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MOTION & CONTROL
NSK

Megatorque Motors®

YSB Series

Significantly enhanced functionality at a low cost, absolute sensor to omit Homing as standard feature and freely interchangeable motors and driver units to support random matching.

New!



High Performance & Low-Cost

NSK, already recognized for introducing low-priced direct drive motors, has launched a new Megatorque Motor Series with enhanced functions whilst still maintaining a low cost.
The YSB Series Megatorque Motor is suitable for a variety of industrial applications, including indexers in production equipment, semiconductor manufacturing and transportation equipment. Most notably, the Megatorque Motor has an absolute sensor to omit Homing as standard equipment. In addition, the Megatorque Motor makes the functional improvement of random matching of motors and driver units to cut down the number of assembling steps and production management costs, as well as many other features that combine to reduce costs while increasing production efficiency.
NSK proudly introduces the YSB Series Megatorque Motor, providing customers with sophisticated functions at low prices.





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Features of YSB Series Megatorque Motor

Point 1: Direct Drive

The Megatorque Motor is capable to drive the load directly without using a mechanical speed reducer, and accordingly, it realizes highly accurate positioning without backlash and lost motion. A Megatorque Motor is a servomotor that equips a position detector to form full closed loop control.

Point 2: High Accuracy

The YSB Series Megatorque Motor incorporates a high-resolution position detector (resolver) that features 819 200 pulses/revolution. This contributes to an exceptionally precise repeatability of ±1.6 arc seconds.

Point 3: High Reliability

The Megatorque Motor is a brushless motor and does not use permanent magnets in its simple construction. It is equipped with a highly rigid and accurate roller bearing (crossed roller bearing), which is packed with lubrication grease, thus offering highly reliable and long-term maintenance-free operation.

Point 4: Highly Functional Driver Unit

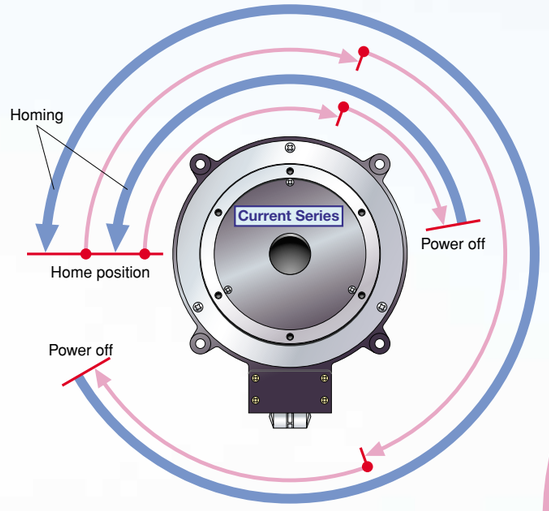
The YSB Series Megatorque Motor constitutes a system in combination with an ESB Driver Unit for a digital servo control incorporating a 32-bit microprocessor.
The ESB Driver Unit has a number of command inputs necessary for motion control, thus permitting its connection with sequencers, a variety of positioning controllers and personal computers, etc. In addition, acceleration profiling and networking functions through various field buses are available.

Point 5: Include Absolute Position Detector as Standard Equipment

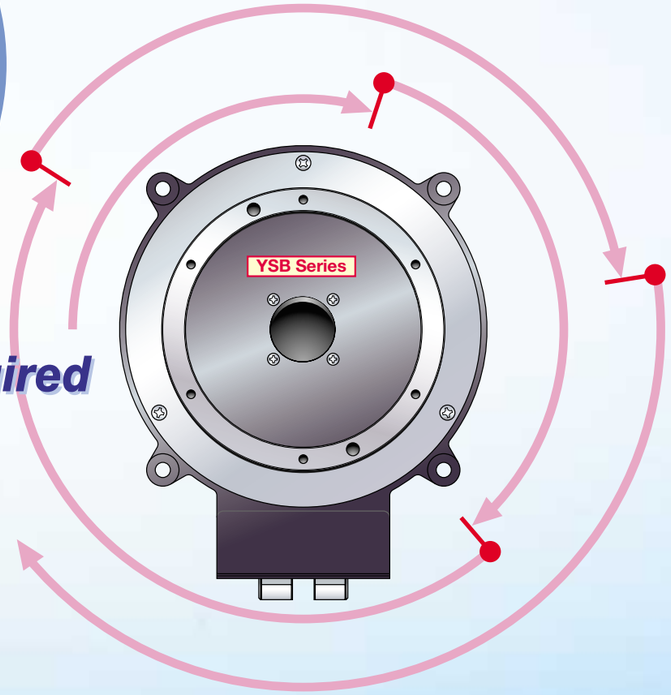
The YSB Series Megatorque Motor has an absolute position detector as standard equipment. This contributes to eliminate the troublesome Homing and thus improves productivity. Additionally, the motors and the Driver Units can be randomly matched as a pair. Cable can be freely selected up to lengths of 30m.

Point 6: Conformity to the International Safety Regulations

The Megatorque Motor systems conform to the EC Directives (CE Marking) and Underwriters' Laboratory (UL) regulations.

