

# Motorised Cable Reels



REELS071

# Cavotec Specimas Cable Reels

## The Cavotec Group

Cavotec is the name of a group of companies specialized in power supply technology for cranes and other industrial equipment. It is formed by 6 manufacturing "Centres of Excellence" located in Canada, France, Germany, Italy and Sweden and by 5 local manufacturing units located in Australia, China, Germany, Sweden and USA.

For distribution of their products and support to customers Cavotec has 22 sales companies which, together with a network of distributors, serve more than 30 countries on five continents. Each manufacturing company, no matter where it is located, aims at being a market leader in its field by providing innovative and reliable products to our customers.

Although they manufacture different products in different countries, they are globally supported and coordinated by the Cavotec Group in their product development and marketing activities.

Each sales company, and each distributor, has a policy aiming at better serving its local market with the full support of the Cavotec Group.

## Our aim is to be local everywhere

Great emphasis is put in providing the highest quality not only in the selected products, but also in service and support to their customers. Our philosophy is to be local everywhere.

## Our fields of activity are



**Ports &  
Terminals**



**Mining &  
Tunnelling**



**Steel Mills &  
Aluminium plants**



**Airports**



**Energy  
& Offshore**



**Shipyards &  
Maritime Industry**



**General Industry  
& Automation**

## Cavotec Sales Companies

The products manufactured by Cavotec Specimas described in the following pages, as well as other quality products in the field of crane and power technology, are distributed around the world by the Cavotec sales companies and by a network of selected distributors.



*Cavotec Specimas manufacturing facility near Milan.*

VARIOGEO

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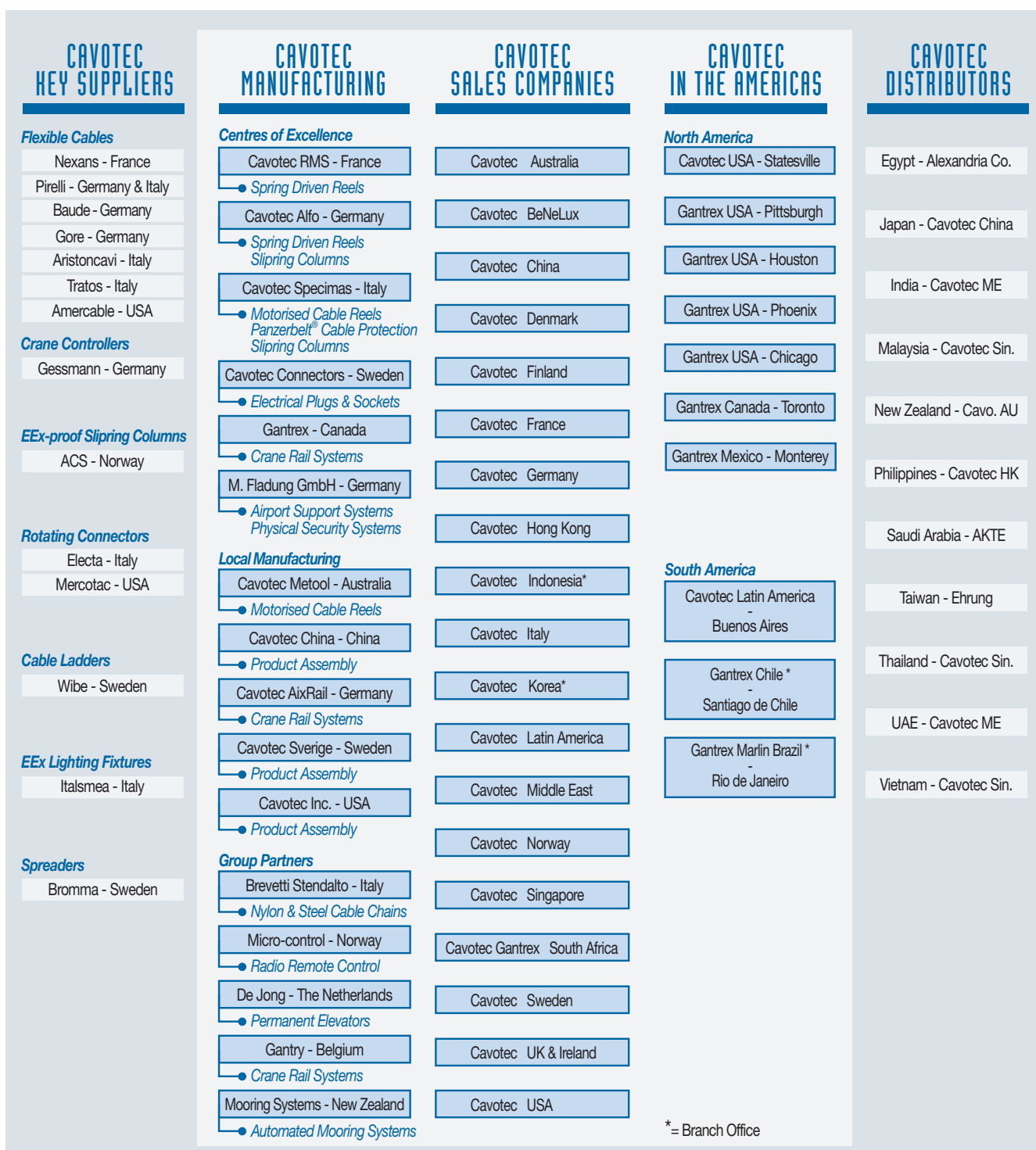
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# Cavotec Group Organization

The graph on this page shows how the Cavotec Group is organised to support its customers around the world. In the centre we have placed the Cavotec manufacturing units, sales companies and Group Partners. On the sides we have placed our key suppliers and distributors. Their combined technological competence and common approach to the market are the secret of the ability of the Cavotec Group to provide specialised and direct assistance to its customers, no matter where they are located in the world.



# Specimas is innovation

## Milestones in innovation

- 1963 **Hydrodynamic Torque Unit**  
First motorised cable reel using standard squirrel cage motor.
- 1965 **Adjustable Monospiral Drum**  
First not fully welded and adjustable monospiral drum system.
- 1969 **Modular Reel**  
First motorised reel produced in separate sub-components.
- 1973 **K-series signal collector**  
Highly compact air insulated signal ring collector.
- 1975 **Panzerflex® flexible cables**  
Development of special reeling cable with Palazzo cable manufacturer.
- 1977 **Pull & Store® cable reel**  
First Pull & Store® cable reel system.
- 1978 **Panzerbelt® cable protection**  
First flexible cable protection system for crane applications (patented).
- 1980 **KK-Collectors**  
State of the art collector for harbour cranes.
- 1982 **Kp-brush system**  
First multi-contact brush gear for cable reel collectors and slipping assemblies.
- 1986 **Electro-magnetic reel**  
Introduction of electro-magnetic clutch designed especially for cable reel applications.
- 1992 **FO-Fibre optic rotary device**  
Planetary fibre optic accumulator device (patented).
- 1993 **T-series gear-boxes**  
Compact and cost-efficient gear-box for continuous duty applications.
- 1994 **Super Panzerbelt® (patented)**
- 1994 **New Permanent Magnet Clutch design (patented)**
- 1995 **CTC - Cavotec Torque Control**  
CTC technology for direct torque control of high speed cable reels.
- 1995 **Marine Propulsion Sliprings**
- 1996 **Spreader reels**
- 2001 **IReel - New vertical reel design**  
Special vertical reel to work with Smart Spreaders
- 2002 **Cavotec Airport Caddy**
- 2003 **Alternative Maritime Power Supply Systems**

## Specimas history.

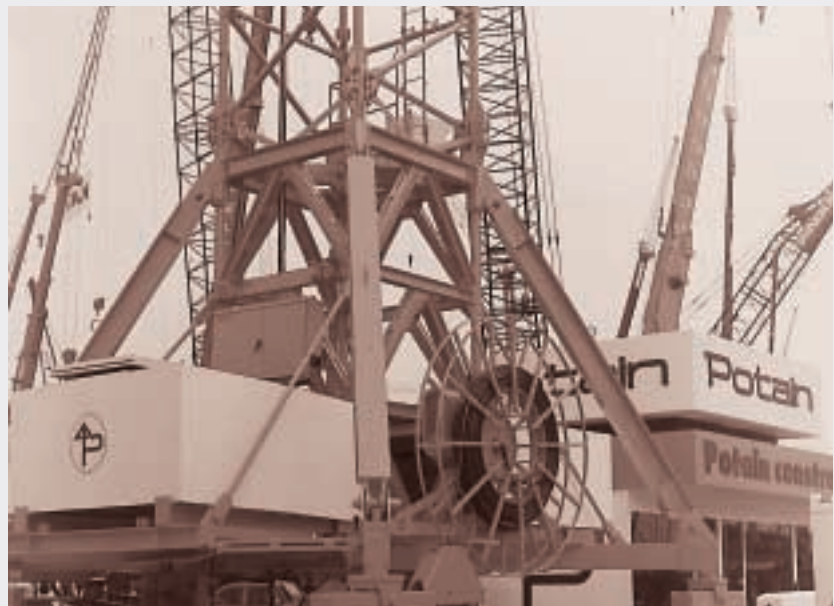
Specimas was started in 1963 in Milan by Vittorio Baldoni, a creative Italian engineer who has given an acknowledged contribution to technological development in the field of motorised cable reels. The first customer of the company was Potain, the French world market leader in tower cranes, which is still today a key-customer after having purchased many thousands of Specimas reels.

Thanks to its highly innovative engineering ideas, Specimas became famous quickly: a tradition which has been kept alive through the years by more than 20 major innovations in cable reel technique, including well-known concepts such as Hydrodynamic torque units, Pull & Store reels, Panzerbelt® cable protection system, and multi-contact brush-gear for collectors. The first Cavotec company was incorporated in Sweden in 1974 as the distributor of Specimas and other electrical equipment, concentrating in power supply for mining and tunnelling, as well as crane equipment.

Ten years later in 1984, Cavotec AB, which in the meantime had become one of the major distributors of Specimas products, purchased Specimas. At this point it was decided to develop Specimas as a manufacturing company specialized in cable reels, while Cavotec concentrated in establishing a network of Cavotec sales and service companies for its world-wide marketing activities.

In 1990 the Cavotec Group purchased the cable reel manufacturing company CTA in Italy and established in Sweden Power Connectors AB, a company devoted to the production of industrial plugs & sockets. In 1997 the Group acquired Alfo GmbH, a German spring reel manufacturer, and in 1999 RMS S.A., a French hose reel manufacturer. In 2001 Specimas changed its name to Cavotec Specimas. In the year 2002 the Cavotec Group acquired Gantrex USA, a major American manufacturer of rail fastening systems. In 2004 the Cavotec Group became the majority shareholder in Fladung GmbH a world leader in airport support systems.

Potain tower crane - 1966



REELS002



# Cavotec Specimas today: a manufacturing company of the Cavotec Group

Cable reels manufactured by Cavotec Specimas are today at work in a number of ports, terminals, mines, tunnels and industries all over the world.

The small factory located just outside Milan, Italy, which started its operations in 1963, has grown into a modern, large factory of 5550 m<sup>2</sup>. Local manufacturing facilities of Cavotec Specimas products have been organised in Australia, China, Sweden, UK and USA.

A number of high level qualified engineers and technicians are engaged in research and development with the aid of the most advanced CAD technology, which allows the company to maintain the innovative lead in its field.

The range of Cavotec Specimas motorised cable reels has been enlarged to cover almost any application and requirement.

Cavotec Specimas also produces a complete line of slipping columns as well as the Panzerbelt<sup>®</sup>, an efficient and economic system for the protection of power cables in ports and terminals.

Cavotec Specimas is committed to quality in products as well as in service.

Its aim is to provide the highest quality standard, as confirmed by the ISO 9001 certificate received from TÜV, a well known German certification and approval organisation.

*Specimas is an ISO 9001 certified company by TÜV since 1995.*



*Cavotec Specimas "pull & store" cable reels, Panzerflex cable and Panzerbelt cable protection system at Salah Container Terminal in Oman.*



REP2004

# Guidelines for cable reel selection

The correct selection of a motorised cable reel is of great importance. Cavotec and Cavotec Specimas engineers are at your disposal and will always assist in an accurate selection for each and every application.

Motorised cable reels are usually divided into applications for Horizontal and Vertical Reeling, and a distinction is made between Intermittent Duty and Continuous Duty applications.

For **Intermittent Duty** applications, Cavotec Specimas normally uses the *Hydrodynamic System*, which is particularly suitable for these applications due to its simplicity and high reliability. Compact design, even torque output in reeling and unreeling mode, standard motor and low maintenance are some of the features of this system leading to the production of many thousands of units in the past years. Normal torque outputs are 10-700 daNm with speeds from 10-60 m/min.

For **Continuous Duty** applications, Cavotec Specimas uses the new family of T-series gearboxes, which can be used with several drive systems. In order to optimise costs and technique, Cavotec Specimas uses different drive systems for different applications and sizes. Typical selections are:

### Torque Motor

for small reels and slow speed applications (5-40 daNm and 0-60 m/min).

### Cavotec Torque Control (CTC)

for the largest reels (torque output 40-750 daNm).

Motorised cable reels normally consist of 5 main components, namely:

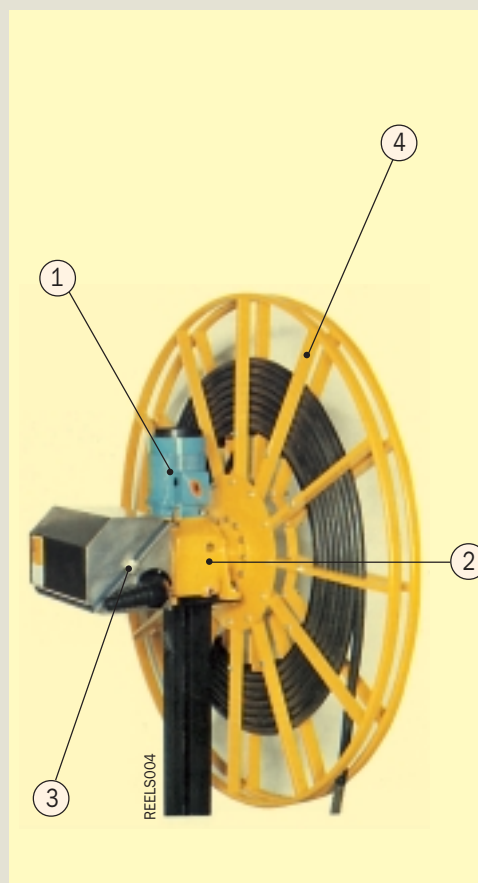
1. Motor (with drive)
2. Gearbox or Torque Unit
3. Collector
4. Drum
5. Cable guide

Cavotec Specimas reels can be fitted with different drums such as monospiral, random lay, parallel lay and Pull & Store configuration.

