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COMMUNICATIONS SOLUTIONS

Leakage detection sensor cable assy for AI server

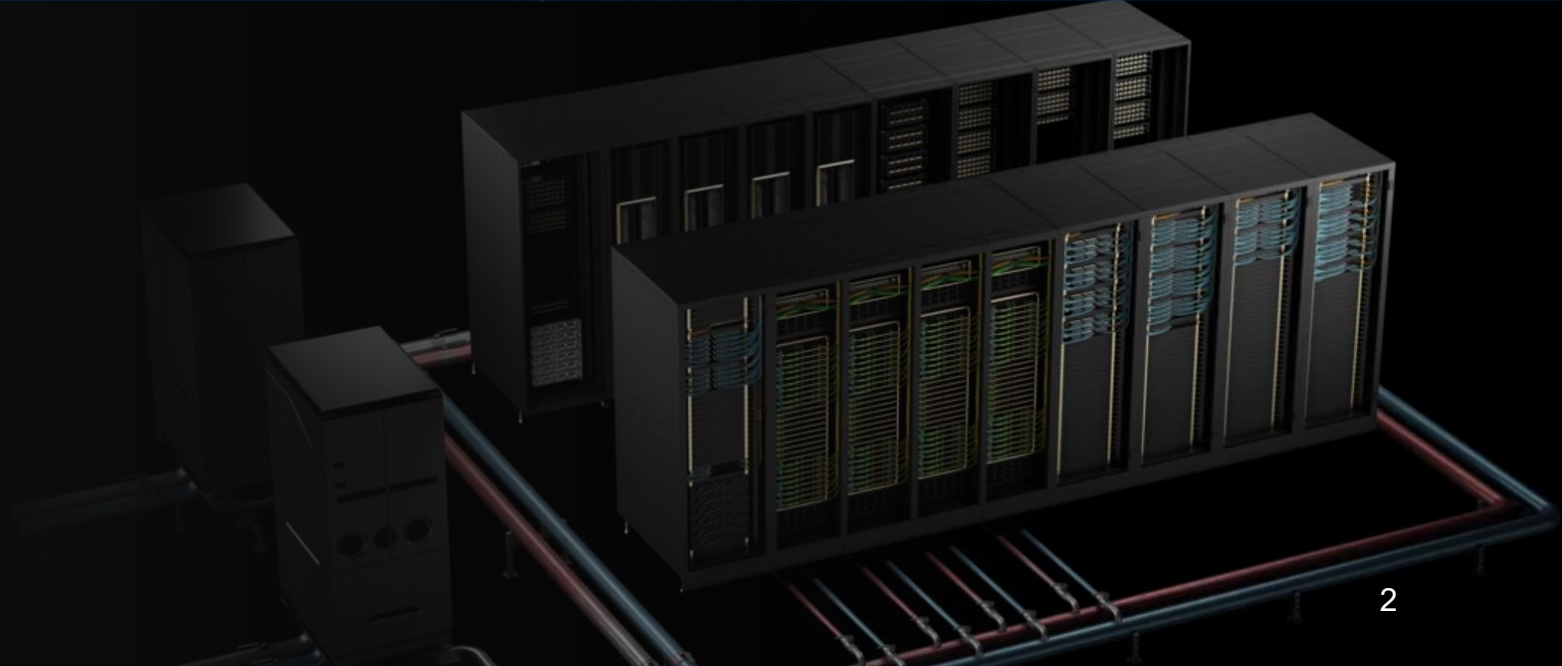
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FCi Basics

