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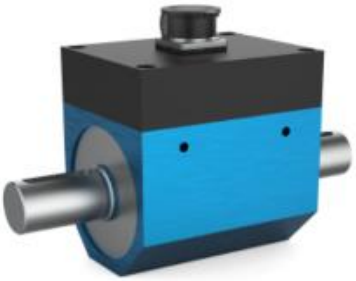
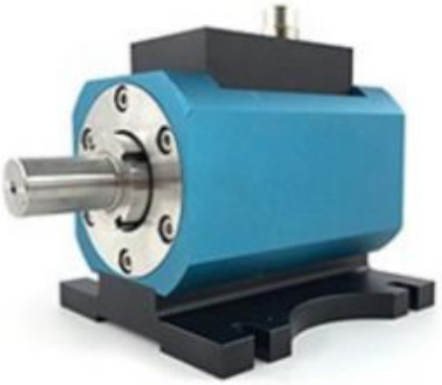
Torque Speed Sensor Manual

V1.0





Product Description

In the fields of industrial manufacturing and research & development, precision requirements are becoming increasingly stringent, while time pressures continue to rise. These changes demand reliable and flexible measurement systems. Through long-term and close collaboration with partners in R&D and industrial sectors, **Validynamics** offers a wide range of high-precision torque sensors that open new avenues for innovative solutions in industrial measurement and system technology.

To significantly enhance the safety, reliability, and efficiency of production and R&D, two key aspects must be addressed:

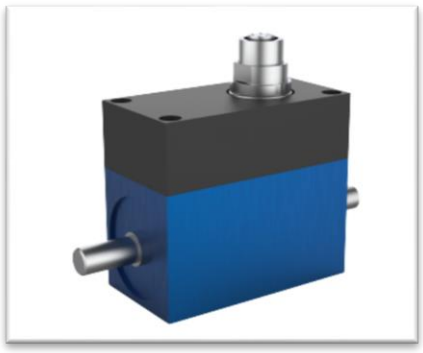
- The mechanical and electronic characteristics of electrical equipment must undergo rigorous testing.
- At the same time, complete test bench systems must continuously adapt to the latest technological developments to ensure maximum precision and reliability.

As a leader in measurement and system technology, in addition to standard torque sensors, **Validynamics** also provides customized torque measurement solutions tailored to clients' specific applications. Whether in universities or industrial settings, for fundamental research or quality monitoring, **Validynamics** torque sensors ensure accurate measurement of power output and friction values in drive systems, gearboxes, and pumps.

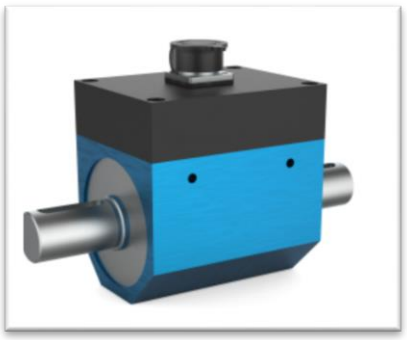
Strain gauge technology offers a powerful solution for measuring rotating shafts as well as for long-term dynamic and static measurements. Thanks to its extremely high precision, high structural rigidity, and excellent temperature stability, strain gauge technology meets the most demanding task requirements.

Piezoelectric reaction torque sensors are favored for their outstanding overload protection, extremely high signal resolution, and very wide frequency range. They are especially suitable for measurement tasks with strict constraints on installation space, temperature range, and dynamic conditions.

A variety of torque sensors can be used to provide ideal solutions for every application. Our torque and rotational speed sensors are available in three main measurement ranges, as listed below:



Small-range Torque Speed Sensor



Medium-range Torque Speed Sensor

Large-range Torque Speed Sensor

Small-range Torque Speed Sensor

Primarily used for measuring small torque values, this torque sensor operates in a non-contact manner. It offers a measurement range of 0.1 to 5 Nm and is available in three maximum rotational speed variants: 15,000 RPM, 10,000 RPM, and 8,000 RPM. An optional OLED display panel can be included to show torque, rotational speed, and power in real time.

