POWER LINE TRANSDUCERS AND MULTIFUNCTION METER

Power line transucers are suitable for measuring electrical parameters like AC voltage, current, frequency, PF, KW, KVAR and also for DC signal isolation. They are best suited for MCC and PCC panels, AMF panels, SCADA systems, PLCs for data acquisition and metering.

MODELS

D2 PTV1, D2 PTC1, D3 PTF1, D5 PTA1, D5 PTW1, D5 PTW2, D5 PTW3, D1 IST1, D3 IST1, D5 IST1, F3 MFM1, D3 TTT1, D3 RET1, D3 TET1, D5 PTC1, D5 PTV1, D1 PTC3, D1 PTV3, D5 MFT1

FEATURES

- Fully solidstate electronic design.
- Rugged to withstand harsh environments
- Load independent outputs
- Galvanically isolated signals
- Accuracy class : 0.5% (Optional 0.2%)
- Self or auxiliary powered.
- CT burden : less than 0.5 VA

FUNCTIONS

- Convert high value AC signal to low value DC signals
- Inputs voltage, current, frequency, power factor, power
- Outputs DC signals single or dual (optionally 3 or 4 for Isolation transducers)

Ordering Instructions

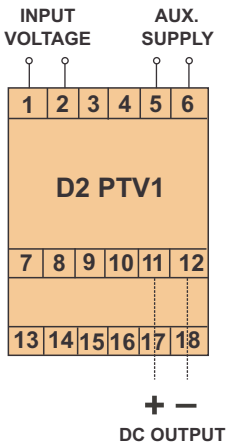
- ✓ Product Family Name
- ✓ Model Name
- ✓ System Supply Voltage
- ✓ Aux. Supply/Control supply voltage
- ✓ CT/PT Ratios
- ✓ Primary range
- ✓ Output required

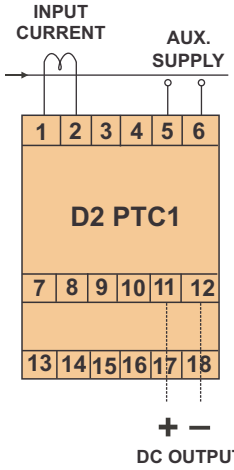
VOLTAGE, CURRENT, FREQUENCY TRANSDUCERS

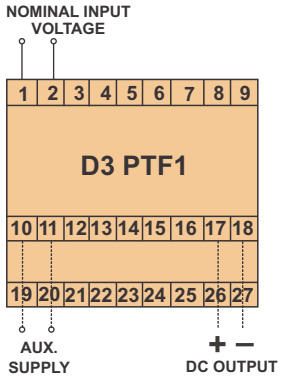
	D2 PTV1 AC Voltage Transducer	D2 PTC1 AC Current Transducer	D3 PTF1 Line Frequency Transducer
			