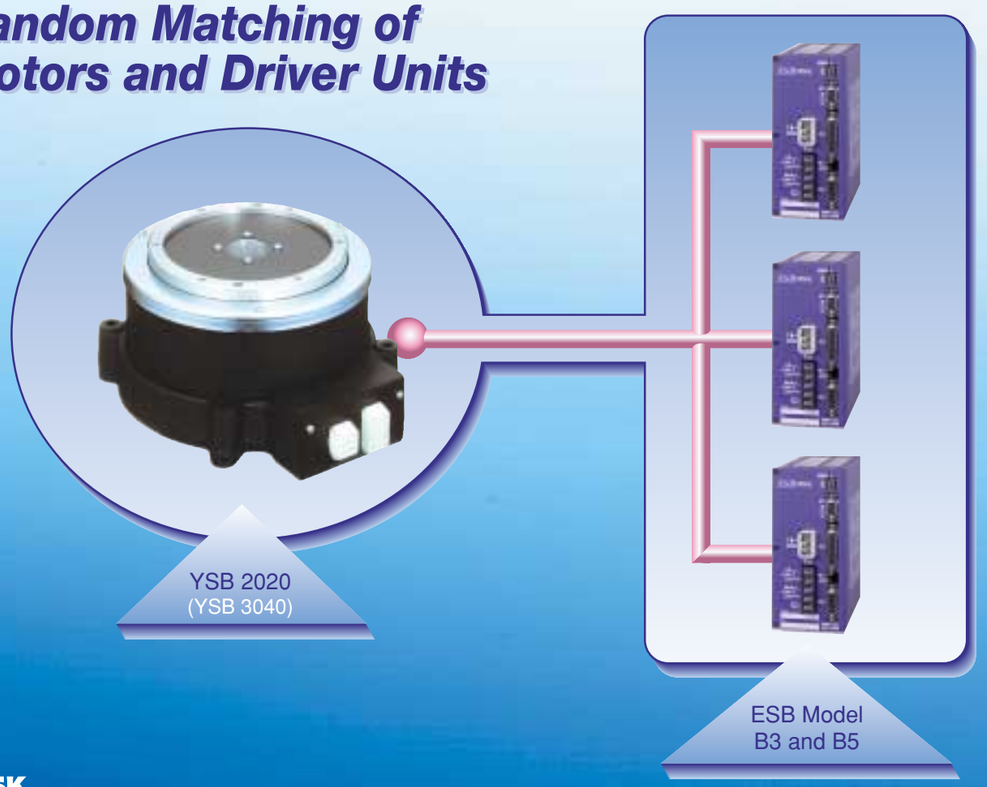


New / Standard Feature
Absolute Sensor



No Homing Required

New
Random Matching of Motors and Driver Units



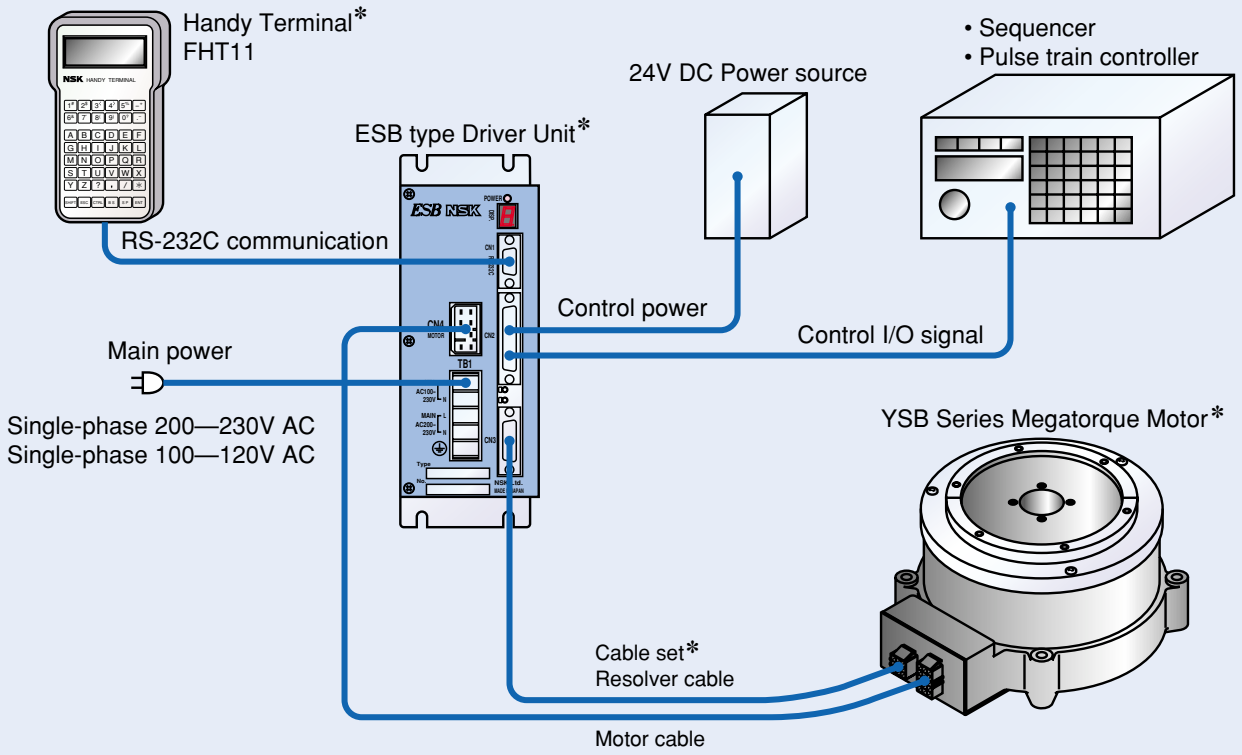
New / An Optional Function
Field Bus for Open Network



YSB Series Megatorque Motor

1. System Configuration

1.1 System Configuration

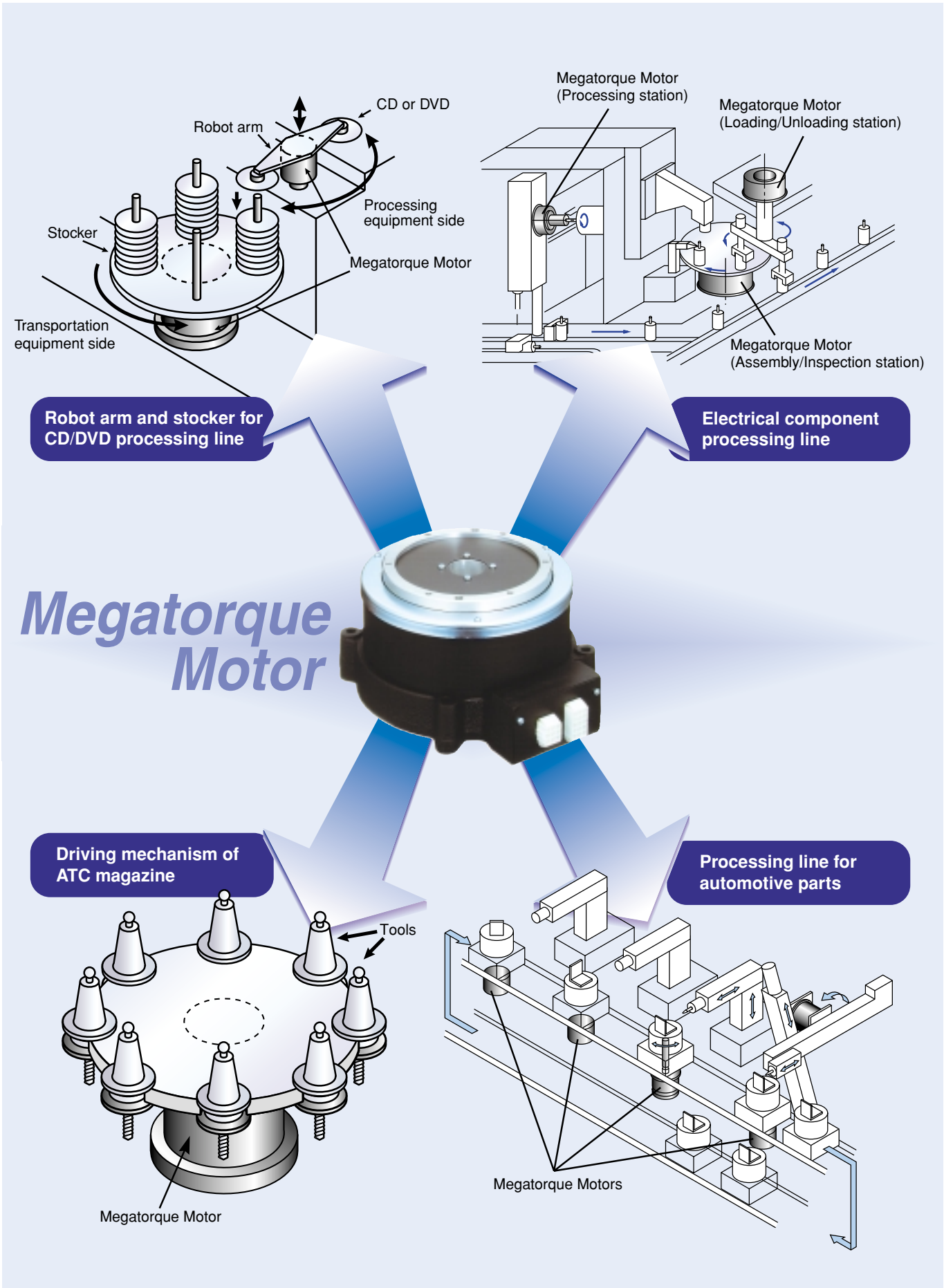


* Provided by NSK.