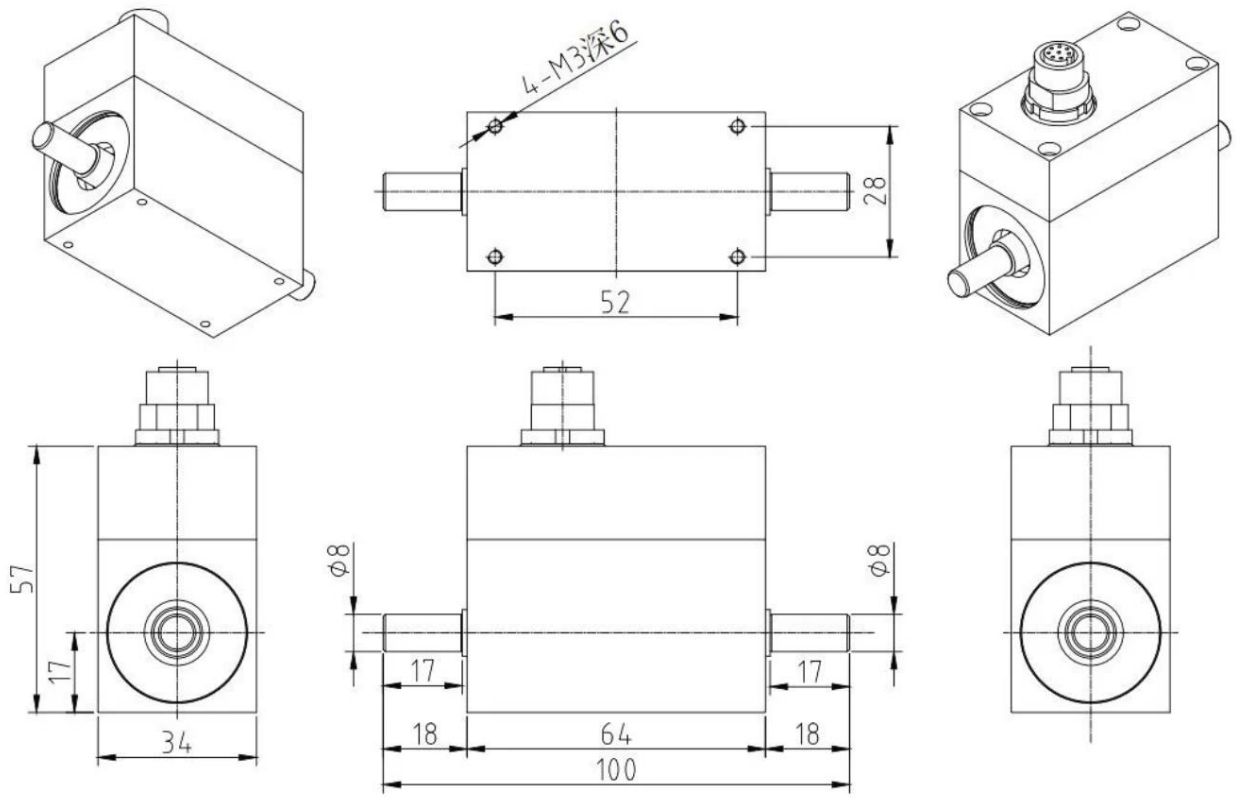
Specification	Details
Measurement Range	0.1 Nm, 0.5 Nm, 1 Nm, 2 Nm, 5 Nm
Torque Output	10 ± 5 kHz; 4 – 20 mA; 0 ± 5/10 VDC; RS485
Speed Output	60-pulse TTL; Open collector 0 – 5/10 VDC; 4 – 20 mA; RS485/RS232
Accuracy	±0.1% FS; ±0.2% FS
Power Supply	12 – 30 VDC
Zero Temp Influence	±0.02% RO/°C
Span Temp Influence	±0.02% RO/°C
Compensated Temp Range	+5°C to +50°C
Operating Temp Range	0°C to +60°C
Electrical Connection	XS12 6-pin connector
Safe Overload Capacity	200% RO
Shaft Material	Stainless steel
Housing Material	Aluminum
Standard Cable Length	5 meters (customizable upon request)

