

液冷连接技术

工程 · 制造 · 验证

LIQUID COOLING CONNECTION
TECHNOLOGIES

面向 AI 数据中心与高密度液冷基础设施

AI DATA CENTER

CDU / RACK

SERVER LIQUID COOLING

PRECISION CONNECTION



Connection technologies for AI and high-density liquid-cooling infrastructure.

NPLUS / CORPORATE & ENGINEERING BROCHURE
Engineering · Manufacturing · Validation

MANUFACTURER IDENTITY

以精准流体连接为核心

BUILT AROUND PRECISION FLUID CONNECTIONS

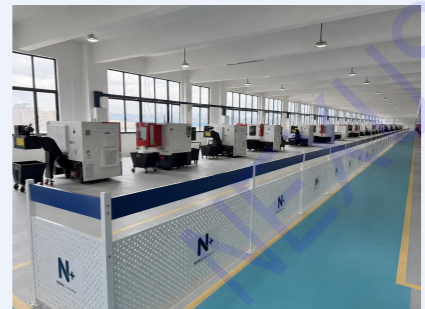
Nplus develops and manufactures fluid-control and connection components for high-density liquid-cooling infrastructure. From precision-machined stainless-steel components to assembled and validated connection systems, engineering, manufacturing, inspection and application support are integrated into one controlled workflow.

Nplus 楠加敏科面向高密度液冷基础设施开发并制造流体控制与连接部件，将工程、制造、检验与应用支持纳入统一受控流程。

WE ARE A MANUFACTURER

工程·制造·装配·验证

- **ENGINEERING** Application review·interface design·CAD support
应用评审·接口设计·CAD支持
- **MANUFACTURING** CNC/precision metal processing
CNC加工·精密金属制造
- **ASSEMBLY** Seals·hardware·functional component
密封件·五金件·功能组件
- **VALIDATION** Pressure·leakage·function·dimension
压力·泄漏·功能·尺寸验证



MANUFACTURER POSITION

A controlled path from engineering intent to shipped connection system.
从工程意图到交付连接系统的受控路径。

LIQUID COOLING CONNECTION ARCHITECTURE

TS

四大产品线，一条冷却路径

FOUR PRODUCT LINES. ONE COOLING PATH.

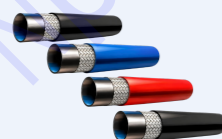
Each product line answers a different service point in the same thermal-management architecture.

每条产品线对应同一热管理架构中的不同服务节点。

0 TRANSFER

1 EPDM 软管

柔性冷却液输送



P05

0 RETAIN

2 安全软管抱箍

软管可靠锁紧



P06

0 SERVICE

3 UQD / UQDB快速接头

机柜级快速连接



P07

0 ISOLATE

4 DRY-BREAK INTERLOCK干式互锁球阀

主回路受控隔离



P08

Flexible transfer → controlled retention → fast service → safe isolation
柔性输送→可靠锁紧→快速维护→安全隔离

MANUFACTURING CAPABILITY

从原材料到精密连接

FROM RAW MATERIAL TO PRECISION CONNECTION

Nplus manufacturing capability is organized as a controlled product-realization path. Replace the marked panels with approved production photography when available.

Nplus 的制造能力按受控产品实现流程组织；获得批准后，可将标注区域替换为真实生产摄影。



PROCESS CONTROL

Dimensions · cleanliness · assembly condition · final release

尺寸 · 洁净度 · 装配状态 · 最终放行

PRODUCT 01

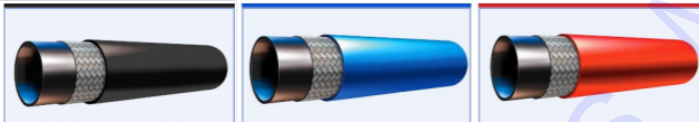
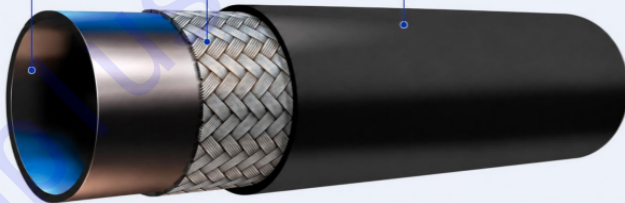
面向冷却液输送的柔性软管

FLEXIBLE ROUTING FOR COOLANT TRANSFER

Peroxide-cured EPDM tube, one fiber braid and a smooth synthetic-rubber cover create a flexible hose architecture for CDU, rack-manifold and server-loop routing.

