OPERATION AND MAINTENANCE MANUAL

Model: G501

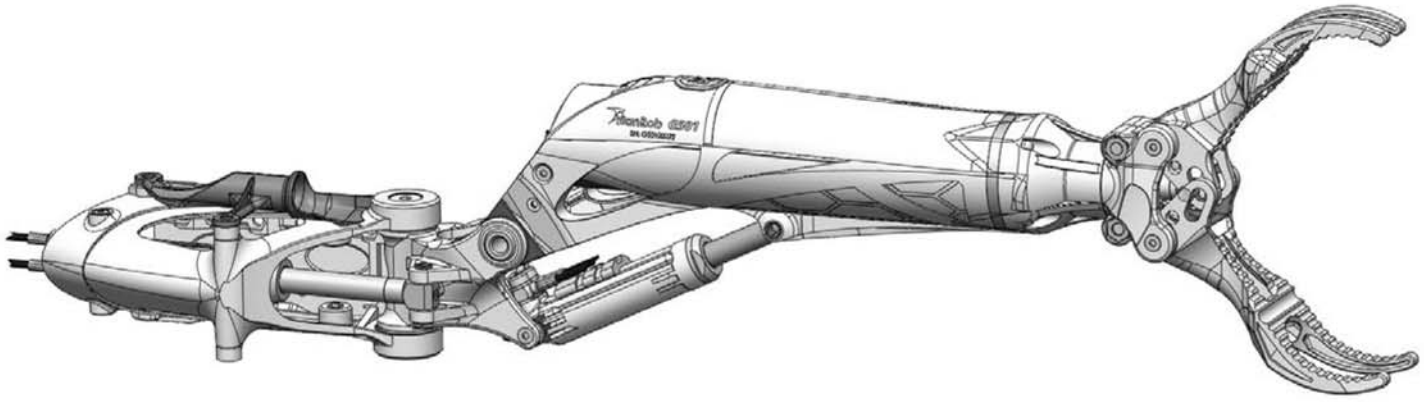
Equipment S/N: G50100222

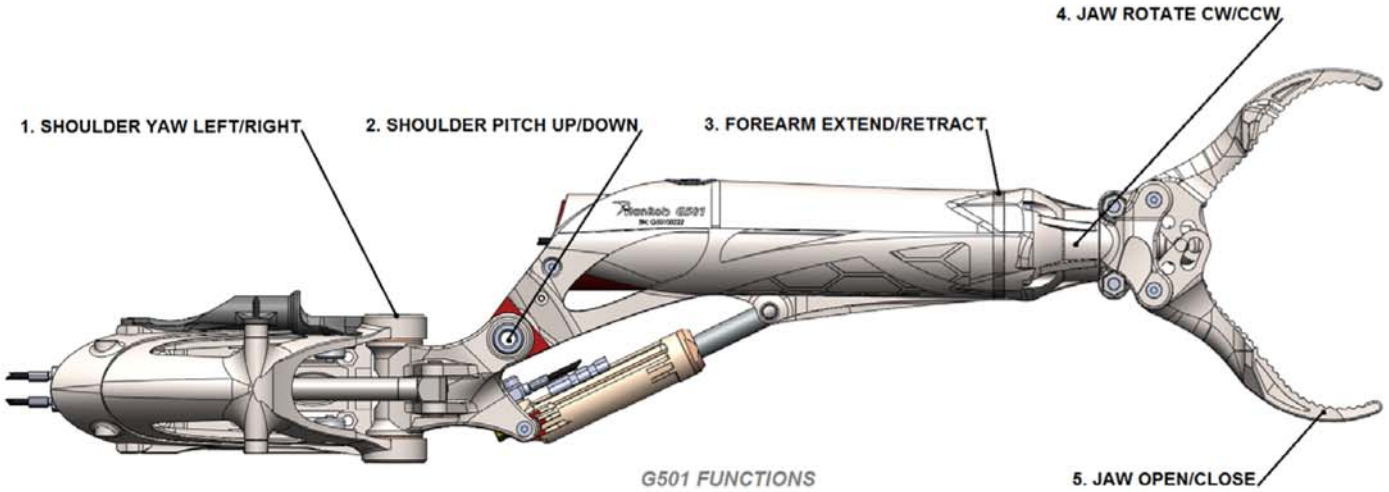
Document Date / Rev.: 28 may 2022 / 01

1.-INTRODUCTION

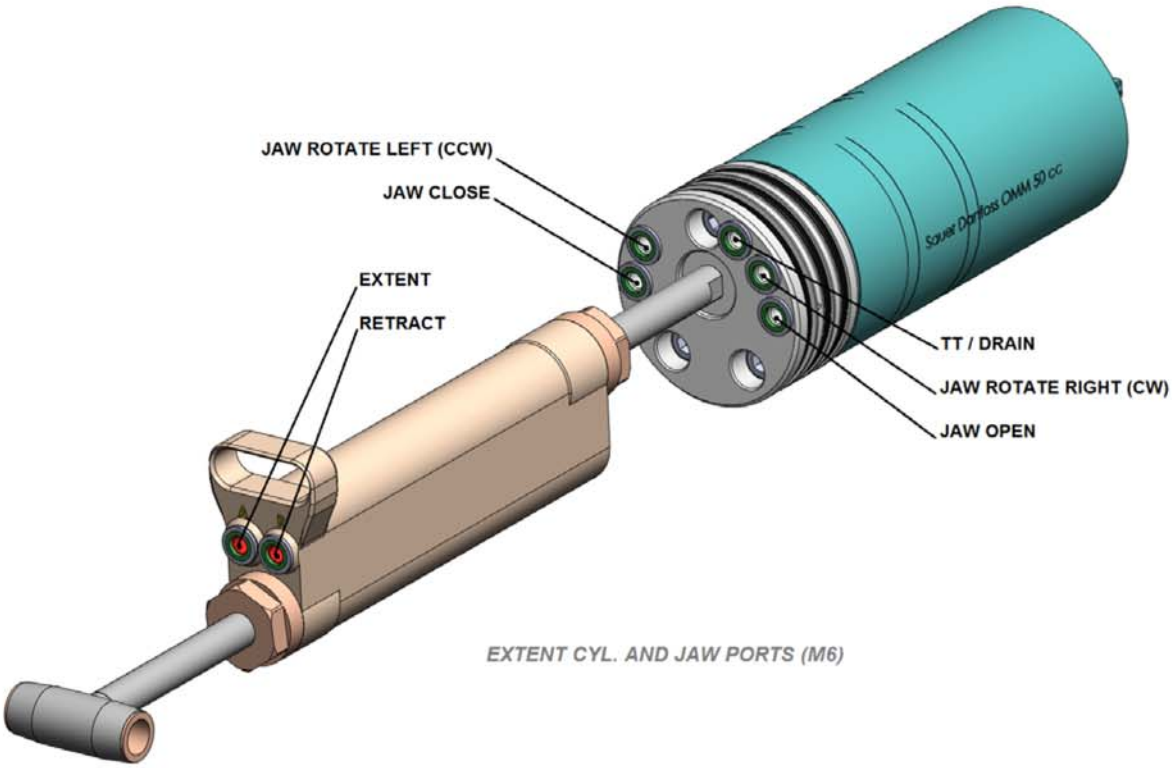
The TITANROB G501 is a titanium built hydraulic grabber designed for heavy duty subsea applications on ROV (Remote Operated Vehicle) submarine operations. It is a manipulator with enhanced characteristics on weight/power ration and capabilities: By using titanium as main material, lower weight and more mechanical characteristics are achieved, allowing improved dimensioning. By using the same hydraulic power supply, the ROV vehicle has a more powerful and rugged tool, with lower weight and dimensions allowing lower buoyancy needs, and thus improving the ROV vehicle overall capabilities.

The G501 is a five function hydraulic manipulator developed for Light Work Class ROVs. Resistant, lightweight and reliable, it's designed for heavy duty ROV works improving performance and operation. It could be rate operated by any low power (1kW) hydraulic power unit and a five function with drain/comp line valve pack fitted in the ROV vehicle.

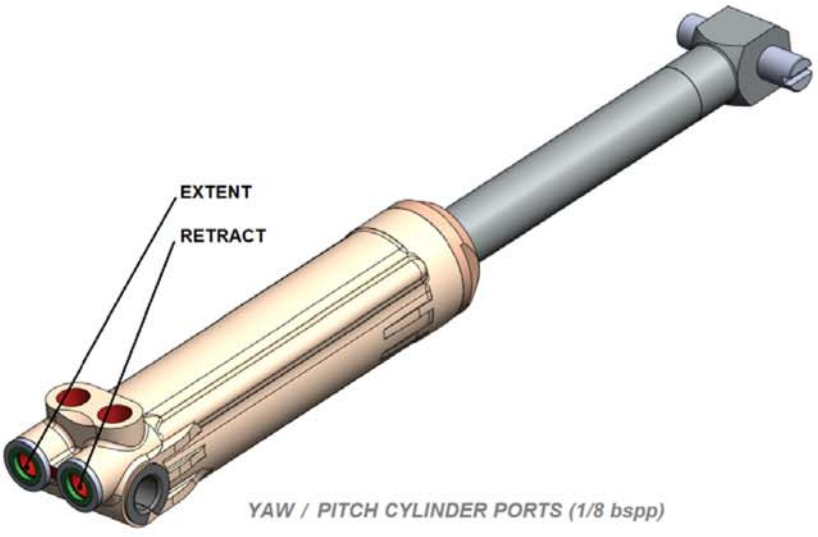




G501 FUNCTIONS



EXTENT CYL. AND JAW PORTS (M6)



YAW / PITCH CYLINDER PORTS (1/8 bspp)

2.-SPECIFICATIONS

GENERAL SPECIFICATIONS

Depth rating (m)	3000
Weight in air (kg)	12,70
Weight in water (kg)	9,50
Maximum reach (mm)	900
Lift at full extension (kg)	80 @ 206 bar
Maximum lift (kg)	100 @ 206 bar
Yaw Grip (kgf)	250
Yaw Torque (Nm)	80
Dimensions stowed LxWxH (mm)	290 x 230 x 750
Operating temperature (C), limited by hyd. Oil specs	-5 / +55
Construction Main Materials	Ti6Al4V Titanium AISI 316 SS

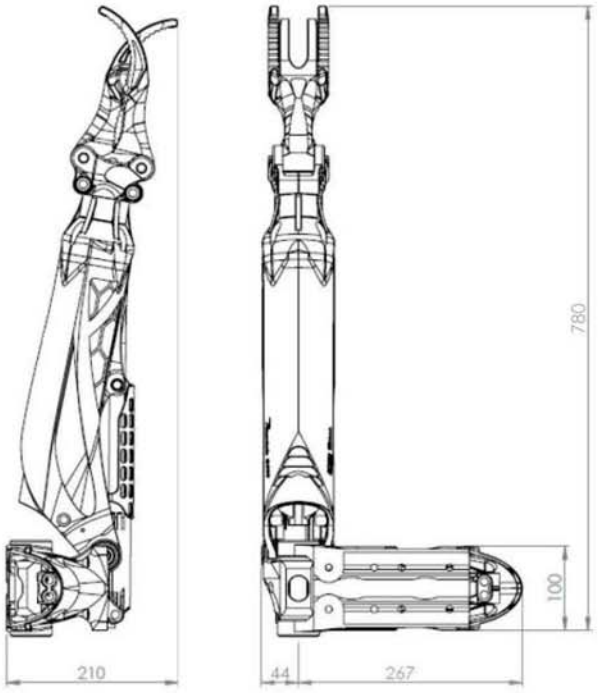
FUNCTIONS

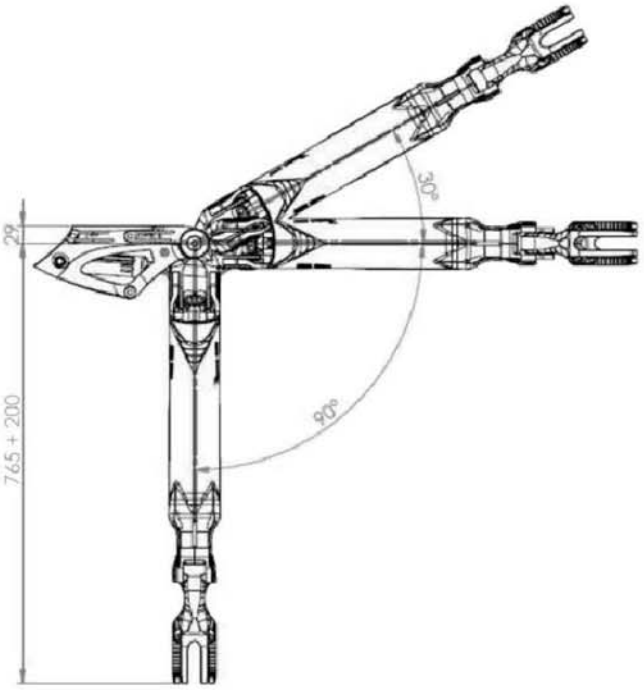
SHOULDER Azimuth (Yaw) (deg)	120 (+90 / -30)
SHOULDER Pitch (deg)	110 (+80/-30)
EXTENSION (mm)	200
JAW Rotate (deg)	360 continuous
JAW Opening (mm)	255

