DTSD545 Three Phase CT Operated Smart Meter
Technical brochure

Holley Technology LTD.

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DTSD545 Three Phase CT Operated Smart Meter Technical Specification
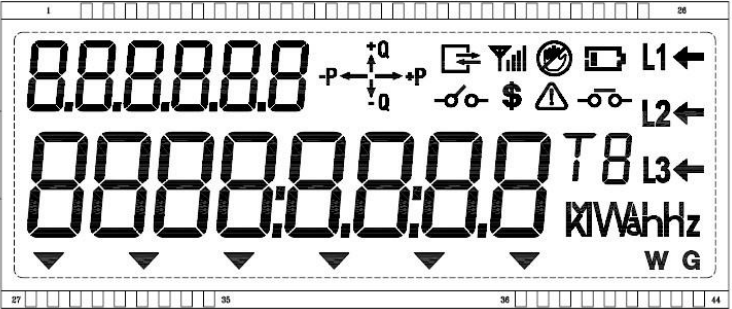
1.1 DTSD545 Three Phase CT operated Smart Meter Specification

1.1.1 Specification

Item	Sub-item	Parameter
Basic	Meter Type	Three-Phase Four-wire CT Operated Type
	Measure	Three element
	Active Accuracy	Class B (EN 50470-3), Class 1(IEC 62053-21)
	Reactive Energy	Class 2 (IEC 62053-23)
	Rated voltage Un	3x 230/400 V Extended operating voltage range: 0.4Un~1.2Un(92V ~ 276V)
	Operating frequency	50Hz Extendedoperating frequency range:± 2%
	Measuring current (A)	5(10)A
	Starting current	0.002Ib
	Pulse constant	10000 imp/kWh 10000 imp/kvarh
	Power consumption	Current circuit power consumption≦0.5VA Voltage circuit power consumption≦2W/5VA
	Temperature range	limit operation range for indoor meters: -40°C to +70°C
	Relative humidity	5%~95%
Measurement	Active Energy	Total Active Energy(import)= 　　　$\lvert+A1\rvert+\lvert+A2\rvert+\lvert+A3\rvert+\lvert-A1\rvert+\lvert-A2\rvert+\lvert-A3\rvert$(default) Or　　$\lvert+A1\rvert+\lvert+A2\rvert+\lvert+A3\rvert$ Total Active Energy(export) = $\lvert-A1\rvert+\lvert-A2\rvert+\lvert-A3\rvert$ Import active energy for each phase $\lvert+A1\rvert/\lvert+A2\rvert/\lvert+A3\rvert$ Export active energy for each phase $\lvert-A1\rvert/\lvert-A2\rvert/\lvert-A3\rvert$
	Apparent Energy	Total Apparent Energy (import) = 　　　$\lvert+A1\rvert+\lvert+A2\rvert+\lvert+A3\rvert+\lvert-A1\rvert+\lvert-A2\rvert+\lvert-A3\rvert$(default) Or　　$\lvert+A1\rvert+\lvert+A2\rvert+\lvert+A3\rvert$

		Total Apparent Energy(export) =|-A1|+|-A2|+|-A3| Apparent Energy (import) per each phase Apparent Energy(export) per each phase
	Reactive Energy	Total Reactive Energy (import)=|+Ri|+|+Rc| Total Reactive Energy (export)=|-Ri|+|-Rc| (The +Ri is 1stquadrant reactive, the +Rc is 2ndquadrant reactive, the -Ri is 3rd quadrant reactive, the -Rc is 4th quadrant reactive) Reactive Energy (import) per each phase Reactive Energy (export) per each phase
	Instantaneous	A/B/C phase Voltage(V) A/B/C phase Current(A) A/B/C phase Active power(kW) A/B/C phase Reactive power(kvar) A/B/C phase Apparent power(kVA) A/B/C phase Power factor Frequency
Communication	Local Comm. Port1	1 Optical port (IEC62056-21)
	Port1 Protocol	IEC62056-21 E mode(DLMS)
	Local Comm. Port2	RS485 (optional, for IHD)
	Port2 Protocol	DLMS HDLC
	Remote Comm. Port3	4G/3G/2G M2M modem, Module can plug-in/plug-out
	Port3 Protocol	DLMS TCP/IP
TOU	TOU	- Up to 6 tariff - 12 day profiles table (10 time span per day profile) - 12 week profiles table (7 typical days per week profile) - 12 Season profiles table (1 typical weeks per season profile) - 100 definable special days

