

# Multi function meter Ai205



- Front panel 96x96mm..
- Communications RS485 Modbus
- Measurement of current, voltage, active, reactive apparent power, power factor, frequency and harmonic up to 31<sup>st</sup> order and etc.
- Simultaneous display 5 measurement values with 9digits energy
- Maximum Demand with Date and time stamp.
- Energy Import, Export, Total (Imp + Exp ), Net (Imp - Exp )
- Large screen LCD and clear display with backlight.
- Programmable ratios for current and voltage transformers
- Pulse output programmable
- Accuracy class 0.2%
- Digital input, Digital output, Relay limit alarm

# Multifunction Digital Meter Din panel, LCD display type



## DESCRIPTION

Ai205 is an Intelligent Power Meter are ideal choice of whenever continuous monitoring electric power system is required.

Electric power system measuring parameters such energy, demands, power quality, remote control, over range alarm, statistics and records, all these functions are only in one pocket-size unit.

Programmable set points and two assignable outputs allow control functions to be added for specific applications. This includes basic alarm on over/ under current, voltage, power, power factor, frequency, unbalance factor or demand and pulse output based on Energy or Reactive Energy. Statues monitoring is possible using the 4 switch inputs. It combines high accuracy measurement with intelligent multi-function and simple HMI interface.

The Ai205 may be used as a data gathering device for an Intelligent Power Distribution Automation System or a Plant Automation System that integrates process, instrument and electrical requirements. All monitored values are available over RS485 communication ports.

The quality of the power system is important with increasing use of electronic loads such as computers, ballasts or variable frequency drives. Ai205 power analysis option, any phase current or voltage can be measured and harmonic content calculated. Data of harmonic distribution, action can be taken to prevent overheated transformers, motors, capacitors, neutral wires and nuisance breaker trips. Redistribution, Resizing of load system or cable can be redesigned.

## FEATURES

### METERING

Voltage	V1, V2, V3, Vlnavg, V12, V23, V31, Vllavg
Current	I1, I2, I3, In, lavg
Power	P1, P2, P3, Psum
Reactive Power	Q1, Q2, Q3, Qsum
Apparent Power	S1, S2, S3, Ssum
Frequency	F
Power Factor	PF1, PF2, PF3, PF
Energy	Ep_imp, Ep_exp, Ep_total, Ep_net
Reactive Energy	Eq_imp, Eq_exp, Eq_total, Eq_net
Demand	Dmd_P, Dmd_Q, Dmd_S

### POWER QUALITY

Voltage Harmonic of V1,V2,V3 order 2<sup>nd</sup> to 31<sup>st</sup> and THD  
 Current Harmonic of I1,I2,I3 order 2<sup>nd</sup> to 31<sup>st</sup> and THD  
 Voltage Crest Factor  
 THFF (TIF) Telephone interference Factor  
 Current K Factor  
 Voltage Unbalance Factor U\_unbl  
 Current Unbalance Factor I\_unbl  
 Max/Min Statistics with Time Stamps, Event record  
 Switch Status (Digital input)

### REMOTE CONTROL

Two relay output can remote control Electric Circuit Breaker.

### COMMUNICATION

RS485 Industry standard Modbus™ protocol  
 Photo isolated 2500V rms, , 250msec response time  
 Max 4000ft. between host and meters.

## ALARMS

The limits of the less than 9 indicated parameters can be set with a specified time interval. If any input of the 9 indicated parameters is over or under its setting limit with persisting time over specified time interval, the event will be recorded with time stamps and trigger the Alarm DO output. The parameters can be any of the following 34 ones. F, V1, V2, V3, Vlnavg, V12, V23, V31, Vllavg, I1, I2, I3, lavg, In, P1, P2, P3, Psum, Q1, Q2, Q3, Qsum, S1, S2, S3, Ssum, PF1, PF2, PF3, PF, U\_unbl, I\_unbl, Dmd\_P, Dmd\_Q, Dmd\_S

## PULSE OUTPUT

Two DO outputs can be configured as Pulse output based any two of KWh, KVarh or KVAh. The Pulse width or Pulse rate is Configurable.

## DISPLAY

Hi-industrial grade level with Clear and Large character LCD Screen display with blue back light. Wide environment temperature endurable.

## DIMENSION

Small Size 96×96 DIN one piece self-contained package.

