



NR10-LoRa

DIN Rail Mounted / Single Phase / (100A)

- Single Phase 100A direct connection
- High accuracy, Class 1 / Class 0.5s
- Multi-parameters measurement
- Bi-directional measurement for kW and kWh
- Configurable pulsed output
- Built-in LoRaWAN communication
- Confirmations/ Offline detection available
- Support auto-upload mode for uploading data to back server actively.
- Support auto-resume mode for suddenly power off of the gateway when resume.
- Download/ Upload time interval can be set or adjusted.
- Wide range of LoRa frequency band (EU868/AS923/CN433/CN470/AU915/US902 MHz, etc.)

NR10-Lora measures and displays the characteristics of single phase two wire(1p2w) supplies, including kWh, kVAh, kW, kVAh, kVA, PF, Frequency, Voltage, Current, dmd, THD etc. It support Max.100A direct connection, saving the cost to install external CTs. Maximum demand current can be measured over preset periods of up to 60 minutes.

This unit has a built-in LoRaWAN module which allows long range wireless communication. Two pulse outputs are available for real time energy measurement.

Specification table

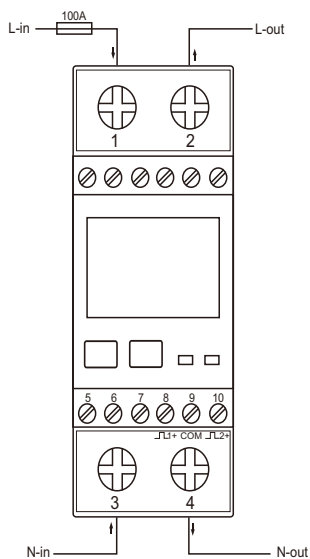
Specification	
Nominal voltage(Un)	120V or 230V AC
Operational voltage	80%~120% of Un
Insulation capabilities	
-AC voltage withstand	4KV for 1 minute
-Impulse voltage withstand	6KV~1.2S μ
Basic current(Ib)	10A
Maximum rated current(Imax)	100A
Operational current range	0.4% Ib-Imax
Over current withstand	30 Imax for 0.01s
Operational frequency range	50 or 60Hz
Internal power consumption	\leq 2W/10VA
Pulse output 1	1000imp/kWh(configurable)
Pulse output 2	1000imp/kWh
Max reading	99999.99kWh
Performance criteria	
Operating humidity	\leq 90%
Storage humidity	\leq 95%
Operating temperature	-25°C~+55°C
Storage temperature	-40°C~+70°C
Reference temperature	23°C \pm 2°C
International standard	IEC 62053-21/ EN50470-1/3
Accuracy class	Class 1/Class B
Installation category	CAT II
Mechanical environment	M1
Electromagnetic environment	E2
Degree of pollution	2
Protection against penetration of dust and water	IP51(indoor)
Insulation encased meter of protective class	II
Electrostatic discharges	8kV contact / 15kVair gap
Electromagnetic HF fields	IEC 6100-4-3
Electrical fast transients	4kV
Surge	4kV
Radiated & conducted emissions	EN55022
Radiated & conducted emissions	EN55022

Accuracy	
Voltage, Current	0.5%
Frequency	0.2% of mid-frequency
Power factor	1% of unity(0.01)
Active power, Apparent power	\pm 1% of range maximum
Reactive power	\pm 1% of range maximum
Reactive energy(VArh)	Class 2
Active energy(Wh)	Class 1

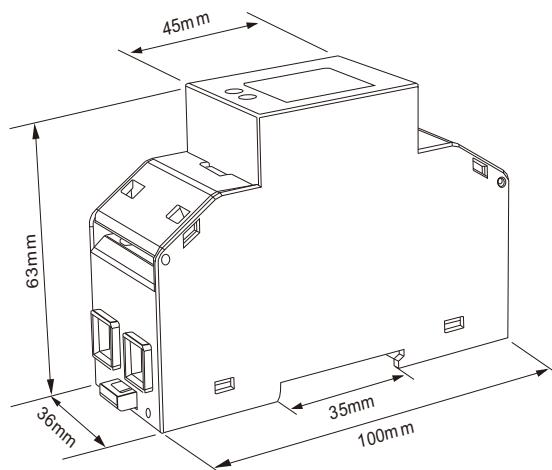
Communications	
Interface standard and protocol	LoRaWAN Specification 1.0.2
Frequency	EU868/AS923/AU915/ US902/CN470/CN433
LoRaWAN Classes	Class C
Auto-upload	Max. 20 parameters
Auto-upload Interval	Configurable
Activation Way	OTAA or ABP
Output Power	13dBm in transmission
Coding Format	ASCII
Communication Distance	1500M in an open area

