



https://www.hp-vanguard.com/

# ST-SEPVO

#### Features

# High Revolution Speed and High Torque

The functionality of the motor has been maximized thanks to the new development of the smart algorithm which achieves high revolution speed and high torque.

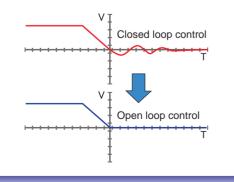
#### **Highly Precise Positioning**

The ST-Servo is equipped with a 16,000ppr high resolution encoder for highly precise positioning.



#### Shortened Takt Time

The user can toggle between closed loop control and open loop control modes. The settling time can be reduced which in turn shortens the takt time.



# Low Heat Generation and Energy Saving

The ST-Servo operates at a high efficiency due to the optimized current controls which change depending on the load.

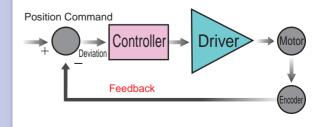
#### Four Different Control Functions in One Unit

The unit features positioning control, speed control, forcing control and torque control. Control modes can be changed in an instant for the optimal control for your unit.



#### Highly Reliable System

This is a step-out-less closed loop system equipped with an optical encoder.



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#### **Quick Response**

The ST-Servo is able to output 150% of its rated torque in an instant which is perfect for nimble starting and stopping.

#### **Assorted Lineup**

Selectable command input feature either Pulse string input or RS485 serial communication.

#### Optimal Control with Three Operation Modes

An optimal mode for a specific application can be chosen from three operation modes: full time closed, dual and full time open.

Operation Mode	Control Method	Features
Full time closed	Optimal current control according to the load	Low vibration Step-out-less Low heat generation
Dual	Switch from open to closed or vise versa at a revolution speed for stopping	Step-out-less No hunting Shortening of positioning and settling times Low heat generation
Full time open	Ordinary micro step control	No hunting Quick response time



ST-Servo

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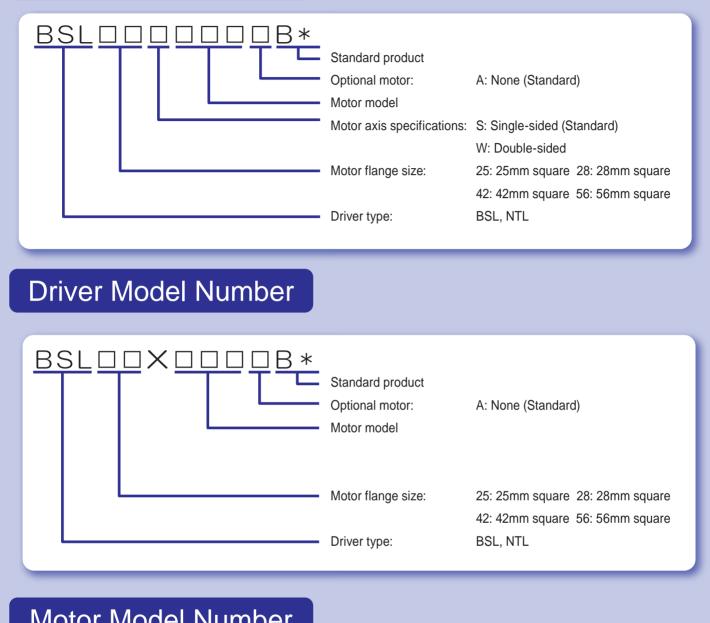




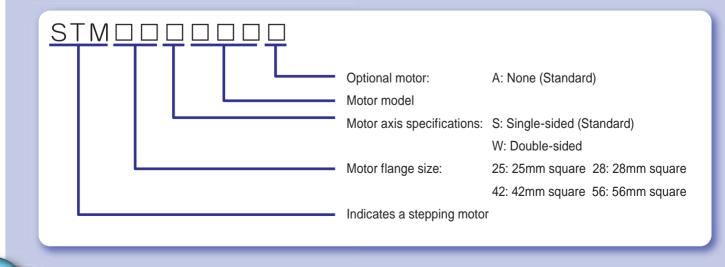
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### How to Read the Model Number

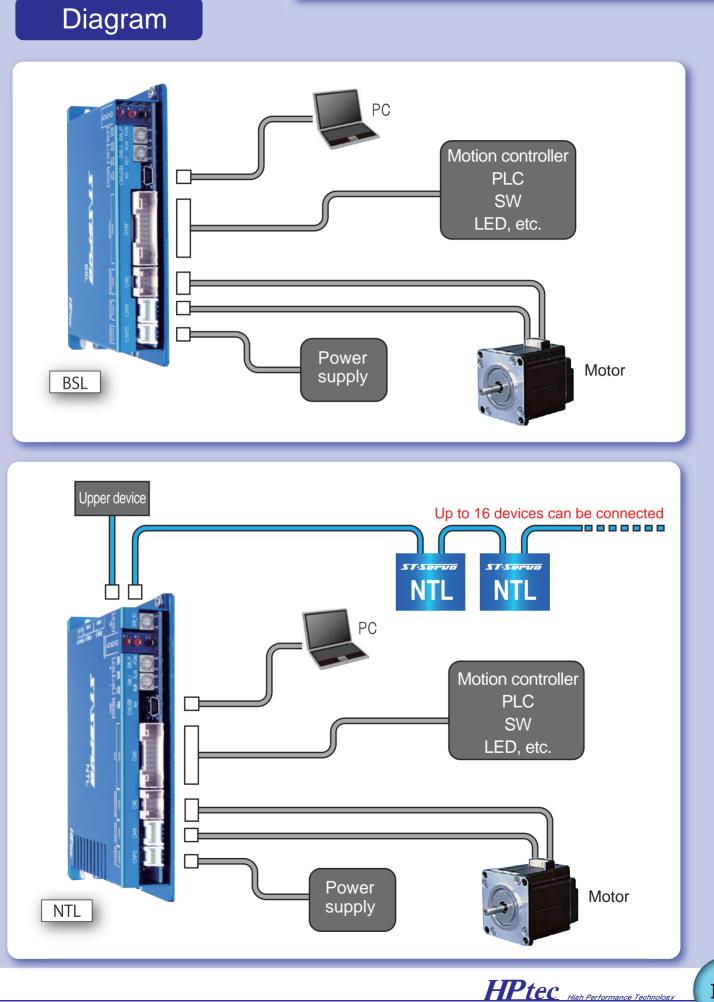
#### Set Model Number



## Motor Model Number



# System Configuration



# **Driver - Rated Specifications**

	lt e ve	DOI		
Incut	Item Power Supply Voltage	BSL	NTL NTL	
inpu		DC24V,		
	Control Modes	Positioning, Speed, Torque and Forcing		
	ated Output Current	2.0A		
		3.0A		
Supp	orted Motor Sizes (mm)	25mm square, 28mm square,		
	Encoder Pulses	6,400ppr, 9,600ppr, 16,000ppr (D		
	Seneral Input Signal	6	8	
	eneral Output Signal	4	8	
Me	chanical Input Signal	None	3(+LM,-LM,ORG)	
	Pulse String (1/2/AB)	Yes	—	
Control	Parameters	Yes	Yes	
	Internal Program	Yes (32 steps)	Yes (64 steps)	
Command		Yes	Yes	
Method	RS485	_	Yes	
	Analog Signal	Yes	—	
	JSB Communication	USB 2.0 (Windows Virtual COM Port)		
R	S485 Communication	– Modbus ASCII/RTU		
		Power LE	D (Green)	
	Display	Alarm LE		
Display		Servo Ready (Green)		
		In Position	n (Green)	
		Loop	Error	
		Full C	Count	
		Over S	Speed	
	Alarm Types	Gain Adjustment Fault		
		Excess	Voltage	
		EERO	M Error	
Operating	g Temperature and Humidity	0 to 50°C, 85%RH or l	ess (No condensation)	
Storage	Temperature and Humidity	-20 to 85°C, 85% or le		
	Dimensions	W117 x D73 x H23 mm	W127 × D78.5 × H23.5 mm	
	Weight	150g	170g	