The AI boom is
coming with the era
of liquid cooling



Air cooling



Cold plate liquid cooling

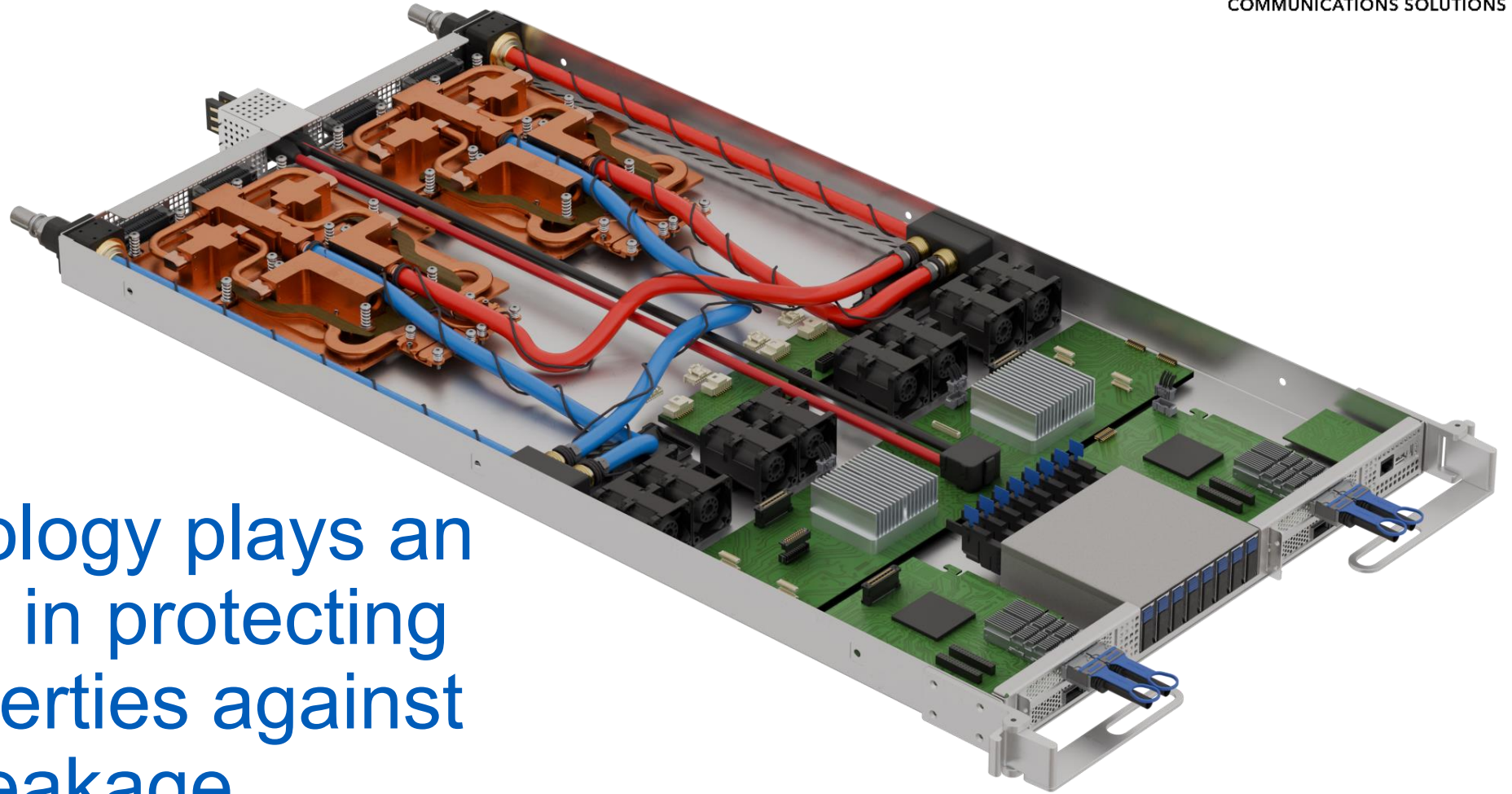


Immersed liquid cooling



Cold plate liquid cooling is the best and most popular way to cool server and switch

