



Autonics TCD220050AB DPU3 Series Single-Phase-3-Phase Digital Power Controllers Instruction Manual

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Autonics

Autonics TCD220050AB DPU3 Series Single-Phase-3-Phase Digital Power Controllers



Product Information

The Transparent Guide Single-Phase / 3-Phase Digital Power Controllers DPU1 / DPU3 Series are electronic devices designed to control power supply to machinery and equipment. These units are available in different models with varying rated current capacity and power supply options. The product also supports RS485 communication and remote display options. The device is equipped with fail-safe features that ensure safe operation of the machinery and equipment connected to it. The product is designed for industrial use and must be installed following the safety instructions provided in the manual.

Product Usage Instructions

Before using the DPU1 / DPU3 digital power controllers, read the user manual carefully and follow the safety instructions to ensure safe and reliable operation.

1. Install the device on a panel and ground separately to prevent electric shock or fire.
2. Connect the unit within the rated specifications to prevent fire or product damage.
3. Use a dry cloth to clean the device and avoid using water or organic solvents which may cause electric shock or fire.
4. Avoid exposing the device to flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity which may result in explosion or fire.
5. Check the connections before wiring to avoid fire or product damage.
6. Do not connect, repair, or inspect the unit while connected to a power source to avoid electric shock or fire.
7. Do not disassemble or modify the unit to avoid electric shock or fire.
8. Since leakage current still flows right after turning off the power or in the output OFF status, do not touch the load terminal to avoid electric shock or burn due to high temperature of the surface.

Follow the ordering information provided in the manual to select the specified model. Download the installation file and the manuals from the Autonics website. Use DAQMaster, the comprehensive device management program

for Autonics' products, to manage the device parameters and data.

Thank you for choosing our Autonics product. Read and understand the instruction manual and manual thoroughly before using the product. For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website. Keep this instruction manual in a place where you can find easily. The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice. Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- symbol indicates caution due to special circumstances in which hazards may occur.

Warning Failure to follow instructions may result in serious injury or death.

1. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.(e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in personal injury, economic loss or fire.
2. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present. Failure to follow this instruction may result in explosion or fire.
3. Install on a device panel, and ground separately. Failure to follow this instruction may result in fire or electric shock.
4. Do not connect, repair, or inspect the unit while connected to a power source. Failure to follow this instruction may result in fire or electric shock.
5. Do not disassemble or modify the unit. Failure to follow this instruction may result in fire or electric shock.
6. Check 'Connections' before wiring. Failure to follow this instruction may result in fire

Caution Failure to follow instructions may result in injury or product damage

1. Use the unit within the rated specifications. Failure to follow this instruction may result in fire or product damage.
2. Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire or electric shock.
3. Keep the product away from metal chip, dust, and wire residue which flow into the unit. Failure to follow this instruction may result in fire or product damage.
4. Since leakage current still flows right after turning off the power or in the output OFF status, do not touch the load terminal. Failure to follow this instruction may result in electric shock.
5. Since leakage current still flows right after turning off the power or in the output OFF status, do not touch the load terminal. Failure to follow this instruction may result in burn due to high temperature of the surface.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.

- Use the product, after 3 sec of supplying power.
- Before use, set the mode and function according to the specification. Since changing the mode / parameter during operation may result in malfunction, set the mode and function after disconnecting load output.
- Re-supply the power to the unit after 3 sec of turning off the power. Failure to follow this instruction may result in malfunction.
- To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.
- Install the unit in the well ventilated place.
- While supplying power to the load or right after turning off the power of the load, do not touch the body and heat sink. Failure to follow this instruction may result in a burn due to the high temperature.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Do not wire to terminals which are not used.
- Use twisted pair wire for communication line.
- Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Since inter element can be damaged when using with coil load, inductive load, etc., the inrush current must be under the rated load current.
- To prevent product malfunction due to noise, wire power, control input, communication, and load cables separately.
- For stable operation, use shield wire for control, alarm, and communication wires. Use a ferrite core on the shield wire to cope with EMC.
- This unit may be used in the following environments.
 - Indoors (in the environment condition rated in 'Specifications')
 - Altitude max. 2,000 m
 - Pollution degree 2
 - Installation category III

Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

Control phase

- **1:** Single-phase
- **3:** 3-phase

Power supply

1. 110 VAC
2. 220 VAC
3. 380 VAC
4. 440 VAC

Size (rated current capacity)

	DPU1	DPU3
A	0 to 70 A	0 to 50 A
B	80 to 200 A	70 to 200 A
C	250 to 350 A	
D	400 to 600 A	

Rated current capacity

Number: Rated current capacity (unit: A)

Option

- **R:** RS485 communication
- **D:** Remote display
- **A:** Remote display + RS485 communication
- **N:** None

Product Components

- Product
- Bolt × 4
- Instruction manual
- Terminal × 1

Software

Download the installation file and the manuals from the Autonics website.

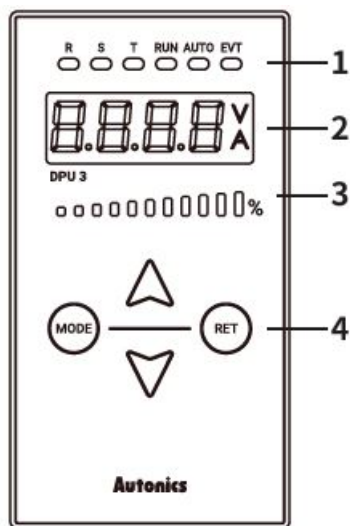
DAQMaster

It is the comprehensive device management program for Autonics' products, providing parameter setting, monitoring and data management

Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals. Download the manuals from the Autonics website

Display



Indicator

Indicator	Color	Descriptions
R / S / T	Green	[DPU3 model] Turns ON by display value of display part E.g.) R, S ON → R-S line voltage display
RUN	Green	Turns ON for RUN, turns OFF of STOP
AUTO	Green	Turns ON for AUTO, turns OFF of MANUAL
EVT	Red	Turns ON for Digital input ON, flashes for alarm output ON

Display part (red)

- **RUN mode:** Displays depending the front display setting
- **Setting mode:** Displays parameter and setting value
- Unit indicator

Indicator	Descriptions
V	Turns ON for voltage display
A	Turns ON for current display
V + A	Turns ON for power display, turns OFF for resistance and input value display

Output BAR (green)

Turns on the current output (voltage / current / power) in a ratio of 0 to 100 % relative to the input.

