HYDRAULIC ROTARY ACTUATORS

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SERIE ARC – ARM - ARF

DESCRIPTION

*Operating concept of **ARC / ARM / ARF** series, actuators designed and manufactured by **Moveco**, is very simple: linear piston motion is converted into shaft rotation. The outside diameter of piston carries a set of splines which engages matching splines in the housing.*
The inside diameter of piston engages matching helical spline machined on the shaft.

"Linear piston motion is converted into shaft rotation"

PRINCIPAL FEATURES

Compact configuration
Short piston stroke due to high helix angles of gearing provides a compact configuration of the actuator.

Heavy load bearing capacity
ARC / ARM / ARF series incorporates integral roller bearings that carry essential thrust, radial and moment load without the need of additional external thrust-bearings.

Zero leakage
PTFE, Polyurethane and NBR seals are selected for rugged and shock resistance. Each actuator is individually tested for leakage prior to shipment.

Shaft machined in one piece and with through bore, when required.
The shaft is machined from alloy steel. The bore can be used to well fasten critical load with a second load path, or can be used as a passage for piston rods, hydraulic hoses or electrical wiring.

Direct mounting of loads
Mounting flange with a drilled and tapped bolt circle is integral with the shaft. This configuration eliminates the clearance of keyed or splined connections.
In the opposite shaft flange a second bolt circle can be machined.

Customized models
Having in stock the basic elements, as shaft, housing, annular piston and thrust ring, it is possible to meet the requirements of the Client, for example: special rotation, cushioning, special shaft and housing configuration, external positioning of rotation.
Special painting and materials are available for corrosive applications.

NAUTICAL APPLICATIONS

ARC / ARM / ARF series actuators are mainly used in nautical field, the applications are:

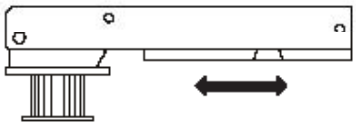
- *davits*
- *gateways*
- *tops*
- *automatisms for doors and ports*

DAVITS

Davits are located on a flybridge, on the stem or the stern of the yacht.
They are used to move a tender in and out the water.
The actuator provides a rotation of 180°.

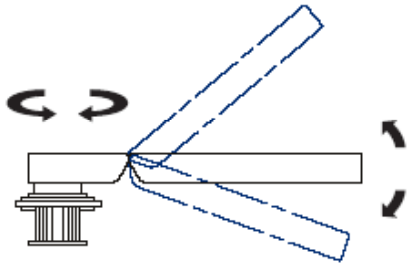
ROTATING GATEWAYS AND MULTIFUNCTIONAL GATEWAYS

Rotating gateways and multifunctional gateways combine the funtions of gateways and small crane. Variable lifting made by hydraulic piston and the hydraulic actuator provides the rotations.



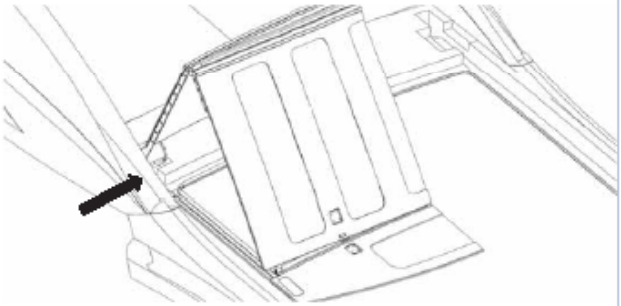
TOPS

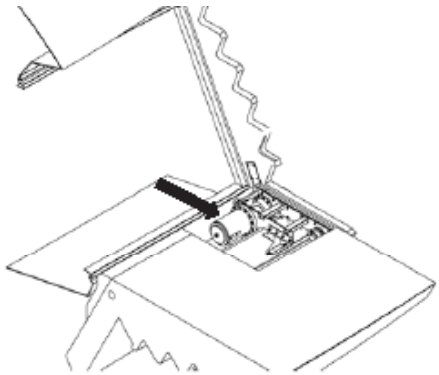
Horizontal sliding tops with automatic winding - unwinding system made by two hydraulic rotating actuator, in apposite position in order to balance the moment capacity of the top.



