TWSystem®
Two-Wire Step Motor System

Best suited for physical/chemical equipment, biochemical analyzers, and medical scientific analyzers

Tamagawa TAMAGAWA SEIKI CO., LTD.

TWSystem®

Two-Wire Step Motor

TW System/Two-wire Step Motor System requires only two wires to connect a dedicated controller to step drivers, and is a new step motor system which can concurrently connect the controller to maximum 16 drivers by daisy chain connection. In addition, there is no need to worry about miswiring because the two connection wires have no polarity. TW System, which enables you to perform the wire connection with only two non-polarity wires, provides the ultimate wire saving system to multiaxial devices.

Features

Wire saving

··· Only two wires are enough to connect a controller (including power supply) to a driver!

In case of the installation shown on the right page ○○○

The number of wires Reduced to a quarter

Resource saving

··· The consumption of copper is reduced due to the wire saving!

In case of the installation shown on the right page ○○○

The copper consumption Reduced by approx. 55%

Nonpolarity

··· Wirable without worrying about polarity because the two-wire system automatically judges the polarity when powered up!

Wiring check of all pins

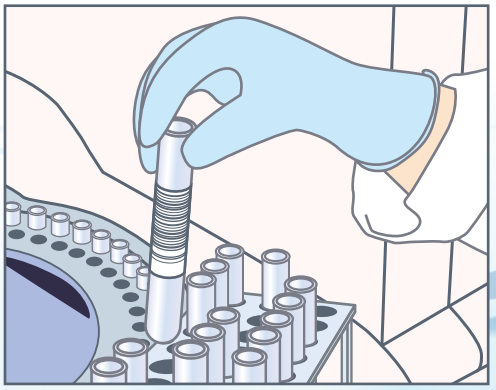
All you have to do is confirm the wires are connected!

No need to worry about miswiring

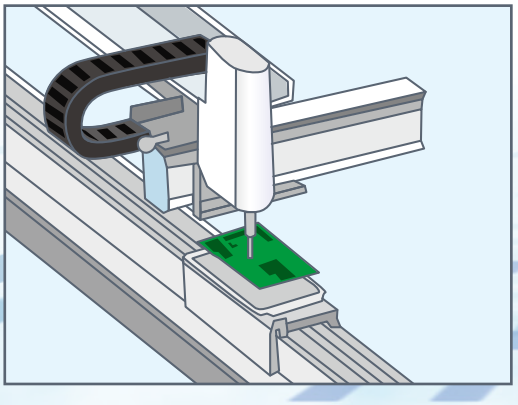
- Excitation-based driving method: Micro step (Default setting)/ Full step/Half step
- The step drivers provided with IO input (3 points) and DC 24 V output can perform the direct input of limit sensors.
- Controller: A maximum of 10A output/Connectable to a maximum of 16 axes/Provided with "Simple Program Function" which can perform simple operations up to 200 steps/Equipped with various protective function
- Corresponding to Modbus-RTU

Applications

- Medical scientific analyzers/Biochemical analyzers



- Actuators and the like for factory automation

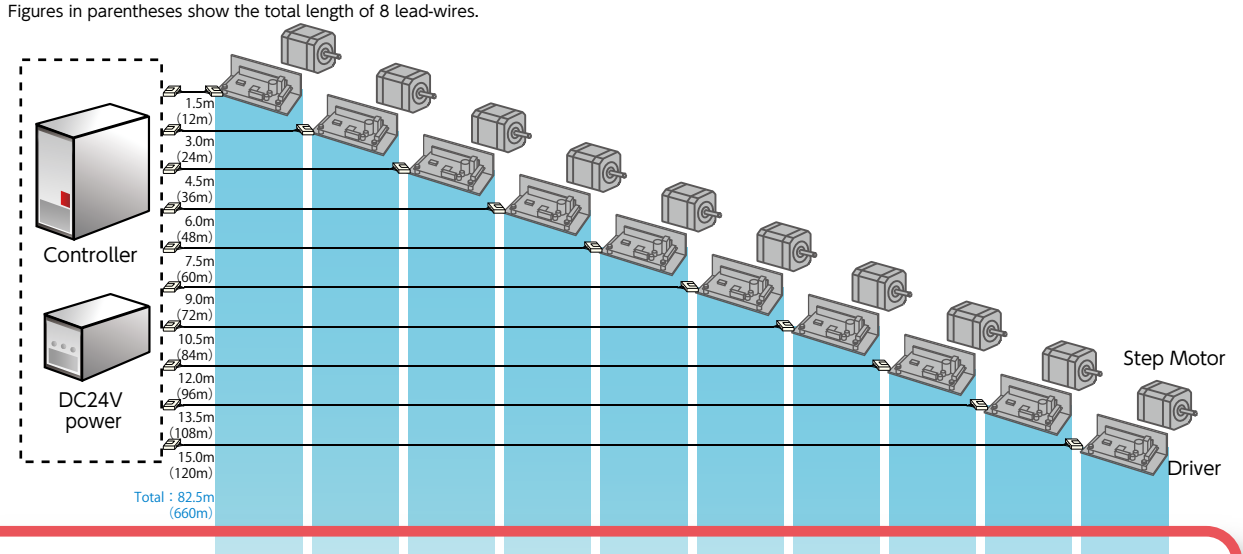


System

For example, in case of 10 axes installation

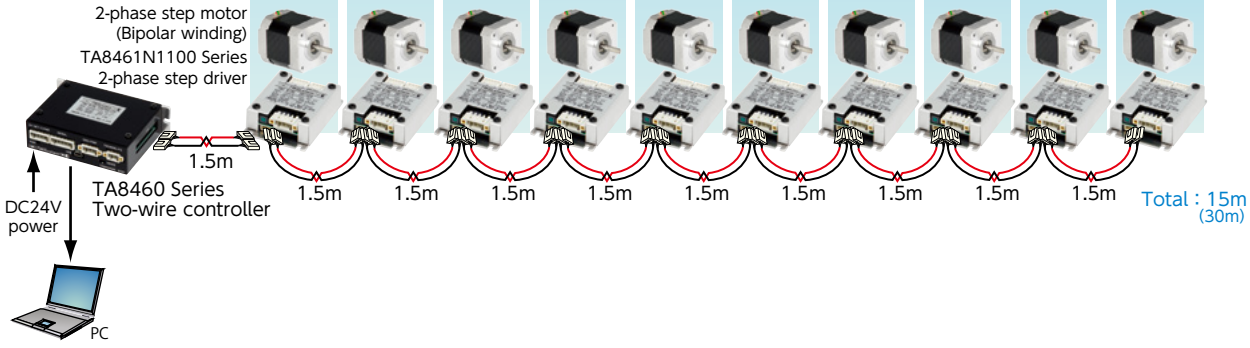
Conventional system

Figures in parentheses show the total length of 8 lead-wires.



New system

Figure in parenthesis shows the total length of 2 wires.



Conventional system

◆ Number of wires : 8wires※1 × 10axes = 80wires

◇ Consumption of copper for lead-wires※2 :

$$\underset{\text{Number of cables}}{8\text{wires}} \times \underset{\text{Total length}}{82.5\text{m}} \times \underset{\text{Cross section}}{0.1288\text{mm}^2} \times \underset{\text{Specific gravity}}{8.9} = 757\text{g}$$

New system

◆ Number of wires : 2wires × 10axes = 20wires

◇ Consumption of copper for lead-wires※2 :

$$\underset{\text{Number of cables}}{2\text{wires}} \times \underset{\text{Total length}}{15\text{m}} \times \underset{\text{Cross section}}{1.288\text{mm}^2} \times \underset{\text{Specific gravity}}{8.9} = 344\text{g}$$

※1 Power wire : One wire for each DC24V, and GND
Signal wire : Two wires for each CW±, CCW±, and Enable±

※2 The consumption is calculated based on AWG26 (0.1288mm²) for the conventional system, and on AWG16 (1.288mm²) for the new system. The specific gravity of copper is deemed to be 8.9.

