



Innovated, Patented and
Reliable - All Inclusive
Compact Modular Design

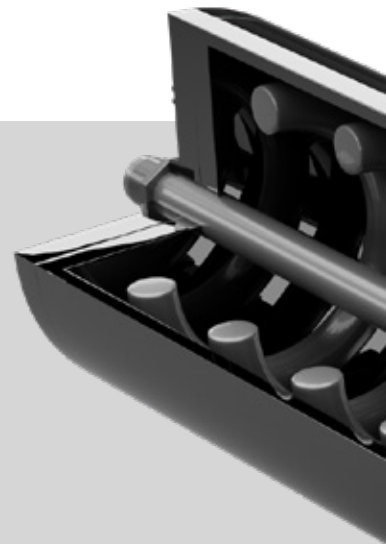
IP Series Pneumatic and
Hydraulic Actuators

The Latest Actuation and Control Technology Solutions

INTÉRO
Actuators and Control Systems

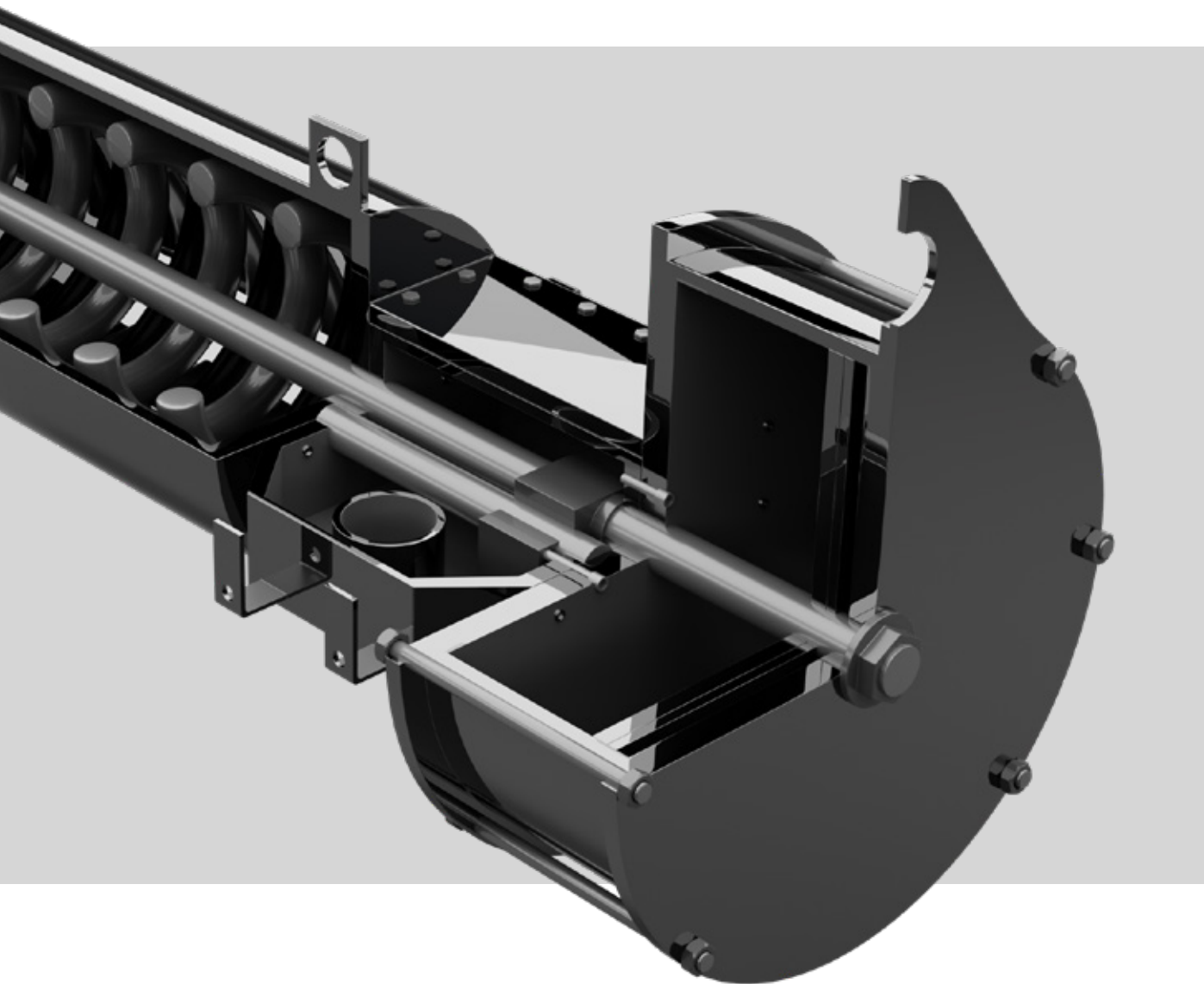


INTERO
Actuators and Control Systems



INTRODUCTION

The INTERO's newly designed IP-Series pneumatic and hydraulic actuators incorporated several patented technical features to provide higher torque output, to ensure better structural strength and to minimize friction of all loaded and sliding parts, extending the overall lifespan of actuators. These technical features ensure the optimum performance of IP-Series for modulating control as well as heavy duty service in any quarter-turn (90 deg.) valve application.



OPERATING RANGE

All INTERO's IP-Series pneumatic and hydraulic Actuators are thoroughly tested for high reliability and durability and guarantee the following output torque range.

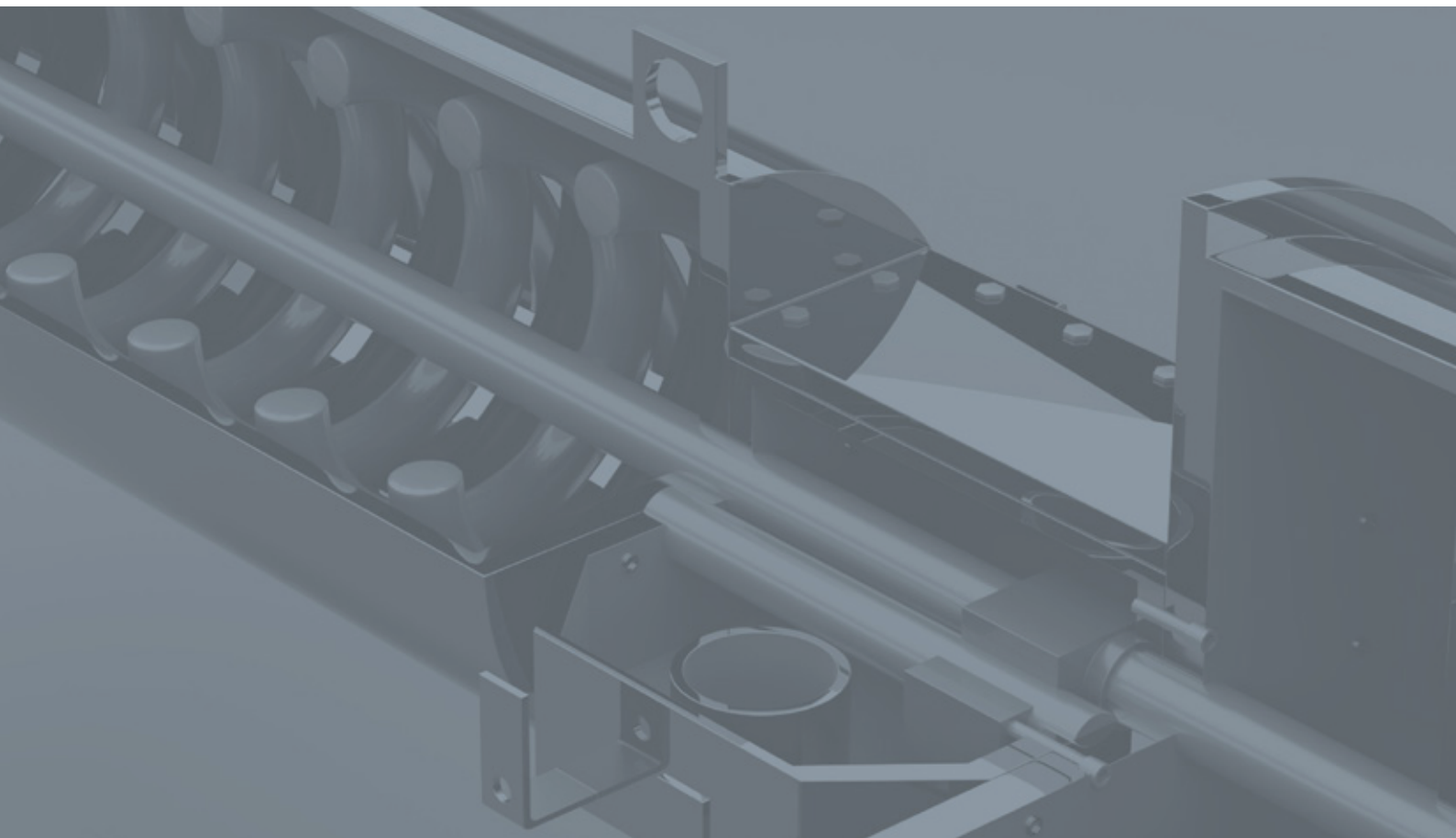
DOUBLE ACTING SERIES: up to 720000 Nm in Break Torque.