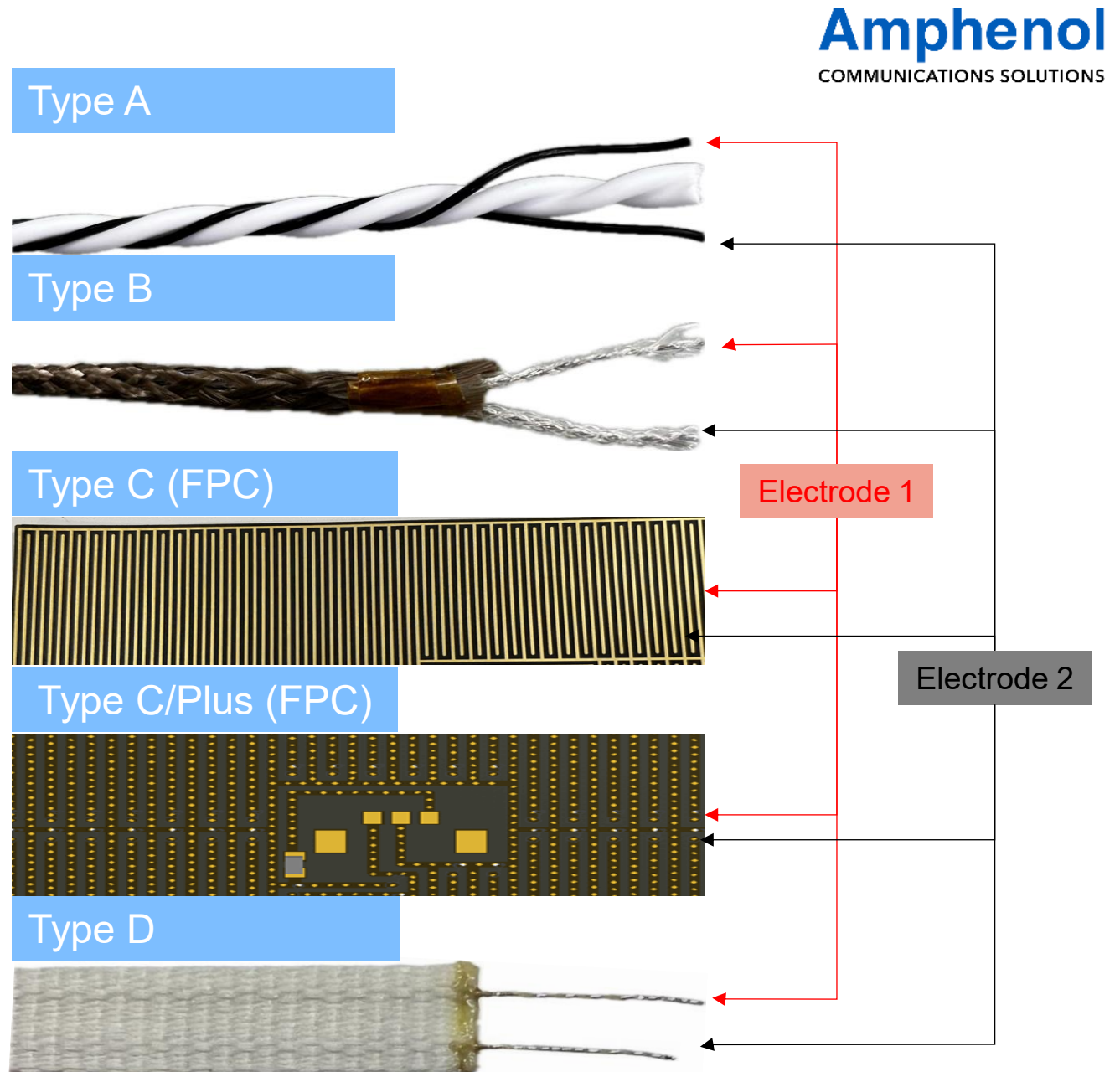
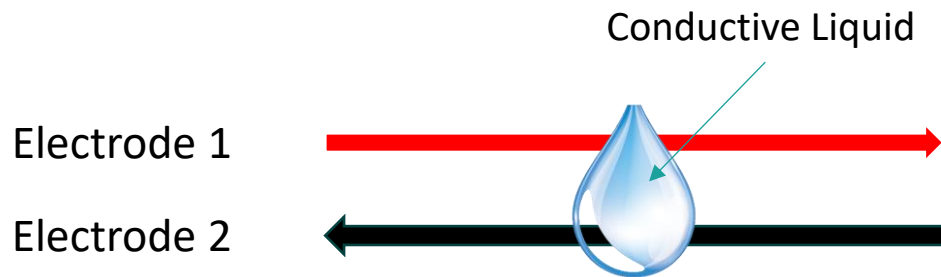
Sensor technology plays an essential role in protecting precious properties against liquid leakage



Sensor cable working principle

An electrical path is formed between electrodes 1 and 2 using water (conductive liquid) as a medium and the resistance lowers, which allows liquid leakage detection.

