

ACCURA 7500

Digital Integrated Protection Relay

+High Accuracy Power Measurements





Summary

Specialized Functions for Essential Relays

Accura 7500 supports only the essential protection relay elements used in extra-high voltage and high-voltage units of general extra-high voltage consumers and can save costs by simplifying operation and configuration of the device compared to existing relays.

Convenient Structure with the Meter Separated from the Relay

Accura 7500 has a power meter completely separated from the protection relay both structurally and by design. The meter function is placed on the left-hand side of the front of the body and the protection relay function is placed on the right-hand side with each having separate control keys to preclude any human concern.

Easy Control

Accura 7500's metering function features the same control interface as Accura digital meters [3300, 3500] so a user experienced with a digital meter can easily handle it. The protection relay features Korean characters on the LCD screen so that the relay status can easily be checked and handled, and each relay element comes with an independent selection key for quick access to the configuration menu [screen].

Reliability

Accura 7500 includes a dual structure where the DSPs for the meter and the protection relay are mutually monitoring each other for any internal malfunction of the device. In addition, Accura 7500 satisfies the EMS test of IEC60255-22 and IEC61010 to guarantee the reliability and stability of the product.

Measurement Accuracy and Power Quality

Accura 7500's power meter can perform 0.2% high-accuracy measurement for voltage and current, and the power/wattage satisfies the IEC 62053-22 Class 0.5S specification, providing accurate power measurement information. In addition, it provides power quality information including voltage/current THD, harmonics analysis and k factor

Application

Extra-high voltage consumer only

Accura 7500 is a model specialized for the extra-high unit and high-voltage unit of extra-high voltage consumers. Distinguished from a conventional multi-purpose protection relay featuring various protection relay elements, Accura 7500 supports only essential protection relay elements, which enables reduction of cost by simplifying operation and configuration of the relay device.

A Power meter in a Relay Device

Accura 7500 includes a power meter completely separated from the protection relay both structurally and by design. The metering function is placed on the left-hand side of the front of the relay and the protection relay is on the right-hand side, with their functions separated for convenience of operation. This removes the burden on the user of human error when operating a product that has meter and relay functions not functionally separated.

High-Accuracy Power Measurement

For higher accuracy in measurement, Accura 7500 uses a separate measurement CT for power measurement, apart from the CT for the relay. This resolves the problem of degradation of measurement accuracy when one CT is shared by the relay and the measurement module.

True RMS Measurement robust to Harmonics

Today's power use environments are composed of non-linear loads-industrial loads, rectifiers, power electronic devices, electric furnaces, etc. that induce harmonics, causing serious distortion to voltage and current waveforms. Accura 7500 performs true RMS measurement of voltage and current waves distorted by harmonics.

Power quality analysis

Accura 7500 can analyze 2~ 31 harmonics as well as harmonic distortion factors of voltage and current, and provides K factors.

Electronic energy management with secured reliability

Management of electric energy is specified by various application services including monitoring, cost management, power demand management, power equipment replacement and electric energy plans in conjunction with upper-layer programs. Here, the most important factor determining the reliability of electric energy management data is the accuracy of measurement data. Accura 7500 provides 0.2% high-accuracy measurement of voltage and current, and the power/wattage satisfies the IEC62053-22 Class 0.5S specification, enabling the implementation of an accurate electric energy management system.

Measurement Test

IEC62053-22, Electricity Meter Equipment: active energy for Classes 0.5S

Current Range	Power Factor	Class 0.5S	Accura 7500
0.05A < I < 0.25A	1.0	±1.0%	±0.4%
0.25A < I < 10.0A	1.0	±0.5%	±0.2%
0.10A < I < 0.50A	0.5 inductive	±1.0%	±0.5%
	0.8 capacitive	±1.0%	±0.5%
0.50A < I < 10.0A	0.5 inductive	±0.6%	±0.5%
	0.8 capacitive	±0.6%	±0.5%
0.50A < I < 10.0A	0.25 inductive	±1.0%	±0.5%
	0.5 capacitive	±1.0%	±0.5%

