

# Hydraulic Rotary actuator

## More than 35 years of experience!

Thanks to over 35 years of experience in this field, we have been manufacturing hydraulic rotary actuators for a wide range of application. This allows us to design actuators made in series or customized models in order to suit many application requirements.

## Other production of RIMA

Storm brakes for crane  
Hydraulic system for:

- Container crane
- Jib cranes
- Double lever cranes
- Cranes and machines for material handling
- Off-shore applications
- Steelworks applications
- Electrical power supply line: Cobra®
- Hydraulic rotary joints

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*Working on ideas handling*

## The system

The hydraulic rotary actuator is a device which transform hydraulic power (pressure and flow) in mechanical power: torque and angular speed.

They are used for alternative movements with a limited rotation angle: max 260°.

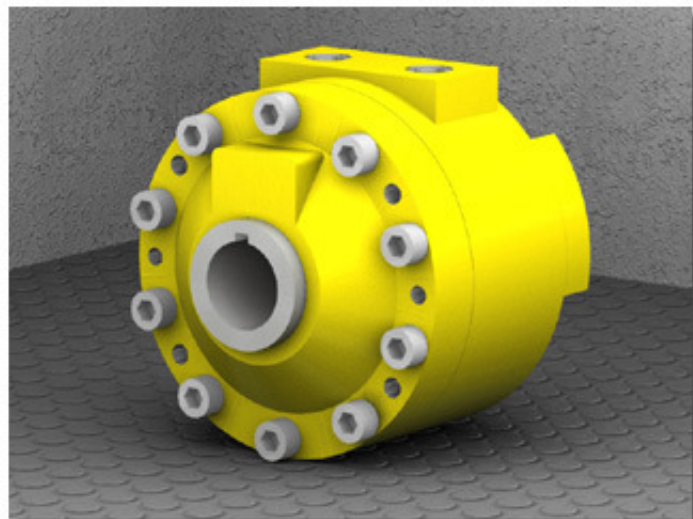
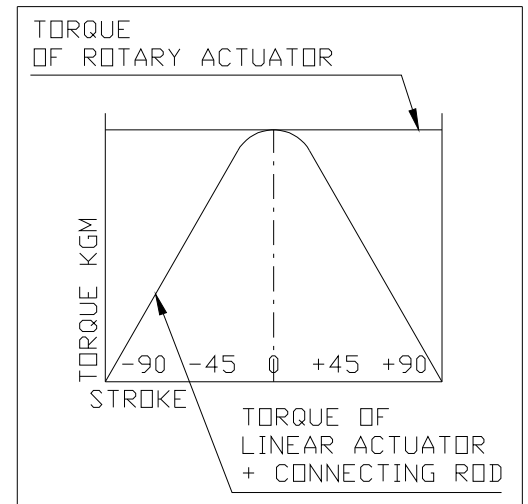
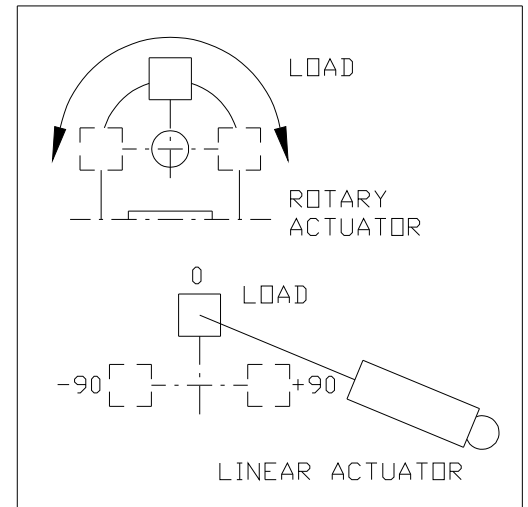
The simplicity of construction of our actuators allows to obtain very high mechanical efficiency value in comparison to the traditional "hydraulic cylinder-rack" system.

The hydraulic rotary actuators Rima have the advantages of a small overall dimensions, a stability of the supplied torque during the run and also a cheap price.

The absence of transmission devices between rotary actuator and utilizer and the mechanical efficiency allow moreover to obtain a very exact torque value.

Our rotary actuators are the ideal choice for all the most advanced applications of automation where high reliability and quality of executions are needed.

The rotary actuators can be positively applied instead of quick motors plus reducers; the elimination of an element (the reducer) cut down the costs, take off the maintenance of an element and usually allows to reduce dimensions.



## Applications

With more than 35 years of experience, we have realized rotary actuators for every kind of application.

The most frequent applications are:

- Back hoes
- Industrial automation machines
- Crane spreaders (flipper movements)
- Presses
- Hydraulic lift
- Injection moulding machines

Our technical department can find the ideal solution for your need, with standard solutions or special executions.

