Selection chart

Motor base speed (rpm)	Motor max. speed (rpm)	Motor power (W)	Motor rated torque (N.m)	Motor peak torque (N.m)	Motor frame size (mm)	Rotor inertia (kg·m²)	MS1 motor model[1]	SV680 drive model	SV680 rated current (A)	SV680 peak current (A)	SV680 size	Drive mass (JINT/PINT (kg)	Motor mass (kg)
For 1/3PH 220V Servo Drive													
3000	7000	50	0.16	0.56	40×40	0.018	MS1H1-05B30CB-A6/S63*R-INT	SV680*S1R6I/S-*INT	1.6	5.8	A	0.96/1.11	0.26
3000	7000	100	0.32	1.12	40×40	0.0316	MS1H1-10B30CB-A6/S63*R-INT	SV680*S1R6I/S-*INT	1.6	5.8	A	0.96/1.11	0.35
3000	7000	200	0.64	2.24	60×60	0.094	MS1H1-20B30CB-A6/S63*R-INT	SV680*S1R6I/S-*INT	1.6	5.8	A	0.96/1.11	0.80
3000	7000	400	1.27	4.45	60×60	0.145	MS1H1-40B30CB-A6/S63*R-INT	SV680*S2R8I/S-*INT	2.8	10.1	A	0.96/1.11	1.11
3000	7000	550	1.75	6.13	80×80	0.55	MS1H1-55B30CB-A6/S63*R-INT[2]	SV680*S5R5I/S-*INT	5.5	16.9	C	1.30/1.45	1.88
3000	7000	750	2.39	8.37	80×80	0.68	MS1H1-75B30CB-A6/S63*R-INT	SV680*S5R5I/S-*INT	5.5	16.9	C	1.30/1.45	2.22
3000	7000	1000	3.18	11.13	80×80	0.82	MS1H1-10C30CB-A6/S63*R-INT	SV680*S7R6I/S-*INT	7.6	23.0	C	1.30/1.45	2.61
3000	6000	1000	3.18	9.54	100×100	1.78	MS1H2-10C30CB-A6/S63*R-INT	SV680*S7R6I/S-*INT	7.6	23.0	C	1.30/1.45	3.85
3000	6000	1500	4.90	14.70	100×100	2.35	MS1H2-15C30CB-A6/S63*R-INT	SV680*S012I/S-*INT	12.0	32.0	D	1.80/1.95	4.65
1500	4500	850	5.39	13.50	130×130	13.56	MS1H3-85B15CB-A6/S63*R-INT	SV680*S7R6I/S-*INT	7.6	23.0	C	1.30/1.45	5.80
1500	4500	1300	8.34	20.85	130×130	19.25	MS1H3-13C15CB-A6/S63*R-INT	SV680*S012I/S-*INT	12.0	32.0	D	1.80/1.95	7.10
3000	7000	50	0.16	0.56	40×40	0.038	MS1H1-05B30CB-A6/S63*R-INT	SV680*S1R6I/S-*INT	1.6	5.8	A	0.96/1.11	0.24
3000	7000	100	0.32	1.12	40×40	0.072	MS1H1-10B30CB-A6/S63*R-INT	SV680*S1R6I/S-*INT	1.6	5.8	A	0.96/1.11	0.32
3000	7000	200	0.64	2.24	60×60	0.22	MS1H1-20B30CB-A6/S63*R-INT	SV680*S1R6I/S-*INT	1.6	5.8	A	0.96/1.11	0.78
3000	7000	400	1.27	4.45	60×60	0.43	MS1H1-40B30CB-A6/S63*R-INT	SV680*S2R8I/S-*INT	2.8	10.1	A	0.96/1.11	1.11
3000	7000	550	1.75	6.13	80×80	1.12	MS1H1-55B30CB-A6/S63*R-INT[2]	SV680*S5R5I/S-*INT	5.5	16.9	C	1.30/1.45	1.85
3000	7000	750	2.39	8.37	80×80	1.46	MS1H1-75B30CB-A6/S63*R-INT	SV680*S5R5I/S-*INT	5.5	16.9	C	1.30/1.45	2.18
3000	7000	1000	3.18	11.13	80×80	1.87	MS1H1-10C30CB-A6/S63*R-INT	SV680*S7R6I/S-*INT	7.6	23.0	C	1.30/1.45	2.55
For 3PH 220V Servo Drive													
3000	6000	2000	6.36	19.10	100×100	2.92	MS1H2-20C30CB-A6/S63*R-INT	SV680*S018I/S-*INT	18.0	45.0	E	3.60/3.75	5.50
