

Reliable Cam System Solutions

SANDEX

CNC Automatic Tool Changer

CTS Series



16CTS

CNC Automatic Tool Changer

CTS Series

Rotary & Lift Part Handling Unit

SANKYO
Innovation

Features & Options

Description



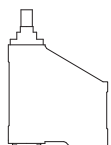
The CTS series is the ideal oscillating or indexing unit for high-speed applications requiring heavy loads transmission, such as machine tool changing, automotive components and general assembly. The thin cast iron housing is recessed to accommodate unique shaped parts or recessed gripper arms. A double reduction ratio drive rotates the cam perimeter to supply large torque capacities. Accurate rotational motion is achieved with a zero backlash spline type output shaft. Since one revolution of the input shaft equals one full cycle, the large cam diameter can yield up to 360 degree of output rotation with long lift strokes up to 165mm (6.5"). The output shaft is supported with long linear bearings compatible with unbalanced loads typical of single arm applications. The lift axis uses the end of the cam with the rotary on the face to keep both motions synchronized. Versatile inverted, side or upright mounting of the handler and the motor drive packages reduce the footprint and design integration time. Shaft extensions can be configured to accommodate special motor drives, timing sensor packages or custom output fixtures. The design level of accuracy, durability, and compact design makes the CTS series a perfect addition to your machinery.

Features

- Lift stroke/linear capacity, 0 to 165mm (6.49") within $\pm 0.5\text{mm}$ (0.0019") accuracy
- Indexing; 2, 4, 6 and 8 incremental output stops within $\pm 90\sim 120$ arc sec.
- Indexing repetitive accuracy 90 arc sec. (0.11mm per 254mm radius or 0.0043" per 10" radius)
- Oscillating; 30, 90, 120, 180, 210, 270, 300 & 360° motions within 300 arc sec. accuracy
- Maximum of 90 cycles per minute bi-directional indexing or oscillating motions
- Painted cast iron housings thermally expands the rate as the internal steel components to maintain accuracy
- Handler mounts in upright (as shown), inverted positions or either side
- Drive mounting package can be rotated in 90° increments with the motor upright (as shown) or inverted

Mounting Options

Handler lift capacities vary due to gravitational force of each mounting position (position-1 is standard). Belt driven induction or servo motors can be mounted in multiple positions (standard is position-A). Each use standard flange mounted motors with timing belt drive components. We recommend the adjustable torque limiting clutch and variable frequency drive (VFD) controller options to protect your investments in the event of a tooling crash.



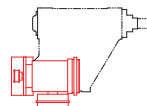
Position-1



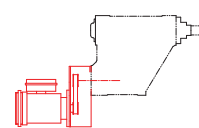
Position-5



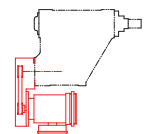
Position-A



Position-B



Position-C



Position-D



Timing Sensor Options

Cycle on demand applications require a method to stop the motor when the part is in position or to interlock supporting machine or avoid crashed tooling. Sankyo offers 1 to 3 sensor packages that can be mounted either side of the housing. Our standard inexpensive photo-eye type sensors or robust proximity type sensors with IP67 wash-down ratings.



Variable Frequency Drive Controller Option

VFD controllers use electronic braking to stop the handler motor consistently even if the motor speed is fast or slow. Multiple speed patterns can be utilized to jog for easy setup. Emergency stops can occur without tripping the torque limiter clutch due to the soft stopping feature. Temporary continuous duty cycles can be simulated while running cycle on demand by lengthening the dwell time since the speed can be changed on the fly with every cycle. Stop/start cycle frequencies are dependant on the output load requirements, most applications can cycle 30 to 50 times/ minute.