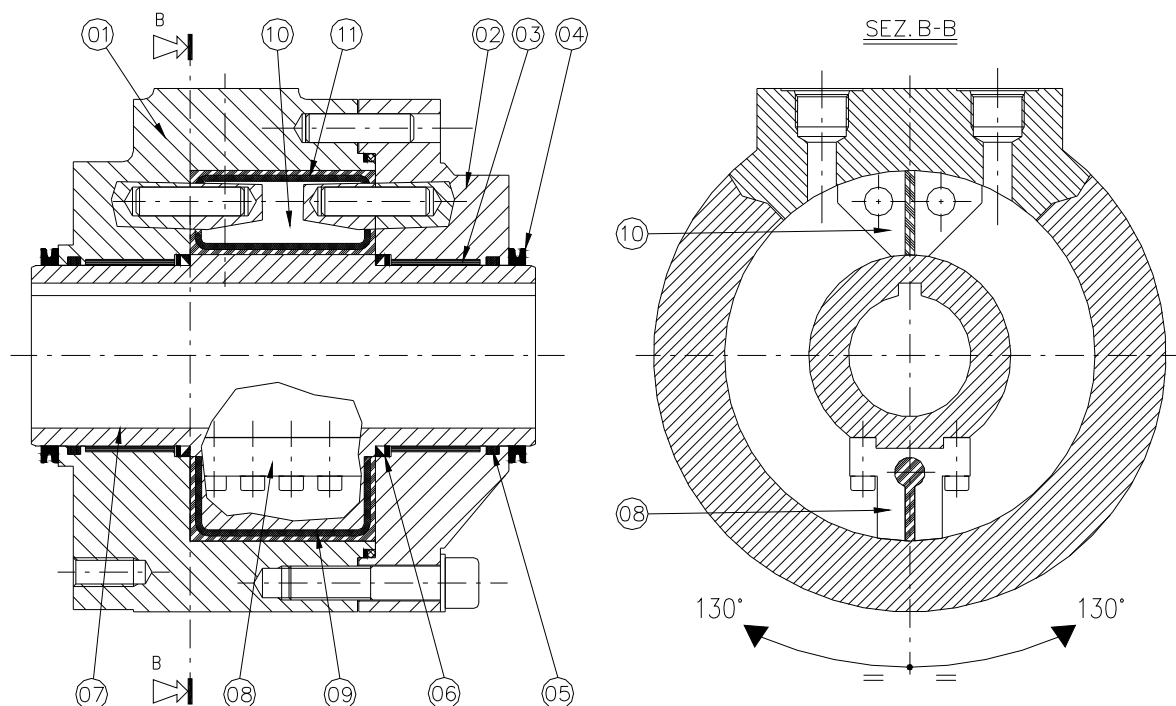
## Construction system

The actuator can be single or double vane.

The single vane allows a greater rotation angle (260°), the double vane determines the reduction of the rotation angle (90°), but increases considerably the torque supplied, external overall dimensions being equal.

The construction elements are: (see figure):

1. Casting rotary actuator's body
2. Head
3. Bushing
4. Dust seal
5. Shaft seal
6. Seal
7. Shaft (grooved or hollow with tongue)
8. Moving vane
9. Moving vane seals
10. Fixed vane
11. Fixed vane seals



Standard actuators must not reach the end of stroke. Therefore external stop devices and / or limit switches must be foreseen.

In case of need to reach the end of stroke, particular indication has to be given at request of quotation. For tech. Expl. Please contact our Technical Dept.

The standard version of rotary actuator can bear limited radial and axial loads. In case of high radial and/or axial loads, please refer to our Technical Dept.

### Installation rules and functioning of hydraulic circuit

In the hydraulic circuit it is convenient to foresee "anti-shock" valves which avoid pressure peaks in the rotary actuator. The suggested circuit is the one shown in figure A.

#### Assembly

The actuator can be fixed with feet or flange.

In case of flange, the two holes not threaded must be bored during assembly, in order to receive the centering pins with force fit.

The torque of the rotary actuator must not be transmitted to the fixing screws.

The shaft is smooth on a side and grooved on the other side.

The execution with hollow shaft foreseen a tongue.

We suggest the execution with oil connections on the upper part, to facilitate air draining.

#### Median position

(see figure B)

In the execution with output shaft:

- single vane: position the arrow on the shaft down side.

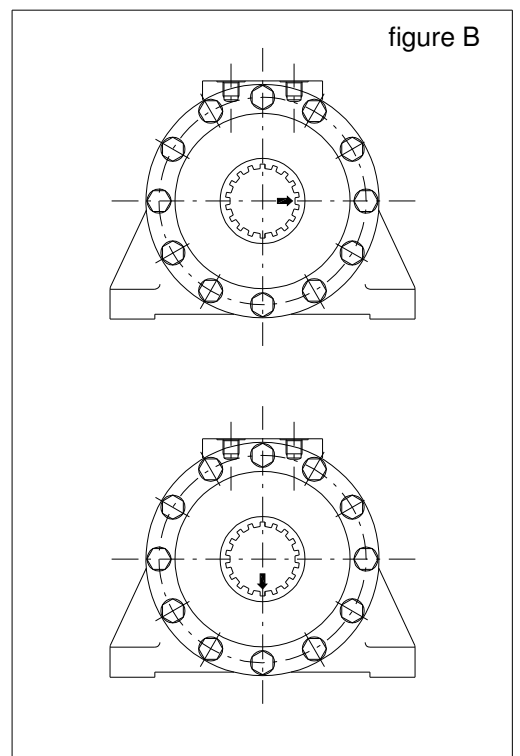
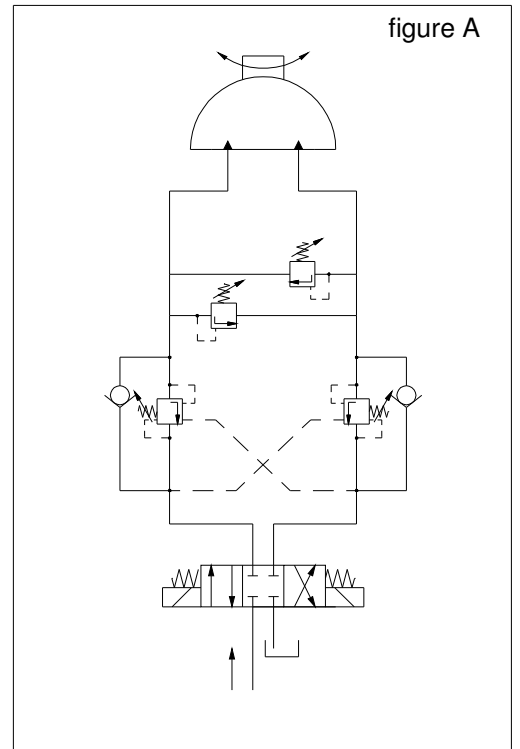
- double vane: position the arrow on the shaft on right side.