3000	6000	2500	7.96	23.90	100×100	3.49	MS1H2-25C30CB-A6/S63*R-INT	SV680*S022I/S-*INT	22.0	55.0	E	3.60/3.75	6.30
3000	6000	3000	9.80	24.50	130×130	6.40	MS1H2-30C30CB-A6/S63*R-INT	SV680*S022I/S-*INT	22.0	55.0	E	3.60/3.75	10.00
3000	6000	4000	12.60	31.50	130×130	9.00	MS1H2-40C30CB-A6/S63*R-INT	SV680*S027I/S-*INT	27.0	67.5	E	3.60/3.75	13.20
3000	6000	5000	15.80	39.50	130×130	11.60	MS1H2-50C30CB-A6/S63*R-INT	SV680*S027I/S-*INT	27.0	67.5	E	3.60/3.75	16.35
1500	4500	1800	11.50	28.75	130×130	24.90	MS1H3-18C15CB-A6/S63*R-INT	SV680*S018I/S-*INT	18.0	45.0	E	3.60/3.75	8.50
1500	4500	2900	18.60	46.50	180×180	44.70	MS1H3-29C15CB-A6/S63*R-INT	SV680*S022I/S-*INT	22.0	55.0	E	3.60/3.75	13.80
1500	4500	4400	28.40	71.10	180×180	64.90	MS1H3-44C15CB-A6/S63*R-INT	SV680*S027I/S-*INT	27.0	67.5	E	3.60/3.75	17.40
For 3PH 400V Servo Drive													
3000	6000	1000	3.18	9.54	100×100	1.78	MS1H2-10C30CD-A6/S63*R-INT	SV680*T3R5I/S-*INT	3.5	11.0	C	1.30/1.45	3.85
3000	6000	1500	4.90	14.70	100×100	2.35	MS1H2-15C30CD-A6/S63*R-INT	SV680*T5R4I/S-*INT	5.4	14.0	C	1.30/1.45	4.65
3000	6000	2000	6.36	19.10	100×100	2.92	MS1H2-20C30CD-A6/S63*R-INT	SV680*T8R4I/S-*INT	8.4	20.0	D	1.80/1.95	5.50
3000	6000	2500	7.96	23.90	100×100	3.49	MS1H2-25C30CD-A6/S63*R-INT	SV680*T012I/S-*INT	12.0	30.0	D	1.80/1.95	6.30
3000	6000	3000	9.80	29.40	130×130	6.40	MS1H2-30C30CD-A6/S63*R-INT	SV680*T012I/S-*INT	12.0	30.0	D	1.80/1.95	10.00
3000	6000	4000	12.60	37.80	130×130	9.00	MS1H2-40C30CD-A6/S63*R-INT	SV680*T017I/S-*INT	17.0	42.5	E	3.60/3.75	13.20
3000	6000	5000	15.80	47.40	130×130	11.60	MS1H2-50C30CD-A6/S63*R-INT	SV680*T021I/S-*INT	21.0	52.5	E	3.60/3.75	16.35
1500	4500	850	5.39	13.50	130×130	13.56	MS1H3-85B15CD-A6/S63*R-INT	SV680*T3R5I/S-*INT	3.5	11.0	C	1.30/1.45	5.80
1500	4500	1300	8.34	20.85	130×130	19.25	MS1H3-13C15CD-A6/S63*R-INT	SV680*T5R4I/S-*INT	5.4	14.0	C	1.30/1.45	7.10
1500	4500	1800	11.50	28.75	130×130	24.90	MS1H3-18C15CD-A6/S63*R-INT	SV680*T8R4I/S-*INT	8.4	20.0	D	1.80/1.95	8.50
1500	4500	2900	18.60	46.50	180×180	44.70	MS1H3-29C15CD-A6/S63*R-INT	SV680*T012I/S-*INT	12.0	30.0	D	1.80/1.95	13.80
1500	4500	4400	28.40	71.10	180×180	64.90	MS1H3-44C15CD-A6/S63*R-INT	SV680*T017I/S-*INT	17.0	42.5	E	3.60/3.75	17.40
1500	4500	5500	35.00	87.60	180×180	86.90	MS1H3-55C15CD-A6/S63*R-INT	SV680*T021I/S-*INT	21.0	52.5	E	3.60/3.75	21.70
1500	4500	7500	48.00	119.00	180×180	127.50	MS1H3-75C15CD-A6/S63*R-INT	SV680*T026I/S-*INT	26.0	65.0	E	3.60/3.75	29.00

