	--------------------------------------------------------------------------------

Measuring range	$\pm 45 / \pm 60 / \pm 90 / \pm 180^\circ$ M100 PA1 $\pm 45 / 60^\circ$ M100-PA2 $\pm 90 / \pm 180^\circ$ M100-PA3
-----------------	--------------------------------------------------------------------------------------------------------------------------

Rated Frequency	50 / 60 / 400 Hz
Frequency influence	0.005 % / Hz

Overload continuous	4 x I_n 1.5 x U_n
Overload for 1 sec.	50 x I_n 2 x U_n

ACCURACY	± 1 Degree
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OUTPUT

Rated value mA	0-1/5/10/20 & 4-20mA
Rated Value Volts	0-5 / 10 & 1-5 V

ADJUSTMENT

Zero	$\pm 2\%$
Span	$\pm 10\%$

AUXILIARY

A.C. Voltage	115 / 230 / 400 V ($\pm 25\%$ / 45-65 Hz / < 2VA)
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D.C. Voltage	24 / 48 / 110 V ($\pm 20\%$ galvanically isolated / <3W)
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WEIGHT & CASE SIZE	Approx. 0.6 kg. 100mm case
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SELECTION GUIDE

M100-PA1	Single phase 4 quadrants
M100-PA2	3 phase 3 or 4 wire balanced 2 quadrants
M100-PA3	3 phase 3 or 4 wire balanced 4 quadrants
M100-PV1	Single phase 4 quadrants phase angle between two voltages

TYPICAL APPLICATIONS

The M100-PA series of phase angle transducers measure the phase angle between current and voltage. They can be used on single and 3 phase 3 or 4 wire balanced systems. Ideal for optimising power factor correction.

The M100-PV1 measures the phase angle between two voltage supplies and provides a D.C. Output signal proportional to the phase angle between the voltages.

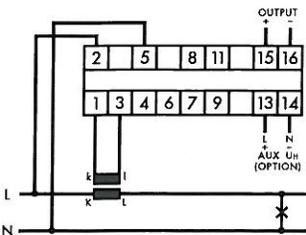
ORDERING INFORMATION

Product code	I/P	I_n	U_n	O/P	Range	Aux.	Freq.	Opt.
M100-PA2		5Amp	400V		$\pm 45^\circ$	120V	60Hz	

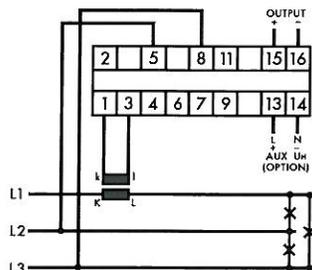
OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23°C

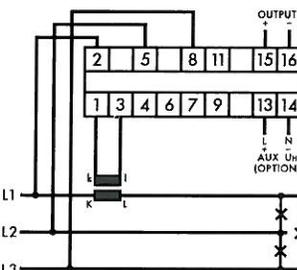
CONNECTION DIAGRAMS



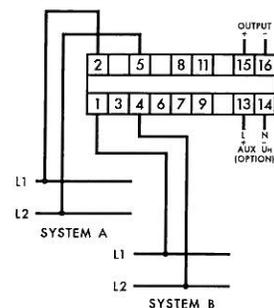
M100A1



M100PA2



M100PA3



M100PV1

ACTIVE POWER



TECHNICAL SPECIFICATION

INPUT

Rated value In	1 or 5 Amp C.T. connected 0.5-10 Amp direct connected
Rated value Un	57.8 < 600 volt
Power consumption	<1 VA voltage <0.2 VA current
Working range	0-125% Un auxiliary powered 75-125% Un self powered 0-150% In
Rated Frequency	50 / 60 / 400 Hz
Frequency influence	0.005 % / Hz
Overload continuous	4 x In 1.5 x Un
Overload for 1 sec.	50 x In 2 x Un

OUTPUT

Rated value mA	0-1/5/10/20 & 4-20mA
Rated Value Volts	0-5 / 10 & 1-5 V

ADJUSTMENT

Zero	± 2%
Span	± 10%

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V (± 20% / galvanically isolated / < 3 W)

WEIGHT & CASE SIZE

M100-WA1,2,3,6,7	Approx. 0.6kg. 100mm case
M100-WA4,5	Approx. 0.8kg. 100mm case

SELECTION GUIDE

M100-WA1	Single phase
M100-WA2	3 phase 3 wire balanced load
M100-WA3	3 phase 4 wire balanced load
M100-WA4	3 phase 3 wire unbalanced load
M100-WA5	3 phase 4 wire unbalanced load
M100-WA6	3 phase 3 wire balanced load externally connected reverse C.T.s
M100-WA7	3 phase 3 wire balanced load internally reversed C.T.s

TYPICAL APPLICATIONS

The M100-WA series measure active power in single, 3 phase 3 or 4 wire balanced and unbalanced systems. Using the time division multiplier circuit means that they can be used over a wide range of input waveforms. The D.C. Output signal is directly proportional to the instantaneous power being measured.

Typical applications include the measurement of power in switchboards, power stations, generating sets etc. The high isolation of 4kV as with all the M100 series, allows these watt transducers to be connected to a variety of measuring and control devices and systems, such as analogue meters, PLC, computers, data loggers, digital instruments and telemetry systems.

Both auxiliary powered and self powered versions of each type are available, it is recommended to use an auxiliary powered version if the system being measured has voltage variations in excess of ± 20%.