In the execution with hollow shaft:

- position the grooves on up side.

#### Filtering

For a correct functioning, an oil filtering of at least 25 micron is required



### Hydraulic oil

In the standard execution it is foreseen the use of normal oil with viscosity between 1,8 and 50°E (between 10 and 370 cSt).

Upon request can be used seal suitable for phosphoric ester or for water.

### Working temperature

From -20°C to +80°C (with Teflon seals). Different temperatures upon request.

### Technical characteristics

Working pressure: 210 bar

Torques: from 100 to 80000 Nm

Angle: single vane 260°

double vane 90°

Leakages: see figure C

Efficiency: with Teflon seals :

Single vane ≈ 90%

Double vane ≈ 95%

The torque values take into account the efficiency.

$$\text{Calculation for pump delivery: } Q_t = \frac{\alpha V 60}{\alpha \max t}$$

$Q_t$  = theoretic pump delivery (l/min.)

$V$  = displacement (l)

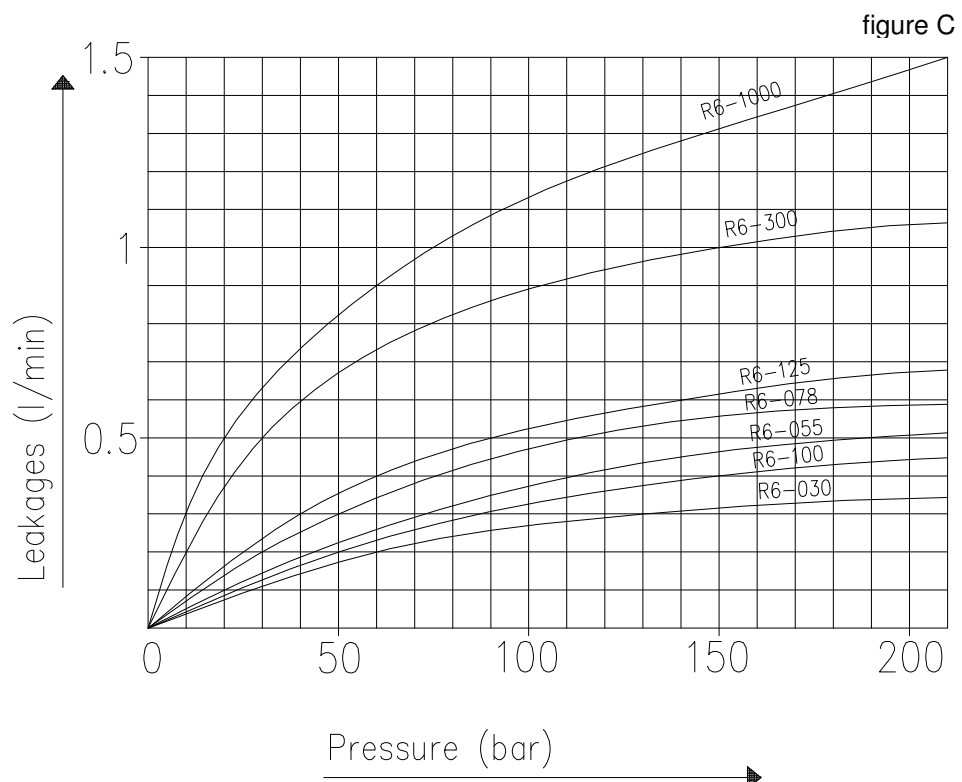
$\alpha$  = required angle

$\alpha \max$  = actuator max angle

$t$  = required time (seconds) to carry out the angle  $\alpha$

effective  $Q = Q_t + \text{leakages}$

(see diagram figure C)



## Special executions

RIMA can make a wide range of customization and fittings to make the actuators suitable to several applications.

Here after the most common special executions:

- Actuators suitable to bear radial and /or axial loads
- Actuator with a rotation angle different from standard
- Actuator with holes, shafts different from standard
- Actuator for high speed

Minimum quantities are required for special executions.