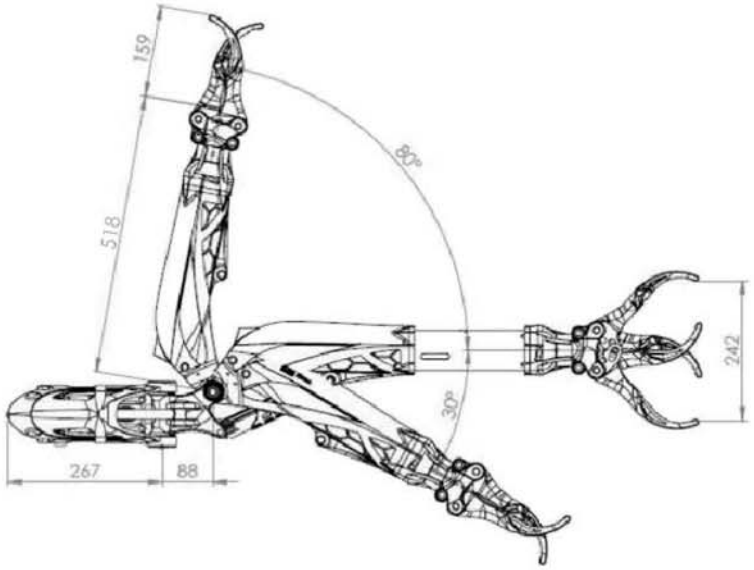
HYDRAULIC REQUERIMENTS

Standard Hydraulic Oil	ISO 32
Operating pressure (bar)	Up to 206 bar
Operating Flow Rate (lpm)	Min 1.5
Test Pressure (bar)	220
Max. Oil Temp. (C)	55

DIMENSIONS:







3.-INSTALLATION

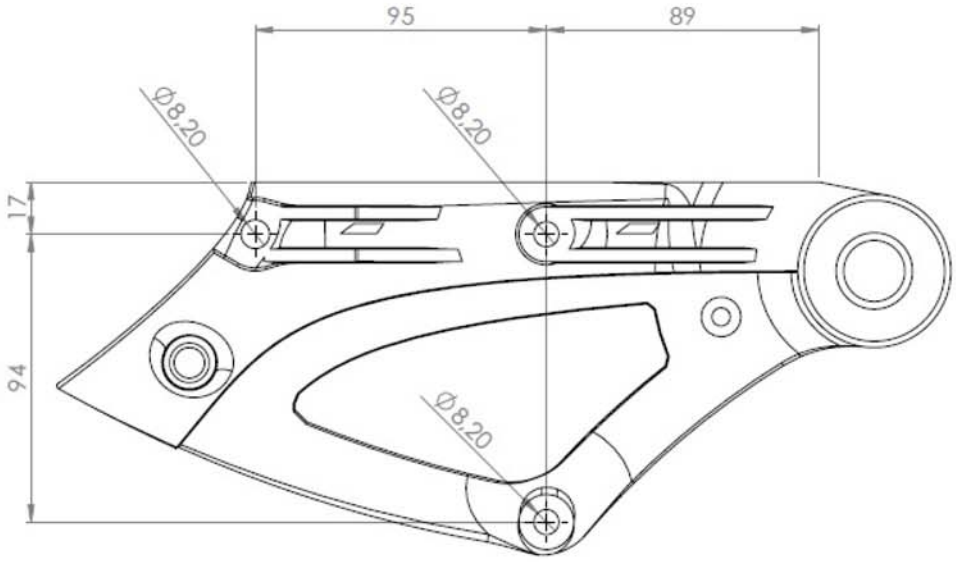
The five function hydraulic manipulator G501 has eleven (11) hoses to be straight connected to the solenoid valve pack of the ROV hydraulic closed circuit; ten hoses for functions from A1/B1 to A5/B5 and a drain/compensation hose (TT). See annexed list of hoses/functions

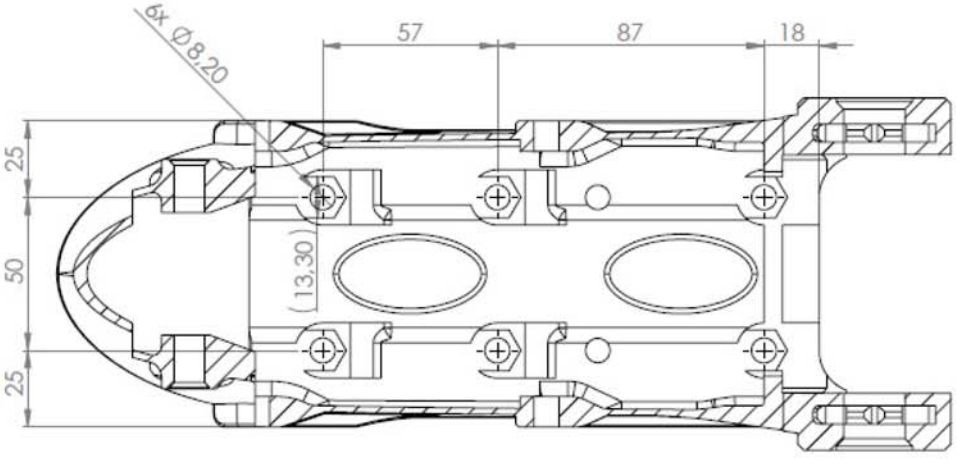
- **SAFETY NOTICE:** This is an hydraulic powered equipment, all personnel must wear protective clothing and goggles. Keep a safe area around the equipment when in operation. Ensure that all power is OFF and without pressure when disassembling any of this equipment or carrying out maintenance work. Any maintenance work must be carried out in accordance with standard safety procedures for hydraulic equipment

- **TECHNICAL NOTE:** Shoulder YAW Right / Left (cylinder Extend/Retract) function should be connected to A1 or B1 port depending on Starboard or Port side position of the manipulator. See annexed list of hoses/functions

- **Drain hose must always be connected directly to compensator or tank. Never plug the Drain Hose with a cap or valve when operate the grabber**
- Oil supply should be between 140 and 206 bar, with an average flow of 1,5 l/min. Recommended oil ISO32 (as Shell Tellus T32) with preferable filter rating of 10µm.
- Manip valve pack should be supplied with pilot operated solenoid valves with cross piloted check valves, and flow control valves for each function. Equipment must be pressure compensated at all times through the drain (TT) port.
- The manip must be bolted and secured to the ROV frame, all hoses fitted and secured, avoiding twists and sharp bends. Check that the Manipulator does not interfere with other vehicle equipment. Check the hoses are well fited and can slide throughout the range of motion.
- All personnel must stand clear of the equipment. Power up HPU and carry out full movements in all its functions. Check oil pressure. Check for leaks.
- With the elbow positioned fully up, carefully bleed air by losing the drain (TT) hose fitting on valve pack end, continuously operating the Jaw Rotating function for both directions, and other functions up to their end positions. Also bleed the main oil reservoir/compensator.
- Carry out several movement test up to maximum extension and bleed until there isn't any air in the system.
- Test the system performance and adjust each flow rate valve to the requested movement speed
- Carry out pre and Post-Dive checks for every dive: fixing bolts tight condition, hydraulic fittings condition and if there is any oil leak, bleed air, oil reservoir level, hydraulic pressure, check movements and adjust flow control, etc.

SUPPORTING BASE HOLE PATTERN





4.-OPERATION & MAINTENANCE

The system will be operated as a ROV ancillary hydraulic equipment operated by the vehicle valve pack.
Please stand clear of the equipment when carrying out pre-dive deck checks.
Follow up above point 3 recommended instructions.
Manipulator movements (speed) could be adjusted by the regulation of the valve pack flow control valves.

The Maintenance routine would be as follows:

-The equipment should be washed down with fresh water after ROV recovery on deck, removing any rest of sand from the inner sides of the shoulder flange

-Inspect the equipment for wear or damage after work

-Inspect the bolts tighten

-Inspect all hoses and fittings condition after work

-Apply Litium LP2 grease on exposed shafts and hydraulic cylinder rod

-Use underwater lubricant as “Aqua shield” or “Aqualube” grease on fixing bolts and fitting threads

-When any ROV Pre-Dive check, confirm functionality and if any oil leakage
-Bleed for air in the Hyd. Circuit and check oil condition regularly

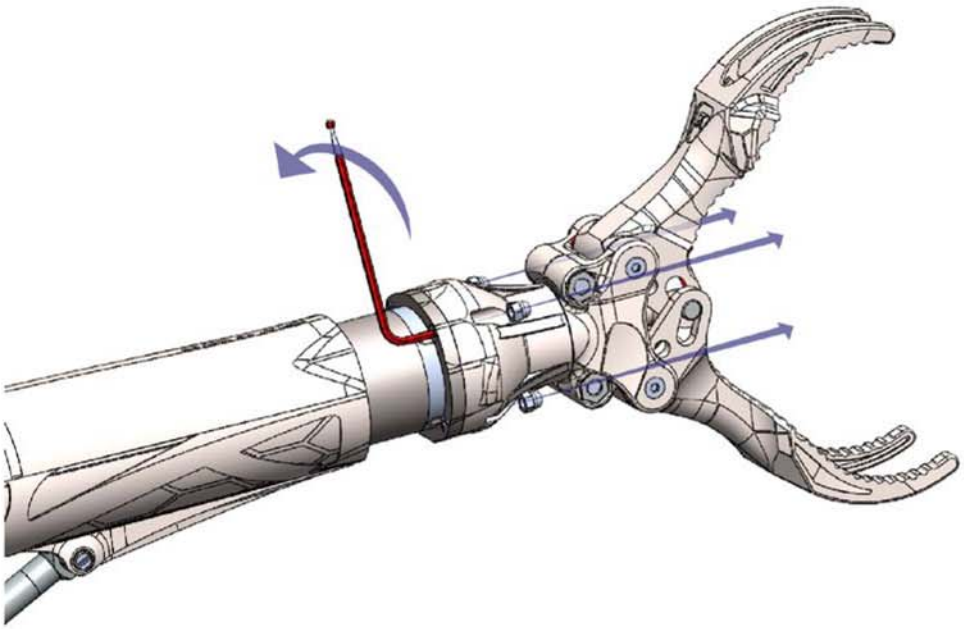
-Hydraulic cylinders can be field maintained replacing relevant seals and O-Rings:

*Use Molikote 55 grease for O-Rings

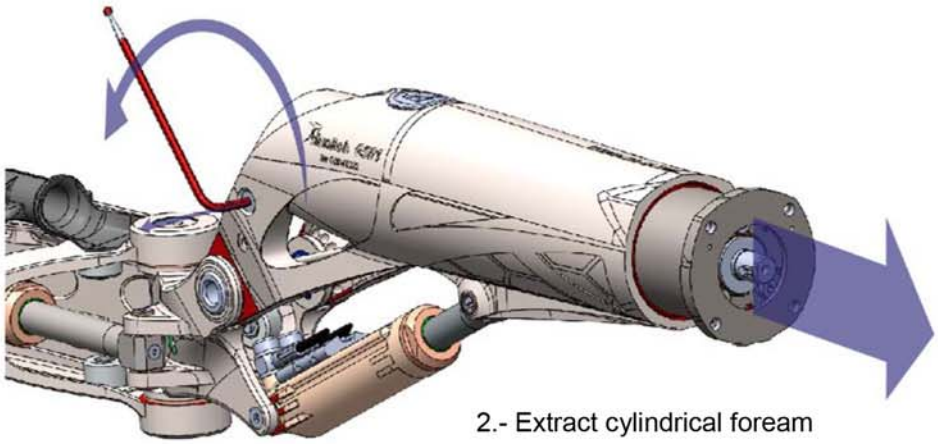
*Use Loctite 243 mid sealant for the piston rod thread inside the piston

*An special tool, a 4 mm allen, is used to tight the OMM50 motor M6 fittings. Included with spares.

