ADB Series (Aluminium)
Flat Face/Dry Break

Danfoss's Aluminium Flat Face ADB coupling is a flat face/dry break coupling used for cooling systems in electric applications with circulating water and antifreeze fluids. This coupling is providing an enhanced solution for preventing spillage of cooling agent which can cause technical failures, system shutdowns, and difficult clean-ups.

Product Features

- Aluminium construction extends life for safer operations and reduced maintenance.
- Enhances operations in demanding applications with heat and vibration compared to plastic couplings.
- Up to 62% higher flow than ISO 16028 requirements to improve efficiency.
- 4-times safety factor at maximum operating pressure of 25 bar.
- Options are available for railway applications with an enhanced version for vibration resistance tested according to EN 61373.
- Pre-guided system that helps users pre-position the coupling in difficult environments, making connection easy and reducing maintenance time.
- Full range of optional seals, end connections and sizes, helping manufacturers benefit from the design in any type of application.

Physical Characteristics

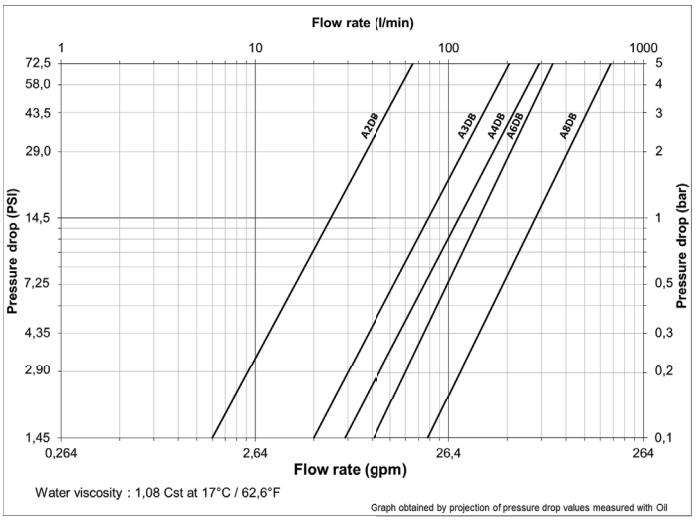
ADB Model	ISO size	Body size	Nominal Flow Diameter	Max. Operating Pressure		Rated* Flow	Air Inclusion	Fluid Loss	Force to Connect	
-	(mm)	(in)	(mm)	(bar)	(psi)	(lpm)	ml-cc.	ml-cc.	N	lbf
A2DB	6.3	1/4"	5.9	25	360	25	0.002	0.001	77	17
A3DB	10	3/8"	9	25	360	80	0.012	0.03	103	23
A4DB	12.5	1/2"	11.5	25	360	110	0.012	0.025	110	25
A6DB	19	3/4"	15	25	360	150	0.03	0.05	193	43
A8DB	25	1"	18.5	25	360	290	0.15	0.13	180	40

* Indicated values refer to a 1 bar / 14.5 psi pressure drop with water values obtained by projection of pressure drops measured with Oil

Applications & Markets

- Electrical cooling applications
- Renewable energy
- Railway
- Processing industry
- Datacenters

Flow Data



Seal Elastomer Data*

Seal Elastomer	Max. Operation Temperature Range
FKM	-20°C +200°C/-4°F +392°F
EPDM (Ethylene-Propylene)	-40°C +150°C/-40°F +302°F
Kalrez® 6375	-20°C +275°C/-4°F +527°F
Generic FFKM (Perfluorocarbon)	-15°C +275°C/+5°F +527°F

* For reference only, based on Danfoss recommended temperatures.
Contact Eaton technical support for further information on fluid compatibility

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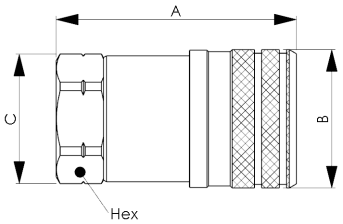

Figure 1

Sockets (Female)

