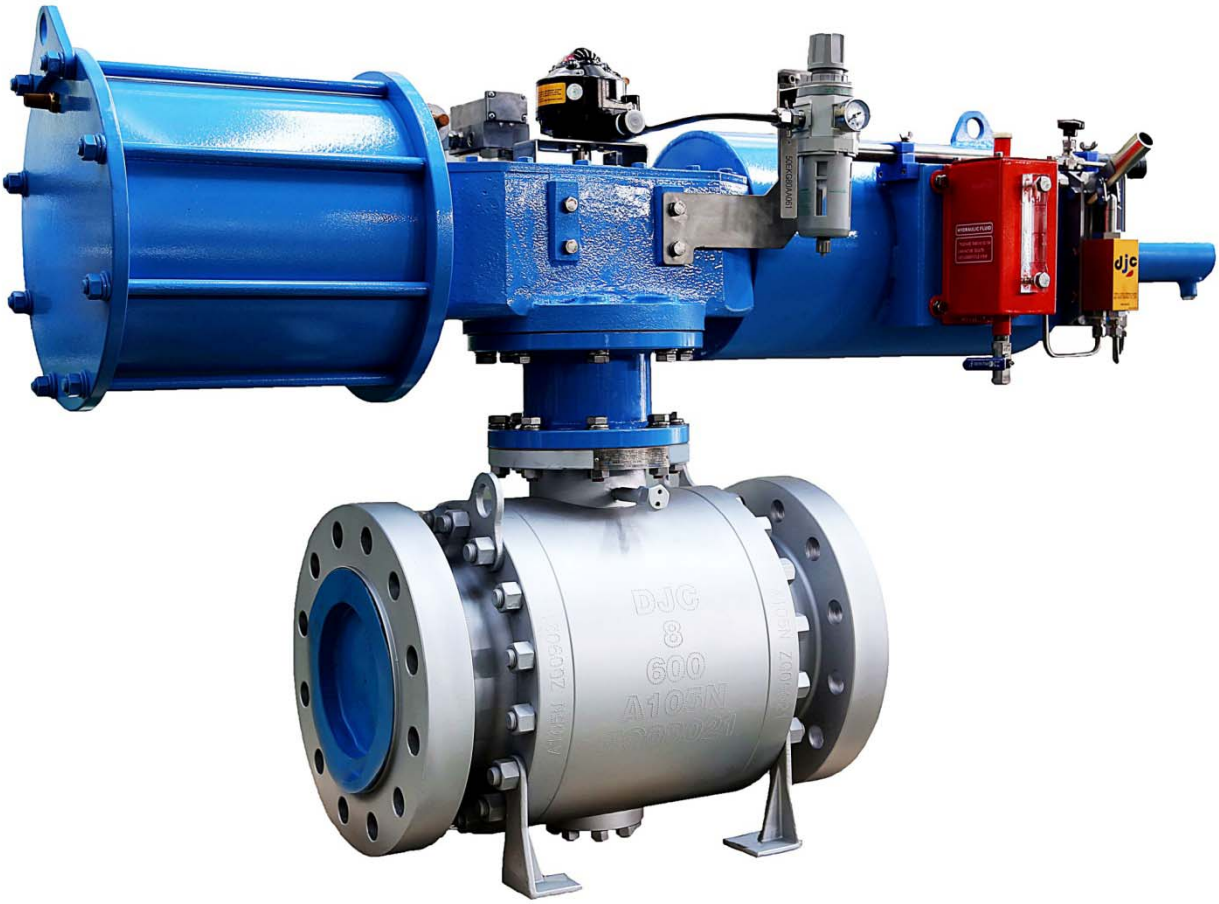
DAEJU CONTROL ACTUATORS

Pneumatic & Hydraulic
Heavy Duty Actuators



DAEJU CONTROL CO., LTD.

History

1985 Established DAEJU Control Tech Inc.

1990 Established R&D Institute for Control Valve

1995 Established R&D Institute for Actuator

2001 Acquired ISO 9001 Certificate

2006 Changed company name to DAEJU Control Co., Ltd.

2007 Registered as an official supplier of Hyundai Heavy Industries

2007 Registered as official supplier of Hyundai Engineering & Construction

2009 Registered as official supplier of DooSan Heavy Industries Co., Ltd.

2012 Acquired SIL2 Certificate for Heavy duty quarter turn Actuator

2013 Acquired SIL3 Certificate for Emergency Shut Down Valves

Certificate

SGS TÜV SAAR

CERTIFICATE NO FS/71/220/12/0020 PAGE 1/1

LICENCE HOLDER
DAEJU CONTROL CO., LTD.
RM 905, NEW T CASTLE, 429-1
GASAN-DONG, GEUMCHEON-GU,
SEOUL, KOREA

MANUFACTURING PLANT
DAEJU CONTROL CO., LTD.
345-7, GOJAN-DONG, NAMDONG-GU,
INCHEON, KOREA

PROJECT NO/-ID	LICENSED TEST MARK	CERT. REPORT NO.
F1X4		F1X40001

Tested according to: IEC 61508: 2010

Certified product(s): Trunnion Pipeline Ball Valves

Model(s): Valve size: 4" to 48"; Rating: 150 to 900
Valve ID: DJ-BA-x-y; (x-valve size, y-valve rating)
(complete model list see certification report)