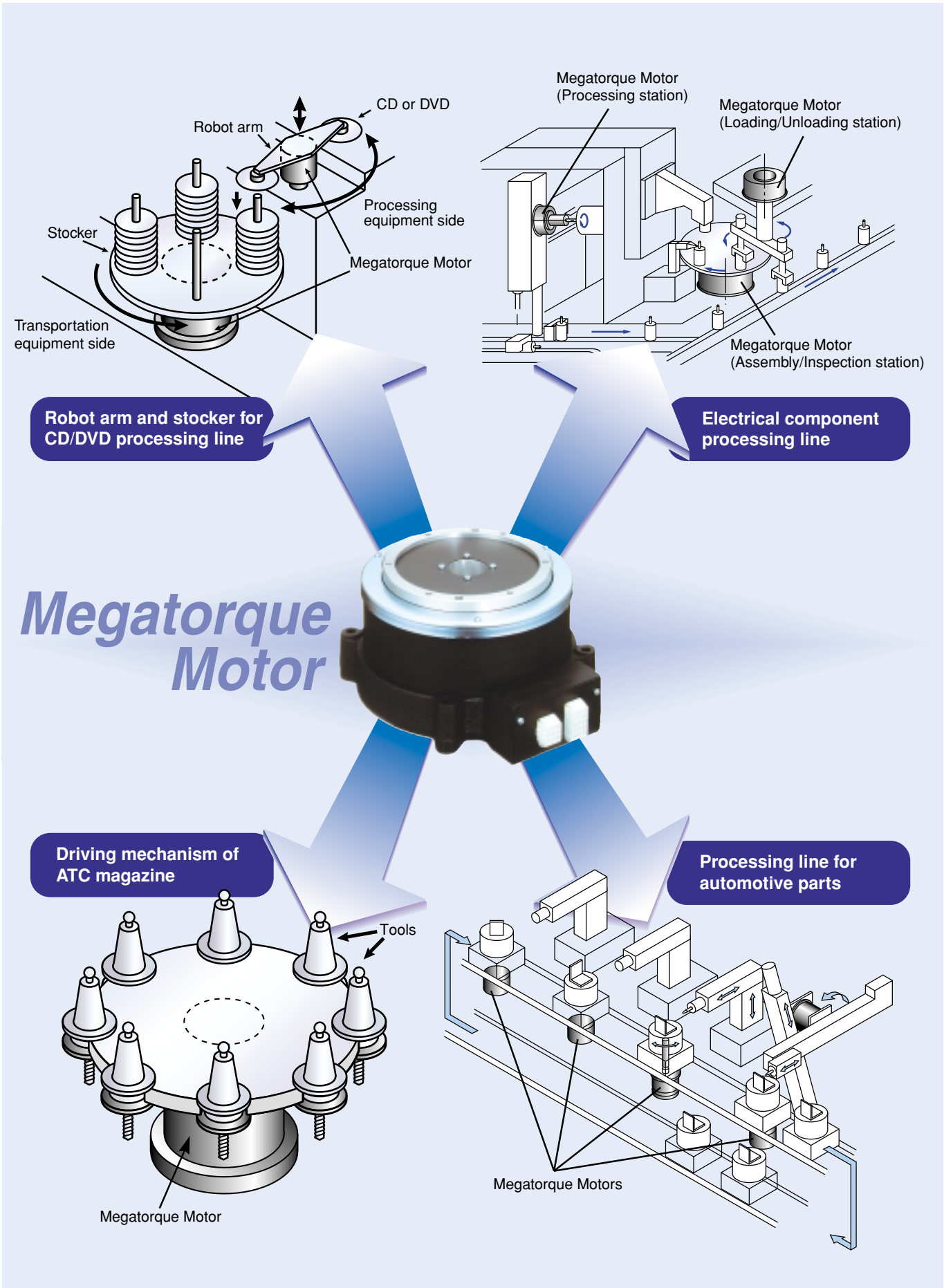
1.2 Application

Classification	Application	Features and Main Reason for Incorporation					
		High Accuracy	High Speed	High Rigidity	Compactness	Cleanliness	Maintenance Free
Semiconductor manufacturing equipment	CVD, Wafer washing, Ion implanting	✓			✓	✓	✓
	Wafer polishing, CMP etc				✓	✓	✓
	Semiconductor transportation/ Inspection/Processing	✓			✓	✓	✓
LCD manufacturing equipment	LCD transportation/Inspection/ Processing	✓	✓		✓	✓	✓
Assembly machines	Electric component assembly machines	✓	✓		✓	✓	✓
	Electronic component high speed assembly machines	✓	✓		✓	✓	✓
	Automotive parts assembly machines		✓				✓
	Various assembly machines	✓	✓		✓		✓
Machine tools	Tool rest feeding and ATC magazines		✓		✓		✓
Inspection/Testing apparatus	Machinery parts inspection	✓			✓		✓
	Electric component inspection	✓			✓		✓
	Optical component inspection	✓			✓		✓
	Liquid medicine inspection	✓			✓		✓
	Various inspection/Testing apparatus	✓			✓		✓
Robots	Various assembly robots	✓	✓	✓	✓		✓
	Various transportation robots	✓	✓				✓
	Inspection/Transportation robot in clean rooms	✓	✓		✓	✓	✓
Transportation	Various work transportation equipment	✓	✓		✓		✓

1.2.1 Examples of Application



1.2.1 Examples of Application



2. Megatorque Motors



YSB 2020



YSB 3040

2.1 Configuration of Motor Reference Number

Example of Reference Number: **M-YSB 2 020 K N 001**

- M-YSB: YSB Series Megatorque Motor
- 2: Motor size code
- 020: Maximum output torque (N•m)
- K: Standard (Incorprates absolute position sensor.)
  J: Optional (Incorporates incremental position sensor.)(2)
- N: No brake
- 001: Design serial number

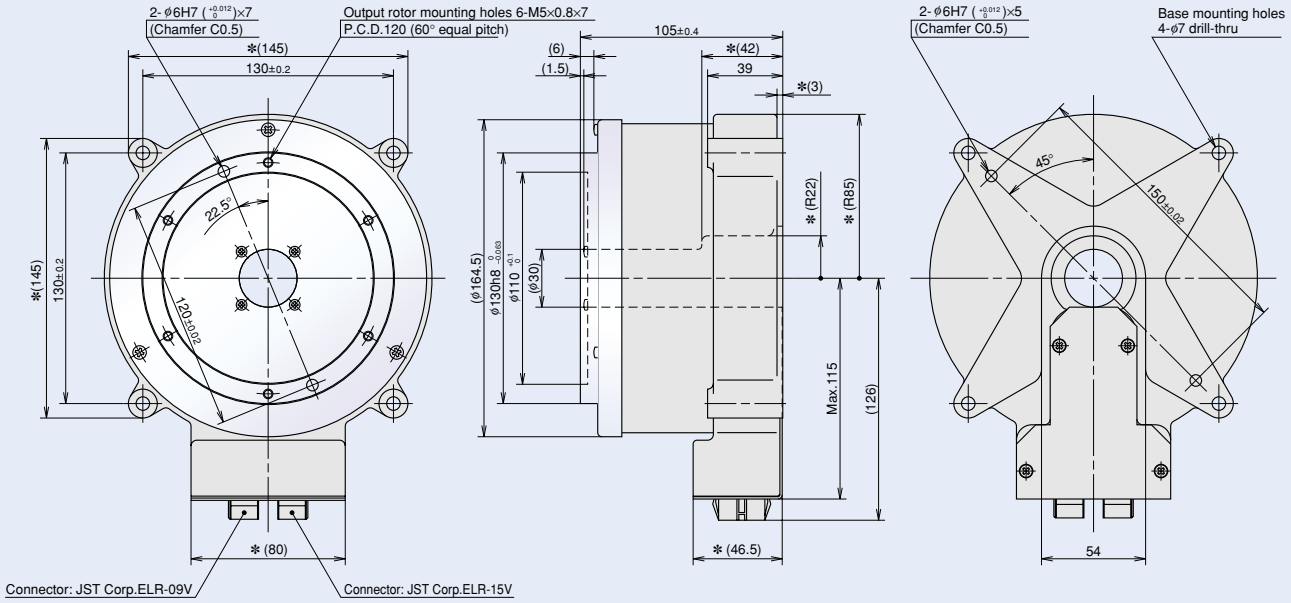
2.2 Motor Specifications

Functional Item (Unit) \ Motor Reference Number		M-YSB2020KN001	M-YSB3040KN001
Maximum output torque	(N•m)	20	40
Maximum current	(A)	6	6
Maximum rotational speed (1)	(s^{-1})	3	3
Resolution of position sensor	(pulse/r)	819 200	819 200
Absolute positioning accuracy	(sec)	150	150
Repeatability	(sec)	±1.6	±1.6
Allowable axial load	(N)	3 700	4 500
Allowable moment load	(N•m)	60	80
Mass	(kg)	10	16
Environmental conditions		Ambient temperature 0-40°C, Humidity: 20-80%, Use indoors, free from dust, condensation and corrosive gas. IP30 equivalent.(3)	

Notes:
(1) Consult with NSK if the motor rotates in one direction continuously at a high speed exceeding 2 (s^{-1}), or oscillates in very minute angle. Keep the flatness of motor mounting surface 0.02 mm or less, and mount the jigs so that its center gravity is not off the rotation axis of the motor. Othewise it will adversely affect on the life of the motor.
(2) A motor equipped with an incremental position sensor is also available. Please consult with NSK.
(3) IP30 is defined as below in a regulation of IEC 52. (International Electronics Commission)
First digit following IP indicates the protection grade against the solids. The number 3 means the protection against penetration of a solid of 2.5 mm or larger into an enclosure. The second digit indicates a protection grade. The number 0 means there is no protection against water.

2.3 Dimensions of Standard Motor

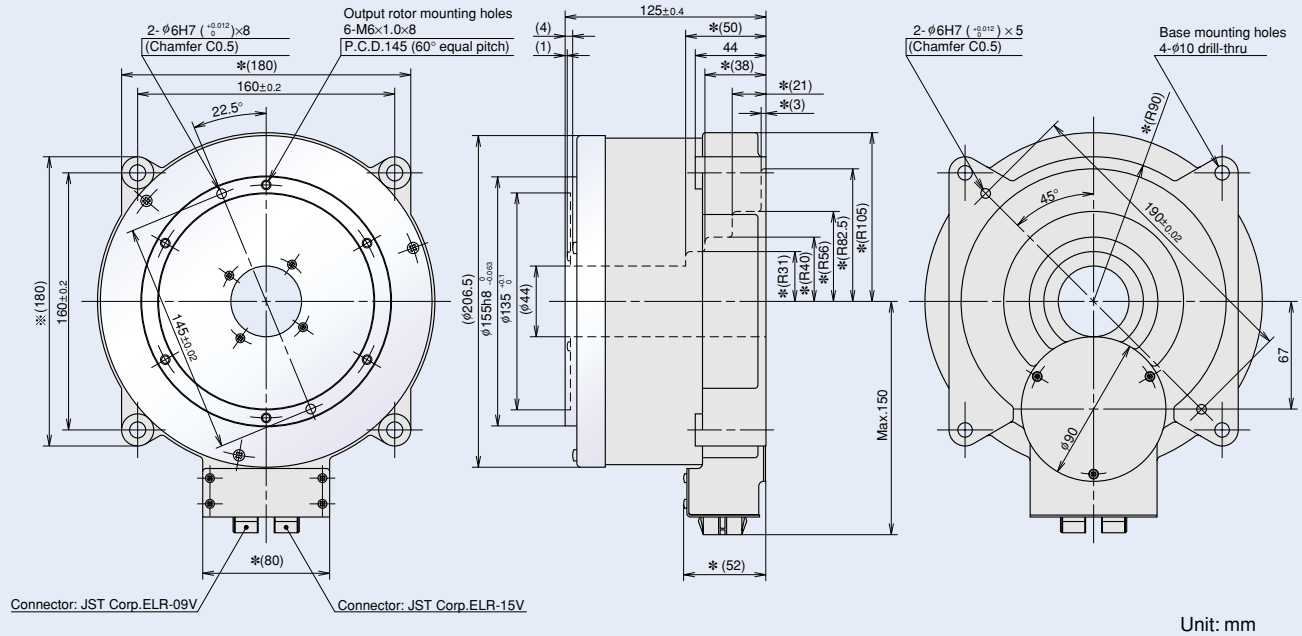
YSB2020 equipped with absolute position sensor



Unit: mm

For the dimensions marked ✻, an extra 2–3 mm margin is required for your workspace due to their variations.

