



Padideh Energy Parsian Co.

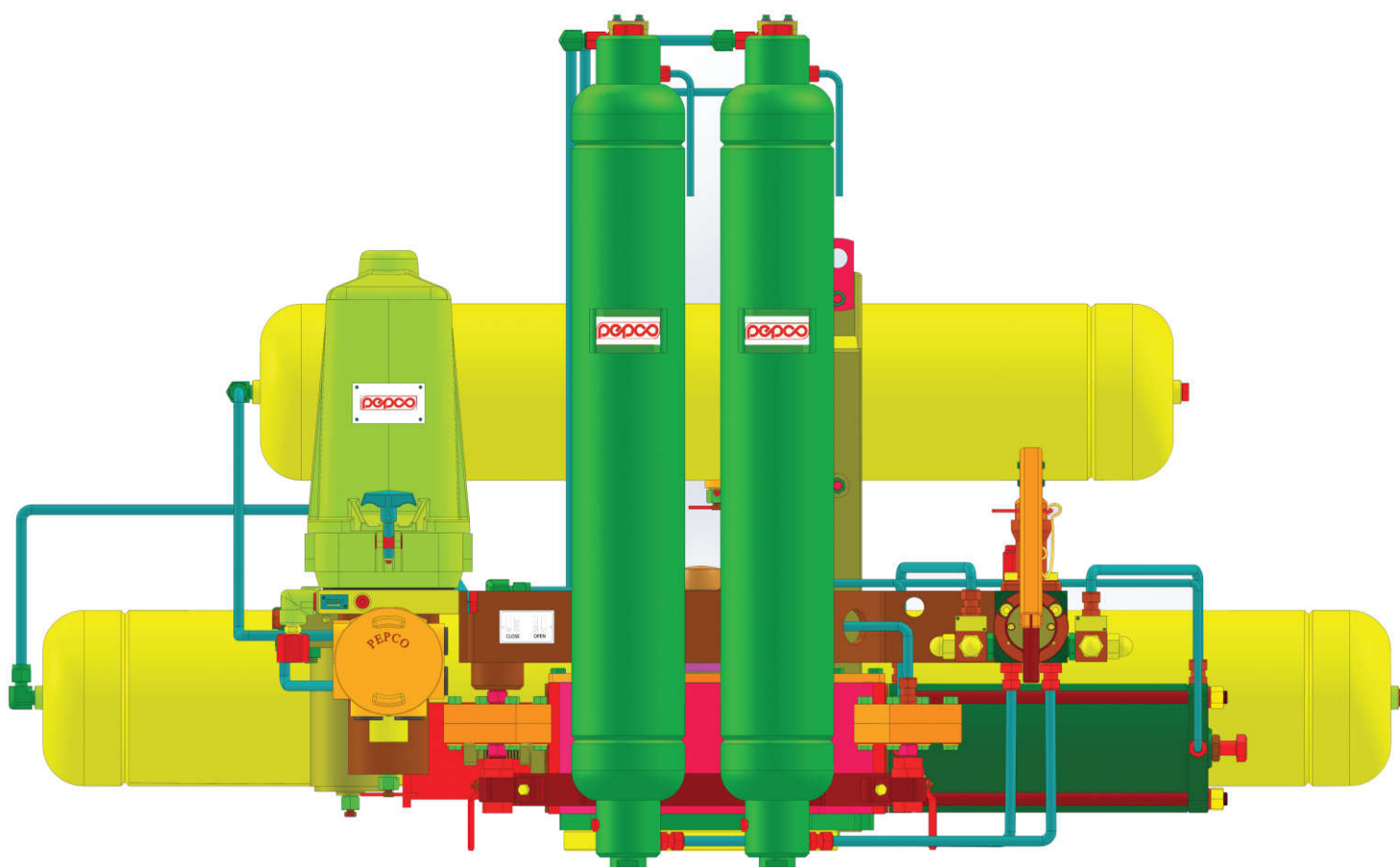
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## Pepco Gas-over -oil Actuator

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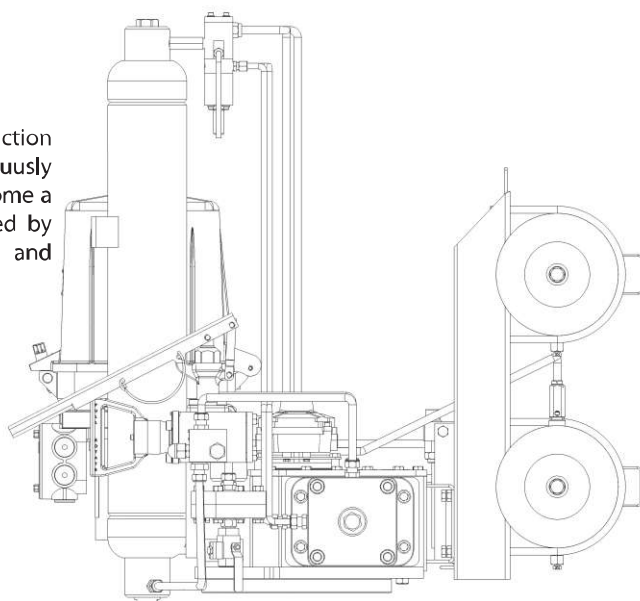
pepco

## 1- Introduction

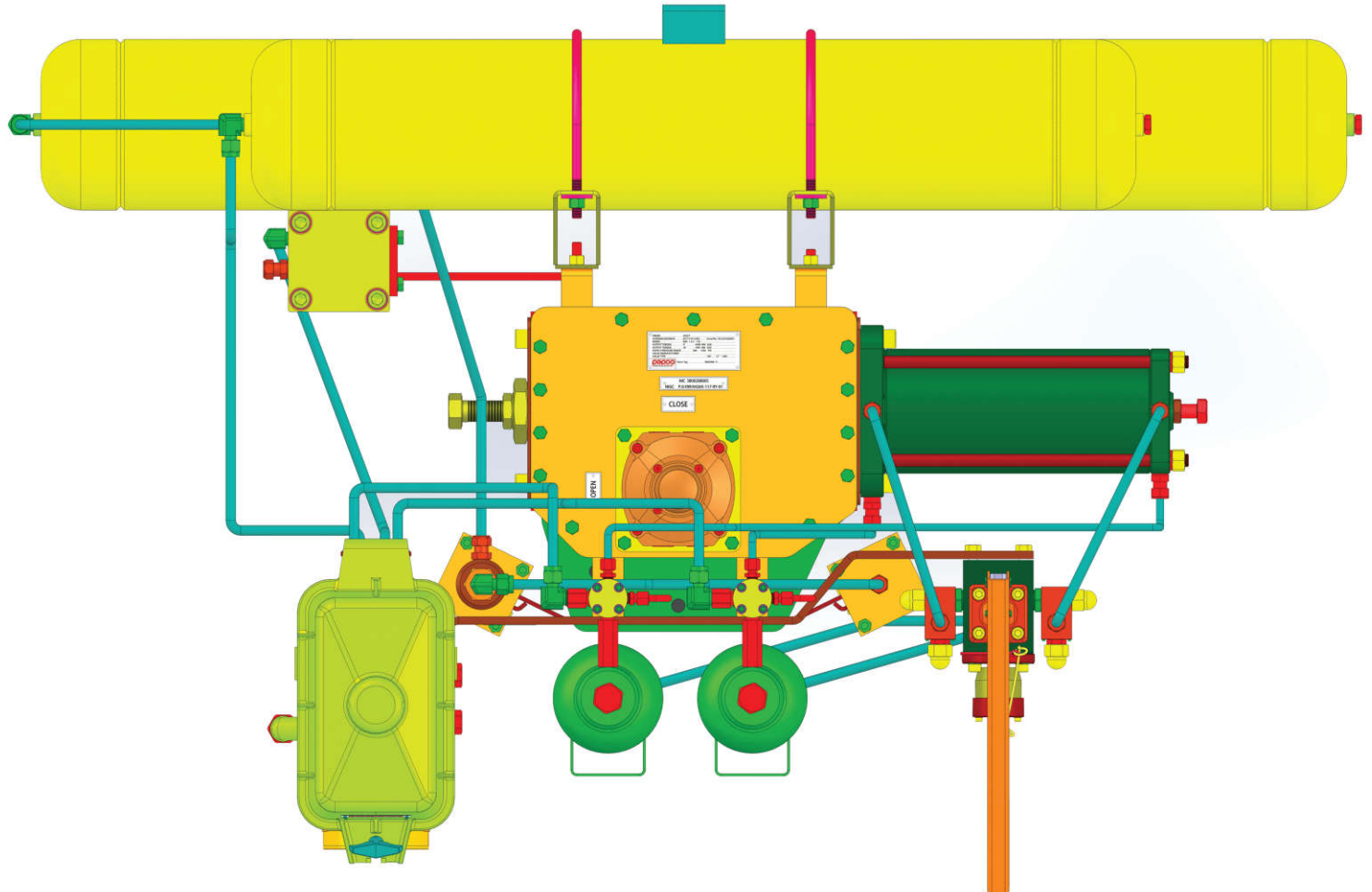


Pepco gas-over-oil actuators have been produced for more than 5 years and through a continuous process of engineering and manufacturing they now represent a precise reference point for every company in the gas pipelines valve automation market. The experience and the knowledge acquired in the actuator industry allow pepco to satisfy the most specific need of Customers .