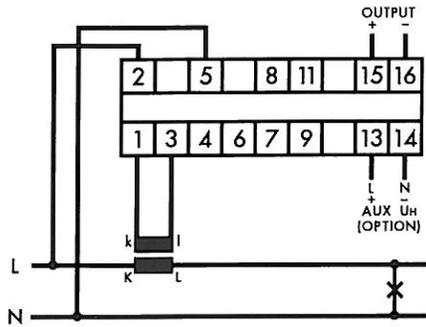
ORDERING INFORMATION

Product Code	I/P	In	Un	O/P	Range	Aux	Freq	Opt.
M100-WA5	800/5A	230v	0-20mA	600kW	230v	50Hz		

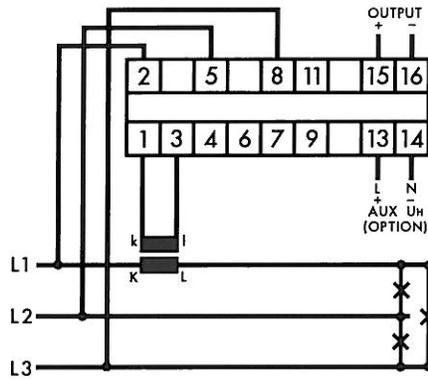
OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23°C

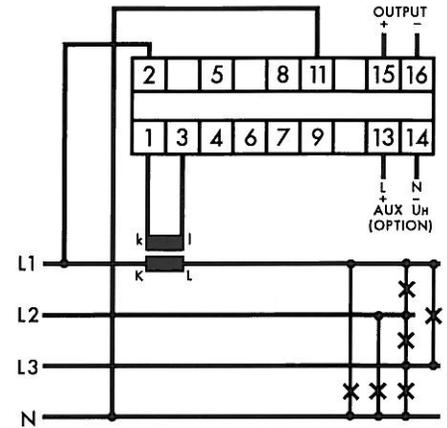
ACTIVE POWER CONNECTION DIAGRAMS



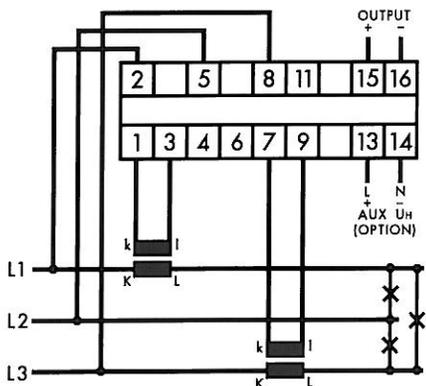
M100WA1



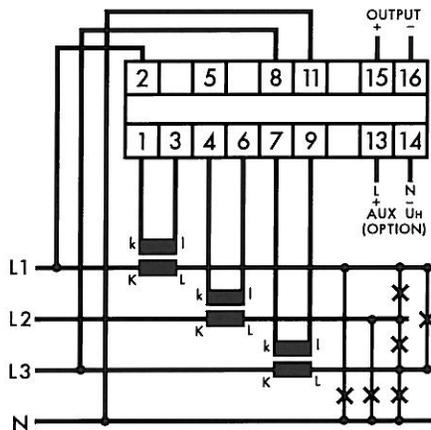
M100WA2



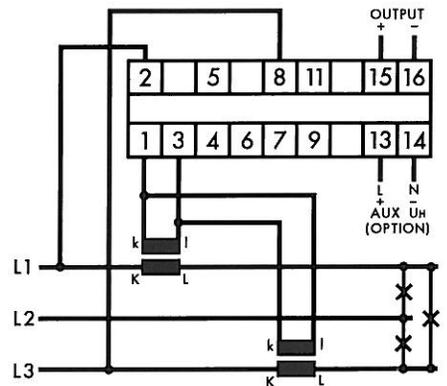
M100WA3



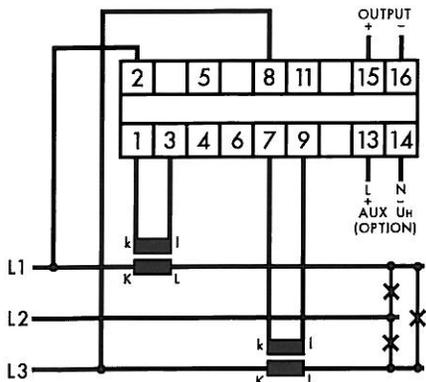
M100WA4



M100WA5



M100WA6



M100WA7

REACTIVE POWER



TECHNICAL SPECIFICATION

INPUT

Rated value In	1 or 5 Amp C.T. connected 0.5-10 Amp direct connected
Rated value Un	57.8 < 600 volt
Power consumption	<1 VA voltage <0.2 VA current
Working range	0-125% Un auxiliary powered 75-125% Un self powered 0-150% In
Rated Frequency	50 / 60 / 400 Hz
Overload continuous	4 x In 1.5 x Un
Overload for 1 sec.	50 x In 2 x Un

OUTPUT

Rated value mA	0-1/5/10/20 & 4-20mA
Rated Value Volts	0-5 / 10 & 1-5 V

ADJUSTMENT

Zero	± 2%
Span	± 10%

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V (± 20% / galvanically isolated / <3W)

WEIGHT & CASE SIZE

M100-XA1,2,3,6,7	Approx. 0.6kg. 100mm case
M100-XA4,5	Approx. 0.8kg 100mm case

SELECTION GUIDE

M100-XA1	Single phase
M100-XA2	3 phase 3 wire balanced load
M100-XA3	3 phase 4 wire balanced load
M100-XA4	3 phase 3 wire unbalanced load
M100-XA5	3 phase 4 wire unbalanced load
M100-XA6	3 phase 3 wire unbalanced load
M100-XA7	3 phase 3 wire balanced load internally reversed C.T.s

TYPICAL APPLICATIONS

The M100-XA series measure reactive power in single, 3 phase 3 or 4 wire balanced and unbalanced systems. Using the time division multiplier circuit means that they can be used over a wide range of input waveforms. The D.C. Output signal is directly proportional to the instantaneous reactive power being measured.