YSB3040 equipped with absolute position sensor



Unit: mm

For the dimensions marked ✻, an extra 2–3 mm margin is required for your workspace due to their variations.

3. ESB Type Driver Units



ESB Model B3



ESB Model B5

3.1 Configuration of Driver Unit Reference Number

Example of Reference Number: **M-ESB – YSB2020 A B 3 00**

- M-ESB: ESB type Driver Unit
- YSB2020: Motor size code
- A: Main power voltage A: 200–230V AC (single-phase); C: 100–110V AC (single-phase)
- B: Specification of position sensor 2: Incorporates incremental position sensor; B: Incorporates absolute position sensor
- 3: Function 3: Standard (Max. 16 channels); 5: Increase program capacity (64 channels) Analog velocity command available; A: Device Net; B: PROFIBUS; C: CC-Link
- 00: Design serial number 00: Pulse train input (Photo coupler); 01: Pulse train input (Line receiver)

3.2 Driver Unit Specifications

3.2.1 Standard Model (ESB Model B3)

Position command		Internal Program, Pulse Train Input, RS-232C Communication	
Input signal	Pulse train input	Maximum frequency: 819.2 Kpps	
	Control input	Input pulse format: CW/CCW, Pulse and direction, or Quadrature ϕA/ϕB	
Output signal	Position feedback signal (1)	Output format: Line driver (Only ϕZ can be switched to open collector)	
	Control output	Driver Unit ready, In position, Brake control, Velocity threshold, Target proximity/In target area	
Alarms		Excess position error, Software thermal, CPU error, Position sensor error, Over current, Over heat, Main AC line trouble, Control AC line under voltage	
Monitoring function		Analog velocity monitor, Alarm status, RS-232C communication monitor (Parameters, program contents, position data, and alarm status)	
Communication		RS-232C serial communication, Baud rate: 9600 bps.	
Others		Automatic gain adjustment by RS-232C communication command (Automatic tuning) Programmed acceleration profiling (2) (Modified sine, modified trapezoid, cycloid and arc patterns)	
Main power voltage		200-230V AC, ±10%, Single-phase 50/60 Hz	100-110V AC, ±10%, Single-phase 50/60 Hz
Main power capacity		YSB2020: 1.0KVA	YSB2020: 0.7KVA
		YSB3040: 1.2KVA	YSB3040: 0.9KVA
Environmental condition		Operating temperature: 0–40°C, Humidity: 20–90%, Use indoors. Free from dust, condensation, and corrosive gas.	

3.2.2 Optional Functions

Option

Increased program capacity	Internal program 64 channels
Analog velocity command (Analog torque command)	±10V analog command
Compatible to field bus (3)	CC-Link (4), PROFIBUS, DeviceNet (5)

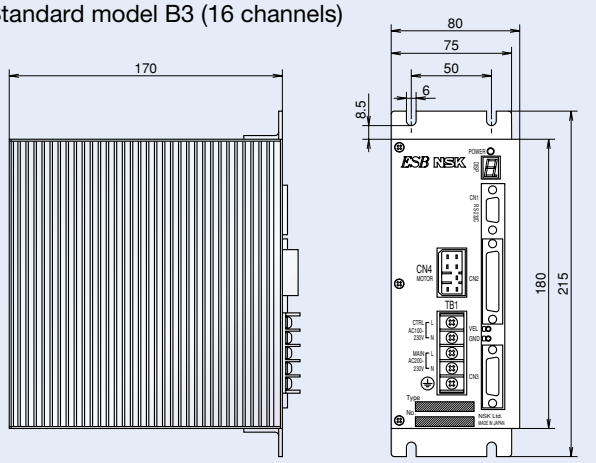
Notes:
(1) Resolution of the position feedback signal is 51 200 (pulse/r).
(2) Function of programmed cam profile acceleration is not available for the field bus specifications.
(3) Detailed consultation with NSK is separately required for the field bus specifications.
(4) CC-Link is the registered trademark of CC-Link Association.
(5) DeviceNet is the registered trademark of Open DeviceNet Vendor Association Incorporated.

3.3 ESB Model B3 Driver Unit



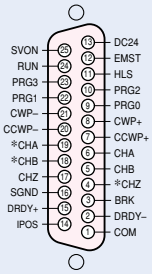
Dimensions of Driver Unit

Standard model B3 (16 channels)



Unit: mm

3.3.1 Input/Output Signal Specifications of CN2 Connector



Input/Output	Signal Code	Pin No.	Signal Name	Function
Imput signal	CWP+	8	CW pulse train (+)	The motor rotates clockwise by the pulse train input.(1) (This part can be a direction or a ϕB signal.)
	CWP–	21	CW pulse train (–)	
	CCWP+	7	CCW pulse train (+)	The motor rotates counterclockwise by the pulse train input.(1) (This part can be a pulse train or a ϕA signal.)
	CCWP–	20	CCW pulse train (–)	
	EMST	12	Emergency stop	Stops the motor and locks the servo.
	SVON	25	Servo on	This signal sets the motor servo on state.
	PRG0	9	Internal program • channel selection 0(2)	A combination of ON and OFF of these 0–3 signals selects a channel (0–15) to execute its internal program.
	PRG1	22	Internal program • channel selection 1(2)	
	PRG2	10	Internal program • channel selection 2	
	PRG3	23	Internal program • channel selection 3	
	HLS	11	Home position limit switch	After a start of Homing, an activation of this signal completes the Homing.
	RUN	24	Positioning start	Start the internal program of selected channel.
	DC24	13	External power supply	External power supply for the input signals (DC24V, 0.2A or over)
Output signal	CHA	6	Position feedback signal ϕA	Pulse signals indicate a rotational speed of the motor. Output format is line driver. (A jumper can switch ϕZ signal only to the open collector format.)
	CHB	5	Position feedback signal ϕB	
	CHZ	17	ϕZ/Digital position signal MSB	
	*CHA	19	Position feedback signal *ϕA	Reversed output of position feedback signal
	*CHB	18	Position feedback signal *ϕB	
	*CHZ	4	*ϕZ/Digital position signal MSB	
	SGND	16	Signal ground	Ground connection for position feedback signal.
	DRDY+	15	Driver Unit ready (+)	This signal notifies that the Driver Unit is ready for operation. (This signal opens when the Driver Unit is not ready or an alarm is given.)
	DRDY–	2	Driver Unit ready (–)	
	IPOS	14	Positioning completed	This signal notifies a completion of positioning.
	BRK	3	Brake control signal	Output of brake signal (Normally closed)(3)
	COM	1	Output signal, common	Common for position complete and brake control signals

Notes:
(1) When looking at the motor from the rotor side.
(2) These 2 signals can be switched to the following signals by the setting of a parameter.
(3) These signals can be switched to the signals outlined below by the setting of parameters.
SPD: Velocity output, NEAR: Target proximity/In target area, OVER: Warning.

Input/Output	Signal Code	Pin No.	Signal Name	Function
Imput signal	JOG	9	Jog	Starts jog.
	DIR	22	Setting rotational direction	This signal is to set the rotational direction of jog.

Imput signal	OTP	9	Overtravel limit switch (+)	Overtravel input signal for clockwise rotation
	OTM	22	Overtravel limit switch (–)	Overtravel input signal for counterclockwise rotation

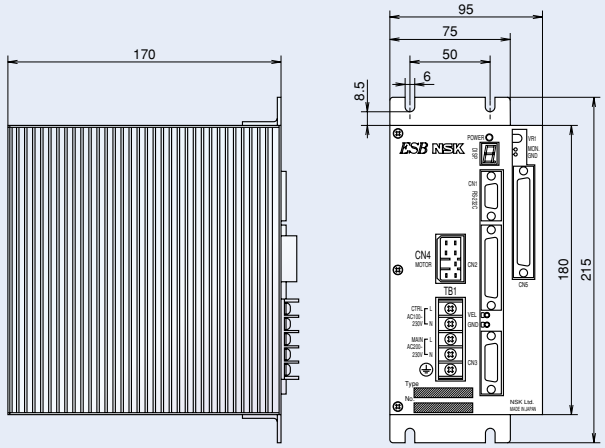
Option

3.4 ESB Model B5 Driver Unit (Option)



Dimensions of Driver Unit

Model B5 (Increased in program capacity)