Technical Data and Parameter: Valve going into safe position within specified time and with specified leakage.
Type A device, 60% ≤ SFF < 90%.
Suitable for safety related systems in low demand mode up to and including SIL 2 (1oo1 configuration) and probabilistic for SIL 3 (1oo2 configuration)

Specific Requirements: The certificate is for type approval and based on voluntary tests. Any changes to the design, materials, components or processing may require repetition of some of the qualification tests in order to retain type approval. The certification report is an integral part of this certificate. All requirements and specifications of the current valid revision of this report shall be met

Certification Body for Functional Safety SGS-TÜV Saar GmbH
Munich, 2013-07-18
Martin Kaiser

CERTIFICATE

SGS TÜV SAAR

CERTIFICATE NO FS/71/220/12/0019 PAGE 1/1

LICENCE HOLDER
DAEJU CONTROL CO., LTD.
RM 905, NEW T CASTLE, 429-1
GASAN-DONG, GEUMCHEON-GU,
SEOUL, KOREA

MANUFACTURING PLANT
DAEJU CONTROL CO., LTD.
345-7, GOJAN-DONG, NAMDONG-GU,
INCHEON, KOREA

PROJECT NO/-ID	LICENSED TEST MARK	CERT. REPORT NO.
F1X4		F1X40002

Tested according to: IEC 61508: 2010

Certified product(s): ESDV (emergency shutdown valve) schematic

Model(s): ESDV schematic with accessory elements as specified in the Document ESDV001; Version 9.0; July 16; 2013
(for details see certification report)

Technical Data and Parameter: Safety function "CLOSE main valve" within specified time and with specified leakage.
Type A device, 60% ≤ SFF < 90%. Suitable for safety related systems in low demand mode up to and including SIL 2, (1oo1) configuration and probabilistic for SIL 3 (1oo2 configuration)

Specific Requirements: The certificate is for type approval and based on voluntary tests. Any changes to the design, materials, components or processing may require repetition of some of the qualification tests in order to retain type approval. The certification report is an integral part of this certificate. All conditions of the current valid revision of this report shall be met.

Certification Body for Functional Safety SGS-TÜV Saar GmbH
Munich, 2013-07-18
Martin Kaiser

CERTIFICATE

SGS TÜV SAAR

CERTIFICATE NO FS/71/220/12/0010 PAGE 1/1

LICENCE HOLDER
DAEJU CONTROL CO., LTD.
RM 905, NEW T CASTLE, 429-1
GASAN-DONG, GEUMCHEON-GU,
SEOUL, KOREA

MANUFACTURING PLANT
DAEJU CONTROL CO., LTD.
345-7, GOJAN-DONG, NAMDONG-GU,
INCHEON, KOREA

PROJECT NO/-ID	LICENSED TEST MARK	CERT. REPORT NO.
F1X4		F1X40003

Tested according to: IEC 61508: 2010

Certified product(s): Pneumatic Actuator (for heavy duty Quarter Turn Type valve)

Model(s): Double Acting and Spring Return:
RDJHD SR/DA 250 – 735 (2.8 – 7 bar);
RDJHD 20 SR/DA 800/900/1000, RDJHD 25 SR/DA
(complete model list see certification report)

Technical Data and Parameter: Drive going into Safe Position within specified Time.
Type A device, 60% ≤ SFF < 90%.
Suitable for safety related systems in low demand mode up to and including SIL 2 (1oo1 configuration) and probabilistic for SIL 3 (1oo2 configuration).

Specific Requirements: The certificate is for type approval and based on voluntary tests. Any changes to the design, materials, components or processing may require repetition of some of the qualification tests in order to retain type approval. The certification report is an integral part of this certificate. All requirements and specifications of the current valid revision of this report shall be met.

Certification Body for Functional Safety SGS-TÜV Saar GmbH
Munich, 2013-07-18
Martin Kaiser

CERTIFICATE

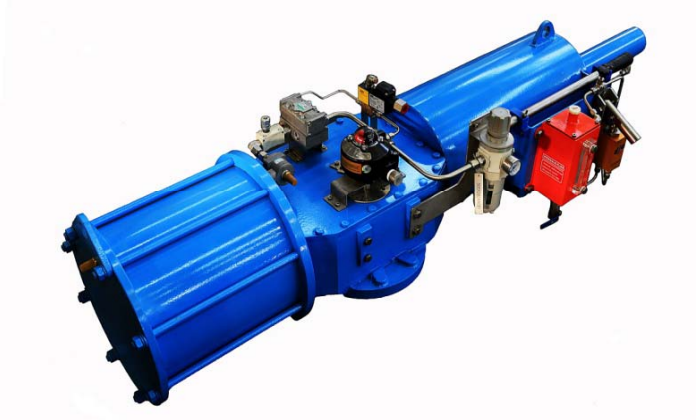
Table of Contents

Heavy Duty Quarter Turn Actuator

Heavy Duty Quarter Turn Actuator

General

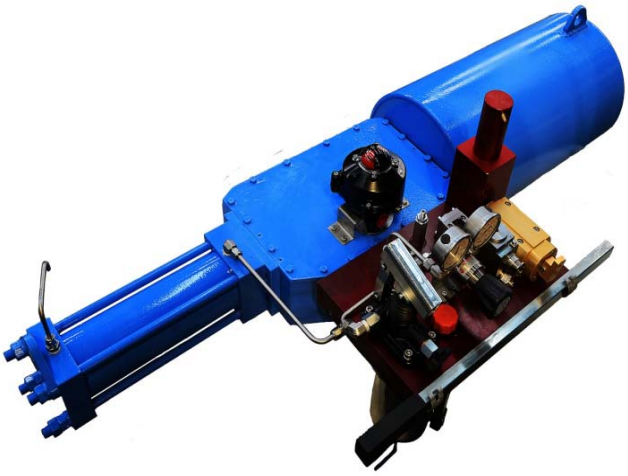
The Daeju of heavy duty scotch yoke actuators offer a broad range of torques to 250,000 Nm.



