

## Aircraft Towbars



Manufactured by **Cavotec Fladung**



# Aircraft Towbars

## Who we are

Cavotec is a multi-national group of companies serving the following industries: mining and tunnelling, ports and maritime, steel and aluminium, energy and offshore, airports, general industry and automation. In the early 1960's our main focus was the design and production of motorised cable reels primarily for manufacturers of tower cranes, harbour cranes and mining equipment. Today, Cavotec is connecting mobile equipment around the world in many diverse applications.

## Where we are

The Cavotec Group consists of 7 manufacturing "Centres of Excellence" located in Canada, France, Germany, Italy, Norway and Sweden and by 5 local manufacturing units located in Australia, China, Germany and the USA. For the distribution of products and providing support to customers Cavotec has 27 sales companies which, together with a network of distributors, serve more than 30 countries in five continents. The ultimate objective is to be perceived as "local everywhere".

## How we work

Our aim is to work closely with our customers in order to build long-term partnerships. To achieve this aim we have created a working environment that attracts the best people, encourages them to stay and brings out their best qualities. By producing totally reliable systems and backing them with efficient service, we strive to create true customer satisfaction.



## Cavotec Fladung

Established in 1968, the Fladung company has grown into a leader in the field of innovative ground support systems. Starting with the supply of 400Hz technology to airports, the company soon started to expand their range of systems for the airport industry.

In 2003 the company became a member of the Cavotec Group, and started operating as Cavotec Fladung GmbH. Today, the company is seen as one of the leading ground support equipment manufacturers in the world. With an extensive range of underground and above ground supply systems, coupled with innovations like the Power and PCA Caddys, Cavotec Fladung has become a natural choice for airport operators around the world.

# Cavotec Group Organisation

As shown here the Cavotec Group is organized to support its customers around the world through its manufacturing units and sales companies.

Each Cavotec manufacturing company, no matter where it is located, aims at being a market leader in its field by providing innovative and reliable products to Group customers.

Each Cavotec sales company, in the 27 countries where they operate, aims at better serving its local market following the Group philosophy "to be local everywhere".

## Manufacturing network

Centres of Excellence	Local Manufacturing	Group Partners
<b>France</b> <b>Cavotec RMS</b> Spring Driven Reels	<b>Australia</b> <b>Cavotec Australia</b> Motorized Cable Reels	<b>Belgium</b> <b>Gantry</b> Crane Rail Systems
<b>Germany</b> <b>Cavotec Alfo</b> Spring Driven Reels Slipring Columns	<b>China</b> <b>Cavotec China</b> Product Assembly	<b>Italy</b> <b>Brevetti Stendalto</b> Cable Chains
<b>Cavotec Fladung</b> Aircraft Support Systems Security Systems	<b>Germany</b> <b>Cavotec Micro-control</b> Radio Remote Controls	<b>Prysmian (Pirelli)</b> Flexible Cables
<b>Italy</b> <b>Cavotec Specimas</b> Motorized Cable Reels Panzerbelt Cable Protection Slipring Columns	<b>Sweden</b> <b>Cavotec Sweden</b> Product Assembly	<b>Tratos Cavi</b> Flexible Cables
<b>Norway</b> <b>Cavotec Micro-control</b> Radio Remote Controls	<b>USA</b> <b>Cavotec USA</b> Product Assembly	
<b>Sweden</b> <b>Cavotec Connectors</b> Electrical Plugs & Sockets		
<b>New Zealand</b> <b>Cavotec MoorMaster</b> Automated Mooring Systems		

## Sales network

### Cavotec Sales Companies

Cavotec Australia	Cavotec France	Cavotec Norway
Cavotec Belgium*	Cavotec Germany	Cavotec Russia*
Cavotec BeNeLux	Cavotec Hong Kong	Cavotec Singapore
Cavotec Brazil*	Cavotec India	Cavotec South Africa
Cavotec Canada	Cavotec Italy	Cavotec Sweden
Cavotec Chile	Cavotec Korea	Cavotec Turkey
Cavotec China	Cavotec Latin America	Cavotec UK & Ireland
Cavotec Denmark	Cavotec Mexico	Cavotec USA
Cavotec Finland	Cavotec Middle East	

\* Branch Office

# Aircraft Towbars

## STANDARD AND UNIVERSAL TYPE

Specially designed aircraft towbars have since many years been an integral part of the complete Cavotec Fladung range. Thanks to their innovative design features and high quality, the Cavotec Fladung towbars are capable of towing all types of aircraft from all major manufacturers such as Boeing, Airbus, Tupolev, Ilushyn, Saab.