Pulse output	
Pulse output	2
Pulse output type	Passive
Pulse output 1	Configurable
Pulse width	200 / 100(default) / 60ms
Pulse output 2	1000imp/kWh

Wiring Configuration



Dimension Drawing



Conformity References

Electromagnetic Compatibility: EN61326-1:2013 & EN61326-2-3:2013

Low Voltage Directive: EN61010-1:2010 & EN61010-2-30:2010



NR32-LoRa

DIN Rail Mounted / Three Phase / (CT)

- Three phase 1/5A current transformer operated
- ETL certified
- High accuracy, Class 1 / Class 0.5s
- Multi-parameters measurement
- Bi-directional measurement for kW and kWh
- Configurable pulsed output
- Built-in LoRaWAN communication
- Confirmations/ Offline detection available
- Support auto-upload mode for uploading data to back server actively.
- Support auto-resume mode for suddenly power off of the gateway when resume.
- Download/ Upload time interval can be set or adjusted.
- Wide range of LoRa frequency band (EU868/AS923/CN433/CN470/AU915/US902 MHz, etc.)

NR32-1-Lora is an advanced multi-function three phase energy monitoring solution with built-in LoraWAN module. It measures and displays the characteristics of single phase two wire(1p2w) , single phase three wire(1p3w), three phase three wire(3p3w,) and three phase four wire(3p4w) supplies, including kWh, kVAh, kW, kVA, PF, Frequency, Voltage, Current, dmd, THD etc. Energy is measured in terms of kWh, kVAh. Maximum demand current can be measured over preset periods of up to 60minutes.

The requisite current input(s) are obtained via current transformers (CT). This meter can be configured to work with a wide range of CTs, giving the unit a wide range of operation. Configuration is password protected.

The meter was ETL approved by intertek.

Specification table

Electrical characteristics	
Type of measurement	RMS including harmonics on three phase AC system (3P, 3P+N)
Measurement accuracy	
- Active Energy	IEC 62053-21 Class 1
- Reactive Energy	IEC 62053-23 Class 2
- Frequency	± 0.2%
- Current	± 0.5%
- Voltage	± 0.5%
- Power	± 0.01
- Power Factor	± 0.01
Data Update Rate	1 second nominal
Input-Voltage	
- VT Primary	30 ~ 500000 Vac
- Un	230 V L-N
- Measured Voltage with Over-range	173 to 480 V AC L-L / 100 to 276 V AC L-N
- Impedance	1MΩ
- Frequency Range	45-65Hz
Input- Current	
- CT Ratings	
- Primary	1-9999A
- Secondary	1A / 5A
- Measured current with Over-range	6A
- Withstand	Continuous 120A for 0.5 Seconds
- Impedance	<1MΩ
- Frequency Range	45-65Hz
- Burden	<0.036VA at 6A
Auxiliary Power Supply	
- Operating Range	85-275V AC / 120-380VDC
- Power Consumption	< 7VA/3.5W
- Frequency	45 to 65 Hz

Mechanical Characteristics	
Weight	330g
IP Degree of Protection (IEC 60529)	IP51 (indoor)
Dimensions (WxHxD)	72x94.5x65mm
Mounting	Din rail (DIN 43880)
Material of meter case	Self-extinguishing UL 94 V-0
Mechanical environment	M1

Environmental Characteristics	
Operating Temperature	-25 to 55°C
Storage Temperature	-40 to 70°C
Humidity Rating	<95% RH at 50 °C (non-condensing)
Pollution Degree	2
Altitude	2000m
Vibration	10Hz to 50Hz, IEC 60068-2-6