# **General Motor Specifications**

Size (mm)	25mm square x 50.5	28mm square x 50.5	42mm square x 48.0
Motor Model		STM28S100A (Single-sided) STM28W100A (Double-sided)	STM42S100A (Single-sided) STM42W100A (Double-sided)
Set Model	BSL25S100AB* (Single-sided) BSL25W100AB* (Double-sided)	BSL28S100AB* (Single-sided) BSL28W100AB* (Double-sided)	BSL42S100AB* (Single-sided) BSL42W100AB* (Double-sided)
Driver Model	BSL25X100AB*	BSL28X100AB*	BSL42X100AB*
Input Power Supply Voltage		DC24V/DC48V ±10%	
Continuous Rating Torque (mN•m)	106	106	300
Rotor Inertia (g·cm <sup>2</sup> )	4	4	50
Encoder Resolution	9,600	9,600	16,000
Weight (g)	120	120	270

Size (mm)	42mm square x 58.0	56mm square x 60.0
Motor Model	STM42S101A (Single-sided)	STM56S100A (Single-sided)
	STM42W101A (Double-sided)	STM56W100A (Double-sided)
Set Model	BSL42S101AB* (Single-sided)	BSL56S100AB* (Single-sided)
Set Model	BSL42W101AB* (Double-sided)	BSL56W100AB* (Double-sided)
Driver Model	BSL42X101AB*	BSL56X100AB*
Input Power Supply Voltage	DC24V/D	0C48V ±10%
Continuous Rating Torque (mN•m)	434	706
Rotor Inertia (g·cm <sup>2</sup> )	75	180
Encoder Resolution	16,000	16,000
Weight (g)	370	620

Note: As for the NTL set model and driver model, "BSL" in the table above is replaced with "NTL".

### List of Cables

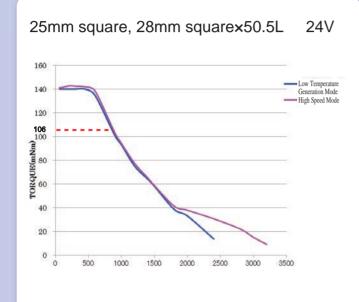
Product Name	Model	Cable Length (meters)
25mm or 28mm square Motor - Motor Cable	C004039- □.0	Standard: 1 Optional: 3, 5, 10, 20
42mm square Motor - Motor Cable	C004035-□.0	Standard: 1 Optional: 3, 5, 10, 20
56mm square Motor - Motor Cable	C004036- □.0	Standard: 1 Optional: 3, 5, 10, 20
25mm or 28mm square Motor - Encoder Cable	C008025-□.0	Standard: 1 Optional: 3, 5, 10, 20
42mm or 56mm square Motor - Encoder Cable	C008024- □.0	Standard: 1 Optional: 3, 5, 10, 20
Power supply Cable	C003036- 🗆	Optional: 1, 2, 3
I/F Cable	C028001- 🗆	Optional: 1, 2, 3

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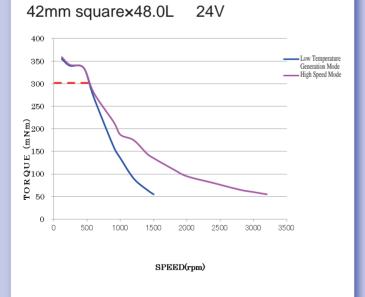
# **Revolution Speed - Torque Curve**

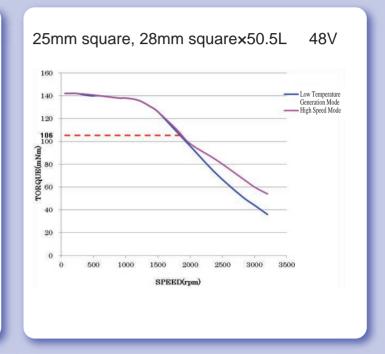
#### 25mm square, 28mm square

Low Temperature Generation Mode: Blue Line High Speed Mode: Red Line



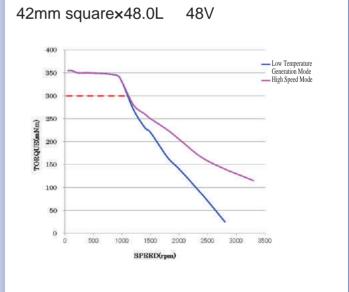
42mm square





Note) The instantaneous torque is the amount of torque which exceeds the continuous rating torque. The maximum torque during the torque control and forcing control is the continuous rating torque.

----- Continuous Rating Torque

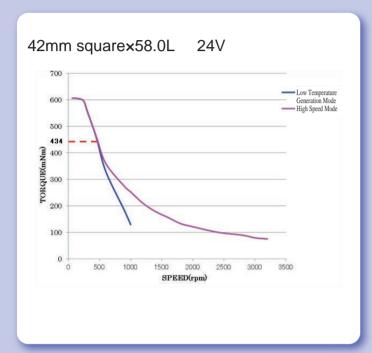


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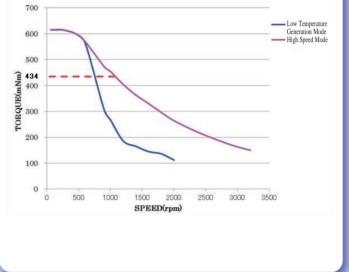
### **Revolution Speed - Torque Curve**

### 42mm square

Low Temperature Generation Mode: Blue Line High Speed Mode: Red Line



# 42mm square×58.0L 48V

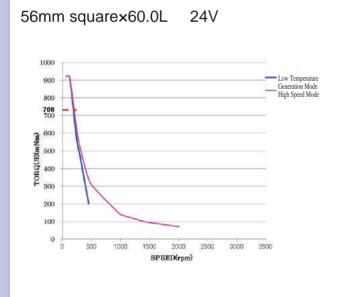


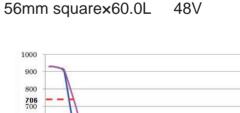
Note) The instantaneous torque is the amount of torque which exceeds the continuous rating torque. The maximum torque during the torque control and forcing control is the continuous rating torque.