Main specifications

- Power supply voltage…DC24V
- Communication protocol…USB(Ver2.0 HID)、Modbus-RTU(serial)
- The number of connectable axes…Up to 16 axes

Two-wire Controller

TA8460 series

Features

- A dedicated controller to supply power and signals to Two-wire step drivers
- Corresponds to "Simple Program Function" which programs operation patterns up to 200 steps by using a special application.
- Output current = 10A Max.
- The number of connectable driver axes = Up to 16 axes
- The connection to upper-level sides※ is executed through serial communications (RS485/RS422/RS232C)
- Separation of control power supply and driving power supply (Control power is supplied via connector terminals of SV-NET)
- Provided with emergency stop input
- 12 inputs and 8 outputs (Also usable as expansion I/O)

※ Connection to upper-level sides: Modbus-RTU, communication sequencers, indicators, etc.

Model Configuration

TA 8460 N 0 1□ 1 E □00

- Hardware spec.2: 1: Standard
- Output current: 1:10A, (2:20A)※
- Hardware spec.1: 1:2-wire controller spec.
- Software spec.: 00:Modbus-RTU (slave)
- Serial setting (Factory setting): 1:RS485, 2:RS422, 3:RS232C

※ Under development/Output current varies depending on model configurations.

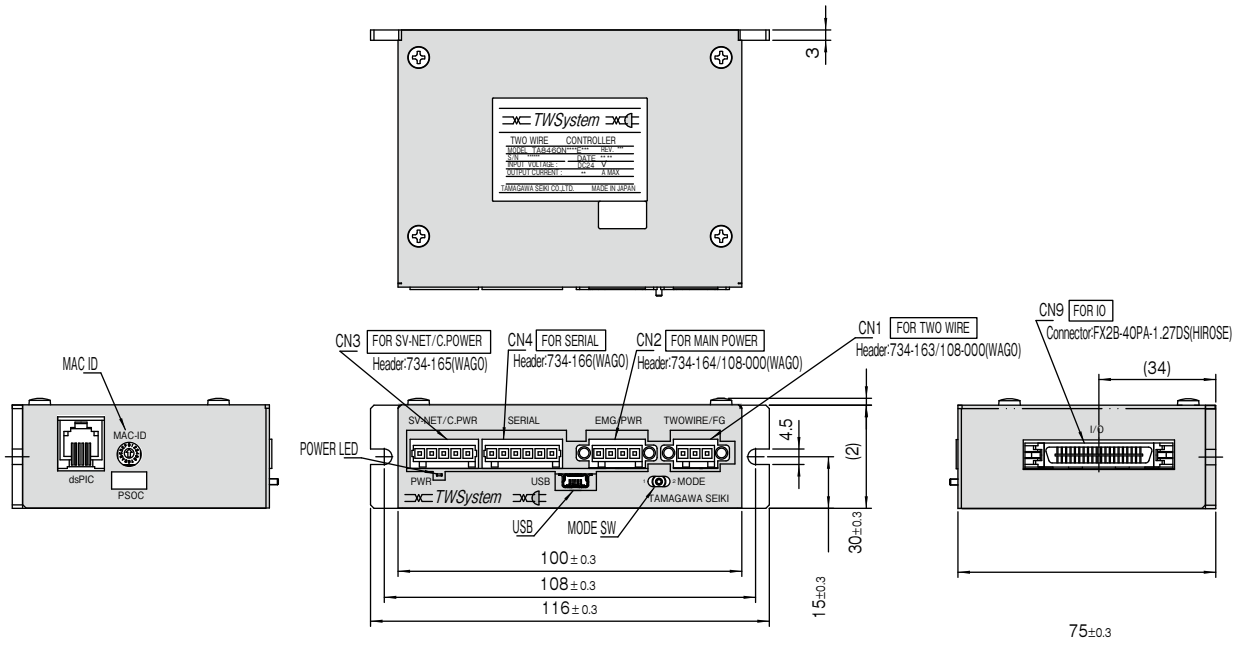
Basic Specifications

Item	Specification	Remarks
Control power	DC24V±10%	To prevent the inrush, avoid the intermittence in a live wire state.
	0.3A Max.	
Driving power	DC24V±10%	
	10A Max. (20A Max.※)	
Output current	10A (20A※)	The total number of the drivers to be connected shall not exceed this capacity.
Communication specification	Communication protocol:SV-NET (Under development)	
	Physical layer : CAN	
	Communication protocol : Modbus-RTU	
	Physical layer : RS485/RS422/RS232C	
I/O	Input : 12 points (Insulated) Output : 8 points (Insulated/Photo-coupler output	Output/Collector current = 120mA Max.
Expansion I/O	IO:8points (Users can set pins.)	Select from PWM×3, counter×3, encoder×1, AD×5, and DA×2
Program capacity	FRAM2KB	200 steps
Corresponding products	Two-wire step driver/Two-wire step motor	Each series of Tamagawa make TA8461/TA8464
Operating temperature	0 ～ +40℃	
Storage temperature	-10 ～ +85℃	
Operating humidity	90% Max.	No condensation
Compliance with	RoHS Directive	
Outline	W30×H116×D75 (mm)	
Mass	Approx. 250g	

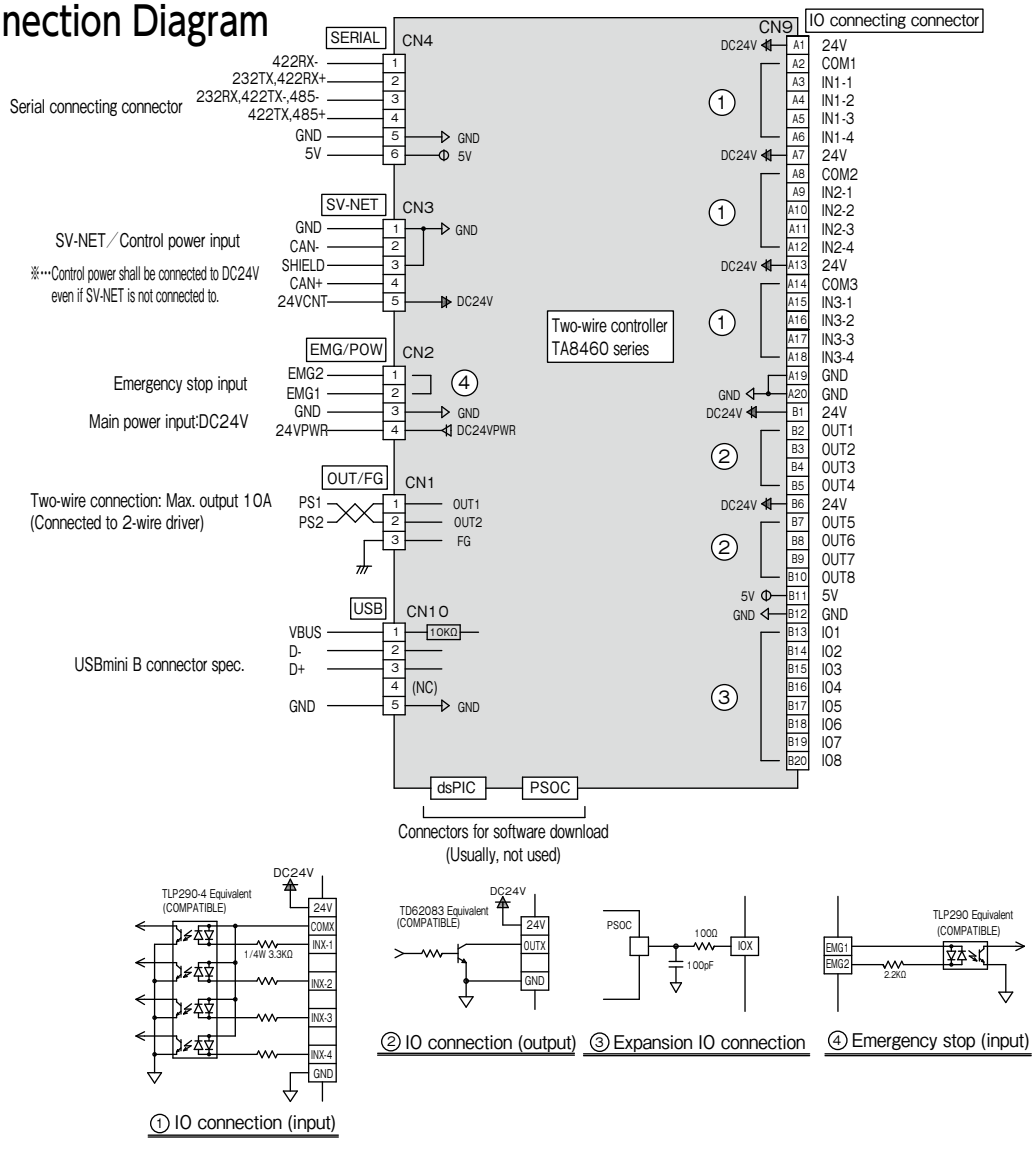
References

1.Two-wire controller	Serial communication specifications	MNL000186W00
2.Master of TWSystem	Programming manual	MNL000577W00
3.Master of TWSystem	Software manual	MNL000576W00

