OP1006-V01

Rayleigh Instruments

RI-D380-G-C

PRODUCT PROFILE

SPECIFICATIONS

Display :Liquid crystal display with backlight
1 line of 4 digits and 2 line of 7 digits per line to show electrical parameters
LCD Indications : ⇌ - Communication in progress
LED Indications : **INT -** Integration of energy
Installation Category :III (300V AC L-N)
Wiring Input :3Ø-4 wire, 1Ø-2 wire - P1, P2, P3
Rated Input Voltage :3x230/400V
Frequency Range :45-65 Hz (MID Approved for 50Hz)
CT Primary 1 to 4 :1A to 6000A (Programmable for any Value)
CT Secondary :0.01...1(1.2)A (Meter input 330mV)
PT Primary :100V to 600V (Programmable for any value)
PT Secondary :100 to 500V AC(L-L)(Programmable for any value)
Display Update Time :1 Sec. For all parameters.
Temperature :Operating : -10°C...55°C, Storage: -20°C...75°C
Humidity :85% non-condensing
Mounting :Din Rail mounting
Meter Type :Indoor
IP rating :IP30 (Front of housing only - this device must be installed within a suitable IP rated enclosure)
IP20 (Terminal Area)
Communication :RS485 (Modbus RTU)

The meter is intended to be installed in Mechanical Environment `M1`,with Shock and Vibrations of low significance, as per 2004/22/EC Directive.
The meter is intended to be installed in Electromagnetic Environment `E2`, as per 2004/22/EC Directive.

ORDER INFORMATION

Product	Supply	Certification	
RI-D380-G-C	Self Supplied(V1,V2,V3,N)	CE	MID
	60 to 300V AC, 50/60Hz	■	■

SERIAL COMMUNICATION

Interface standard and protocol	RS485 AND MODBUS RTU
Communication address	1 to 255
Transmission Mode	Half duplex
Data types	Float, Hex and Integer
Transmission distance	500 Meter maximum
Transmission speed	300, 600,1200, 2400, 4800, 9600, 19200 (in bps)
Parity	None, Odd, Even
Stop bits	1 or 2

MID APPROVAL INSTALLATION NOTES

For the installation to be valid the following steps must be followed:

1. **The CT ratio must be set before putting the meter into service.**
2. **The RJ45 connection between the meter and the current transformer must be sealed**

CONFIGURATION LOCK PARAMETER DESCRIPTION

Once user done the modifications in configuration menu, with any lock parameters mentioned in reference and enter key pressed then Config get lock after 15 Min Or after immediate Power OFF-ON.

PARAMETERS ARE :

1) No. Of Channel Selection
2) Network selection
3) CT Primary 1 to 4
4) CT Mounting 1 to 4
5) PT secondary
6) PT Primary
7) Factory Default
8) Energy Reset

ACCURACY

Measurement	Accuracy
Voltage V_{L-N}	±0.5% of F.S.
Voltage V_{L-L}	±0.5% of F.S.
Current	±0.5% of F.S.
Frequency For L-N > 20V, For L-L > 35V	±0.1% of F.S.

Measurement	Accuracy
Active Power	1%
Apparent power	1%
Reactive Power	1%
Power factor	±0.01 (Digit)
Active energy	EN50470-3: Cl.B
Reactive energy	EN62053-23: Cl.2

(F.S - Full Scale)

RESOLUTION

PT Ratio x CT Ratio	<15	<150	<1500	<15000	>15000
kWh	0.01K	0.1K	1K	0.01M	0.1M
INT	10K	0.01K	0.1K	1K	0.01M

SAFETY PRECAUTIONS

Safety related notifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of personnel as well as the instrument.
If the equipment is not used in a manner specified by the manufacturer it may 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.
- No repairs, maintenance or adjustments are possible.

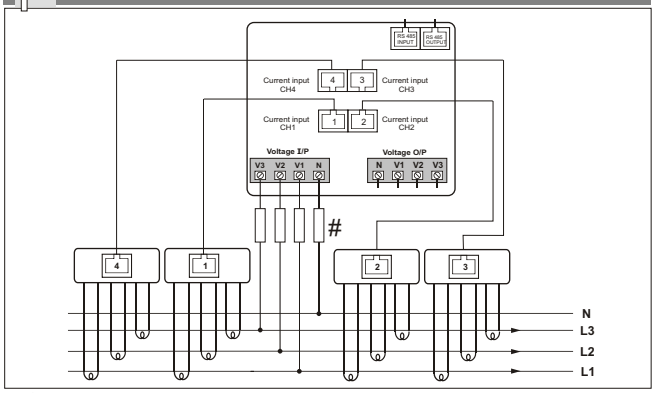
CAUTION

1. Read complete instructions prior to installation or operation of the unit.
2. Risk of electric shock. Only to be installed by competent personnel.
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.

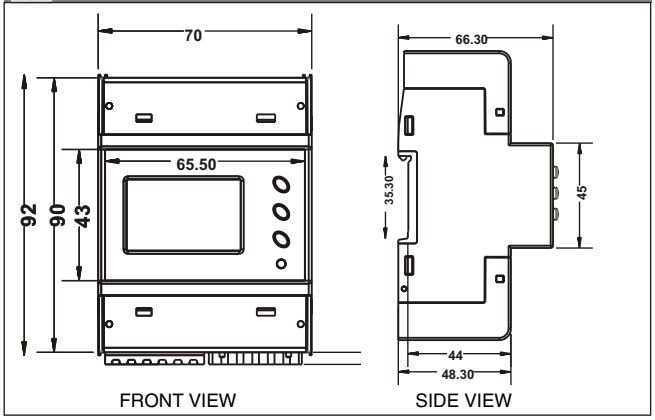
WIRING GUIDELINES

1. To prevent the risk of electrocution, always isolate the power supply to the equipment prior to undertaking any work. Always confirm absence of supply prior to starting work using appropriate voltage detection equipment.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct before energizing the equipment.
3. To reduce electromagnetic interference use of wires with adequate ratings and twists of equal size are recommended. All connection should be kept as short as possible.
4. Routing of connecting cables shall be away from any internal EMI source.
5. All cables used for connections must have a cross section of 0.5mm² to 2.5mm².(20 to14AWG;75C °(min))

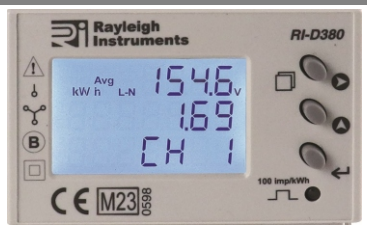
TERMINAL CONNECTIONS



MECHANICAL INSTALLATION / DIMENSIONS (in mm)



FRONT PANEL DESCRIPTION



ONLINE PAGE DESCRIPTION

There are 2 dedicated keys with symbols marked as ❻ and ❹ to read meter parameters.