AUTOMATISM FOR PORTS OF STERN

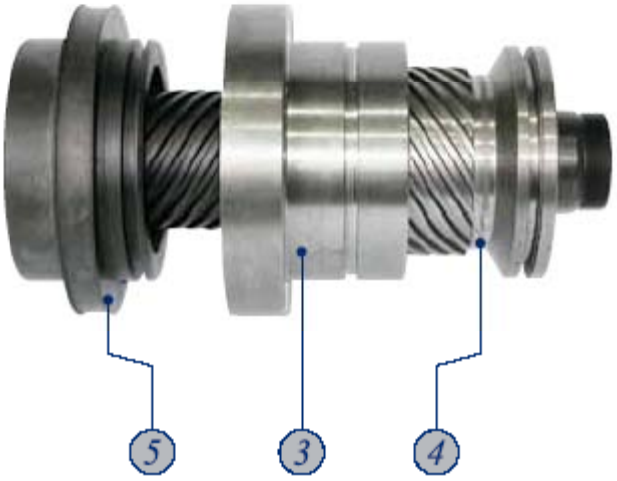
Automations for ports of stern and ports carried out with steel hinges actuated by two opposite rotating actuators.
Automations can be provided with shutter sensors to control opening - closing and safety locking during the navigation.



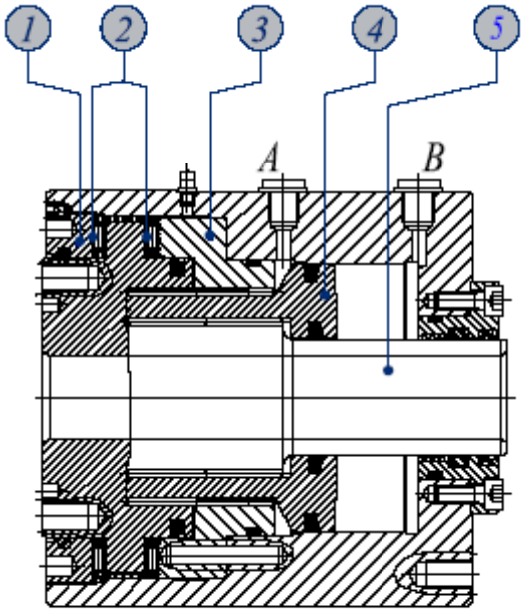


ROTARY ACTUATOR

ROTARY SET



1	Threaded End Flange
2	Thrust Ring
3	Spiral Gear Ring
4	Spiral Gear Piston
5	Splined Shaft



HYDRAULIC ROTARY ACTUATORS ARC / ARM / ARF SERIES

SPECIFICATION	U.M.	ARC 55	ARC 85	ARC 130-165	ARM 140	ARF 210	ARM 600
Moveco Drawing		H.978/180..	H.975/160..	H.979/180..	H.971/090..	H.812/125..	H.915/125..
Rotation		180°	160°	180°	90°	120°± 5°	125°
Weight	Kg	33	35	68	31	37	111
Displacement	cm^3	295	366	724-965	320	770	1937
Max Pressure	bar	210	210	210	210	210	210
Test Pressure	bar	320	320	320	320	320	320
Max Thrust Capacity	N	12000	5000	24000	20000	32000	48000
Max Radial Capacity	N	6000	6000	12000	10000	16000	30000
Max Output Torque	Nm	1200	1900	2950-3900	3060	4570	12970
Max Moment Capacity Cantilever Mounting	Nm	6900	5000	26000	-	-	-
Overcenter Valve		On request	On request	Integral	On request	On request	On request

ENGINEERING CONSIDERATIONS

Basic Actuator Selection

Before selecting any rotary actuator all dynamic forces and variable loadings relative to the application must be evaluated.
Actuators Moveco, Series ARC / ARM / ARF, have been designed to carry tremendous moment capacity without the need for additional external bearings.

Backlash

Gateways and davits operating on the craft require a very low backlash.
Backlash will result due to manufacturing tolerances, to fluid compressibility and seal compression.
For our actuators standard backlash is lower than 0,5°.

Output Torque

Because the area is equal on both sides of the piston, the actuator produces equal torque for both clockwise and counter-clockwise rotation.
Due to the higher frictional loads on radial and thrust bearings the output torque is affected by moment capacity.