## Our experience

There are many types of actuators: pneumatic, hydraulic, vane, piston and ground rack.

RIMA is specialized in manufacturing hydraulic vane rotary actuators.

Peculiarity of this kind of actuator is high efficiency and minimum effect *Slip-stick*.

Our know how makes our actuator the best solution for applications in which high torque and defined angle are required.

RIMA actuators have a max. torque from 1.200Nm to 83.000 Nm, at 3.000 Psi (210 Bar) according to size.

## RIMA codes

R6	030	AS	S	P	N
Rotary actuators	Displacement	AS = protruding shaft	S = single vane	P = feet	N = standard execution
		AC = hollow shaft	D = double vane	F = flange	S = special execution

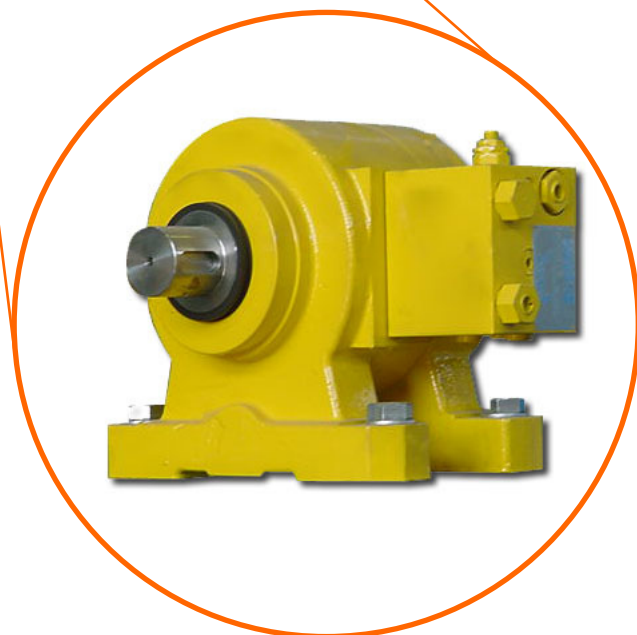
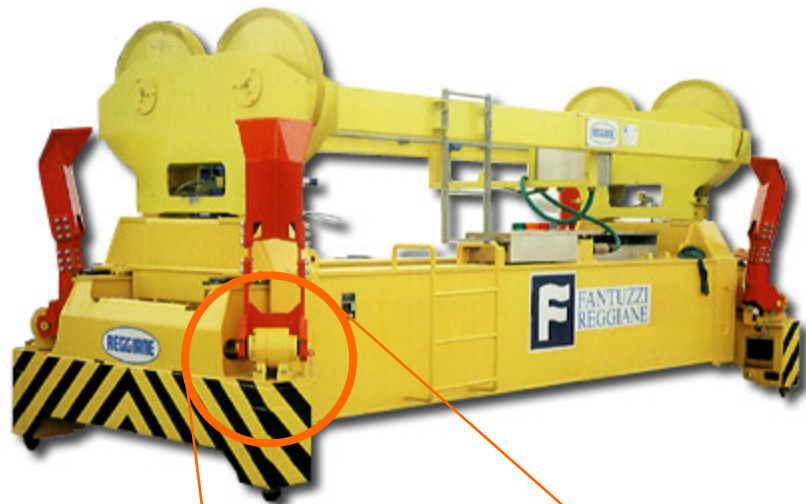
## Types and main data

