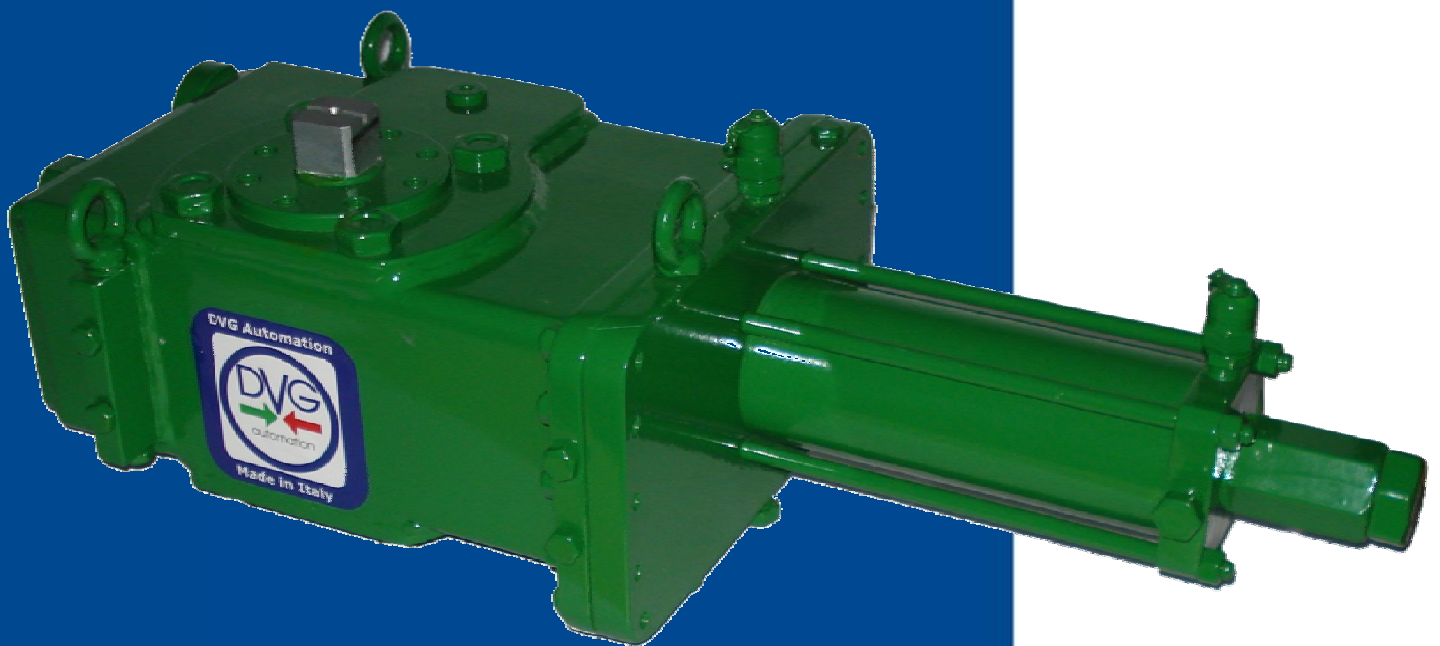




# DVG Automation

**“BY” SERIES**  
**Direct Gas Actuators**

***PATENT PENDING***  
***Nr PR2008A000007***





## INTRODUCTION

The DVG Automation newly designed "BY" Series incorporates several new design features to provide higher efficiency and cost effective solution.

These actuators shows lightweight and compact design but above all introduce a new generation of patented mechanism which minimizes wearing effect on all loaded & sliding parts, thus extending overall lifespan.

These features boost BY Series for all modulating as well as heavy-duty services virtually fitting any quarter turn (90 deg) application.

Construction and design make this product ideal for FPSO vessel, skid manufacturers and wherever space constraint and overall weight issues may arise.

## OPERATING RANGE

Three off actuator center-body size available.

The DVG Automation double-acting BY Series are available with individual test and guaranteed minimum output torque ranging from **40 Nm (350 lb-in) to 5,000 Nm (44,250 lb-in)**

Our single acting BY series requires pressure in only one stroking direction and they are available both for fail clockwise and counterclockwise application by simply reversing actuator mounting plane.

These models produce spring ending torque ranging from **31 Nm (275 lb-in) to 2080 Nm (18,400 lb-in)**

The Direct Gas operating pressure for the BY Series ranges between **15 barg (290 psig) and 105 barg (1600 psig)**

Their standard design construction allows operating temperature from **-30 degC (-20 degF) to +85 degC (+185 degF)**

Low Temperature extended operating range down to **-60 degC (-76 degF)**

## KEY DESIGN FEATURES & ADVANTAGES

### **Bar Yoke:**

Patented Mechanism which zeroes mechanical clearances between cylinder piston rod and driving module.

### **Mechanism Guide System:**

Patented Dual Guide Bar hard chromium plated to minimize/zeroing driving block swing extending piston rod lifespan under heavy load &/or continuous modulating duty.

### **Symmetric or canted yoke:**

BY Series is available with either symmetric or canted yoke design depending on valve torque profile demand.

### **Swept Volume:**

Reduced gas consumption with higher efficiency

### **Water ingress protection:**

totally enclosed and weather-proof actuator center-body is engineered to meet IP66, IP67 IP67M and NEMA 4 & 4X specifications for submerged and high pressure water deluge application.

