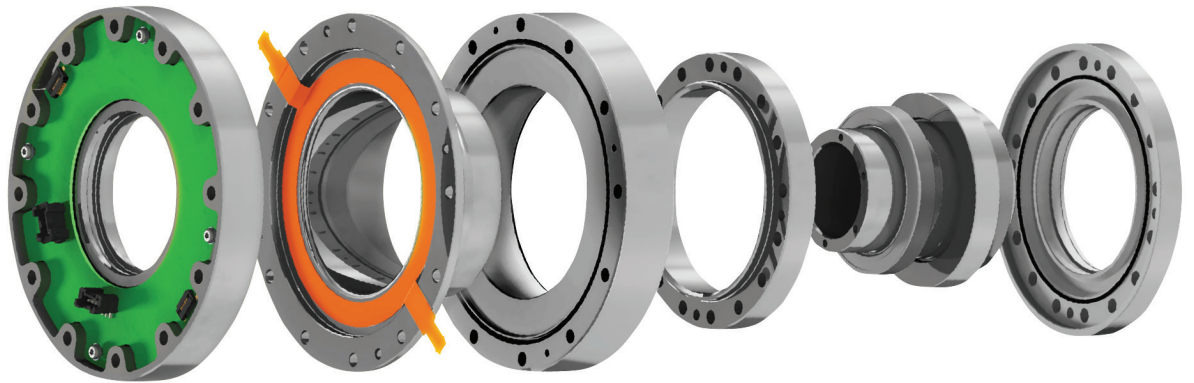




Smart-FLEXWAVE

Next Generation Integrated Multi-Sensor



WP Series

Integrated, Compact & Efficient Design

NIDEC DRIVE TECHNOLOGY CORPORATION

Smart-FLEXWAVE

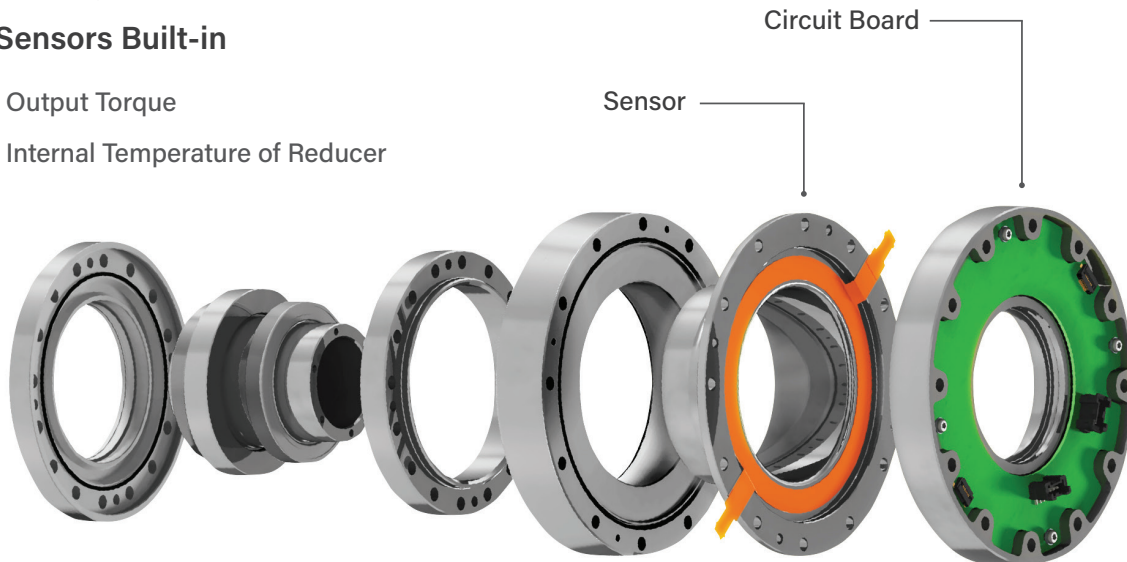
Maximize your manufacturing and automation capabilities with the *Next Generation* Nidec Smart-FLEXWAVE gear reducers. The *Next Generation* Nidec Smart-FLEXWAVE features an integrated sensor that detects output torque and internal temperature of the reducer giving our customers the all-around edge in process control, optimization, and safety. In addition, get up-to-date statistics in real time from anywhere with network monitoring system capabilities.