10655 State Route 47 • Sidney, Ohio 45365-4338

Tel: (937) 498-4901 • Fax: (937) 498-9403

www.sankyoamerica.com • sales@sankyoamerica.com

CTS Series

Rotary & Lift Part Handling Unit

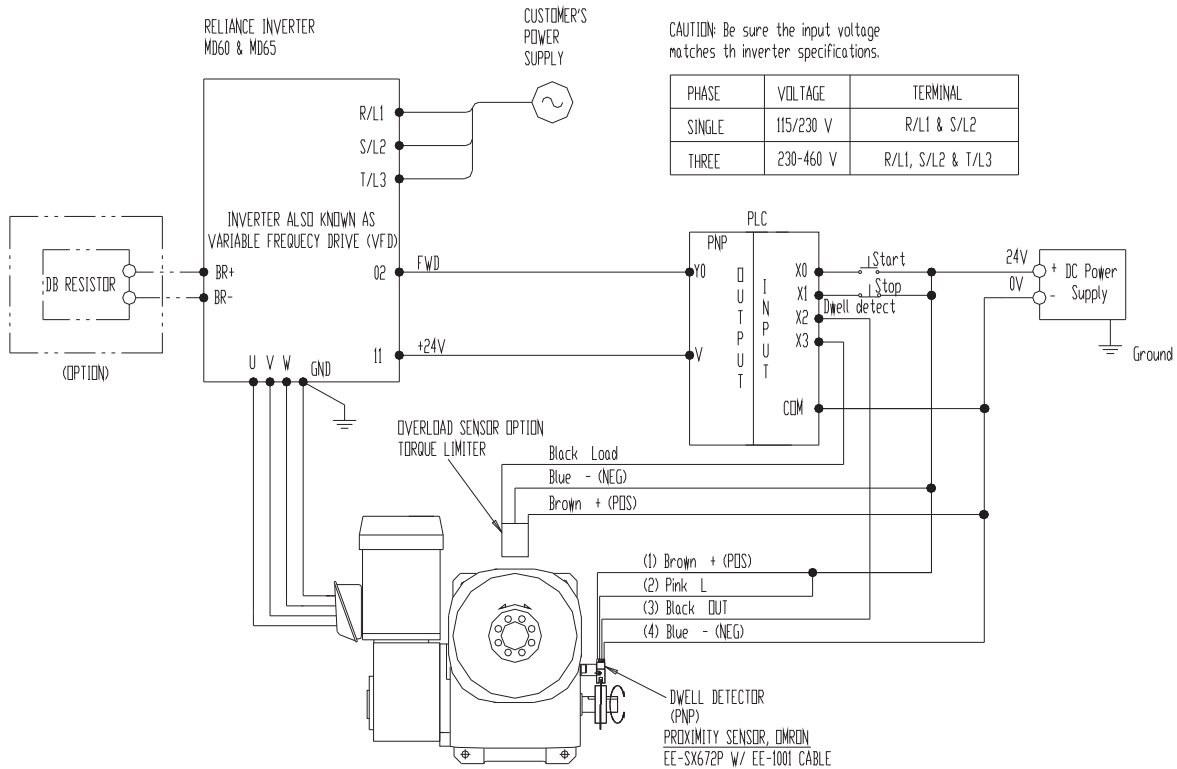
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Specifications & Wiring

Specifications Quick Reference Chart

Model	Units	12CTS	14CTS	16CTS
Maximum Cycles per Minute	-	90 (1 input revolution equals a full cycle)		
Lift Stroke Length	mm (in)	0~90 (0~3.54)	0~118 (0~4.64)	0~165 (6.49)
Lift Stroke/Linear Backlash	mm (in)	±0.5 (0.0019)		
Oscillation Angles	deg	30, 90, 120, 180, 210, 270, 300 & 360°		
Oscillation Repetitive Accuracy	arc sec.	300		
Indexing Incremental Stops	-	2, 4, 6 & 8		
Indexing Accuracy	arc sec.	±120		±90
Indexing Repetitive Accuracy	arc sec.	90		
Output Rotational Backlash	arc sec.	52		
Max. Lift Load Capacity (90 cpm)	N (lbf)	97 (21)	82 (18)	115 (25)
Max. Rotary Torque Capacity (90 cpm)	Nm (lbf-in)	112 (991)	165 (1460)	187 (1655)
Max. Output Axial Load Capacity	N (lbf)	588 (132)		
Max. Output Radial Load Capacity	N (lbf)	784 (176)		
Drive Package Power	kW (hp)	0.2~0.4 (0.25~0.5)	0.2~0.4 (0.25~0.5)	0.4~0.8 (0.5~1.0)
Unit Weight (no drive package)	kg (lb)	50 (110)	90 (198)	130 (286)

