IAI
Quality and Innovation

Applicable to Fieldbus

Table Top Type Robot TT
First Step Guide First Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual (CD) included with the product in addition to this First Step Guide to ensure correct use.
This Instruction Manual is original.

Warning : Operation of this equipment requires detailed installation and operation instructions which are provided on the CD Manual included in the box this device was packaged in. It should be retained with this device at all times.
A copy of the CD Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

Product Check

This product is comprised of the following parts if it is of standard configuration.
If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts

No.	Part Name		Model	Reference
1	Controller Main Body (with a built-in controller)		Refer to “How to read the model plate”, “How to read the model No.”	
Accessories				
2	Power Supply Plug		AP-400-C (Supplier : Yamate Electric Co., Ltd.)	
3	Fieldbus Connector	DeviceNet type	SMSTB2.5/5-ST-5.08AU (Supplier : PHOENIX CONTACT)	
		CC-Link type		
		PROFIBUS-DP type	Prepare Dsub 9-pin (female) connector.	
4	Fieldbus Terminal Resistance	DeviceNet type	Prepare it if the controller is terminating device	121Ω±1%, 1/4W
		CC-Link type	130Ω1/2W, 110Ω1/2W enclosed one unit each	
		PROFIBUS-DP type		
5	First Step Guide			
6	Instruction Manual (CD)			
7	Safety Guide			

2. Optional Components

No.	Part Name	Model
1	Main Body Mounting Bracket (with set bolts and nuts)	TT-FT

3. Teaching Tool (Option)
The personal computer application software or teaching pendant is required for the operations including program creation and setup such as position setting and parameter setting with teaching. Use either of them.

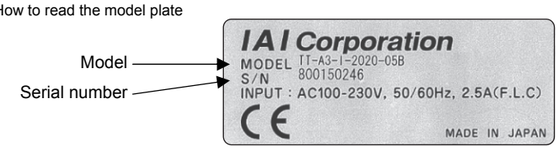
No.	Part Name	Model	Remarks
1	PC Software (with RS232C Cable + Emergency Stop Box)	IA-101-X-MW	RS232C→RS232C*1
2	PC Software (USB conversion adapter + RS232C cable + Cable and Emergency Stop Box)	IA-101-X-USBMW	USB→RS232C*1
3	PC Software (with USB Cable + Dummy Plug)	IA-101-TT-USB	USB→USB*1
4	Teaching pendant	SEL-T	—
5	Teaching pendant (with deadman switch)	SEL-TD	—
6	Teaching pendant (with deadman switch + TP Adapter (IA-LB-TG))	SEL-TG	—
7	Teaching pendant	IA-T-X	—
8	Teaching pendant (with deadman switch)	IA-T-XD	—

*1 The communication port on the left is for the personal computer and on the right is for the TT.

4. Instruction Manuals related to this product, which are contained in the CD.

No.	Name	Manual No.
1	Table Top Type Robot TT Instruction Manual	ME0149
2	PC software IA-101-X-MW Instruction Manual	ME0154
3	Teaching pendant SEL-T/TD Instruction Manual	ME0183
4	Teaching pendant IA-T-X/XD Instruction Manual	ME0160
5	DeviceNet Instruction Manual	ME0124
6	CC-Link Instruction Manual	ME0123
7	PROFIBUS-DP Instruction Manual	ME0153

5. How to read the model plate



6. How to read the model No.
Model No. Example **TT — A3 — I — 2020 — 05B — DV**
1) 2) 3) 4) 5) 6)

1) Series	2) Type	3) Encoder type	4) XY Stroke	5) Z Stroke	6) Option
TT (Normal)	A2 : Gate Type with 2-axis C2 : Cantilever Type with 2-axis	I: Incremental	2020 200 × 200mm 4040 400 × 400mm	-	DV : DeviceNet Type CC : CC-Link Type PR : PROFIBUS Type ET : Ethernet Type FT : Main Body Mounting Bracket included P : I/O PNP Type Not Specified : I/O NPN Type
	A3 : Gate Type with 3-axis C3 : Cantilever Type with 2-axis			05B 50mm 10B 100mm	

Basic Specifications

[Common Specifications]

Item	Specifications
Surrounding air temperature/humidity	0 to 40°C, Room Humidity 20 to 85% or less
Motor Type	Pulse Motor (Servo Control)
Position detection method	Incremental Encoder
Driving System	Ball Screw (ϕ10mm, Rolled C10), Ball Screw Lead 6mm
Positioning Repeatability	±0.02mm
Backlash	0.1mm or less
Guide	Direct Driven Infinite Circulation Type
Allowable Load Moment Note 1	Ma : 6•5N•m Mb : 9.3N•m Mc : 16.4N•m

Note 1 Value found on the assumption of the life of 5000km run

[Individual Mechanism Specifications]

Type		Stroke [mm] X Axis	Stroke [mm] Y Axis	Stroke [mm] Z Axis	Max. Speed for each axes [mm/sec] X Axis	Max. Speed for each axes [mm/sec] Y Axis	Max. Speed for each axes [mm/sec] Z Axis	Acceleration/ Deceleration [G]	Max. Load Capacity [kg] Note 1 X Axis	Max. Load Capacity [kg] Note 1 Y Axis	Max. Load Capacity [kg] Note 1 Z Axis	Weight [kg]	Model
Gate Type with	2-axis	200	200	-	300			0.3	10	5	-	14.8	TT-A2-I-2020
		400	400	-								33	TT-A2-I-4040
	3-axis	200	200	50	300		280	0.3	10	-	2	16.5	TT-A3-I-2020-05B
				100	300								TT-A3-I-2020-10B
		400	400	50	300		280					35	TT-A3-I-4040-05B
				100	300								TT-A3-I-4040-10B
Cantilever Type with	2-axis	200	200	-	300			0.2	-	4	-	16.3	TT-C2-I-2020
		400	400	-								35	TT-C2-I-4040
	3-axis	200	200	50	300		280	0.2	-	-	2	18	TT-C3-I-2020-05B
				100	300								TT-C3-I-2020-10B
		400	400	50	300		280					37	TT-C3-I-4040-05B
				100	300								TT-C3-I-4040-10B