The reliability and high production quality enabled Pepco to continuously expand the market and to become a Iranian manufacturer recognised by the most important oil, gas and engineering companies.



## 2- Quality Assurance



PEPCO has designed and implemented a Quality Assurance System in accordance with standard (ISO 9001). The Quality Assurance System defines the competence, the purpose and the procedures related to each company department.

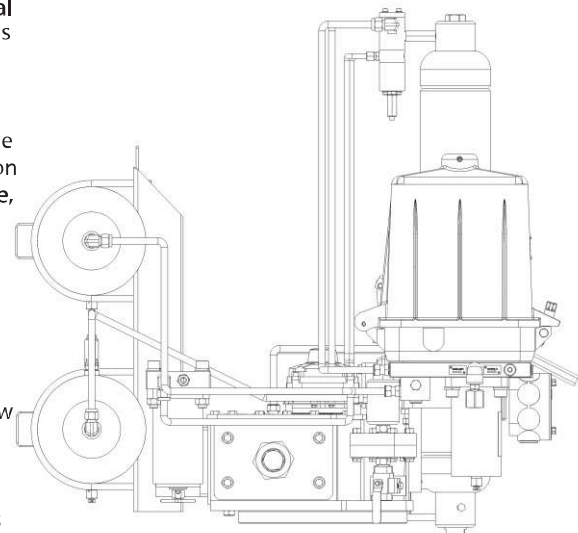
PEPCO is certified for the Environmental Management System in accordance with ISO – 14001

The Quality Assurance System is the instrument for monitoring the production process and the quality of the relevant services. PEPCO Quality System ensures the following advantages: it is a guarantee for PEPCO, as the various tests, which are

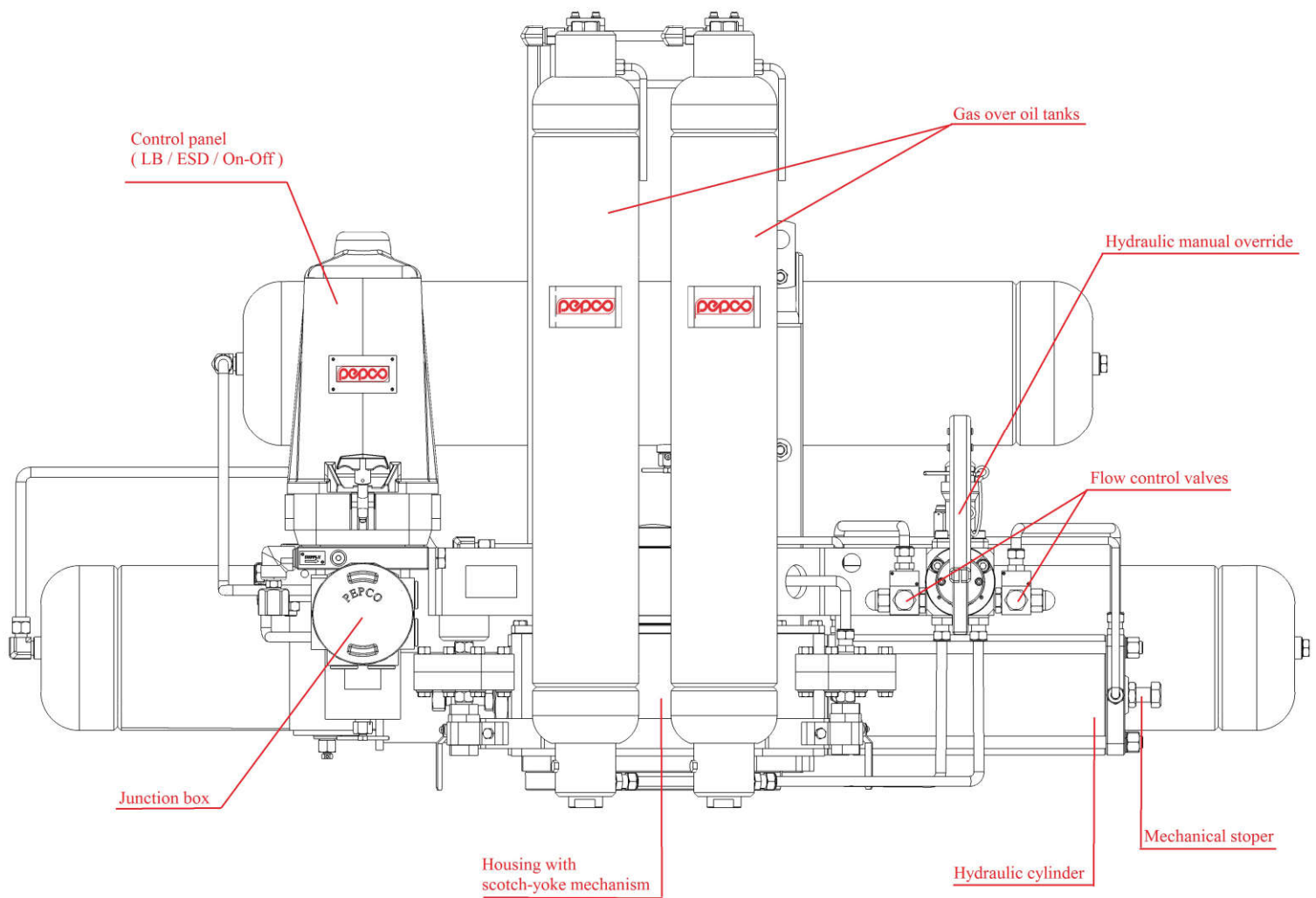
carried out, highlight all possible critical points inside the organisation, and thus make it possible to take the necessary corrective actions and to optimise the available resources.

It is a guarantee for the Customer as the control of every phase of the production cycle, from the quotation to the invoice, is performed within a controlled and documented system.

The PEPCO Quality control System is organised through a network of personal computers interfaced to the main frame. This computerised system guarantees the correct information flow through all the departments. It also guarantees a uniform and regular method to automatically and systematically check all the Company's activities.



### 3- Gas Over Oil Assembly



## 4- Gas Over Oil Control System



Fig. 1- Control system complete with solenoid valves and "LINE BREAK" device

PEPCO has produced a wide range of pneumatic and hydraulic components specifically engineered to suit the most varying needs of the customer (i.e. control mode, emergency operation, working temperature range, pressure range of the gas supply etc.). These components guarantee a high reliability and compact design. Every pneumatic valve is engineered to work with high pressure gas. Therefore the control group does not need to be fed by means of a pressure reducer. In this way the reliability of the system is increased.

The pneumatic valves in alluminium alloy are poppet-type in order to provide bubble tightness. The sealing seats are made of teflon, thus granting chemical resistance, lack of sticking and aging effects and the highest compatibility with every environment condition. The basic control system of the PEPCO gas-over-oil actuator mainly consists of a double 3-way 2-position control valve, which is normally piloted by 2 solenoid valves for remote control, one for closing and one for opening. It is also possible to locally operate this valve by means of 2 levers, one for closing and one for opening.

The junction box, where all the wiring coming from the actuator electric components and from the remote control panel are connected, can be supplied complete with a local / remote selector.

The pneumatic control valves are enclosed in a weather-proof padlockable enclosure.

PEPCO can supply different types of control systems following customer requirements.