	Voltage transducer, Input AC voltage, Output (DC) single or dual, accuracy 0.5%	Current transducer, Input AC Current, Output (DC) single or dual, accuracy 0.5%	Frequency transducer, Output (DC) single or dual, accuracy 0.5%
Auxiliary Supply	24/48 VDC+/- 20%, 60-300 VAC / DC		24/48 VDC+/- 20%, Self Powered, 60-300 VAC/DC
Power Consumption	3.5 VA - AC, 4 VA - DC 24/48 VDC +/- 20%	3.5 VA - AC, 4 VA - DC	3.5 VA - AC, 4 VA - DC
Input Value I in	N.A.	0 -1 A AC / 0 - 5 A AC	Freq. Range 45 to 55 Hz/40-60 Hz/55-65 Hz/48-52Hz
V in	110 / 240 / 415 V	N.A.	63.5 / 110 / 240 / 415 V
DC Output (Single / Dual)	0 - 1 mA, 0 - 10 mA, 0 - 20 mA, 4 - 20 mA, 0 - 5 V, 0 - 10 V Other optional on request		
No of Signal Output	Single (Optional Dual Output)	Single (Optional Dual Output)	Single (Optional Dual Output)
Response Time		Less than 500 miliseconds	
Input / Output isolation	Galvanic	Galvanic	Galvanic
Temperature	0^0C to + 55^0C	0^0C to + 55^0C	0^0C to + 55^0C
Humidity	Up to 95% Rh non condensing	Up to 95% Rh non condensing	Up to 95% Rh non condensing
Dimensions (L x W x D) (mm)	75 x 56.5 x 117.5	75 x 56.5 x 117.5	75 x 83.5 x 117.5
Weight	440 gms	440 gms	575 gms
Operations	The input Voltage signal is scaled down through Interposing potential transformer. The scaled down signal is fed to a precision rectifier stage, its output is processed to provide DC Voltage/ Current output proportional to input AC voltage. The output signal is calibrated for RMS value.	The input current signal is scaled down through Interposing current transformer. The scaled down signal is fed to a precision rectifier stage, its output is processed to provide DC Voltage/ Current output proportional to input AC Current. The output signal is calibrated for RMS value.	The input frequency signal is scaled down through Interposing potential transformer. The scaled down signal is fed to a precision frequency to voltage Converter stage, its output is processed to provide DC Voltage/ Current proportional to Line Frequency.

Common Specifications

Output Load Resistance (Rout) For Current Output For Voltage Output	 Max. 10V/I out (Optional Max. 15V/Iout) 10 Kohm (min.)
Output Ripple	Less than 0.5% of span (peak to peak)
Auxiliary Supply Burden	Less than 4 VA
Insulation Resistance	More than 100 Mohms at 500 V DC
Zero Span Adjustment	Optionally provided
Terminals	Suitable for 2.5 sq.mm wires
Enclosure Type	ABS Plastic, Ingress Protection IP40







Note: Voltage/Current Transducer in case of dual output will come in D3 enclosure (Dimension change)

POWER TRANSDUCERS

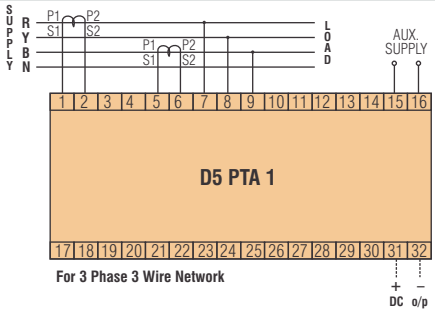
minilec®

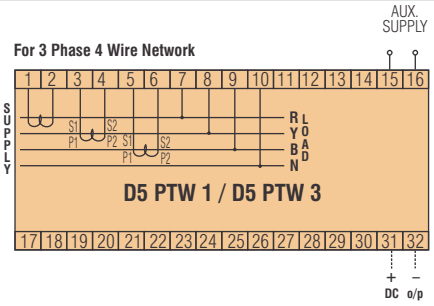
D5 PTA1 Power Factor Transducer	D5 PTW1 Active Power Transducer	D5 PTW2 Reactive Power Transducer	D5 PTW3 Apparent Power Transducer
			
