

## SV660N – Single-Axis EtherCAT Servo

High dynamic performance with a compact footprint:  
the SV660N servo solution for industrial automation applications

- User friendly installation
- Easy set-up and tuning
- Ultra-fast 4.5 kHz current loop
- Safe Torque Off - SIL3

EtherCAT<sup>®</sup>



# The SV660N

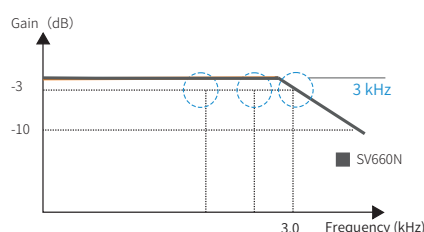
## Product overview

### Improved performance with ultra-fast current loop

SV660N's 4.5 kHz current loop bandwidth allows the motor to follow the motion profile with minimal error. The drive achieves a radically improved system performance with a shorter settling time and higher throughput. In case of mechanical resonance, high performance can be ensured through use of notch filters (up to four notch filters are available for simultaneous use if necessary).

|                          | SV660N       |
|--------------------------|--------------|
| Carrier frequency        | 12 kHz       |
| Current loop cycle time  | 1.6 $\mu$ s  |
| Speed loop cycle time    | 62.5 $\mu$ s |
| Position loop cycle time | 62.5 $\mu$ s |

Speed loop response graph



### High speed EtherCAT communications – 125 $\mu$ s

The SV660N series uses a high performance processor for high speed communications, achieving a cycle time of 125  $\mu$ s for all EtherCAT operating modes.

### Seven EtherCAT CiA402 profile (CoE) operation modes are available

- Profile Position Mode (PP)
- Profile Velocity Mode (PV)
- Profile Torque Mode (PT)
- Homing Mode (HM)
- Cyclic Synchronous Position Mode (CSP)
- Cyclic Synchronous Velocity Mode (CSV)
- Cyclic Synchronous Torque Mode (CST)

### Accurate EtherCAT synchronization – 20 ns synchronization jitter

Through precise operation of the EtherCAT distributed clock, SV660N achieves a 15 ns synchronization error and  $\pm 20$  ns synchronization jitter for 300 nodes (with a maximum distance of 120 m). Position control loops are coordinated with the synchronization signal to further improve the accuracy of multi-axes control.

### Functional safety – STO SIL3 EN/IEC 61800-5-2 compliant<sup>\*1</sup>

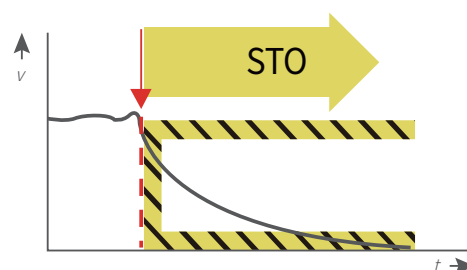
The STO function guarantees safe machine stop without using additional contactors.

### High resolution feedback encoder

23 bit serial single/multi-turn absolute encoder provides 8,388,608 pulses within one mechanical turn. Multi-turn absolute information can be also saved at power down, avoiding the need to perform machine homing at every power-up.

### Short output winding

Standard, built-in, *short output winding* ensures safe braking if the drive is unexpectedly disabled – even in the case of a failure in the motor holding brake.



<sup>\*1</sup> STO is supplied in the standard FS version. A non-STO version is also available.

EtherCAT<sup>®</sup>

**SIL3**  
Safety Integrity Level



### Robust and reliable – designed for harsh environments

Isolated cooling channel prevents dust contamination of internal electrical components. Conformally coated PCBs are resistant to 3S2 and 3C2 environments (acc. to IEC 60721-3-3), providing further protection.

### Comprehensive data storage in case of failure

Allows for thorough failure analysis.

### Reduced panel size

SV660N offers a compact footprint and increased power density, with an average 30% smaller footprint than the previous generation.