*Use hydraulic oil when replacing cylinder seals (see annexed Main Cylinder and Jaw Cylinder drawings)

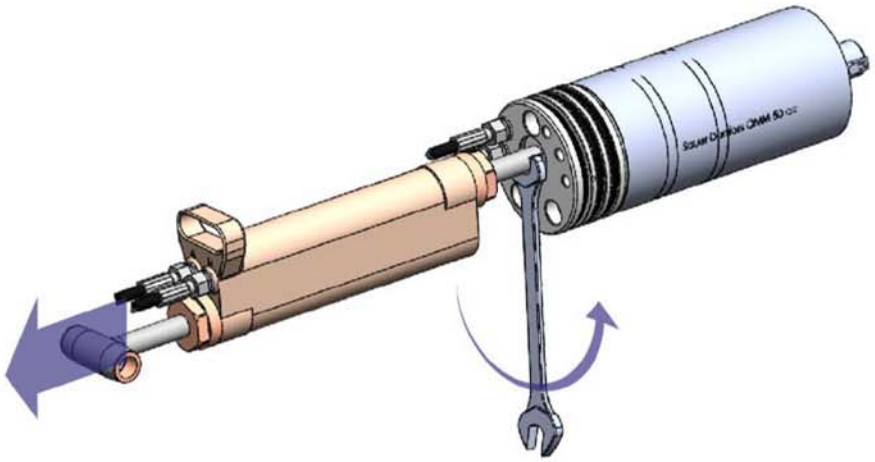


1.- Remove (4x) bolts w/ Allen 4 mm and extract wrist and jaw assembly

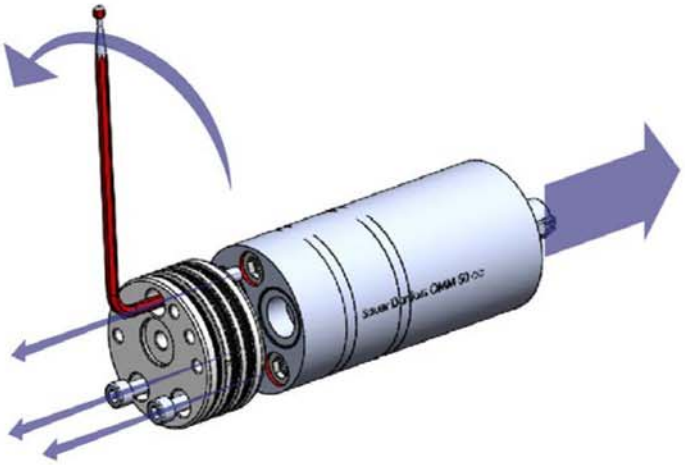


2.- Extract cylindrical foream

3.- Remove the 3 motor bolts, then gently extract motor/cylinder assembly

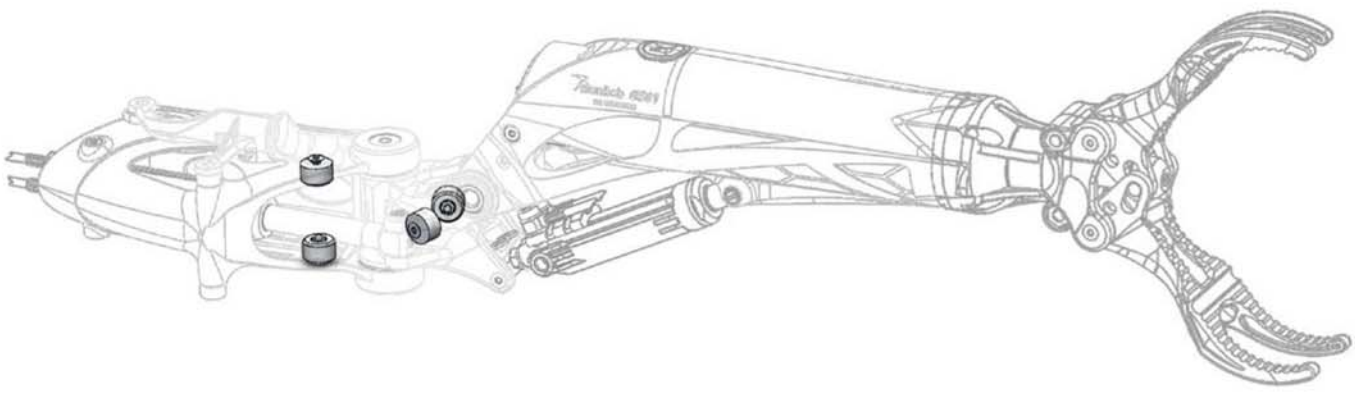


4.- Separate extent cylinder (W/ 8 mm spanner).



5.- Remove (3x) manifold bolts (W/ Allen 5mm) and separate OMM50 hyd. Motor.

MAINTENANCE – (4x) ANODE LOCATION



5.-DOCUMENTS & DRAWINGS:

- GRABBER G501 MAIN ASSEMBLY DRAWING

- CYLINDER MAIN ASSEMBLY DRAWING (Ø30x100 mm)

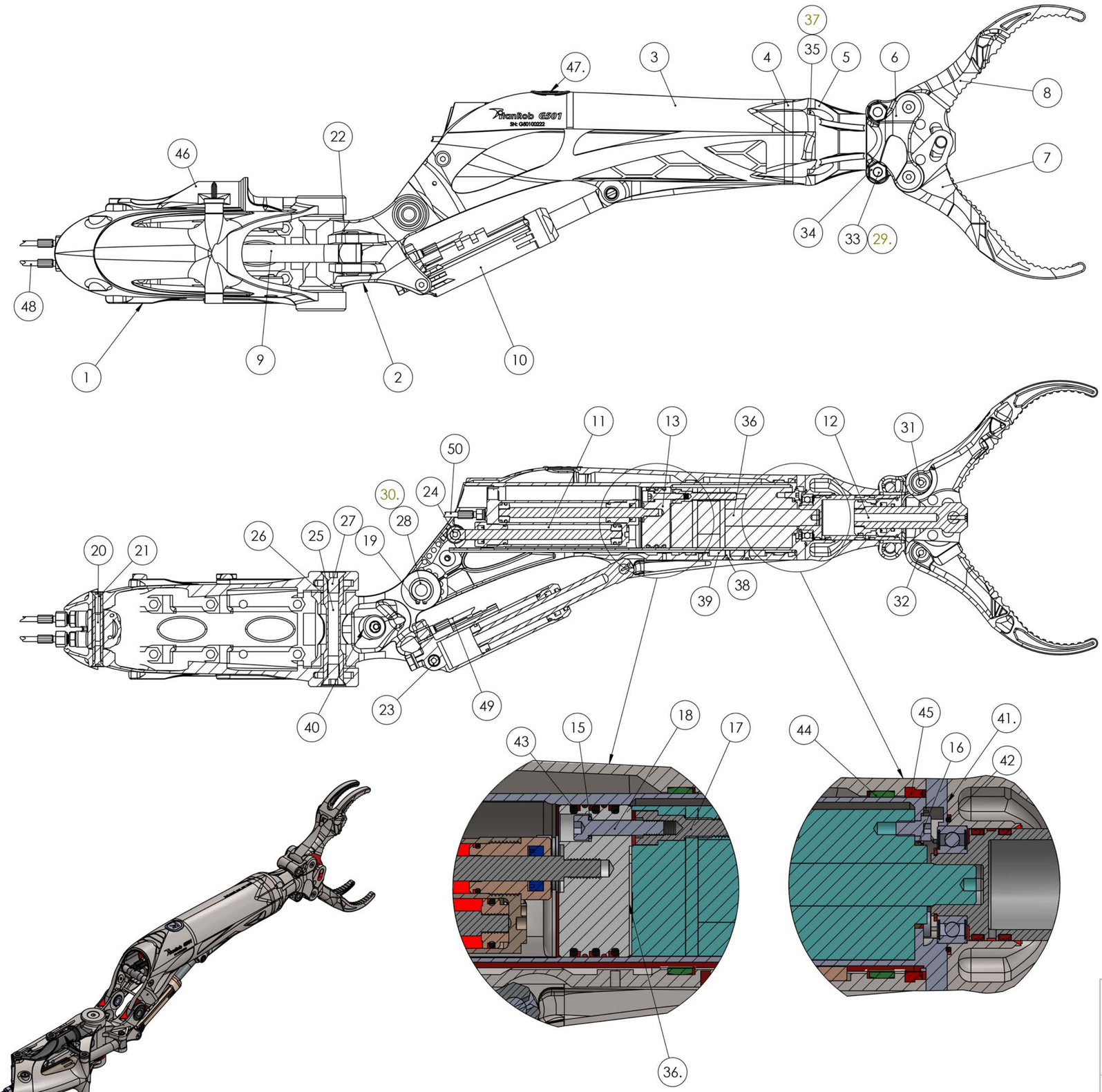
- GRABBER PITCH CYLINDER DRAWING (Ø30x100 mm)

- GRABBER DOUBLE CYLINDER DRAWING (Ø20x200 mm)

- JAW CYLINDER (Ø36x32 mm)

- HYDRAULIC HOSE LIST

- SPARE PARTS KIT (5 DRAWINGS)



ITEM	REF.	DESCRIPTION	QTY.
1	3053.14.000-001-R01	SUPPORTING BASE	1
2	3054.14.000-001 R01	YAW FLANGE	1
3	3054.14.000-002 - R03	ARM	1
4	3054.14.000-003 - R02	FOREARM	1
5	3054.14.000-005 - R03	WRIST BEARING COVER	1
6	3054.14.000-006	JAW BODY	1
7	3054.14.000-007	WIDE JAW	1
8	3054.14.000-008	NARROW JAW	1
9	M700C - 100	CYLINDER MAIN ASSY.	1
10	3054.14.000-100	PITCH CYLINDER	1
11	3054.14.000-200	GRABBER DOUBLE CYLINDER	1
12	3054.14.000-300	JAW CYLINDER	1
13	3054.14.000-503 - R01	MOTOR END COVER	1
36	OMM 50	OMM 50 HYD. MOTOR	1
15	203MBM6I	BONDED WASHER M6 INOX	8
16	3054.14.000-502	MOTOR CENTERING RING	1
17	3053.14.000-302-R01	SPECIAL BOLT M8-M6	3
18	DIN 912 M6x30	ALLEN BOLT M6X20	3
19	DIN 471 D20	CIRCLIP Ø20	2
20	3053.14.000-203	SHAFT CYL. #1	1
21	DIN 7991 M6x20	COUNTERSUNK BOLT M6x20	14
22	673.152	CUSHION DUB 10-12-18-12	4
23	3054.14.000-204	SHAFT CYL. #2	1
24	3054.14.000-206	SHAFT CYL. #3	1
25	3053.14.000-206-R02	YAW SHAFT	1
26	3053.14.000-209	BRONZE BUSH (Yaw Shaft)	2
27	Din 7991 M12x20	COUNTERSUNK BOLT M12x20	2
28	3053.14.000-208-R01	PITCH SHAFT	2
29	552.604	COPPER WASHER 10-14-1	2
30	3054.14.000-113	BRONZE BUSH (Pitch Shaft)	4
31	3054.14.000-202	NARROW JAW SHAFT	1
32	3054.14.000-203	WIDE JAW SHAFT	1
33	DIN 912 M10x40	ALLEN BOLT M10x40	2
34	DIN 934 M10	NUT M10	2
35	DIN 1587 M6	ACORN NUT M6	4
36	667.089	O-RING 23x1	2
37	Din 7984 M6x20	ALLEN BOLT M6x20	7
38	Din 7991 M5x9	COUNTERSUNK BOLT M5x9	2
39	3054.14.000-110 - R01	ANTI-ROTATION KEY	1
40	192045	ANODE Ø24 mm	4
41	340.653	O-RING 3x2	2
42	493.114	O-RING 50x2	1
43	363.770	O-RING 54x3	3
44	598.164	GUIDE RING Ø70	2
45	475.152	WIPER SEAL Ø70	1
46	3054.14.000-504	TPU HOSE GUIDE	1
47	3054.14.000-505	TOP COVER	1
48	HOSE 1050 mm GAS - JIC	DN2 HOSE 1050 - 1/8" BSPP FEMALE SWIVEL	2
49	HOSE 1680 mm BANJO JIC	DN2 HOSE 1680 - 1/8" BANJO	2
50	HOSE 1880 mm M6 - JIC	DN2 HOSE 1880 - M6 CONNECTOR	7

