INOVANCE

Driven by Technology

AC Drives	AC MultiDrives	MV Drives

Single-Axis Servos	Multi-Axes Servos	Robotics & Motion Controllers

EtherCAT.

PLCs & HMIs	CNC Machine Tool Solutions	Electric Vehicle Inverters

EtherCAT.

IS620 Series - Single Axis Servo

For General Purpose Applications

EtherCAT® CANopen

Pulse/analog input
Embedded motion

CE KC

INOVANCE
Forward, Always Progressing

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IS620 Series Servos

High-performance servo system for motion control applications

IS620 Series Servo Drive - Key Features

High performance
- High current loop bandwidth > 4 kHz
- High speed loop bandwidth: 1.2 kHz

Wide range
- Supply voltage
  - Single-phase 220V
  - Three-phase 220V
  - Three-phase 380V
- 0.1 kW to 7.5 kW

Network compatibility
- Pulse/Analog – IS620P series servo
- EtherCAT – IS620N series servos
- CANopen – IS620P-CO series servo

Easy to use
- Easy commissioning with keypad
- Fine tune with PC software (InoServoShop)

Smart tuning
- Inertia auto-tuning (On-line/Off-line)
- Automatic gain tuning
- Adaptive notch filter
- Automatic/Manual damping filter for low
  frequency resonance

MS1 Series Servo Motor - Key Features

High precision
- 20-bit resolution serial incremental encoder
- 23-bit resolution multi-turn absolute encoder

Reliable operation
- IP67 degree of protection with oil seal (MS1H1/H4)
- Low cogging torque – 1% of rated torque

Wide selection
- Motor frame – 40, 60, 80, 100, 130, 180
- Rated torques from 0.16 Nm up to 48.0 Nm
- Low and medium inertia selection
- Rated speed 1500 rpm or 3000 rpm

Powerful performance
- Rated torque 350% (750W or less MS1 motor)

IS620 Series Highlights

The IS620 series is engineered to achieve new levels of performance and reliability – enabling users to maximize the productivity of their automation systems

High accuracy - Multi-turn absolute encoder with 23 bit resolution

Proprietary Inovance algorithm
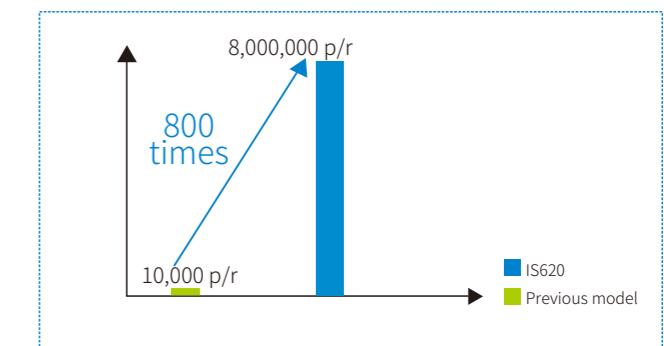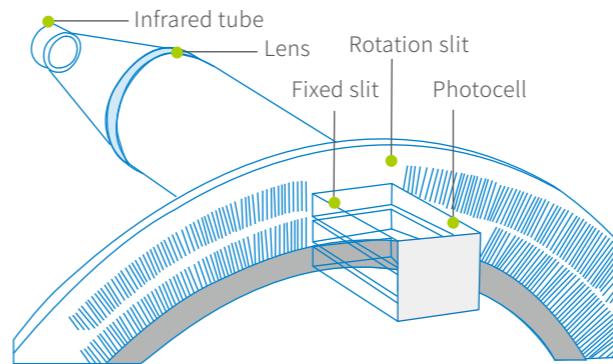
The 23-bit multi-turn absolute encoder, developed by WeTon, an Inovance group subsidiary, has a resolution of 8 million pulses per revolution for extremely precise positioning applications such as industrial robots, machine tools and semiconductor manufacturing machinery.

The system's battery ensures data is backed-up at servo drive power-off and calculates the mechanical absolute position after servo driver power-on. It does not need to repeat the homing operation.

Smaller footprint, higher performance

The built-in encoder has been developed in house considering size compactness, so the flange is kept the same all along the motor. The MS1H1 and MS1H4 motors are suitable for equipment requiring high torque (maximum torque of 350%).

Convenient connector

Compact size

Actual size, 77.5 mm MS1H1 100W model

Maximum torque 350%

IS620 Series Highlights

The IS620 series is engineered to achieve new levels of performance and reliability – enabling users to maximize the productivity of their automation systems

Improved performance – Speed loop bandwidth 1.2 kHz

Speed loop bandwidth is a measure of how fast the motor can respond. High response control based on torque feed forward can reduce the settling time of machines. Settling time of position control is only 5.0 to 6.0 ms.

Shorter settling time, reduced positioning time, higher throughput.
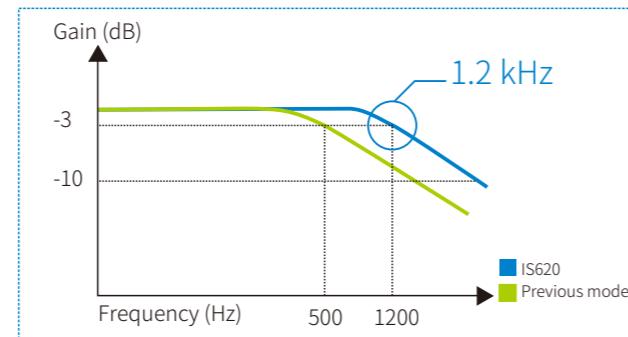
Smart tuning – Easy commissioning with new tuning function

The machine can be automatically optimized using automatic gain tuning function based on the stiffness level to achieve fast response and stability.

- **Load inertia identification**: on-line and off-line inertia identification.
- **Automatic gain adjustment**: speed loop and position loop gains can be automatically adjusted by setting the stiffness level.
- **Self-adaptive notch filter**: The vibration frequency can be automatically detected and the notch filter can be automatically set.
- **Damping filter**: suppresses vibration from 1 to 100 Hz.
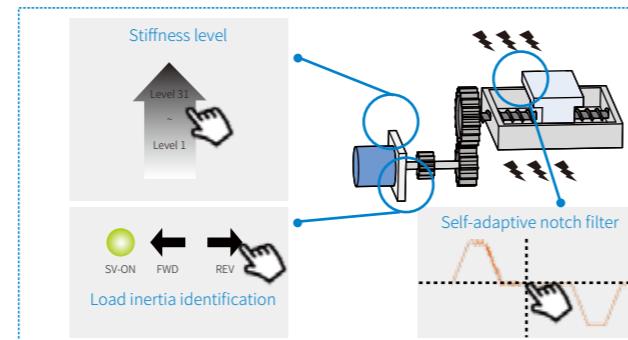
Wide protocol – Pulse/Analog, EtherCAT, MODBUS, CANopen

The IS620 family of servo drives support a variety of protocols for your system.

- IS620P Servo Drive
  Pulse/Analog Input;
  MODBUS RTU: RS232/RS485
  Internal positioning: Up to 16 positions can be stored.
  It supports point-to-point positioning using a simple digital input from the controller.
- IS620N Servo Drive
  EtherCAT: complies with CiA 402 drive profile
- IS620P-CO Servo Drive
  CANopen: device profile specification for embedded systems
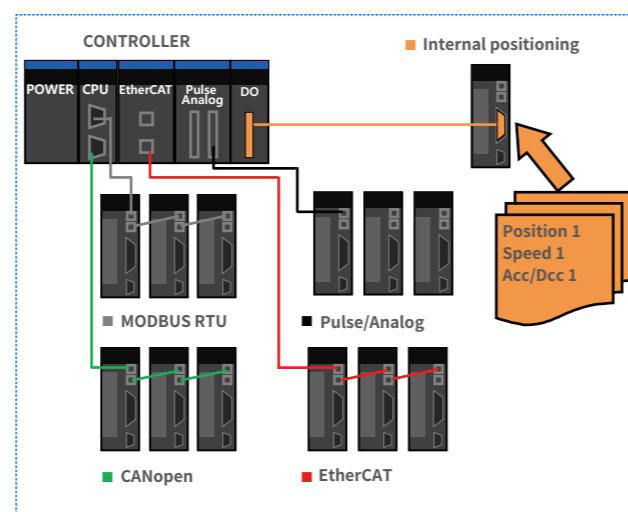
IS620 Servo Drive Technical Data

Servo drive for position, speed, and torque control via Pulse/Analog, EtherCAT

IS620 P S 5R5 I - A - INT
① ② ③ ④ ⑤ ⑥ ⑦

① Series IS620 servo drive	④ Rated output current 1R6: 1.6 A … 021: 21 A 026: 26 A	⑥ Customized function A: 16-bit analog input M: E-cam, gantry sync C: CANlink CO: CANopen CO-EM: Embedded motion
② Product type P: Pulse/Analog N: EtherCAT		
③ Voltage class S: 220 Vac T: 400 Vac	⑤ Installation I: Base mount	⑦ Version INT: International

Servo drive specifications

Single-phase 220 V

Frame Size	SIZE-A		
Model No.	S1R6	S2R8	S5R5
Rated current (A)	1.6	2.8	5.5
Maximum current (A)	5.8	10.1	16.9
Input voltage	Single-phase 200 to 240 Vac, +10 to -15%, 50/60 Hz		
Internal DBR	No	50Ω / 50W	

Three-phase 220 V

Frame Size	SIZE-A	SIZE-C	
Model No.	S5R5	S7R6	S012
Rated current (A)	5.5	7.6	11.6
Maximum current (A)	16.9	17	28
Input voltage	Three-phase 200 to 240 Vac, +10 to -15%, 50/60 Hz		
Internal DBR	50Ω / 50W	25Ω / 80W	

Three-phase 380 V

Frame Size	SIZE-C				SIZE-E		
Model No.	T3R5	T5R4	T8R4	T012	T017	T021	T026
Rated current (A)	3.5	5.4	7.4	11.9	16.5	20.8	25.7
Maximum current (A)	8.5	14.0	20.0	24.0	42.0	55.0	65.0
Input voltage	Three-phase 380 to 440 Vac, +10 to -15%, 50/60 Hz						
Internal DBR	100Ω / 80W		50Ω / 80W		40Ω / 100W		

Notes: Internal DBR is built-in regenerative resistor specification.

Models S1R6 and S2R8 are not configured with a built-in regenerative resistor. Use an external regenerative resistor if necessary

Servo drive dimensions

Size	L (mm)	H (mm)	D (mm)	L1 (mm)	H1 (mm)	D1 (mm)	Screw Hole	Tightening Torque (Nm)
A	50	160	173	40	150	75	2-M4	0.6 to 1.2
C	90	160	184	80	150	75	4-M4	0.6 to 1.2
E	100	250	230	90	240	75	4-M4	0.6 to 1.2

IS620P Servo Drive Configuration

Wiring example of single-phase 220V system

Power supply
Single-phase
220 VAC

Circuit breaker for wiring

Noise filter

Electromagnetic contactor
Turns ON /OFF power of the
servo drive. Install a surge
suppressor when using this
contactor.

Regenerative resistor

AO output
-10 V~+10 V I < 1 mA

CN5

Communication cable for multi - drive parallel connection

Communication
cable for multi - drive
parallel connection

Note 2

CN3
CN4

Servo drive to PC communication cable

Servo drive to PLC communication cable

L1C
L2C
L1
L2

Note 1

P
D
C

U
V
W

PE

CN1

CN2

Servo drive I / O cable
(prepared by user)

Servo motor
encoder cable

System
ground

Battery box

Servo motor main circuit cable

Brake power supply
24 VDC power supply, used
when the servo motor is
configured with brake.

24 VDC

Electromagnetic relay
Turns ON /OFF the
brake power supply. Install a surge
suppressor when using this contactor.

Note 1: Remove the jumper between
terminals ℞ and D of the servo drive when
connecting a regenerative resistor.

MS1 motor

Pulse/Analog

IS620P Servo Drive Configuration

Wiring example of three-phase 220V/380V system

Power supply
Three-phase
220 / 380VAC

Circuit breaker for wiring

Noise filter

Electromagnetic
contactor
Turns ON /OFF power of the
servo drive. Install a surge
suppressor when using this
contactor.

Regenerative resistor

AO output
-10 V~+10 V I < 1 mA

CN5

Communication cable for multi - drive parallel connection

Communication
cable for multi - drive
parallel connection

CN3
CN4

Servo drive to PC communication cable

Servo drive to PLC communication cable

L1C
L2C
R
S
T

Note 1

P
D
C

U
V
W

PE

CN1

CN2

Servo drive I / O cable
(prepared by user)

Servo motor
encoder cable

System
ground

Battery box

Servo motor main circuit cable

Brake power supply
24 VDC power supply, used
when the servo motor is
configured with brake.

24 VDC

Electromagnetic relay
Turns ON /OFF the
brake power supply. Install a surge
suppressor when using this contactor.

Note 1: Remove the jumper between
terminals ℞ and D of the servo drive when
connecting a regenerative resistor.

