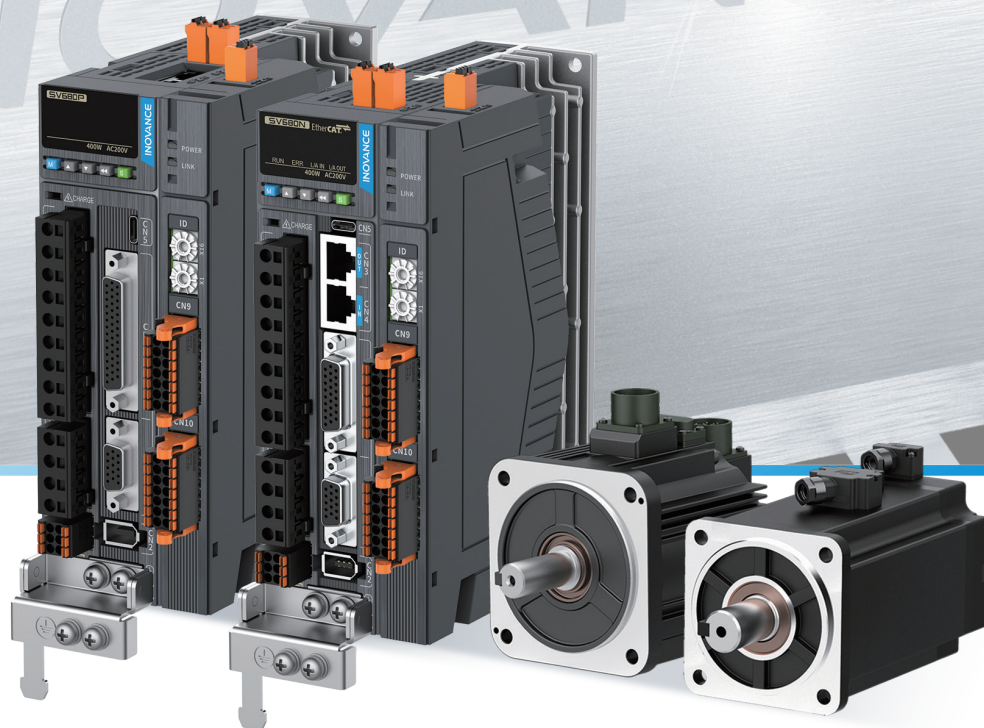


INOVANCE

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

CANopen

Ether**CAT**

 **Modbus**



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.



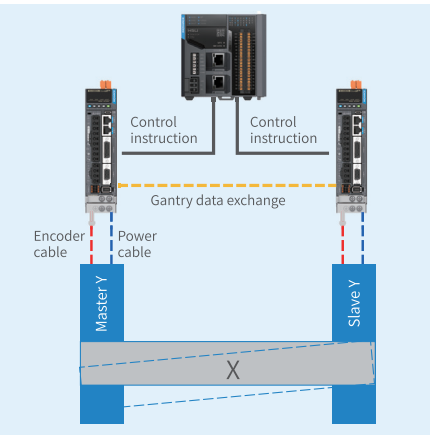
Linear and direct drive rotary motor control



- 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

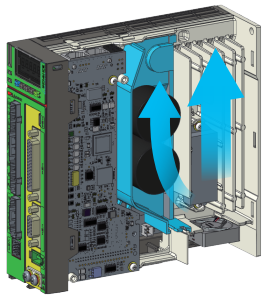
- Built-in brake output
- Control signals I/Os: 2x AI (16 bits and 12 bits), 1x AO, 5x DI, 2x DO (8x DI, 5x DO pulse model), PTC input (motor thermal protection).
- Indexer: Multi-function position mode integrated with homing, constant speed control, and positioning control. Pulse-type SV680 series drives 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.