Note 1 The load capacity in the case of rated acceleration is shown (Gate Type: 0.3G, Cantilever Type: 0.2G)

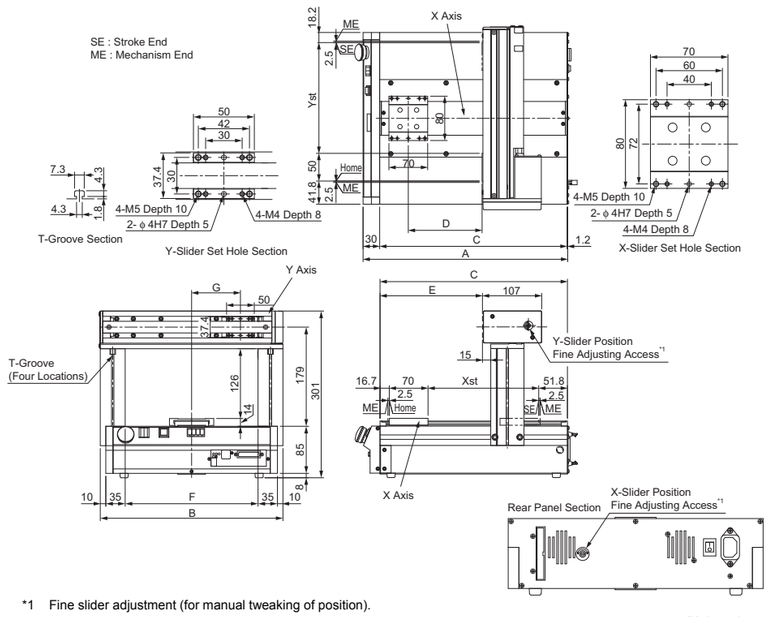
[Controller Specifications]

Item		Specifications	
Number of axes		2-axis	3-axis
Supply voltage		Single-phase 100 to 115V AC, 200 to 230V AC ±10%	
Power frequency		50Hz/60Hz	
Power-source capacity	100V AC	150VA	210VA
	200V AC	155VA	215VA
Maximum Current Note 1		3A (100V AC), 1.6A (200V AC)	4.2A (100V AC), 2.2A (200V AC)
Rush Current Note 2		15A (100V AC), 30A (200V AC)	
Leakage Current		0.75mA	
Insulation Strength		2000V AC for 1min.	
Momentary Power Interruption Tolerance		500μs or more	
Speed Setting		1 to 300mm/s	
Acceleration Setting		0.01 to 0.3G	
Program language		SEL language	
Number of programs (Number of multitask programs)		64 programs (16 programs)	
Number of program steps		6000 steps (Total)	
Number of positions		3000 positions (Total)	
Program Startup		Special Digital Switch + Special Start Switch	
Data storage device		Flash ROM + SRAM Note 3	
Standard I/O Board		16 Input Points / 16 Output Points	
Applicable Field Bus		DeviceNet/CC-Link/PROFIBUS/Ethernet	
Protective functions		Over-voltage, motor over current, motor overload, driver temperature error, encoder error, etc.	

Note 1 The current reaches its maximum level when the servo-motor exciting phase is detected which is to be performed in the first servo-motor turning ON processing after the power injection. (Normal: Approx. 1 to 2sec, Max.: 10sec)
Note 2 Rush current at the power connection continues for about 20ms. Consider the safety rate at the time when rush current passes. The rush current value varies depending on the impedance of the power line.
Note 3 The SRAM data is not battery backed up. Accordingly, when the power is turned off, the data of flags and variables used in the program, are not saved. Take the greatest care.
The same procedure is applied when the program or position data is not written on the Flash ROM.

External Dimensions

[Gate Type with 2-axis TT-A2]

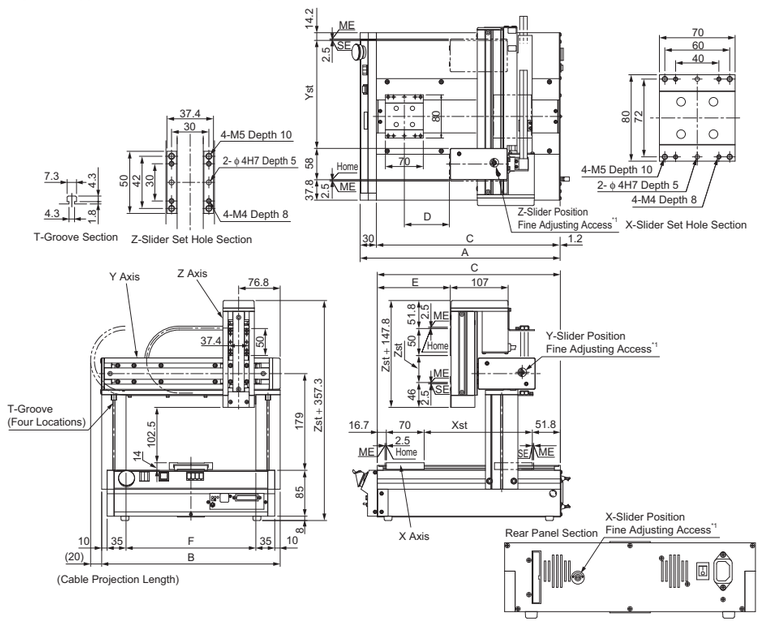


*1 Fine slider adjustment (for manual tweaking of position).