All the Daeju of quarter-turn scotch-yoke actuators are designed and manufactured for the transmission of high torque suited for ball or butterfly valves, plug etc for on-off or throttling service.

The design, engineering and materials used in production ensure optimum performances in the heaviest work condition in every environment according to the international standard Specifications.

In the central housing a slotted link kinematics provides to transform the linear motion of the rod into the rotary motion of the valve shaft.



Our standard offering is the symmetrical design yoke that delivers maximum torque at both ends of the 90° cycle.

The square slide bearing with guide bar gives high cycle life and smooth stroke while minimizing wear points.

As with all Daeju actuators, our heavy duty series comes with a complete line of accessories, including jackscrew, hydraulic overrides, limit switches, solenoids and positioners.

Heavy Duty Quarter Turn Actuator

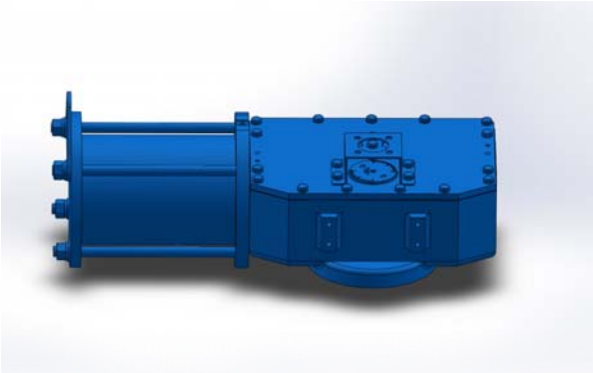
Typical Application

For on /off or modulating control of any quarter-turn operated valve.

Configurations

Pneumatic Heavy Duty Quarter-turn Actuator

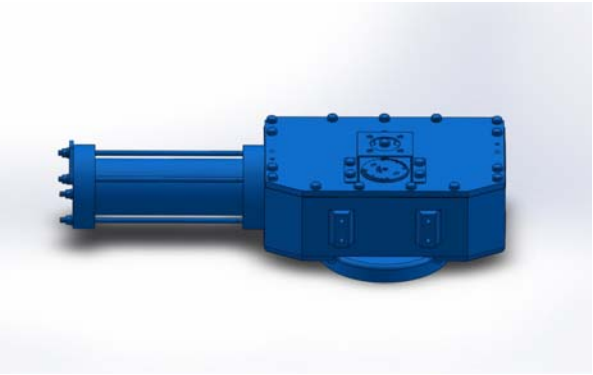
Spring Return



Double Acting

Hydraulic Quarter-turn Actuator

Spring Return



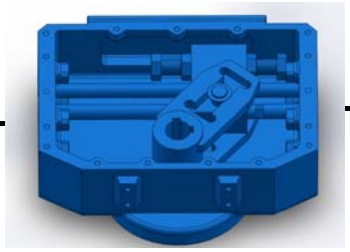
Double Acting

Heavy Duty Quarter Turn Actuator

Modular Assembly

Consistent engineering design and efficient modular assembly allows increased operational flexibility to be achieved. Double-acting, spring fail close/open or manual override operations are combinations that are readily obtainable on the low-pressure air, high-pressure gas or hydraulic products. This maintains product consistency throughout any project requirement, regardless of valve size, class, actuator supply medium, pressure, or actuator function (DA/SR) requirements. As a result, all products can be safely and confidently operated by personnel. In addition, the consistent design provides a significant reduction in the quantity of recommended spare parts and seal kits, which reduces costs within maintenance programs.

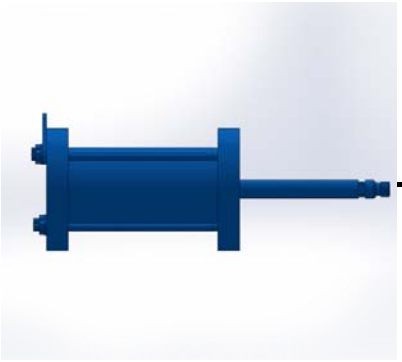
Power Cylinders for
Compressed Air Supply