The standard available tube lengths are 3.510mm, 4.430mm and 6.885mm. Each can be fitted with optional features such as torsion adapters, shock absorbers and a pivoting towing eye.

### The towing tube

The main part of any aircraft towbar is the towing tube. Cavotec Fladung towbars all feature either a special aluminium or steel tube. Each individual

towbar is specifically designed for a certain type of aircraft and is therefore capable of towing any load related to that individual aircraft. The tube comes equipped with handles on both ends and a towing eye with a 76mm diameter (NATO towing eye).

### Undercarriage and hydraulics

The towbar undercarriage consists of a rectangular tube construction and comes equipped with an optional swing axle and two tyres. Each towbar can be adjusted in height through an hydraulic handpump, allowing it to be raised towards the nosewheel hook-up point. Remember that when connected to the aircraft the towbar must be lowered to the correct transport height. The lowering speed is adjustable through a valve mounted on the towbar.

The drawing on the next page show the default undercarriage and hydraulics configurations of both the standard and universal towbars.

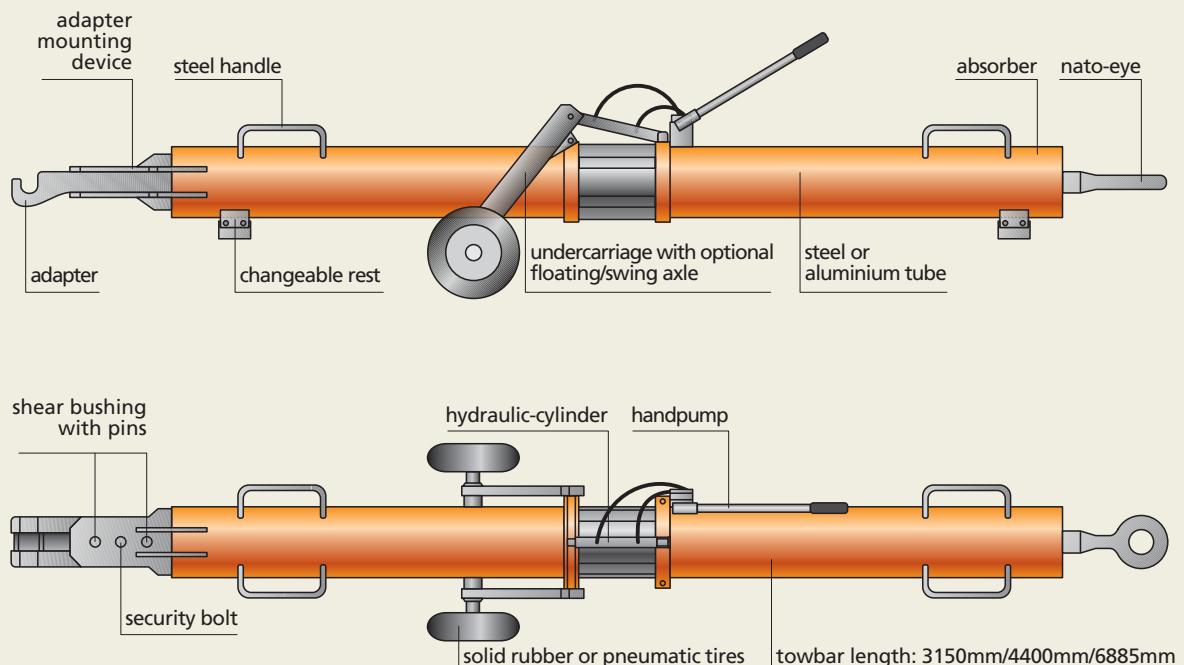
### Handling extra-long towbars

It is possible that a situation occurs where the distance between the towbar adapter head and floor is too low. This can be due to, for instance, the extra length of the towbar or height of the coupling on the towing truck. As this situation occurs when the towbar is in its lowered position, the towbar has to be transported in the raised (upper) position. To ensure a safe operation however, the towbar must only be raised sufficiently to obtain enough space between the adaptor and tarmac apron.