At power ON meter displays average phase to neutral voltage and active energy of three phases.

The device will return to the default screen, 60 seconds after the last button press.

ONLINE PAGE DESCRIPTION FOR 4 CHANNEL 3P4W

FIRST KEY (▷) PRESS	SECOND KEY (△) PRESS	DESCRIPTION
Press (▷) key (1st Time)	——	Displays average line to neutral voltage and CH 1 Active Energy.
	1st time	Displays average line to neutral voltage and CH 2 Active Energy.
	2nd time	Displays average line to neutral voltage and CH 3 Active Energy.
	3rd time	Displays average line to neutral voltage and CH 4 Active Energy.
	4th time	Displays average line to neutral voltage and total active energy of all channel.
Press (▷) key (2nd Time)	——	Displays line to neutral voltage of CH 1.
	1st time	Displays line to neutral voltage of CH 2.
	2nd time	Displays line to neutral voltage of CH 3.
	3rd time	Displays line to neutral voltage of CH 4.
Press (▷) key (3rd Time)	——	Displays line to line voltage of CH 1.
	1st time	Displays line to line voltage of CH 2.
	2nd time	Displays line to line voltage of CH 3.
	3rd time	Displays line to line voltage of CH 4.
Press (▷) key (4th Time)	——	Displays current of CH 1.
	1st time	Displays current of CH 2.
	2nd time	Displays current of CH 3.
	3rd time	Displays current of CH 4.
Press (▷) key (5th Time)	——	Displays CH 1 Power Factor and frequency.
	1st time	Displays CH 2 Power Factor and frequency.
	2nd time	Displays CH 3 Power Factor and frequency.
	3rd time	Displays CH 4 Power Factor and frequency.
	——	Displays average line to neutral voltage and CH 1 Reactive Energy.
Press (▷) key (6th Time)	1st time	Displays average line to neutral voltage and CH 2 Reactive Energy.
	2nd time	Displays average line to neutral voltage and CH 3 Reactive Energy.
	3rd time	Displays average line to neutral voltage and CH 4 Reactive Energy.
	4th time	Displays average line to neutral voltage and total Reactive Energy of all channel.
Press (▷) key (7th Time)	——	Displays average line to neutral voltage and CH 1 Apparent Energy.
	1st time	Displays average line to neutral voltage and CH 2 Apparent Energy.
	2nd time	Displays average line to neutral voltage and CH 3 Apparent Energy.
	3rd time	Displays average line to neutral voltage and CH 4 Apparent Energy.
	4th time	Displays average line to neutral voltage and total Apparent Energy off all channel.
Press (▷) key (8th Time)	——	Displays Active Power of CH 1.
	1st time	Displays Active Power of CH 2.
	2nd time	Displays Active Power of CH 3.
	3rd time	Displays Active Power of CH 4.
Press (▷) key (9th Time)	——	Displays Reactive Power of CH 1.
	1st time	Displays Reactive Power of CH 2.
	2nd time	Displays Reactive Power of CH 3.
	3rd time	Displays Reactive Power of CH 4.
Press (▷) key (10th Time)	——	Displays Apparent Power of CH 1.
	1st time	Displays Apparent Power of CH 2.
	2nd time	Displays Apparent Power of CH 3.
	3rd time	Displays Apparent Power of CH 4.

CT MOUNTING CHECK DESCRIPTION

1)For CT mounting first go to the current page as per the requirement CH1,CH2,CH3,CH4.
2)Press enter key for 3 sec to display CT mounting method: RHS/LHS/ is ok / not ok/ invalid .
3)Range for ok : if PF is in between of 0.8L to 0.8C
Range for not ok : if PF is not between of 0.8L to 0.8C
Range for invalid : if current is zero

NOTE : In 1P2W for 4 Channel meter all pages will be same as 3P4W only selected phase parameter will display.

ONLINE PAGE DESCRIPTION FOR 12 CHANNEL 1P2W

FIRST KEY (▷) PRESS	SECOND KEY (△) PRESS	DESCRIPTION
(1st Time)	——	Displays line to neutral voltage and CH 1 Active Energy.
	1st time	Displays line to neutral voltage and CH 2 Active Energy.
	2nd time	Displays line to neutral voltage and CH 3 Active Energy.
	3rd time	Displays line to neutral voltage and CH 4 Active Energy.
	4th time	Displays line to neutral voltage and CH 5 Active Energy.
	5th time	Displays line to neutral voltage and CH 6 Active Energy.
	6th time	Displays line to neutral voltage and CH 7 Active Energy.
	7th time	Displays line to neutral voltage and CH 8 Active Energy.
	8th time	Displays line to neutral voltage and CH 9 Active Energy.
	9th time	Displays line to neutral voltage and CH 10 Active Energy.
	10th time	Displays line to neutral voltage and CH 11 Active Energy.
	11th time	Displays line to neutral voltage and CH 12 Active Energy.
	12th time	Displays line to neutral voltage and Total Active Energy of all channel.
Press (▷) key (2nd Time)	——	Displays line to neutral voltage of Group 1.
	1st time	Displays line to neutral voltage of Group 2.
	2nd time	Displays line to neutral voltage of Group 3.
	3rd time	Displays line to neutral voltage of Group 4.
Press (▷) key (3rd Time)	——	Displays current of Group 1.
	1st time	Displays current of Group 2.
	2nd time	Displays current of Group 3.
	3rd time	Displays current of Group 4.
Press (▷) key (4th Time)	——	Displays group 1 power factor and Frequency.
	1st time	Displays group 2 power factor and Frequency.
	2nd time	Displays group 3 power factor and Frequency.
	3rd time	Displays group 4 power factor and Frequency.
Press (▷) key (5th Time)	——	Displays line to neutral voltage and CH 1 Reactive Energy.
	1st time	Displays line to neutral voltage and CH 2 Reactive Energy.
	2nd time	Displays line to neutral voltage and CH 3 Reactive Energy.
	3rd time	Displays line to neutral voltage and CH 4 Reactive Energy.
	4th time	Displays line to neutral voltage and CH 5 Reactive Energy.
	5th time	Displays line to neutral voltage and CH 6 Reactive Energy
	6th time	Displays line to neutral voltage and CH 7 Reactive Energy
	7th time	Displays line to neutral voltage and CH 8 Reactive Energy
	8th time	Displays line to neutral voltage and CH 9 Reactive Energy
	9th time	Displays line to neutral voltage and CH 10 Reactive Energy
	10th time	Displays line to neutral voltage and CH 11 Reactive Energy
	11th time	Displays line to neutral voltage and CH 12 Reactive Energy
	12th time	Displays line to neutral voltage and Total Reactive Energy of all channel.
Press (▷) key (6th Time)	——	Displays line to neutral voltage and CH 1 Apparent Energy.
	1st time	Displays line to neutral voltage and CH 2 Apparent Energy.
	2nd time	Displays line to neutral voltage and CH 3 Apparent Energy.
	3rd time	Displays line to neutral voltage and CH 4 Apparent Energy.