SV680 "GINT" variant

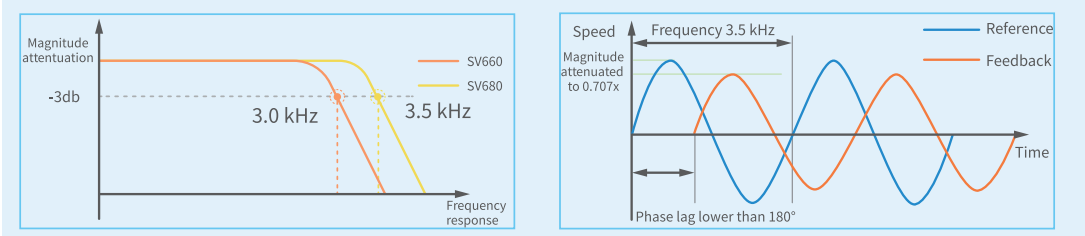
Designed for harsh environments

- 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 μ s (625 kHz), speed loop cycle 62.5 μ s (16 kHz), position loop cycle 62.5 μ s (16 kHz).



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

Easy tuning 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.

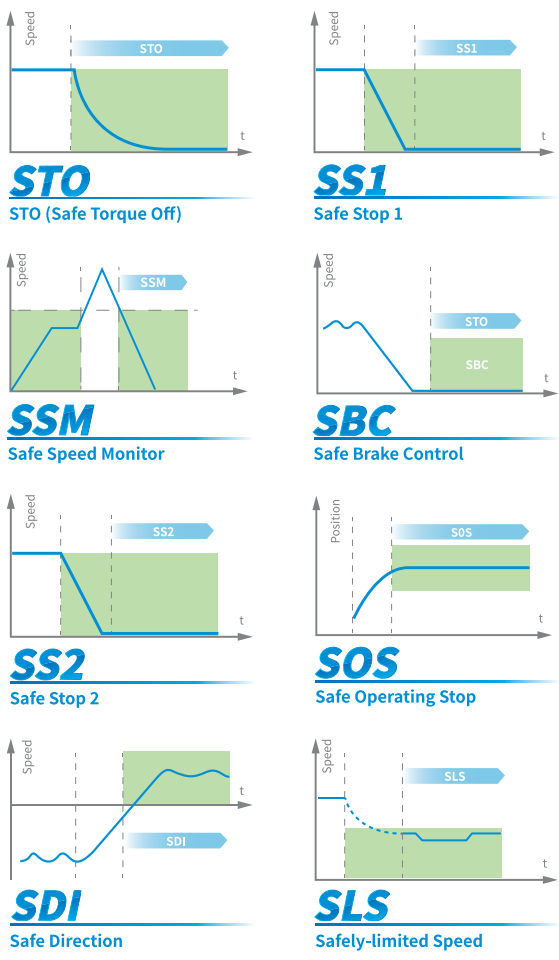
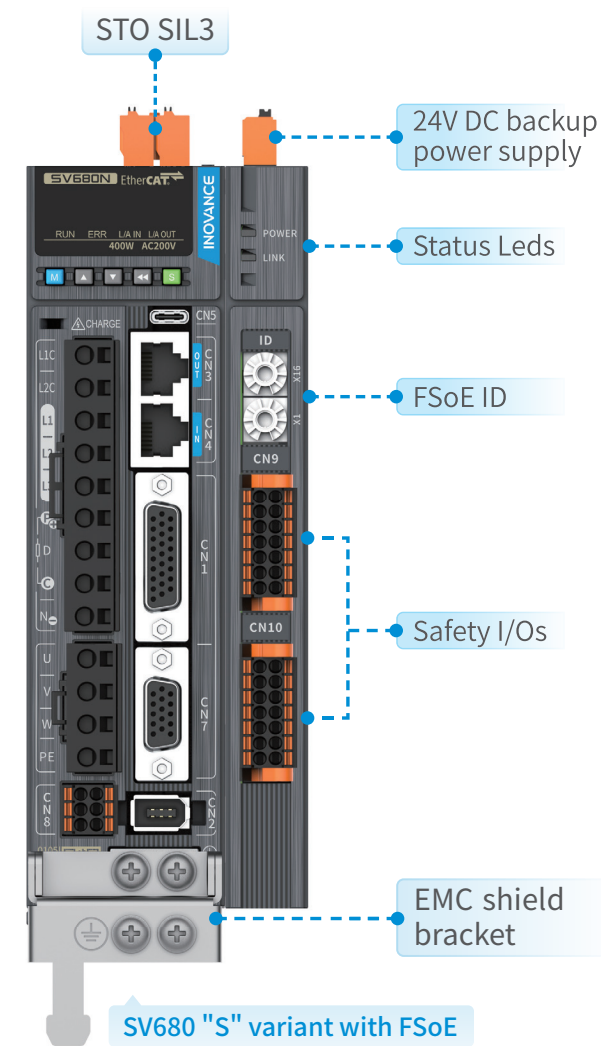
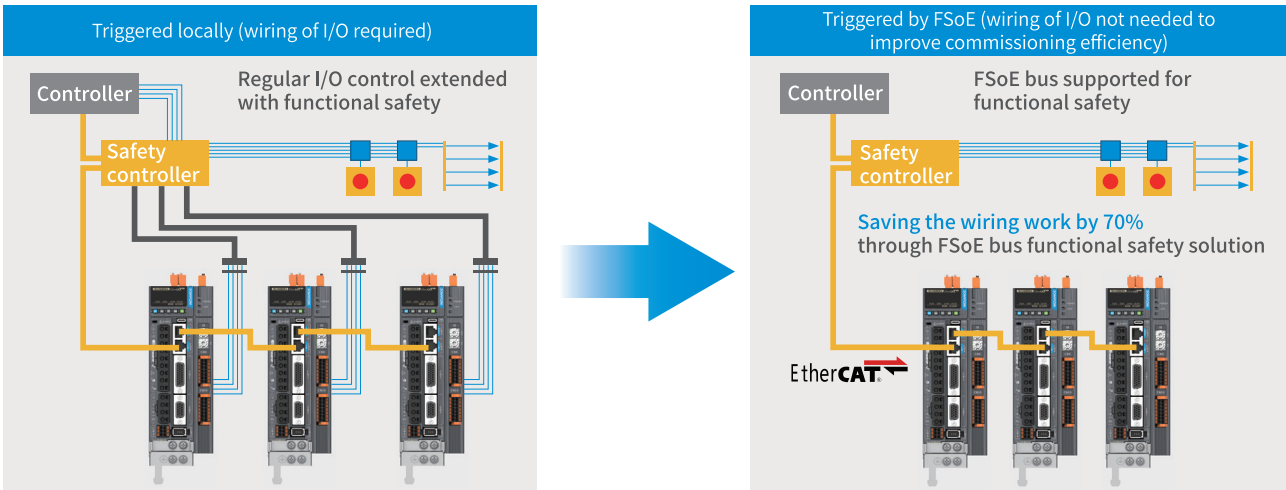


Advanced Functional Safety variant (FSoE)

- 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.



Safety over EtherCAT



Ordering code

SV680 N S 2R8 I -GINT

① Product series SV680: SV680 series servo drive	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
② Product type N: EtherCAT communication type P: Pulse type + CANopen communication type		⑥ Version GINT: General-purpose type PINT: 24V DC backup power supply type ^[1]
③ Voltage class S: 200 V to 240 V T: 380 V to 480 V		

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).

