

RTEX Cable

April 1st, 2022

Panasonic Industry Co., Ltd.

Cable and Connector

The Kind of Ethernet Cable

RTEX needs to use Ethernet cable on the market.

“**CAT5e**” and “**STP**” type is recommended in many kinds of the cables.

Frequency Characteristic Category:

Recommended

	CAT3	CAT5	CAT5e	CAT6 / 6e / 7
Purposes	10BASE-T	100BASE-TX	100BASE-TX 1000BASE-T	100BASE-TX 1000BASE-T 1000BASE-TX
Usable	No	No	Yes	Yes
Remark	No longer on the market		Standard	Hard to bend

Shield:

Recommended

	UTP	STP
Shield	Without	With
Application	Consumer	Industrial
Usable	No	Yes

CAT: CAtegory
 5e: 5 enhanced
 STP: Shielded Twisted Pair cable
 UTP: Unshielded Twisted Pair cable

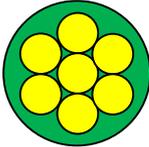
Note: Panasonic does not provide Ethernet cable, so you need to get it on the market by yourself.

Conductor

Solid and Stranded

Although both solid and stranded can be used, the **solid** conductor which has enhanced transmission characteristics is more recommended.

Recommended

	Solid	Stranded
Transmission Characteristics	Good	Fair
Bend Enduring	Fair	Good
Structure in section		

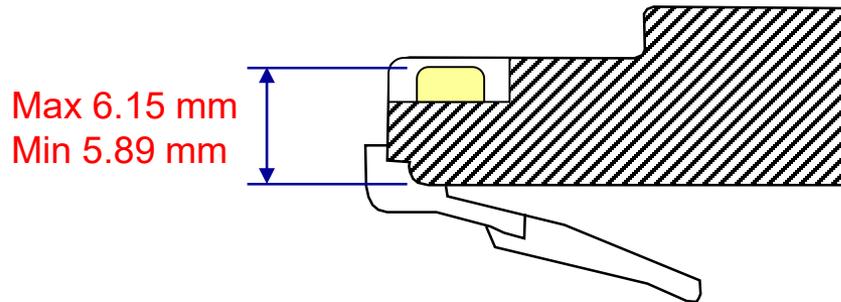
Size

Thin conductor causes attenuation.
Typically **AWG24** should be used.

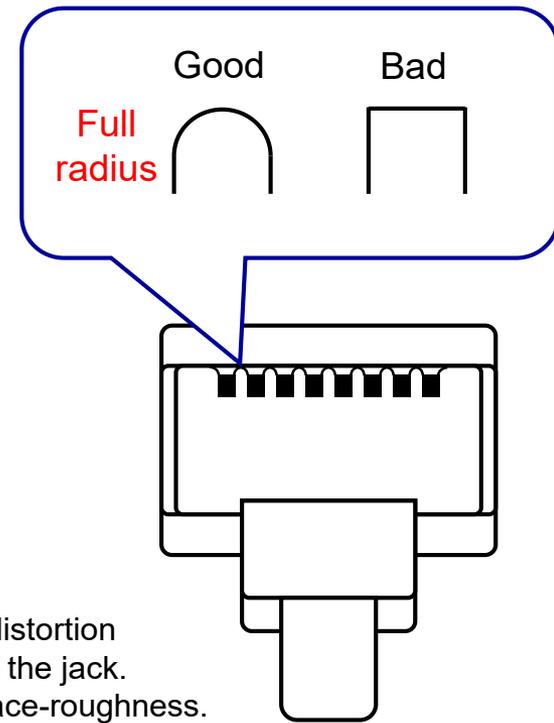
Plug Connector

Plugs compliant with **IEC 60603-7** standard must be used.
Especially, a contact height and a nose shape of the rib are important.