过氧化物硫化 EPDM 管、单层纤维编织与合成橡胶外覆层，形成适用于 CDU、机柜歧管及服务器回路的柔性软管结构。

- 01 BLACK EPDM TUBE**
黑色过氧化物硫化 EPDM 内管
- 02 ONE FIBER BRAID**
单层纤维编织增强层
- 03 SYNTHETIC COVER**
合成橡胶外覆层



CONSTRUCTION

Black EPDM tube · one fiber braid · synthetic-rubber cover
黑色 EPDM 管 | 单层纤维编织 | 合成橡胶外覆层

PERFORMANCE

-40 to +100° C · 150 psi / 10.3 bar reference* · UL94 V-0 cover
-40 至 +100° C | 150 psi / 10.3 bar 参考值* | UL94 V-0 外覆层

APPLICATION

CDU · rack manifold · server loop · service connection
CDU | 机柜歧管 | 服务器回路 | 维护连接

CONFIGURATION

ID RANGE

1/4 in → 1 in
内径范围

PACK

600 ft → 150 ft reels
包装: 600 ft → 150 ft 卷盘

MEDIA

DI water · water/glycol · air
介质: 去离子水 | 水 / 乙二醇 | 空气

VACUUM

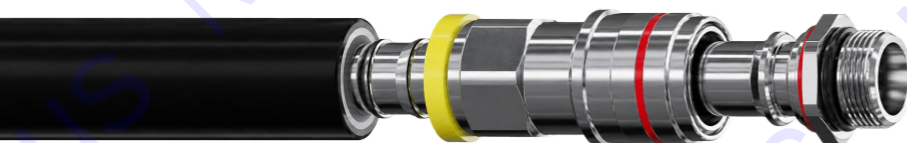
15 inHg (-04 to -12)
真空: 15 inHg (-04 至 -12)

NOTE

Size-specific selection
按规格选型

* NLH-EP-16 reference pressure is 100 psi / 6.9 bar.

* NLH-EP-16 参考压力为 100 psi / 6.9 bar。



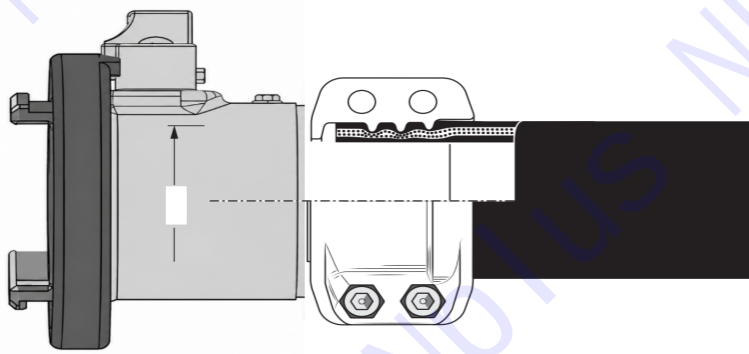
PRODUCT 02

可靠锁紧，便捷维护

CONTROLLED RETENTION. SERVICEABLE ASSEMBLY.

The RK safety clamp forms a controlled mechanical interface between hose assembly and ferrule. This portfolio is limited to stainless-steel variants and matching A2 hardware.

