



Danfoss CoolTrain™

Description

The CoolTrain™ is an advanced, pre-assembled hose solution tailored for liquid cooling in data centers. Featuring a pressure-independent flow control valve (PICV), it ensures efficient energy transfer and reduced pumping costs. The system connects the building's supply and return headers (technical water loop - TCS) to individual racks, with a supply line marked by a blue hose and a return line marked by a red hose.

Danfoss CoolTrain™ integrates the AB-QM valve in the supply line and the AMZ motorized isolation valve in the return line, creating a compact and time-saving connection set. This design optimizes hydronic balance in direct-to-chip cooling applications with variable flow, regulated by the AB-QM pressure-independent control valve. With easy installation and robust safety features, including interlockable FD83 couplings and remote monitoring capabilities, the CoolTrain™ offers reliability and energy efficiency for modern data centers.

Features & benefits

- Easy Installation:
 - Pre-assembled for quick setup.
 - Easy coupling with FD83.
- Reliable Product:
 - Pressure-tested for reliability.
 - Flow-validated for performance.
 - Dripless connections prevent leaks.
 - Cleaned to ISO4406 standards.
- Digital Connectivity and Telemetry:
 - Novocon actuator supports Modbus RTU & BACnet MS/TP.
 - Optional NovoCon® Energy temperature sensors.
 - Remote commissioning and presets.
 - Real-time flow and energy data.
- Safety Functions:
 - Interlockable couplings for security.
 - Motorized isolation ball valve for shut-off.
 - Alarms and failure alerts via NovoCon®S.
- Energy Efficiency:
 - Truly pressure independent with 100% authority for optimal control performance.
 - Adjustable maximum or variable flow.



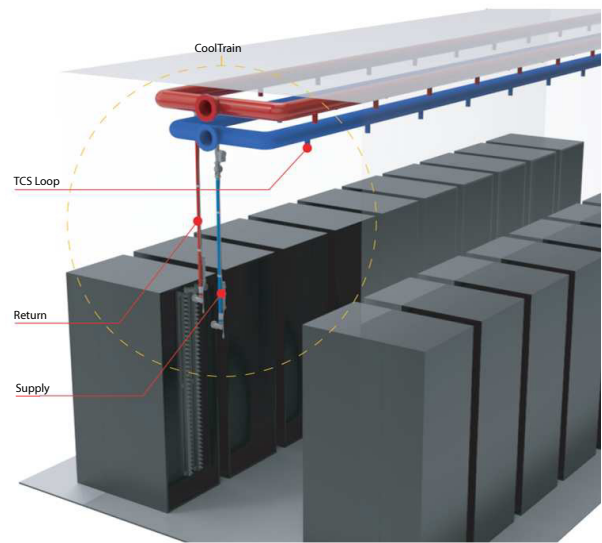
Applications

The CoolTrain™ unit is installed between the technical water loop (TCS) and the data rack. It is suitable for both direct to chip and rear door cooling racks.

Depending on the required cooling capacity, multiple CoolTrain™ units can be connected to a single data rack.

To enable remote shut-off of the water supply to the data rack, the supply and return actuators can be connected to a controller.

The pressure-independent control valve (AB-QM) regulates the required flow to the data rack and maintains hydronic balance in the system. This pressure-independent design ensures precise, dynamic control of each data rack without being affected by pressure fluctuations in the TCS loop.



Overview

Product portfolio

CoolTrain™

Length	Coupling	Hose	PICV	Isolation valves (return/supply)
2 m / 82"	1" FD83	1" EHW194	AB-QM DN32 HF	AMZ-112 DN25
3 m / 118"	1" FD83	1" EHW194	AB-QM DN32 HF	AMZ-112 DN25
3.5 m / 138"	1" FD83	1" EHW194	AB-QM DN32 HF	AMZ-112 DN25
4 m / 158"	1" FD83	1" EHW194	AB-QM DN32 HF	AMZ-112 DN25

