



Certificate No:
TAP000028H

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hydraulic Actuator for Valve (Not Hydraulic Motor)

with type designation(s)
XTV-HAS/ XTV-HAD

Issued to
XTronica AS
Flatåsen, Norway

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.
Dsgn. press./Torque See Certificate

Issued at **Høvik** on **2021-05-11**

This Certificate is valid until **2026-05-10**.

for **DNV**

DNV local station: **Norway CMC, Mid-North**

Approval Engineer: **Mehdi Rowshan**

Zeinab Sharifi
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2021-03

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Product description

Rack and pinion hydraulic actuators in two types:

Single acting type XTV-HAS (HAD30/80/150/250/500/800/1000/1600/2500/5000)

Double acting type XTV-HAD (HAS30/80/150/250/500/800/1000/1600/2500/5000)

Design according to DNVGL-ST-0194

Materials:

Cylinder & Cover: AL7075, SS316, SS2205 and ISO C45

Rod: Al 7075/45Cr

Gear shaft: 40Cr

Bolting: SS316,

Seals: NBR, HNBR, FKM

Actuator manufacturing plant:

Øvre Flatåsveg 14B, NO-7079 Flatåsen, Norway

Room 101, Building 1, No. 1228 Jinhu Road, Pu Dong, Shanghai 201206, China

Application/Limitation

All actuators covered by this certificate are approved for 110 bar design pressure for the design temperature range between -40 °C to 200 °C according to the applied seal material with temperature range as follows:

HNBR: -40° C to 150° C

NBR: -20° C to 100° C

FKM: -20° C to 200° C

The hydraulic actuators may have torque table specified in the table below:

Action Type	No	Rack and pinion series	
		Model	Output torque (NM)
Single Acting	1	HAS30	90
	2	HAS80	200
	3	HAS150	510
	4	HAS250	850
	5	HAS500	1700
	6	HAS800	2650
	7	HAS1000	3500
	8	HAS1600	5300
	9	HAS2500	8900
	10	HAS5000	17800
Double Acting	1	HAD30	90
	2	HAD80	200
	3	HAD150	510
	4	HAD250	850
	5	HAD500	1700
	6	HAD800	2650
	7	HAD1000	3500
	8	HAD1600	5300
	9	HAD2500	8900
	10	HAD5000	17800

For carbon steel material, requirements of impact testing according to DNVGL rules Part 2 Chapter 2 shall be complied with.