Safety	
Measurement Category	Per IEC61010-1 CAT III
Current Inputs	Require external Current Transformer for Insulation
Over voltage Category	CAT III
Dielectric Withstand	As per IEC 61010-1 Double Insulated front panel display
Protective Class	II

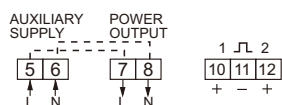
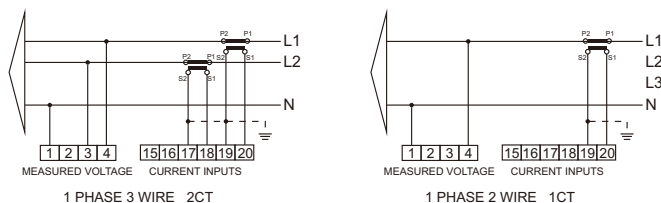
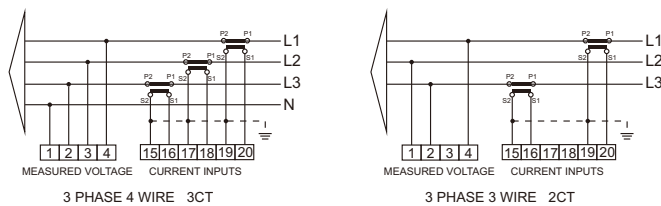
Communications	
Interface standard and protocol	LoRaWAN Specification 1.0.2
Frequency	EU868/AS923/AU915/ US902/CN470/CN433
LoRaWAN Classes	Class C
Auto-upload	Max. 30 parameters
Auto-upload Interval	Configurable
Activation Way	OTAA or ABP
Output Power	13dBm in transmission
Coding Format	ASCII

NR32-LoRa

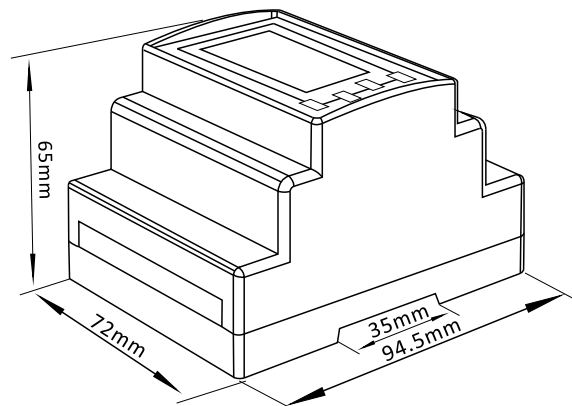
DIN Rail Mounted / Three Phase / (CT)



Wiring Configuration



Dimension Drawing



Conformity References

Electromagnetic Compatibility: EN61326-1:2013 & EN61326-2-3:2013

Low Voltage Directive: EN61010-1:2010 & EN61010-2-30:2010

LUMEL

NR35-LoRa

DIN RAIL SMART METER
FOR SINGLE & THREE PHASE ELECTRICAL SYSTEMS



SERVICE MANUAL

- Measures kWh Kvarh, KW, Kvar, KVA, P., F, PF, Hz, dmd, V, A, etc.
- Bi-directional measurement IMP & EXP
- Pulse output
- 2DI
- LoRaWAN
- Din rail mounting 35mm
- 100A direct connection
- Better than Class 0.5 / C accuracy

Part 1. Introduction

Introduction

The NR35-LoRa is a three phase multi-function remote control energy meter.

It measures all important electrical parameters, such as Active Energy (kWh), Current (A), Voltage (V), Frequency(Hz), Power Factor, Power Demand, import and export energy etc.

With built-in relay inside, the meter can be remotely controlled to turn on or off the electricity supply via LoRaWAN. The user can also set alarm objects and alarm level, once the alarm is activated the relay will be turned off. The relay of each phase can be controlled together or separately.

Built-in interfaces provides pulse and LoRaWAN outputs.