SINGLE ACTING, SPRING RETURN SERIES: up to 150000 Nm in Spring Ending Torque.

The maximum operating pressure is 12.0 bar.g for IP-Series pneumatic actuators and 100 bar.g for hydraulic actuators.

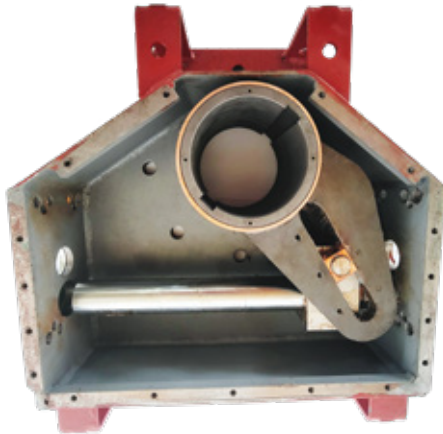
The standard ambient temperature range is between -30°C and 100°C and low temperature design extends operating range down to -60°C.

The supply media of IP series Pneumatic are instrument air, nitrogen and natural gas.



KEY DESIGN FEATURES AND ADVANTAGES

SCOTCH YOKE MECHANISM



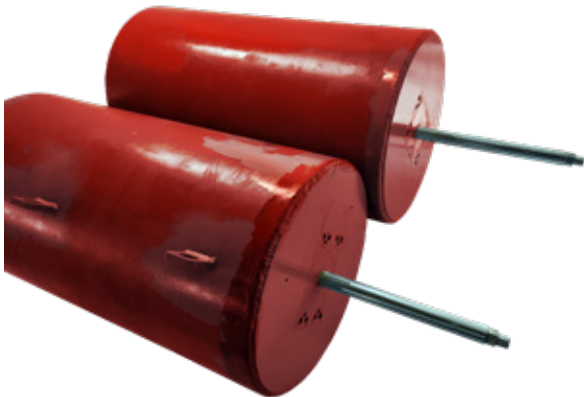
- Patented dual guide bars provides higher torque output and more robust structure. Patent No.10-2378153 (KIPO)
- Hollow guide shaft provides higher torsional rigidity and shear stress, resisting transversal load.
- Hard chromium plated guide bar and piston rod extend lifespan under heavy load on continuous regulation service and eliminate any side load to protect the valve stem from any possible deformation.
- IP series can be supplied with either symmetrical yoke or non-symmetrical (Canted) yoke design options depending on valve torque characteristics.
- Oil impregnated bronze bushings of dual sliding guide minimize friction and extend service life.

CYLINDER



- Electroless nickel plated and honed cylinder internal surface provides minimum friction and maximum protection against corrosion.
- Floating type piston seals provide low hysteresis and high sensitivity, eliminating the stick-slip phenomenon.
- External tie rod ensures operational safety and maintains cylinder integrity.

SPRING CARTRIDGE



- Spring return pack incorporates up to four springs, completely encapsulated in a factory welded cartridge to ensure safety of personnel and simplify assembly.
- The spring action can be easily changed in the field from "closed" mode into "open" mode or vice versa (modular design).

MATERIALS

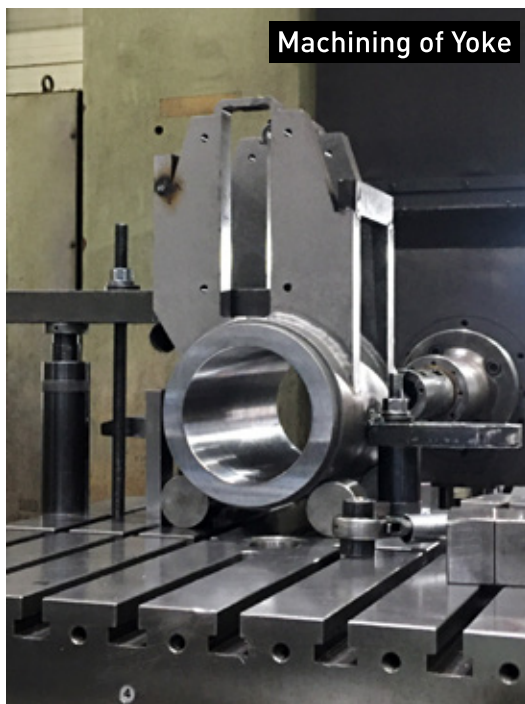
- Cylinder tube and all structural parts are manufactured in carbon steel. No cast/grey iron and aluminum materials are present. All pressure containing parts are supplied with a certificate in accordance with EN10204-3.1.

WATER INGRESS PROTECTION

- Totally enclosed and weather proof actuators are certified to IP67M in accordance with IEC60529.

CORROSION PREVENTION

- External coating system (Epoxy and Polyurethane coatings) provides higher reliability in harsh environmental conditions. Special coating is available for offshore or corrosive environmental conditions.



TRAVEL STOPS

- External travel stops for precise angular stroke adjustment up to $-80/+80$ at each end of stroke.

MOUNTING COUPLINGS

- IP series valve interface according to ISO 5211 or 5210 can be offered to optimize valve top plate design. It can be fixed on top of valve directly or, when required, with the interposition of an adaptor flange or a mounting bracket.

MANUAL OVERRIDE

Jack-screw with Handwheel



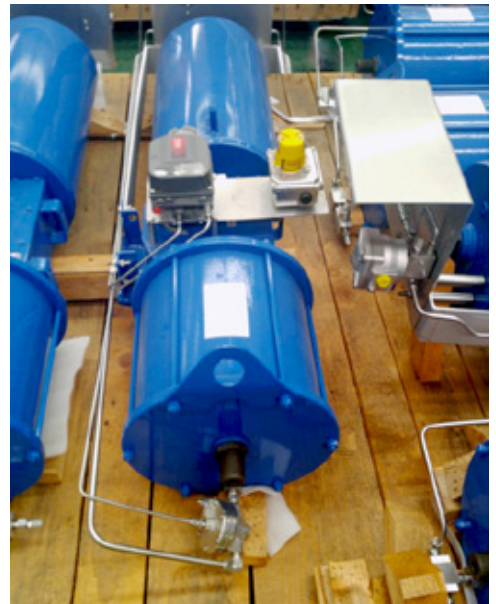
Hydraulic Hand Pump System



- INTERO offers a variety of mechanical manual override options such as a jack-screw with handwheel, bevel gear reduction manual override and hydraulic hand pump system.



Declutchable Worm Gear Manual Override



Actuator with Complete Control System

CONTROL SYSTEM



Most advanced technology is used to design and manufacture the control system based on customer specification and plant requirements. The control system can be housed within stainless steel AISI316 cabinet or panel folded over to sun-shade and it can be assembled on actuator or at remote location. An extensive range of control accessories is available.

- Limit switch boxes - explosion proof, intrinsically safe and/or weather proof. Limit switches can be supplied in different types according to customer requirement.
- Position transmitters - explosion proof, intrinsically safe and/or weather proof.
- Solenoid valves - explosion proof, intrinsically safe and/or weather proof.
- Filter and regulator - stainless steel 316SS or aluminum diecast
- Air/Gas storage tanks - in accordance with different codes(ASME VIII, div. 1) or "U" stamped upon request.
- Control valves, Flow regulators, Quick exhaust valves, Fusible plugs.
- Smart type positioner - explosion proof, intrinsically safe and/or weather proof.
- Pressure switches - electric or pneumatic
- Terminal enclosure, push button boxes - explosion proof, intrinsically safe or weather proof.