Product details

General data

Technical Specifications


Technical data		Specification
Flow	Q _{nom} (100%)	83 LPM / 22 GPM
Connections		DN25 interlockable couplings, with or without swivel adapters
Available lengths		82/118/138/158" 2/3/3.5/4 meter (or customized length)
Setting Range (AB-QM) (%)		10-100
Operating Pressure		70-520 kPa / 10-75 psi
Min. Differential Pressure ^{1) 2)}		90 kPa / 13 psi
Max. operating pressure		10bar / 145 psi
Leakage Rate Shut-off		ISO5208 Class A (no leakage)
Factory Setting	Isolation Valves (AMZ)	Open
	PICV (AB-QM)	100%
	Connections (FD83)	Closed
	Wet shipment	The hoses are delivered filled with DowFrost LC25
Flow Medium		25% propylene glycol-based coolant with industrial corrosion inhibitors, equivalent to DowFrost LC
Operating Temperature		15 - 65 °C / 59-149 °F
Factory cleanliness standard		ISO4406 19/18/17 (>4,6,14 microns)
PICV valve ³⁾		AB-QM DN 32 HF
Connection (to datarack & TCS)		Dual interlock couplings (FD83 1") ⁴⁾
Hose type		EHW194 1"

¹⁾ Min. differential pressure for supply and return line to reaches at least 90% of nominal flow.

²⁾ for 3.5m / 138" length

³⁾ For more information see [AB-QM datasheet](#).

⁴⁾ Refer to the Operator's Manual for details on the Danfoss Hansen® [FD83 Coupling](#).

Isolation Valve Actuator	AMZ-112 DN25 ⁵⁾
Power Supply	DC 24V +10%/-15%
Power Consumption	nom. 2.5VA, max = 3VA
Running Speed	28 sec/90°
Control Type	3-point
Rotation Angle	90°
Auxiliary Switch	SPDT, non adjustable, activated 10° ±5° from close position
Auxiliary Switch Max. Load	Supply: 1.5 A, 30 VDC; Return: 2A, 30VDC
Cable	5 meter PVC with M12
Protection Class	III according to EN 60730-1
Grade of Enclosure	IP52/NEMA2
Approvals ^{6), 7)}	
CE - marking in accordance with:	Low Voltage Directive 2006/95/EC; EMC-Directive 2004/108/EC; RoHS II: 2011/65/EU
	EN 60730-1, EN 60730-2-14; UL60730-1, CAN/CSA E60730-1; UL 60730-2-14, CAN/CSA-E 60730-2-14

⁵⁾ For more information see [AMZ datasheet](#)

⁶⁾ Applies to AMZ-112 DN25

⁷⁾ Conformity is valid with associated equipment: Power supply 24VDC Class 2

Actuator options PICV AB-QM

1. NovoCon® S

Type	Code No.
NovoCon® S	003Z8504

Accessories

Type	Length	Connections	Cable material	Code No.
Cable NovoCon® Digital	1.5 m	bus / power	Halogen free	003Z8601
Cable NovoCon® Digital	5 m	bus / power	Halogen free	003Z8602
Cable NovoCon® Digital	1 m	actuator / actuator	Halogen free	003Z8608
Cable NovoCon® Digital, daisy chain	0.5 m	actuator / actuator	Halogen free	003Z8605
Cable NovoCon® Digital, daisy chain	1.5 m	actuator / actuator	Halogen free	003Z8609
Cable NovoCon® Digital, daisy chain	10 m	actuator / actuator	Halogen free	003Z8610
Cable NovoCon® I/O	1.5 m	actuator / free wires	Halogen free	003Z8612

Note! Cables are not included with actuator and must be ordered separately.

For plenum rate cables contact Danfoss.

Cable NovoCon® Energy	1.5 m	Plug-in cable with Pt1000 surface temperature sensors	PVC	003Z8610
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Note! If separate Pt1000 temperature sensors are needed, Danfoss has an array of Pt1000 sensors that can be used with NovoCon® S. See Danfoss Pt1000 sensors ESMT, ESM-10, ESM-11, ESMB-12, ESMC, ESMU and code no. 187F3418.

