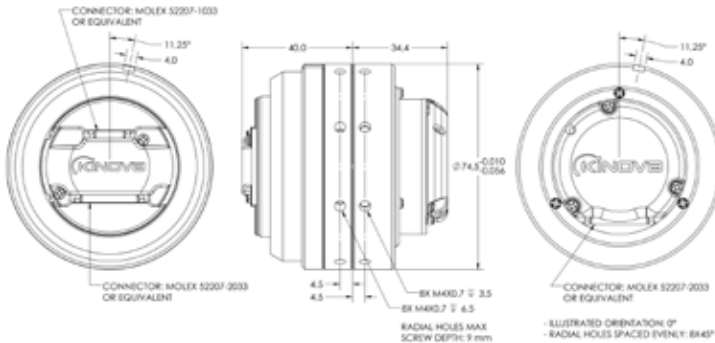




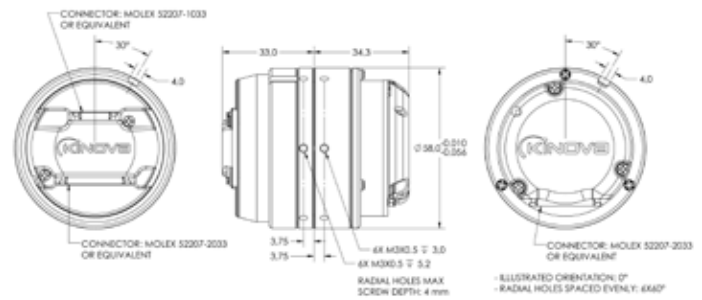
ACTUATORS

K-75+ K-58

K-75+ Ø74.5 mm, 12.0 Nm nominal, 37 Nm peak Brushless DC motor, ratio 160 Harmonic Drive™



K-58 Ø58 mm, 3.6 Nm nominal, 7.7 Nm peak Brushless DC motor, ratio 110 Harmonic Drive™



GEARED MOTOR (WITH 24V SUPPLY)

	K-75+	K-58
No load speed	12.2 rpm	20.3 rpm
Nominal torque	12.0 Nm	3.6 Nm
Nominal speed	9.4 rpm	15.0 rpm
Peak torque <i>(software limitation)</i>	30.5 Nm	6.8 Nm
Max motor efficiency	83%	81%
Max gearing efficiency	76%	69%
Torque gradient	13.8 Nm/A	7.8 Nm/A
Backdriving torque	0.8 to 7 Nm	1.7 to 5.2 Nm

SENSORS

	K-75+	K-58
Position sensor resolution	3,686,400/turn	2,534,400/turn
Motion before position indexation	±2.25°	±3.27°
Absolute position sensor precision at start-up <i>(before indexation)</i>	±1.5°	
Torque sensor precision <i>(room temperature)</i>	±0.4 Nm	
Torque sensor temperature drift <i>(-10 °C to 40 °C)</i>	±0.3 Nm	
Torque sensor cross-axis torque sensitivity	0% to 8%	
Accelerometers range and bandwidth <i>(x, y and z)</i>	±3g, 50 Hz	
Motor current sensor range and bandwidth	±5 A, 140 Hz	
Temperature sensor range and precision	-40 °C to 125 °C, ±2 °C	

MECHANICAL

	K-75+	K-58
Weight	570 g	357 g
Motion range after start-up <i>(software limitation)</i>	±27.7 turns	±27.7 turns
Max axial, radial and flexion moment loads <i>(static)</i>	7.6 kN, 3.0 kN, 87 Nm	4.7 kN, 1.8 kN, 39 Nm
Dynamic axial, radial and flexion moment loads ratings of the main bearing	3.5 kN, 1.5 kN, 41 Nm	2.1 kN, 0.8 kN, 17 Nm

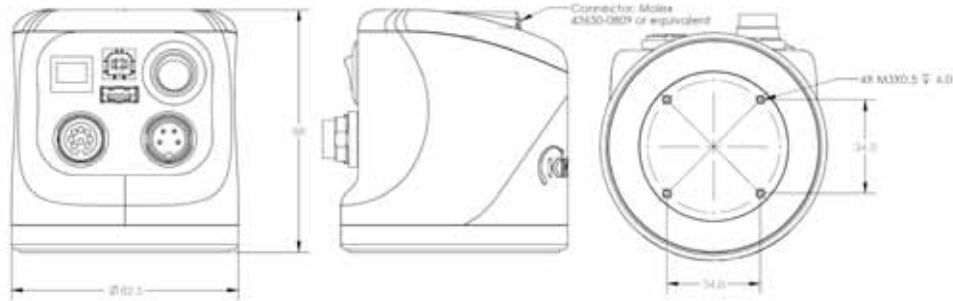
THERMAL

	K-75+	K-58
Operating temperature range	-10 °C to 40 °C	
Max frame temperature <i>(overheat protection triggered)</i>	75 °C	
Thermal time constant of the winding	22 s	16 s
Thermal time constant of the frame	39 min.	35 min.