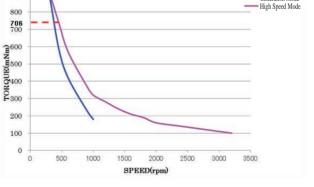
----- Continuous Rating Torque

 Low Temperature Generation Mode

56mm square



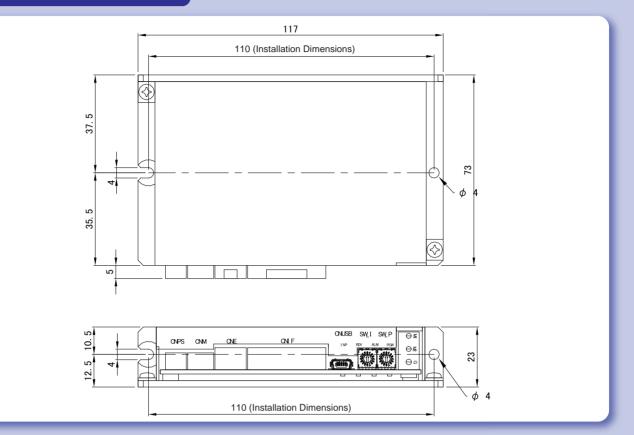




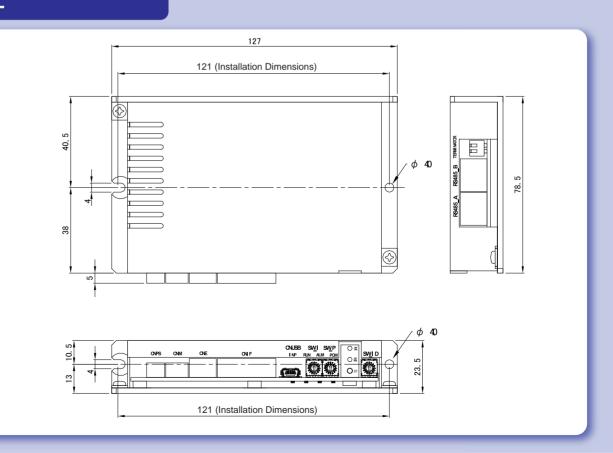
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# **Outline Drawing**

# BSL V2

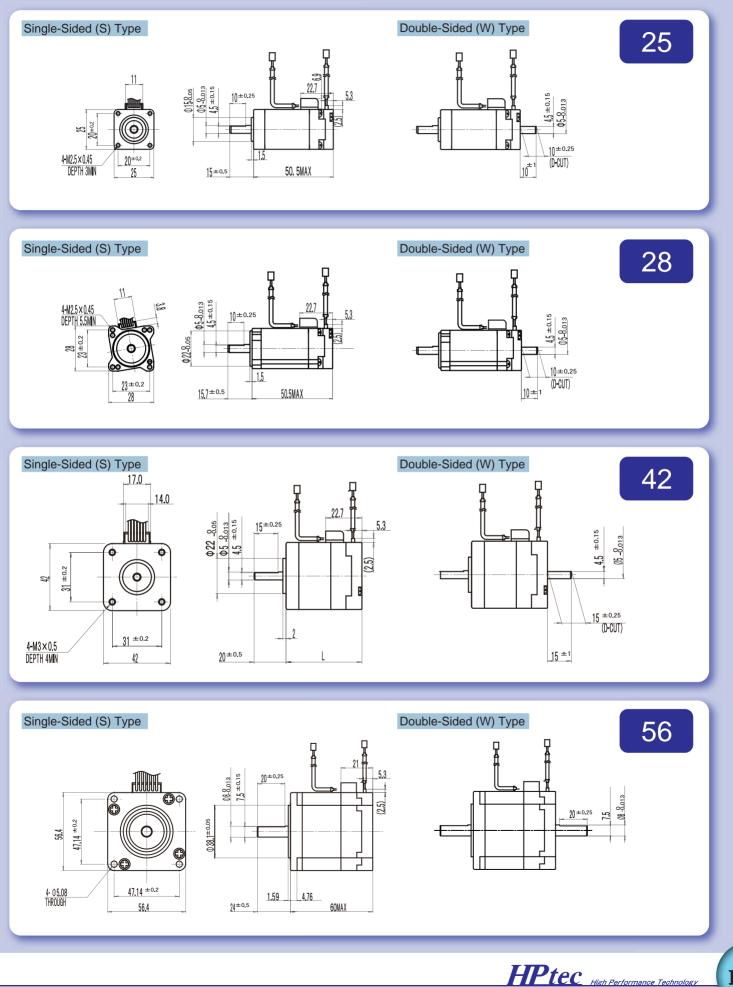


### NTL



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# **Outline Drawing - Motor**



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### Interface

# BSL, NTL







#### •General Components

Monitor terminal (5V Standard)

Terminal	Details (Select according to the parameters)
M1	Command speed, motor speed, command torque
M2	Motor speed, torque, position deviation, in position
G	GND

#### CNM (For Motor)

No.	Signal Name	Details
1	A	Motor A phase
2	/A	Motor / A phase
3	В	Motor B phase
4	/B	Motor / B phase

#### CNUSB (For USB)

No.	Signal Name	IN/OUT	Details
1	+5V	IN	Bus power from PC
2	D-	IN/OUT	Data line -
3	D+	IN/OUT	Data line +
4			
5	GND	IN	Signal ground

CNPS (For Power Supply)

No.	Signal Name	Details	Remarks
1	+24V or +48V		+24V ±10% +48V ±10%
2	0V	0V main power supply	
3	FG	Frame ground	Be sure to wire the frame ground

#### CNE (For Encoder)

No.	Signal Name	IN/OUT	Details
1	+5V	OUT	+5V power supply for encoder
2	GND	OUT	Power supply GND for encoder
3	A+	IN	A phase +
4	A-	IN	A phase -
5	B+	IN	B phase +
6	B-	IN	B phase -
7	Z+	IN	Z phase +
8	Z-	IN	Z phase -
9	NC		
10	FG		Shield (Note)

Note) The cable included with the driver is not shielded. If using a cable that is longer than 1 meter, be sure to use a shielded cable.

#### Gain Switch

SW	Details	Remarks
	Proportional gain of speed loop	Match the load inertia with 0-F.
SW_I	Integral time constant of speed loop	Match the load rigidity with 0-F.

