MANUAL

SMART 7KT
Multifunction meter
7KT0307 (Single Line LED Class 1)

SMART 7KT power monitoring devices

SIEMENS

Index

SMART 7KT
Multifunction meter
7KT0307 (Single Line LED Class 1)

Manual

1. Introduction 3
2. Safety precautions 4
3. Technical specification 5
4. Installation 7
5. Connection 9
6. Configuration 11
7. Communication 16
8. Maintenance 18

09/2022
SME7KT030700

Introduction

1

1.1 Purpose of this document

This present manual describes the SMART 7KT multifunction meter.

It is intended for the use of:

- Planners
- Plant operators
- Commissioning engineers
- Service and maintenance personnel

1.2 Required basic knowledge

A general knowledge of the field of electrical engineering is required to understand this manual.

Knowledge of the relevant safety regulations and standards is required for installing and connecting the device.

1.3 Components of the product

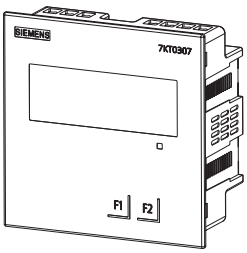
The carton for the products contain

1 SMART 7KT meter

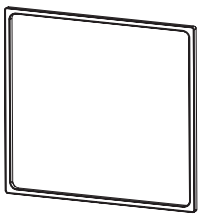
1 set of clamps (4 clamps) for mounting the meter on the panel door

1 Gasket

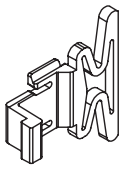
1 Operating instruction



Unit 1x nos.



Gasket 1x nos.



Sliding Clamp 4x nos.

2 Safety precautions

<table>
<tr><td rowspan="3">  </td><td colspan="3">DANGER</td></tr>
<tr><td colspan="3">Hazardous voltage will cause death or serious injury. Turn off and lock out all power supply before working on this device.</td></tr>
<tr><td>  </td><td>NOTICE
Installation and maintenance must be carried out by qualified personnel.
This product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may require to take adequate mitigation measures.
Risk of damage: Please ensure the proper isolation of meter during the IR (Meggering) test.</td><td>  </td></tr>
</table>

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument. If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

Do not use the equipment if there is any mechanical damage.

Ensure that the equipment is supplied with correct voltage.

NOTICE:

This product has been designed for environment A. Use of this product in environment B may cause unwanted electromagnetic disturbances in which case the user may require to take adequate mitigation measures.

Risk of damage: Please ensure the proper isolation of meter during the IR (Meggering) test.

CAUTION:

1. Read complete instructions prior to installation and operation of the unit.
2. Risk of electric shock.
3. The equipment in its installed state must not come in close proximity to any heating sources, oils, steam, caustic vapors or other unwanted process by products.

Technical specification

3

	7KT0307 (Single Line LED Class 1)
	Power Monitoring Device Panel instrument for std electrical values Protocol: Modbus RTU, Single line LED Display Vaux: 95V to 240V AC x/1 or 5 A, Class 1
Measurements	
measuring procedure	
• for voltage measurement	True RMS
• for current measurement	True RMS
type of measured value detection	complete
voltage curve	Sinusoidal or distorted
measurable line frequency	
• initial value	45 Hz
• full-scale value	65 Hz
operating mode for measured value detection automatic line frequency detection	Yes
Supply voltage	
design of the power supply	SMPS power supply
type of voltage of the supply voltage	AC
Degree of protection class	
protection class IP on the front	IP54
protection class IP of the terminal	IP20
Suitability	
suitability for operation	Installation in stationary panels in closed rooms
Product Functions	
product function	
• voltage measurement	Yes
• current measurement	Yes
• active power measurement	Yes
• reactive power measurement	Yes
• apparent power measurement	Yes
• power factor measurement	Yes
• frequency measurement	Yes
• apparent energy/active energy/reactive energy	Yes
Display and operation	
design of the display	LED
height of the display	22 mm
width of the display	69 mm
color of the background of the display	Black
national language on the display screen is supported	EN
number of keys	2
Fault limits	
reference condition for metering accuracy	In accordance with IEC61557-12, IEC62053-21, IEC 62053-23
formula for relative total measurement inaccuracy	
• for measured variable voltage	Class 0.5 as per IEC 61557-12
• for measured variable current	Class 0.5 as per IEC 61557-12
• for measured variable apparent power	Class 1 as per IEC 61557-12
• for measured variable active power	Class 1 as per IEC 61557-12
• for measured variable reactive power	Class 2 as per IEC 61557-12
• for measured variable power factor	Class 1 as per IEC 61557-12
• for measured variable active energy	Class 1 as per IEC 62053-21 and IEC 61557-12
• for measured variable reactive energy	Class 2 as per IEC 61557-12 and IEC 62053-23