Product features

- Max.100A Direct Connect
- Multifunction Measurement, Displays Scrollable Settings
- Support AMR, SCADA system
- Remote Control with Bulit-in Relay
- Energy Resettable
- White Backlit LCD Display
- Din Rail Mounting 35mm

Technical parameters

◆ Input Voltage: Basic Value: 230V AC

Operating Voltage Range: $\pm 20\%$ Basic Value

Measurement Form: Valid Values

◆ Input Current: Basic Value: 5A

Max.Current: 100A

Over Current Withstand: 20 I_{max} for 0.5s

◆ Input Frequency: Basic Value: 50/60Hz

Input Frequency Range: 45-65 Hz

◆ Insulation Capabilities: - AC voltage withstand 4KV/1min

Impulse Voltage Withstand 6kV – 1.2 μ S waveform

◆ Power Consumption: $\leq 2W$

◆ Pulse Port: Can be Set(See Operating Instructions for Details)

◆ Pulse Output Rate: 1000imp/kWh(Default)

◆ Display: LCD with White Backlit

◆ Max reading: 999999.99 kWh

Energy Measurements

- Imported active energy 0 to 999999.99 kWh
- Exported active energy 0 to 999999.99 kWh
- Imported reactive energy 0 to 999999.99 kVArh
- Exported reactive energy 0 to 999999.99 kVArh
- Total active energy 0 to 999999.99 kWh
- Total reactive energy 0 to 999999.99 kVArh

Accuracy

- Voltage 0.5% of range maximum
- Current 0.5% of nominal
- Frequency 0.1% of mid-frequency
- Power factor 1% of unity (0.01)
- Active power (W) $\pm 1\%$ of range maximum
- Reactive power (VAr) $\pm 1\%$ of range maximum
- Apparent power (VA) $\pm 1\%$ of range maximum
- Active energy (Wh) Class 0.5 IEC 62053-22
Class C EN50470-1/3
- Reactive energy (VArh) Class 2 IEC 62053-23
- Response time to step input 1s, typical, to >99% of final reading, at 50 Hz.

Interfaces for External Monitoring

Two interfaces are provided:

- LoRaWAN communication channels via protocol wireless.
- Pulse output indicating real-time measured energy

Pulse Output

Pulse output is non-configurable. It is fixed up with active kWh. The constant is 1000imp/kWh.

Reference Conditions of Influence Quantities

Influence Quantities are variables that affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.

- Ambient temperature 23°C $\pm 1^\circ\text{C}$
- Input frequency 50Hz(MID)
50 or 60Hz $\pm 2\%$ (non-MID)
- Input waveform Sinusoidal (distortion factor < 0.005)
- Magnetic field of external origin Terrestrial flux

Environment





- Operating temperature 3K6 (-25°C to +55°C*)
- Storage temperature -40°C to +70°C*
- Relative humidity 0 to 90%, non-condensing

- Altitude Up to 2000m
- Warm up time 5S
- Vibration 10Hz to 50Hz, IEC 60068-2-6, 2g
- Shock 30g in 3 planes


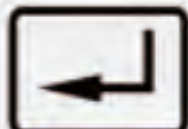
* Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.










Start-up Screens








After a short delay, the screen will display active energy measurements.








1		The first screen lights up all display segments and can be used as a display check.
2		The second screen indicates the firmware installed in the unit and its build number.
3		Firmware number
4		If the communication failed, the meter will show ERR 1024.









Measurements

	<ul style="list-style-type: none"> ◆ Measurement mode, short press: switch the screen; ◆ Setting mode: short press: switch menu or single-digit increases at the same level; Long press: return to the previous menu.
	<ul style="list-style-type: none"> ◆ Measurement mode, short press: invalid; Long press: enter the setting mode; ◆ Setting mode, short press: move the cursor (the cursor flashing number for setting the state); Long press: menu item selection confirmation and parameter modification confirmation.

Page	Display	Description
1		<p>Total active energy Example energy: 120.00kWh</p> <p> Represents relay open</p> <p> Represents relay close</p>
2		<p>Import active energy Example: 60.00kWh</p>
3		<p>Export active energy Example: 60.00kWh</p>
4		<p>Total reactive energy Example: 200.00 kVArh</p>
5		<p>Import reactive energy Example: 100.00 kVArh</p>
6		<p>Export reactive energy Example: 100.00kVArh</p>
7		<p>L1 Voltage Example: 230.0V</p>

