Amphenol

太阳能连接器H4线段系列安装手册

PV Connector H4 Cable Series Instruction Manual

H4 太阳能线段连接器
H4 PV CABLE CONNECTOR

H4-H 太阳能线段连接器
H4-H PV CABLE CONNECTOR

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1.警告
Caution

1) 连接器在安装或拆卸过程中必须断开电源
The connector must be isolated and disconnected from the power supply during the assembling or disassembling process.

2) 不可带电插拔。
Do not connect or disconnect under load.

3) 推荐使用光伏电缆线。
The use of PV cable is recommended.

4) 推荐使用镀锡线芯线材。
The use of tin plated cable is recommended.

5) 安费诺连接器配合状态符合IP68（水下1米一小时）密封性能。
The Amphenol connectors being mated are IP68 compliant in the function of sealing, and can be positioned for underwater 1 meter an hour

6) 该产品应由有相应资质或经过专家培训的、具备相关安全应用规范的专业人员安装。
The product may be assembled and installed only by suitably qualified and trained specialists with due observance of applicable safety regulations

7) 该连接器只适用于B类和C类的铜导线(参考NFPA NEC 70第9章,表格10)。如果与其他等级的铜导线使用，连接器应做标记。参考电缆导体标准：UL 486A-486B。
This connector is suitable for use only with Class B and C stranded copper conductors (See NFPA NEC 70 chapter 9, Table 10)" If the connector is found to be in use with other stranding classes, the connector shall be marked with the specific class conductors. See the Standard for Wire Connectors, UL 486A-486B

8)H4，H4-H连接器沿其轴向可承受最小44Lb拉力，但是不能长时间施加外力在连接器上.如图1.1所示。但不可使用如图1.2所示非连接器轴向力来拉连接器。
The H4，H4-H and Enlarge H4 can withstand the pull force 44Lb MINS. But can't apply external force on the connector for a long time. along the direction of picture 11.1 shows at the coupling interface. The force as shown in picture 1.2 shows is forbidden.

图1.1
picture 1.1

图 1.2
picture 1.2

9) 安费诺不承担对于未依照此安装手册要求安装而产生的任何责任。
Amphenol declines any liability in the event of failure to comply with this assembly instructions.

10）那些可与Amphenol零件相匹配的，非Amphenol原产的连接器以及被有时称为可与“Amphenol兼容”的连接器，它们不符合安全的，长期稳定的电气要求，并且出于安全方面的考虑，不允许它们与Amphenol零件连接.如果这些连接器（未经Amphenol认证）与Amphenol零件连接并产生损害，对此我们不承担任何责任。

Connectors not made by Amphenol which can be mated with Amphenol elements and in some cases are also described as “Amphenol-compatible”do not conform to the requirements for safe electrical connection with long-term stability, and for safety reasons must not be plugged together with Amphenol elements .Amphenol can therefore accept no liability for damage which occurs as a result of mating these connectors which lack Amphenol approval with Amphenol elements.

11) 安费诺已知接触或使用化学品可能引起产品被污染，腐蚀，导致产品性能的衰减、或出现产品开裂的情形，禁止这些化学品与产品接触见附件文件：WI -S047-ENG Rev.B。

A warning to our customers and users of product to prevent exposure of the chemicals to our product. These chemicals may cause corrosion, degradation of performance, or cracking of product and might lead to potential safety issues in applications. See file：WI -S047-ENG Rev.B。

2.技术参数:
Technical data

额定电压： Electrical rating	1000V DC (TÜV IEC 62852) ① 1500V DC (UL 6703)
额定电流: Current rating AWG)	TÜV(IEC 62852) 25A @85℃; (2.5mm²/ 14 AWG) / 35A @85℃; (4mm²/ 12 AWG) / 45A @85℃; (6mm²/ 10 UL (UL 6703) 15A (14 AWG) / 20A (12 AWG) / 30A (10 AWG)
保护等级: Protection degree:	连接器互配状态IP68 ,连接器分离状态 IP2X IP68 mated and IP2X unmated
安全等级: Safety class	II
可使用温度范围: Operation Temperature Range	-40℃ to +85℃
持证方： License holder	Amphenol Industrial Operations
地址： Full Address	40-60 Delaware Avenue, Sidney, New York State 13838-1395, USA
制造商 Producer	Amphenol Technology （Shenzhen）Co.,Ltd
电话 Telephone	+86-755-29918389