	RTC	≤0.5s/day (in 23°C)
	DST	Support
	Backup battery	Replaceable battery for RTC when power outage. Operating for at least 3 years in case of any power failure
	Time synchronization	Through central system and local communication
LED &Display	LED	1 Active pulse indicate 1 Reactive pulse indicate 1 Alarm LED indicate
	LCD	Size of LCD: more than 20cm^2 The min size of each digit 0.6cm x 1.20cm(width x height) View angle:15° upward directions and 30° in other directions Distance of display image area :approx.1 meter
	LCD display when power outage	Configurable
	Energy value display	Active Energy: 6+2 display(default) Reactive Energy: 6+2 display Can Select 5+3/6+2/7+1/8+0
	Instantaneous value display	Power: 2+4 display Voltage:4+2 display Current:4+2 display Frequency:2+2 display Power Factor:1+3 display
	Display Mode	Scroll mode: Display scroll time defultis 10 seconds(can be setted:1-99s).

		Manual operating mode: Push button Power-off display mode: LCD displays nothing, after button pressing, it can stay 60s
	Display content	Display contents as follow (configurable, support 48 display items): - Display test - (1.8.0) Total import active energy - (1.8.1) tariff1 import active energy - (1.8.2) tariff2 import active energy - (1.8.3) tariff3 import active energy - (1.8.4) tariff4 import active energy - (1.8.5) tariff5 import active energy - (1.8.6) tariff6 import active energy - (2.8.0) Total export active energy - (2.8.1) tariff1 export active energy - (2.8.2) tariff2 export active energy - (2.8.3) tariff3 export active energy - (2.8.4) tariff4 export active energy - (2.8.5) tariff5 export active energy - (2.8.6) tariff6 export active energy - (3.8.0) Total import reactive energy - (3.8.1) tariff1 import reactive energy - (3.8.2) tariff2 import reactive energy - (3.8.3) tariff3 import reactive energy - (3.8.4) tariff4 import reactive energy - (3.8.5) tariff5 import reactive energy - (3.8.6) tariff6 import reactive energy - (4.8.0) Total export reactive energy - (4.8.1) tariff1 export reactive energy - (4.8.2) tariff2 export reactive energy - (4.8.3) tariff3 export reactive energy - (4.8.4) tariff4 export reactive energy - (4.8.5) tariff5 export reactive energy - (4.8.6) tariff6 export reactive energy - (9.8.0) Total import apparent energy - (9.8.1) tariff1 import apparent energy - (9.8.2) tariff2 import apparent energy

| | | - (9.8.3) tariff3 import apparent energy |
		- (9.8.4) tariff4 import apparent energy
		- (9.8.5) tariff5 import apparent energy
		- (9.8.6) tariff6 import apparent energy
		- (10.8.0) Total export apparent energy
		- (10.8.1) tariff1 export apparent energy
		- (10.8.2) tariff2 export apparent energy
		- (10.8.3) tariff3 export apparent energy
		- (10.8.4) tariff4 export apparent energy
		- (10.8.5) tariff5 export apparent energy
		- (10.8.6) tariff6 export apparent energy
		- (5.8.0) Total quadrant1 reactive energy
		- (6.8.0) Total quadrant2 reactive energy
		- (7.8.0) Total quadrant3 reactive energy
		- (8.8.0) Total quadrant4 reactive energy
		- (1.6.0) Total import active MD and happen time
		- (1.6.1) Tariff1 import active MD and happen time
		- (1.6.2) Tariff2 import active MD and happen time
		- (1.6.3) Tariff3 import active MD and happen time
		- (1.6.4) Tariff4 import active MD and happen time
		- (1.6.5) Tariff5 import active MD and happen time
		- (1.6.6) Tariff6 import active MD and happen time
		- (2.6.0) Total export active MD and happen time
		- (2.6.1) Tariff1 export active MD and happen time
		- (2.6.2) Tariff2 export active MD and happen time
		- (2.6.3) Tariff3 export active MD and happen time
		- (2.6.4) Tariff4 export active MD and happen time
		- (2.6.5) Tariff5 export active MD and happen time
		- (2.6.6) Tariff6 export active MD and happen time
		- (3.6.0) Total import reactive MD and happen time
		- (3.6.1) Tariff1 import reactive MD and happen time
		- (3.6.2) Tariff2 import reactive MD and happen time
		- (3.6.3) Tariff3 import reactive MD and happen time
		- (3.6.4) Tariff4 import reactive MD and happen time
		- (3.6.5) Tariff5 import reactive MD and happen time
		- (3.6.6) Tariff6 import reactive MD and happen time
		- (4.6.0) Total export reactive MD and happen time

