

Small & Compact Product !

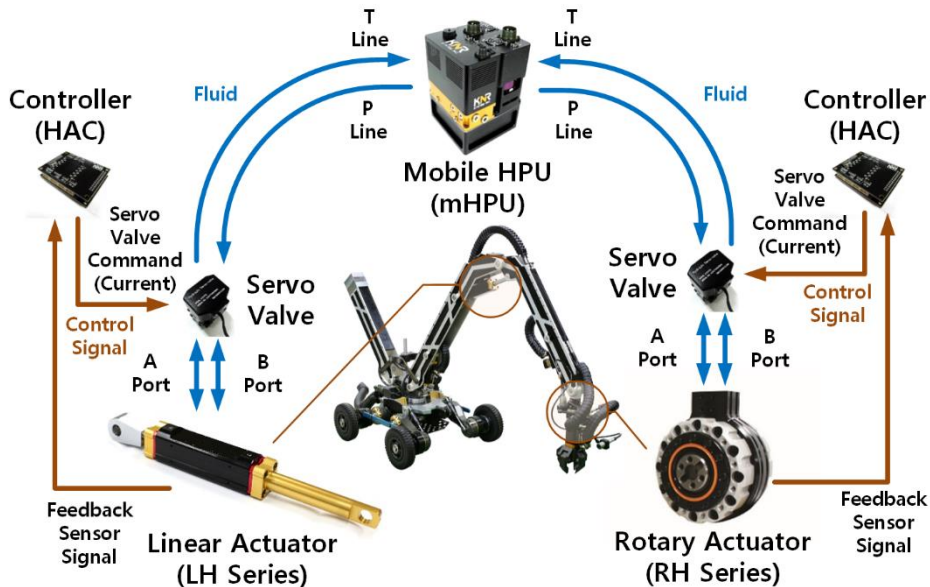
Customization Service !

KRH / KLH Series

KNR Systems Inc. develops high quality hydraulic components consisting of linear and rotary actuators, mobile or stationary hydraulic power units, and servo valves. These hydraulic components are mainly used in the field of robotics, where the components are connected to form a central controller for a robot.



We supply two main categories of hydraulic actuator products: KRH (Rotary Hydraulic actuator) and KLH (Linear Hydraulic Actuator). KRH Series a group of rotary actuators that can create rotational joints with high torque, without additional parts. KLH Series is a group of linear actuators used to implement prismatic motion or rotational motion using a link. The KRH/KLH Series can perform high precision closed loop feedback control, with the use of servo valves and specific sensors; generally, LVDT is used for linear movement control and RVDT or Encoder for the rotational control. We providing customization option with the KRH/KLH Series for the customers with specific purposes.



KNR Systems Inc.

Robotics Division RND.KNRSYS.COM

HEADQUARTERS WWW.KNRSYS.COM

Tel +82.31.326.3510

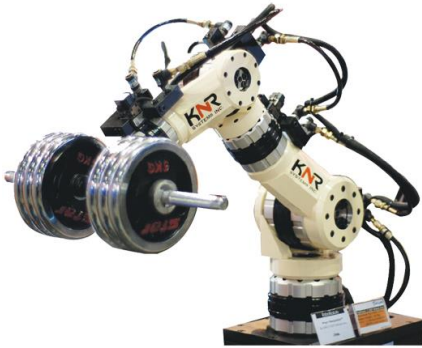
E-mail rnd.knrsys.com

HYDRAULIC ROTARY ACTUATOR

Your Benefit

Heavy load-carrying capacity

KNR's unique design achieves high FWR(Force to Weight Ratio) performance to meet the needs of various applications. And it supports heavy radial moment and thrust load without additional parts to make application systems robust and have high power density.



Compact design

Tight assemble with several parts permits double or single vane/stroke resulting in high torque/Force output from compact configurations. No mechanical part causes power loss.