Specifications:

Small-range Precision Torque Speed Sensor								
Model	Shaft Type	Rated Torque	Max. Torque	Torque Precision	Pulse/Rotation	Maximum Speed	Output Signal	Product Photo
SVMP-102-A1-U	Double-ended	0.1N.m	0.15N.m	0.20%	60	8000rpm / 10000rpm/ 150000rpm	Torque Output（Optional）：10±5KHZ；4-20mA,0±5/10VDC；0-5/10VDC；	
SVMP-502-A1-U	Double-ended	0.5N.m	0.75N.m	0.20%	60			
SVMP-103-A1-U	Double-ended	1N.m	1.5N.m	0.10%	60			
SVMP-203-A1-U	Double-ended	2N.m	3N.m	0.10%	60			
SVMQ-102-A1-U	Double-ended	0.1N.m	0.15N.m	0.20%	60		RS485 Speed Output：Default 0-30KHz (60 Pulse,1KHz to 1000RPM)	
SVMQ-502-A1-U	Double-ended	0.5N.m	0.5N.m	0.20%	60			
SVMQ103-A1-U	Double-ended	1N.m	1N.m	0.10%	60			
SVMQ-503-A1-U	Double-ended	5N.m	7.5N.m	0.10%	60			

*Not the full list, please inquiry us for the torque and speed requirement and we will suggest the model.

Dimension:

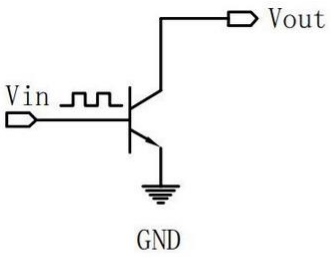


Signal Output Pin Definition:

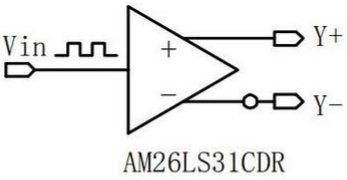
8-Core Electrical Connection (Signal Output and Communication)					
Power	Pin5	Red	Supply Vin+		
	Pin6	Black	Supply Vin-		
Signal	Pulse/Current/Voltage				Differential
	Pin1	White	Signal- (GND)		Torque A-
	Pin2	Blue	Blank		Speed B-
	Pin3	Green	Torque		Torque A+
	Pin4	Yellow	Speed		Speed B+
Communication			RS485	RS232	CAN
	Pin7	Brown	A+	TxD	H+
	Pin8	Grey	B-	RxD	L-
Signal- (Public) must be white GND, Not supply Vin-					
Vin- has voltage difference with GND					

Output Signal Specification:

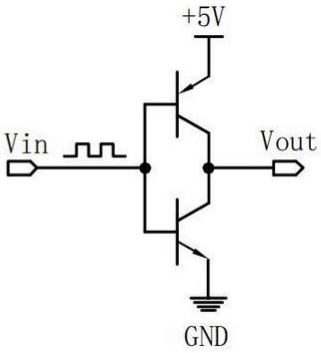
Open-Drain Output



Differential Output



Push-Pull Output



	Output Way	Description
Signal	Open-Drain Pulse Output	NPN Open-Drain: User need to connect the Pull-up resistor R to have pulse output. For 5V output, R: 330 ohm - 1k ohm; 12V output, R: 2k ohm - 4.7k ohm;
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Push-Pull Pulse	Default Logic High is +5V (Customize for +12V is possible)
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Differential Pulse	Differential Output IC: AM26LS31, Recommended receiving IC: AM26LS32, or directly drive opt coupler
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Voltage Output	Full range support 0 +/- 10DCV, User can set the output range within this.
		Default torque 0 +/- 10DCV, Default Speed 0-10DCV
	Current Output	Full range support 0-20mA, User can set the output range within this.
		Default torque 4-12-20mA, Default Speed 4-20mA
Communication	RS485	Support BPS: 115200 (default), 57600,38400,19200,9600,4800,2400
	RS232	Support BPS: 115200 (default), 57600,38400,19200,9600,4800,2400
	CAN	Support BPS: 1M (default), 500k, 250k, 100k, 50k, 10k, 1k
Default power input 24DCV (Max. 150mA), Customize to 12DCV (Max. 300mA)		

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Medium-range Torque Speed Sensor

Primarily used for measuring small to medium torque values, this torque sensor operates in a non-contact manner. It offers a measurement range of 5 to 100 Nm and is available in three maximum rotational speed variants: 12,000 RPM, 10,000 RPM, and 8,000 RPM. An optional OLED display panel can be included to show torque, rotational speed, and power in real time.

Specification	Details
Measurement Range	5 Nm, 10 Nm, 20 Nm, 50 Nm, 100 Nm
Torque Output	10 ± 5 kHz; 4 – 20 mA; 0 ± 5/10 VDC; RS485
Speed Output	60-pulse TTL; Open collector 0 – 5/10 VDC; 4 – 20 mA; RS485/RS232
Accuracy	±0.1% FS; ±0.2% FS
Power Supply	12 – 30 VDC
Zero Temp Influence	±0.02% RO/˚C
Span Temp Influence	±0.02% RO/˚C
Compensated Temp Range	+5˚C to +50˚C
Operating Temp Range	0˚C to +60˚C
Electrical Connection	XS12 6-pin connector
Safe Overload Capacity	200% RO
Shaft Material	Stainless steel
Housing Material	Aluminum
Standard Cable Length	5 meters (customizable upon request)

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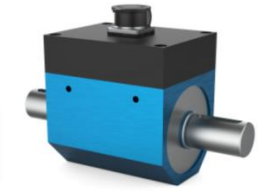
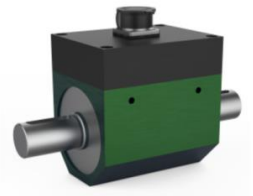
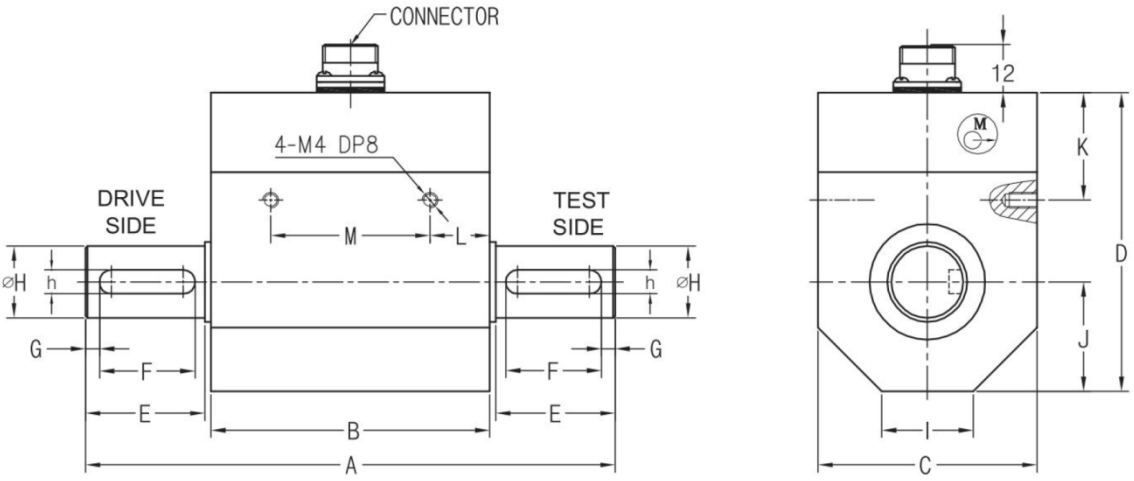
Medium-range Precision Torque Speed Sensor