Power cables

Motor Model		Cable Name	Cable Model	Cable Length (m)
MS1H1/MS1H4 terminal type motor	Front outlet	Without brake	S6I-L-M107-3.0-TS-INT	3
			S6I-L-M107-5.0-TS-INT	5
			S6I-L-M107-10.0-TS-INT	10
		With brake	S6I-L-B107-3.0-TS-INT	3
			S6I-L-B107-5.0-TS-INT	5
			S6I-L-B107-10.0-TS-INT	10
	Back outlet	Without brake	S6I-L-M108-3.0-TS-INT	3
			S6I-L-M108-5.0-TS-INT	5
			S6I-L-M108-10.0-TS-INT	10
		With brake	S6I-L-B108-3.0-TS-INT	3
S6I-L-B108-5.0-TS-INT	5			
S6I-L-B108-10.0-TS-INT	10			
MS1H1/MS1H4 flying leads type motor (-S)		Without brake	S6-L-M100-3.0(-INT)	3
			S6-L-M100-5.0(-INT)	5
			S6-L-M100-10.0(-INT)	10
MS1H2 motors of 3 kW and below/MS1H3 motors of 1.8 kW and below	Without brake	S6I-L-M111-3.0-TS-INT	3	
		S6I-L-M111-5.0-TS-INT	5	
		S6I-L-M111-10.0-TS-INT	10	
	With brake	S6I-L-B111-3.0-TS-INT	3	
		S6I-L-B111-5.0-TS-INT	5	
		S6I-L-B111-10.0-TS-INT	10	

Motor Model	Cable Name	Cable Model	Cable Length (m)
MS1H2 motors of 4 kW/5 kW	Without brake	S6I-L-M011-3.0-TS-INT	3
		S6I-L-M011-5.0-TS-INT	5
		S6I-L-M011-10.0-TS-INT	10
	With brake	S6I-L-B011-3.0-TS-INT	3
		S6I-L-B011-5.0-TS-INT	5
		S6I-L-B011-10.0-TS-INT	10
MS1H3 motors of 2.9 kW	Without brake	S6I-L-M112-3.0-TS-INT	3
		S6I-L-M112-5.0-TS-INT	5
		S6I-L-M112-10.0-TS-INT	10
	With brake	S6I-L-B112-3.0-TS-INT	3
		S6I-L-B112-5.0-TS-INT	5
		S6I-L-B112-10.0-TS-INT	10
MS1H3 motors of 4.4 kW and above	Without brake	S6E-L-M022-3.0-US	3
		S6E-L-M022-5.0-US	5
		S6E-L-M022-10.0-US	10
	With brake	S6E-L-B022-3.0-US	3
		S6E-L-B022-5.0-US	5
		S6E-L-B022-10.0-US	10

Encoder cables

Motor Model		Cable Model	Cable Length (m)
MS1H1/MS1H4 terminal-type motor	Front outlet	S6I-L-P124-3.0-TO-INT	3
		S6I-L-P124-5.0-TO-INT	5
		S6I-L-P124-10.0-TO-INT	10
	Rear outlet	S6I-L-P125-3.0-TO-INT	3
		S6I-L-P125-5.0-TO-INT	5
		S6I-L-P125-10.0-TO-INT	10

Motor Model	Cable Model	Cable Length (m)
MS1H1/MS1H4 flying leads type motor (-S)	S6-L-P120-3.0(-INT)	3
	S6-L-P120-5.0(-INT)	5
	S6-L-P120-10.0(-INT)	10
	S6I-L-P121-3.0-TO-INT	3
MS1H2/MS1H3 motor	S6I-L-P121-5.0-TO-INT	5
	S6I-L-P121-10.0-TO-INT	10

Note: All power and encoder cables are flexible type for dynamic applications, EMC shielded, oil resistant, CE and UL recognised.