Frame & Yoke

Spring Cartridge

Gear with Handwhell Manual Override



Power Cylinders for
Natural Gas Supply

Hydraulic Manual Override

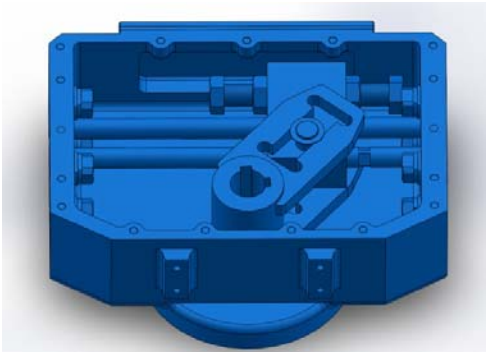
Power Cylinders for
Hydraulic Supply

Heavy Duty Quarter Turn Actuator

Standard Features

Frame & Yoke

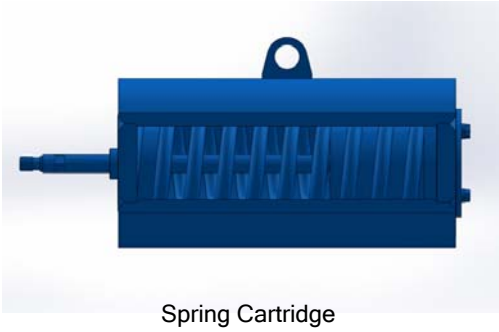
- Travel adjustments ±7° for clockwise and counter clockwise strokes
- Scotch yoke mechanism generates powerful opening and closing torque outputs
- Ductile Iron frame provides rugged foundation of modular assemblies
- Chrome-plated side load bar with guide block for effective elimination of piston rod deflection
  •Steel slide block, bronze slide bearings to minimize friction and provide long cycle life
- Visual position indicator



Frame & Yoke

Spring Cartridge

- The spring cartridge, fully closed to prevent spring corrosion in aggressive environment, is designed to allow the replacement of the springs in field with the utmost security.
- Seal-welded design construction provides increased personnel safety
- Alloy steel, corrosion resistant and heat treated springs designed and manufactured for long high cycle life

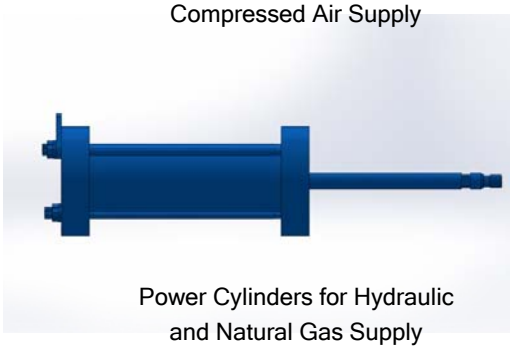


Spring Cartridge

Power Cylinder

- Steel cylinder assemblies, each designed specifically for the safe pressure containment of low-pressure compressed air, high-pressure gas or high-pressure hydraulic supply mediums
- Steel cylinder assembly provides robust pressure containment for all conditions
- Rugged heavy duty steel pressure plated for long wear and corrosion resistance
- Nitrile rubber piston seal configurations specifically designed for pneumatic and hydraulic applications
- PTFE Guide Band supports piston while providing smooth operation and extended life