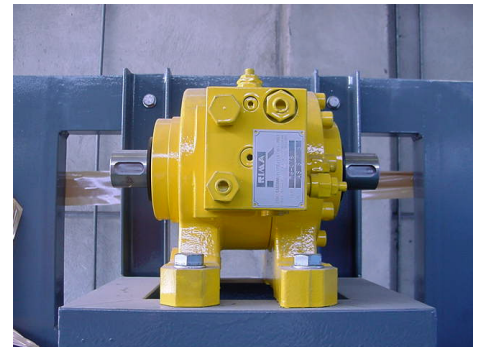
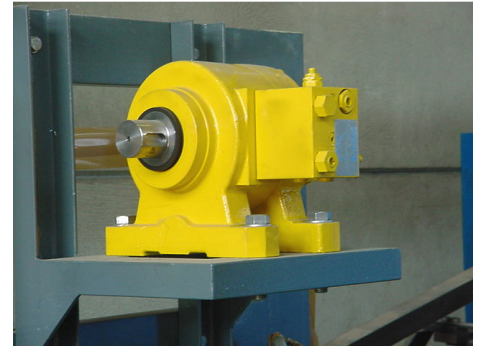
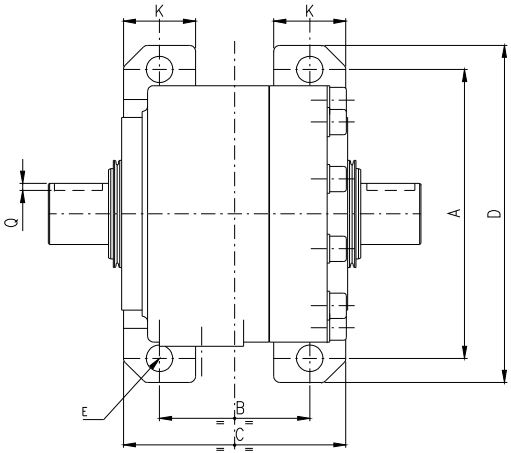
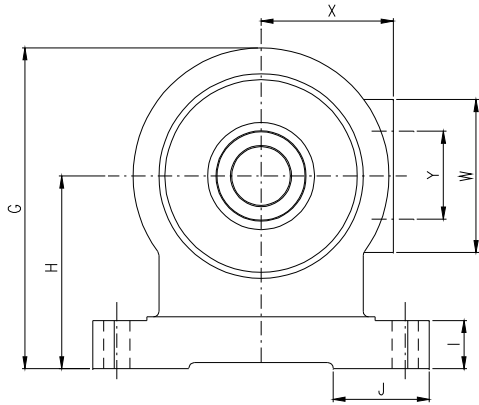
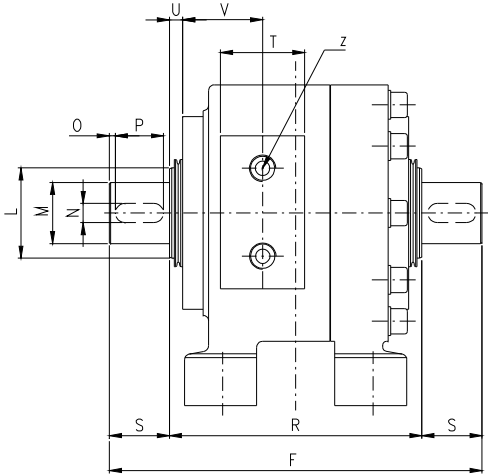
Type	Shaft	Rotation angle	Torque at 210 bar (Nm)	Displacement (cm <sup>3</sup> /°)	Weight without oil (kg)
R6-030-ASS	Protruding	260	1200	1.15	20
R6-022-ASD	"	90	2500	2.44	21
R6-078-ASS	"	260	3000	3	65
R6-100-ASS	"	260	3800	3.85	50
R6-070-ASD	"	90	8000	7.78	51
R6-300-ASS	"	260	11600	11.54	160
R6-214-ASD	"	90	24500	23.78	162
R6-1000-ASS	"	260	39000	38.46	440
R6-730-ASD	"	90	83000	81.11	450
R6-055-ACS	Hollow	260	2000	2.12	30
R6-078-ACS	"	260	3000	3	35
R6-125-ACS	"	260	4800	4.81	43

## Spreader applications

One of the rotary actuators' applications is the flipper movement for spreaders. Our models, conceived expressly for this use, are fixed with feet. This simplifies the installation and assembly on spreaders, reducing the production cost.

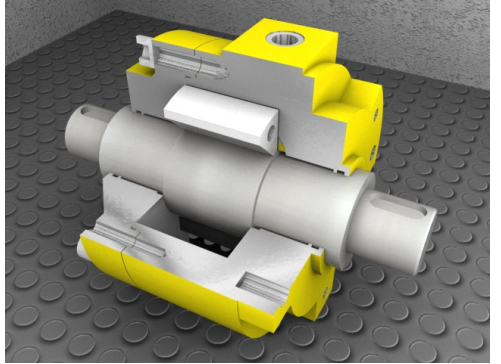
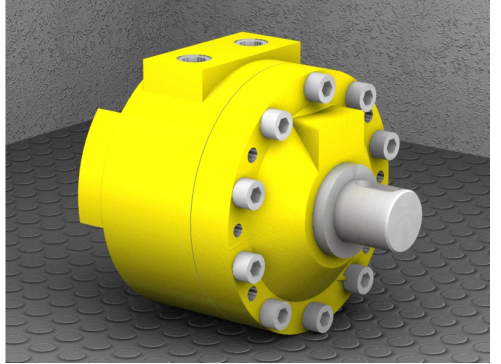
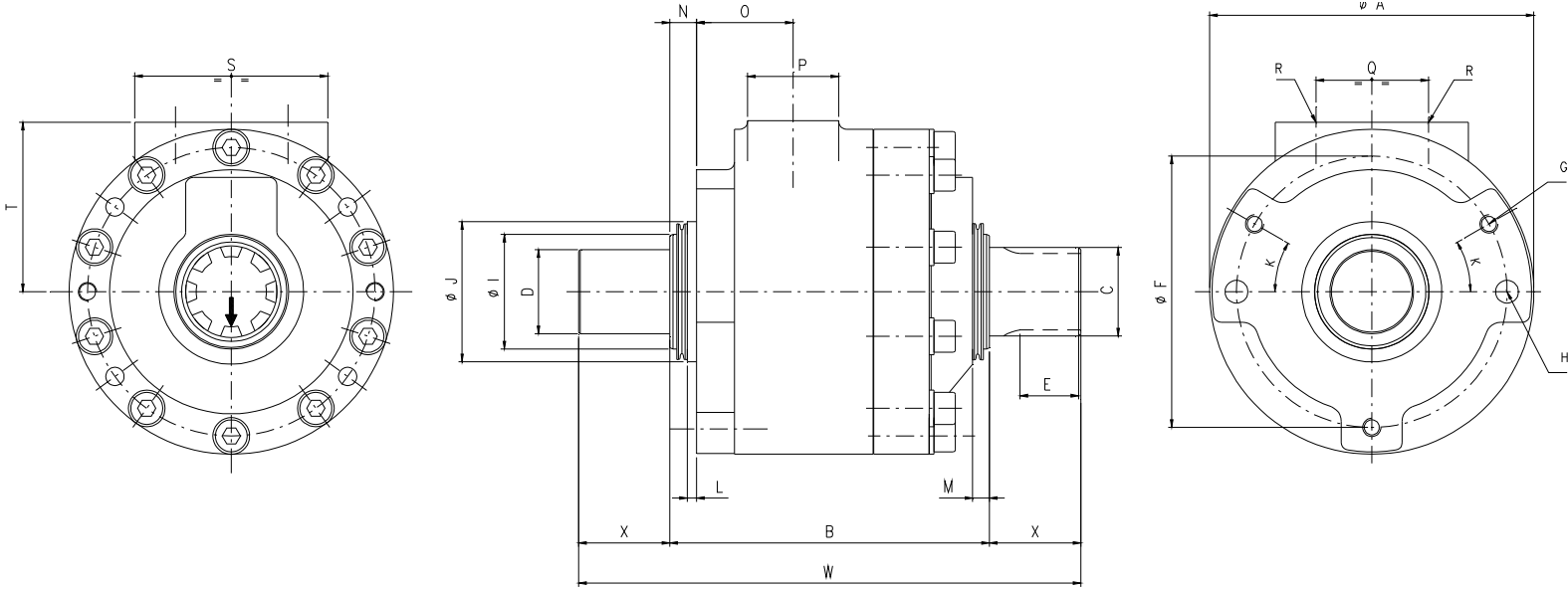
The presence of special valves, assembled directly on the rotary actuator, keep safe the spreader against pipe damages and provides an effective anti-shock protection.