Type	Novocon® S
Speed	3/6/12/24 s/mm
Power Supply	24V AC/DC
Control Signal	0-10V, 2-10 V, 0-20mA, 4-20mA
Communication Protocol	BACnet MS/TP, Modbus RTU
Enclosure	IP54 (IP40 if mounted upside down)
Approvals	
CE marking in accordance with:	Directive 2014/30/EU EN 61000-6-3: 2007 + A1: 2011 : Electromagnetic compatibility (EMC) Emission EN 61000-6-1:2007 : Electromagnetic compatibility (EMC) Immunity RoHS II: 2011/65/E

For more information see [Novocon® datasheet](#).

2. AME 120 NLX-1

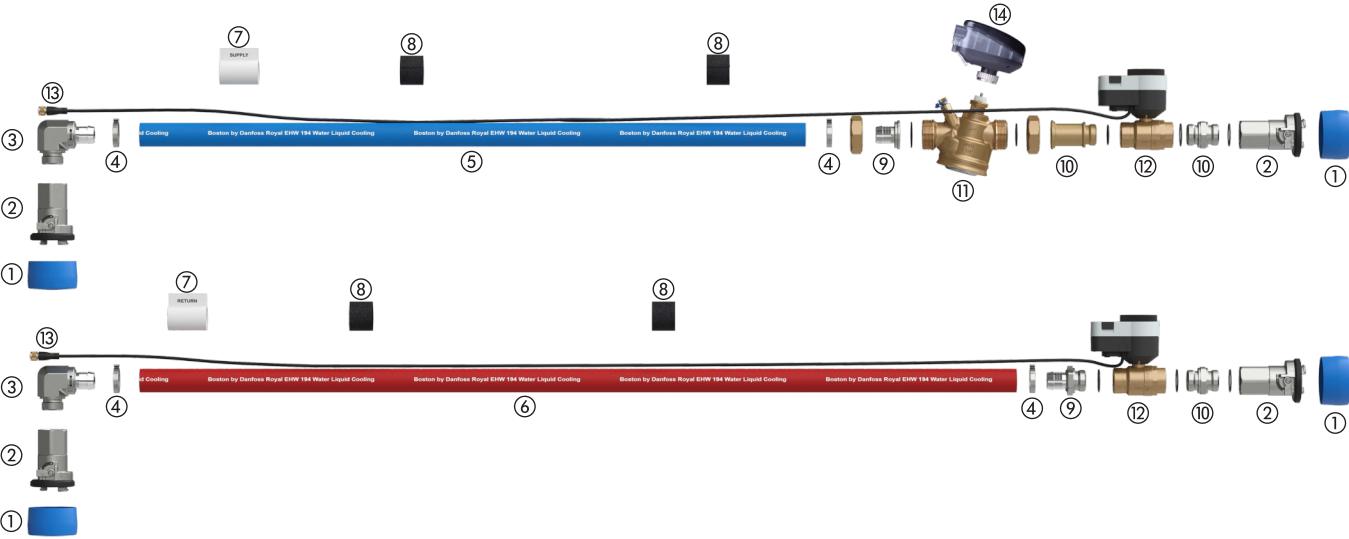
Type	Supply voltage	Speed	Code No.
AME 120 NLX-1	24 V~	10 s/mm @ 60 Hz 12 s/mm @ 50 Hz	082H5004

Type		AME 120 NLX-1
Speed		10 s/mm (@60Hz)
		12 s/mm (@50Hz)
Power Supply		24V AC
Control Signal		0-10V, 0-20mA,
Feedback Signal		Analogue, Position feedback or output signal
Enclosure		Type 1, IP42
Approvals		
	USA	UL Listed, CCN XABE, File E480529; to ANSI/UL 60730-1 and ANSI/ UL 60730-2-14
		Investigated and approved for plenum use in accordance with UL 2043
	Canada	UL listed, CCN XABE7, File E48029; to CAN/CSA-E60730-1:13 and CAN/CSA-E60730-2-14:13
	Europe	CE Mark - Danfoss declares that this product complies with all relevant CE-marking directives

For more information see [AME 120 NLX-1 datasheet](#)