Power Cylinders for
Compressed Air Supply

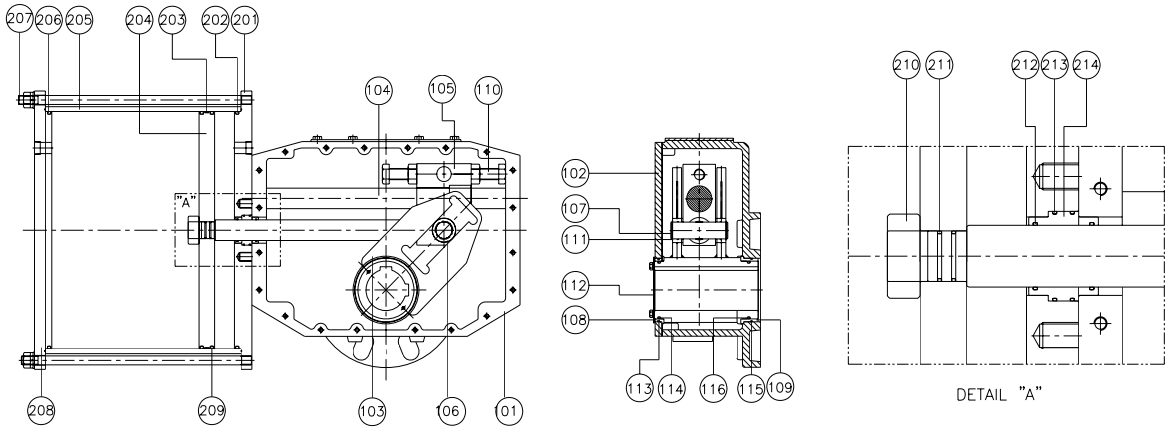


Power Cylinders for Hydraulic
and Natural Gas Supply

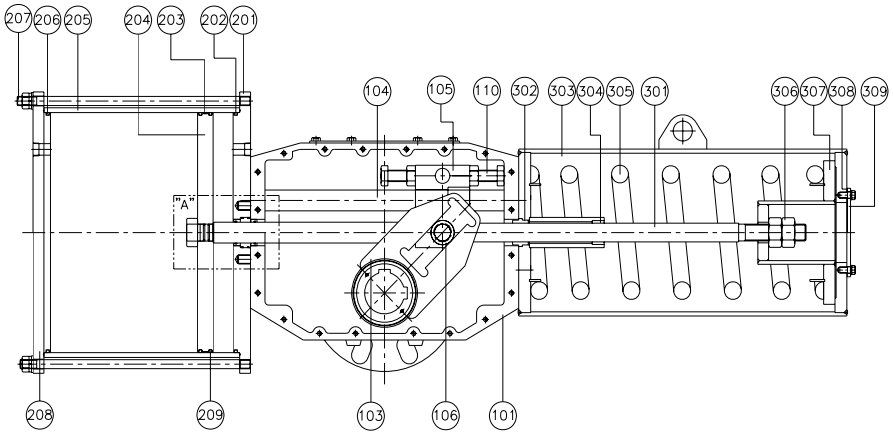
Heavy Duty Quarter Turn Actuator

Pneumatic Heavy Duty Quarter Turn Actuator Standard Construction

Double Acting



Single Acting



Material

FRAME PART

NO	DESCRIPTION	MATERIAL
101	HOUSING	CASTING
102	HOUSING COVER	CASTING
103	YOKE	CARBON STEEL
104	GUIDE ROD	CARBON STEEL
105	SLIDING BLOCK	CARBON STEEL
106	SLIDING BLOCK BEARING	CARBON STEEL
107	YOKE PIN	CARBON STEEL
108	TOP YOKE BEARING	BRASS
109	BOTTOM YOKE BEARING	BRASS
110	STOPPER BOLT & NUT	CARBON STEEL
111	SNAP RING	CARBON STEEL
112	INDICATOR	CARBON STEEL
113	O-RING (TOP YOKE BEARING)	NBR
114	O-RING (TOP YOKE)	NBR
115	O-RING (BOTTOM YOKE BEARING)	PTFE
116	O-RING (BOTTOM YOKE)	NBR

AIR CYLINDER PART

NO	DESCRIPTION	MATERIAL
201	FRONT FLANGE	CARBON STEEL
202	O-RING (FRONT FLANGE)	NBR
203	BACK UP RING (PISTON)	PTFE
204	PISTON	CARBON STEEL
205	CYLINDER	CARBON STEEL
206	O-RING (END FLANGE)	NBR
207	TIE ROD & NUT	CARBON STEEL
208	END FLANGE	CARBON STEEL
209	O-RING (PISTON)	NBR
210	PISTON ROD NUT	CARBON STEEL
211	O-RING (PISTON ROD)	NBR
212	O-RING (SEAL BUSH INSIDE)	NBR
213	O-RING (SEAL BUSH OUTSIDE)	NBR
214	SEAL BUSH	BRASS

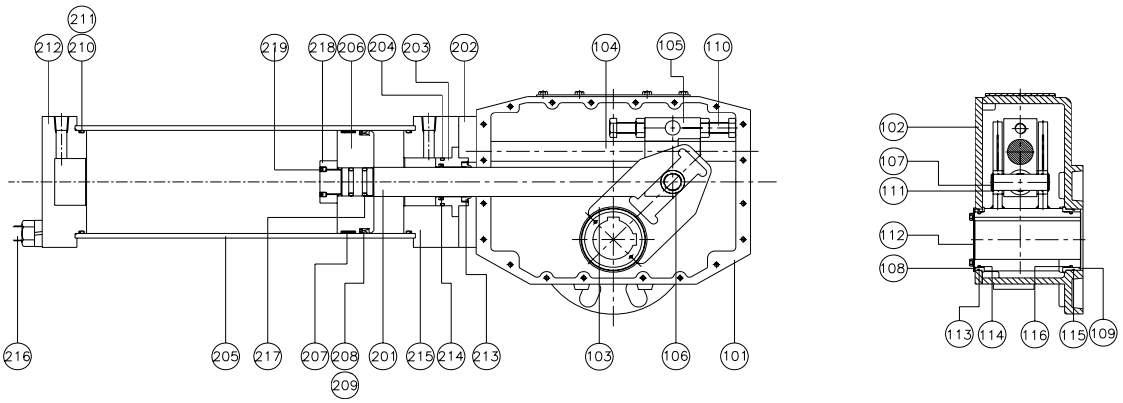
SPRING CARTRIDGE PART

NO	DESCRIPTION	MATERIAL
301	SPRING ROD	CARBON STEEL
302	CENTER RING	BRASS
303	SPRING HOUSING	CARBON STEEL
304	GUIDE BUSH	OILESS B/R
305	SPRING	CARBON STEEL
306	BOLT	CARBON STEEL
307	SPRING GUIDE	CARBON STEEL
308	GASKET	NBR
309	COVER	CARBON STEEL