(Unit mm)

Model	A	B	C	D	E	F	G	Xst	Yst
TT-A2-I-2020	369.7	330	338.5	133.3	185	240	88.2	200	200
TT-A2-I-4040	569.7	530	538.5	333.3	385	440	188.2	400	400

[Gate Type with 3-axis TT-A3]

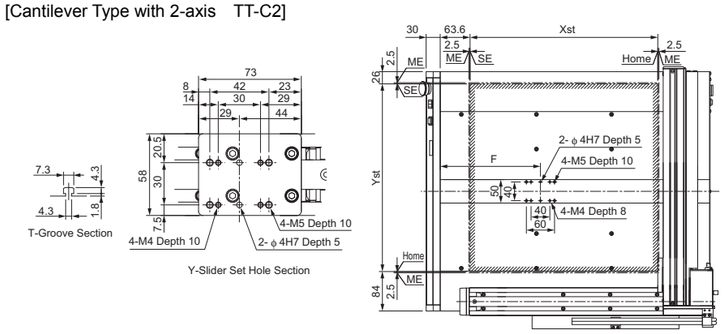


*1 Fine slider adjustment (for manual tweaking of position).

(Unit mm)

Model	A	B	C	D	E	F	Xst	Yst	Zst
TT-A3-I-2020-05B	369.7	330	338.5	83.3	135	240	200	200	50
TT-A3-I-2020-10B	369.7	330	338.5	83.3	135	240	200	200	100
TT-A3-I-4040-05B	569.7	530	538.5	283.3	335	440	400	400	50
TT-A3-I-4040-10B	569.7	530	538.5	283.3	335	440	400	400	100

[Cantilever Type with 2-axis TT-C2]

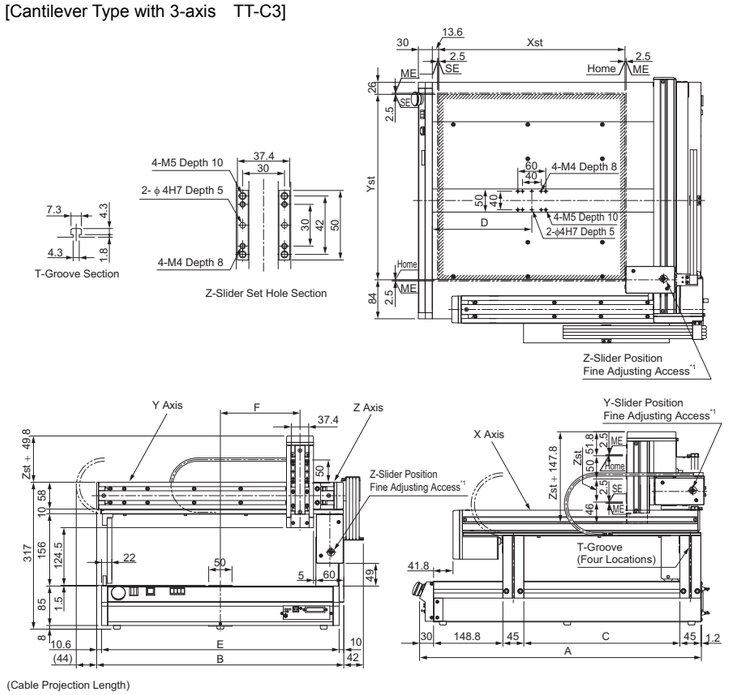


*1 Fine slider adjustment (for manual tweaking of position).

(Unit mm)

Model	A	B	C	D	E	F	Xst	Yst
TT-C2-I-2020	405	320	135	120	310	42	200	200
TT-C2-I-4040	605	520	335	213.6	510	142	400	400

[Cantilever Type with 3-axis TT-C3]



(Cable Projection Length)

*1 Fine slider adjustment (for manual tweaking of position).

(Unit mm)

Model	A	B	C	D	E	F	Xst	Yst	Zst
TT-C3-I-2020-05B	405	330.6	135	120	310	71	200	200	50
TT-C3-I-2020-10B	405	330.6	135	120	310	71	200	200	100
TT-C3-I-4040-05B	605	530.6	335	213.6	510	171	400	400	50
TT-C3-I-4040-10B	605	530.6	335	213.6	510	171	400	400	100

Installation Environment

This product is capable for use in the environment of pollution degree 2*1 or equivalent.
*1 Pollution Degree 2 : Environment that may cause non-conductive pollution or transient conductive pollution by frost. (IEC60664-1)

1. Installation Environment

Do not use this product in the following environment.
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity exceeds 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets
- Environment that blocks the air vent [Refer to Installation and Noise Elimination Section]

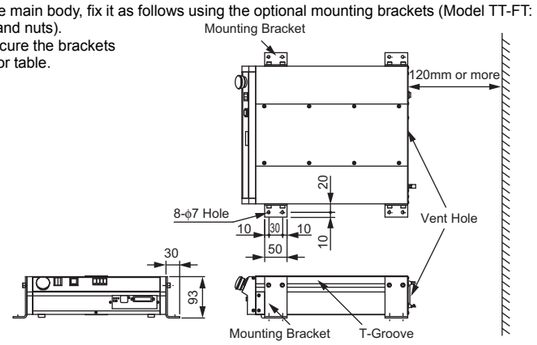
When using the product in any of the locations specified below, provide a sufficient shield.
- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

2. Storage and Preservation Environment

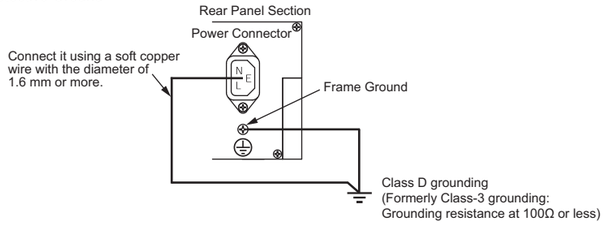
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

Installation and Noise Elimination

1. There is a cooling vent hole on the main body's rear panel section. Do not close the vent hole when the main body is installed.
2. When it required to fix the main body, fix it as follows using the optional mounting brackets (Model TT-FT: 4 sets with secure bolts and nuts).
   User supplied bolts to secure the brackets to the mounting surface or table.