Outline

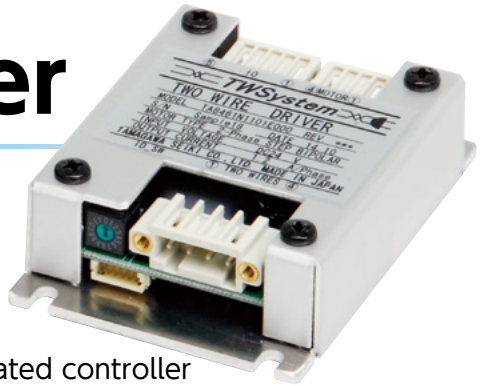


Connection Diagram



Two-wire Step Driver

TA8461N1100 series



Features

- A driver to drive a 2-phase step motor, connected to a dedicated controller
- 1.4A Max./phase output; Drives a 2-phase step motor with bipolar connection
- Compliant with RoHS
- Provided with 3 inputs usable for limit sensors (Possible to supply DC24V)
- A regeneration circuit is built in to suppress a voltage rise in an internal circuit
- Protective function: Overheat detection, voltage reduction, regeneration failure, etc.

Model Configuration

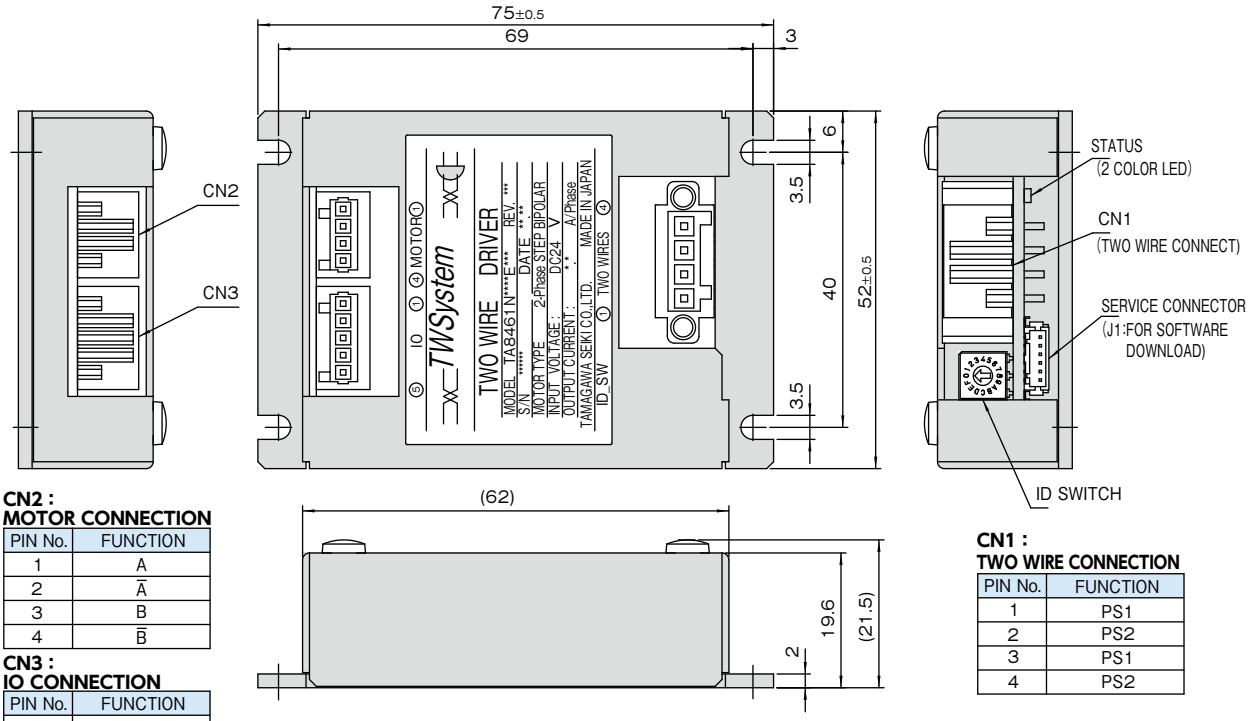
TA 8461 N 1 1 0 □ E 000

- 000: Software spec. 000:Standard spec.
- 1: Output current 1:1.4A/phase Max.
- 1: Conforms to 0:RoHS
- 0: Combined motor 1:2-phase bipolar step motor
- □: Mechanical connector spec. 0:Straight connector 1:Right-angle type connector

Basic Specifications

Item	Specification	Remarks
Power supply voltage	DC24V±10%	
Driving capacity	1.4A ／ phase Max.	
Communication specification	Communication protocol: 2-wire original	Connected to a dedicated controller
	Physical layer: 2-wire network	
Operating temperature	0 ～ +50℃	Heat dissipation measures to a housing are required under a high-temperature/high-load atmosphere.
Storage temperature	-10 ～ +85℃	
Operating humidity	90%Max.	No condensation
Outline	W52×H21.5×D75 (mm)	
Mass	75g typ.	
Basic step angle	1.8deg(recommendable)	Depends on combined motors
Excitation drive system	Full step/Half step/Micro step	Selectable through a dedicated controller
Protective function	Overheat detection, overvoltage/voltage reduction, and regeneration failure	Displayed by STATUS LED
External input	Input: 3 points	

