easywire

Pulse SO

Modbus RTU

RI-F400-B-C / RI-F400-G-C

M-Bus

RI-F400-B-MB / RI-F400-G-MB

X 4

X 1

UK CA CE

Specifications	
Wiring Input	3Ø - 4 wire / 1Ø - 2 wire P1
Rated Input Voltage	3x 100...240V AC (L-N), 173...415V AC (L-L)
Frequency Range	45...65Hz
CT Primary	5A...10,000A configurable
CT Secondary	0.01...1(1.2)A (Meter input: 330mV)
VT Primary	100...500kV configurable
VT Secondary	173...415V AC (L-L) configurable
Display Update Rate	1 sec all parameters
Auxiliary	Supplied from V1
Voltage Rated Burden	< 8VA
Operating/Storage Temperature	-10...55°C / -20...70°C
Humidity	0...85% non-condensing
Protection Degree (IEC/EN60529)	IP54 Front only (rubber gasket fitted)
Pulse Output	External 5...27V DC / 100mA
Pulse Resolution / Duration	0.01...99.99kWh per imp / 50...300mS
Communication	Modbus RTU over RS485 MBus (EN13757)

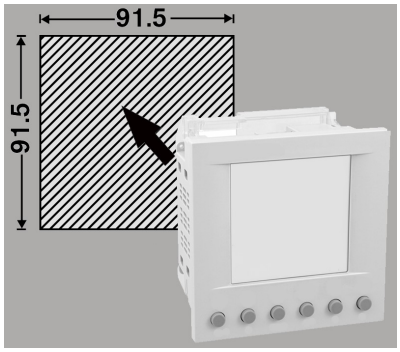
Accuracy	
Voltage V L-N and V L-L	±0.5% of full scale
Current	±0.5% of full scale
Frequency for L-N > 20V, L-L > 35V	±0.1% of full scale
Active, Reactive and Apparent Power	1%
Power Factor	±0.01 of Unity
Active Energy	Class 1 (IEC/EN 62053-21)
Reactive Energy	Class 2 (IEC/EN 62053-23)

Wh Resolution and Default Pulse Weight

CT Ratio x VT Ratio	<15	<150	<1500	<15k	<150k	>150k
Wh / VAh / VArh	0.01k	0.1k	1k	0.01M	0.1M	1M
INT	0.01k	0.1k	1k	0.01M	0.1M	0.1M

Example
If CT Primary = 200A (CT ratio = 200/1 = 200) & VT = 350/350V (VT Ratio = 1)
Wh resolution = 1kWh (200 x 1 = <1500) | Pulse O/P default = 1kWh/pulse

MECHANICAL INSTALLATION



Installation & Environmental

Panel mounted, indoor used only.

Installation category: III (300V L-N)

Altitude: up to 2000 m

Protection Class: II

Pollution degree: II

All terminal covers must be fitted after wiring

PRODUCT SAFETY

Safety related notification, 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 are mechanical damage
- Do not exceed the stated maximum ratings of the device
- No repairs, maintenance or adjustments are possible
- Read the complete instruction manual prior to installation or operating the unit
- The equipment in its installed state must not come into close proximity to any heating sources, oils, steam, caustic vapours or other unwanted process by-products
- Do not use in hazardous or classified location where explosion or other dangers can be triggered by the device

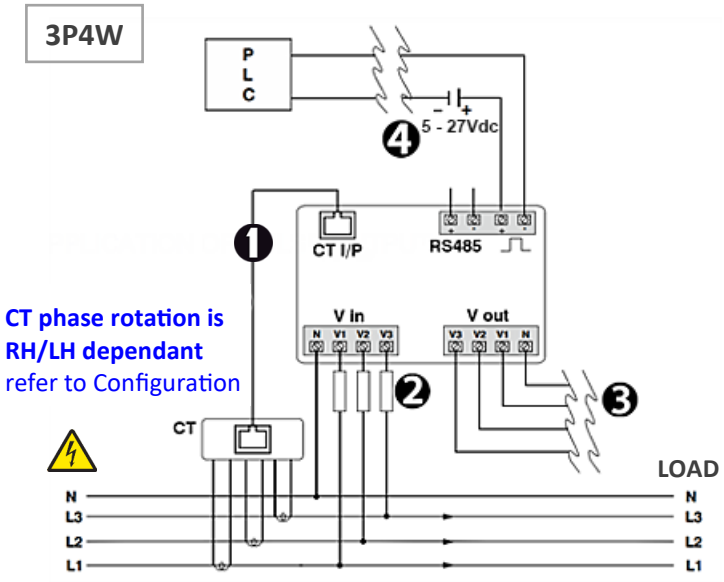
INSTALLATION PRECAUTIONS

Risk of electric shock!
Only to be installed by a competent person

- To prevent the risk of electrocution, always isolate and lock-off the power supply to the equipment prior to undertaking any work
- Always confirm absence of electricity prior to starting work using appropriate voltage detection equipment
- Wiring shall be done strictly according to the terminal layout
- Confirm that all connections are correct before energizing the equipment
- Routing of cables shall be way from any internal EMI source
- Copper cable should be used
- All wiring to be in accordance with applicable local standards