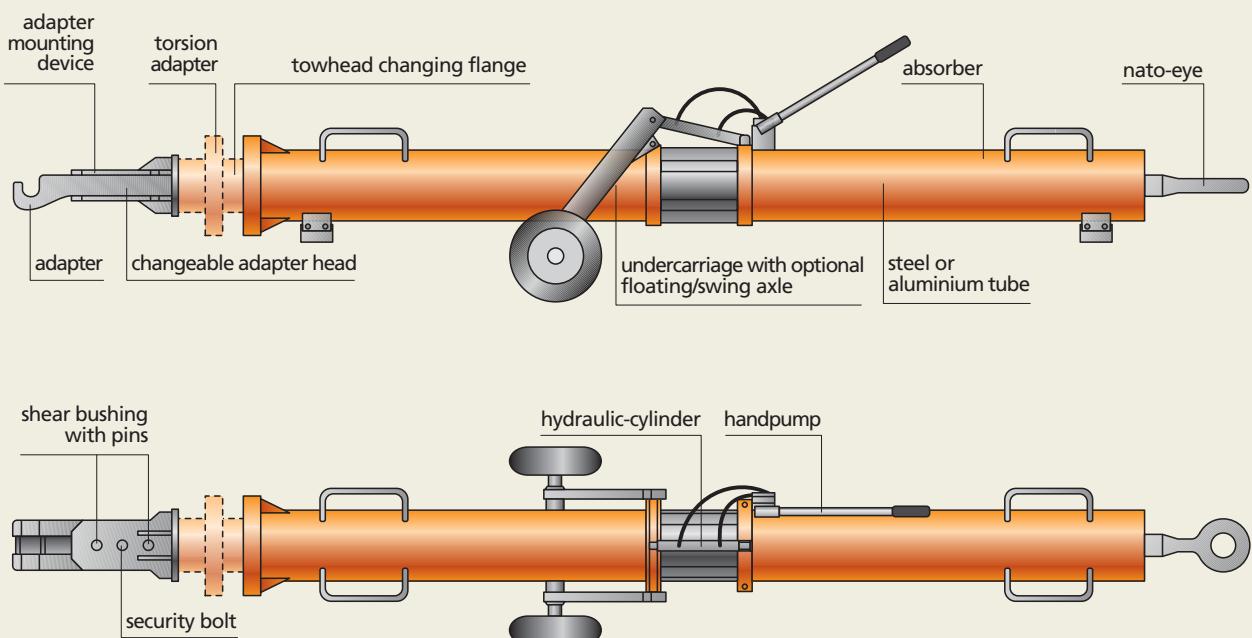


A Cavotec Fladung towbar in action.

## Standard Towbar



## Universal Towbar



# Towbar adapters

A very important part of each towbar is the adapter head, as it provides the actual connection between tow-truck and aircraft. The adapter is a hand operated locking device fitted with aircraft specific claws that interlock with the towing device at the nosewheel.

The transfer of force and pressure from the towbar to the adapter head goes through two specially designed shear bolts. These bolts are constructed in such a way that when too much force is exerted on the connection they will break away, preventing further damage to the nosewheel.

To ensure that the adapter head cannot be pulled out of the flange, it is fitted with an additional screw that remains in place even after the shear bolts have been broken. The shear bolts must be tightened using a torque wrench and according to the specified amount of torque.

## Adapter optionals

The Cavotec Fladung towbars and adapter heads can be fitted with a number of optional devices. For the adapter head the most important optional is the "Turning Device for Adapter". This device allows the adapter head to be turned 15° degrees in both directions providing unprecedented flexibility while maintaining a completely safe operating environment.