MS1 motor

Pulse/Analog

IS620P Servo Drive Connection Diagram

Standard wiring for pulse train input, analog input

Standard wiring of speed control mode

| Analog speed | AI1 20 | Low-pass filter |
| Positive analog torque limit | AI2 18 / GND 19 | Low-pass filter | A/D converter |

Servo drive

Standard wiring of position control mode

Internal 24V power supply for open-collector output — PULLHI 35 — 2.4kΩ / 2.4kΩ

PULS [CW phase A] — PULSE+ 41 — 240Ω
PULSE- 43

Low-speed pulse position reference

SIGN [CCW phase B] — SIGN+ 37 — 240Ω
SIGN- 39 — 2.4kΩ / 2.4kΩ

High-speed pulse position reference Max. 4 MHz

HPULSE [CW phase A] — HPULSE+ 38 / HPULSE- 36
HSIGN [CCW phase B] — HSIGN+ 4 / HSIGN- 40
GND 29 注2

AO1 / GND
AO2 / GND

7 DO1+
6 DO1-
5 DO2+
4 DO2-
3 DO3+
2 DO3-
1 DO4+
26 DO4-
28 DO5+
27 DO5-

Standard wiring of torque control mode

| Analog torque | AI1 20 | Low-pass filter |
| Positive analog speed limit | AI2 18 / GND 19 | Low-pass filter | A/D converter |

24V power supply 24V / 17
COM+ 11

DI1 9 — 4.7kΩ
DI2 10 — 4.7kΩ
DI3 3 — 4.7kΩ
DI4 8 — 4.7kΩ
DI5 33 — 4.7kΩ
DI6 32 — 4.7kΩ
DI7 31 — 4.7kΩ
DI8 30 — 4.7kΩ
DI9 12 — 4.7kΩ
COM- 14

Encoder frequency-division pulse differential output

21 PAO+
22 PAO- — Phase A output
25 PBO+
23 PBO- — Phase B output
13 PZO+
24 PZO- — Phase Z output
29 GND — GND

44 PZ-OUT
29 GND — Encoder phase Z open-collector output
GND

5V
15 +5V
29 GND
GND

PE shield connected to connector housing

Pulse/Analog

IS620N Servo Drive Configuration

Wiring example of single-phase 220V system with EtherCAT network

Power supply Single-phase 220 VAC

Circuit breaker for wiring

Noise filter

Electromagnetic contactor
Turns ON /OFF power of the servo drive. Install a surge suppressor when using this contactor

Regenerative resistor

System ground — Battery box

Brake power supply
24 VDC power supply, used when the servo motor is configured with brake.

Electromagnetic relay
Turns ON /OFF the brake power supply. Install a surge suppressor when using this contactor.

Note 1: Remove the jumper between terminals ⏚ and D of the servo drive when connecting a regenerative resistor.

Servo drive RS232 communication cable

EtherCAT

Communication cable for multi-drive parallel connection

Communication cable for multi-drive parallel connection

EtherCAT

Servo drive to PLC communication cable

Servo drive I / O cable (prepared by user)

Servo motor encoder cable

Servo motor main circuit cable

24 VDC

MS1 motor

Note 1 / Note 2

L1C / L2C / L1 / L2 / P⏚ / D / C / U / V / W / PE

CN5 / CN3 / CN4 / CN1 / CN2

EtherCAT®

IS620N Servo Drive Configuration

Wiring example of three-phase 220V/380V system with EtherCAT network

Power supply
Three-phase
220/380 VAC

Circuit breaker for wiring

Noise filter

Electromagnetic contactor
Turns ON /OFF power of the servo drive. Install a surge suppressor when using this contactor.

Regenerative resistor

Brake power supply
24 VDC power supply, used when the servo motor is configured with brake.

Electromagnetic relay
Turns ON /OFF the brake power supply. Install a surge suppressor when using this contactor.

Note 1: Remove the jumper between terminals P and D of the servo drive when connecting a regenerative resistor.

Servo drive RS 232 communication cable

EtherCAT

Communication cable for multidrive parallel connection

EtherCAT

Servo drive to PLC communication cable

Communication cable for multi-drive parallel connection

Servo drive I/O cable (prepared by user)

Servo motor encoder cable

Servo motor main circuit cable

System ground

Battery box

24 VDC

MS1 motor

IS620N Servo Drive Connection Diagram

Standard wiring for EtherCAT communication

Servo drive

Host controller

Next slave

Note1

Note2

Positive limit switch — P-OT(DI1)
Negative limit switch — N-OT(DI2)
Pulse input inhibited — INHIBIT(DI3)
Fault/Warning reset — ALM-RST(DI4)
Zero speed clamp enabled — ZCLAMP(DI5)
Gain switchover — GAIN-SEL(DI6)
Touch probe — TouchProbe(DI8)
Home switch — HomeSwitch(DI9)

Note3

Second encoder

Note4

Bi-directional 1 mA meter — Analog output:-10 to 10 V Maximum output: < 1 mA
Bi-directional 1 mA meter — Analog output: -10 to 10 V Maximum output: <1 mA

+24V power
COM+
Note2

S-RDY+(DO1+)
S-RDY-(DO1-)
COIN+(DO2+)
COIN-(DO2-)
ALM+(DO3+)
ALM-(DO3-)

State output
Note6

Phase A output
Phase B output
Phase Z output

Encoder frequency-division pulse differential output
Note7

PZ-OUT — Encoder phase Z open-collector output

Note8

The shield of the PE is connected to the housing of the connector.

IS620N EtherCAT Overview

EtherCAT is a high performance, flexible, cost-effective technology

Open technology

EtherCAT is a high-performance, easy-to-use industrial Ethernet technology with a flexible topology. CoE (Can application protocol over EtherCAT) is the most commonly used EtherCAT communication protocol for acyclic data access. CoE also provides a mechanism to configure PDOs for cyclic data exchange.

The drive profile CiA402 (IEC61800-7-201) is mapped to EtherCAT. Our IS620N servo drive complies with CiA 402 profile.

CIA 402 Profile type (CoE)
■ 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)

Example of EtherCAT network system with IS620N servo drive

PLC (AM600)

MAX RTU 5

Hybridin One RTU1 Analog= 4 Digital

MAX Analog Modules in One RTU 4

MAX Digital Modules in One RTU 16

IS620N   IS620N   IS620N   IS620N

A maximum of 64 slaves
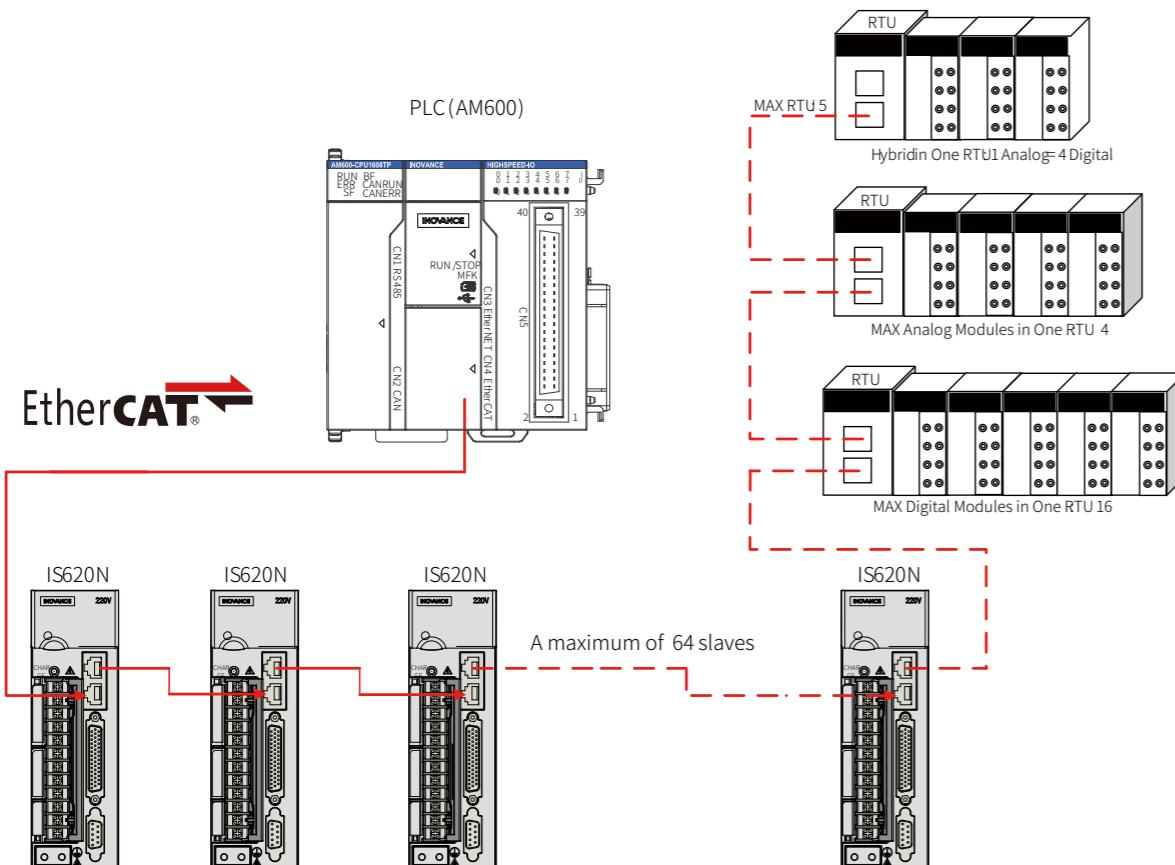
IS620N EtherCAT Overview

Network configuration using TwinCAT platform with IS620N
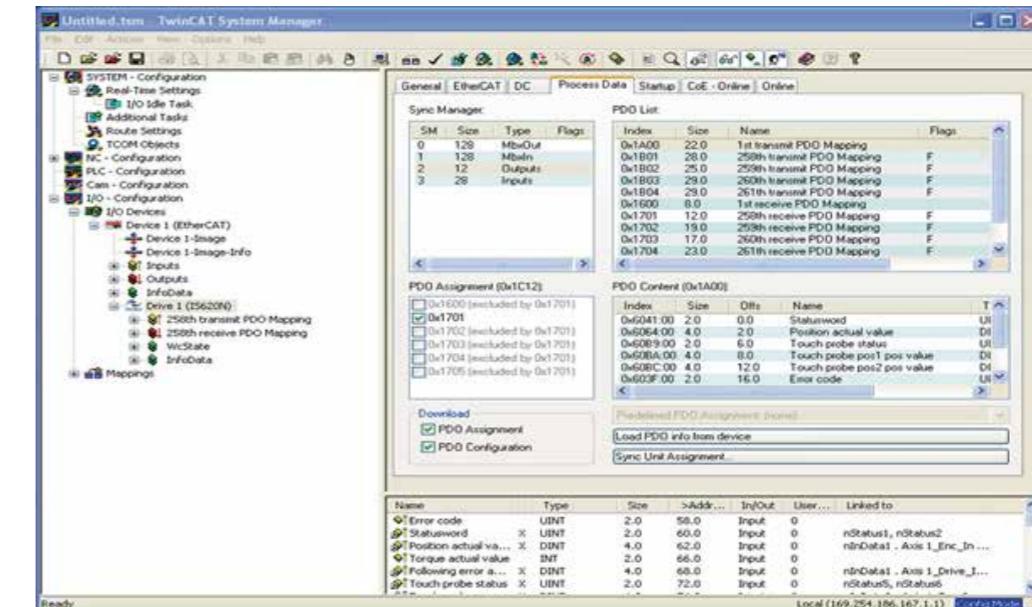
Configuration of the IS620N drive is automatically recognized by the controller using the XML library related to the drives.

Network configuration using Trio Motion platform with IS620N
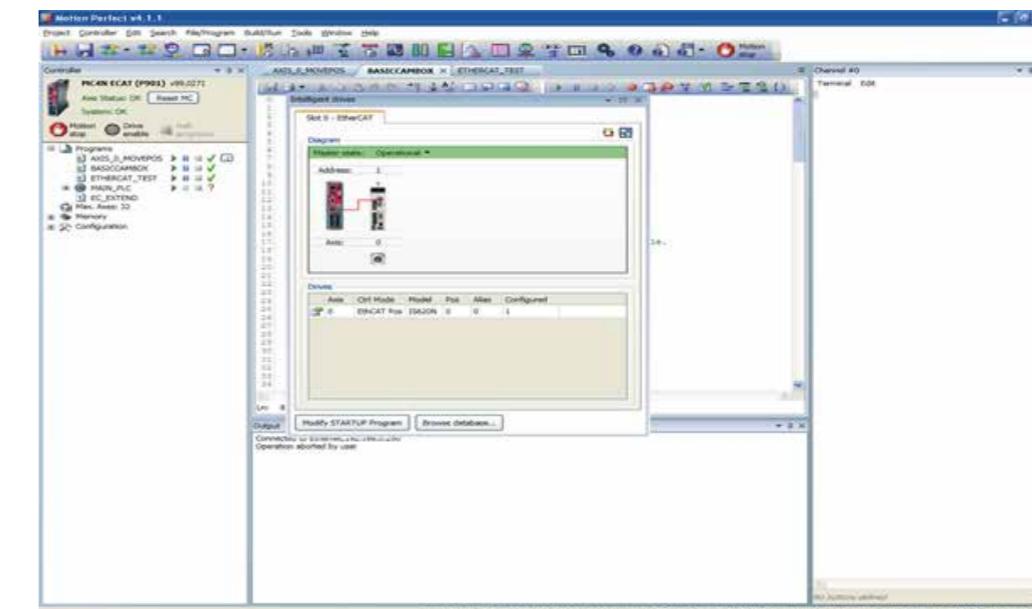
Configuration of the IS620N drive is automatically recognized by the controller using the XML library related to the drives.