Wiring



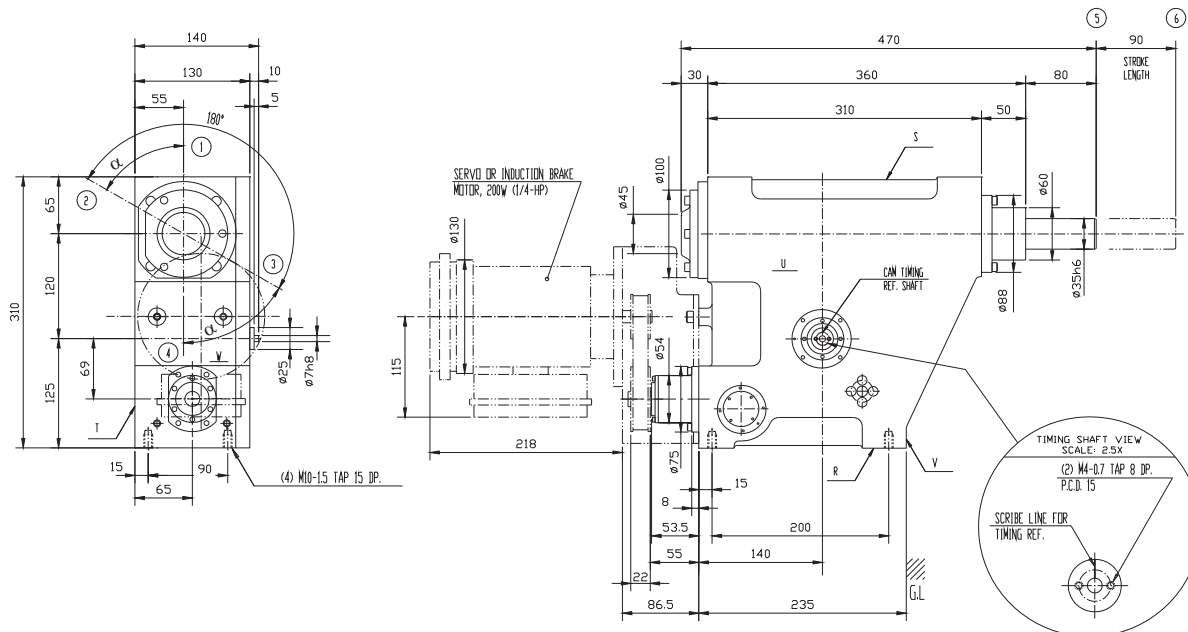
Service

Sankyo offers repair or rebuild service at our facility in Sidney, Ohio. On site service is also available throughout the North America, Central America, South America, Europe, the Middle East and Africa. Our mother plant in Japan, Korea or China covers the Asian areas and Australia.



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Tel: (937) 498-4901 • Fax: (937) 498-9403
www.sankyoamerica.com • sales@sankyoamerica.com