- (4.6.1) Tariff1 export reactive MD and happen time
- (4.6.2) Tariff2 export reactive MD and happen time
- (4.6.3) Tariff3 export reactive MD and happen time
- (4.6.4) Tariff4 export reactive MD and happen time
- (4.6.5) Tariff5 export reactive MD and happen time
- (4.6.6) Tariff6 export reactive MD and happen time
- (9.6.0) Total import apparent MD and happen time
- (9.6.1) Tariff1 import apparent MD and happen time
- (9.6.2) Tariff2 import apparent MD and happen time
- (9.6.3) Tariff3 import apparent MD and happen time
- (9.6.4) Tariff4 import apparent MD and happen time
- (9.6.5) Tariff5 import apparent MD and happen time
- (9.6.6) Tariff6 import apparent MD and happen time
- (10.6.0) Total export apparent MD and happen time
- (10.6.1)Tariff1 export apparent MD and happen time
- (10.6.2)Tariff2 export apparent MD and happen time
- (10.6.3)Tariff3 export apparent MD and happen time
- (10.6.4)Tariff4 export apparent MD and happen time
- (10.6.5)Tariff5 export apparent MD and happen time
- (10.6.6)Tariff6 export apparent MD and happen time
- (1.6.0.1) Last one month of total active MD and happen time
- (1.6.1.1) Last one month of tariff1 active MD and happen time
- (1.6.2.1) Last one month of tariff2 active MD and happen time
- (1.6.3.1) Last one month of tariff3 active MD and happen time
- (1.6.4.1) Last one month of tariff4 active MD and happen time
- (1.6.5.1) Last one month of tariff5 active MD and

		happen time
		- (1.6.6.1) Last one month of tariff6 active MD and happen time
		- (9.6.0.1)Last one month of total apparent MD and happen time
		- (9.6.1.1) Last one month of tariff1 apparent MD and happen time
		- (9.6.2.1) Last one month of tariff2 apparent MD and happen time
		- (9.6.3.1) Last one month of tariff3 apparent MD and happen time
		- (9.6.4.1) Last one month of tariff4 apparent MD and happen time
		- (9.6.5.1) Last one month of tariff5 apparent MD and happen time
		- (9.6.6.1) Last one month of tariff6 apparent MD and happen time
		- (1.6.0.2) Last two month of total active MD and happen time
		- (1.6.1.2) Last two month of tariff1 active MD and happen time
		- (1.6.2.2) Last two month of tariff2 active MD and happen time
		- (1.6.3.2) Last two month of tariff3 active MD and happen time
		- (1.6.4.2) Last two month of tariff4 active MD and happen time
		- (1.6.5.2) Last two month of tariff5 active MD and happen time
		- (1.6.6.2) Last two month of tariff6 active MD and happen time
		- (9.6.0.2) Last two month of total apparent MD and happen time
		- (9.6.1.2) Last two month of tariff1 apparent MD and happen time
		- (9.6.2.2) Last two month of tariff2 apparent MD and happen time