## FUNCTION AVAILABLE

		Function	Parameters	
METERING	REAL TIME MEASURING	Phase Voltage	V1,V2,V3,V-Ln-avg	
		Line Voltage	V12,V23,V31,V-LL-avg	
		Current	I1,I2,I3,In,lavg	
		Power	P1,P2,P3,Psum	
		Reactive Power	Q1,Q2,Q3,Qsum	
		Apparent Power	S1,S2,S3,Ssum	
		Power Factor	PF1,PF2,PF3,PF	
		Frequency	Frequency	
	Energy Demand	Active Energy	Imp, Exp, Total, Net	
		Reactive Energy	Imp, Exp, Total, Net	
Demand		Dmd_P, Dmd_Q, Dmd_S		
MONITORING	POWER QUALITY	Voltage Unbalance	U_unbl	*
		Current Unbalance	I_unbl	*
		Voltage THD	THD_V1,THD_V2,THD_V3	*
		Current THD	THD_I1, THD_I2, THD_I3	*
		Harmonics	V1,V2,V3 order 1 <sup>st</sup> to 31 <sup>st</sup> I1,I2,I3 order 1 <sup>st</sup> to 31 <sup>st</sup>	*
		Voltage Crest Factor	Crest Factor	*
		Telephone interference Factor	THFF	*
		TIF (Interference to		
		Current K Factor	K Factor	*
		I/O	MAX with Time Stamp	
MIN with Time Stamp			*	
Switch Status(DI)			*	
Relay Output			*	
OTHERS	ALARM	Pulse output		*
		Over/Under Alarm		*
	TIME	COMM RS485 Port	Modbus™ Protocol	
		Real Time Clock	Year, Month, date Hour, minute, Second	*

Note \* Option

- Two DI is basic feature.
- Additional 2DI is option but provided DC supply to activate signal plus two DO for pulse output and two relay alarm limit output.
- The two DO may be used as alarm or pulse output.

# Multifunction Digital Meter

## Din panel, LCD display type

### TECHNICAL DATA

METERING			
Parameter	Accuracy	Resolution	Range
Voltage	0.2%	0.1%	20V to 500KV
Current	0.2%	0.02%	0-9999 A
KW	0.5%	0.1%	-9999~9999 KW
KVar	0.5%	0.1%	-9999~9999KVar
KVA	0.5%	0.1%	0-9999KVA
KWh	0.5%	0.1KWh	0-99999999.9KWh
KVarh	0.5%	0.1%KVarh	0-99999999.9KWh
Power Factor	0.5%	0.1%	-1.0-0-1.0
Frequency	0.2%	0.01Hz	45-65Hz
Amps THD	0.5%	0.01%	0-25%
Volts THD	0.5%	0.01%	0-25%
Harmonic	0.5%	0.01%	0-25%
KW Demand	0.5%	0.1%	0-9999KW
KVar Demand	0.5%	0.1%	0-9999KVar
KVA Demand	0.5%	0.1%	0-9999KVA

### COMMUNICATION

Type: RS485 Isolated  
 Baud Rate: up to 38400 bps  
 Protocol: Modbus® RTU  
 Function: Read Write set points  
 Read actual values  
 Execute commands

### OUTPUT

#### OUTPUT RELAY

Type: Mechanical Contact  
 Contact Resistance: 30m ohm@1A  
 Max Break Voltage: 250Vac, 100Vdc  
 Max Break Current: 3A  
 Configuration: Form A  
 Contact material: Silver Alloy  
 Output Mode: Latch or Momentary  
 (50-3000ms Configurable)

#### PULSE OUTPUT

Parameters: Wh-Imp, Wh-exp, Wh-net, Wh-total,  
 Varh-Imp, Varh-exp, Varh-net,  
 Varh-total  
 Interval: 1 to 6000, steps 1x(0.1 KWh or KVarh)  
 Pulse Width: 20ms to 1000ms in steps of 20ms  
 Min Pulse Interval: 20ms

#### ALARM OUTPUT

Parameters: Frequency, Volt, Amp, W, Var, VA, PF,  
 Voltage Unbalance, Current Unbalance,  
 W-Demand, Var-Demand, VA-Demand

Time Limit: 0 to 76500ms in step of 300ms  
 Output Form: Open Collector, NO  
 Optical Isolated: 4000Vac rms  
 Max Positive Voltage: 40Vac  
 Max Negative Voltage: 6Vdc  
 Max Positive Current: 30mA