		<p>L2 Voltage Example: 230.0V</p>
		<p>L3 Voltage Example: 230.0V</p>
		<p>L1 Current Example: 50.809A</p>
		<p>L2 Current Example: 50.809A</p>
		<p>L3 Current Example: 50.809A</p>
		<p>L1 Active power Example: 1.800kW</p>
		<p>L2 Active power Example: 1.800kW</p>

		<p>L3 Active power Example: 1.800kW</p>
		<p>Total Active power Example: 5.400kW</p>
		<p>L1 Power factor Example: 1.000</p>
		<p>L2 Power factor Example: 1.000</p>
		<p>L3 Power factor Example: 1.000</p>
		<p>Total Power factor Example: 1.000</p>
		<p>Frequency Example: 50.00hz</p>

		<p>Maximum total active power demand Example: 2.680kW</p>
		<p>Pulse Constant Example: 1000imp/kWh The current output mode of the optocoupler pulse is total active energy mode.</p>
		<p>The failure interface Example: Err-01 Automatic display when the current fault occurs, and error-01 means that the relay cannot be disconnected.</p>
		<p>Over-limit alarm interface In the measurement interface, the upper right corner appears  and  indicates that the measured value of the alarm object exceeds the alarm value. The relay can be closed by using communication or manually only after troubleshooting.</p>
		<p>DI 1 - count</p>
		<p>DI 2 - count</p>

3.3 Basic Setting

Long press " " for three seconds to enter the setting mode (exit the setting interface if there is no operation in the next minute and return the remaining amount interface) :


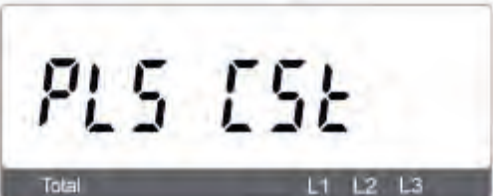





Instructions: on the normal display interface, press the button 3s on the right to enter the setting interface (password input interface).





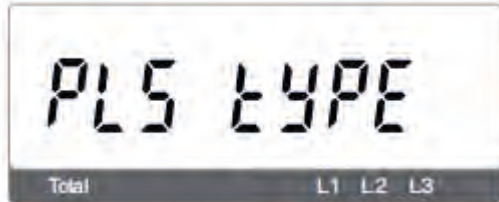










In the setting state, long press the left button 3s to exit the setting state.



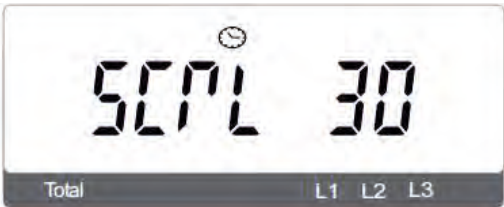










In the setting state, long press the right button 3s to enter/confirm.




Press the button on the right side to set the moving position;

In the setting state, press the button on the left side to scroll or change the setting item;

Page	Display	Description
1		<p>Password</p> <p>Enter password into the Settings screen;</p> <p>Default password: 1000</p> <p>Press select number, press select shift. Then long press to enter the setup system.</p>
2-1		<p>Pulse Constant</p> <p>Default: 1000imp/kWh</p> <p>Optional: 1000, 100,10,1.</p>
2-2		<p>Long press  into the constant setting interface, the current character flashing.</p> <p>Then, press  to select the new constant.</p> <p>Finally, long press  to confirm Settings.</p>
3-1		<p>Pulse width</p> <p>Default: 100ms</p> <p>Optional:200, 100,60.</p> <p>If the pulse constant is equal to 1000imp/kWh, the setting interface cannot be set to 200ms at this time.</p>

<p>3-2</p>		<p>Long press  to enter pulse width setting interface, the current character flashing.</p> <p>Then, press  to select the new pulse width.</p> <p>Finally, long press  to confirm Settings.</p>
<p>4-1</p>		<p>Pulse output type Default: P (Total active energy) Optional</p>
<p>4-2</p>		<p>Long press  into the pulse output type setting interface, the current character flicker. current charact Then, press  to select the new pulse output type. Finally, long press  to confirm settings.</p> <p> kWh Total active kWh</p> <p> kWh Total reactive kWh</p>
<p>5-1</p>		<p>Demand cycle Default: 60 min Demand cycle range: 0-60min. 0 represents real-time update demand.</p>
<p>5-2</p>		<p>Long press  into the demand period setting interface, the current character flicker. Then, press  to select a new demand cycle.</p>