IS620N EtherCAT Overview

EtherCAT is a high performance, flexible, cost-effective technology

Network configuration using AM600 platform with IS620N
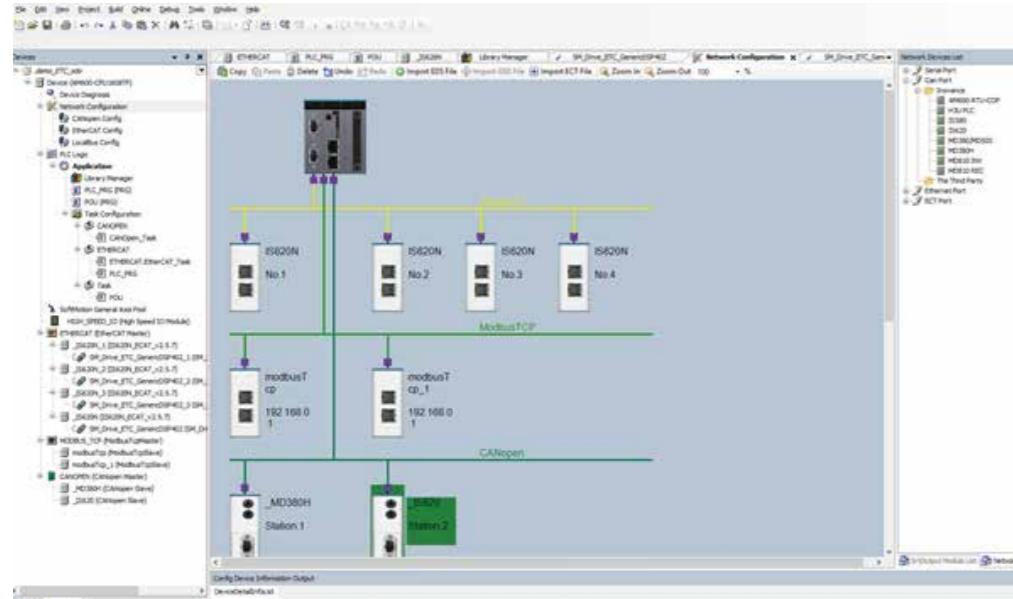
AM600 platform example of EtherCAT configuration + CANOpen module + Modbus TCP/IP for service and commissioning.

IS620P-CO CANopen Overview

CANopen networks are used in many embedded machine control systems

The internationally standardized CiA 402 device profile for drives and motion controllers (IEC 61800-7-201/301) is the most widely implemented solution.

The CiA 402 profile specifies several operation modes in detail. They are selectable by means of a command, and confirmed at the application level.

CANopen supports Master/Slave mode, the IS620P only supports Slave mode. It supports only one master node in the network, the address of master/slave nodes is between 1 and 63, different for each node.

CiA 402
■ 0-Speed mode
■ 1-Position mode
■ 2-Torque mode
■ 3-Speed mode<->Torque mode
■ 4-Position mode<->Speed mode
■ 5-Position mode<->Torque mode
■ 6-Position<->speed<->Torque mode

Mode 3-6 can be changed on the fly

IS620 Embedded Motion Overview

Easy mode programming language for embedded motion

IS620P-CO-Embedded motion platform, gives the possibility to realize PLC programs directly on the drive, reducing cost and increasing performance. Dedicated motion functions reduces commissioning and tuning time. The embedded motion platform is supported by Modbus RTU to allow communication with an external device e.g. a PLC (CANopen communication is optional).

Embedded Motion Block Diagram
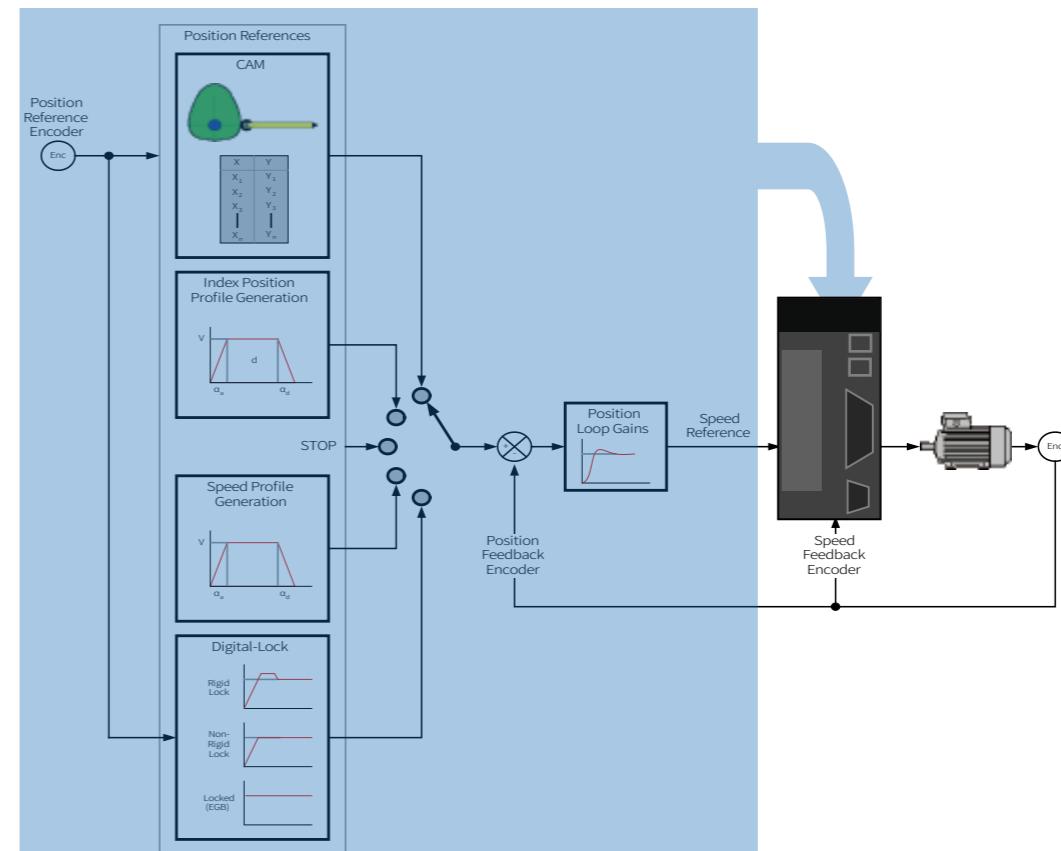
Available function
■ Cam Function (1000 CP)
■ Digital lock
■ Profile Generator with position on fly change
■ Fast access to all drive data parameters
■ Easy mode programming

Easy mode programming
■ Basic statement (For… Next, Do…while…)
■ Trigonometric function (Tan, Atan, Sin, Cos…)
■ Logical Operators (And, Or, Not…)
■ Motion functions
FORWARD
REVERSE
MOVE
MOVEABS
CAMBOX_WRAP
EPOS
HPARAM

IS620 Embedded Motion Examples

Example 1 Electronic Cam

This code example shows how to use the cambox function. It combines a forward continuous movement with a sine profile generated by the cambox function.

```
REM Simple Cambox demo

PRINT VERSION$               ' print Motion basic revision
PRINT " Setting IS620P...."
HPARAM("0901")=20            ' set rigidity level 21
encoder=8388608              ' 2^23 encoder

UNIT(1)                      ' set unit = encoder count

ACCEL=20*encoder             ' set the acceleration
DECEL=20*encoder             ' set the deceleration
SPEED=5*encoder              ' set the motor speed
CAMBOX_SPEED=2*encoder       ' set the cambox master speed

PRINT "Motor Speed", 60*SPEED/encoder, "rpm" ' convert speed in rpm

PRINT "Set Cambox Table"
nstep=100
REM set first TABLE from 0 to nstep with sine profile
FOR I=0 TO nstep-1
SS=2000*SIN((6.28*I)/nstep)
TABLE(I, SS)
NEXT I

camcycles=5
PRINT "Set Cambox running for", camcycles, "cycles"
DATUM(0)
REM set option bit3=1 enable cam wrap interrupt, bit6=1 enable last cam cycle interrupt
camoption=8+64
CAMBOX_COUNT(1)=camcycles

ON CAMBOX_WRAP(1) GOSUB camboxwrap
ON CAMBOX_LAST(1) GOSUB camboxlast

CAMBOX(1, 0, nstep, 2000, 5*encoder, camoption)

WDOG(1)
FORWARD                      ' add forward movement to the cambox (composite movement)
WAIT(100)
FORWARD CAMBOX(1)

loopwait:
WAIT(400)
count=CAMBOX_COUNT(1)
IF count > 0 THEN loopwait
WAIT(1000)
WDOG(0)
END

camboxwrap:
```

Example 2 MOVE Function

This code example shows how to use the MOVE function.

```
delay=500                    ' set delay to 500ms
encoder=8388608              ' set for 2^23 encoder
step=10*encoder              ' set n. of steps to move
FE_LIMIT(8*encoder)          ' set the following error limit to 8 shaft turns

UNIT(1)                      ' set the unit in encoder count

ACCEL=10*encoder             ' set acceleration
DECEL=10*encoder             ' set deceleration
SPEED=2*encoder              ' set speed 2 rps (120rpm)

DATUM(0)                     ' set the absolute position 0
WDOG(1)                      ' drive enable

PRINT "Actual position:", MPOS
MOVE(step)                   ' move from actual position of step count
WAIT IDLE                    ' wait until the final position has not been reached

WAIT(delay)                  ' wait delay ms

PRINT "Actual position:", MPOS
MOVE(-step/2)                ' move back from actual position of step/2 count
WAIT_IDLE                    ' wait until the final position has not been reached

WAIT(delay)                  ' wait delay ms

WDOG(0)                      ' drive disable

END                          ' end program
```

PC Software InoServoShop

## Easy to use engineering tool for commissioning and diagnostics

Easy auto-tuning using position JOG and self-adjustment

Inertia auto-tuning calculates estimated inertia of load
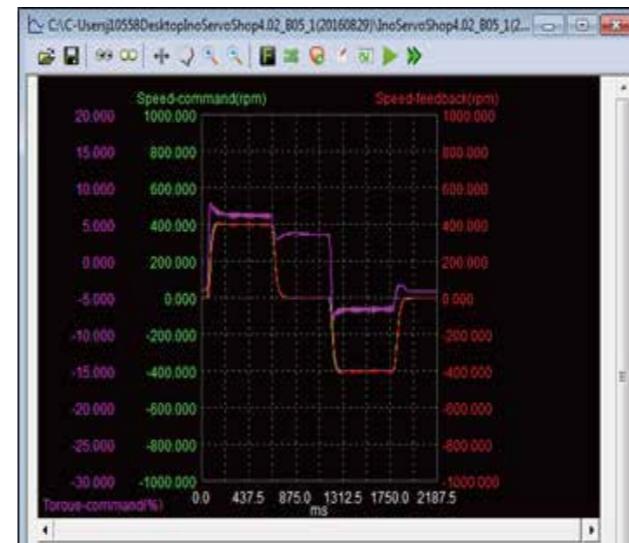
Oscilloscope function to monitor servo motor performance
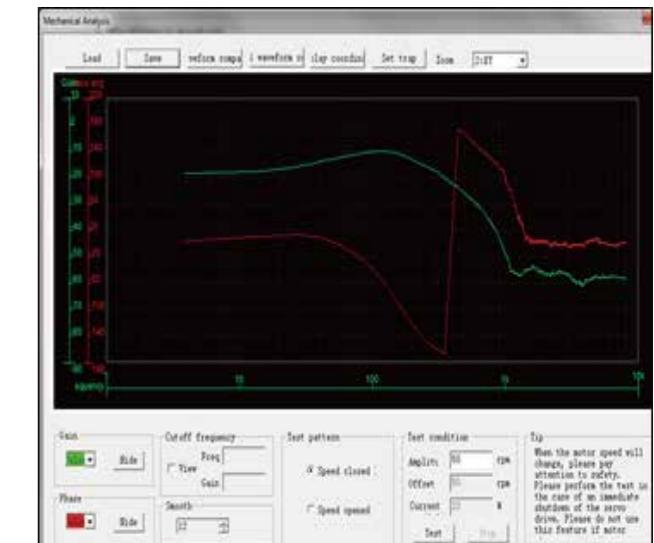
Mechanical analysis to diagnose natural frequency of system

Function – Setting, Monitoring
▪ Read/Write parameters
▪ Real time monitoring parameters
▪ DI/DO graphic configuration
▪ Osilloscope (Trace)
▪ Software reset
▪ JOG Run
▪ Automatic U-V current phase calibration

| Function – Adjustment |
| --- |
| ▪ Automatic gain tuning |
| ▪ Inertia auto-tuning |
| ▪ Mechanical analysis |
| Advanced function |
| ▪ Electronic CAM |

Application Examples

Double Position Loop Control

Description

The encoder installed on the velocity measurement roller feeds back the actual speed and position signals of materials. The servo drive conducts closed-loop position control via the signals to ensure that the materials are delivered accurately and smoothly to the preset position. This function can effectively compensate slipping of materials and conveyors, and properly adjust gaps between the conveying processes. The dual-PG full closed-loop control function is powered by the algorithm integrated in the servo drive. The smoothness of speed and position control during the conveying process can be adjusted by the filter embedded in the drive. Besides, the runaway protection will function when the difference between positions of the internal and external loops is large. This ensures smooth and reliable conveying of materials.