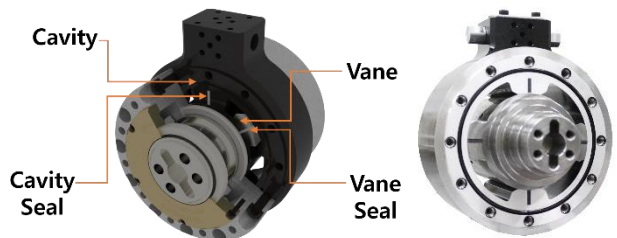
Flexibility

Shaft features a large diameter mounting flange with drilled and tapped bolt circle. It provides considerable application flexibility with directly connected linkages.



Less leakage

Sealing is applied against accurately manufactured smooth surfaces, effectively eliminating most of the leakage and enabling selected positions to be held without drift.

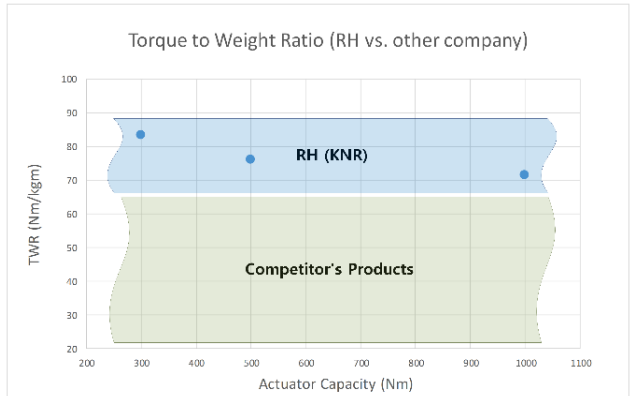
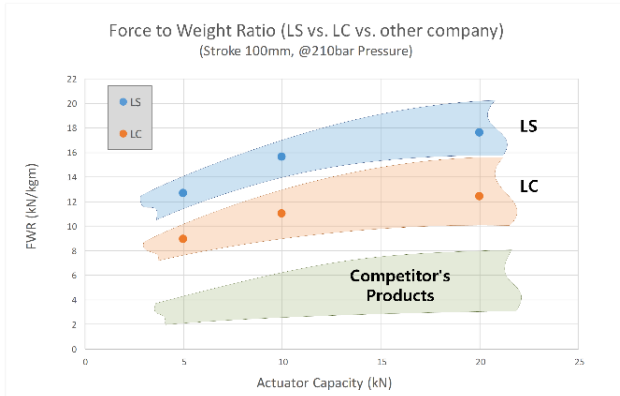
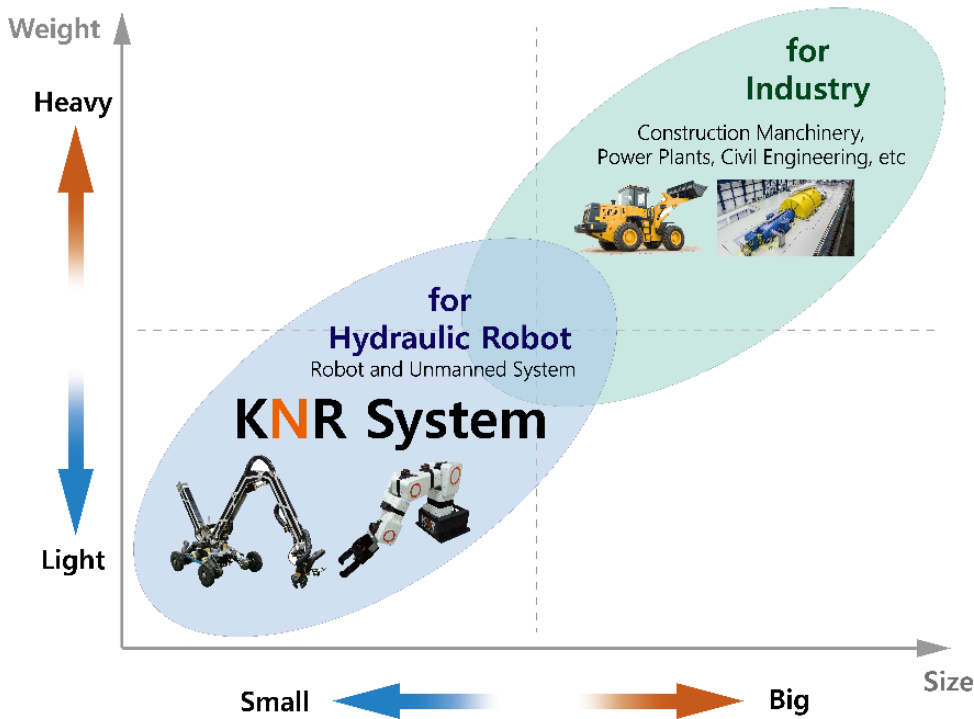