Typical applications include the measurement of reactive power in switchboards, power stations and generating sets etc. The high isolation of 4kV as with all the M100 series, allows these VAr transducers to be connected to a variety of measuring and control devices and systems, such as analogue meters, PLC, computers, data loggers, digital instruments and telemetry systems.

Both auxiliary powered and self powered versions of each type are available, it is recommended to use an auxiliary powered version if the system being measured has voltage variations in excess of ± 20%.

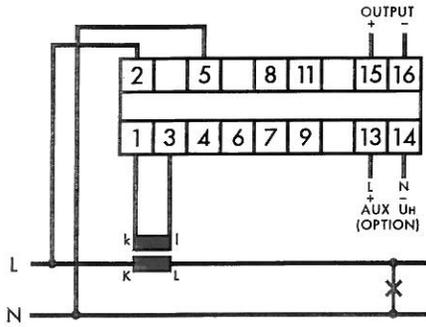
ORDERING INFORMATION

Product code	I/P	In	Un	O/P	Range	Aux.	Freq.	Opt.
M100-XA4	400/5	400	0-20mA	300kVAr	120	60Hz		

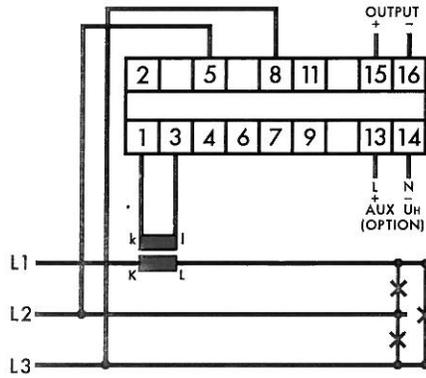
OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at nominal Hz 35.....450Hz
4. Calibration at temperature other than 23 °C

