SBC

INOVANCE

SV660ND series

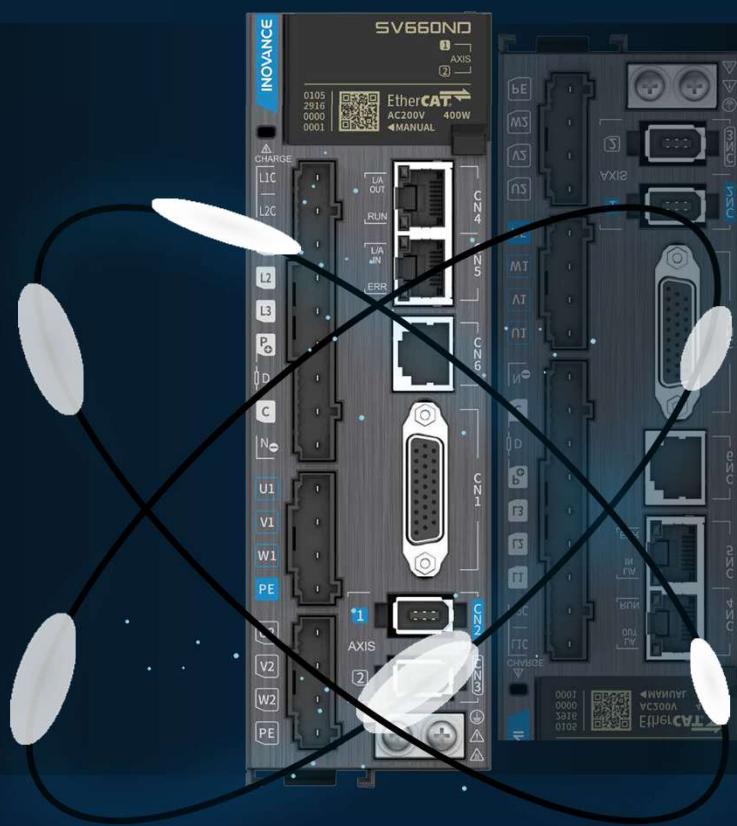## 2軸汎用サーボドライブ

http://www.sbclinear.co.jp

CE KC EtherCAT

SV660ND シリーズ

2軸汎用サーボドライブ

4大特長

ワンクリック調整　　**省スペース**　　**EtherCATのサポート**　　**正確な位置決め**

SV660NDは高性能マルチマシン ACサーボドライブです。0.4 kW 、0.75 kW の電力容量、EtherCAT バス通信をサポートします。SV660ND は、STO（SIL3）、ワンクリック調整、適応形リミッターを備えており、より使いやすくなりました。特に、MS1シリーズサーボモータ（23ビットループ絶対エンコーダ搭載）と組み合わせ使用の場合、より静かで安定した稼働、正確な位置制御が得られます。

省スペース

150mm depth

SV660N
INOVANCE
EtherCAT
AC200V 400W
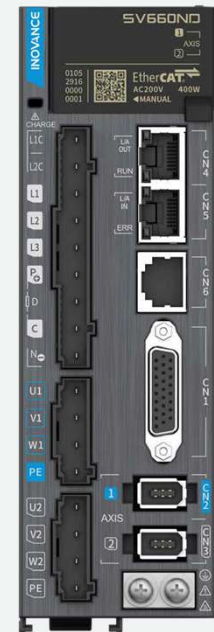0562336998754O012