Collectors are available for low and high voltage, up to 20kV, with standard amperage capacities up to 2400 Amps. Motors are standard squirrel cage motors for all reels, except the torque motor reels. Motorised hose reels are also available in standard sizes for any pressures and for up to hose sizes 1/4" to 8".

## Necessary data for correct reel selection

1. Type of equipment to be served
2. Working location
3. Cable characteristics ( $\varnothing$ , weight, size)
4. Reeling length
5. Reeling speed
6. Acceleration time/deceleration time
7. Installation height
8. Ambient temperature
9. Motor voltage & protection
10. Other special requirements



### 1. Motor (with drive)

Standard squirrel cage motor, according to IEC Norms. Alternatively, the cable reel can be supplied with a pneumatic or hydraulic motor.

### 2. Gearbox or Torque Unit

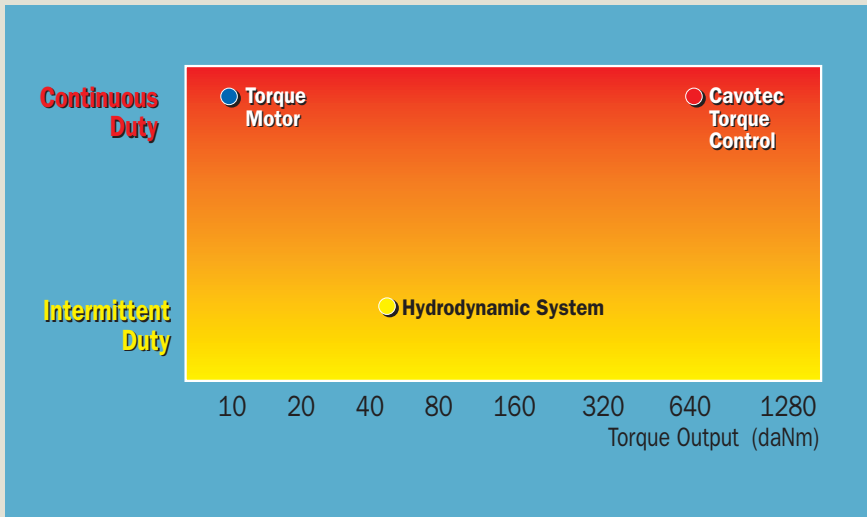
7 gearboxes and 8 torque units are available with variable output torque from 10-750 daNm

### 3. Collector

Standard sizes of collectors are available for power and signals, Current ratings vary from 10 to 2000 Amp, voltages from and voltages up to 20kV. We also manufacture custom-made collectors exceeding the above parameters.

### 4. Drum

Cavotec Specimas drums are composed of standard elements and can easily be adjusted to the required width. Standard drums sizes vary from 300 mm to 8500 mm diameter.

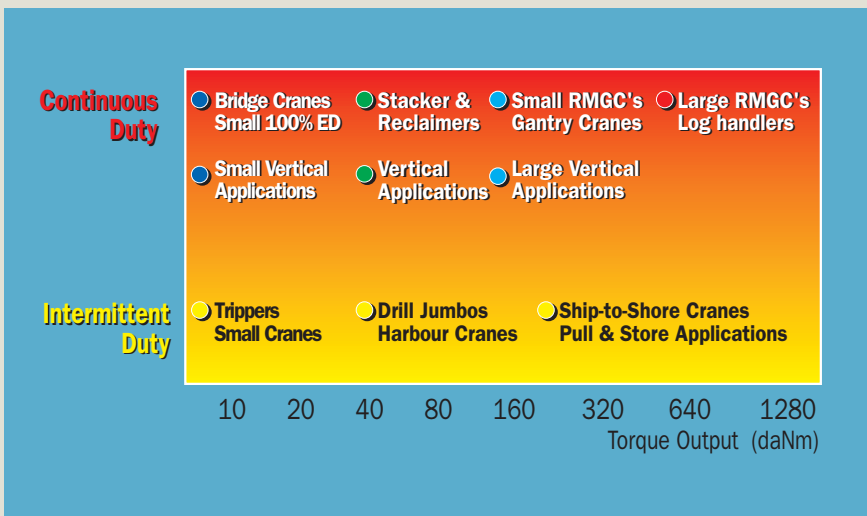


### Range of Cavotec Specimas cable reel systems

The chart to the left shows the available Cavotec Specimas cable reel systems for **Continuous Duty** and **Intermittent Duty** applications and their normal working ranges.

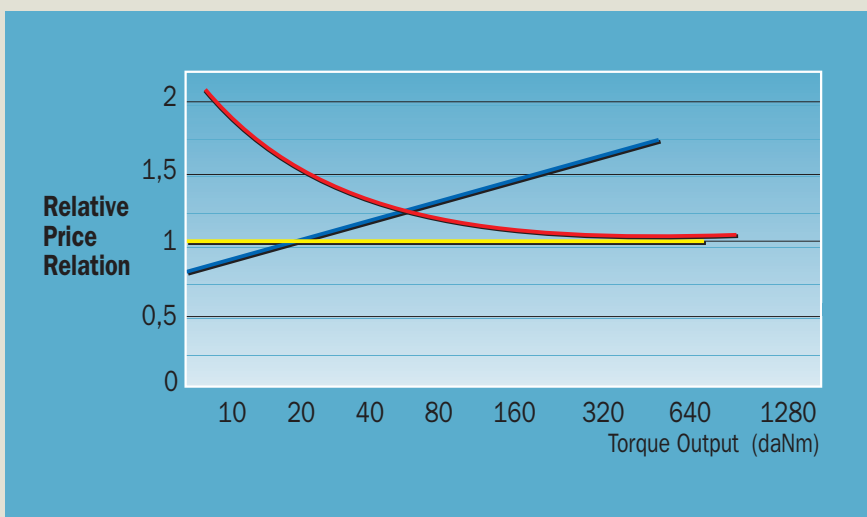
For **Continuous Duty**, Cavotec Specimas can offer the following drives: Torque Motor and Cavotec Torque Control (CTC) - all using T-series gearboxes.

For **Intermittent Duty**, Cavotec Specimas offer its well-known Hydrodynamic System with a range of 8 torque units from 10 to 700 daNm. If oversized these units can also be used for applications with higher duty cycles.



### Typical cable reel applications

The chart to the left shows different typical cable reel applications related to the most suitable cable reel system and drive. Cavotec Specimas designs and supplies a great variety of motorised cable reels for almost any application. Production is based on a large number of standard sub-components which can be combined easily in order to satisfy most needs and requirements. Special designs are made on request.



### Cost-efficiency of the Cavotec Specimas cable reel systems

Since reeling application parameters (eg. speed, cable size installation high) can vary greatly, it becomes necessary to use different systems and drives to satisfy all needs. These systems have also different cost-efficiencies, as illustrated in simple, but generalised terms, in the diagram to the left.

It is of great importance to choose the correct system for each application, in order to achieve optimal cost-efficiency. Our aim is to offer our customers the most suitable technical solution and the best quality at the lowest possible price.

- Hydrodynamic
- Torque Motor
- CTC

## CABLE HOSE REEL SELECTION SHEET NECESSARY DATA

Please fill out the from below to enable us to quote on your cable reel requirement

**1) Your contact details**

Company: \_\_\_\_\_ Address: \_\_\_\_\_  
 Contact person: \_\_\_\_\_ Department: \_\_\_\_\_  
 Telephone: \_\_\_\_\_ Facsimile: \_\_\_\_\_

**2) Application description**

- Type of machine: \_\_\_\_\_  
 - Machine application / use: \_\_\_\_\_  
 - Working intensity (travel motors / hoist motors): \_\_\_\_\_ % ED

**3) Ambient conditions**

- Temperature min/max: \_\_\_\_\_ °C  
 - Humidity: \_\_\_\_\_ %  
 - Type of atmosphere: \_\_\_\_\_

**4) Cable/Hose details**

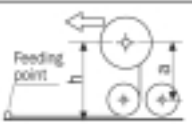
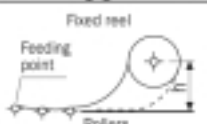
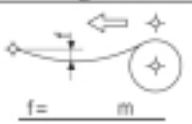


- Nr. of conductors x Section of conductors / Hose type: \_\_\_\_\_ n x mm<sup>2</sup>  
 - Nominal cable voltage / Hose pressure: \_\_\_\_\_ V/MPa  
 - Max. outside diameter (or dimensions if flat type): \_\_\_\_\_ mm  
 - Weight per metre (without fluid for hose ) \_\_\_\_\_ Kg/m  
 - Maximum allowable safe continuous tension: \_\_\_\_\_ N  
 - For hose application only: type of fluid: \_\_\_\_\_

**5) Slipping data**

- Nr. of rings: \_\_\_\_\_  
 - Max. continuous capacity: \_\_\_\_\_ Amp

**6) Cable reel motor data**

- Voltage/frequency: \_\_\_\_\_ V/Hz

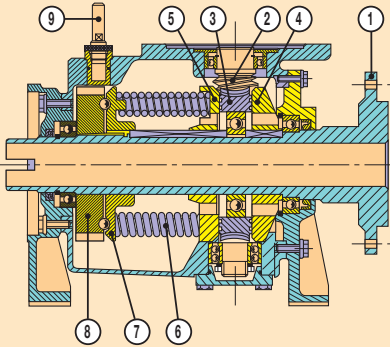
Horizontal recovery			Vertical Recovery	
<b>7) Application configuration (please tick the appropriate box)</b>				
				
<input type="checkbox"/> Mobile application	<input type="checkbox"/> Stationary application	<input type="checkbox"/>	<input type="checkbox"/> Vertical downwards	<input type="checkbox"/> Vertical upwards
<p>8) Feed point position  <input type="radio"/> Centre of runway      <input type="radio"/> End of runway</p> <p>9) Travel length of equipment (total runway length): _____ m</p> <p>10) Active reeling length: _____ m</p> <p>11) Installation height of cable reel (distance between drum centre and cable laying level): _____ m</p> <p>12) Travel speed of equipment: _____ m/min</p> <p>13) Acceleration time: _____ sec.</p>			<p>10) Active reeling length: _____ m</p> <p>11) Installation height of cable reel (total suspended length from drum centre to cable end): _____ m</p> <p>12) Hoisting speed of equipment: _____ m/min</p> <p>13) Acceleration time: _____ sec.</p>	

**14) Notes/Special requirements** \_\_\_\_\_  
 \_\_\_\_\_





# Cavotec Hydrodynamic System



In the torque unit, represented in the sectional drawing above, the clutch is the main component which allows the constant torque output.

The bronze crown gear (3), driven by the motorised worm screw (2), is freely mounted on the drum shaft (1). Its surfaces are specially machined. The two friction plates (4,5) are mounted on both sides of the crown gear.

These are made of steel and are fixed to the drum shaft with a key.

The friction plates are also specially machined so that whilst turning, an oil film is created between the crown gear and the two plates, thus transmitting the torque to the drum shaft.

In order to adjust the clutch to obtain the required output, the torque unit has an adjustable spring assembly, which consists of the rear friction plate (5), a series of springs (6), the spring holder plate (7) and the torque regulating nut (8).

The rear friction plate is fixed to the drum shaft with a key, but can slide along the shaft axis. The torque regulating nut is screwed onto the drum shaft and pushes against the spring holder plate through a series of steel balls.

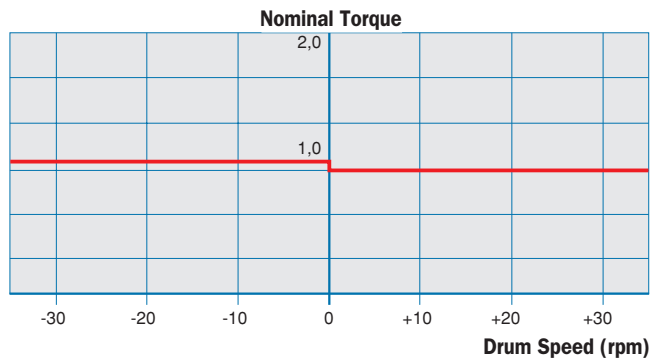
The torque can therefore be adjusted by placing the torque regulating key (9) upside down into the torque unit. With the torque regulating nut held in position, the drum can be turned manually, thus increasing or decreasing the pressure on the spring assembly, and thereby increasing or decreasing the torque output of the clutch to the necessary output level.

The Cavotec Specimas hydrodynamic torque unit was introduced to the market in 1963. At the time it was the only alternative cable reel system to the traditional torque motor reels, and it was the first system which used conventional squirrel cage electric motors. Still the most unique feature of the Cavotec Specimas hydrodynamic system is that its clutch is acting directly on the main drum shaft.

This gives an even torque output in reeling and unreeling modes, independently of clutch slip or reeling speed, thus assuring a long life for the cable.

The diagram below shows the typical torque/slip diagram for a hydrodynamic torque unit with an unbeaten even torque output. The torque variation due to slip or reeling speed does not exceed 5-10% depending on the torque unit size.

Slip/torque diagram



An Atlas Copco drilling rig at work in a Swedish tunneling project, equipped with a Cavotec Specimas cable reel and Cavotec Connectors.



REP20010

Due to its unique patented design, the Cavotec Specimas hydrodynamic system provides a simple and rational solution for many cable and hose reel applications. The system is based on a torque unit in which reduction gear, clutch and brake are built into one closed unit.

It provides a constant torque output, allowing an even recovery of any type of cable.

The Cavotec Specimas hydrodynamic cable reel is driven by a standard squirrel cage motor but can also be supplied with a hydraulic or pneumatic motor.

Another major advantage is that the torque can easily be readjusted on site.

This way, the tension of the cable may be reduced or increased according to the actual requirements.

Cavotec Specimas hydrodynamic cable reels are at work throughout the world on harbour cranes, container cranes, mining machines and mobile cranes.