Safety Conditions

a) High Cycling Frequency

Having high speed cycling, seal failure due to extreme heat can arise.
The mechanical efficiency of Moveco actuators is about 70%, therefore about 30% of energy is dissipated as heat.
Heat exchanger should be provided.

b) High Speed Rotation

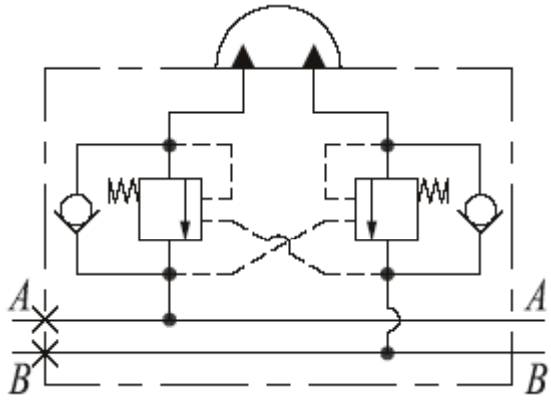
When high speed rotation occurs, the torque applied to an actuator via the angular deceleration can exceed the torque produced at the maximum pressure.
Loads should be stopped via external stops.

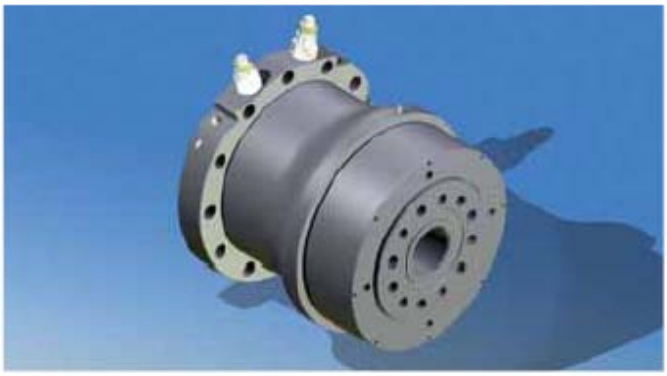
Nautical requirements

The actuator provides:
- *accurate positioning*
- *quiet operation*
- *aesthetic elements*
- *strenght corrosion*

INTEGRAL OVERCENTER VALVE

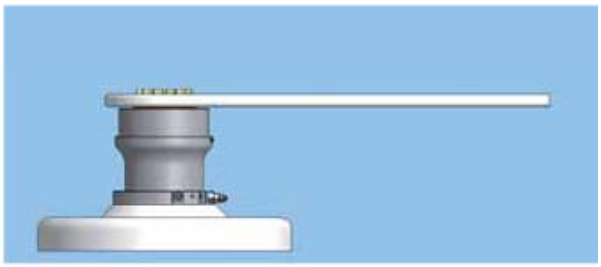
Two overcenter cartridges fitted in aluminium block bolted on the housing or screwed in actuator body.
The overcenter valve provides controlled and smooth rotation.



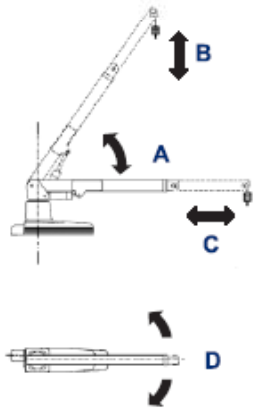


MOUNTINGS

Cantilever Mounting
The load is supported at one end of the shaft.
Actuators incorporate thrust bearings that carry essential thrust, radial and moment load without the need of additional external bearings.



Davit - Actuator's stress
In a telescopic crane with hydraulic movements for rotation, elevation and arm extension, on the actuator radial, axial and variable moment arise.