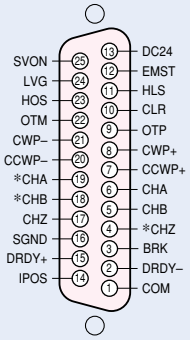
Unit: mm

3.4.1 Input/Output Signal Specifications of CN2 Connector

Input/Output	Signal Code	Pin No.	Signal Name	Function
Input signal	CWP+	8	CW pulse train (+)	The motor rotates clockwise by the pulse train input. (This part can be a direction or signal B.)
	CWP–	21	CW pulse train (–)	
	CCWP+	7	CCW pulse train (+)	The motor rotates counterclockwise by the pulse train input. (This part can be a pulse train or a ϕA signal by switching.)
	CCWP–	20	CCW pulse train (–)	
	EMST	12	Emergency stop	Stops the motor and locks the servo.
	SVON	25	Servo on	This signal sets the motor servo on state.
	HLS	11	Home position limit switch	After Homing starts, this signal's activation completes the Homing.
	CLR	10	Clear input	This signal clears alarm state and errors in the position error counter.
	LVG	24	Lower gain	Switches lowering gain function ON and OFF.
	OTP	9	Overtravel limit (+)	Overtravel limit input for clockwise rotation
	OTM	22	Overtravel limit (–)	Overtravel limit input for counterclockwise rotation
	HOS	23	Start homing	To be used for Homing
	DC24	13	External power supply	External power supply for the input signals (DC24V, 0.2A or over)
Output signal	CHA	6	Position feedback signal ϕA	Pulse signals indicate a rotational speed of the motor. Output format is line driver. (A jumper can switch ϕZ signal only to the open collector format.)
	CHB	5	Position feedback signal ϕB	
	CHZ	17	ϕZ/Digital position signal MSB	
	✻CHA	19	Position feedback signal ✻ϕA	Reversed output of position feedback signal
	✻CHB	18	Position feedback signal ✻ϕB	
	✻CHZ	4	✻ϕZ/Digital position signal MSB	
	SGND	16	Signal ground	Ground connection for position feedback signal
	DRDY+	15	Driver Unit ready (+)	This signal notifies that the Driver Unit is ready for operation. (This signal opens when the Driver Unit is not ready or an alarm is given.)
	DRDY–	2	Driver Unit ready (–)	
	IPOS	14	Positioning completed	This signal notifies a completion of positioning.
	BRK	3	Brake control signal	Output signal of brake control (Normally closed)
	COM	1	Output signal, common	Common for position complete and brake control signals

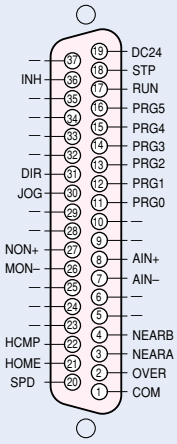
CN2

CN2 Pin out



CN5

CN5 Pin out



3.4.2 Input/Output Signal Specifications of CN5 Connector

Input/Output	Signal Code	Pin No.	Signal Name	Function
Input signal	DC24	19	External power supply	Power supply for input signals (DC24V, 0.2A or over)
	STP	18	Positioning stop	Interrupts positioning
	RUN	17	Positioning start	Starts an internal program of selected channel.
	PRG0	11	Internal program•Channel selection 0	A combination of ON and OFF of these 0–5 signals selects a channel (0–64) to execute its internal program.
	PRG1	12	Internal program•Channel selection 1	
	PRG2	13	Internal program•Channel selection 2	
	PRG3	14	Internal program•Channel selection 3	
	PRG4	15	Internal program•Channel selection 4	
	PRG5	16	Internal program•Channel selection 5	
	JOG	30	Jog	Starts jog.
	DIR	31	Jog direction	Sets direction of jog.
	AIN+	8	Analog command input	Input port for velocity or torque analog command when specified
	AIN–	7	Ground of analog command input	
	INH	36	External command prohibited	Prohibits accepting the pulse train input or analog input command.
Output signal	MON+	27	Analog monitor output	Analog output to monitor controlled status of the motor
	MON–	26	Monitor output ground	Ground for the monitor output
	HCMP	22	Home position established	This signal notifies that the home position is fixed.
	HOME(2)	21	Homing completed/Tell home position	Reports completion of homing or home position.
	SPD	20	Velocity threshold	Reports motor speed.
	COM	1	Control output common	Common for control output signal
	OVER	2	Warning	This output closes when a warning is given.
	NEARA(1)	3	Target proximity/In target area A	Reports the motor is approaching the target or the motor is in the target area.
	NEARB(1)	4	Target proximity/In target area B	

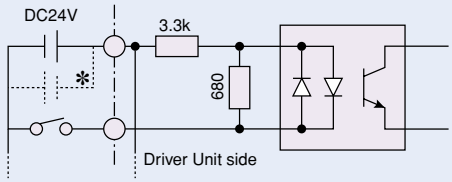
Notes:
(1) You may select “Target proximity” or “In target area” by setting a parameter.
(2) You may select “Homing completed” or “Tell home position” by setting a parameter.

3.5 Electrical Specifications of CN2 and CN5 Connectors

● General Inputs

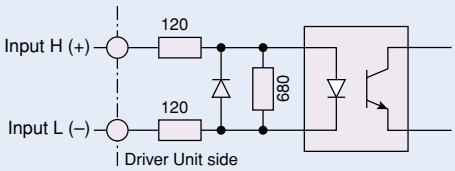
Input voltage	24V DC±10%
Impedance	3.3kΩ
Input current	10 mA or less (per port)

Note:
✻ Can be used as a minus common.



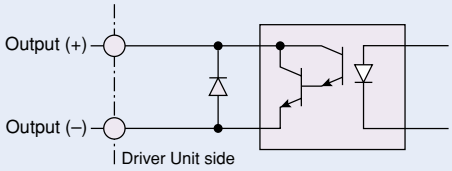
● Pulse Train Inputs

Input voltage	5V DC±10%
Impedance	240Ω
Input current	25 mA or less



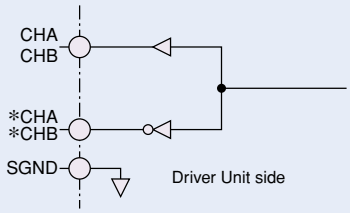
● General Outputs

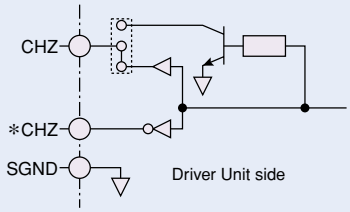
Maximum switching capacity	24V DC/50mA
Saturation voltage	2V or less



● Position Feedback Signals

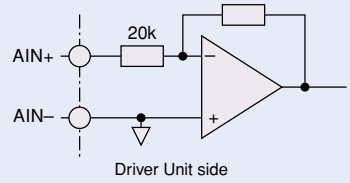
Output format	• CHA, ✻CHA, CHB, ✻CHB, Line driver • CHA, ✻CHA, CHB, ✻CHB, Line driver or open collector	
Driver used	Texas Instruments Inc. SN75ALS912	
Recommendable line receiver	Texas Instruments Inc. SN75ALS193 or AM26LS32 equivalent	
Maximum collector current	100 mA	At open collector format
Maximum collector voltage	24V DC	
Saturation voltage	1V or less	





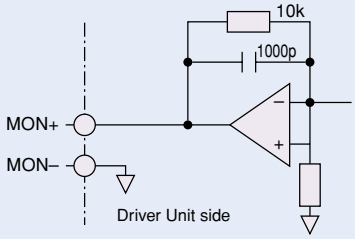
● Analog Command Inputs

Maximum input voltage	±10V DC
Impedance	20kΩ
Maximum input current	0.5mA



● Analog Monitor Outputs

Output format	Operation amplifier output
Maximum output voltage	±10V±10%
Saturation current	4 mA or less



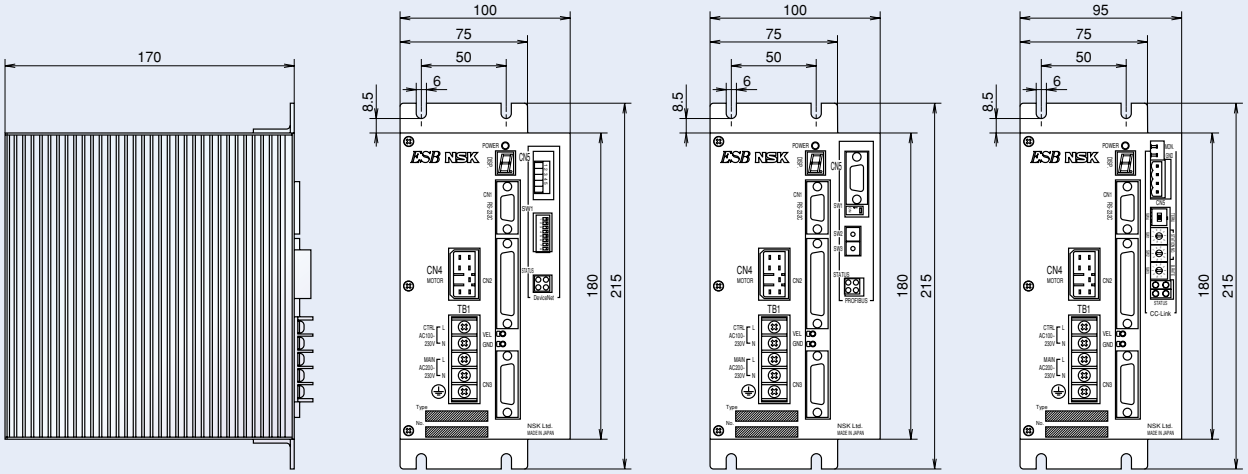
3.6 Field Bus Specifications (Option)

Option

Compatibility to the field bus contributes to the networking user's production equipment and cost reduction.