Leakage detection cable --- Detection principle



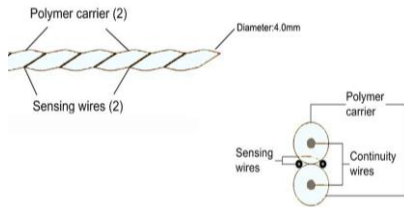
Sensor cable structure

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Type A

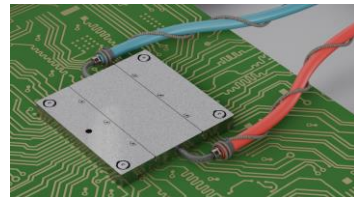
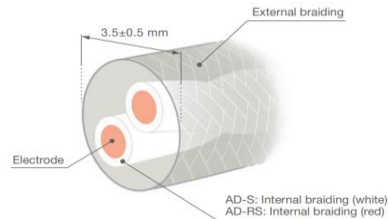
Fluoropolymer carrier with
conductive fluoropolymer
sensing wires, OD 4.5mm



- High resistance to corrosion, abrasion, and chemicals
- Fast drying time

Type B

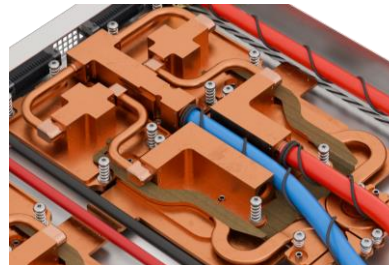
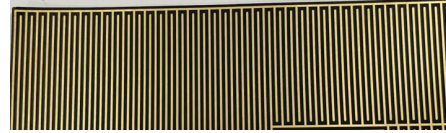
Braided insulation
Round cable
OD 2.7mm



- Wrap on liquid pipe for detection
- Braided insulation, easy to be installed
- Excellent water absorption characteristics
- Small amount detection, 0.3ml or less

Type C

Flexible Print Circuit

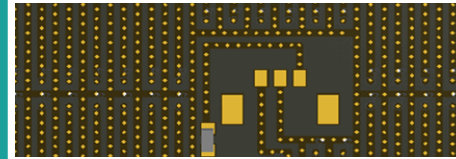


- Place on cold plate for detection
- Ultra thinner sensor cable, fit in narrow space
- Custom shape to cover wider surface

Type C Plus

Coated FPC

NEW



- With the coated surface to minimize the short risk
- Fast drying time

Type D

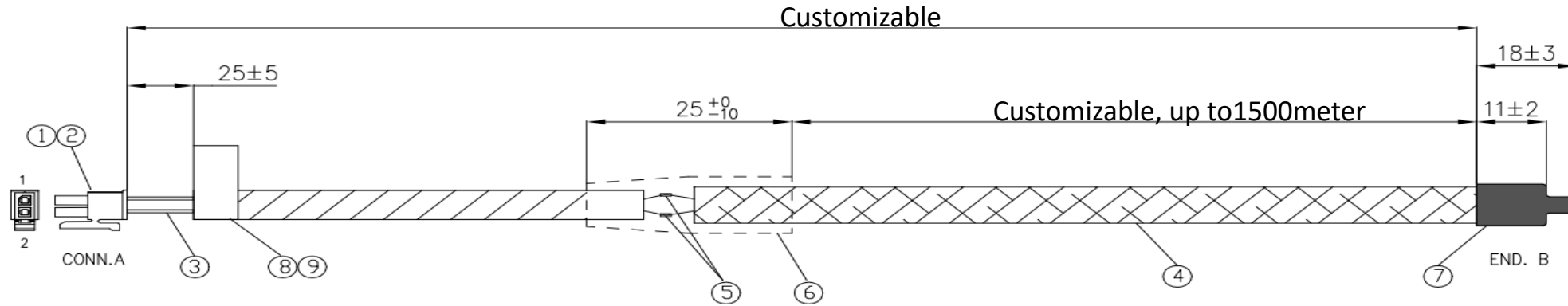
Thinner Braided insulation
Flat cable
Thickness: 0.75mm

NEW



- 0.75*6.25±0.3mm, thinner and wider
- Flat cable, easy to be installed in the narrow space
- Small amount detection, 0.3ml or less

Typical product



1&2: Wire to board connector: Connect the cable to main board

3: Electric wire: Connect the sensor cable with WTB connector

- a) Sensing cable conductors are too thick to crimp to a CTW contact
- b) The connector cable needs more flexible (for A type)
- c) The sensing cable is more expensive than connector cable: you only want sensing cable where you need it most