IPD DOUBLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 1C-100 to 5C-585

Operating supply pressure (bar g)		3.5		4		4.5		5		5.5		MOP ¹
Model	Position	OP	CL	OP	CL	OP	CL	OP	CL	OP	CL	(bar g)
1C-100	0°	396	409	455	472	516	535	576	597	636	660	12
	45°	156	147	180	170	204	192	227	215	252	237	
	90°	223	199	257	230	291	261	325	292	359	323	
1C-135	0°	729	780	839	897	949	1,016	1,059	1,133	1,169	1,251	12
	45°	288	281	332	323	375	365	418	407	462	449	
	90°	411	381	473	438	535	495	597	553	659	611	
1C-175	0°	1,237	1,344	1,421	1,544	1,606	1,745	1,791	1,945	1,975	2,145	7
	45°	488	482	561	554	634	626	707	699	780	771	
	90°	697	656	801	754	905	852	1,009	950	1,113	1,048	
1C-235	0°	2,250	2,467	2,582	2,833							4
	45°	889	886	1,021	1,018							
	90°	1,265	1,201	1,451	1,379							
2C-235	0°	2,594	2,845	2,978	3,266	3,361	3,687	3,745	4,108	4,129	4,529	10
	45°	1,025	1,022	1,177	1,173	1,328	1,324	1,480	1,475	1,632	1,627	
	90°	1,462	1,389	1,678	1,595	1,894	1,800	2,110	2,006	2,327	2,211	
2C-280	0°	3,693	4,013	4,238	4,605	4,783	5,197	5,328	5,789	5,872	6,382	7
	45°	1,460	1,441	1,675	1,653	1,890	1,867	2,105	2,079	2,321	2,292	
	90°	2,082	1,959	2,389	2,248	2,696	2,538	3,003	2,827	3,310	3,116	
3C-280	0°	4,648	5,049	5,334	5,795	6,019	6,540	6,704	7,285	7,390	8,030	10
	45°	1,837	1,814	2,107	2,081	2,379	2,349	2,649	2,616	2,920	2,884	
	90°	2,619	2,465	3,006	2,829	3,393	3,193	3,779	3,557	4,165	3,921	
3C-335	0°	6,673	7,296	7,654	8,370	8,635	9,443	9,617	10,517	10,598	11,590	7
	45°	2,637	2,620	3,024	3,006	3,412	3,392	3,800	3,777	4,188	4,163	
	90°	3,761	3,563	4,314	4,086	4,867	4,610	5,420	5,135	5,973	5,659	
3C-385	0°	8,865	9,730	10,161	11,153	11,457	12,576	12,753	13,997			5
	45°	3,503	3,495	4,015	4,006	4,527	4,517	5,040	5,028			
	90°	4,997	4,750	5,727	5,445	6,458	6,139	7,188	6,834			
4C-335	0°	11,099	12,136	12,731	13,922	14,362	15,707	15,995	17,493	17,627	19,278	7
	45°	4,386	4,358	5,031	5,000	5,675	5,641	6,320	6,282	6,965	6,924	
	90°	6,256	5,926	7,175	6,797	8,095	7,669	9,015	8,540	9,935	9,413	
4C-385	0°	14,745	16,183	16,900	18,549	19,056	20,916	21,212	23,283	23,368	25,650	6
	45°	5,826	5,812	6,678	6,661	7,530	7,511	8,382	8,362	9,234	9,212	
	90°	8,311	7,901	9,525	9,057	10,741	10,212	11,956	11,367	13,171	12,523	
4C-435	0°	18,878	20,771	21,631	23,798	24,383	26,827	27,135	29,855			5
	45°	7,460	7,459	8,547	8,546	9,635	9,634	10,723	10,722			
	90°	10,641	10,141	12,191	11,619	13,743	13,098	15,294	14,577			
4C-485	0°	23,536	25,940	26,958	29,711							4
	45°	9,301	9,315	10,652	10,670							
	90°	13,266	12,665	15,194	14,506							
5C-485	0°	27,570	30,385	31,577	34,802	35,585	39,219	39,592	43,636	43,598	48,052	7
	45°	10,894	10,912	12,478	12,499	14,062	14,084	15,644	15,671	17,228	17,257	
	90°	15,540	14,835	17,798	16,992	20,056	19,148	22,316	21,305	24,574	23,462	
5C-535	0°	33,645	37,127	38,521	42,509	43,397	47,889	48,273	53,270	53,149	58,652	5.5
	45°	13,295	13,334	15,221	15,266	17,149	17,198	19,075	19,131	21,002	21,064	
	90°	18,964	18,127	21,712	20,755	24,460	23,382	27,208	26,009	29,957	28,636	
5C-585	0°	40,228	44,432	46,058	50,872	51,887	57,312					4.5
	45°	15,896	15,956	18,199	18,269	20,503	20,582					
	90°	22,674	21,693	25,959	24,838	29,246	27,982					

Note 1. MOP = Maximum Operating Pressure (bar g)

IPD DOUBLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 6C-635 to 9C-1000

Operating supply pressure (bar g)		3.5		4		4.5		5		5.5		MOP ¹
Model	Position	OP	CL	OP	CL	OP	CL	OP	CL	OP	CL	(bar g)
6C-635	0°	51,703	56,860	59,196	65,102	66,690	73,343	74,182	81,585	81,676	89,827	7
	45°	20,430	20,420	23,392	23,380	26,353	26,339	29,313	29,300	32,274	32,260	
	90°	29,142	27,761	33,365	31,785	37,589	35,809	41,812	39,834	46,036	43,857	
6C-685	0°	60,165	66,252	68,885	75,854	77,605	85,457	86,324	95,061	95,044	104,663	6
	45°	23,775	23,793	27,220	27,241	30,666	30,691	34,111	34,139	37,557	37,588	
	90°	33,912	32,347	38,826	37,035	43,741	41,724	48,656	46,412	53,571	51,100	
6C-735	0°	69,270	76,355	79,308	87,422	89,348	98,489	99,387	109,556	109,426	120,623	5.5
	45°	27,372	27,422	31,339	31,396	35,306	35,371	39,273	39,345	43,240	43,320	
	90°	39,043	37,280	44,701	42,683	50,359	48,087	56,018	53,490	61,676	58,893	
6C-785	0°	79,014	87,170	90,467	99,804	101,918	112,439					4.5
	45°	31,223	31,306	35,748	35,843	40,273	40,380					
	90°	44,535	42,560	50,990	48,729	57,444	54,897					
7C-635	0°	59,516	65,453	68,142	74,940	76,767	84,426	85,393	93,914	94,019	103,401	9
	45°	23,518	23,506	26,926	26,913	30,335	30,320	33,743	33,728	37,151	37,134	
	90°	33,546	31,957	38,407	36,589	43,269	41,221	48,131	45,853	52,993	50,484	
7C-685	0°	69,258	76,264	79,295	87,318	89,333	98,372	99,370	109,426	109,408	120,480	6
	45°	27,368	27,389	31,334	31,359	35,301	35,328	39,266	39,298	43,233	43,267	
	90°	39,036	37,236	44,694	42,632	50,351	48,029	56,008	53,426	61,667	58,824	
7C-735	0°	79,738	87,894	91,295	100,634	102,850	113,373	114,406	126,113	125,963	138,853	6
	45°	31,508	31,566	36,075	36,141	40,642	40,716	45,208	45,291	49,774	49,866	
	90°	44,943	42,913	51,457	49,133	57,970	55,354	64,484	61,573	70,997	67,793	
7C2-635	0°	118,494	131,503	135,668	150,563	152,842	169,623					4.5
	45°	46,824	47,227	53,610	54,072	60,395	60,917					
	90°	66,787	64,205	76,468	73,511	86,147	82,817					
7C2-685	0°	137,978	153,126	157,975	175,320							4
	45°	54,522	54,993	62,424	62,963							
	90°	77,769	74,763	89,040	85,598							
8C-685	0°	80,986	89,178	92,723	102,104	104,461	115,030	116,197	127,955	127,935	140,882	12
	45°	32,002	32,026	36,640	36,668	41,278	41,310	45,915	45,952	50,553	50,595	
	90°	45,647	43,540	52,262	49,851	58,877	56,162	65,493	62,473	72,108	68,784	
8C-735	0°	93,240	102,777	106,753	117,675	120,267	132,572	133,780	147,468	147,293	162,365	10
	45°	36,844	36,911	42,184	42,261	47,524	47,610	52,863	52,960	58,203	58,310	
	90°	52,553	50,180	60,170	57,454	67,786	64,727	75,403	72,000	83,020	79,273	
8C-835	0°	120,337	132,851	137,778	152,105	155,218	171,361	172,659	190,616	190,099	209,871	7
	45°	47,552	47,711	54,443	54,626	61,335	61,541	68,227	68,456	75,118	75,370	
	90°	67,827	64,863	77,657	74,265	87,487	83,665	97,317	93,066	107,146	102,468	
9C2-685	0°	161,342	179,055	184,725	205,007	208,110	230,959	231,494	256,910	254,879	282,862	12
	45°	63,754	64,304	72,995	73,624	82,235	82,944	91,475	92,264	100,716	101,584	
	90°	90,939	87,423	104,118	100,093	117,299	112,763	130,479	125,434	143,659	138,105	
9C-935	0°	167,653	185,001	191,950	211,816	216,247	238,630	240,545	265,443	264,842	292,257	7
	45°	66,248	66,439	75,850	76,070	85,450	85,699	95,052	95,329	104,653	104,958	
	90°	94,495	90,325	108,190	103,417	121,885	116,509	135,580	129,601	149,275	142,693	
9C-1000	0°	191,772	211,770	219,565	242,463	247,359	273,157	275,152	303,850	302,945	334,544	7
	45°	75,779	76,053	86,762	87,075	97,744	98,099	108,726	109,122	119,710	120,144	
	90°	108,090	103,395	123,755	118,380	139,420	133,367	155,085	148,352	170,752	163,338	
9C-1100	0°	232,045	256,140	265,675	293,264	299,304	330,389	332,934	367,513	366,564	404,638	6
	45°	91,693	91,987	104,982	105,320	118,271	118,652	131,560	131,985	144,848	145,317	
	90°	130,789	125,058	149,744	143,184	168,699	161,309	187,654	179,436	206,609	197,561	