TITANRob®

CIF: B27725225

Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado	
19/05/2022			MATAR ARISTAS 0,5 x45°

Proyecto: M700C

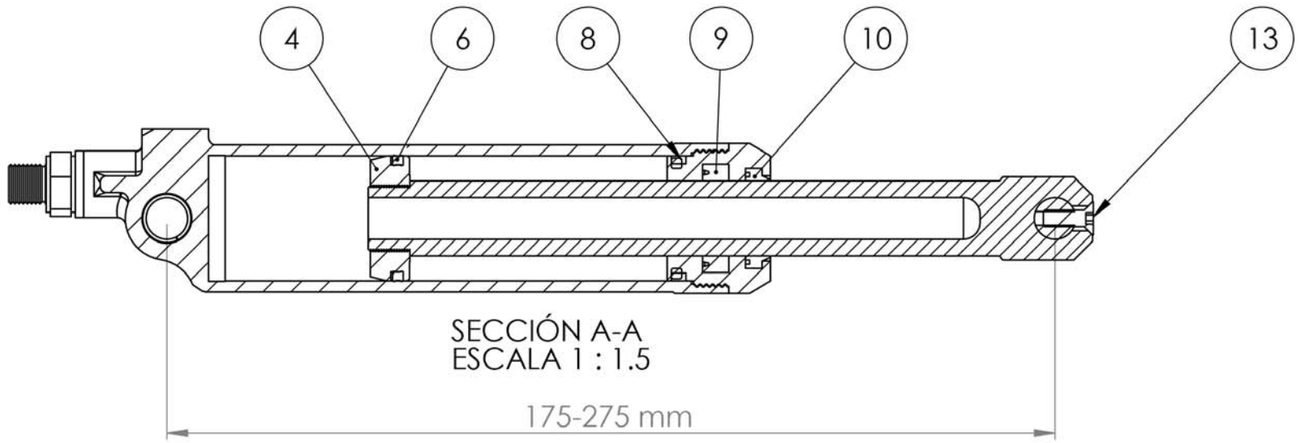
COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK

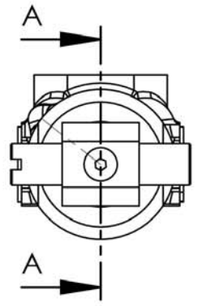
Material	Tratamiento	Peso (Kg.)
Titanium 64		

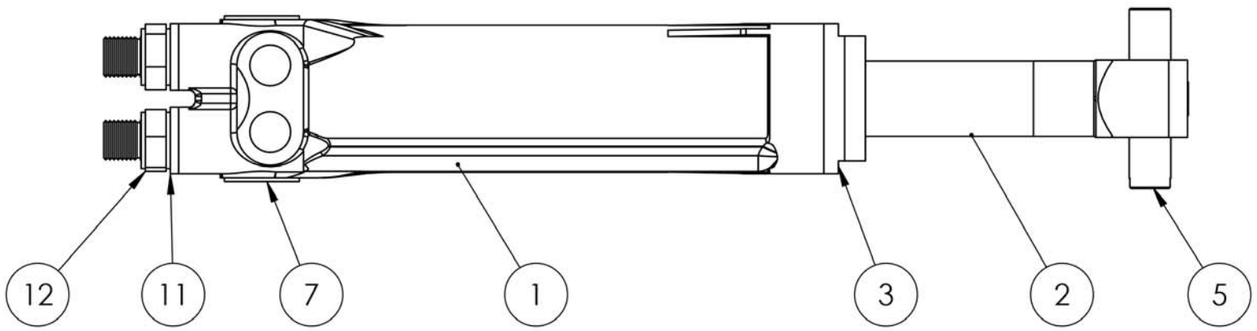
Cliente

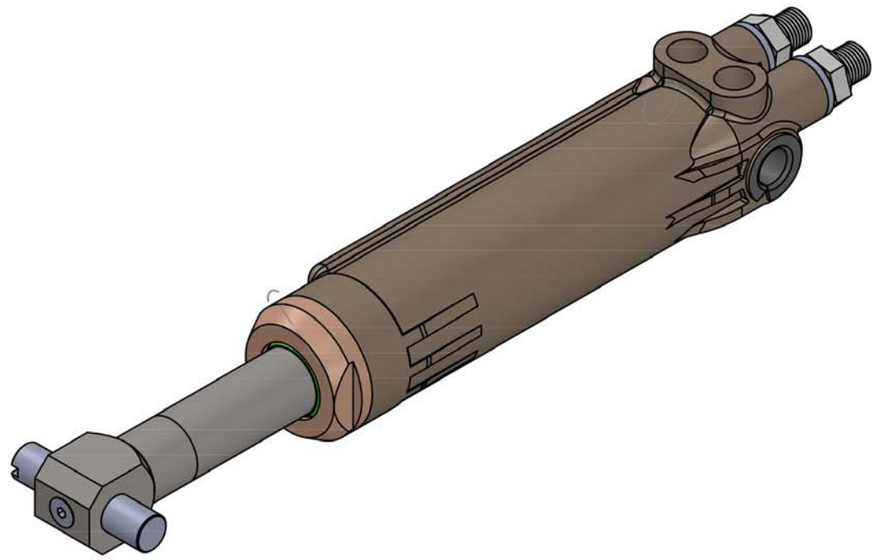
Designación: **3054.100.000 - 000 - Grabber G501 Assembly**

Nº de plano	Cant.	Escala	Formato	Hoja
	-	1:10	A2	1 de 1









ITEM	REF.	DESCRIPTION	QTY.
1	3053.14.000-010-R01	CYLINDER BODY Ø30X100	1
2	M700C - T018	PISTON ROD	1
3	3053.14.000-107-R01	CYLINDER HEAD	1
4	3053.14.000-108-R02	PISTON	1
5	3053.14.000-202-R02	ROD PIN	1
6	3053.14.000-310	SEAL PU88 Ø30	1
7	673.152	CUSHION DUB 10-12-18-12	2
8	472.147	O-RING 24x2,5	1
9	640.300	ROD SEAL Ø18	1
10	337.847	WIPER SEAL PU11 18x24x4	1
11	C-XAM480002	BONDED WASHER G1/8" INOX	2
12	C-XRC60180202	FITTING BSPP 1/8" M-M INOX	2
13	DIN 7991 M4x12 A4	COUNTERSUNK BOLT M4X12	1

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CIF: B27725225
Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado
04/01/2019	P. Iglesias	

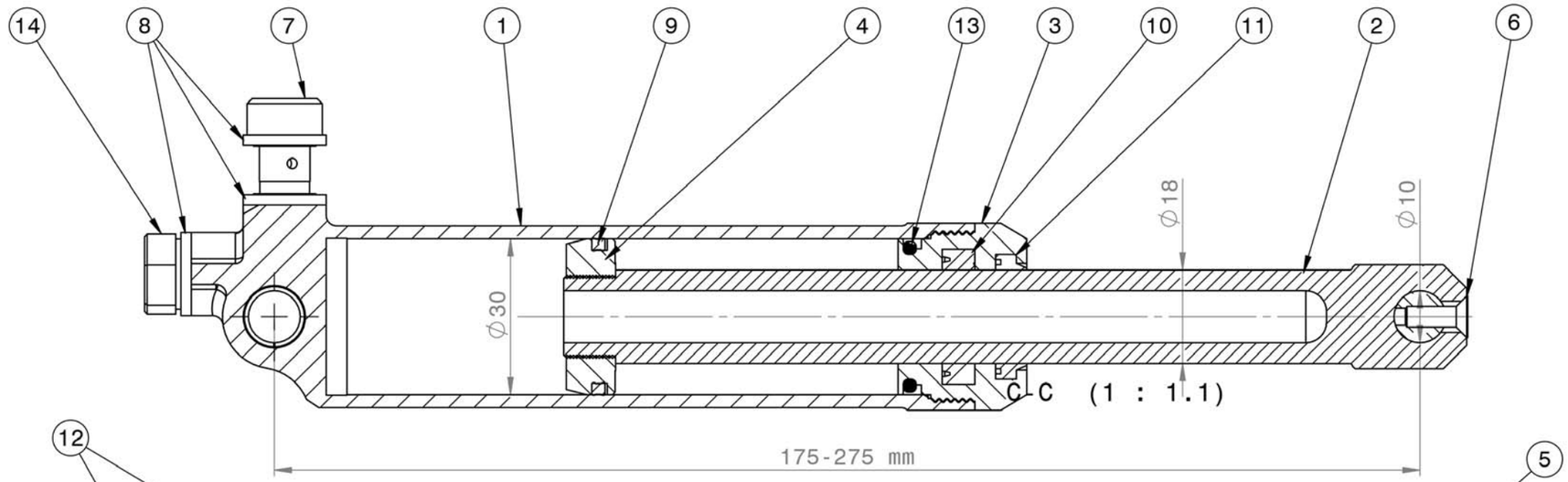
N8 — MATAR ARISTAS 0,5 x45°

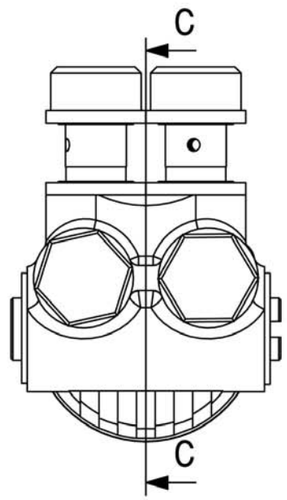
COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK

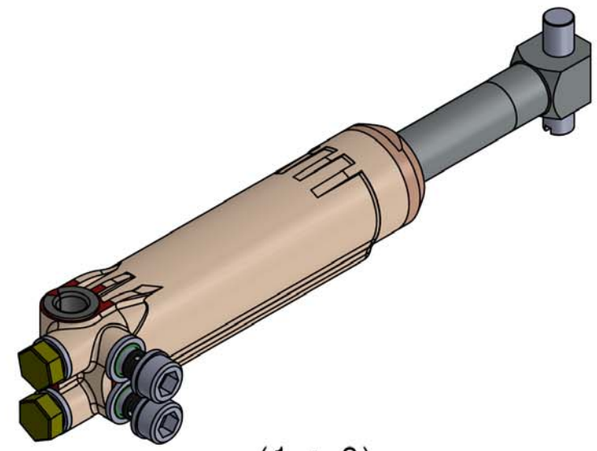
Proyecto	Material	Tratamiento	Peso (Kg.)
M700C	Titanium 64		0.50

Cliente	Designación	Proceso
	CYLINDER MAIN ASSY.	Hoja1

Nº de plano	Cant.	Escala	Formato	Hoja
M700C - 100	-	1:2	A3	1 de 1







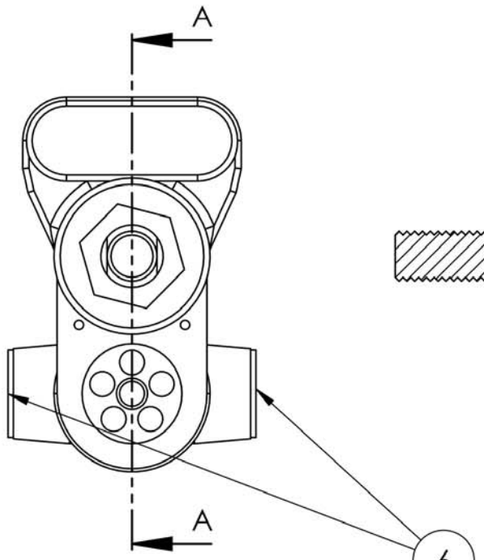
(1 : 2)