Contact Height



Nose Shape of Rib



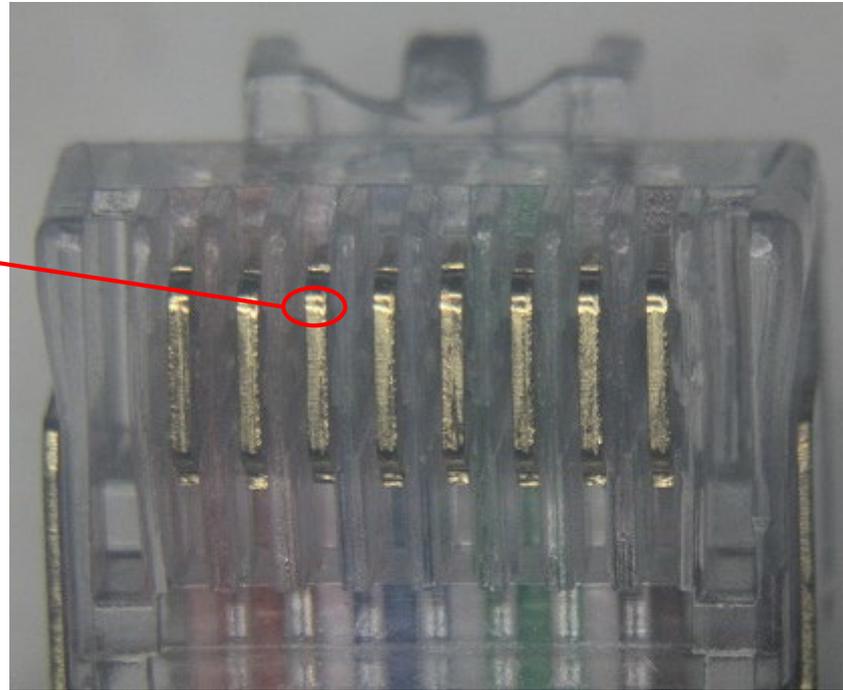
Note:

The rib means partitions between contacts.
If the shape is not full radius, it may cause distortion of jack contacts when inserting the plug into the jack.
It is also required that the rib has good surface-roughness.

Contact Surface Roughness

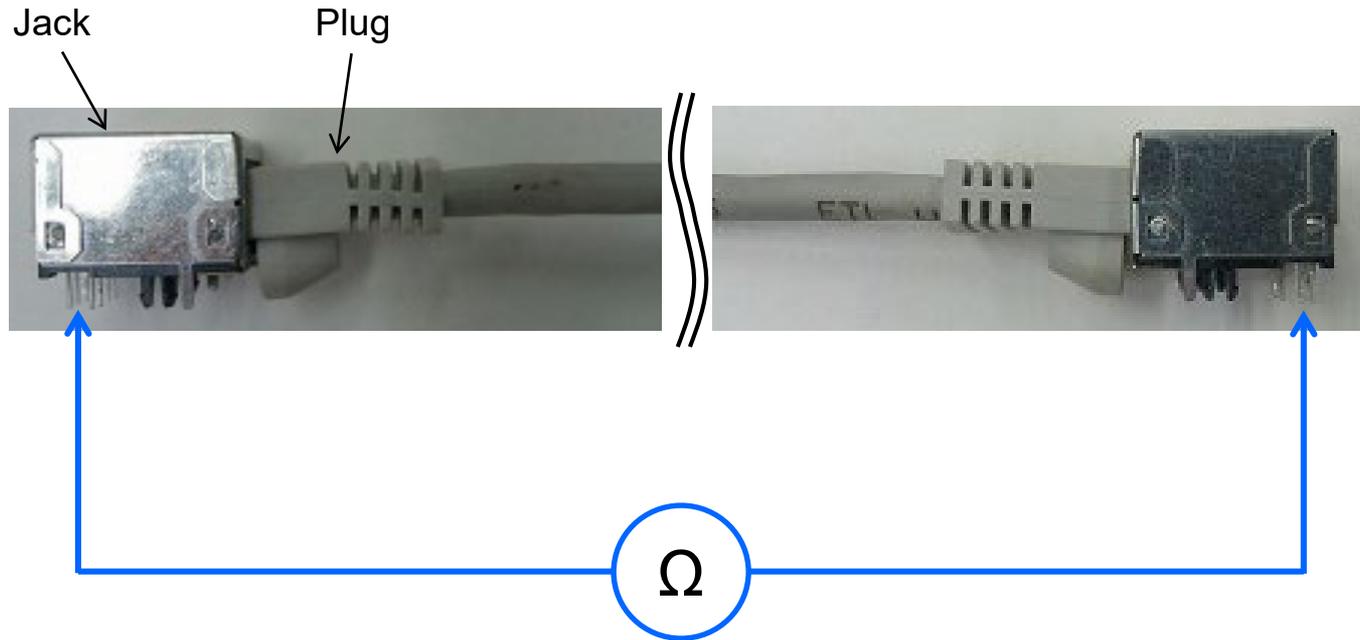
Do not use a plug having contacts of bad surface roughness.