Outline



CN2 :
MOTOR CONNECTION

PIN No.	FUNCTION
1	A
2	$\bar{A}$
3	B
4	$\bar{B}$

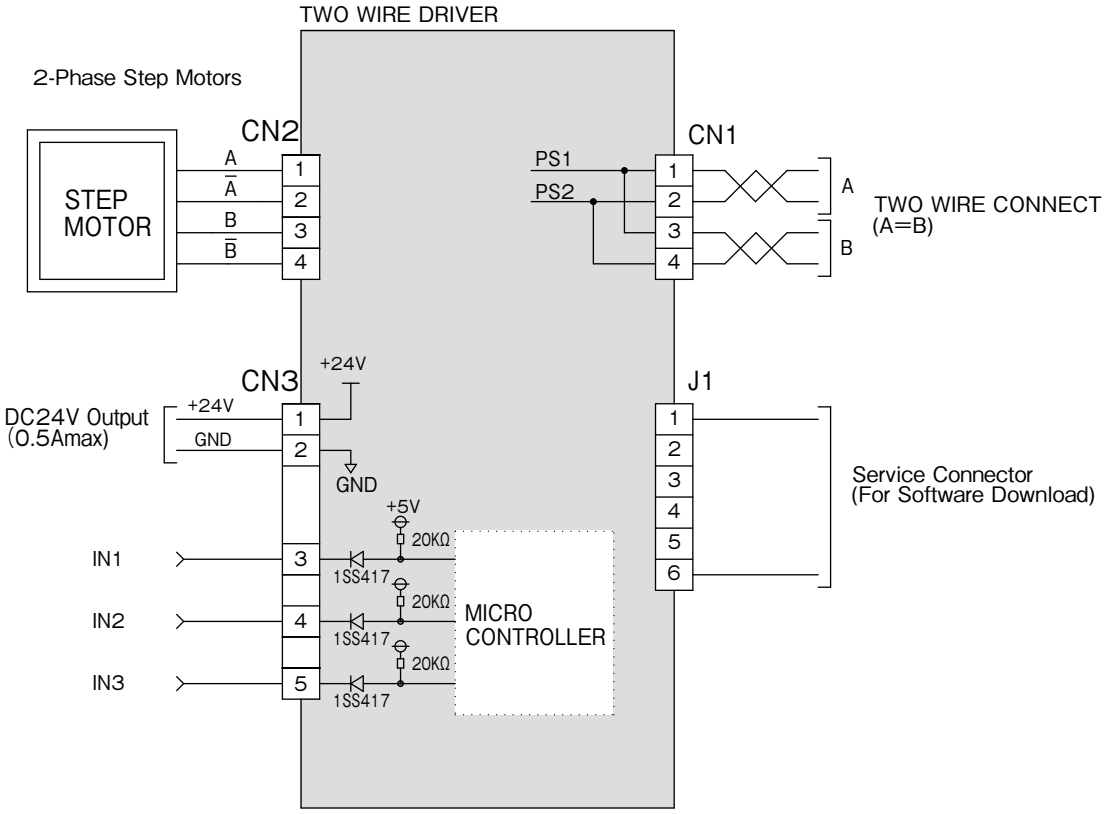
CN3 :
IO CONNECTION

PIN No.	FUNCTION
1	+24V
2	GND
3	IN1
4	IN2
5	IN3

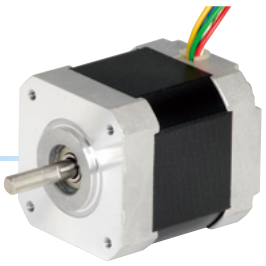
CN1 :
TWO WIRE CONNECTION

PIN No.	FUNCTION
1	PS1
2	PS2
3	PS1
4	PS2

Connection Diagram



Two-wire Step Motor



Combined Standard Motor

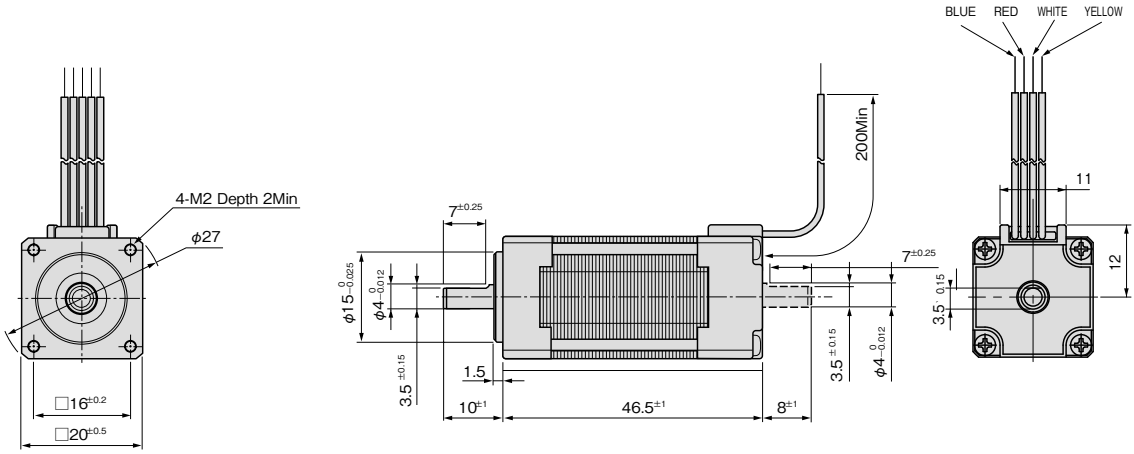
Lineup

Size	Step angle	winding method	Model number		Rated voltage	Rated current	Holding torque	Body size
mm	Deg.		Single shaft	Dual shaft	V/Phase	A/Phase	N·m(kgf·cm)	mm
□20	1.8	Bipolar	TS3692N42	TS3692N52	5.6	0.35	0.032 (0.32)	□20 X46.5
□28			TS3641N174	TS3641N175	1.5	1.4	0.123 (1.25)	□28 X47.5
□35			TS3214N12	-	4.3	1.0	0.18 (1.8)	□35 X40
□39			TS3139N13	-	12.0	0.4	0.2 (2)	□39 X37
□42			TS3617N549	-	4.2	1.13	0.354 (3.6)	□42 X39
			TS3617N574	TS3617N575	2.9	1.4	0.431 (4.4)	□42 X47
			TS3617N584	TS3617N585	6.0	1.4	0.883 (9.0)	□42 X61
□56.4			TS3653N434	TS3653N435	3.6	1.4	0.539 (5.5)	□56.4X39
□60			TS3606N24	TS3606N25	4.0	1.4	1.029 (10.5)	□60 X43.5

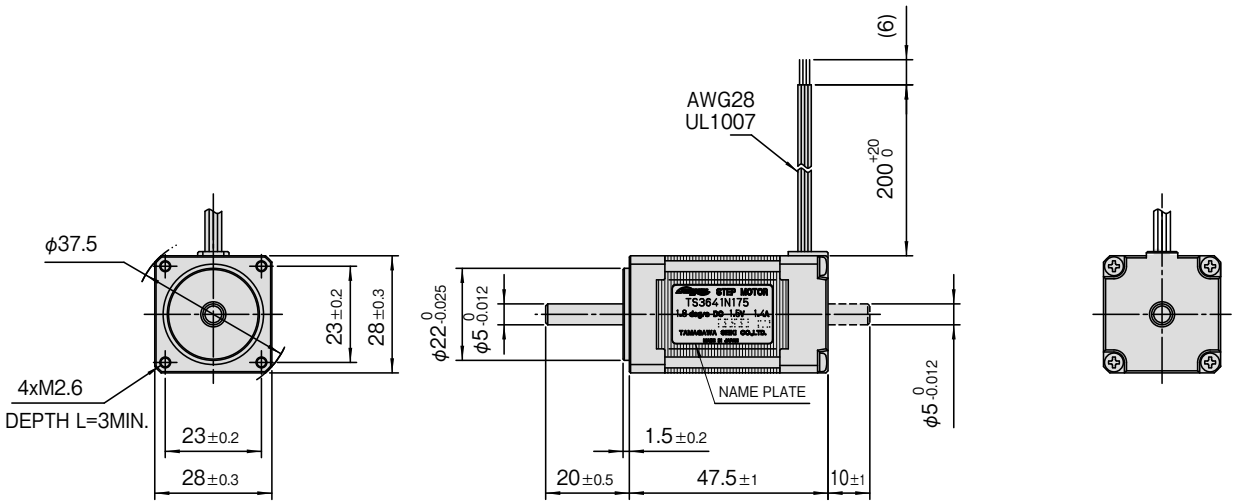
※The holding torque is not the value when a motor is combined but the designed value (For reference)
For outer shapes, refer to a separate outline drawing for each motor.
Please refer to us about the outline drawing of TS3617N549.