Parameter Accuracy

Item	Display Range	Accura 7500	
Line to neutral voltage	0.0 - 9999V, kV	±0.2% Reading	
Line to line voltage	0.0 - 9999V, kV	±0.2% Reading	
Current	0.000 - 9999A	±0.2% Reading	
Power	Active	0.000 - ±9999kW, MW	
	Reactive	0.000 - ±9999kVar, MVar	±0.5% Reading
	Apparent	0.000 - 9999kVA, MVA	±0.5% Reading
Energy	Active	0 - ±999,999,999kWh	Class 0.5S
	Reactive	0 - ±999,999,999kVarh	±0.5% Reading
	Apparent	0 - 999,999,999kVAh	±0.5% Reading
Frequency	45 - 70Hz	0.01Hz Reading	
Power factor	-1.000 - 1.000	±0.5% Reading	
THD	Voltage	0.0 - 999.9%	±1.0% Full scale
	Current	0.0 - 999.9%	±1.0% Full scale
Demand	Power	0.000 - ±9999kW, MW	Class 0.5S
	Current	0.000 - 9999A, kA	±0.2%

Class 0.5S means IEC62053-22 Class 0.5S.

Harmonics Accuracy

Harmonics	Accura 7500	
	Voltage	Current
5th harmonic	±1.0%	±1.0%
7th harmonic	±1.0%	±1.0%
11th harmonic	±1.0%	±1.0%
13th harmonic	±1.0%	±1.0%
25th harmonic	±1.0%	±1.0%
31th harmonic	±1.0%	±1.0%

Voltage: 220V 50% harmonics analysis capability/ current: 5A 50% harmonics analysis capability

Reliability Test

IKEMC1120, IEC60225-22, IEC61000-4

Compliance	Criteria	Accura 7500
KEMC 1120	Digital-type protection relay	Performance, structure, various features
IEC60255-22-1	1MHz Burst Disturbance Test	2.5kV/1kV, common/differential
IEC60255-22-2	Electrostatic Discharge(ESD) Test	6kV/ 8kV, contact/ air
IEC60255-22-3	Radiated Electromagnetic Field Disturbance Test	10V/m
IEC60255-22-4	Electric Fast Transient / Burst Immunity Test	4kV
IEC60255-22-5	Surge Immunity	1kV/2kV, line to line/line to earth
IEC60255-22-6	Immunity to conducted disturbance induced by radio frequency fields	10V
IEC61000-4-8	Rated Power Frequency Magnetic Field	30A/m
IEC61000-4-11	Voltage Dip/Short Interruptions	0.5 cycle, each polarity 100%

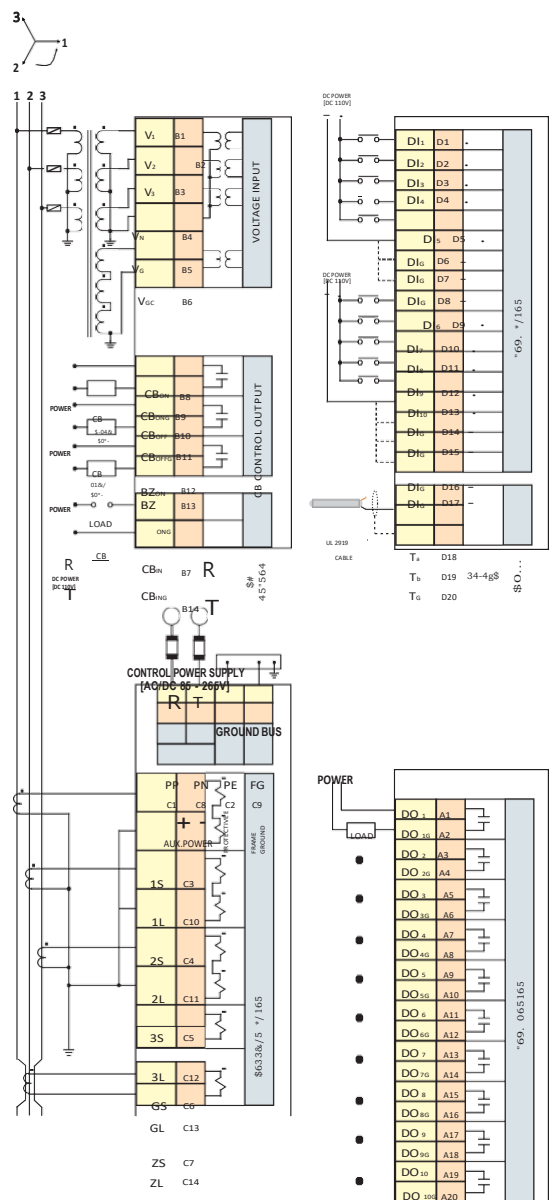
Features

Measurement Voltage, power, energy[or power factor, frequency displayed at the same time] 64 sampling/cycle True RMS measurement IEC60253-22 Class 0.5S 50/60Hz supported Periodic saving of energy[internal volatile memory] Power, energy, power factor, frequency Fundamental wave and True RMS measurement of current Quadrature energy - Received energy, delivered energy - NET energy[received energy- delivered energy] - Sum energy[received energy + delivered energy] Line to neutral voltage, line to line voltage, current Active power, reactive power, active energy, power factor, frequency Fundamental wave and True RMS measurement of current Quadrature power Demand measurement, Peak demand Maximum	Power Quality Voltage/current THD Harmonics analysis* K-Factor*
Communication RS485 port[meter rear] - Modbus RTU protocol - Communication speed : 1,200 ~ 57,600bps	Power Supply AC 85 - 265V, 50/60Hz DC 100 - 300V Power consumption: 10VA