BAD Example



Contact Resistance

If possible, make sure of contact resistance with the following way.



Measure resistance between the same number pins with a multimeter.

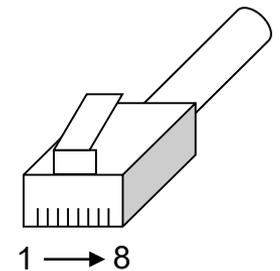
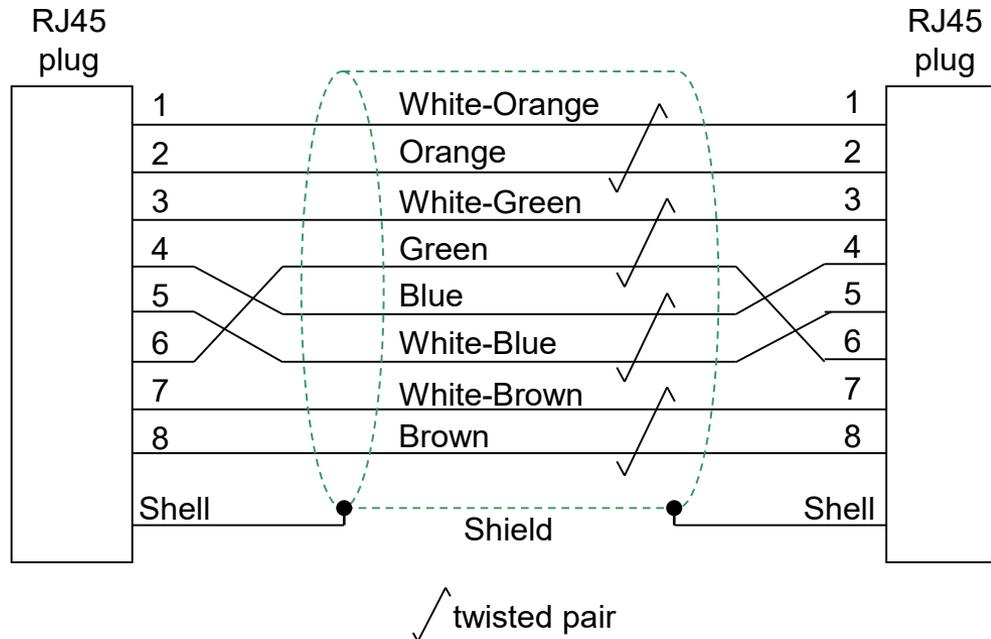
Normally, it shows less than 1 Ohm.

If it is higher or unstable value, the plug is failure.