Type Approval documentation

Doc. ref.	Description	Rev.	Doc. ref.	Description	Rev.
Double Acting HAD-30			Single Acting HAS-30		
XTV-HAD30-000	Assemble Drawing	0	XTV-HAS30-000	Assemble drawings	0
XTV-HAD30-003	Left cylinder	0	XTV-HAS30-001	Left Rod	0
XTV-HAD30-004	Rack piston	0	XTV-HAS30-002	Right Rod	0
XTV-HAD30-005	Shaft seat	0	XTV-HAS30-003	Left Cylinder	0
XTV-HAD30-006	Gear Shaft	0	XTV-HAS30-004	Rack Piston	0
XTV-HAD30-007	Upper end cap	0	XTV-HAS30-005	Shaft Seat	0
XTV-HAD30-009	Right cylinder	0	XTV-HAS30-006	Gear Shaft	0
Double Acting HAD-80			XTV-HAS30-007	Upper End Cap	0
XTV-HAD80-000	Assemble Drawing	0	XTV-HAS30-008	Right Cylinder	0
XTV-HAD80-003	Left cylinder	0	XTV-HAS30-012	Gas Spring	0
XTV-HAD80-004	Rack piston	0	Single Acting HAS-80		
XTV-HAD80-005	Shaft seat	0	XTV-HAS80-000	Assemble drawings	0
XTV-HAD80-006	Gear Shaft	0	XTV-HAS80-001	Left Rod	0
XTV-HAD80-007	Upper end cap	0	XTV-HAS80-002	Right Rod	0
XTV-HAD80-009	Right cylinder	0	XTV-HAS80-003	Left Cylinder	0
Double Acting HAD-150			XTV-HAS80-004	Rack Piston	0
XTV-HAD150-000	Assemble Drawing	0	XTV-HAS80-005	Shaft Seat	0
XTV-HAD150-003	Left cylinder	0	XTV-HAS80-006	Gear Shaft	0
XTV-HAD150-004	Rack piston	0	XTV-HAS80-007	Upper End Cap	0
XTV-HAD150-005	Shaft seat	0	XTV-HAS80-008	Right Cylinder	0
XTV-HAD150-006	Gear Shaft	0	XTV-HAS80-012	Gas Spring	0
XTV-HAD150-007	Upper end cap	0	Single Acting HAS-150		
XTV-HAD150-009	Right cylinder	0	XTV-HAS150-000	Assemble drawings	0
Double Acting HAD-250			XTV-HAS150-001	Left Rod	0
XTV-HAD250-000	Assemble Drawing	0	XTV-HAS150-002	Right Rod	0
XTV-HAD250-003	Left cylinder	0	XTV-HAS150-003	Left Cylinder	0
XTV-HAD250-004	Rack piston	0	XTV-HAS150-004	Rack Piston	0
XTV-HAD250-005	Shaft seat	0	XTV-HAS150-005	Shaft Seat	0
XTV-HAD250-006	Gear Shaft	0	XTV-HAS150-006	Gear Shaft	0
XTV-HAD250-007	Upper end cap	0	XTV-HAS150-007	Upper End Cap	0
XTV-HAD250-009	Right cylinder	0	XTV-HAS150-008	Right Cylinder	0
Double Acting HAD-500			XTV-HAS150-012	Gas Spring	0
XTV-HAD500-000	Assemble Drawing	0	Single Acting HAS-250		
XTV-HAD500-003	Left cylinder	0	XTV-HAS250-000	Assemble drawings	0
XTV-HAD500-004	Rack piston	0	XTV-HAS250-001	Left Rod	0
XTV-HAD500-005	Shaft seat	0	XTV-HAS250-002	Right Rod	0
XTV-HAD500-006	Gear Shaft	0	XTV-HAS250-003	Left Cylinder	0
XTV-HAD500-007	Upper end cap	0	XTV-HAS250-004	Rack Piston	0
XTV-HAD500-009	Right cylinder	0	XTV-HAS250-005	Shaft Seat	0
Double Acting HAD-800			XTV-HAS250-006	Gear Shaft	0
XTV-HAD800-000	Assemble Drawing	0	XTV-HAS250-007	Upper End Cap	0