**Materials:**

Cylinder Tube & all structural parts are manufactured in carbon steel material: no cast/grey iron or aluminum parts are present.

All pressure containing part are supplied with 3.1 certificate according to EN10204. DVG guarantees, where applicable, that actuator and are designed and manufactured according to PED (97/23 CE) directive . Cylinder tube is internally nickel-plated lined (minimum 25µm). Nickel-plating layer can be increased upon request.

**Seal:**

Teflon ring with external charging O-ring and internal sealing O-ring prevents sticking phenomena after prolonged operation-less period and ensures reduced hysteresis and high sensitivity.

**Bearing:**

dual piston PTFE sliding guide. Yoke arm & shaft are mounted with steel bronze Teflon coated bushing to minimize wearing effect and show higher sensitivity.

**Output shaft:**

symmetric squared output shaft nickel-plated for corrosion resistance and reduced friction.

**Labeling:**

AISI 316 Stainless steel embossed name plate ensures long last information preservation guaranteeing lifetime traceability.

**Travel stops:**

External travel stops with protective cap ensure precise angular stroke adjustment up to -5deg/+5deg at each end.

## OPTIONAL FEATURES

**Mounting pad:**

accessory mounting pad allows dual side mounting do not require fixing modification in case of rear side assembly.

**Manual Override Option:**

DVG Automation BYG series can be supplied with hydraulic manual override system for both double acting and spring return actuator.

Power is provided by operation of local manual hydraulic hand pump.

Open and close action can be selected by means of a directional control valve.

Schematics at page 16

**Lifting point:**

by means of DIN certified eyelet (three or four off lifting point according to center-body size).

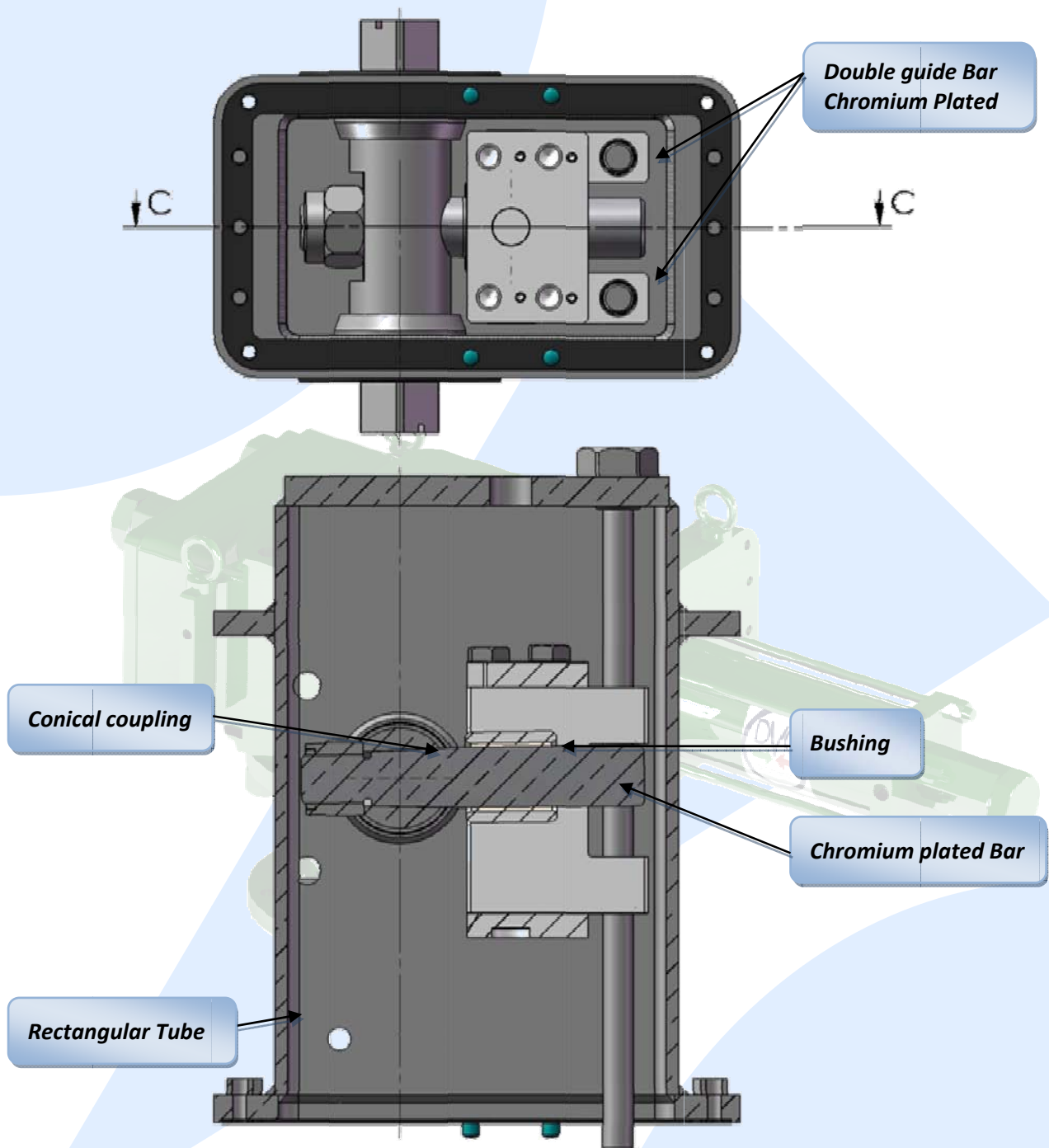
## CONTROL SYSTEM

Actuator Control Systems are integral part of any automated valve package. Our BY Series actuators can be equipped with extensive range of auxiliary components specifically engineered and integrated to meet the largest variety of Customers' requests either for ON/OFF or modulating. Our Control System can be housed within cabinet &/or stainless steel (AISI316) panel folded over to provide sun-shade, and assembled on actuator or at remote location

**Position Monitor Device:**

Virtually all positioning monitor devices can be assembled on top of our BY Series actuators, responding to any kind of technical requirement.