	7KT0307 (Single Line LED Class 1)
Measuring inputs	
measurable supply voltage between L and N at AC maximum rated value	240 V
measurable supply voltage between L and N at AC	
• minimum	11 V
• maximum	300 V
measurable supply voltage between the line conductors at AC maximum rated value	415 V
measurable supply voltage between the line conductors at AC	
• minimum	19 V
• maximum	519 V
voltage measuring range extension with external voltage transformers	up to 500kV
line conductors and neutral conductors internal resistance for voltage measurement	1.12 MΩ
measuring category for voltage measurement	CAT III
measurable current	1A / 5A
relative measurable current at AC	
• minimum	1 %
• maximum	120 %
current measuring range extension with external current transformers	up to 10kA
measuring category for current measurement	CAT III
Connections	
type of electrical connection	
• at the measurement inputs for voltage	screw-type terminals
• at the measurement inputs for current	screw-type terminals
Mechanical Design	
mounting	flush panel-door mounted
size of Power Monitoring Device	size 96
height	99 mm
width	99 mm
cut-out	91.5 mm x 91.5 mm
depth	52 mm
installation depth	49 mm
net weight	228 g
mounting position	Vertical
Environmental conditions	
ambient temperature during operation	
• minimum	-10 °C
• maximum	55 °C
ambient temperature during storage	
• minimum	-20 °C
• maximum	75 °C
relative humidity at 25 °C without condensation during operation maximum	85 %
installation altitude at height above sea level maximum	2 000 m
degree of pollution	2

IEC Standards

Description	Standard
Accuracy	IEC 61557-12; IEC 62053-21 | Active Energy
EMC requirements	IEC 61326-1
Degree of protection test (IP)	IEC 60529
Safety requirements	IEC 61010-1 and IEC 61010-2-030

Certifications

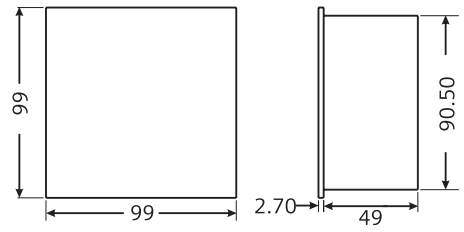
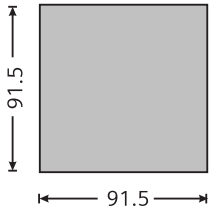
SMART 7KT multifunction meter conforms to IEC standards, IPC electronics assembly standard and