① H4-H just get TÜV certification

3.工具及应用
Tools & application

3.1)工具:
Required tools

机加工端子压接钳:
Crimp tool for cold forming contact
（2.5/4.0/6.0/10mm²端子）
(for 2.5/4/6/10mm² contact)

UTXTC0004
UTXTC0005

冲压端子压接钳:
Crimp tool for stamping forming contact:
（2.5/4.0/6.0mm²端子）
(for 2.5/4/6mm² contact)

H4TC0003

剥线钳（2.5/4.0/6.0mm²光伏线）:
Strip tool for 2.5/4/6mm² PV cable

H4TS0000

端子深度探测工具
Contact depth inspection tool

H4TT0001

母端防尘帽:
Female protect caps

UTXPF

公端防尘帽:
Male protect caps

UTXPM

机加工端子钳口:
Crimping die for cold forming contact:
（2.5/4.0/6.0/10mm²端子）
(for 2.5/4/6/10mm² contact)

UTXTD0004
UTXTD0005

冲压端子钳口:
Crimping die for stamping forming contact:
（2.5/4.0/6.0mm²端子）
(for 2.5/4/6mm² contact)

UTXTD0003

H4&H4-H连接器蓝色扳手:
Wrench tool for H4&H4-H Cable connector

H4TW0001

H4&H4-H连接器套筒:
Open-end back cap spanner for H4&H4-H

H4TTW100

工具箱:
Complete tool kit for installers

H4TK0000

3.2) 剥线流程:
Cable preparation and stripping process

使用安费诺剥线工具(H4TS0000)剥线时，首先调整卡位将线材放置合适位置，剥去线皮长度7.0±0.5 mm。注意不要伤及铜丝, 见下图3.2.1到图3.2.3。
Amphenol specified strip tool (H4TS0000) can be used in this step. First adjust the striper stopper ,then put the cable in corresponding notch to strip the length of 7±0.5mm. Strip cable are carefully not to nick conductors. See below pictures3.2.1 to 3.2.3.

图3.2.1
Picture 3.2.1

图 3.2.2
Picture 3.2.2

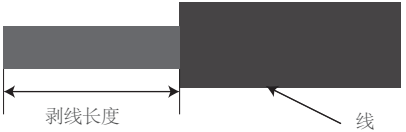


图3.2.3
Picture 3.2.3

3.3) 机加工端子压接流程:
Cold Formed contacts crimping process:

使用安费诺压线钳(UTXTC0004/ UTXTC0005)压线时，首先将已剥好的线材线芯放入端子孔内并确保所有线芯都在端子孔内（可从检查孔确认线芯是否到位）然后将带线材的端子放入对应的压线钳钳口，并对应正确的定位器孔位，如图3.3.1至图3.3.5。压接后端子电缆拔出力要求需要满足表3.3.1
Amphenol specified crimp tool (UTXTC0004/ UTXTC0005) can be used in this step. Insert striped cable into contact barrel and insure all conductor strands are captured in the contact barrel and the conductors are visible in the inspection hole. Crimp contact barrel by using the 4-ident crimping die, by putting the contact barrel with striped cable in the corresponding crimping locator. See below pictures 3.3.1 to 3. 3.5 . The pull-out forces have to meet below table 3.3.1 requirement.

图 3.3.1
Picture 3.3.1

检查孔
Inspection hole

图 3.3.2
Picture 3.3.2

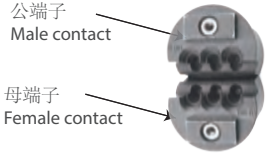


图 3.3.3
Picture 3.3.3

图 3.4.4
Picture 3.4.4

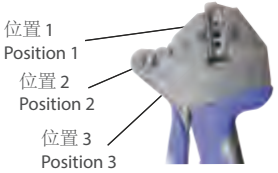


图 3.4.5
Picture 3.4.5

位置 Position	电缆规格 Cable size	电缆拔出力要求 Cable pull-out force
1	14AWG/2.5 mm²	Min. 223 N
2	12AWG/4.0 mm²	Min. 312 N
3	10AWG/6.0 mm²	Min. 356 N
3	8AWG/10.0 mm²	Min. 401 N
Compression Ratio(压缩比率)： 60%≤ X ≤80%		

表格3.3.1
Table 3.3.1

端子压接好后的效果见图3.3.6及图3.3.7.
See below pictures 3. 3.6 and 3.3.7 for crimping result.