Power Factor Transducer, Input 3-phase voltage & current, output Single or Dual (DC), Accuracy 0.5%	Active Power Transducer, Input 3-phase voltage & current, output Single or Dual (DC), Accuracy 0.5%	Reactive Power Transducer, Input 3-phase voltage & current, output Single or Dual (DC), Accuracy 0.5%	Apparent Power Transducer, Input 3-phase voltage & current, output Single or Dual (DC), Accuracy 0.5%
24/48 VDC+/- 20%, Self Powered, 60-300 VAC / DC			
3.5 VA - AC, 4 VA - DC	3.5 VA - AC, 4 VA - DC	3.5 VA - AC, 4 VA - DC	3.5 VA - AC, 4 VA - DC
1 A / 5 A	1 A / 5 A	1 A / 5 A	1 A / 5 A
110 / 415 V	110 / 415 V	110 / 415 V	110 / 415 V
0 - 1 mA, 0 - 10 mA, 0 - 20 mA, 4 - 20 mA, 0 - 5 V, 0 - 10 V			
Single (Optional Dual Output)	Single (Optional Dual Output)	Single (Optional Dual Output)	Single (Optional Dual Output)
Less than 500 miliseconds			
Galvanic	Galvanic	Galvanic	Galvanic
0^0C to + 55^0C	0^0C to + 55^0C	0^0C to + 55^0C	0^0C to + 55^0C
Up to 95% Rh non condensing	Up to 95% Rh non condensing	Up to 95% Rh non condensing	Up to 95% Rh non condensing
73 x 150 x 113	73 x 150 x 113	73 x 150 x 113	73 x 150 x 113
1200 gms.	1200 gms.	1200 gms.	1200 gms.

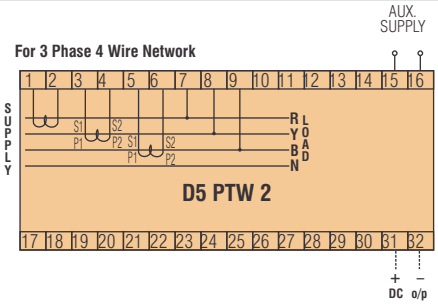
The input Voltage and current signals are scaled down through interposing and current transformers. The scaled down voltage signal proportional to vcosØ. This signal is divided by the voltage signal to get DC Voltage linearly proportional to Power Factor. This output is further processed to provide DC Voltage / Current output signal.

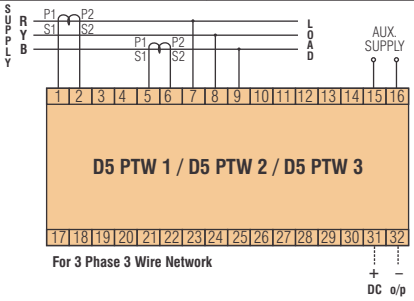
The Transducer is suitable for balanced load conditions only, when used on 3 Phase 3 Wire, 3 Phase 4 Wire electrical networks.

The input Voltage and current signals are scaled down through interposing potential and current transformer. In case of reactive transducers the voltage signals are 900 phase shifted. The scaled down signals are fed to precision multipliers working on time division multiplication principle. The multiplier output is processed to provide DC Voltage / Current output signal proportional to input active / reactive power. For Signal Phase network, only Active Power Transducer is offered. Fro 3 Phase 3 Wire or 3 Phase 4 Wire electrical networks both Active and Reactive Power Transducers are offered for balanced as well as unbalanced load conditions.

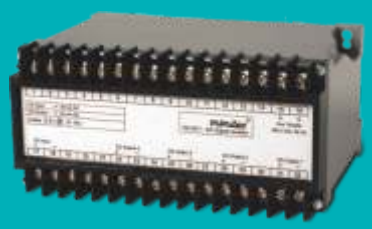








ISOLATION TRANSDUCERS

	D1 IST1 DC Signal Isolation Transducer	D3 IST1 DC Signal Isolation Transducer	D5 IST1 DC Signal Isolation Transducer
			