The *Next Generation* Nidec Smart-FLEXWAVE is smaller in size and weight that reduces decline in rigidity than a typical external torque sensor which is installed outside the modules of the motor and gear reducer. With its integrated sensor design, the *Next Generation* Nidec Smart-FLEXWAVE delivers a streamline addition to your most demanding applications, saving space with its compact and lightweight design.

Sensor Integration Features

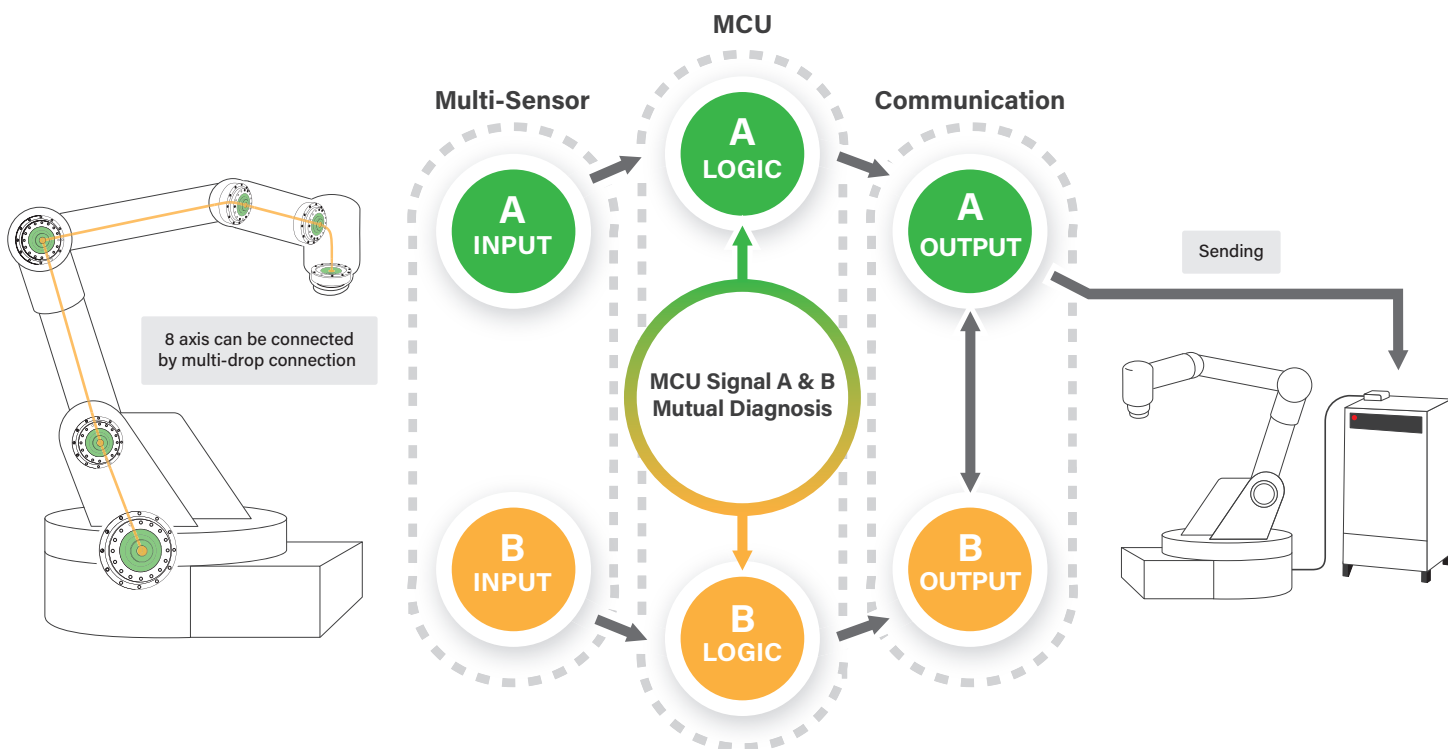
Integrated Sensors Built-in

- Detects Output Torque
- Detects Internal Temperature of Reducer



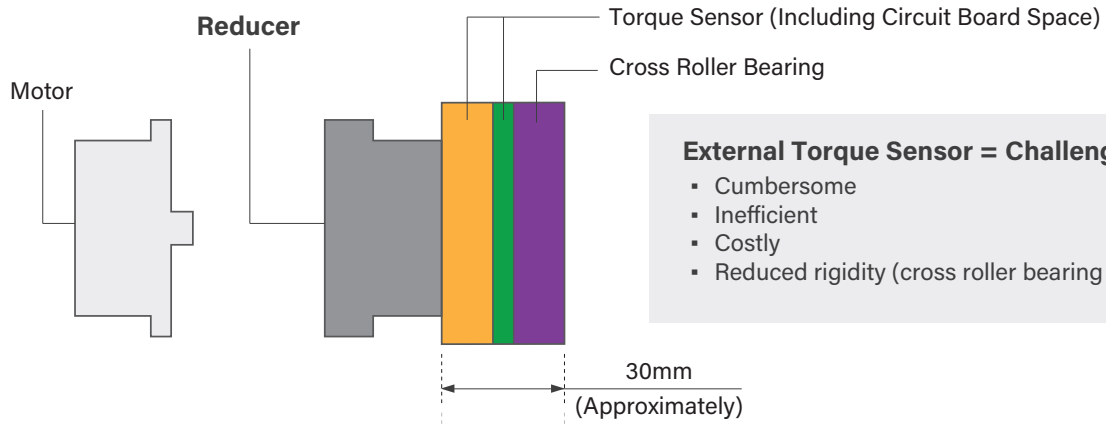
Dual System for Cooperative Robot

Equipped with two systems of sensors to ensure the safety required for cooperative robots.



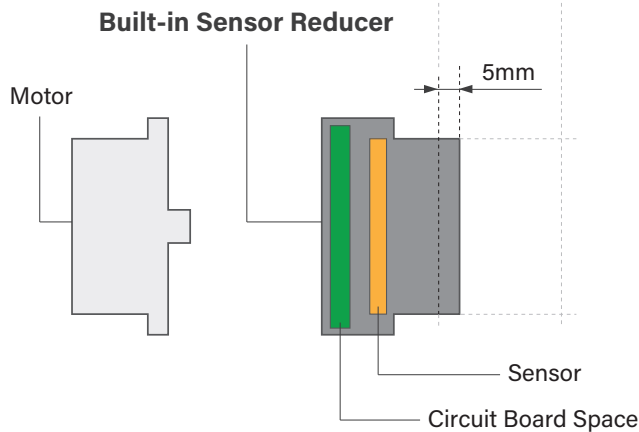
Comparison between Conventional External Torque Sensor and Smart-FLEXWAVE

Conventional External Type Torque Sensor



- External Torque Sensor = Challenges**
- Cumbersome
 - Inefficient
 - Costly
 - Reduced rigidity (cross roller bearing required)

Smart-FLEXWAVE



- Smart-FLEXWAVE = Solutions**
- Integrated sensor
 - Compact and lightweight
 - Economical
 - No decrease in rigidity
 - Low influence of crossed axes

Smart-FLEXWAVE Weight and Size

Model	Weight *1 [kg]	Outer Diameter of Cover A *2 [mm]	Thickness *3 [mm]
WPU-35-□-SRH-BD	0.72	+ 4	+ 7
WPU-42-□-SRH-BD	1.0	+ 4	+ 7
WPU-50-□-SRH-BD	1.4	+ 0	+ 5
WPU-63-□-SRH-BD	2.1	+ 0	+ 5
WPU-80-□-SRH-BD	4.2	+ 0	+ 5

*1 Weight is almost same with based reducer.

*2 Outer diameter of #35 and #42 is larger than based reducer's one.

*3 Thickness increases with all models against based reducer.