Accessories

Model	Outline Drawing	Description
S6-C4A-NB		Battery box kit (without battery) Required for multi-turn absolute function of Inovance encoders.
S6-C4A		Battery box kit (with lithium battery) Required for multi-turn absolute function of Inovance encoders.
S6-C74		Adapter from CN1 DB26 connector to push-in type spring clamp terminals, 10 terminals for connecting 5 digital inputs and 2 outputs.
S6-C6		CN7 DB15 male connector for secondary encoder input, 15 pins, 3 rows.
S6-C25 (for sizes A and C)		EMC shield bracket for earthing of cable shields.
S6-C27 (for size D to size E)		

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 (kgc m²)	MS1 motor model	SV680 drive model	SV680 rated current (A)	SV680 peak current (A)	SV680 size	Drive mass GINT/PINT (kg)	Motor mass (kg)
For 1/3PH 220V Servo Drive													
3000	7000	50	0.16	0.56	40×40	0.018	MS1H1-05B30CB- ① 3 ② ③ -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	0.032	MS1H1-10B30CB- □ 3 □ □ -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- □ 3 □ □ -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- □ 3 □ □ -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	0.550	MS1H1-55B30CB- □ 3 □ □ -INT ^[1]	SV680*S5R5I/ S -*INT	5.5	16.9	C	1.30/1.45	1.88
3000	7000	750	2.39	8.37	80×80	0.680	MS1H1-75B30CB- □ 3 □ □ -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	0.820	MS1H1-10C30CB- □ 3 □ □ -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	1.780	MS1H2-10C30CB- □ 3 □ □ -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	2.350	MS1H2-15C30CB- □ 3 □ □ -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	13.560	MS1H3-85B15CB- □ 3 □ □ -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	19.250	MS1H3-13C15CB- □ 3 □ □ -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	MS1H4-05B30CB- □ 3 □ □ -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	MS1H4-10B30CB- □ 3 □ □ -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	0.220	MS1H4-20B30CB- □ 3 □ □ -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	0.430	MS1H4-40B30CB- □ 3 □ □ -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	1.120	MS1H4-55B30CB- □ 3 □ □ -INT ^[1]	SV680*S5R5I/ S -*INT	5.5	16.9	C	1.30/1.45	1.85
3000	7000	750	2.39	8.37	80×80	1.460	MS1H4-75B30CB- □ 3 □ □ -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	1.870	MS1H4-10C30CB- □ 3 □ □ -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	2.920	MS1H2-20C30CB- □ 3 □ 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	3.490	MS1H2-25C30CB- □ 3 □ 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	6.400	MS1H2-30C30CB- □ 3 □ 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	9.000	MS1H2-40C30CB- □ 3 □ 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	11.600	MS1H2-50C30CB- □ 3 □ 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	24.900	MS1H3-18C15CB- □ 3 □ 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	44.700	MS1H3-29C15CB- □ 3 □ 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	64.900	MS1H3-44C15CB- □ 3 □ 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	1.780	MS1H2-10C30CD- □ 3 □ □ -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	2.350	MS1H2-15C30CD- □ 3 □ □ -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	2.920	MS1H2-20C30CD- □ 3 □ □ -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	3.490	MS1H2-25C30CD- □ 3 □ □ -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	6.400	MS1H2-30C30CD- □ 3 □ □ -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	9.000	MS1H2-40C30CD- □ 3 □ □ -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	11.600	MS1H2-50C30CD- □ 3 □ □ -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	13.560	MS1H3-85B15CD- □ 3 □ □ -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	19.250	MS1H3-13C15CD- □ 3 □ □ -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	24.900	MS1H3-18C15CD- □ 3 □ □ -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	44.700	MS1H3-29C15CD- □ 3 □ □ -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	64.900	MS1H3-44C15CD- □ 3 □ □ -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	86.900	MS1H3-55C15CD- □ 3 □ □ -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	127.500	MS1H3-75C15CD- □ 3 □ □ -INT	SV680*T026I/ S -*INT	26.0	65.0	E	3.60/3.75	29.00

Note: [1]: Brake option not available.