图 3.3.6
Pictures 3.3.6

图 3.3.7
Pictures 3.3.7

3.4) 冲压端子压接流程:
Stamped and Formed contacts crimping process:

使用安费诺压接工具 (H4TC0003)压线时，首先将已剥好的线材线芯放入端子槽内，并确保所有线芯都在端子槽内，然后将要压接的端子放入压线钳钳口, 并对应正确的定位器孔位，小心不要伤到定位翅膀，见图 3.4.1至图3.4.5. 压接后端子电缆拔出力要求需要满足表3.4.1要求，
Amphenol specified crimp tool (H4TC0003) can be used in this step. Insert striped cable into contact barrel and Insure all conductor strands are captured in the contact barrel. Crimp contact barrel by using the crimping die, Be careful for not hurting the locator wings. See below pictures 3. 4.1 to 3.4.5. The pull-out force should meet below table 3.4.1 requirement.

图 3.4.1
Picture 3.4.1

图 3.4.2
Picture 3.4.2

位置 Position	电缆规格 Cable size	电缆拔出力要求 Cable pull-out force
1	14AWG/2.5 mm²	Min. 223 N
2	12AWG/4.0 mm²	Min. 312 N
3	10AWG/6.0 mm²	Min. 356 N

表格3.4.1
Table 3.4.1

图 3.4.3
Picture 3.4.3

图 3.4.4
Picture 3.4.4

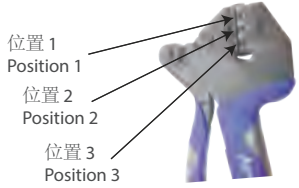


图 3.4.5
Picture 3.4.5

端子压接好后的效果见图3.4.6及图3.4.7。
See below pictures 3.4.6 and 3.4.7 for crimping result.

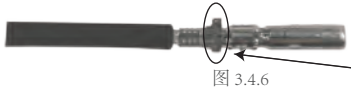
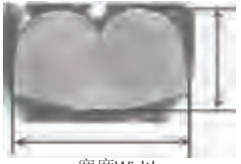


图 3.4.6
Picture 3.4.6

定位翅膀(不可被压接)
Locator wings should not be crimped

图 3.4.7
Picture 3.4.7

客户使用自动打端子机进行压接时, 建议的压接规范,
The customer wants to use the automatic crimping machine, we suggest that the contact crimping spec



高度Height

宽度Width

电缆规格 Cable Size	铆接高度(A) Crimping Height(A)	铆接宽度(B) Crimping Width(B)
14AWG/2.5 mm^2	2.10mm REF	3.40mm REF
12AWG/4.0 mm^2	2.39mm REF	4.00mm REF
10AWG/6.0 mm^2	2.70mm REF	4.25mm REF
H/W Ratio(高度/宽度比率): 50%≤ X ≤75%		
Compression Ratio(压缩比率): 70%≤ X ≤90%		

表格3.4.2
Table 3.4.2

4. 组装流程:
Assembly process
4.1) 线端连接器安装
For Cable connector assembling
4.1.1) 压接端子及插线
Crimped contacts with cable
将已压接好的端子从连接器后端插入，当插到位后会听到“滴”的卡位声，端子插入后不可再拔出，(端子的压接方法及剥线请参考工具的应用3.2到3.4)见下图4.1.1到图4.1.4。
Insert contact cable assembly into back of male and female connector. A “click” should be heard or felt when the contact cable assembly is seated in correct position. Contacts cannot be removed once seated (Contacts are crimped per tool application 3.2 to 3.4) See below pictures 4.1.1 to pictures4.1.4.

母端连接器
Female connector

图4.1.1
Picture 4.1.1

图4.1.2
Picture 4.1.2

公端连接器
Male Connector:

图4.1.3
Picture 4.1.3

图4.1.4
Picture 4.1.4

备注:
Notes:
可通过端子探测工具确认端子是否插到位。连接器边缘要落在端子深度探测工具白色区域内。见下图4.1.5到图4.1.7。
Can use the contact depth inspection tool confirm whether the contact is right seated or not. The edge of connector should locate within the white area of the contact depth inspection tool. See below picture 4.1.5 to 4.1.7.