170mm

40mm   10mm   40mm

外形寸法
39%
縮小

400 W comparison

正面寸法
既存シリーズ: 170 mm x 90 mm
新シリーズ: 170 mm x 55 mm

新シリーズ

183mm depth

SV660ND
INOVANCE
EtherCAT
AC200V 400W

170 mm

55mm
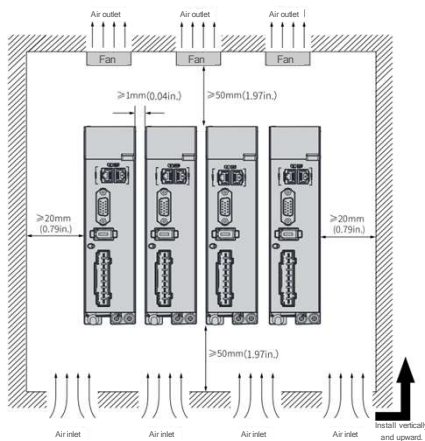
ゼロピッチ取付け、ディレーティング不要

既存シリーズ

0.2 ～ 0.75 kW 、コンパクトな設置、
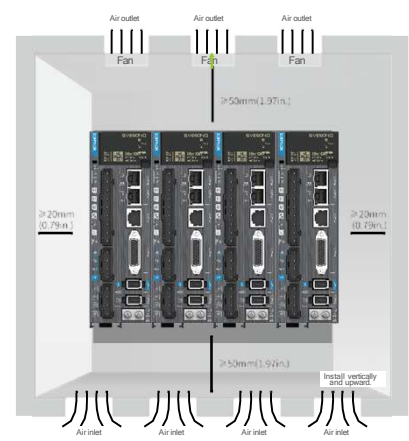75% 定格を下げる必要があり

省スペース
24%

750 W

750w 単軸ドライブ 8 台に必
要なスペース

既存シリーズ：
447mm×270mm
（放熱機能付き、コンパクト設置）

新シリーズ：
340 mm x 270 mm
（放熱機能付き、ゼロピッチ取付

新シリーズ

0.4～0.75kWはコンパクトな設置を
サポート 、ディレーティングなし

型式の見方

SV660 - N D S 2R8 I - * -INT
①　②　③④　⑤　⑥⑦　⑧

① サーボ呼び型番 　SC660シリーズ サーボドライバ	④ 電圧 S：220 V	⑥ インストールモード 　I：ベースプレート取り付け
② 製品機種 N: ネットワーク機種	⑤ 定格出力電流 2R8: 2.8 A 5R5: 5.5 A	⑦ オプション 無記号:標準 FS: STO 機能安全付
③ 軸数 D: 2軸		⑧バージョン: INT: 国際バージョン

MS1H1-75B30CB - A3 31 R（-＊）– INT
①　　②③　④　　⑤

① エンコーダの種類 A3:23ビットマルチターンアブソリュートエンコーダ	③ モーターの種類 R: 永久磁石内蔵モーター（IPM）
② ブレーキ 1: ブレーキ無 4:ブレーキ付	④ オプション 無記号:標準 S:フライングリードタイプ ⑤バージョン INT: 国際バージョン

型式選定表

サーボドライバ (SV660ND****I-INT)				サーボモータ			
モデル	電圧 (V)	サイズ	ドライブ番号	ブレーキ無	ブレーキ付	ベース(mm)	容量(kW)
MS1H1シリーズモータの定格（Vn = 3000 rpm、Vmax = 6000 rpm）							
S2R8	単相/三相220V	A	3	MS1H1-40B30CB- A331R	MS1H1-40B30CB- A334R	60	0.4
S5R5	単相/三相220V	B	5	MS1H1-55B30CB- A331R	-	80	0.55
S5R5				MS1H1-75B30CB- A331R	MS1H1-75B30CB- A334R	80	0.75
MS1H4シリーズモータの定格（Vn = 3000 rpm、Vmax = 6000 rpm）							
S2R8	単相/三相220V	A	3	MS1H4-40B30CB-A331R	MS1H4-40B30CB-A334R	60	0.4
S5R5		B	5	MS1H4-55B30CB-A331R	-	80	0.55
S5R5				MS1H4-75B30CB-A331R	MS1H4-75B30CB-A334R	80	0.75

寸法
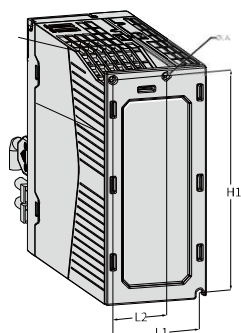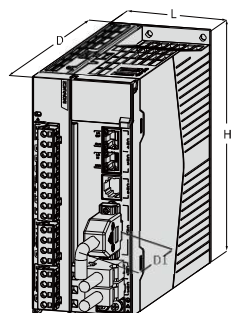
フレームサイズ	L (mm)	H (mm)	D (mm)	L1 (mm)	L2 (mm)	H1 (mm)	D1 (mm)	ねじサイズ	締め付けトルク	質量 (kg)
Aサイズ	55 (2.17)	170 (6.69)	183 (7.20)	45 (1.77)	／	160 (6.30)	75 (2.95)	2-M4	1.2	1.4
Bサイズ	75 (2.95)	170 (6.69)	183 (7.20)	65 (2.56)	40 (1.57)	160 (6.30)	75 (2.95)	3-M4	1.2	1.8