Model	Shaft Type	Rated Torque	Max. Torque	Torque Precision	Pulse/Rotation	Maximum Speed	Output Signal	Product Photo
MVMP-503-A2-U	Double-ended	5N.m	7.5N.m	0.20%	60	8000rpm /10000rpm /120000rpm	Torque Output （Optional）： 10±5KHZ； 4-20mA,0±5/10VDC； 0-5/10VDC； RS485 Speed Output：Default 0-30KHz (60 Pulse,1KHz to 1000RPM)	
MVMP-104-A1-U	Double-ended	10N.m	15N.m	0.20%	60			
MVMP-204-A1-U	Double-ended	20N.m	30N.m	0.20%	60			
MVMP-504-A1-U	Double-ended	50N.m	75N.m	0.20%	60			
MVMP-105-A1-U	Double-ended	100N.m	150N.m	0.20%	60			

*Not the full list, please inquiry us for the torque and speed requirement and we will suggest the model.

Dimension:



量程（N.m）	A	B	C	D	E	F	G	H	h	I	J	K	L	M
5；10；20；30；50；100	133	70	55	75	30	24	3.5	18	6	23	27.5	27	15	40

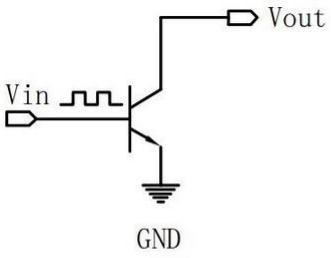
Signal Output Pin Definition:

6-Core Electrical Connection							
	Pin	Color	Pulse/Current/Voltage	RS485	RS232	CAN	Differential
Power	Pin5	Red	Supply Vin+				
	Pin6	Black	Supply Vin-				
Communication	Pin1	White	Signal- (GND)	GND			Torque A-
	Pin2	Blue	Blank	B-	RxD	L-	Speed B-
	Pin3	Green	Torque	A+	TxD	H+	Torque A+
	Pin4	Yellow	Speed				Speed B+
Signal- (Public) must be white GND, Not supply Vin-							
Vin- has voltage difference with GND							

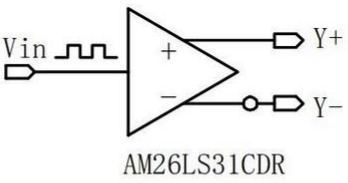
8-Core Electrical Connection (Signal Output and Communication)					
Power	Pin5	Red	Supply Vin+		
	Pin6	Black	Supply Vin-		
Signal	Pulse/Current/Voltage				Differential
	Pin1	White	Signal- (GND)		Torque A-
	Pin2	Blue	Blank		Speed B-
	Pin3	Green	Torque		Torque A+
	Pin4	Yellow	Speed		Speed B+
Communication			RS485	RS232	CAN
	Pin7	Brown	A+	TxD	H+
	Pin8	Grey	B-	RxD	L-
Signal- (Public) must be white GND, Not supply Vin-					
Vin- has voltage difference with GND					

Output Signal Specification:

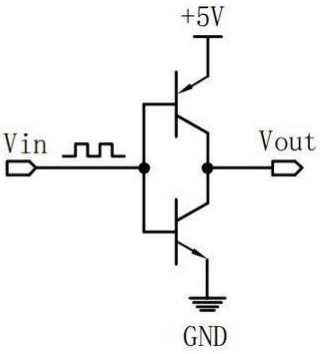
Open-Drain Output



Differential Output



Push-Pull Output



	Output Way	Description
Signal	Open-Drain Pulse Output	NPN Open-Drain: User need to connect the Pull-up resistor R to have pluse output. For 5V output, R: 330 ohm - 1k ohm; 12V output, R: 2k ohm - 4.7k ohm;
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Push-Pull Pulse	Default Logic High is +5V (Customize for +12V is possible)
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Differential Pulse	Differential Output IC: AM26LS31, Recommended receiving IC: AM26LS32, or directly drive opt coupler
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pluse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Voltage Output	Full range support 0 +/- 10DCV, User can set the output range within this.
		Default torque 0 +/- 10DCV, Default Speed 0-10DCV
	Current Output	Full range support 0-20mA, User can set the output range within this.
		Default torque 4-12-20mA, Default Speed 4-20mA
Communication	RS485	Support BPS: 115200 (default), 57600,38400,19200,9600,4800,2400
	RS232	Support BPS: 115200 (default), 57600,38400,19200,9600,4800,2400
	CAN	Support BPS: 1M (default), 500k, 250k, 100k, 50k, 10k, 1k
Default power input 24DCV (Max. 150mA), Customize to 12DCV (Max. 300mA)		

Large-range Torque Speed Sensor

Primarily used for measuring small to medium torque values, this torque sensor operates in a non-contact manner. It offers a measurement range of 5 to 5000 Nm and is available in different maximum rotational speed variants: 4000 - 15000 RPM. An optional OLED display panel can be included to show torque, rotational speed, and power in real time.

Specification	Details
Measurement Range	5, 10 , 20, 50, 100 , 200, 500, 1k, 2k, 3k, 5kNm
Torque Output	10 ± 5 kHz; 4 – 20 mA; 0 ± 5/10 VDC; RS485
Speed Output	60-pulse TTL; Open collector 0 – 5/10 VDC; 4 – 20 mA; RS485/RS232
Accuracy	±0.1% FS; ±0.2% FS
Power Supply	12 – 30 VDC
Zero Temp Influence	±0.02% RO/°C

Specification	Details
Span Temp Influence	±0.02% RO/°C
Compensated Temp Range	+5°C to +50°C
Operating Temp Range	0°C to +60°C
Electrical Connection	XS12 6-pin connector
Safe Overload Capacity	200% RO
Shaft Material	Stainless steel
Housing Material	Aluminum
Standard Cable Length	5 meters (customizable upon request)

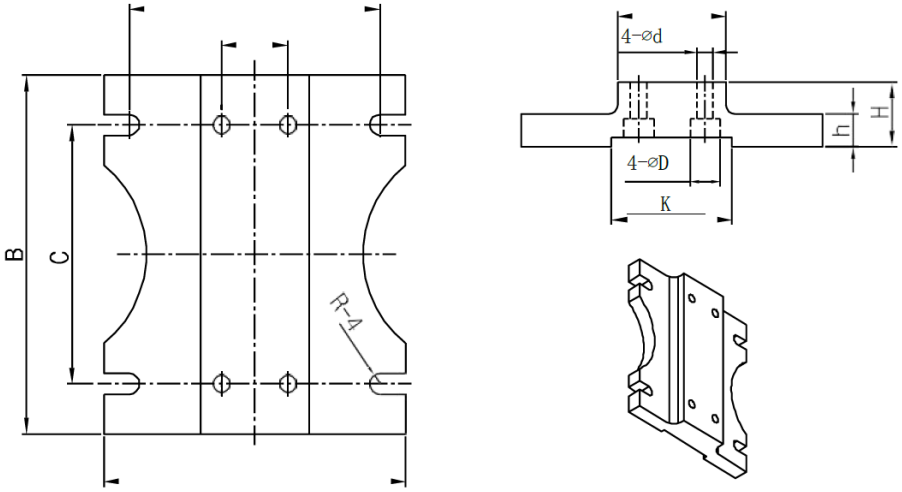
Specifications:

Large-range Precision Torque Speed Sensor								
Model	Shaft Type	Rated Torque	Max. Torque	Torque Precision	Pulse	Maximum Speed	Output Signal	Product Photo
LVMS-503-A2-U	Double-ended	5N.m	7.5N.m	0.10%	60	15000 rpm	Torque Output（Optional）：10±5KHZ；4-20mA,0±5/10VDC；0-5/10VDC； RS485 Speed Output： Default 0-30KHz (60 Pulse,1KHz	
LVMS-104-A1-U	Double-ended	10N.m	15N.m	0.10%	60	15000 rpm		
LVMS-204-A1-U	Double-ended	20N.m	30N.m	0.10%	60	15000 rpm		
LVMS-504-A1-U	Double-ended	50N.m	75N.m	0.10%	60	12000 rpm		

LVMS-105-A1-U	Double-ended	100N.m	150N.m	0.10%	60	12000 rpm	to 1000RPM)	
LVMS-205-A1-U	Double-ended	200N.m	300N.m	0.10%	60	12000 rpm		
LVMS-305-A1-U	Double-ended	300N.m	450N.m	0.10%	60	10000 rpm		
LVMS-505-A1-U	Double-ended	500N.m	750N.m	0.10%	60	8000 rpm		

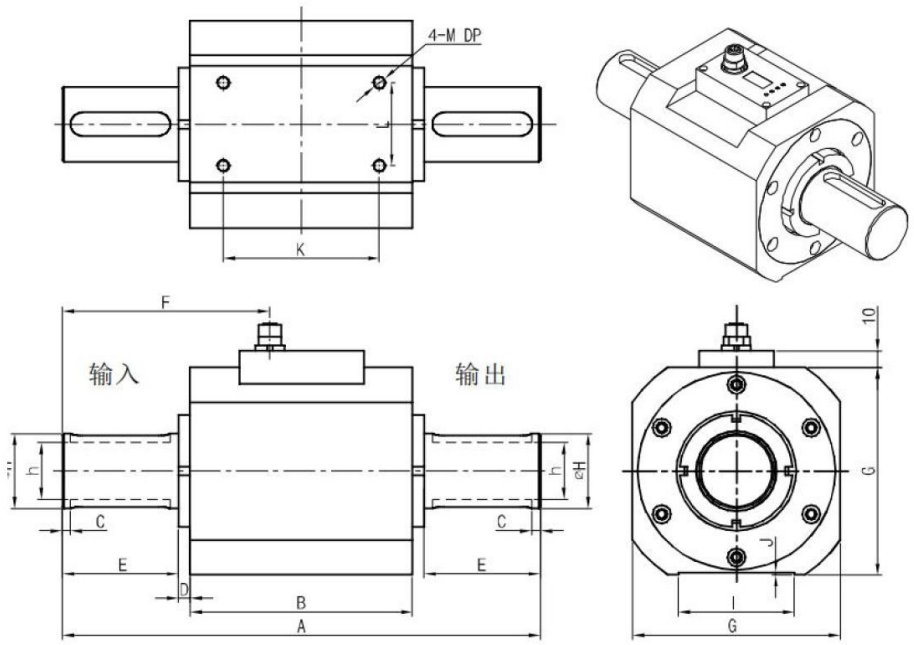
*Not the full list, up to 5000Nm, please inquiry us for the torque and speed requirement and we will suggest the model.

Base Option:



量程（N.m）	A	B	C	D	d	E	F	G	H	h	K	R
5-100	100	111	80	10	5.5	83	22	36	20	10	40	3.25
200-500	114	114	84	10	5.5	97	36	50	20	10	54	3.25
1000-2000	175	134	94	15	9	142	50	70	28	18	74	4.5
3000-5000	220	141	100	18	11	181	80	110	33	20	104	5.5

Dimension:



量程（N.m）	A	B	C	D	E	F	G	φH	h	I	J	K	L	M	Key(b*h*l*n)
5-100	185	111	3.5	7	30	73.5	70	18	14.5	36	1.5	80	22	4-M5 DP9	6*6*22*1
200-500	198	114	3	7	35	80	85	28	24	50	1.5	84	36	4-M5 DP11	8*7*30*1
1000-2000	288	134	5	7	70	125	125	45	34	70	1.5	94	50	4-M8 DP15	14*9*60*2
3000-5000	355	141	4	7	100	158.5	160	75	60	100	2.5	100	80	4-M8 DP18	20*12*93*2