### INPUT

#### AC CURRENT

CT Input Pri/Sec: Primary 5-10000A  
 Secondary 5A Option 1A  
 Burden: 0.2VA  
 Overload: 2×CT for Continuous  
 Accuracy: 0.2%

#### AC VOLTAGE

PT Pri/Sec: Direct 100-500 Option 700V  
 Primary: ~500,000V  
 Secondary: 100-400V

Input Range: 20-500V  
 Burden: <0.2VA  
 Accuracy: 0.2%

#### SWITCH STATUS (DI)

Optical Isolated: 4000Vac RMS  
 Input Type: Wet Contact  
 Resistance: 2M ohm (Typical)  
 Input Voltage: 5-30Vdc  
 Close Contact: 5V  
 Max Input Current: 20mA

### SYSTEM

Connection: 1Ph2W, 3Ph3W, 3Ph4W

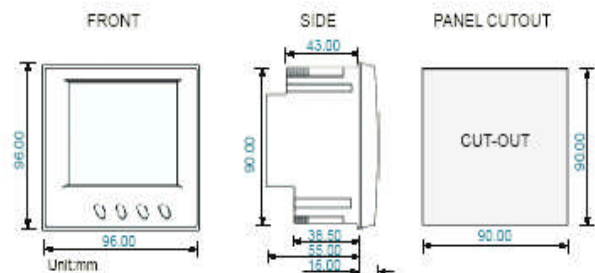
### POWER SUPPLY

Voltage: 85-264V ac 50-60Hz, 90-280V dc, 2W

### ENVIRONMENTAL

Humidity: 95% non-condensing  
 Operating Temp.: -25 °C to 70 °C  
 Storage Temp.: -40 °C to 85 °C  
 Protection: Front IP54 front panel, IP20 terminal  
 Insulation: 2500V ac input-output, 500M I/O and case  
 Standard apply: IEC870, ANSI37.90A/IEEE472 SWC surge withstand  
 Surge: 4kV surge transient protections.  
 Measuring: IEC60687, ANSI C12.16, IEC61036, IEC61268  
 Safety: IEC61557-2  
 EMC: DIN EN 50082-2, IEC61000-4/2-3-4-5-6-8-11

### DIMENSION



### ORDERING INFORMATION

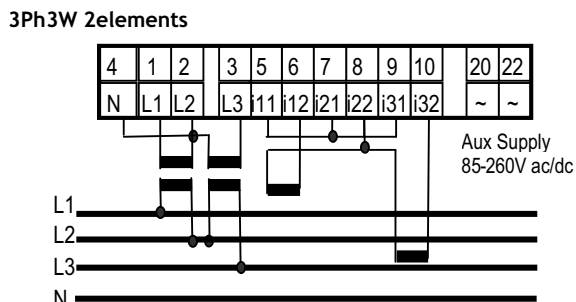
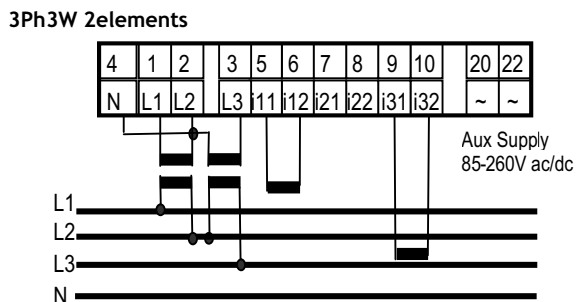
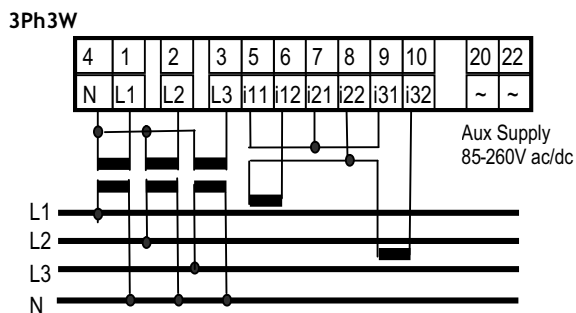
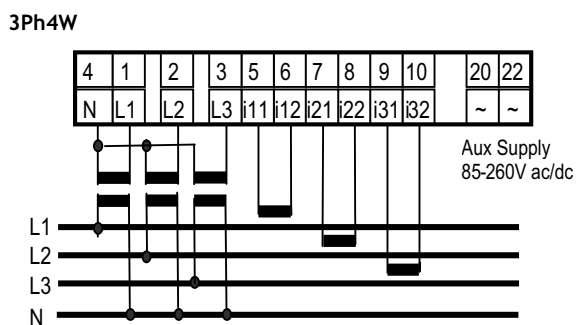
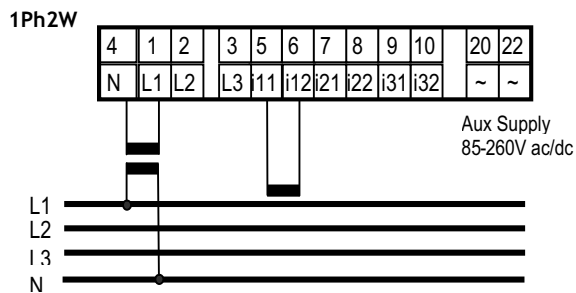
EXAMPLE Ai205 + X1 + X2 + X3 + X4  
 Ai205-A-A-P2  
 Multifunction meter Ai205 input 5A, 400V, Harmonic 2nd-31st order