DeviceNet PROFIBUS CC-Link



Unit: mm

3.6.1 Features of ESB Model BC Driver Unit (CC-Link)

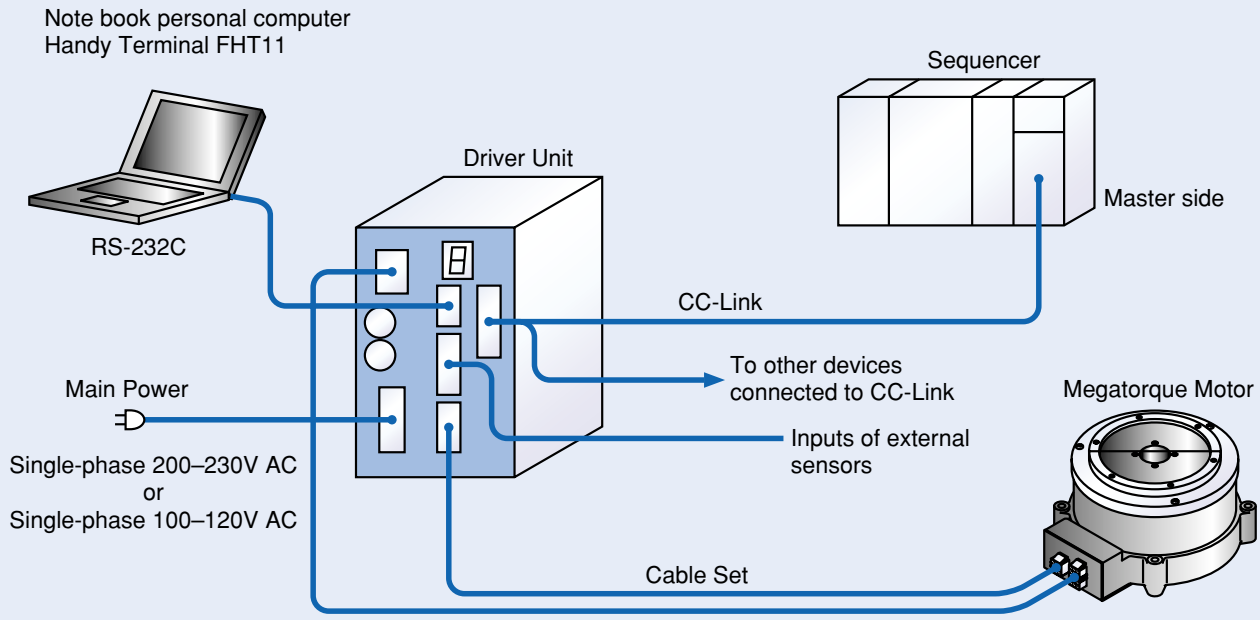
Option

- ESB Driver Unit of Megatorque Motor System provides the field bus (CC-Link) compatibility.
- You can set station numbers and the baud rate with the switches provided on the Driver Unit's front panel.
- Monitoring communication status by LED and setting of the terminating resistor are available.
- The ESB Driver Units are compatible with CC-Link Ver. 1.10.

3.6.2 CC-Link Specifications

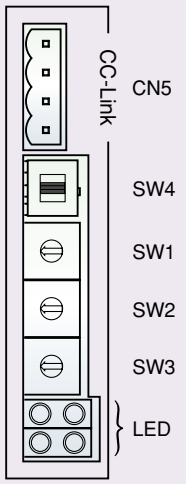
CC-Link station specification			Remote device station (Exclusive station: 1)
Positioning command			Internal programmed operation via CC-Link or RS-232C communication
Input signal	Control input	CN2	Emergency stop, Home position limit switch, Overtravel limit switch (CW, CCW)
		CC-Link (CN5)	Emergency stop, Servo on, Internal program start, Homing start, Clear, Jog, Jog direction, Internal program channel select, Velocity change
Output signal	Control output	CN2	Driver Unit ready, Positioning completed, Brake control
		CC-Link (CN5)	Driver Unit ready, Positioning completed, Brake control, Home position established, Processing internal pulse, Warning, Target proximity/In target area output A and B, Selected channel number
Alarms			Excess position error, Software thermal, CPU error, Position sensor error, Over current, Over heat, Main AC line trouble, Control AC line under voltage
Monitoring function			Alarm status, Analog velocity monitor, Alarm status, RS-232C communication monitor (Parameters, program contents, position data, and alarm status)
Communication			Serial RS-232C communication: Baud rate 9600 bps CC-Link communication: Baud rate: 156k/625k/2.5M/5M/10Mbps Station number: 1–64 Terminating resistor: None/110Ω/130Ω

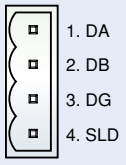
3.6.3 CC-Link System Configuration



Option

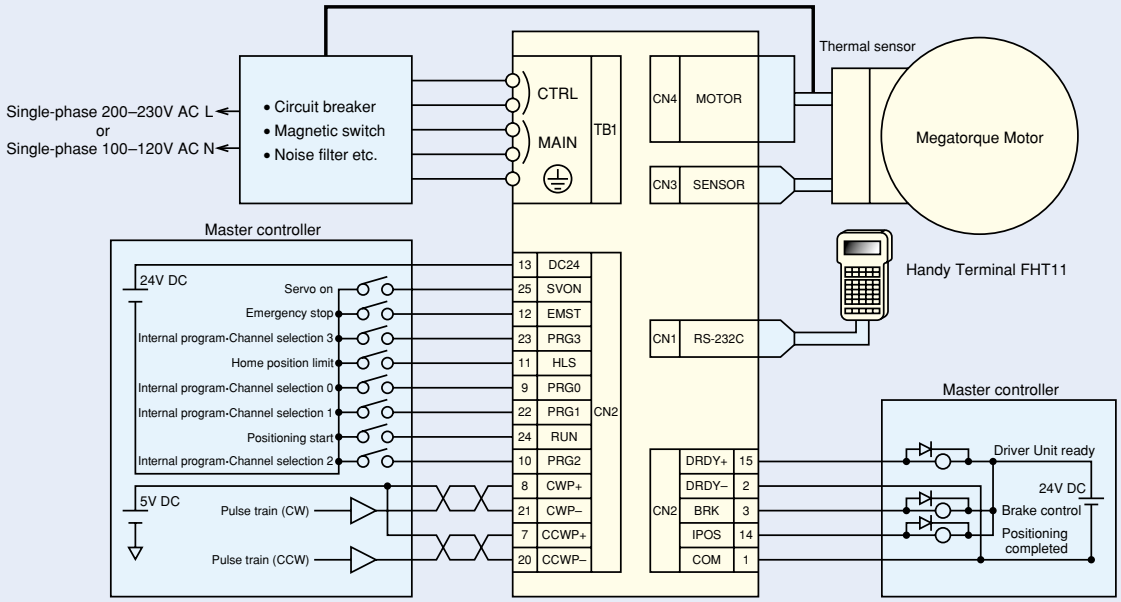
3.6.4 CC-Link Interface



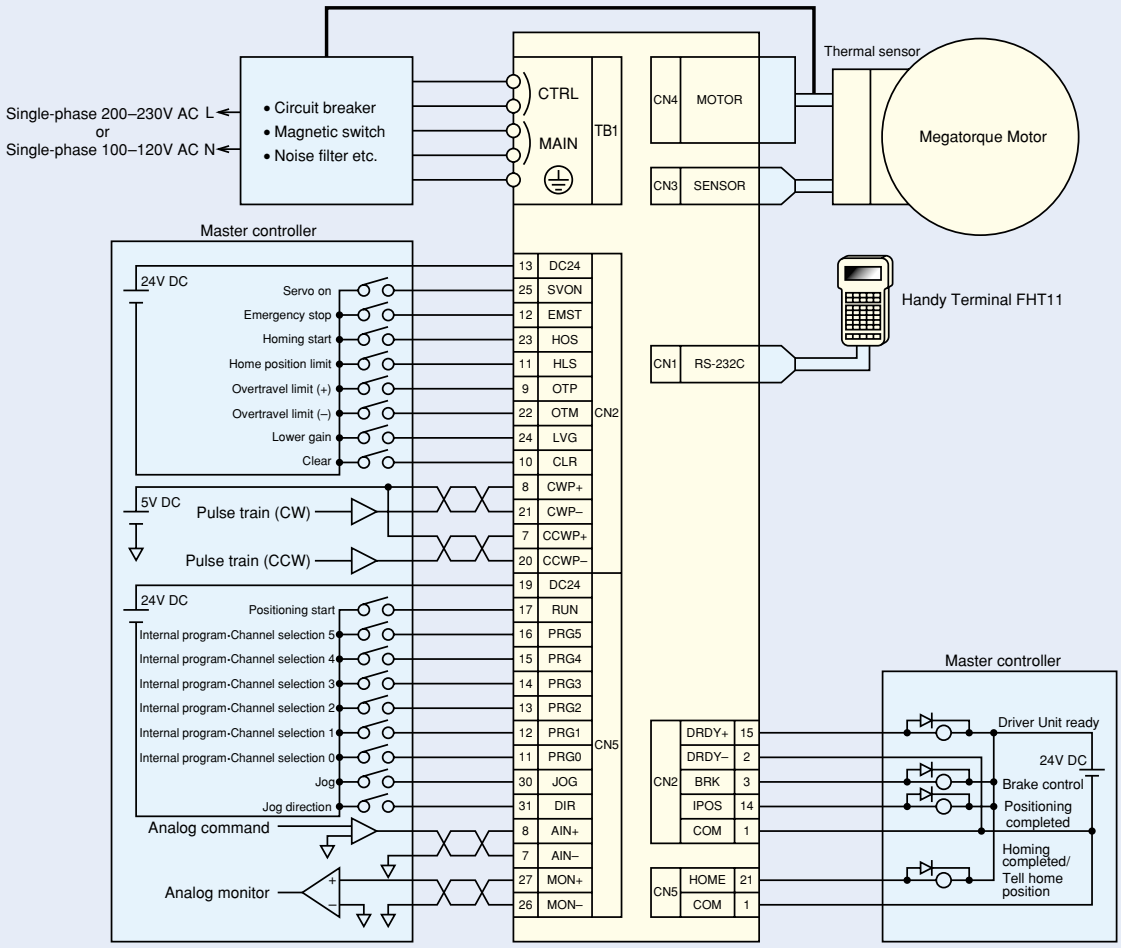
CN5	CC-Link connector 	DA : Data A DB : Data B DG : Data ground SLD : Shield
SW4	Setting terminating resistor	Upper: Terminating resistor 110Ω Middle: No terminating resistor Bottom: Terminating resistor 130Ω
SW1 SW2	Setting station number	Station number = (SW2 × 10) + (SW3) ✻ Never set the numbers of 0 and 55 or over for station numbers
SW3	Baud rate	0: 156Kbps 1: 625Kbps 2: 2.5Mbps 3: 5Mbps 4: 10Mbps 5–9: Never set
LED	Data status indicator	RUN ERR RD SD

