multitek

TRANSDUCERS
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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 / Output
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

APPLICATION STANDARDS

General IEC 688 / BS 6253 / VDE / VDI 2192
Safety EN61010-1
DIN 57411 / VDE 0411
ANSI C37
Surge withstand IEC 801 / EN 55020
ANSI C37-90a
Radio screening RFI degree N complies with
VDE 0875
EMC Emissions EN61326-1
Immunity EN61326-2

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
40-20mA <0.75kOhm

Load resistance volts
(M100-VA1,VA3 only)
1, 5 & 10 volts >1 kOhm
<0.1 %

Load influence
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

U.L. Approval File No E157034

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 & 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 Approx. 0.4 kg. 55mm case
M100-AAR1 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
AC CURRENT CONNECTION
DIAGRAMS

M100-AA1

M100-AL1 / AX1 / AR1

M100-AA3

M100-AL3 / AX3

M100-AAS

M100-ALS
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)
- ± 2% (ALS)
- ± 10% (AX1, AX3, ALS)
- Span: ± 10% (AX1, AX3, AAS)
- ± 10% (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 Frequency 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 Un 57.8 <100 / 110 <600 V
Power consumption <1.5 VA (VA1, VA3)
<1 VA (VL1, VL3, VR1)
Working range 15-125% Un (VA1, VA3)
0-125% Un (VL1, VL3, VR1)
Rated Frequency 50 / 60 / 400 Hz
Frequency influence 0.005 % / Hz
Overload continuous 1.5 x Un
Overload for 1 sec. 4 x Un (VL1 VL3 VR1 )
2 x Un (VA1 VA3)

OUTPUT
Rated value mA 0-1/5/10/20mA (VA1, VA3)
Rated value mA 1/5/10 & 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)
± 2% (VR1,VL1)
± 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.

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.
TECHNICAL SPECIFICATION

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

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)
±2% (VS1)
Span ± 10% (VX1, VX3, VS1)

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-VS1 is self powered

WEIGHT & CASE SIZE
M100-VS1 Approx. 0.4 kg. 55mm case
M100-VX1 Approx. 0.7 kg. 100mm case
M100-VX3

ORDERING INFORMATION
Product Code Input Un Output Aux Freq. Option
M100-VS1 110V ± 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 than 23°C
AC VOLTAGE CONNECTION DIAGRAMS

M100-VA1 / VS1

M100-VA3

M100-VL1 / VR1 / VX1

M100-VL3 / VX3
FREQUENCY

TECHNICAL SPECIFICATION

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

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**

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<td>3 phase 3 or 4 wire balanced 2 quadrants</td>
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<td>M100-PA3</td>
<td>3 phase 3 or 4 wire balanced 4 quadrants</td>
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<td>M100-PV1</td>
<td>Single phase 4 quadrants phase angle between two voltages</td>
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**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-PV2 measures the phase angle between two voltage supplies and provides a D.C. Output signal proportional to the phase angle between the voltages.

**TECHNICAL SPECIFICATION**

**INPUT**
- Rated value In: 1 or 5 Amp C.T. connected
- Rated value Un: 0.5-10 Amp direct connected
- Power consumption: 57.8 < 600 volt
- Frequency influence: 0.005 % / Hz
- Overload continuous: 4 x In 1.5 x Un
- Overload for 1 sec.: 50 x In 2 x Un
- Measuring range: ± 45 / 60 / 90 / 180° M100-PA1
  ± 45 / 60° M100-PA2
  ± 90 / 180° M100-PA3

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

**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. 0.6 kg. 100mm case

**ORDERING INFORMATION**

M100-PA2 5Amp 400V ± 45° 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
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

M100-WA1

M100-WA2

M100-WA3

M100-WA4

M100-WA5

M100-WA6

M100-WA7
**TECHNICAL SPECIFICATION**

**INPUT**
- Rated value \( I_{\text{in}} \) 1 or 5 Amp C.T. connected
- Rated value \( U_{\text{n}} \) 57.8 < 600 volt
- Power consumption \(<1\ \text{VA}\ \text{voltage}
- \text{current}<0.2\ \text{VA}\ \text{current}
- Working range 0-125% \( U_{\text{n}} \) auxiliary powered
- 75-125% \( U_{\text{n}} \) self powered
- 0-150% \( I_{\text{n}} \)
- Rated Frequency 50 / 60 / 400 Hz
- Overload continuous 4 \( I_{\text{in}} \) 1.5 \( U_{\text{n}} \)
- Overload for 1 sec. 50 \( I_{\text{in}} \) 2 \( U_{\text{n}} \)

**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**

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
DC LINEAR INTEGRATOR

TECHNICAL SPECIFICATION

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

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: $5 \times 10^6$ (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

ORDERING INFORMATION
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

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.