## BAR YOKE





# "BY" SERIES Direct Gas Actuators

## BY Series double acting torque - BYG

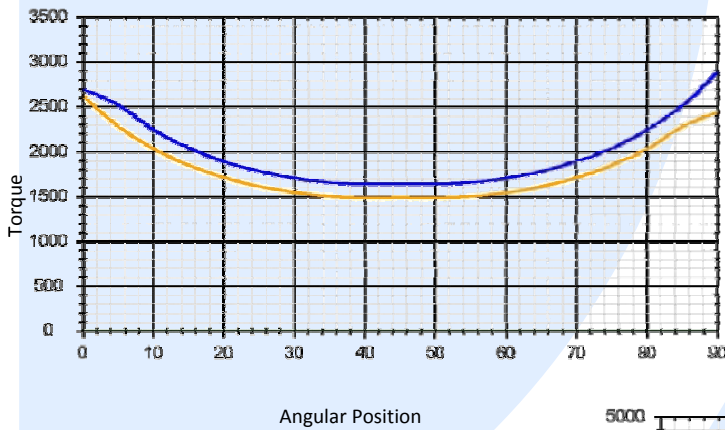
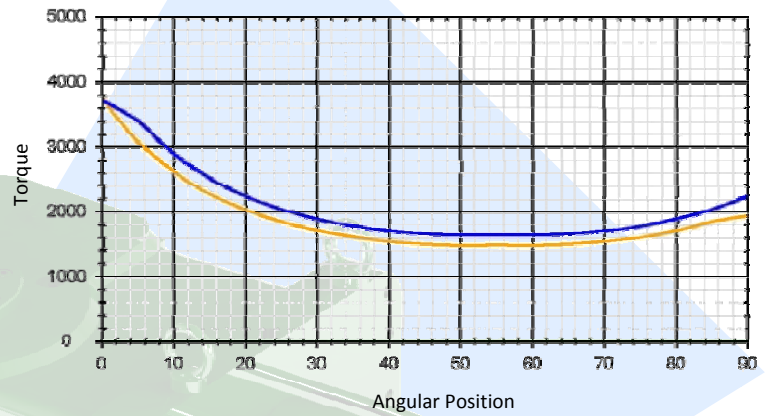


Figure 1

Torque for symmetric double acting BY

Figure 2  
Torque for canted double acting BY



## BY Series single acting torque -BYGS

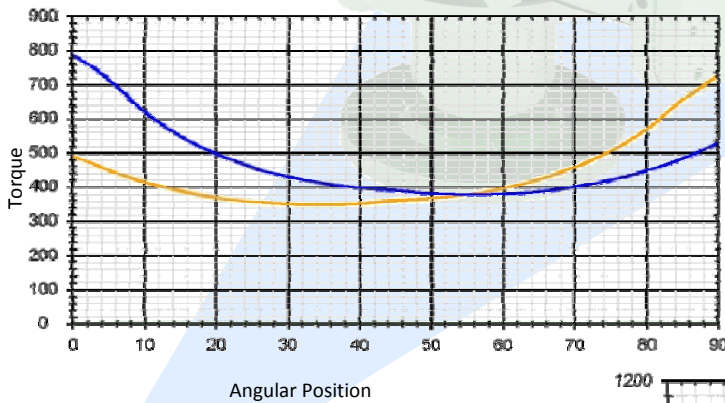
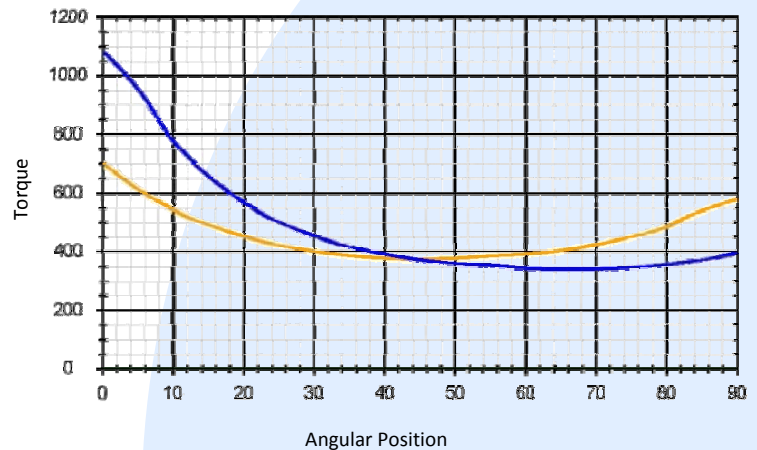