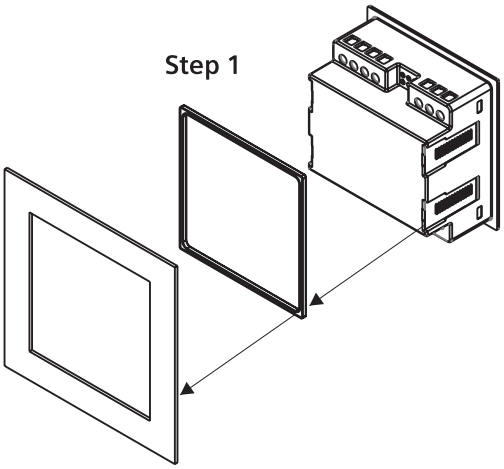
Assembly

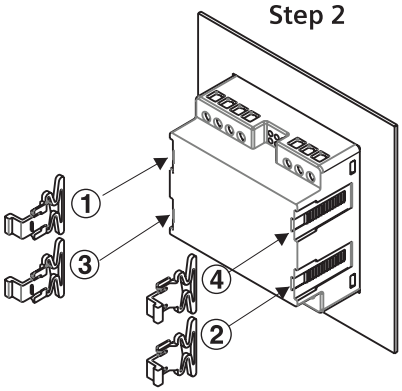
4

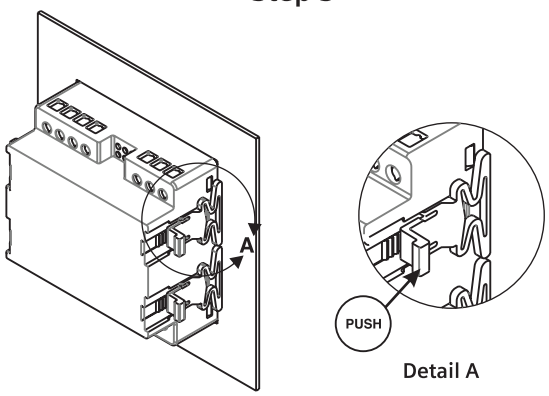
Installation

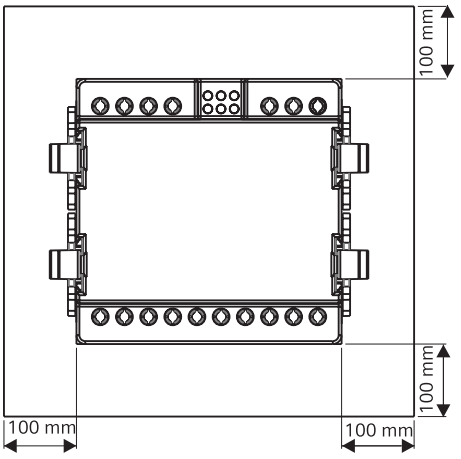
For installing the meter
Prepare the panel cutout with proper dimensions as shown below.

OUTLINE Dimensions (in mm)	PANEL CUTOUT Dimensions (in mm)
	









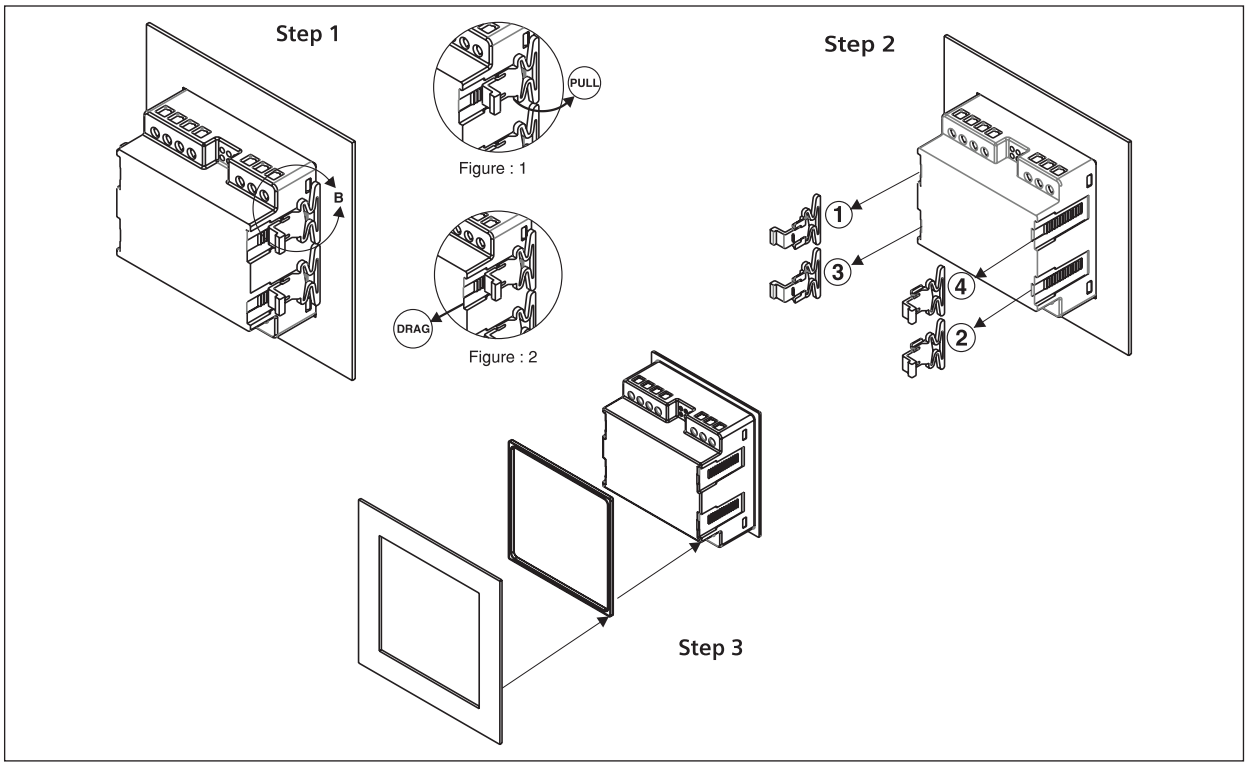
Installation Guidelines

1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
2. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.
4. Before disconnecting the secondary of the external current transformer from the equipment, make sure that the current transformer is short circuited to avoid risk of electrical shock and injury.
5. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
6. The equipment does not have a built-in-type fuse. Installation of external fuse of 0.5 A, Class gG type for electrical circuitry is highly recommended.
7. Remove the scratch-guard from the meter display during commissioning of the panel.