WIRING

3P4W



CT phase rotation is RH/LH dependant
refer to Configuration

Notes:

1 RJ45 cable

2 Fuse class CC UL, fast acting
3-Phase 600V / Single Phase 250V

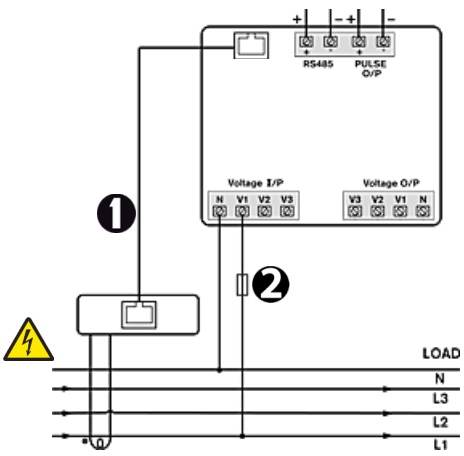
No. Meters	≤ 5	≤ 10	≤ 20	≤ 32
Fuse Rating	0.5A	1A	1.5A	2A

3 Supply 31 additional meters (32 total)

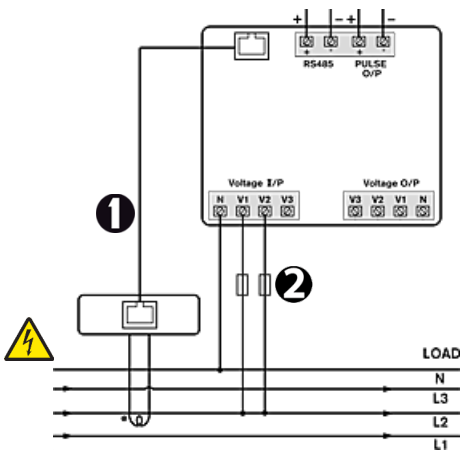
4 For 'Volt-free' PLC or digital input, voltage must be provided by the addition of a DC PSU