FIRST KEY (▷) PRESS	SECOND KEY (△) PRESS	DESCRIPTION
Press (▷) key (6th Time)	4th time	Displays line to neutral voltage and CH 5 Apparent Energy.
	5th time	Displays line to neutral voltage and CH 6 Apparent Energy.
	6th time	Displays line to neutral voltage and CH 7 Apparent Energy.
	7th time	Displays line to neutral voltage and CH 8 Apparent Energy.
	8th time	Displays line to neutral voltage and CH 9 Apparent Energy.
	9th time	Displays line to neutral voltage and CH 10 Apparent Energy.
	10th time	Displays line to neutral voltage and CH 11 Apparent Energy.
	11th time	Displays line to neutral voltage and CH 12 Apparent Energy.
	12th time	Displays line to neutral voltage and Total Apparent Energy of all channel.
Press (▷) key (7th Time)	——	Displays Active Power of group 1.
	1st time	Displays Active Power of group 2.
	2nd time	Displays Active Power of group 3.
	3rd time	Displays Active Power of group 4.
Press (▷) key (8th Time)	——	Displays Reactive Power of group 1.
	1st time	Displays Reactive Power of group 2.
	2nd time	Displays Reactive Power of group 3.
	3rd time	Displays Reactive Power of group 4.
Press (▷) key (9th Time)	——	Displays Apparent Power of group 1
	1st time	Displays Apparent Power of group 2
	2nd time	Displays Apparent Power of group 3.
	3rd time	Displays Apparent Power of group 4.

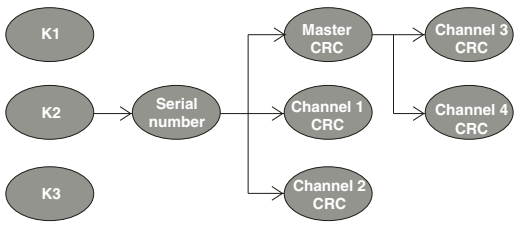
CHANNEL DESCRIPTION

Group	12 Channel Meter	4 Channel Meter
Gr 1	CH1, CH2, CH3	1st, 2nd and 3rd phase of CH1
Gr 2	CH4, CH5, CH6	1st, 2nd and 3rd phase of CH2
Gr 3	CH7, CH8, CH9	1st, 2nd and 3rd phase of CH3
Gr 4	CH10, CH11, CH12	1st, 2nd and 3rd phase of CH4

AUTO / MANUAL PAGE MODE DESCRIPTION :

Press ❐ (First) key for 3sec. to toggle between Automatic and Manual mode.
Note : By default unit operates in automatic mode.
In automatic mode online pages scroll automatically at the rate of 5 sec. per page.
In automatic mode when any key is pressed, unit temporarily switches to manual mode and the appropriate page is displayed, also if any key is not pressed for 5sec., unit resumes automatic mode.

CRC Display



1) Press K2 for 10 sec to display 8 digit serial no.
2) While showing serial no. Press K1 to display 10 digit 4 byte CRC of Master.
3) While showing serial no. Press K2 to display 10 digit 4 byte CRC of Ch1.
4) While showing serial no. Press K3 to display 10 digit 4 byte CRC of CH2.
5) While showing Master CRC Press K1 to display 10 digit 4 byte CRC of CH3.
6) While showing Master CRC Press K2 to display 10 digit 4 byte CRC of Ch4.

CONFIGURATION

There are 3 dedicated key with symbols marked as ▷, △ and ↵. Use these 3 key to enter into configuration / change setting.
Note : The settings should be done by a professional, after going through this users manual and after having understood the application situation.
For the configuration setting mode

- Use △ and ↵ for 3 sec. to enter or exit from config mode
- Use ▷ shift key to move cursor left or right by one digit each time. After last digit of display cursor shift at 1st digit of display.
- Use △ increment key for increasing the parameter value.
- Use ↵ key to save the setting and move on to next page
- Use △ and ▷ keys to go back to previous page.

Config. page.	FUNCTION	Range or Selection	Factory Setting
	Password	0000 to 9998	1000
1	Change Password	No / Yes	No
1.1	New Password	0000 to 9998	0000
2	No of Channel	4 CH / 12 CH	4 CH
3	Network Selection		3P4W
	For 4 Channel	3P4W, 1P2W-P1, 1P2W-P2, 1P2W-P3.	
	For 12 Channel	1P2W	
4	CT Secondary	1	1
	For 4 Channel		
5	CT Primary CH 1	1 to 6000	1
6	CT Primary CH 2	1 to 6000	1
7	CT Primary CH 3	1 to 6000	1
8	CT Primary CH 4	1 to 6000	1
	For 12 Channel		
5	CT Primary Gr 1	1 to 6000	1
6	CT Primary Gr 2	1 to 6000	1
7	CT Primary Gr 3	1 to 6000	1
8	CT Primary Gr 4	1 to 6000	1
9	L1 CT Mounting	RHS/LHS	RHS
10	L2 CT Mounting	RHS/LHS	RHS
11	L3 CT Mounting	RHS/LHS	RHS
12	L4 CT Mounting	RHS/LHS	RHS
13	PT Secondary	100 to 500	350
14	PT Primary	100 to 600	350
15	Slave Id	1 to 255	1
16	Baud Rate	300, 600, 1200, 2400, 4800, 9600 and 19200	9600
17	Parity	None, Odd, Even	None
18	Stop Bit	1 to 2	1
19	Backlight	0000 to 7200	0000
20	Factory Default	No / Yes	No
21	Reset Energy	No / Yes	No
21.1	Password	0001 to 9999	1001
21.2	Reset kWh		None
	For 4 Channel	CH 1 TO CH 4 None and All	
	For 12 Channel	CH 1 TO CH 12 None and All	
21.3	Reset kVArh		None
	For 4 Channel	CH 1 TO CH 4 None and All	
	For 12 Channel	CH 1 TO CH 12 None and All	
21.4	Reset kVAh		None
	For 4 Channel	CH 1 TO CH 4 None and All	
	For 12 Channel	CH 1 TO CH 12 None and All	

For resetting energy parameters user will be prompted 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.