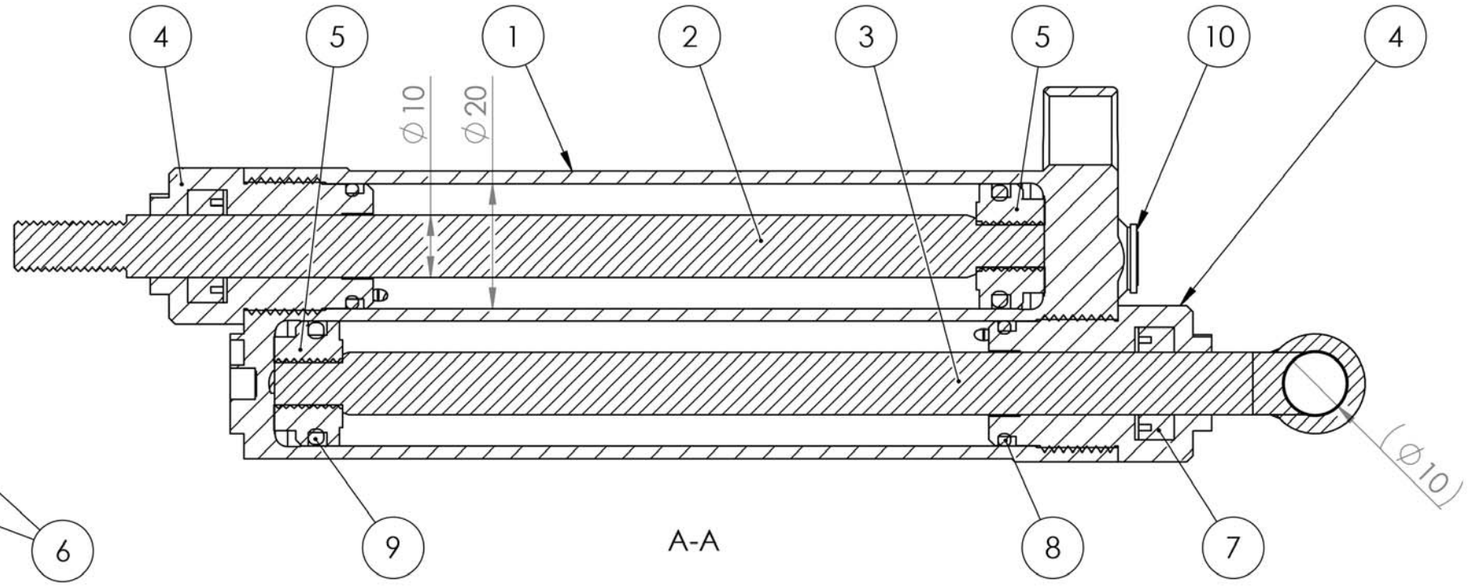
ITEM	REF.	DESCRIPTION	QTY.
1	3054.14.000-009	CYLINDER BODY	1
2	M700C - T018	PISTON ROD	1
3	3053.14.000-107-R01	CYLINDER HEAD	1
4	3053.14.000-108-R02	PISTON	1
5	3053.14.000-202-R02	ROD PIN	1
6	DIN 7991 M4x12	BOLT DIN 7991 M4x12	1
7	3054.14.000-117	BANJO BOLT	2
8	C-XAM480002	BONDED WASHER G1/8" INOX	6
9	3053.14.000-310	SEAL PU88 Ø30	1
10	640.300	ROD SEAL Ø18	1
11	337.847	WIPER SEAL PU11 18x24x4	1
12	673.152	CUSHION DUB 10-12-18-12	2
13	472.147	O-RING 24x2.5	1
14	PLUG 1/8"M	HYDRAULIC PLUG 1/8"M INOX	2

TITANRob®

CIF: B27725225
Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado		
05/12/2014	P. Iglesias		MATAR ARISTAS 0,5 x45°	
Proyecto: G501			COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK	
			Material: -	Tratamiento: - / Peso (Kg.): 0.70
Cliente	Designación: PITCH CYLINDER			Proceso: MONTAJE
	Nº de plano: **3054.14.000-100**	Cant.: -	Escala: 1:1	Formato: A3 / Hoja: 1 de 1





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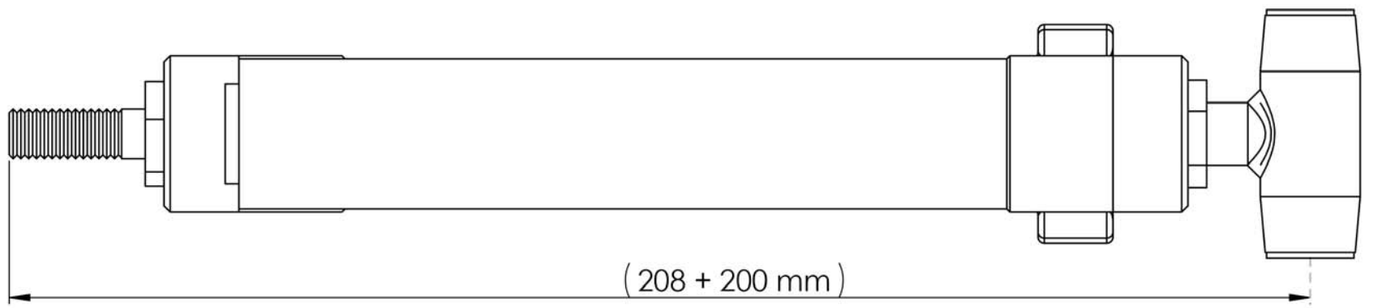

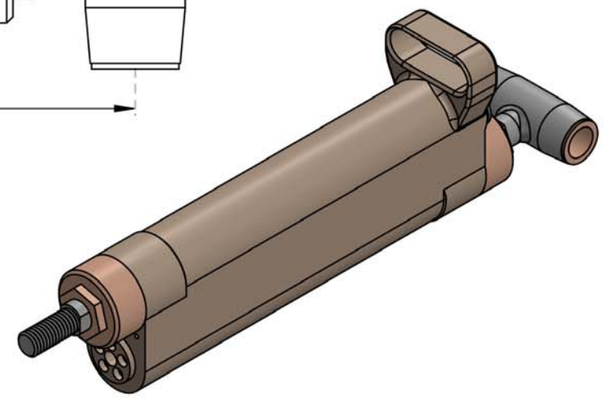

ITEM	REF.	DESCRIPTION	QTY.
1	3054.14.000-004	DOUBLE CYLINDER BODY	1
2	3054.14.000-106	FRONT ROD	1
3	3054.14.000-107	REAR ROD	1
4	3054.14.000-108	CYLINDER HEAD	2
5	3054.14.000-109	PISTON	2
6	3054.14.000-205	DOUBLE CYLINDER BUSH	2
7	483.476	WIPER SEAL T20	2
8	463.828	O-RING 16x2	2
9	436.599	O-RING 14.5x2.5	2
10	203MBM6I	BONDED WASHER M6 INOX	2

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Porto do Molle, Rúa das Pontes, nº19,
CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado	N8	MATAR ARISTAS 0,5 x45°
04/02/2022	P. Iglesias			

Proyecto		COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK	
G501	Material: -	Tratamiento	Peso (Kg.)

Cliente	Designación			Proceso	
	GRABBER DOUBLE CYLINDER			Hoja1	
	Nº de plano	Cant.	Escala	Formato	Hoja
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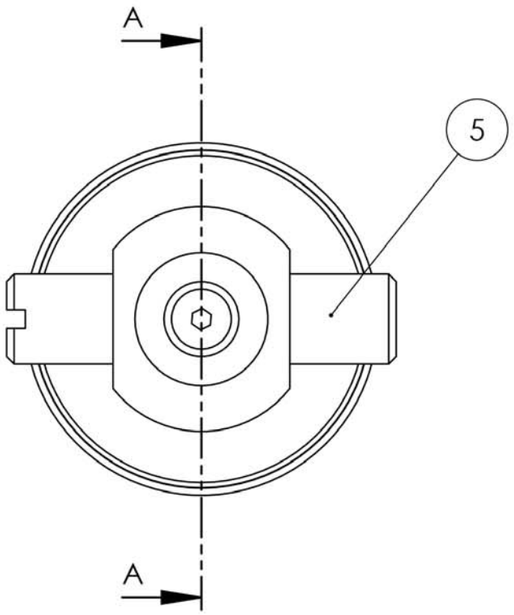

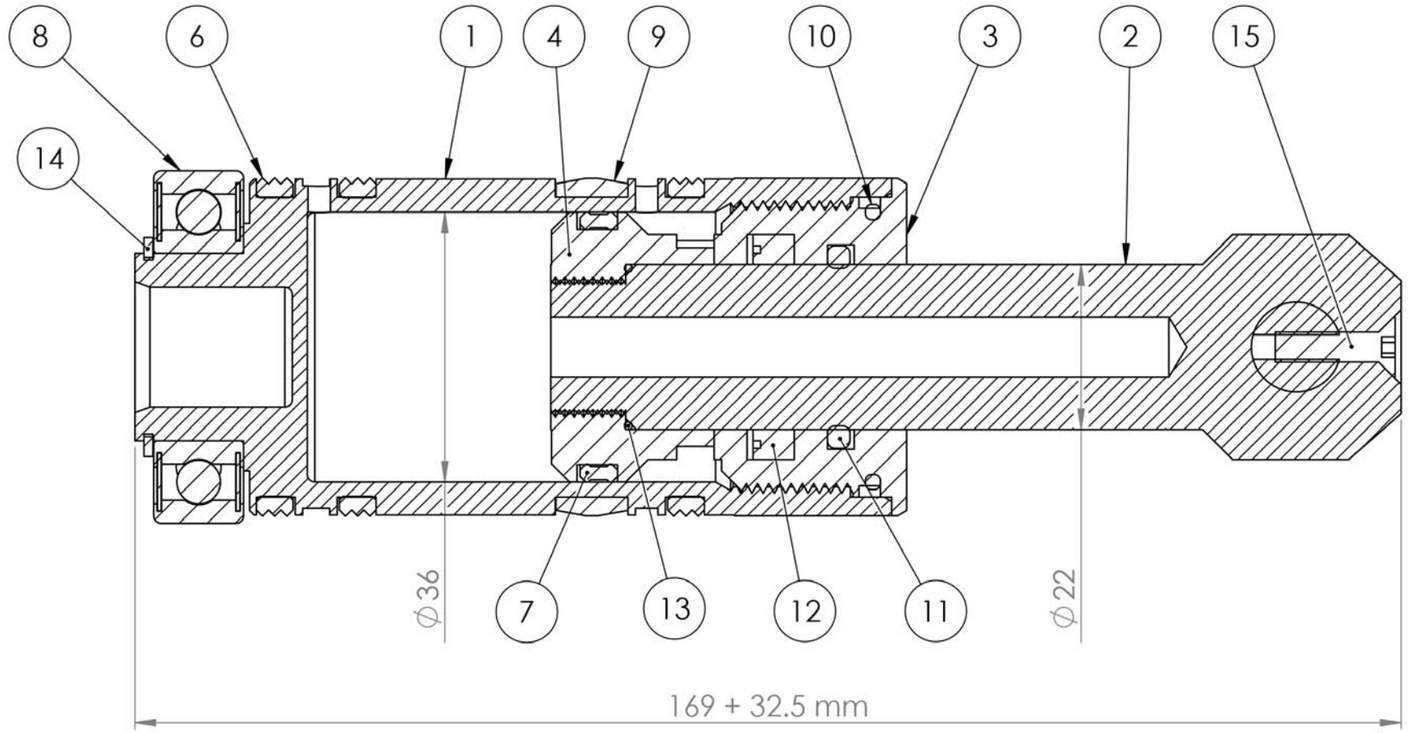

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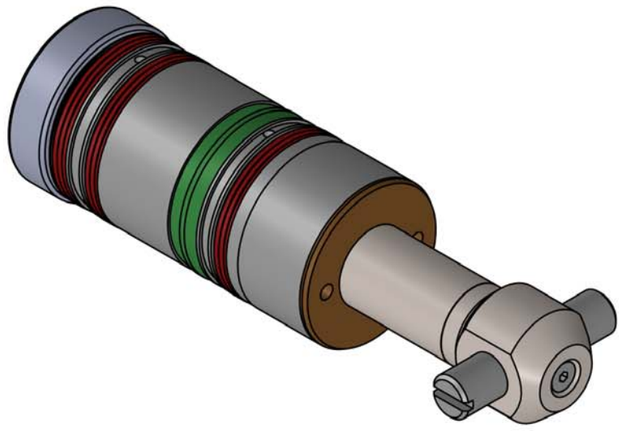


ITEM	REF.	DESCRIPTION	QTY.
1	3054.14.000-102 - R03	GRABBER JAW CYLINDER	1
2	3054.14.000-104	GRABBER JAW ROD	1
3	3054.14.000-105 -R01	CYLINDER HEAD	1
4	3054.14.000-103	CYLINDER PISTON	1
5	3054.14.000-201 - R01	ROD PIN	1
6	3054.14.000-306	SEAL ROT PU88	3
7	3054.14.000-307	PISTON SEAL PU88	1
8	BEARING 25.47.12	WRIST GRABBER BEARING	1
9	367.234	GUIDE RING Ø40	1
10	342.415	O-RING 34 x 2	1
11	424.339	O-RING 21x3	1
12	640.326	ROD SEAL Ø22	1
13	345.023	O-RING 20 x 1	1
14	DIN 471 D25	CIRCLIP Ø25	1
15	DIN 7991 M4x16	BOLT M4x20	1