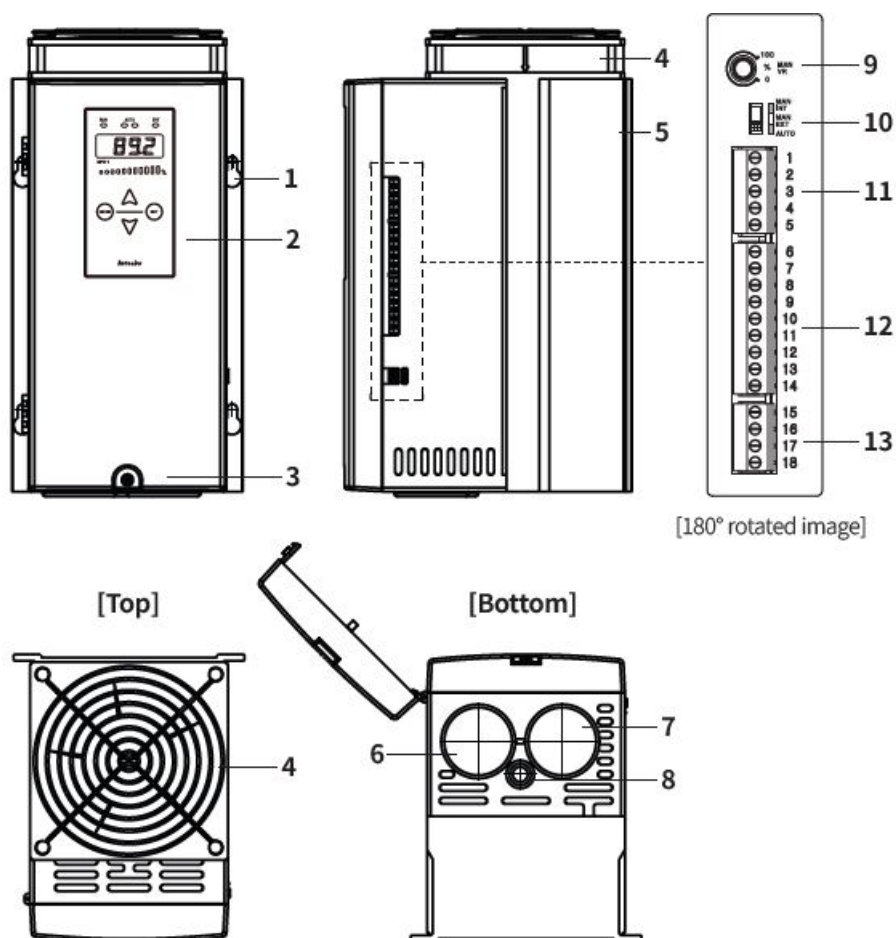
Setting keys

Key	Descriptions
[MODE]	To enter monitoring / operation setting 1, 2 mode and to move between parameters
[▲ / ▼]	To move setting modes and to set parameters.
[RET]	To return to RUN mode from monitoring / operation setting 1, 2 / alarm setting mode

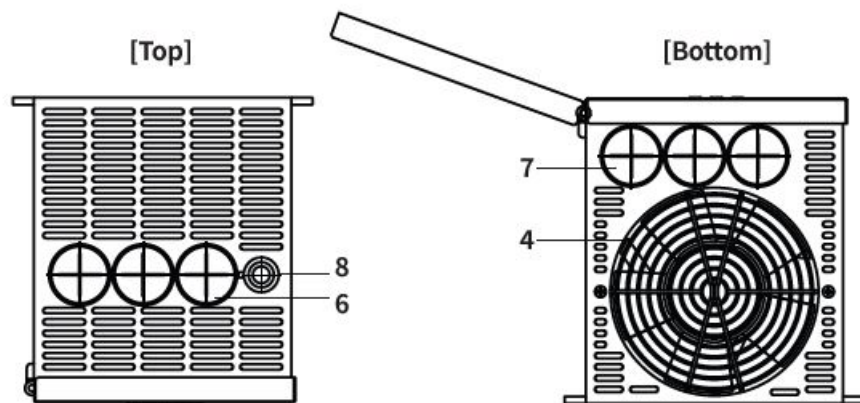
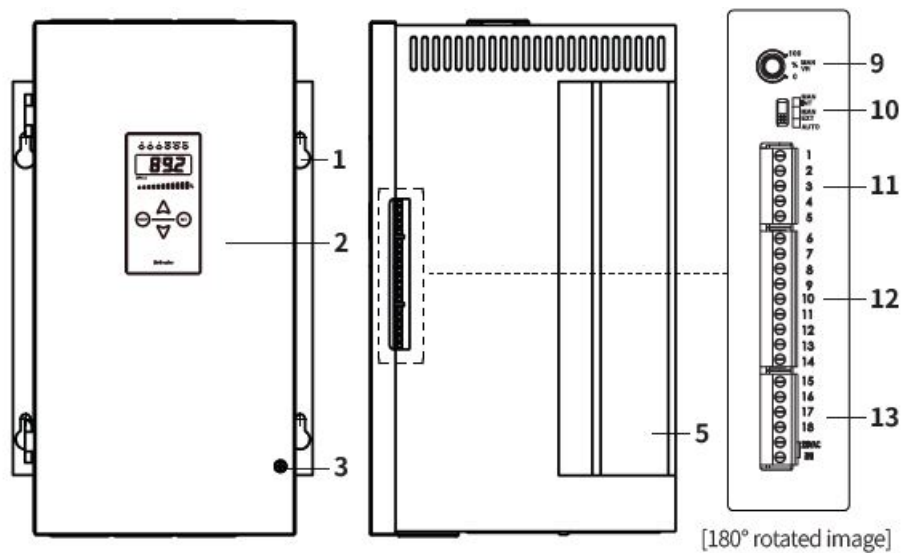
Unit Descriptions

Configurations may vary by model depending on supported specifications.