Aircraft type	Carriage size	Adapter type	Length mm	Aircraft type	Carriage size	Adapter type	Length mm
A300/310	M	C	D159x4400	DC9 / MD80-95	K	P	D4"x2660
A319/320/321	M	C*	D159x4400	DO 328	K	P	D4"x3150
A330	M	C	D159x4400	EMB 110	M	P	D4"x3150
A340-400	M	C*	D159x3150	EMB 120	M	P	D4"x3150
A340/500-600	M	C*	D159x3150	EMB 145	M	C	D4"x3150
A380	M	C*	D159x3150	EMB 170	K	C	D159x4400
A300/600(UPS)	M	C	D159x4400	F 27	G	P	D4"x3150
AN12	K	P	D159x4400	F 28	M	P	D4"x4400
AN 22	G	P	D159x3150	F 50	G	C	D159x3150
AN24	M	P	D159x3150	F 100/F 70	G	C	D159x4400
AN26,30,32	M	P	D159x3150	Falcon 10/20	G	C	D4"x3150
ATP	K	C	D4"x3150	Falcon 2000	K	C	D4"x3150
ATR42/72	K	C	D4"x3150	Falcon 50/90	G	C	D4"x3150
B707/A300	G	P	D159x4400	Gulfstream IV+V	K	P	D4"x3150
B727	K	P	D159x4400	HFB 320	K	C	D4"x3150
B737/100	K	P	D159x4400	HS 146/BAE 146	K	C	D4"x4430
B737/200-800	K	C	D159x4400	HS 21	K	C	D159x3150
B747	K	P	D159x3150	IL 18	G	P	D159x4400
B757	K	C	D159x4400	IL 62	M	P	D159x4400
B767	K	C	D159x4400	IL76 (long)	G	P	D159x6600
B777	K	C	D159x4400	IL 86/76	G	P	D159x4400
BAC111	K	C	D159x6000	IL 96	M	C	D159x3150
BD 700	K	P	D159x3150	L 188 ELEKTRA/P3	M	C	D4"x3150
C130	M	C	D159x5x3500	METRO III	M	P	D4"x3150
C160	M	P	D159x6000	Mini 1000			
Challenger CL600	K	P	D159x3150	Mini 2000			
CESSNA 560 XL•	K	P	D4"x3150	Saab 2000	K	P	D159x3150
CRJ-600-700	K	P	D159x3150	Saab 340	K	P	D159x3150
CRJ 100-200	K	P	D159x3150	SE 210/212		P	D4"x3150
DASH 7	K	C	D4"x3150	SF 340	K	P	D159x3150
DASH8	K	C	D4"x3150	TU 134	K	P	D159x4400
DASH 8-400	K	C	D4"x3150	TU 154	G	P	D159x4400
DC 8	K	P	D159x3700	TU 204	M	C	D159x4400
DC 9	K	P	D4"x2660	YAK 40	K	P	D159x3150
DC10/L1011	K	C	D159x3150	YAK 42	G	P	D159x4400

M = medium

C = clamp

K = small

P = lock pin

G = large

\* = with a rotating adapter +/-15°

• = III, VI, VII, X, XL

**Above towbars are all fitted with steel tubes**

This page provides an overview of the different adapter-heads supplied by Cavotec Fladung. Please contact your local Cavotec company for more information concerning the complete range.



A300-310



A320



A330



A340



ATR42



B707-A300



B737-100



B737-200-800



B747



B757



B767



B777



BAC1 11



BAE146



C130



CRJ100



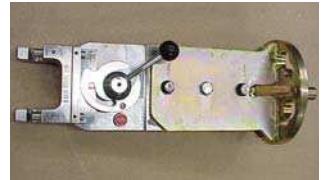
DASH8



DC9



DO328



F50



IL18



IL76



L188

## Mini Towbar

The Cavotec Fladung mini-towbar is specially designed for towing small aircraft with a maximum of 2000 kg nosewheel weight (or 15% maximum takeoff weight). It features a steel tube mounted with a special height adjustable drawbar eye, an undercarriage with soft tyres and an overall length of only 3.800mm.

Operating this towbar is simple as the nose wheel support-shell is lifted and lowered by hydraulic cylinders operated either by handpumps, or by the oil pump on the aircraft. The lowering speed can be set over a one-way restrictor with a built-in rope winch, enabling easy placement of the nose wheel into the support-shell.



*This towbar is specially designed for towing small aircraft with up to 2000kg nose wheel weight.*



*A Cavotec Fladung towbar connected to a tow truck at Frankfurt Airport, Germany.*

<b>From:</b>	
Date:	Inquiry No
Person in charge:	

---

<b>To:</b>	

### Questionnaire

- |   |   |
|---|---|
| <input type="checkbox"/> Floating axle            | <input type="checkbox"/> Adapter torsion                                      |
| <input type="checkbox"/> Shock absorber           | <input type="checkbox"/> Full rubber tyres                                    |
| <input type="checkbox"/> Pivoting towing eye NATO | <input type="checkbox"/> Pneumatic tyres                                      |
| <input type="checkbox"/> Steel towing eye         | <input type="checkbox"/> Paint: Skydrol resistant<br>Standard white (RAL9010) |
| <input type="checkbox"/> Stiff axle               | <input type="checkbox"/> Paint: single color (RAL .....                       |

- Standard Towbar  
 Universal Towbar

Aircraft Type .....

- Mini Towbar  
 for max. 1.000 Kg  
 for max. 2.000 Kg

Aircraft type .....

- Steel tube (standard version) length .....  
welded handles one/two on either side .....
- Aluminium tube length .....  
Screwed on handles one/two on either side .....
- Number of additional shear pins required.....

# Towbar configuration

Aircraft manufacturers often use completely different configurations to connect to towbars. These variations are not limited to just the manufacturers but also to each different type of aircraft, even if they are from the same company.