SERIAL NUMBER DESCRIPTION

Press △ key for 10sec. to display 8 digit serial number only for 10sec. at 2nd and 3rd line of display.

Energy rollover counter addresses

Readable parameters for 4 Channel Meter : [Length (Register) : 1 ; Data Structure : Integer]

ADDRESS	HEX ADDRESS	PARAMETER
30438	0x1B6	KWh1 CH 1
30439	0x1B7	KWh2 CH 1
30440	0x1B8	KWh3 CH 1
30441	0x1B9	Total kWh CH 1
30442	0x1BA	KWh1 CH 2
30443	0x1BB	KWh2 CH 2
30444	0x1BC	KWh3 CH 2
30445	0x1BD	Total KWh CH 2
30446	0x1BE	KWh1 CH 3
30447	0x1BF	KWh2 CH 3
30448	0x1C0	KWh3 CH 3
30449	0x1C1	Total KWh CH 3
30450	0x1C2	KWh1 CH 4
30451	0x1C3	KWh2 CH 4
30452	0x1C4	KWh3 CH 4
30453	0x1C5	Total KWh CH 4
30454	0x1C6	KVArh1 CH 1
30455	0x1C7	KVArh2 CH 1
30456	0x1C8	KVArh3 CH 1
30457	0x1C9	Total kVArh CH 1
30458	0x1CA	KVArh1 CH 2
30459	0x1CB	KVArh2 CH 2
30460	0x1CC	KVArh3 CH 2
30461	0x1CD	Total kVArh CH 2
30462	0x1CE	KVArh1 CH 3
30463	0x1CF	KVArh2 CH 3
30464	0x1D0	KVArh3 CH 3
30465	0x1D1	Total KVArh CH 3
30466	0x1D2	KVArh1 CH 4
30467	0x1D3	KVArh2 CH 4
30468	0x1D4	KVArh3 CH 4
30469	0x1D5	Total KVArh CH 4
30470	0x1D6	KVAh1 CH 1
30471	0x1D7	KVAh2 CH 1
30472	0x1D8	KVAh3 CH 1
30473	0x1D9	Total kVAh CH 1
30474	0x1DA	KVAh1 CH 2
30475	0x1DB	KVAh2 CH 2
30476	0x1DC	KVAh3 CH 2
30477	0x1DD	Total KVAh CH 2
30478	0x1DE	KVAh1 CH 3
30479	0x1DF	KVAh2 CH 3
30480	0x1E0	KVAh3 CH 3
30481	0x1E1	Total KVAh CH 3
30482	0x1E2	KVAh1 CH 4
30483	0x1E3	KVAh2 CH 4
30484	0x1E4	KVAh3 CH 4
30485	0x1E5	Total KVAh CH 4
30486	0x1E6	Total KWh
30487	0x1E7	Total KVArh
30488	0x1E8	Total KVAh
30489	0x1E9	Channel Selection 1st
30490	0x1EA	Channel Selection 2nd
30491	0x1EB	Channel Selection 3rd
30492	0x1EC	Channel Selection 4th
30493	0x1ED	Channel Selection 5th
30494	0x1EE	Channel Selection 6th
30495	0x1EF	Channel Selection 7th
30496	0x1F0	Channel Selection 8th
30497	0x1F1	Channel Selection 9th
30498	0x1F2	Channel Selection 10th
30499	0x1F3	Network Selection 1st
30500	0x1F4	Network Selection 2nd
30501	0x1F5	Network Selection 3d
30502	0x1F6	Network Selection 4th
30503	0x1F7	Network Selection 5th
30504	0x1F8	Network Selection 6th
30505	0x1F9	Network Selection 7th
30506	0x1FA	Network Selection 8th
30507	0x1FB	Network Selection 9th
30508	0x1FC	Network Selection 10th
30509	0x1FD	CT Primary CH1 1st
30510	0x1FE	CT Primary CH1 2nd
30511	0x1FF	CT Primary CH1 3rd
30512	0x200	CT Primary CH1 4th
30513	0x201	CT Primary CH1 5th
30514	0x202	CT Primary CH1 6th
30515	0x203	CT Primary CH1 7th
30516	0x204	CT Primary CH1 8th
30517	0x205	CT Primary CH1 9th
30518	0x206	CT Primary CH1 10th
30519	0x207	CT Primary CH2 1st
30520	0x208	CT Primary CH2 2nd
30521	0x209	CT Primary CH2 3rd
30522	0x20A	CT Primary CH2 4th
30523	0x20B	CT Primary CH2 5th
30524	0x20C	CT Primary CH2 6th
30525	0x20D	CT Primary CH2 7th
30526	0x20E	CT Primary CH2 8th
30527	0x20F	CT Primary CH2 9th
30528	0x210	CT Primary CH2 10th
30529	0x211	CT Primary CH3 1st
30530	0x212	CT Primary CH3 2nd
30531	0x213	CT Primary CH3 3rd
30532	0x214	CT Primary CH3 4th
30533	0x215	CT Primary CH3 5th
30534	0x216	CT Primary CH3 6th
30535	0x217	CT Primary CH3 7th
30536	0x218	CT Primary CH3 8th
30537	0x219	CT Primary CH3 9th
30538	0x21A	CT Primary CH3 10th
30539	0x21B	CT Primary CH4 1st
30540	0x21C	CT Primary CH4 2nd
30541	0x21D	CT Primary CH4 3rd
30542	0x21E	CT Primary CH4 4th
30543	0x21F	CT Primary CH4 5th
30544	0x220	CT Primary CH4 6th
30545	0x221	CT Primary CH4 7th
30546	0x222	CT Primary CH4 8th
30547	0x223	CT Primary CH4 9th
30548	0x224	CT Primary CH4 10th
30549	0x225	CT Mounting CH1 1st
30550	0x226	CT Mounting CH1 2nd
30551	0x227	CT Mounting CH1 3rd
30552	0x228	CT Mounting CH1 4th
30553	0x229	CT Mounting CH1 5th
30554	0x22A	CT Mounting CH1 6th
30555	0x22B	CT Mounting CH1 7th
30556	0x22C	CT Mounting CH1 8th
30557	0x22D	CT Mounting CH1 9th
30558	0x22E	CT Mounting CH1 10th
30559	0x22F	CT Mounting CH2 1st
30560	0x230	CT Mounting CH2 2nd
30561	0x231	CT Mounting CH2 3rd
30562	0x232	CT Mounting CH2 4th
30563	0x233	CT Mounting CH2 5th
30564	0x234	CT Mounting CH2 6th
30565	0x235	CT Mounting CH2 7th
30566	0x236	CT Mounting CH2 8th
30567	0x237	CT Mounting CH2 9th
30568	0x238	CT Mounting CH2 10th
30569	0x239	CT Mounting CH3 1st
30570	0x23A	CT Mounting CH3 2nd
30571	0x23B	CT Mounting CH3 3rd
30572	0x23C	CT Mounting CH3 4th
30573	0x23D	CT Mounting CH3 5th
30574	0x23E	CT Mounting CH3 6th
30575	0x23F	CT Mounting CH3 7th
30576	0x240	CT Mounting CH3 8th
30577	0x241	CT Mounting CH3 9th
30578	0x242	CT Mounting CH3 10th
30579	0x243	CT Mounting CH4 1st
30580	0x244	CT Mounting CH4 2nd
30581	0x245	CT Mounting CH4 3rd
30582	0x246	CT Mounting CH4 4th
30583	0x247	CT Mounting CH4 5th
30584	0x248	CT Mounting CH4 6th
30585	0x249	CT Mounting CH4 7th
30586	0x24A	CT Mounting CH4 8th
30587	0x24B	CT Mounting CH4 9th
30588	0x24C	CT Mounting CH4 10th
30589	0x24D	PT Secondary 1st
30590	0x24E	PT Secondary 2nd