12CTS Series Dimensions



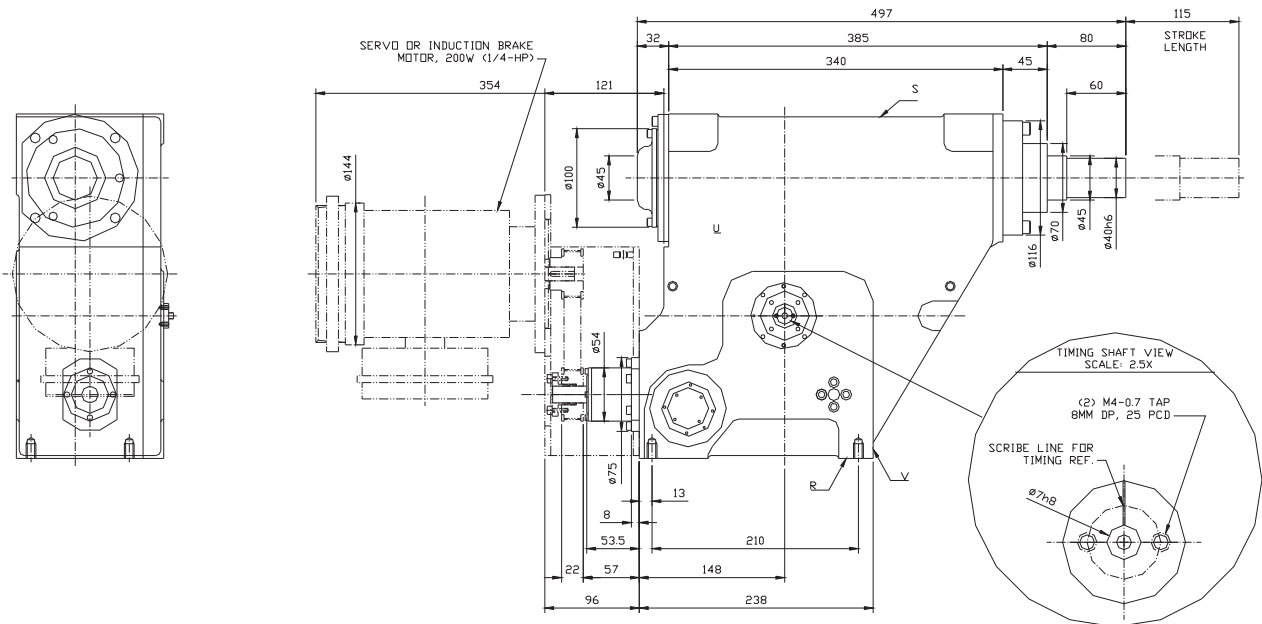
12CTS Series Capacity

Torque Capacity, Indexing Motion (MS Cam Curve)			Dynamic-rated Output Torque Top (Nm)			Carrying Capacity, Linear Motion (MS Cam Curve)		Dynamic Allowable Load (N) Mounting Position-1 & 5 (rpm)		
Stops	Index period (deg)	Static-rated output torque Ts (N-m)	N=30 (rpm)	N=60 (rpm)	N=90 (rpm)	Stroke length (mm)	Index period (deg)	N=30 (rpm) pos-1 / pos-5	N=60 (rpm) pos-1 / pos-5	N=90 (rpm) pos-1 / pos-5
2	120	277	106	86	76	30	33	254.8 / 588.0	104.9 / 179.3	37.2 / 54.9
	150	311	111	90	80		40	377.3 / 588.0	197.0 / 407.7	87.2 / 133.3
	180	335	114	92	81		50	396.9 / 588.0	236.2 / 588.0	125.4 / 219.5
4	60	274	143	117	103	50	39	238.1 / 588.0	88.2 / 144.1	26.5 / 39.2
	90	333	154	125	111		50	352.8 / 588.0	170.5 / 337.1	69.6 / 105.8
	120	365	155	126	112		60	373.4 / 588.0	203.8 / 485.1	98.0 / 163.7
6	45	183	118	96	85	70	44	238.1 / 588.0	84.3 / 133.3	22.5 / 34.3
	60	211	124	101	89		50	311.6 / 588.0	123.5 / 213.6	38.2 / 56.8
	90	241	126	102	90		60	340.1 / 588.0	158.8 / 317.5	62.7 / 98.0
8	45	194	136	111	98	90	48	229.3 / 588.0	77.4 / 119.6	14.7 / 24.5
	60	211	135	110	98		60	307.7 / 588.0	124.5 / 224.4	40.2 / 61.7
	90	225	128	104	93		70	331.2 / 588.0	153.9 / 314.6	60.8 / 97.0

12CTS Series Specifications

Description	Unit	Value	Description	Unit	Value	Description	Unit	Value
Maximum output carrying load	N	Refer to capacity chart	Maximum input axial load	N	N/A	Linear backlash	mm	±0.5
						Indexing accuracy	arc sec.	±120
Maximum output axial load	N	588	Maximum input radial load	N	N/A	Index repeat accuracy	arc sec.	90
						Osc. repeat accuracy	arc sec.	300
Maximum output radial load	N	588	Maximum input repetitious torque	N-m	N/A	Rotational backlash	arc sec.	52
						Maximum cycles/min	rpm	90
Output static load	N-m	Refer to capacity chart	Input torsional rigidity	N-m/rad	N/A	Housing color	Hammer-tone gray	
Output torsional rigidity	N-m	12200	Input inertia	kg-m ²	2.97 x 10 ⁻⁴	Product weight	kg	50 (no drive)
Output shaft mass	kg	3.6	Cam curve	Modified sine		Motor horsepower	hp	1/4 ~ 1/2
Output inertia (oscillate)	kg-m ²	1.35 x 10 ⁻³	Internal gear ratio	5/97		Motor voltages, 60 Hz	230-460 volts, 50 & 60 Hz	
Optional drawbar release striker plate	Hardened to HRC-62		Drawbar release backlash	Min.	0.5 to 0.75	Optional timing sensor	Proximity or photo eye type, max. quantity-4	