XTV-HAD800-003	Left cylinder	0	XTV-HAS250-008	Right Cylinder	0
XTV-HAD800-004	Rack piston	0	XTV-HAS250-012	Gas Spring	0
XTV-HAD800-005	Shaft seat	0	Single Acting HAS-500		
XTV-HAD800-006	Gear Shaft	0	XTV-HAS500-000	Assemble drawings	0
XTV-HAD800-007	Upper end cap	0	XTV-HAS500-001	Left Rod	0
XTV-HAD800-009	Right cylinder	0	XTV-HAS500-002	Right Rod	0
Double Acting HAD-1000			XTV-HAS500-003	Left Cylinder	0
XTV-HAD1000-000	Assemble Drawing	0	XTV-HAS500-004	Rack Piston	0
XTV-HAD1000-003	Left cylinder	0	XTV-HAS500-005	Shaft Seat	0
XTV-HAD1000-004	Rack piston	0	XTV-HAS500-006	Gear Shaft	0
XTV-HAD1000-005	Shaft seat	0	XTV-HAS500-007	Upper End Cap	0
XTV-HAD1000-006	Gear Shaft	0	XTV-HAS500-008	Right Cylinder	0
XTV-HAD1000-007	Upper end cap	0	XTV-HAS500-012	Gas Spring	0
XTV-HAD1000-009	Right cylinder	0	Single Acting HAS-800		
Double Acting HAD-1600			XTV-HAS800-000	Assemble drawings	0
XTV-HAD1600-000	Assemble Drawing	0	XTV-HAS800-001	Left Rod	0
XTV-HAD1600-003	Left cylinder	0	XTV-HAS800-002	Right Rod	0
XTV-HAD1600-004	Rack piston	0	XTV-HAS800-003	Left Cylinder	0
XTV-HAD1600-005	Shaft seat	0	XTV-HAS800-004	Rack Piston	0
XTV-HAD1600-006	Gear Shaft	0	XTV-HAS800-005	Shaft Seat	0
XTV-HAD1600-007	Upper end cap	0	XTV-HAS800-006	Gear Shaft	0
XTV-HAD1600-009	Right cylinder	0	XTV-HAS800-007	Upper End Cap	0
Double Acting HAD-2500			XTV-HAS800-008	Right Cylinder	0
XTV-HAD2500-000	Assemble Drawing	0	XTV-HAS800-012	Gas Spring	0
XTV-HAD2500-003	Left cylinder	0	Single Acting HAS-1000		
XTV-HAD2500-004	Rack piston	0	XTV-HAS1000-000	Assemble drawings	0
XTV-HAD2500-005	Shaft seat	0	XTV-HAS1000-001	Left Rod	0
XTV-HAD2500-006	Gear Shaft	0	XTV-HAS1000-002	Right Rod	0
XTV-HAD2500-007	Upper end cap	0	XTV-HAS1000-003	Left Cylinder	0
XTV-HAD2500-009	Right cylinder	0	XTV-HAS1000-004	Rack Piston	0
Double Acting HAD-5000			XTV-HAS1000-005	Shaft Seat	0
XTV-HAD5000-000	Assemble Drawing	0	XTV-HAS1000-006	Gear Shaft	0
XTV-HAD5000-003	Left cylinder	0	XTV-HAS1000-007	Upper End Cap	0
XTV-HAD5000-004	Rack piston	0	XTV-HAS1000-008	Right Cylinder	0
XTV-HAD5000-005	Shaft seat	0	XTV-HAS1000-012	Gas Spring	0
XTV-HAD5000-006	Gear Shaft	0	Single Acting HAS-1600		
XTV-HAD5000-007	Upper end cap	0	XTV-HAS1600-000	Assemble drawings	0
XTV-HAD5000-009	Right cylinder	0	XTV-HAS1600-001	Left Rod	0
Single Acting HAS-5000			XTV-HAS1600-002	Right Rod	0
XTV-HAS5000-000	Assemble drawings	0	XTV-HAS1600-003	Left Cylinder	0
XTV-HAS5000-001	Left Rod	0	XTV-HAS1600-004	Rack Piston	0
XTV-HAS5000-002	Right Rod	0	XTV-HAS1600-005	Shaft Seat	0
XTV-HAS5000-003	Left Cylinder	0	XTV-HAS1600-006	Gear Shaft	0

XTV-HAS5000-004	Rack Piston	0	XTV-HAS1600-007	Upper End Cap	0
XTV-HAS5000-005	Shaft Seat	0	XTV-HAS1600-008	Right Cylinder	0
XTV-HAS5000-006	Gear Shaft	0	XTV-HAS1600-012	Gas Spring	0
XTV-HAS5000-007	Upper End Cap	0	Single Acting HAS-2000		
XTV-HAS5000-008	Right Cylinder	0	XTV-HAS2000-000	Assemble drawings	0
XTV-HAS5000-012	Gas Spring	0	XTV-HAS2000-001	Left Rod	0
Single Acting HAS-2500			XTV-HAS2000-002	Right Rod	0
XTV-HAS2500-000	Assemble drawings	0	XTV-HAS2000-003	Left Cylinder	0
XTV-HAS2500-001	Left Rod	0	XTV-HAS2000-004	Rack Piston	0
XTV-HAS2500-002	Right Rod	0	XTV-HAS2000-005	Shaft Seat	0
XTV-HAS2500-003	Left Cylinder	0	XTV-HAS2000-006	Gear Shaft	0
XTV-HAS2500-004	Rack Piston	0	XTV-HAS2000-007	Upper End Cap	0
XTV-HAS2500-005	Shaft Seat	0	XTV-HAS2000-008	Right Cylinder	0
XTV-HAS2500-006	Gear Shaft	0	XTV-HAS2000-012	Gas Spring	0
XTV-HAS2500-007	Upper End Cap	0	Single Acting HAS-2500		
XTV-HAS2500-008	Right Cylinder	0	XTV-HAS2500-012	Gas Spring	0
	XTV Hydraulic Actuator Type Approval Document	4			

Production testing

Each actuator is to be hydro tested at 1.5 x the maximum allowable pressure before delivery.

Certification

No product certificate is required.

Marking of product

For traceability to this type approval the actuators are to be marked with:

- Manufacturer's name or trademark
- Pressure rating and maximum torque
- Type designation

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.