Figure 3

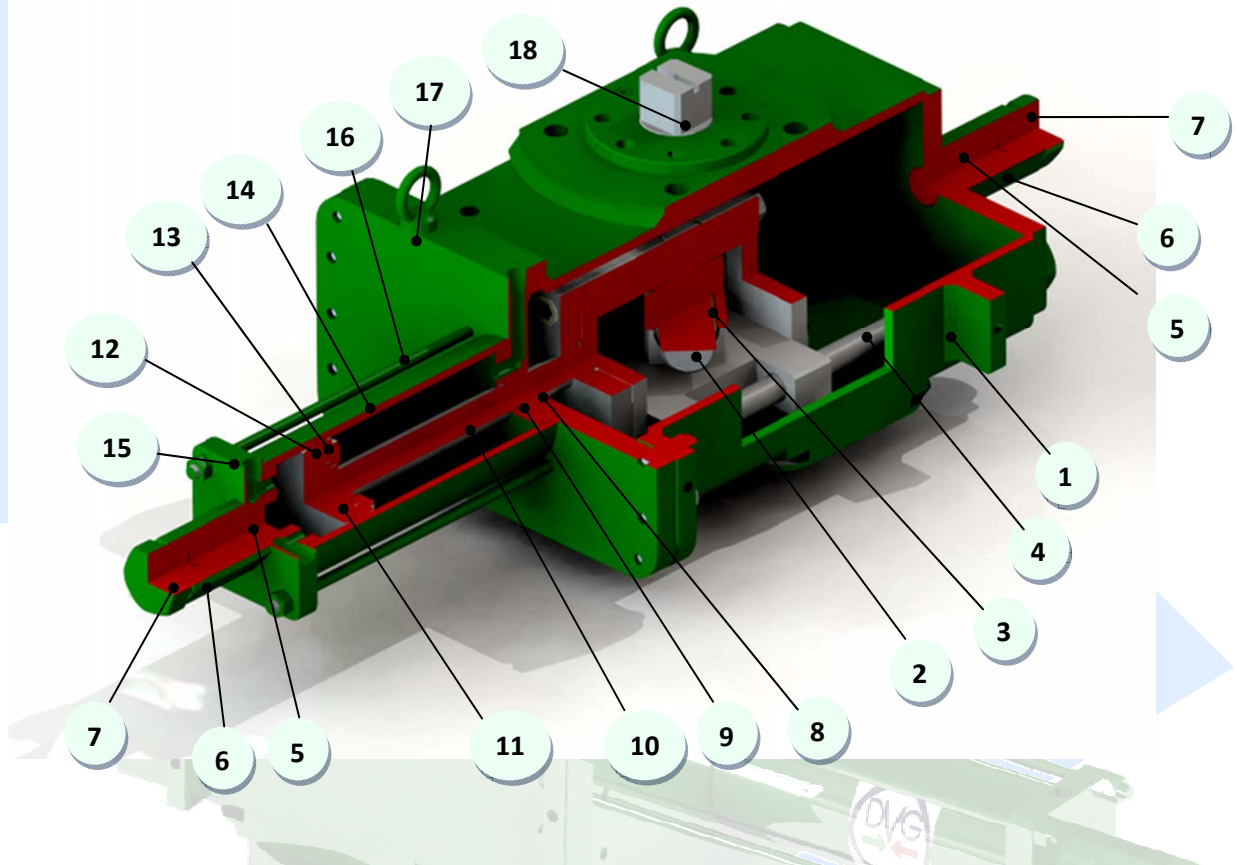
Torque for symmetric single acting BY

Figure 4  
Torque for canted single acting BY



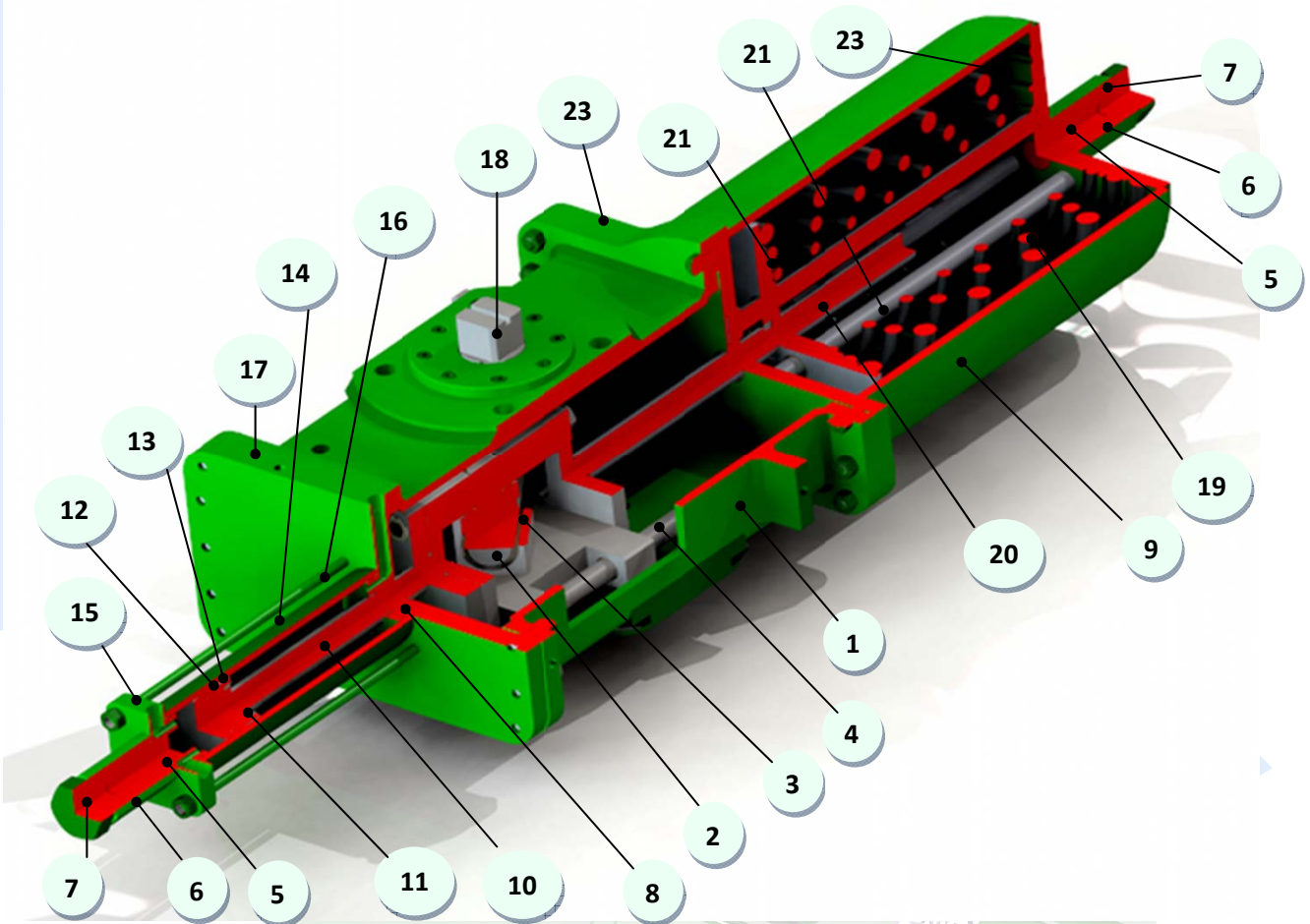
Angular Position

## BY Series double acting sectional drawing - BYG



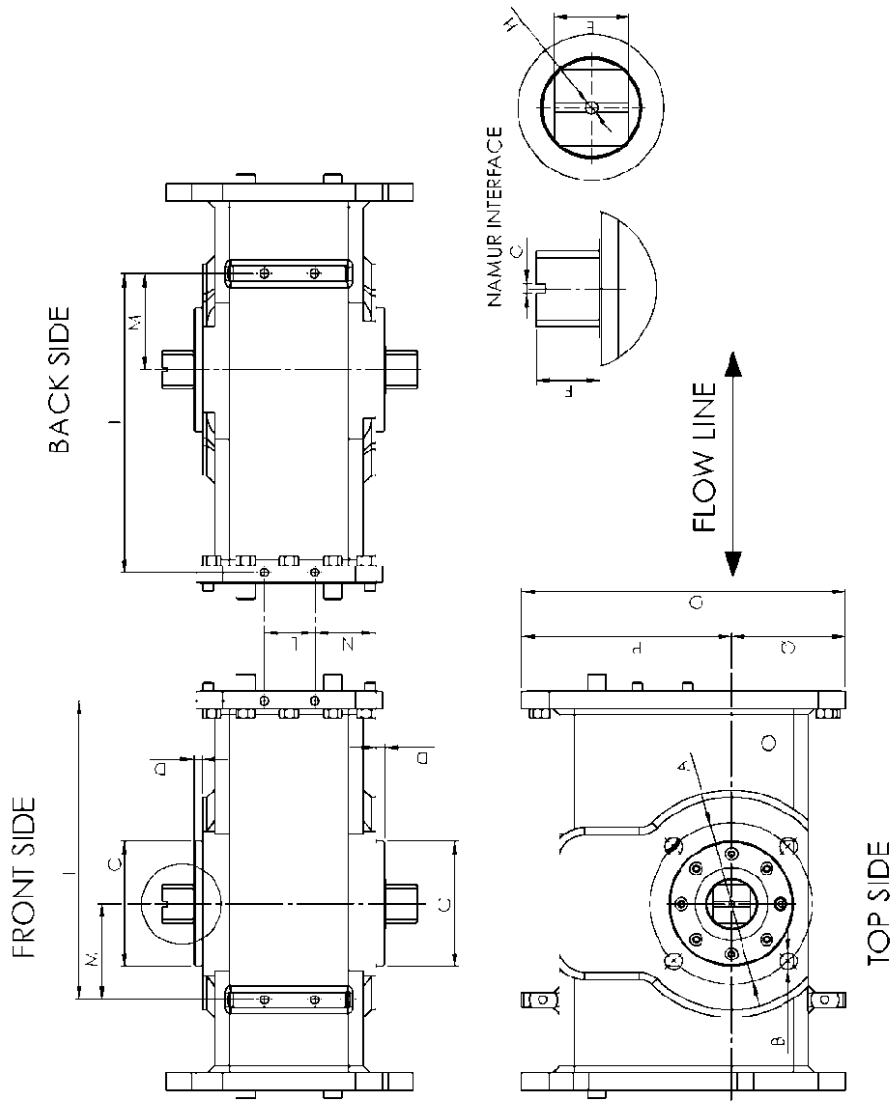
Item	Description	EN Material	ASTM Material
1	Housing	S355 J2 H EN 10210	ASTM A500 Grade C
2	Bar Yoke	36CrNiMo4 EN 10083	AISI (9840)
3	Yoke Bushing	Carbon steel + Bronze + PTFE	Carbon steel + Bronze + PTFE
4	Guide bar	36CrNiMo4 EN 10083	AISI (9840)
5	Travel stop screw	Class 45H ISO 4026	Class 45H ISO 4026
6	Stop screw protection	S235 JR EN 10025	AISI (9840)
7	Plug	Class 8.8 ISO 4017	Class 8.8 ISO 4017
8	Piston rod bushing	Carbon steel + Bronze + PTFE	Carbon steel + Bronze + PTFE
9	Piston rod seal	NBR (FKM – MFQ – CR) + PTFE	NBR (FKM – MFQ – CR) + PTFE
10	Piston rod	36CrNiMo4 EN 10083	AISI (9840)
11	Piston	S355 J2G3 EN 10025	ASTM A570 Grade 50
12	Piston seal	NBR (FKM – MFQ – CR) + PTFE	NBR (FKM – MFQ – CR) + PTFE
13	Piston sliding guide	PTFE - Graphite	PTFE - Graphite
14	Cylinder tube	E355 K2+N EN 10297 - 10305	ASTM A500 Grade C
15	Cylinder End flange	S355 J2G3 EN 10025	ASTM A570 Grade 50
16	Tie rod	ASTM A320L7	ASTM A320L7
17	Cylinder Head flange	S355 J2G3 EN 10025	ASTM A570 Grade 50
18	Stem	36CrNiMo4 EN 10083	AISI (9840)