Energy rollover counter addresses

Readable parameters for 4 Channel Meter : [Length (Register) : 1 ; Data Structure : Integer]

ADDRESS	HEX ADDRESS	PARAMETER
30591	0x24F	PT Secondary 3rd
30592	0x250	PT Secondary 4th
30593	0x251	PT Secondary 5th
30594	0x252	PT Secondary 6th
30595	0x253	PT Secondary 7th
30596	0x254	PT Secondary 8th
30597	0x255	PT Secondary 9th
30598	0x256	PT Secondary 10th
30599	0x257	PT Primary 1st
30600	0x258	PT Primary 2nd
30601	0x259	PT Primary 3rd
30602	0x25A	PT Primary 4th
30603	0x25B	PT Primary 5th
30604	0x25C	PT Primary 6th
30605	0x25D	PT Primary 7th
30606	0x25E	PT Primary 8th
30607	0x25F	PT Primary 9th
30608	0x260	PT Primary 10th

MODBUS RESISTER ADDRESSES FLOAT

Readable parameters for 4 Channel Meter : [Length (Register) : 2 ; Data Structure : Float]

ADDRESS	HEX ADDRESS	PARAMETER
30000	0x00	V1N of CH 1
30002	0x02	V2N of CH 1
30004	0x04	V3N of CH 1
30006	0x06	Average Voltage LN CH 1
30008	0x08	V12 of CH 1
30010	0x0A	V23 of CH 1
30012	0x0C	V31 of CH 1
30014	0x0E	Average voltage LL CH 1
30016	0x10	I1 CH 1
30018	0x12	I2 CH 1
30020	0x14	I3 CH 1
30022	0x16	Average current of CH 1
30024	0x18	Frequency CH1
30026	0x1A	KW1 CH 1
30028	0x1C	KW2 CH 1
30030	0x1E	KW3 CH 1
30032	0x20	Total kW CH 1
30034	0x22	KVAr1 CH 1
30036	0x24	KVAr2 CH 1
30038	0x26	KVAr3 CH 1
30040	0x28	Total KVAr CH 1
30042	0x2A	KVA1 CH 1
30044	0x2C	KVA2 CH 1
30046	0x2E	KVA3 CH 1
30048	0x30	Total KVA CH 1
30050	0x32	PF1 CH 1
30052	0x34	PF2 CH 1
30054	0x36	PF3 CH 1
30056	0x38	Average PF CH 1
30058	0x3A	KWh1 CH 1
30062	0x3E	KWh2 CH 1
30066	0x42	KWh3 CH 1
30070	0x46	Total KWh CH 1
30074	0x4A	KVArh1 CH 1
30078	0x4E	KVArh2 CH 1
30082	0x52	KVArh3 CH 1
30086	0x56	Total KVArh CH 1
30090	0x5A	KVAh1 CH 1
30094	0x5E	KVAh2 CH 1
30098	0x62	KVAh3 CH 1
30102	0x66	Total KVAh CH 1
30106	0x6A	V1N of CH 2
30108	0x6C	V2N of CH 2
30110	0x6E	V3N of CH 2
30112	0x70	Average Voltage LN CH 2
30114	0x72	V12 of CH 2
30116	0x74	V23 of CH 2
30118	0x76	V31 of CH 2
30120	0x78	Average voltage LL CH 2
30122	0x7A	I1 CH 2
30124	0x7C	I2 CH 2
30126	0x7E	I3 CH 2
30128	0x80	Average current of CH 2
30130	0x82	Frequency CH 2
30132	0x84	KW1 CH 2
30134	0x86	KW2 CH 2
30136	0x88	KW3 CH 2
30138	0x8A	Total KW CH 2
30140	0x8C	KVAr1 CH 2
30142	0x8E	KVAr2 CH 2
30144	0x90	KVAr3 CH 2
30146	0x92	Total KVAr CH 2
30148	0x94	KVA1 CH 2
30150	0x96	KVA2 CH 2
30152	0x98	KVA3 CH 2
30154	0x9A	Total KVA CH 2
30156	0x9C	PF1 CH 2
30158	0x9E	PF2 CH 2
30160	0xA0	PF3 CH 2
30162	0xA2	Average PF CH 2
30164	0xA4	KWh1 CH 2
30168	0xA8	KWh2 CH 2
30172	0xAC	KWh3 CH 2
30176	0xB0	Total KWh CH 2
30180	0xB4	KVArh1 CH 2
30184	0xB8	KVArh2 CH 2
30188	0xBC	KVArh3 CH 2
30192	0xC0	Total KVArh CH 2
30196	0xC4	KVAh1 CH 2
30200	0xC8	KVAh2 CH 2
30204	0xCC	KVAh3 CH 2
30208	0xD0	Total KVAh CH 2
30212	0xD4	V1N of CH 3
30214	0xD6	V2N of CH 3
30216	0xD8	V3N of CH 3
30218	0xDA	Average Voltage LN CH 3
30220	0xDC	V12 of CH 3
30222	0xDE	V23 of CH 3
30224	0xE0	V31 of CH 3
30226	0xE2	Average voltage LL CH 3
30228	0xE4	I1 CH 3
30230	0xE6	I2 CH 3
30232	0xE8	I3 CH 3
30234	0xEA	Average current of CH 3
30236	0xEC	Frequency CH 3
30238	0xEE	KW1 CH 3
30240	0xF0	KW2 CH 3
30242	0xF2	KW3 CH 3
30244	0xF4	Total kW CH 3
30246	0xF6	KVAr1 CH 3
30248	0xF8	KVAr2 CH 3
30250	0xFA	KVAr3 CH 3
30252	0xFC	Total kVAr CH 3
30254	0xFE	KVA1 CH 3
30256	0x100	KVA2 CH 3
30258	0x102	KVA3 CH 3
30260	0x104	Total kVA CH 3
30262	0x106	PF1 CH 3
30264	0x108	PF2 CH 3
30266	0x10A	PF3 CH 3
30268	0x10C	Average PF CH 3
30270	0x10E	KWh1 CH 3
30274	0x112	KWh2 CH 3
30278	0x116	KWh3 CH 3
30282	0x11A	Total KWh CH 3
30286	0x11E	KVArh1 CH 3
30290	0x122	KVArh2 CH 3
30294	0x126	KVArh3 CH 3
30298	0x12A	Total kVArh CH 3
30302	0x12E	KVAh1 CH 3
30306	0x132	KVAh2 CH 3
30310	0x136	KVAh3 CH 3
30314	0x13A	Total kVAh CH 3