DPU1 Series



DPU3 Series



1. Mounting holes
2. Display
3. Case screw
4. Cooling fan (01)
5. Heatsink
6. Load wiring input hole
7. Load wiring output hole
8. Ground wiring hole
9. Internal adjuster
10. AUTO / MANUAL select switch
11. Control input (voltage / current) connector
12. Control input (contact) / RS485 communication connector
13. **DPU1**: alarm output connector
14. **DPU3**: control power (FAN) / alarm output connector

DPU1 Series 25 / 40 / 50 A models do not have attached a Fan.

Specifications

Series	DPU1	DPU3
Control phase	Single-phase	3-phase
Rated frequency	50 / 60 Hz (auto recognition), allowable frequency range: ± 2 Hz	
Display method	4 digit 7 segment, Output BAR	
Indicators	Operation / manual control indicator (green) DI, alarm / unit (V, A) indicator (red)	R, S, T indicator (green) Operation / manual control indicator (green) DI, alarm / unit (V, A) indicator (red)
Auto control input	<ul style="list-style-type: none"> • Current 01): 4 – 20 mA, 0 – 20 mA • Voltage 02): 0 – 5 VDC , 1 – 5 VDC , 0 – 10 VDC • Contact (non-voltage): ON / OFF • Contact (voltage): 0 / 12 VDC (24 VDC) • Communication: RS485 	
Manual control input	Internal adjuster (10 k Ω), external adjuster (3 to 10 k Ω , ≥ 2 W)	
Digital input (DI)	AUTO / MAN selectable, RUN / STOP selectable, RESET, HOLD, Setting Point 1 to 6	
Display content	Control input, load voltage, load current, load power, load resistance, power supply frequency	
Min. display output	Min. 2.5 % of rated voltage / current	
Approval	, ,	
SCCR Rating	80 kA (UL certification)	

1. Input impedance = 100 Ω

2. Input impedance = 25 Ω

Control method	Phase control	Cycle control	ON / OFF control
Control mode	Normal / constant current feedback / constant voltage feedback / constant power feedback	Fixed cycle / variable cycle 01)	—
Applied load	Resistance / inductive load	Resistance load	Resistance load
Output range	0 to 98 %	0 to 100 %	0 to 100 %
Output accuracy of phase control	<ul style="list-style-type: none"> • Normal : Within ± 10 % F.S. of rated load voltage • Constant current feedback: Within ± 3 % F.S. of rated load current (within variable 1 to 10 times of rated resistance) • Constant voltage feedback: Within ± 3 % F.S. of rated load voltage (within variable ± 10 % F.S. of rated voltage) • Constant power feedback: Within ± 3 % F.S. of rated load power (within variable ± 10 % F.S. of rated power and within variable 1 to 10 times of rated resistance) 		

DPU1 only

Series	DPU1	DPU3
Power supply	110 / 220 / 380 / 440 VAC model	110 / 220 / 380 / 440 VAC model (fan and control power 220 VAC 50 / 60 Hz separately)
Allowable voltage range	90 to 110 % of power supply	85 to 115 % of power supply
Min. load current	1 A	
Power consumption	≤ 40 W (control power)	≤ 60 W (control power)
Insulation resistance	≥ 200 MΩ (500 VDC megger)	
Dielectric strength	Between input terminal and power terminal: 2000 VAC 50 / 60 Hz for 1 min	
Vibration	0.75 mm double amplitude at frequency of 5 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours	
Noise immunity	±2 kV square wave noise (pulse width: 1 μs) by the noise simulator	
Ambient temp.	-10 to 50 °C, storage: -20 to 80 °C (no freezing or condensation)	
Ambient humidity	5 to 90 %RH, storage: 5 to 90 %RH (no freezing or condensation)	

Unit weight (packaged)	DPU1	DPU3
A	≈ 3.0 kg (≈ 3.2 kg)	≈ 6.5 kg (≈ 7.6 kg)
B	≈ 3.0 kg (≈ 5.6 kg)	≈ 11.5 kg (≈ 13.0 kg)
C	≈ 11.0 kg (≈ 12.1 kg)	≈ 20.0 kg (≈ 21.1 kg)
D	≈ 11.0 kg (≈ 19.3 kg)	≈ 30.8 kg (≈ 35.7 kg)