*A Tamrock drill rig equipped with Cavotec Specimas cable and hose reels.*

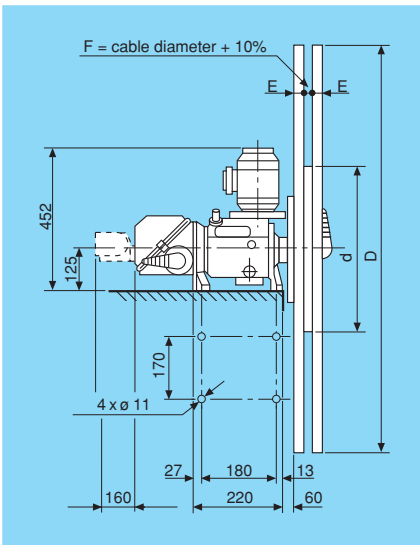


*Cavotec Specimas hydrodynamic cable and hose reels are used in mines and tunnels all over the world on drilling machines, loaders, scrapers, service vehicles, trippers, stackers, reclaimers and dredgers.*

REP20011

# Hydrodynamic Reels — Low Voltage

Cavotec Specimas hydrodynamic reels are assembled from standard sub-components which can be combined to satisfy almost any cable or hose reel requirement. The following tables are therefore only giving a general idea of the existing range and sizes. Cavotec Specimas and Cavotec engineers are at your disposal for the correct choice to meet your specific requirements.



## Torque unit 10.0

Reduction 1:42  
Nominal torque 80 Nm  
weight: 35 kg

Motor (values for 400V, 50Hz)			Flange Size 80		Collector 600 V, IP 55			
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K 12	K 412	K 424
			d=300	d=500				
4/1410	0,75	2,1	32	53	N° rings	12	4	4
6/920	0,55	1,8	21	35	Nominal amperage	Amp 30	120	240
8/700	0,18	1,0	15	26	Continuous rating	Amp 16	60	120
Motor weight: 9 Kg					Weight	Kg 9	8	TBC

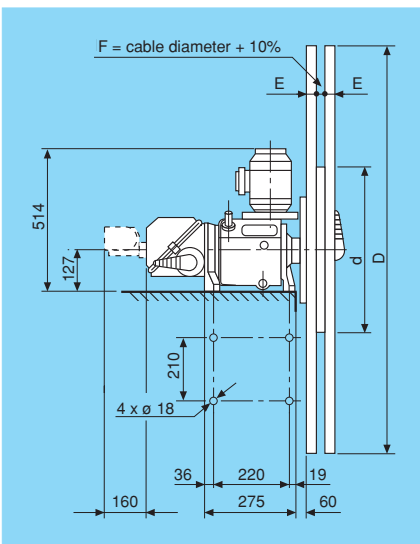
Drum dimensions			Approximate weight (Kg)	Monospiral reel						
D	d	E		Type	Capacity (metres)					
700	300	20	15	10.0 M 307	7	6	9	9		
900	300	20	17	10.0 M 309	16	14	20	18	13	10
1000	500	40	20	10.0 M 510	18	15	22	20	15	12
1200	500	40	24	10.0 M 512	31	27	36	34	25	21
1400	500	40	28	10.0 M 514	46	40	54	51	38	32
1600	500	40	39	10.0 M 516	64	56	75	71	54	46

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	7x 2,5	12x 2,5	4x 4	4x 6	4x 10	4x 16
Outer diameter	~ mm	24	27	21	22	28	32
Amperage rating	~ Amp	24	24	33	43	60	80
Weight	~ kg	0,7	0,9	0,55	0,7	1,1	1,5

## Torque unit 20.0

Reduction 1:60  
Nominal torque 160 Nm  
weight: 55 kg



Motor (values for 400V, 50Hz)			Flange Size 90		Collector 600 V, IP 55			
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K24	K 424	K 440
			d=500	d=800				
4/1420	1,5	3,7	37	60	N° rings	24	4	4
6/930	1,1	3,4	24	39	Nominal amperage	Amp 30	240	400
8/700	0,55	2,3	18	29	Continuous rating	Amp 16	120	200
Motor weight: 15 Kg					Weight	Kg 9	9	12

Drum dimensions			Approximate weight (Kg)	Monospiral reel						
D	d	E		Type	Capacity (metres)					
1000	500	40	20	20.0 M 510	13	10	12			
1200	500	40	24	20.0 M 512	22	18	22			
1400	500	40	28	20.0 M 514	34	28	33	27		
1600	800	40	40	20.0 M 816	40	34	40	32	29	23
1900	800	40	52	20.0 M 819	64	54	64	52	47	39
2200	800	40	63	20.0 M 822	93	79	92	75	68	57

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	18x 2,5	24x 2,5	4x 16	4x 25	4x 35	3x 50
Outer diameter	~ mm	31	35,6	31,2	37,1	40,3	46,7
Amperage rating	~ Amp	14,4	12,8	83	110	137	170
Weight	~ kg	1,27	1,67	1,47	2,16	2,72	3,4

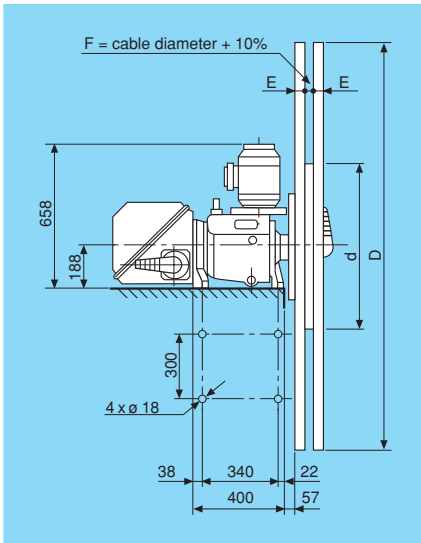


## Torque unit 40.0

Reduction 1:63

Nominal torque 320 Nm

weight: 125 kg



Motor (values for 400V, 50Hz)			Flange Size 100/112		Collector 600V, IP 55			
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K 24	K 440	K 460
			d=800	d=1200				
4/1430	3,0	6,9	57	86	N° rings	24	4	4
6/930	2,2	5,8	37	56	Nominal amperage Amp	30	400	600
8/690	1,5	4,6	28	42	Continuous rating Amp	16	200	300
Motor weight: 23/31 Kg					Weight Kg	9	12	35

Drum dimensions			Approximate weight (Kg)	Monospiral reel						
D	d	E		Type	Capacity (metres)					
1400	500	40	28	<b>40.0 M 514</b>	34	28	24	19	17	15
1600	800	40	40	<b>40.0 M 816</b>	40	34	29	23	21	19
1900	800	40	52	<b>40.0 M 819</b>	64	54	47	39	34	32
2200	800	40	63	<b>40.0 M 822</b>	93	79	68	57	51	47
2500	1200	60	136	<b>40.0 M 1225</b>	109	93	81	68	61	57
2800	1200	60	148	<b>40.0 M 1228</b>	147	126	110	93	83	78

These tables only give an indication of general capacity and size. Always ask Cavotec/Cavotec Specimas for a specific quotation.

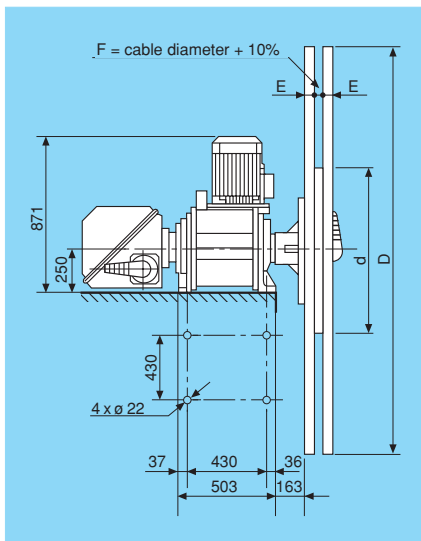
Cable size	mm <sup>2</sup>	18x 2,5	24x 2,5	4x 35	3x50 + 3x10	3x70 + 3x16	3x95 + 3x16
Outer diameter ~ mm		31	35,6	40,3	46,7	51,4	54,2
Amperage rating ~ Amp		14,4	12,8	137	170	210	254
Weight ~ kg		1,27	1,67	2,72	3,4	4,4	5,5

## Torque unit 120.0

Reduction 1:90

Nominal torque 1000 Nm

weight: 316 kg



Motor (values for 400V, 50Hz)			Flange Size 132		Collector 1000 V, IP 55			
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K 440	K 460	K 4121
			d=1200	d=1500				
4/1440	7,5	16	60	75	N° rings	4	4	4
6/940	5,5	12,7	39	49	Nominal amperage Amp	400	600	1200
8/710	3,0	9	29	37	Continuous rating Amp	200	300	600
Motor weight: 50 Kg					Weight Kg	12	35	48

Drum dimensions			Approximate weight (Kg)	Monospiral reel						
D	d	E		Type	Capacity (metres)					
2200	800	40	63	<b>120.0 M 822</b>	68	57	51	47	40	39
2500	800	40	75	<b>120.0 M 825</b>	93	78	70	65	56	54
3100	1200	60	160	<b>120.0 M 1231</b>	142	120	107	101	88	85
3800	1200	80	360	<b>120.0 M 1238</b>	230	196	176	165	144	139
4000	1500	100	380	<b>120.0 M 1240</b>	246	209	188	177	155	149
4300	1500	100	450	<b>120.0 M 1543</b>	292	249	224	211	184	178

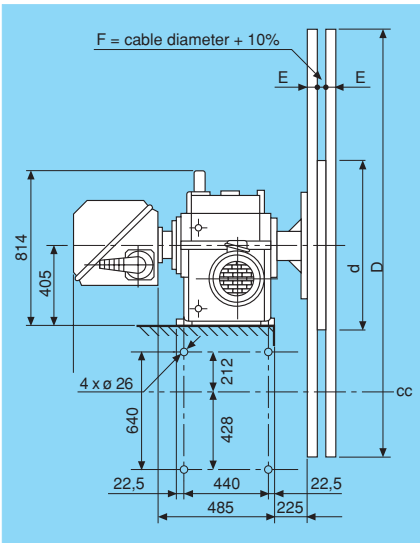
These tables only give an indication of general capacity and size. Always ask Cavotec/Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	4x 35	3x50 + 3x10	3x70 + 3x16	3x95 + 3x16	3x120 + 3x25	3x150 + 3x25
Outer diameter ~ mm		40,3	46,7	51,4	54,2	61,1	62,9
Amperage rating ~ Amp		137	170	210	254	296	340
Weight ~ kg		2,72	3,4	4,4	5,5	6,8	7,94

# Hydrodynamic Reels — Low Voltage

## Torque unit 200.0/300.0

Reduction 1:186 / 1:237  
 Nominal torque 2000 / 2700 Nm  
 weight: 610 kg



Motor (values for 400V, 50Hz) Flange Size 132					Collector 1000 V, IP 55						
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K 440	K460	K4121			
			d=1500	d=2000							
4	7,5	16,5	36	28	48	38	N° rings	4	4	4	
6	5,5	12,7	23	18	31	24	Nominal amperage	Amp	400	600	1200
8	3	9	17	14	23	18	Continuous rating	Amp	200	300	600
Motor weight: 50 kg					Weight		kg	12	35	48	

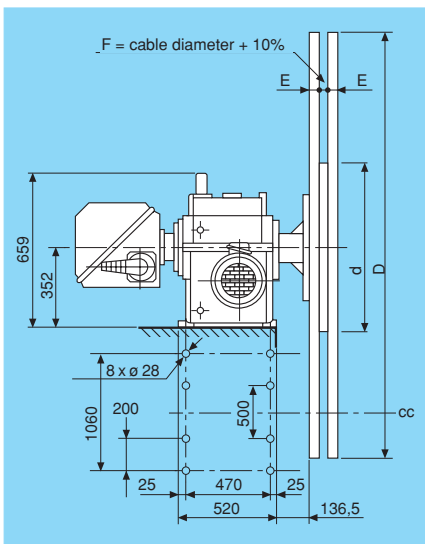
Drum dimensions			Approximate Weight Kg	Monospiral reel						
D	d	E		Type	Capacity (metres)					
3500	1200	80	320	200.0/300.0 M1235	190	161	145	136	118	114
3800	1200	80	360	200.0/300.0 M1238	230	196	176	165	144	139
4300	1500	100	450	200.0/300.0 M1543	292	249	224	211	184	178
5000	1500	100	640	200.0/300.0 M1550	352		317	300	262	254
5500	2000	120	820	200.0/300.0 M2055			371	350	307	298
6000	2000	120	1160	200.0/300.0 M2060			455	430	377	365

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	4x 35	3x50 3x10	3x70 3x16	3x95 3x16	3x120 3x25	3x150 3x25
Outer diameter	~ mm	40,3	46,7	51,4	54,2	61,1	62,9
Amperage rating	~ Amp	137	170	210	254	296	340
Weight	~ kg	2,72	3,4	4,4	5,5	6,8	7,94

## Torque unit 550.0/700.0

Reduction 1:202 / 1:256  
 Nominal torque 4500/5700 Nm  
 Weight: 1015 Kg



Motor (values for 400V, 50Hz) Flange Size 132					Collector 1000 V, IP 55						
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K 440	K460	K4121			
			d=2000	d=3000							
4	7,5	16,5	44	35	67	52	N° rings	4	4	4	
6	5,5	12,7	29	23	43	34	Nominal amperage	Amp	400	600	1200
8	3	9	22	17	33	26	Continuous rating	Amp	200	300	600
Motor weight : 50 kg					Weight		kg	12	35	48	

Drum dimensions			Approximate Weight kg	Monospiral reel						
D	d	E		Type	Capacity (metres)					
6000	2000	100	1160	550.0/700.0 M2060	589	504	455	430	377	365
6500	2500	120	1550	550.0/700.0 M2560	667	571	516	488	429	415
6500	2500	120	1550	550.0/700.0 M2565	667	571	516	488	429	415
7000	2500	120	2000	550.0/700.0 M2570	681		615	581	511	496
7300	2500	150	2500	550.0/700.0 M2573			678	641	564	547
7300	3000	150	2500	550.0/700.0 M3073			640	605	533	516

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	4x 35	3x50 3x10	3x70 3x16	3x95 3x16	3x120 3x25	3x150 3x25
Outer diameter	~ mm	40,3	46,7	51,4	54,2	61,1	62,9
Amperage rating	~ Amp	137	170	210	254	296	340
Weight	~ kg	2,72	3,4	4,4	5,5	6,8	7,94