MODBUS RESISTER ADDRESSES FLOAT

Readable parameters for 4 Channel Meter : [Length (Register) : 2 ; Data Structure : Float]

ADDRESS	HEX ADDRESS	PARAMETER
30318	0x13E	V1N of CH 4
30320	0x140	V2N of CH 4
30322	0x142	V3N of CH 4
30324	0x144	Average Voltage LN CH 4
30326	0x146	V12 of CH 4
30330	0x14A	V23 of CH 4
30332	0x14C	V31 of CH 4
30334	0x14E	Average voltage LL CH 4
30336	0x150	I1 CH 4
30338	0x152	I2 CH 4
30340	0x154	I3 CH 4
30342	0x156	Average current of CH 4
30344	0x158	Frequency CH 4
30346	0x15A	KW1 CH 4
30348	0x15C	KW2 CH 4

ADDRESS	HEX ADDRESS	PARAMETER
30350	0x15E	KW3 CH 4
30352	0x160	Total KW CH 4
30354	0x162	KVAr1 CH 4
30356	0x164	KVAr2 CH 4
30358	0x166	KVAr3 CH 4
30360	0x168	Total kVAr CH 4
30362	0x16A	KVA1 CH 4
30364	0x16C	KVA2 CH 4
30366	0x16E	KVA3 CH 4
30368	0x170	Total KVA CH 4
30370	0x172	PF1 CH 4
30372	0x174	PF2 CH 4
30374	0x176	PF3 CH 4
30376	0x178	Average PF CH 4
30380	0x17C	KWh1 CH 4

ADDRESS	HEX ADDRESS	PARAMETER
30384	0x180	KWh2 CH 4
30388	0x184	KWh3 CH 4
30392	0x188	Total KWh CH 4
30396	0x18C	KVArh1 CH 4
30400	0x190	KVArh2 CH 4
30404	0x194	KVArh3 CH 4
30408	0x198	Total KVArh CH 4
30412	0x19C	KVAh1 CH 4
30416	0x1A0	KVAh2 CH 4
30420	0x1A4	KVAh3 CH 4
30424	0x1A8	Total KWh (CH1,CH2, CH3, CH4)
30428	0x1AC	Total KVArh (CH1,CH2, CH3, CH4)
30432	0x1B0	Total KVAh (CH1,CH2, CH3, CH4)
30436	0x1B4	Serial no. (Data structure : Hex)

MODBUS RESISTER ADDRESSES INTEGER

Readable parameters for 4 Channel Meter : [Length (Register) : 2 OR 3 ; Data Structure : HEX]

ADDRESS	HEX ADDRESS	PARAMETER	LENGTH
31000	0x00	V1N of CH 1	2
31002	0x02	V2N of CH 1	2
31004	0x04	V3N of CH 1	2
31006	0x06	Average Voltage LN CH 1	2
31008	0x08	V12 of CH 1	2
31010	0x0A	V23 of CH 1	2
31012	0x0C	V31 of CH 1	2
31014	0x0E	Average voltage LL CH 1	2
31016	0x10	I1 CH 1	2
31018	0x12	I2 CH 1	2
31020	0x14	I3 CH 1	2
31022	0x16	Average current of CH 1	2
31024	0x18	Frequency CH1	2
31026	0x1A	KW1 CH 1	2
31028	0x1C	KW2 CH 1	2
31030	0x1E	KW3 CH 1	2
31032	0x20	Total KW CH 1	2
31034	0x22	KVAr1 CH 1	2
31036	0x24	KVAr2 CH 1	2
31038	0x26	KVAr3 CH 1	2
31040	0x28	Total KVAr CH 1	2
31042	0x2A	KVA1 CH 1	2
31044	0x2C	KVA2 CH 1	2
31046	0x2E	KVA3 CH 1	2
31048	0x30	Total KVA CH 1	2
31050	0x32	PF1 CH 1	2
31052	0x34	PF2 CH 1	2
31054	0x36	PF3 CH 1	2
31056	0x38	Average PF CH 1	2
31058	0x3A	KWh1 CH 1	3
31062	0x3E	KWh2 CH 1	3
31066	0x42	KWh3 CH 1	3
31070	0x46	Total KWh CH 1	3