TITANRob®
TITANRob® is a registered trademark of Quantum Innovative SL
CIF: B27725225
Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

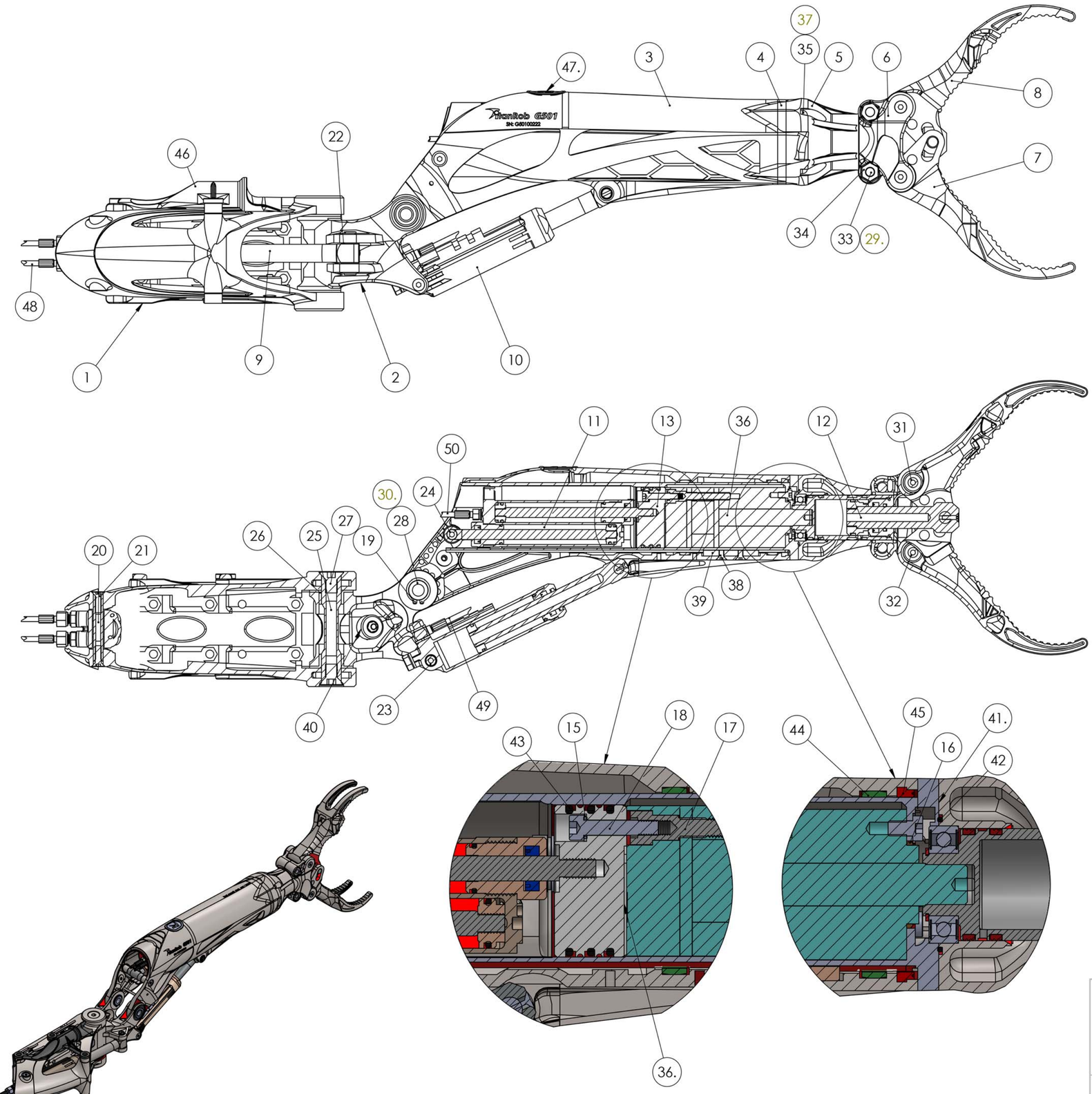
Fecha original	Dibujado	Comprobado		
04/02/2022	P. Iglesias		N8	MATAR ARISTAS 0,5 x45°
Proyecto: G501				COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK
			Material: -	Tratamiento:	Peso (Kg.): 961.33
Cliente	Designación: JAW CYLINDER			Proceso: Hoja1
	Nº de plano: **3054.14.000-300**		Cant.: -	Escala: 1:2	Formato: A3	Hoja: 1 de 1

TITANRob®

TITANROB
HYDRAULIC HOSE LIST

Equipment	**G501 – 5F GRABBER**	Ref.	**3054.14.000**
S/N	**G50100222**	Date	**15feb2022**
Assembly	**HYDRAULIC HOSES**	Revised by	**PIN / CAP**

No.	FUNCTION	Actuator	Valve Pack Port No.	DWG Ref. / Pos.	Hose Length (mm)	Manip end Fitting	V Pack end Fitting	Hose Type	Manufacturer Supplier Ref.
1	SHOULDER / Azimuth Yaw RIGHT	Extend (Right Hand conf.) Retract (LH)	A1	3054.14.000	1050	BSPP 1/8" F Swivel	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
2	SHOULDER / Azimuth Yaw LEFT	Retract (RH) Extend (LH)	B1	3054.14.000	1050	BSPP 1/8" F Swivel	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
3	SHOULDER / ARM Pitch UP	Extend	A2	3054.14.000	1680	BSPP 1/8" Banjo	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
4	SHOULDER / ARM Pitch DOWN	Retract	B2	3054.14.000	1680	BSPP 1/8" Banjo	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
5	FOREARM EXTENT	Extend	A3	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
6	FOREARM RETRACT	Retract	B3	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
7	JAW Rotate Right (CW)	Rotate CCW	A4	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
8	JAW Rotate Left (CCW)	Rotate CW	B4	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
9	JAW OPEN	Extent	A5	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
10	JAW CLOSE	Retract	B5	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A
11	DRAIN	N/A	TT	3054.14.000	1880	M6 Male Connector	JIC 7/16" F. Swivel	Parker 2020N-012V30	N/A



ITEM	REF.	DESCRIPTION	QTY.
1	3053.14.000-001-R01	SUPPORTING BASE	
2	3054.14.000-001 R01	YAW FLANGE	
3	3054.14.000-002 - R03	ARM	
4	3054.14.000-003 - R02	FOREARM	
5	3054.14.000-005 - R03	WRIST BEARING COVER	
6	3054.14.000-006	JAW BODY	
7	3054.14.000-007	WIDE JAW	
8	3054.14.000-008	NARROW JAW	
9	M700C - 100	CYLINDER MAIN ASSY.	
10	3054.14.000-100	PITCH CYLINDER	
11	3054.14.000-200	GRABBER DOUBLE CYLINDER	
12	3054.14.000-300	JAW CYLINDER	
13	3054.14.000-503 - R01	MOTOR END COVER	
36	OMM 50	OMM 50 HYD. MOTOR	
15	203MBM6I	BONDED WASHER M6 INOX	
16	3054.14.000-502	MOTOR CENTERING RING	
17	3053.14.000-302-R01	SPECIAL BOLT M8-M6	
18	DIN 912 M6x30	ALLEN BOLT M6X20	
19	DIN 471 D20	CIRCLIP Ø20	2
20	3053.14.000-203	SHAFT CYL. #1	
21	DIN 7991 M6x20	COUNTERSUNK BOLT M6x20	2
22	673.152	CUSHION DUB 10-12-18-12	4
23	3054.14.000-204	SHAFT CYL. #2	
24	3054.14.000-206	SHAFT CYL. #3	
25	3053.14.000-206-R02	YAW SHAFT	
26	3053.14.000-209	BRONZE BUSH (Yaw Shaft)	
27	Din 7991 M12x20	COUNTERSUNK BOLT M12x20	
28	3053.14.000-208-R01	PITCH SHAFT	
29	552.604	COPPER WASHER 10-14-1	2
30	3054.14.000-113	BRONZE BUSH (Pitch Shaft)	
31	3054.14.000-202	NARROW JAW SHAFT	
32	3054.14.000-203	WIDE JAW SHAFT	
33	DIN 912 M10x40	ALLEN BOLT M10x40	2
34	DIN 934 M10	NUT M10	2
35	DIN 1587 M6	ACORN NUT M6	2
36	667.089	O-RING 23x1	2
37	Din 7984 M6x20	ALLEN BOLT M6x20	2
38	Din 7991 M5x9	COUNTERSUNK BOLT M5x9	2
39	3054.14.000-110 - R01	ANTI-ROTATION KEY	
40	192045	ANODE Ø24 mm	4
41	340.653	O-RING 3x2	2
42	493.114	O-RING 50x2	1
43	363.770	O-RING 54x3	3
44	598.164	GUIDE RING Ø70	2
45	475.152	WIPER SEAL Ø70	1
46	3054.14.000-504	TPU HOSE GUIDE	
47	3054.14.000-505	TOP COVER	1
48	HOSE 1050 mm GAS - JIC	DN2 HOSE 1050 - 1/8" BSPP FEMALE SWIVEL	1
49	HOSE 1680 mm BANJO JIC	DN2 HOSE 1680 - 1/8" BANJO	1
50	HOSE 1880 mm M6 - JIC	DN2 HOSE 1880 - M6 CONNECTOR	1

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Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado
19/05/2022		

MATAR ARISTAS 0,5 x45°

COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK

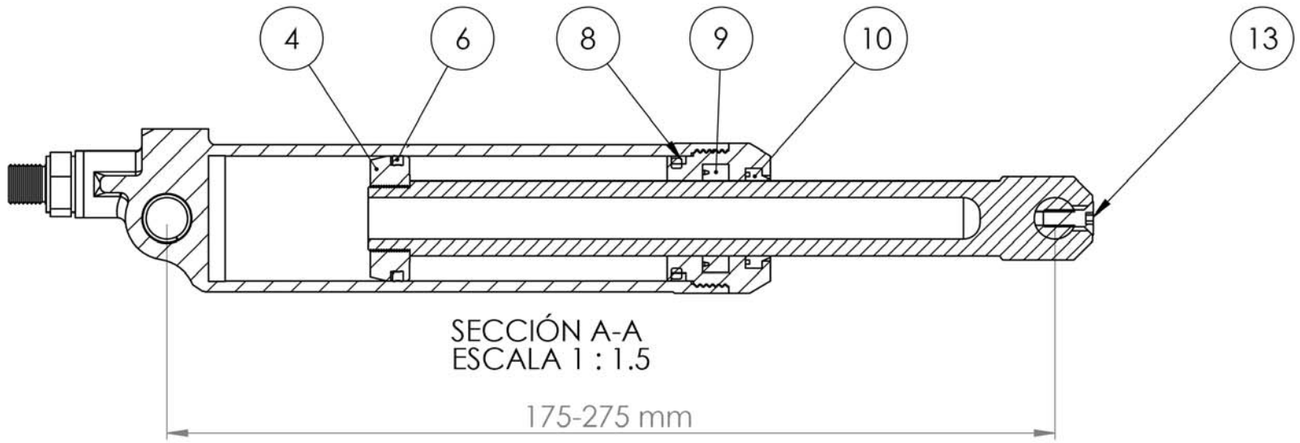
Proyecto: G 501

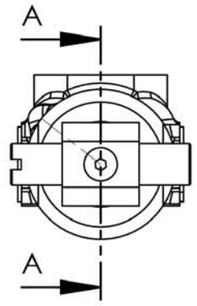
Material	Tratamiento	Peso (Kg.)
Titanium 64	FV	12,70

