

SOP for Extending the CT Cable of Three-Phase Inverter

1. Purpose

To standardise the procedure for extending the CT (current transformer) signal cable of a three-phase inverter, ensuring stable CT signal transmission and accurate inverter sampling after extending the cable by a further 10 metres (bringing the total length to 20 metres) from the original 10-metre length.

2. Tools and Materials

No.	Name	Qty	Specifications/Requirements
1	CT	3	Inverter accessories, cable length 10m
2	CAT5e network cable	3	Category 5e shielded twisted pair cable, length $\leq 10\text{m}$
3	Crimp terminals	6	Suitable cable diameter, for connecting the CT-side network cable to the CT lead
4	Wire strippers/crimping pliers	1	Suitable wire gauge
5	Multimeter	1	For continuity testing
6	Heat-shrink tubing or electrical tape	1	For insulation protection at connection points

3. Wiring scheme

Three CAT5e network cables are used, with one cable extended independently for each CT phase. **The four twisted pairs within each cable are used in parallel** (i.e. all four core wires are connected together), corresponding respectively to the CT's S1 and S2 terminals.

Schematic of a single network cable connection (using phase L1 as an example):

CT leads	Handling of the 8-core network cable	Inverter COM3 pin
CT1-S1	Connect all four twisted pairs (e.g. blue, blue-white, orange, orange-white) in parallel to the CT-S1 signal	Pin 11
CT1-S2	Connect the other four twisted-pair wires (e.g. green, green-white, brown, brown-white) in parallel to the CT-S2 signal	Pin 12

Note: The eight cores inside each network cable are divided into two groups, with four strands (two pairs of twisted pairs) in each group connected in parallel. these serve as the CT's S1 and S2 signal lines, respectively, thereby reducing cable resistance and enhancing immunity to interference.

4. Steps for Extending the Cable

4.1. Cable Preparation

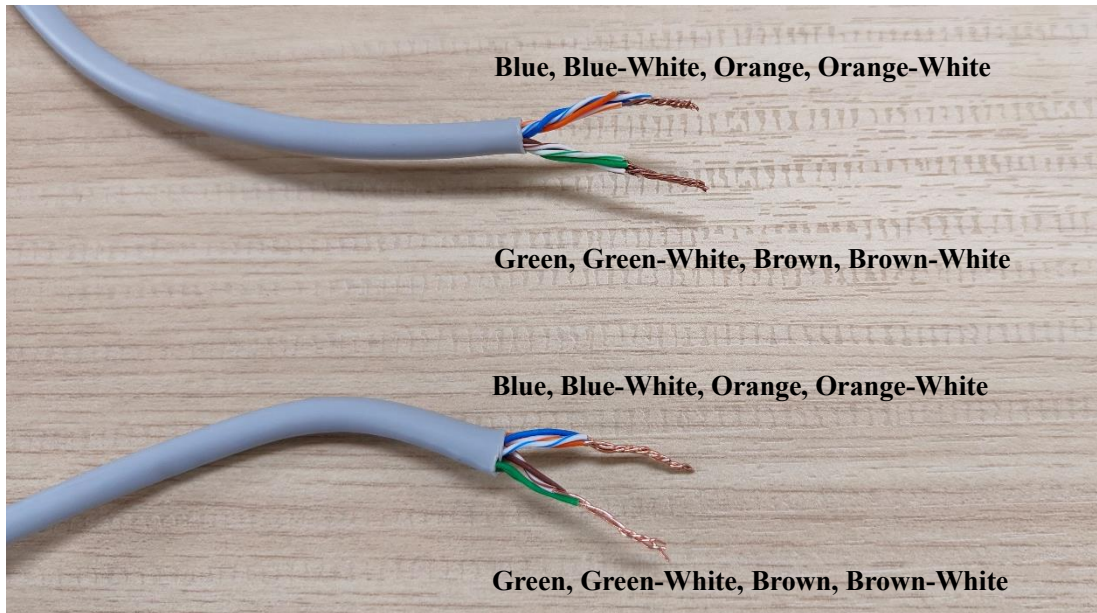
CT signal wires:

1. Cut off the crimped terminals at the ends of the CT leads.
2. Strip approximately 5–8 mm of insulation from the ends of each of the two CT leads to expose the copper core.



For each network cable:

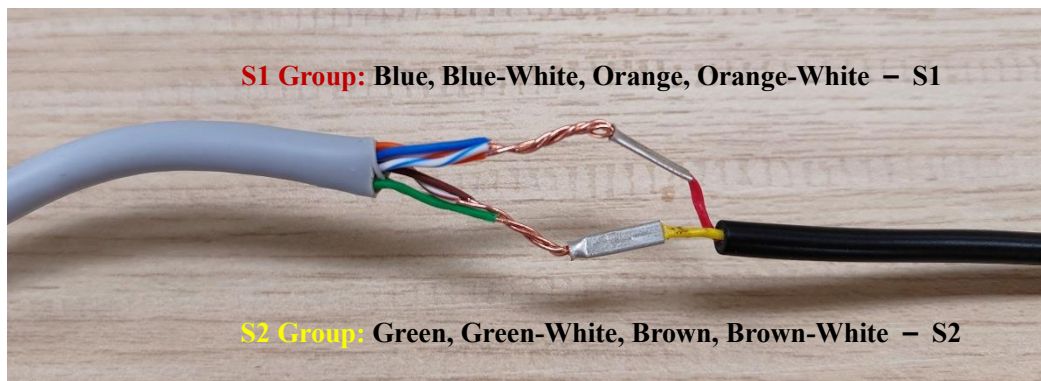
1. Take a length of CAT5e shielded cable (length ≤ 10 metres), and strip approximately 5 cm of sheathing from both ends.
2. Divide the 8 wires into two groups:
 - **Group S1:** Strip the ends of the 4 wires (two twisted pairs) and twist them together in parallel.
 - **Group S2:** Strip the ends of the other 4 wires (two twisted pairs) and twist them together in parallel.