5 Single Phase Easywire CT - Set to 1P2W-P1, ensure Voltage Reference to V1 is the same Phase as being measured by CT

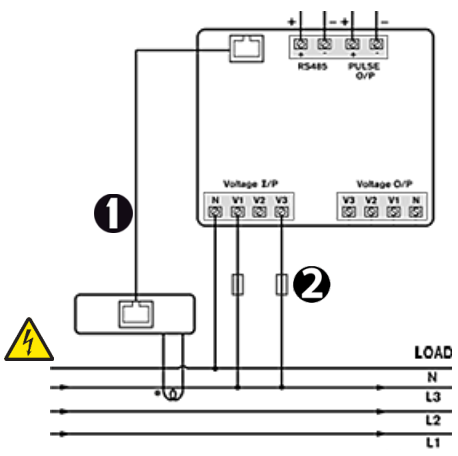
1P2W-P1 ❺



1P2W-P2

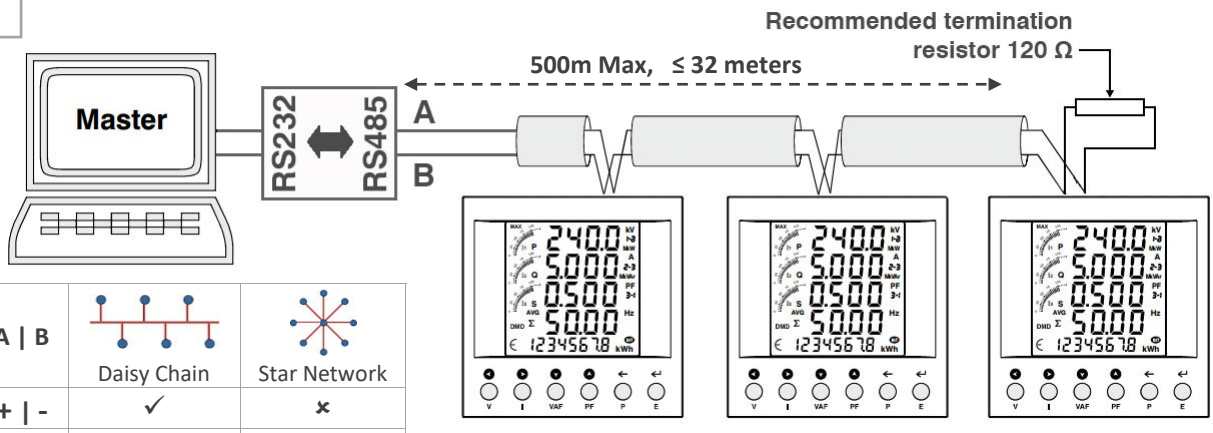


1P2W-P3



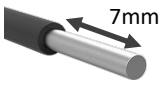
Modbus / MBus

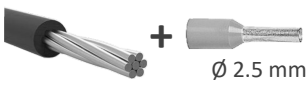
Typical Modbus configuration shown
For MBus interface follow Wiring Topology below



Wiring Topology	A | B	Daisy Chain	Star Network
Modbus	+ | -	✓	×
MBus	1 | 2	✓	✓

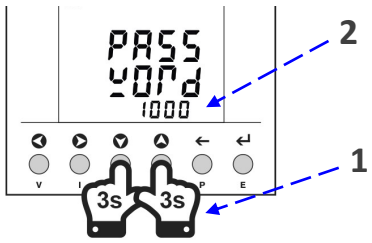
Single Core	Stranded	
0.5 > 4mm²	0.5 > 2.5mm²	0.5 Nm Max
Ø 2.5mm Max	Ø 2.5 mm	





CONFIGURATION

Step A: Enter Configuration Menu



2 Password = 1000 (Refer to Step 2)

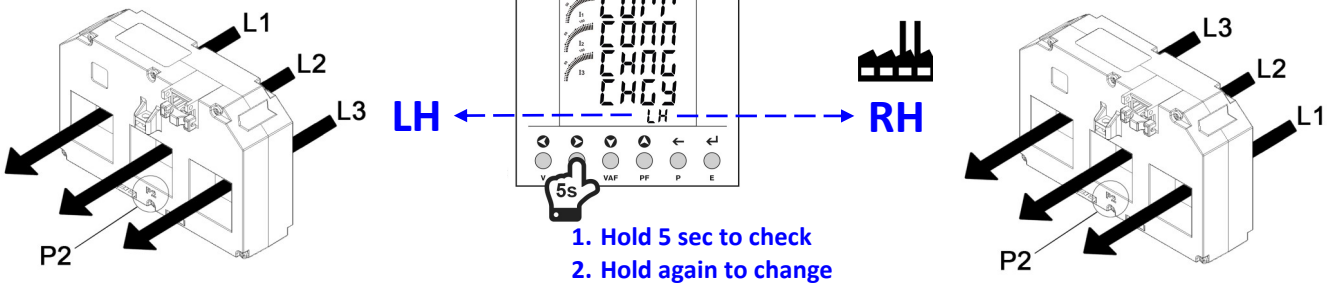
1 Hold 3 Secs to Enter Config (same to Exit)

Step B: Configure each setting, as required, referring to Settings Table below, using the buttons as follow:

1	◀ ▶	Press either button once to make digit or option flash, press again to move flashing cursor
2	▼ ▲	Press to change digit or option, press ◀ or ▶ to move cursor position as required
3	↵	Press to save and move to next setting option, Exit menu once all settings are configured (see Step 1)