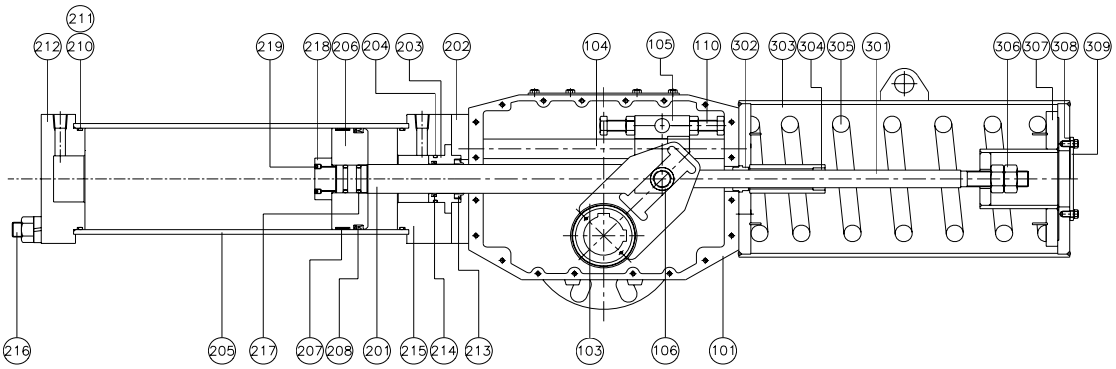
Heavy Duty Quarter Turn Actuator

Hydraulic Heavy Duty Quarter Turn Actuator Standard Construction

Double Acting



Single Acting



Material

FRAME PART

NO	DESCRIPTION	MATERIAL
101	HOUSING	CASTING
102	HOUSING COVER	CASTING
103	YOKE	CARBON STEEL
104	GUIDE ROD	CARBON STEEL
105	SLIDING BLOCK	CARBON STEEL
106	SLIDING BLOCK BEARING	CARBON STEEL
107	YOKE PIN	CARBON STEEL
108	TOP YOKE BEARING	BRASS
109	BOTTOM YOKE BEARING	BRASS
110	STOPPER BOLT & NUT	CARBON STEEL
111	SNAP RING	CARBON STEEL
112	INDICATOR	CARBON STEEL
113	O-RING (TOP YOKE BEARING)	NBR
114	O-RING (TOP YOKE)	NBR
115	O-RING (BOTTOM YOKE BEARING)	PTFE
116	O-RING (BOTTOM YOKE)	NBR

HYDRAULIC CYLINDER PART

NO	DESCRIPTION	MATERIAL
201	ROD	CARBON STEEL
202	FLANGE	CARBON STEEL
203	BOSS	BRASS
204	BOSS O-RING	NBR
205	CYLINDER	CARBON STEEL
206	PISTON	CARBON STEEL
207	WEAR-RING	PTFE
208	PISTON U-PACKING	URETHANE
209	BACK-UP RING	PTFE
210	HEAD COVER O-RING	NBR
211	BACK-UP RING	PTFE
212	HEAD COVER	CARBON STEEL
213	DUST SEAL	URETHANE
214	ROD SEAL	URETHANE
215	ROD COVER	CARBON STEEL
216	TIE ROD	CARBON STEEL
217	ROD O-RING	NBR
218	ROD NUT	CARBON STEEL
219	SET SCREW	STAINLESS STEEL
220	TIE NUT/SW	CARBON STEEL

SPRING CARTRIDGE PART

NO	DESCRIPTION	MATERIAL
301	SPRING ROD	CARBON STEEL
302	CENTER RING	BRASS
303	SPRING HOUSING	CARBON STEEL
304	GUIDE BUSH	OILESS B/R
305	SPRING	CARBON STEEL
306	BOLT	CARBON STEEL
307	SPRING GUIDE	CARBON STEEL
308	GASKET	NBR
309	COVER	CARBON STEEL

Heavy Duty Quarter Turn Actuator

Heavy Duty Spring Return Torque Chart

Pneumatic Actuator

(Unit : Nm)

MODEL		SPRING TORQUE (Nm)			AIR TORQUE : AIR SUPPLY PRESSURE											
					2.8 BAR			4.2 BAR			5.6 BAR			7 BAR		
		START	R	END	START	R	END	START	R	END	START	R	END	START	R	END
RDJHD 08SR 250	4.2BAR	1,519	740	945	735	252	114	1,575	748	931	2,415	1,244	1,748			
	5.6BAR	2,012	980	1,252				1,268	508	438	2,108	1,004	1,255	2,948	1,500	2,071
RDJHD 08SR 300	4.2BAR	2,182	1,063	1,357	1,062	365	171	2,272	1,079	1,347	3,482	1,793	2,523			
	5.6BAR	2,923	1,424	1,818				1,811	718	606	3,021	1,432	1,782	4,230	2,146	2,959
RDJHD 08SR 335	4.2BAR	2,702	1,316	1,680	1,337	465	231	2,846	1,355	1,698	4,355	2,245	3,165			
	5.6BAR	3,632	1,769	2,259				2,267	902	768	3,776	1,792	2,235	5,284	2,683	3,701
RDJHD 10SR 335	4.2BAR	3,211	1,560	1,982	1,567	535	240	3,342	1,583	1,965	5,117	2,631	3,690			
	5.6BAR	4,271	2,074	2,636				2,688	1,069	905	4,463	2,117	2,630	6,237	3,164	4,356
RDJHD 10SR 385	4.2BAR	4,248	2,063	2,621	2,067	704	310	4,411	2,088	2,589	6,755	3,472	4,868			
	5.6BAR	5,807	2,742	3,318				3,714	1,409	1,030	6,058	2,793	3,309	8,402	4,176	5,588
RDJHD 10SR 435	4.2BAR	5,423	2,634	3,347	2,638	899	396	5,630	2,665	3,305	8,622	4,431	6,214			
	5.6BAR	7,381	3,486	4,218				4,759	1,813	1,347	7,751	3,579	4,256	10,744	5,346	7,166
RDJHD 13SR 485	4.2BAR	8,896	4,231	5,185	4,487	1,478	507	9,323	4,333	5,209	14,159	7,188	9,911			
	5.6BAR	12,461	5,674	6,409				8,099	2,890	1,644	12,935	5,745	6,346	17,771	8,599	11,047
RDJHD 13SR 535	4.2BAR	10,880	5,174	6,341	5,428	1,773	562	11,312	5,246	6,283	17,196	8,719	12,004			
	5.6BAR	15,164	6,905	7,799				9,854	3,515	1,999	15,738	6,988	7,720	21,623	10,462	13,441
RDJHD 16SR 535	4.2BAR	13,665	6,373	7,537	6,948	2,177	418	14,190	6,452	7,459	21,432	10,727	14,500			
	5.6BAR	18,141	8,532	10,249				11,478	4,293	2,983	18,720	8,568	10,024	25,963	12,843	17,066
RDJHD 16SR 585	4.2BAR	16,258	7,582	8,967	8,352	2,641	579	17,011	7,752	8,998	25,670	12,863	17,417			
	5.6BAR	21,507	10,115	12,151				13,827	5,219	3,749	22,486	10,330	12,168	31,146	15,442	20,586
RDJHD 16SR 635	4.2BAR	17,769	8,912	11,920	8,486	3,133	2,070	18,689	9,156	11,989	28,892	15,179	21,908			
	5.6BAR	25,401	11,897	14,183				16,426	6,171	4,357	26,629	12,194	14,276	36,832	18,216	24,196
RDJHD 20SR 685	4.2BAR	28,119	13,008	15,150	14,532	4,513	738	29,373	13,273	15,167	44,214	22,033	29,596			
	5.6BAR	36,710	17,390	21,162				23,361	8,891	6,576	38,202	17,651	21,005	53,043	26,412	35,433
RDJHD 20SR 735	4.2BAR	32,667	14,996	17,210	16,963	5,176	557	34,050	15,262	17,169	51,137	25,348	33,781			
	5.6BAR	42,315	19,982	24,180				27,080	10,276	7,521	44,167	20,362	24,133	61,253	30,448	40,745