A: Alza/abbassa braccio
Raise/lower arm

B: Alza/abbassa cavo
Raise/lower cable

C: Uscita telescopio
Extending the Telescope

D: Rotazione
Rotation

ARC 55

Rotation
Standard 180° (*Degrees*)
A richiesta – *Special 90° - 270° - 360°*

Weight
33 Kg

Displacement
295 cm³

Max Pressure
210 bar

Test Pressure
320 bar

Maximum Thrust Capacity
12.000 N

Maximum Radial Capacity
6.000 N

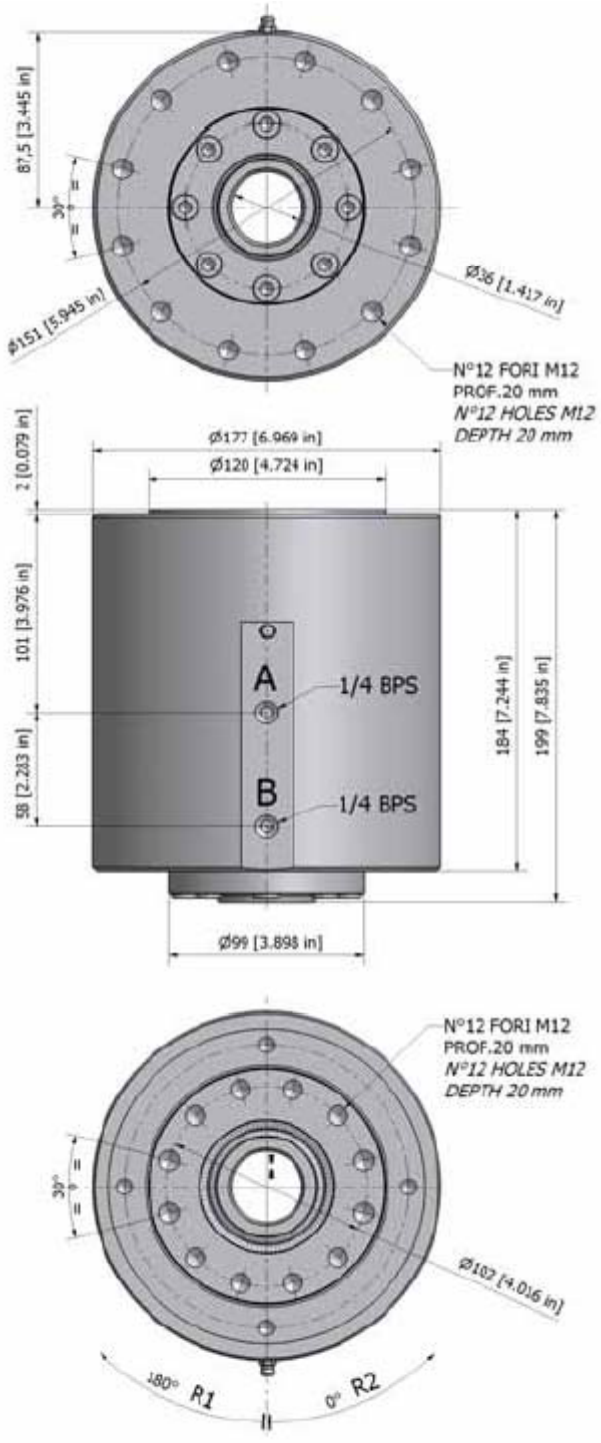
Maximum output torque at 210 bar
1.200 Nm

Maximum Moment Capacity Cantilever Mounting
6.900 Nm

Seals
PTFE - Poliuretano – Gomma Nitrilica
PTFE - Polyurethane - NBR

Working Temperature
da -20°C a +80°C
-20°C to +80°C

Notes
Actuators are shipped at the begin of clockwise rotation as shown in the body.