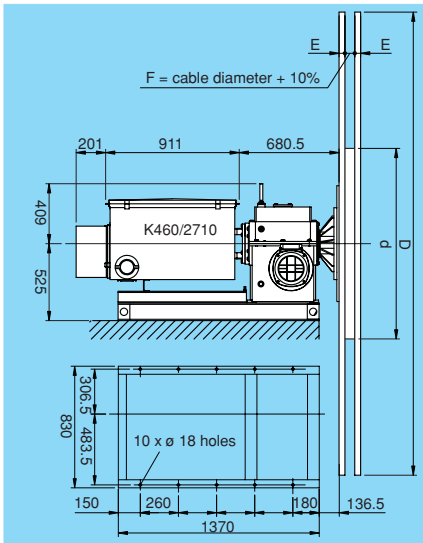
# Hydrodynamic Reels — Medium Voltage

## Torque unit 200.0/300.0

Reduction 1:186 / 1:237

Nominal torque 2000 / 2700 Nm

weight: 610 kg



Motor (values for 400V, 50Hz) Flange Size 132					Collector MV, IP 55						
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K460/2710	K460/2713	K460/4522			
			d=1500	d=2000							
4	7,5	16,5	36	28	48	38	Nominal voltage	kV	6	10	20
6	5,5	12,7	23	18	31	24	Max. voltage	kV	7,2	12	24
8	3	9	17	14	23	18	N° rings		4	4	4
						Nominal amperage	Amp	600	600	600	
						Continuous rating	Amp	300	300	300	
Motor weight: 50 kg						Weight (basement included)	kg	190	210	350	

Drum dimensions				Approximate Weight kg	Monospiral reel					
D	d	E	Type		Capacity (metres)					
3500	1200	80	320	<b>200.0/300.0 M1235</b>	145	98	136	96	104	94
3800	1200	80	360	<b>200.0/300.0 M1238</b>	176	120	165	118	127	115
4300	1500	100	450	<b>200.0/300.0 M1543</b>	224	154	210	151	163	147
5000	1500	100	640	<b>200.0/300.0 M1550</b>	318	219	299	216	233	211
5500	2000	120	820	<b>200.0/300.0 M2055</b>	372	258	350	254	273	248
6000	2000	120	1160	<b>200.0/300.0 M2060</b>	456	317	429	312	336	305

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

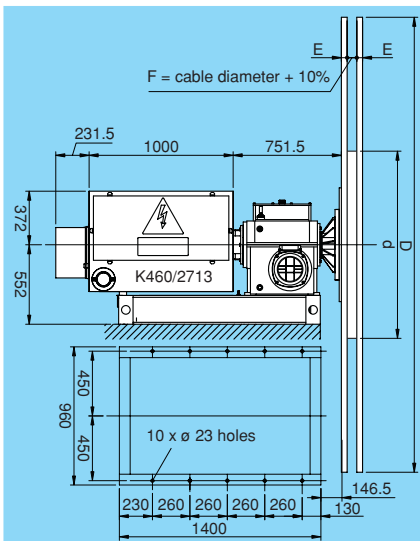
Cable size	mm <sup>2</sup>	3x35 3x120 3x10 3x25	3x25 3x95 3x10 3x25	3x35 3x50 3x10 3x10	3x50 3x10
Outer diameter	~ mm	40,3 46,7	51,4 54,2	61,1 62,9	
Amperage rating	~ Amp	137 170	210 254	296 340	
Weight	~ kg	2,72 3,4	4,4 5,5	6,8 7,94	

## Torque unit 550.0/700.0

Reduction 1:202; 1:256

Nominal torque 4500Nm; 5700 Nm

Weight: 1015 kg



Motor (values for 400V, 50Hz) Flange Size 132					Collector MV, IP 55						
No. of poles/ rpm	kW	Amp	Reel speed (m/min)		Type	K460/2710	K460/2713	K460/4522			
			d=2000	d=3000							
4	7,5	16,5	44	35	67	52	Nominal voltage	kV	6	10	20
6	5,5	12,7	29	23	43	34	Max. voltage	kV	7,2	12	24
8	3	9	22	17	33	26	N° rings		4	4	4
						Nominal amperage	Amp	600	600	600	
						Continuous rating	Amp	300	300	300	
Motor weight: 50 kg						Weight (basement included)	kg	190	210	350	

Drum dimensions				Approximate Weight kg	Monospiral reel					
D	d	E	Type		Capacity (metres)					
6000	2000	100	1160	<b>550.0/700.0 M2060</b>	456	317	429	312	336	305
6500	2500	120	1550	<b>550.0/700.0 M2560</b>	517	361	487	355	382	347
6500	2500	120	1550	<b>550.0/700.0 M2565</b>	517	361	487	355	382	347
7000	2500	150	2000	<b>550.0/700.0 M2570</b>	616	431	580	424	456	414
7300	2500	150	2500	<b>550.0/700.0 M2573</b>	680	476	640	468	503	457
7300	3000	150	2500	<b>550.0/700.0 M3073</b>	641	449	604	443	475	432

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

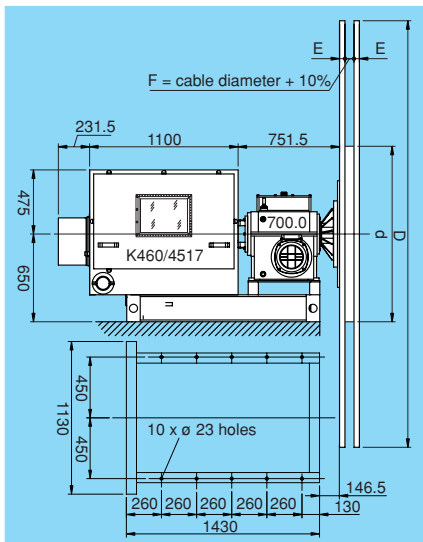
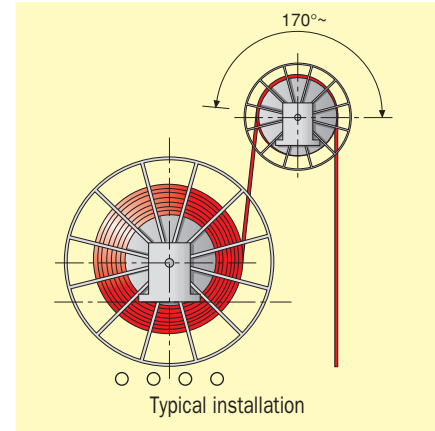
Cable size	mm <sup>2</sup>	3x35 3x120 3x10 3x25	3x25 3x95 3x10 3x25	3x35 3x50 3x10 3x10	3x50 3x10
Outer diameter	~ mm	51,3 71,6	54,3 72,6	68 74,2	
Amperage rating	~ Amp	130 281	105 240	137 172	
Weight	~ kg	3,54 8,21	3,38 7,14	5,44 6,22	

# Cavotec Pull & Store System

Cavotec Specimas Pull & Store reels are today working all over the world in about 1000 installations. The system has provided a simple solution to the problem of cable over-tensioning in high lift applications. The motorised Pull reel lifts the cable with constant reeling radius, while the Store reel collects the cable on the main drum. By splitting the work to Pull and to

Store the cable on two separate torque units – each with even torque output – Cavotec Specimas introduced in 1977 a simple system for cable protection. The system becomes intrinsically safe, featuring an integrated over tension limitation, without the need for more sophisticated and sensitive torque control systems.

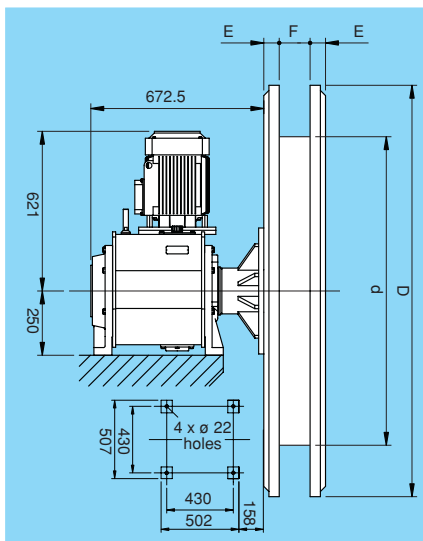
## Standard Pull & Store configuration



## Store reel

Collector MV, IP 55				
Nominal voltage	6kV	10kV	20kV	
N° rings	4	4	4	
Nominal amperage Amp	600	600	600	
Continuous rating Amp	300	300	300	

Drum dimensions		Approximate weight (Kg)	Store reel		Reeling Capacity (metres)					
D	d		Type							
6000	2000	100	1160	300.0 M 2060	378	347	365	341	336	306
6500	2000	120	1150	300.0 M 2065	454	417	439	410	404	368
7000	2500	150	2000	550.0 M 2570	512	471	495	463	456	416
7500	2500	150	2500	550.0 M 2573	565	519	546	511	503	459
7300	3000	150	2500	700.0 M 3073	534	491	516	483	475	434
8500	4000	180	4000	700.0 M 4085	686	631	663	621	612	559



These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	3x70 3x16	3x95 3x16	3x50 3x10	3x70 3x16	3x35 3x10	3x50 3x10
Outer diameter	~ mm	61	66	63	67	68	74
Amperage rating	~ Amp	220	268	178	220	143	178
Weight	~ kg	5,6	6,6	4,9	5,9	5,4	6,2

## Pull reel

Drum dimensions		Approximate weight (Kg)	Pull reel		Lifting Capacity (metres)						
D	d		Type								
1600	1200	40	120	50	40.0 P 1216	7	6	8	6	7	6
1900	1500	50	120	58	120.0 P 1519	17	14	20	16	18	15
2200	1800	50	120	65	120.0 P 1822	14	12	16	13	15	13
2400	2000	60	120	100	200.0 P 2024	26	22	30	24	27	23

\* The Pull & Store can also be driven by the CTC drive.



## Comparison of cable tensions between Monospiral and Pull & Store reels

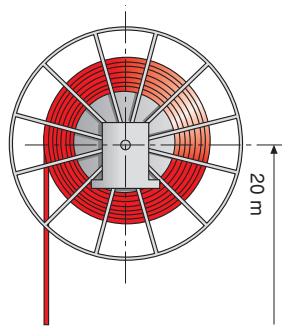
If the cable tension is not monitored and controlled it will vary in a reel application mainly due to the characteristics of the clutch, the reeling diameter and the inertia of the drum and cable. Below follows a comparison of Monospiral and Pull & Store application using the hydrodynamic torque units. The data used are for a normal application on a ship-to-shore crane.

### Application data

Type of crane	Ship-to-shore crane
Cable	Panzerflex 11 kV diameter 58 mm weight 5,1 kg
Cable length	460 m
Speed	46 m/min
Acceleration time	5 s
Height of installation	20 m
Duty cycle (travel)	40 % ED

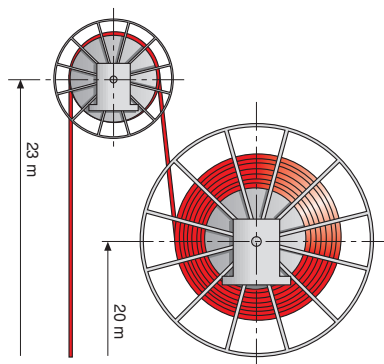
### Monospiral reel

The diagram to the right shows the cable tension as a function of the number of turns of the cable on the drum in a monospiral application. In a monospiral reel with a constant drive the cable tension increases as the reeling diameter decreases. This varies also depending on the reeling or unreeling mode. As illustrated here it is not unusual that the maximum tension allowed on the cable is exceeded in a monospiral application - especially when there is big ratio between drum inner and outer diameter is large.

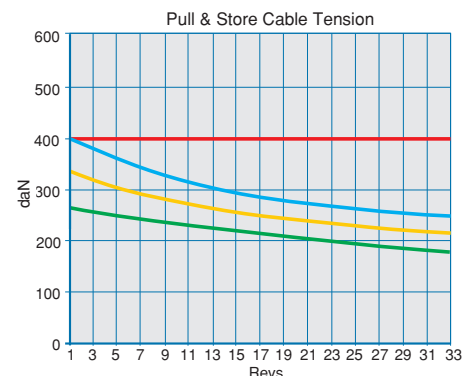
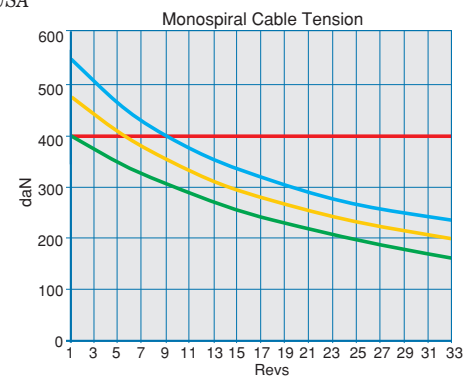


### Pull & Store reel

The diagram to the right shows the cable tension as a function of the number of turns of the cable on the drum in a Pull & Store system based on the same data as above. In the Pull & Store reel, the cable tension is limited mainly by the fact that the Pull reel lifts the cable on a constant reeling radius. It varies also depending on the reeling or unreeling mode and due to inertia of drum and cable. Through the use of a Pull & Store configuration it is possible to limit the maximum tension of the cable within the allowed limits, as shown in the diagram, without the need of sophisticated torque control.