Note 1. MOP = Maximum Operating Pressure (bar g)

IPD DOUBLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 10C-935 to 10C2-1200

Operating supply pressure (bar g)		3.5		4		4.5		5		5.5		MOP ¹
Model	Position	OP	CL	OP	CL	OP	CL	OP	CL	OP	CL	(bar g)
10C-935	0°	196,743	217,102	225,256	248,568	253,770	280,035	282,284	311,503	310,796	342,969	12
	45°	77,744	77,968	89,010	89,268	100,277	100,569	111,545	111,870	122,812	123,170	
	90°	110,891	105,998	126,963	121,362	143,034	136,725	159,106	152,088	175,176	167,452	
10C-1000	0°	225,049	248,515	257,664	284,535	290,279	320,554	322,896	356,573	355,511	392,592	10
	45°	88,928	89,249	101,816	102,185	114,704	115,121	127,593	128,056	140,481	140,991	
	90°	126,846	121,336	145,229	138,922	163,612	156,508	181,996	174,094	200,379	191,680	
10C-1100	0°	272,308	300,584	311,773	344,151	351,239	387,716	390,704	431,283	430,169	474,850	7
	45°	107,603	107,949	123,198	123,594	138,792	139,241	154,387	154,887	169,982	170,533	
	90°	153,483	146,757	175,727	168,029	197,971	189,299	220,215	210,570	242,459	231,841	
10C-1200	0°	324,070	358,028	371,036	409,920	418,002	461,812	464,970	513,703	511,936	565,594	7
	45°	128,057	128,579	146,615	147,215	165,175	165,850	183,733	184,486	202,293	203,121	
	90°	182,658	174,804	209,130	200,140	235,602	225,475	262,074	250,811	288,546	276,147	
10C2-935	0°	392,367	435,445	449,234	498,556	506,101	561,667	562,968	624,777	619,835	687,888	6
	45°	155,045	156,381	177,516	179,047	199,987	201,711	222,458	224,376	244,929	247,042	
	90°	221,153	212,603	253,205	243,416	285,258	274,229	317,310	305,043	349,362	335,856	
10C2-1000	0°	448,978	498,272	514,049	570,488	579,121	642,704	644,192	714,920			5
	45°	177,414	178,944	203,128	204,879	228,841	230,814	254,554	256,749			
	90°	253,061	243,277	289,738	278,536	326,414	313,795	363,091	349,053			
10C2-1100	0°	543,155	602,789	621,877	690,154							4
	45°	214,629	216,480	245,736	247,855							
	90°	306,143	294,307	350,513	336,962							
10C2-1200	0°	646,678	717,678									3.5
	45°	255,536	257,739									
	90°	364,492	350,400									

Note 1. MOP = Maximum Operating Pressure (bar g)

IPS SINGLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 1C-2AS-100-CL to 3C-11S-585-CL

Operating supply pressure (bar g)					3.5			4.0			4.5			5.0			5.5		
MOP¹																			
Model	(bar g)	BTC	RTC	ETC	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO
1C-2AS-100-CL	12	204	114	188							298	51	51	358	82	85	418	108	119
1C-2AS-135-CL	12	196	109	174	511	145	172	621	189	233	731	232	295	841	276	358	951	319	419
1C-2BS-100-CL	12	313	157	187															
1C-2BS-135-CL	12	305	152	173	513	59	59	623	120	120	733	174	182	843	219	245	952	264	306
1C-2CS-100-CL	12	377	193	242															
1C-2CS-135-CL	12	370	187	227							677	112	112	787	173	174	897	220	236
1C-3S-135-CL	12	602	328	491															
1C-3S-175-CL	9	593	321	474				887	122	122	1,072	227	227	1,256	308	331	1,441	384	435
1C-3S-235-CL	6	580	310	446	1,716	494	590	2,049	627	777	2,382	759	965	2,715	889	1,152	3,047	1,021	1,341
1C-3S-175-CL	10	752	440	799										932	148	148	1,117	249	252
1C-4S-235-CL	6	739	431	771	1,392	365	407	1,725	499	595	2,058	630	782	2,391	762	970	2,723	893	1,158
2C-5S-235-CL	12	988	573	1,017	1,479	321	321	1,862	484	537	2,247	639	753	2,630	791	970	3,014	943	1,186
2C-5S-280-CL	9	973	562	986	2,579	771	941	3,123	986	1,248	3,667	1,201	1,555	4,213	1,415	1,862	4,757	1,629	2,169
2C-5S-335-CL	6	962	554	962	4,204	1,411	1,856	4,983	1,717	2,296	5,763	2,022	2,736	6,543	2,328	3,175	7,323	2,633	3,615
2C-6S-235-CL	12	1,187	721	1,423							1,841	475	526	2,225	630	742	2,609	783	958
2C-6S-280-CL	9	1,172	709	1,392	2,173	600	712	2,718	826	1,020	3,263	1,041	1,326	3,808	1,256	1,634	4,352	1,470	1,941
2C-6S-335-CL	6	1,160	701	1,369	3,798	1,253	1,629	4,578	1,558	2,068	5,358	1,864	2,507	6,138	2,170	2,947	6,918	2,474	3,387
2C-7S-280-CL	10	1,883	1,102	1,995							2,663	555	555	3,207	798	862	3,753	1,021	1,170
2C-7S-335-CL	7	1,872	1,094	1,972	3,198	794	857	3,978	1,111	1,297	4,758	1,423	1,735	5,537	1,731	2,175	6,317	2,039	2,615
2C-7S-385-CL	6	1,858	1,083	1,944	4,925	1,488	1,830	5,954	1,895	2,411	6,984	2,301	2,991	8,014	2,706	3,571	9,045	3,110	4,152
2C-7S-435-CL	4	1,848	1,076	1,923	6,899	2,267	2,943	8,214	2,784	3,684									
2C-7S-485-CL	4	1,842	1,071	1,910	9,125	3,141	4,197												
2C-8S-280-CL	10	2,227	1,357	2,700										2,505	466	466	3,050	732	773
2C-8S-335-CL	7	2,216	1,349	2,677	2,496	461	461	3,276	826	900	4,056	1,143	1,340	4,835	1,453	1,779	5,615	1,762	2,219
2C-8S-385-CL	6	2,203	1,339	2,650	4,222	1,210	1,434	5,252	1,618	2,014	6,282	2,024	2,595	7,312	2,429	3,175	8,342	2,834	3,756
2C-8S-435-CL	5	2,192	1,331	2,628	6,197	1,992	2,547	7,512	2,508	3,288	8,827	3,024	4,029						
2C-8S-485-CL	4	2,185	1,326	2,615	8,422	2,866	3,802												
2C-9S-335-CL	7	3,153	1,885	3,588										3,929	756	756	4,709	1,132	1,196
2C-9S-385-CL	6	3,140	1,875	3,560	3,316	411	411	4,346	975	991	5,376	1,407	1,572	6,406	1,823	2,153	7,435	2,233	2,733
2C-9S-435-CL	5	3,129	1,867	3,538	5,291	1,372	1,524	6,606	1,903	2,265	7,920	2,425	3,006						
2C-9S-485-CL	4	3,122	1,862	3,525	7,516	2,265	2,779	9,151	2,911	3,699									
3C-10S-385-CL	7	5,819	3,258	5,270										7,274	723	723	8,570	1,454	1,454
3C-10S-435-CL	6	5,806	3,248	5,244				7,526	865	865	9,180	1,797	1,797	10,834	2,591	2,730	12,489	3,276	3,662
3C-10S-485-CL	5	5,798	3,242	5,226	8,671	1,511	1,511	10,727	2,546	2,669	12,785	3,396	3,829	14,841	4,225	4,988			
3C-10S-535-CL	5	5,796	3,241	5,223	11,789	2,989	3,268	14,292	4,005	4,679									
3C-10S-585-CL	4	5,769	3,220	5,168	15,167	4,355	5,172												
3C-11S-385-CL	7	6,749	3,965	7,238															
3C-11S-435-CL	6	6,736	3,955	7,210										8,875	1,656	1,656	10,529	2,481	2,590
3C-11S-485-CL	6	6,728	3,948	7,194	6,712	438	438	8,769	1,597	1,597	10,825	2,605	2,756	12,883	3,453	3,916	14,939	4,279	5,075
3C-11S-535-CL	5	6,726	3,947	7,190	9,830	2,174	2,195	12,333	3,229	3,606	14,835	4,238	5,016						
3C-11S-585-CL	4	6,699	3,927	7,136	13,209	3,584	4,099												