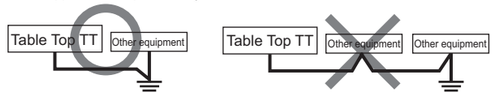


3. Protective Ground



4. Noise Elimination Grounding (Frame Ground)

Connect it using a soft copper wire with the diameter of 1.6 mm or more to the frame ground on the main body (Refer to the above figure).
Do not share the ground wire with or connect to other equipment. Ground each controller.
The same procedure is applied for the protective ground.

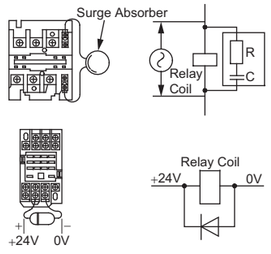


5. Precautions Regarding wiring Method

Separate the I/O cable, communication line and power / driving cable each other.

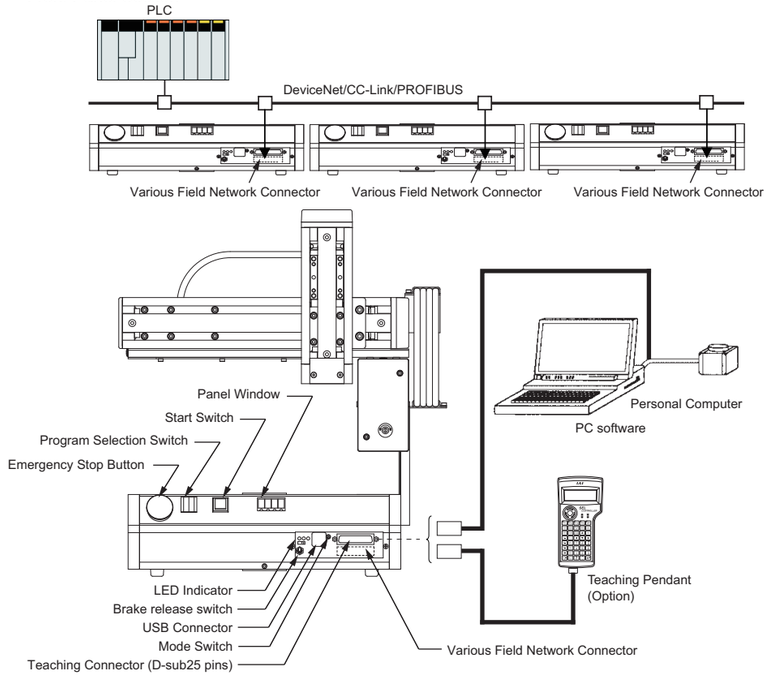
6. Noise Sources and Elimination

Carry out noise elimination measures for power devices on the same power path and in the same equipment. The following are examples of measures to eliminate noise sources:
1) AC solenoid valves, magnet switches and relays
   [Measure] Install a Surge Absorber parallel with the coil.
2) DC solenoid valves, magnet switches and relays
   [Measure] Install a diode parallel with the coil. Use a DC relay with a built-in diode.

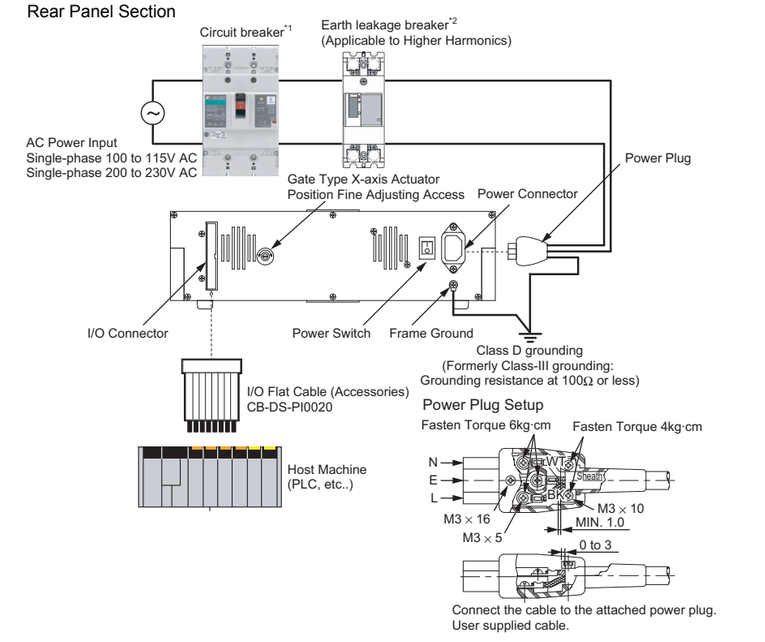


Wiring Diagram

Front Panel Section



Rear Panel Section

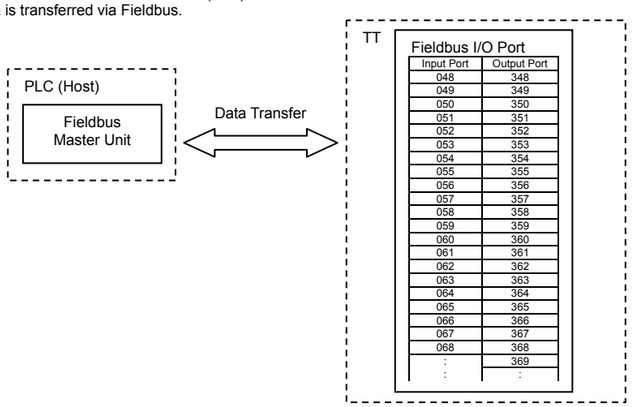


*1 For the selection of the circuit breaker, perform it according to the following items.
Breaker Teaching pendant Value > Power Capacity / AC Input Voltage
(Refer to the item for the controller specifications for the power capacity).
- The current reaches the maximum level when the servo-motor is turned on and the servo-motor exciting phase is detected. Select a circuit breaker with rated current that does not trip the TT's current.
- Select the circuit breaker that does not trip with the rush current described in the controller specifications. (Refer to the operating characteristic curve described in the manufacturer's catalog.)
- For the rated breaking current for the circuit breaker, select the breaking current value with which the current can be securely broken down even when short-circuit current passes.
  Rated Breaking Current > Short-circuit Current = Primary Power Supply Capacity / Power Voltage.
- Select the breaking current value for the circuit breaker leaving some margin.