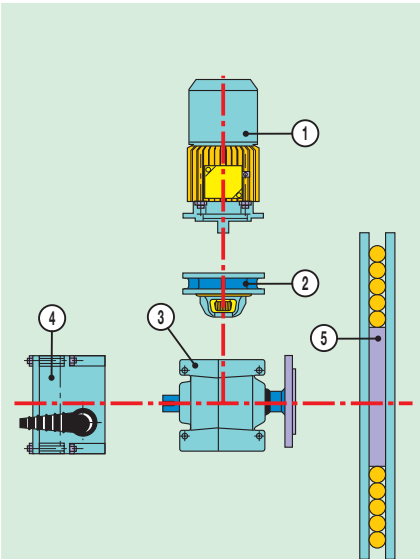


Pull & Store reels in action at Everglades Terminal, USA



- █ Maximum allowed cable tension
- █ Maximum pull when reeling out
- █ Pull at constant speed
- █ Maximum pull reeling in

# Cavotec Torque Motor System



**1 - Motor**

*Self-braking torque motor*

**2 - Pre-reducer**

*Mounted between torque motor and main gearbox to adapt motor torque and speed to required values.*

**3 - Gearbox**

*This is the basic component of the Cavotec Specimas system. It adapts motor speed and torque to the requirement of the application*

**4 - Collector**

*The purpose of the slipping assembly is to allow the reeling of the cable onto the drum without torsional strain. Cavotec Specimas slipping assemblies are monobloc units, they are self-contained and fitted directly onto the torque unit shaft.*

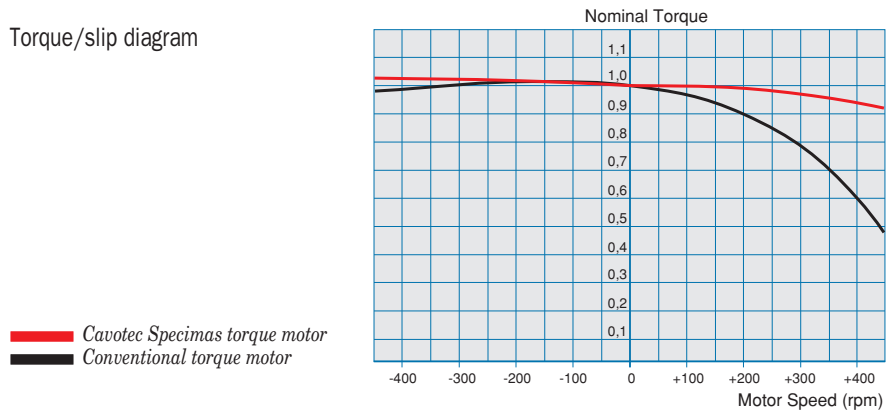
**5 - Drum**

*Cavotec Specimas drums are of modular design, using standard components, offering a wide range of selections. Drums are manufactured from steel tubing and surface treated to withstand tropical and corrosive marine conditions. Drums with small diameters are manufactured from sheet and are welded. Assembly bolts are in stainless steel.*

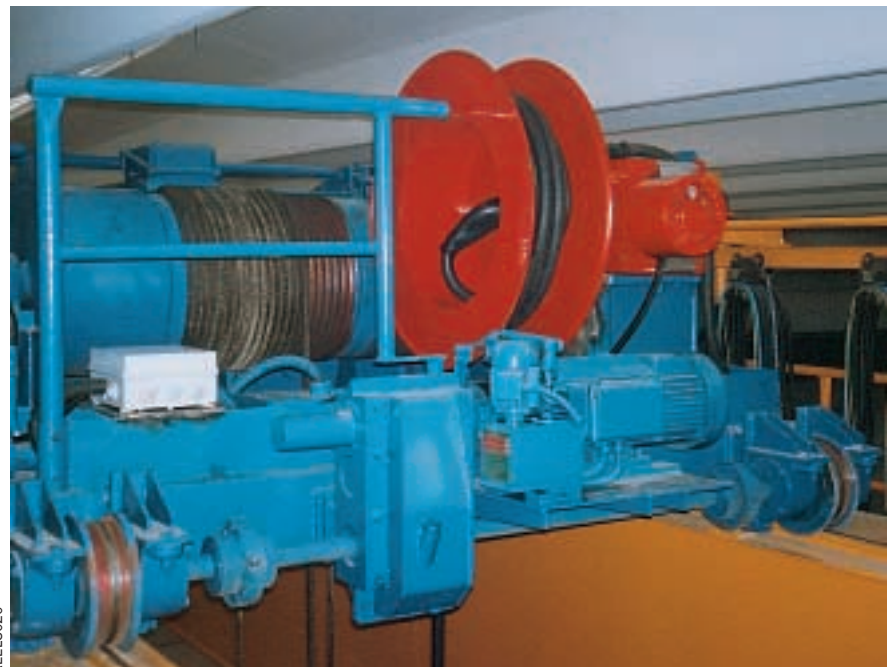
The Cavotec Specimas torque motor for cable reels has been designed to provide a nearly constant torque in reeling and unreeling mode. The system is also designed for continuous duty. The resulting mechanical cable tension could be compared to a hydrodynamic system. This has been obtained by using a torque motor with a very flat torque/slip curve. The motors are used up to maximum of  $\pm 400$  rpm and, within this range, the torque fluctuation is approximately 10%. Besides the motor

characteristics, the gearbox efficiency also influence the traction to which the cable is submitted. The Cavotec Specimas T-series gearboxes are designed with this in mind. They incorporate a monoshaft planetary gear which makes them highly reversible. The torque motors are equipped with an electro-magnetic brake and are servo-ventilated. The standard protect class is IP55 and is suitable for environment temperatures up to 40°C. Special ventilation and motor insulation are supplied for higher temperature ranges.

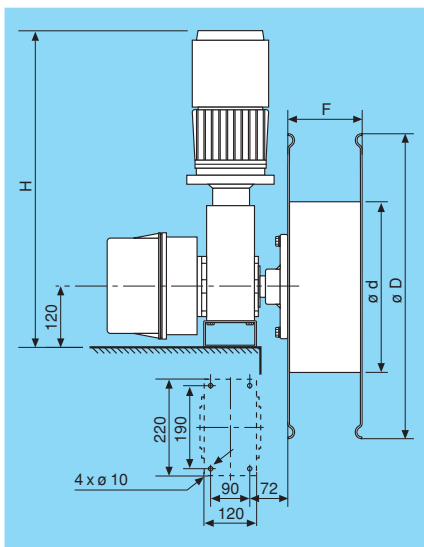
Torque/slip diagram



Typical torque motor reel application in a vertical cable reel installation in a steel mill.



REELS020



## Reducer T2 with torque motor

Nominal torque 109 Nm

Reducer T2		Reeling speed (m/min)				collector 600 V, IP55			
Type	Reduction	Approximate Weight (kg)	d=300	d=400	d=500	Type	KA4512	KA0204	KA0304
<b>T2.10</b>	10,3	20	36	48	61	N° rings	11+P	3+P	3+P
<b>T2.14</b>	14,1	20	27	35	45	Nominal amperage Amp	25	50	90
<b>T2.23</b>	23,1	20	16	22	27	Continuous rating Amp			
Weight (kg)							4	3,5	5

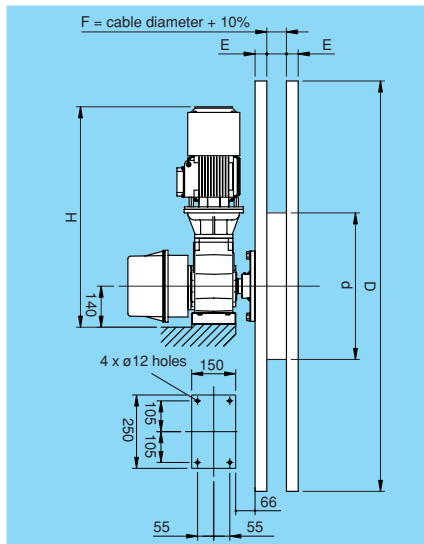
Torque motors 400V (±5%) - 50 Hz (±400 rpm) Drum					collector 600 V, IP55					
Type	Nominal torque Nm	Approximate Weight (kg)	Amp	H H1 (1)	Type	dimension D d F	Approx. Capacity (metres) Weight(kg)			
<b>N2</b>	2	14	0,63	703	<b>TF306</b>	600 300 100	15	29 25	30 28	
<b>N3</b>	3	20	0,84	750	<b>TF306</b>	600 300 150	16	43 37	45 42	
<b>N5</b>	5	28	1,28	785	<b>TF306</b>	600 300 200	18	58 50	61 56	
<b>N7</b>	7	35	2,72	860	<b>TF408</b>	800 400 100	25	52 44	55 51	42 35
					<b>TF408</b>	800 400 150	28	78 66	82 76	64 54
					<b>TF408</b>	800 400 200	33	104 89	110 102	99 84

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mmq	7x 2,5	12x 2,5	4x 4	4x 6	4x 10	4x 16
Outer diameter ~ mm		21,2	24,8	20	21,5	25,5	30
Amperage rating ~ Amp		24	24	33	43	60	80
Weight ~ kg		0,7	0,9	0,55	0,68	1,03	1,47

## Reducer NT3 with torque motor

Nominal torque 290 Nm



Reducer T3N		Reeling speed (m/min)				collector 600 V, IP55			
Type	Reduction	Approximate Weight (kg)	d=300	d=500	Type	K12	K412	K424	
<b>NT3.09</b>	9,3	24	40	67	N° rings	12	4	4	
<b>NT3.14</b>	13,6	24	27	46	Nominal amperage Amp	30	120	240	
<b>NT3.23</b>	22,8	24	16	27	Continuous rating Amp	16	60	120	
<b>NT3.23</b>	29,3	24	12	21	Weight kg	9	7	8	

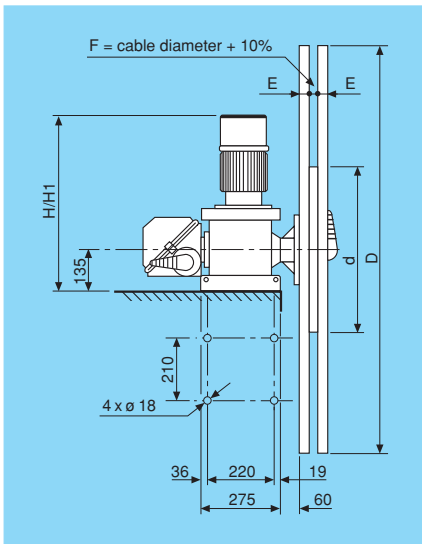
Torque motors 400V (±5%) - 50 Hz (±400 rpm) Drum					collector 600 V, IP55					
Type	Nominal torque Nm	Approximate Weight (kg)	Amp	H H1 (1)	Type	dimension D d E	Approx. Capacity (metres) Weight(kg)			
<b>N2</b>	2	17	0,63	575 625	<b>M307</b>	700 300 20	15	7 6	9 9	
<b>N3</b>	3	18	0,84	620 670	<b>M309</b>	900 300 20	17	16 14	20 18	13 10
<b>N5</b>	5	26	1,28	655 705	<b>M510</b>	1000 500 40	20	18 15	22 20	15 12
<b>N6</b>	6	26	1,71	655 705	<b>M512</b>	1200 500 40	24	31 27	36 34	25 21
<b>N7</b>	7	30	2,72	730 780	<b>M514</b>	1400 500 40	28	46 40	54 51	38 32
<b>N8.6</b>	8,6	38	3,32	730 780	<b>M516</b>	1600 500 40	39	64 56	75 71	54 46
<b>N10</b>	10	45	3,63	855 905						

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	7x 2,5	12x 2,5	4x 4	4x 6	4x 10	4x 16
Outer diameter ~ mm		24	27	21	22	28	32
Amperage rating ~ Amp		24	24	33	43	60	80
Weight ~ kg		0,7	0,9	0,55	0,7	1,1	1,5
Drum width F mm		26	29	23	24	30	35

### Reducer T4 with torque motor

Nominal torque 400 Nm



Reducer T4		Reel speed (m/min)			collector 600 V, IP55			
Type	Reduction	Approximate Weight (kg)	d=500	d=800	Type	K24	K424	K440
T4.0	15	75	41	66	N° rings	24	4	4
T4.1 <sup>(1)</sup>	23	91,5	27	43	Nominal amperage Amp	30	240	400
T4.2 <sup>(1)</sup>	30	91,5	20	33	Continuous rating Amp	20	120	200
T4.3 <sup>(1)</sup>	38	91,5	16	26	Weight kg	9	9	12

Torque motors 400V (±5%) - 50 Hz (±400 rpm) Drum					collector 600 V, IP55			
Type	Nominal torque Nm	Approximate Weight (kg)	Amp	H	H1 <sup>(1)</sup>	Type	dimension D d E	Approx. Capacity (metres)
N5	5	26	1,28	703	780	M510	1000 500 40 20	13 10 12
N6	6	26	1,71	703	780	M512	1200 500 40 24	22 18 22
N7	7	30	2,72	778	855	M514	1400 500 40 28	34 28 33 27
N8,6	8,6	38	3,32	778	855	M816	1600 800 40 40	40 34 40 32 29 23
N10	10	45	3,63	904	980	M819	1900 800 40 52	64 54 64 52 47 39
N12	12	65	4,59	985	1062	M822	2200 800 40 63	93 79 92 75 68 57
N15	15	75	4,75	1023	1100	M825	2500 800 60 75	126 108 125 103 93 78

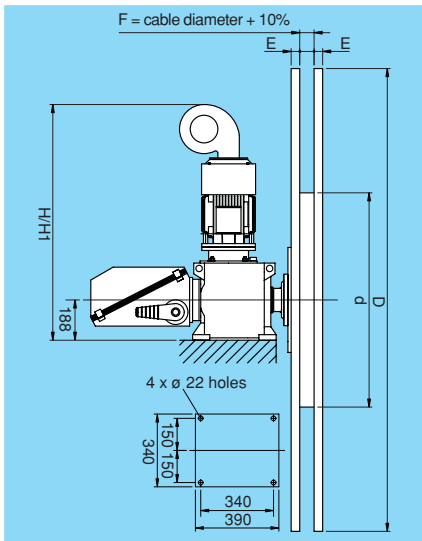
<sup>(1)</sup> with pre-reducer

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	18x 2,5	24x 2,5	4x 16	4x 25	4x 35	3x50 + 3x10
Outer diameter	~ mm	31	35,6	31,2	37,1	40,3	46,7
Amperage rating	~ Amp	14,4	12,8	83	110	137	170
Weight	~ kg	1,27	1,67	1,47	2,16	2,72	3,4
Drum width F	mm	34	39	34	40	44	51

### Reducer T5 with torque motor

Nominal torque 1000 Nm



Reducer T5		Reel speed (m/min)			collector 600 V, IP55				
Type	Reduction	Approximate Weight (kg)	d=500	d=800	d=1200	Type	K24	K440	K460
T5.0	21	193,0	30	48		N° rings	24	4	4
T5.1	32	207,5	20	32	48	Nominal amperage Amp	30	400	600
T5.2	43	207,5	15	24	36	Continuous rating Amp	20	200	300
T5.3	53	207,5	12	19	28	Weight (kg)	9	12	35