Smart-FLEXWAVE Technical Data

Sensor Data

Sensor Type	Features	Description	Notes
Torque Sensor	Rated torque	Equivalent to the maximum allowable torque of the reducer	--
	Limit torque	Equivalent to the emergency stop torque of reducer	--
	Durability	Equivalent to reducer	--
	Measuring range (Full scale)	Determined by the size of the reducer	--
	Non-linearity	±3% FS or less	Range to rated torque
	Hysteresis	3% FS or less	Range to rated torque
	Cross-axis sensitivity	±1% FS or less	Range to allowable moment of reducer
	Temperature compensation	±0.05FS/°C	Use the built-in temperature sensor
	Resolution	12-bit	Range: ±2000 LSB:Determined by the size of the reducer
Functional safety	PLd (Category 3) /ISO 13849-1 SIL2 /IEC 61508	Certification is expected in 2024	
Temperature Sensor	Accuracy	±2°C	T.B.D.
	Measuring range	0°C ~ 80°C	--
	Resolution	0 ~ 800 bit	LSB: 0.1°C
General	Power supply voltage	DC24V+10%/-15%	--
	Consumption current	0.1A or less	T.B.D.
	Communication method	RS-485 Half-duplex (2-wire)	--
	Baud rate	3.0Mbps	--
	Operating temperature limit	0°C ~ 80°C	--
	Protection grade	IP00	Use with IP54 or better
	Thickness	WP-35, 42: 7mm up, WP-50, 63, 80: 5mm up	Extended flex gear cover section
	Mass	The same as that of the Type B2 standard unit	--
Target model	B2 type, Open type, Standard unit type	--	

Sensor Specifications

Frame	Ratio R*1	Rated Load	Full Scale	LSB
		[Nm]	[Nm]	[Nm]
35	50	23	± 50	0.025
	80	30		
	100	36		
42	50	44	± 100	0.050
	80	56		
	100	70		
	120	70		
50	50	73	± 150	0.075
	80	96		
	100	107		
	120	113		
	160	120		
63	50	127	± 300	0.150
	80	178		
	100	204		
	120	217		
	160	229		
80	50	281	± 600	0.300
	80	395		
	100	433		
	120	459		
	160	484		

Reducer Model Nomenclature

WP	C	—	35	—	50	—	CR	—	**
Series Name	Type		Size		Ratio		Code *		Specifications
WP WP series	C: Component type S: Simple unit type U: Unit type • Input shaft unit • Hollow unit		35 42 50 63 80		50 80 100 120 160		CR SR SRH SRJ		Input shaft diameter, etc.

* For code details, check Dimensions Table

Ratio Matrix Availability

Frame Size	Reduction Ratio				
	50	80	100	120	160
35					
42					
50					
63					
80					

Reducer Specifications

Frame	Ratio R*1	Nominal Output Torque *2	Maximum Output Torque *3	Emergency Stop Torque *4	Nominal Input Speed *5	Maximum Input Speed *6	Life *7
		[Nm]	[Nm]	[Nm]	[r/min]	[r/min]	[hours]
35	50	7	23	46	3000	8500	10000
	80	10	30	61			
	100	10	36	70			
42	50	21	44	91	3000	7300	
	80	29	56	113			
	100	31	70	143			
	120	31	70	112			
50	50	33	73	127	3000	6500	
	80	44	96	165			
	100	52	107	191			
	120	52	113	191			
	160	52	120	191			
63	50	51	127	242	3000	5600	
	80	82	178	332			
	100	87	204	369			
	120	87	217	395			
	160	87	229	408			
80	50	99	281	497	3000	4800	
	80	153	395	738			
	100	178	433	841			
	120	178	459	892			
	160	178	484	892			

*1 Reduction ratio is to be calculated by the formula in the previous page, using R value in this table.

*2 The maximum allowable value at the input rotation speed of 2000r/min

*3 The maximum torque when starting and stopping.

*4 The maximum torque when it receives shock.

*5 The maximum average input speed.

*6 The maximum input speed.

*7 The life time at the input rotation speed of 2000 r/min and nominal output torque.

www.nidec-dtc.com

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NIDEC DRIVE TECHNOLOGY CORPORATION
175 Wall Street, Glendale Heights, IL 60139 USA
Phone: (800) 842-1479 • info@nidec-dtc.com