Note 1. MOP = Maximum Operating Pressure (bar g)

IPS SINGLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 4C-12S-385-CL to 6C-17S-935-CL

Operating supply pressure (bar g)					3.5			4.0			4.5			5.0			5.5		
MOP ¹																			
Model	[bar g]	BTC	RTC	ETC	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO
4C-12S-385-CL	12	9,978	6,002	11,590													11,442	1,956	1,956
4C-12S-435-CL	7	9,956	5,986	11,546							12,457	2,528	2,528	15,209	3,779	4,080	17,961	4,904	5,630
4C-12S-485-CL	6	9,943	5,976	11,517	11,611	2,051	2,051	15,032	3,705	3,979	18,453	5,101	5,907	21,874	6,469	7,835	25,295	7,825	9,764
4C-12S-535-CL	5	9,939	5,974	11,511	16,797	4,432	4,974	20,960	6,105	7,321	25,123	7,757	9,667	29,285	9,399	12,013			
4C-12S-585-CL	12	9,895	5,941	11,421	22,417	6,685	8,142	27,394	8,654	10,947									
5C-13S-485-CL	9	14,269	8,706	17,355							17,766	3,942	3,985	21,773	5,635	6,243	25,781	7,256	8,503
5C-13S-535-CL	7	14,266	8,703	17,348	15,827	2,892	2,892	20,703	5,195	5,640	25,579	7,175	8,389	30,456	9,119	11,137	35,332	11,048	13,885
5C-13S-585-CL	6	14,214	8,665	17,242	22,410	5,895	6,602	28,239	8,239	9,888	34,070	10,550	13,174	39,900	12,850	16,460	45,730	15,143	19,746
5C-13S-635-CL	6	14,157	8,623	17,127	29,580	8,772	10,644	36,449	11,490	14,516	43,319	14,196	18,387	50,187	16,894	22,259	57,057	19,589	26,131
5C-13S-735-CL	12	14,031	8,529	16,868	45,684	15,125	19,720	54,887	18,738	24,908									
5C-14S-535-CL	9	19,324	12,158	26,024							16,938	2,662	2,662	21,815	5,166	5,411	26,691	7,178	8,160
5C-14S-585-CL	7	19,273	12,120	25,918	13,769	876	876	19,599	4,162	4,162	25,430	6,665	7,448	31,260	9,013	10,734	37,089	11,330	14,021
5C-14S-635-CL	6	19,216	12,079	25,803	20,940	4,789	4,917	27,809	7,630	8,789	34,678	10,374	12,661	41,547	13,091	16,533	48,417	15,797	20,404
5C-14S-735-CL	5	19,090	11,986	25,544	37,044	11,311	13,994	46,247	14,943	19,181	55,450	18,561	24,369						
6C-15S-635-CL	10	23,045	14,524	31,215	19,786	3,033	3,033	27,279	6,746	7,256	34,772	9,793	11,480	42,266	12,777	15,703	49,759	15,740	19,927
6C-15S-735-CL	7	22,907	14,423	30,932	37,353	10,825	12,934	47,392	14,805	18,592	57,431	18,762	24,252	67,470	22,706	29,910	77,509	26,643	35,568
6C-15S-785-CL	6	22,831	14,367	30,776	47,098	14,688	18,426	58,549	19,201	24,881	70,000	23,699	31,335	81,452	28,189	37,790	92,903	32,676	44,244
6C-15S-835-CL	6	22,749	14,308	30,609	57,484	18,782	24,281	70,440	23,871	31,583	83,397	28,951	38,886	96,354	34,027	46,190	109,310	39,099	53,493
6C-15S-885-CL	5	22,663	14,244	30,431	68,511	23,115	30,496	83,066	28,821	38,700	97,621	34,522	46,903	112,175	40,220	55,107			
6C-15S-935-CL	5	22,571	14,178	30,244	80,180	27,689	37,073	96,425	34,055	46,230	112,671	40,415	55,387						
6C-16S-635-CL	12	29,927	18,408	37,405										36,101	8,086	8,213	43,594	11,247	12,437
6C-16S-735-CL	7	29,789	18,308	37,122	31,188	5,445	5,445	41,227	10,272	11,103	51,266	14,354	16,762	61,305	18,358	22,420	71,344	22,331	28,078
6C-16S-785-CL	7	29,713	18,251	36,966	40,932	10,150	10,938	52,385	14,803	17,392	63,836	19,361	23,847	75,287	23,887	30,301	86,739	28,396	36,755
6C-16S-835-CL	6	29,631	18,192	36,799	51,319	14,375	16,792	64,276	19,535	24,095	77,232	24,653	31,397	90,189	29,752	38,700	103,146	34,842	46,003
6C-16S-885-CL	6	29,545	18,128	36,621	62,347	18,771	23,007	76,901	24,522	31,210	91,456	30,250	39,414	106,011	35,965	47,617	120,566	41,671	55,822
6C-16S-935-CL	5	29,452	18,061	36,434	74,014	23,385	29,584	90,260	29,779	38,740	106,507	36,159	47,897	122,752	42,529	57,054			
6C-17S-735-CL	7	38,408	23,724	48,681							39,755	7,178	7,178	49,793	12,079	12,837	59,832	16,199	18,495
6C-17S-785-CL	7	38,331	23,668	48,525	29,422	1,354	1,354	40,873	7,808	7,808	52,324	13,132	14,263	63,776	17,787	20,717	75,227	22,359	27,172
6C-17S-835-CL	6	38,250	23,608	48,357	39,807	7,208	7,208	52,764	13,315	14,511	65,721	18,569	21,814	78,677	23,728	29,117	91,634	28,853	36,419
6C-17S-885-CL	6	38,163	23,545	48,180	50,835	12,514	13,423	65,390	18,436	21,628	79,944	24,230	29,831	94,499	29,983	38,035	109,054	35,714	46,238
6C-17S-935-CL	5	38,072	23,478	47,993	62,503	17,276	20,000	78,749	23,756	29,157	94,995	30,178	38,313	111,240	36,573	47,471			

Note 1. MOP = Maximum Operating Pressure [bar g]

IPS SINGLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 7C-18S-835-CL to 9C-25S-1450-CL