	Loop Powered DC Signal Isolator input & output DC signal. Single Output. Accuracy 0.2%	Signal Isolation transducer, Input & output DC signals, Single or dual outputs, accuracy 0.5%	Signal Isolation transducer, Input & output DC signals, upto 4 outputs, accuracy 0.5%
Auxiliary Supply	Looped Powdered	24/48 VDC+/- 20%, 60-300 VAC / DC	
Power Consumption		3.5 VA - AC, 4 VA - DC	3.5 VA - AC, 4 VA - DC
Input Value I in	4 - 20 mA DC Signal.	0-1, 0-5, 0-10, 0-20, 4-20mADC Signals	
V in		0-50, 0-60, 0-75, 0-100 mV DC / 0-1, 0-5, 0-10, 0-150, 0-300, 0-600 V DC	
Resistance Type	N.A.	N.A.	N.A.
DC Output (Single / Dual)	4- 20 mA DC	0 - 1 mA, 0 - 10 mA, 0 - 20 mA, 4 - 20 mA, 0 - 5 V, 0 - 10 V	
No of Signal Output	Single	Single (Optional Dual Output)	Single (Optional Dual or 3 or 4)
Response Time	Less than 100 mSec.		
Input / Output isolation	Galvanic	Galvanic	Galvanic
Temperature	0^0 C to + 55^0C	0^0 C to + 55^0C	0^0 C to + 55^0C
Humidity	Up to 95% Rh non condensing	Up to 95% Rh non condensing	Up to 95% Rh non condensing
Dimensions (L x W x D) (mm)	30 x 80 x 120	73 x 83.5 x 117.5	73 x 150 x 113
Weight	150 gms.	1200 gms.	1200 gms.

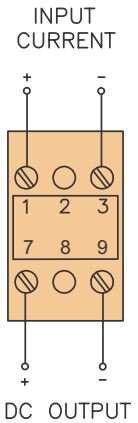
Operations

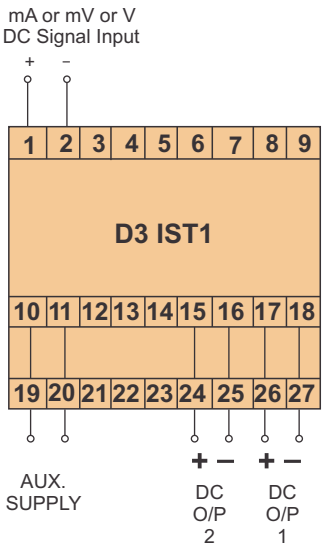
The input signal is filtered and processed to convert into a standard dc voltage. This voltage is fed to a linear optocoupler which provides the required galvanic isolation. An optical feedback is used for improved linearity, response time and temperature effects. The output from the linear optocoupler is further processed to provide dc voltage / current output.

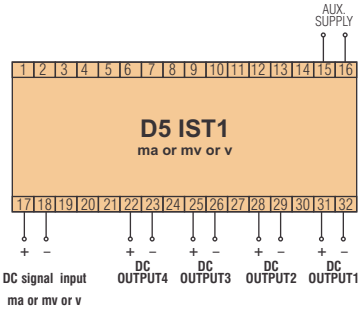
The isolator with fast response time (10 mSec) are typically used in feedback control system.

In input dc current is chopped by the chopper to convert it into high frequency ac signal. This signal is fed to an isolating high frequency transformer. The ac output current from the transformer is rectified and filtered to obtain load independent dc output current. As the transformation ratio is 1:1 the output current is identical in value to the dc input current.

D1 IST1







D3 TTT1
Transformer Tap Position Transducer

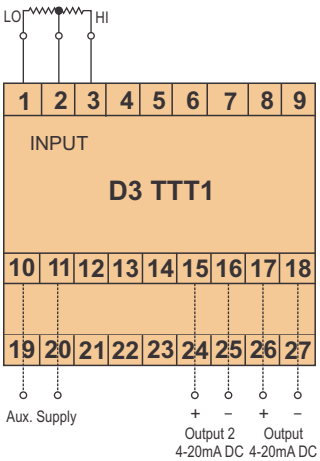
Transformer Tap Position transducer,
Input Resistance
output (DC) single or dual,
accuracy 0.5%

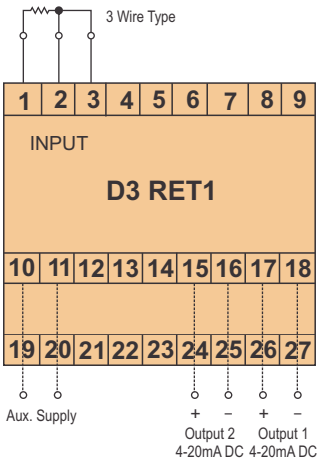
D3 RET1
Resistance Transducer

Resistance transducer,
Input 2 Wire or 3 Wire Resistance
output (DC) single or dual,
accuracy 0.5%