LED Nomo	Features	
LED Name		LED
POW	<ul> <li>Indicates that the power is ON.</li> <li>Blinks when a parameter which requires the power to be turned ON again has been overwritten.</li> </ul>	Green
ALM	<ul> <li>Indicates that the driver is faulty.</li> <li>The type of alarm can be identified by the number of times it blinks. Refer to the alarm details for the alarm features.</li> <li>Lights up when a parameter which requires the power to be turned ON again has been overwritten.</li> </ul>	Red
RDY	<ul> <li>Indicates that the initialization process for the driver is complete after turning on the power.</li> <li>Blinks when the operation for the power factor detection has been set using the command input.</li> </ul>	Green
INP	<ul> <li>Indicates that it is in the in-position zone during position control.</li> <li>Indicates that the target speed has been reached during speed control.</li> <li>Indicates that the torque limit has been reached during forcing control.</li> </ul>	Green

# Interface

#### •BSL CNIF (For I/F)

#### •NTL CNIF (For I/F)

CIVII	- (1	UI	1/1

1       P1+       Command Oulse or B phase         3       P2+       Command CW pulse or command direction or A phase         4       P2-       or command CW pulse or command direction or A phase         5       COM+       +24V power supply for I/O       IN         6       COM+       +24V power supply for I/O       IN       Power plus for insulation (+24V ± 10%)         6       COM+       +24V power supply for I/O       IN       Power supply OV for insulation (+24V ± 10%)         7       IN1       Digital input 1       IN       Servo on when shipped         8       IN2       Digital input 2       IN       The alarm is reset when shipped         10       IN4       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         11       IN5       Digital input 5       IN       Mode(Mode/Mode/I) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Ration direction (CWICOW) for speed command for power supply for speed command       OUT         13       +10Vout       Power supply for speed command       OUT       Used when shipped         14       Vref+       Speed and trouge command for position for Position control or Zero speed for Speed control when shipped         15       vref+	No.	Signal Name	Details	IN/OUT	Remarks
2       P1-       or command QUSe or B phase       pulse or goins one pulse and two phase pulse         3       P2+       command CCW pulse or command direction or A phase       IN       Set to two pulse when shipped (CW / CCW pulse)         5       COM+       +24V power supply for I/O       IN       Power plus for insulation (+24V ± 10%)         6       COM-       0V power supply for I/O       IN       Power supply for I/O       Power supply         7       IN1       Digital input 2       IN       Power supply for I/O       The alarm is reset when shipped         8       IN2       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 5       IN       Mode/Mode/Mode/I for Control mode switch when shipped         11       IN5       Digital input 5       IN       Mode/Mode/Mode/I for Control mode switch when shipped         12       IN6       Digital input 6       IN       Robation direction (WCCM) for Speed or Torque control when shipped         13       +10Vout       Power supply for Speed command       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command forque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref+       Minus for a	1	P1+			Can be selected from two
Image: space of a phase of a phase pulse       phase pulse         3       P2+       Command CCW pulse of or A phase       IN       Set to two pulse when shipped (CW / CCW pulse)         4       P2-       or A phase       Power pulse for insulation (+24V ± 10%)       IN       Power pulse for insulation (+24V ± 10%)         6       COM+       OV power supply for I/O       IN       Power supply OV for insulation (+24V ± 10%)         7       IN1       Digital input 2       IN       The alarm is reset when shipped         8       IN2       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 5       IN       Mode(Mode)ModeI) for Control mode switch when shipped         11       IN5       Digital input 5       IN       Mode(Mode)ModeI) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWCOW) for Speec command         13       +10Vout       Power supply for speed command       OUT       Used when shipped         13       +10Vout       Power supply for command       OUT       Used when shipped         14       Vref+       Speed and trouge ommand Inva pulse       IN       Same voltage as internal GND         16       OUT1       <	2	P1-			
3P2+Command CCW pulse or command direction or command directionINSet to two pulse when shipped (CW / CCW pulse)4P2-or A phaseINPower plus for insulation (+24V ± 10%)5COM++24V power supply for I/OINPower plus for insulation (+24V ± 10%)6COM-Dy power supply for I/OINPower supply 0V for insulation (+24V ± 10%)7IN1Digital input 1INServo on when shipped8IN2Digital input 2INThe alarm is reset when shipped9IN3Digital input 3INStart/Stop for Speed or Torque control when shipped10IN4Digital input 5INModelModel/Model/ for Control mode switch when shipped11IN5Digital input 5INModelModel/Model/ for Control mode switch when shipped12IN6Digital input 5INModelModel/Model/ for Control mode switch when shipped13+10VoutPower supply for speed commandOUTUsed when setting the speed command with the volume14Vref+Speed and torque command Torque limit value plusINSame voltage as internal GND16OUT1Digital output 1OUTIn position for Position control or 2 speed for Speed control when shipped17OUT2Digital output 2OUTAlarm when shipped18OUT3Digital output 3OUTTorque limit for the forcing control when shipped19OUT4Digital output 4 <td></td> <td></td> <td>or B phase</td> <td></td> <td></td>			or B phase		
aprocessionshipped (CW / CCW pulse)4P2-or A phasePower plus for insulation5COM+ $424V$ power supplyINPower supply 0V for insulation6COM-0V power supplyINPower supply 0V for insulation7IN1Digital input 1INServo on when shipped8IN2Digital input 2INThe alarm is reset when shipped9IN3Digital input 3INStart/Stop for Speed or Torque control when shipped10IN4Digital input 4INP operation when shipped11IN5Digital input 5INMode(Model/Model) for Control mode switch when shipped12IN6Digital input 6INRotation direction (WCCW) for Speed or Torque control when shipped13+10VoutPower supply for speed commandOUTUsed when setting the speed command or Torque control when shipped14Vref+Speed and torque commandOUTUsed when setting the speed command or Torque control when shipped14Vref+Digital output 1OUTSame voltage as internal GND15Vref-Minus for above commandINSame voltage as internal GND16OUT1Digital output 2OUTAlarm when shipped17OUT2Digital output 3OUTTorque limit for the forcing control when shipped18OUT3Digital output 4OUTSpeed rached for Speed control when shipped19OUT4Digital output 4OUTSpeed rached	2	D2 .	Command CCW pulse	IN	
4 $p_2$ - or A phaseINPower Number of A phase5COM+ $\frac{424V}{10}$ power supply for I/OINPower supply OV for insulation ( $\frac{424V}{10\%}$ )6COM-0V power supply for I/OINPower supply OV for insulation ( $\frac{424V}{10\%}$ )7IN1Digital input 1INServo on when shipped8IN2Digital input 2INThe alarm is reset when shipped9IN3Digital input 3INStart/Stop for Speed or Torque control when shipped10IN4Digital input 5INMode(Mode0Mode1) for Control mode switch when shipped11IN5Digital input 5INMode(Mode0Mode1) for Control mode switch when shipped12IN6Digital input 6INRotation director(WICCW) for Speed or Torque control when shipped13+10VoutPower supply for speed command Torque limit value plusOUTUsed when setting the speed command with the volume14Vref-Minus for above commandINSame voltage as internal GND16OUT1Digital output 2OUTAlarm when shipped17OUT2Digital output 3OUTSpeed rotoring when shipped18OUT3Digital output 4OUTSpeed rotoring when shipped19OUT4Digital output 4OUTSpeed rotoring when shipped18OUT3Digital output 4OUTSpeed rotoring when shipped20BRAKE+Brake release output +OUTSo	3	P2+			
412-1414105COM++24 V power supply for I/OINPower plus for insulation (+24V ± 10%)6COM-00 power supply for I/OINPower supply 0V for insulation (+24V ± 10%)7IN1Digital input 1INServo on when shipped8IN2Digital input 2INThe alarm is reset when shipped9IN3Digital input 4INP operation when shipped10IN4Digital input 5INMode(Mode0/Mode1) for Control mode switch when shipped11IN5Digital input 5INMode(Mode0/Mode1) for Control mode switch when shipped12IN6Digital input 6INRation direction (WCCW) for Spece or Torque control when shipped13+10VoutPower supply for speed commandOUTUsed when setting the speed command14Vref+Speed and torque command Torque limit value plusIN0 to ±5V or 0 to ±10V15Vref-Minus for above commandINSame voltage as internal GND16OUT1Digital output 2OUTAlarm when shipped17OUT2Digital output 3OUTSpeed achor shipped18OUT3Digital output 4OUTSpeed reached for Speed control when shipped19OUT4Digital output 4OUTSpeed reached for Speed control when shipped18OUT3Digital output 4OUTSpeed reached for Speed control when shipped19		50			snipped (CW / CCW pulse)
S       COM+       for I/O       IN       IN       (+24V ± 10%)         6       COM- $0^{V}$ power supply for I/O       IN       Power supply 0V for insulation         7       IN1       Digital input 1       IN       Servo on when shipped         8       IN2       Digital input 2       IN       The alarm is reset when shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWCCW) for Speed or Torque control when shipped         13       +10Vout       Speed and torque command Torque inmit value plus       IN       0 to ±5V or 0 to ±10V         14       Vref+       Speed and torque command Torque inmit value plus       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero Speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3	4	P2-	or A priase		
S       COM+       for I/O       IN       IN       (+24V ± 10%)         6       COM- $0^{V}$ power supply for I/O       IN       Power supply 0V for insulation         7       IN1       Digital input 1       IN       Servo on when shipped         8       IN2       Digital input 2       IN       The alarm is reset when shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWCCW) for Speed or Torque control when shipped         13       +10Vout       Speed and torque command Torque inmit value plus       IN       0 to ±5V or 0 to ±10V         14       Vref+       Speed and torque command Torque inmit value plus       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero Speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3	_		+24V power supply		Power plus for insulation
6       COM- for I/O       OV power supply power supply 0V for insulation         7       IN1       Digital input 1       IN         8       IN2       Digital input 2       IN       The alarm is reset when shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWICW) for Speec or Torque control when shipped         13       +10Vout       Power supply for Speed and torque command torque limit value plus       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref+       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         16       OUT1       Digital output 2       OUT       Alarm when shipped         17       OUT2       Digital output 3       OUT       Torque limit for the forcing control when shipped         18       OUT3       <	5	COM+		IN	
b       COM- IN       for I/O       IN       Power supply ov for insulation         7       IN1       Digital input 1       IN       Servo on when shipped         8       IN2       Digital input 2       IN       The alarm is reset when shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mde0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWICCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command with the volume         14       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       Same voltage as internal GND         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT			0V power supply		,
8       IN2       Digital input 2       IN       The alarm is reset when shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode/Mode/Mode/I for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWCCW) for Speed or Torque control when shipped         13       +10 Vout       Speed command or Torque control when shipped       OUT       Used when setting the speed command or Torque limit value plus         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command IN       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 3       OUT       Alarm when shipped         18       OUT3       Digital output 4       OUT       Speed reached for Speed control when shipped         19       OUT4       Digital output 3       OUT       Speed reached for Speed contr	6	сом-		IN	Power supply 0V for insulation
8       IN2       Digital input 2       IN       shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWCCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command Torque limit value plus       OUT       Used when setting the speed command dotted in the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command Torque limit value plus       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Spe	7	IN1	Digital input 1	IN	Servo on when shipped
8       IN2       Digital input 2       IN       shipped         9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWCCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command Torque limit value plus       OUT       Used when setting the speed command dotted in the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command Torque limit value plus       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Spe					
9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0/Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (VWCCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque limit value plus         14       Vref+       Speed and torque command torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       Speed reached fo					The alarm is reset when
9       IN3       Digital input 3       IN       Start/Stop for Speed or Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CWICCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque command         14       Vref+       Speed and torque command       OUT       Used when setting the speed command for torque limit value plus         15       Vref-       Minus for above command       IN       0 to ±5V or 0 to ±10V         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 4       OUT       Speed reached for Speed output 4         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE+       Brake release output +       OUT       Stat pin)	8	IN2	Digital input 2	IN	shipped
9       IN3       Digital input 3       IN       Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0)Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CW) for Speed rol roque command         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque command         14       Vref+       Speed and torque command       OUT       Used when setting the speed command torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         20       BRAKE+       Brake release output -       OUT       Speed reached for Speed control when shipped         21       BRAKE+       Brake release output -       OUT <td></td> <td></td> <td></td> <td></td> <td></td>					