ADDRESS	HEX ADDRESS	PARAMETER	
31074	0x4A	KVArh1 CH 1	3
31078	0x4E	KVArh2 CH 1	3
31082	0x52	KVArh3 CH 1	3
31086	0x56	Total KVArh CH 1	3
31090	0x5A	KVAh1 CH 1	3
31094	0x5E	KVAh2 CH 1	3
31098	0x62	KVAh3 CH 1	3
31102	0x66	Total KVAh CH 1	3
31106	0x6A	V1N of CH 2	2
31108	0x6C	V2N of CH 2	2
31110	0x6E	V3N of CH 2	2
31112	0x70	Average Voltage LN CH 2	2
31114	0x72	V12 of CH 2	2
31116	0x74	V23 of CH 2	2
31118	0x76	V31 of CH 2	2
31120	0x78	Average voltage LL CH 2	2
31122	0x7A	I1 CH 2	2
31124	0x7C	I2 CH 2	2
31126	0x7E	I3 CH 2	2
31128	0x80	Average current of CH 2	2
31130	0x82	Frequency CH2	2
31132	0x84	KW1 CH 2	2
31134	0x86	KW2 CH 2	2
31136	0x88	KW3 CH 2	2
31138	0x8A	Total kW CH 2	2
31140	0x8C	KVAr1 CH 2	2
31142	0x8E	KVAr2 CH 2	2
31144	0x90	KVAr3 CH 2	2
31146	0x92	Total KVAr CH 2	2
31148	0x94	KVA1 CH 2	2
31150	0x96	KVA2 CH 2	2
31152	0x98	KVA3 CH 2	2
31154	0x9A	Total KVA CH 2	2

ADDRESS	HEX ADDRESS	PARAMETER	
31156	0x9C	PF1 CH 2	2
31158	0x9E	PF2 CH 2	2
31160	0xA0	PF3 CH 2	2
31162	0xA2	Average PF CH 2	2
31164	0xA4	KWh1 CH 2	3
31168	0xA8	KWh2 CH 2	3
31172	0xAC	KWh3 CH 2	3
31176	0xB0	Total KWh CH 2	3
31180	0xB4	KVArh1 CH 2	3
31184	0xB8	KVArh2 CH 2	3
31188	0xBC	KVArh3 CH 2	3
31192	0xC0	Total KVArh CH 2	3
31196	0xC4	KVAh1 CH 2	3
31200	0xC8	KVAh2 CH 2	3
31204	0xCC	KVAh3 CH 2	3
31208	0xD0	Total KVAh CH 2	3
31212	0xD4	V1N of CH 3	2
31214	0xD6	V2N of CH 3	2
31216	0xD8	V3N of CH 3	2
31218	0xDA	Average Voltage LN CH 3	2
31220	0xDC	V12 of CH 3	2
31222	0xDE	V23 of CH 3	2
31224	0xE0	V31 of CH 3	2
31226	0xE2	Average voltage LL CH 3	2
31228	0xE4	I1 CH 3	2
31230	0xE6	I2 CH 3	2
31232	0xE8	I3 CH 3	2
31234	0xEA	Average current of CH 3	2
31236	0xEC	Frequency CH3	2
31238	0xEE	KW1 CH 3	2
31240	0xF0	KW2 CH 3	2
31242	0xF2	KW3 CH 3	2
31244	0xF4	Total KW CH 3	2

MODBUS RESISTER ADDRESSES INTEGER

Readable parameters for 4 Channel Meter : [Length (Register) : 2 OR 3; Data Structure : HEX]

ADDRESS	HEX ADDRESS	PARAMETER	
31246	0xF6	KVAr1 CH 3	2
31248	0xF8	KVAr2 CH 3	2
31250	0xFA	KVAr3 CH 3	2
31252	0xFC	Total KVAr CH 3	2
31254	0xFE	KVA1 CH 3	2
31256	0x100	KVA2 CH 3	2
31258	0x102	KVA3 CH 3	2
31260	0x104	Total KVA CH 3	2
31262	0x106	PF1 CH 3	2
31264	0x108	PF2 CH 3	2
31266	0x10A	PF3 CH 3	2
31268	0x10C	Average PF CH 3	2
31270	0x10E	KWh1 CH 3	3
31272	0x110	KWh2 CH 3	3
31278	0x116	KWh3 CH 3	3
31282	0x11A	Total KWh CH 3	3
31286	0x11E	KVArh1 CH 3	3
31290	0x122	KVArh2 CH 3	3
31294	0x126	KVArh3 CH 3	3
31298	0x12A	Total KVArh CH 3	3
31302	0x12E	KVAh1 CH 3	3
31306	0x132	KVAh2 CH 3	3
31310	0x136	KVAh3 CH 3	3
31314	0x13A	Total KVAh CH 3	3
31318	0x13E	V1N of CH 4	2
31320	0x140	V2N of CH 4	2
31322	0x142	V3N of CH 4	2
31324	0x144	Average Voltage LN CH 4	2
31326	0x146	V12 of CH 4	2
31328	0x148	V23 of CH 4	2
31330	0x14A	V31 of CH 4	2
31332	0x14C	Average voltage LL CH 4	2
31334	0x14E	I1 CH 4	2
31336	0x150	I2 CH 4	2
31338	0x152	I3 CH 4	2
31340	0x154	Average current of CH 4	2
31342	0x156	Frequency Ch 4	2
31344	0x158	KW1 CH 4	2
31346	0x15A	KW2 CH 4	2
31348	0x15C	KW3 CH 4	2
31350	0x15E	Total KW CH 4	2
31352	0x160	KVAr1 CH 4	2
31354	0x162	KVAr2 CH 4	2
31356	0x164	KVAr3 CH 4	2
31358	0x166	Total kVAr CH 4	2
31360	0x168	KVA1 CH 4	2
31362	0x16A	KVA2 CH 4	2
31364	0x16C	KVA3 CH 4	2
31366	0x16E	Total kVA CH 4	2
31368	0x170	PF1 CH 4	2
31370	0x172	PF2 CH 4	2
31372	0x174	PF3 CH 4	2
31374	0x176	Average PF CH 4	2
31376	0x178	KWh1 CH 4	3
31380	0x17C	KWh2 CH 4	3
31384	0x180	KWh3 CH 4	3
31388	0x184	Total kWh CH 4	3
31392	0x188	KVArh1 CH 4	3
31496	0x18C	KVArh2 CH 4	3
31400	0x190	KVArh3 CH 4	3
31404	0x194	Total KVArh CH 4	3
31408	0x198	KVAh1 CH 4	3
31412	0x19C	KVAh2 CH 4	3
31416	0x1A0	KVAh3 CH 4	3
31420	0x1A4	Total kVAh CH 4	3

Note : 1. Voltage and Current will display in mV and mA. Power will display in W(Active), VAr(Reactive) & VA(Apparent). Energy will display in Wh(Active), VArh(Reactive) & VAh(Apparent).