Note: [1]: MS1 A6 motor for SV680-XXXXX-I model (standard type); MS1 S6 motor for SV680-XXXXX-S model (functional safety type).
[2]: Brake option not available.

MS1H1-75B30CB - A6 31 R (- *) - INT
① ② ③ ④

① **Encoder type**
A6: 26-bit multi-turn absolute encoder
S6: 26-bit multi-turn absolute functional safety encoder

② **Brake**
1: Without brake
4: With brake

③ **Motor type**
R: Interior Permanent Magnet motors (IPM)

④ **Non-standard feature**
Blank: Standard
S: Flying leads type

Scan for the manual of SV680-INT.
For more information, please contact our local offices.

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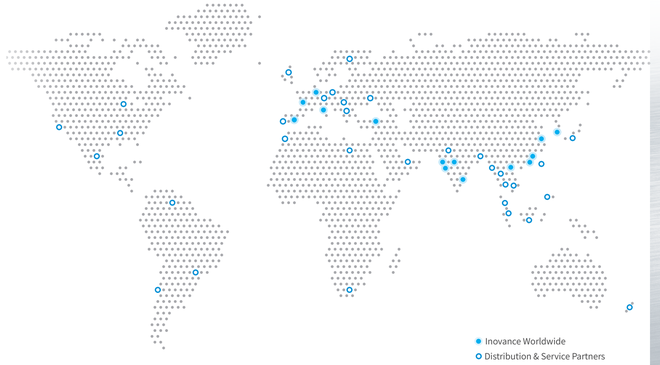

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FOLLOW US

INOVANCE

SV680 Series Servo Drive

Precision with Safety & Flexible Functionality

Safety over EtherCAT
Safety function supported

EnDat 2.2 / SSI / BiSS INTERFACE
Multi-encoder supported

Linear motor supported

3 YEARS WARRANTY
3 years global warranty

CANopen · EtherCAT · Modbus

Power cables

Motor Model	Cable Name	Cable Model	Cable Length (m)
MS1H1/MS1H4 terminal type motor	Front outlet, Without brake	S6-L-M107-3.0(-T)(-INT)	3
		S6-L-M107-5.0(-T)(-INT)	5
		S6-L-M107-10.0(-T)(-INT)	10
	Front outlet, With brake	S6-L-B107-3.0(-T)(-INT)	3
		S6-L-B107-5.0(-T)(-INT)	5
		S6-L-B107-10.0(-T)(-INT)	10
	Back outlet, Without brake	S6-L-M108-3.0(-T)(-INT)	3
		S6-L-M108-5.0(-T)-INT	5
		S6-L-M108-10.0(-T)(-INT)	10
	Back outlet, With brake	S6-L-B108-3.0(-T)(-INT)	3
		S6-L-B108-5.0(-T)(-INT)	5
		S6-L-B108-10.0(-T)(-INT)	10
MS1H1/MS1H4 flying leads type motor (-S)	Without brake	S6-L-M100-3.0(-T)(-INT)	3
		S6-L-M100-5.0(-T)(-INT)	5
		S6-L-M100-10.0(-T)(-INT)	10
MS1H2 motors of 3 kW and below/ MS1H3 motors of 1.8 kW and below	Without brake	S6-L-M111-3.0(-T)(-INT)	3
		S6-L-M111-5.0(-T)(-INT)	5
		S6-L-M111-10.0(-T)(-INT)	10
	With brake	S6-L-B111-3.0(-T)(-INT)	3
		S6-L-B111-5.0(-T)(-INT)	5
		S6-L-B111-10.0(-T)(-INT)	10

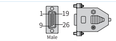
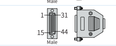
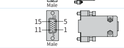
Motor Model	Cable Name	Cable Model	Cable Length (m)
MS1H2 motors of 4 kW/5 kW	Without brake	S6-L-M011-3.0(-T)(-INT)	3
		S6-L-M011-5.0(-T)(-INT)	5
		S6-L-M011-10.0(-T)(-INT)	10
	With brake	S6-L-B011-3.0(-T)(-INT)	3
		S6-L-B011-5.0(-T)(-INT)	5
		S6-L-B011-10.0(-T)(-INT)	10
MS1H3 motors of 2.9 kW	Without brake	S6-L-M112-3.0(-T)(-INT)	3
		S6-L-M112-5.0(-T)(-INT)	5
		S6-L-M112-10.0(-T)(-INT)	10
	With brake	S6-L-B112-3.0(-T)(-INT)	3
		S6-L-B112-5.0(-T)(-INT)	5
		S6-L-B112-10.0(-T)(-INT)	10
MS1H3 motors of 4.4 kW and above	Without brake	S6-L-M022-3.0(-T)(-INT)	3
		S6-L-M022-5.0(-T)(-INT)	5
		S6-L-M022-10.0(-T)(-INT)	10
	With brake	S6-L-B022-3.0(-T)(-INT)	3
		S6-L-B022-5.0(-T)(-INT)	5
		S6-L-B022-10.0(-T)(-INT)	10