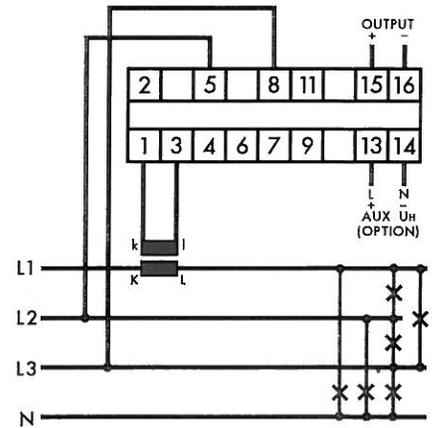
REACTIVE POWER CONNECTION DIAGRAMS



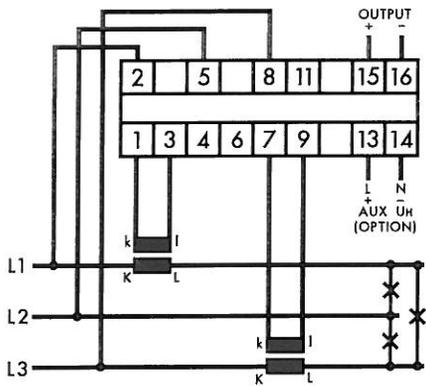
M100XA1



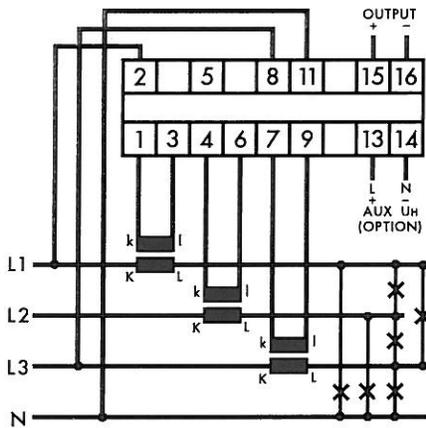
M100XA2



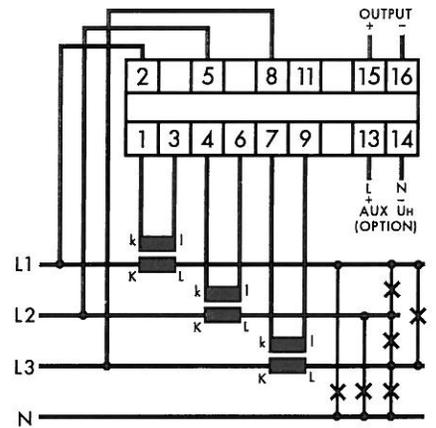
M100XA3



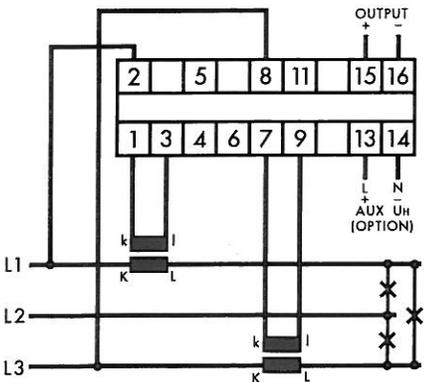
M100XA4



M100XA5

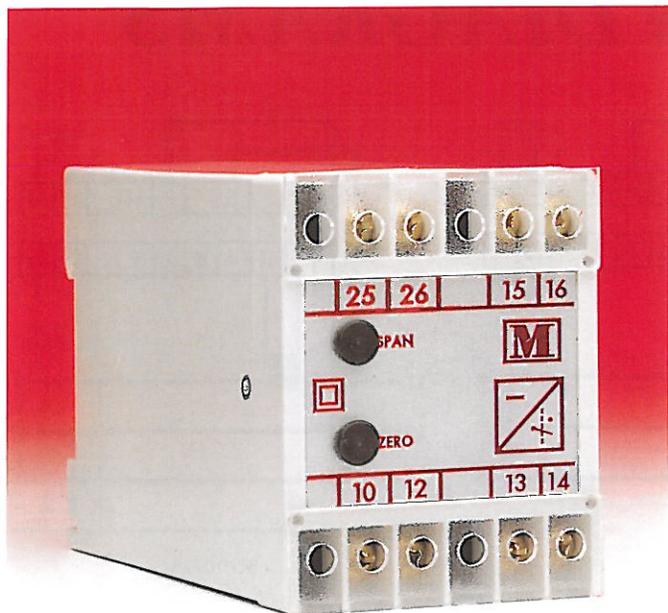


M100XA6



M100XA7

DC LINEAR INTEGRATOR



TECHNICAL SPECIFICATION

INPUT

Rated value I_n	0-1 / 5 / 10 / 20 & 4-20 mA
Voltage drop	20mV
Rated value U_n	0-20mV.....10V
Impedance	100 kOhm / V
Working range	0-125%
Overload continuous	1.5 x U_n 4 x I_n

OUTPUT

Contact	volt free closure
Pulse rate	100.....5000 pulse/hr
Pulse width	250 msec

RELAY

Voltage	50 V DC / 250 V AC
Rating	10W
Contact material	Ruthonium
Initial resistance	200 mOhm
Initial capacitance	0.4 pF
Electrical life	5 x 10 ⁶ (250 V DC / 10mA / resistance load)
Test voltage	coil to contacts 4kV

ADJUSTMENT

Zero	± 2%
Span	± 10%

AUXILIARY

A.C. Voltage	115 / 230 / 400 V (± 25% / 45-65Hz / <2 VA)
D.C. Voltage	24 / 48 / 110 V ± 20% galvanically isolated / < 3 W

WEIGHT & CASE SIZE Approx. 0.4 kg. 55mm case

SELECTION GUIDE

M100-DI1	Single relay output
M100-DI2	Double relay output

TYPICAL APPLICATIONS

The M100-DI1 is a linear integrator which accepts D.C. Inputs, and integrates the input with respect to time. An output is provided via a relay which gives a pulsed output, the frequency of which is directly proportional to the amplitude of the input signal.

One of the main uses of the M100-DI1 is the measurement of Watt and Kilowatt hour. This is achieved by feeding the output of a watt transducer (M100-WA series) into the M100-DI1. The input signal is integrated against time and the resulting output pulses from the relay are proportional to the kW.h being consumed. These pulses then can be fed to an electromechanical counter, digital counter or a computer, where the kW.h consumed can be stored. Another use is the measurement of Ampere hours.

The M100-DI2 is the same as M100-DI1 with the additional feature of having 2 relay outputs, this allows the user to feed one set of pulses to a counter on a switchboard whilst feeding the other set of pulses to a remote computer in a control room.

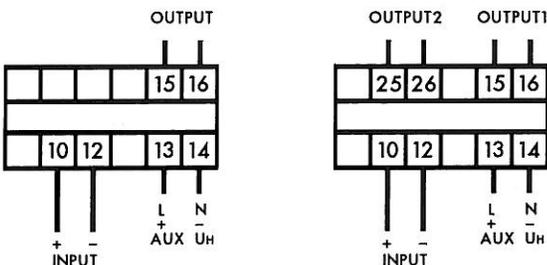
ORDERING INFORMATION

Product Code	Input I_n	Pulse Rate	Aux. Freq. Opt.
M100-DI1	10mA	100/hour	230V 50Hz

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

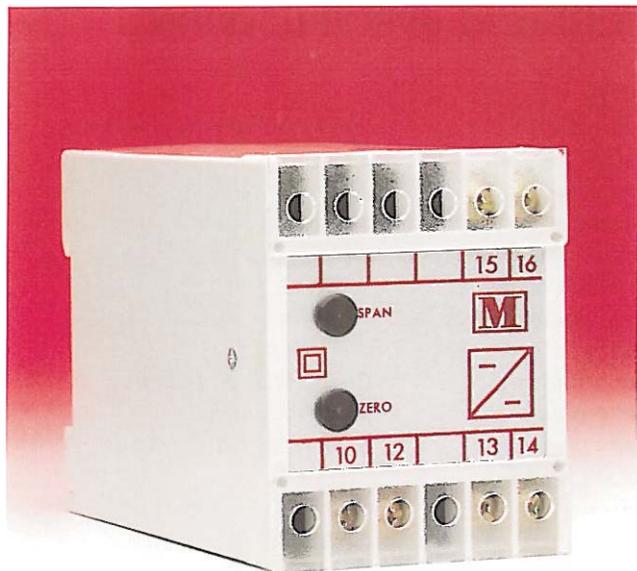
CONNECTION DIAGRAM



M100DI1

M100DI2

DC CURRENT OR VOLTAGE 4kV OR 1.5kV ISOLATION



SELECTION GUIDE

M100-DA1	DC current input, 4kV isolation
M100-DV1	DC voltage 20mV...11.9V input, 4kV isolation
M100-DV2	DC voltage 12V...1000V input, 4kV isolation
M100-DA1I	DC current input, 1.5kV isolation
M100-DV1I	DC voltage 20mV...11.9V input, 1.5kV isolation
M100-DV2I	DC voltage 12V...600V input, 1.5kV isolation

TYPICAL APPLICATIONS

These isolators isolate the DC input signal from the DC output signal, which is directly proportional to the input signal. There are two levels of isolation offered: the M100-DA1 / DV1 / DV2 have 4kV isolation and the M100-DA1I / DV1I / DV2I have 1.5kV isolation. A wide range of both DC current and voltage inputs are offered.