Design



1. Dust cap

2. FD83 Quick disconnect coupling

3. Elbow with hose barb

4. Hose clamp

5. EHW194 hose blue

6. EHW194 hose red

7. Return or Supply label
8. Velcro cable strips

9. Hose barb

10. Adaptor

11. AB-QM DN32HF – PICV valve

12. AMZ 112 – Isolation valve & Actuator

13. M12 cable

14. Optional NovoCon S

Materials

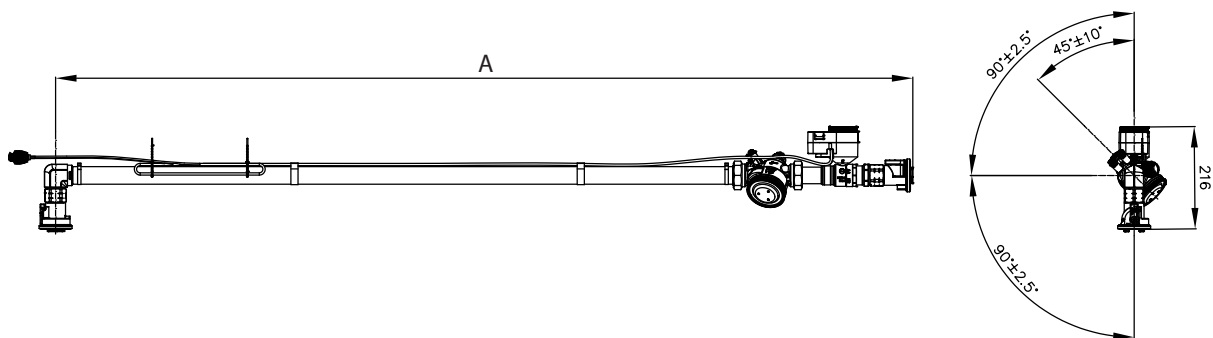
Wetted Materials ¹⁾	
Stainless Steel	AISI301/AISI316L/AISI304
Other Metals	Brass (CR-plated)/ Brass (Ni-plated)/ DZR brass (CW602N)
Plastics	PPS/PPSU/PA/PFTE
Rubber	EPDM/EPR
Other Materials	Brass (CW617N/CW614N) ²⁾

¹⁾ Small amount of grease and oil used for assembly.
²⁾ Wetted material not in direct flow. Chemical compatibility confirmed with ASTM1384 test to PG25.

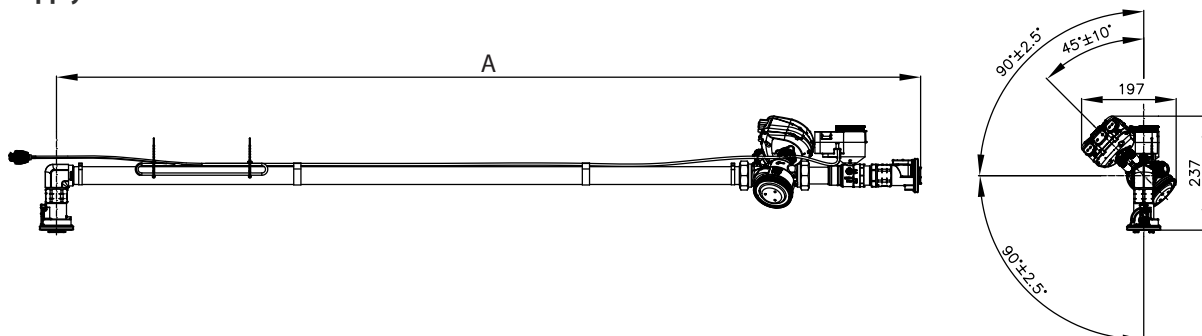
Dimensions

Versions / Length (A)
2 m / 82"
3 m / 118"
3.5 m / 138"
4 m / 158"