Applications

Steel plate cutting, Pipe bending, Wire stripping
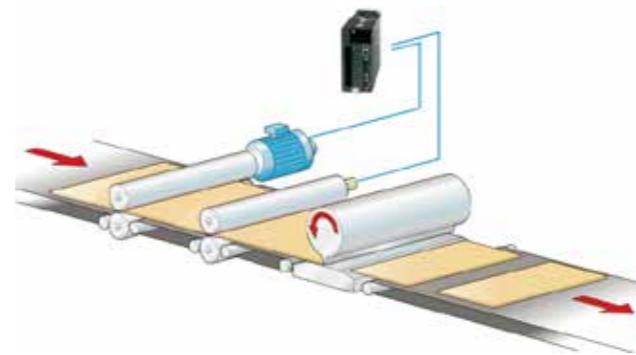
Change On-fly Position Control

Description

The servo drive runs position control and the fixed-length interruption function is enabled. After an external DI interruption function is input, the motor immediately runs to the preset length at the existing speed. The function has the highest priority, which ensures fast responding and shortest delay. When the function is effective, the servo motor does not respond to other position commands, thus preventing the influence of other commands sent to the servo motor.

Applications

Material laying

Bearing tube cutting
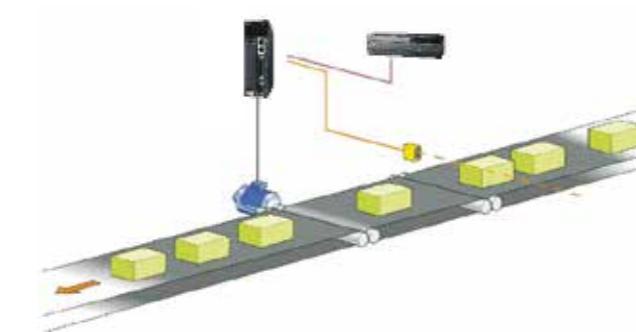
CANlink Communication (optional)

Description

CANlink is a communication protocol developed by INOVANCE based on the CAN bus. CANlink is an open protocol and allows connection of devices that support this protocol. Currently, CANlink 3.0 adopts the master-slave model, where there is but one master and at most 62 slaves. The highest communication rate is 1M. CANlink can realize networking of INOVANCE's HMIs, PLCs, servo drives and AC drives. It simplifies the networking process and improves reliability and resistance to interference. It can meet the demands of application scenarios that require large number of DIs and DOs. The standard CANopen protocol is also supported

Applications

Hoop bending, Film cutting, Automatic screwing, Stacking, Plastic injection molding, Other production processes
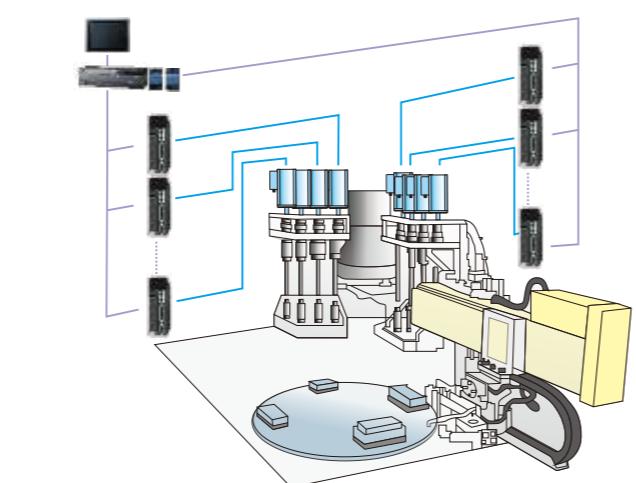
Electronic Cam Control

Description

The encoder installed on the velocity measurement roller feeds back actual speed and position signals of materials. The servo drive uses the signals as signals of the master axis and programs a position curve for the slave axis (servo motor). The servo motor runs this curve. This function substitutes the mechanical cam in an electronic way to reduce mechanical input and easily realizes change of cam curves without maintaining or changing cams.

Rotary cutting, flying cutting and flying saw functions can be realized.

Applications

Printing machines

Flying cutting
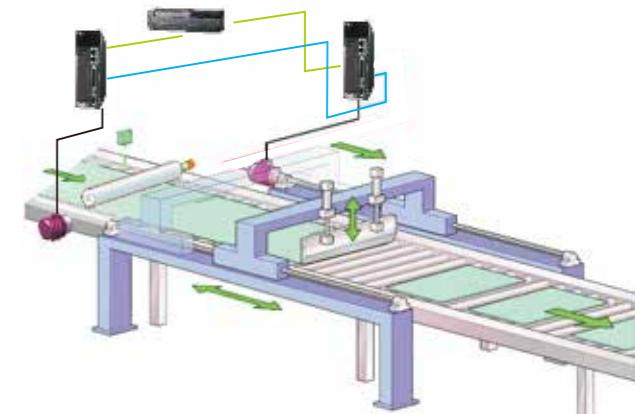
Gantry Synchronization

Description

The host sends pulse references to two servo drives simultaneously. Encoders on the two servo motors feed back position pulses. The servo drives interact and cross-couple these pulse signals to adjust the speeds of the motors in real time, so that the two axes are synchronized. Dual-axis drive control can be used in applications where there are large gantry structures to reduce mechanical coupling.

The virtual synchronization controllers inside the servo drives can continuously track synchronization and sound an alarm when the position deviation exceeds the preset limit to stop the system.

Applications

Large facing machine

Welding and cutting
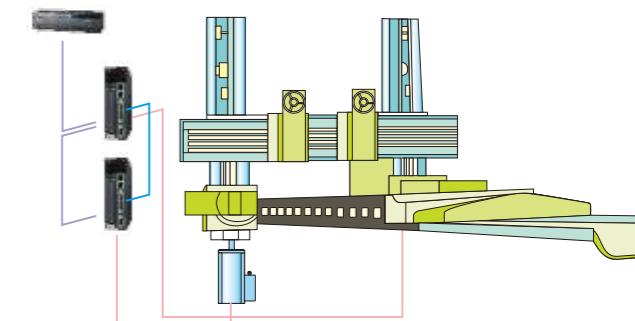
Multi-Position Control

Description

Control of up to 16 positions can be realized through combinations of input terminals, by selecting different in-built position references (relative or absolute positions) previously preset by PLC via communications or by manual input.

Up to 16 positions are supported. To use this function servo motor installed with multi-turn absolute encoder is required, and the home seek operation needs to be performed. During the operation of multi-position control, a position-reach signal will be given when each phase is completed.

Applications

Longitudinal line cutting

Multi-station switching

Servo tool holder
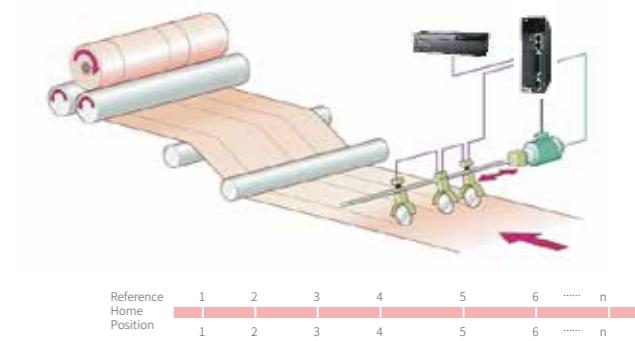
MS1 Servo Motor Technical Data

Reliable operation, wide selection

Model designation

$$MS1 \quad H1 - 75B \quad 30C \quad B - A3 \quad 3 \quad 1 \quad Z - INT$$

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series: MS1 series servo motor

② Inertia
H1: Low inertia, 40/60/80 mm flange
H2: Low inertia, 100/130 mm flange
H3: Medium inertia 130/180 mm flange
H4: Medium inertia 60/80 mm flange

③ Rated power
A: x 1
B: x 10
C: x 100
D: x 1000
E: x 10000
E.g. 75B : 750W; 15C : 1500W

④ Rated speed
A: x 1
B: x 10
C: x 100
D: x 1000
E: x 10000
E.g. 30C : 3000 RPM

⑤ Voltage class
B: 220V
D: 380V

⑥ Encoder type
U2: 20-bit serial incremental
A3: 23-bit multi-turn absolute

⑦ Motor shaft
1: Plain
2: Keyed
3: Keyed + tapped hole
5: Tapped hole

⑧ Brake, Oil sealing
0: None
1: Oil sealing
2: Brake
4: Brake + Oil sealing

⑨ Motor configuration
Y: 8 pole
Z: 10 pole

⑩ INT: international version

| Servo motor model	Rated output [kW]	Rated torque [Nm]	Peak torque [Nm]	Rated current [Arms]	Peak current [Arms]	Rated speed [RPM]	Peak speed [RPM]	Torque constant [Nm/Arms]	Rotor inertia [10⁻⁴ x kgm²]	Voltage [V]
MS1H1 (N rated = 3,000 RPM, Nmax = 6,000 RPM)										
MS1H1-05B30CB-□□□□Z-INT	0.05	0.16	0.56	1.3	4.7			0.15	0.026 (0.028)	
MS1H1-10B30CB-□□□□Z-INT	0.1	0.32	1.12	1.3	4.7			0.26	0.041 (0.043)	
MS1H1-20B30CB-□□□□Z-INT	0.2	0.64	2.24	1.5	5.8			0.46	0.207 (0.220)	
MS1H1-40B30CB-□□□□Z-INT	0.4	1.27	4.46	2.8	10.1	3,000	6,000	0.53	0.376 (0.390)	220
MS1H1-55B30CB-□□□□Z-INT	0.55	1.75	6.13	3.8	15.0			0.49	1.06	
MS1H1-75B30CB-□□□□Z-INT	0.75	2.39	8.36	4.8	16.9			0.58	1.38 (1.43)	
MS1H1-10C30CB-□□□□Z-INT	1.0	3.18	11.1	7.6	28			0.46	1.75	
MS1H2 (N rated = 3,000 RPM, Nmax = 5,000/6,000 RPM)										
MS1H2-10C30CB-□□□□Y-INT	1.0	3.18	9.54	7.5	23		6,000	0.43	1.87 (3.12)	220
MS1H2-15C30CB-□□□□Y-INT	1.5	4.9	14.7	10.8	32		5,000	0.45	2.46 (3.71)	
MS1H2-10C30CD-□□□□Y-INT	1.0	3.18	9.54	3.65	11		6,000	0.87	1.87 (3.12)	
MS1H2-15C30CD-□□□□Y-INT	1.5	4.9	14.7	4.5	14			1.09	2.46 (3.71)	
MS1H2-20C30CD-□□□□Y(-S4)-INT	2.0	6.36	19.1	5.89	20	3,000		1.08	3.06 (4.31)	380
MS1H2-25C30CD-□□□□Y(-S4)-INT	2.5	7.96	23.9	7.56	25		5,000	1.05	3.65 (4.9)	
MS1H2-30C30CD-□□□□Y(-S4)-INT	3.0	9.8	29.4	10	30			0.98	7.72 (7.72)	
MS1H2-40C30CD-□□□□Y(-S4)-INT	4.0	12.6	37.8	13.6	40.8			0.93	12.1 (14.6)	
MS1H2-50C30CD-□□□□Y(-S4)-INT	5.0	15.8	47.6	16	48			1.07	15.4 (17.9)	
MS1H3 (N rated = 1,500 RPM, Nmax = 3,000 RPM)										
MS1H3-85B15CB-□□□□Z-INT	0.85	5.39	13.5	6.6	16.5			0.9	13.3 (14)	220
MS1H3-13C15CB-□□□□Z-INT	1.3	8.34	20.85	10	25			0.9	17.8 (18.5)	
MS1H3-85B15CD-□□□□Z-INT	0.85	5.39	13.5	3.3	8.25			1.75	13.3 (14)	
MS1H3-13C15CD-□□□□Z-INT	1.3	8.34	20.85	5	12.5			1.78	17.8 (18.5)	
MS1H3-18C15CD-□□□□Z-INT	1.8	11.5	28.75	6.6	16.5	1,500	3,000	1.8	25 (25.7)	
MS1H3-29C15CD-□□□□Z-INT	2.9	18.6	37.2	11.9	28			1.7	55 (57.2)	380
MS1H3-44C15CD-□□□□Z-INT	4.4	28.4	71.1	16.5	40.5			1.93	88.9 (90.8)	
MS1H3-55C15CD-□□□□Z-INT	5.5	35	87.6	20.85	52			1.8	107 (109.5)	
MS1H3-75C15CD-□□□□Z-INT	7.5	48	119	25.7	65			1.92	141 (143.1)	
MS1H4 (N rated = 3,000 RPM, Nmax = 6,000 RPM)										
MS1H4-40B30CB-□□□□Z-INT	0.4	1.27	4.46	2.8	10.1	3,000	6,000	0.53	0.657 (0.667)	220
MS1H4-75B30CB-□□□□Z-INT	0.75	2.39	8.36	4.8	16.9			0.58	2 (2.012)	

Notes: Brake version can only work in S4 duty, for example ISMH2-20C30CD-A334Y-S4-INT.