Wiring Guidelines

1. To prevent the risk of electric shock, power supply to the equipment must be kept OFF while doing the wiring arrangement.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.
6. Cable used for connection to power source, must have a cross-section of 1mm^2 to 2.5mm^2. These wires shall have current carrying capacity of 6A.
7. Copper cable should be used (Stranded or Single core cable).

For demounting the meter



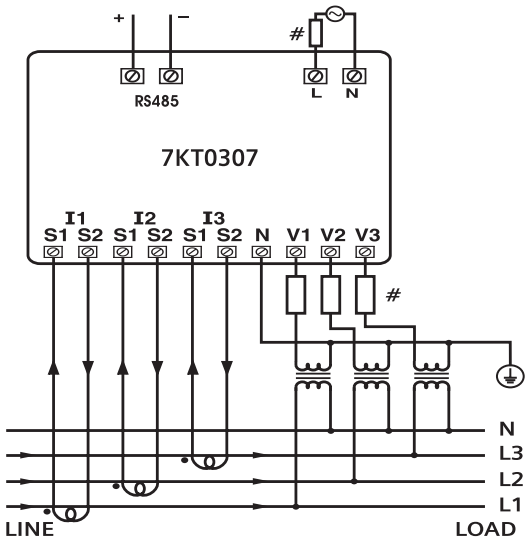
Connection

5

Typical Wiring Diagram

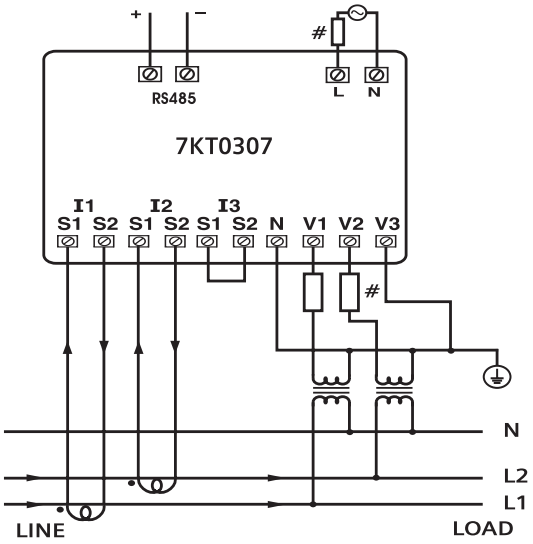
3 Phase - 4 Wire

3 Ø - 4 Wire, 3 CT's and 3 PT's



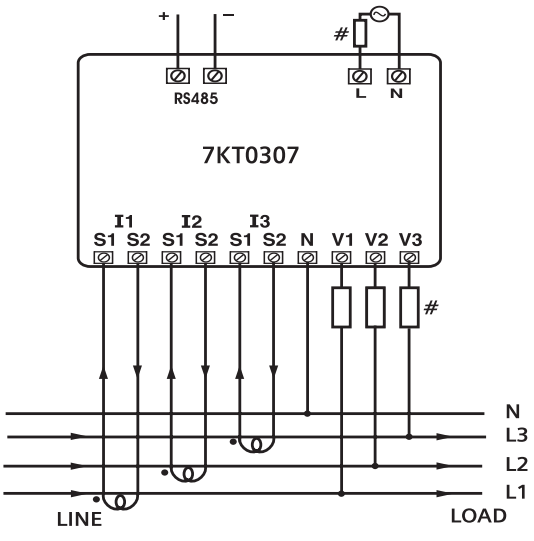
2 Phase - 3 Wire

2 Ø - 3 Wire, 2 CT's and 2 PT's



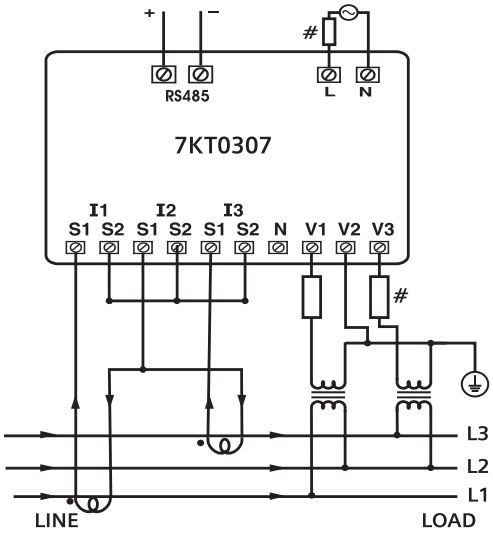
3 Phase - 4 Wire (commonly used)