24/48 VDC+/- 20%, 60 – 300 VAC / DC	24/48 VDC+/- 20%, 60 – 300 VAC / DC
Less than 4 VA	Less than 4 VA
0 – 1.6 Kohm, 0 – 16 Kohm, 0 – 1.7 Kohm, 0 – 17 Kohm	As per given range, e.g. 0 - 100 Ohm, 0 - 200 Ohm, 0 - 1KOhm
-	-
3 Terminal Input	2 Wire, 3 Wire
0 – 1 mA DC, 0 – 5 mA DC, 0 – 10 mA DC, 0 – 20 mA DC, 4 – 20 mA DC, (-)20 – 0 - (+)20 mA DC, 4 – 20 mA DC, 500 Ohm (max), 0 – 5 V DC, 0 - (+)10 V DC, (-)10 – 0 - (+)10 V DC	
Single (Optional Dual Output)	Single (Optional Dual Output)
Less than 500 mSec.	Less than 500 mSec.
2 KV 50 Hz for 1 min	2 KV 50 Hz for 1 min
0 – 55 Deg. C.	0 – 55 Deg. C.
95% RH Non-condensing	95% RH Non-condensing
85 X 80 X 120	85 X 80 X 120
350 gms.	350 gms.

It is a precision grade transducer is used for galvanically isolated measurement of Transformed Tap or Resistance (2 Wire or 3 Wire). It 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 input is in the form of Resistance and provides a Stable, Ripple-Free and Optically Isolated DC load independent output in the form of current or voltage. The transducer is fully solid state. Use of latest circuit techniques and quality components ensure reliable operation over long period.