ELECTRONIC

Power supply voltage	18 to 29 VDC, 24 VDC nominal
Communication protocol	RS-485
Communication cables	20 pins flat flex cable
Expansion pins	2 (on communication bus)

CONTROLLER



Ports	Joystick	1 Mbps Canbus
	Power supply	18 to 29 VDC
	USB 2.0 (API)	12 Mbps
	Ethernet (API)	100 Mbps
Control system frequency	High level (API)	100 Hz
	Low level (API)	500 Hz
CPU		360 MHz
SDK	APIs	High and low level
	Compatibility	Windows, Linux Ubuntu & ROS
	Port	USB 2.0, Ethernet
	Programming languages	C++
Control		Force, cartesian & angular

REFERENCE

A	M	N	T
Absolute position sensor precision at start-up (before indexation): <i>The absolute position measurement precision at power-up, before an index is detected (see Motion before indexation below).</i>	Max axial, radial and flexion moment loads (static): <i>The actuator main bearing static loads capacity.</i>	No load speed: <i>The maximum speed (no payload, 24 VDC power supply).</i>	Temperature sensor range and precision: <i>The range and precision of the temperature sensor mounted on the actuator chassis.</i>
Accelerometers range and bandwidth (x, y and z): <i>The range and bandwidth of the tri-axis accelerometer with signal conditioning.</i>	Max frame temperature (overheat protection triggered): <i>The temperature measured at the frame at which a progressive current limitation starts to be applied by software. Torque loads above nominal should always be brief; this protection cannot guarantee the integrity of the motor under loads significantly higher than the nominal.</i>	Nominal speed: <i>The maximum speed under Nominal torque load.</i>	Thermal time constant of the frame: <i>An indicator of the thermal response time (first order system approximation) of the frame. When a torque load is applied, the winding heats first and then start to heat the more massive frame (which has thus a slower response).</i>
Backdriving torque: <i>The load torque that causes an unpowered unit to backdrive. This value varies depending on of factors that include temperature and wear.</i>	Max gearing efficiency: <i>An indicator of the gearing performance at input speed 500 rpm and temperature 30 °C. The efficiency of the gearing depends on factors including speed, load and temperature.</i>	Nominal torque: <i>The continuous torque output that causes the actuator frame to heat up to Max frame temperature (tested at 23 °C with the actuator enclosed in a plastic shell). Loadings above this value should always be brief.</i>	Thermal time constant of the winding: <i>An indicator of the thermal response time (first order system approximation) of the winding.</i>
Communication cables: <i>The cables used to link each actuator in a daisy chain.</i>	Max motor efficiency: <i>An indicator of the motor performance at its ideal operation torque and velocity. The efficiency of the motor depends on factors including friction and Joule power losses.</i>	Operating temperature range: <i>Actuator safe operating temperature range.</i>	Torque gradient: <i>The ratio of torque output to motor current calculated without gearing losses. The actual torque applied on the load depends on motion direction and gearing efficiency.</i>
Communication protocol: <i>The communication protocol used between the actuators and controller.</i>	Motion before position indexation: <i>The max required output motion (after power-up) before an index is detected. When this precision index is detected, the position information is updated to the precise value.</i>	Peak torque (software limited): <i>The maximum torque output (in the direction of motion) with the motor current limited by software.</i>	Torque sensor cross-axis torque sensitivity: <i>The effect of torque applied perpendicularly to the actuator axis on the measured torque (torque measure bias / cross-axis torque).</i>
Dynamic axial, radial and flexion moment loads ratings of the main bearing: <i>The actuator main bearing dynamic loads capacity.</i>	Motion range after start-up (software limitation): <i>The motion range (software limitation).</i>	Position sensor resolution: <i>The position sensing resolution measured at the input and calculated for the output.</i>	Torque sensor precision (room temperature): <i>The precision of the sensor at 23 °C under a pure moment loads.</i>
Expansion pins (on communication bus): <i>The pins that are available to transmit signals through all the actuators to the controller with the output on the joystick port. 24V and ground pins are also available.</i>	Motor current sensor range and bandwidth: <i>The motor current measurement range and bandwidth.</i>	Power supply voltage: <i>The rated range of power supply tension of the actuator drive.</i>	Torque sensor temperature drift (-10 °C to 40 °C): <i>The maximum effect of temperature on torque measurement precision.</i>
		Weight: <i>The weight of the actuator module.</i>	
			W