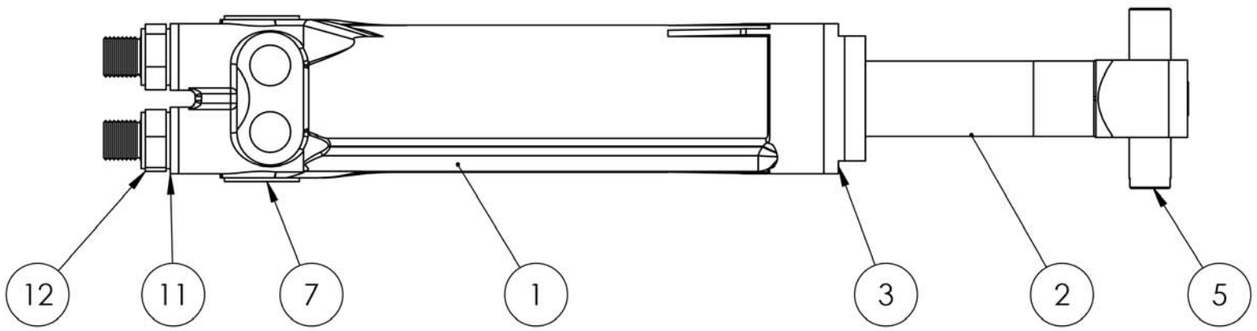
Cliente

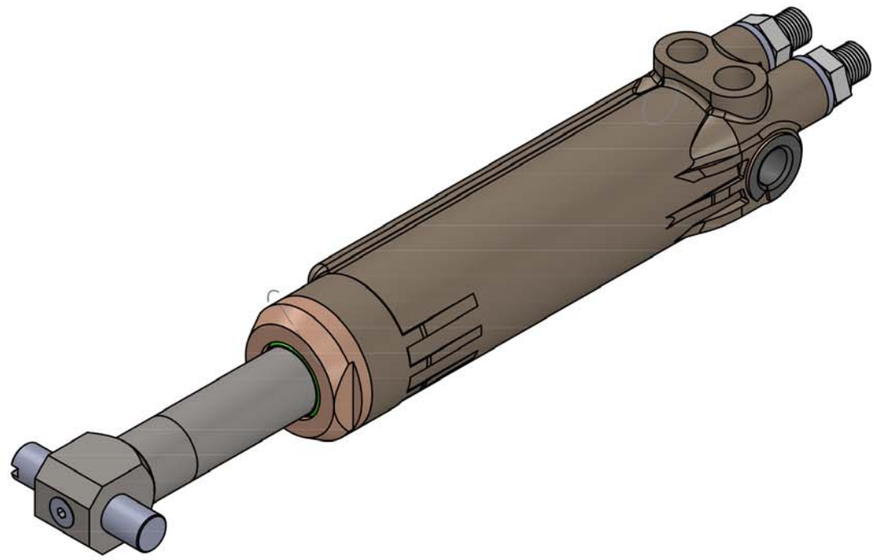
Designación: **3054.14.000-000 Grabber G501 Main Assy. SPARES**

Nº de plano	Cant.	Escala	Formato	Hoja
	-	1:10	A2	1 de 1









ITEM	REF.	DESCRIPTION	QTY.
1	3053.14.000-010-R01	CYLINDER BODY Ø30X100	
2	M700C - T018	PISTON ROD	
3	3053.14.000-107-R01	CYLINDER HEAD	
4	3053.14.000-108-R02	PISTON	
5	3053.14.000-202-R02	ROD PIN	
6	3053.14.000-310	SEAL PU88 Ø30	1
7	673.152	CUSHION DUB 10-12-18-12	2
8	472.147	O-RING 24x2,5	1
9	640.300	ROD SEAL Ø18	1
10	337.847	WIPER SEAL PU11 18x24x4	1
11	C-XAM480002	BONDED WASHER G1/8" INOX	2
12	C-XRC60180202	FITTING BSPP 1/8" M-M INOX	2
13	DIN 7991 M4x12 A4	COUNTERSUNK BOLT M4X12	1

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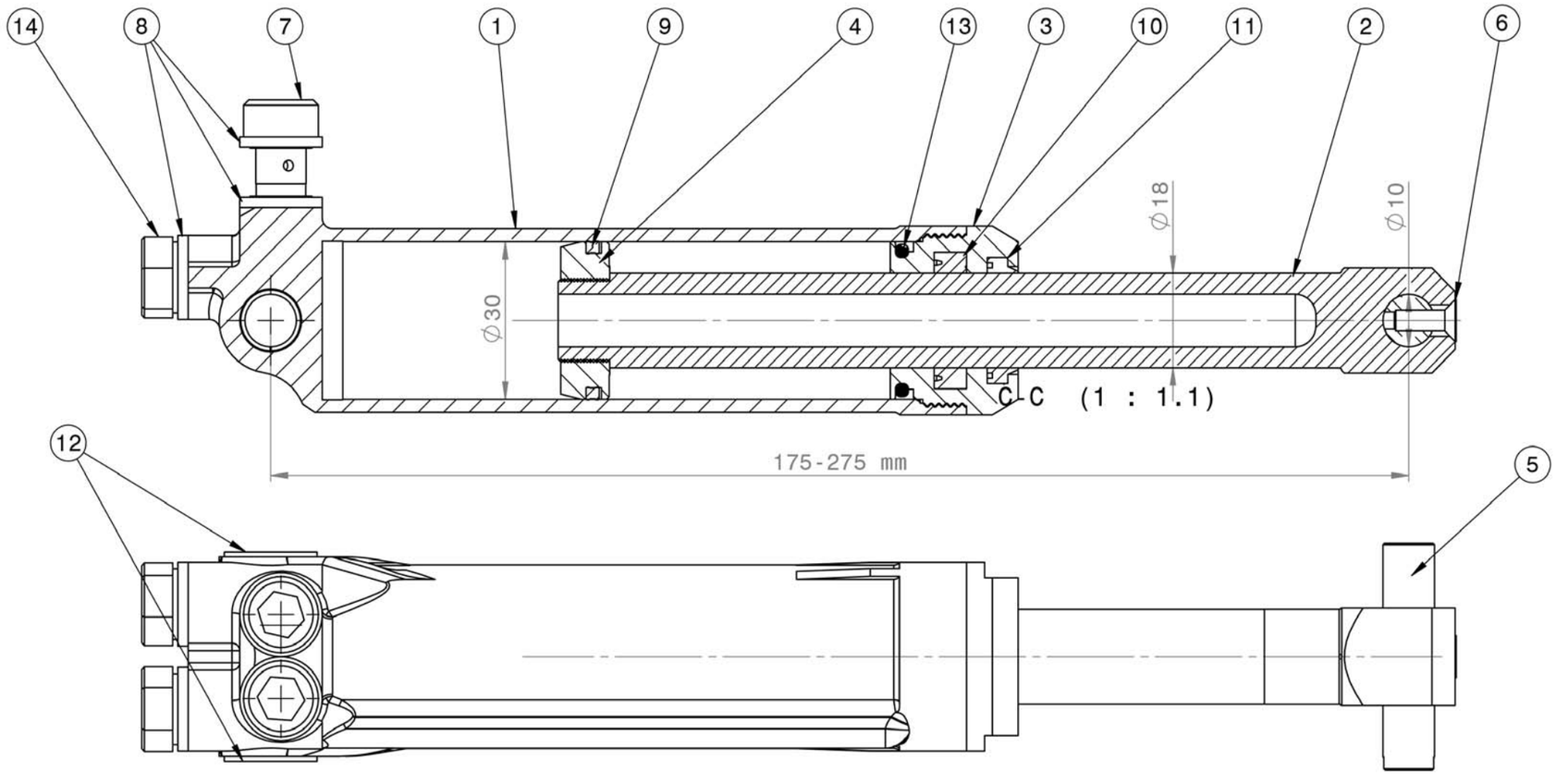
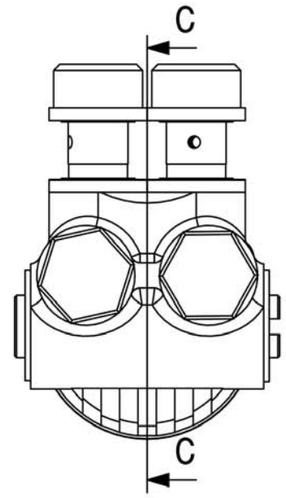
CIF: B27725225
Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

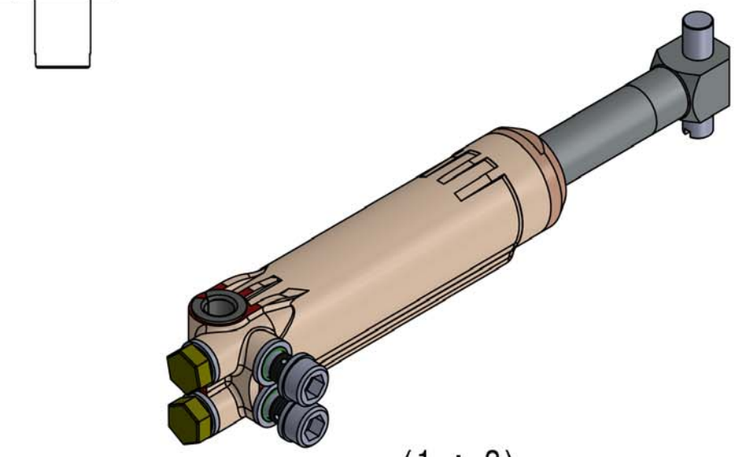
Fecha original	Dibujado	Comprobado	N8	MATAR ARISTAS 0,5 x45°
04/01/2019	P. Iglesias			

Proyecto		COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK	
M700C			
Material	**Tratamiento**		**Peso** (Kg.)
Titanium 64			0.50

Cliente	Designación			Proceso	
	CYLINDER MAIN ASSY.			Hoja1	
	Nº de plano **M700C - 100 SPARES**	**Cant.**	**Escala**	**Formato**	**Hoja**
		-	1:2	A3	1 de 1







(1 : 2)

ITEM	REF.	DESCRIPTION	QTY.
1	3054.14.000-009	CYLINDER BODY	
2	M700C - T018	PISTON ROD	
3	3053.14.000-107-R01	CYLINDER HEAD	
4	3053.14.000-108-R02	PISTON	
5	3053.14.000-202-R02	ROD PIN	
6	DIN 7991 M4x12	COUNTERSUNK BOLT M4x12	1
7	3054.14.000-117	BANJO BOLT	
8	C-XAM480002	BONDED WASHER G1/8" INOX	6
9	3053.14.000-310	SEAL PU88 Ø30	1
10	640.300	ROD SEAL Ø18	1
11	337.847	WIPER SEAL PU11 18x24x4	1
12	673.152	CUSHION DUB 10-12-18-12 O-	2
13	472.147	RING 24x2.5	1
14	PLUG 1/8"M	HYDRAULIC PLUG 1/8"M INOX	

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Quantum Innovative SL
CIF: B27725225
Porto do Molle, Rúa das Pontes, nº19,
CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado	
05/12/2014	P. Iglesias		MATAR ARISTAS 0,5 x45°