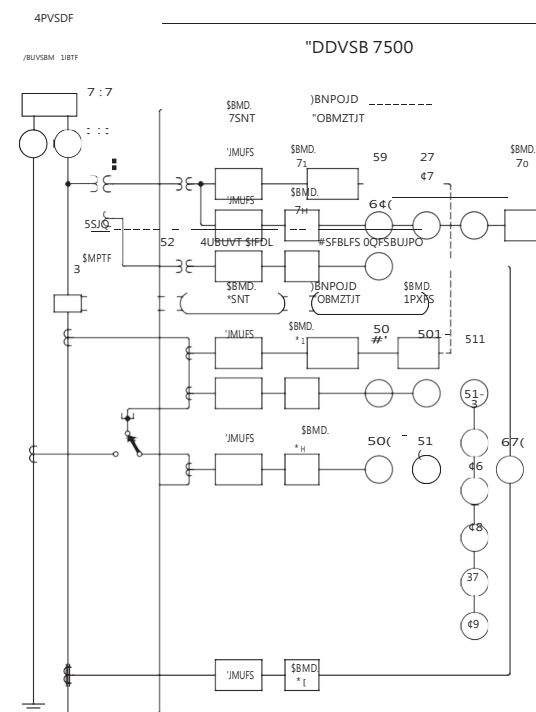
*Data acquisition is possible at RS485 communication.

Diagram

Typical Wiring Diagram: 3P3W, 3PTs/3CTs



Function Block



Digital Output Trip Relay Close Relay 10 Aux Relay	Monitor Demand Harmonic PT Failure
Digital Input CB Status 10 Digital Input ch.	Event Recorder Oscillograph
Control Cold Load Pickup Under voltage Restoration	Communication RS-485 Modbus RTU

Protection Relay

Protection	ANSI	Classification	Tap Configuration Range	Time Configuration Range	Time Feature	
Feeder	OCR	51P	Inverse time	0.50 - 12.00A/ 0.01A	0.05 - 1.20/0.01	IEC(A,B,C,L), KEPCO(NI, VI)
		50/51P	Instantaneous , definite	1.00 - 99.99A/0.01A	0.05 - 60.00sec/0.01	Definite time feature when
	OCGR	51G	Inverse time1	0.10 - 2.50A/0.01A	05 - 1.20/0.01	IEC(A,B,C,L), KEPCO(NI, VI)
			Inverse time2	0.10 - 2.50A/0.01A	0.05 - 1.20/0.01	IEC(A,B,C,L), KEPCO(NI, VI)
			Definite time	0.10 - 2.50A/0.01A	0.05 - 60.00sec/0.01	Definite time
	OCGR	50G	Instantaneous time	1.00 - 50.00A/ 0.01A	0.05sec	Instantaneous
	OVR	59P	Definite time	60 - 270V/ 1V	0.05 - 60.00sec/0.01	Definite time
			Instantaneous time	60 - 270V/ 1V	0.05sec	Instantaneous
	POR	47P	Definite time	5 - 100%/1%	0.05 - 60.00sec/0.01	Instantaneous time feature when
	UVR	27P	Definite time1	20 - 200V/ 1V	0.05 - 60.00sec/0.01	Instantaneous time feature when
			Definite time2	20 - 200V/ 1V	0.05 - 60.00sec/0.01	Instantaneous time feature when
			Definite time3	20 - 200V/ 1V	0.05 - 60.00sec/0.01	Instantaneous time feature when
	OVGR	64G	Definite time	10 - 110V/ 1A	0.05 - 60.00sec/0.01	Definite time
			Instantaneous time	10 - 110V/ 1A	0.05sec	Instantaneous
	SGR	67G	Definite time1	0.2 - 10.0mA/0.1mA	0.05 - 60.00sec/0.01	Definite time, directional MTA: 0
Definite time2			0.2 - 10.0mA/0.1mA	0.05 - 60.00sec/0.01	Definite time, directional MTA: 0	
Definite time3			0.2 - 10.0mA/0.1mA	0.05 - 60.00sec/0.01	Definite time, non-directional	
NSOCR	46	Inverse time	0.10 - 4.00A/0.01A	0.05 - 1.20/0.01	IEC(A,B,C,L), KEPCO(NI, VI)	
		Instantaneous time	0.10 - 50.00A/0.01A	0.05 - 60.00sec/0.01	Definite time feature when config	
Motor	NSOVR	47	Definite time	5 - 110V/1V	0.05 - 60.00sec/0.01	Instantaneous time feature when
	THR	49	Inverse time	0.50 - 15.00A/0.01A	1 - 60min/1min	HOT/COLD, k=1.00 - 1.50/0.01
	LOCK	51LR	Definite time	1.00 - 20.00 x motor rating/0.01	0.05 - 60.00sec/0.01	Definite time
	Starter	48	Inverse time	1.00 - 20.00 x motor rating/0.01	0.1 - 600.0sec/0.1	$I^2 \cdot T$
	UCR	37	Definite time	0.10 - 5.00A/0.01A	0.1 - 600.0sec/0.1	Definite time