3 Ø - 4 Wire, 3 CT's



3 Phase - 3 Wire

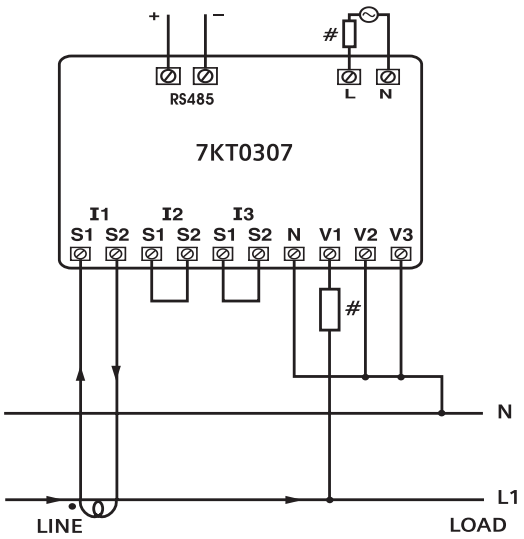
3 Ø - 3 Wire, 2 CT's and 2 PT's



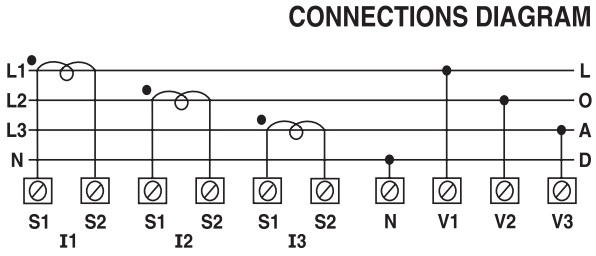
Typical Wiring Diagram (Continued)

1 Phase - 2 Wire

1 Ø - 2 Wire, 1 CT

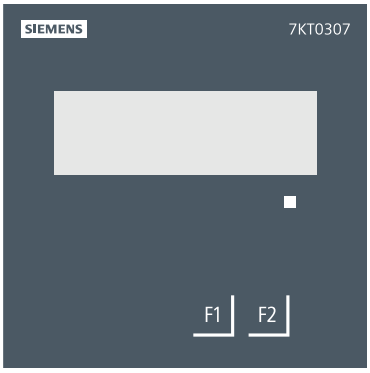


Terminal Connections



Configuration

6



There are two dedicated keys “F1” and “F2”.

Keys have multiple assignments. Function assignments and key labelling change according to the context of operator input.

For reading serial number

Touch F1 key for 3 sec. to display 8-digit serial number only for 5 sec.

The serial number will be displayed in 2 pages - 4 digits each.

Eg.: For serial number 11220002, the display will be:

Page 1: 1122

Page 2: 0002

Automatic / manual mode

Auto / Manual mode can be set in configuration setting.

By default, unit operates in automatic mode.

In automatic mode online pages scroll automatically at the rate of 5 seconds per page.

In automatic mode when any key is pressed, unit temporarily switches to manual mode and the appropriate page is displayed. If any key is not pressed for 5 sec, unit resumes automatic mode.

In manual mode, unit shows the last set page after power on.

Password to start configuration

When the meter is set to configuration mode by touching keys F1 + F2, the password page will display which shows the password 000.

Enter the password 100, which is the default password, by touching the F1 and F2 keys. The F2 key is to be used to shift into edit mode & move cursor right by one digit at a time; while the F1 key is to be used to increment the values.

To save the password touch and hold F2 for 2 sec.

Use F1 to enter and go to the next page

For the configuration setting mode

Touch and hold F1 + F2 key for 3 sec to enter and exit from configuration menu.

Use F2 key to shift the parameter in edit mode

Use F1 key to increment the parameter

Touch and hold F2 key for 2 sec to save the parameter value

Use ‘F1’ for enter & go to next page

Parameterization with function keys

Sequence	Function	Range or Selection	Factory Setting
1	Password	000 to 998	100
1.1	Change password	No / Yes	No
2	New password	000 to 998	100
3	Network selection	3P4W / 3P3W / 1P2W-R/ 1P2W-Y/ 1P2W-B	3P4W
4	CT secondary	1 / 5	5
5	CT primary	5 to 10000, if CT SEC is 5A 1 to 10000, if CT SEC is 1A	5
6	PT secondary	100 to 500	350
7	PT primary	100 to 500K	350
8	Slave ID	1 to 255	1
9	Baud Rate	300, 600, 1200, 2400, 4800, 9600 19200	9600
10	Parity	None / Even / Odd	none
11	Stop Bit	1 or 2	1
12	Demand Interval method	Sliding / Fixed	Sliding
13	Demand Interval duration	1 to 30	15
14	Demand Interval length	1 to 30	1
15	Page Scrolling	Auto/Manual	Auto
16	Factory default	Yes / No	No
17	Reset energy	Yes / No	No
17.01	Password	001 to 999	101
17.02	Reset kWh	Yes / No	No
17.03	Reset old kWh	Yes / No	No
17.04	Reset kVArh	Yes / No	No
17.05	Reset old kVArh	Yes / No	No
17.06	Reset kVAh	Yes / No	No
17.07	Reset old kVAh	Yes / No	No
17.08	Reset Max	Yes / No	No
17.09	Reset ON Hour	Yes / No	No