9       IN3       Digital input 3       IN       Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0)Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CW) for Speed rol roque command         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque command         14       Vref+       Speed and torque command       OUT       Used when setting the speed command torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         20       BRAKE+       Brake release output -       OUT       Speed reached for Speed control when shipped         21       BRAKE+       Brake release output -       OUT <td></td> <td></td> <td></td> <td></td> <td></td>					
9       IN3       Digital input 3       IN       Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0)Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CW) for Speed rol roque command         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque command         14       Vref+       Speed and torque command       OUT       Used when setting the speed command torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         20       BRAKE+       Brake release output -       OUT       Speed reached for Speed control when shipped         21       BRAKE+       Brake release output -       OUT <td></td> <td></td> <td></td> <td></td> <td></td>					
9       IN3       Digital input 3       IN       Torque control when shipped         10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0)Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CW) for Speed rol roque command         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque command         14       Vref+       Speed and torque command       OUT       Used when setting the speed command torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         20       BRAKE+       Brake release output -       OUT       Speed reached for Speed control when shipped         21       BRAKE+       Brake release output -       OUT <td></td> <td></td> <td></td> <td></td> <td>Start/Stop for Speed or</td>					Start/Stop for Speed or
Image: state in the state of the state o	9	IN3	Digital input 3	IN	
10       IN4       Digital input 4       IN       P operation when shipped         11       IN5       Digital input 5       IN       Mode(Mode0/Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command or torque control when shipped         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       SoOmA					
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11       IN5       Digital input 5       IN       Mode(Mode0)Mode1) for Control mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CCW) for Speec or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command torque command         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command Torque limit value plus       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Stome voltage level as 5th pin)         21       BRAKE-       Brake release output -       OUT       Stome voltage level as 5th pin)         23       ECA+       Encoder A phase       OUT       Di	10		Disital issue 4	15.1	Descention where ships and
11       INS       Digital input 5       IN       mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CCW) for Speec or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       SomA max         21       BRAKE-       Brake release output -       OUT       SomA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B	10	IN4	Digital Input 4	IN	P operation when shipped
11       INS       Digital input 5       IN       mode switch when shipped         12       IN6       Digital input 6       IN       Rotation direction (CW/CCW) for Speec or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       SomA max         21       BRAKE-       Brake release output -       OUT       SomA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B					Mode(Mode0/Mode1) for Control
12       IN6       Digital input 6       IN       Rotation direction (CW/CCW) for Speed or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       Stom A max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24	11	IN5	Digital input 5	IN	
12       ING       Digital input 6       IN       or Torque control when shipped         13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Speed reached for Speed control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       Stom A max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECB+       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase </td <td></td> <td></td> <td></td> <td></td> <td></td>					
13       +10Vout       Power supply for speed command       OUT       Used when setting the speed command with the volume         14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase	12	IN6	Digital input 6	IN	
13     +10 Vout     speed command     OUT     command with the volume       14     Vref+     Speed and torque command Torque limit value plus     IN     0 to ±5V or 0 to ±10V       15     Vref-     Minus for above command     IN     Same voltage as internal GND       16     OUT1     Digital output 1     OUT     In position for Position control or Zero speed for Speed control when shipped       17     OUT2     Digital output 2     OUT     Alarm when shipped       18     OUT3     Digital output 3     OUT     Torque limit for the forcing control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     Speed reached for Speed control when shipped       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     ECC     Circular z phase     OUT     Differential output			• ·		or Torque control when shipped
14       Vref+       Speed and torque command Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       Speed reached for Speed control when shipped         22       ECA+       Brake release output -       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECB+       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT	12	10\/out	Power supply for		Used when setting the speed
14       Vref+       Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Cianal around       Same voltage as internal	13	+10vout	speed command	001	command with the volume
14       Vref+       Torque limit value plus       IN       0 to ±5V or 0 to ±10V         15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Cianal around       Same voltage as internal			Speed and torque command		
15       Vref-       Minus for above command       IN       Same voltage as internal GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output -       OUT       500mA max         22       ECA+       OUT       Differential output         23       ECA-       Encoder A phase       OUT       Differential output         24       ECB+       Encoder B phase       OUT       Differential output         25       ECB-       OUT       Differential output       OUT         26       ECZ+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder	14	Vref+		IN	0 to $\pm 5V$ or 0 to $\pm 10V$
15       Vref-       command       IN       GND         16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       Speed reached for Speed control when shipped         21       BRAKE-       Brake release output +       OUT       SpoomA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Circal around       Same voltage as internal			roique mine raide pide		
16       OUT1       Digital output 1       OUT       In position for Position control or Zero speed for Speed control when shipped         17       OUT2       Digital output 2       OUT       Alarm when shipped         18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       +24V (Same voltage level as 5th pin)         21       BRAKE-       Brake release output -       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Eincoder Z phase       OUT       Differential output	15	Vrof	Minus for above	INI	Same voltage as internal
16     OUT1     Digital output 1     OUT     or Zero speed for Speed control when shipped       17     OUT2     Digital output 2     OUT     Alarm when shipped       18     OUT3     Digital output 3     OUT     Torque limit for the forcing control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     \$Speed reached for Speed control when shipped       20     BRAKE-     Brake release output +     OUT     \$Speed reached for Speed control when shipped       21     BRAKE-     Brake release output +     OUT     \$Speed reached for Speed control when shipped       22     ECA+     Brake release output -     OUT     \$00mA max       23     ECA+     Encoder A phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output     OUT       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     ECC     Signal around     Same voltage as internal	15	viei-	command	IIN	GND
16     OUT1     Digital output 1     OUT     or Zero speed for Speed control when shipped       17     OUT2     Digital output 2     OUT     Alarm when shipped       18     OUT3     Digital output 3     OUT     Torque limit for the forcing control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     \$Speed reached for Speed control when shipped       20     BRAKE-     Brake release output +     OUT     \$Speed reached for Speed control when shipped       21     BRAKE-     Brake release output +     OUT     \$Speed reached for Speed control when shipped       22     ECA+     Brake release output -     OUT     \$00mA max       23     ECA+     Encoder A phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output     OUT       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     ECC     Signal around     Same voltage as internal					
Image: Control when shipped       17     OUT2     Digital output 2     OUT     Alarm when shipped       18     OUT3     Digital output 3     OUT     Torque limit for the forcing control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder Z phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     ECC     Eincoder Z phase     OUT     Differential output					
17     OUT2     Digital output 2     OUT     Alarm when shipped       18     OUT3     Digital output 3     OUT     Torque limit for the forcing control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder Z phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     SC     Same voltage as internal	16	OUT1	Digital output 1	OUT	
18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       +24V (Same voltage level as 5th pin)         21       BRAKE-       Brake release output -       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         25       ECB-       OUT       Differential output         26       ECZ+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Circad around       Same voltage as internal					control when shipped
18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       +24V (Same voltage level as 5th pin)         21       BRAKE-       Brake release output -       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         25       ECB-       OUT       Differential output         26       ECZ+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Circad around       Same voltage as internal					
18       OUT3       Digital output 3       OUT       Torque limit for the forcing control when shipped         19       OUT4       Digital output 4       OUT       Speed reached for Speed control when shipped         20       BRAKE+       Brake release output +       OUT       +24V (Same voltage level as 5th pin)         21       BRAKE-       Brake release output -       OUT       500mA max         22       ECA+       Encoder A phase       OUT       Differential output         23       ECA-       Encoder B phase       OUT       Differential output         24       ECB+       Encoder Z phase       OUT       Differential output         25       ECB-       OUT       Differential output         26       ECZ+       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         27       ECZ-       Encoder Z phase       OUT       Differential output         28       ECC       Circad around       Same voltage as internal	17		Digital output 2	OUT	Alarm when shipped
18     OUT     Digital output 3     OUT     control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder Z phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     SC     Same voltage as internal	l	0012	Digital Output 2	001	, and when empped
18     OUT     Digital output 3     OUT     control when shipped       19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder Z phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     SC     Same voltage as internal					Tanana limit tan tha tanàn a
19     OUT4     Digital output 4     OUT     Speed reached for Speed control when shipped       20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     EC     Same voltage as internal     Encoder Z phase     OUT	18	OUT3	Digital output 3	OUT	
19     OUT4     Digital output 4     OUT     control when shipped       20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     SC     Same voltage as internal			• •		
20     BRAKE+     Brake release output +     OUT     +24V (Same voltage level as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Same voltage as internal	10		Digital output 4		
20     BRAKE+     output +     OU1     as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Same voltage as internal	13	0014	Digital Output 4	001	control when shipped
20     BRAKE+     output +     OU1     as 5th pin)       21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     Encoder A phase     OUT     Differential output       23     ECA-     Encoder B phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Same voltage as internal			Brake release		+24V (Same voltage level
21     BRAKE-     Brake release output -     OUT     500mA max       22     ECA+     OUT     Differential output       23     ECA-     Encoder A phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal	20	BRAKE+	output +	OUT	
21     BRAKE-     output -     OUT     500mA max       22     ECA+     OUT     Differential output       23     ECA-     Encoder A phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal			Brake release		. ,
22     ECA+     OUT       23     ECA-     Encoder A phase     OUT       24     ECB+     Encoder B phase     OUT       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal	21	BRAKE-		OUT	500mA max
23     ECA-     Encoder A phase     OUT     Differential output       24     ECB+     Encoder B phase     OUT     Differential output       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT     Differential output       27     ECZ-     Encoder Z phase     OUT     Differential output       28     SC     Same voltage as internal		<u> </u>			
23     ECA-     OUT       24     ECB+     Encoder B phase     OUT       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal	22	ECA+		OUT	
23     ECA-     OUT       24     ECB+     Encoder B phase     OUT       25     ECB-     OUT     Differential output       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal		l	Encoder A phase		Differential output
Encoder B phase     Differential output       25     ECB-     OUT       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal	23	ECA-	-	OUT	-
Encoder B phase     Differential output       25     ECB-     OUT       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal					
Encoder B phase     Differential output       25     ECB-     OUT       26     ECZ+     Encoder Z phase     OUT       27     ECZ-     Encoder Z phase     OUT       28     SC     Same voltage as internal	24	ECB+		OUT	
26         ECZ+         Encoder Z phase         OUT         Differential output           27         ECZ-         Encoder Z phase         OUT         Differential output           28         SC         Simple around         Same voltage as internal	L		Encoder B phase	201	Differential output
27 ECZ- Encoder 2 phase OUT Differential output	25	ECB-		OUT	
27 ECZ- Encoder 2 phase OUT Differential output	26	ECZ+	Encodes 7 - b	OUT	Differential extent
Same voltage as internal			Encoder ∠ phase		Dillerential output
20 Signal ground Signal ground			Signal arctined		
	28	30	Signal ground		Signal ground