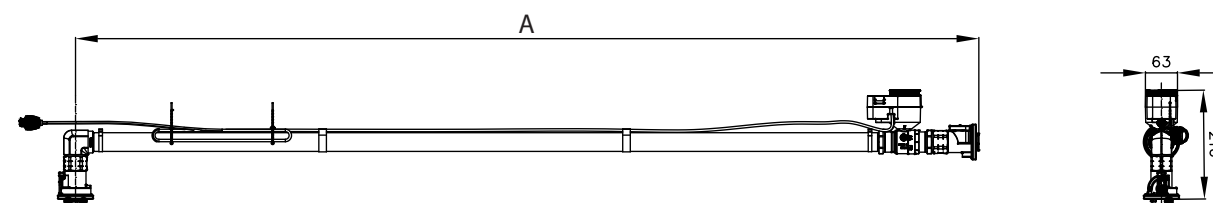
Supply line



Supply line with Novocon



Return line





Installation

The CoolTrain™ is intended for indoor installation. Before installation, remove the dust caps from both couplings. The CoolTrain™ is delivered pre-filled with PG25 and closed couplings. During installation, connect the couplings to their counterparts in the TCS line and data rack. Ensure that the remaining system is properly flushed and deaired prior to installation to prevent any operational issues. Once securely mounted, the couplings can be opened.

Presetting of flow

The calculated flow can be adjusted easily without using special tools. Either using digital actuator or manually turning the scale as described below.

AB-QM

Setting: 0 = 0%
10 = 100%



The change of presetting (factory setting is 100% (10) follow steps below:

- 1. Remove the blue protective cap or the mounted actuator
- 2. Turn the pointer (clockwise to decrease) to the new setting

Setting	l/h	l/s	GPM
10%	500	0.139	2.20
15%	750	0.208	3.30
20%	1000	0.278	4.40
25%	1250	0.347	5.50
30%	1500	0.417	6.60
35%	1750	0.486	7.70
40%	2000	0.556	8.80
45%	2250	0.625	9.90
50%	2500	0.694	11.00
55%	2750	0.764	12.10
60%	3000	0.833	13.20
65%	3250	0.903	14.30
70%	3500	0.972	15.40
75%	3750	1.042	16.50
80%	4000	1.111	17.60
85%	4250	1.181	18.70
90%	4500	1.250	19.80
95%	4750	1.319	20.90
100%	5000	1.389	22.00

Tender text

Tender Specification – TCS Loop to Datarack Hose Assembly with PICV

Scope: The flow between the TCS loop and the datarack shall be controlled by a **pressure independent control valve (PICV)** integrated into a **flexible hose assembly set**.

1. Hose Assembly Set Requirements

General:

- Pre-assembled set comprising **one supply line** and **one return line**.
- Hose colour coding:
- **Supply line:** Blue
- **Return line:** Red
- Hose material: **Peroxide-cured, zinc-free synthetic EPDM rubber**, reinforced with **2-ply textile**.
- Connection: Identical **interlockable coupling halves** for both TCS loop and datarack connections.
- Coupling safety: **Dual interlock** design, disconnectable only via **locking pin** and **lever handle**.
- Wetted materials: **Chemically compatible with PG25**.

Valves & Actuators:

- Supply line to include a **pressure independent control valve (PICV)**
- Each line to include an **motorized isolation ball valve**:
- **Full bore ball valve** with actuator.
- **3-point control** capability.
- Actuator running speed: **< 30 seconds per 90° rotation**.
- **Position indication** and **manual override** included.

Testing & Cleanliness:

- Delivered **pressure tested**.
 - Cleaned to **ISO 4406** standard.
 - Supplied with **dust caps**.
-

2. PICV Requirements

- **Automatic flow limitation** function.
- **Self-acting / membrane-driven** design.
- Modulation capability: **< 1% of set flow**, independent of setting.
- **Authority = 1** (100 %) at all settings.
- **Linear control characteristic** (adjustable to equal percentage via actuator settings).
- Flow setting scale: **Percentage of flow**.
- **Control ratio:** 1:1000.
- **Test plugs** for pump optimisation and flow measurement.
- Option for **remote flow setting** via **analogue, ModBus, or BACnet** through PICV actuator.

Contact details

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.



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