Dimension drawing of SIZE A drive
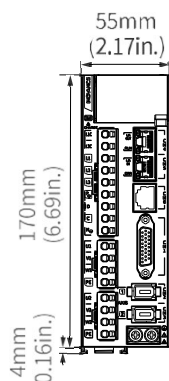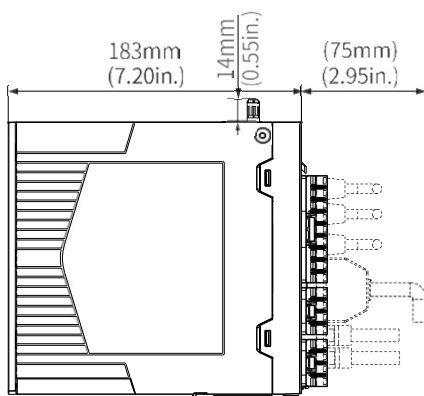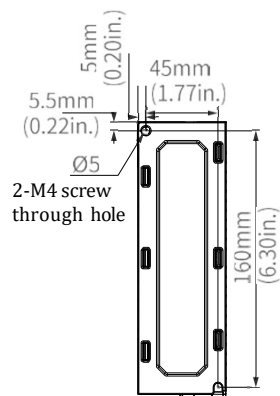
Front view　　Left view　　Rear view　　Top view
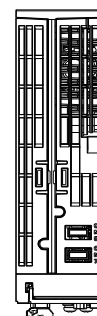
Dimension drawing of SIZE B drive

Front view　　Left view　　Rear view　　Top view

System connection

Single-phase connection of dual-axis servo cables

Power Supply
Single-phase 220V

Circuit breaker
Protects the power supply
cable by disconnecting the
circuit upon overcurrent

Power supply filter
Prevents external
interference generated
from the power cable

Electromagnetic
contactor
Turns on/off the
power supply

Braking resistor
Connected between terminals P
and C in case of insufficient
bus capacitance

Brake power supply
(24V DC)
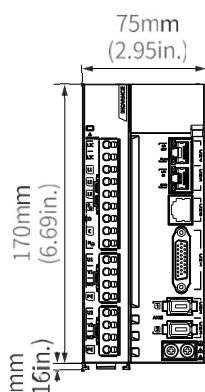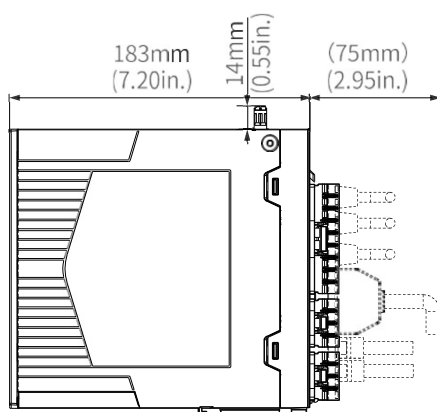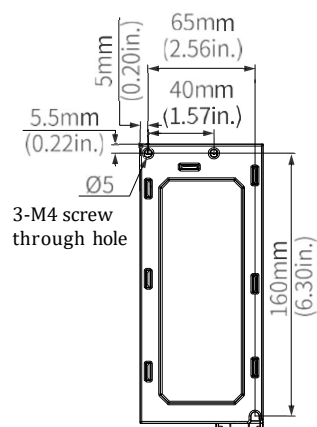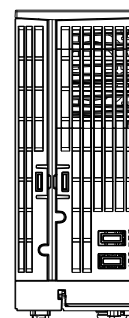Used by the motor
with brake

Electromagnetic contactor
Turns on/off the brake power
supply for the brake control
signal. Install a surge protection
device when used. A servo drive
DO controlled electromagnetic
contactor is recommended

Main circuit cable of servo drive motor
PE terminal: grounding terminal of the motor

CN7
Functional safety
terminal that used to
connect external
functional safety signal

Multi-drive
communication
cable

Drive to PLC
communication cable

CN4
CN5

EtherCAT
communication cable

CN5
Serial communication
terminal that used to
connect the software tool

Drive to PC communication cable

24V DC

CN2&CN3

CN1

Three-phase connection

Power Supply
3phase 220V AC

Circuit breaker
Protects the power supply
cable by disconnecting the
circuit upon overcurrent

Power supply filter
Prevents external
interference generated
from the power cable

Electromagnetic
contactor
Turns on/off the
power supply

Braking resistor
Connected between terminals P
and C in case of insufficient
bus capacitance