Outline

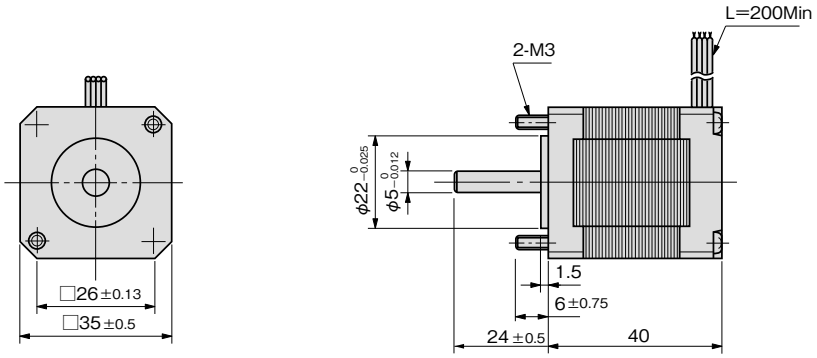
□20mm TS3692N42(single shaft),N52(Dual shaft)



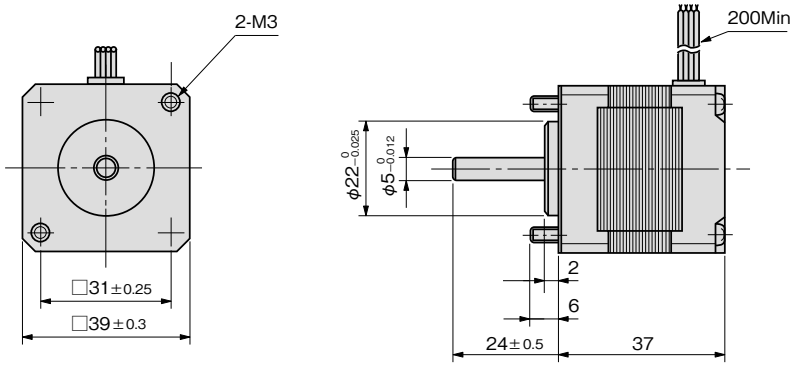
□28mm TS3641N174(Single shaft),175(Dual shaft)



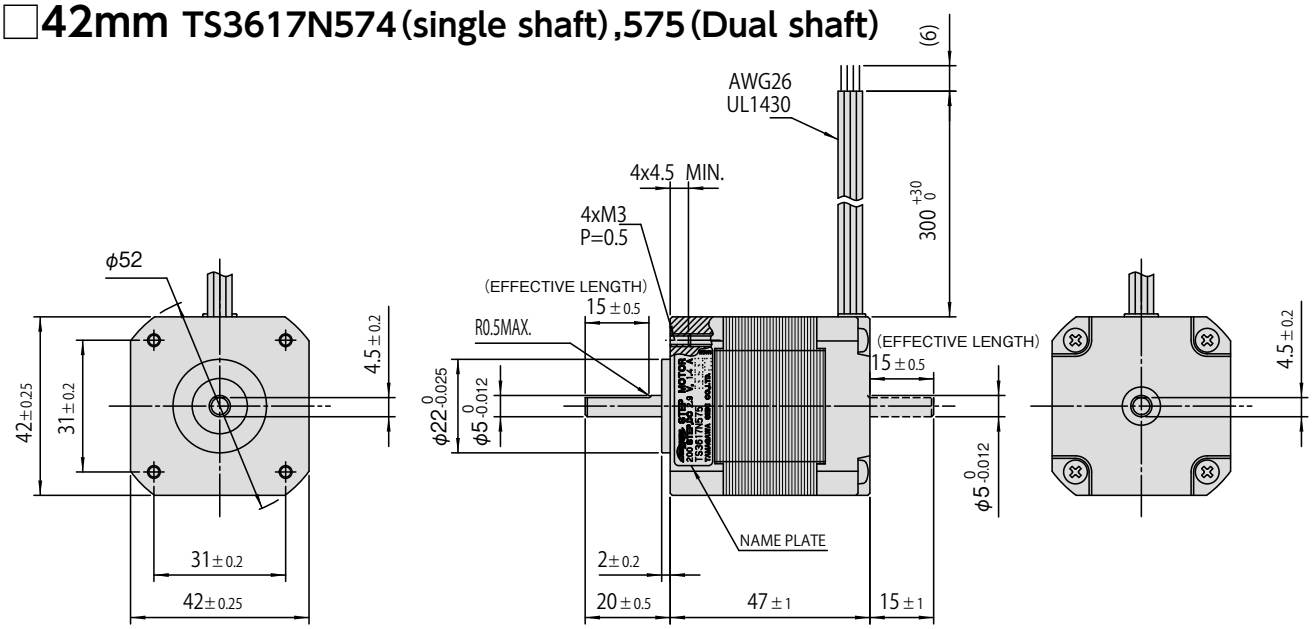
□35mm TS3214N12 (single shaft)



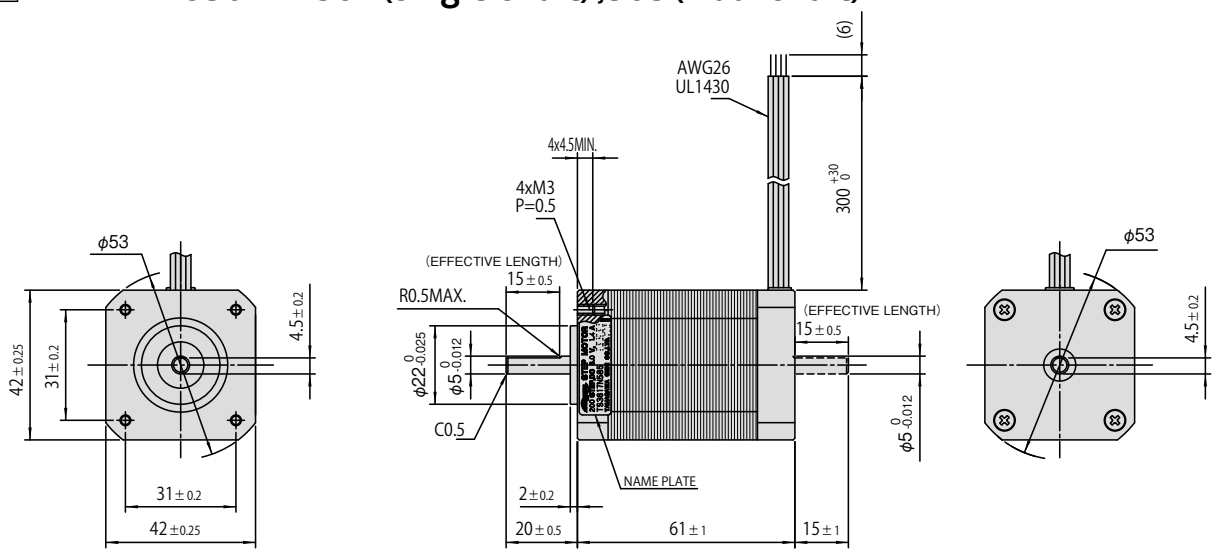
□39mm TS3139N13 (single shaft)



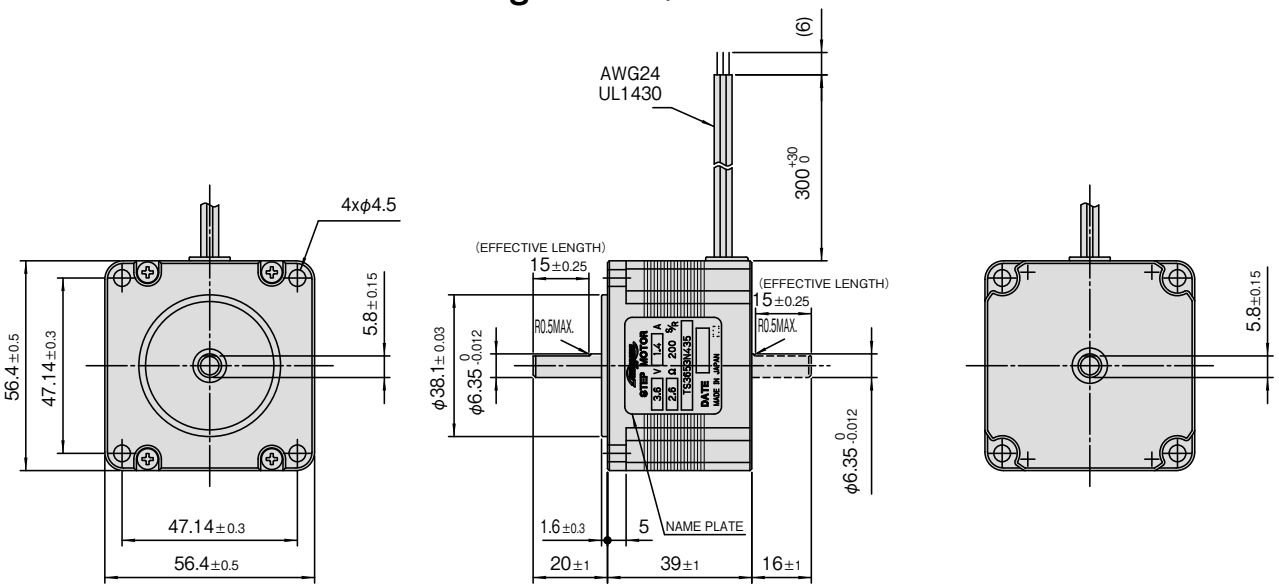
□42mm TS3617N574 (single shaft), 575 (Dual shaft)