Operating supply pressure (bar g)					3.5			4.0			4.5			5.0			5.5		
MOP ¹																			
Model	(bar g)	BTC	RTC	ETC	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO
7C-18S-835-CL	12	62,181	36,305	65,325													95,860	21,934	22,526
7C-18S-935-CL	6	61,976	36,152	64,905	62,327	3,625	3,625	81,028	14,165	14,165	99,729	23,599	24,706	118,430	31,342	35,246	137,131	38,881	45,787
7C-18S-1000-CL	6	61,830	36,043	64,606	80,892	14,089	14,089	102,283	24,680	26,146	123,675	33,469	38,202	145,066	42,054	50,260	166,458	50,552	62,316
7C-18S-1100-CL	5	61,587	35,862	64,108	111,888	28,670	31,559	137,772	39,138	46,148	163,655	49,441	60,737						
7C-18S-1200-CL	12	61,320	35,664	63,562	145,837	42,360	50,694	176,640	54,582	68,056									
7C-18S-1300-CL	12	61,031	35,447	62,969	182,737	56,990	71,492												
7C-19S-835-CL	12	78,919	45,780	81,075															
7C-19S-935-CL	12	78,714	45,627	80,655										102,745	16,994	16,994	121,446	27,140	27,535
7C-19S-1000-CL	6	78,568	45,520	80,356							107,990	19,950	19,950	129,381	30,588	32,007	150,772	39,469	44,064
7C-19S-1100-CL	5	78,324	45,338	79,858	96,203	13,306	13,306	122,086	27,425	27,896	147,970	38,323	42,485	173,854	48,796	57,073			
7C-19S-1200-CL	12	78,057	45,139	79,312	130,151	30,916	32,441	160,955	43,602	49,803									
7C-19S-1300-CL	12	77,768	44,922	78,718	167,051	46,063	53,239												
7C-20S-935-CL	12	88,265	50,702	87,630													114,499	17,227	17,227
7C-20S-1000-CL	12	88,119	51,530	88,948										124,701	22,101	22,101	146,488	33,491	34,381
7C-20S-1100-CL	5	87,875	50,410	86,832	89,255	2,998	2,998	115,139	17,588	17,588	141,023	31,649	32,176	166,907	42,594	46,765			
7C-20S-1200-CL	12	87,608	50,211	86,287	123,203	22,133	22,133	154,008	37,236	39,495									
7C-20S-1300-CL	12	87,319	49,994	85,694	160,104	39,784	42,931												
7C-21S-935-CL	12	98,839	58,586	109,287															
7C-21S-1000-CL	12	98,693	58,478	108,989													122,256	21,598	21,598
7C-21S-1100-CL	6	98,449	58,297	108,490							119,454	20,019	20,019	145,337	33,540	34,608	171,221	44,365	49,198
7C-21S-1200-CL	5	98,182	58,099	107,944	101,635	9,976	9,976	132,438	27,338	27,338	163,242	41,085	44,700						
7C-21S-1300-CL	12	97,893	57,884	107,350	138,535	30,532	30,774	174,687	45,782	51,150									
8C-22S-1100-CL	7	113,086	63,926	106,026							160,432	26,639	26,639	190,698	42,920	43,699	220,965	55,754	60,758
8C-22S-1200-CL	6	112,775	63,692	105,388	139,595	14,895	14,895	175,615	35,197	35,197	211,635	51,877	55,499	247,655	66,656	75,802	283,674	81,134	96,104
8C-22S-1300-CL	5	112,435	63,437	104,694	182,744	39,215	39,215	225,017	57,422	63,042	267,291	74,569	86,869	309,564	91,455	110,696			
8C-23S-1100-CL	12	131,519	76,034	133,505										163,332	23,055	23,055	193,598	40,115	40,115
8C-23S-1200-CL	6	131,207	75,802	132,866							184,269	34,856	34,856	220,288	52,477	55,158	256,308	67,395	75,460
8C-23S-1300-CL	6	130,868	75,547	132,172	155,378	18,572	18,572	197,651	42,399	42,399	239,925	60,678	66,226	282,198	77,874	90,053	324,471	94,791	113,879
9C-24S-1100-CL	7	142,848	79,207	124,838							171,254	11,335	11,335	204,884	30,290	30,290	238,514	49,245	49,245
9C-24S-1200-CL	7	142,502	78,945	124,129							228,147	43,401	43,401	268,170	63,174	65,960	308,191	79,837	88,517
9C-24S-1300-CL	6	142,125	78,662	123,357	196,046	25,308	25,308	243,016	51,783	51,783	289,986	72,338	78,257	336,957	91,526	104,730	383,928	110,382	131,205
9C-24S-1450-CL	5	141,504	78,193	122,085	275,152	66,136	69,896	333,587	90,165	102,832	392,023	113,618	135,768	450,458	136,833	168,704			
9C-25S-1100-CL	12	149,281	84,057	138,016										191,761	22,893	22,893	225,390	41,848	41,848
9C-25S-1200-CL	7	148,935	83,797	137,306							215,024	36,004	36,004	255,045	57,479	58,563	295,068	74,445	81,120
9C-25S-1300-CL	6	148,559	83,513	136,535	182,923	17,912	17,912	229,893	44,385	44,385	276,863	66,856	70,859	323,834	86,212	97,334	370,804	105,136	123,808
9C-25S-1450-CL	5	147,938	83,045	135,263	262,029	60,533	62,498	320,463	84,842	95,434	378,898	108,372	128,370	437,334	131,631	161,306			

Note 1. MOP = Maximum Operating Pressure (bar g)

IPS SINGLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 1C-2AS-100-OP to 3C-11S-585-OP