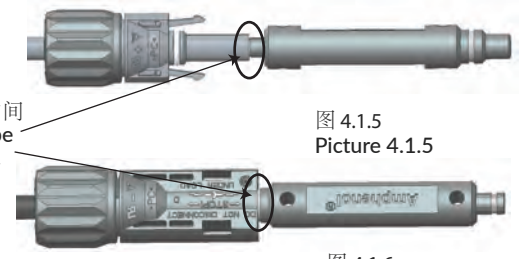


图 4.1.5
Picture 4.1.5

图 4.1.6
Picture 4.1.6

4.1.2) 锁紧螺帽

Tightening the back cap

H4及H4-H连接器锁紧螺帽的扭矩：2.6 N·m 到2.9 N·m。

H4 and H4-H connector back cap must be screwed up with a properly torque range 2.6 to 2.9 N·m.

在锁紧螺帽时，不论是使用帽子还是本体进行连接器组装都不会影响连接器的功能,客户可以根据自己的组装工艺选择组装方式。

Whether the connectors were screwed by cap or body, there is no any effect on the functionality. Customer can choose the different screwed method according to their manufacturing processes.

以下是连接器通过本体和帽子组装时的受力面， 如图4.1.7

See the acting point when connector was screwed by body and cap, as below picture 4.1.7

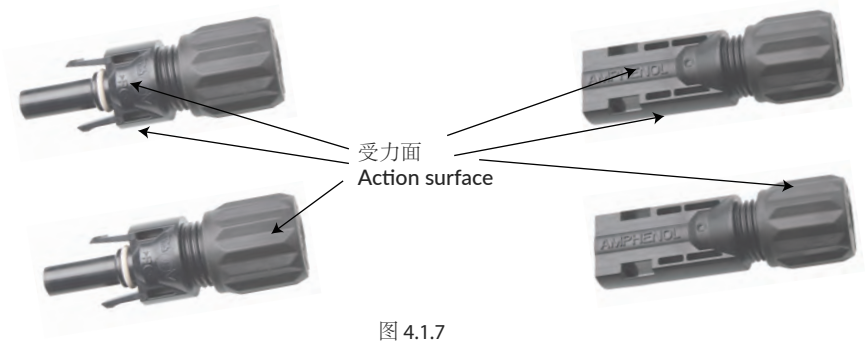


图 4.1.7
Picture 4.1.7

客户在现场安装时，可使用安费诺蓝色扳手(H4和H4-H使用H4TW0001)组装连接器，如图4.1.8及图4.1.9。
客户用扭力扳手组装连接器时，可使用安费诺专用连接器套筒进行组装(H4和H4-H使用H4TTW100)。如图4.1.10及图4.1.11
Amphenol specified wrench tool (H4TW0001 for H4&H4-H and H4TW0004 for Enlarge H4) can be used in this step See below picture 4.1.8 and 4.1.9.
Customer can use open-end back cap spanner (H4 use H4TTW100) if customer use electric torque controlled wrench tool
to tighten the cap，as below picture4 .1.10 and 4.1.11.

图 4.1.8
Picture 4.1.8

图 4.1.9
Picture 4.1.9

图 4.1.10
Picture 4.1.10

图 4.1.11
Picture 4.1.11

4.1.3) 备注：
Notes：

1> H4及H4-H连接器线材外径要求为ø4.5mm 到 ø7.8mm。
The cable range of H4 and H4-H connector is from ø4.5mm to ø7.8mm.

2> 适用H4及H4-H连接器导线的线芯数为7到140根。
The number of conductor strands for H4 and H4-H is from 7 to 140.

3> 扭矩要求只针对太阳能线材。不同的线材组装完成后都需达到IP68及拉力测试要求（无端子状态下吊重20Lb，一分钟）。
These torque force apply to Amphenol PV cable only. The cable assembly should pass IP68 and Pullout test (20Lb, 1Min, without contact).