Brake power supply
(24V DC)
Used by the motor
with brake

Electromagnetic contactor
Turns on/off the brake power
supply for the brake control
signal. Install a surge protection
device when used. A servo drive
DO controlled electromagnetic
contactor is recommended

Main circuit cable of servo drive motor
PE terminal: grounding terminal of the motor

CN7
Functional safety
terminal that used to
connect external
functional safety signal

Multi-drive
communication
cable

Drive to PLC
communication cable

CN4
CN5

EtherCAT
communication cable

CN6
Serial communication
terminal that used to
connect the software tool

Drive to PC communication cable

24V DC

CN2&CN3

CN1

2軸サーボドライブの端子ポート

CN1 terminal pin signal

Signal name		Default function	Pin No.	Function
	DI1	P-OT	10	Axis 1 positive switch
	DI2	P-OT	1	Axis 2 positive switch
	DI3	N-OT	11	Axis 1 negative switch
	DI4	N-OT	2	Axis 2 negative switch
	DI5	HomeSwitch	12	Axis 1 home switch
	DI6	HomeSwitch	3	Axis 2 home switch
	DI7	TouchProbe2	13	Axis 1 probe 1
	DI8	TouchProbe1	4	Axis 2 probe 1
		+24 V	14	Internal 24 V power supply; voltage range: 20 V to 28 V; maximum output current: 150 mA.
		COM-	6	
General		COM-	5	Common terminal of DI terminals
	DO1+	S-RDY+	19	Axis 1 ready
	DO1-	S-RDY-	20	
	DO2+	ALM+	21	Axis 2 ready
	DO2-	ALM-	22	
	DO3+	BK+	23	Axis 1 brake output
	DO3-	BK-	24	
	DO4+	BK+	25	Axis 2 brake output
	DO4-	BK-	26	
		AI	9	Analog input (voltage-type)
		AO	18	Analog output
		GND	17	Common terminal of AI/AO

CN2 and CN3 encoder terminals

Pin No.	Assignment	Description
1	+5 V	5 V power supply
2	GND	
3	Reserved	/
4	Reserved	/
5	PS+	Encoder signal
6	PS-	
Enclosure	PE	Shield

CN4&CN5 EtherCAT（communication terminals）

Pin No.	Name	Description
1	TD+	Transmitting data (+)
2	TD-	Transmitting data (-)
3	RD+	Receiving data (+)
4 and 5	/	-
6	RD-	Receiving data (-)
7 and 8	/	-
9	TD+	Transmitting data (+)
10	TD-	Transmitting data (-)
11	RD+	Receiving data (+)
12 and 13	/	-
14	RD-	Receiving data (-)
15 and 16	/	-

CN6 communication terminal

Pin No.	Assignment
1–5	/
6	RS232-TXD
7	RS232-RXD
8	GND

主回路端子（Aサイズ/Bサイズ）

端子名	仕様
L1C、L2C（制御回路電源入力端子）	制御回路電源は銘板に記載の定格電圧に従って入力してください。
L1、L2、L3（主回路電源入力端子）	制御回路電源は銘板に記載の定格電圧に従って入力してください。
P⊕、D、C は外部制動抵抗器に接続ターミナル[1]	端子 P⊕ と端子 C の間に外部制動抵抗器を接続する前に、端子 P⊕ と端子 D の間のジャンパバーを取り外してください。
P⊕、N⊖（サーボバス端子）	複数のサーボドライブの共通 DC バスに使用されます。
U、V、W（サーボモータ接続用端子）	ブレーキとモーターの温度フィードバックの配線に使用されます。
PEアース端子	接地用としてモーターのアース端子に接続します。

STO安全端子CN7

ピン番号	区分	説明
1	COM-	STO基準GND
2	24 V	24V電源
3	STO1	Control input of STO1
4	STO2	Control input of STO2