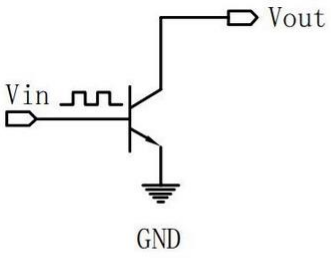
Signal Output Pin Definition:

6-Core Electrical Connection							
	Pin	Color	Pulse/Current/Voltage	RS485	RS232	CAN	Differential
Power	Pin5	Red	Supply Vin+				
	Pin6	Black	Supply Vin-				
Communication	Pin1	White	Signal- (GND)	GND			Torque A-
	Pin2	Blue	Blank	B-	RxD	L-	Speed B-
	Pin3	Green	Torque	A+	TxD	H+	Torque A+
	Pin4	Yellow	Speed				Speed B+
Signal- (Public) must be white GND, Not supply Vin-							
Vin- has voltage difference with GND							

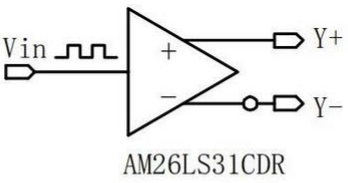
8-Core Electrical Connection (Signal Output and Communication)					
Power	Pin5	Red	Supply Vin+		
	Pin6	Black	Supply Vin-		
Signal	Pulse/Current/Voltage				Differential
	Pin1	White	Signal- (GND)		Torque A-
	Pin2	Blue	Blank		Speed B-
	Pin3	Green	Torque		Torque A+
	Pin4	Yellow	Speed		Speed B+
Communication			RS485	RS232	CAN
	Pin7	Brown	A+	TxD	H+
	Pin8	Grey	B-	RxD	L-
Signal- (Public) must be white GND, Not supply Vin-					
Vin- has voltage difference with GND					

Output Signal Specification:

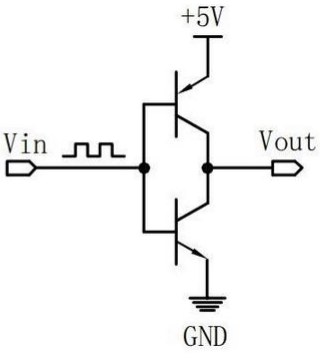
Open-Drain Output



Differential Output



Push-Pull Output



	Output Way	Description
Signal	Open-Drain Pulse Output	NPN Open-Drain: User need to connect the Pull-up resistor R to have pluse output. For 5V output, R: 330 ohm - 1k ohm; 12V output, R: 2k ohm - 4.7k ohm;
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Push-Pull Pulse	Default Logic High is +5V (Customize for +12V is possible)
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pulse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Differential Pulse	Differential Output IC: AM26LS31, Recommended receiving IC: AM26LS32, or directly drive opt coupler
		Default torque 10+/-5KHz, Default speed 0-30KHz (60 Pluse, 1KHz refer to 1000 rpm)
		Customize with special pulse frequency output is possible
	Voltage Output	Full range support 0 +/- 10DCV, User can set the output range within this.
		Default torque 0 +/- 10DCV, Default Speed 0-10DCV
	Current Output	Full range support 0-20mA, User can set the output range within this.
		Default torque 4-12-20mA, Default Speed 4-20mA
Communication	RS485	Support BPS: 115200 (default), 57600,38400,19200,9600,4800,2400
	RS232	Support BPS: 115200 (default), 57600,38400,19200,9600,4800,2400
	CAN	Support BPS: 1M (default), 500k, 250k, 100k, 50k, 10k, 1k
Default power input 24DCV (Max. 150mA), Customize to 12DCV (Max. 300mA)		