Encoder cables

Motor Model	Cable Model	Cable Length (mm)
MS1H1/MS1H4 terminal-type motor	S6-L-P124-3.0(-T)(-INT)	3
	S6-L-P124-5.0(-T)(-INT)	5
	S6-L-P124-10.0(-T)(-INT)	10
	S6-L-P125-3.0(-T)(-INT)	3
	S6-L-P125-5.0(-T)(-INT)	5
	S6-L-P125-10.0(-T)(-INT)	10

Motor Model	Cable Model	Cable Length (mm)
MS1H1/MS1H4 flying leads type motor (-S)	S6-L-P120-3.0(-T)(-INT)	3
	S6-L-P120-5.0(-T)(-INT)	5
	S6-L-P120-10.0(-T)(-INT)	10
MS1H2/MS1H3 motor	S6-L-P121-3.0(-T)(-INT)	3
	S6-L-P121-5.0(-T)(-INT)	5
	S6-L-P121-10.0(-T)(-INT)	10

Accessories

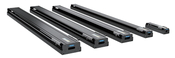
Description	Model	Outline Drawing
Battery box kit (without battery)	S6-C4A-NB	
Battery kit	S6-C4A	
CN1 connector (DB26)	S6-C74	
CN1 connector (DB44)	S6-C8	
CN7 connector (DB15)	S6-C6	
Shield bracket	S6-C25 (optional for sizes A and C)	
	S6-C27 (optional for size D to size E)	

Product family overview

Encoder interfaces

- Inovance's latest 26 bit serial single/multi-turn absolute provides more than 67.1 million pulses within one mechanical turn. Multi-turn absolute information can be also saved at power down(when using optional backup battery), avoiding the need to perform machine homing at every power-up. The MS1 series of servo motors are available with both Inovance's 23 and 26 bit serial single/multi-turn absolute encoders.
- The SV680 servo drive as standard , supports Endat 2.2, BISS-C, SSI and ABZ incremental encoders fitted to customer's choice of servo motor.

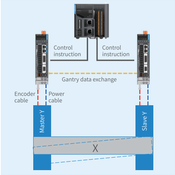
Linear and direct drive rotary motor control



- Only one drive model for Rotary, DDL & DDR motor control.
- Accuracy error compensation table.
- Supports incremental and absolute encoders.
- Different wake & shake modes to improve motor phasing.

Gantry synchronization

- Gantry synchronization is supported both by the pulse type and bus type drives. Rotary and linear motor gantry functions supported.
- The position error between two axes can be reduced to 1/5000 of a revolution for a travel distance of 1.2 m.
- Multiple gantry alignment modes are available, including: alignment after enabling the axis, by home, by torque or by digital input.



Extra functions

- Built-in brake output
- Control signals I/Os: 2x AI (16 bits and 12 bits), 1x AO, 5x DI, 2x DO (8x DI, 5x DO pulse model), PTC input (motor thermal protection).
- Indexer: Multi-function position mode integrated with homing, constant speed control, and positioning control. Pulse-type SV680 series drives support 16 process segments.
- Full closed loop with INOVANCE serial type (23 and 26 bits, single/multi-turn absolute), EnDat 2.2, BiSS-C, SSI, and ABZ incremental encoders.
- Trip avoidance in case of instantaneous power failure compliant to SEMI F47.

3 years global warranty

- All SV680-INT models come with a 3-years worldwide warranty.

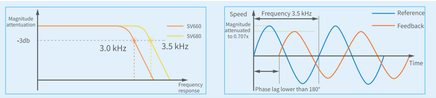
SV680 "GINT" variant

Designed for harsh environments

- Conformally coated PCBs are resistant to 3S2 and 3C3 environments (acc. to IEC 60721-3-3), providing further protection.
- Isolated cooling channel prevents dust contamination of internal electrical components.

Superior control with ultra fast current loop

- Superior current loop control algorithm to deliver smooth and accurate motion profile.
- A speed loop response bandwidth of 3.5 kHz* gives significantly improved performance compared to the previous generation of Inovance products.
- Current loop cycle 1.6 μs (625 kHz), speed loop cycle 62.5 μs (16 kHz), position loop cycle 62.5 μs (16 kHz).



*Please note: The statement refers to the highest frequency speed command change that the servo system can respond to.