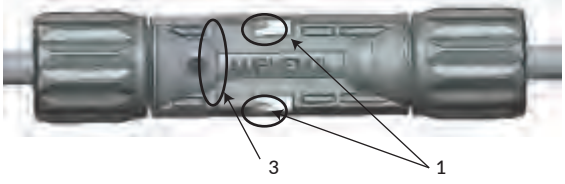
4> 线材线芯只能用铜线芯。
A statement that the conductor type is limited to copper wire only ("Copper" or "CU" are acceptable).

5> 从2017年10月起，仅适用于EN50618认证的线缆。
From October 2017 Only valid in connection with cables certified according EN50618.

4.2) 连接器对插及解锁
Connector mating and un-mating

公端和母端连接器对插直到听到"滴"的卡位声说明对插到位。安费诺H4连接器符合NEC 2008 690.33标准, 所以需要工具进行解锁。
For mating, align the 2 half connectors and mate them together by hand until a "click" is heard and/or felt. For un-mating, since the Amphenol H4 complies with the NEC 2008 690.33, a tool is required to disconnect the connector once mated.

以下特征可以确认连接器是否对插到位:
Below feather can confirm the connector has been good mated or not:
1. 卡扣卡到位如下第一点。/ The latch was hookup as below point one.
2. 密封圈在外部不可看见。/ O-ring pressed inside and invisible.
3. 公头和母头之间仅可有小的间隙(间隙≤0.3mm）。/ There is very small gap between the interface of male and female（gap≤0.3mm）.



安费诺提供蓝色扳手(H4TW0001)和解锁工具(H4TU0000)用于安费诺H4系列连接器连接器的解锁, 如图4.2.1及图4.2.2。
Amphenol specified wrench tool (H4TW0001) or Universal tool (H4TU0000) should be used in this step for H4 series. See below picture 4.2.1 and 4.2.2.

H4-H连接器可直接用手打开。
The H4-H can be disconnected by hand.

万能解锁工具解锁
Universal Tool Disconnect

图 4.2.1
Picture 4.2.1

蓝色扳手解锁
Wrench Tool Disconnect

图 4.2.2
Picture 4.2.2

连接器选型:
Connector order number:

How to Order a Connector (please choose one code per position, below)

Product Line	Product Type	Gender	Connector Type	Cable Size		Certifications	Packaging		Contact Type	
H4 (H4 series)	**C** (Connector)	**F** Female	**C** Cable gland tool unlock	**0**	Without Contact	**D** Dual UL/TÜV Certified	**I**	1 pc/bag	**S**	S&F
				2	2.5mm²/ 14AWG		**C**	100 pcs/bag		
		M Male		**4***	4.0mm²/12 AWG & 6.0mm²/10AWG(S&F) 4.0mm²/12AWG(CF)		**M**	400 pcs/bag	**(Blank)**	CF
				6	6.0mm²/ 10AWG					

*When ordering a S&F contact, please use cable size order code “4” for both 4.0mm²/ 12AWG & 6.0mm²/ 10AWG

卷装冲压端子选型:
Stamped and Formed contacts order number:

How to Order S&F contacts on Reels (please choose one code per position, below)

Product Line	Product Type	Gender	Connector Type	Cable Size		Packaging	
H4 (H4 series)	**F** (S&F contact)	**F** Female	**C** Cable gland tool unlock	**2**	1.5mm²/ 16AWG & 2.5mm²/ 14AWG	**R**	2000pcs/reel
		M Male		**4**	4.0mm²/12 AWG & 6.0mm²/10AWG		

Note: if ording contacts in 2000pcs/reel version, need to order contact and plastic housing seperately. Contact’s ordering code refers to this table, plastic housing should be chosen as H4CF0DM for female housing and H4CMC0DM for male housing.

5. 电缆状态:
Cable routing

电缆根部建议保留20mm未折弯长度，以免因线缆折弯产生的外力引起连接器密封件变形. 如图5.1和图5.2。
In order to avoid the cable bend force lead to a visible deformation in the sealing portion of the insulation, the cable need keep at least 20mm straight length. See picture 5.1 and 5.2.

电缆最小弯曲半径请参考电缆生产厂商详细要求。
Refer to cable manufacturer's specification for minimum bending radius of cable.