General specifications

Item			Description
Basic Specifications	Control mode		IGBT PWM control, sinusoidal wave current drive mode 220 V, 380 V: Single-phase or three-phase full-bridge rectifier
	Encoder feedback		23-bit multi-turn absolute encoder, which can be used as an incremental encoder in absence of the battery
	Conditions for use	Ambient/Storage temperature [1]	0°C to 55°C (If the ambient temperature exceeds 45°C , derate by 10% for every additional 5°C)/ -20°C to +70°C
		Ambient/Storage humidity	Below 90% RH (without condensation)
		Vibration resistance	4.9 m/s^2
		Impact resistance	19.6 m/s^2
		Protection rating	IP20 (excluding terminals (IP00))
		Pollution degree	PD2
		Altitude	The maximum altitude is 2000 m. For altitudes not higher than 1000 m, derating is not required. For altitudes above 1000 m, derate 1% for every additional 100 m. For altitudes above 2000 m, contact Inovance.
Velocity Torque Control Authority	Performance	Speed control range	1:6000 (Under the rated torque load, the servo drive keeps running as long as the lower limit of the speed control range is not exceeded.)
		Speed loop bandwidth	3 kHz
		Torque control accuracy (repeatability)	±2%
		Soft startup time	0s to 65s (Acceleration and deceleration can be set separately.)
	Input signal	Speed reference input Torque reference input	The network-type instruction is derived from the local mode and local multi-speed set by EtherCAT communication
Position Control Authority	Performance	Positioning time	1 ms to 10 ms
	Input signal	Position reference	Network-type instructions are derived from the local mode supported by EtherCAT communication
Input Output Signal	DI signal	DI signal function assignment	8 DIs DI1 to DI8: Fast DI (falling edge (24 V input from high to low) input delay time: 30 us, Rising edge (24 V input from low to high) input delay time: 5 us, voltage range: 12 V to 24 V
			P-OT (forward overtravel switch) N-OT (reverse overtravel switch) HomeSwitch TouchProbe1 (probe 1) TouchProbe2 (touch probe 2)
	Digital output signal	Output signal function selection	4-way DO DO has a load capacity of 50 mA and a voltage range of 5 V to 30 V. S-RDY: Servo ready Brake output
Built-in function	Overtravel (OT) prevention		The servo drive stops immediately when P-OT or N-OT signal is active.
	Protection Functions		Protections against overcurrent, overvoltage, undervoltage, overload, main circuit detection error, heatsink overheat, overspeed, encoder error, CPU error, and parameter error
	LED display		Main circuit CHARGE indicator, 5-digit LED display
	Vibration suppression		4 notches (including two adaptive notches) available, 50 Hz to 5000 Hz
	Communication function	Software tool commissioning	RS232
		Communication Protocol	EtherCAT
		Multi-station communication	Maximum number of slaves: 255
		Axis address setting	No physical knob, set to 0 to 255 through the software
		Description	Including status display, user parameter setting, monitored value display, fault tracing display, JOG and auto-tuning, and speed/torque reference signal observation
	Others		Gain tuning, alarm record, jog
Basic performance of slave		Communication protocol	EtherCAT protocol
		Service supported	CoE (PDO, SDO)
		Synchronization mode	DC - Distributed clock
		Physical layer	100BASE-TX
		Baud rate:	100 Mbit/s (100Base-TX)
		Duplex mode	Full duplex
		Topology	Ring and linear
		Transmission medium	Shielded cables of Cat 5e or higher
		Transmission distance	Less than 100 m between two nodes (with proper environment and cables)
		Number of slaves	Up to 65535 by protocol, not exceeding 100 in actual use
		EtherCAT frame length	44 bytes to 1498 bytes
		Process data	Max. 1,486 bytes per Ethernet frame
		Synchronous jitter of two slaves	<1 us
		Update time	About 30 us for 1,000 digital inputs and outputs About 100 μs for 100 servo axes Define different update time for different interfaces.
		Communication code error rate	10^{-10} Ethernet standard

General specifications

Item		Description
Configuration unit	Number of FMMU units	8
	Number of storage synchronization management units	8
	Process data RAM	8 kB
	Distributed Clock	64-bit
	EEPROM capacity	32-kbit

電源ケーブル

Motor Model		Cable Model	Cable Length (m)
MS1H1/MS1H4 terminal type motor	Front outlet	S6-L-M107-3.0(-T)(-INT)	3
		S6-L-M107-5.0(-T)(-INT)	5
		S6-L-M107-10.0(-T)(-INT)	10
		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	S6-L-M108-3.0(-T)(-INT)	3
		S6-L-M108-5.0(-T)-INT	5
		S6-L-M108-10.0(-T)(-INT)	10
		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)		S6-L-M100-3.0(-T)(-INT)	3
		S6-L-M100-5.0(-T)(-INT)	5
		S6-L-M100-10.0(-T)(-INT)	10