HYDRAULIC ROTARY ACTUATOR

Heavy load-carrying capacity

KNR Systems develops actuators that satisfies the needs in the filed of robotics and unmanned systems. Our actuators have higher "Force to weight" ratio compared to the products of competitors. And it supports heavy radial moment and thrust load without additional parts to make application systems robust and to have high power density.

Area of KNR's Actuator Coverage : fit for the use in small application such as robotics



Customization Service

Hydraulic Actuators have simple but compact design, making modifications easier for a specific purpose, when the standard model is not suitable. We can customize the products to meet your special specifications and actuator shapes, at an additional cost and period.

Customized Specification

- Stroke or Rotation Range
- Capacity
(KLH Series : Force / KRH Series : Torque)
- Internal Leakage & Friction

Customized Shape

- Actuator Size & Shape
- Hydraulic Mounting Type
- Mechanical Mounting Interface
(Joint Accessories)

Customizing Integrated Package Product

- Integrated Actuators including hydraulic servo valve, position sensor, pressure sensor and controller

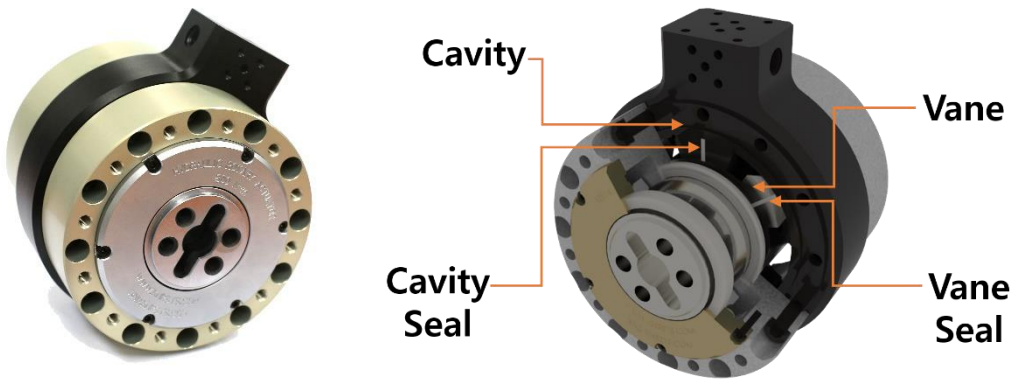


HYDRAULIC ROTARY ACTUATOR

HYDRAULIC ROTARY ACTUATOR (KRH Series)

Rotary actuators can be adapted to form the systems, providing high levels of mechanical stiffness and torque. They have compact yet heavy-duty designs. These kinds of actuators can be implemented to yield a torque-to-weight ratio about 10 times higher than a standard motor and Harmonic Drive configuration.

One of the advantages of rotary actuators is that they can be added to a system easily, with a simple insertion between two links. There's no need for extra parts, such as bearings and gearheads, so joints are guaranteed to have precise and powerful movements, and links have no need for clearance. Their precision makes them ideal not only for robots, but for other industrial applications and for testing.



We consistently research for different types of mounts, and we can provide actuators with different levels of power from our standard models 100Nm (885 in-lbs), 300 Nm (2655 in-lbs), 500 Nm (4425 in-lbs), and 1000 Nm (8851 in-lbs) at 210 bar (3045psi). Also, we have an ongoing interest in developing actuators better equipped for harsh environments, to better fit applications that require operations in underwater, high temperature, or high dust level environments.