Wiring

Wiring for 4-pairs Cable

“Straight” Wiring

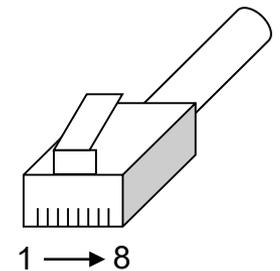
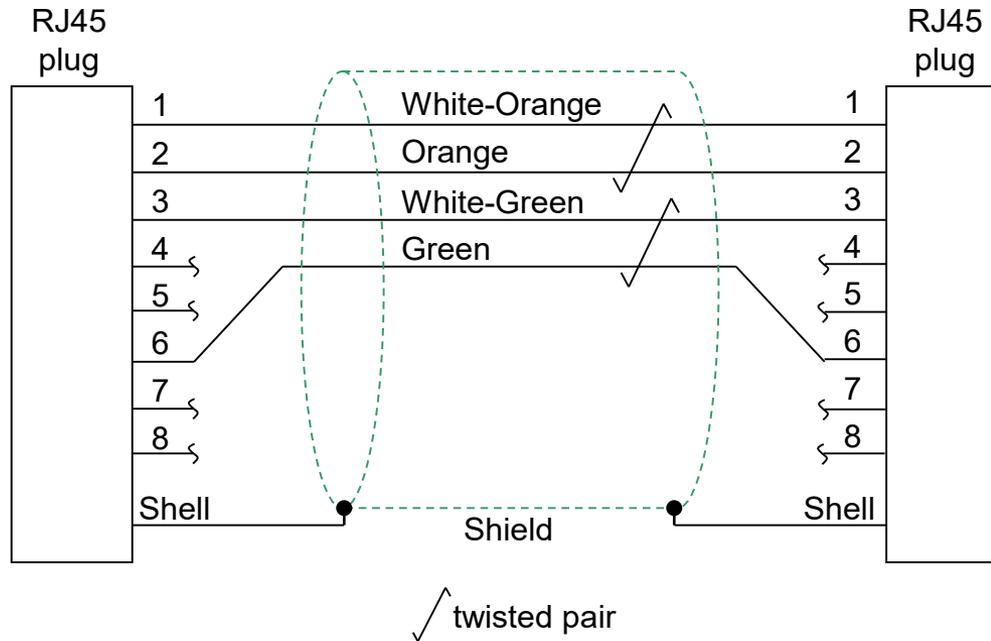


Notes:

- STP(Shielded Twisted Pair cable) conformed to category 5e must be used.
- Colors of the lead wire are defined by TIA/EIA-568B.
- A pair connected to 3-6pin is used as signal line.
- Unused 3 pairs must be also connected to 1-2, 4-5 and 7-8 as the above figure.