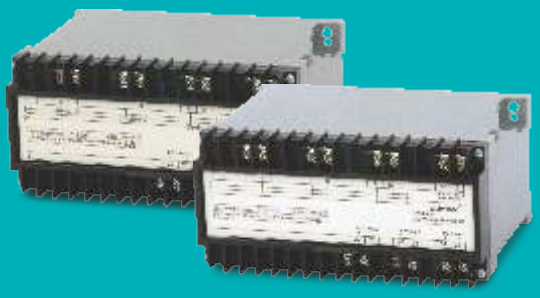


ISOLATION TRANSDUCERS

D3 TET1
Temperature Transducer

Temperature transducer,
Input PT 100,
Output (DC) single or dual,
accuracy 0.5%

D5 PTC1 / D5 PTV1
3 Phase Combined AC Current or Voltage Transducer



3 Phase Combined Current transducer, Input AC Current, Output (DC) 3 Nos., accuracy 0.5%

3 Phase Combined Voltage transducer, Input AC Voltage, Output (DC) 3 Nos., accuracy 0.5%

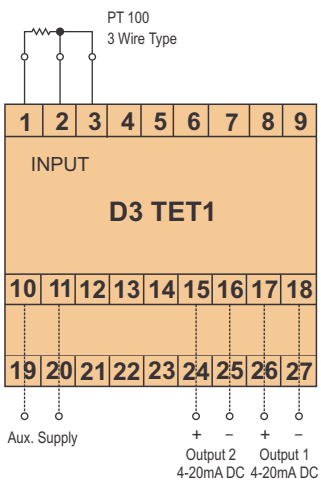
	D3 TET1	D5 PTC1 / D5 PTV1
Auxiliary Supply	24/48 VDC+/- 20%, 60 – 300 VAC / DC	24/48 VDC+/- 20%, Universal Supply 80 – 300 VAC / DC
Power Consumption	Less than 4 VA	Less than 12 VA
Sensor	P T– 100, 3 Wire Connection	N.A.
Input Value I in	N.A.	0 – 1 A / 0 – 5 A AC for D5 PTC2
V in	N.A.	0 – 150 V, 0 – 300 V, 0 – 500 V AC or any user range for D5 PTV2
Resistance Type	N.A.	N.A.
DC Output (Single / Dual)	0 – 1 mA DC,0 – 5 mA DC,0 – 10 mA DC,0 – 20 mA DC,4 – 20 mA DC,(-)20 – 0 - (+)20 mA DC,4 – 20 mA DC, 500 Ohm (max),0 – 5 V DC, 0 - (+)10 V DC,(-)10 – 0 - (+)10 V DC	
No of Signal Output	Single (Optional Dual Output)	Three Nos.
Response Time	Less than 500 mSec.	Less than 500 mSec.
Input / Output Isolation	2 KV 50 Hz for 1 min	2 KV 50 Hz for 1 min
Temperature	0 – 55 Deg.C.	0 – 55 Deg.C.
Humidity	95% RH Non-condensing	95% RH Non-condensing
Accuracy	(+/-)0.5% of Span	(+/-)0.5% of Span
Enclosure	D3	D5
Dimensions (L x W x D) (mm)	85 X 80 X 120	120 X 70 X 114
Weight	350 gms.	750 gms.

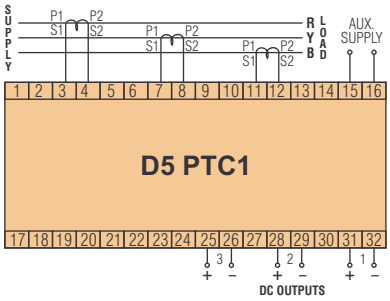
It is a precision grade transducer is used for galvanically isolated measurement of Temperature using external PT100 (RTD) Sensor 3 Wire Type. It measures temperature by measuring resistance of the PT100 Sensor. The input is in the form of Resistance and provides a Stable, Ripple-Free and Optically Isolated DC load independent output in the form of current or voltage. The transducer is fully solid state. Use of latest circuit techniques and quality components ensure reliable operation over long period.

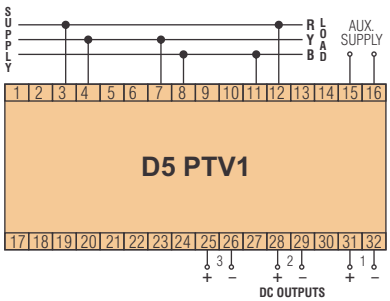
In this type of Transducer, 3 Separate Current/Voltage Transducers are combined in one enclosure. This Type of Transducer can be used to measure Voltages or Current in a 3 Phase 3 Wire or 4 Wire Electrical Network.

Advantages:

a) Reduces Wiring cost
b) Compact compared to 3 separate Transducers
c) Economical







D1 PTC3 / D1 PTV3

2 Wire Type AC Current or Voltage Transducer

2 Wire Current transducer,
Input AC Current,
Output (DC) single,
accuracy 0.5%

2 Wire Voltage transducer,
Input AC Voltage,
Output (DC) single,
accuracy 0.5%

D5 MFT1

Multifunction Transducer (Analog Outputs)

D5MFT1 is a Multifunction Power Line Transducer for simultaneous measurement of various electrical parameters of 3 Phase 3 Wire or 4 Wire electric power system. The information is available through 4 Nos. of galvanically isolated Analog Outputs and RS 485, Half Duplex Serial Communication Port over MODBUS RTU Protocol. Use of latest circuit techniques and quality components ensures reliable operation over long periods. The Transducer are widely used in application areas where accurate and reliable monitoring of powerline parameters is essential.