14CTS Series Dimensions



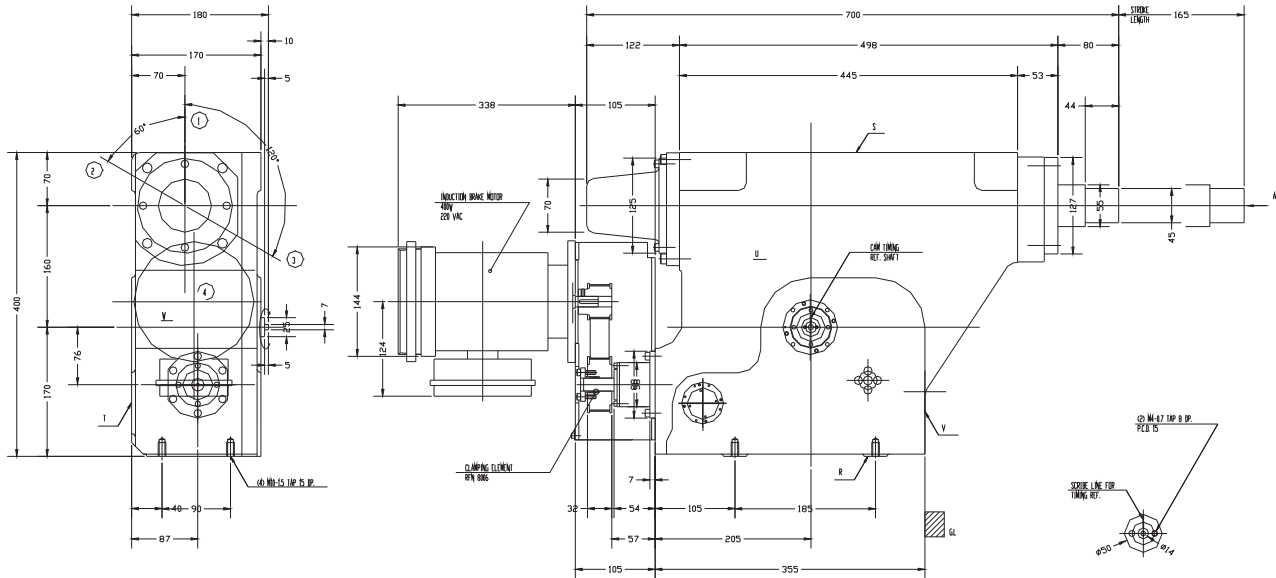
14CTS Series Capacity

Torque Capacity, Indexing Motion (MS cam curve)			Dynamic-rated Output Torque Top (Nm)			Carrying Capacity, Linear Motion (MS Cam Curve)		Dynamic Allowable Load (N) Mounting Position-1 & 5 (rpm)		
Stops	Index period (deg)	Static-rated output torque Ts (N-m)	N=30 (rpm)	N=60 (rpm)	N=90 (rpm)	Stroke length (mm)	Index period (deg)	N=30 (rpm) pos-1 / pos-5	N=60 (rpm) pos-1 / pos-5	N=90 (rpm) pos-1 / pos-5
2	110	372	146	118	105	50	45	477.3 / 784.0	213.6 / 370.4	79.4 / 117.6
	150	434	155	126	112		50	535.1 / 784.0	256.8 / 510.6	103.9 / 158.8
	180	465	166	135	120		60	571.3 / 784.0	310.7 / 741.9	149.0 / 249.9
4	60	386	202	164	145	75	49	419.4 / 784.0	160.7 / 266.6	42.1 / 64.7
	90	463	214	174	154		60	496.9 / 784.0	222.5 / 434.1	83.3 / 128.4
	120	502	213	173	153		70	531.2 / 784.0	268.5 / 602.7	117.6 / 195.0
6	65	399	118	186	165	100	53	391.0 / 784.0	125.4 / 203.8	22.5 / 38.2
	90	431	225	183	162		60	430.2 / 784.0	160.7 / 282.2	44.1 / 68.6
	120	450	213	175	155		70	473.3 / 784.0	205.8 / 405.7	73.5 / 117.6
8	N/A					118	55	358.7 / 784.0	103.9 / 166.6	10.8 / 23.5
	N/A						60	387.1 / 784.0	127.4 / 213.6	24.5 / 42.1
	N/A						70	434.1 / 784.0	170.5 / 316.5	51.0 / 82.3