## BY Series single acting sectional drawing - BYGS



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7	Plug	Class 8.8 ISO 4017	Class 8.8 ISO 4017
8	Piston rod bushing	Carbon steel + Bronze + PTFE	Carbon steel + Bronze + PTFE
9	Spring cartridge tube	E355 K2+N EN 10297 - 10305	ASTM A500 Grade C
10	Piston rod	36CrNiMo4 EN 10083	AISI (9840)
11	Piston	S355 J2G3 EN 10025	ASTM A570 Grade 50
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16	Tie rod	ASTM A320L7	ASTM A320L7
17	Cylinder Head flange	S355 J2G3 EN 10025	ASTM A570 Grade 50
18	Stem	36CrNiMo4 EN 10083	AISI (9840)
19	Spring	EN-10270-2-FDSiCr	ASTM A-401
20	Spring cartridge rod	36CrNiMo4 EN 10083	AISI (9840)
21	Spring cartridge load flange	S355 J2G3 EN 10025	ASTM A570 Grade 50
22	Spring cartridge guide bar	36CrNiMo4 EN 10083	AISI (9840)
23	Spring cartridge flange	S355 J2G3 EN 10025	ASTM A570 Grade 50

## Housing Mounting holes and interface



Model Size	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
5	70	N4 M10	55	6.5	18	15	4	M6	170	24	64.5	33.5	180	113	67
20	130	N4 M16	100	7.5	30	25	4	M6	240	40	77	50	260	168	92
50	165	N4 M20	130	10	45	40	4	M6	360	85	124.5	60	345	228	117





# "BY" SERIES Direct Gas Actuators

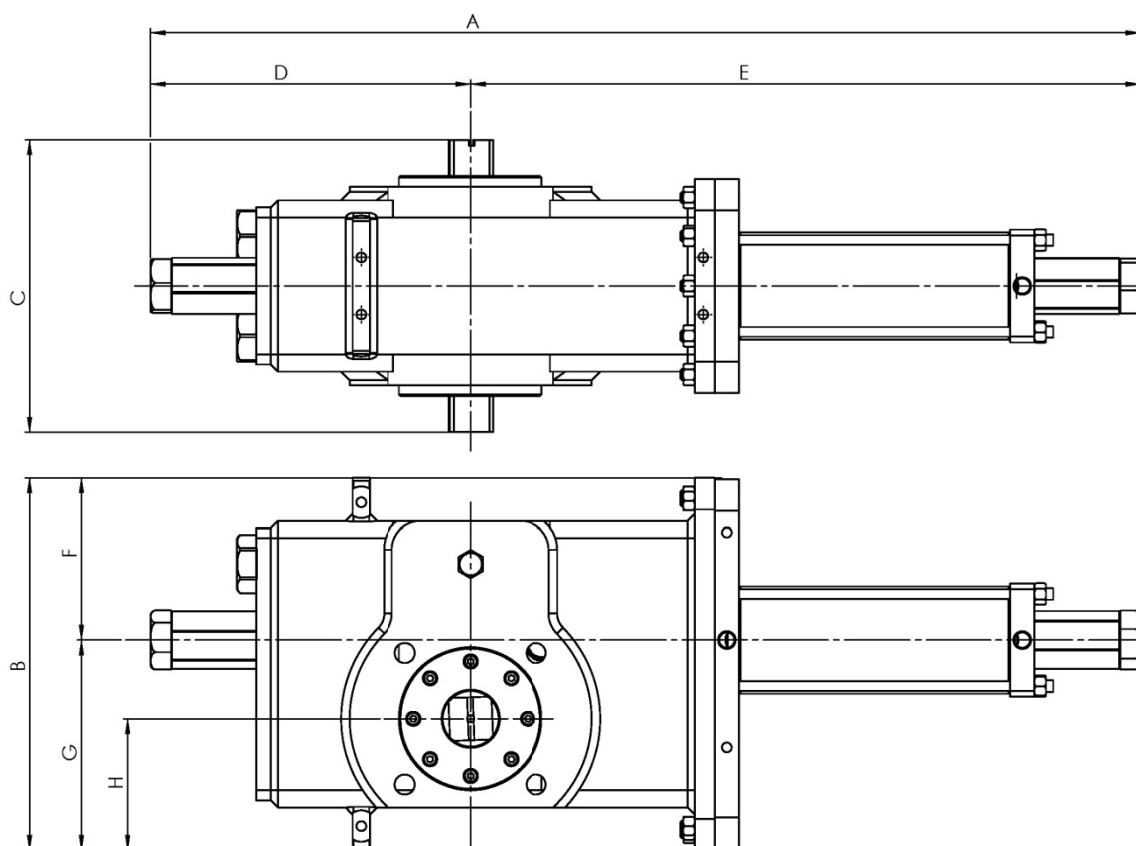
## Output Torques (Nm) for symmetric yoke mechanism