Easy tunning with STune and ETune

- Plug & play system that recognizes INOVANCE motors by reading the motor data from the encoder memory.
- Fine tuning is possible using the Stune and ETune software functions, which are both designed for use in applications with small load inertia changes:
  - STune obtains the gains using a calculation based on the set stiffness level.
  - ETune automatically adjusts the optimal gain parameters of the servo drive to deliver the best performance.
- Notch and Biquad filters for mechanical resonance suppression.

PC commissioning with advanced software wizard

- Graphical user interface means specialist skills are not required for commissioning.
- PC Software is available for download.
- Built-in USB-C port (for PC connection).
- USB-C port allows easy parameter upload/download and firmware upgrade, with no the need to provide any additional or external power supply to the drive.

Advanced Functional Safety variant (FSoE)

SV680S-GINT variant supports advanced functional safety functions, with the following features:

- **FSoE** (Fail Safe over EtherCAT) safe protocol based on EtherCAT fieldbus, compliant to SIL 3 PL e.
- 8 safety functions according to IEC 61800-5-2 SIL 3: STO, SS1, SS2, SOS, SSM, SBC, SDI, SLS.
- 5 digital safety inputs and 6 digital safety outputs.
- Two ways to activate advanced safety functions, through I/Os or through communications with **FSoE**.

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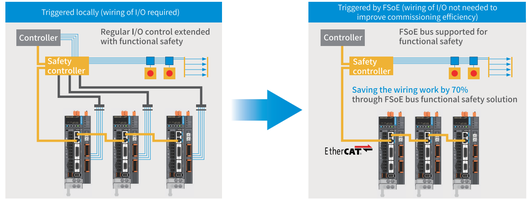
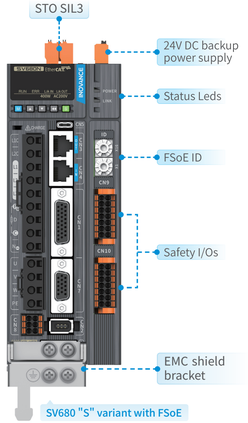
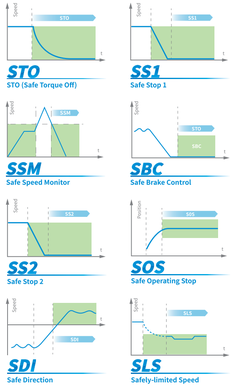
Safety over EtherCAT





SV680 "S" variant with FSoE



Ordering code

SV680 N S 2R8 I -GINT

① ② ③ ④ ⑤ ⑥

① **Product series**
SV680: SV680 series servo drive

② **Product type**
N: EtherCAT communication type
P: Pulse type + CANopen communication type

③ **Voltage class**
S: 200 V to 240 V
T: 380 V to 480 V

④ **Rated output current**

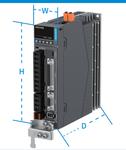
S: 200 V to 240 V	T: 380V to 480V
1R6: 1.6 A	3R5: 3.5 A
2R8: 2.8 A	5R4: 5.4 A
5R5: 5.5 A	8R4: 8.4 A
7R6: 7.6 A	012: 12.0 A
012: 12.0 A	017: 17.0 A
018: 18.0 A	021: 21.0 A
022: 22.0 A	026: 26.0 A
027: 27.0 A	

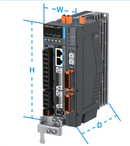
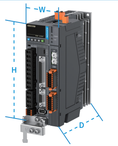
⑤ **Model configuration**
I: Standard type
S: Advanced functional safety type with 24V DC backup

⑥ **Version**
GINT: General-purpose type
PINT: 24V DC backup power supply type[1]

Note [1] If 24V DC backup function is required for the standard type, order the PINT variant.

Dimensions

Models without 24V DC backup		Frame size	W (mm)	H (mm)	D (mm)	Mass (kg)
SV680N****I-GINT	SV680P****I-GINT					
		SIZE A	45.5	170	150	0.96
		SIZE C	55±1	170	173±1	1.30
		SIZE D	80±1	170	183	1.80
		SIZE E	90	250	230	3.60

Models with 24V DC backup & FSoE		Frame size	W (mm)	H (mm)	D (mm)	Mass (kg)
SV680N****S-GINT & SV680N****-PINT	SV680P****S-GINT & SV680P****-PINT					
		SIZE A	64.5	170	150	1.11
		SIZE C	74±1	170	173±1	1.45
		SIZE D	99±1	170	183	1.95
		SIZE E	109	250	230	3.75

Note: Dimensions shown are for the drive module excluding the dimensions of the EMC shield brackets, terminals and DB connectors (refer to user guide).