Wiring for 2-pairs Cable

“Straight” Wiring

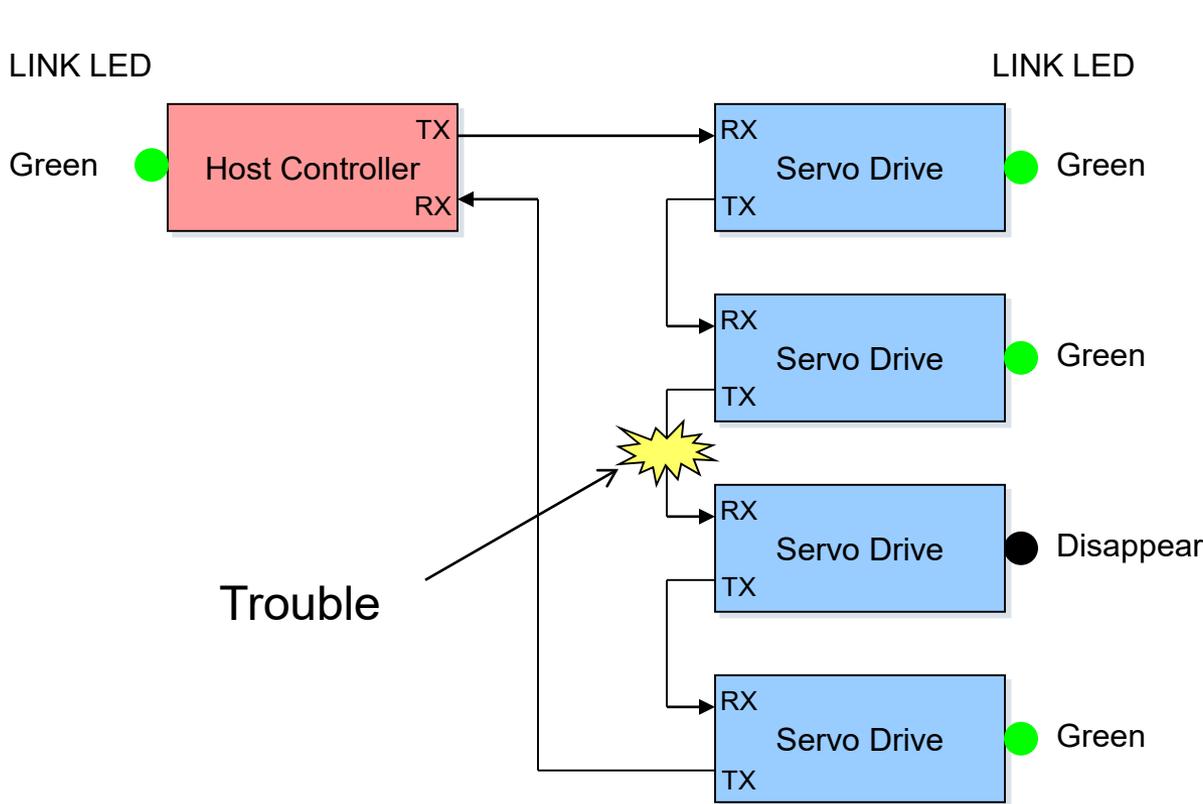


Notes:

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- Colors of the lead wire are defined by TIA/EIA-568B.
- A pair connected to 3-6pin is used as signal line.
- Unused 3 pairs must be also connected to 1-2 as the above figure.

Trouble of Cable

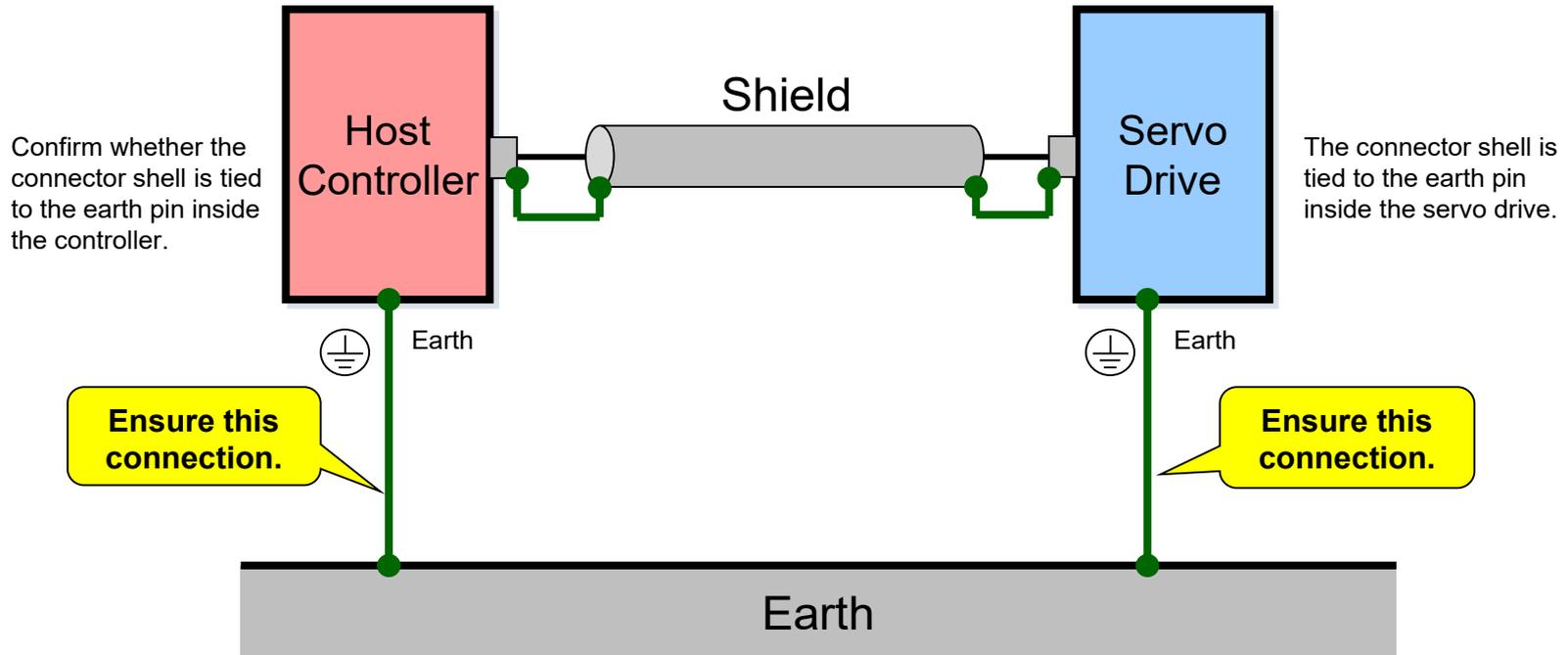
When “LINK” LED is disappear against power ON of all servos, make sure whether there is a trouble such as breaking down with a cable connected to RX of the disappearing node.