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

CONNECTION DIAGRAMS

M100-DI1  M100-DI2
DC CURRENT OR VOLTAGE
4kV OR 1.5kV ISOLATION

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 ± 12 V...600 V M100-DV2 / DV2I
Impedance 10 kOhm / volt
Working range ± 125% In
Overload continuous 4 x In M100-DA1 (upto 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 & 1-5 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. 55mm case

INSULATION
M100-DA1/DV1/DV2 4kV As shown in general specification see page 3.
M100-DA1I/DV1I/DV2I Test voltage 1.5kV RMS 50Hz 1 min between input / case / output, rest of specification as shown in general specification see page 3

ORDERING INFORMATION
Product code  Input In   Output   Aux   Freq. Options
M100-DAI1   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 DIAGRAM

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 D.C. 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 A.C. or D.C. 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.
DC CURRENT OR VOLTAGE
1 INPUT 3 OUTPUTS

TECHNICAL SPECIFICATION

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

OUTPUT
Rated value mA 0-1/5/10/20 & 4-20mA
Load resistance 10/2/1/0.5 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. 100mm case

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

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

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.
DC CURRENT SUMMATION

TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>INPUT</th>
<th></th>
<th>OUTPUT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated value In</td>
<td>± 0-1mA...20mA</td>
<td>Rated value mA</td>
<td>0-1/5/10/20 &amp; 4-20mA</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>20mV</td>
<td>Load resistance</td>
<td>12/2.4/1/2/0.6 kOhm</td>
</tr>
<tr>
<td>Working range</td>
<td>±125%</td>
<td>Rated value volts</td>
<td>0-5 / 10 &amp; 1-5 V</td>
</tr>
<tr>
<td>Overload continuous</td>
<td>4 x In</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload continuous</td>
<td>1.5 x Un</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADJUSTMENT</th>
<th></th>
<th>AUXILIARY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>± 2%</td>
<td>A.C. Voltage</td>
<td>115 / 230 / 400 V (± 25% / 45-65 Hz / &lt; 2VA)</td>
</tr>
<tr>
<td>Span</td>
<td>± 10%</td>
<td>D.C. Voltage</td>
<td>24 / 48 / 110 V (± 20% / galvanically isolated / &lt;3W)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>AUXILIARY</th>
<th></th>
<th>ORDERING INFORMATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.C. Voltage</td>
<td></td>
<td>Product Code Input In Output</td>
<td></td>
</tr>
<tr>
<td>D.C. Voltage</td>
<td></td>
<td>M100-DS1</td>
<td>1mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M100-DS1</td>
<td>230V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPTIONS</th>
<th></th>
<th>OPTIONS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Non standard inputs / outputs only as far as technically acceptable.</td>
<td></td>
<td>2. A.C. Auxiliary in range 57.7 to 450 volts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Calibration at temperature other than 23°C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONNECTION DIAGRAMS</th>
<th></th>
<th>CONNECTION DIAGRAMS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M100-DS2 / DS3 / DS4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

SELECTION GUIDE

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M100-DS1</td>
<td>DC current 1 input</td>
</tr>
<tr>
<td>M100-DS2</td>
<td>DC current 2 inputs</td>
</tr>
<tr>
<td>M100-DS3</td>
<td>DC current 3 inputs</td>
</tr>
<tr>
<td>M100-DS4</td>
<td>DC current 4 inputs</td>
</tr>
</tbody>
</table>
REMOTE RESISTANCE

TECHNICAL SPECIFICATION

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

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

ADJUSTMENT
Zero 0-35%
Span 65-100%

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. 55mm case

NOTE
No isolation is provided between input and output

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.

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 DIAGRAM

M100-RPN
**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 measures 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**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>No Taps</th>
<th>Output</th>
<th>Aux.</th>
<th>Freq.</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>M100-TAP</td>
<td>10</td>
<td>5 mA</td>
<td>230V</td>
<td>50Hz</td>
<td></td>
</tr>
</tbody>
</table>

**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**

---

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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 ± 0.5%
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. 0.3 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 DIAGRAM

M100-RTD
THERMOCOUPLE TEMPERATURE

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 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.

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
NOTE
No isolation is provided between input and output

ORDERING INFORMATION

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
FREQUENCY TRANSDUCER

TECHNICAL INFORMATION

INPUT
Input range Hz 0-100Hz minimum span
Voltage range 0- volts

Input range Hz 0-10kHz maximum span
Voltage range 0- volts

Working range ± 125% Hz

Overload continuous 1.5 x Un

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. 55mm case

ORDERING INFORMATION
Product code I/P Hz I/P Un Output Aux Freq. Options
M100-FE1 600Hz 10V 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 DIAGRAM

M100-FE1
2 Wire Transmitters
AC Current

The M700 series are 2 wire transmitters. The M700-AL1 converts the A.C. Input current signal to a 4-20mA D.C. Output. The output is directly proportional to the input signal.

2 Wire transmitters like the M700-AL1, obtain the power to operate from the 4-20mA output circuit to which they are connected, and therefore require no separate auxiliary supply. The M700-AL1 is average sensing RMS calibrated current transmitter.