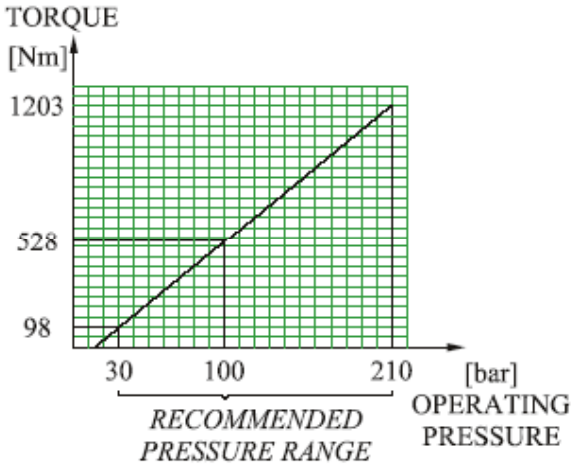
Dimensions are refered to 180° rotation

P in A = *Rotation R1*

P in B = *Rotation R2*

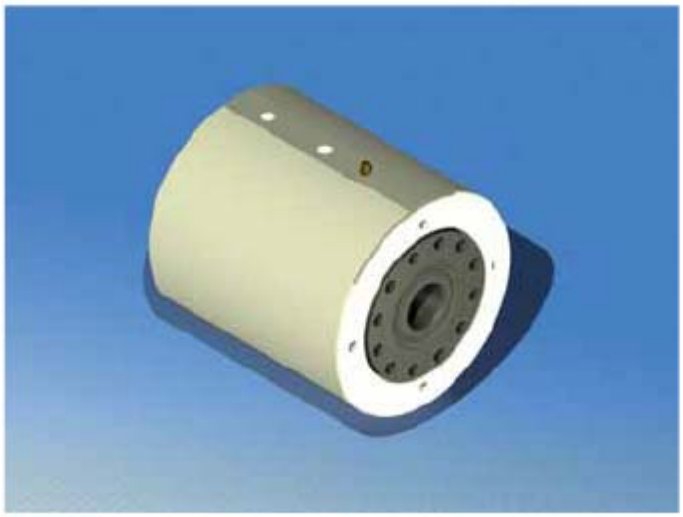
OUTPUT TORQUE VERSUS PRESSURE

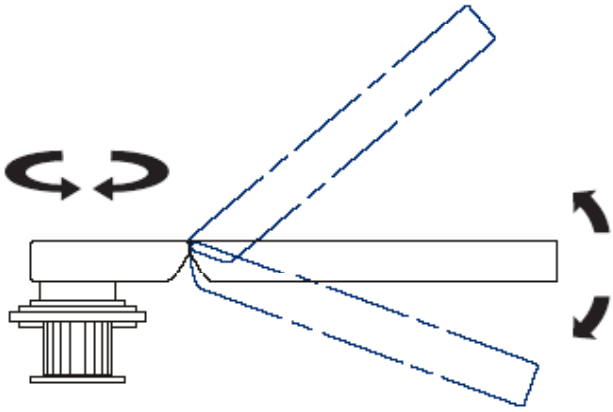
Torque output is a linear function of system pressure.



APPLICATIONS

Rotating and multifunctional gateways.
Benefit is the very reduced obstruction.
Lifting of gateways by hydraulic piston and rotation by actuator.





ORDERING INFORMATION

1	2	3	4
ARC	55	180	H.978/ ...

1	Series
2	Model
3	Rotation
4	Moveco Code

ARC 130-165

Rotation
Standard 180° (*Degrees*)
A richiesta – *Special 90° - 270° - 360°*

Weight
68 Kg

Displacement
ARC 130: 724 cm³ - ***ARC 165:*** 965 cm³

Max Pressure
210 bar

Test Pressure
320 bar

Maximum Thrust Capacity
24.000 N

Maximum Radial Capacity
12.000 N

Maximum output torque at 210 bar
ARC 130: 2.950 Nm - ***ARC 165:*** 3.900 Nm

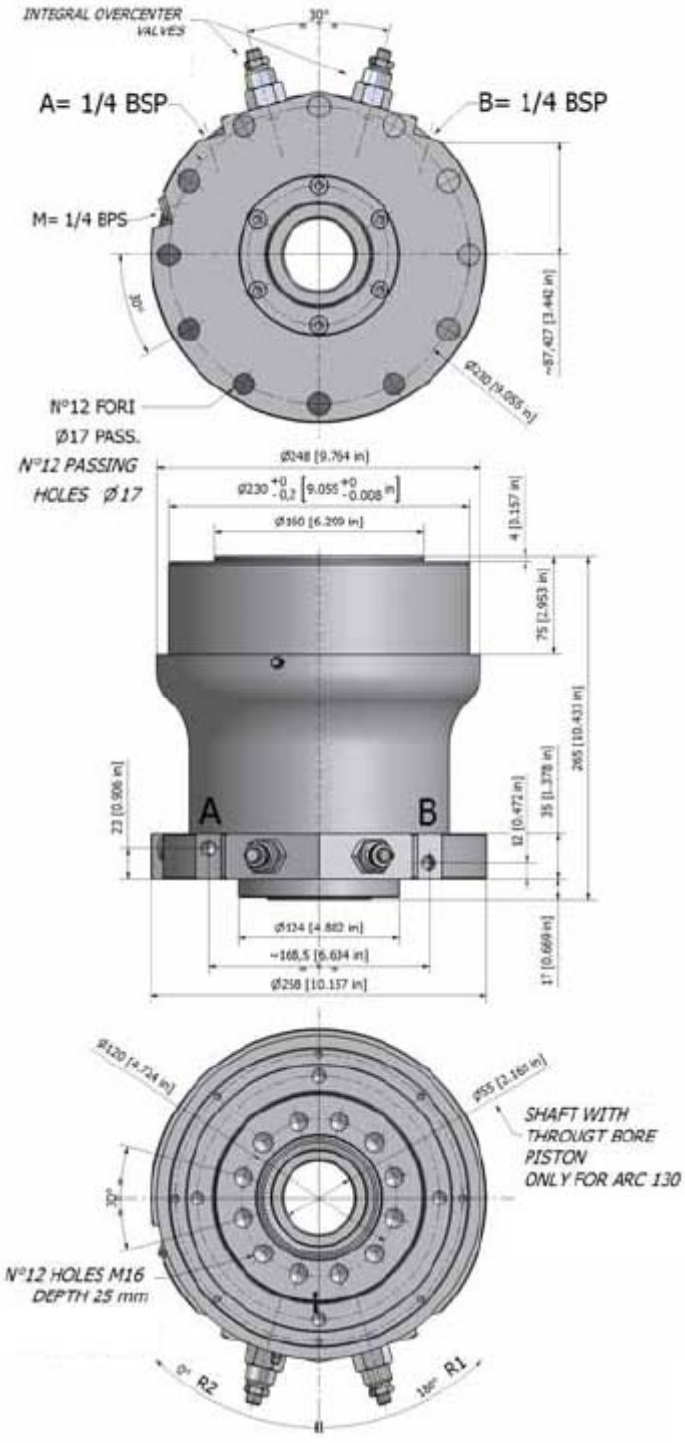
Maximum Moment Capacity Cantilever Mounting
26.000 Nm