14CTS Series Specifications

Description	Unit	Value	Description	Unit	Value	Description	Unit	Value
Maximum output carrying load	N	Refer to capacity chart	Maximum input axial load	N	N/A	Linear backlash	mm	±0.5
Maximum output axial load	N	784	Maximum input radial load	N	N/A	Indexing accuracy	arc sec.	±120
Maximum output radial load	N	784	Maximum input repetitious torque	N-m	N/A	Index repeat accuracy	arc sec.	90
Output static load	N-m	Refer to capacity chart	Input torsional rigidity	N-m/rad	N/A	Osc. repeat accuracy	arc sec.	300
Output torsional rigidity	N-m	19130	Input inertia	kg-m ²	2.54 x 10 ⁻⁴	Rotational backlash	arc sec.	52
Output shaft mass	kg	6	Cam curve		Modified sine	Maximum cycles/min	rpm	90
Output inertia (oscillate)	kg-m ²	2.8 x 10 ⁻³	Internal gear ratio		1/20, 1/28	Housing color		Hammer-tone gray
Optional drawbar release striker plate		Hardened to HRC-62	Drawbar release backlash	Min.	0.5 to 0.75	Product weight	kg	90 (no drive)
						Motor horsepower	hp	1/4 ~ 1/2
						Motor voltages, 60 Hz		230~460 volts, 50 & 60 Hz
						Optional timing sensor		Proximity or photo eye type, max. quantity-4

16CTS Series Dimensions



16CTS Series Capacity

Torque Capacity, Indexing Motion (MS Cam Curve)			Dynamic-rated Output Torque Top (Nm)			Carrying Capacity, Linear Motion (MS Cam Curve)		Dynamic Allowable Load (N) Mounting Position-1 & 5 (rpm)		
Stops	Index period (deg)	Static-rated output torque Ts (N-m)	N=30 (rpm)	N=60 (rpm)	N=90 (rpm)	Stroke length (mm)	Index period (deg)	N=30 (rpm) pos-1 / pos-5	N=60 (rpm) pos-1 / pos-5	N=90 (rpm) pos-1 / pos-5
2	110	439	172	140	124	50	47	653.7 / 980.0	297.9 / 542.9	111.7 / 173.5
	150	511	183	148	131		60	780.1 / 980.0	418.5 / 980.0	194.0 / 334.2
	180	546	185	150	133		70	815.4 / 980.0	475.3 / 980.0	248.9 / 477.3
4	55	435	233	189	168	100	54	538.0 / 980.0	167.6 / 285.2	22.5 / 46.1
	90	543	251	204	181		60	584.1 / 980.0	209.7 / 378.3	48.0 / 83.3
	120	587	249	202	179		70	643.9 / 980.0	273.4 / 549.8	90.2 / 150.9
6	45	394	246	200	177	150	62	449.8 / 980.0	113.7 / 194.0	NA / 10.8
	60	442	211	212	187		70	505.7 / 980.0	156.8 / 281.3	19.6 / 45.1
	75	471	260	211	187		90	607.6 / 980.0	253.8 / 537.0	82.3 / 146.0
8	N/A					165	66	443.0 / 980.0	111.7 / 194.0	NA / 10.8
	N/A						70	470.4 / 980.0	132.3 / 234.2	5.9 / 26.5
	N/A						90	573.3 / 980.0	225.4 / 461.6	63.7 / 115.6