RK 安全卡箍在软管组件与法兰之间形成受控机械接口。本系列仅提供不锈钢版本及匹配的A2五金件。



HOSE

→ FERRULE → CLAMP
→ 法兰 → 卡箍

Inspectable · retightenable · stainless-steel set
可检查 · 可重新紧固 · 不锈钢套件

REFERENCE RANGE

BODY

316 stainless reference
316 不锈钢参考

HARDWARE

A2 bolts and nuts
A2 螺栓与螺母

STANDARD

EN 14420-3 / DIN 2817
EN 14420-3 / DIN 2817

SIZE

ND 15 → 100
ND 15 → 100

THREAD

M6 / M8 / M10
M6 / M8 / M10

ID RING

Optional polished stainless 可选抛光不锈钢
内环

ORDER BY MEASURED HOSE OD

Confirm hose OD, ferrule geometry, clamp material and hardware grade before release.
下单前请确认软管外径、法兰几何、卡箍材质及五金件等级。

PRODUCT 03

快速实现机架级维护

FAST RACK SERVICE

Nplus UQD / UQDB targets compact in-rack liquid-cooling connections where push-to-connect service, color identification and controlled disconnect matter.

Nplus UQD / UQDB 面向紧凑型机柜液冷连接，强调按压式维护、颜色识别与受控断开。



INTERFACE

Push-to-connect · flat-face · double shutoff
按压式连接 · 平面密封 · 双截止

IDENTIFICATION

Red / blue sleeves · color-coded O-rings
红 / 蓝套筒 · 颜色标识 O 形圈

SERVICE POSITION

Rack service · module replacement · compact branch connection
机柜维护 · 模块更换 · 紧凑型支路连接

REFERENCE ENVELOPE

SIZES

4 OCP-referenced sizes 4 种 OCP 参考尺寸

TEMP

5° C to 65° C 5° C 至 65° C

PRESSURE

Typical 6.9 bar 典型 6.9 bar

SMALLER SIZES

**Up to 20 bar
小规格最高 20 bar**

SEALS

EPDM-P reference EPDM-P 参考

OPTIONS

ORB · BSPP · hose ORB · BSPP · 软管

PRODUCT 04

主干管路的可控隔离

CONTROLLED ISOLATION FOR MAINLINE SERVICE

The RL-FD platform is positioned on larger source-line and CDU-to-rack paths where full-bore routing, sequential interlock and controlled dry-break service matter.

RL-FD平台面向较大规格的源端管路及CDU至机柜回路，适用于全通路输送、顺序互锁与受控干式断开维护。



FULL FLOW · DRY DISCONNECT · MECHANICAL INTERLOCK

316L body/ferrules · 304 linkage · EPDM/PTFE seal options

全通路 干式断开 机械互锁

Mate → open → close → release

316L 本体/卡盘 · 304 连杆 · EPDM/PTFE 密封选项

DOCUMENTED ENVELOPE

PRESSURE

16 bar working
工作压力 16 bar

PROOF BASIS

24 bar assessment
评估压力 24 bar

TEMP

-20 to +80° C
-20 至 +80° C

BORE

NPS 1 / 2 / 3 reference NPS 1 / 2 / 3 参考

ENDS

Multiple configurations 多种端部配置

ENGINEERING REVIEW

Application-specific performance data and order-specific dimensions available upon engineering review.
具体应用性能数据与订单尺寸可通过工程评审提供。

PRODUCT EXTENSION

面向液冷服务的卫生级阀门

SANITARY VALVES FOR LIQUID-COOLING SERVICE

Sanitary butterfly and ball valves extend the liquid-cooling connection portfolio with clean-flow isolation, serviceable interfaces and application-specific end configurations.

卫生级蝶阀与球阀扩展液冷连接产品组合，支持洁净流体隔离、便捷维护及按应用定制端部配置。

BUTTERFLY VALVE · BALL VALVE



Clean isolation · low restriction · serviceable
洁净隔离 · 低流阻 · 便于维护

DOCUMENTED ENVELOPE PRESSURE

16 bar working
工作压力 16 bar

PROOF BASIS
24 bar assessment
评估压力 24 bar

TEMP
-20 to +80°C
-20 至 +80 ° C

BORE
NPS 1 / 2 / 3 reference
NPS 1 / 2 / 3 参考

ENDS
Multiple configurations
多种端部配置

CUSTOM VALVE CONFIGURATION

Media · temperature · pressure · bore · end connection · seal
介质 · 温度 · 压力 · 通径 · 端部连接 · 密封
Tri-Clamp · welded · threaded · application-specific

LIQUID-COOLING VALVE SERVICE

**Application review → interface definition → prototype
validation → controlled production**
应用评审 → 接口定义 → 样件 → 验证 → 受控制造

面向液冷定制的卫生级管件

SANITARY FITTINGS FOR LIQUID-COOLING CUSTOMIZATION

From sanitary 3A, 45°, BPE and ISO fittings to hose adapters, unions and custom transitions, Nplus adapts clean-flow components to liquid-cooling interfaces.