Operating supply pressure (bar g)					3.5			4.0			4.5			5.0			5.5		
MOP¹																			
Model	(bar g)	BTC	RTC	ETC	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO
1C-2AS-100-OP	12	378	91	97							148	72	75	181	98	142	214	122	209
1C-2AS-135-OP	12	365	85	89	264	159	311	324	203	434	382	247	555	442	290	677	502	333	799
1C-2BS-100-OP	12	581	97	97															
1C-2BS-135-OP	12	568	89	89	252	63	63	311	156	185	371	203	306	431	248	429	490	292	551
1C-2CS-100-OP	12	701	125	125															
1C-2CS-135-OP	12	688	117	117							337	160	160	397	209	282	456	254	404
1C-3S-135-OP	12	1,119	250	253															
1C-3S-175-OP	10	1,103	243	245				438	155	155	538	279	360	638	355	564	738	430	769
1C-3S-235-OP	6	1,078	230	230	887	541	1,074	1,067	672	1,444	1,248	804	1,813	1,428	934	2,182	1,609	1,065	2,553
1C-4S-175-OP	12	1,396	366	409										463	205	205	562	297	410
1C-4S-235-OP	6	1,372	356	396	711	410	715	892	544	1,085	1,072	675	1,454	1,252	807	1,824	1,433	938	2,193
2C-5S-235-OP	12	1,765	444	483	785	420	600	993	577	1,026	1,200	731	1,451	1,408	884	1,878	1,616	1,034	2,303
2C-5S-280-OP	9	1,737	433	467	1,381	863	1,820	1,676	1,077	2,424	1,971	1,293	3,029	2,266	1,506	3,634	2,561	1,720	4,238
2C-5S-335-OP	6	1,717	423	455	2,261	1,503	3,623	2,683	1,808	4,488	3,106	2,114	5,354	3,528	2,419	6,220	3,951	2,724	7,085
2C-6S-235-OP	12	2,131	592	689				773	411	576	981	568	1,002	1,189	723	1,428	1,397	874	1,853
2C-6S-280-OP	9	2,103	581	673	1,161	702	1,370	1,457	918	1,975	1,752	1,133	2,580	2,047	1,347	3,184	2,342	1,561	3,788
2C-6S-335-OP	6	2,083	573	662	2,042	1,343	3,173	2,464	1,649	4,039	2,886	1,956	4,905	3,309	2,261	5,770	3,732	2,567	6,635
2C-7S-280-OP	10	3,366	863	951	-	-	-	1,117	426	426	1,412	747	1,031	1,708	971	1,636	2,003	1,191	2,240
2C-7S-335-OP	7	3,346	855	940	1,703	967	1,625	2,125	1,281	2,491	2,547	1,592	3,356	2,969	1,899	4,221	3,393	2,207	5,086
2C-7S-385-OP	6	3,321	845	926	2,637	1,657	3,541	3,196	2,064	4,684	3,754	2,469	5,827	4,312	2,873	6,970	4,870	3,278	8,113
2C-7S-435-OP	5	3,302	837	915	3,707	2,435	5,733	4,421	2,952	7,192	5,133	3,468	8,651						
2C-7S-485-OP	4	3,290	832	908	4,914	3,310	8,202												
2C-8S-280-OP	10	4,002	1,120	1,310										1,327	681	856	1,623	906	1,461
2C-8S-335-OP	7	3,981	1,112	1,298	1,322	677	846	1,745	998	1,711	2,167	1,313	2,576	2,589	1,623	3,442	3,011	1,930	4,307
2C-8S-385-OP	6	3,957	1,103	1,284	2,257	1,380	2,761	2,816	1,788	3,904	3,373	2,192	5,048	3,932	2,598	6,191	4,490	3,002	7,334
2C-8S-435-OP	5	3,937	1,095	1,273	3,327	2,160	4,954	4,040	2,676	6,412	4,752	3,192	7,872						
2C-8S-485-OP	4	3,926	1,091	1,267	4,534	3,034	7,423												
2C-9S-335-OP	9	5,651	1,519	1,727							1,659	529	529	2,082	1,078	1,394	2,504	1,400	2,259
2C-9S-385-OP	7	5,626	1,509	1,713	1,750	714	714	2,308	1,252	1,857	2,866	1,672	3,000	3,425	2,086	4,143	3,982	2,494	5,286
2C-9S-435-OP	6	5,607	1,502	1,703	2,820	1,637	2,906	3,532	2,165	4,365	4,245	2,686	5,824	4,957	3,204	7,284	5,669	3,721	8,742
2C-9S-485-OP	5	5,594	1,497	1,695	4,026	2,526	5,375	4,912	3,170	7,189	5,797	3,814	9,004						
3C-10S-385-OP	9	10,272	2,350	2,413										3,879	1,297	1,297	4,582	2,310	2,737
3C-10S-435-OP	7	10,248	2,339	2,399				4,016	1,577	1,577	4,912	2,567	3,413	5,809	3,250	5,249	6,705	3,922	7,086
3C-10S-485-OP	6	10,233	2,333	2,391	4,637	2,353	2,849	5,751	3,207	5,132	6,866	4,041	7,413	7,980	4,866	9,696	9,094	5,682	11,979
3C-10S-535-OP	5	10,230	2,331	2,389	6,326	3,638	6,309	7,683	4,647	9,086	9,038	5,642	11,864	10,395	6,630	14,641			
3C-10S-585-OP	4	10,181	2,309	2,361	8,157	4,997	10,058	9,779	6,182	13,379									
3C-11S-385-OP	10	11,994	3,091	3,415													3,520	624	624
3C-11S-435-OP	7	11,970	3,080	3,401							3,851	1,302	1,302	4,747	2,451	3,138	5,644	3,137	4,974
3C-11S-485-OP	6	11,954	3,074	3,393	3,575	736	736	4,690	2,406	3,019	5,804	3,257	5,302	6,919	4,090	7,585	8,034	4,915	9,866
3C-11S-535-OP	5	11,951	3,073	3,390	5,265	2,849	4,197	6,621	3,869	6,975	7,976	4,875	9,752	9,333	5,866	12,530			
3C-11S-585-OP	5	11,902	3,053	3,363	7,095	4,222	7,947	8,717	5,416	11,267	10,338	6,598	14,588						

Note 1. MOP = Maximum Operating Pressure (bar g)

IPS SINGLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 4C-12S-385-OP to 6C-17S-935-OP

Operating supply pressure (bar g)					3.5			4.0			4.5			5.0			5.5		
MOP ¹																			
Model	[bar g]	BTC	RTC	ETC	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO
4C-12S-385-OP	10	18,079	4,905	5,609										5,083	1,392	1,392	6,274	3,180	3,831
4C-12S-435-OP	7	18,038	4,889	5,586				5,314	1,865	1,865	6,834	3,615	4,979	8,355	4,765	8,092	9,875	5,899	11,207
4C-12S-485-OP	7	18,012	4,878	5,571	6,367	3,252	4,022	8,257	4,692	7,893	10,147	6,100	11,763	12,036	7,490	15,633	13,927	8,868	19,504
4C-12S-535-OP	6	18,006	4,876	5,568	9,232	5,420	9,890	11,532	7,121	14,600	13,831	8,799	19,310	16,131	10,471	24,019	18,430	12,139	28,729
4C-12S-585-OP	5	17,923	4,843	5,521	12,336	7,708	16,248	15,086	9,711	21,879	17,835	11,707	27,511						
5C-13S-485-OP	10	25,780	7,201	8,396				7,574	3,435	3,435	9,783	5,322	7,960	11,992	6,984	12,486	14,203	8,623	17,011
5C-13S-535-OP	7	25,773	7,198	8,392	8,714	4,502	5,769	11,402	6,543	11,277	14,091	8,542	16,783	16,780	10,512	22,289	19,467	12,470	27,795
5C-13S-585-OP	7	25,676	7,159	8,337	12,344	7,245	13,204	15,558	9,619	19,787	18,772	11,964	26,371	21,987	14,302	32,954	25,201	16,633	39,538
5C-13S-635-OP	6	25,570	7,116	8,277	16,297	10,159	21,300	20,084	12,918	29,057	23,871	15,669	36,814	27,659	18,415	44,571	31,446	21,157	52,328
5C-13S-735-OP	5	25,333	7,021	8,144	25,175	16,616	39,485	30,250	20,291	49,878	35,324	23,963	60,270						
5C-14S-535-OP	9	35,133	10,495	12,797							9,322	4,648	5,301	12,011	6,712	10,807	14,699	8,723	16,313
5C-14S-585-OP	7	35,036	10,456	12,742	7,575	1,722	1,722	10,790	5,786	8,306	14,004	8,204	14,889	17,218	10,584	21,473	20,433	12,932	28,056
5C-14S-635-OP	6	34,930	10,414	12,682	11,528	6,348	9,819	15,316	9,179	17,576	19,103	11,961	25,333	22,891	14,720	33,090	26,678	17,470	40,847
5C-14S-735-OP	5	34,693	10,320	12,548	20,407	12,913	28,005	25,481	16,603	38,397	30,556	20,283	48,790	35,629	23,958	59,183			
6C-15S-635-OP	10	41,978	12,585	15,382	10,921	5,417	6,071	15,061	8,585	14,550	19,200	11,663	23,028	23,339	14,694	31,506	27,479	17,708	39,984
6C-15S-735-OP	7	41,717	12,483	15,236	20,625	12,711	25,947	26,171	16,757	37,305	31,717	20,785	48,665	37,263	24,805	60,023	42,808	28,821	71,382
6C-15S-785-OP	6	41,574	12,425	15,155	26,009	16,638	36,973	32,334	21,233	49,930	38,661	25,818	62,886	44,986	30,398	75,843	51,313	34,973	88,800
6C-15S-835-OP	6	41,421	12,364	15,069	31,746	20,806	48,724	38,903	25,993	63,384	46,062	31,177	78,044	53,219	36,351	92,704	60,376	41,526	107,363
6C-15S-885-OP	5	41,258	12,300	14,977	37,838	25,222	61,201	45,879	31,044	77,669	53,919	36,857	94,137	61,959	42,670	110,605			
6C-15S-935-OP	5	41,085	12,231	14,880	44,284	29,889	74,403	53,258	36,380	92,785	62,233	42,868	111,166						
6C-16S-635-OP	10	54,313	15,453	18,242							15,748	7,638	7,897	19,887	10,853	16,375	24,027	13,965	24,853
6C-16S-735-OP	7	54,053	15,350	18,095	17,174	8,767	10,817	22,719	12,987	22,176	28,265	17,114	33,534	33,811	21,179	44,893	39,357	25,219	56,251
6C-16S-785-OP	7	53,908	15,293	18,015	22,556	12,866	21,843	28,883	17,570	34,800	35,208	22,199	47,757	41,535	26,804	60,712	47,860	31,396	73,669
6C-16S-835-OP	6	53,756	15,231	17,928	28,294	17,135	33,595	35,452	22,377	48,254	42,609	27,586	62,913	49,766	32,780	77,573	56,924	37,966	92,233
6C-16S-885-OP	6	53,593	15,166	17,836	34,386	21,599	46,071	42,426	27,452	62,539	50,466	33,287	79,007	58,506	39,112	95,474	66,547	44,934	111,942
6C-16S-935-OP	5	53,420	15,097	17,739	40,831	26,292	59,273	49,806	32,808	77,654	58,780	39,310	96,036	67,755	45,809	114,417			
6C-17S-735-OP	9	69,582	19,962	23,693				16,452	3,128	3,128	21,998	11,349	14,486	27,544	15,574	25,845	33,089	19,711	37,203
6C-17S-785-OP	7	69,438	19,904	23,612	16,289	2,794	2,794	22,616	11,827	15,751	28,941	16,621	28,708	35,268	21,325	41,664	41,593	25,967	54,621
6C-17S-835-OP	7	69,285	19,842	23,526	22,028	11,372	14,546	29,185	16,803	29,206	36,342	22,120	43,866	43,499	27,358	58,525	50,657	32,571	73,184
6C-17S-885-OP	6	69,122	19,778	23,434	28,119	16,004	27,023	36,159	21,985	43,491	44,199	27,869	59,959	52,240	33,721	76,427	60,280	39,558	92,894
6C-17S-935-OP	6	68,949	19,709	23,337	34,564	20,804	40,225	43,539	27,387	58,606	52,513	33,921	76,987	61,488	40,435	95,369	70,462	46,939	113,750