*2 When the leakage breaker is to be installed, it is required to select it with the purpose clarified such as protection from fire or human body protection.
Measure the leakage current at the location where the leakage breaker has been installed.
Use the "applicable to higher harmonics type" leakage breaker.

I/O Port for TT Fieldbus

Fieldbus I/O port is a place where the data inside the master unit and TT is sent and received.
1 port can handle data of 1 contact (1 bit).
Data is transferred via Fieldbus.



Input Port	Output Port
048	348
049	349
050	350
051	351
052	352
053	353
054	354
055	355
056	356
057	357
058	358
059	359
060	360
061	361
062	362
063	363
064	364
065	365
066	366
067	367
068	368
:	369
:	:

- I/O Mapping

  Listed below are the I/O port numbers for TT.
  [Please refer to the “Table Top Type Robot TT Instruction Manual” for the details.]

	Port No.	Function		Port No.	Function
Internal DI	000	Start	Internal DI	300	ALM (Front Panel LED)
	001	(Software Reset)		301	RDY (Front Panel LED)
	002	(Servo ON)		302	EMG (Front Panel LED)
	003	(Automatic Start Start-up)		303	In Automatic Operation
	004	(Soft Interlock)		304	HPS (Front Panel LED)
	005	(Pause Release)		305	System Reservation
	006	(Pause)		306	
	007	Program No. appointment For digital switch of one’s digit		307	
	008			308	To switch ON/OFF internal DI – No.001
	009			309	To switch ON/OFF internal DI – No.002
	010			310	To switch ON/OFF internal DI – No.003
	011	Program No. appointment For digital switch of ten’s digit		311	To switch ON/OFF internal DI – No.004
	012			312	To switch ON/OFF internal DI – No.005
	013			313	To switch ON/OFF internal DI – No.006
	014	(Driving Power Cancellation Input)		314	To switch ON/OFF internal DI – No.014
	015	(Home Return etc.)		315	To switch ON/OFF internal DI – No.015
External DI	016 to 031	General-purpose Input (Rear Panel I/O Connector)	External DI	316 to 331	General-purpose Output (Rear Panel I/O Connector)
Internal DI	032	System Reservation	Internal DI	332	To specify 7-segment display digits
	033			333	
	034			334	System Reservation
	035			335	
	036			336	
	037			337	To refresh 7-segment display
	038			338	To alternately display 7-segment user and system
	039			339	To specify 7-segment user display
	040			340	DT0 (7-segment user display bit)
	041			341	DT1 (7-segment user display bit)
	042			342	DT2 (7-segment user display bit)
	043			343	DT3 (7-segment user display bit)
	044			344	DT4 (7-segment user display bit)
	045			345	DT5 (7-segment user display bit)
	046			346	DT6 (7-segment user display bit)
	047			347	System Reservation

External DI	048 to 287	For field network	External DI	348 to 587	For field network

Setting (I/O parameter)

No.	Parameter Name	Initial Value (Reference)	Input Range	Reference
1	I/O Port Allocation Type	1	0, 1	0: Fixed Allocation 1: Automatic Allocation (Order of Priority : Field Bus Port) →Standard I/O Board (Slot 1)
6	Extension I/O 1 Input Port Start Number at Fixed Allocation	48	−1 to 599	0+ (Multiples of 8) (Unavailable when it is negative figure)
7	Extension I/O 1 Output Port Start Number at Fixed Allocation	348	−1 to 599	300+ (Multiples of 8) (Unavailable when it is negative figure)
12	Extension I/O 1 Error Monitor	1	0 to 5	0: Non Monitoring 1: Monitoring * There are some exceptions
14	Network I/F Module Fix-Allocated Input Port Start No.	64	0 to 240	Multiples of 16
15	Network I/F Module Fix-Allocated Output Port Start No.	64	0 to 240	Multiples of 16

For TT, The number of the used ports can be changed with the parameter settings.
I/O Port Start Numbers are already determined.
Set the number of ports to use in Parameters No. 14 and 15.
Intput Port Start No.48
Output Port Start No.348

The occupied address area on the PLC side is determined by the number of used inputs and outputs.
Refer to Instruction Manual (CD) or the instruction manual of the master unit for the details.

DeviceNet

- Specification

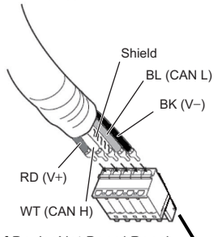
Item	Specification			
Communication Protocol	DeviceNet2.0 (Certified Interface)			
For Communication	Master/Slave Connection		Bit Strobe	
			Polling	
			Cyclic	
Baud Rate	500k/250k/125kbps			
Communication Cable Length (Note1)	Baud Rate	Max. Network Length	Max. Branch Line Length	Total Branch Line Length
	500kbps	100m	6m	39m
	250kbps	250m		78m
	125kbps	500m		156m
	(Note) When DeviceNet dedicated thick cable is used			
No. of Occupied Nodes	1 node			
Communication Power Supply	Voltage 24V DC±10% Current Consumption 60mA Externally Supplied (Supplied from DeviceNet communication cable side)			
Communication Cable	Dedicated cable for DeviceNet			

Note 1 Refer to the instruction manuals for the master unit and the mounted programmable logic controller (stated as PLC from now on) when a T-junction communication is to be conducted.