### Easy installation and fast commissioning

Pluggable connectors for both signal and power allows avoidance of wiring mistakes. Fine tuning is possible using the STune and ETune software functions, which are both designed for use in applications with small load inertia changes:

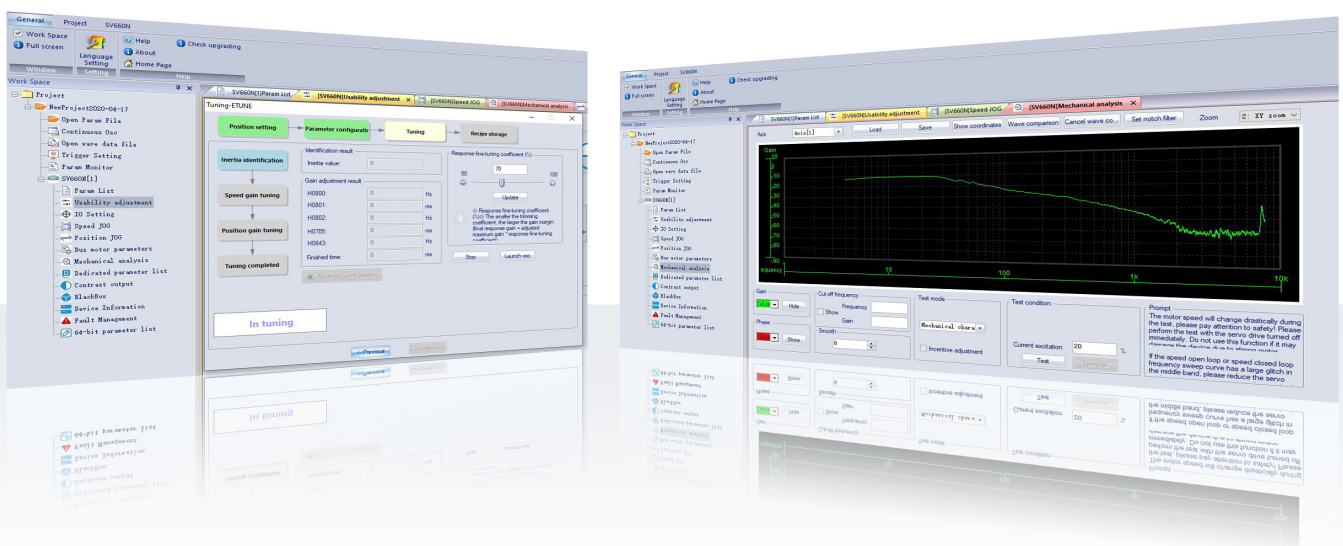
- STune obtains the gains using a calculation based on the set stiffness level
- ETune automatically adjusts the optimal gain parameters of the servo drive to deliver the best performance

### Easy cloning of drive parameters

Parameters of all SV660N drives in a machine can be cloned in one go using the commissioning software and the EtherCAT network.

### Guided PC commissioning software with advanced wizard

- Graphical user interface means specialist skills not needed for commissioning
- Software included free of charge
- Optional communication cable (S6-L-T00-3.0) required