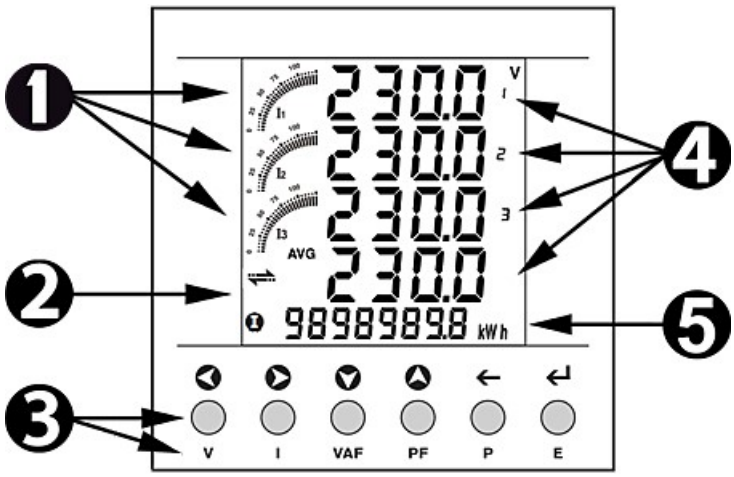
F400-x-C	F400-x-MB	Setting	Default	Adjustment Range	Network & CT Must configure	VT Adjust if Using VT	RS485 Modbus / MBus	Pulse O/P Adjust if used	System Settings Optional
1	1	Change Password	1000	NO / YES (0000 - 9998)					✓
2	2	Phase Network Selection	3P4W	3P4W / 1P2W-P1,2,3	✓				
3	3	CT Secondary	5	330 mV non-adjustable					
4	4	CT Primary (see CT Label)	160	5 - 10,000A	✓				
5	5	PT Secondary	350	173V - 415V		✓			
6	6	PT Primary	350	100V - 500kV		✓			
7	7	Slave ID *Modbus:* *MBus (Primary ID):*	1 1	1 > 255 1 > 250			✓		
8	8	Baud rate *Modbus:* *MBus:*	9600 2400	300 > 38400 bps 1200 > 9600			✓		
9	9	Parity *Modbus:* *MBus:*	None Even	None / Odd / Even Even			✓		
10	10	Stop Bit *Modbus:* *MBus:*	1 1	1 / 2 1			✓		
11	11	Back Light Off (0000 = never)	0000	0 - 7200 Sec					✓
12	12	Demand interval method	Sliding	Sliding / Fixed					✓
13	13	Demand interval duration	15	1 - 30					✓
14	14	Demand interval length	1	1 - 30 min					✓
15	15	Max Auto Display Pages	21	1 - 21					✓
16	16	Change Page Sequence	1	No / YES (1 - 21)					✓
17	17	Pulse Weight	0.1	00.01 - 99.99 kWh/imp				✓	
18	18	Pulse Duration	0.1	0.1 - 2.0 sec				✓	
X	19	MBus Secondary ID	Serial #	0000 0000 - 9999 9999			✓		
19	20	Factory Default	No	No / Yes	Does not reset energy or demand values				✓
20	21	Reset Energy & Demand	No	No / Yes (Password +1)	Once entered, reset each value individually				✓

easywire CT Phase Rotation - RH or LH, must check/change in normal operation



1. Hold 5 sec to check
2. Hold again to change

OPERATION



1 Current level bar graph (% of CT current rating)
2 Functions & displayed measurement indicators:

⇄	RS485 communication in progress
I	Integration of energy (blinks every 5 sec)
∑	Sum of 3-phase
AVG	Average of 3-phase
DMD	Max/Min Demand
TH	Total Harmonic Distortion (THD)
IP	Imported Energy (positive value)
EP	Exported Energy (negative value)
Total	Sum of 3-phase Energy (IP or EP)
Net	Sum of IP + EP Energy

3 Function buttons and function symbols
4 Phase & total or average instantaneous measurements (V, A, PF, Hz, kW, kVAr, kVA) >> **V/I/VAF/PF/P buttons**
5 Energy readings (kWh/kVArh/kVAh) >> **E button**

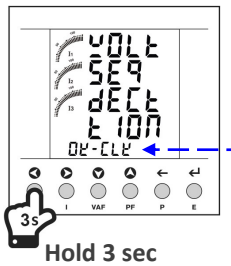
No. of Presses	V	I	VAF	PF	P
x1	Voltage (L-N)	Current	L1: V/A/PF/Hz	Power Factor	Active Power - kW
x2	**Voltage (L-L)**	Current Max DMD	**L2: V/A/PF/Hz**	**Hold 10 sec** displays Serial #	Reactive Power - kVAr
x3	% THD (L-N)	% THD	**L3: V/A/PF/Hz**		Apparent Power - kVA
x4	**% THD (L-L)**		**Avg: V/A/PF/Hz**		L1: kW/kVAr/kVA/PF
x5					**L2: kW/kVAr/kVA/PF**
x6					**L3: kW/kVAr/kVA/PF**
x7					**∑: kW/kVAr/kVA/PF**
x8					Max DMD: kW/kVAr/kVA
x9					Min DMD: kW/kVAr

Parameters in BOLD not displayed for 1P2W configuration

E											
	x1 > 9	**Active Energy - kWh** ⇨	L1 IP	**L2 IP**	**L3 IP**	L1 EP	**L2 EP**	**L3 EP**	∑ IP	∑ EP	Net (IP + EP)
	x10 > 18	**Reactive Energy - kVArh** ⇨	L1 IP	**L2 IP**	**L3 IP**	L1 EP	**L2 EP**	**L3 EP**	∑ IP	∑ EP	Net (IP + EP)
	x19 > 22	**Apparent Energy - kVAh** ⇨	L1	**L2**	**L3**	∑					
	x23	Run Hour (0.01 hr = 36 sec)									

E **Hold 10 sec** - change Page Scroll Auto <-> Manual

Voltage Phase Sequence



Hold 3 sec

OK-CLK: L1 → L2 → L3 ✓

ANTI-CK: Incorrect Order
INVAL Id: Missing Phase ✗