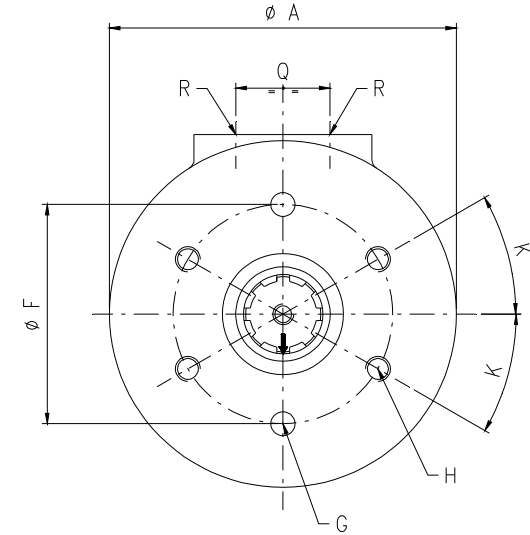
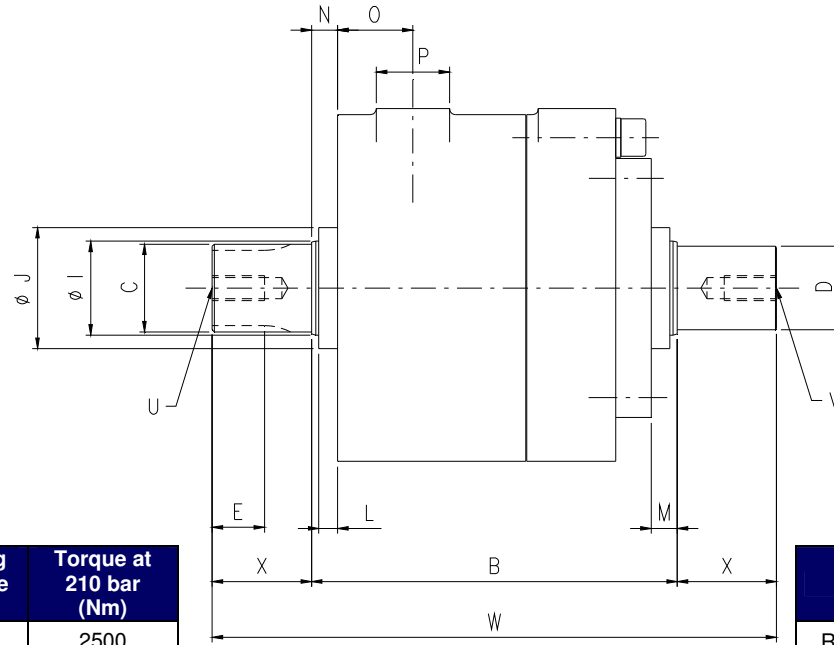
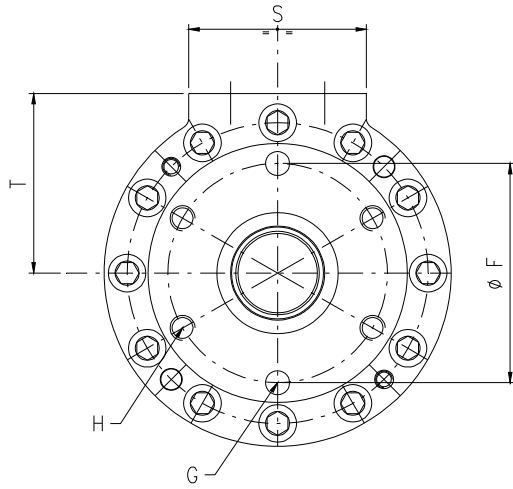
Type	Displacement (cm <sup>3</sup> /°)	Rotation angle (°)	Working pressure (bar)	Torque at 210 bar (Nm)
R6-078-AS-S-P-N	3	260	210	3000
R6-100-AS-S-P-N	3.85	260	210	3800