7.5 - 36 V DC, 2 Wire Type (Mostly 24 V DC)	18-60 V AC/DC, 65 - 300 V AC/DC
Less than 1 VA	Less than 6 VA
N.A.	N.A.
0 – 1 A / 0 – 5 A AC for D1 PTC3	1A, 5A (User Selectable)
0 – 150 V, 0 – 300 V, 0 – 500 V AC or any user range for D1 PTV3	110 V, 415 V (User Selectable)
N.A.	N.A.
4 - 20 mA DC	4 Nos. of Galvanically Isolated 4 –20 mA DC, 500 or 750 Ohm
Single	N.A.
Less than 500 mSec.	Less than 500 mSec.
2 KV 50 Hz for 1 min.	2 KV AC, 50 Hz for 1 min.
0 – 55 Deg.C.	0 – 55 Deg C.
95% RH Non-condensing	95% RH Non – Condensing
(+/-)0.5% of Span	±0.5% of Span
D1	ABS Plastic Enclosure, Ingress Protection IP40
30 X 80 X 120	120 x 70 x 114
100 gms.	750 gms.

The Transducer converts the A.C. Input current or Voltage signal to a 4-20mA D.C. Output.
The output is directly proportional to the input signal. 2 Wire Transducer obtain the power to operate from the 4-20mA output circuit to which they are connected, and therefore require no separate auxiliary supply. It is average sensing RMS calibrated current Transducer. 2 Wire Transducers 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 Transducer can be used to measure current or voltage in energy management systems, switchboards, generator and telemetery controls. Isolation of 2 KV is provided between the input and output signal, allowing the output to be fed to conventional analogue meters, digital meters, PLC, and computer systems.

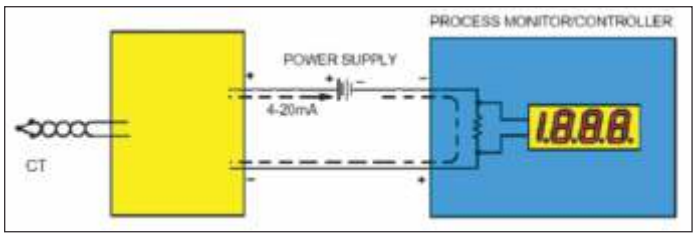
Salient Feature

- Monitoring of various electrical parameters from a Single Transducer Replaces Multiple Analog Transducers.
- Programmable CT and PT Ratio.
- Modbus RTU Communication Protocol.
- Complete galvanic isolation between Input, Output, Auxiliary Supply.
- High long term stability.
- DIN Rail, Panel Wall Mounting.

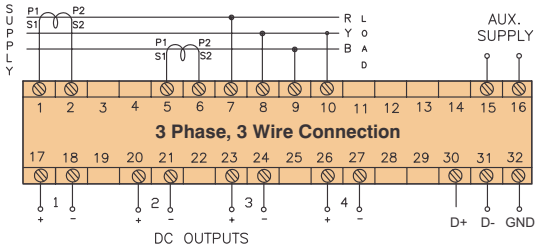
Applications

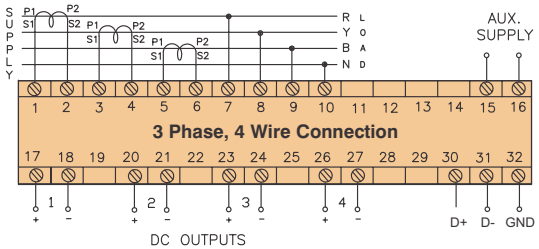
- Electrical Utility
- Motor and Power Control Circuits
- Process Monitoring and Control
- Energy Management
- Substation Monitoring
- Building Management Systems
- Standalone Or SCADA, RTU Integration
- Telemetering
- Power Generation, Transmission & Distribution
- Captive Power Plants

Wiring Diagram

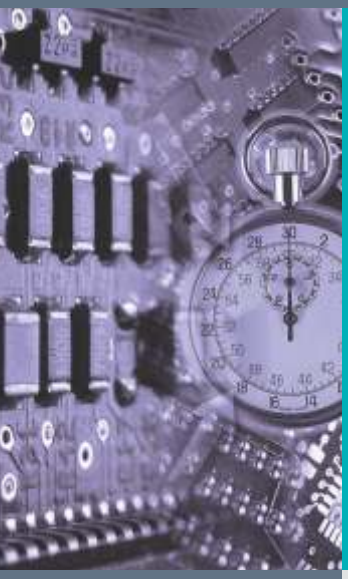


Transducer





MULTIFUNCTION METER



Minilec offers multifunction meter F3MFM1 to 4 for simultaneous measurement of various Electrical Parameters of 3 Phase 3 Wire or 4 Wire electric power system.
The Meters are widely used in application areas where accurate and reliable monitoring of Power Line parameters is essential.