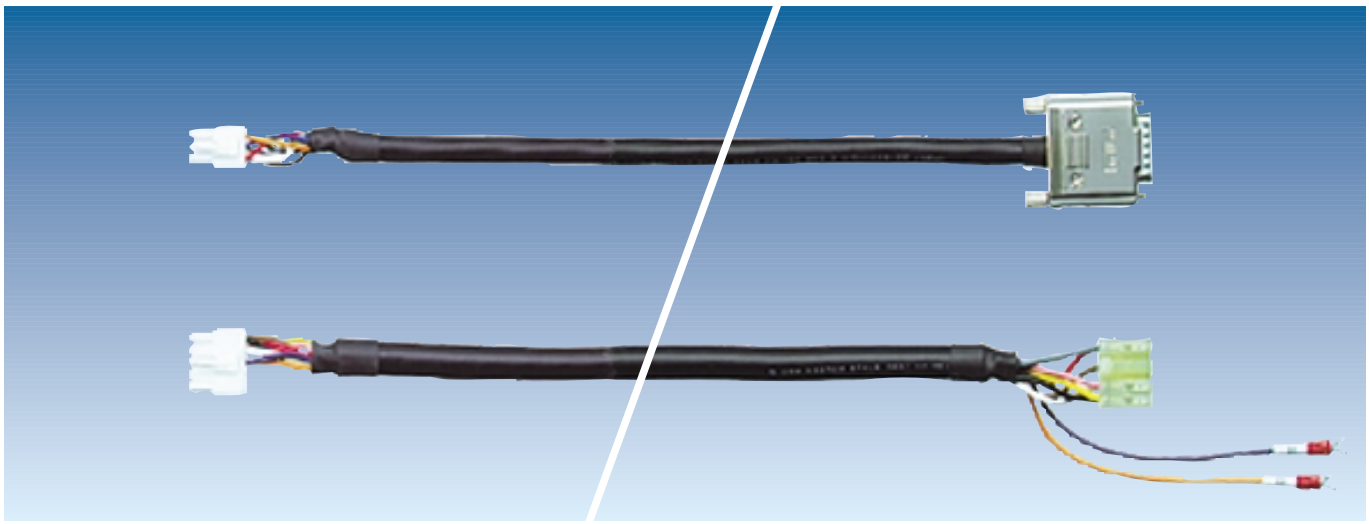
3.7 Wiring Example

ESB Model B3 Driver Unit



ESB Model B5 Driver Unit





Gray cable: For fixed use.
Black cable: Flexible type for moving use.

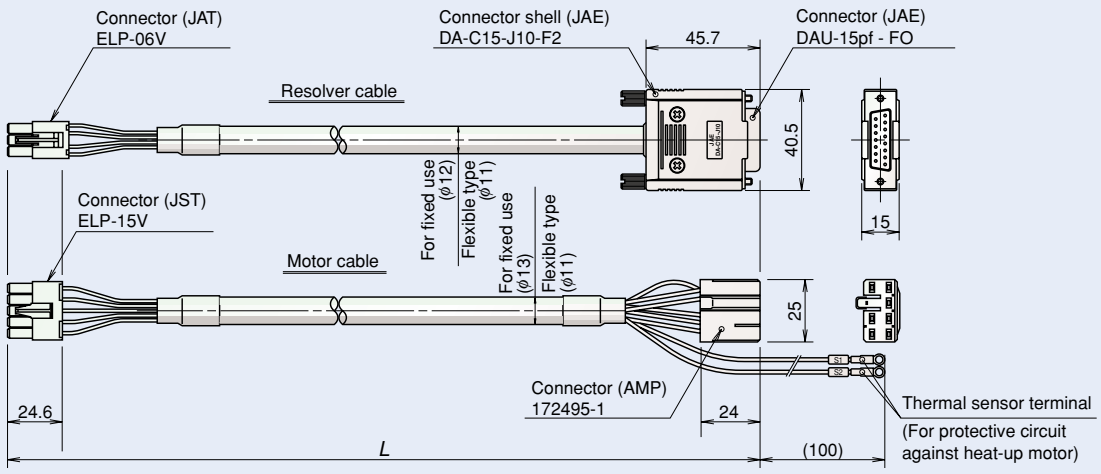
4.1 Configuration of Reference Number

Example of reference number: **M-C** **004** **SB** **03**

- **M-C**: Cable set
- **004**: Cable length (m)
- **SB**: SB: ESB Driver Unit
- **03**: Design serial number
  - 01: Incremental positioning sensor (For fixed use)
  - 03: Absolute positioning sensor (For fixed use)
  - 11: Incremental positioning sensor (Flexible type)
  - 13: Absolute positioning sensor (Flexible type)

4.2 Dimensions of Cable Set

For Motor with absolute position sensor (M-C ✻ ✻ ✻ SB03)



- Cables of design serial number 01 and 03 are for fixed use only. (Cannot be connected to moving part.)
- Minimum bending radius of the motor cable shall be 135 mm, and 110 mm for the resolver cable.

5. Handy Terminal

Handy Terminal FHT11 is an easy-to-handle RS-232C communication terminal for inputting parameters and programs to the ESB driver unit. You need just connect it to the CN1 connector of the driver unit.

- LCD screen: 20 letters × 4 lines
- No external power source required.
- Cable length: 3m



5.1 Configuration of Reference Number

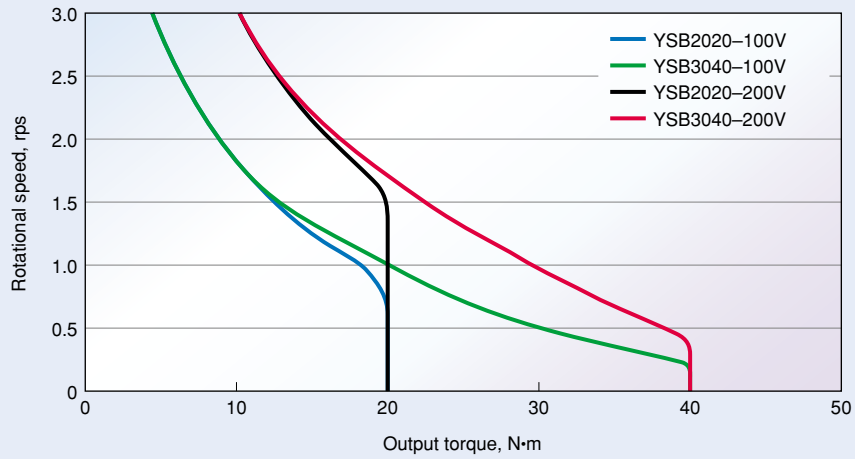
Example of reference number: **M-FHT** **11**

M-FHT: Handy Terminal

11: Serial number

6. Characteristics/Accuracy

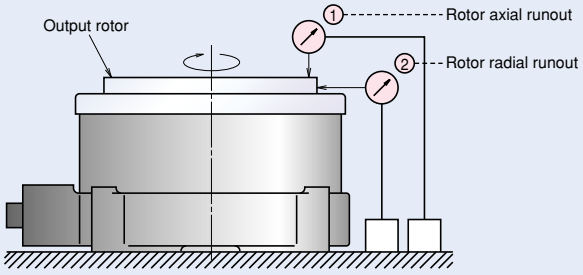
6.1 Speed/Output Torque



6.2 Runout

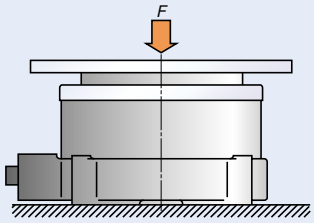
(Unit: mm)

Item	Specification
(1) Rotor axial runout	0.050 or less
(2) Rotor radial runout	0.050 or less

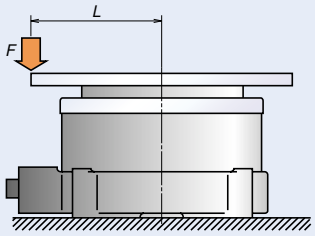


It is essential to study the allowable load and output torque that requires positioning the motor at a desired time. Refer to the motor specifications for the allowable axial and moment loads. Use the following formulas to obtain an actual load to the motor.