		 <p>Finally, long press  to confirm settings.</p>
6-1		<p>Auto display scroll time Default: 0s (without round show) Rotation time range: 0~30s</p>
6-2		<p>Long press  to enter auto wheel display time setting interface, the current character flicker.</p> <p>Then, press  to select the new auto wheel display time.</p> <p>Finally, long press  to confirm settings.</p>
7-1		<p>Backlight lighting time Default: 60 min optional: off,on,5,10,20,30,60,120 Off means that the backlight is turn off; on means that the backlight is turn on.</p>
7-2		<p>Long press  into the backlit time setting interface, the current character will flicker. Then, press  to select the new backlight lighting time.</p> <p>Finally, long press  to confirm settings.</p>
8		<p>DI fliter time Setting range: 0~255ms Default 100ms</p>








9	 <p>The LCD display shows 'MD' at the top, '0L7' in large red digits in the center, and a status bar at the bottom with 'Total' on the left and 'L1 L2 L3' on the right.</p>	<p>Long press  enter the maximum demand reset setting interface, the current character flicker.</p> <p>Finally, long press  to confirm zero clearing.</p>
---	---	---

3.4 Checking Meter Information








This function allows to check meter setting information, also some of below information can be set through another password (refer to section 4.3).






3.4.1 Join Information - OTAA

1	 <p>The LCD display shows 'DE7' and 'EU1' in large black digits, with 'Total' and 'L1 L2 L3' at the bottom.</p>	<p>DevEui: end-device identifier ***** (16 digits)</p>
1-1	 <p>The LCD display shows '0' followed by '1234567' in large black digits, with 'Total' and 'L1 L2 L3' at the bottom.</p>	<p>1-8 digits</p>
1-2	 <p>The LCD display shows '90' followed by '123456' in large black digits, with 'Total' and 'L1 L2 L3' at the bottom.</p>	<p>9-16 digits</p>
2	 <p>The LCD display shows 'APP' and 'EU1' in large black digits, with 'Total' and 'L1 L2 L3' at the bottom.</p>	<p>AppEui: application identifier ***** (16 digits)</p>


2-1		1-8 digits
2-2		9-16 digits
3		AppKey: Application key (32 digits)
3-1		1-8 digits
3-2		9-16 digits
3-3		17-24 digits
3-4		25-32 digits



3.4.2 Join Information - ABP

1		Dev address
1-1		Total 8 digits
2		NwkKey: Network session key ***** (32 digits)
2-1		1-8 digits
2-2		9-16 digits
2-3		17-24 digits
2-4		25-32 digits

3		<p>AppSKey: Application session key ***** (32 digits)</p>
3-1		1-8 digits
3-2		9-16 digits
3-3		17-24 digits
3-4		25-32 digits

3.4 Join Status




1		<p>JOIN OK Means the meter is connected to the gateway successfully</p>
---	---	--

1-1		OTAA mode
2		ABP mode: ON/OFF









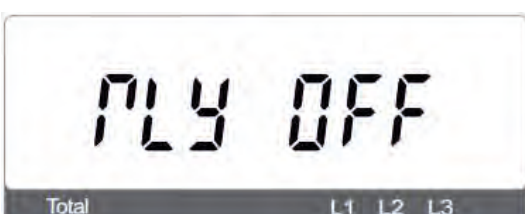
3.5 Auto: Upload ON/OFF, Upload Interval Time





When Auto is ON, the meter will send a command to gateway automatically. This is for the gateway to check if the meter is still online.