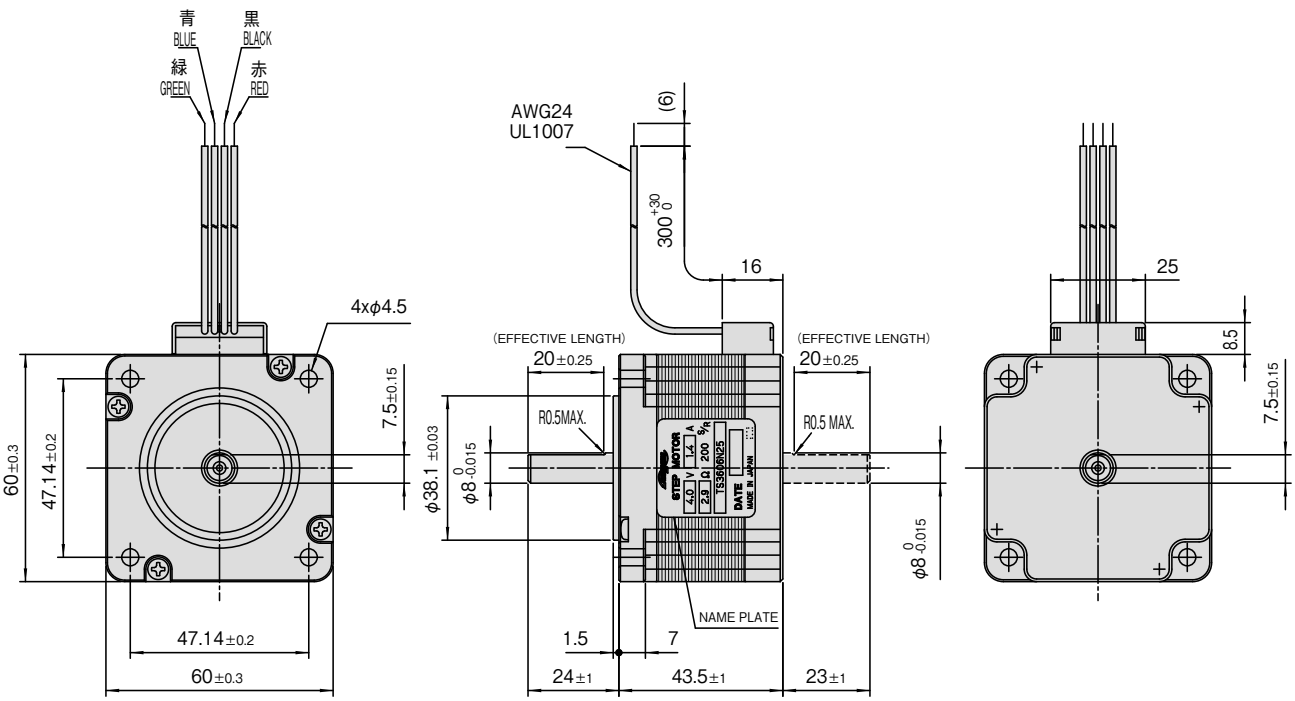
□42mm TS3617N584 (Single shaft), 585 (Dual shaft)



□56.4mm TS3653N434 (Single shaft), 435 (Dual shaft)



□60mm TS3606N24 (Single shaft), 25 (Dual shaft)

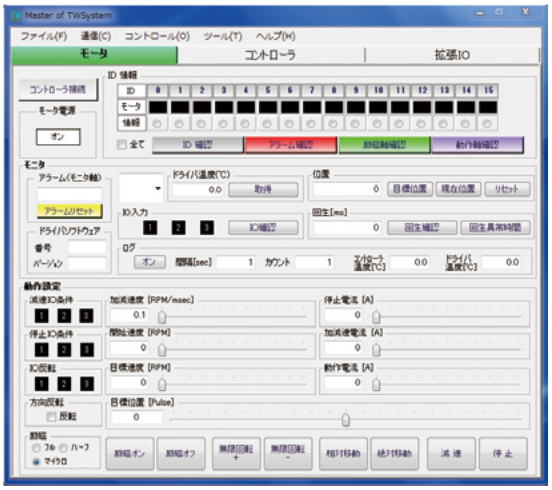


Special Application Software

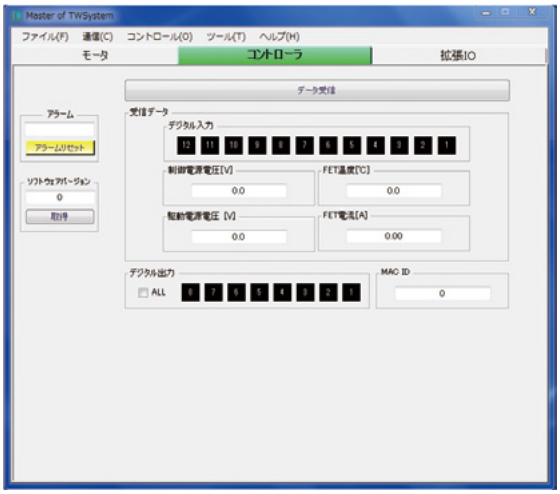
Master of TWSystem

Connects a PC to a Two-wire controller with a USB cable, sets and monitors various operations of the Two-wire system. In addition, the programming up to 200 steps and the standalone operation can be performed by the "Simple Program Function".