Shielding

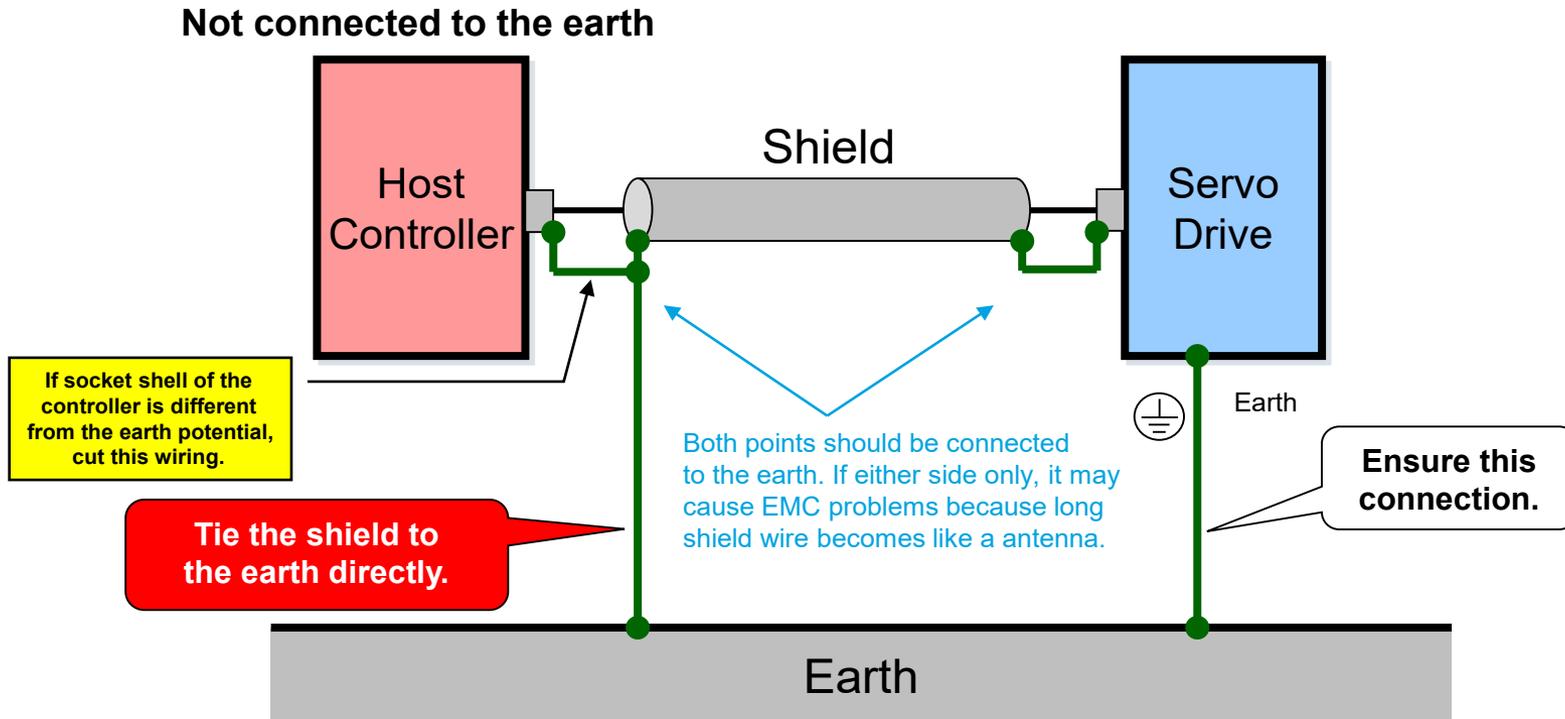
Basic Shielding

Tie the cable shield to the plug shells certainly,
and connect the earth-pins to the earth in both controller and servo.