Typically, these isolators can be used to prevent earth loops, which occur when a measuring source (that is earthed) is connected to a computer or data logger that is also earthed. Another common use is to provide isolation on the inputs to a PLC.

All of the above isolators have either AC or DC auxiliaries which means they have an advantage over loop powered units, in that if for any reason the output lead should become disconnected, the input will not be saturated.

TECHNICAL INFORMATION

INPUT

Rated Value In	±0-1mA...10A M100-DA1 / DA1I
Voltage drop	20mV
Rated Value Un	±20mV...11.9V M100-DV1 / DV1I
Impedance	100 kOhm / volt
Rated Value Un	±12V...1000V M100-DV2 /
	±12V...600V M100-DV2I

Impedance	10 kOhm / volt
Working range	±125% In
Overload continuous	4 x In M100-DA1 (up to 20A max.)
Overload continuous	1.5 x Un M100-DV1 / DV2

OUTPUT

Rated Value mA	0-1 / 5 / 10 / 20 & 4-20mA
Load Resistance	12 / 2.4 / 1.2 / 0.6 kOhm
Rated Value volts	0-5 / 10 & 1-5V

ADJUSTMENT

Zero	±2%
Span	±10%

AUXILIARY

AC Voltage	115 / 230 / 400V (±25% / 45-65 Hz / <2VA)
DC Voltage	24 / 48 / 110V (±20% / galvanically isolated / <3W)

WEIGHT & CASE SIZE

approx. 0.88 lbs. (0.4 kg) in 55mm case

INSULATION

M100-DA1 / DV1 / DV2	4kV (as shown in General Specification)
M100-DA1I / DV1I / DV2I	Test voltage 1.5kV RMS 50Hz 1 min between input / case / output, rest of specification as shown in General Specification

ORDERING INFORMATION

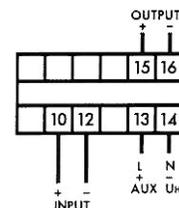
Product Code	Input	Output	Aux	Freq	Options*
M100-DA1I	1mA	4-20mA	230V	50Hz	

* OPTIONS

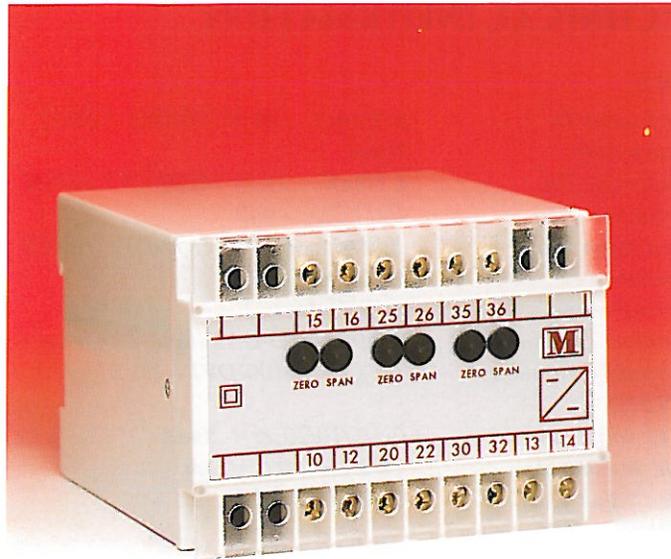
1. Non-standard inputs / outputs as far as technically acceptable.
2. AC Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 73.4°F (23°C)

CONNECTION DIAGRAM

M100DA1 / DV1 / DV2
M100DA1I / DV1I / DV2I



DC CURRENT OR VOLTAGE 1 INPUT 3 OUTPUTS



TECHNICAL SPECIFICATION

INPUT

Rated value In	$\pm 0-1 / 5 / 10 / 20$ & $4-20\text{mA}$
Voltage drop	20mV
Rated value Un	$\pm 20\text{mV} \dots 10\text{V}$
Impedance	100 kOhm / volt
Working range	$\pm 125\%$ In
Overload continuous	4 x In
Overload continuous	1.5 x Un

OUTPUT

Rated value mA	0-1/5/10/20 & $4-20\text{mA}$
Load resistance	10/2/1/0.5 kOhm
Rated value volts	0-5 / 10 & 1-5 V

ADJUSTMENT

Zero	$\pm 2\%$
Span	$\pm 10\%$

AUXILIARY

A.C. Voltage	115 / 230 / 400 V ($\pm 25\%$ / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V ($\pm 20\%$ / galvanically isolated / < 3W)

WEIGHT & CASE SIZE

INSULATION Approx. 0.4 kg, 100mm case

INSULATION

Test voltage	1.5 kV between Input/ Output/Case 500 volt between each output
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SELECTION GUIDE

M100-DM3 One input three outputs

TYPICAL APPLICATIONS

The M100-DM3 takes 1 DC Input and provides 3 isolated outputs all directly proportional to the input. The outputs can all be of the same D.C. Value or can be different.

Typically this product is used to prevent earth loops between measuring devices. For example the M100-DM3 could have its input signal provided by a M100-WA4 watt transducer with 4-20mA output. The 3 outputs from the M100-DM3 could be as follows.

Output A = 4-20mA fed to a PLC.

Output B = 0-20mA fed to a analogue meter scaled in kW.

Output C = 1-5 volt fed to a chart recorder.

The isolation between the Input / Output / Case is 1.5kV and the isolation between each output is 500 volts.