覆盖 3A、45°、BPE、ISO等卫生级管件，并可按液冷接口提供软管转接与定制组件。

CUSTOMIZATION SCOPE

- 01

FITTING FAMILY
3A · 45° · BPE · ISO · DIN
卫生级系列覆盖
- 02

CUSTOM INTERFACE
Tube OD · end connection · seal · finish
管径 · 端接 · 密封 · 表面
- 03

LIQUID-COOLING ADAPTATION
EPDM hose · UQD / UQDB · dry-break
软管 · 快速接头 · 干式断开
- 04

DOCUMENTED DELIVERY
Drawing · sample · inspection · traceability
图纸 · 样件 · 检验 · 追溯

SANITARY CONNECTIONS



Tube · ferrule · clamp · gasket
管件 · 卡箍 · 密封 · 转接



**45° SHORT
ELBOW**
45° 短弯头



**45° LONG
ELBOW**
45° 长弯头



90° ELBOW
90° 弯头



TEE
三通



REDUCER
大小头

CUSTOM FITTING SERVICE

Application review → interface definition → prototype → validation → controlled production
应用评审 → 接口定义 → 样件 → 验证 → 受控制造

START WITH THE SERVICE POINT

根据连接位置进行选型

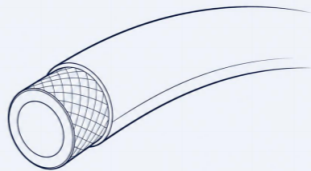
SELECT BY WHERE THE CONNECTION LIVES

Use the service point as the first filter, then confirm the engineering conditions before release.
以服务节点为第一筛选条件，再在放行前确认工程边界条件。

01 FLEXIBLE TRANSFER

EPDM Hose

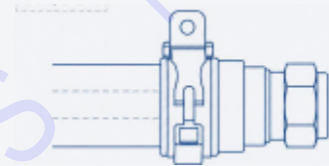
CDU / rack / server



02 HOSE RETENTION

Safety Clamp

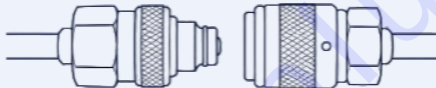
Hose / ferrule



03 RACK SERVICE

UQD / UQDB

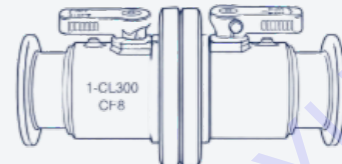
Compact branch



04 SOURCE ISOLATION

Dry-Break

Mainline / CDU



ENGINEERING SELECTION INPUTS

SIZE

MEDIA

TEMPERATURE

PRESSURE

FLOW

END CONNECTION

SEAL

CONFIGURATION

Application-specific performance data available upon engineering review.
工程评审可提供面向具体应用的性能数据。

FACILITY TO GPU

贯穿冷却系统的 协同连接路径

A COORDINATED PATH THROUGH THE COOLING SYSTEM

Nplus products are distributed across the same thermal-management architecture with each interface matched to its service task.

Nplus 产品分布在同一热管理架构中，每个接口与其服务任务相匹配。



DRY-BREAK

Mainline

Nplus connection point

EPDM + CLAMP

CDU / manifold

Nplus connection point

UQD / UQDB

Rack service

Nplus connection point

HOSE + UQD

Server loop

Nplus connection point

SYSTEM VIEW

Facility → CDU → rack → server → GPU

建筑冷却水 → CDU → 机柜 → 服务器GPU



APPLICATION TO PRODUCTION

从应用评审到受控生产

FROM APPLICATION TO PRODUCTION

Nplus can participate from application review through controlled production and documented delivery.