		- (9.6.3.2) Last two month of tariff3 apparent MD and happen time - (9.6.4.2) Last two month of tariff4 apparent MD and happen time - (9.6.5.2) Last two month of tariff5 apparent MD and happen time - (9.6.6.2) Last two month of tariff6 apparent MD and happen time - (1.6.0.3) Last three month of total active MD and happen time - (1.6.1.3) Last three month of tariff1 active MD and happen time - (1.6.2.3) Last three month of tariff2 active MD and happen time - (1.6.3.3) Last three month of tariff3 active MD and happen time - (1.6.4.3) Last three month of tariff4 active MD and happen time - (1.6.5.3) Last three month of tariff5 active MD and happen time - (1.6.6.3) Last three month of tariff6 active MD and happen time - (9.6.0.3) Last three month of total apparent MD and happen time - (9.6.1.3) Last three month of tariff1 apparent MD and happen time - (9.6.2.3) Last three month of tariff2 apparent MD and happen time - (9.6.3.3) Last three month of tariff3 apparent MD and happen time - (9.6.4.3) Last three month of tariff4 apparent MD and happen time - (9.6.5.3) Last three month of tariff5 apparent MD and happen time - (9.6.6.3) Last three month of tariff6 apparent MD and happen time - (15.7.0) Total phase Active power

		- (21.7.0) phase A Active power - (41.7.0) phase B Active power - (61.7.0) phase C Active power - (23.7.0) phase A Reactive power - (43.7.0) phase B Reactive power - (63.7.0) phase C Reactive power - (13.7.0) Total phase Power Factor - (33.7.0) phase A Power Factor - (53.7.0) phaseB Power Factor - (73.7.0) phaseC Power Factor - (14.7.0)Frequency - (32.7.0) phase A Voltage - (52.7.0) phase B Voltage - (72.7.0) phase C Voltage - (31.7.0) phase A Current - (51.7.0) phase B Current - (71.7.0) phase C Current - (0.9.2) Date - (0.9.1) Time - (C.1.0) Electronicl Meter Serial number - Tampercode - CT ratio
	Display Symbol	- Tariff indicator - Battery Status indicator - Four Quadrant indicator - Tamper indicator - Status of load switch
Load Profile	Reading	Locally and remotely. Readable in defined blocks (based on start and end time and channels).
	Load Profile1 (Energy&MD)	Support 8 channels. Interval: 1~60minutes(configurable),default 30 minutes Storage: More than 120 days30 minutes interval(4800 records) Capture objects as follows(configurable): - Import Active Demand(kW) - Export Active Demand(kW)

		- Import Reactive Demand(kvar)
		- Export Reactive Demand(kvar)
		- Import Apperant Demand(kVA)
		- Export Apperant Demand(kVA)
		- Import Active Energy(kWh)(Total&each tariff)
		- Export Active Energy (kWh) (Total&each tariff)
		- Import Reactive Energy (kvarh) (Total&each tariff)
		- Export Reactive Energy (kvarh) (Total&each tariff)
		- Import Apperant Energy (kVAh) (Total&each tariff)
		- Export Apperant Energy (kVAh) (Total& each tariff)
	Load Profile2 (Instantaneous)	Support 12 channels. Interval: 1~60minutes(configurable),default 30 minutes Storage: More than 120 days 30 minutes interval(4800 records) Capture objects as follows(configurable): A/B/C phase voltage(Max,Min,Avg) A/B/Cphase current(Ins) Active total/A/B/C power(Ins) Reactive total/A/B/C power(Ins) Apparent total/A/B/C power(Ins) Power Grid Frequency Total/A/B/C power factor (Ins) A/B/C phase angle AB voltage angle BCvoltage angle
Billing & Max.Demand	Max.Demand Mode	Block mode. Demand interval: 5,10,15,20,30 or 60 minutes Demand interval is configurable.
	Billing/Max.Demand Reset	Manually billing: pressing the programming button for over 5s. Programming billing: billing by PC software and reset max. demand. Automatically billing: billing automatically on billing days.
	Billing Data(Energy)	Storage recent 12 times billing data Data capture object as follows:

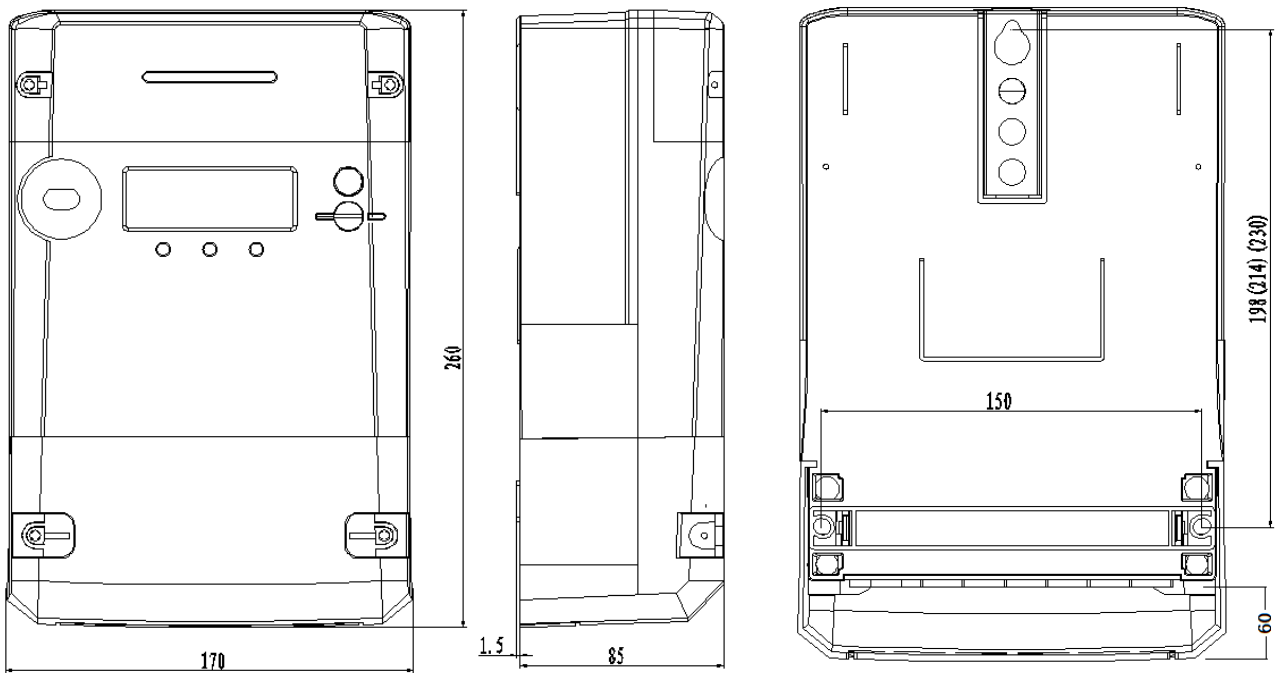|		
		- Import active energy(Total & each tariff) - Export reactive energy(Total & each tariff) - Export apperant energy(Total & each tariff)
	Billing Data(Active MD)	Storage recent 12 times billing data Data capture object as follows: - Import active MD and happen time (Total & each tariff)
	Billing Data(Reactive MD)	Storage recent 12 times billing data Data capture object as follows: - Import reactive MD and happen time (Total & each tariff)
	Billing Data(Apparent MD)	Storage recent 12 times billing data Data capture object as follows: - Import apperant MD and happen time (Total & each tariff)
Integrated Disconnect/ Reconnect Switch	Maximal switching voltage	240V
	Maximal switching current by phases	2A
	Circuit break	according to IEC 62053-21 30*Iмах
	Electrical endurance	a.Resistive Load (cosΦ=1) 2A/230V 5000 times b.Inductive Load (cosΦ=0.5) 2A/230V 5000 times
	Mechanical Endurance	100,000 times
Disconnection &Reconnection management	Normal demand &Emergency demand	limitation definition(configurable); Activated or deactivated (configurable); Reconnection Tims every day(configurable); (if relay reconnection times surpass the pre-set times, relay close will not be allowed on that day.)
	Relay Control	According to DLMS
	Load Switch Display	⌐_o⌐o_ Under relay mode 5, this symbol is displayed when relay is disconnected remotely; When this symbol blinks, it means it's ready for reconnection.