Under Active upload mode, the Auto function is not used

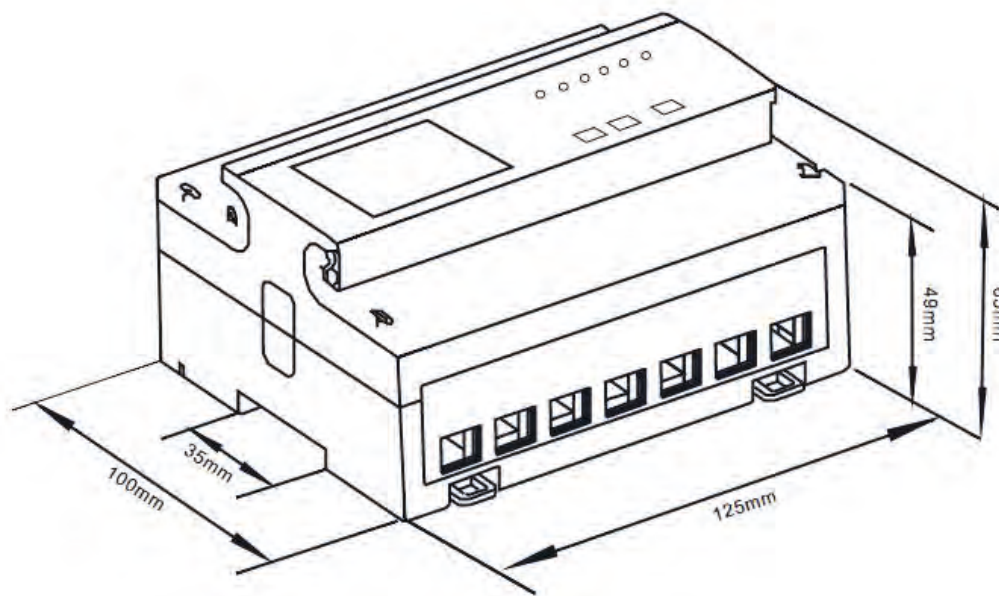
1		From the Set-up menu, use and buttons to select the AUTO option. Press for 3s enter to the setting page.
1-1		UP LOAd: ON Range: ON/OFF Press for 3s, the current option will flash. Use or to choose the option.
2		Interval Time Option: 5/ 10/ 20/ 30/ 90/ 120/ 150/ 180/ 210/ 240 minutes 05 means the meter will send a command to gateway every 5 minutes.

3.6 Password setting and alarm settings



1		<p>User Password Default: 1000 optional: 0 ~ 9999</p>
1-1		<p>Long press  to enter the user password setting interface and the current character flashes. Then, click on  the new User Password. Finally, long press  to confirm settings.</p>
2		<p>Check alarm information Enter this setting to check alarm associated information: Voltage\ Current\Active power\reactive Power\apparent power\Frequency</p>
2-1		<p>Alarm object Default: NULL(No alarm object) Note: this option can only be set via communication</p>
2-2		<p>Alarm Value Default: 100000.0 Note: this option can only be set via communication</p>
2-3		<p>Relay Control The display status of this option is off for relay open and on for relay close. This option can be set only if the alarm occurs when the relay automatically disconnects. Set relay close through this option, which means manually disarming the alarm. Therefore, before you do this, make sure the alarm object is</p>

		<p>troubleshooting.</p> <p>Long press enter relay status setting interface, current character 2-4flicker. Then, press select the new relay status. Finally, long press to confirm settings..</p>
<p>2-4</p>		<p>Long press  to enter relay status setting interface, current character flicker. Then, press  to select the new relay status.</p> <p>Finally, long press  to confirm settings.</p>

Dimensions:

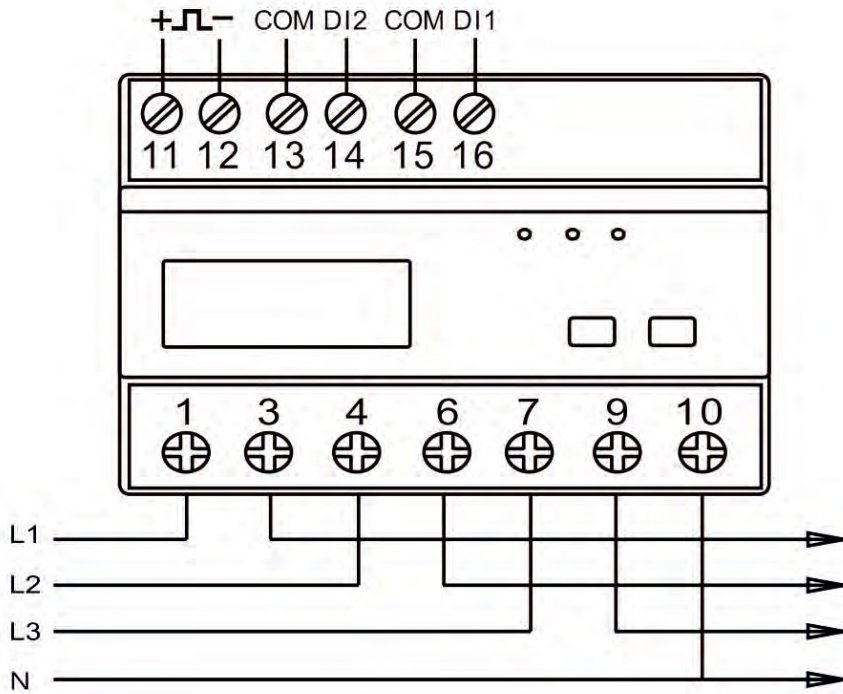


Wiring torque

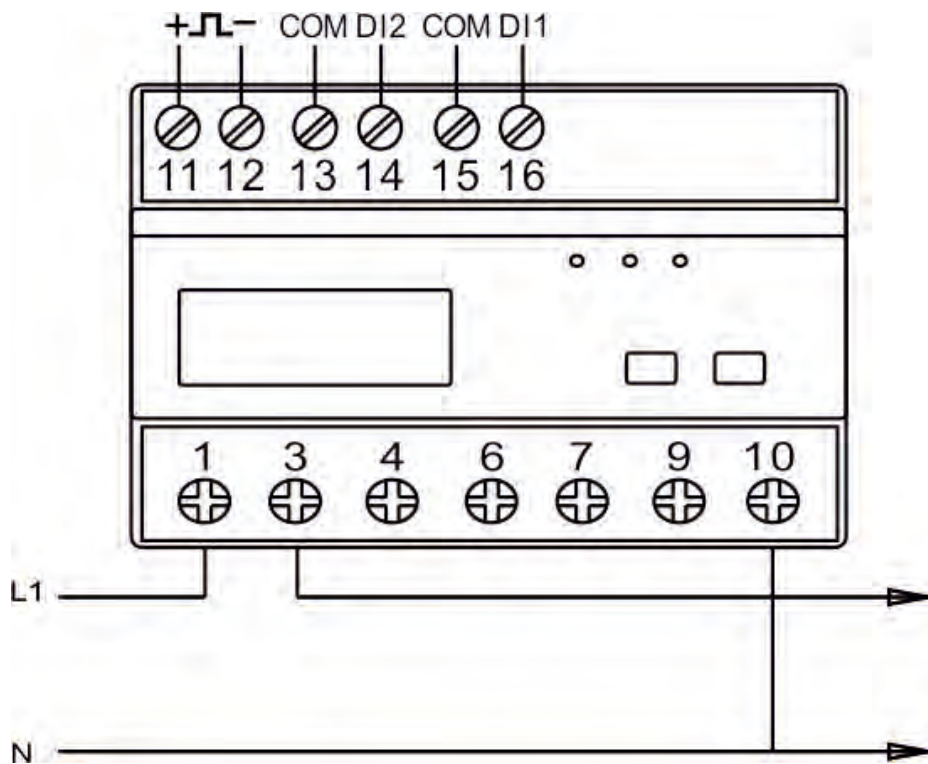
Terminals		
COMM/Pulse/2T	0.5~1.5mm ²	0.4Nm
Load	4~25mm ²	3Nm

Wiring diagram

- Three Phase Four Wires:



- Single Phase Two Wires:





LUMEL
EVERYTHING COUNTS

LUMEL S.A.
ul. Ślubicka 4, 65-127 Zielona Góra, Poland
tel.: +48 68 45 75 100, fax +48 68 45 75 508
www.lumel.com.pl

Technical support:
tel.: (+48 68) 45 75 143, 45 75 141, 45 75 144, 45 75 140
e-mail: export@lumel.com.pl

Export department:
tel.: (+48 68) 45 75 130, 45 75 131, 45 75 132
e-mail: export@lumel.com.pl

Calibration & Attestation:
e-mail: laboratorium@lumel.com.pl