MS1H1-75B30CB - A3 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
A3: 23-bit multi-turn absolute encoder

② Brake

1: Without brake
4: With brake

③ Motor type

Z: Surface Permanent Magnet motors (SPM)
R: Interior Permanent Magnet motors (IPM)

④ Non-standard feature

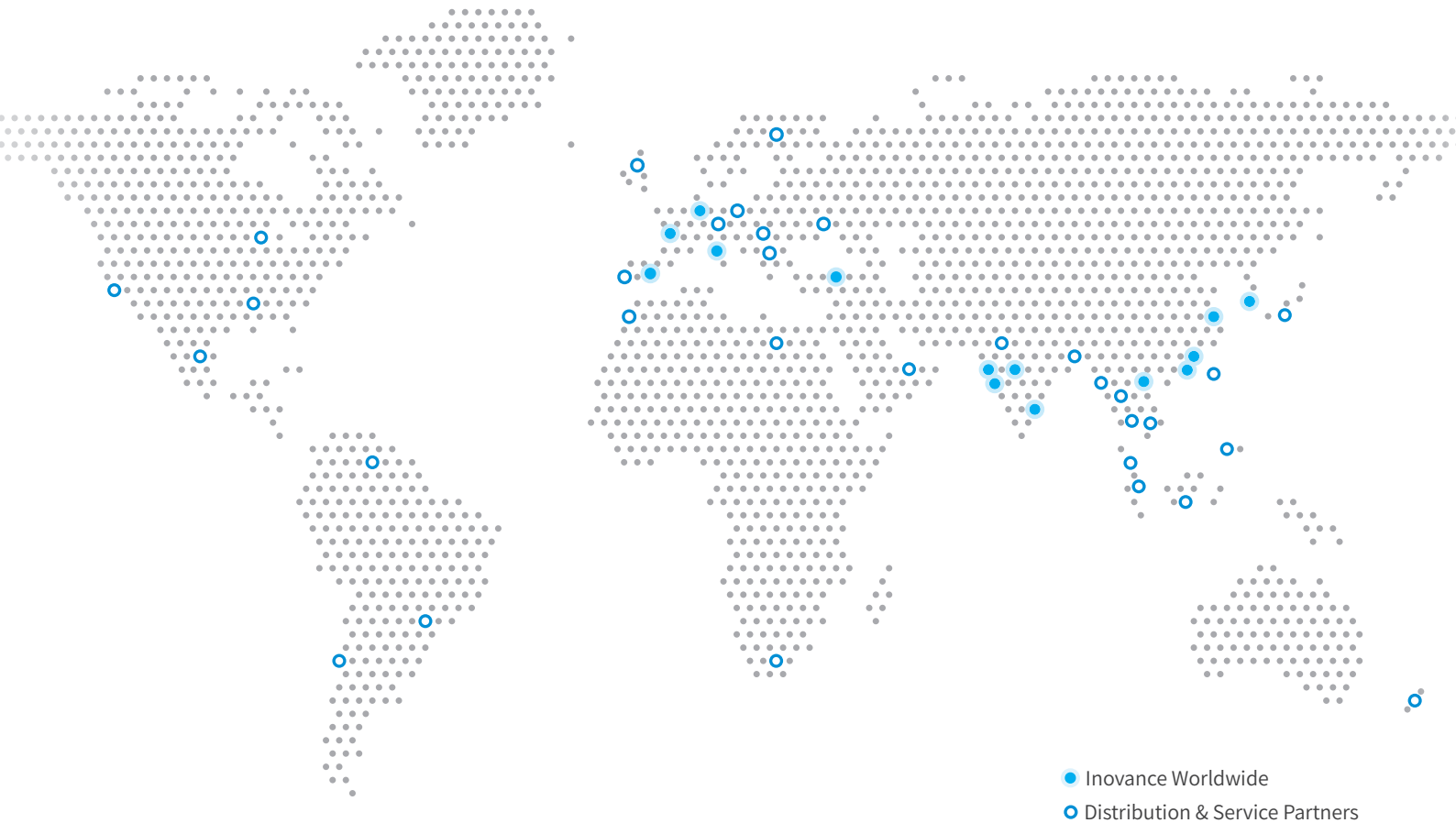
Blank: Standard
S: Flying leads type

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



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