		This symbol appears when demand is over normal threshold; Symbol blinks when demand is over emergency threshold; Relay is connected
Integrated Output	Pulse output	Pulse output of kwh+, kwh-, Kvarh+
	Signal output	One signal output with rated voltages 100-240V, it can be program operation for the following functions - Indication of active tariff zone - Maximum value overstepping warning
Tampering & Event	Alarm/Eventlog	Recent 100 times event records as follow: - Power switch On/Off(Relay connect/ diconnect) - Meter parameterization(Programming) - Date and time sets(Clock Change) - Internal errors - Terminal cover removal(Terminal cover remove) - Meter enclosure tampering(Meter cover remove) - DC Field detection(Magnetic Field influence) - Wiring inversion(Energy reverse) - Current without voltage - Communication problems - Configuration problems - Power breaks(Power off/on) - Phase errors - Over voltage - Under voltage - Bypass **1) Standard Event** - Date and time sets(Clock Change) - Meter parameterization(Programming) - Login Failed(including password error)) - Tariff change - Meter self-check **2) Power Grid Event**

		- Bypass start
		- Bypass end
		- Terminal cover open start
		- Terminal cover open end
		- Magnetic influence start
		- Magnetic influence end
		- Meter cover open start
		- Meter cover open end
		- Remote disconnect
		- Remote connect
		- Local disconnect
		- Local connect
		- Manual disconnect
		- Manual disconnect
		- Phase reverse start
		- Phase reverse end
		- Power off
		- Power on
		- Swell of phase A start
		- Swell of phase A end
		- Swell of phase B start
		- Swell of phase B end
		- Swell of phase C start
		- Swell of phase C end
		- Sag of phase A start
		- Sag of phase A end
		- Sag of phase B start
		- Sag of phase B end
		- Sag of phase C start
		- Phase A loss start
		- Phase A loss end
		- Phase B loss start
		- Phase B loss end
		- Phase C loss start
		- Phase C loss end
		- Phase A current reverse start
		- Phase A current reverse end

		- Phase B current reverse start
		- Phase B current reverse end
		- Phase C current reverse start
		- Phase C current reverse end
		- Polarity reverse start
		- Polarity reverse end
	Anti-Tamper record	Recent 10 times each type of alarm and event records. - Meter cover open - Terminal cover open - Magnetic influence - Power off - Remote connect/disconnect - Local connect/disconnect - Manual connect/disconnect - Swell of phase A - Swell of phase B - Swell of phase C - Voltage loss of phase A - Voltage loss of phase B - Voltage loss of phase C - Sag of phase A - Sag of phase B - Sag of phase C - Current reverse of phase A - Current reverse of phase B - Current reverse of phase C - Phase sequence reverse - Polarity reverse - The incoming phase and neutral interchanged(Bypass) - The load side interchanged with the input side (Bypass) - The load connected between either the incoming phase and load side neutral or between the incoming neutral and load side phase (Bypass) - Earth partially or fully used as a return path

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		(Bypass) - Detection and alarming of meter and terminal cover opening or tampering (Terminal cover) - Measurement technology is highly resistant to tamper attempts with DC magnetic fields(Magnetic Field influence) - Meter enclosure tampering(Meter cover remove)
Firmware upgrate		The meter supports firmware remote upgrading
Security	Passwords	Meter support password Each meter password have inaccessible and protected codes.
	Data encryption/decryption	AES128 method used in all information exchanges in private network
Mechanical	Terminal Box	DIN Standard
	Enclosure protection	IP51
	PLC module seal and replacement	Replaceable
	Seal	Two meter cover seals Two terminal cover seal Two module seal One Config button seal One IR port seal
	Meter Case	Polycarbonate
	Against mechanical stroke and shake	IEC62052-11 parts 5.2.2.1, 5.2.2.2 & 5.2.2.3
	Dimensions(LxWxH)	290mmx170mmx85mm
	Weight	Approx. 1.7 kg