Heavy Duty Quarter Turn Actuator

Heavy Duty Spring Return Torque Chart

Pneumatic Actuator

(Unit : Nm)

MODEL		SPRING TORQUE (Nm)			AIR TORQUE : AIR SUPPLY PRESSURE											
					2.8 BAR			4.2 BAR			5.6 BAR			7 BAR		
		START	R	END	START	R	END	START	R	END	START	R	END	START	R	END
RDJHD 08SR 250	4.2BAR	1,519	740	945	735	252	114	1,575	748	931	2,415	1,244	1,748			
	5.6BAR	2,012	980	1,252				1,268	508	438	2,108	1,004	1,255	2,948	1,500	2,071
RDJHD 08SR 300	4.2BAR	2,182	1,063	1,357	1,062	365	171	2,272	1,079	1,347	3,482	1,793	2,523			
	5.6BAR	2,923	1,424	1,818				1,811	718	606	3,021	1,432	1,782	4,230	2,146	2,959
RDJHD 08SR 335	4.2BAR	2,702	1,316	1,680	1,337	465	231	2,846	1,355	1,698	4,355	2,245	3,165			
	5.6BAR	3,632	1,769	2,259				2,267	902	768	3,776	1,792	2,235	5,284	2,683	3,701
RDJHD 10SR 335	4.2BAR	3,211	1,560	1,982	1,567	535	240	3,342	1,583	1,965	5,117	2,631	3,690			
	5.6BAR	4,271	2,074	2,636				2,688	1,069	905	4,463	2,117	2,630	6,237	3,164	4,356
RDJHD 10SR 385	4.2BAR	4,248	2,063	2,621	2,067	704	310	4,411	2,088	2,589	6,755	3,472	4,868			
	5.6BAR	5,807	2,742	3,318				3,714	1,409	1,030	6,058	2,793	3,309	8,402	4,176	5,588
RDJHD 10SR 435	4.2BAR	5,423	2,634	3,347	2,638	899	396	5,630	2,665	3,305	8,622	4,431	6,214			
	5.6BAR	7,381	3,486	4,218				4,759	1,813	1,347	7,751	3,579	4,256	10,744	5,346	7,166
RDJHD 13SR 485	4.2BAR	8,896	4,231	5,185	4,487	1,478	507	9,323	4,333	5,209	14,159	7,188	9,911			
	5.6BAR	12,461	5,674	6,409				8,099	2,890	1,644	12,935	5,745	6,346	17,771	8,599	11,047
RDJHD 13SR 535	4.2BAR	10,880	5,174	6,341	5,428	1,773	562	11,312	5,246	6,283	17,196	8,719	12,004			
	5.6BAR	15,164	6,905	7,799				9,854	3,515	1,999	15,738	6,988	7,720	21,623	10,462	13,441
RDJHD 16SR 535	4.2BAR	13,665	6,373	7,537	6,948	2,177	418	14,190	6,452	7,459	21,432	10,727	14,500			
	5.6BAR	18,141	8,532	10,249				11,478	4,293	2,983	18,720	8,568	10,024	25,963	12,843	17,066
RDJHD 16SR 585	4.2BAR	16,258	7,582	8,967	8,352	2,641	579	17,011	7,752	8,998	25,670	12,863	17,417			
	5.6BAR	21,507	10,115	12,151				13,827	5,219	3,749	22,486	10,330	12,168	31,146	15,442	20,586
RDJHD 16SR 635	4.2BAR	17,769	8,912	11,920	8,486	3,133	2,070	18,689	9,156	11,989	28,892	15,179	21,908			
	5.6BAR	25,401	11,897	14,183				16,426	6,171	4,357	26,629	12,194	14,276	36,832	18,216	24,196
RDJHD 20SR 685	4.2BAR	28,119	13,008	15,150	14,532	4,513	738	29,373	13,273	15,167	44,214	22,033	29,596			
	5.6BAR	36,710	17,390	21,162				23,361	8,891	6,576	38,202	17,651	21,005	53,043	26,412	35,433
RDJHD 20SR 735	4.2BAR	32,667	14,996	17,210	16,963	5,176	557	34,050	15,262	17,169	51,137	25,348	33,781			
	5.6BAR	42,315	19,982	24,180				27,080	10,276	7,521	44,167	20,362	24,133	61,253	30,448	40,745