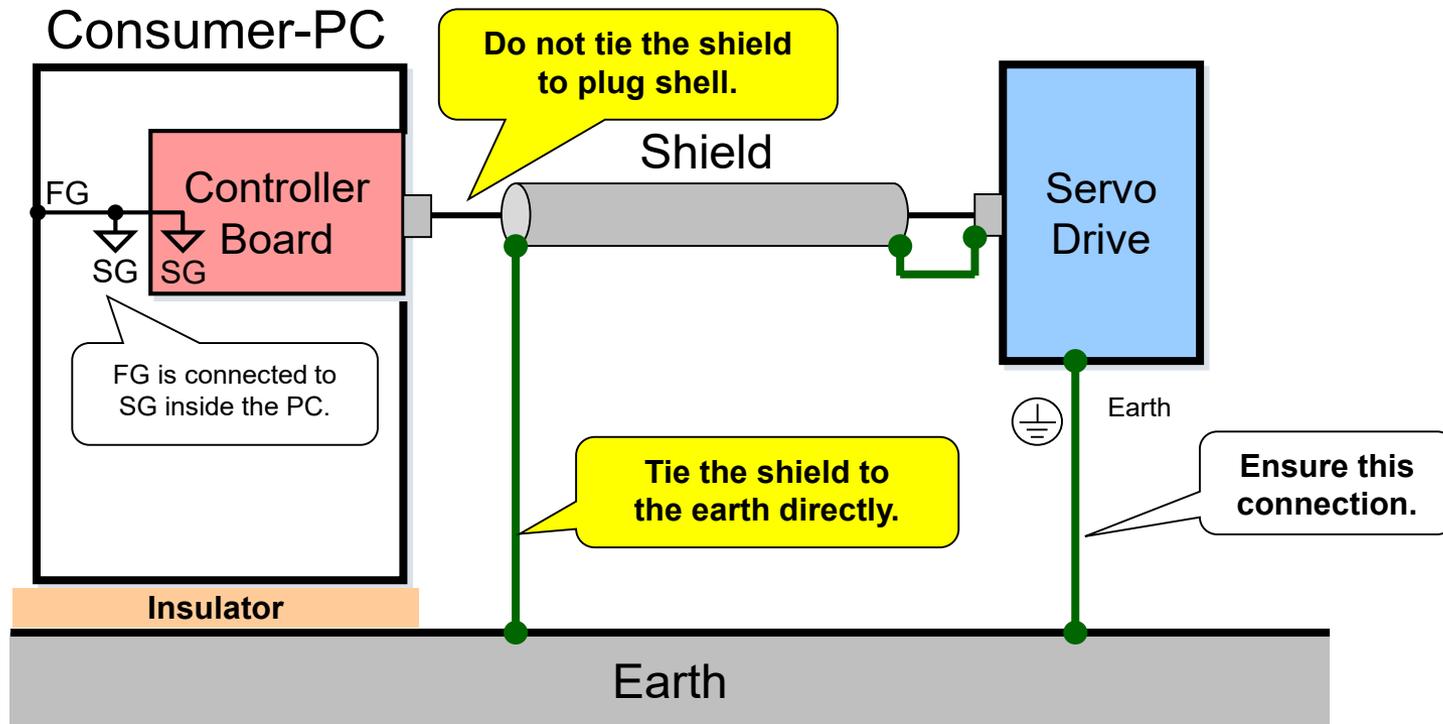
Non-earthed Controller Case

If socket shell of the controller is not connected to the earth, shield of cable should be tied to the earth directly.