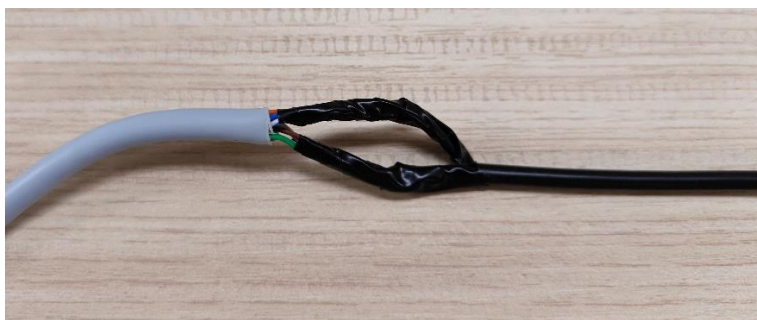
4.2. Connection Cables

CT-side wiring (CT lead → CAT5e network cable):

- Insert the S1 wire of the CT lead into the same terminal as the S1 group (4 wires in parallel) of the network cable and crimp securely.
- Insert the S2 wire of the CT lead into the same terminal as the S2 group (4 wires in parallel) of the network cable and crimp securely.

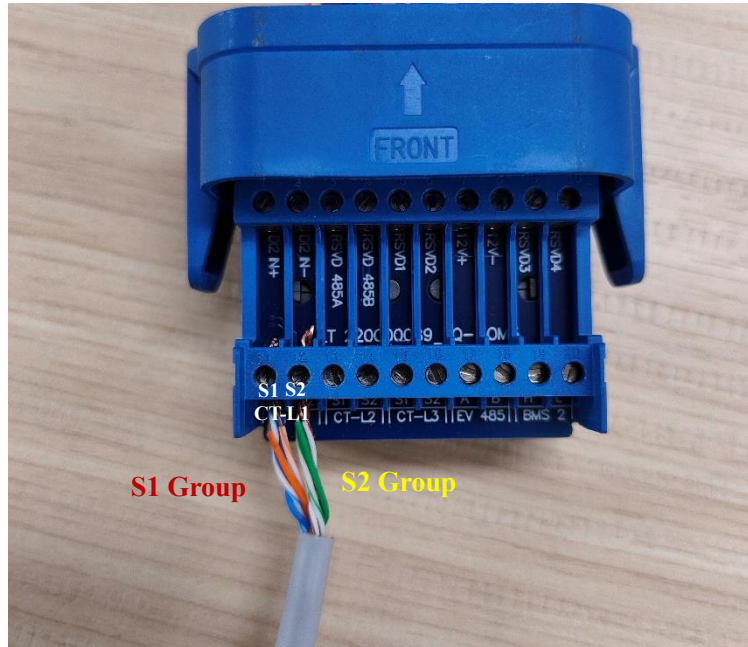


- Insulate the connections using heat-shrink tubing or electrical tape.
- Gently tug to check that the crimp is secure.



Inverter-side wiring (CAT5e network cable → inverter):

Insert the S1 and S2 groups of the three network cables into pins 11–16 of the inverter’s COM3 port respectively, tighten the screws, and gently tug to check that they are secure.



General Wiring Reference Table:

Phase sequence	CT Leads	Network cable (8-core grouped)	Port (Inverter COM3)
L1	CT1-S1	Ethernet cable 1: S1 group (4 wires in parallel)	Pin 11
	CT1-S2	Ethernet cable 1: S2 group (4 wires in parallel)	Pin 12
L2	CT2-S1	Ethernet cable 2: S1 group (4 wires in parallel)	Pin 13
	CT2-S2	Ethernet cable 2: S2 group (4 wires in parallel)	Pin 14
L3	CT3-S1	Ethernet cable 3: S1 group (4 wires in parallel)	Pin 15
	CT3-S2	Ethernet cable 3: S2 group (4 wires in parallel)	Pin 16

5. Testing and Verification

Once the extension is complete, follow these steps to verify:

- Continuity test:** Use a multimeter to check that there is continuity between the CT side of each phase and the corresponding pin on the inverter side (S1 to S1, S2 to S2), and that there are no short circuits.
- Insulation test:** Verify that there are no short circuits between the S1 and S2 groups within the same cable. there must be no short circuits between the three phases.
- Installation inspection:** Check that the CT phase sequence and orientation are correct.