Network selection and wiring input	
Network selection Configuration mode	**Wiring Input**
3P4W	3P4W
3P3W	3P3W
1P2W-R	1P2W-R
1P2W-Y	1P2W-Y
1P2W-B	1P2W-B

Note: For resetting energy parameters user will be prompted to enter the password. If correct password is entered, the user will be able to reset all energy parameters. This password will be value which will be greater than the configuration password by 1.

Reading of parameters

Touch Key		Online Page Description	Touch Key		Online Page Description	Touch Key		Online Page Description
3P4W			3P3W			1P2W-R		
After Power ON	–	Displays R phase line-neutral voltage	After Power ON	–	Displays R-Y phase line-line voltage	After Power ON	–	Displays R phase line-neutral voltage
	Touch F2 1st time	Displays Y phase line-neutral voltage		Touch F2 1st time	Displays Y-B phase line-line voltage	Touch F1 Key 1st time	–	Displays R phase current
	Touch F2 2nd time	Displays B phase line-neutral voltage		Touch F2 2nd time	Displays B-R phase line-line voltage	Touch F1 Key 2nd time	–	Displays R phase power factor
	Touch F2 3rd time	Displays average of three phase line to neutral voltage		Touch F2 3rd time	Displays average of three phase line to line voltage	Touch F1 Key 3rd time	–	Displays frequency
Touch F1 Key 1st time	–	Displays R-Y phase line-line voltage	Touch F1 Key 1st time	–	Displays R phase current	Touch F1 Key 4th time	–	Displays R phase active power
	Touch F2 1st time	Displays Y-B phase line-line voltage		Touch F2 1st time	Displays Y phase current	Touch F1 Key 5th time	–	Displays R phase reactive power
	Touch F2 2nd time	Displays B-R phase line-line voltage		Touch F2 2nd time	Displays B phase current	Touch F1 Key 6th time	–	Displays R phase apparent power
	Touch F2 3rd time	Displays average of three phase line to line voltage		Touch F2 3rd time	Displays all 3 phase average current	Touch F1 Key 7th time	–	Displays unit of old total active energy for 1 sec & then displays value
Touch F1 Key 2nd time	–	Displays R phase current	Touch F1 Key 2nd time	–	Displays average of all 3 phase power factor		Touch F2 1st time	Displays unit of old total reactive energy for 1 sec & then displays value
	Touch F2 1st time	Displays Y phase current	Touch F1 Key 3rd time	–	Displays frequency		Touch F2 2nd time	Displays unit of old total apparent energy for 1 sec & then displays value
	Touch F2 2nd time	Displays B phase current	Touch F1 Key 4th time	–	Displays total active power of all three phases	Touch F1 Key 8th time	–	Displays import active energy of 1st phase
	Touch F2 3rd time	Displays all 3 phase average current	Touch F1 Key 5th time	–	Displays total reactive power of all three phases		Touch F2 1st time	Displays export active energy of 1st phase
Touch F1 Key 3rd time	–	Displays R phase power factor	Touch F1 Key 6th time	–	Displays total apparent power of all three phases		Touch F2 2nd time	Displays total active energy (import & export)
	Touch F2 1st time	Displays Y phase power factor	Touch F1 Key 7th time	–	Displays unit of old total active energy for 1 sec & then displays value	Touch F1 Key 09th time	–	Displays import reactive energy of 1st phase
	Touch F2 2nd time	Displays B phase power factor	Touch F1 Key 8th time	–	Displays total active energy (import & export)		Touch F2 1st time	Displays export reactive energy of 1st phase
	Touch F2 3rd time	Displays average of all 3 phase power factor	Touch F1 Key 9th time	–	Displays total reactive energy (IMP + EXP)		Touch F2 2nd time	Displays total reactive energy (IMP + EXP)
Touch F1 Key 4th time	–	Displays frequency	Touch F1 Key 10th time	–	Displays total Apparent energy of three phase	Touch F1 Key 10th time	–	Displays R phase Apparent energy

Reading of parameters (Continued)