Overcenter Settings
230 bar

Seals
PTFE - Polyurethane - NBR

Working Temperature
da -20°C a +80°C
-20°C to +80°C

Notes
Actuators are shipped at the begin of counterclockwise rotation as shown in the body.



Dimensions are refered to 180° rotation

P in A = *Rotation R1*

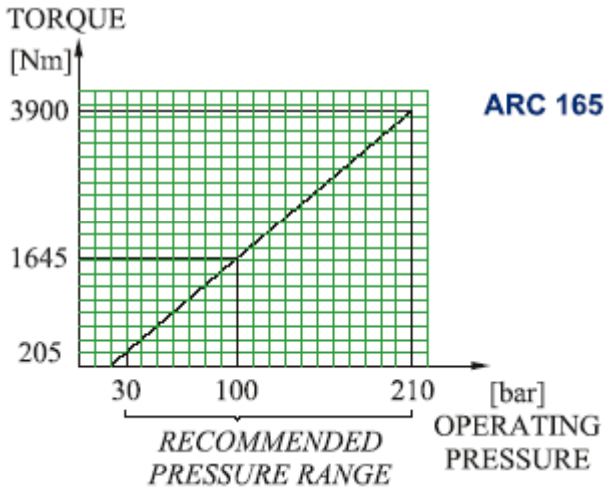
P in B = *Rotation R2*

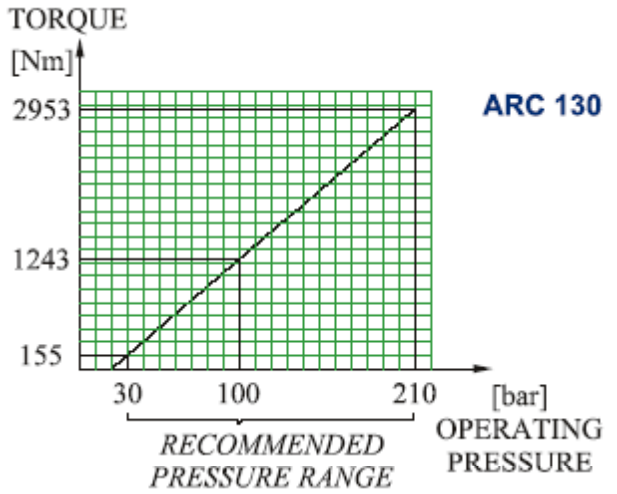
OUTPUT TORQUE VERSUS PRESSURE

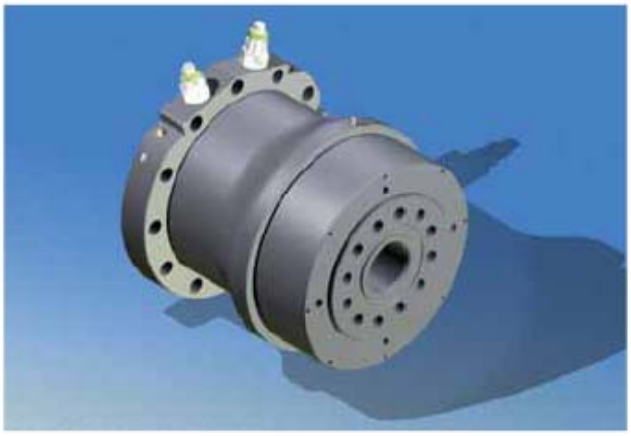
Torque output is a linear function of system pressure.