Start screen



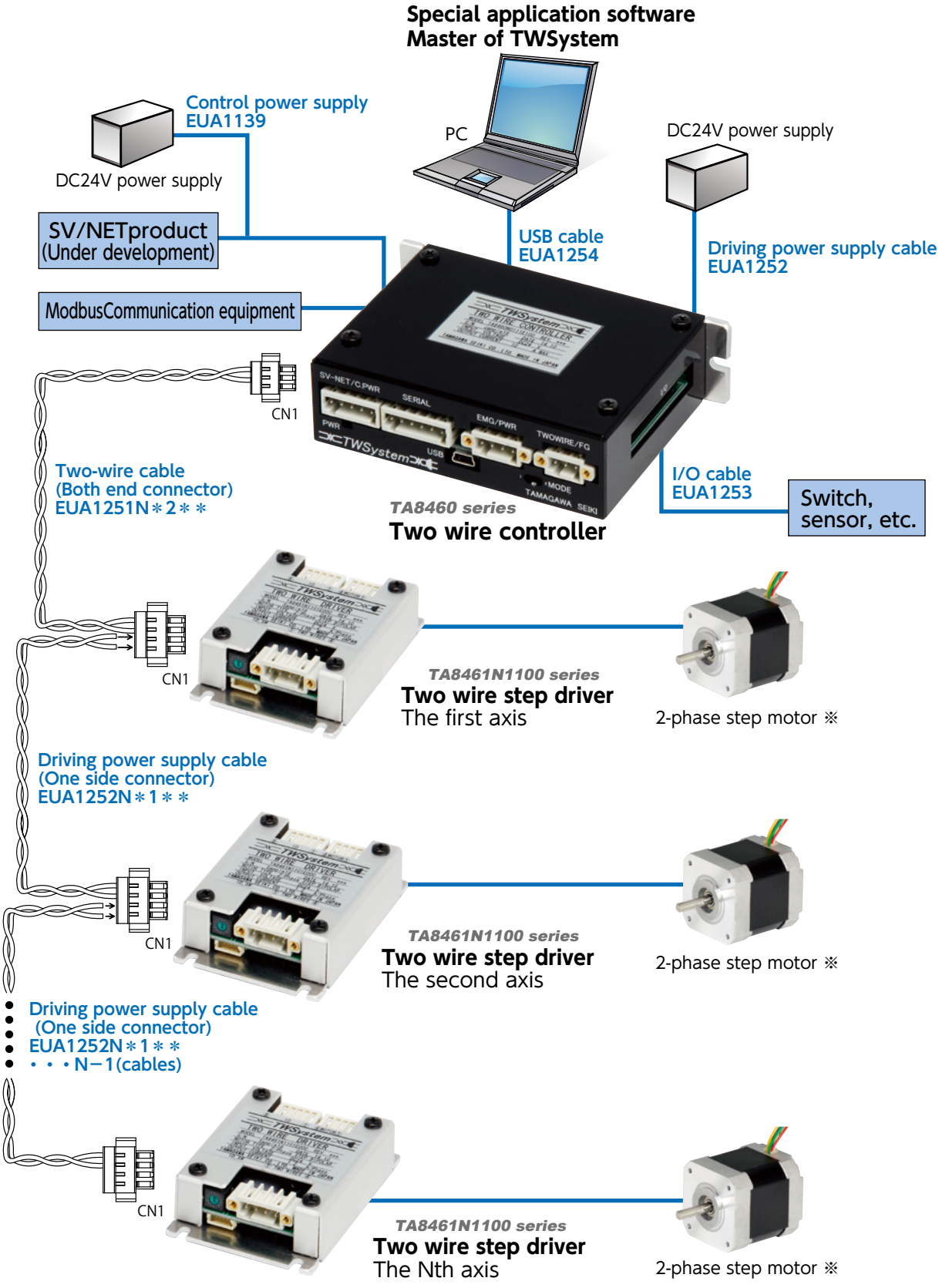
Motor setting screen



Controller monitor screen

Simple program screen

Connection diagram



※Connect the driver to the motor with driver/mating connectors.

Option

Two-Wire Cable for TW System RoHS compliant

Model No.

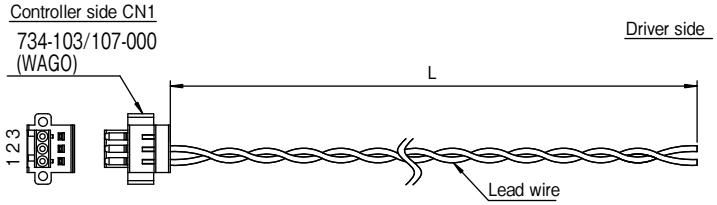
EUA1251N＊＊＊＊

- Current spec.
  - 1 : For 10A
  - 2 : For 20A
- Connector spec.
  - 0 : Lead wire only
  - 1 : One side connector (Controller side only)
  - 2 : Both end connector (Between controller and driver)
  - 3 : Shielding wire only
  - 4 : Shielding wire One side connector (controller side only)
  - 5 : Shielding wire Both end connector (Between controller and driver)
  - 6 : Both end connector (Between driver and driver)
- Lead length (By 100mm)

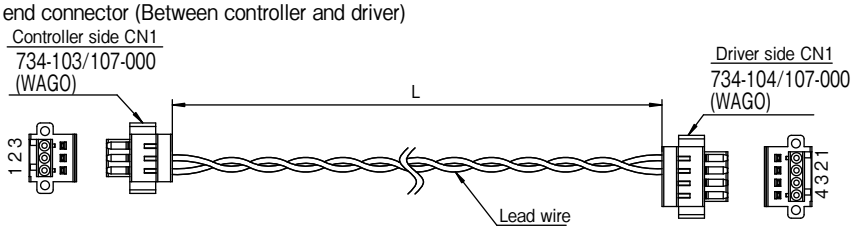
Model No.	L (mm)	Tolerance
EUA1251N**05	500	+50mm 0
EUA1251N**10	1000	+50mm 0
EUA1251N**30	3000	+100mm 0
EUA1251N**50	5000	+100mm 0

Outline

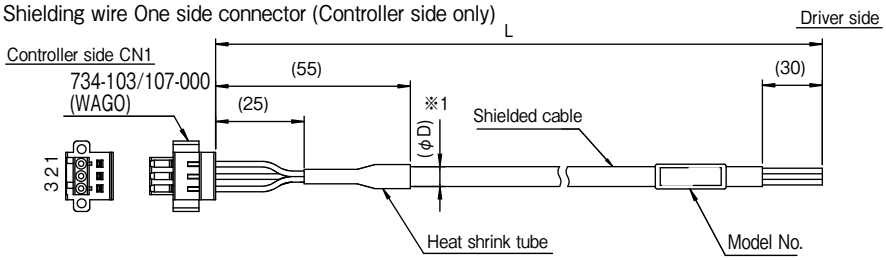
EUA1251N11** EUA1251N21** One side connector (Controller side only)



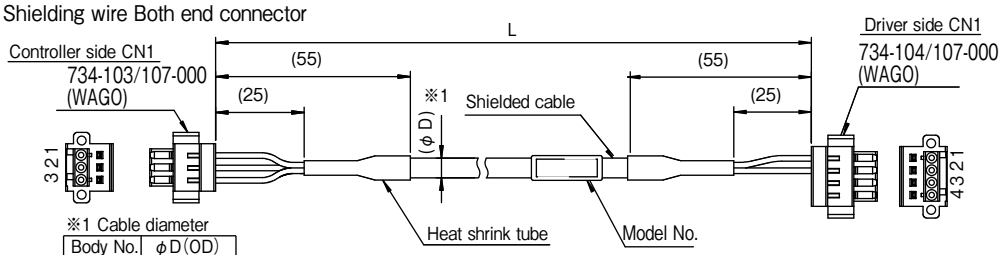
EUA1251N12** EUA1251N22** Both end connector (Between controller and driver)



EUA1251N14** EUA1251N24** Shielding wire One side connector (Controller side only)



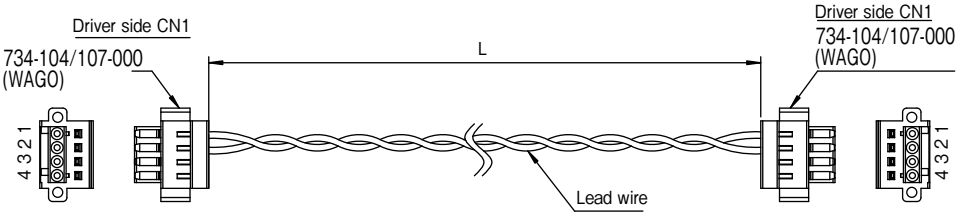
EUA1251N15** EUA1251N25** Shielding wire Both end connector



※1 Cable diameter

Body No.	φD(OD)
N1***	9.9mm
N2***	11.4mm

EUA1251N16** EUA1251N26** Both end connector (Between driver and driver)



Driving Power Supply Cable for TW System

RoHS compliant

(For controller power supply cable/driver Two-wire cable)

Model No.