エンコーダケーブル

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

通信ケーブル

Description	ケーブル型番	ケーブル長さ（mm）	公差(T)（mm）
PC通信ケーブル	S6-L-T00-3.0	3000	(-30.30)
The servo drive is connected in parallel Communication cable	S6-L-T01-0.3	300	(-10.10)
The servo drive and host controller are switched on Communication cable	S6-L-T02-2.0	2000	(-20.20)

コネクター

Description	型番
CN1端子（DB26）	S6-C74
電池ボックスコネクタキット	S6-C9
SV660NDのEMCブラケット	S6-C37

INOVANCE
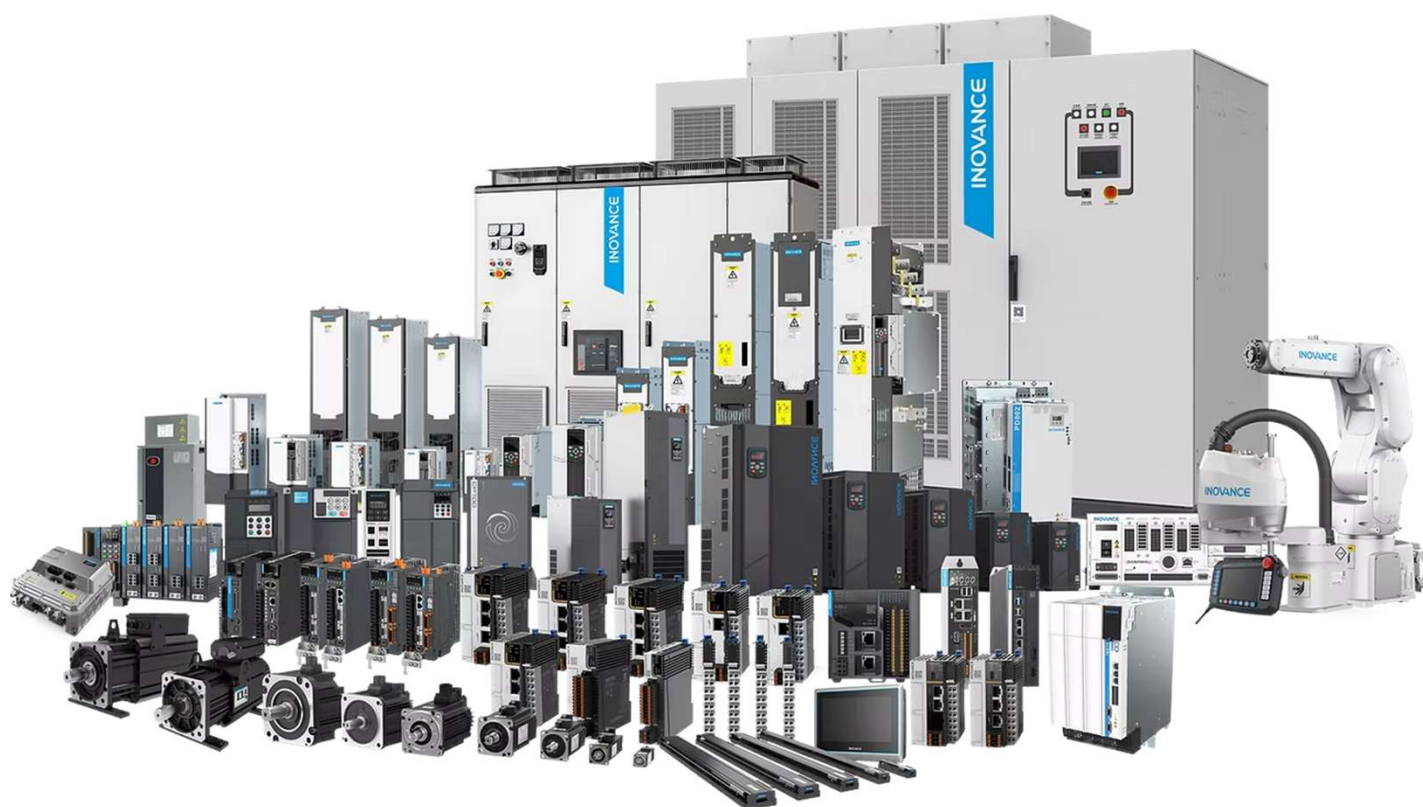
株式会社SBC

〒581-0813
大阪府八尾市泉町１丁目３２−１ TEL
：072-927-9048
FAX：072-927-9049

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by INOVANCE