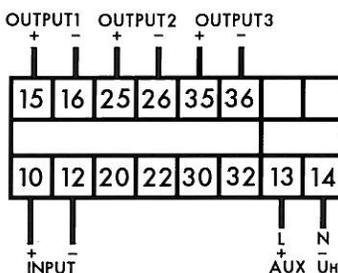
ORDERING INFORMATION

Product Code	Input	In	Output	Aux.	Freq.	Options
M100-DM3	1mA	A=1mA	230V	50Hz		B=4-20mA C=10V

OPTIONS

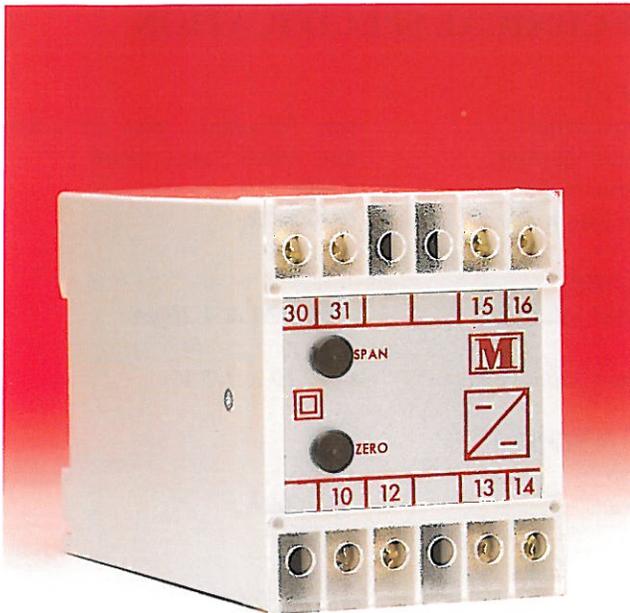
1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

CONNECTION DIAGRAMS



M100DM3

DC CURRENT SUMMATION



TECHNICAL SPECIFICATIONS

INPUT

Rated value I_n	$\pm 0-1\text{mA} \dots 20\text{mA}$
Voltage drop	20mV
Working range	$\pm 125\%$
Overload continuous	4 x I_n
Overload continuous	1.5 x U_n

OUTPUT

Rated value mA	0-1/5/10/20 & 4-20mA
Load resistance	12/2.4/1.2/0.6 kOhm
Rated value volts	0-5 / 10 & 1-5 V

ADJUSTMENT

Zero	$\pm 2\%$
Span	$\pm 10\%$

AUXILIARY

A.C. Voltage	115 / 230 / 400 V ($\pm 25\%$ / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V ($\pm 20\%$ / galvanically isolated / < 3W)

WEIGHT & CASE SIZE Approx. 0.4 kg, 55mm case

SELECTION GUIDE

M100-DS1	DC current 1 input
M100-DS2	DC current 2 inputs
M100-DS3	DC current 3 inputs
M100-DS4	DC current 4 inputs

TYPICAL APPLICATIONS

The M100-DS series of summation transducer take up to four inputs and provide an output signal directly proportional to the sum of the inputs.

A typical application is the summation of total kW of four separate generating sets e.g. the four individual kW readings are provided by M100-WA4 transducers with 0-1mA output signals. The M100-DS4 summates the four 0-1mA signals and provides a single output signal that is directly proportional the sum of the total kW of all four generators.

It is important to note the following when using summation transducers, to ensure the correct reading is obtained :-

The current and voltage ratios must be identical otherwise the subsequent summation will be meaningless.

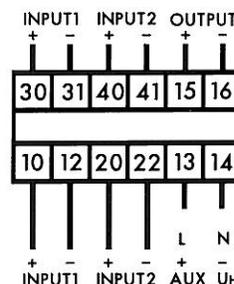
ORDERING INFORMATION

Product Code	Input	In	Output	Aux.	Freq.	Options
M100-DS1	1mA		4-20mA	230V	50Hz	

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

CONNECTION DIAGRAMS



M100DS2/DS3/DS4

REMOTE RESISTANCE

TECHNICAL SPECIFICATION

INPUT

Rated range	min. 100 ohms.... max. 50 kOhms
Sensor current	min. 20uA.... max. 10mA
Sensor voltage	1 Volt
Working range	0-100% R_N

OUTPUT

Rated value mA	1/5/10/20 & 4-20mA
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Rated value volts	0-5 / 10 & 1-5 V
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ADJUSTMENT

Zero	0-35%
Span	65-100%

AUXILIARY

A.C. Voltage	115 / 230 / 400 V ($\pm 25\%$ / 45-65 Hz / < 2VA)
D.C. Voltage	24 / 48 / 110 V ($\pm 20\%$ / galvanically isolated / < 3W)

WEIGHT & CASE SIZE	Approx. 0.4 kg. 55mm case
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NOTE

No isolation is provided between input and output

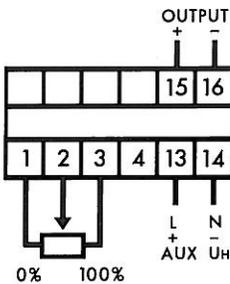
ORDERING INFORMATION

Product Code	Input	Output	Aux. Freq.	Options
M100-RPN	2 kOhm	0-20mA	230V	50Hz

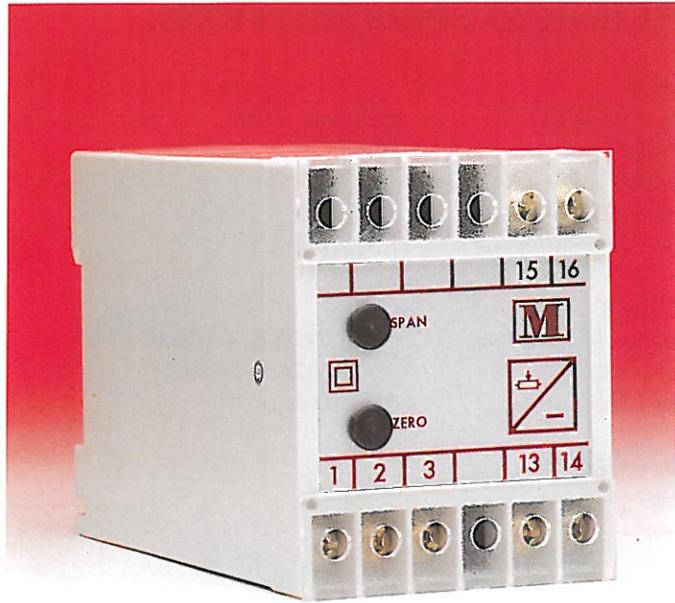
OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