Type	A	B	C	D	E	F	G	H	I	K	J	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
R6-078	250	130	195	300	N°4 ø23	355	267	160 <sup>0</sup> <sub>-0.1</sub>	40	65	90	Ø75 h7	Ø50.8 h8	16 <sup>-0.018</sup> <sub>-0.061</sub>	5	40	6 <sup>+0.2</sup> <sub>0</sub>	255	50	70	12.5	88.5	127	110	73	G1/2"
R6-100	260	158	197	305	N°4 ø17	332	238	118 <sup>+0.15</sup> <sub>-0.15</sub>	30	65	45	Ø65 h7	Ø60 k6	18 N9	3	46	7 <sup>+0.2</sup> <sub>0</sub>	226	53	45	1	56	120	-	63	G3/8"



Type	Displacement (cm <sup>3</sup> /°)	Rotation angle (°)	Working pressure (bar)	Torque at 210 bar (Nm)
R6-078-AS-S-F-N	3	260	210	3000

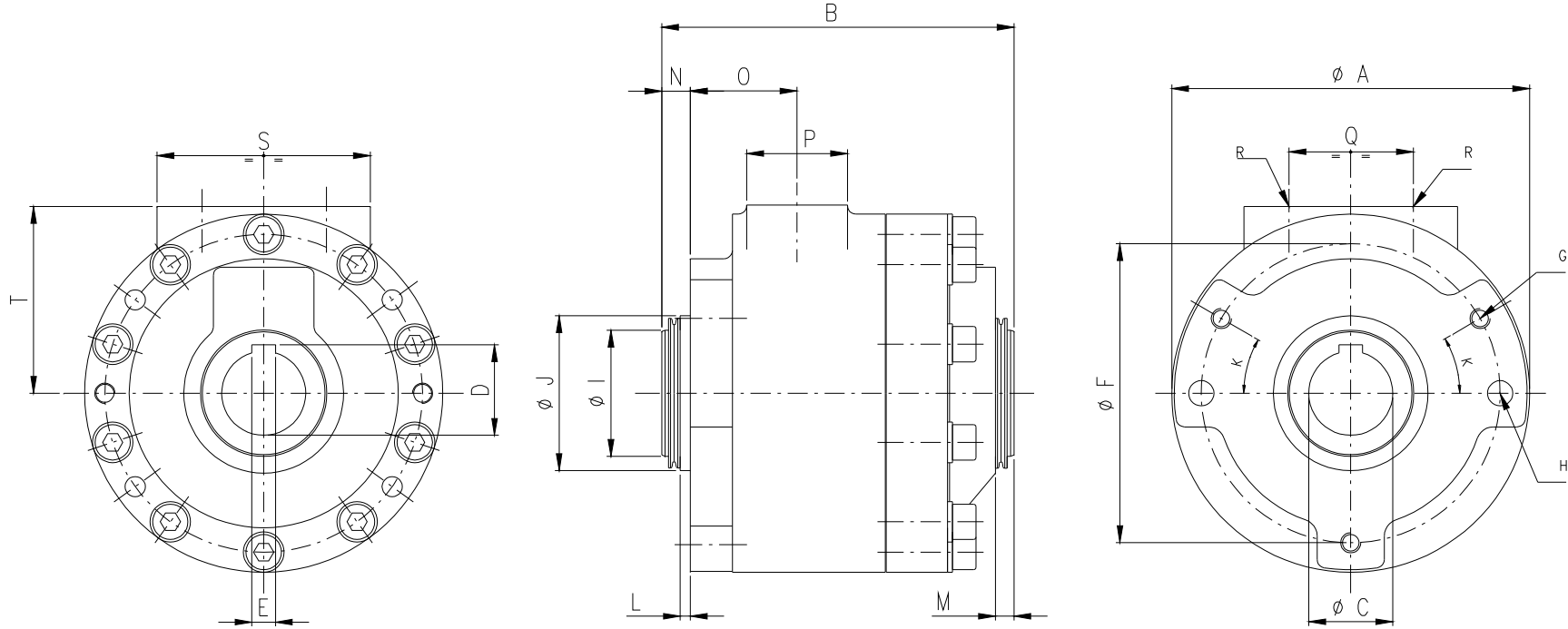
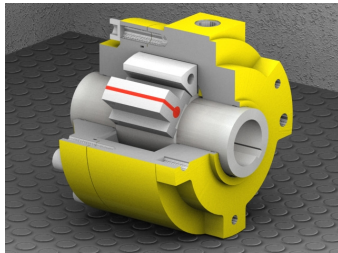
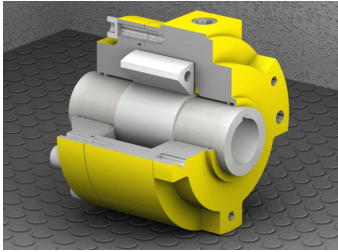
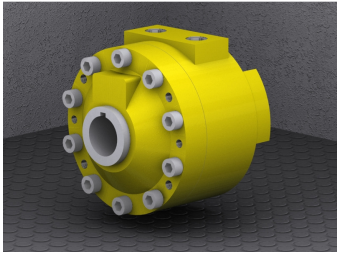
Type	A	B	C	D	E	F	G	H	I	K	J	L	M	N	O	P	Q	R	S	T	U	V	W	X
R6-078	212	210	52 UNI 221	Ø 55 h7	40	180	N°3 M12X25	N°2 Ø15x32	75 h7	30°	92 h7	6	11	17.5	63.5	60	73	G1/2"	127	112	M12x25	-	330	60