MODEL	Angular Position	Nm/Barg (OP) (CL)		DISL (l)	Cylinder nominal Pressure (Barg)	Max operating Pressure (Barg)
BYG-05S-40	0°	6.06	5.58	0.1	110	85
	45°	3.69	3.17			
	90°	6.5	5.2			
BYG-20S-45	0°	12.9	11.1	0.25	220	160
	45°	7.9	6.3			
	90°	13.8	10.3			
BYG-20S-65	0°	26.9	26.2	0.44	110	85
	45°	16.4	14.8			
	90°	28.9	24.4			
BYG-50S-55	0°	27.3	20.6	0.44	220	190
	45°	16.6	11.7			
	90°	29.3	19.1			
BYG-50S-75	0°	50.8	45.8	0.83	110	105
	45°	30.9	26			
	90°	54.5	42.6			
BYG-50S-95	0°	81.5	78.7	1.33	110	65
	45°	49.7	44.7			
	90°	87.5	73.4			

## Output Torques (Nm) for canted yoke mechanism

MODEL	Angular Position	Nm/Barg (OP) (CL)		DISL (l)	Cylinder nominal Pressure (Barg)	Max operating Pressure (Barg)
BYG-05C-40	0°	8.3	8	0.1	110	65
	45°	3.7	3.2			
	90°	5	4.1			
BYG-20C-45	0°	17.7	15.9	0.25	220	130
	45°	7.95	6.38			
	90°	10.7	8.2			
BYG-20C-65	0°	37.1	37.4	0.44	110	65
	45°	16.5	15			
	90°	22.4	19.3			
BYG-50C-55	0°	37.6	29.4	0.44	220	150
	45°	16.8	11.8			
	90°	22.7	15.2			
BYG-50C-75	0°	70	65.5	0.83	110	80
	45°	31.2	26.2			
	90°	42.3	33.9			
BYG-50C-95	0°	112.2	112.7	1.33	110	50
	45°	50.1	45.1			
	90°	67.8	58.2			

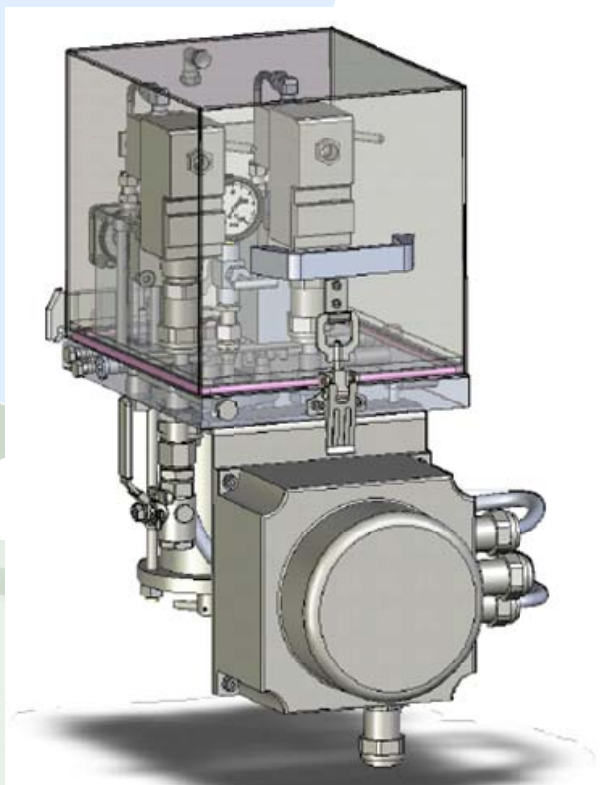
## Overall Dimensions Double acting



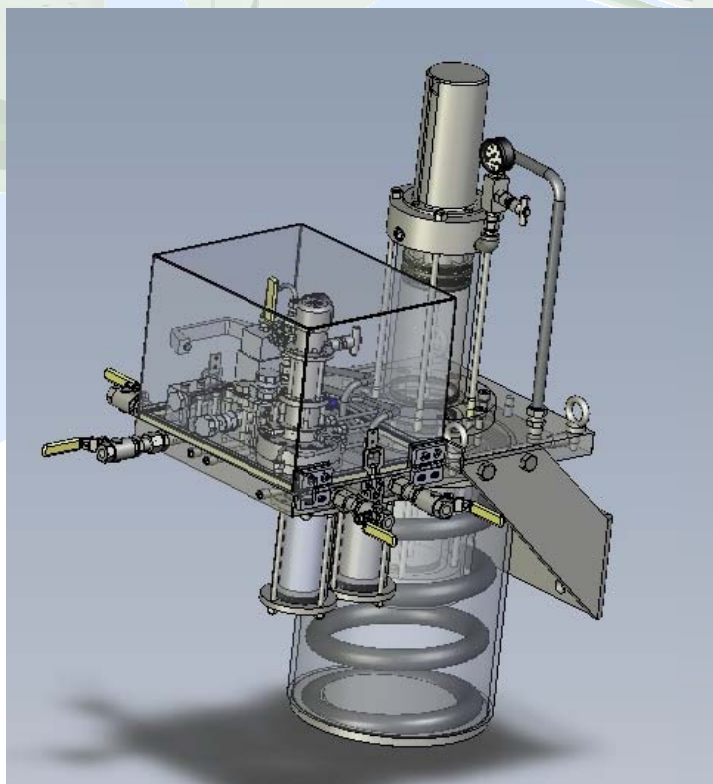
Model Size	A	B	C	D	E	F	G	H	Weight (Kg)	PED Category
BYG-05S/C-40	470	180	136	140	330	80	100	67	10.7	3.3
BYG-20S/C-45	707	260	205	225	482	113	147	92	39	3.3
BYG-20S/C-65	695	260	205	225	470	113	147	92	40	3.3
BYG-50S/C-55	990	345	306	332	658	151	194	117	82	3.3
BYG-50S/C-75	985	345	306	332	653	151	194	117	90	3.3
BYG-50S/C-95	991	345	306	332	659	151	194	117	100	3.3

## QTG –Typical Control System I

### HPLR High Pressure Local/Remote Control



### ALBC (Automatic line break control)



## Manual Hand pump



Figure 5 - Manual hand pump single effect with control schematic



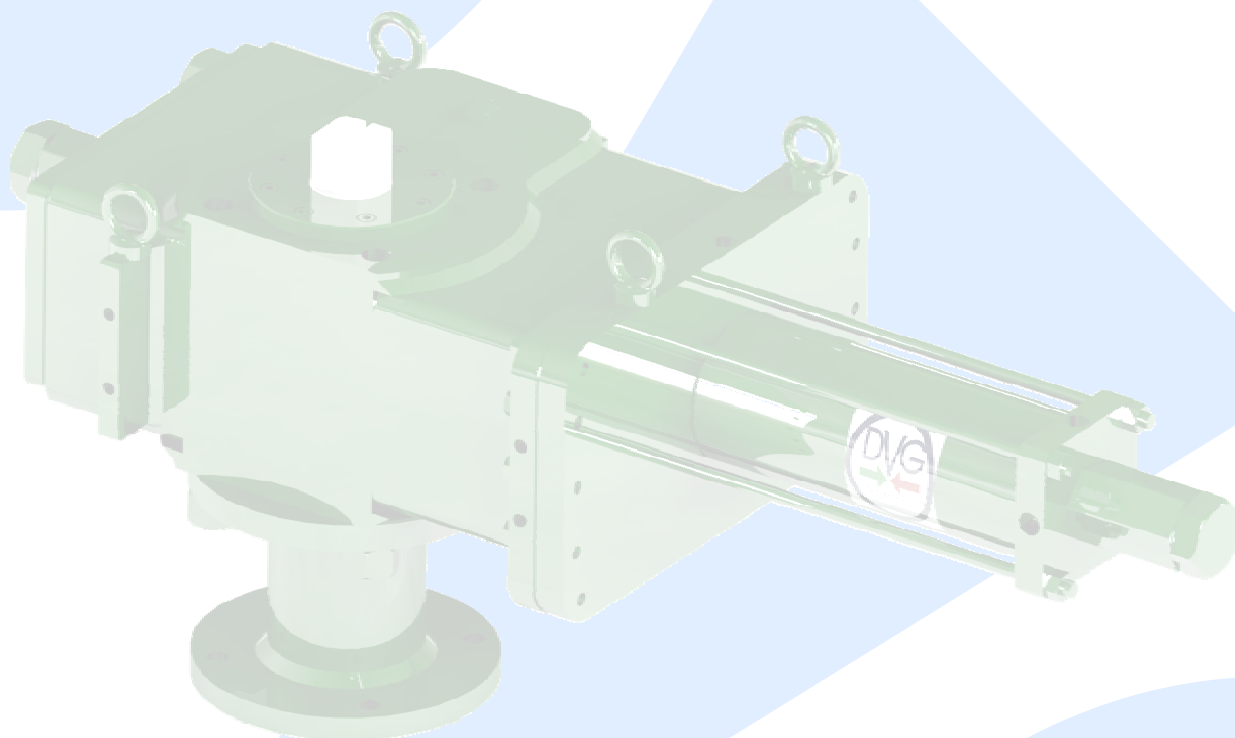
Figure 6 - Manual hand pump double effect with control schematic

Model Size	Tank size (l)
BYG-05	1
BYG-20	2
BYG-50	3



# "BY" SERIES Direct Gas Actuators

NOTES:





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