- Wiring

  For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

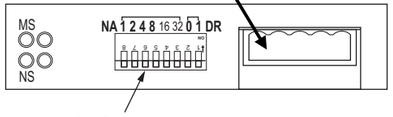
The connection connector is enclosed as a standard option.
Connector : SMSTB2.5/5-ST-5.08AU
(Supplier : PHOENIX CONTACT)

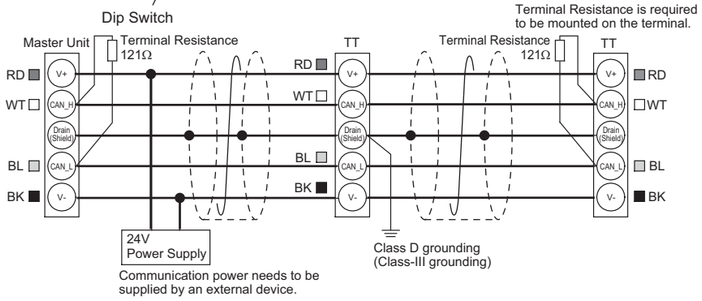


There is a sticker attached on the panel showing the corresponding cable colors.
Use the dedicated cable and connect the wires to the corresponding colors for the signal identification.

Color	Signal Type
RD	Power Supply Cable Positive Side (V+)
WT	Communication Data High Side (CAN H)
–	Shield
BL	Communication Data Low Side (CAN L)
BK	Power Supply Cable Negative Side (V–)

Picture of DeviceNet Board Panel





- Dip Switch Setting

  With the dip switches, it is possible to perform (1) Node Address Setting and (2) Baud Rate Setting.
  (Note) Make sure the power supply to TT is turned off when changing the settings on the dip switches.

  (1) Node Addresses (MAC ID) Setting
  Set the node addresses (MAC IDs) by using hexadecimal numbers following the table below:

	Dip Switch					
Node Addresses (MAC ID)	NA32	NA16	NA8	NA4	NA2	NA1
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
:	:	:	:	:	:	:
60	1	1	1	1	0	0
61	1	1	1	1	0	1
62	1	1	1	1	1	0
63	1	1	1	1	1	1

(Note) The node addresses comply with PLC remote I/O addresses. On this DeviceNet card, it is able to set 240 ports of input and 240 ports of output at maximum. Therefore, on the PLC, the number of node addresses that corresponds to the number of input and output ports is occupied.
Exercise caution to avoid node address duplication. [Refer to the PLC Instuction Manual for the details]

(2) Baud Rate Setting
Set the baud rate following the table below:

1 : ON 0 : OFF

	Dip Switch	
Baud Rate	DR1	DR0
125kbps	0	0
250kbps	0	1
500kbps	1	0
Setting Prohibited	1	1

CC-Link

- Specification

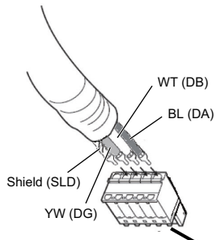
Item	Specification					
Communication Protocol	CC-Link Ver1.10					
Baud Rate	10M/5M/2.5M/625k/156kbps					
Communication System	Broadcast Polling System					
Synchronization System	Frame synchronization system					
Transmission Path Format	Bus format (EIA RS485 conformance 3-line type)					
Error Control System	CRC ($X^{16} + X^{12} + X^5 + 1$)*1					
No. of Occupied Stations	Remote Device Station [Refer to Field Network Wirings and Settings Section]					
Communication Cable Length(Note1)	Baud Rate	10Mbps	5Mbps	2.5Mbps	625kbps	156kbps
	Total Cable Length	100m	160m	400m	900m	1200m
Communication Cable	Dedicated cable for CC-Link					

Note 1 Refer to the instruction manuals for the master unit and the mounted programmable logic controller (stated as PLC from now on) when a T-junction communication is to be conducted.
*1 CRC : Cyclic Redundancy Check: It is a data error detection method often used for the synchronous transmission

- Wiring

  For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

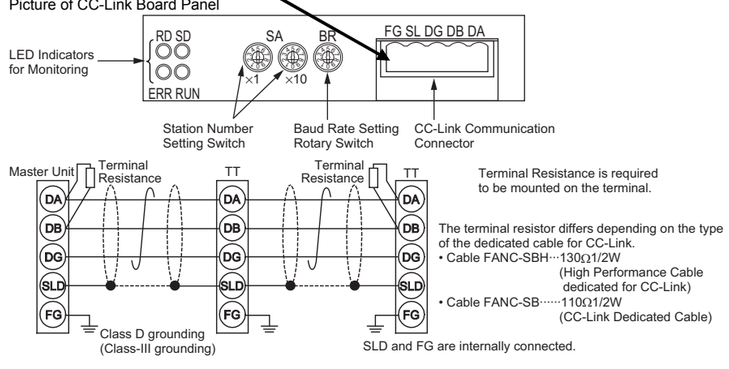
The connection connector is enclosed as a standard option.
Connector : SMSTB2.5/5-ST-5.08AU
(Supplier : PHOENIX CONTACT)



Use the dedicated cable and connect the wires to the corresponding colors for the signal identification.

Color	Signal Type
BL	Communication Line A (DA)
WT	Communication Line B (DB)
YW	Communication Ground Line (DG)
□	Shield (SLD)

Picture of CC-Link Board Panel



Terminal Resistance is required to be mounted on the terminal.