Touch Key		Online Page Description	Touch Key		Online Page Description	Touch Key		Online Page Description
3P4W			3P3W			1P2W-R		
Touch F1 Key 5th time	–	Displays R phase active power	Touch F1 Key 11th time	–	Displays max demand of total active power	Touch F1 Key 11th time	–	Displays R phase Max Demand of current
	Touch F2 1st time	Displays Y phase active power		Touch F2 1st time	Displays max demand of total reactive power	Touch F1 Key 12th time	–	Displays max demand of total active power
	Touch F2 2nd time	Displays B phase active power		Touch F2 2nd time	Displays max demand of total apparent power		Touch F2 1st time	Displays max demand of total reactive power
	Touch F2 3rd time	Displays total active power of all three phases	Touch F1 Key 12th time	–	On hr		Touch F2 2nd time	Displays max demand of total apparent power
Touch F1 Key 6th time	–	Displays R phase reactive power				Touch F1 Key 13th time	F1	On hr
	Touch F2 1st time	Displays Y phase reactive power						
	Touch F2 2nd time	Displays B phase reactive power						
	Touch F2 3rd time	Displays total reactive power of all three phases						
Touch F1 Key 7th time	–	Displays R phase apparent power						
	Touch F2 1st time	Displays Y phase apparent power						
	Touch F2 2nd time	Displays B phase apparent power						
	Touch F2 3rd time	Displays total apparent power of all three phases						
Touch F1 Key 8th time	–	Displays unit of old total active energy for 1 sec & then displays value						
	Touch F2 1st time	Displays unit of old total reactive energy for 1 sec & then displays value						
	Touch F2 2nd time	Displays unit of old total apparent energy for 1 sec & then displays value						
Touch F1 Key 9th time	–	Displays import active energy of 1st phase						
	Touch F2 1st time	Displays import active energy of 2nd phase						
	Touch F2 2nd time	Displays import active energy of 3rd phase						
	Touch F2 3rd time	Displays export active energy of 1st phase						
	Touch F2 4th time	Displays export active energy of 2nd phase						
	Touch F2 5th time	Displays export active energy of 3rd phase						
	Touch F2 6th time	Displays total import active energy						
	Touch F2 7th time	Displays total export active energy						
	Touch F2 8th time	Displays total active energy (import & export)						

Reading of parameters (Continued)

Touch Key		Online Page Description	Touch Key		Online Page Description	Touch Key		Online Page Description
3P4W			3P3W			1P2W-R		
Touch F1 Key 10th time	–	Displays import reactive energy of 1st phase						
	Touch F2 1st time	Displays import reactive energy of 2nd phase						
	Touch F2 2nd time	Displays import reactive energy of 3rd phase						
	Touch F2 3rd time	Displays export reactive energy of 1st phase						
	Touch F2 4th time	Displays export reactive energy of 2nd phase						
	Touch F2 5th time	Displays export reactive energy of 3rd phase						
	Touch F2 6th time	Displays total import reactive energy						
	Touch F2 7th time	Displays total export reactive energy						
	Touch F2 8th time	Displays total reactive energy (IMP + EXP)						
Touch F1 Key 11th time	–	Displays R phase Apparent energy						
	Touch F2 1st time	Displays Y phase Apparent energy						
	Touch F2 2nd time	Displays B phase Apparent energy						
	Touch F2 3rd time	Displays total Apparent energy of three phase						
Touch F1 Key 12th time	–	Displays R phase Max Demand of current						
	Touch F2 1st time	Displays Y phase Max Demand of current						
	Touch F2 2nd time	Displays B phase Max Demand of current						
	Touch F2 3rd time	Displays of average Max demand current of three phases						
Touch F1 Key 13th time	–	Displays max demand of total active power						
	Touch F2 1st time	Displays max demand of total reactive power						
	Touch F2 2nd time	Displays max demand of total apparent power						
Touch F1 Key 14th time	F1	On hr						

Communication 7

Protocol and interface

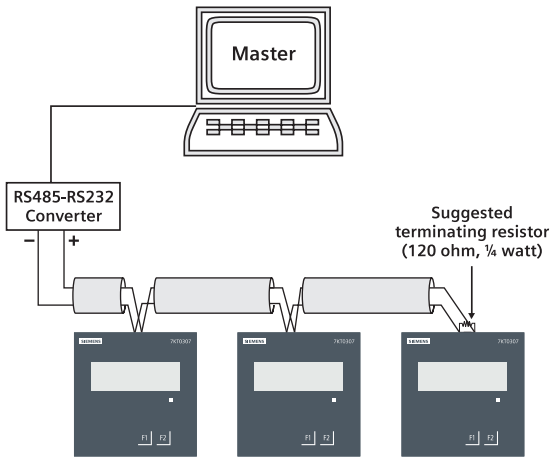
Protocol: Modbus RTU

Interface: Integrated RS485 interface

Communication parameters

Communication address	1 to 255
Transmission mode	Half duplex
Data types	Float and Integer
Transmission distance	500m maximum
Transmission Speed	300, 600, 1200, 2400, 4800, 9600, 19200 (in bps)
Parity	None, Odd, Even
Stop bits	1 or 2
Response Time	100ms Max & Independent, at Baud rate

Connection diagram for communication



Contact sales for PC based monitoring software to communicate with the meters.