Servo Motor and Servo Drive Combination

	1-phase 220V	1/3-phase 220V	3-phase 220V			
Servo Drive						
	SIZE A	SIZE A	SIZE C			SIZE E
	IS620□S1R6I	IS620□S2R8I	IS620□S5R5I	IS620□S7R6I	IS620□S012I	IS620□S018I	IS620□T026I
Servo Motor	50 W, 100 W, 200 W	400 W	550 W, 750 W	850 W, 1.0 kW	1.3 kW, 1.5 kW	2.0 kW	2.5 kW, 3.0 kW
	MS1H1-05B30CB MS1H1-10B30CB MS1H1-20B30CB	MS1H1-40B30CB MS1H4-40B30CB	MS1H1-55B30CB (no brake) MS1H1-75B30CB MS1H4-75B30CB	MS1H1-10C30CB (no brake) MS1H2-10C30CB MS1H3-85B15CB	MS1H3-13C15CB MS1H2-15C30CB	MS1H2-20C30CB	MS1H2-20C30CB MS1H2-25C30CB

	3-phase 380V						
Servo Drive							
	SIZE C			SIZE E			
	IS620□T3R5I	IS620□T5R4I	IS620□T8R4I	IS620□T012I	IS620□T017I	IS620□T021I	IS620□T026I
Servo Motor	850 W	1.0 kW, 1.3 kW, 1.5 kW	1.8 kW, 2.0 kW, 2.5 kW	2.9 kW, 3.0 kW	4.0 kW, 4.4 kW, 5.0 kW	5.5 kW	7.5 kW
	MS1H3-85B15CD	MS1H3-13C15CD MS1H2-10C30CD MS1H2-15C30CD	MS1H3-18C15CD MS1H2-20C30CD MS1H2-25C30CD	MS1H3-29C15CD MS1H2-30C30CD	MS1H3-44C15CD MS1H2-40C30CD MS1H2-50C30CD	MS1H3-55C15CD	MS1H3-75C15CD

Servo Motor Dimensions and Drawings

Shaft sketch   Flat key sketch
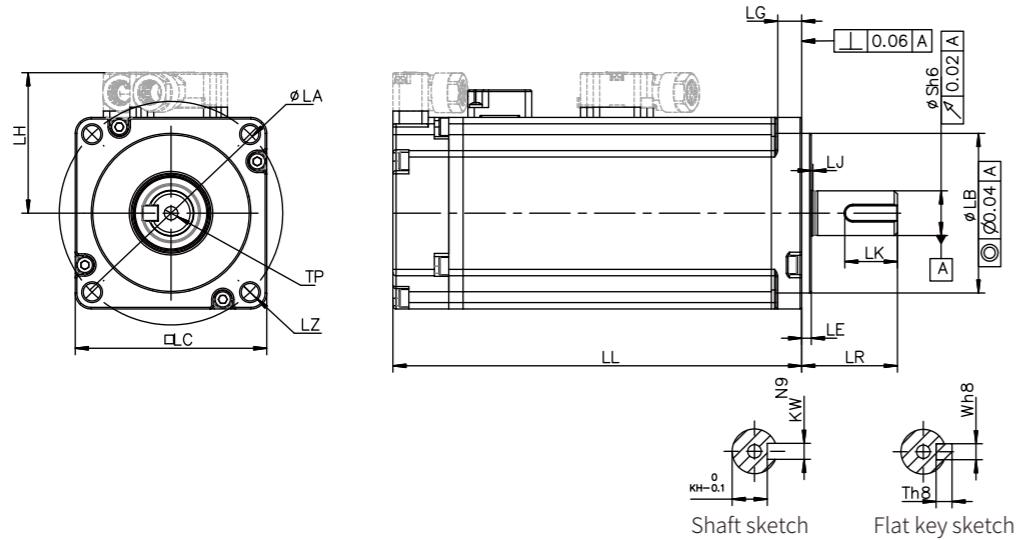
Model	LC (mm)	LL (mm)	LR (mm)	LA (mm)	LZ (mm)	LH (mm)	LG (mm)	LE (mm)	LJ (mm)
MS1H1-05B30CB -□□□□Z-INT	40	65 (96)	25±0.5	46	2-Φ4.5	34	5	2.5±0.5	0.5±0.35
MS1H1-10B30CB -□□□□Z-INT	40	77.5 (109)	25±0.5	46	2-Φ4.5	34	5	2.5±0.5	0.5±0.35
MS1H1-20B30CB -□□□□Z-INT	60	72.5 (100)	30±0.5	70	4-Φ5.5	44	7.5	3±0.5	0.5±0.35
MS1H1-40B30CB -□□□□Z-INT	60	91 (119)	30±0.5	70	4-Φ5.5	44	7.5	3±0.5	0.5±0.35
MS1H1-55B30CB -□□31Z-INT	80	96.2	35±0.5	90	4-Φ7	54	7.7	3±0.5	0.5±0.35
MS1H1-75B30CB -□□□□Z-INT	80	107 (140)	35±0.5	90	4-Φ7	54	7.7	3±0.5	0.5±0.35
MS1H1-10C30CB -□□31Z-INT	80	118.2	35±0.5	90	4-Φ7	54	7.7	3±0.5	0.5±0.35

Model	LB (mm)	S (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)
MS1H1-05B30CB -□□□□Z-INT	30	8	M3×6	15.5	6.2	3	3	3	0.39 (0.50)
MS1H1-10B30CB -□□□□Z-INT	30	8	M3×6	15.5	6.2	3	3	3	0.45 (0.64)
MS1H1-20B30CB -□□□□Z-INT	50	14	M5×8	16.5	11	5	5	5	0.78 (1.16)
MS1H1-40B30CB -□□□□Z-INT	50	14	M5×8	16.5	11	5	5	5	1.11 (1.48)
MS1H1-55B30CB -□□31Z-INT	70	19	M6×20	25	15.5	6	6	6	1.85
MS1H1-75B30CB -□□□□Z-INT	70	19	M6×20	25	15.5	6	6	6	2.18 (2.82)
MS1H1-10C30CB -□□31Z-INT	70	19	M6×20	25	15.5	6	6	6	2.55

Servo Motor Dimensions and Drawings

Shaft sketch   Flat key sketch
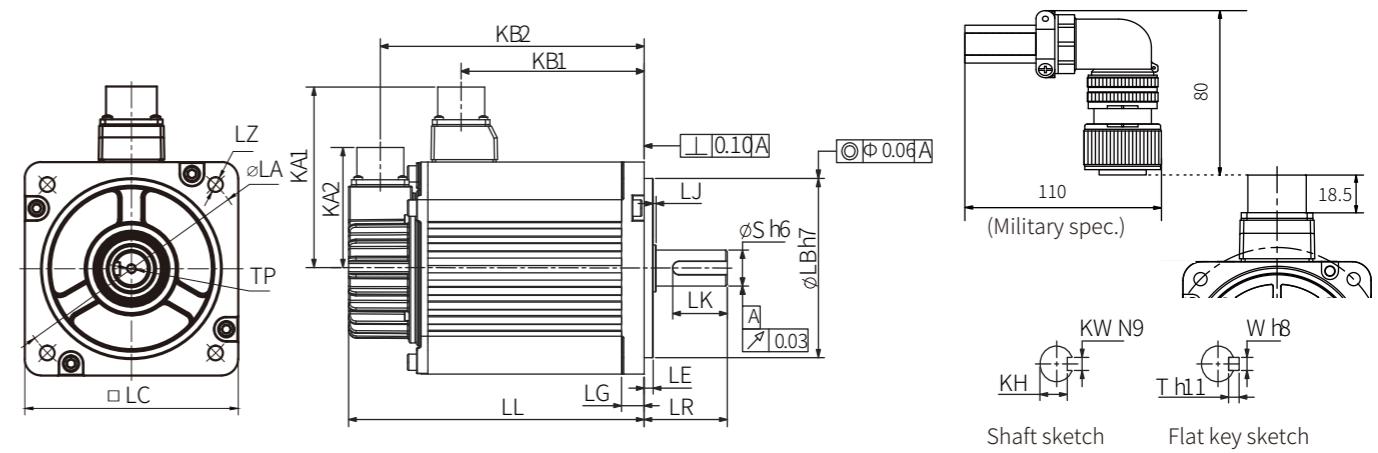
Model	LC (mm)	LL (mm)	LR (mm)	LA (mm)	LZ (mm)	KA1 (mm)	KB1 (mm)	KA2 (mm)	KB2 (mm)	LG (mm)	LE (mm)	LJ (mm)	LB (mm)
MS1H2-10C30CB(D) -□□□□Y-INT	100	164 (213.5)	45±1	115	4-Φ7	88	94.5 (101)	74	143.5 (192.5)	10	5±0.3	2.5±0.75	95
MS1H2-15C30CB(D) -□□□□Y-INT	100	189 (239)	45±1	115	4-Φ7	88	119.5 (128)	74	168.5 (219.5)	10	5±0.3	2.5±0.75	95
MS1H2-20C30CD -□□□□Y(-S4)-INT	100	214 (265)	45±1	115	4-Φ7	88	144.5 (153)	74	193.5 (244)	10	5±0.3	2.5±0.75	95
MS1H2-25C30CD -□□□□Y(-S4)-INT	100	240.5 (290)	45±1	115	4-Φ7	88	169.5 (178)	74	218.5 (269)	10	5±0.3	2.5±0.75	95
MS1H2-30C30CD -□□□□Y(-S4)-INT	130	209.5 (265.5)	63±1	145	4-Φ9	103	136 (139)	74	188.5 (244.5)	14	6±0.3	0.5±0.75	110
MS1H2-40C30CD -□□□□Y(-S4)-INT	130	252 (308)	63±1	145	4-Φ9	103	178.5 (181.5)	74	231 (287)	14	6±0.3	0.5±0.75	110
MS1H2-50C30CD -□□□□Y(-S4)-INT	130	294.5 (350.5)	63±1	145	4-Φ9	103	221 (224)	74	273.5 (329.5)	14	6±0.3	0.5±0.75	110

Model	S (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)	Conn -ector	Power Side (incl. Power Brake Side)	Encoder Side
MS1H2-10C30CB(D) -□□□□Y-INT	24	M8×16	36	20$_{-0.2}^{0}$	8	8	7	5.11 (6.41)	Aviation plug	MI-DTL-5015 3102E20-18P	MI-DTL-5015 3102E20-29P
MS1H2-15C30CB(D) -□□□□Y-INT	24	M8×16	36	20$_{-0.2}^{0}$	8	8	7	6.22 (7.52)			
MS1H2-20C30CD -□□□□Y(-S4)-INT	24	M8×16	36	20$_{-0.2}^{0}$	8	8	7	7.39 (8.7)			
MS1H2-25C30CD -□□□□Y(-S4)-INT	24	M8×16	36	20$_{-0.2}^{0}$	8	8	7	8.55 (9.8)			
MS1H2-30C30CD -□□□□Y(-S4)-INT	28	M8×20	54	24$_{-0.2}^{0}$	8	8	7	10.73 (13.2)	Aviation plug	MI-DTL-5015 3102E20-18P	MI-DTL-5015 3102E20-29P
MS1H2-40C30CD -□□□□Y(-S4)-INT	28	M8×20	54	24$_{-0.2}^{0}$	8	8	7	15.43 (17.9)			
MS1H2-50C30CD -□□□□Y(-S4)-INT	28	M8×20	54	24$_{-0.2}^{0}$	8	8	7	16.2 (18.7)			

MS1H3 mounting dimensions (N_{rated} = 1,500 RPM, N_{max} = 3,000 RPM)