Torque motors 400V (±5%) - 50 Hz (±400 rpm) Drum					collector 600 V, IP55			
Type	Nominal torque Nm	Approximate Weight (kg)	Amp	H	H1 <sup>(1)</sup>	Type	dimension D d E	Approx. Capacity (metres)
N5	3	26	1,28	781	853	M514	1400 500 40 28	34 28 24
N7	5	30	2,72	876	948	M816	1600 800 40 40	40 34 29 23
N8,6	7	38	3,32	876	948	M819	1900 800 40 52	64 54 47 39 34
N10	10	45	3,63	876	948	M822	2200 800 40 63	93 79 68 67 51 47
N12	12	65	4,59			M1225	2500 1200 60 136	109 93 81 68 61 57
N15	15	75	4,75			M1228	2800 1200 60 148	147 126 110 93 83 78
						M1231	3100 1200 60 160	189 163 142 120 107 101

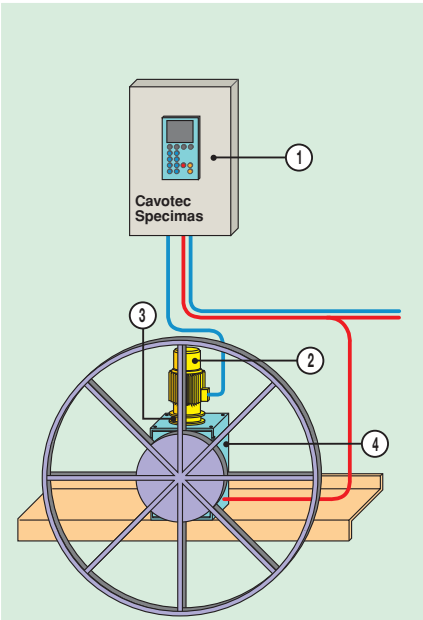
These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	18x 2,5	24x 2,5	4x 35	3x50 3x10	3x70 3x16	3x95 3x16
Outer diameter	~ mm	30,2	33,6	39	41	49,4	56,4
Amperage rating	~ Amp	14,4	12,8	137	170	210	254
Weight	~ kg	1,27	1,68	2,72	3,4	4,7	6
Drum width	mm	35	38	44	46	54	60





# Cavotec Torque Control (CTC)

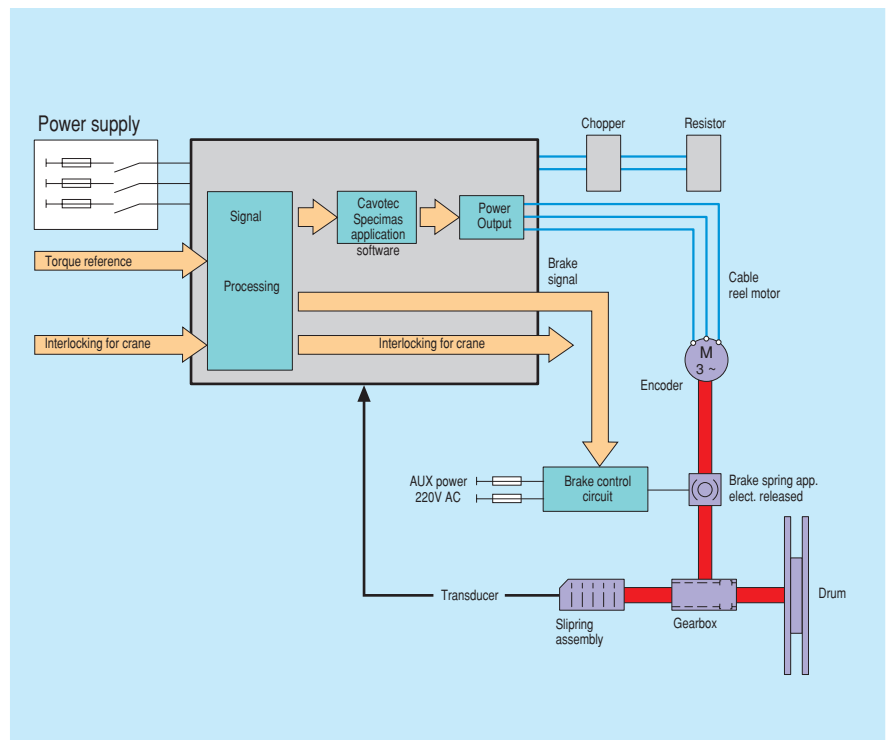


- 1 - CTC drive.
- 2 - Standard squirrel cage electric motor.  
One or more motors can be used in parallel.
- 3 - Pre-reducer and electromagnetic holding brake.
- 4 - Main gear-box.

The Cavotec Specimas cable reel with CTC drive is the result of a technical cooperation between drive manufacturers and Cavotec Specimas. The CTC system achieves precise speed and torque control of standard maintenance-free squirrel cage motors. A slipping device between motor and gear-box is not needed. The Cavotec Specimas CTC driven cable reel allows an almost constant pull on the cable. In fact, by following the torque reference signal (see fig.1) computed on the basis of reeling variables – such as cable weight, reeled cable on the drum, acceleration or deceleration of the crane, position on the track – the CTC minimizes the pull on the cable.

Cavotec Specimas has also chosen to use oversized, not force ventilated, motors for reliability and for simplicity in system layout. The result is a longer cable life and an increased reliability of the cable reel system.

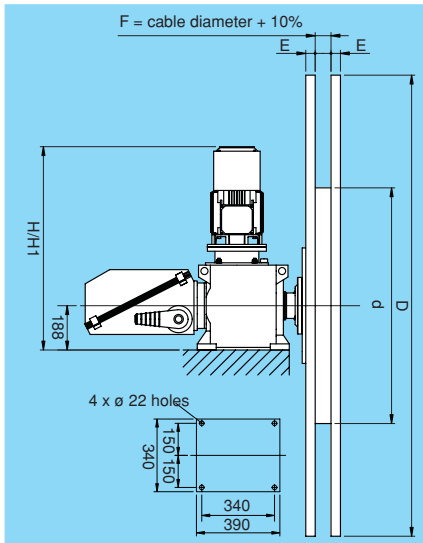
**Fig. 1 – Cavotec Torque Control, CTC drive**





## Reducer T5 with CTC

Nominal torque 1000 Nm



Reducer T5		Reeling speed (m/min)			collector 750 V, IP55				
Type	Reduction	Approx. W. (kg)	d=500	d=800	d=1200	Type	K24	K440	K460
T5.0	21	193,0	104	166	249	N° rings	24	4	4
T5.1	32	207,5	68	108	162	Nominal amperage	Amp 30	400	600
T5.2	42	207,5	52	83	124	Continuous rating	Amp 16	200	300
T5.3	53	207,5	41	65	97	Weight	kg 9	12	35

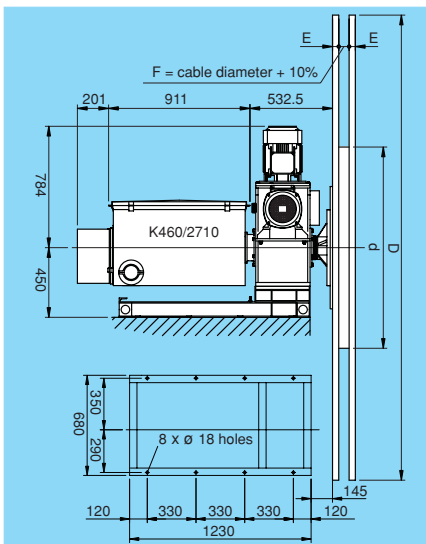
Torque motors 400V (±5%) 50Hz (±1400rpm)					Drum								
Motor selection	Nominal torque Nm	Motor weight (kg)	CTC power	CTC output current	Type	dimension D	dimension d	Approx. Capacity (metres) E	W. (kg)				
1x3kW	20	20	759	831	M514	1400	500	40 20	34 28				
1x4kW	25	31	773	845	M816	1600	800	40 40	34 29				
2x3kW	2x20	2x20	7,5	18	759	831	M819	1900	800	40 52	64 54	47 39	34
2x4kW	2x25	2x31	11	24	773	845	M822	2200	800	40 63	93 79	68 67	51 47
					M1225	2500	1200	60 136	109 93	81 68	61 57		
					M1228	2800	1200	60 148	147 126	110 93	83 78		
					M1231	3100	1200	60 160	189 163	142 120	107 101		

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	18x 2,5	24x 2,5	4x 35	3x50 + 3x10	3x70 + 3x16	3x95 + 3x16
Outer diameter	~ mm	30,2	33,6	39	44,9	49,4	56,4
Amperage rating	~ Amp	14,4	18,8	137	170	210	254
Weight	~ kg	1,27	1,68	2,72	3,68	4,70	6,00
Drum width F	mm	35	38	44	50	55	61

## Reducer T6 (600) with CTC

Nominal torque 2400 Nm



Reducer T6		Reeling speed (m/min)			collector 750 V, IP55				
Type	Reduction	Approx. W. (kg)	d=1500	d=2000	d=2500	Type	K460/2710	K460/2713	K460/2715
T6.0	33	350	200			Nominal voltage	6	10	15
T6.1	46	364,5	143	190		Max. voltage	7,2	12	18
T6.2	57	364,5	115	153	191	N° rings	4	4	4
						Nominal amperage	Amp 600	600	6200
						Continuous rating	Amp 300	300	300
						Weight	190	210	270
						Shaft height	A 450	450	555

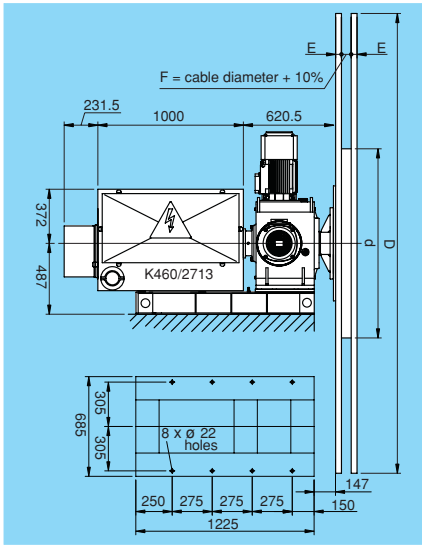
Torque motors 400V (±5%) 50Hz (±1400rpm)					Drum						
Motor selection	Nominal torque Nm	Motor weight (kg)	CTC Power	CTC Output Current	Type	dimension D	dimension d	Approx. Capacity (metres) E	W. (kg)		
1x7,5kW	50	50	7,5	18	891	M1546	4600	1500 100 530	263 180	247 178	208 189
1x9kW	60	62	11	24	891	M1550	5000	1500 120 640	318 219	299 216	299 216
2x7,5kW	2x50	2x50	15	32	891	M2046	4600	2000 100 530	240 165	225 163	191 173
2x9kW	2x60	2x62	18,5	42	891	M2050	5000	2000 120 650	295 204	278 201	235 214
						M2055	5500	2000 120 820	372 258	350 274	297 270
						M2060	6000	2000 120 1160	456 317	429 312	364 332
						M2560	6000	2500 120 1200	425 296	400 292	340 310

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	3x35 + 3x10	3x120 + 3x25	3x25 + 3x10	3x95 + 3x16	3x25 + 3x10	3x70 + 3x16
Outer diameter	~ mm	53,2	72,1	56,7	72,5	61,1	72,9
Amperage rating	~ Amp	130	281	105	240	110	210
Weight	~ kg	3,74	8,47	3,9	7,55	4,39	7,08
Drum width F	mm	58	77	61	77	66	77

### Reducer T7 with CTC

Nominal torque 4000 Nm



Reducer T7				Reeling speed (m/min)				collector MV, IP55			
Type	Reduction	Approx. W. (kg)	d=1500	d=2000	d=2500	Type	K460/2710	K460/2713	K460/4517		
T7.0	30	450	227			Nominal voltage	kV	6	10	15	
T7.1 <sup>(1)</sup>	45	470	151	202		Max. voltage	kV	7,2	12	18	
T7.2 <sup>(1)</sup>	60	470	113	151	189	N° rings		4	4	4	
						Nominal amperage	Amp	600	600	600	
						Continuous rating	Amp	300	300	300	
						Weight (baseant included)	kg	190	210	270	
						Shaft height	A	450	450	555	

Motor 400 V - Direct Torque Controller 380 V							
Motor selection	Nominal torque Nm	Motor weight (kg)	Power (kW)	Output Current	H	DTC	
						DTC	H1
1x5,5 kW	37	40	5,5	15	845	925	
1x7,5 kW	50	50	7,5	18	845	925	
1x9 kW	60	62	11	24	845		
2x5,5 kW	2x37	2x40	11	24	845		

<sup>(1)</sup> with pre-reducer

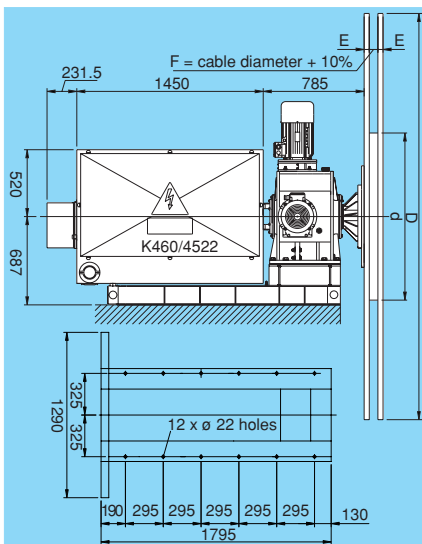
Drum											
Type	dimension D	dimension d	dimension E	Approx. Capacity (metres) W. (kg)							
M1546	4600	1500	100	530	263	180	247	178	208	189	
M1550	5000	1500	120	640	318	219	299	216	253	230	
M2046	4600	2000	100	530	240	165	225	163	191	173	
M2050	5000	2000	120	650	295	204	278	201	235	214	
M2055	5500	2000	120	820	372	258	350	254	297	270	
M2060	6000	2000	120	1160	456	317	429	312	364	332	
M2560	6000	2500	120	1200	425	296	400	292	340	310	

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	3x35 3x10	3x120 3x25	3x25 3x10	3x95 3x16	3x25 3x10	3x70 3x16
Outer diameter	~ mm	51,3	71,6	54,3	72,6	63,1	68,7
Amperage rating	~ Amp	130	281	105	240	110	210
Weight	~ kg	3,54	8,21	3,38	7,14	4,34	5,56
Drum width F	mm	55	75	58	76	67	72

### Reducer T8 with CTC

Nominal torque 6000 Nm



Reducer T8				Reeling speed (m/min)				collector MV, IP55				
Type	Reduction	Approx. W. (Kg)	d=1500	d=2000	d=2500	d=3000	Type	K460/2713	K460/4517	K460/4522		
T8.0	34	950	200				Nominal voltage	kV	10	15	20	
T8.1 <sup>(1)</sup>	51	1000	133	178	223		Max. voltage	kV	12	18	24	
T8.2 <sup>(1)</sup>	68	1000	100	133	167	200	N° rings		4	4	4	
							Nominal amperage	Amp	600	600	600	
							Continuous rating	Amp	300	300	300	
							Weight	kg	210	270	350	
							Shaft height	A	522	600	670	