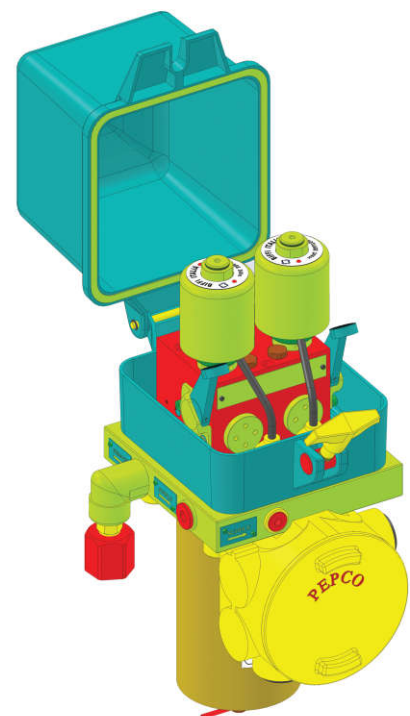


Fig. 2 - Control system complete with solenoid valves

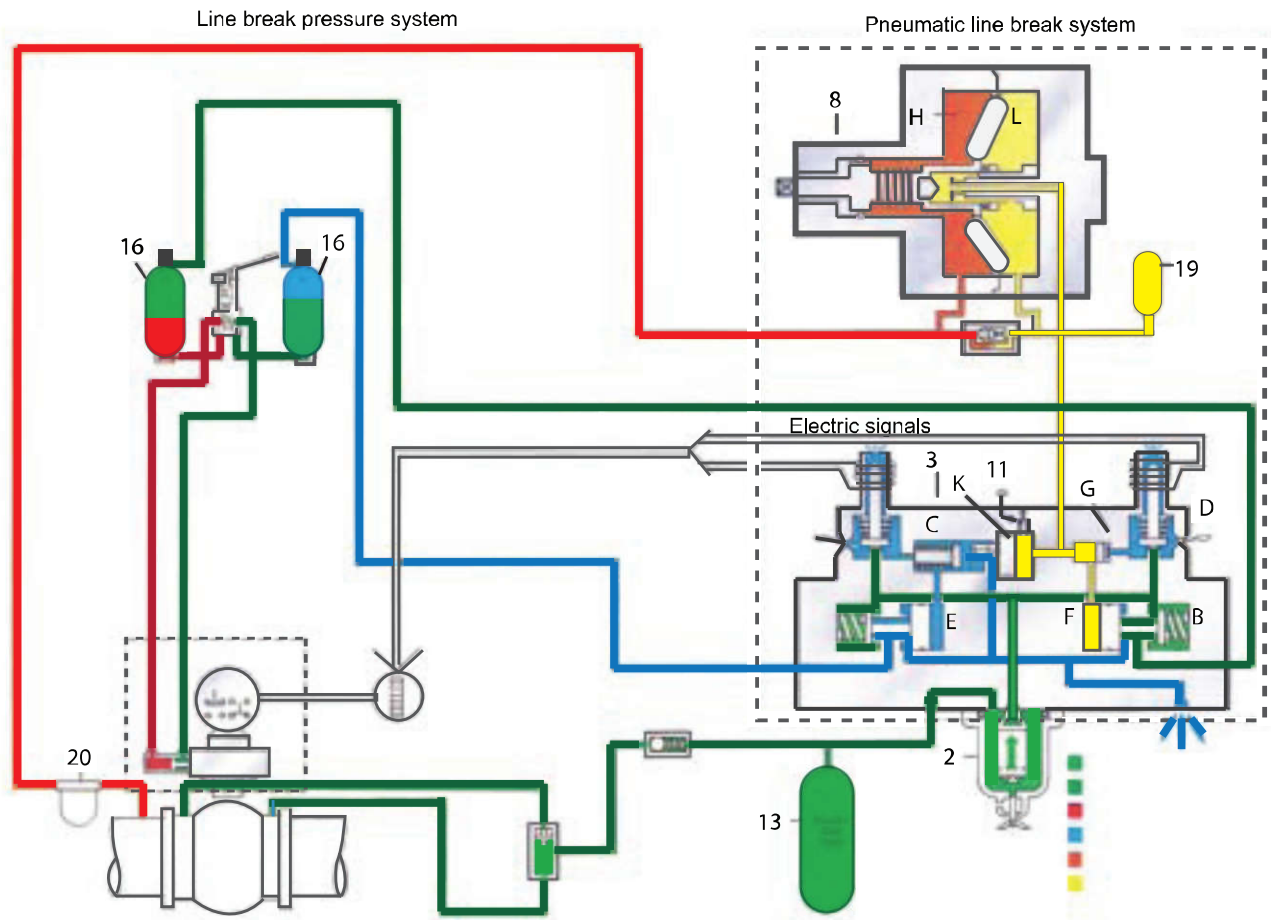


Fig. 3- Control system complete with solenoid valves and "LINE BREAK" device

The actuator control can be made with one or more electric signals or by means of low/high pressure pneumatic signals.

Automatic control groups for the actuator operation (in opening or in closing) are also available. The "ESD" and the "LINE BREAK" devices are typical examples.

The standard LINE BREAK control is completely autonomous, not depending on other power/control sources.

The "LINE BREAK" device automatically closes the actuator when the pressure drop rate exceeds a preset value.

Special versions of LINE BREAK control for sour gas, liquid fluids, dirty and very humid natural gas are also available.

The "ESD" device automatically opens or closes the actuator when the pressure or the pressure value is outside the normal range of values. The pressure switch can either be pneumatic or electric. A typical example of "ESD" device is shown in schematic drawing 4, page 12.

A typical example of "LINE BREAK" device is shown in schematic drawing 6, page 14.

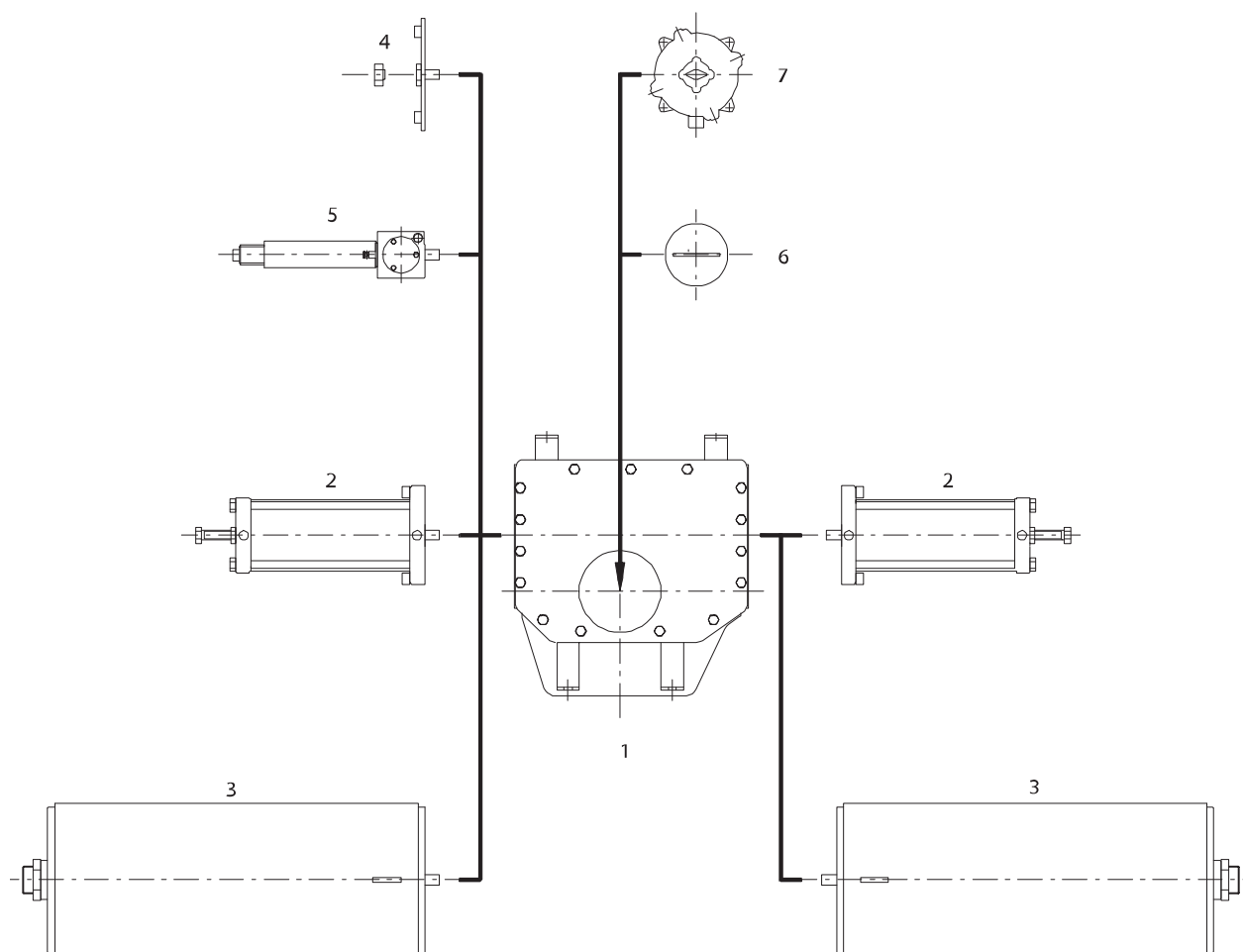
In case the control signal is also present at the end of the manoeuvre like for the "ELECTRIC FAIL SAFE" system (see enclosed schematic drawing 5, page 13) and for the "ESD" device, the actuator can be provided with

pneumatic limit switches which cause the exhaust of the gas used for the operation at the end of the actuator manoeuvre.

In this way the gas-over-oil tanks and all the hydraulic components are only pressurised during the actuator operation.

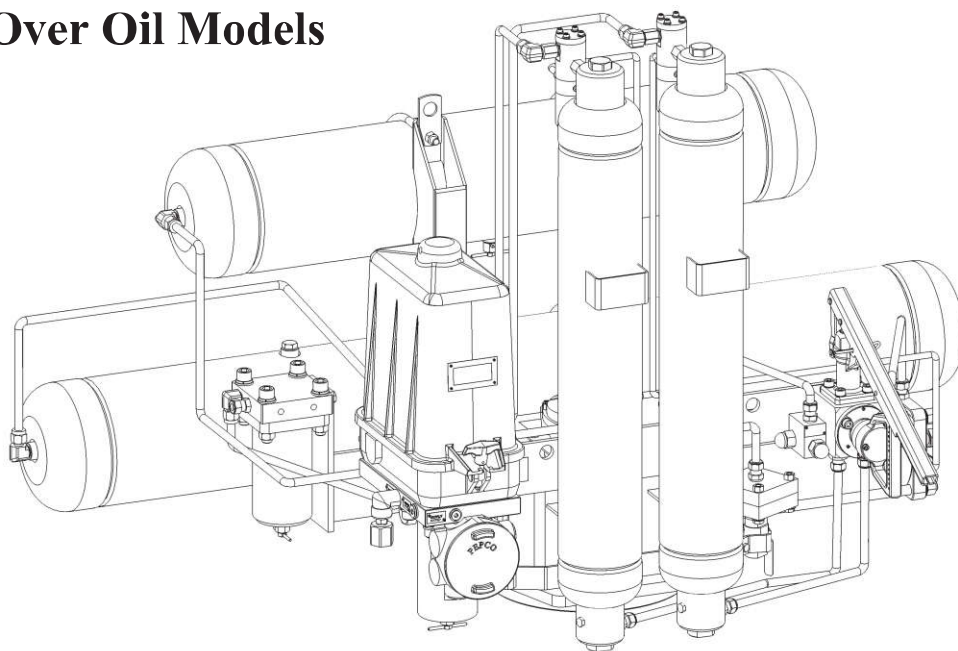


## 5- Configuration Hydraulic Actuators



Item	Name
1	Scotch yoke mechanism
2	Hydraulic cylinder
3	Spring cartridger
4	Travel stop screw
5	Manual override
6	Local position indicator
7	Electric limit switch box

## 6- Gas Over Oil Models



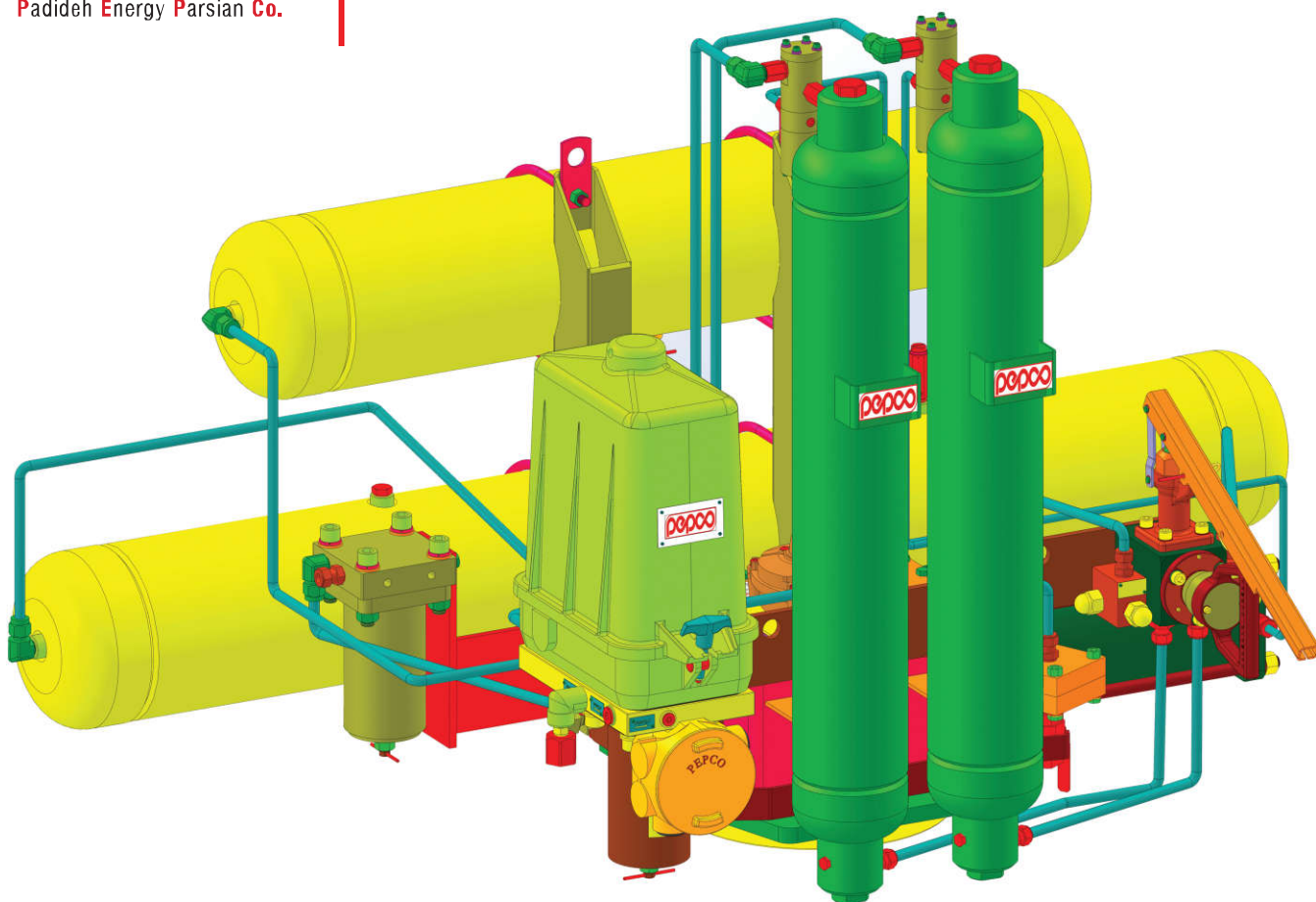
Pepco actuators performance table

Actr Model	Max operating torque (Nm)	Output torque at 45° (Nm/bar)	Canted yoke		Symmetric yoke	
			Output torque at 0° (Nm/bar)	Output torque at 90° (Nm/bar)	Output torque at 0° (Nm/bar)	Output torque at 90° (Nm/bar)
*0.3C-75	3000	22	64	31	40	38
*0.3C-100	3000	41	115	57	73	69
*0.9C-100	9000	47	132	65	85	80
*0.9C-135	9000	87	243	120	154	146
*1.5C-135	15000	108	304	150	212	169
*1.5C-175	15000	184	512	255	356	287
*3C-135	30000	176	493	244	346	285
*3C-175	30000	298	829	412	582	482
*6C-175	60000	348	970	482	679	565
*6C-200	60000	451	1320	624	887	732
*6C2-200	60000	947	2419	1311	1695	1536
14C-235	120000	700	1912	969	1360	1115
14C-280	120000	996	2715	1379	1931	1588
14C2-235	120000	1448	3700	2005	2631	2309
14C2-280	120000	2059	5261	2851	3741	3282
18C-235	180000	805	2197	1114	1564	1283
18C-280	180000	1146	3122	1586	2220	1827
18C2-235	180000	1666	4255	2306	3025	2656
18C2-280	180000	2368	6050	3278	4300	4152
32C-235	300000	955	2616	1323	1812	1529
32C-280	300000	1360	3707	1883	2573	2177
32C2-235	300000	1978	5052	2738	3506	3165
32C2-280	300000	2812	7183	3892	4984	4499
50C-235	400000	1073	2934	1486	2013	1699
50C-280	400000	1528	4165	2116	2858	2419
50C-300	400000	1739	4782	2407	3281	2751
50C2-235	400000	2198	5614	3042	3895	3517
50C2-280	400000	3124	7981	4325	5538	4999
50C2-300	400000	3568	9121	4943	6329	5713

### Notes

- \* standard models
- Max allowable pressure 100 bar (static pressure applicable to fully stroked actuator against the travel stops)
- for Symmetric yoke, please change C with S



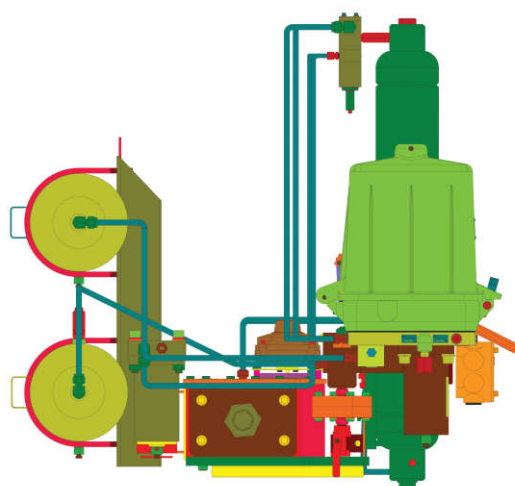


#### Note

For Symmetric yoke, please change C with S

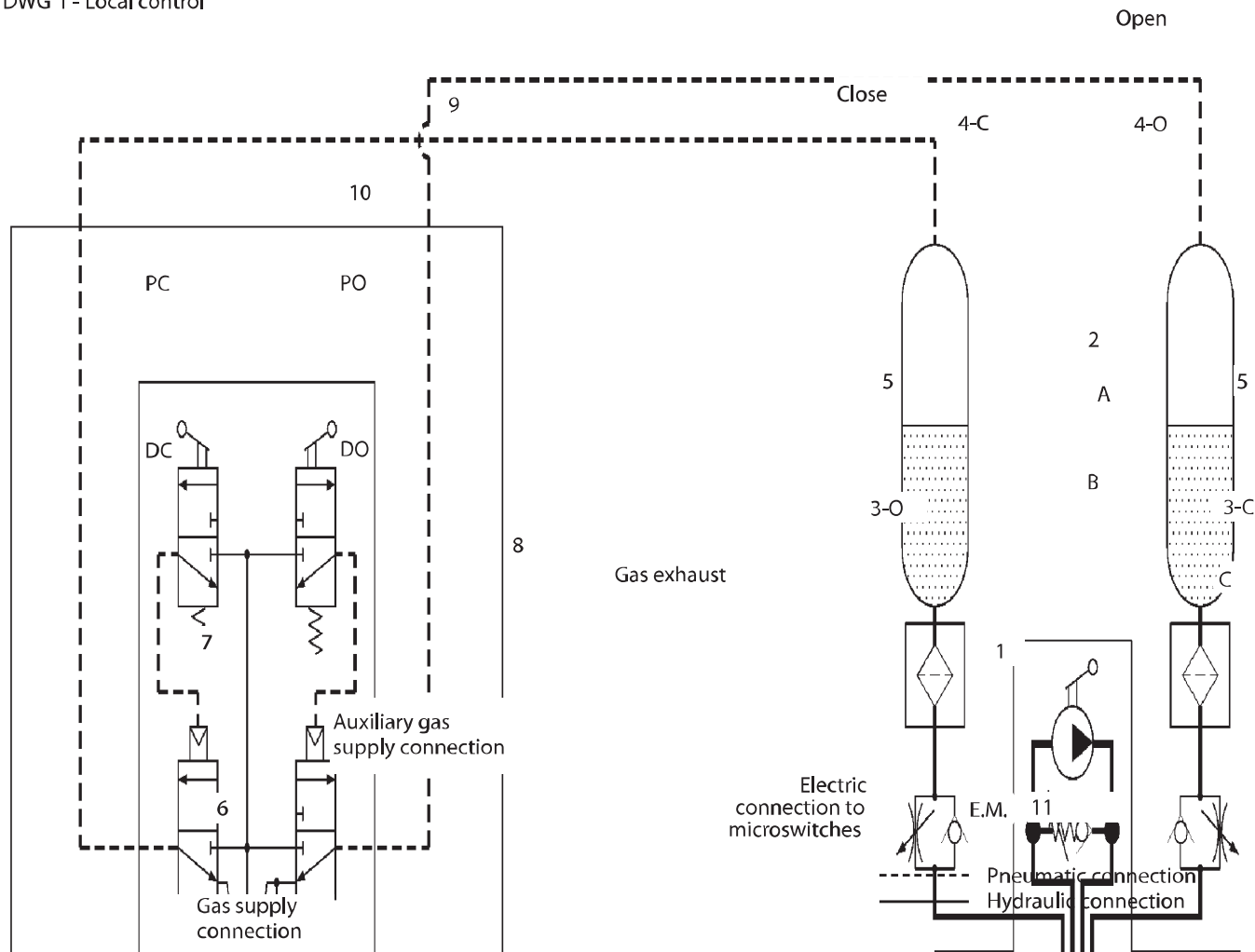
#### Pepco actuators technical data

Actuator model	Oil displacement (lt.)	Gas consumption (lt.)	Tank capacity (lt.)	Hand pump operations per stroke	Oil content (lt.)
0.3C*-75	0.7	1.6	4.3	38	8
0.3C*-100	1.2	2.7	4.3	65	7.6
0.9C*-100	1.4	3.2	7.5	76	13.5
0.9C*-135	2.4	5.2	7.5	130	13
1.5C*-135	3	6	7.5	162	12.5
1.5C*-175	5	9	12	270	20
3C*-135	5	9	19	270	33
3C*-175	8	14	19	432	33
6C*-175	10	17	24	392	40
6C*-200	12	20	24	470	40
6C*2-200	24	40	49	470	80
14C*-235	18	30	35	706	60
14C*-280	26	42	50	1020	85
14C*2-235	36	59	75	706	120
14C*2-280	51	84	96	1020	170
18C*-235	21	34	40	824	70
18C*-280	30	48	60	1176	100
18C*2-235	41	68	82	824	135
18C*2-280	59	97	123	1176	190
32C*-235	25	40	50	980	80
32C*-280	35	57	75	1372	115
32C*2-235	48	80	96	980	160
32C*2-280	68	113	130	1372	220
50C*-235	27	44	60	1060	90
50C*-280	39	3	82	1530	130
50C*-300	45	72	96	1765	150
50C*2-235	52	85	96	1060	170
50C*2-280	76	125	140	1530	250
50C*2-300	88	144	171	1765	290



## 7- Type Of Gas Over Oil Control System

DWG 1 - Local control



### Local control

Press lever of valve 10-PO to open or 10-PC to close with power supply

### Manual operation

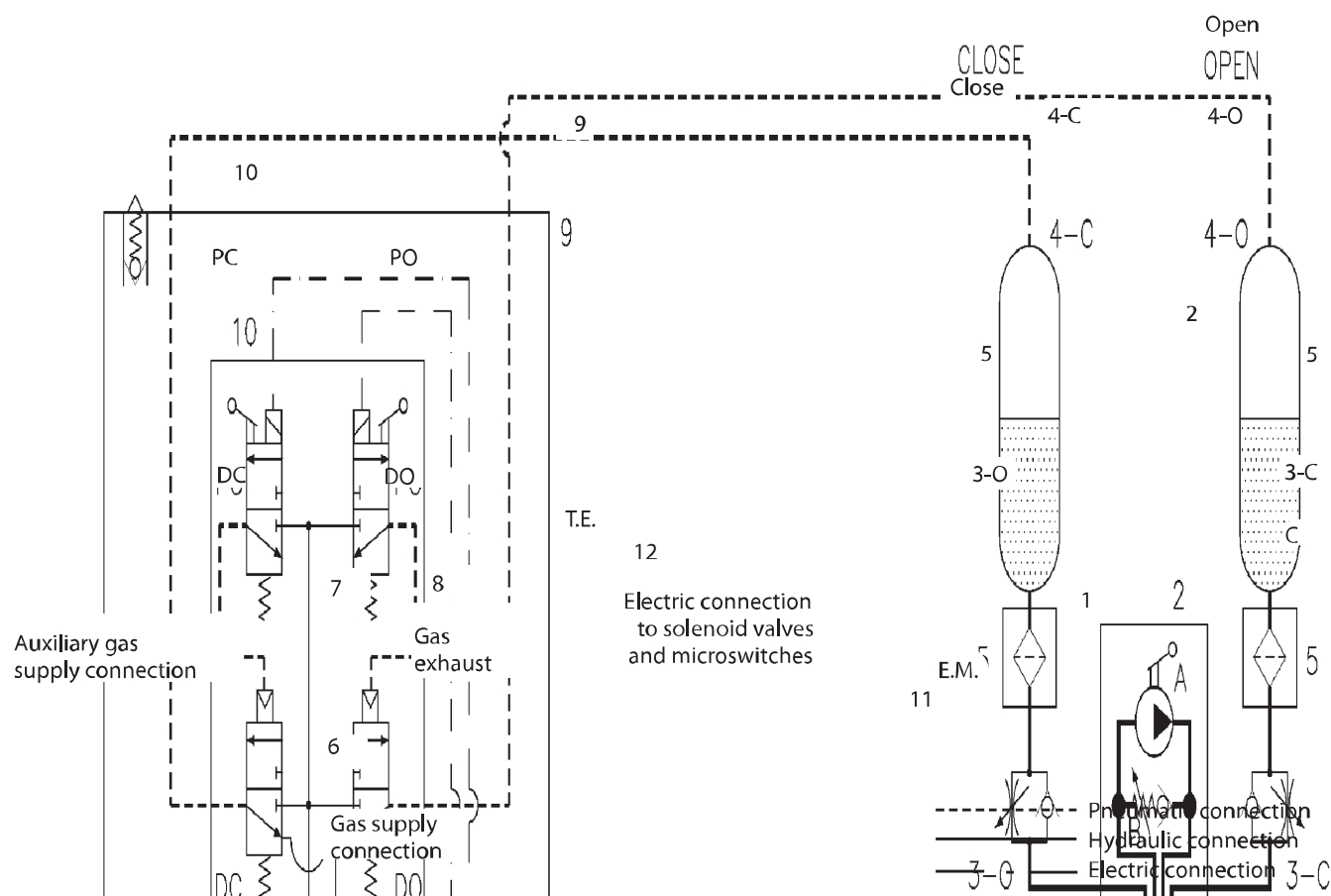
Select by the valve 2C the opening or closing operation and actuate the hand pump 2A

### Note

The operating diagram is drawn with control valves not actuated

Item	Name
1	Double-acting gas-over-oil actuator
2	Hydraulic manual override
	A – Handpump
	B – Adjustable relief valve
	C – Hand-operated directional control valve
3	Unidirectional flow regulator (adjustable setting)
4	Gas-hydraulic tank
5	Hydraulic filter
6	Stop valve
7	Gas filter/Condensate separator
8	Dust excluder with check valve
9	Control valves enclosure with vent valve
10	Double 3/2 n.c. hand-operated/spring-return valve
	PC – 3/2 n.c. hand-operated/ spring pilot valve (to close)
	PO – 3/2 n.c. hand-operated/spring pilot valve (to open)
	DC – 3/2 n.c. pneumatic pilot/spring-return valve (to close)
	DO – 3/2 n.c. pneumatic pilot/spring-return valve (to open)
11	Electric microswitches

DWG 2 - Local and remote control



### Electric remote control

Energize solenoid valve 10-PC to close or 10-PO to open the actuator, during all the valve stroke.

Solenoid valves must be de-energized at the end of the actuator operation.

### Local control

Press lever of valves 10-PO to open and 10-PC to close with power supply

### Manual operation

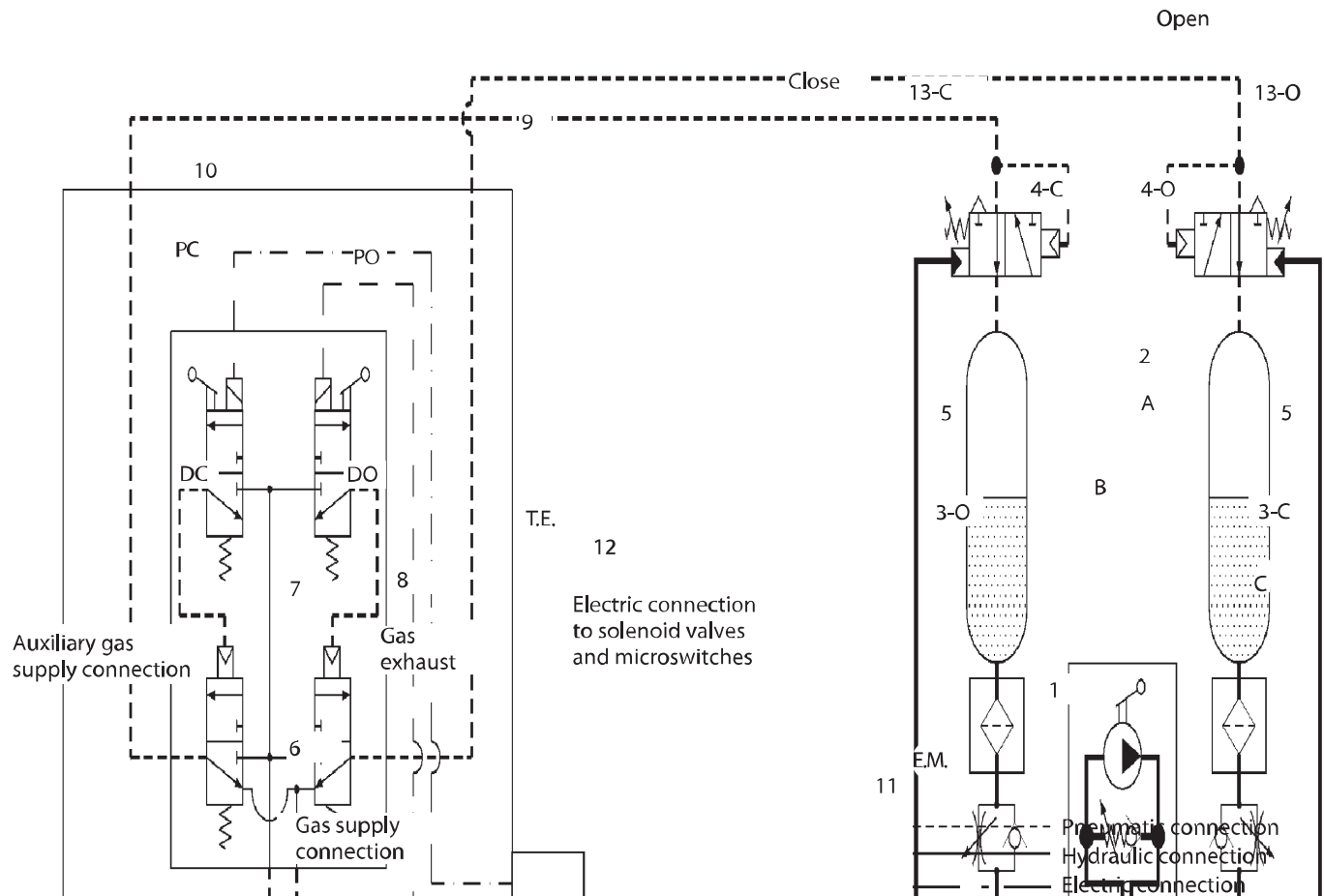
Select by the valve 2C the opening or closing operation and actuate the hand pump 2A

#### Note

The operating diagram is drawn with control valves not actuated

Item	Name
1	Double-acting gas-over-oil actuator
2	Hydraulic manual override
	A – Handpump
	B – Adjustable relief valve
	C – Hand-operated directional control valve
3	Unidirectional flow regulator (adjustable setting)
4	Gas-hydraulic tank
5	Hydraulic filter
6	Stop valve
7	Gas filter/Condensate separator
8	Dust excluder with check valve
9	Control valves enclosure with vent valve
10	Double 3/2 n.c. solenoid valve with manual override
	PC – 3/2 n.c. pilot solenoid valve, manual override (to close)
	PO – 3/2 n.c. pilot solenoid valve, manual override (to open)
	DC – 3/2 n.c. pneumatic pilot/spring-return valve (to close)
	DO – 3/2 n.c. pneumatic pilot/spring-return valve (to open)
11	Electric microswitches
12	Terminals enclosure

DWG 3 - Local and remote control, torque limiting device



### Electric remote control

Energize solenoid valve 10-PC to close or 10-PO to open the actuator, during all the valve stroke  
Solenoid valves must be de-energized at the end of the actuator operation

### Local control

Press lever on valves 10-PO to open or 10-PC to close with power supply

### Manual operation

Select by the valve 2C the opening or closing operation and actuate the hand pump 2A

### Torque limiting device

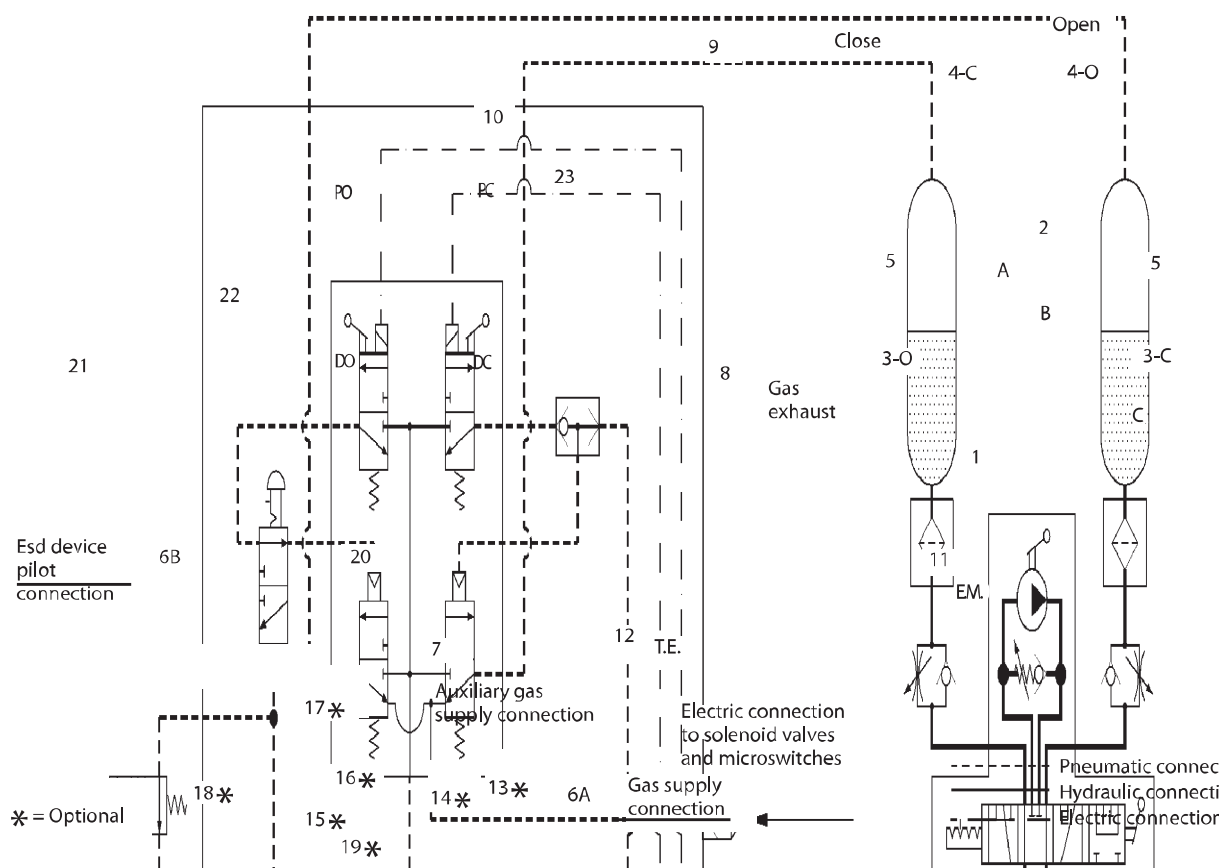
When the actuator output torque exceeds the set value, the torque limiting switch 13 stops the gas flow to the relevant gas-hydraulic tank 4, and the enclosed gas is exhausted

Item	Name
1	Double-acting gas-over-oil actuator
2	Hydraulic manual override
	A – Handpump
	B – Adjustable relief valve
	C – Hand-operated directional control valve
3	Unidirectional flow regulator (adjustable setting)
4	Gas-hydraulic tank
5	Hydraulic filter
6	Stop valve
7	Gas filter/Condensate separator
8	Dust excluder with check valve
9	Control valves enclosure with vent valve
10	Double 3/2 n.c. solenoid valve with manual override
	PC – 3/2 n.c. pilot solenoid valve, manual override (to close)
	PO – 3/2 n.c. pilot solenoid valve, manual override (to open)
	DC – 3/2 n.c. pneumatic pilot/spring-return valve (to close)
	DO – 3/2 n.c. pneumatic pilot/spring-return valve (to open)
11	Electric microswitches
12	Terminals enclosure
13	Torque limit switch

### Note

The operating diagram is drawn with control valves not actuated

DWG 4 - Local and remote control, emergency low pressure shut down



## Electric remote control

**Energize solenoid 10-PC to close or 10-PO to open the actuator during all the valve stroke. Solenoid valves must be de-energized at the end of the actuator operation.**

## Local operation

Press lever of valves 10- PO to open  
or 10- PC to close with power supply

## Manual operation

Select by the valve 2C the opening or closing operation and actuate the hand pump 2A

## Emergency shut down operation

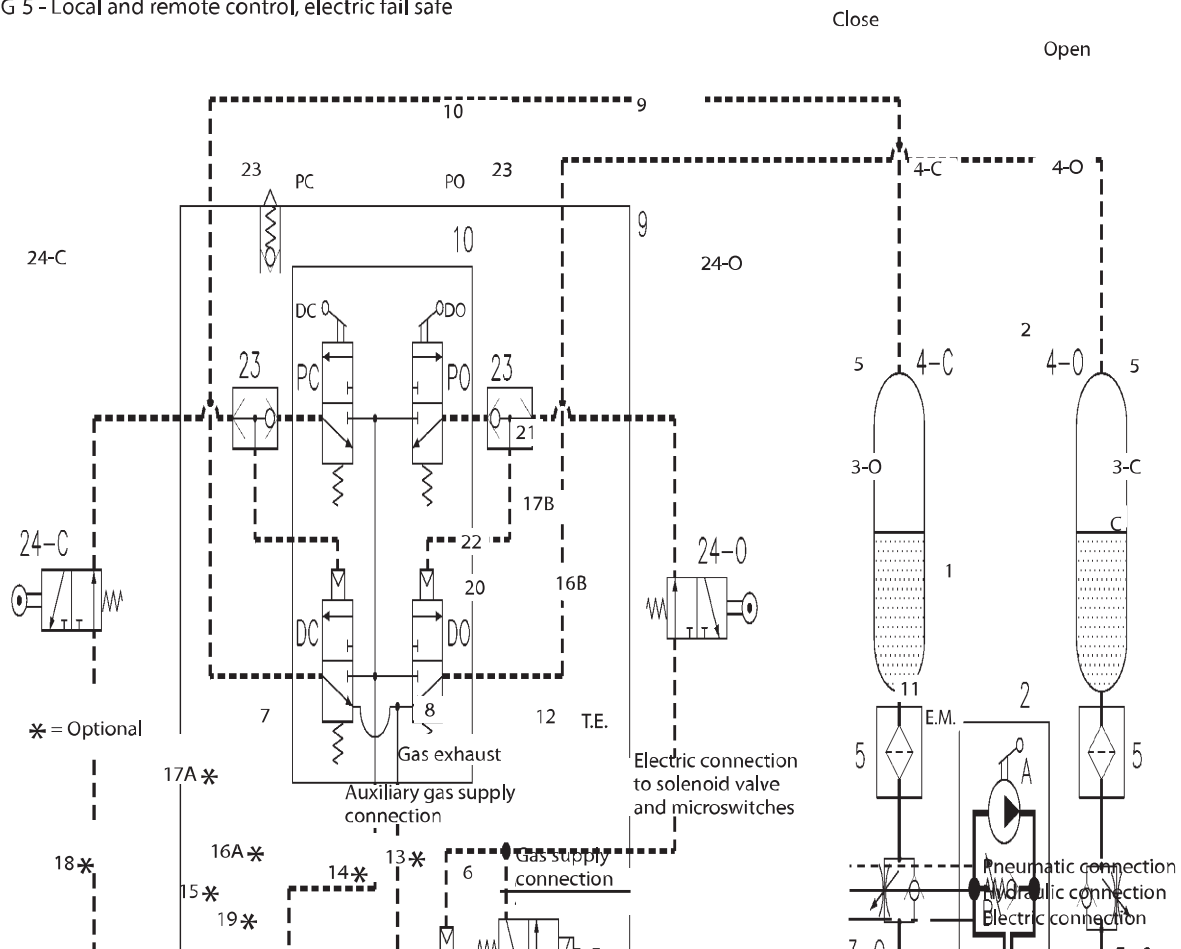
The pressure to be controlled is connected to the pressure switch (20) pilot. When the pressure decreases below the set point of the pressure switch (20), a pressure signal pilots the valve (22) to inhibit opening operation and power valve (10-PO) causes the actuator closing. The pilot pressure must be re-established and the opening operation inhibition valve must be manually reset before the actuator can be reopened.

### Note

The operating diagram is drawn for solenoid valves coils not energized, low pressure in the ESD device pilot line, and no pressure in the gas supply line and into the storage tank

Item	Name
1	Double-acting gas-over-oil actuator
2	Hydraulic manual override A – Handpump B – Adjustable relief valve C – Hand-operated directional control valve
3	Unidirectional flow regulator (adjustable setting)
4	Gas-hydraulic tank
5	Hydraulic filter
6	Stop valve
7	Gas filter/Condensate separator
8	Dust excluder with check valve
9	Control valves enclosure with vent valve
10	Double 3/2 n.c. solenoid valve with manual override PC – 3/2 n.c. pilot solenoid valve, manual override (to close) PO – 3/2 n.c. pilot solenoid valve, manual override (to open) DC – 3/2 n.c. pneumatic pilot/spring-return valve (to close) DO – 3/2 n.c. pneumatic pilot/spring-return valve (to open)
11	Electric microswitches
12	Terminals enclosure
13	Mechanical filter
14	Check valve
15	Gas storage tank
16	Needle valve
17	Pressure gauge
18	Relief valve
19	Manual drain valve
20	N.o. pneumatic pressure switch (adjustable setting)
21	3/2 n.o. cam-actuated/spring-return valve
22	3/2 n.o. pneumatic pilot/hand-return valve
23	Higher pressure shuttle valve

DWG 5 - Local and remote control, electric fail safe



### Electric remote control

Energize solenoid 21 to open, de-energize to close the actuator: in case of electric supply failure the actuator moves automatically in closing. At the end of actuator strokes the valves 24 are actuated and cause the exhaust of the gas utilized for the operation.

### Local control

Move the valve 20 to "local operation". Press lever on valves 10-PO to open or 10-PC to close with power supply.

### Manual operation

Move the valve 20 to "local operation". Select by the valve 2C the opening or closing operation and actuate the hand pump 2A.

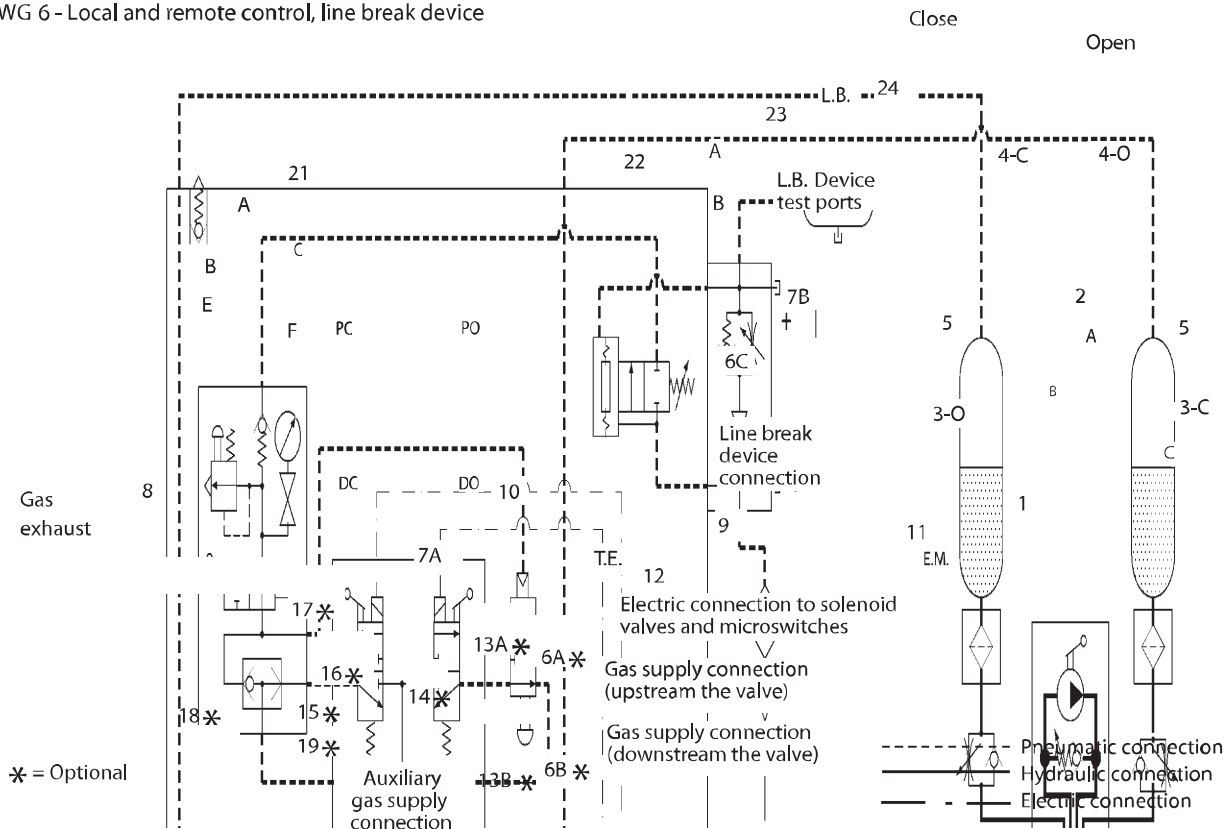
### Note

The operating diagram is drawn for solenoid valve coil not energized, no pressure in the gas supply line and into the storage tank, valve in intermediate position.

Item	Name
1	Double-acting gas-over-oil actuator
2	Hydraulic manual override
	A – Handpump
	B – Adjustable relief valve
	C – Hand-operated directional control valve
3	Unidirectional flow regulator (adjustable setting)
4	Gas-hydraulic tank
5	Hydraulic filter
6	Stop valve
7	Gas filter/Condensate separator
8	Dust excluder with check valve
9	Control valves enclosure with vent valve
10	Double 3/2 n.c. hand-operated/spring-return valve
	PC – 3/2 n.c. hand-operated/ spring pilot valve (to close)
	PO – 3/2 n.c. hand-operated/spring pilot valve (to open)
	DC – 3/2 n.c. pneumatic pilot/spring-return valve
	DO – 3/2 n.c. pneumatic pilot/spring-return valve
11	Electric microswitches
12	Terminals enclosure
13	Mechanical filter
14	Check valve
15	Gas storage tank
16	Needle valve
17	Pressure gauge
18	Relief valve
19	Manual drain valve
20	3/2 hand-operated valve
21	3/2 n.o. solenoid/spring-return pilot valve
22	3/2 n.o. pneumatic pilot/spring-return valve
23	Higher pressure shuttle valve
24	3/2 n.o. cam-actuated/spring-return valve



DWG 6 - Local and remote control, line break device



### Electric remote control

Energize solenoid valve 10-PC to close or 10-PO to open the actuator, during all the valve stroke  
Solenoid valves must be de-energized at the end of the actuator operation

### Local control

Press lever on valves 10-PO to open or 10-PC to close with power supply

### Manual operation

Select by the valve 2C the opening or closing operation and actuate the hand pump 2A

### Line break operation

A rate of pressure drop in the pipeline causes a differential pressure across the diaphragm valve 22. When the differential pressure is higher than the preset value, the diaphragm valve 22 trips and pilots the valve 20 to inhibit open operation and the power valve 10C causes the actuator to close.  
After the line break intervention, the inhibition valve (20) must be manually reset before the actuator can be reopened.

The line break pilot has to be connected to the pipeline (downstream the valve) and the pressure intake has to be separate from the gas supply pressure intake

### Note

The operating diagram is drawn with control valves not actuated

Item	Name
1	Double-acting gas-over-oil actuator
2	Hydraulic manual override
A	Handpump
B	Adjustable relief valve
C	Hand-operated directional control valve
3	Unidirectional flow regulator (adjustable setting)
4	Gas-hydraulic tank
5	Hydraulic filter
6	Stop valve
7	Gas filter/Condensate separator
8	Dust excluder with check valve
9	Control valves enclosure with vent valve
10	Double 3/2 n.c. solenoid valve with manual override
PC	3/2 n.c. pilot solenoid valve, manual override (to close)
PO	3/2 n.c. pilot solenoid valve, manual override (to open)
DC	3/2 n.c. pneumatic pilot/spring-retu
DO	3/2 n.c. pneumatic pilot/spring-retu
11	Electric microswitches
12	Terminals enclosure
13	Mechanical filter
14	Higher pressure shuttle valve (double check valve)
15	Gas storage tank
16	Needle valve
17	Pressure gauge
18	Relief valve
19	Manual drain valve
20	3/2 n.o. pneumatic pilot/hand-return valve
21	Shuttle valve device
A	Check valve
B	Low pressure vent valve
C	Stop valve for pressure gauge
D	Pressure gauge
E	2/2 hand-operated valve
F	Higher pressure shuttle valve
22	2/2 n.c. diaphragm pilot valve (adjustable)
23	Check valve with orifice for line break device
A	Check valve with orifice
B	Stop valve
24	Reference tank for line break device

Your enquiries for gas-hydraulic actuators can be efficiently processed when you supply the information requested on this page.

Please use this page as guidance when sending your enquiries; if you need assistance just directly contact our offices.

## 8- Enquiry and Ordering Data

### Applicable documents

Customer requisition n° .....

Data sheet .....

Specification .....

### Valve data

Manufacturer .....  
 Model ..... Type .....  
 Size : ..... ☐ mm ☐ inches  
 Class ..... ☐ Ansi/ ☐ Api  
 Diff. pressure: from ..... to .....  
☐ bar ☐ psi  
 Service .....  
 .....  
 .....

Torque required to operate the valve  
 (safety factor) ☐ Nm ☐ Lbs-in  
 At 0° ( Close Valve ) to open:  
 ..... at min. diff. press. (90°)  
 ..... at max. diff. press. (90°)  
 At 90° ( Open Valve ) to close:  
 ..... at min. diff. press. (90°)  
 ..... at max. diff. press. (90°)  
 Running: ..... Angular position: .....°  
☐ To Open .....  
☐ To Close .....  
 Coupling dimensions  
 Customer's drawing N° .....

Stem  
☐ Pepco Standard ☐ According to Customer's DRW  
 diameter/square side .....mm  
 height .....mm  
 key dimension ..... x .....mm  
 Flange Pepco standard ☐  
 According to customer's DRWG ☐  
 Operating time (sec.): .....  
 Opening: from ..... to .....  
 Closing: from ..... to .....  
 Installation  
 pipe axis: ☐ vertical ☐ horizontal  
 valve stem: ☐ vertical ☐ horizontal  
 cylinder axis: ☐ parallel ☐ perpendicular to the pipe axis

notes .....  
 .....  
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### Actuator data

Gas supply  
 Pressure: from ..... to .....  
☐ bar ☐ psi  
 Temperature ..... ☐ °C ☐ °F  
 From: ☐ Main line ☐ Separate Line  
 Composition: .....

Connections: q.ty .....  
 size .....  
 Environment conditions .....  
 Temperature ..... ☐ °C ☐ °F  
 Required painting cycle .....

Notes .....  
 .....  
 .....  
 .....  
 .....

### Control system

Remote electric control  
 Solenoid valve to Open ☐  
 Solenoid valve to Close ☐  
 Coils supply voltage .....  
☐ DC ☐ AC ..... Hz  
 Local control ☐  
 Emergency operation control .....  
 Set value .....  
 Other control .....  
 .....  
 Electric limit switches  
 Open: q.ty .....  
 Closed: q.ty .....  
 Intermediate: q.ty .....  
☐ SPDT

Supply voltage .....  
☐ DC ☐ AC ..... Hz  
☐ DPDT  
 Load: Inductive ..... Amps  
 Resistive ..... Amps  
☐ Sealed SPDT  
☐ SPDT: sealed under inert gas  
 Type/Manufacturer .....  
 Electric position transmitter  
☐ from 0 to ..... Ohm  
☐ from 1 to ..... V  
☐ from 4 to 20 mA  
☐ Special .....  
 Local position indicator  
☐ Standard ☐ Special

Electric components protection  
☐ Weatherproof IP .....  
☐ Explosionproof .....  
 Standard .....  
 Cables entries N° ..... size .....  
 Gas storage tank  
 N° of operations .....  
 Code .....  
 Starting pressure ..... ☐ bar ☐ psi  
 Safety valve ☐ Code .....  
 Other accessories .....  
 .....  
 .....  
 .....

notes .....  
 .....  
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