This is why Cavotec Fladung has a very comprehensive range of towbars. Ranging from the special mini towbar to the larger standard and universal towbars. To further increase the versatility of the range most towbars can be fitted with different adapter-heads. These adapter-heads are specifically designed for a certain type of aircraft and ensure a safe connection when towing.

For more information on all the different towbar and adapter-head possibilities please contact your local Cavotec company.



*Towbar fitted with the adapter-head for DC8 aircraft.*



*A Boeing 747 adapter-head fitted on a steel tube with floating axle.*



*An adapter-head for the Airbus 330 mounted on a standard towbar.*



*Towbar fitted with the adapter-head for IL62 aircraft.*



*Towbar fitted with the adapter-head for an IL76/86 type aircraft.*



*This adapter-head can be used for different aircraft such as Tu154, IL96 and BAE 146.*

## At work around the world

Cavotec Fladung is a global leader in the supply of specialised ground support equipment.

A full range of underground and above ground supply systems coupled with innovations such as the Power and PCA Caddy's, make Cavotec Fladung the obvious choice for airport operators around the world.

For more information concerning the range of ground support equipment please contact your local Cavotec company or visit [www.cavotec.com](http://www.cavotec.com).



*A hangar solution in action at Atitech, Italy.*



*Dual coils mounted under a passenger bridge.*



*Cavotec Caddy at work at FRAport, Germany.*



*Specialised cable coils at Nice Airport.*



*400Hz pop up system in action.*



*Scissor system FRAport, Germany.*

*Head Office*

**Cavotec MSL Holdings Ltd.**

Cavotec MSL is listed on the **NZX**

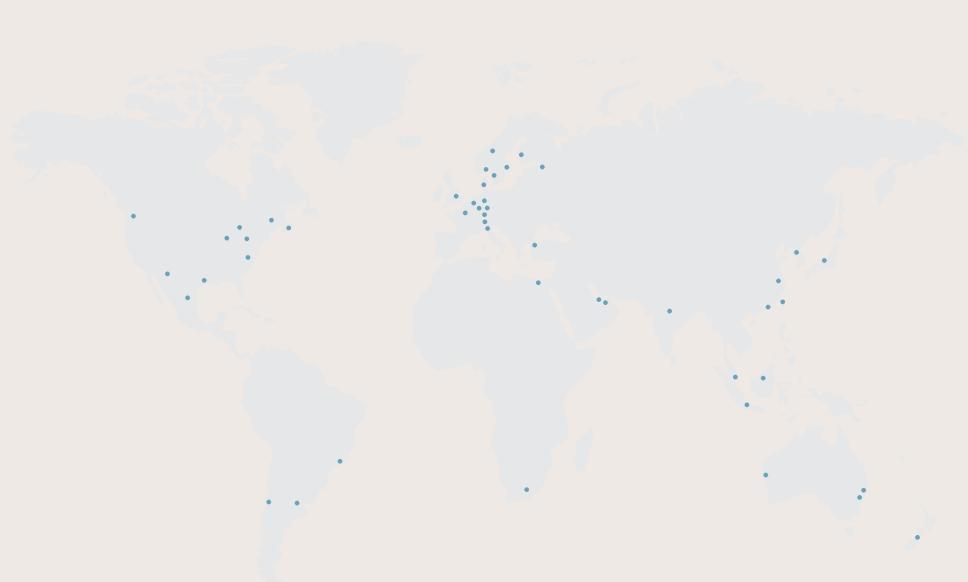
*Corporate Office*

**Cavotec (Swiss) SA**

Via Serafino Balestra 27  
CH-6900 Lugano, Switzerland

*We are present in*

Argentina      Luxemburg  
Australia      Malaysia  
Belgium      Mexico  
Brazil      The Netherlands  
Canada      New Zealand  
Chile      Norway  
China      Russia  
Denmark      Saudi Arabia  
Egypt      Singapore  
Finland      South Africa  
France      Sweden  
Germany      Switzerland  
Hong Kong      Taiwan  
India      Turkey  
Indonesia      Qatar  
Ireland      U.A.E.  
Italy      U.K.  
Japan      U.S.A.  
Korea



*For more information please visit our website [www.cavotec.com](http://www.cavotec.com)  
or contact us directly at [info@cavotec.com](mailto:info@cavotec.com)*



OS-KOM spol. s r.o.  
Zdíkovská 22, 150 00 Praha 5  
Tel.: 00420 - 257 210 114  
Fax: 00420 - 257 211 935  
E-mail: [oskom@oskom.cz](mailto:oskom@oskom.cz)  
[www.oskom.cz](http://www.oskom.cz)