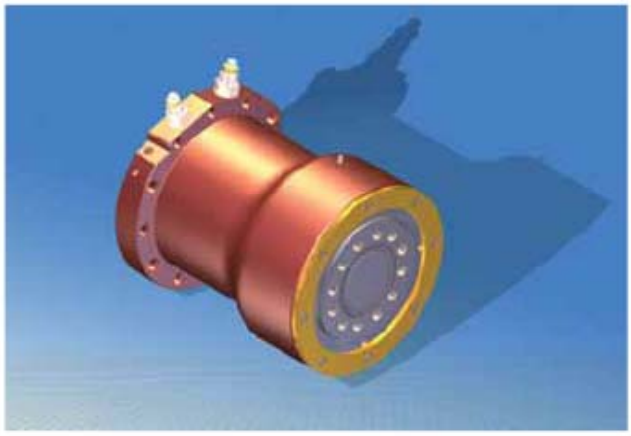
APPLICATIONS

Davits are located on a fly or on the stern or the stem of the yatch.
They are used to move a tender in and out the water.
The actuator provides a rotation of 180°.









ORDERING INFORMATION

1	2	3	4
ARC	130	180	H.979/ ...

1	Series
2	Model
3	Rotation
4	Moveco Code

1	2	3	4
ARC	165	180	H.979/ ...

1	Series
2	Model
3	Rotation
4	Moveco Code

ARF 210

Rotation
Standard 120°± 5° (*Degrees*)
Personalizzato a richiesta - *Special on request*

Weight
37 Kg

Displacement
770 cm³

Max Pressure
210 bar

Test Pressure
320 bar

Maximum Thrust Capacity
32.000 N

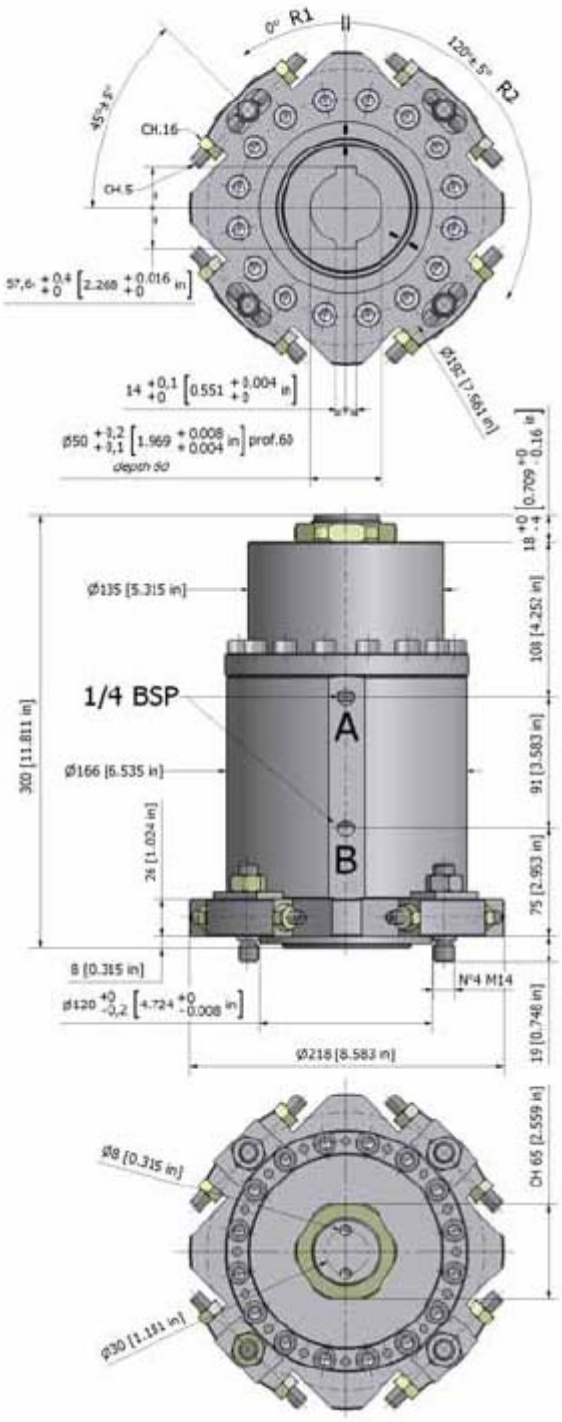
Maximum Radial Capacity
16.000 N

Maximum output torque at 210 bar
4.570 Nm

Seals
PTFE - Poliuretano - Gomma Nitrilica
PTFE - Polyurethane - NBR

Working Temperature
da -20°C a +80°C
-20°C to +80°C

Notes
Actuators are shipped at the begin of clockwise rotation as shown in the body.