Consumer-PC Using Case

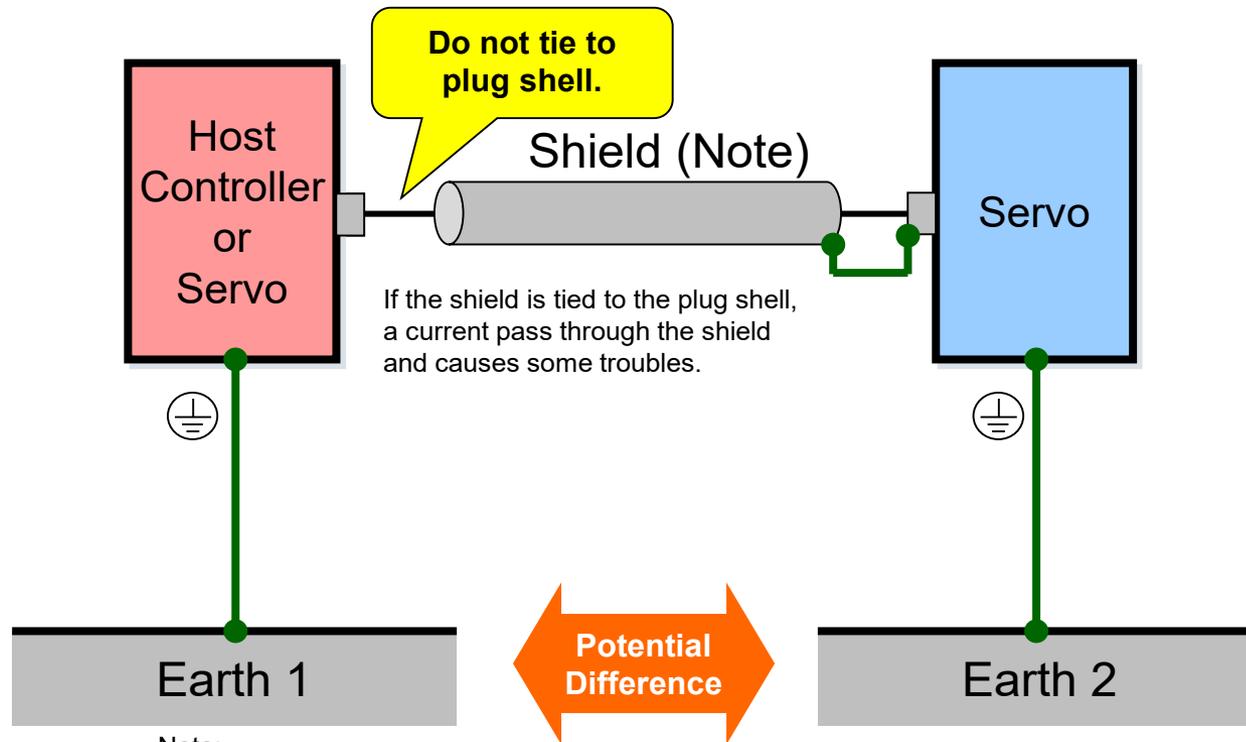
In most consumer-PCs, frame-ground (FG) is connected to signal-ground (SG) internally. To separate servo-FG and PC-SG, the shield must not be tied to plug shell at PC side.



Note: If servo-FG is connected to PC-SG, noise from servo-FG might cause malfunctions of PC.

Different Earth-Potentials Case

Some large-scale systems have different earth-potentials on each device. In this case, the shield must be separated from the plug shell at either side to prevent a current through the shield.



Note:

The connection to the earth at either side only might cause radiated noise problems.

In such a case, a shield-less "UTP" and installing a ferrite core should be used as a remedy.

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