Motor 400 V - Direct Torque Controller 380 V							
Motor selection	Nominal torque Nm	Motor weight (Kw)	Power (Kw)	Output Current	H	DTC	
						DTC	H1
1x7,5Kw	50	50	7,5	18	920	1005	
1x9 Kw	60	62	11	24	920	1005	
2x7,5Kw	2x50	2x50	15	32	920		
2x9 Kw	2x60	2x62	18,5	41	920		
3x7,5Kw	3x50	3x50	22	47	920		

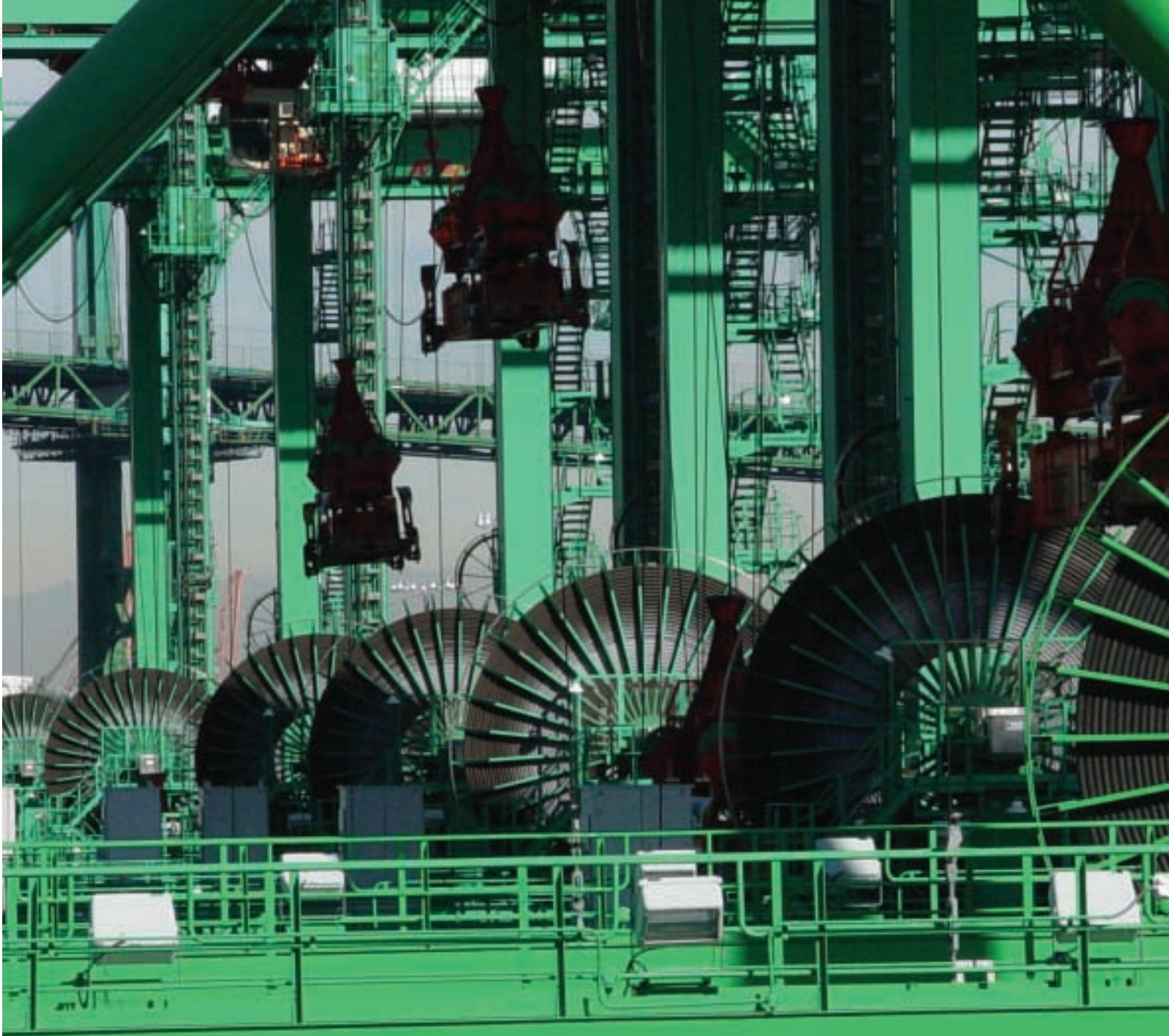
<sup>(1)</sup> with prereducer

Drum											
Type	dimension D	dimension d	dimension E	Approx. Capacity (metres) W. (kg)							
M1550	5000	1500	120	640	299	216	253	209	233	211	
M2046	4600	2000	100	530	225	163	191	157	175	159	
M2050	5000	2000	120	650	278	201	235	194	216	196	
M2055	5500	2000	120	820	350	254	297	246	273	248	
M2060	6000	2000	120	1160	429	312	364	302	336	305	
M2560	6000	2500	120	1200	400	292	340	282	313	285	
M2573	7300	2500	150	2500	640	468	545	543	503	457	
M3073	7300	3000	150	2500	604	443	515	429	475	432	

These tables only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

Cable size	mm <sup>2</sup>	3x25 3x10	3x92 3x25	3x25 3x10	3x70 3x16	3x35 3x10	3x50 3x10
Outer diameter	~ mm	54,3	72,6	63,1	74,8	68	74,2
Amperage rating	~ Amp	105	240	110	210	137	172
Weight	~ kg	3,38	7,14	4,34	5,56	5,44	6,22
Drum width F	mm	58	76	67	78	72	78





SWL: UNDER SPRE  
SWL: UNDER CARGO





# Cavotec Spreader Reels

Container crane spreaders have a requirement for both electrical power and control signals.

These are typically supplied via a suspended multi-core electrical cable. This cable has historically been handled by a basket mounted on the spreader headblock. However the basket is not suitable for the higher lifting speeds of modern day cranes; this led to the development of the spreader reel.

Cavotec Specimas spreader reels have been specifically developed for high speed, high duty container crane spreader cable applications. They are typically mounted on the trolley, and there are three versions available to accommodate a wide range of space envelopes and application parameters.

For all the spreader reel versions described above, cable tension control is achieved through the use of a CTC drive system. Control systems of varying sophistication are available to accommodate most applications. Spreader reels are typically supplied with a plug and socket to facilitate quick cable replacement. Heavy-duty collectors provide long-term reliability with minimal maintenance requirements.

On the following page we show some examples of possible spreader reel configurations. Please note that these are only examples for illustrational purposes. For exact information please contact Cavotec Specimas or your local Cavotec company.

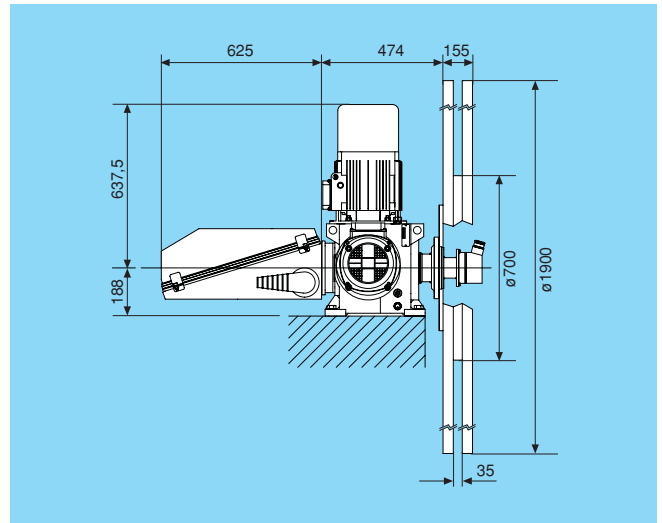


*A Cavotec Specimas Spreader Reel in action.*

### Monospiral Spreader Reel

The Monospiral Spreader Reel is the simplest and most economical version, consisting of a monospiral drum mounted directly onto a reducer as shown in the adjacent figure. Drums can be made from hot-dip galvanised mild steel or stainless steel.

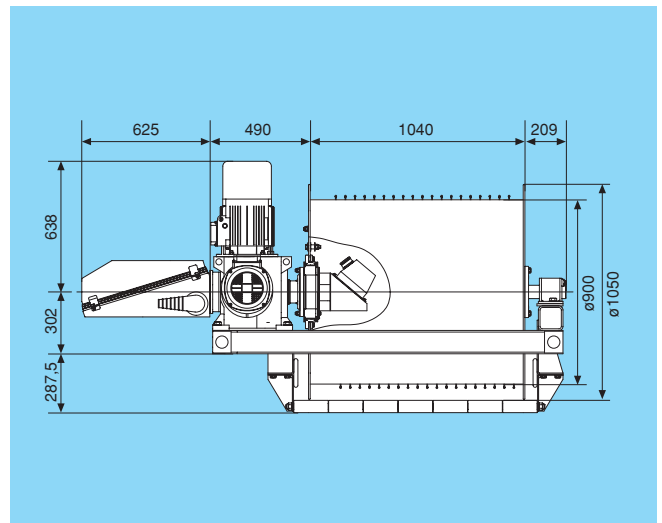
Reel version	Monospiral
Type code	T5.0.CTC (2x3kW).6 VM719-35G KV406/32/FCi/R
Cable type	Gore 42x2.5 mm <sup>2</sup>
Cable dimensions	32.6 mm, 1.7 kg/m
Reeling length	57 m
Suspended length	62 m
Spreader speed	150 m/min
Spreader acceleration	0.63 m/s <sup>2</sup>
Drive type	CTC - Cavotec Torque Control
Control mode	2 torque levels



### LS Spiralsised Spreader Reel

The LS Spiralsised Spreader Reel is used when it is not possible to use a monospiral configuration due to height restrictions. A spiral guide reliably lays the cable horizontally on the drum, so there is no need for a sophisticated and potentially troublesome indexing device. LS drums are always made from stainless steel.

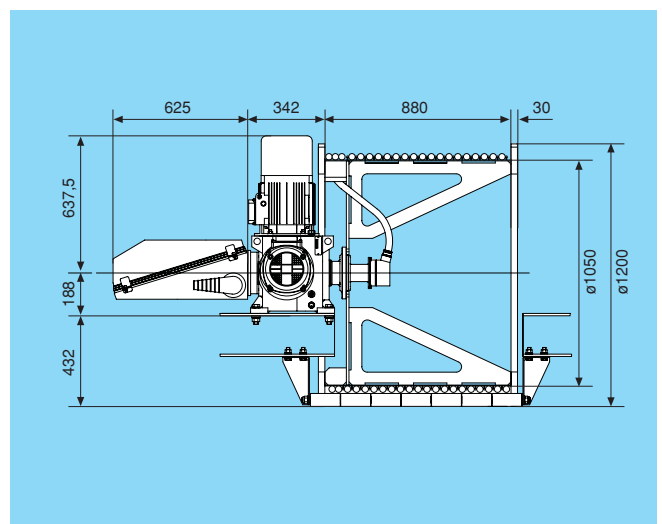
Reel version	LS Spiralsised
Type code	T5.0.CTC (2x5.5kW).4 LS910-1040X KV44/FCi/R
Cable type	44x2.5 mm <sup>2</sup>
Cable dimensions	37 mm, 2.28 kg/m
Reeling length	50 m
Suspended length	55 m
Spreader speed	180 m/min
Spreader acceleration	0.75 m/s <sup>2</sup>
Drive type	CTC - Cavotec Torque Control
Control mode	Linear torque control



### LSC Spiralsised Spreader Reel

For applications with lighter cables, the LSC Spiralsised Spreader Reel offers a less expensive and more compact alternative to the LS version.

Reel version	LSC Spiralsised
Type code	T5.2.CTC (2x3kW).4 LSC1012-880X KV406/20/FCi/R
Cable type	24x2.5 mm <sup>2</sup>
Cable dimensions	29.2 mm, 1.34 kg/m
Reeling length	57 m
Suspended length	62 m
Spreader speed	120 m/min
Spreader acceleration	1 m/s <sup>2</sup>
Drive type	CTC - Cavotec Torque Control
Control mode	Linear torque control

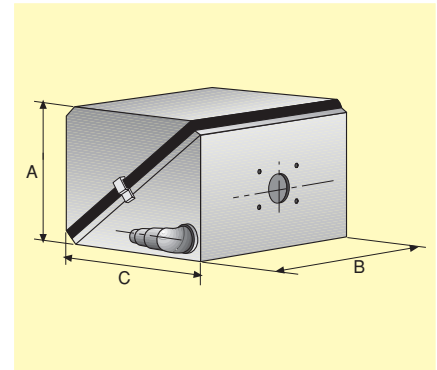


The tables on this page only give an indication of general capacity and size. Always ask Cavotec Specimas for a specific quotation.

## Collectors 600V / 1 kV

Cavotec Specimas collectors are made as separate sub-components and are interchangeable since the mounting flange for all torque units and gearboxes are standardised.

All collector housings are made in stainless steel and can be opened upwards or sideways due to their diagonal opening. Standard protection class IP55 but higher grades can also be supplied on request. All Cavotec Specimas collectors can be fitted with anti-condensation heating elements and with rotary cam limit-switches. Rings are available for nominal amperages of 30, 60, 120, 240, 400, 600 and 1200 Amps. Special non-standard ring configurations



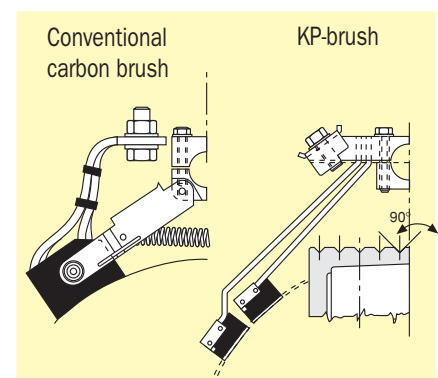
or combinations with hydraulic swivels or fibre optic rotary joints can be supplied on request.