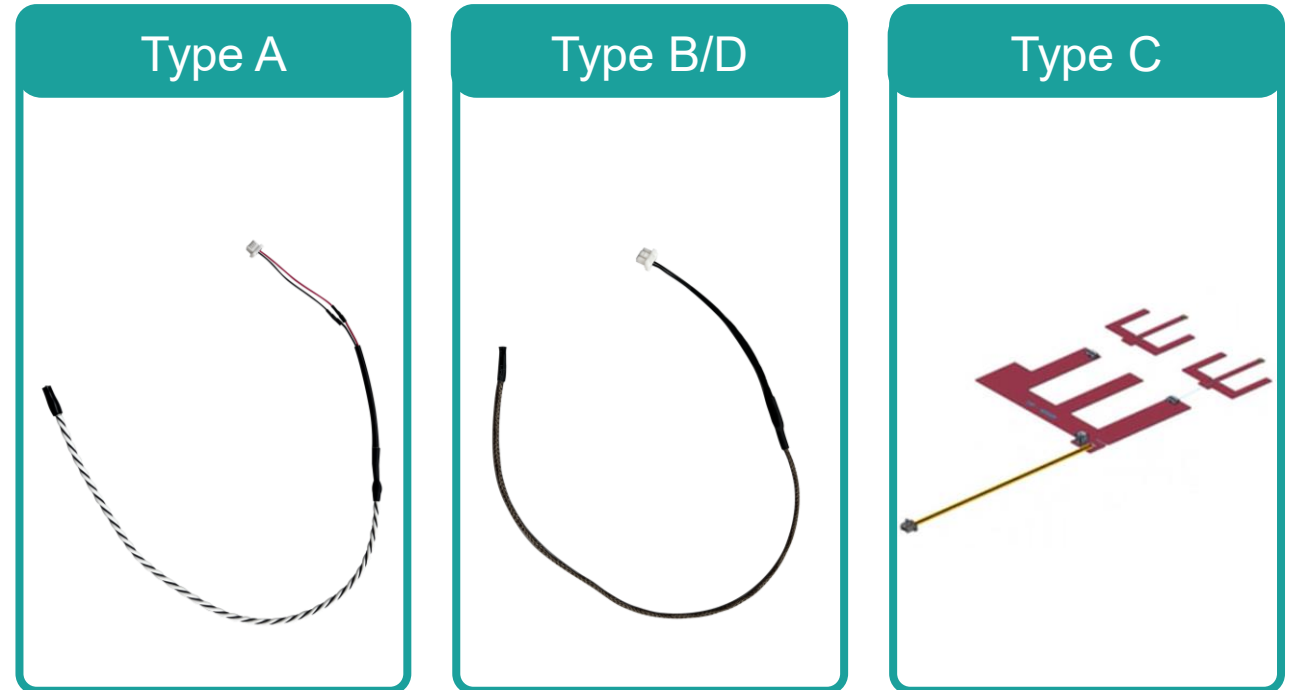
4: Sensor cable: Detect liquid leakage

5: Heat shrink tube: Protect the solder joint (For type A&B)

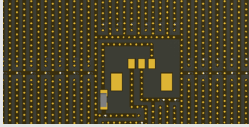
6: Adhesive heat shrink tube: (For type A&B)

7: Adhesive heat shrink cap: Seal the open wires (For type A&B)

8&9: Labels to show CPN/DC/LOT



Design consideration – How to choose sensor cable

Item	Type A	Type B	Type C	Type C Plus	Type D
Image					
Flexibility	More rigid, not flexible	Flexible, can be wrapped	Thinner & wider	Thinner & wider	Flexible, can be wrapped
Outer diameter	4.5mm, use it if space is not limited	2.7mm, for smaller space	Thickness < 0.3mm	Thickness < 0.4mm	Thickness: 0.75mm
Bending radius	25mm	3mm	NA	NA	TBD
Dry time	Faster, will dry in 15 seconds after wiping off water (liquid) with a rag	Requires longer time to dry	Fastest	Fastest	Requires longer time to dry
Corrosion and Abrasion resistance	Good	Good	Not good	Better	Good
Sensitive	5mm length surface to be covered	Better, 0.3ml liquid or less	Good	Good	Good
Cost	\$	\$\$	\$\$	\$	\$\$

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– How to choose wire to board connector

Product series:

FCI Basics Minitex®

Position:

2pos is enough for common use

4pos connector: 2 positions used as a jumper for presence detection

Pitch:

2.0mm or 1.5mm with active latch is common solution, depends on the PCB space

Orientation:

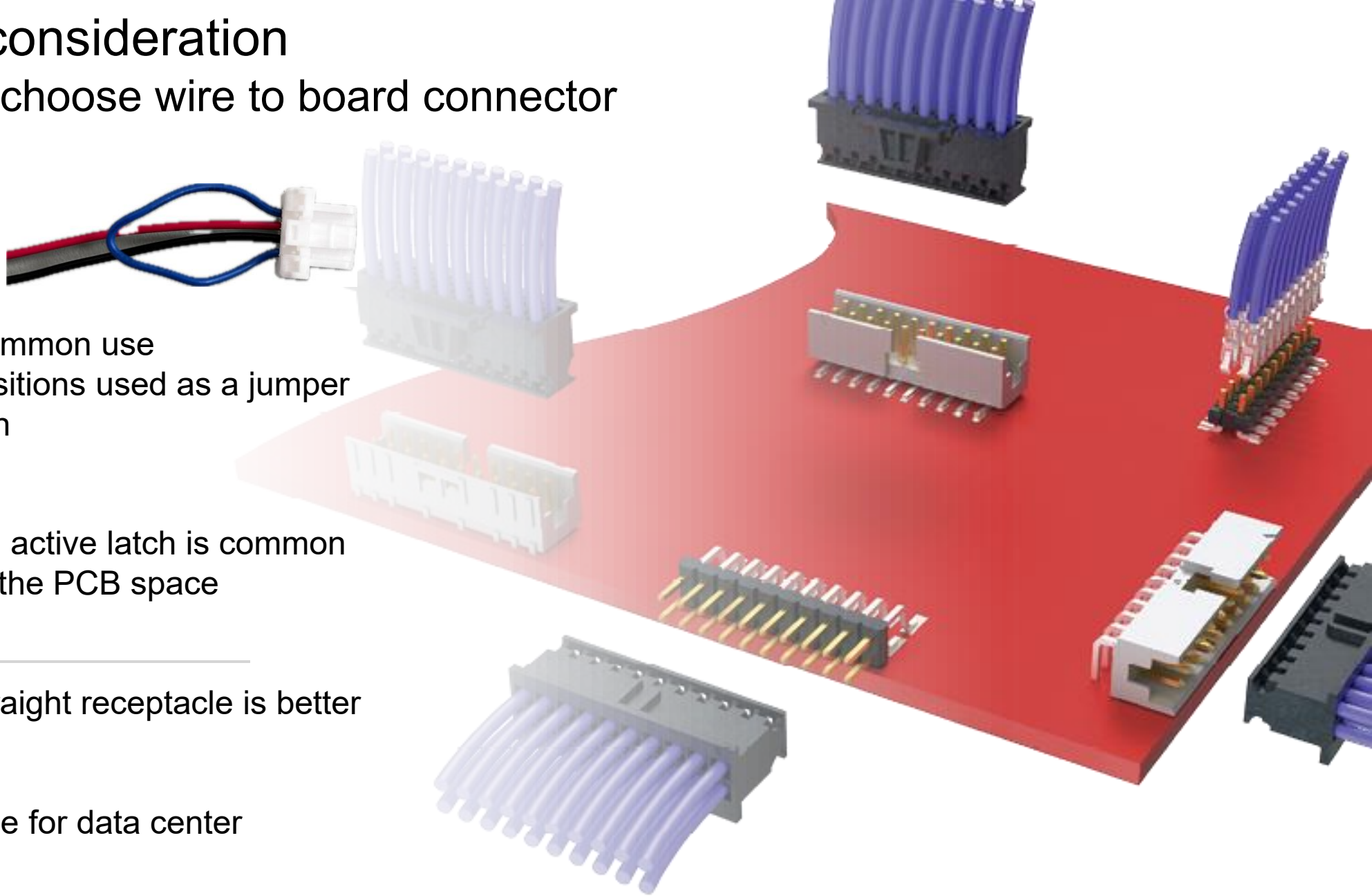
vertical header VS straight receptacle is better

Contact plating:

30u" GXT is preferable for data center

Mount Type:

Through hole mount is preferred,



THANKS