No.	Signal Name	Details	IN/OUT	Remarks
	Ť	+24V power supply		+24V ±10% power supply
1	COM+	for I/O	IN	input for insulation
2	СОМ-	0V power supply for I/O	IN	Power supply input for insulation
3	IN1	Digital input 1	IN	Servo on when shipped
4	IN2	Digital input 2	IN	The alarm is reset when shipped
_				Start/Stop for Speed or
5	IN3	Digital input 3	IN	Torque control when shipped
6	IN4	Digital input 4	IN	P operation when shipped
_				Control mode switch when
7	IN5	Digital input 5	IN	shipped (Mode 0 / Mode 1)
				Revolution direction (CW/CCW)
8	IN6	Digital input 6	IN	for Speed or Torque control
	-	5		when shipped
9	IN7	Digital input 7	IN	General input when shipped
10	IN8	Digital input 8	IN	General input when shipped
11	+LM	+ limit sensor	IN	
12	-LM	<ul> <li>limit sensor</li> </ul>	IN	Mechanical sensor
13	ORG	Origin sensor	IN	
				In position for Position control
14	OUT1	Digital output 1	OUT	or Zero speed for Speed
				control when shipped
15	OUT2	Digital output 2	OUT	Alarm when shipped
4.0		Disital autout 0	OUT	Torque limit for the forcing
16	OUT3	Digital output 3	001	control when shipped
47		Disting autout 4	OUT	Speed reached for Speed
17	OUT4	Digital output 4	OUT	control when shipped
18	OUT5	Digital output 5	OUT	General output when shipped
19	OUT6	Digital output 6	OUT	General output when shipped
20	OUT7	Digital output 7	OUT	General output when shipped
21	OUT8	Digital output 8	OUT	General output when shipped
22	BRAKE+	Brake release output +	OUT	+24V (Same voltage level as 5th pin)
23	BRAKE-	Brake release output -	OUT	500mA max
24	FG	Shield		