Measurement	3 Phase 3 Wire or 4 Wire (User Selectable)
Input Current	0 - 120% ofthe selected range (1A,5A AC User Selectable)
Input Voltage	0 - 120% of the selected range (110 or 415 V User Selectable)
Frequency	40 - 60 Hz
Power Factor	(Lag) 0.5 -1- 0.5 (Lead)
Power	0-√3*V*I*PF
Continuous Overload	2 times for Current, 1.2 times for Voltage
Momentary Overload	40 times for Current (1 Second) 2 times for Voltage (1 Second)
Power Supply	45 - 300 V AC/DC, 18- 60 V DC Self Powered (Pl. Specify)
Burden	Less than 5 VA for Auxiliary Supply 0.5 VA for Voltage & Current
Response Time	Less than 500 mSec.
Display	3 Lines of 7 Segment 4 Digits
Keys	3 Tactile keys
Comm. Port	RS 232 or RS 485 (Optional)
Isolation	2 KV, 50 Hz for 1 min between Input, Supply & Communication Port
Insulation	100 Mohms at 500 V DC for 1 min
Environmental	0-55C. 95% RH Non-Condensing

Features

- **Accuracy Class 0.5 and 0.2%**
- **Compact and Easy Installation**
- **Programmable CT, PT Ratio**
- **Wide range of Auxiliary Power Supply 45 to 300 V (Self Powered also available)**
- **True RMS Measurement**
- **Conformity to EMI/EMC**
- **4 Quadrant Measurement**
- **Communication with PC, DCS, PLC through RS 232 or RS 485 Port**
- **Demand, Energy Parameters**
- **Password Protection**

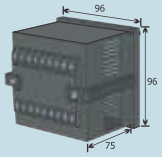
Applications

- Electrical Utility
- Control Panels
- Motor and Power Control Circuits
- Process Monitoring and Control
- Energy Management
- Substation Monitoring
- Building Management Systems
- Telemetering
- Power Generation, Transmission and Distribution
- Captive Power Plants

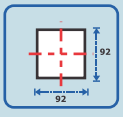
Parameters	Class 0.5	Class 0.2
Voltage Current	0.5% of Span	0.2% of Span
Frequency	0.5% of Reading	0.2% of Reading
Power Factor	0.5% of Reading	0.2% of Reading
Active Power Reactive Power Apparent Power	0.5% of Span	0.2% of Span
Active Energy Reactive Energy Apparent Energy	0.5% of Reading	0.2% of Reading

Parameters	F3 MFM2	F3 MFM3	F3 MFM4
Vpn, Vl, V2, V3	✓	✓	✓
Vpp, Vry, Vyb, Vbr	✓	✓	✓
A, Al, A2, A3	✓	✓	✓
W, Wl, W2, W3	✓	✓	✓
VAR, VAR1, VAR2, VAR3	✓	✓	✓
VA, VA1, VA2, VA3	✓	✓	✓
Frequency	✓	✓	✓
PF, PF1, PF2, PF3	✓	✓	✓
Wh, Import Wh, Export Wh		✓	✓
VARh, Import VARh, Export VARh		✓	✓
Vah		✓	✓
Demand Parameters (W/VA/A)			✓
Run, On Hours, Interruptions	✓	✓	✓
User Selectable any 10 Parameters At your End (Except Demand)		**F3 MFM1**	

Dimensional Drawing



Panel Cutout



All Dimensions in mm