MODBUS REGISTER ADDRESSES LIST

Readable / Writable parameters from RI-D380

Address	Hex Address	Parameter	Range		Length(Register)	Data Structure
			Min value	**Max value**		
40000	0x00	Password	0	9998	1	Integer
			Value	**Meaning**		
40001	0x01	N/W selection	0x0000	3P-4W	1	Integer
			0x0001		1	Integer
			0x0002	1P2W-P1	1	Integer
			0x0003	1P2W-P2	1	Integer
			0x0004	1P2W-P3	1	Integer
		(Valid only for 12 Channel meter)	0x0005	1P2W	1	Integer
			Min value	**Max value**		
40002	0x02	CT Secondary	1	1	1	Integer
40003	0x03	CT Primary CH1 (Gr 1 for 12 CH Meter)	1	10000	1	Integer
40004	0x04	CT Primary CH2 (Gr 2 for 12 CH Meter)	1	10000	1	Integer
40005	0x05	CT Primary CH3 (Gr 3 for 12 CH Meter)	1	10000	1	Integer
40006	0x06	CT Primary CH4 (Gr 4 for 12 CH Meter)	1	10000	1	Integer
40007	0x07	PT Secondary	100	500	1	Integer
40008	0x08	PT Primary	100	10000	2	Integer
40010	0x0A	Slave ID	1	255		
			Value	**Meaning**		
40011	0x0B	Baud Rate	0x0000	300	1	Integer
			0x0001	600	1	Integer
			0x0002	1200	1	Integer
			0x0003	2400	1	Integer
			0x0004	4800	1	Integer
			0x0005	9600	1	Integer
			0x0006	19200	1	Integer

MODBUS REGISTER ADDRESSES LIST

Readable / Writable parameters from RI-D380

Address	Hex Address	Parameter	Range		Length(Register)	Data Structure
40012	0x0C	Parity	0x0000	None	1	Integer
			0x0001	Odd	1	Integer
			0x0002	Even	1	Integer
40013	0x0D	Stop Bit	0x0000	1	1	Integer
			0x0001	2	1	Integer
			Min value	**Max value**		
40014	0x0E	Backlight	0000	7200	1	Integer
			Value	**Meaning**		
40015	0x0F	No of channel	0x0000	4 channel	1	Integer
			0x0001	12 channel	1	Integer
40016	0x10	Factory Default	1	To set factory setting range	1	Integer
40017	0x11	Reset Active Energy	1 to 13	CH 1 to CH12 , ALL	1	Integer
40018	0x12	Reset Apparent Energy	1 to 13	CH 1 to CH12 , ALL	1	Integer
40019	0x13	Reset Reactive Energy	1 to 13	CH 1 to CH12 , ALL	1	Integer

Example to Read Data from Input Register

For eg. If Total Active Power =1.234 MW
Start Address : 31100 , No. of Register: 02
Hexadecimal Equivalent of 1.234 MW is 0x0012D450

	A	B
Data stored at 31100 is LSB :	D4	50

	C	D
Data stored at 31101 is MSB :	00	12

EU DECLARATION OF CONFORMITY

RAYLEIGH INSTRUMENTS Sp. Z 0.0. (European Office)
Ul. Aleje Jerozolimskie 214, Warsaw, Poland, 02-486

Hereby declares under its sole responsibility the products described below:

Product Family	**RI-D380 THREE PHASE ENERGY METER (DIN RAIL MOUNT)**
Models	**RI-D380-G-x** (all variants)

complies with the provisions of the following harmonised Direc ves:

2014/32/EU - Measuring Instruments Direc e (MID) (as amended)
2015/863 - RoHS Direc (as amended)

based on compliance with the following harmonised Standards:

EN 50470-1:2006 - Electricity metering equipment (AC), General requirements, tests and test condi ons.
EN 50470-3:2006 - Electricity metering equipment (AC), Par equirements
EN IEC 63000:2018 - Technical documenta for the assessment of electrical and electronic products with respect to the restric on of hazardous substances

EU Type Examina	MID Annex B
Cer ate Number	TCM 221/22 5861
Issued By	Czech Metrology Ins - 1383

Par lars:

- The product is traceable by its serial number applied on the product's casing
- CE marking is applied to the product's casing and packaging
- Conformance of installa n is realized only when conducted by a competent installer

Issued: 15th August 2022
Chelmsford UK

Chi Cheung - Technical Manager
On behalf of Rayleigh Instruments

UKCA DECLARATION OF CONFORMITY

RAYLEIGH INSTRUMENTS LIMITED
Raytel House, Cutlers Road, South Woodham Ferrers, Chelmsford, Essex CM3 5WA. UK

Hereby declares under its sole responsibility the products described below:

Product Family	**RI-D380 THREE PHASE ENERGY METER (DIN RAIL MOUNT)**
Models	**RI-D380-G-x** (all variants)

complies with the provisions of the following UK Regula :

SI 2016/1153 Measuring Instruments Regula 2016 (as amended)
SI 2012/3032 Restric n of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regula ons 2012 (as amended)

based on compliance with the following Bri Standards:

BS EN 50470-1:2006 - Electricity metering equipment (AC), General requirements, tests and test condi
BS EN 50470-3:2006 - Electricity metering equipment (AC), Par ar requirements
BS EN IEC 63000:2018 – Technical documenta or the assessment of electrical and electronic products with respect to the restric on of hazardous substances

UK Type Examina	MIR Annex B
Cer ate Number	TCM 221/22 5861
Issued By	Czech Metrology Ins e - 1383

Par lars:

- The product is traceable by its serial number applied on the product's casing
- UKCA marking is applied to the product's casing and packaging
- Conformance of installa n is realized only when conducted by a competent installer

Issued: 15th August 2022
Chelmsford UK

Chi Cheung - Technical Manager
On behalf of Rayleigh Instruments

(Specifications are subject to change, since development is a continuous process.)

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