# SV660N Selection Chart

| Power supply voltage | Motor base speed (RPM) | Motor maximum speed (RPM) | Motor power (W) | Motor rated torque (N·m) | Motor peak torque (N·m) | Motor frame size (mm) | Rotor inertia (0.0001x kg·m <sup>2</sup> ) | MS1 motor type       | SV660N type        | SV660N rated current (A) | SV660N peak current (A) | Size | Dimensions H x W x D (mm) | Connector kit |
|----------------------|------------------------|---------------------------|-----------------|--------------------------|-------------------------|-----------------------|--------------------------------------------|----------------------|--------------------|--------------------------|-------------------------|------|---------------------------|---------------|
| 1PH 220V             | 3000                   | 6000                      | 50              | 0.16                     | 0.56                    | 40X40                 | 0.026                                      | MS1H1-05B30CB-A330Z  | SV660NS1R6I-FS-INT | 1.6                      | 5.80                    | A    | 170X40X150                | S6-C22        |
|                      | 3000                   | 6000                      | 100             | 0.32                     | 1.12                    | 40X40                 | 0.041                                      | MS1H1-10B30CB-A330Z  | SV660NS1R6I-FS-INT | 1.6                      | 5.80                    | A    | 170X40X150                | S6-C22        |
|                      | 3000                   | 6000                      | 200             | 0.64                     | 2.24                    | 60X60                 | 0.207                                      | MS1H1-20B30CB-A331Z  | SV660NS1R6I-FS-INT | 1.6                      | 5.80                    | A    | 170X40X150                | S6-C22        |
|                      | 3000                   | 6000                      | 400             | 1.27                     | 4.46                    | 60X60                 | 0.376                                      | MS1H1-40B30CB-A331Z  | SV660NS2R8I-FS-INT | 2.8                      | 10.10                   | A    | 170X40X150                | S6-C22        |
|                      | 3000                   | 6000                      | 400             | 1.27                     | 4.46                    | 60X60                 | 0.657                                      | MS1H4-40B30CB-A331Z  | SV660NS2R8I-FS-INT | 2.8                      | 10.10                   | A    | 170X40X150                | S6-C22        |
|                      | 3000                   | 6000                      | 550             | 1.75                     | 6.13                    | 80X80                 | 1.06                                       | MS1H1-55B30CB-A331Z* | SV660NS5R5I-FS-INT | 5.5                      | 16.90                   | B    | 170X50X173                | S6-C22        |
|                      | 3000                   | 6000                      | 750             | 2.39                     | 8.36                    | 80X80                 | 1.38                                       | MS1H1-75B30CB-A331Z  | SV660NS5R5I-FS-INT | 5.5                      | 16.90                   | B    | 170X50X173                | S6-C22        |
|                      | 3000                   | 6000                      | 750             | 2.39                     | 8.36                    | 80X80                 | 2                                          | MS1H4-75B30CB-A331Z  | SV660NS5R5I-FS-INT | 5.5                      | 16.90                   | B    | 170X50X173                | S6-C22        |
| 1/3 PH 220V          | 1500                   | 3000                      | 850             | 5.39                     | 13.50                   | 130X130               | 13.3                                       | MS1H3-85B15CB-A331Z  | SV660NS7R6I-FS-INT | 7.6                      | 23.00                   | C    | 170X55X173                | S6-C29        |
|                      | 3000                   | 6000                      | 1000            | 3.18                     | 9.12                    | 80X80                 | 1.75                                       | MS1H1-10C30CB-A331Z* | SV660NS7R6I-FS-INT | 7.6                      | 23.00                   | C    | 170X55X173                | S6-C22        |
|                      | 3000                   | 6000                      | 1000            | 3.18                     | 11.10                   | 80X80                 | 1.75                                       | MS1H1-10C30CB-A331Z* | SV660NS012I-FS-INT | 11.6                     | 32.00                   | D    | 170X80X183                | S6-C22        |
|                      | 3000                   | 6000                      | 1000            | 3.18                     | 9.54                    | 100X100               | 1.87                                       | MS1H2-10C30CB-A331Z  | SV660NS7R6I-FS-INT | 7.6                      | 23.00                   | C    | 170X55X173                | S6-C29        |
|                      | 1500                   | 3000                      | 1300            | 8.34                     | 20.85                   | 130X130               | 17.8                                       | MS1H3-13C15CB-A331Z  | SV660NS012I-FS-INT | 11.6                     | 32.00                   | D    | 170X80X183                | S6-C29        |
|                      | 3000                   | 5000                      | 1500            | 4.9                      | 14.70                   | 100X100               | 2.46                                       | MS1H2-15C30CB-A331Z  | SV660NS012I-FS-INT | 11.6                     | 32.00                   | D    | 170X80X183                | S6-C29        |
| 3 PH 400V            | 3000                   | 6000                      | 1000            | 3.18                     | 9.54                    | 100X100               | 1.87                                       | MS1H2-10C30CD-A331Z  | SV660NT5R4I-FS-INT | 5.4                      | 14.00                   | C    | 170X55X173                | S6-C29        |