The terminal resistor differs depending on the type of the dedicated cable for CC-Link.
• Cable FANC-SBH···130Ω1/2W
(High Performance Cable dedicated for CC-Link)
• Cable FANC-SB·····110Ω1/2W
(CC-Link Dedicated Cable)

- Rotary Switch
  With the rotary switches, it is possible to perform (1) Station Number Setting and (2) Baud Rate Setting.

(1) Station No. Setting
For CC-Link, it is able to connect up to 64 stations at maximum.
Set the station numbers in the values from 1 to 64 by using the two rotary switches.
SA × 10 ····· Set the number of ten's place
SA × 1 ····· Set the number of one's place

Selected Number on Rotary Switch	Station No.	
	SA × 10	SA × 1
0	0	0
1	10	1
2	20	2
3	30	3
4	40	4
5	50	5
6	60	6
7	—	7
8	—	8
9	—	9

(Example) If you want to set the station number to 12, you need to set;
Rotary Switch SA × 10 to "1", and
Rotary Switch SA × 1 to "2".

(Note) The PLC's CC-Link head I/O address is decided depending on the master unit installation position and the number of I/O points occupied by the unit installed before it.
The I/O addresses in PLC will be asigned in the order of the station number with this head I/O address as the top number.
Also, for the details of the Station No. setting and I/O address setting in PLC, refer to the Instruction Manuals for the master unit and loaded PLC.

(2) Baud Rate Setting
The baud rate can be set with Rotary Switch BR.

Selected Number on Rotary Switch	Baud Rate
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
Prohibited to set to 5 or above	Error

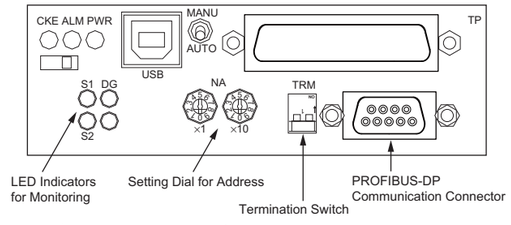
PROFIBUS-DP

- Specification

Item	Specification					
Communication Protocol	PROFIBUS-DP (RS485 conformance)					
Communication System	Hybrid System (Master-Slave System or Token Passing System)					
Baud Rate	9.6k to 12Mbps (Automatically follows the master)					
Communication Cable Length (Type A Cable)	Baud Rate	12/6/3Mbps	1.5Mbps	500kbps	187.5kbps	93.75/45.45/ 19.2/9.6kbps
	Total Cable Length	100m	200m	400m	1000m	1500m
No. of Occupied Nodes	1 node					
Communication Cable	Type A Cable for PROFIBUS-DP (Standard EN50170)					

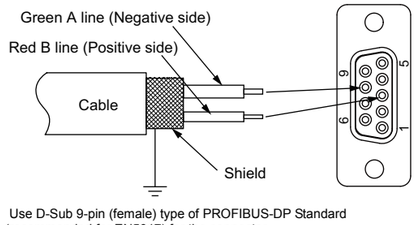
- Wiring
  For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

Picture of PROFIBUS-DP Board Panel

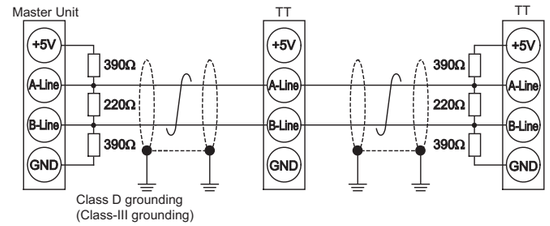


Pin No.	Signal Name	Detail
1	NC	Unconnected
2	NC	Unconnected
3	B-Line	Communication line B (Positive side)
4	NC	Unconnected
5	GND	Signal grounding
6	+5V	+5V output
7	NC	Unconnected
8	A-Line	Communication line A (Negative side)
9	NC	Unconnected
Housing	Shield	Cable Shield

Use the type A cable for PROFIBUS-DP (EN5017).



Use D-Sub 9-pin (female) type of PROFIBUS-DP Standard (recommended for EN5017) for the connector.



- Node Addresses Setting
  Settings of PROFIBUS-DP Slave Station Addresses can be done with × 1 on the left and × 10 on the right of the address setting dials.
  They are the rotary switches to set the node addresses for this controller.
  The controller is equipped with two switches, and both of them can select from 0 to 9.
  To set the address, Node Address Number = (Address Setting Dial × 10) + (Address Setting Dial × 1).
  Example)

Desired Station Number	Examples of Rotary Switch Setting	
	Setting of × 10	Setting of × 1
9	0	9
12	1	2

Note 1) For the PROFIBUS-DP station number settings, PROFIBUS-DP master station number is always set to 0. Thus the slave stations can be set to the numbers from 1 to 99.
Note 2) The node address setting shown above cannot be performed during a communication with the master.

- Bus Termination Setting

Termination Switch ON	Termination activated (Be careful not to turn it ON when the device is not connected to the ends since turning this switch ON may cause a bad influence or communication error to the bus communication.)
Termination Switch OFF	Termination not activated

- Network Type Setting
  The I/O Parameter No. 225 "Network I/F Module Control" has been set to "3_H" (PROFIBUS) when the unit is delivered. (Therefore, the setting is not necessary.)
- Node Addresses
  Station number is set with parameter.
  Set the node address to I/O Parameter No. 226 "Network I/F Module Communication Attribute 1". The setting range is from 0 to 125. (Set in delivery : 1)
  (Note) "D75: Fieldbus Parameter Error" would occur if the set address is out of the allowable range.
- Baud Rate Setting
  There is no need to set the baud rate since it automatically follows the master setting.

(Note) Make sure to reboot the controller after the parameter setting is complete, and do not forget to turn the mode changeover switch to "AUTO" side.

Starting Procedures

When using this product for the first time, pursue work while making sure to avoid omission and incorrect wiring by referring to the procedure below.