•NTL

CN485A, CN485B (For RS485 communication)

No.	Signal Name	IN/OUT	Details
1			
2	SG		Signal ground
3	Sig-A	IN/OUT	Signal line A
4			
5	SG		Signal ground
6	Sig-B	IN/OUT	Signal line B
7			
8	SG		Signal ground

NTL

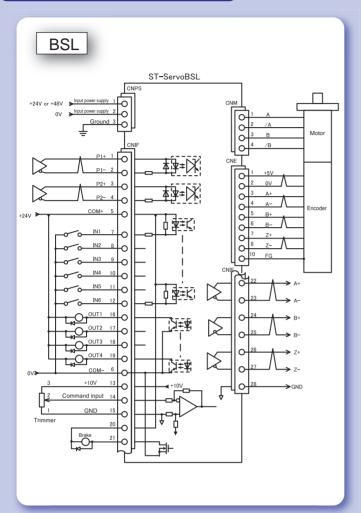
Communication switch

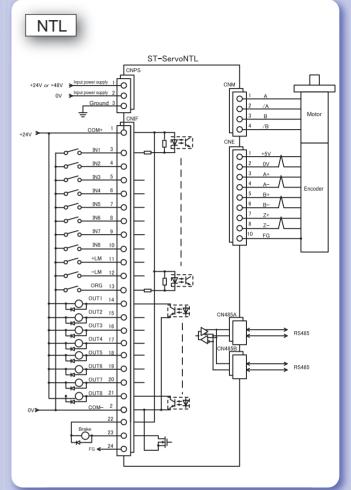
SW	Details	Remarks	
SW_ID	SW_ID Communication ID Set the ID for the machine with 0-F.		
SW/ TM		The termination will be OFF when both 1 and 2 are OFF. The termination will be ON when both 1 and 2 are ON.	



### Electrical Schematic and List of Combinations

### **Electrical Schematic**





# List of Combinations

Size (mm)	25mm squarex50.5	28mm squarex50.5	42mm squarex48.0
Motor Model	STM25S100A (Single-Sided) STM25W100A (Double-Sided)	STM28S100A (Single-Sided) STM28W100A (Double-Sided)	STM42S100A (Single-Sided) STM42W100A (Double-Sided)
Set Model	BSL25S100AB* (Single-Sided) BSL25W100AB* (Double-Sided)	BSL28S100AB* (Single-Sided) BSL28W100AB* (Double-Sided)	BSL42S100AB* (Single-Sided) BSL42W100AB* (Double-Sided)
Driver Model	BSL25X100AB*	BSL28X100AB*	BSL42X100AB*
	, ,	*	
Size (mm)	42mm squarex58.0	56mm squarex60.0	
Motor Model	STM42S101A (Single-Sided) STM42W101A (Double-Sided)	STM56S100A (Single-Sided) STM56W100A (Double-Sided)	
Set Model	BSL42S101AB* (Single-Sided) BSL42W101AB* (Double-Sided)	BSL56S100AB* (Single-Sided) BSL56W100AB* (Double-Sided)	
Driver Model	BSL42X101AB*	BSL56X100AB*	]

### Software

The ST-Servo comes with application software running on Windows. The application software allows you to do the following:

• Set and edit ST-Servo parameters

Set and edit program data

Manual operation

and more.

Operating Environ	ment
[OS]	Windows 7
	Windows 8 / 8.1
	* The application software can be run on both 64 bit (x64) and 32 bit (x86) Japanese operating systems.
[Processor]	Intel Pentium 4 3GHz or faster (Recommended: Intel Core2 Duo 2GHz or faster)
	Or another processor with compatible capability.
[Memory]	1GB or more (Recommended: 2GB or more)

The ST-Servo communication specifications have also been made public for users to control it using their own programming.