Shaft sketch   Flat key sketch

(Military spec.)
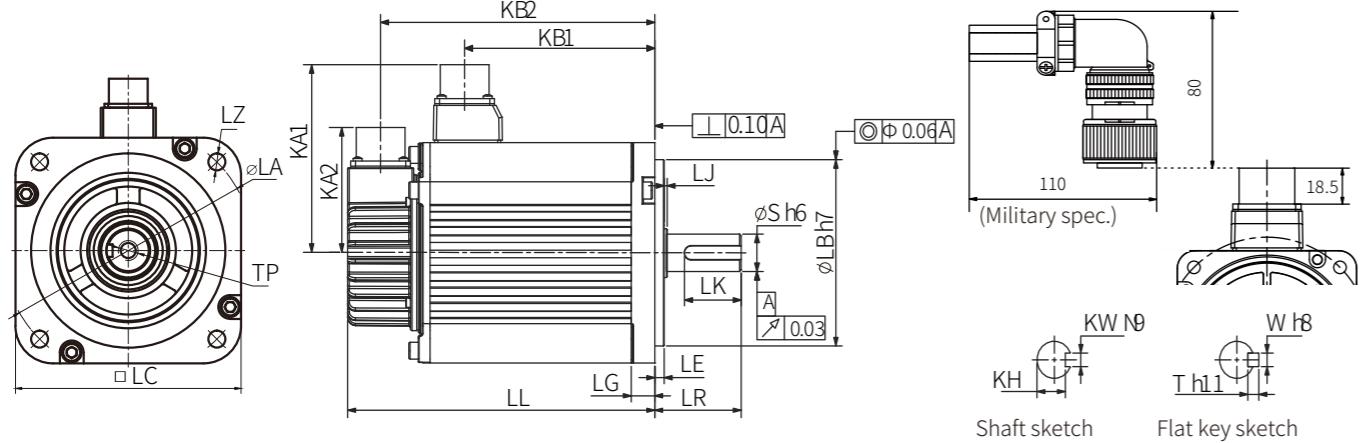
Model	LC (mm)	LL (mm)	LR (mm)	LA (mm)	LZ (mm)	KA1 (mm)	KB1 (mm)	KA2 (mm)	KB2 (mm)	LG (mm)	LE (mm)	LJ (mm)	LB (mm)
MS1H3-85B15CB(D)-□□□□Z-INT	130	146 (182)	55±1	145	4-Φ9	103	72.5	74	125 (161)	14	4	0.5±0.75	110
MS1H3-13C15CB(D)-□□□□Z-INT	130	163 (199)	55±1	145	4-Φ9	103	89.5	74	142 (178)	14	4	0.5±0.75	110
MS1H3-18C15CD-□□□□Z-INT	130	181 (217)	55±1	145	4-Φ9	103	107.5	74	160 (196)	14	4	0.5±0.75	110
MS1H3-29C15CD-□□□□Z-INT	180	197 (273)	79±1	200	4-Φ13.5	138	136 (134)	74	177 (253)	18	3.2±0.3	0.3±0.75	114.3
MS1H3-44C15CD-□□□□Z-INT	180	230 (307)	79±1	200	4-Φ13.5	138	169 (167)	74	210 (286)	18	3.2±0.3	0.3±0.75	114.3
MS1H3-55C15CD-□□□□Z-INT	180	274 (350)	113±1	200	4-Φ13.5	138	213 (211)	74	254 (330)	18	3.2±0.3	0.3±0.75	114.3
MS1H3-75C15CD-□□□□Z-INT	180	330 (407)	113±1	200	4-Φ13.5	138	269 (267)	74	310 (386)	18	3.2±0.3	0.3±0.75	114.3

Model	S (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)	Conn-ector	Power Side (incl. Power Brake Side)	Encoder Side
MS1H3-85B15CB(D)-□□□□Z-INT	22	M6×20	36	$18_{-0.2}^{0}$	8	8	7	7 (8)	Aviation plug	MI-DTL-5015 3102E20-18P	MI-DTL-5015 3102E20-29P
MS1H3-13C15CB(D)-□□□□Z-INT	22	M6×20	36	$18_{-0.2}^{0}$	8	8	7	8 (9.5)			
MS1H3-18C15CD-□□□□Z-INT	22	M6×20	36	$18_{-0.2}^{0}$	8	8	7	9.5 (11)			
MS1H3-29C15CD-□□□□Z-INT	35	M12×25	65	$30_{-0.2}^{0}$	10	10	8	15 (25)	Aviation plug	MI-DTL-5015 3102E20-22P	MI-DTL-5015 3102E20-29P
MS1H3-44C15CD-□□□□Z-INT	35	M12×25	65	$30_{-0.2}^{0}$	10	10	8	19.5 (30)			
MS1H3-55C15CD-□□□□Z-INT	42	M16×32	96	$37_{-0.2}^{0}$	12	12	8	28 (38)			
MS1H3-75C15CD-□□□□Z-INT	42	M16×32	96	$37_{-0.2}^{0}$	12	12	8	32 (42)			

MS1H4 mounting dimensions (N_{rated} = 3,000 RPM, N_{max} = 6,000 RPM)

Shaft sketch   Flat key sketch
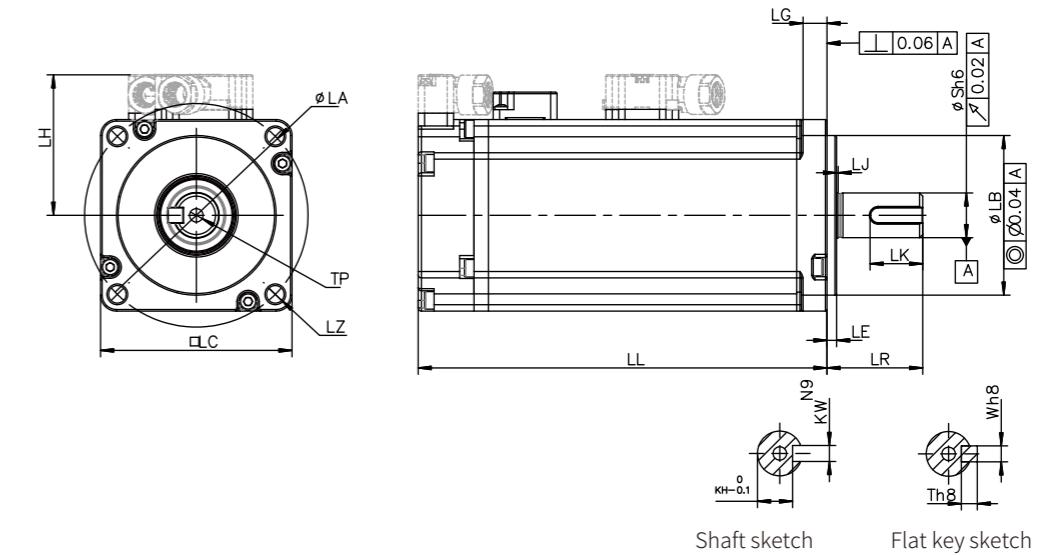
Model	LC (mm)	LL (mm)	LR (mm)	LA (mm)	LZ (mm)	LH (mm)	LG (mm)	LE (mm)	LJ (mm)
MS1H4-40B30CB-□□□□Z-INT	60	105 (128)	30±0.5	70	4-Φ5.5	44	7.5	3±0.3	0.5±0.35
MS1H4-75B30CB-□□□□Z-INT	80	117.5 (147.5)	35±0.5	90	4-Φ7	54	7.7	3±0.3	0.5±0.35

Model	LB (mm)	S (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)
MS1H4-40B30CB-□□□□Z-INT	50	14	M5×8	16.5	11.0	5	5	5	1.27 (1.62)
MS1H4-75B30CB-□□□□Z-INT	70	19	M6×20	25	15.5	6	6	6	2.40 (3.04)

Servo Motor Torque Vs Speed Graph

A (Continuous operation area) & B (Short term operation area)

MS1H1 Low inertia Small capacity

MS1H1-05B30CB

MS1H1-10B30CB

MS1H1-20B30CB

MS1H1-40B30CB
MS1H4-40B30CB

MS1H1-55B30CB

MS1H1-75B30CB
MS1H4-75B30CB

MS1H1-10C30CB

MS1H4 High inertia Small capacity

MS1H2 Low inertia Medium capacity

MS1H2-10C30C□

MS1H2-15C30C□

MS1H2-20C30CD

MS1H2-25C30CD

MS1H2-30C30CD

MS1H2-40C30CD

MS1H2-50C30CD

MS1H3 High inertia Medium capacity

MS1H3-85B15C□

MS1H3-13C15C□

MS1H3-18C15CD

MS1H3-29C15CD

MS1H3-44C15CD

MS1H3-55C15CD

MS1H3-75C15CD

Servo Motor Overload Characteristic Graph

MS1H1/MS1H2/MS1H3/MS1H4

Load in%	Deceleration time(s).
120	230
130	80
140	40
150	30
160	20
170	17
180	15
190	12
200	10
210	8.5
220	7
230	6
240	5.5
250	5
300	3
350	2

Note: MSIH1 / MS1H4 motor = 3.5 times of rated torque
MS1H2 Motor = 3 times of rated torque
MS1H3 (excluding 2.9 kW) = 2.5 times of rated torque
MS1H3 (2.9 kW) = Max. 2 times of rated torque
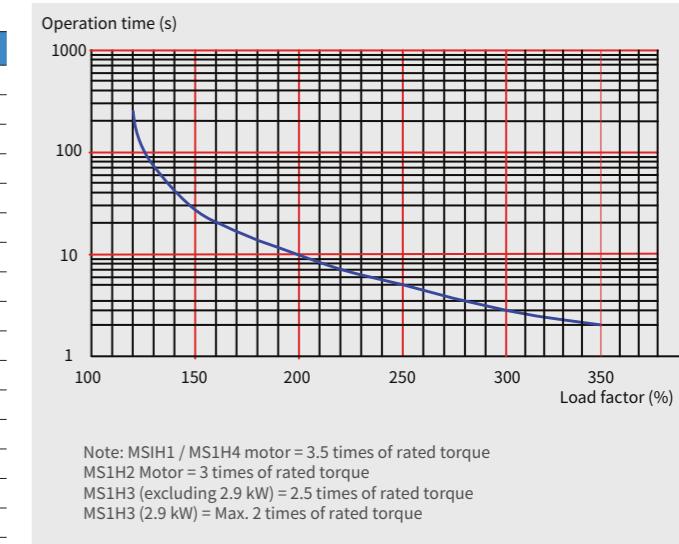
Allowable Radial Load, Axial Load

Servo motor model	Allowable radial load (N)	Allowable axial load (N)
MS1H1−05B30CB−U3□□Z/A3□□Z-INT	78	54
MS1H1−10B30CB−U3□□Z/A3□□Z-INT	78	54
MS1H1−20B30CB−U3□□Z/A3□□Z-INT	245	74
MS1H1−40B30CB−U3□□Z/A3□□Z-INT	245	74
MS1H1−55B30CB−U3□1Z/A3□1Z-INT	392	147
MS1H1−75B30CB−U3□□Z/A3□□Z-INT	392	147
MS1H1−10C30CB−U3□1Z/A3□1Z-INT	392	147
MS1H2−10C30C□−U2□□Z/A3□□Z-INT	686	196
MS1H2−15C30C□−U2□□Z/A3□□Z-INT	686	196
MS1H2−20C30CD−U2□□Y/A3□□Y(−S4)-INT	686	196
MS1H2−25C30CD−U2□□Y/A3□□Y(−S4)-INT	686	196
MS1H2−30C30CD−U2□□Y/A3□□Y(−S4)-INT	980	392
MS1H2−40C30CD−U2□□Y/A3□□Y(−S4)-INT	1176	392
MS1H2−50C30CD−U2□□Y/A3□□Y(−S4)-INT	1176	392
MS1H3−85B15C□−U3□□Z/A3□□Z-INT	686	196
MS1H3−13C15C□−U3□□Z/A3□□Z-INT	686	196
MS1H3−18C15CD−U3□□Z/A3□□Z-INT	686	196
MS1H3−29C15CD−U2□□Z/A3□□Z-INT	1470	490
MS1H3−44C15CD−U2□□Z/A3□□Z-INT	1470	490
MS1H3−55C15CD−U2□□Z/A3□□Z-INT	1764	588
MS1H3−75C15CD−U2□□Z/A3□□Z-INT	1764	588
MS1H4−40B30CB−U3□□Z/A3□□Z-INT	245	74
MS1H4−75B30CB−U3□□Z/A3□□Z-INT	392	147

Brake Specifications

Model	Holding torque (Nm)	Input voltage (V) (±10%)	Resistance (Ω)	Input current (A)(±7%)	Opening time (ms)	Closing time (ms)	Power (W)
MS1H1 −05/10B	0.3		96	0.23∼0.27	10	30	6.1
MS1H1 −20B/40B	1.5		82.3	0.25∼0.34	20	50	7.6
MS1H1 −75B	2.5		50.1	0.40∼0.57	25	60	8
MS1H2 −10C/15C/20C/25C	8		25	0.81∼1.14	30	90	20
MS1H2 −30C/40C/50C	16	24	21.3	0.95∼1.33	60	120	19.4
MS1H3 −85B/13C/18C	12		21.3	0.95∼1.33	60	120	19.4
MS1H3 −29C/44C/55C/75C	48		13.7	1.47∼2.07	100	230	40
MS1H4 −40B	1.5		82.3	0.25∼0.34	20	50	7.6
MS1H4 −75B	2.5		50.1	0.40∼0.57	25	60	8

Operation time (s)

Load factor (%)

Servo Motor Encoder and Power Wiring Details

Motor connections description

□40, □60, □80 Frame size
motor end connector

Motos end power 6-PIN connector
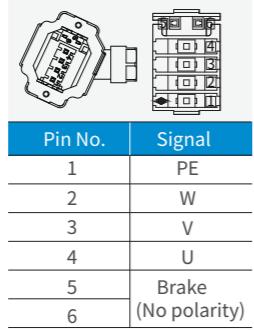

Pin No.	Signal
1	PE
2	W
3	V
4	U
5	Brake
6	(No polarity)

Drive end encoder 9-PIN connector
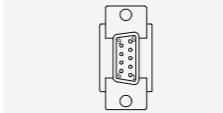
Pin No.	Signal
1	PS+
2	PS-
7	+5V
8	0V

Motor end encoder 7-PIN connector
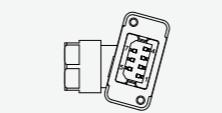
Pin No.	Signal
1	PS+
2	PS-
3	DC+
4	DC-
5	+5V
6	0V
7	PE