Technical Data	
OUTPUT Torque	100Nm, 300Nm, 500Nm, 1kNm (885, 2655, 4425, 8851 in-lbs)
Rotation	Double Vane Type : 100deg Single Vane Type : 270deg
Vane Type	Single Vane Type , Double Vane Type
Nominal Pressure	210 (bar)

HYDRAULIC ROTARY ACTUATOR

ORDERING CODE (KRH Series)

KRH - D 300 - SV

Model

KRH : Rotary
Hydraulic
Actuator

Vane Type 1)

S : SINGLE Vane Type
D : DOUBLE Vane Type

Hydraulic Mount

SV : SERVO VALVE
T8 : AB PORT (PT) 1/8"
T4 : AB PORT (PT) 1/4"
F8 : AB PORT (PF) 1/8"
F4 : AB PORT (PF) 1/4"

Torque (@ ΔP = 210bar)

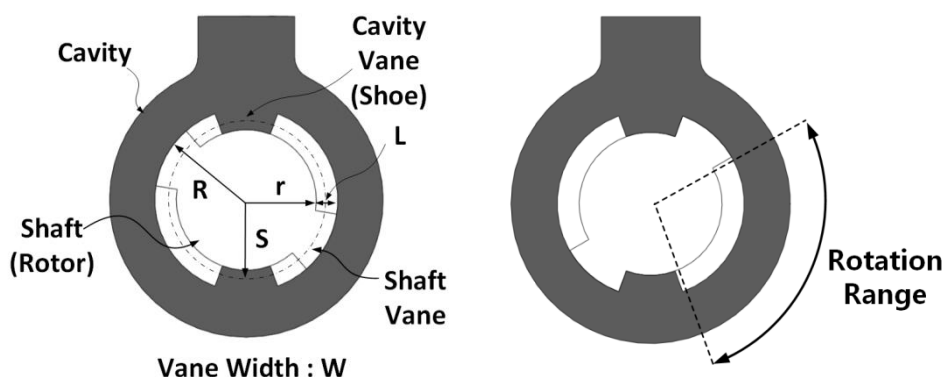
100 : 100 (Nm)
300 : 300 (Nm)
500 : 500 (Nm)
1k : 1000 (Nm)

- 1) Rotary actuators can be designed in two types: single vane or double vane. Single vane type allows better range of movements and double vane provides more torque. The two features makes rotary actuators suitable for a wide variety of applications.

HYDRAULIC ROTARY ACTUATOR

SPECIFICATION

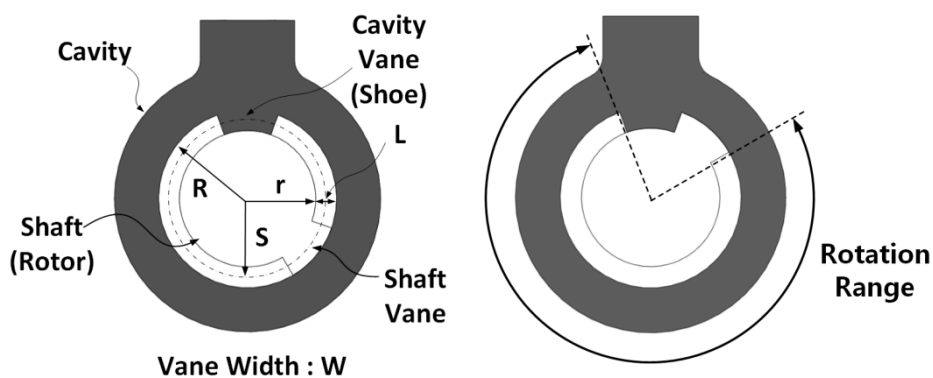
▪ Double Vane Type



Model	Rotation Range (deg.)	Displacement (mm ³ /rad)	Piston Area (mm ²)	Torque Radius (S, mm)
KRH-D100 (100Nm@210bar)	100	5565	259.4	21.45
KRH-D300 (300Nm@210bar)	100	16290.6	530.6	30.7
KRH-D500 (500Nm@210bar)	100	28046.6	739	37.95
KRH-D1k (1000Nm@210bar)	100	57181	1156.3	49.45

※ Torque Radius in the table below is "S" in the drawing above.