Heavy Duty Quarter Turn Actuator

Heavy Duty Spring Return Torque Chart

Hydraulic Actuator

(Unit : Nm)

MODEL		SPRING TORQUE (Nm)			OIL & GAS TORQUE : OIL & GAS SUPPLY PRESSURE								
					50 BAR			70 BAR			90 BAR		
		START	R	END	START	R	END	START	R	END	START	R	END
RDJHH05SR 50	S1	391	158	134	395	154	124	607	279	330	819	404	536
	S2	541	219	185				556	219	180	768	344	386
	S3	700	286	240							713	279	226
RDJHH 05SR 60	S1	613	248	210	630	248	204	966	446	531	1,302	645	857
	S2	858	347	294				882	347	285	1,218	545	612
	S3	1,126	456	386							1,126	437	344
RDJHH 05SR 70	S1	819	332	281	849	335	279	1,300	602	718	1,752	869	1,157
	S2	1,144	463	392				1,189	470	393	1,641	737	832
	S3	1,487	602	510							1,523	598	490
RDJHH 08SR 70	S1	1,430	531	327	1,481	536	327	2,203	963	1,030	2,926	1,390	1,733
	S2	2,018	749	461				2,069	745	442	2,792	1,172	1,145
	S3	2,581	958	590							2,663	963	582
RDJHH 08SR 80	S1	1,844	684	421	1,917	696	429	2,852	1,248	1,339	3,787	1,800	2,248
	S2	2,612	969	597				2,677	963	571	3,612	1,515	1,480
	S3	3,353	1,244	766							3,442	1,240	739
RDJHH 08SR 90	S1	2,211	915	827	2,279	918	809	3,522	1,652	2,017	4,765	2,385	3,225
	S2	3,094	1,281	1,157				3,192	1,286	1,134	4,434	2,020	2,342
	S3	3,988	1,651	1,492							4,100	1,650	1,448
RDJHH 10SR 90	S1	3,648	1,142	1,145	2,738	1,151	1,128	4,292	2,067	2,638	5,845	2,984	4,148
	S2	3,740	1,613	1,617				3,819	1,596	1,545	5,373	2,513	3,055
	S3	4,754	2,062	2,096							4,894	2,064	2,041
RDJHH 10SR 100	S1	3,266	1,408	1,412	3,333	1,392	1,347	5,230	2,513	3,192	7,128	3,633	5,037
	S2	4,544	1,959	1,964				4,678	1,961	1,913	6,575	3,082	3,758
	S3	5,815	2,522	2,563							5,976	2,519	2,487

Heavy Duty Quarter Turn Actuator

Heavy Duty Spring Return Torque Chart

Hydraulic Actuator

(Unit : Nm)

MODEL		SPRING TORQUE (Nm)			OIL & GAS TORQUE : OIL & GAS SUPPLY PRESSURE								
					50 BAR			70 BAR			90 BAR		
		START	R	END	START	R	END	START	R	END	START	R	END
RDJHH 10SR 110	S1	3,879	1,673	1,677	4,013	1,686	1,653	6,290	3,030	3,866	8,566	4,374	6,079
	S2	5,445	2,348	2,354				5,613	2,355	2,300	7,889	3,698	4,513
	S3	7,015	3,025	3,033							7,210	3,022	2,943
RDJHH 13SR 110	S1	4,998	2,177	2,235	5,162	2,190	2,194	8,121	3,936	5,071	11,080	5,683	7,948
	S2	6,988	3,044	3,125				7,231	3,069	3,081	10,190	4,816	5,957
	S3	9,027	3,932	4,037							9,279	3,928	3,919
RDJHH 13SR 125	S1	6,546	2,851	2,927	6,710	2,837	2,823	10,564	5,113	6,571	14,419	7,388	10,319
	S2	9,133	3,978	4,084				9,407	3,986	3,984	13,262	6,261	7,731
	S3	11,659	5,078	5,214							12,132	5,161	5,205
RDJHH 13SR 140	S1	8,157	3,553	3,648	8,522	3,631	3,675	13,390	6,504	8,407	18,258	9,378	13,140
	S2	11,477	4,999	5,133				11,905	5,058	5,088	16,774	7,932	9,821
	S3	14,736	6,418	6,590							15,316	6,513	6,562
RDJHH 16SR 140	S1	8,973	4,375	5,593	9,385	4,467	5,590	15,377	8,004	11,415	21,368	11,540	17,240
	S2	12,647	6,166	7,884				13,086	6,212	7,741	19,078	9,749	13,566
	S3	16,207	7,902	10,103							16,858	8,013	10,005
RDJHH 16SR 150	S1	10,268	5,006	6,401	10,679	5,075	6,337	17,510	9,108	12,979	24,342	13,141	19,621
	S2	14,318	6,981	8,926				14,986	7,134	8,929	21,818	11,166	15,571
	S3	18,592	9,065	11,590							19,154	9,083	11,297
RDJHH 16SR 160	S1	11,599	5,655	7,231	12,085	5,747	7,180	19,812	10,307	14,692	27,538	14,868	22,204
	S2	15,947	7,934	10,480				16,563	8,029	10,344	24,290	12,590	17,856
	S3	20,555	10,227	13,508							21,262	10,297	13,248

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