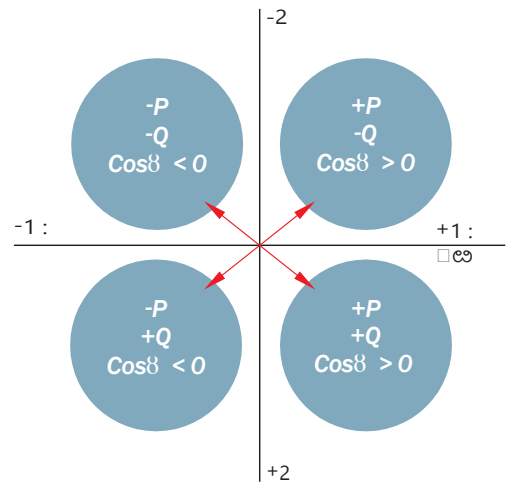
$POR\ Unbalance[\%]=[(V_{max}-V_{min})/ V_{average}] \times 100$

Measurement Elements

Parameter

Item	Real time	Average	Sum	Maximum	Minimum
Line to neutral voltage	•	•		•	•
Line to line voltage	•	•		•	•
Current	•	•		•	
Power	Active	•	•	•	
	Reactive	•	•	•	
	Apparent	•		•	
Energy	Active		•		
	Reactive		•		
	Apparent			•	
Frequency	•				
Power factor	•		•		
THD	Voltage	•			
	Current	•			
Demand	Power		•	•	
	Current	•		•	