Type	Nominal Amperage	Continuous Amperage	Nominal Voltage	Max. cable size (mm)	Dimensions (mm)		
Amperage	Amperage	Amperage	Voltage	size (mm)	A	B	C
K 12	30	10	600	2,5	242	370	242
K 24	30	10	600	2,5	271	456	359
K 37	30	10	600	2,5	275	456	461
K 412	120	60	600	25	242	370	242
K 424	240	120	600	35	242	370	242
K 440	400	200	1000	70	272	456	272
K 460	600	300	1000	240	382	642	377
K4121	1200	600	1000	2 X 240	487	788	480

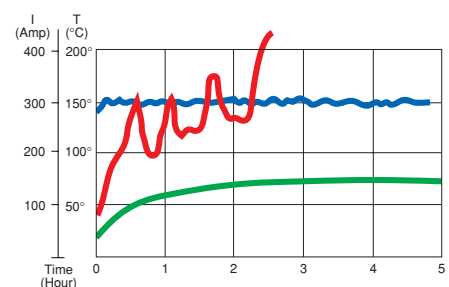
## KP Brush

Stand still slipping applications often require a high degree of derating of the current capacity of conventional carbon brushgear. Increasing the physical size of the brushes is not always a solution, since the actual contact area does not increase proportionally. Cavotec Specimas has overcome this problem by developing a multicontact brushgear which has effectively doubled the capacity. This is achieved by a division of the brush into independent sections, thus ensuring an increased effective contact area.

The diagram shows a comparison between a conventional brushgear (BG) and a multi-contact brushgear (KP) of the same physical size carrying 300 Amp continuous.



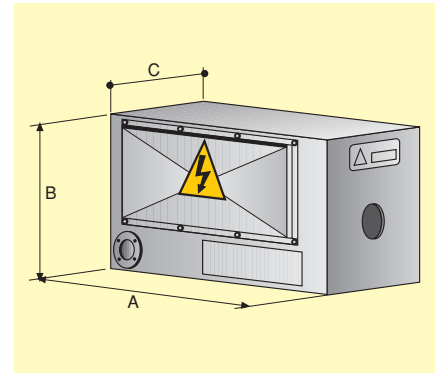
— Continuous current 300 Amp  
— Temperature Carbon brush  
— Temperature Kp-brush





## Medium voltage collectors 6, 10, 15, 20 kV

Cavotec Specimas high voltage collectors are also made as separate sub-components and are all interchangeable since the mounting flange for all torque units and gearboxes are standardised. All collector housings are made out of stainless steel. Standard protection class IP55 but higher grades can also be supplied on request. All Cavotec Specimas collectors can be fitted with anti-condensation heating elements and with rotary cam limit-switches. The collectors can easily be combined with a series of standard fibre optic rotary joints, either accumulator type or prism type for unlimited revolutions. Nominal voltages are 6kV, 10kV, 15kV and 20kV.



Non-standard ring configurations and special interlocking devices can be supplied on request.

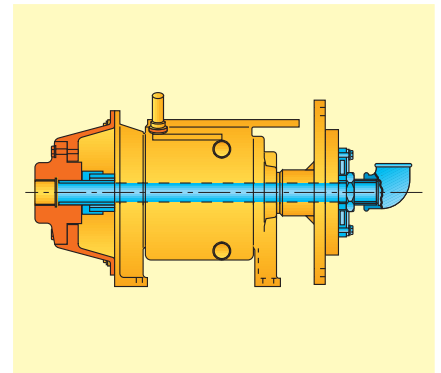
Type	Nominal Amperage	Continuous Amperage	Nominal Voltage	Max. voltage	Dimensions (mm)		
					A	B	C
<b>K460/2710 - 6kV</b>	600	300	6000	7200	850	573	730
<b>K460/2713 - 10kV</b>	600	300	10000	12000	1000	697	746
<b>K460/4517 - 15kV</b>	600	300	15000	18000	1100	925	1096
<b>K460/4522 - 20kV</b>	600	300	20000	24000	1450	1110	1200

## Swivels

Cavotec Specimas can supply swivels for any fluid for most of the standard torque units and gearboxes. These are made as independent sub-components which can easily be mounted inside the shaft and on the standardised rear mounting flange of the torque units.

All parts are either stainless steel or other non-corrosive material. Standard sizes are 1" and 2".

Working pressure for standard units is 10 bars; swivels for higher pressure and for hose sizes up to 6" are available on request.



Size	Torque unit/ Gear boxes	Max Pressure (bar)	End fittings (Female)
<b>1"</b>	10.0/T3	10	1" Pipe thread
<b>2"</b>	20.0/T4	10	2" Pipe Thread

### Fibre optic rotary accumulator (GFO)

In recent years optical signals are more and more frequently used in ports and terminals. Composite cables including both medium voltage cores and fibre optic bundles are common. To address these needs, Cavotec Specimas has developed a fibre optic rotary accumulator. The design is heavy-duty and made for rugged environments. The system can also be used as a stand alone rotary accumulator when the reel is equipped with fibre optic cable only. The housing is made of stainless steel, and includes anti-condensation heating element and rotary limit switches. The signal transmission is uninterrupted, so the only losses are due to the fibres and connectors themselves.

With a fibre length of about 15 m in the rotary connector, fibre dimming can be disregarded. For the rotary accumulator, including bilateral connections, a dimming of less than 3 dB is to be taken into account. The connection is made on both sides via plug connectors in the fixed and rotating terminal boxes. Terminal strip and coupling bushings are included.

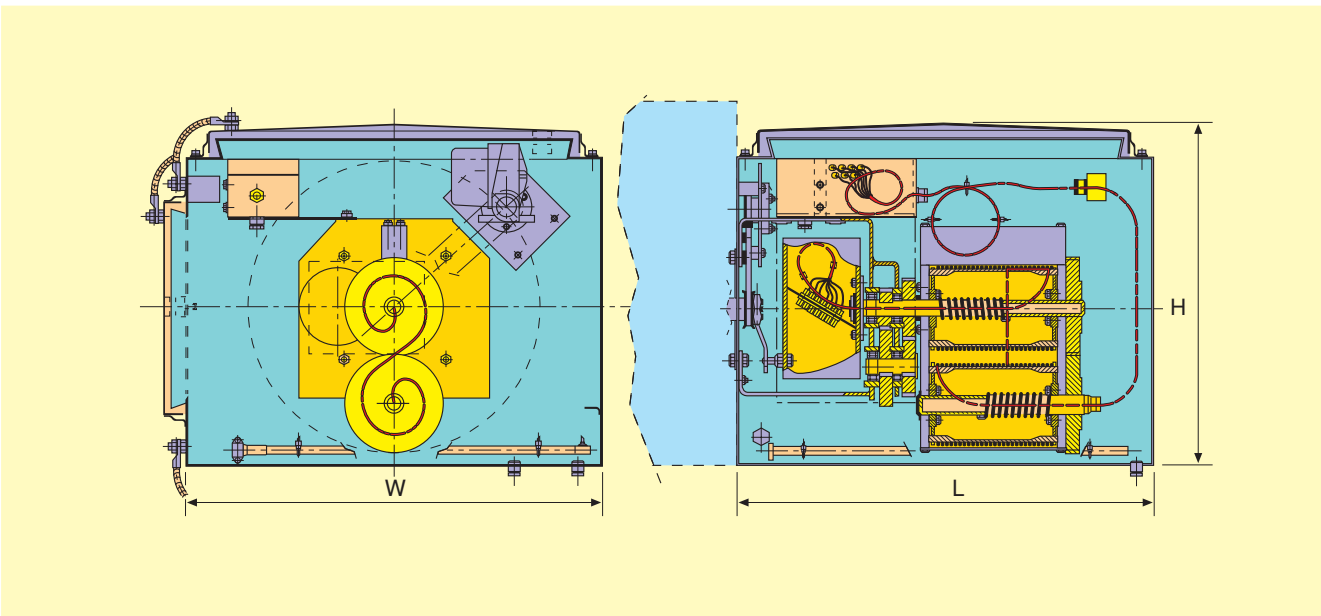
**Technical data:**

Operational temperature	-25°C to 60°C
Humidity	max 90% relative humidity, no surface condensation
Max cable reel drum revolutions	40/50/70/110
Fibre type	any commercially available fibre can be fitted
Normally requested fibres are	single mode 9/125 µm multi mode 50/125 µm multi mode 62,5/125 µm
Standard number of fibres are	2/4/6/8/10/12/14/18/24
Connectors most commonly used are	ST-PC with ceramic ferrule or FC-PC with ceramic ferrule. Other type delivered on request



REELS024

No. turns	No. fibres	L	W	H
40	Up to 12	650	650	530
	Above 12	750	680	653
50	Up to 12	650	650	530
	Above 12	750	680	653
70	Up to 12	750	650	530
	Above 12	850	680	653
110	Up to 12	900	650	530
	Above 12	1000	680	653

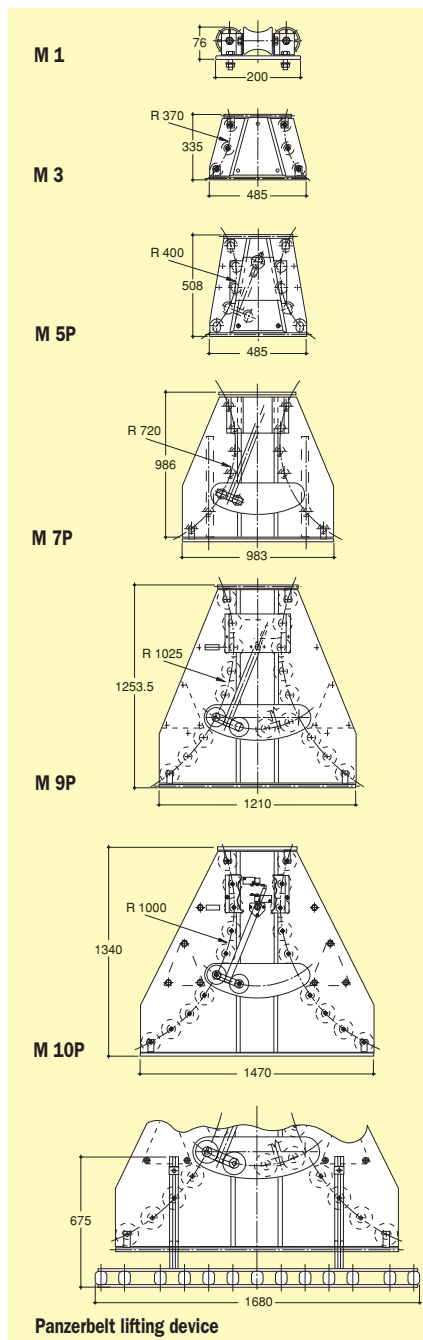


## Cable guides

Cable guides are used both in horizontal and vertical applications.

In **horizontal** applications, they are essential in both modes of operation, i.e. reeling and unreeling, to ensure that regular laying of the cable is achieved. The cable guide is normally fitted with devices to sense crane location in respect to center feed point (left/right), slack cable and overtension.

In **vertical** applications it normally depends on the type of drum and its mounting whether a guide is used or not. If the drum is not of a monospiral type (i.e. semi wide or wide), it is recommended to use a guide below the drum to guide the cable centrally onto the drum and to absorb shocks and sway from the cable.



Type	Horizontal application	Vertical application	LV cable ø max mm	MV cable ø max mm	Weight kg
M 1		■	80	80	4
M 3	■		30	25	8
M 5 P	■		42	35	20
M 7 P	■		76	63	71
M 9 P	■		97	89	91
M 10P	■		97	89	105
Panzerbelt lifting device	■	(Optional for M7P, M9P, M10P)			15

Kawasaki Container Terminal Japan



REELS025



# The Cavotec Specimas Service

Producing high quality products is one matter. Servicing them in such a way that they always perform to the highest standard during their whole life time is quite another. We provide 24/7 hrs assistance for mounting, commissioning, upgrades, repairs and training. Here at Cavotec Specimas we take great pride in the high level performance of our manufactured products. This is why we have a top grade specialised service team to support our customers wherever and whenever this is required. The Cavotec Specimas Service Team is operates all over the world through our own sales companies and distributors located in 30 countries. When you need us, we will be there to help you!



REELS060

- 1 Replacement of a damaged slipping unit on an offshore application in Qatar, at +48 deg. C
- 2 This electromagnetic cable reel is being commissioned in Korea for a compost plant application
- 3 One of our drums during erection on a harbor application in Singapore
- 4 The commissioning of a giant hose reel for Madrid metropolitan tunnel drilling.
- 5 Our service team at minus 30 deg. C in Northern Canada commissioning a DTC reel for a log handling application



REELS066



REELS069



REELS068



REELS068

VAR0060





 CAVOTEC

# At work around the world

Cavotec Specimas equipment and technology is at work around the world in very diverse operating environments, from ports and terminals to offshore and energy and from mining and tunnelling to marine industry and shipyards. The pictures on these two pages show some typical examples of our equipment at work around the world.



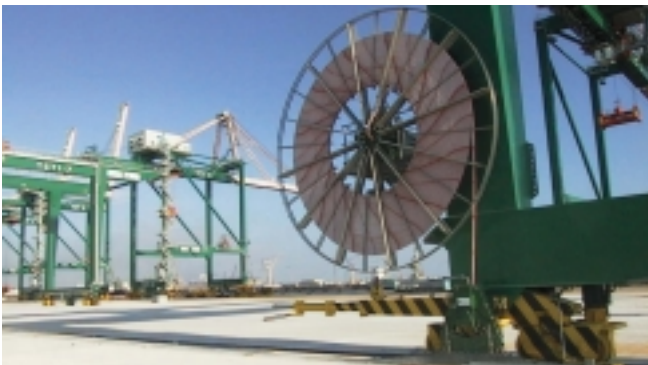
*Cavotec reel mounted on a maritime power supply application*



*A Pull & Store reel application at Copenhagen Port, Denmark*



*Cavotec Specimas reel in action in the Port of Dubai*



*Cavotec reel and Panzerbelt working together at a port installation*



*Panzerbelt application at work in the Port of Singapore*



*Cavotec reel at work in a Swedish mine*





*Panzerbelt in action at Southampton Port, UK*



*Giant tunnelling reels for the San Gothard tunnel, Switzerland*



*Pull & Store reels at work at Everglades terminal, USA*



*Cavotec reels in action at Port of Los Angeles, USA*



*Cavotec reels at work on a Stena Line High Speed Ferry*



*Cavotec reel on a surface drilling machine, USA*



*Cavotec Caddy mounted reel in action at Frankfurt Airport, Germany*



*Cavotec reel and connector at work on a drilling rig, Sweden*