Part Number	Thread Size		Dimensions								Weight	
EPDM	Body Size	BSPP	A (in)	B (in)	C (in)	Hex (in)	A (mm)	B (mm)	C (mm)	Hex (mm)	lbs	grams
A2DBS25BS192	1/4'	1/4'	1.84	1.06	0.96	0.87	46.7	26.8	24.5	22	0.098	44.4
A3DBS37BS192	3/8'	3/8'	2.42	1.26	1.16	1.06	61.5	32	29.5	27	0.186	84.3
A4DBS50BS192	1/2'	1/2'	2.49	1.49	1.4	1.26	63.3	37.9	35.5	32	0.276	125.4
A6DBS75BS192	3/4'	3/4'	3.48	1.89	1.83	1.61	88.5	48	46.5	41	0.597	270.7
A8DBS100BS192	1'	1'	3.70	2.26	2.16	1.97	93.9	57.4	54.9	50	0.928	421

*Alternative end connections available upon request.
To obtain connected length of coupling, add dimensions A (Fig. 1) and G (Fig. 2) together.

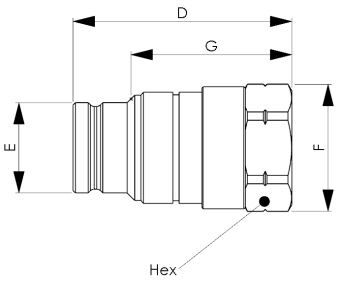

Figure 2

Plugs (Male)

Part Number	Thread Size		Dimensions									Weight	
EPDM	Body Size	BSPP	D (in)	E (in)	F (in)	G (in)	Hex (in)	D (mm)	E (mm)	F (mm)	G (mm)	Hex (mm)	lbs	grams
A2DBP25BS192	1/4'	1/4'	1.71	0.65	0.96	1.26	0.87	43.5	16.5	24.5	32.1	22	0.063	28.4
A3DBP37BS192	3/8'	3/8'	2.25	0.77	1.16	1.45	1.06	57.1	19.7	29.5	39.5	27	0.111	50.35
A4DBP50BS192	1/2'	1/2'	2.39	0.99	1.4	1.59	1.26	60.6	25.2	35.5	40.4	32	0.187	85
A6DBP75BS192	3/4'	3/4'	3.28	1.29	1.83	2.27	1.61	83.4	32.8	46.5	57.7	41	0.376	170.7
A8DBP100BS192	1'	1'	3.52	1.59	2.16	2.44	1.97	89.4	40.4	54.9	62	50	0.575	261

*Alternative end connections available upon request.
To obtain connected length of coupling, add dimensions A (Fig. 1) and G (Fig. 2) together.

Color Coding Ring Option*

Body Size (in)	ISO Size (mm)	Size	Socket/Female Ring Part Number**				Plug/Male Ring Part Number**				Tool Part Number	Tool & Rings Kit Part Number***
			Blue	Red	Yellow	Green	Blue	Red	Yellow	Green		
½	12.5	12FF	CR12FFSLB	CR12FFSRD	CR12FFSYL	CR12FFSDG	CR12FFPLB	CR12FFPRD	CR12FFPYL	CR12FFPDG	CR12FFSP93	CRKIT12FF

For color coded rings TPE material is used that offers excellent flexibility which allows a very good shock resistance in demanding applications.
Good thermal, chemical and weather resistance provides a great fit on the coupling and a extended life time in toughest conditions.
The color coded rings are easy to install by using the referenced tools. Please refer to the user guide

* For requests on alternative colors or installation instructions, please contact your sales representative. **
Orders must be in multiples of 10 pcs.
*** The kit consists of a tool plus 10 socket rings and 10 plug rings of each color.