Proyecto: *G501*

COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK

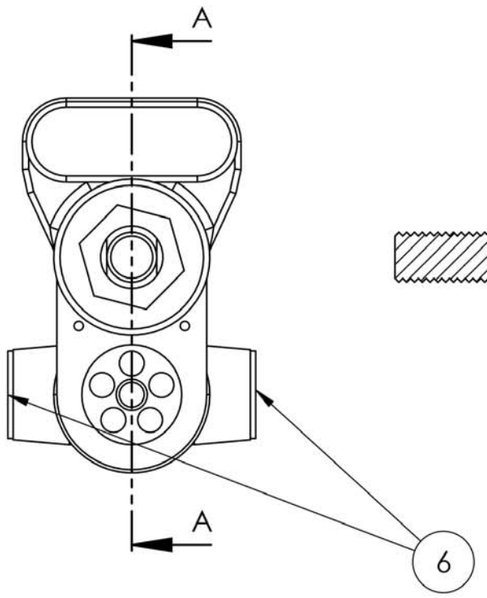
Material	Tratamiento	Peso (Kg.)
-		0.70

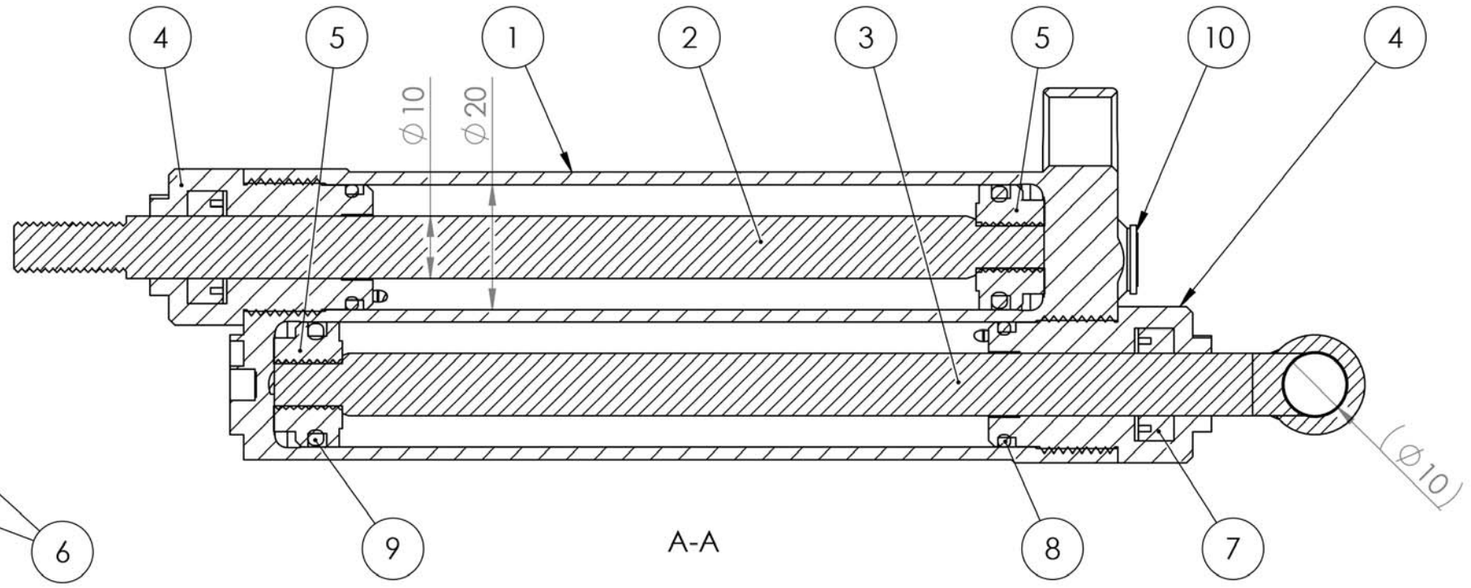
Cliente

Designación: PITCH CYLINDER

Proceso: MONTAJE

Nº de plano	Cant.	Escala	Formato	Hoja
3054.14.000-100 SPARES	-	1:1	A3	1 de 1





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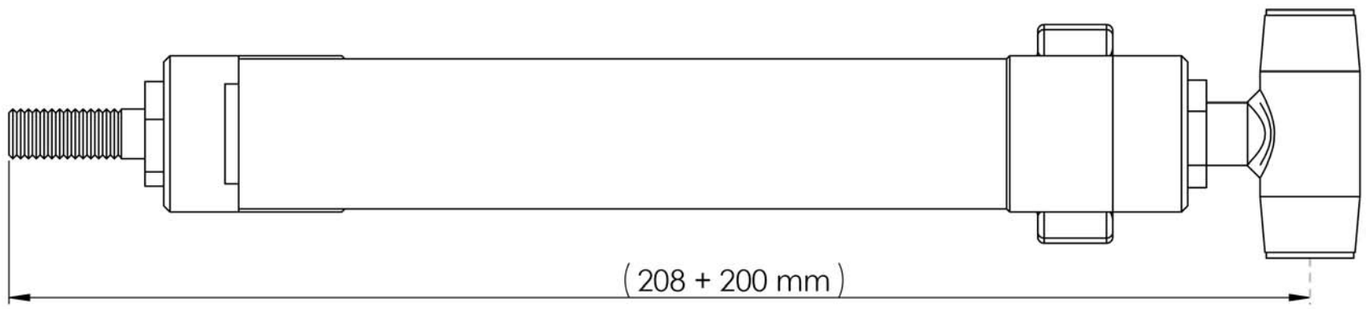

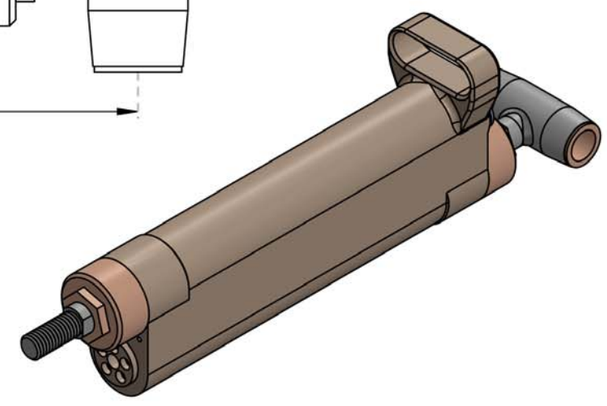

ITEM	REF.	DESCRIPTION	QTY.
1	3054.14.000-004	DOUBLE CYLINDER BODY	
2	3054.14.000-106	FRONT ROD	
3	3054.14.000-107	REAR ROD	
4	3054.14.000-108	CYLINDER HEAD	
5	3054.14.000-109	PISTON	
6	3054.14.000-205	DOUBLE CYLINDER BUSH	
7	483.476	ROD SEAL Ø10	2
8	463.828	O-RING 16x2	2
9	436.599	O-RING 14.5x2.5	2
10	203MBM6I	BONDED WASHER M6 INOX	2

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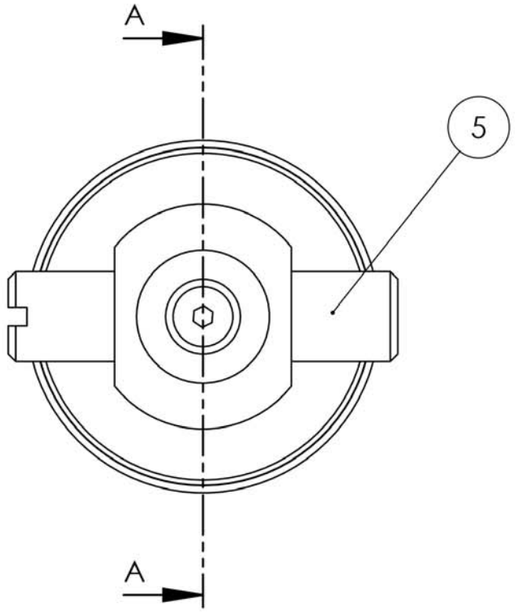
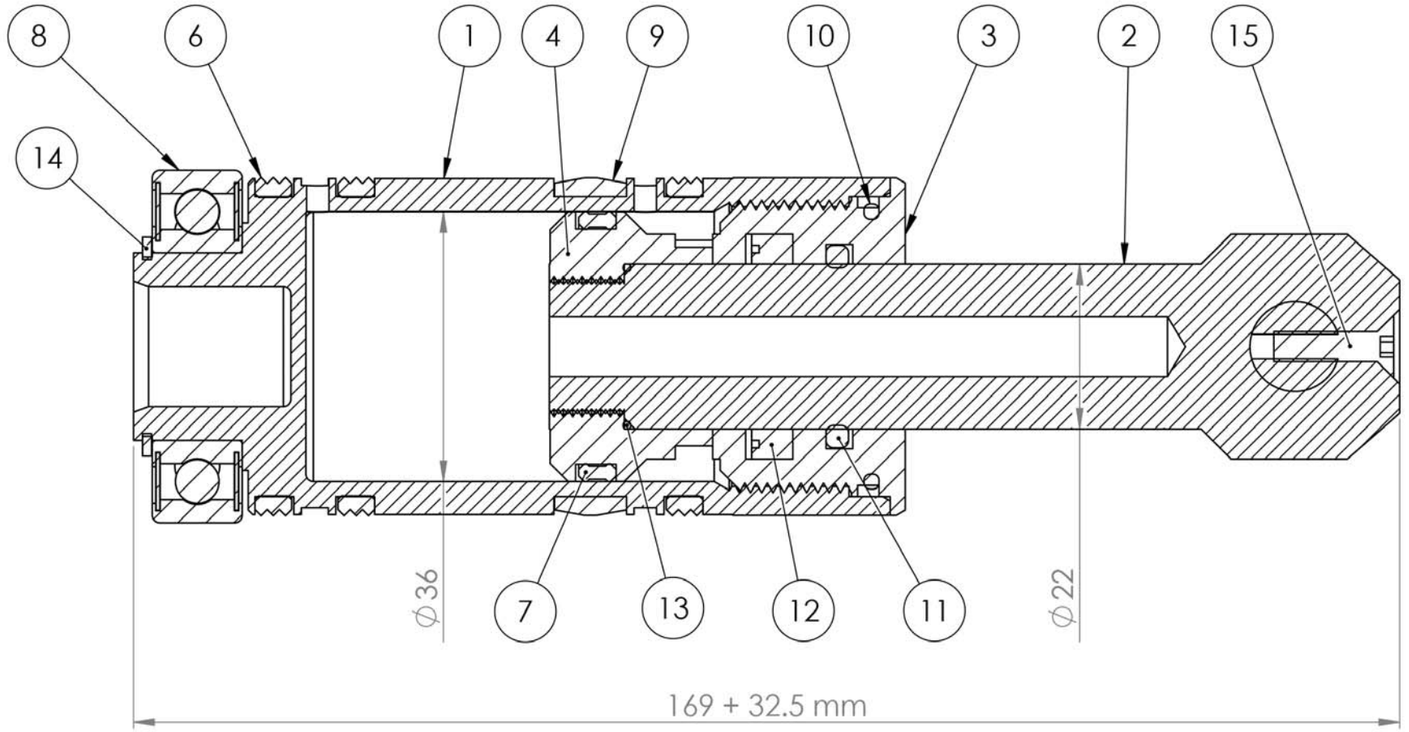
Porto do Molle, Rúa das Pontes, nº19,
CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado		
04/02/2022	P. Iglesias		N8	MATAR ARISTAS 0,5 x45°
Proyecto: G501				COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK
			Material: -	Tratamiento / Peso (Kg.)
Cliente	Designación: GRABBER DOUBLE CYLINDER - SPARES			Proceso: Hoja1
	Nº de plano: 3054.14.000-200	Cant.: -	Escala: 1:2	Formato: A3 / Hoja: 1 de 1





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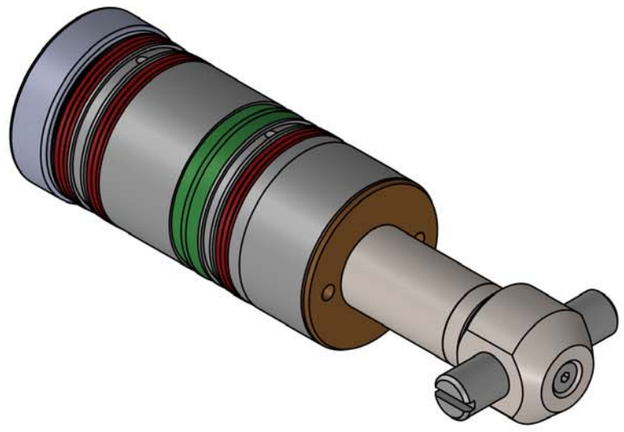

ITEM	REF.	DESCRIPTION	QTY.
1	3054.14.000-102 - R03	GRABBER JAW CYLINDER	
2	3054.14.000-104	GRABBER JAW ROD	
3	3054.14.000-105 -R01	CYLINDER HEAD	
4	3054.14.000-103	CYLINDER PISTON	
5	3054.14.000-201 - R01	ROD PIN	
6	3054.14.000-306	SEAL ROT PU88	3
7	3054.14.000-307	PISTON SEAL PU88	1
8	BEARING 25.47.12	WRIST GRABBER BEARING	1
9	367.234	GUIDE RING Ø40	1
10	342.415	O-RING 34 x 2	1
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12	640.326	ROD SEAL Ø22	1
13	345.023	O-RING 20 x 1	1
14	DIN 471 D25	CIRCLIP Ø25	1
15	DIN 7991 M4x16	BOLT M4x20	1

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CIF: B27725225

Porto do Molle, Rúa das Pontes, nº19, CP:36350, Nigrán (Pontevedra) SPAIN

Fecha original	Dibujado	Comprobado		
04/02/2022	P. Iglesias		N8	MATAR ARISTAS 0,5 x45°
Proyecto: G501				COTAS SIN TOLERANCIA SEGÚN ISO 2768 mK
			Material: -	Tratamiento:	Peso (Kg.): 961.33
Cliente	Designación: JAW CYLINDER			Proceso: Hoja1
	Nº de plano: 3054.14.000-300 - SPARES		Cant.: -	Escala: 1:2	Formato: A3	Hoja: 1 de 1