□100, □130 Frame size
motor end connector

Motor end power 20-18 military connector
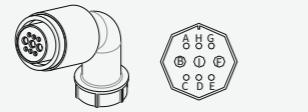
MIL-DTL-5015 Series 3108E20-18S

Y-Series terminal		Z-Series terminal	
Pin No.	Signal	Pin No.	Signal
B	U	B	U
I	V	I	V
F	W	F	W
G	PE	G	PE
C	Brake		
E	(No polarity)		

Motor end encoder 20-29 military connector

MIL-DTL-5015 Series 3108E20-29S

Pin No.	Signal	
	20-bit Incremental	23-bit Absolute
A	PS+	PS+
B	PS-	PS-
C	-	-
D	-	-
E	-	Battery+
F	-	Battery-
G	+5V	+5V
H	GND	GND
J	Shield	Shield

□180 Frame size
motor end connector

Motor end power 20-22 military connector
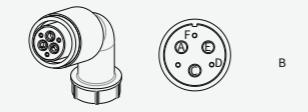
MIL-DTL-5015 Series 3108E20-22S

Y-Series terminal		Z-Series terminal	
Pin No.	Signal	Pin No.	Signal
A	U	A	U
C	V	C	V
E	W	E	W
F	PE	F	PE
		B	Brake
		D	(No polarity)

Motor end encoder 20-29 military connector

MIL-DTL-5015 Series 3108E20-29S

Pin No.	Signal	
	20-bit Incremental	23-bit Absolute
A	PS+	PS+
B	PS-	PS-
C	-	-
D	-	-
E	-	Battery+
F	-	Battery-
G	+5V	+5V
H	GND	GND
J	Shield	Shield

Motor Power Cable Item Codes

Model	Servo motor power cable- Cable direction toward front side					
	Without brake			With brake		
	L = 3.0 m	L = 5.0 m	L = 10.0 m	L = 3.0 m	L = 5.0 m	L = 10.0 m
MS1H1	S6-L-M007-3.0	S6-L-M007-5.0	S6-L-M007-10.0	S6-L-B007-3.0	S6-L-B007-5.0	S6-L-B007-10.0
MS1H4	S6-L-M007-3.0	S6-L-M007-5.0	S6-L-M007-10.0	S6-L-B007-3.0	S6-L-B007-5.0	S6-L-B007-10.0

Model	Servo motor power cable- Cable direction towards back side					
	Without brake			With brake		
	L = 3.0 m	L = 5.0 m	L = 10.0 m	L = 3.0 m	L = 5.0 m	L = 10.0 m
MS1H1	S6-L-M008-3.0	S6-L-M008-5.0	S6-L-M008-10.0	S6-L-B008-3.0	S6-L-B008-5.0	S6-L-B008-10.0
MS1H4	S6-L-M008-3.0	S6-L-M008-5.0	S6-L-M008-10.0	S6-L-B008-3.0	S6-L-B008-5.0	S6-L-B008-10.0

| Model	Servo motor power cable					
	Without brake			With brake		
	L = 3.0 m	L = 5.0 m	L = 10.0 m	L = 3.0 m	L = 5.0 m	L = 10.0 m
MS1H2	S6-L-M11-3.0	S6-L-M11-5.0	S6-L-M11-10.0	S6-L-B11-3.0	S6-L-B11-5.0	S6-L-B11-10.0
MS1H3 (1.8 kW & below)	S6-L-M11-3.0	S6-L-M11-5.0	S6-L-M11-10.0	S6-L-B11-3.0	S6-L-B11-5.0	S6-L-B11-10.0
MS1H3 (2.9 kW)	S6-L-M12-3.0	S6-L-M12-5.0	S6-L-M12-10.0	S6-L-B12-3.0	S6-L-B12-5.0	S6-L-B12-10.0
MS1H3 (above 2.9 kW)	S6-L-M22-3.0	S6-L-M22-5.0	S6-L-M22-10.0	S6-L-B22-3.0	S6-L-B22-5.0	S6-L-B22-10.0

Motor Encoder Cable Item Codes

Model	Servo motor encoder cable- Cable direction toward front side					
	23-bit incremental encoder			23-bit absolute encoder		
	L = 3.0 m	L = 5.0 m	L = 10.0 m	L = 3.0 m	L = 5.0 m	L = 10.0 m
MS1H1	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0
MS1H4	S6-L-P014-3.0	S6-L-P014-5.0	S6-L-P014-10.0	S6-L-P024-3.0	S6-L-P024-5.0	S6-L-P024-10.0

Model	Servo motor encoder cable- Cable direction toward back side					
	23-bit incremental encoder			23-bit absolute encoder		
	L = 3.0 m	L = 5.0 m	L = 10.0 m	L = 3.0 m	L = 5.0 m	L = 10.0 m
MS1H1	S6-L-P015-3.0	S6-L-P015-5.0	S6-L-P015-10.0	S6-L-P025-3.0	S6-L-P025-5.0	S6-L-P025-10.0
MS1H4	S6-L-P015-3.0	S6-L-P015-5.0	S6-L-P015-10.0	S6-L-P025-3.0	S6-L-P025-5.0	S6-L-P025-10.0

Model	Servo motor encoder cable					
	20-bit incremental encoder			23-bit absolute encoder		
	L = 3.0 m	L = 5.0 m	L = 10.0 m	L = 3.0 m	L = 5.0 m	L = 10.0 m
MS1H2	S6-L-P01-3.0	S6-L-P01-5.0	S6-L-P01-10.0	S6-L-P21-3.0	S6-L-P21-5.0	S6-L-P21-10.0
MS1H3 (1.8 kW & below)	S6-L-P01-3.0	S6-L-P01-5.0	S6-L-P01-10.0	S6-L-P21-3.0	S6-L-P21-5.0	S6-L-P21-10.0
MS1H3 (2.9 kW)	S6-L-P01-3.0	S6-L-P01-5.0	S6-L-P01-10.0	S6-L-P21-3.0	S6-L-P21-5.0	S6-L-P21-10.0
MS1H3 (above 2.9 kW)	S6-L-P01-3.0	S6-L-P01-5.0	S6-L-P01-10.0	S6-L-P21-3.0	S6-L-P21-5.0	S6-L-P21-10.0

Model	Connector kit	Battery set for absolute encoder back-up
MS1H2	S6-C2 (CN1 & CN2 terminal, 20-18 pin & 20-29 pin connector)	
MS1H3 (1.8 kW & below)	S6-C2 (CN1 & CN2 terminal, 20-18 pin & 20-29 pin connector)	S6-C4 (Battery & battery case)
MS1H3 (2.9 kW)	S6-C3 (CN1 & CN2 terminal, 20-22 pin & 20-29 pin connector)	
MS1H3 (above 2.9 kW)		

Appearance of Cables

Cable type	Item code	L (mm)	Appearance
Motor power cable- Cable direction towards front	S6-L-M007-3.0	3,000	
	S6-L-M007-5.0	5,000	
	S6-L-M007-10.0	10,000	
Motor power cable- Cable direction towards back	S6-L-M008-3.0	3,000	
	S6-L-M008-5.0	5,000	
	S6-L-M008-10.0	10,000	
Motor power cable	S6-L-M11-3.0	3,000	
	S6-L-M11-5.0	5,000	
	S6-L-M11-10.0	10,000	
	S6-L-M12-3.0	3,000	
	S6-L-M12-5.0	5,000	
	S6-L-M12-10.0	10,000	
	S6-L-M22-3.0	3,000	
	S6-L-M22-5.0	5,000	
	S6-L-M22-10.0	10,000	

Appearance of Cables

Cable type	Item code	L (mm)	Appearance
Motor brake power cable- Cable direction towards front	S6-L-B007-3.0	3,000	
	S6-L-B007-5.0	5,000	
	S6-L-B007-10.0	10,000	
Motor brake power cable- Cable direction towards back	S6-L-B008-3.0	3,000	
	S6-L-B008-5.0	5,000	
	S6-L-B008-10.0	10,000	
Motor brake power cable	S6-L-B11-3.0	3,000	
	S6-L-B11-5.0	5,000	
	S6-L-B11-10.0	10,000	
Motor encoder cable- Cable direction towards front 23bit incremental encoder (MS1 encoder cable)	S6-L-P014-3.0	3,000	
	S6-L-P014-5.0	5,000	
	S6-L-P014-10.0	10,000	
Motor encoder cable- Cable direction towards back 23bit incremental encoder (MS1 encoder cable)	S6-L-P015-3.0	3,000	
	S6-L-P015-5.0	5,000	
	S6-L-P015-10.0	10,000	
Servo motor 20/23 bit Incremental encoder (H2 / H3 encoder cable)	S6-L-P01-3.0	3,000	
	S6-L-P01-5.0	5,000	
	S6-L-P01-10.0	10,000	
Motor encoder cable- Cable direction towards front 23-bit absolute encoder (MS1 encoder cable)	S6-L-P024-3.0	3,000	
	S6-L-P024-5.0	5,000	
	S6-L-P024-10.0	10,000	
Motor encoder cable- Cable direction towards back 23-bit absolute encoder (MS1 encoder cable)	S6-L-P025-3.0	3,000	
	S6-L-P025-5.0	5,000	
	S6-L-P025-10.0	10,000	
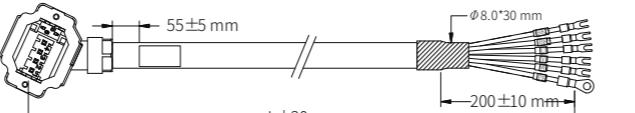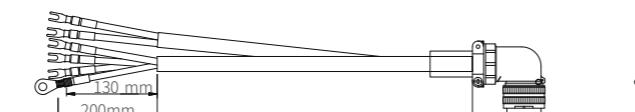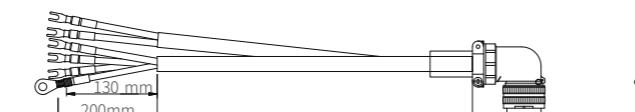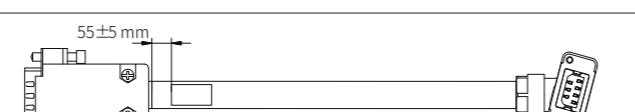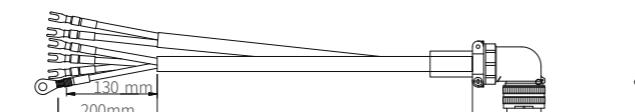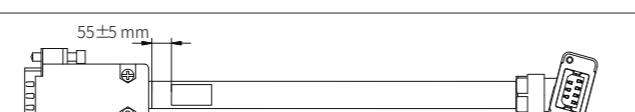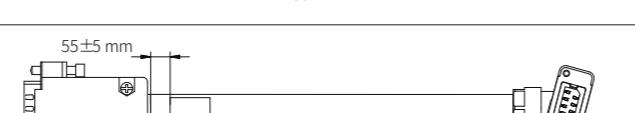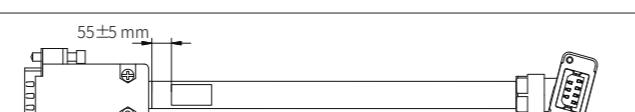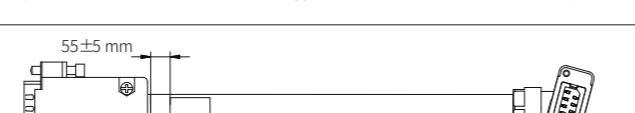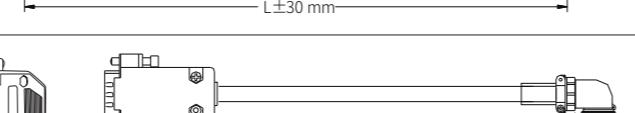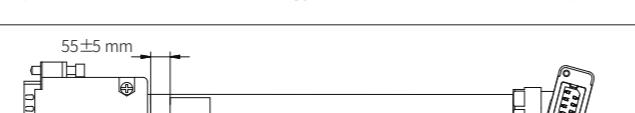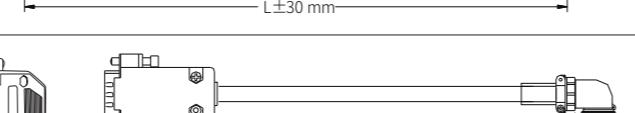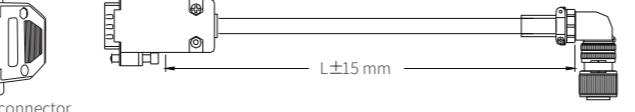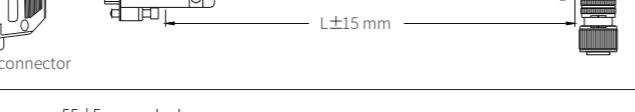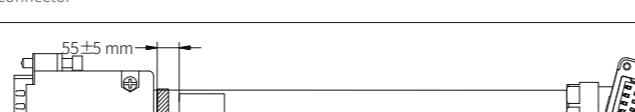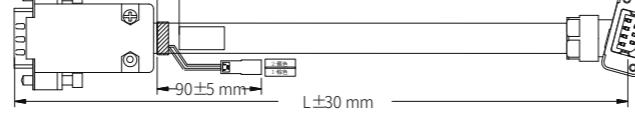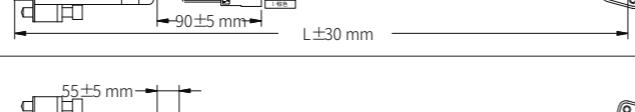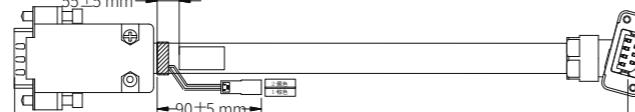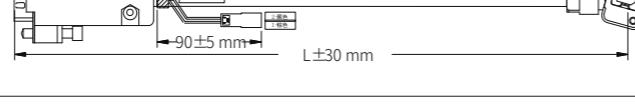
Cable type	Item code	L (mm)	Appearance
Servo motor 20/23 bit Incremental encoder (H2 / H3 encoder cable)	S6-L-P21-3.0	3,000	
	S6-L-P21-5.0	5,000	
	S6-L-P21-10.0	1,0000	
IS620P servo drive to PC communication cable	S6-L-T01-3.0	3,000	
IS620P servo drive CAN and RS485 multi-axis communication cable	S6-L-T01-0.3	300	
PLC ↔ IS620P servo drive CAN & RS485 communication cable	S6-L-T02-2.0	2,000	
IS620P Servo drive CAN & RS485 termination resistor	S6-L-T03-0.0		
IS620P Servo drive analog output (CN5) cable	S5-L-A01-1.0	1,000	
IS620N Servo drive EtherCAT communication cable	S6-L-T04-0.3	300	
	S6-L-T04-3.0	3,000	
IS620N Servo drive to PC communication cable	S6N-L-T00-3.0	3,000	
Absolute encoder battery	S6-C4		
Switch cable (When replacing MS1 with old ISMH1 / ISMH4)	S6-C23	500	
IS620 Servo Drive CN1 connector	S6-C8 (DB44)		
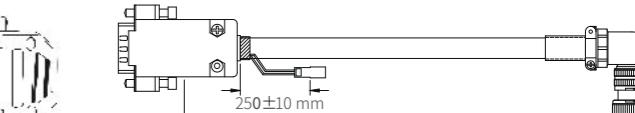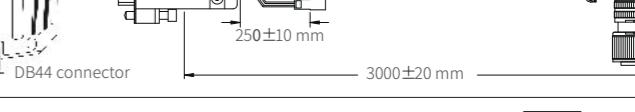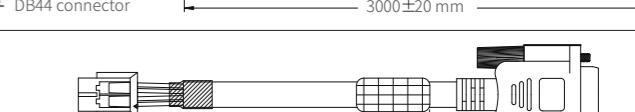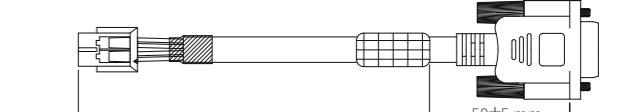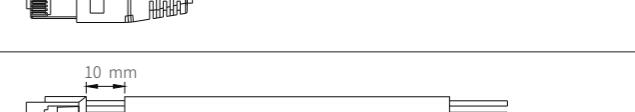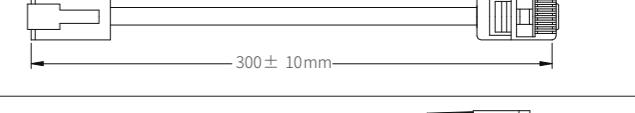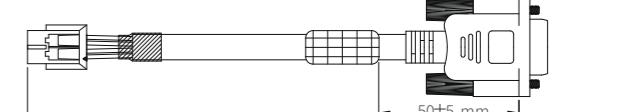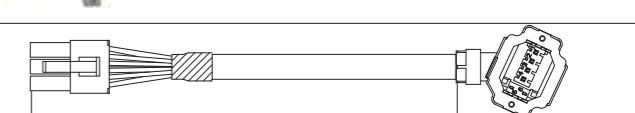
IS620 Servo Drive and Motor Selection Table