Type	Displacement (cm <sup>3</sup> /°)	Rotation angle (°)	Working pressure (bar)	Torque at 210 bar (Nm)
R6-022-AS-D-F-N	2.44	90	210	2500
R6-070-AS-D-F-N	7.78	90	210	8000
R6-214-AS-D-F-N	23.78	90	210	24500
R6-730-AS-D-F-N	81.11	90	210	83000

Type	Displacement (cm <sup>3</sup> /°)	Rotation angle (°)	Working pressure (bar)	Torque at 210 bar (Nm)
R6-030-AS-S-F-N	1.15	260	210	1200
R6-100-AS-S-F-N	3.85	260	210	3800
R6-300-AS-S-F-N	11.54	260	210	11600
R6-1000-AS-S-F-N	38.4	260	210	39000

Type	A	B	C	D	E	F	G	H	I	K	J	L	M	N	O	P	Q	R	S	T	U	V	W	X
R6-022	166	184	36 UNI 221	Ø40 h8	25	105	N <sup>4</sup> ø12H7x20	N <sup>8</sup> M12x20	Ø45 h7	30°	Ø58 h8	9	17	17	36	35	45	G1/4"	85	86	-	-	270	43
R6-030	166	175	36 UNI 221	Ø40 h8	25	105	N <sup>4</sup> ø12H7x20	N <sup>8</sup> M12x20	Ø45 h7	30°	Ø58 h8	9	12.5	12.5	36	35	45	G1/4"	85	86	-	-	270	47.5
R6-070	235	242	52 UNI 221	Ø55 h7	40	143	N <sup>4</sup> ø15H7x32	N <sup>8</sup> M14x30	Ø65 h7	30°	Ø85 h8	10	19	19	46	45	63	G3/8"	120	120	-	-	362	60
R6-100	235	242	52 UNI 221	Ø55 h7	40	143	N <sup>4</sup> ø15H7x32	N <sup>8</sup> M14x30	Ø65 h7	30°	Ø85 h8	10	19	19	46	45	63	G3/8"	120	120	-	-	362	60
R6-214	350	304	82 UNI 221	Ø85 h7	75	225	N <sup>4</sup> ø22H7x47	N <sup>8</sup> M20x35	Ø95 h7	30°	Ø125 h8	17	26	26	51	45	95	G3/4"	185	180	-	-	510	103
R6-300	350	304	82 UNI 221	Ø85 h7	75	225	N <sup>4</sup> ø22H7x47	N <sup>8</sup> M20x35	Ø95 h7	30°	Ø125 h8	17	26	26	51	45	95	G3/4"	185	180	-	-	510	103
R6-730	520	450	150 UNI 221	Ø135 h8	145	350	N <sup>4</sup> ø31,5H7x50	N <sup>8</sup> M27x50	Ø155 h7	30°	Ø280 h8	25	45	45	150	100	140	G1"	230	270	-	-	780	103
R6-1000	520	450	150 UNI 221	Ø135 h8	145	350	N <sup>4</sup> ø31,5H7x50	N <sup>8</sup> M27x50	Ø155 h7	30°	Ø280 h8	25	45	45	150	100	140	G1"	230	270	-	-	780	165



Type	Displacement (cm <sup>3</sup> /°)	Rotation angle (°)	Working pressure (bar)	Torque at 210 bar (Nm)
R6-055-AC-S-F-N	2.12	260	210	2000
R6-078-AC-S-F-N	3	260	210	3000
R6-125-AC-S-F-N	4.81	260	210	4800

Type	A	B	C	D	E	F	G	H	I	K	J	L	M	N	O	P	Q	R	S	T	U	V
R6-055	213	185	50 H7	53.8 0 +0.2	14 H8	180	N°3 M12X25	N°2 Ø15H7/32	75 h7	30°	92 h7	6	11	17.5	63.5	50	73	G1/2"	127	111	-	-
R6-078	213	210	50 H7	53.8 0 +0.2	14 H8	180	N°3 M12X25	N°2 Ø15H7/32	75 h7	30°	92 h7	6	11	17.5	63.5	60	73	G1/2"	127	112	-	-
R6-125	213	255	50 H7	53.8 0 +0.2	14 H8	180	N°3 M12X25	N°2 Ø15H7/32	75 h7	30°	92 h7	6.35	5.8	18.5	63.5	60	73	G1/2"	127	112	-	-