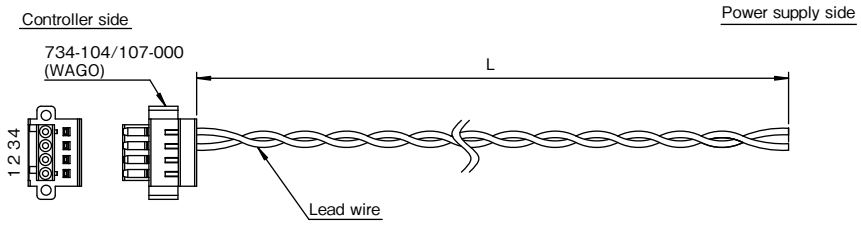
EUA1252N＊＊＊＊

- Current spec.
  1 : For 10A (UL1007, AWG#18) equivalent
  2 : For 20A (BEAMEX-ER5001, 1.25mm²) equivalent
- Lead terminal spec.
  1 : Lead wire extracted
  2 : With crimped terminal (M4)
- Cable length (By 100mm)
  05: 500mm
  10:1000mm
  30:3000mm
  50:5000mm

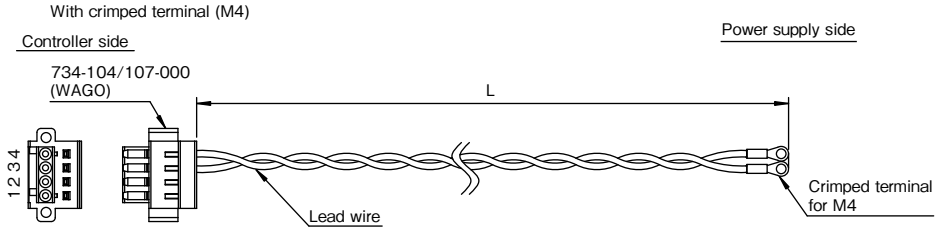
Model No.	L (mm)	Tolerance
EUA1252N**05	500	+50mm 0
EUA1252N**10	1000	+50mm 0
EUA1252N**30	3000	+100mm 0
EUA1252N**50	5000	+100mm 0

Outline

EUA1252N*1** One side connector



EUA1252N*2**



I/O Cable for TW System

RoHS compliant

Model No.

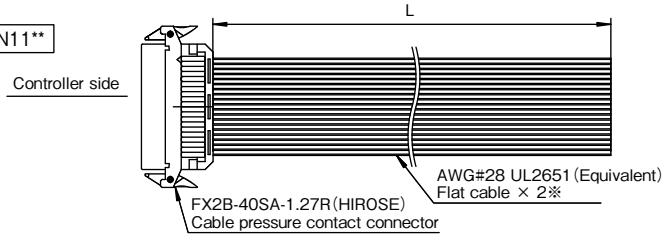
EUA1253N＊＊＊＊

- Connector spec.
  1 : One side connector (FX2B-40SA-1.27R)
  2 : Both end connector (FX2B-40SA-1.27R)
- Cable spec.
  1 : Flat cable
  2 : Shielded cable
- Cable length (By 100mm)
  05: 500mm
  10:1000mm
  30:3000mm
  50:5000mm

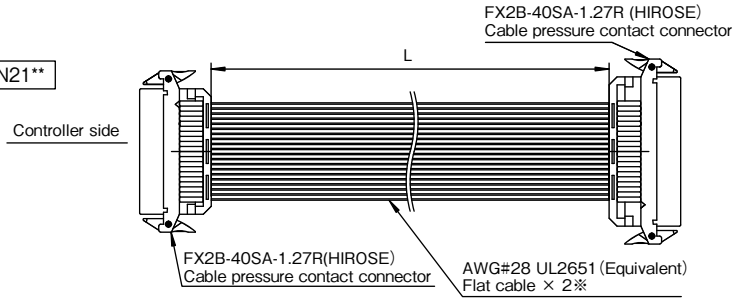
Model No.	L (mm)	Tolerance
EUA1253N**05	500	+50mm 0
EUA1253N**10	1000	+50mm 0
EUA1253N**30	3000	+100mm 0
EUA1253N**50	5000	+100mm 0

Outline

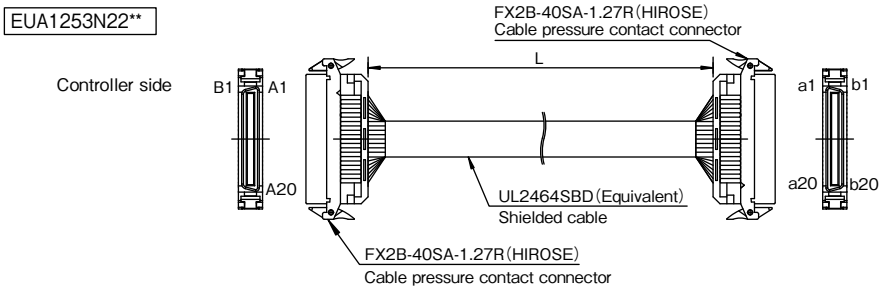
EUA1253N11**



EUA1253N21**



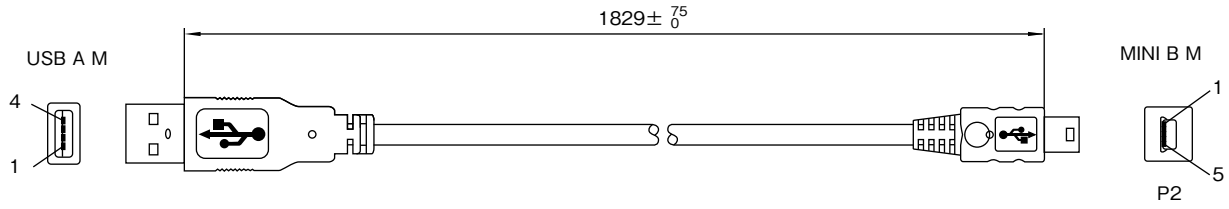
※Two flat cables with 20 cores are provided.
(One is for connector pins 1 to 20, and the other is 21 to 40.)



USB Cable

Model No. EUA1254N0018

Outline

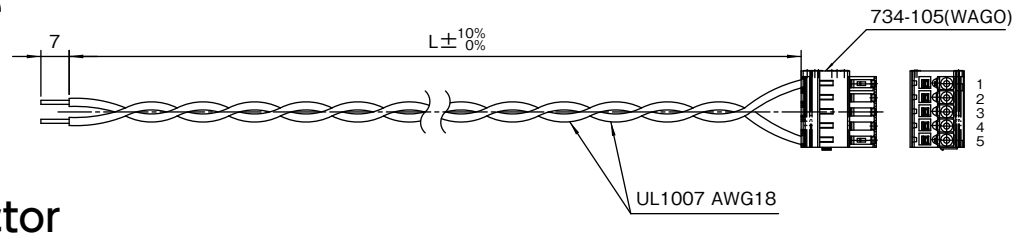


Control Power Supply Cable for TW System

Model No. EUA1139N0＊＊＊

Cable length (By 100mm)
001： 100mm
010： 1,000mm
100：10,000mm
Designation range:001～200 (0.1m～20m)

Outline



Connector

Please select mating connectors from the following:

- Connector set for Two-wire controller
  Model No. : EUA1378
  〔CN1:734-103/107-000、CN2:734-104/107-000、CN3:734-105、CN4:734-106 (WAGO)〕

- Connector set for Two-wire driver
  Model No. : EUA1379
  〔CN1:734-104/107-000、CN2:733-104、CN3:733-105 (WAGO)〕

Tamagawa® 多摩川精機株式会社

販売会社

多摩川精機販売株式会社
TAMAGAWA TRADING CO.,LTD.

本　社　〒395-0063　長野県飯田市羽場町1丁目3番1号

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■Overseas Sales Department

Head quarters : 1-3-1, HABA-cho, IIDA-City, NAGANO-Pref, 395-0063. JAPAN

PHONE : +81-265-56-5423　FAX : +81-265-56-5427

■各種お問い合わせ

〒395-0063　長野県飯田市羽場町1丁目3番1号　TEL(0265)56-5421,5422　FAX(0265)56-5426

製造会社

多摩川精機株式会社

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■第3事業所	〒399-3303	長野県下伊那郡松川町元大島3174番地22	TEL(0265)34-7811	FAX(0265)34-7812
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⚠ Safety Warning

●To ensure proper and safe use of our products, please read the "SAFETY PRECAUTIONS" carefully before using them.

WARRANTY

Tamagawa Seiki sets a warranty period of one (1) year from the date of factory shipment, during which period we warrant that our products are free of defects, except quality degradation by design or by accident on the part of the user. Even after the warranty period, however, we will be willing to offer repair services necessary for maintaining the product quality. Even though each of our products has a very long MTBF (mean time between failures) that is based on meticulous prediction, the predictable failure rate is not zero. It is advisable, therefore, that you take into account possible aftereffects due to malfunctions of our products, and incorporate multiple safety measures in your systems and/or products so as to prevent any consequential trouble.

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