Eaton Aluminium Flat Face ADB coupling
Quick disconnect couplings

EH010563

Aluminium offers significant reliability advantages in liquid-cooling system applications

In this article,
Christian Künstel
Product Manager
Connectors EMEA
of Eaton looks at the importance of material selection in couplings for liquid-cooling systems, outlining why aluminium is able to outperform thermoplastics in terms of reliability in these applications

Introduction:

Increasing numbers of vehicle, machinery and equipment OEMs are utilising liquid cooling in their electrical systems due to the fact that it transfers heat far more efficiently than air, helping to ensure the safe and effective operation of system components at stable temperatures.

Although plastic couplings have been the historical choice in liquid-cooling applications, they can demonstrate a number of disadvantages, often due to the effect of heat. The higher the temperature, the weaker thermoplastic couplings become, which in turn has a negative impact on maximum pressure resistance. For instance, at 70°C, plastic couplings are only rated up to pressures of around 5 bar, while at temperatures in excess of 70°C, the maximum pressure rating declines.

Contrast this to the latest aluminium couplings, which are **typically rated up to 25 bar**,

and the difference is clear to see.

It is commonly assumed that plastic is the most cost-effective option for couplings in liquid-cooling applications, while its lightweight nature makes it the only choice. However, aluminium flat-face couplings now offer a viable alternative in a **wide variety of liquid-cooling systems.**

For instance, in the industrial machinery market, liquid cooling can be found on laser-cutting, injection-moulding and drilling machines. Transportation is another exponent of this technology, for applications such as motor pre-heat systems on buses, as well as electrical converters in railway rolling stock. In the renewable energy sector, liquid cooling is utilised for turbines at water plants, and in the converters employed by wind turbines and solar plant. Water cooling for mainframe computers in data centres, and fuel cells used in the broadcasting industry, are among numerous further applications for this increasingly popular solution.

Environmental exposure:

Environmental exposure to UV/sunlight

or extreme cold is a known cause of premature degradation in plastic couplings. As a result, users can sometimes experience early breakage, which not only creates potential technical problems in the application, but difficult-to-clean spillages.

In comparison, the latest aluminium couplings, such as the ABD flat-face series from Eaton, provide high strength, endurance, corrosion resistance and life expectancy, while retaining light weight

characteristics. The end result is reduced TCO (total cost of ownership). Importantly, the spill risk is minimised in critical electric cooling applications, offering the end user reduced maintenance requirements and higher operational safety.

Vibration:

As a result of material characteristics, plastic couplings offer lower connection strength than metallic counterparts. In short, the connection can break more easily under the **vibration**

conditions typically experienced in liquid-cooling applications. It is also possible for plastic couplings to disconnect above a certain temperature level.

Aluminium provides the solution as it offers high resistance to mechanical stress, which in turn provides a strong connection under both continuous vibration and heat. In fact, the latest aluminium couplings provide a **minimum safety factory of 4** (for a working pressure of 25 bar). In excessive vibration applications, such as those found in the rail industry, versions offering enhanced vibration resistance can be sourced that are tested in accordance with EN 61373, which specifies shock and vibration tests for rolling stock equipment.

Flow:

Although liquid-cooling is typically a low-pressure application, flow is an important consideration in the selected coupling as pressure drops can cause the fluid to heat up, reducing the efficiency of cooling systems. Here, an aluminium coupling with a flat-face design offers **29-62% higher flow**

(depending on the specific application) in comparison with ISO 16028 requirements. This performance enables any drops in flow to be reduced, ultimately improving the efficiency of the cooling system.

The installed space:

It is notoriously difficult to connect couplings when access or visibility are restricted, which is often the case in many modern liquid-cooling systems. Couplings such as the Eaton ADB have a **convenient pre-guiding system**

which helps users to pre-position the coupling before connection, without seeing. The inherent ease-of-use of this push-fit connection system both simplifies and accelerates the maintenance process in awkward access applications, which in turn boosts uptime.

Colour-coding is another advantage of aluminium couplings, a feature that promotes connecting without mistakes. Typically, plastic couplings can only be colour-coded in high quantities. In contrast, aluminium couplings can be processed in low batch sizes using anodising, even in gold colours, providing further assistance to maintenance teams.