Check of Packed Items
Has everything been received?
No→ Contact us or our distributor.
↓Yes

Installation and Wiring
Perform the installation and wiring according to the instruction manual and this guide.
→ Point Check Item
• Is frame ground (FG) connected?
• Has the noise countermeasure been taken?
• Is the terminal treatment conducted on the shielded wire?
• Is the terminal resistance connected?
←Yes

Fieldbus Unit Initial Settings
Have the settings done for the mode settings, field network baud rate, node addresses (station numbers) and so on to suit to the system.
↓

Initial Setting of IAI Controller connected to Fieldbus Unit
• Have the settings for axis numbers.
• Parameter No. 14: Set the number of ports used for the network I/F card remote input
• Parameter No. 15: Set the number of ports used for the network I/F card remote output
• Have all other necessary parameter settings done.
↓

PLC (Master Unit) Baud Rate
Conduct the settings for the node addresses (station numbers) and baud rate.
→ Important Check Item
Is the programmed control sequence complied with the operation mode and the system?
←Yes

Power Supply and Alarm Check
Connect the personal computer or teaching pendant, set the AUTO/MANU switch to the [MANU] side and inject the power.
→ Check Item
Is the status display showing "rdy"?
No→ Deal with each condition depending on the status display.
(Refer to the status display description processing method)
↓Yes
↓

Communication Establishment Check
• Confirm that the communication has been established by checking the monitor LEDs.
[Refer to Troubleshooting Section.]
• Are the LEDs turned on in normal condition? Is PLC (master unit) side also in normal condition?
(Note) Refer to the PLC and master unit instruction manuals for the details how to check on the master unit side.
No→ Reconfirm all the settings following the procedure in this chart while referring to the Instruction Manual for each unit, controller and PLC.
↓Yes

Communication is established. Move on to the system operation check and adjustment.

Now it is ready for operation.

Troubleshooting

If an error has occurred, it is possible to check the operation condition on the status LEDs on the front panel.

- In the case of DeviceNet:

LED Indicators for Monitoring				Condition	Treatment
MS		NS			
GN	OR	GN	OR		
Illuminating	□	Illuminating	□	In normal operation	
Illuminating	□	OFF	OFF	Waiting for the completion of the node address duplication check on the master side	• Check if the communication speed of the master is the same as that for all the slave units. Correct the setting and re-start the machine. • Check if the connector is connected correctly.
Illuminating	□	Flashing	□	Waiting for the establishment of the connection with the master	• Check if the master is operated normally. • Check if it has been registered in the master's scanning list.
□	Illuminating	OFF	OFF	A hardware error occurred.	• Contact our company.
□	Flashing	OFF	OFF	Dip Switch Setting Error	• Check if the communication speed of this unit is the same as that of the master. • Check if the configuration has been set correctly.
Illuminating	□	□	Illuminating	Duplicated node address or Busoff (Communication stop due to frequent data error) detection	• Correct the node address and restart the machine. • Check if there is any noise source close to the unit or the communication cable is not arranged parallel to the power line, and check for the influence of the noise.
Illuminating	□	□	Flashing	Communication Time-out	• Check if the communication speed of this unit is the same as that of the master.
In NS, green light is turned ON and flashes repeatedly or red light and green light flash repeatedly.				Communication Error	• Check if it has been registered in the master's scanning list. • Check if the I/O area is not duplicated with that of the other slave unit. • Check if the I/O area does not exceed the area permitted by the master unit. (in the case of fixed allocation)

- In the case of CC-Link

STATUS1	STATUS0	Condition
Illuminating	Illuminating	Impossible condition
Illuminating	OFF	• An error occurs. (CRC Error, Station Setting Error or Communication Speed Setting Error) • Since turning the power ON or software reset till completion of CC-Link initialization
OFF	Illuminating	Normal Communication Status
OFF	OFF	Power Failure: Remote station power unit breakdown or communication cable breakage
Flashing	Illuminating	Impossible condition
Flashing	OFF	The station number setting or the baud rate setting is changed during the communication

- In the case of PROFIBUS-DP

LED	Color	Illumination Status	Indication Description (Meaning)
STATUS 1	GN	Illuminating	Online from fieldbus and communication in normal condition.
		Flashing	Offline from fieldbus.
	OR	Flashing	Communication error is occurred.
STATUS 0	GN	Illuminating	In normal operation.
		Flashing	Getting ready for operation.
	OR	Illuminating	An error detected on communication-related hardware during preparing for operation.

Troubleshooting

The following alarm displays are frequently generated at the start-up operation.
Deal with each of them referring to the following table.

Status display	Status contents	Cause and Remedy
ErG	During Emergency-stop	It is not an alarm. • It is caused when the emergency stop button is not cleared on the front panel. Clear it. • It is generated when the emergency stop switch in the teaching pendant or the personal computer application software is not cancelled. In such case, cancel it. • It is generated when the personal computer cable is not connected to the emergency stop box.
dSF	Deadman switch OFF	It is not an alarm. • It generated when the AUTO/MANU switch has been set to "MANU" and the personal computer or the teaching pendant is not connected. Connect the personal computer or the teaching pendant or set the AUTO/MANU switch to "AUTO". • When the actuator is to be started up, hold the deadman switch on the teaching pendant to turn it on.
ACF	AC Power Interruption Momentary Power Failure Power Voltage Drop	It is generated when the power voltage is not supplied. Check the power supply.
EE69	24V I/O Error	It is generated when the +24V power for I/O is not supplied. Check the power supply. (Procedure for starting up I/O 24V power unit without connection) Set both the I/O parameter No. 10 and No. 12 to "0". In this case, the I/O connection is invalid.
EdS□	Field Bus Error	It is generated when the field bus link connection is not established. Check the link cable connection, I/O parameter and PLC parameter settings. (How to start up the controller without connecting the field bus) Set both the I/O parameter No. 10 and No. 12 to "0".

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