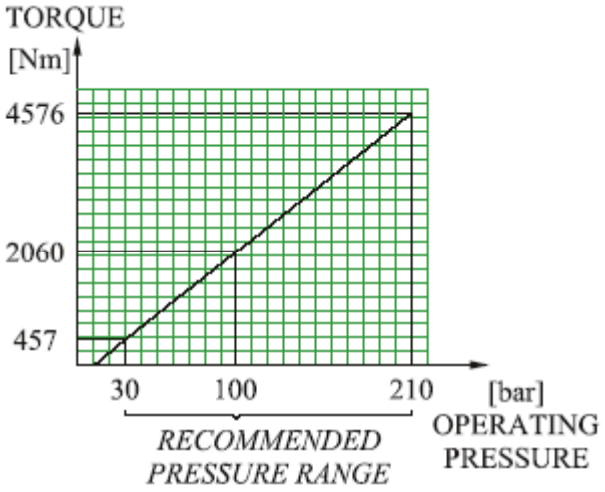
Dimensions are refered to 120°± 5° rotation

P in A = *Rotation R1*

P in B = *Rotation R2*

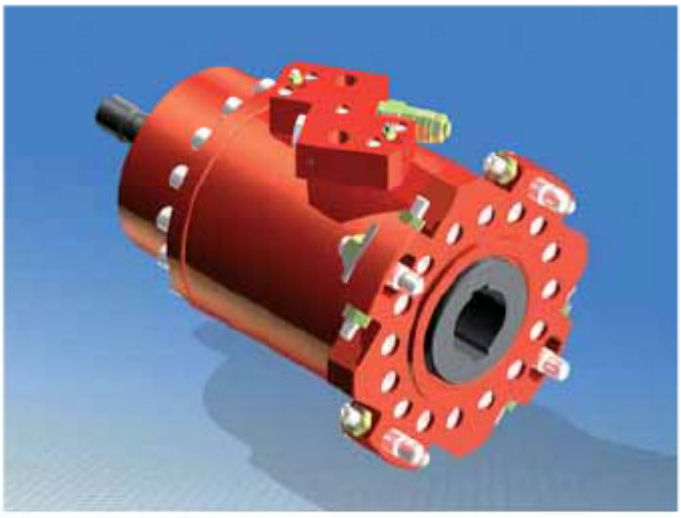
OUTPUT TORQUE VERSUS PRESSURE

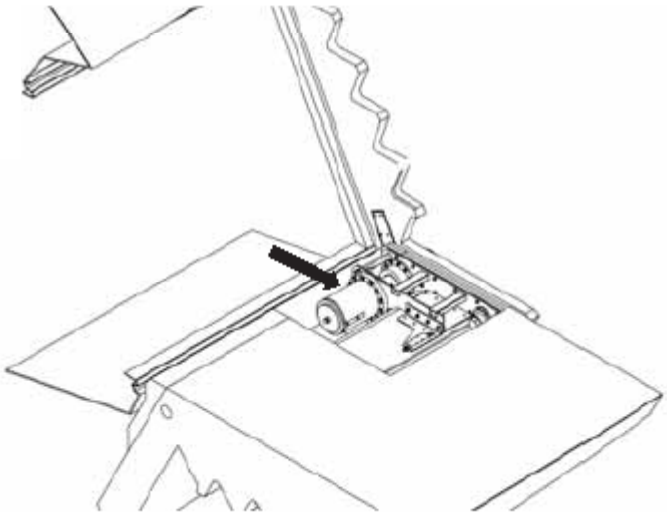
Torque output is a linear function of system pressure.



APPLICATIONS

Automations for ports of stern and ports carried out with steel hinges actuated by two opposite rotating actuators.
With these hinges you can obtain a remarkable increase of volumetric space.





ORDERING INFORMATION

1	2	3	4
ARF	210	125	H.812/ ...

1	Series
2	Model
3	Rotation
4	Moveco Code