16CTS Series Specifications

Description	Unit	Value	Description	Unit	Value	Description	Unit	Value
Maximum output carrying load	N	Refer to capacity chart	Maximum input axial load	N	N/A	Linear backlash	mm	±0.5
Maximum output axial load	N	980	Maximum input radial load	N	N/A	Indexing accuracy	arc sec.	±90
Maximum output radial load	N	980	Maximum input repetitious torque	N-m	N/A	Index repeat accuracy	arc sec.	90
Output static load	N-m	Refer to capacity chart	Input torsional rigidity	N-m/rad	N/A	Osc. repeat accuracy	arc sec.	300
Output torsional rigidity	N-m	26395	Input inertia	kg-m ²	2.97 x 10 ⁻⁴	Rotational backlash	arc sec.	52
Output shaft mass	kg	9.3	Cam curve	Modified sine		Maximum cycles/min	rpm	90
Output inertia (oscillate)	kg-m ²	7.5 x 10 ⁻³	Internal gear ratio		3/115	Housing color	Hammer-tone gray	
Optional drawbar release striker plate	Hardened to HRC-62		Drawbar release backlash	Min.	0.5 to 0.75	Product weight	kg	130 (no drive)
						Motor horsepower	hp	1/2 ~ 1
						Motor voltages, 60 Hz	230-460 volts, 50 & 60 Hz	
						Optional timing sensor	Proximity or photo eye type, max. quantity-4	

CTS Series

Related Products

Rotary & Lift Handling Unit

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Fixed Stop Rotary Indexers

Sankyo's AD/DTR low profile dial indexers feature hollow bore centers for routing supply lines with a stationary flange for mounting a second dial above the indexing dial. Our ED series offers nickel plated steel billet housings with cleanroom compatible models available. A great choice for packaging machine, our DU series is designed with short index periods for continuous duty cycles. Parallel shaft indexers are designed for inline indexing in confined spaces. Most series perform index or oscillate motion with ± 30 arcsec accuracy. Special configurations are available to meet your needs.

				
<i>AD – Dial Index (High Torque Capacity)</i>	<i>DTR – Large Dial (Integrated Reducer)</i>	<i>ED – Right Angle Index (Cleanroom Compatible)</i>	<i>DU – Universal Index (Short Index Period)</i>	<i>P – Parallel Index (Parallel Shafts)</i>

Programmable Rotary Indexers

Each series below features programmable stops or non-patterned motions driven with servo motor drives. Constant lead cams include internal cam ratios which can be driven with or without optional reducers for combined ratios up to 1600:1. Multiple housing sizes are available in each series with stationary or rotating hollow outputs, for cycle rates up to 1500+ cycles/minute.

				
<i>AR – Dial Index (High Torque)</i>	<i>RE – Dial Index (Mid Torque/speed)</i>	<i>RTR – Dial Index (Extreme Torque)</i>	<i>RA – Rotating Bore Index (High Speed)</i>	<i>Ro – Ring Index (Large Bore)</i>




Linear & Rotary Handlers

Sankyo's handlers feature rotary & linear motions combined with lift motions. All internal cam motions include gripper dwell times and easy synchronization (1 input shaft revolution for one full cycle). Multiple sizes for each series are available.

				
<i>FN – Rotary Handler (Lift, Index, Oscillate)</i>	<i>FH – Rotary Handler (600 cpm Handler)</i>	<i>GY – Linear Handler (Pick & Place)</i>	<i>GV – Linear Handler (Walking Beam)</i>	<i>G – Linear Handler (Large Capacity W.B.)</i>

Rotary & Linear Assembly

Our rotary and linear assembly machine can incorporate synchronizes or asynchronous handlers. Our BH series can mount 0~12 synchronized handlers above a 6~36 station indexing dial plate. The IC80 series precision chain conveyor can use our GY series handler with 12~256 stations. Our MPC series can change feed pitch by station. Each pallet is driven with a cam to control the pallet motion by station. Perfect for accumulation or long inspection times.

	<p>BH Series (rotary assembly)</p> <ul style="list-style-type: none"> • 90 cycles/min • 6~36 stations • 0~12 handlers • 3 frame sizes • 1 motor drives index & handler • clutch protected 		<p>IC80 Series (linear assembly)</p> <ul style="list-style-type: none"> • 120 cycles/min • 80~160mm link • 1~4 link pitch • 960~9600 long • line shaft drive for handlers • clutch protected 		<p>MPC Series (linear assembly)</p> <ul style="list-style-type: none"> • 60 cycles/min • 0~375mm pitch • 30~100 pallets • pallets can accumulate or feed multiples • clutch protected
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