CONNECTION DIAGRAMS



M100RPN



SELECTION GUIDE

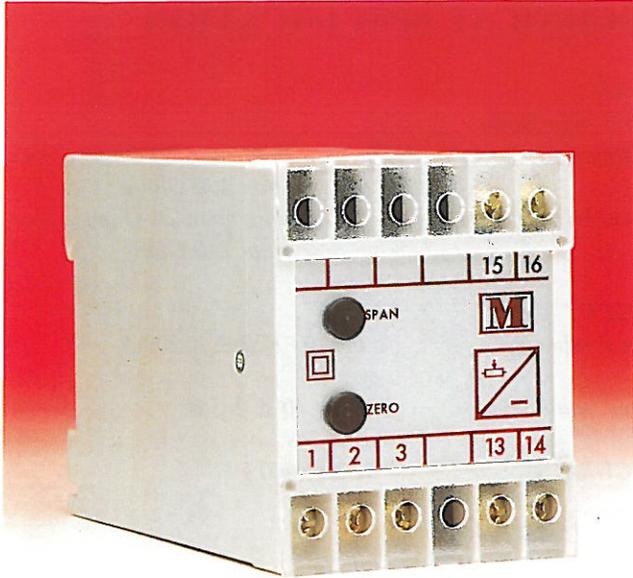
M100-RPN Resistance measurement

TYPICAL APPLICATIONS

The M100-RPN is designed to measure the resistance of 3 wire potentiometers, where the resistance value is proportional to the position of the wiper of the potentiometer. The output value from the M100-RPN is directly proportional to the resistance value at the wiper.

A typical application is monitoring remote resistance of potentiometer used in manual valve control.

TAP POSITION



TECHNICAL SPECIFICATION

INPUT

Rated range	min. 100 ohms.... max. 20 kOhms
Sensor current	min. 50uA.... max. 10mA
Sensor voltage	<1 Volt
Working range	0-125% Rn

OUTPUT

Rated value mA 0-1/5/10/20 & 4-20mA

Rated value volts 0-5 / 10 & 1-5 V

ADJUSTMENT

Zero	±2%
Span	±10%

AUXILIARY

A.C. Voltage 115 / 230 / 400 V (± 25% / 45-65 Hz / < 2VA)

D.C. Voltage 24 / 48 / 110 V (± 20% / galvanically isolated / < 3W)

WEIGHT & CASE SIZE Approx. 0.4 kg. 55 mm case

NOTE

No isolation is provided between input and output

SELECTION GUIDE

M100-TAP Resistance measurement

TYPICAL APPLICATIONS

The M100-TAP measures the value of resistance on tap position changers, typically used on high voltage transformers. Each position on the selector has an equal value of resistance so that as the tap position is increased or decreased the value of resistance increases or decrease respectively. The M100-TAP measure the value of this resistance and provides an output proportional to the value of the number of taps selected.

The M100-TAP can also be used to measure variable resistance 2 or 3 wire systems.

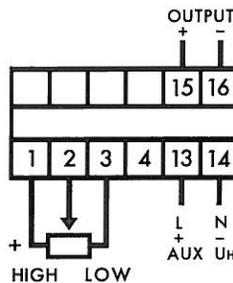
ORDERING INFORMATION

Product Code	No Taps	Output	Aux.	Freq.	Options
M100-TAP	10	5 mA	230V	50Hz	

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

CONNECTION DIAGRAMS



M100TAP

RTD TEMPERATURE



TECHNICAL SPECIFICATION

INPUT

2 or 3 wire input

Platinum Pt 100 Ohm RTD

min. span 20 Ohms ...max.

span 200 Ohms

Nickel Ni 120 Ohm RTD

min. span 24 Ohms...max.

span 240 Ohms

OUTPUT

Rated value mA

0-1/5/10/20 & 4-20mA

Rated value volts

0-5 / 10 & 1-5 V

ACCURACY

Class $\pm 0.5\%$

ADJUSTMENT

Zero

$\pm 2\%$

Span

$\pm 10\%$

AUXILIARY

A.C. Voltage

115 / 230 / 400 V ($\pm 25\%$ / 45-65 Hz / < 2VA)

D.C. Voltage

24 / 48 / 110 V ($\pm 20\%$ / galvanically isolated / < 3W)

WEIGHT & CASE SIZE

Approx. 0.3 kg. 55mm case

NOTE

No isolation is provided between input and output

SELECTION GUIDE

M100-RTD RTD temperature measurement

TYPICAL APPLICATIONS

The M100-RTD monitors the resistance of either 100 Ohm Platinum, or 120 Ohm Nickel. The RTDs resistance increase as the temperature rises, this resistance change is detected by the M100-RTD, which provides an output corresponding to the temperature being measured.

The temperature versus resistance values, are provided by the supplier of the RTD used.

RTD measurement of temperature is used in large transformers and large motors, to ensure winding temperatures do not rise to a level that would damage the winding.