1.1.2 Meter Dimensions

1.1.3 Meter Terminal Box
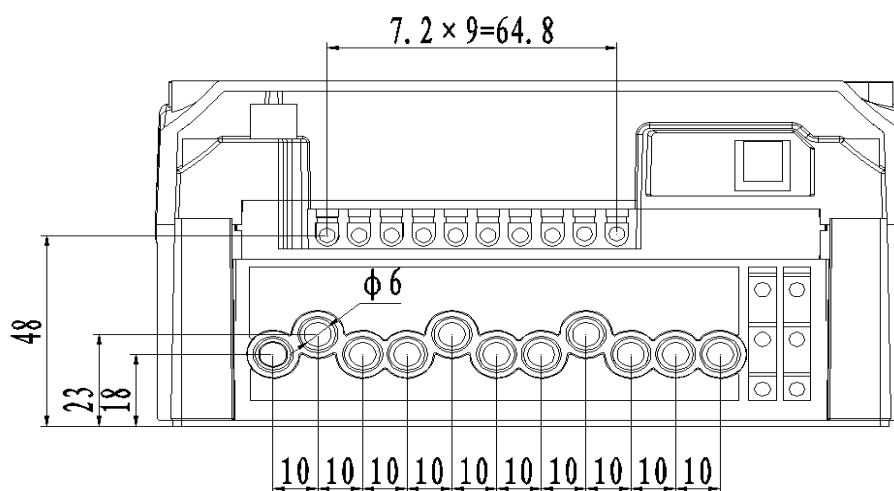
1.1.4 Meter Wiring Diagrams Connection
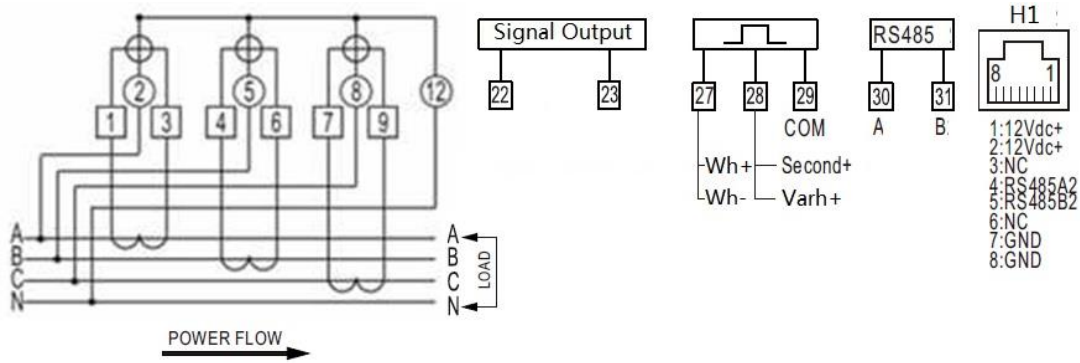
1.2 GPRS/4G Module Specification

1.2.1 Specification

Item	Sub-item	Parameter
Basic	Operating voltage range	DC 15V
	Standby current	<20mA
	Average current	200mA~300mA
	Peak current	2A
	Normal operating temperature range	-40℃～+70℃
	Storage temperature range	-40℃～+70℃
Parameters	Receiver sensitivity	-109dBm ~ -95dBm
	Operation frequency	FDD-LTE: B1, B3, B5, B7, B8, B20 TDD-LTE: B40 UMTS: B1, B8 GSM/GPRS/EDGE: 850/900/1800/1900 MHz
	Wireless Velocity	GPRS：Max 85.6Kbps(DL) / Max

Item	Sub-item	Parameter
		85.6Kbps(UL) CDMA: Max 3.1Mbps (DL) / Max 1.8Mbps (UL) WCDMA：DC-HSPA+，Max 42Mbps(DL)/Max 5.76Mbps(UL) FDD-LTE：non-CA cat4, Max 150Mbps(DL)/Max 50Mbps(UL) TDD-LTE：non-CA cat4 ,Max 130Mbps(DL)/Max 35Mbps(UL)
	Power grade	GSM850：+33dBm (Power Class 4) EGSM900：+33dBm (Power Class 4) DCS1800：+30dBm (Power Class 1) PCS1900：+30dBm (Power Class 1) EDGE 850MHz：+27dBm (Power Class E2) EDGE 900MHz：+27dBm (Power Class E2) EDGE1800MHz：+26dBm (Power Class E2) EDGE1900MHz：+26dBm (Power Class E2) CDMA 1X/EVDO: +23dBm(Power Class 3) UMTS：+23dBm (Power Class 3) LTE：+23dBm(Power Class 3)
	Antenna type	Internal/external(optional)
	Antenna matched impedance	50ohm
	SIM card	Support 1.8/3V SIM card
Mechanical Characteristics	Dimensions(LxWxH)	108.4 x 63.2mm x 40mm
	Weight	About 0.1kg

1.2.2 2G/4G Module Dimension