Quadrature power



Specification

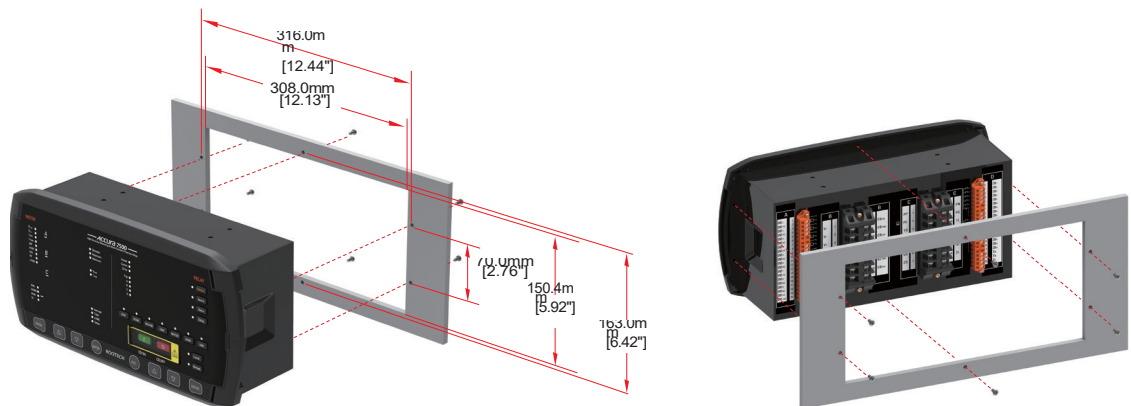
Voltage Input	
Source PT	110V - 770kV/50 - 260V
Source PT Ratio	1 - 7,000/0.01 unit adjustment
Rating frequency	50/60Hz
Burden	Less than 0.04VA/phase @ 260V
Overvoltage	Less than AC 260V[continuous], AC 2,000V[more than 1 minute]
Wiring mode	3PTs, Open-Delta
Line to Neutral Current, Neutral Current Input	
Source CT	1 - 50,000A/1 or 5A[select when ordering]
Burden	Less than 0.05VA/phase @ 5V
Overload	15A[continuous], 100A[2 seconds]
Zero Sequence Current Input	
Source ZCT	200mA/1.5mA
Burden	Less than 0.05VA/phase @ 10mA
Overload	0.1A[continuous], 10A[2 seconds]
Digital Input	
CB state input	1 channel
Digital input	7 channels
Wet contact point	DC70-125V[external supply]
Insulation	
All input/output	AC 2,500V for 1 minute
Digital Output: CB ON, CB OFF Relay	
Sort	A contact point
Contact point rating[Resistive Load]	25A @ AC 240V, 20A @ DC 30V
Contact point rating[Inductive Load $\cos\theta = 0.7$]	20A @ AC 250V[Inrush 80A]
Contact point resistance	Maximum 50m Ω
Insulation resistance	Minimum 100M Ω @ DC 500V
Digital Output: Alarm, Aux. Relay	
Sort	A contact point
Contact point rating[Resistive Load]	10A @ AC 125V, 5A @ AC 250V, 5A @ DC 30V
Maximum switching power	1,250VA, 150W
Maximum switching voltage	AC 250V, DC 110V[0.3A]
Contact point resistance	Maximum 100m Ω
Insulation resistance	Minimum 1000M Ω @ DC 500V
Operating Condition	
Operating temperature	-20 to 70°C[-4°F to 158°F]
Storage temperature	-40 to 85°C[-40°F to 185°F]
Operating humidity	5% ~ 95% non-condensing
Case	
Withdrawal method	Front withdrawal[Auto CT disconnected]
Mounting	Panel or 19" rack
Weight	4.6kg

Standard Compliance

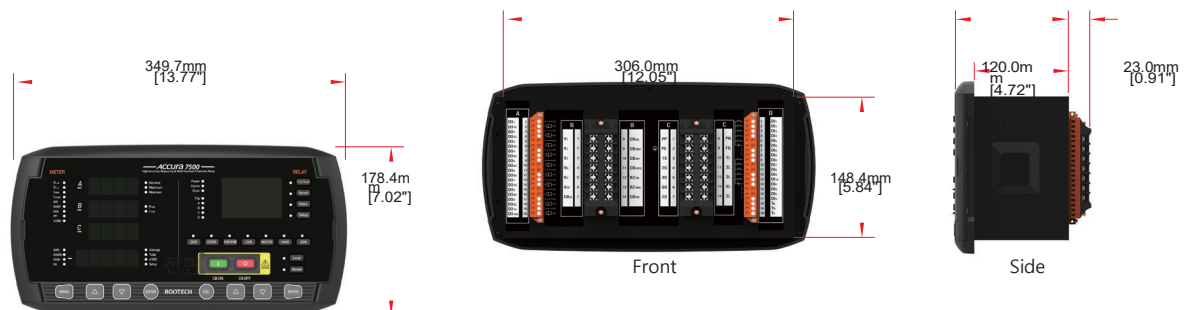
Accuracy	
IEC62053-22 Class 0.5S	
Safety	
UL61010-2, 2 nd edition[IEC61010]	
EMC	
KEMC 1120	
IEC60255-22-1	1MHz Burst Disturbance
IEC60255-22-2	Electrostatic Discharge[ESD]
IEC60255-22-3	Radiated Electromagnetic Field Disturbance
IEC60255-22-4	Electric Fast Transient/ Burst Immunity
IEC60255-22-5	Surge Immunity
IEC60255-22-6	Conducted RF Immunity
IEC61000-4-8	Rated Power Frequency Magnetic Field
IEC61000-4-12	Voltage Dip/Short Interruptions
Certification	
CE	
ISO 9001:2001[QMS-1347]	
General	
Warranty	2 years

Installation

Cutting Size/Attachment Method



Dimension



Rootech provides a total solution of electrical energy which covers both of high accuracy measurements and customer oriented contents.
Rootech has goals for pursuing happiness of human and nature on the basis of rightly understanding electrical energy.



Rootech, Inc.

102-611 Digital Empire2,
Sin won-ro, 88, Yeongtong-gu, Suwon, Gyeonggi-do, Korea
Tel. 031_695_7350 Fax. 031_695_7399
supervisor@rootech.com

www.rootech.com



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