Note 1. MOP = Maximum Operating Pressure [bar g]

IPS SINGLE ACTING PNEUMATIC ACTUATORS

Output torques (Nm) - Canted scotch yoke design, model 7C-18S-835-OP to 9C-25S-1450-OP

Operating supply pressure (bar g)					3.5			4.0			4.5			5.0			5.5		
MOP¹																			
Model	(bar g)	BTC	RTC	ETC	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO	BTO	RTO	ETO
7C-18S-835-OP	9	110,532	27,788	30,212							36,999	12,600	12,600	45,230	23,273	29,458	53,461	29,575	46,316
7C-18S-935-OP	7	110,146	27,628	29,995	34,955	8,412	8,412	45,276	23,309	29,551	55,596	31,184	50,690	65,917	38,902	71,828	76,238	46,548	92,966
7C-18S-1000-OP	6	109,872	27,514	29,840	45,200	23,250	29,397	57,006	32,246	53,576	68,811	41,051	77,756	80,617	49,761	101,936	92,422	58,381	126,116
7C-18S-1100-OP	6	109,415	27,325	29,582	62,306	36,212	64,434	76,591	46,810	93,691	90,876	57,252	122,948	105,160	67,652	152,205	119,446	78,028	181,463
7C-18S-1200-OP	5	108,914	27,117	29,300	81,042	50,072	102,806	98,042	62,474	137,625	115,042	74,833	172,444						
7C-18S-1300-OP	4	108,370	26,891	28,992	101,407	64,922	144,516	121,358	79,416	185,380									
7C-19S-835-OP	10	140,315	34,747	37,412										36,608	-7,075	-7,075	44,840	9,784	9,784
7C-19S-935-OP	7	139,930	34,586	37,195							46,975	14,158	14,158	57,295	29,098	35,296	67,617	37,033	56,434
7C-19S-1000-OP	7	139,656	34,471	37,041				48,385	17,044	17,044	60,190	31,350	41,224	71,995	40,342	65,403	83,802	49,178	89,584
7C-19S-1100-OP	6	139,198	34,281	36,783	53,685	26,238	27,902	67,970	37,301	57,158	82,255	48,025	86,416	96,539	58,629	115,673	110,824	69,103	144,931
7C-19S-1200-OP	5	138,697	34,071	36,501	72,421	40,663	66,274	89,421	53,354	101,093	106,421	65,886	135,912	123,421	78,293	170,731			
7C-19S-1300-OP	4	138,152	33,843	36,194	92,786	55,848	107,984	112,737	70,498	148,848									
7C-20S-935-OP	9	163,561	40,725	44,004										49,402	6,310	6,310	59,724	27,449	27,449
7C-20S-1000-OP	7	163,286	40,611	43,849							52,297	12,238	12,238	64,102	31,955	36,418	75,908	41,094	60,597
7C-20S-1100-OP	6	162,829	40,422	43,591				60,077	28,172	28,172	74,362	39,912	57,430	88,646	50,702	86,688	102,931	61,349	115,945
7C-20S-1200-OP	6	162,328	40,214	43,309	64,528	32,292	37,289	81,528	45,352	72,107	98,528	58,078	106,926	115,528	70,672	141,745	132,528	83,102	176,563
7C-20S-1300-OP	5	161,784	39,987	43,002	84,893	47,888	78,999	104,844	62,767	119,863	124,795	77,460	160,726						
7C-21S-935-OP	9	183,437	48,873	55,206													47,820	3,068	3,068
7C-21S-1000-OP	7	183,162	48,762	55,052										52,199	12,037	12,037	64,005	31,877	36,218
7C-21S-1100-OP	7	182,706	48,576	54,795				48,173	3,792	3,792	62,459	30,647	33,050	76,743	41,727	62,307	91,028	52,487	91,565
7C-21S-1200-OP	6	182,204	48,372	54,511	52,624	12,908	12,908	69,624	36,272	47,727	86,624	49,187	82,546	103,624	61,862	117,365	120,624	74,405	152,183
7C-21S-1300-OP	5	181,660	48,150	54,204	72,989	38,861	54,618	92,940	53,915	95,482	112,891	68,725	136,345	132,842	83,331	177,209			
8C-22S-1100-OP	7	207,622	49,348	51,802				68,981	12,866	12,866	85,751	42,446	47,211	102,519	55,450	81,557	119,288	68,105	115,903
8C-22S-1200-OP	7	207,033	49,098	51,469	74,205	23,567	23,567	94,163	49,036	64,441	114,119	64,226	105,315	134,076	79,143	146,189	154,032	93,930	187,063
8C-22S-1300-OP	6	206,394	48,827	51,110	98,112	52,080	72,530	121,534	69,787	120,501	144,954	87,214	168,472	168,376	104,450	216,442	191,797	121,541	264,412
8C-23S-1100-OP	9	241,938	60,643	65,808							70,327	5,117	5,117	87,097	39,463	39,463	103,866	54,590	73,809
8C-23S-1200-OP	7	241,350	60,400	65,477				78,740	22,347	22,347	98,696	50,585	63,221	118,653	65,859	104,096	138,610	80,823	144,970
8C-23S-1300-OP	6	240,711	60,135	65,116	82,690	30,437	30,437	106,111	56,318	78,407	129,532	74,039	126,378	152,954	91,487	174,348	176,374	108,765	222,319
9C-24S-1100-OP	10	261,853	59,245	60,481				72,057	-23,928	-23,928	90,689	14,234	14,234	109,322	52,395	52,395	127,954	67,182	90,558
9C-24S-1200-OP	7	261,199	58,956	60,114				100,036	33,377	33,377	122,210	62,732	78,794	144,383	79,723	124,210	166,558	96,380	169,625
9C-24S-1300-OP	7	260,488	58,642	59,713	104,425	42,366	42,366	130,448	69,106	95,667	156,472	88,826	148,967	182,496	108,248	202,268	208,519	127,516	255,568
9C-24S-1450-OP	6	259,317	58,123	59,052	148,253	82,641	132,134	180,628	106,865	198,443	213,003	130,804	264,754	245,380	154,460	331,064	277,755	178,038	397,375
9C-25S-1100-OP	10	273,994	64,506	67,325										102,051	37,503	37,503	120,683	61,544	75,665
9C-25S-1200-OP	7	273,341	64,225	66,956				92,765	18,485	18,485	114,939	57,017	63,901	137,112	74,202	109,317	159,287	90,936	154,733
9C-25S-1300-OP	7	272,630	63,921	66,556	97,154	27,474	27,474	123,177	63,485	80,774	149,201	83,355	134,075	175,225	102,838	187,376	201,248	122,148	240,676
9C-25S-1450-OP	6	271,458	63,417	65,896	140,982	77,140	117,241	173,357	101,447	183,551	205,732	125,460	249,862	238,108	149,155	316,172	270,484	172,749	382,483

Note 1. MOP = Maximum Operating Pressure (bar g)

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