▪ Single Vane Type

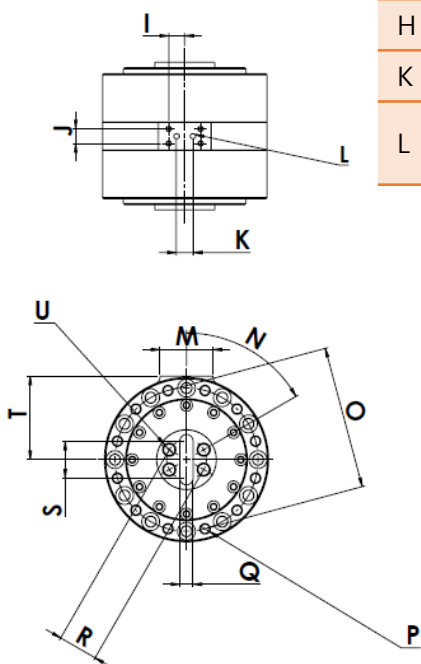


Model	Rotation Range (deg.)	Displacement (mm ³ /rad)	Piston Area (mm ²)	Torque Radius (S, mm)
KRH-S100 (100Nm@210bar)	270	5407.5	235.6	22.95
KRH-S300 (300Nm@210bar)	270	15138.8	493.1	30.7
KRH-S500 (500Nm@210bar)	270	25897.8	682.4	37.95
KRH-S1k (1000Nm@210bar)	270	52932.3	1070.4	49.45

HYDRAULIC ROTARY ACTUATOR

DIMENSION

Double Vane Type



H	: 4	I	: 12	J	: 11
K	: 12.2mm	M	: 40mm	N	: 60°
L	: 2 x Control Port Required Seal (8.0 O.D. x 6.0 I.D. x 1 Thickness O-Ring)				

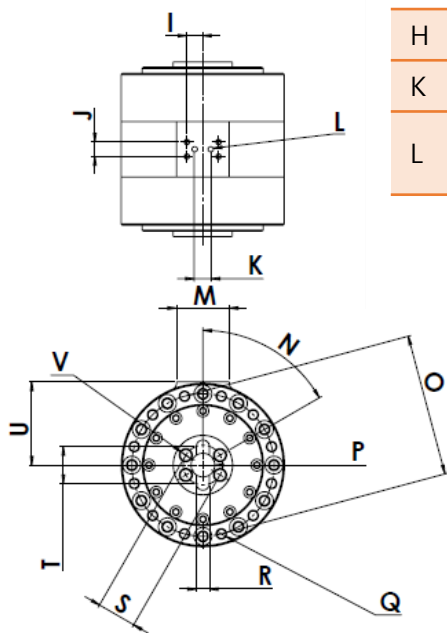
Model	A	B	C	D	E	F	G
KRH-D100	16	63.4	71.4	79.4	$\phi 20_{-0.01}^0$	$\phi 52_{-0.1}^0$	$\phi 74$
KRH-D300	16	85.4	94.4	102.4	$\phi 35_{-0.01}^0$	$\phi 79_{-0.1}^0$	$\phi 105$
KRH-D500	21	94.4	103.4	111.4	$\phi 45_{-0.01}^0$	$\phi 92_{-0.1}^0$	$\phi 124$
KRH-D1k	28.5	121.9	130.9	138.9	$\phi 60_{-0.01}^0$	$\phi 118_{-0.1}^0$	$\phi 155$