|                      | 3000                   | 5000                      | 1500            | 4.9                      | 14.70                   | 100X100               | 2.46                                       | MS1H2-15C30CD-A331Z  | SV660NT5R4I-FS-INT | 5.4                      | 14.00                   | C    | 170X55X173                | S6-C29        |
|                      | 3000                   | 5000                      | 2000            | 6.36                     | 19.10                   | 100X100               | 3.06                                       | MS1H2-20C30CD-A331Z  | SV660NT8R4I-FS-INT | 8.4                      | 20.00                   | D    | 170X80X183                | S6-C29        |
|                      | 3000                   | 5000                      | 2500            | 7.96                     | 19.12                   | 100X100               | 3.65                                       | MS1H2-25C30CD-A331Z  | SV660NT8R4I-FS-INT | 8.4                      | 20.00                   | D    | 170X80X183                | S6-C29        |
|                      | 3000                   | 5000                      | 2500            | 7.96                     | 23.90                   | 100X100               | 3.65                                       | MS1H2-25C30CD-A331Z  | SV660NT012I-FS-INT | 11.9                     | 29.75                   | D    | 170X80X183                | S6-C29        |
|                      | 3000                   | 5000                      | 3000            | 9.8                      | 29.16                   | 130X130               | 7.72                                       | MS1H2-30C30CD-A331Z  | SV660NT012I-FS-INT | 11.9                     | 29.75                   | D    | 170X80X183                | S6-C29        |
|                      | 3000                   | 5000                      | 3000            | 9.8                      | 29.40                   | 130X130               | 7.72                                       | MS1H2-30C30CD-A331Z  | SV660NT017I-FS-INT | 16.5                     | 41.25                   | E    | 250X90X230                | S6-C29        |
|                      | 3000                   | 5000                      | 4000            | 12.6                     | 37.80                   | 130X130               | 12.1                                       | MS1H2-40C30CD-A331Z  | SV660NT017I-FS-INT | 16.5                     | 41.25                   | E    | 250X90X230                | S6-C29        |
|                      | 3000                   | 5000                      | 5000            | 15.8                     | 40.91                   | 130X130               | 15.4                                       | MS1H2-50C30CD-A331Z  | SV660NT017I-FS-INT | 16.5                     | 41.25                   | E    | 250X90X230                | S6-C29        |
|                      | 3000                   | 5000                      | 5000            | 15.8                     | 47.60                   | 130X130               | 15.4                                       | MS1H2-50C30CD-A331Z  | SV660NT021I-FS-INT | 20.8                     | 52.12                   | E    | 250X90X230                | S6-C29        |
|                      | 1500                   | 3000                      | 850             | 5.39                     | 13.50                   | 130X130               | 13.3                                       | MS1H3-85B15CD-A331Z  | SV660NT3R5I-FS-INT | 3.5                      | 11.00                   | C    | 170X55X173                | S6-C29        |
|                      | 1500                   | 3000                      | 1300            | 8.34                     | 20.85                   | 130X130               | 17.8                                       | MS1H3-13C15CD-A331Z  | SV660NT5R4I-FS-INT | 5.4                      | 14.00                   | C    | 170X55X173                | S6-C29        |
|                      | 1500                   | 3000                      | 1800            | 11.5                     | 28.75                   | 130X130               | 25                                         | MS1H3-18C15CD-A331Z  | SV660NT8R4I-FS-INT | 8.4                      | 20.00                   | D    | 170X80X183                | S6-C29        |
|                      | 1500                   | 3000                      | 2900            | 18.6                     | 37.20                   | 180X180               | 55                                         | MS1H3-29C15CD-A331Z  | SV660NT012I-FS-INT | 11.9                     | 29.75                   | D    | 170X80X183                | S6-C39        |
|                      | 1500                   | 3000                      | 4400            | 28.4                     | 71.10                   | 180X180               | 88.9                                       | MS1H3-44C15CD-A331Z  | SV660NT017I-FS-INT | 16.5                     | 41.25                   | E    | 250X90X230                | S6-C39        |
|                      | 1500                   | 3000                      | 5500            | 35                       | 87.60                   | 180X180               | 107                                        | MS1H3-55C15CD-A331Z  | SV660NT021I-FS-INT | 20.8                     | 52.12                   | E    | 250X90X230                | S6-C39        |
|                      | 1500                   | 3000                      | 7500            | 48                       | 117.63                  | 180X180               | 141                                        | MS1H3-75C15CD-A331Z  | SV660NT026I-FS-INT | 25.7                     | 64.25                   | E    | 250X90X230                | S6-C39        |

\*Brake option not available.  
 All MS1 motors are CE certified and UL listed.  
 For detailed motor dimension data please contact your local Inovance representative or refer to the IS620 brochure.



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