Nplus 可从应用评审参与至受控生产与文件化交付。



CUSTOMIZATION INPUT

Application medium · temperature · pressure · flow · interface standard · seal preference · documentation requirement

应用介质 · 温度 · 压力 · 流量 · 接口标准 · 密封偏好 · 文件要求

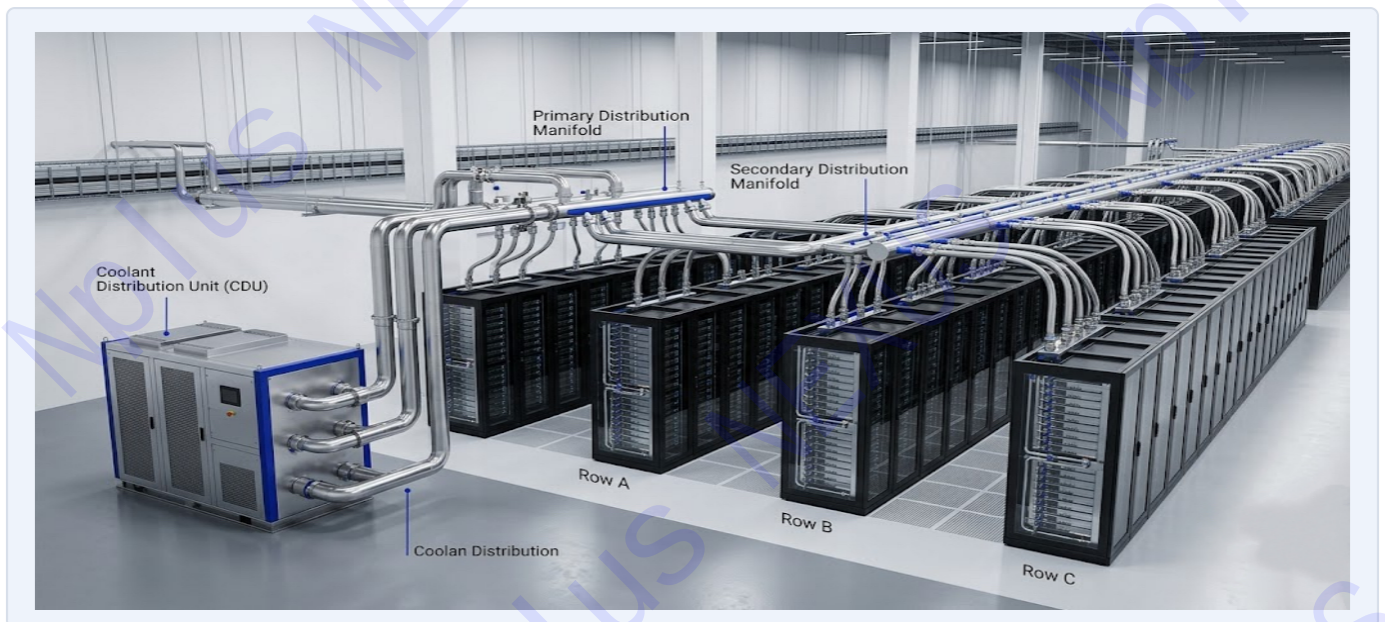
HIGH-DENSITY COOLING

为高密度液冷而构建

BUILT FOR HIGH-DENSITY COOLING

Connection technologies for AI data centers, AIDC, HPC, GPU clusters, CDU rack manifolds and server liquid cooling.

面向AI数据中心、AIDC、HPC、GPU集群、CDU、机柜歧管及服务器液冷连接。



AI DATA CENTER

高密度算力数据中心

CDU

液冷分配单元

GPU CLUSTER

GPU集群

RACK MANIFOLD

机柜歧管

HPC

高性能计算

SERVER LIQUID COOLING

服务器液冷

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围绕冷却任务 构建连接系统

BUILD THE CONNECTION AROUND THE COOLING TASK

Engineering, manufacturing and
validation for liquid-cooling connection
systems.

面向液冷连接系统的工程、制造与验证能力。

PRODUCT SELECTION

APPLICATION REVIEW

DRAWING / CAD SUPPORT

PROTOTYPE SUPPORT

TEST DOCUMENTATION

MANUFACTURING

CONFIGURATION SUPPORT

N+ 楠加敏科
Nplus NEXUS

NPLUS CONNECTION TECHNOLOGIES

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