X1	CT	X2	Volt	X3	Option	X4	Memory
A	5A	A	400	P0	None	M	1MB
B	1A	B	100	P1	2 Pulse		
		C	700	P2	Harmonic 2-31 order		
				P3	2Pulse, 2Relay, 4DI, Harmonic 2-31 order		

# Multifunction Digital Meter

## Din panel, LCD display type

### WIRING DIAGRAM



### OUTPUT DIAGRAM

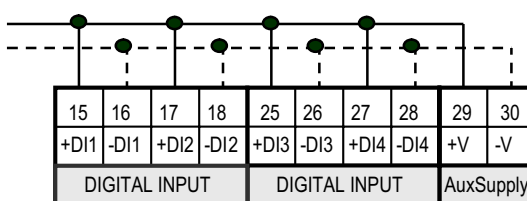
#### BASIC FEATURE

11	12	13	15	16	17	18	20	22	24
A	B	S	+DI1	-DI1	+DI2	-DI2	L	N	G
RS485			DIGITAL INPUT				SUPPLY		

#### OPTION FEATURE

25	26	27	28	29	30	31	32	33	34	35	36	37	38
+DI3	-DI3	+DI4	-DI4	+V	-V	R11	R12	R21	R22	+Do1	-Do1	+Do2	-Do2
DIGITAL INPUT				AuxSupply		RELAY OUTPUT				DIGITAL OUTPUT			

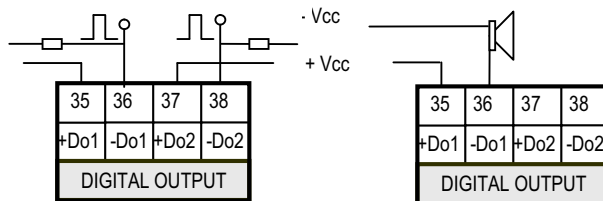
#### DIGITAL INPUT DIAGRAM WITH INTERNAL SUPPLY



#### DIGITAL OUTPUT DIAGRAM WITH INTERNAL SUPPLY

Programmable of two type

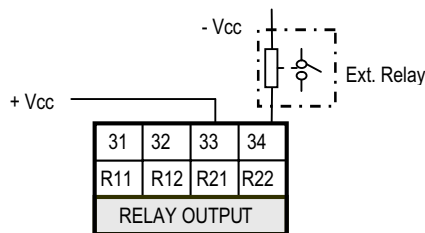
- 1) Energy pulse output, Such, DO1 set to Kwh pulse and DO2 set to Kvarh pulse. Also programmable of pulse width and pulse constant.
- 2) Alarm, with programmable of min-max, limit value, parameter, time interval and output port can be set.



#### RELAY OUTPUT (LOAD CONTROL)

2 relay option with two modes selection for relay function.

- 1) Latching mode, the relay used to output two statuses on or off.
- 2) Momentary mode, Output relay changes from off to on for a period of time T-on and then goes off. T-on can be setting from 50-300ms.



#### RS485 NETWORK

The connection from PC to meter is one by one in the RS485 net as picture and the Rt is a anti signal reflecting resistor 120-300Ω/0.25W. This resistor will put at the circuit of the last meter, if necessary.