图 5.1
Picture 5.1

图 5.2
Picture 5.2

6. 连接器对插前防尘保护:
connector dust protection before mating:

连接器安装过程中，如未能及时对插公母头连接器，需要用防尘帽（母头使用UTXPF，公头使用UTXPM) 组装保护，以防止连接器内部被污染。如图6.1和图6.2。
In the process of connector assembly, the connect need be protected by dust cap (female end use UTXPF and male end use UTXPM) if connector can't be mated in time, so as to prevent the internal of connector be contaminated. See picture 6.1 and 6.2.

图 6.1
Picture 61

图 6.2
Picture 6.2

7. 存储注意事项：

Note on storage：

我们建议连接器零件的存储温度为-30℃-+60℃，相对湿度低于70%。连接器零件不能暴露在因直接降雨、冷凝等带来的水汽中。确保零件不能与酸、碱、瓦斯、丙酮或者任何其他会影响材料使用的化学物质接触。如果以上条件得到满足，连接器的零件存储时间长达两年时间。

We recommend that you store connector components at temperature between-30℃to +60℃ and with a relative humidity of less than 70%.The components must not be exposed to moisture due to direct rainfall ,condensation .etc ,Ensure that the individual components do not come into contact with acids, alkalis, gases, acetone or any other chemical substance that could impact the materials use .If these condition are met. The components can be stored for a maximum period of up to two years from the date of manufacture.

WARNING

警告

安费诺已知接触或使用以下化学品可能引起产品被污染，腐蚀，导致产品性能的衰减、或出现产品开裂的情形，禁止这些化学品与产品接触。

A warning to our customers and users of product to prevent exposure of the following chemicals to our product. These chemicals may cause corrosion, degradation of performance, or cracking of product and might lead to potential safety issues in applications.

Lists of all known chemicals:
已知化学品清单如下表:

Classify分类	Chemical Name化学品名称
Commonly used chemicals 常用化学品	Grease 黄油、Lubricate oil 润滑油、Rust inhibitors防锈剂 、Stamping oil冲压油、Engine Oil机油、Banana Oil天那水、WD40、Insecticide杀虫剂、Oily sealing agent油性封孔剂、Doduconta B25 Kontaktol、Evabrite S、Virex TB强氧化性消毒剂、Suma Lima L3餐具清洗剂、Suma Rinse餐具清洗剂、Plasticizer增塑剂
Grease 脂类	Molykote EM-50L(Dow Corning)、Molykote PG-641(Dow Corning)
Oils 油类	Die Cut(OELHELD), Machine Oil KV46(Nippon Oil)
Mould Release Agent 脱模剂	Pelicoat S-6(Chukyo-Kasei)
Binder 粘合剂	Chemlok(LORD)
Alcohols 醇类	Isopropyl alcohol(IPA)乙丙醇
Fatty hydrocarbons 脂肪族化合物	Heptane庚烷、Hexane乙烷、Cyclohexane环已烷、Liquid paraffin液状石蜡
Acid,Alkali,Salt 酸碱类	Salt acid盐酸、Sulfuric acid 硫酸、Nitric acid硝酸、Phosphoric acid磷酸、Acetic acid醋酸、Ammonia氨气/氨水、Sodium hydroxide氢氧化钠
Halogenated hydrocarbon 族碳化合物	Freon氟利昂、Carbon tetrachloride四氯化碳、Trichloromethane氯仿/三氯化碳,Virex 256烷基二甲基氯化铵
Ketone 酮类	Acetone丙酮、Methyl ethyl ketone甲基乙基酮/丁酮
Aromatic Hydrocarbon 芳香族碳氢化合物	Toluene甲苯、Xylene二甲苯、Cresol甲酚
Other，Organic solvent 其他/有机溶剂	Ethyl acetate乙酸乙酯、Butyl acetate乙酸丁酯、Tributyl phosphate磷酸三丁酯、Kerosene煤油、Gasoline汽油、Varnish清漆、Esters酯类、Ethers醚类、Amines胺类、Glacial acetic acid冰醋酸
Adhesion sealant 粘合密封材料	APF125(Wacker Chemical)
Potting Material 填充材料	KE-200(ShinEtsu)、CX-200(ShinEtsu)

Remarks: Chemicals not listed in the above table (other oils & chemicals in manufacturing process & in solar farm sites), it is the responsibility of user to validation such chemicals not affect our product performance.
备注：对于不在此列表内的其他在生产制造过程和产品安装过程中可能接触或使用的化学品需用户自行确认对产品无影响后方可使用。

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