	<< 全て >>				
で 	N	o. 記号	内容	範囲	データ
分類02:速度制御用パラメータ	▶ 1-	01 PKp	位置ループゲイン		120
分類03:トルク制御用パラメータ 分類04:押し当て(位置、速度)制術		02 PKv	速度演算比例ベースゲイン		60
分類047年0日(10世、速度7年11 分類05:共通パラメータ	1-	03 PTv	速度演算積分ベース時定数		25
…分類06:入力ポートアサイン …分類07:出力ポートアサイン	1-	D4 PKd	速度フィードバックゲイン		320
分類07:出力ホートアリイン 分類08:位置制御時の速度パラメ、	1-	05 PDv	微分補償ゲイン	$0\sim 20$	5
一分類09:原点復帰パラメータ	1-	D6 PKvp	P制御時の比例ゲイン		20
	1-	07 Ff	フィードフォワード(%)	$0 \sim 100$	0
	1-	08 SelComPulse	指令パルスの形式	$0 \sim 2$	0
	1-	09 ErrCountClr	サーボOFF時の偏差カウンタクリア	$0 \sim 1$	0
	1-	10 FullCountValue	フルカウントアラームカウント値	$1 \sim 2147483647$	30000
	1-	11 InPositionZone	インボジションゾーンカウント値	$0 \sim 1000$	4
	1-	12 ElectroGearNum	電子ギア分子	$1 \sim 10000$	1
	1-	13 ElectroGearDen	電子ギア分母	$1 \sim 10000$	1
	1-	14 PosDir	パルス指令のときの回転方向指定	0~1	0
	1-	15 OpenModeSwitch	停止時のオープン制御またはクローズ制御の選択	$0 \sim 2$	0
	1-	16 CloseToOpenSpeed	クローズからオープンに切り替える回転数(rpm)	$0\sim 5000$	10
	※各モータ	こより異なった初期値が設定	Ečhます。		常時変更可能パラメーク
					市時変更可能ハフメーン
					モーダー利御用のバラメ 電源再投入が必要です
					電源再投入加必要じ9 EEP ROMに書き込み後 電源の再投入を行ってく

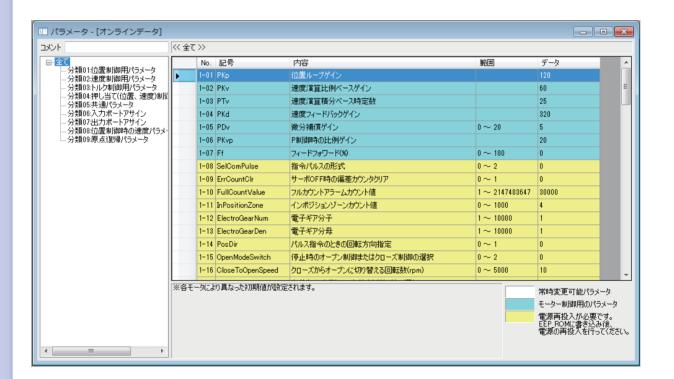


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#### Software

• Setting and Editing Parameters There are parameters for each function. BSL has 9 classifications while NTL has 11 classifications.

Classification 01: Position Control Parameters Classification 02: Speed Control Parameters Classification 03: Torque Control Parameters Classification 04: Forcing (Position / Speed) Parameters Classification 05: Common Parameters Classification 06: Assign Input Ports Classification 07: Assign Output Ports Classification 07: Assign Output Ports Classification 08: Speed Parameters During Position Control Classification 09: Zero Return Parameters Classification 10: Communication Settings Parameters (\*NTL only) Classification 15: Expansion Parameters (\*NTL only)



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#### Software

#### Programming

A maximum of 32 steps (64 steps for the NTL) can be programmed.

The step no. executed can be selected from the input port for the program selection no. When setting the steps, you can either set one step or multiple steps.

The function for each step is selected using the mode.

#### Mode types

- 0: INC Relative Positioning
- 1: ABS Absolute Positioning
- 2: ORG Zero Return
- 3: +TLS Search for + Directional Torque Limit
- 4: -TLS Search for Directional Torque Limit
- 5: +SIG + Direction Signal Detection

6: -SIG - Direction Signal Detection

7: SET Set the Current Position

8: CLR Clear the Deviation Counter

9: OUTI General Output - Instant

10: OUTB General Output - Coordinate Comparison (Large)

11: OUTS General Output - Coordinate Comparison (Small)

	■ プログラム - [オンラインデータ]							×			
プログロ 分類05 2(モード また、モ・ 分類05 1(ご設定	ムを動/ 注2)に割 ード10 (共通/	作させる場合は 〈ラメータ「SelCh 〈定しておく必要だ 3+TSLJ「04-TS 〈ラメータ「Modes は入力ポートの「	angeMode 制御モー (あります。 にJで動作させる場合、 Switch モード切り替え CONT_MODEJをON(;	ド切替え入 :ソフトスイッ :しておく必	力による制御モー チ]を 要があります。	・ドの種類」を					
	No.	モード	移動量	速度(%)	トルク(×0.1%)	対象ポート	レンジロ	レンジ用	ウェイト(msec)	次	-
•	0	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	1	00:INC	0.0	100	500	0	0.0	0.0	0	-1	Ξ
	2	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	3	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	4	00:INC	0.0	100	500	0	0.0	0.0	0	-1	1
	5	00:INC	0.0	100	500	0	0.0	0.0	0	-1	1
	6	00:INC	0.0	100	500	0	0.0	0.0	0	-1	1
	7	00:INC	0.0	100	500	0	0.0	0.0	0	-1	1
	8	00:INC	0.0	100	500	0	0.0	0.0	0	-1	1
	9	00:INC	0.0	100	500	0	0.0	0.0	0	-1	1
	10	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	11	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	12	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	13	00:INC	0.0	100	500	0	0.0	0.0	0	-1	
	14	00:INC	0.0	100	500	0	0.0	0.0	0	-1	<b>.</b>
	45	00710	0.0	400	500	•			l		

### Software

#### Manual Operation

•

Perform various manual operations and monitor the current operational status.

💷 マニュアル動作 - 制御モード:位置	×
移動	- ステータス
サーボON/OFF サーボON サーボOFF 偏差カウンタクリア	サーボON/OFF 1:サーボON 動作状態 0:停止中 位置制御用
位置/押し当て(位置)制御	インポジション 1:インポジションON
起動速度 100.0 ← JOG動作 最高速度 1000.0 ← -移動 +移動	速度制御用 ゼロ速度 0:モータ回転中 速度到達 0:目標速度OFF
相対移動     150000.0 ◆     -移動     +移動       絶対移動     0.0 ◆     実行       位置指定     0.0 ◆     実行	トルクノ押し当て用 トルクリミット ロトルクリミットOFF
非常停止 減速停止	共通
シグナルサーチ 対象入力ポート 10:IN6/\イレベル↑ ・ 速度(%) 100 テ 一方向移動 +方向移動	アラーム     0:アラームなし       モータの回転数(rpm)     0       モータの電流(%)     1.2       指令現在位置     0.0       エンコーダ位置     0.0
押し当て(位置)制御 原点復帰 トルクリミットサーチ 一方向移動 (+方向移動) 速度/トルク制御	出力 1 VELO_ZERO 2 ALARM 3 TRQ_LMT 4 VELO_COIN CONT_MODE 6 VELO_DIR
──方向移動 (+方向移動) 停止	通信エラーステータス 0:エラーなし

### **Quotation Request / Order Form**

# **Quotation Request / Order Form**

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□ Quotation □ Order

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	E-MAIL	

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Grand Total				

The total price does not include sales tax.

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Email: sales-div1@hp-vanguard.com



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ST-SERVE