Model	O	P	Q	R	S	T	U
KRH-D100	62	8 x M5 DP10	$5_0^{+0.02}$	13	$12_0^{+0.1}$	38	4 x M4 DP10
KRH-D300	93	12 x M6 DP12	$8_0^{+0.02}$	24	$20_0^{+0.1}$	53.5	4 x M6 DP16
KRH-D500	108	12 x M8 DP16	$10_0^{+0.02}$	30	$28_0^{+0.1}$	63	4 x M8 DP20
KRH-D1k	137	12 x M10 DP20	$12_0^{+0.02}$	40	$38_0^{+0.1}$	78.5	4 x M12 DP24

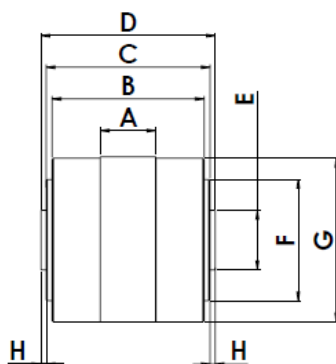
HYDRAULIC ROTARY ACTUATOR

DIMENSION

▪ Single Vane Type



H	: 4	I	: 12	J	: 11
K	: 12.2mm	M	: 40mm	N	: 60°
L	: 2 x Control Port Required Seal (8.0 O.D. x 6.0 I.D. x 1 Thickness O-Ring)				



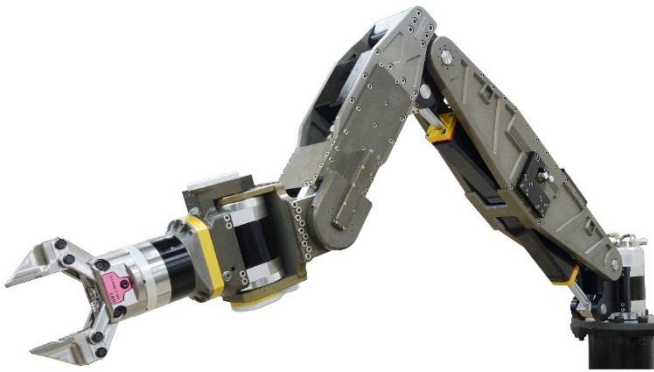
Model	A	B	C	D	E	F	G
KRH-S100	20	80.4	88.4	96.4	$\phi 20_{-0.01}^0$	$\phi 58_{-0.1}^0$	$\phi 80$
KRH-S300	33	102.4	111.4	119.4	$\phi 35_{-0.01}^0$	$\phi 79_{-0.1}^0$	$\phi 105$
KRH-S500	42	115.4	124.4	132.4	$\phi 45_{-0.01}^0$	$\phi 92_{-0.1}^0$	$\phi 124$
KRH-S1k	56	149.4	158.4	166.4	$\phi 60_{-0.01}^0$	$\phi 118_{-0.1}^0$	$\phi 155$

Model	O	P	Q	R	S	T	U	V
KRH-S100	68	$\phi 7$	8 x M5 DP10	$5_{0}^{+0.02}$	13	$12_{0}^{+0.1}$	41	4 x M4 DP10
KRH-S300	93	$\phi 14$	12 x M6 DP12	$8_{0}^{+0.02}$	24	$20_{0}^{+0.1}$	53.5	4 x M6 DP16
KRH-S500	108	$\phi 18$	12 x M8 DP16	$10_{0}^{+0.02}$	30	$28_{0}^{+0.1}$	63	4 x M8 DP20
KRH-S1k	137	$\phi 24$	12 x M10 DP20	$12_{0}^{+0.02}$	40	$38_{0}^{+0.1}$	78.5	4 x M12 DP24

HYDRAULIC ROTARY ACTUATOR

APPLICATIONS

▪ Manipulator



HYDRA-UW
(KNR's Underwater Manipulator)



HYDRA-MP3
(KNR's Multi-Purpose Manipulator)

▪ Field Robot



GIBBON
(KNR's Hydraulic Mobile Robot in a nuclear power plant)



DCR

(KNR's Hydraulic Mobile Robot in high dust & high temperature environment)

NCR