Power supply voltage	Motor frame size (mm)	Motor power (W)	Motor rated speed (RPM)	Motor rated torque (Nm)	Motor peak torque (Nm)	Motor brake	IS620 drive H x W x D (mm)	Motor model	IS620P pulse/analog drive	IS620N EtherCAT drive
Single-phase 220V	40	50	3,000	0.16	0.56		160 x 50 x 173	MS1H1-05B30CB-A330Z-INT MS1H1-05B30CB-U330Z-INT	IS620PS1R6I-INT	IS620NS1R6I-INT
		50		0.16	0.56	Brake		MS1H1-05B30CB-A332Z-INT MS1H1-05B30CB-U332Z-INT		
		100		0.32	1.12			MS1H1-10B30CB-A330Z-INT MS1H1-10B30CB-U330Z-INT		
		100		0.32	1.12	Brake		MS1H1-10B30CB-A332Z-INT MS1H1-10B30CB-U332Z-INT		
	60	200	3,000	0.64	2.24			MS1H1-20B30CB-A331Z-INT MS1H1-20B30CB-U331Z-INT		
		200		0.64	2.24	Brake		MS1H1-20B30CB-A334Z-INT MS1H1-20B30CB-U334Z-INT		
		400		1.27	4.46			MS1H1-40B30CB-A331Z-INT MS1H1-40B30CB-U331Z-INT	IS620PS2R8I-INT	IS620NS2R8I-INT
		400		1.27	4.46	Brake		MS1H1-40B30CB-A334Z-INT MS1H1-40B30CB-U334Z-INT		
		400		1.27	4.46			MS1H4-40B30CB-A331Z-INT MS1H4-40B30CB-U331Z-INT		
		400		1.27	4.46	Brake		MS1H4-40B30CB-A334Z-INT MS1H4-40B30CB-U334Z-INT		
Single-phase & Three-phase 220V	80	550	3,000	1.75	6.13		160 x 50 x 173	MS1H1-55B30CB-A331Z-INT MS1H1-55B30CB-U331Z-INT	IS620PS5R5I-INT	IS620NS5R5I-INT
		750		2.39	8.36			MS1H1-75B30CB-A331Z-INT MS1H1-75B30CB-U331Z-INT		
		750		2.39	8.36	Brake		MS1H1-75B30CB-A334Z-INT MS1H1-75B30CB-U334Z-INT		
		750		2.39	8.36			MS1H4-75B30CB-A331Z-INT MS1H4-75B30CB-U331Z-INT		
		750		2.39	8.36	Brake		MS1H4-75B30CB-A334Z-INT MS1H4-75B30CB-U334Z-INT		
Three-phase 220V	130	850	1,500	5.39	13.5		160 x 90 x 183	MS1H3-85B15CB-A331Z-INT MS1H3-85B15CB-U331Z-INT	IS620PS7R6I-INT	IS620NS7R6I-INT
		850		5.39	13.5	Brake		MS1H3-85B15CB-A334Z-INT MS1H3-85B15CB-U334Z-INT		
		1,300		8.34	20.85			MS1H3-13B15CB-A331Z-INT MS1H3-13B15CB-U331Z-INT	IS620PS012I-INT	IS620NS012I-INT
		1,300		8.34	20.85	Brake		MS1H3-13B15CB-A334Z-INT MS1H3-13B15CB-U334Z-INT		
Three-phase 220V	80	1,000	3,000	3.18	11.1		160 x 90 x 183	MS1H1-10C30CB-A331Z-INT MS1H1-10C30CB-U331Z-INT	IS620PS7R6I-INT	IS620NS7R6I-INT
	100	1,000		3.18	7.21			MS1H2-10C30CB-A331Y-INT MS1H2-10C30CB-U231Y-INT		
		1,000		3.18	7.21	Brake		MS1H2-10C30CB-A334Y-INT MS1H2-10C30CB-U234Y-INT		
		1,000	3,000	3.18	9.54			MS1H2-10C30CB-A331Y-INT MS1H2-10C30CB-U231Y-INT	IS620PS012I-INT	IS620NS012I-INT
		1,000		3.18	9.54	Brake		MS1H2-10C30CB-A334Y-INT MS1H2-10C30CB-U234Y-INT		
		1,500		4.9	12.70			MS1H2-15C30CB-A331Y-INT MS1H2-15C30CB-U231Y-INT		
		1,500		4.9	12.70	Brake		MS1H2-15C30CB-A334Y-INT MS1H2-15C30CB-U234Y-INT		

Power supply voltage	Motor frame size (mm)	Motor power (W)	Motor rated speed (RPM)	Motor rated torque (Nm)	Motor peak torque (Nm)	Motor brake	IS620 drive H x W x D (mm)	Motor model	IS620P pulse/analog drive	IS620N EtherCAT drive
Three-phase 40 0 V	130	850	1,500	5.39	13.5		160 x 90 x 183	MS1H3-85B15CD-A331Z-INT MS1H3-85B15CD-U331Z-INT	IS620PT3R5I-INT	IS620NT3R5I-INT
		850		5.39	13.5	Brake		MS1H3-85B15CD-A334Z-INT MS1H3-85B15CD-U334Z-INT		
		1,300		8.34	20.85			MS1H3-13C15CD-A331Z-INT MS1H3-13C15CD-U331Z-INT	IS620PT5R4I-INT	IS620NT5R4I-INT
		1,300		8.34	20.85	Brake		MS1H3-13C15CD-A334Z-INT MS1H3-13C15CD-U334Z-INT		
		1,800		11.5	28.75			MS1H3-18C15CD-A331Z-INT MS1H3-18C15CD-U331Z-INT	IS620PT8R4I-INT	IS620NT8R4I-INT
		1,800		11.5	28.75	Brake		MS1H3-18C15CD-A334Z-INT MS1H3-18C15CD-U334Z-INT		
	180	2,900		18.6	37.2		250 x 100 x 230	MS1H3-29C15CD-A331Z-INT MS1H3-29C15CD-U231Z-INT	IS620PT012I-INT	IS620NT012I-INT
		2,900		18.6	37.2	Brake		MS1H3-29C15CD-A334Z-INT MS1H3-29C15CD-U234Z-INT		
		4,400		28.4	71.1			MS1H3-44C15CD-A331Z-INT MS1H3-44C15CD-U231Z-INT	IS620PT017I-INT	IS620NT017I-INT
		4,400		28.4	71.1	Brake		MS1H3-44C15CD-A334Z-INT MS1H3-44C15CD-U234Z-INT		
		5,500		35	87.6			MS1H3-55C15CD-A331Z-INT MS1H3-55C15CD-U231Z-INT	IS620PT021I-INT	IS620NT021I-INT
		5,500		35	87.6	Brake		MS1H3-55C15CD-A334Z-INT MS1H3-55C15CD-U234Z-INT		
		7,500		48	119			MS1H3-75C15CD-A331Z-INT MS1H3-75C15CD-U231Z-INT	IS620PT026I-INT	IS620NT026I-INT
		7,500		48	119	Brake		MS1H3-75C15CD-A334Z-INT MS1H3-75C15CD-U234Z-INT		
Three-phase 400 V	100	1,000	3,000	3.18	9.54		160 x 90 x 183	MS1H2-10C30CD-A331Y-INT MS1H2-10C30CD-U231Y-INT	IS620PT5R4I-INT	IS620NT5R4I-INT
		1,000		3.18	9.54	Brake		MS1H2-10C30CD-A334Y-INT MS1H2-10C30CD-U234Y-INT		
		1,500		4.9	14.7			MS1H2-15C30CD-A331Y-INT MS1H2-15C30CD-U231Y-INT		
		1,500		4.9	14.7	Brake		MS1H2-15C30CD-A334Y-INT MS1H2-15C30CD-U234Y-INT		
		2,000		6.36	19.1			MS1H2-20C30CD-A331Y-INT MS1H2-20C30CD-U231Y-INT	IS620PT8R4I-INT	IS620NT8R4I-INT
		2,000		6.36	19.1	Brake		MS1H2-20C30CD-A334Y-S4-INT MS1H2-20C30CD-U234Y-S4-INT		
		2,500		7.96	23.90			MS1H2-25C30CD-A331Y-INT MS1H2-25C30CD-U231Y-INT		
		2,500		7.96	23.90	Brake		MS1H2-25C30CD-A334Y-S4-INT MS1H2-25C30CD-U234Y-S4-INT		
	130	3,000		9.8	29.4		250 x 100 x 230	MS1H2-30C30CD-A331Y-INT MS1H2-30C30CD-U231Y-INT	IS620PT012I-INT	IS620NT012I-INT
		3,000		9.8	29.4	Brake		MS1H2-30C30CD-A334Y-S4-INT MS1H2-30C30CD-U234Y-S4-INT		
		4,000		12.6	37.8			MS1H2-40C30CD-A331Y-INT MS1H2-40C30CD-U231Y-INT	IS620PT017I-INT	IS620NT017I-INT
		4,000		12.6	37.8	Brake		MS1H2-40C30CD-A334Y-S4-INT MS1H2-40C30CD-U234Y-S4-INT		
		5,000		15.8	47.6			MS1H2-50C30CD-A331Y-INT MS1H2-50C30CD-U231Y-INT		
		5,000		15.8	47.6	Brake		MS1H2-50C30CD-A334Y-S4-INT MS1H2-50C30CD-U234Y-S4-INT		