Leakage:

Leaks are a common pain point for users of electrical systems that rely on liquid cooling. Due to their lower resistance to chemical attack from water-glycol cooling agents, users of thermoplastics couplings can sometimes experience leaks. Moreover, any leaked agent can prove difficult to clean, an activity that frequently leads to prolonged system stoppages.

To combat the situation, well-specified aluminium couplings offer a number of defence mechanisms against leaks. For instance, specifiers should look for couplings that provide **flat-face, non-spill functionality**

(dry break with no liquid loss), which makes them particularly suitable for use in electrical environments. This functionality reduces the risk of technical failure and safety concerns, promoting higher effectivity in the field.

Seal selection:

Another factor that influences leakage resistance is selecting the **optimum seal.**

Here EPDM seals are known to provide high levels of water-glycol compatibility. However, engineers should look out for coupling suppliers able to provide a host of different seal compounds, not simply EPDM alone.

The driver behind this issue is the requirement for many manufacturers to build several cooling system types, in a multitude of different formats. Here, customers will benefit from utilising a single source to maximise production efficiency, with seals able to handle different cooling agents as liquids or gases. Manufacturers will also enjoy advantages from selecting couplings available in a range of end connections, such as inside flat, outside flat and elbow solutions. Put simply, choosing a supplier that is able to provide a full range of optional seals, end connections and sizes, will deliver long-term benefits.

Conclusion:

Ultimately, aluminium couplings offer **extended operational life**

and minimised spill risk in all critical electrical cooling applications, providing the end user with safer operation and reduced maintenance costs. In addition, thanks to advantageous material characteristics over plastic, aluminium couplings can be deployed with higher levels of success in environments where high vibration or heat exposure is unavoidable. The upshot is that OEMs at last have a viable alternative to traditional thermoplastic couplings in liquid-cooling applications.

Introducing the Eaton® Aluminium Flat Face ADB coupling

Developed for cooling systems in electric applications with circulating water and antifreeze fluids. This coupling is providing an enhanced solution for preventing spillage of cooling agent which can cause technical failures, system shutdowns, and difficult clean-ups.

Eaton Aluminium Flat Face ADB coupling offers no-spill, flat-face design and high reliability

Endurance to exposure

Aluminium construction extends life for safer operations and reduced maintenance.

Eaton Flat face Aluminum (ADB) coupling is light weight and strong, providing resistance to environmental exposure, pressure and mechanical stress.

It is designed to extend the life of the coupling, minimizing spill risk in critical electric cooling applications, offering end users reduced maintenance and safer operations.

Safe connection

Aluminium construction enhances operations in demanding applications with heat and vibration compared to plastic couplings.

Optimal to be used in environments with vibration and heat exposure.

It connects with 4-times safety factor at maximum operating pressure of 25 bar.

Options are available for railway applications with an enhanced version for vibration resistance tested according to EN 61373.

High flow rates

Up to 62% higher flow than ISO 16028 requirements to improve efficiency.

Higher pressure rate from 29% to 62% compared to ISO 16028 requirements, reducing pressure drops and increasing cooling system efficiency.

- Pre-guided system that helps users pre-position the coupling in difficult environments, making connection easy and reducing maintenance time.
- Full range of optional seals, end connections and sizes, helping manufacturers benefit from the design in any type of application.
- Eaton Flat face ADB couplings, due to the aluminum material, are available in a variety of color coding options, and can be anodized in colors such as red, blue and even in Gold, aiding assembly and field maintenance processes.

ADB Model	Body size	Nominal Flow Diameter	Max. Operating Pressure	Rated flow*
—	(in)	(mm)	(bar)	(lpm)
A2DB	1/4"	5.9	25	15
A3DB	3/8"	9	25	33
A4DB	1/2"	11.5	25	73
A6DB	3/4"	15	25	120
A8DB	1"	18.5	25	207

* Indicated values refer to a 1 bar/14.5 psi pressure drop