Modbus register addresses list

Readable Parameters: Length Register: 2, Data Structure: Float

Address	Hex Address	Parameter
30000	0x00	Voltage V1N
30002	0x02	Voltage V2N
30004	0x04	Voltage V3N
30006	0x06	Average Vtg L-N
30008	0x08	Voltage V12
30010	0x0A	Voltage V23
30012	0x0C	Voltage V31
30014	0x0E	Average Vtg L-L
30016	0X10	Current I1
30018	0x12	Current I2
30020	0x14	Current I3
30022	0x16	Average Current
30024	0x18	kW1
30026	0x1A	kW2
30028	0x1C	kW3
30030	0x1E	kVA1
30032	0x20	kVA2
30034	0x22	kVA3

Address	Hex Address	Parameter
30036	0x24	kVAr1
30038	0x26	kVAr2
30040	0x28	kVAr3
30042	0x2A	Total kW
30044	0x2C	Total kVA
30046	0x2E	Total kVAr
30048	0x30	PF1
30050	0x32	PF2
30052	0x34	PF3
30054	0x36	Average PF
30056	0x38	Frequency
30058	0x3A	Total kWh
30060	0x3C	Total kVAh
30062	0x3E	Total kVArh
30064	0x40	Active power max demand
30068	0x44	Reactive power max demand
30070	0x48	Apparent power max demand
30082	0x50	On hour

Modbus register addresses list (Continued)

Address	Hex Address	Parameter
30084	0x54	Import kWh1
30086	0x56	Import kWh2
30088	0x58	Import kWh3
30090	0x5A	Export kWh1
30092	0x5C	Export kWh2
30094	0x5E	Export kWh3
30096	0x60	Total Import kWh
30098	0x62	Total Export kWh
30100	0x64	Import kVArh1
30102	0x66	Import kVArh2
30104	0x68	Import kVArh3
30106	0x6A	Export kVArh1
30108	0x6C	Export kVArh2
30110	0x6E	Export kVArh3

Address	Hex Address	Parameter
30112	0x70	Total Import kVArh
30114	0x72	Total Export kVArh
30116	0x74	kVAh1
30118	0x76	kVAh2
30120	0x78	kVAh3
30684	0x2AC	Serial no. (Data Structure: Hex)
30692	0x2B4	Max I1 Demand
30694	0x2B6	Max I2 Demand
30696	0x2B8	Max I3 Demand
30698	0x2BA	Max avg. I demand
30718	0x2D0	Active energy old
30720	0x2D2	Reactive energy old
30722	0x2D4	Apparent energy old

Readable/ Writable Parameter: [Length (Register)]: 1; Data Structure: Integer

Address	Hex Address	Parameter
40000	0x00	PASSWORD
40001	0x01	N/W SELECTION
40002	0x02	CT Secondary
40003	0x03	CT Primary (CT Secondary = 5) CT Primary (CT Secondary = 1)
40004	0x04	PT Secondary
40005	0x05	PT Primary
40007	0x07	Slave Id
40008	0x08	Baud Rate
40009	0x09	Parity
40010	0x0A	Stop Bit
40011	0x0B	Backlight Off

Address	Hex Address	Parameter
40012	0x0C	Factory Default
40013	0x0D	Reset Active Energy
40014	0x0E	Reset Apparent Energy
40015	0x0F	Reset Reactive Energy
40034	0x22	Demand interval Method
40035	0x23	Demand interval length
40036	0x24	Demand interval Duration
40039	0X27	Reset Max Demand
40042	0x2A	Run hour
40043		Mode Scroll
40070	0x46	Endianness Selection

Maintenance

8

Guidelines

- The equipment should be cleaned regularly to avoid blockage of ventilating parts.
- Clean the equipment with a clean dry or damp cloth. Do not use any cleaning agent other than water.

Disposal and recycling

Dispose of or recycle the module in accordance with the applicable laws and regulations in your country.

These instructions do not purport to cover all details or variations in equipment, or to provide for every possible contingency in connection with installation, operation, or maintenance. Should additional information be desired, please contact the local Siemens sales office. The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment, or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

Customer Care Toll free no. 1800 209 0987 Email: ics.india@siemens.com

Siemens Ltd.

S18490