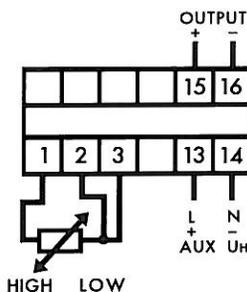
ORDERING INFORMATION

Product Code	RTD	Temp	O/p	Aux	Freq Options
M100-RTD	Pt 100	0-250°C	5 mA	230V	50Hz

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C

CONNECTION DIAGRAMS



M100RTD

THERMOCOUPLE TEMPERATURE



TECHNICAL SPECIFICATION

INPUT

Type J Fe/Const.	Min. range 0-185°C (min. span 10mV) Max range 0-870 °C (max. span 50mV)
Type K NiCr/NiAl	Min. range 0-245 °C (min. span 10mV) Max. range 0-1230 °C (max. span 50mV)

Impedance >10kOhm

Thermocouple Break protection

Upscale or down scale optional

Cold junction compensation

Automatic over the range 0-50 °C

Overload

10 x input continuous

OUTPUT

Rated value mA 0-1/5/10/20 & 4-20mA

Load resistance 12/2.4/1.2/0.6 kOhm

Rated value volts 0-5 / 10 & 1-5 V

ADJUSTMENT

Zero ± 2%

Span ± 10%

AUXILIARY

A.C. Voltage 115 / 230 / 400 V (±25% / 45-65 Hz / < 2VA)

D.C. Voltage 24 / 48 / 110 V (± 20% / galvanically isolated / <3W)

WEIGHT & CASE SIZE Approx. 0.4 kg. case 55mm

SELECTION GUIDE

M100-TJ1 Type J thermocouple

M100-TK1 Type K thermocouple

TYPICAL APPLICATIONS

The M100-TJ1 and TK1 measure the millivolt drop of J and K type thermocouples respectively.

Thermocouples are made from two dissimilar metals and as the temperature rises, the mV across the thermocouple increases. The millivolts voltage developed corresponds to the change in temperature, thermocouple manufacturers provide tables showing temperature versus voltage drop.

The M100 TJ1 / TK1 measures this voltage change and converts it to an output signal that corresponds to the temperature being monitored. The output from the M100-TJ1/TK1 is not linearised

Thermocouple temperature measurement is used in a variety of applications, including monitoring of temperature of furnaces etc.

The M100 thermocouple transducer is provided with automatic cold junction temperature compensation over the range 0-50 °C. Also provided is thermocouple break protection should the thermocouple leads break, the output from the transducer will go to its maximum or minimum output value, depending on which option is chosen at time of ordering.

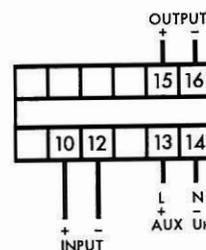
ORDERING INFORMATION

Product Code	Temp.	O/p.	Aux.	Freq.	Options
M100-TK1	0-500°C	1 mA	120V	60Hz	Up scale

OPTIONS

1. Non standard inputs / outputs only as far as technically acceptable.
2. A.C. Auxiliary in range 57.7 to 450 volts
3. Calibration at temperature other than 23°C
4. Up or down scale break protection

CONNECTION DIAGRAMS



M100TJ1/TK1



Multitek Power Ltd is a privately owned company that was founded in 1989. Its aim was to be expert in the design and manufacture of products for the power measuring and control industry.

Multitek Power Ltd. manufacture an extensive range of precision power transducers, monitoring relays, digital panel meters, kilowatt hour meters and digital power metering systems.

The company is completely self contained:
We wind the transformers, mould the cases, assemble all the printed circuit boards and sub-assemblies and print all the labels for our products.

All of our products are designed at the factory by our team of design and production engineers, who draw on over 50 years experience in the power measurement and control industry. Our products are designed to the latest international standards and the ever changing requirements of our customers.
All production, calibration and test equipment is traceable to international standards. The worldwide market is served by exclusive distributors in over 35 countries.

2001 saw the complete redesign of the M800 meter to the new M802 which retained the same green LCD and simple two button programming format but was half the depth and half the cost. The cost reduction was necessary to keep pace with the increased demand for Multifunction meters and the number of competitors entering the market.
The M802 required new case tooling so major investment was made in new mould tools.

2002-2006 saw the continual investment in product design of intelligent meters and transducers like the M550-CT* PowerCom, M560-AT* PowerSig and the M812-LD* LED power meter.
The design of each new product saw further expenditure in EMC approval and UL approval.

New products were enabling Multitek to enter new markets and appoint further distributors

2007 saw investment in new three phase power calibration racks to cater for the increase volume of products being manufactured.

2008 saw the start of the design of a complete new range of multifunction meters known as the MultiPower M850.

The new range had a clip together case and fast production assembly with the majority of the assembly being surface mount with no internal wiring. The M850-MP1 has a unique blue LED display that could be read at distance and in bright sun light. The product was designed for low cost high volume production with normal product batches being 500 pcs.

The new range required investment in a new surface mount assembly machine.

2008 to 2011 saw further development to the M850 range introducing ethernet communication, BACnet protocol, low voltage DC auxiliary supplies and DC measurement for solar power and telecommunications.

In 2012 the M850-CTE was introduced. This product uses a external three phase plug-in current transformer which connects to the meter via a RJ45 connector making the M850-CTE installation time up to 60% faster than a conventional meter and current transformer arrangement.

In 2013 further investment in a new two spindle transformer winding machine and two new DC calibration racks for calibration on the M850-MPD dc power measuring meter took place.

2014 saw the development of the C-Tran range of combined three phase current transformer and power measuring transducers.

techniCAL is the Canadian distributor for Multitek Transducers as well as other manufacturers of test, measurement, calibration, control and recording instrumentation.

Smarter. Better. *FASTER.*

Products constantly update. All specifications are subject to change without notice.
For more information on this product, please contact:

