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24/15/11a

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ACTUADORES ELÉCTRICOS Y ELECTROHIDRÁULICOS

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SECTION 1 ACTUADORES ELECTRICOS

1.1 IQ RANGE ACTUATOR

The IQ Range of electric actuators is described in publication E110E and includes:

- * Double sealed watertight enclosure to IEC529, IP68 (BS5490)
- * Terminal box with three threaded cable entries. (Fourth entry as an option).
- * Integral controls.
- * Non-intrusive commissioning and control configuration using the supplied infra-red IQ Setting Tool.
- * Integral illuminated, digital valve position indicator showing 1% increments in valve position and LEDs showing valve Open/Intermediate/Closed.
- * On-board data logger included as standard.
- * IrDA compatible for local and remote actuator analysis via cell phone or PC.
- * Data logging and commissioning is also supported with power off.
- * One setting tool is provided Free of Charge with the first 10 actuators, two setting tools for orders upto 50 units and three setting tools for orders of 51 unit or more.

1.2 ENCLOSURE

Enclosure also certified for Explosionproof Factory Mutual approved for Class Groups C and D Division hazardous areas to NEC Article 500

1.3 POWER SUPPLY

The actuators offered are suitable for operation on a nominal supply of 460V 3ph-60Hz.

1.4 WIRING DIAGRAM

Wiring diagram 3000-000 includes:

- Control circuit transformer
- Integral local control and local/remote selectors
- Four user configureable indication contacts
- Monitor relay with changeover contact
- Automatic phase rotation correction

1.5 WIRING DIAGRAM

Wiring diagram 3000-200 includes:

- Control circuit transformer

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- Integral local control and local/remote selectors
- Four user configureable indication contacts
- Monitor relay with changeover contact
- Automatic phase rotation correction
- Pack-Scan Integral Field Unit (Valve control/indication via 2 wire loop)

1.6 CONTRACT DOCUMENTATION

All actuators are manufactured and tested strictly following Rotork's Quality Plan and Test Procedures. These are Rotork's standard documents and, as such, they cannot be modified. These documents are available to the customer in case of being required during quotation stage.

Within the order only the standard documentation will be supplied, which includes a wiring diagram, an installation and maintenance manual and a test certificate (the last one is supplied after delivering each actuator). If additional documentation is required, please specify the type of documentation and required number of copies and a quotation for it will be sent.

1.7 ACTUATOR DRIVE BUSH

The actuator drive bush is supplied blank, for you to machine to suit your valve stem or gearbox input shaft.

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SECTION 2 ACTUADORES ELECTROHIDRAULICOS

2.1 OPERATING CONDITIONS

AMBIENT CONDITIONS

Actuators and relevant accessories are suitable for use under hostile environmental conditions both for on and off-shore, considering exposure to salt laden, dust laden or corrosive atmosphere.

Ambient conditions considered are the following:

Minimum ambient temp. -10°C

Maximum ambient temp. +50°C

HAZARDOUS AREAS

All equipment offered is certified according to European standards, and suitable for allocation in hazardous area, gas group IIB, temperature class T3 as minimum, and with minimum ingress protection IP 65

POWER SUPPLY

Hydraulic actuators will be operated by mineral oil at the following pressure range:

- minimum 103 Bar g (actuator sizing)
- nominal 140 Bar g
- maximum 195 Bar g
- design 220 bar g

ELECTRIC INPUT POWER

24 vdc (electric connections M20x1,5)

2.2 QUALITY ASSURANCE

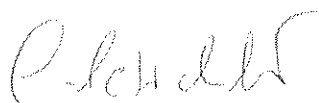
QUALITY CONTROL SYSTEM AND QUALITY PLAN

Rotork Fluid System production activities are governed by our ISO 9001 certified Quality Control System and Quality plan, which can be made available on request.

TEST PROCEDURES

The prices quoted are inclusive of Rotork Fluid System standard inspection and testing according to our internal procedure QS-024, (available on request).

Should you have specific requirements which differ from our standard, please submit these to Rotork Fluid System for technical evaluation; should these have any technical or commercial impact on our quotation we may need to revise our offer.



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2.3 TECHNICAL DESCRIPTION ACTUATORS

ACTUATOR SERIES GH/D (HYDRAULIC) – GENERAL DESCRIPTION

The Rotork Fluid System hydraulic double acting actuator series EH/D is based on the scotch yoke mechanism especially designed to provide an output torque curve which covers the most common quarter turn valve torque requirement along the full 90° stroke.

Actuator series EH/D is suitable to actuate medium and large size / class quarter turn valves, which require a max. actuator output torque provided up to **600.000 Nm**.

The EH/D actuators includes the following main features:

- Totally enclosed weatherproof body complete with relief valve to avoid any undesired overpressure.
- Scotch yoke mechanism in canted or symmetric execution.
- Bronze sliding blocks to ensure minimal friction and long service life.
- Alloy steel chromium plated thrust bar to support the transverse thrusts of the scotch yoke.
- Carbon steel single acting hydraulic cylinder electroless nickel-plated to reduce surface roughness and provide minimum friction and maximum protection against corrosion.
- Carbon steel piston supported by chromium plated piston rod, with rubber seals and PTFE sliding ring, to reduce friction and avoid stick slip effect even after prolonged periods without operation
- Mechanical end stoppers on hydraulic cylinder to ensure accurate angular stroke adjustment (standard execution 90° +/-5°). Stop screw is externally protected by means of a painted carbon steel cap nut.
- Visual position indicator showing actuator / valve full stroke.

2.4 TECHNICAL DESCRIPTION – CONTROL PANELS

CONTROL CIRCUIT

Our offer is based on and limited to the items in this quotation.

Items included in this offer:

- EH actuator system, including power unit, control enclosure, and solenoid valves.
- Remote/Local/Offline selector switch
- Local Open/Close switch
- 4 x SPDT Limit switches - 15 Amp at 110VAC, 3A at 24 VDC dry contact type.
- Local LCD display - shows position, system pressure and includes red and green indicating lights.
- Nominal System Pressure (psi) 1500
- Actuator Type Quarter Turn
- Actuator Action Fail last
- Fail Position close.

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• Input Power (V)	24 vdc
• Control Type	On/Off
• Area Class	Explosion Proof Class1, Div1, Gr C& D, T3B
• Close Stroke Time (sec)	120
• Open Stroke Time (sec)	120
• Close Stroke Time Adjustability	YES
• Open Stroke Time Adjustability	YES
• Hydraulic Manual Override pump	YES
• Network Card	ModBus
• Valve Stem Orientation	Vertical Stem
• Close Direction	Clockwise

A setting tool is required for EH system setup. One setting tool is provided free of charge for EH orders for up to 10 actuators, two setting tools for up to 50 actuators, and three setting tools for orders containing more than 50 actuators. Additional tools are available at an additional charge.

EH HYDRAULIC ACCUMULATOR

The spring return electro-hydraulic system will be designed to operate Ball valves. The actuator will be supplied with a hydraulic accumulator that has been sized for 3 actuator strokes. The purpose of the accumulator is to provide:

- 1) Increased speed of operation
- 2) Power to drive the valve to the close position upon loss of power or upon receipt of an ESD signal.
- 3) Power to operate the actuator after loss of power
- 4) Adjustable stroke time

The actuator will operate from the accumulator at all times. After each actuator movement, the accumulator will be partially depleted and will need some time to recharge the volume of oil that was used. The recharge time after each full stroke of movement will be 5 minutes or less. If the actuator is commanded to move several times in a row, and the accumulator becomes depleted, the actuator stroke time will be slower than what is indicated on this quotation, and the fail stroke will not be available until the accumulator is allowed to recharge.

2.5 PAINTING

Actuators and relevant accessories not in stainless steel or otherwise corrosion protected will be painted according to Rotork Fluid System painting cycle **PC04P3011** as follows.

sandblasting to grade sa 2 1/2"
inorganic zinc primer
intermediate coat epoxy
final coat polyurethane
total dry film thickness
final standard color

D.F.T. 75 microns
110 microns
40 microns
225 microns
RAL 3011 (dark red)

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2.6 COMMENTS

1. For actuator sizing we have considered the torque figures provided and added a minimum safety factor of 1,2 to torque, please confirm as safety factor was not specified
2. For actuator quotation we have considered the electric power supply of 24vdc,
3. Please check indicated actuator torque output along stroke against valve requirements.
4. Actuators have been sized considering a minimum supply pressure of 1500 Psig.
5. Please note that the actuators are designed to withstand the maximum supply pressure (static pressure applicable to fully stroked actuator against the travel stop) and to override the valve torque with a Safety Factor included at the minimum pressure supply.

In case of the valve stuck on position, the actuator output torque generated by the hydraulic cylinder may exceed (depending on the inlet pressure supplied) the max allowable structural torque of the actuator.
6. Quoted actuators double acting fail last, as requested. Pls note that in data sheets actuator lines 35/36 the actuator type request with return by spring it is contradictory with line 31 and 40/41.
7. The control panel accessories are not in stainless steel as not requested.
8. The control panel accessories have been sized for an operating/fail time of 120 (3 sec for inch valve), pls see attached performance table.
9. Pls. note that we use oil Mobil DTE 11.
10. Please note that we have offered an accumulator bank with 2 strokes of stored high-pressure oil. If mains power is available the motor will turn on approximately after a 300 psig drop to recharge the accumulators to full charge. If mains (motor) power is lost the motor will not turn on, and the actuator will operate from accumulator only.
11. The valve/actuator adaption parts are included in this offer. Please note that the actuator/valve bolting are not included in the supply.
12. The quotation includes the above suggested painting cycle (section 5) should you require a different solution pls revert and we shall revise our offer accordingly assessing the impact on price/delivery.
13. This bid is limited to materials, procedures and documentation described in the quotation itself.
14. Please note that we have included ModBus network card, please confirm.
15. All the torque/thrust values are theoretical. The real values can be up to 20% higher.
16. If a witness test is required, Pls. note that the indicated delivery time is related to the goods being ready before the witness test.

			DESCRIPCION DEL BIEN ENTREGADO																										PLAZO ENTREGA (DÍAS CALENDARIO)			
ITEM	CANT.	UND.	Tipo Válvula	Descripción	STD. Diseño	Tamaño STD	Eje Sello STD	Complemento de otros STDs	Tamaño STD	Clase (lbs)	Extremos	Op.	Cuerpo	Trim N°	Boiler Disco	Huallipir Pasador	Asiento/ Sello	Tonillos/ Tuercas	Válvula Peso Unitario (kg)	Válvula Total (kg)	Torque (N-m) requerido válvula	Torque (N-m) ofrecido actuador	Thrust (kN)	Dámetro eje (mm)	ISO Carcin	N° vueltas	ACTUADOR	TIPO ACTUADOR	RPA	Optimo (segs)		
1	7	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	34"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	1155	2555	1875	2551	320	2 1/4 3/4CHIE	F30	622.5	74	ELECTRICO	IQ35F25 23	29	154	130
2	4	EA	Bola guadaña (tipo turbinas)	3PC	API 598	30"	API 598	MADE MR 0175 ANSI B16.5 API 598	Completo	150	Embrudados RF	BS	A105		VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	5900	22000	10000	18000	-	9 1/10	F35	-	-	ELECTRICO	IQ35F25 23	255	125	160
3	10	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	12"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	283	2830	410	542	105	1 1/2 3/4CHIE	F16	316	50	ELECTRICO	IQ35F16 A	43	69	150
4	4	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	18"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	524	2005	700	1016	160	1 3/4 3/4CHIE	F25	408	60	ELECTRICO	IQ35F25 A	57	68	130
5	3	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	18"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	662	1880	875	1287	175	1 7/8 3/4CHIE	F25	408	73	ELECTRICO	IQ35F25 A	43	101	150
6	5	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	24"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	1195	5975	1875	2551	320	2 1/4 3/4CHIE	F30	622.5	74	ELECTRICO	IQ35F25 23	21	154	180
7	1	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	34"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	3550	3550	4900	6595	680	3 3/4CHIE	F40	885	60	ELECTRICO	IQ35F25 23	220	179	190
8	2	EA	Bola guadaña (tipo turbinas)	3PC	API 598	18"	API 598	MADE MR 0175 ANSI B16.5 API 598	Completo	150	Embrudados RF	BS	A105		VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	1500	3000	5000	7500	-	9 1/2	F25	-	-	ELECTRICO HIDRAULICO	IQ35F25 A	35	224	
9	2	EA	Bola guadaña (tipo turbinas)	3PC	API 598	30"	API 598	MADE MR 0175 ANSI B16.5 API 598	Completo	150	Embrudados RF	BS	A105		VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	5500	11000	15000	27700	-	9 1/10	F35	-	-	ELECTRICO HIDRAULICO	IQ35F25 A	90	224	
10	2	EA	Bola guadaña (tipo turbinas)	3PC	API 598	30"	API 598	MADE MR 0175 ANSI B16.5 API 598	Completo	150	Embrudados RF	BS	A105		VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	5500	11000	15000	27700	-	9 1/10	F35	-	-	ELECTRICO HIDRAULICO	IQ35F25 A	90	224	
11	3	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	14"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	237	1181	500	678	120	1 5/8 3/4CHIE	F16	372	59	ELECTRICO	IQ35F25 A	57	61	160
12	3	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	10"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	193	580	530	474	65	1 3/4 3/4CHIE	F16	270	41	ELECTRICO	IQ35F25 A	57	45	150
13	1	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	2"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	18	18	40	142	19	3/4 3/4CHIE	F10	64.5	16	ELECTRICO	IQ35F25 A	115	5	150
14	1	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	1 1/2"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	12	12	35	34	17	5/8 3/4CHIE	F07	30	10	ELECTRICO	IQ35F25 A	115	6	150
15	1	EA	Computadora con flecha	BB - borola empujador/lepa atomizada	API 598	20"	API 598	MADE MR 0175 ANSI B16.5 API 598	Regular	150	Embrudados RF	BS	A276 VCB 5#	5#	VCB + Sealless	A276 410	A105 + STL6	37M / 2H4	810	810	1330	1554	250	2 3/4CHIE	F30	518	92	ELECTRICO	IQ35F25 A	43	113	180

* Los días de calendario del plazo de entrega se contabilizan a partir de la recepción (en Kebab) de planos firmados y sellados por parte de Fertipneu

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