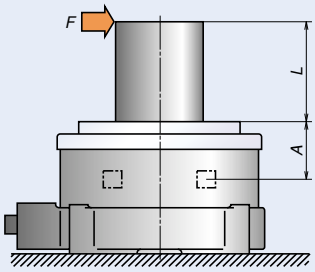
7.1 Estimation of Actual Load



(1) **When *F* is an external force:**
- Axial load: *Fa* = *F* + total weight of jigs/works
- Moment load: M = 0



(2) **When F is an external force:**
- Axial load: *Fa* = *F* + total weight of jigs/works
- Moment load: $M = F \times L$



(3) **When F is an external force:**
- Axial load: *Fa* = total weight of jigs/works
- Moment Load: $M = F \times (L+A)$

Motor Reference Number	YSB 2020	YSB 3040
A dimension (mm)	61.5	72.5

7.2 How to Use Charts for Minimum Positioning Time

Following the check of allowable loads, study the minimum time required to position the motor.
The charts provided below are for checking the minimum positioning time of the YSB Megatorque Motors. Refer to the charts in the following cases.

- **The user wishes to know which motor size should be selected for positioning within a required time, when the indexing angle and the load inertia are predetermined.**
- **The user wishes to know the required time for positioning, when an indexing angle, the load inertia and the motor size are predetermined.**

These charts can be used only when the following conditions are satisfied;

1) The load is directly coupled to the rotor, neither using a mechanical speed reducer such as belt or gears nor coupling, and is sufficiently rigid (natural frequency is 50Hz or over.)
2) No load torque is applied on a motor.

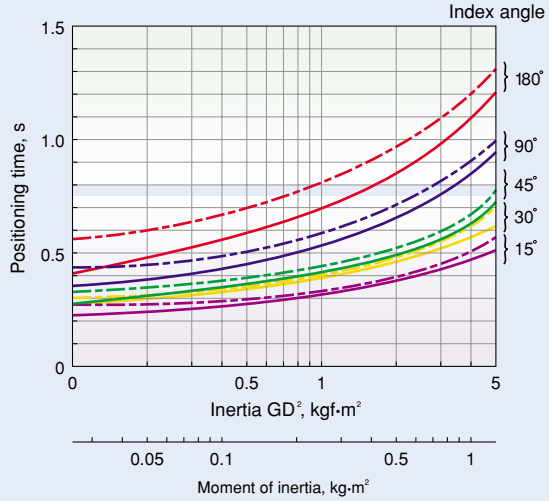
In addition, further examination is recommended when a motor is to be used in any of the following conditions.

1) Load inertia exceeds the allowable value so that it may not appear on the charts: Even in this case, driving a motor is not always impossible, but may take a longer time than the theoretical value because considerable limitations will be placed on the acceleration and the rotational speed.
2) When there is no chart applicable to the indexing angle: Separate calculation shall be made. However, the minimum time for positioning cannot be obtained when the indexing angle is too small.
3) The settling time of 0.2 seconds is added initially. You may change the settling time to be shorter if you can relax the repeatability.

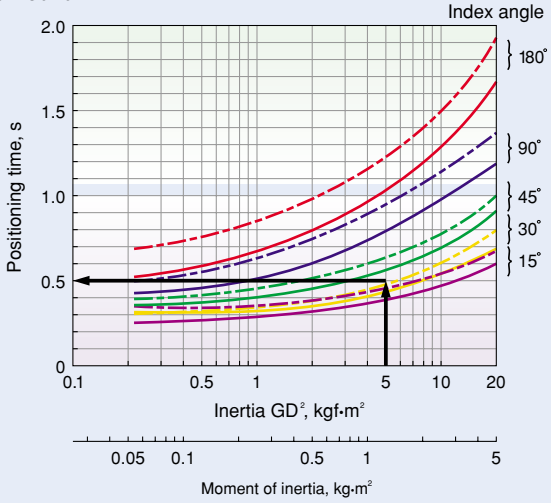
Example: Motor: YSB3040 (100–110V AC) Moment of inertia: 1.25 kg•m² (GD²: 5 kgf•m²) Index angle: 30°
Following the arrows on the chart below right, the minimum positioning time is 0.5 seconds.

(Power voltage 100V AC — – — Power voltage: 200V AC ———)

YSB 2020



YSB 3040



8. Combination

8.1 Motors Equipped With Absolute Position Sensor

Motor Reference Number	Driver Unit Reference Number	Power Voltage	Main Specifications
M-YSB2020KN001	M-ESB-YSB2020AB300(1)	200-230V AC	Internal program 16 channels (Acceleration profiling pattern can be set to each channel) Pulse train input (Photo coupler)
	M-ESB-YSB2020CB300	100-110V AC	
M-YSB3040KN001	M-ESB-YSB3040AB300	200-230V AC	
	M-ESB-YSB3040CB300	100-110V AC	
M-YSB2020KN001	M-ESB-YSB2020AB500	200-230V AC	Internal program 64 channels (Acceleration profiling pattern can be only set to 32 channels) Analog velocity command Pulse train input (Photo coupler)
	M-ESB-YSB2020CB500	100-110V AC	
M-YSB3040KN001	M-ESB-YSB3040AB500	200-230V AC	
	M-ESB-YSB3040CB500	100-110V AC	
M-YSB2020KN001	M-ESB-YSB2020ABA00	200-230V AC	DeviceNet compatible Internal program 64 channels
	M-ESB-YSB2020CBA00	100-110V AC	
M-YSB3040KN001	M-ESB-YSB3040ABA00	200-230V AC	
	M-ESB-YSB3040CBA00	100-110V AC	
M-YSB2020KN001	M-ESB-YSB2020ABB00	200-230V AC	PROFIBUS compatible Internal program 64 channels
	M-ESB-YSB2020CBB00	100-110V AC	
M-YSB3040KN001	M-ESB-YSB3040ABB00	200-230V AC	
	M-ESB-YSB3040CBB00	100-110V AC	
M-YSB2020KN001	M-ESB-YSB2020ABC00	200-230V AC	CC-Link compatible Internal program 64 channels
	M-ESB-YSB2020CBC00	100-110V AC	
M-YSB3040KN001	M-ESB-YSB3040ABC00	200-230V AC	
	M-ESB-YSB3040CBC00	100-110V AC	

Standard cable (Hard type for fixed use)

Cable Set Reference Number	Cable Length
M-C002SB03	2m
M-C004SB03	4m
M-C008SB03	8m
M-C015SB03	15m
M-C030SB03	30m

Optional Type (Flexible type for moving use)

Cable Set Reference Number	Cable Length
M-C002SB13	2m
M-C004SB13	4m
M-C008SB13	8m
M-C015SB13	15m
M-C030SB13	30m

Notes:

(1) For pulse train (line receiver format) position command, the last 2 digits of the driver unit reference number change to 01 from 00.

Example: Internal program 16 channels (16 acceleration profiling patterns), pulse train (line receiver format)
M-ESB-YSB2020AB301

(2) The driver unit compatible to field bass dose not provide the pulse train input function. Therefore the last digits of its reference number are 00 only.

9. International Safety Regulations

9.1 CE Marking

● Low Voltage Directive

NSK has worked with an EU Notified Body and an EU Competent Body to ensure that the YSB Series Megatorque Motor Systems conform to the pertinent regulations of the EC Low Voltage Directive, thus any system of the users, into which the Megatorque Motor is incorporated as a “component,” can easily conform to the EC Directives.

● Electromagnetic Compatibility Directive

We set conditions on the installation distance and wirings between a YSB Motor and an ESB Driver Unit and checked them for compliance with the pertinent regulations of the MC Directive. Naturally, the way to incorporate a YSB Motor and an ESB Driver Unit into your system may differ from our checking conditions, the users therefore require a final inspection of their systems, which incorporates a Megatorque Motor System, for conformity to EMC Directive (radiated noise and conducted noise).

9.2 Underwriters’ Laboratory (UL)

● Motor

Conforms to UL1004 regulation
(File number: E216970)

● Driver Unit

Conforms to UL508C regulation
(File number: E216221)

● Cable Set

We use the material conforming to the UL regulations.

If you require more detailed information such as installing conditions, please contact your local NSK representative.

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