2 Wire transmitters have an advantage over conventional auxiliary powered transducer, because no separate auxiliary is required, savings in the cost of providing a separate auxiliary supply and wiring are made. 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.

Selection Guide
M700-AL1 2 Wire transmitter, ave. sensing. RMS calibrated.

Typical Applications
The M700 series are 2 wire transmitters.

The M700-AL1 converts the A.C. Input current signal to a 4-20mA D.C. Output. The output is directly proportional to the input signal.

2 Wire transmitters like the M700-AL1, obtain the power to operate from the 4-20mA output circuit to which they are connected, and therefore require no separate auxiliary supply. The M700-AL1 is average sensing RMS calibrated current transmitter.

2 Wire transmitters have an advantage over conventional auxiliary powered transducer, because no separate auxiliary is required, savings in the cost of providing a separate auxiliary supply and wiring are made. 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.

Technical Specification

<table>
<thead>
<tr>
<th>INPUT</th>
<th>1 or 5 Amp C.T. connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated value In</td>
<td>0.5-10 Amp direct connected</td>
</tr>
<tr>
<td>Working range</td>
<td>10-125% In</td>
</tr>
<tr>
<td>Rated Frequency</td>
<td>40-400 Hz</td>
</tr>
<tr>
<td>Frequency influence</td>
<td>0.005 % / Hz</td>
</tr>
<tr>
<td>Overload continuous</td>
<td>4 x In</td>
</tr>
<tr>
<td>Overload for 1 sec.</td>
<td>50 x In</td>
</tr>
</tbody>
</table>

| Accuracy               | 0.2%                      |
| Linearity              | <0.1%                     |
| Repeatability          | ± 0.05% of span           |
| Common mode rejection  | 130dB                     |
| Input impedance        | 0.1 Ohm                   |
| Response time          | <250mSec 0-90% at full load |

| OUTPUT                 | 4-20mA                    |
| DC current             | 24 volts (max. 35 volts)  |
| DC volt drop           | 12 volts dc max.          |
| Output load change effect | 0.1% up to RL max.      |
| Max. loop load (Ohms)  | V supply - 12V            |
|                        | 0.02                      |

| ADJUSTMENT             |                           |
| Zero                   | ± 1%                      |
| Span                   | ± 10%                     |

| Isolation              | 4kV RMS 50Hz for 1 minute |

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

| Weight & Case          |                           |
| M700-AL1               | Approx. 0.2 kg. 55mm case  |

Options
1. Calibration at temperature other than 23°C

Connection Diagram

Product Code  Input In Output Options
M700-AL1  5A  4-20mA

M700AL1
2 WIRE TRANSMITTERS
AC VOLTAGE

TECHNICAL SPECIFICATION

INPUT
- Rated value Un: 0-600 Volts AC
- Working range: 10-125% In
- Rated Frequency: 40-400 Hz
- Frequency influence: 0.005 % / Hz
- Overload continuous: 1.5 x Un
- Overload for 1 sec.: 2 x Un
- Accuracy: 0.2%
- Linearity: < 0.1%
- Repeatability: ± 0.03% of span
- Common mode rejection: 130dB
- Input impedance: 0.1 Ohm
- Response time: < 250mSec 0-90% at full load

OUTPUT
- DC current: 4-20mA
- Drive voltage: 24 volts (max. 35 volts)
- DC volt drop: 12 volts dc max.
- Output load change effect: 0.1% up to RL max.
- Max. loop load (Ohms): \( V_{\text{supply}} - 12V \)

ADJUSTMENT
- Zero: ± 1%
- Span: ± 10%

ISOLATION
- Between input & output: 4kV RMS 50Hz for 1 minute

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

WEIGHT & CASE
- M700-VL1: Approx. 0.2 kg, 55mm case

ORDERING INFORMATION
Product Code: M700-VL1
Input In: 110V
Output: 4-20mA
Options: 2 Wire transmitter, ave. sensing, RMS calibrated.

OPTIONS
1. Calibration at temperature other than 23°C

SELECTION GUIDE
M700-VL1 2 Wire transmitter, ave. sensing, RMS calibrated.

TYPICAL APPLICATIONS
The M700 series are 2 wire transmitters. The M700-VL1 converts the a.c. input voltage signal to a 4-20mA d.c. Output. The output is directly proportional to the input signal.

2 Wire transmitters like the M700-VL1, obtain the power to operate from the 4-20mA output circuit to which they are connected, and therefore require no separate auxiliary supply. The M700-VL1 is average sensing RMS calibrated current transmitter.

2 Wire transmitters have an advantage over conventional auxiliary powered transducer, because no separate auxiliary is required, savings in the cost of providing a separate auxiliary supply and wiring are made.

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.

CONNECTION DIAGRAM

M700-VL1

LOAD

25
THE MULTITEK RANGE

TRANSDUCERS, MONITORING RELAYS, DIGITAL PANEL METERS, PANEL MOUNT EARTH LEAKAGE RELAYS, PANEL MOUNT 3 PHASE CURRENT RELAYS

multitek®

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