Communication Interface

RS485

Comm. protocol	Modbus RTU
Application standard	Compliance with EIA RS485
Max. connection	31-unit (address: 01 to 64)
Comm. synchronous method	Asynchronous
Comm. method	2-wire half duplex
Comm. distance	≤ 800 m
Comm. speed	4,800 / 9,600 / 19,200 / 38,400 (default) bps
Comm. response time	5 to 99 ms
Data bit	8-bit (fixed)
Parity bit	Even (fixed)
Stop bit	1-bit (fixed)

Initial Display When Power is ON

- When power is supplied, after all display will flash for 1 sec, device version > rated voltage > rated current are displayed sequentially. After this, enter into RUN mode.
- Example of DPU 2A-050 model,

	1. Display part	2. Device version	3. Rated voltage	4. Rated current	5. RUN mode
DPU1)))0	DP20	220	50	10)3
DPU3)))0	DP30	220	50	10)3

Alarm

- Parameter setting is available to set alarm delay time, alarm channel, etc.
- For details on parameter setting, refer to the product manual

Alarm	Display	Operation	Alarm release 01)
Overcurrent	O-C	Stop (SCR OFF)	<ul style="list-style-type: none">• Re-supply power.• Press [RET]. 02)• Switch to STOP mode
Overvoltage	O-V		
Fuse break 03)	FUSE	<ul style="list-style-type: none">• DPU1: Stop (SCR OFF)• DPU3: when 1-phase break, it maintains output when 2-phase break, it stops output.	
Heatsink over heat	TEMP	Stop (SCR OFF)	
SCR error 03)	SCR		
Heater break	H-BK	Continues operation	Automatically released with in the setting range

1. If the alarm occurrence condition is not removed, the alarm is re-occur even if the alarm release method is applied.
2. The power is reapplied.
3. If the alarm is not released after power is applied again, replace the fuse or check whether the SCR element is abnormal.

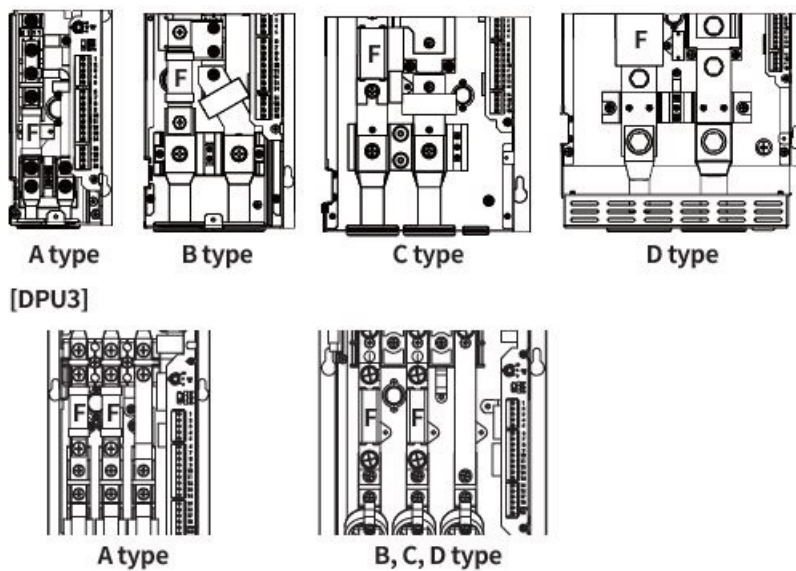
Replacement of Fuse

- To prevent accident, replace a fuse every two years.
- Must turn off the power before removing the fuse.
- If using a fuse not supplied by Autonics, the performance of the product is not guaranteed. When replacing the fuse, use a fuse of the recommended specification.

Fuse position

After loosening the case screws, there is a fuse on the side of the product.

[DPU1]



Among R, S, T inputs, R and S have a built-in fuse, but T does not have an internal fuse. If a fuse is required, install a fuse of the following or equivalent performance outside the product separately.

Device size	Fuse fixed bolt	
	DPU1	DPU3
A	M5	M6
B	M8	
C	M8	
D	M12	

Fuse recommended specifications

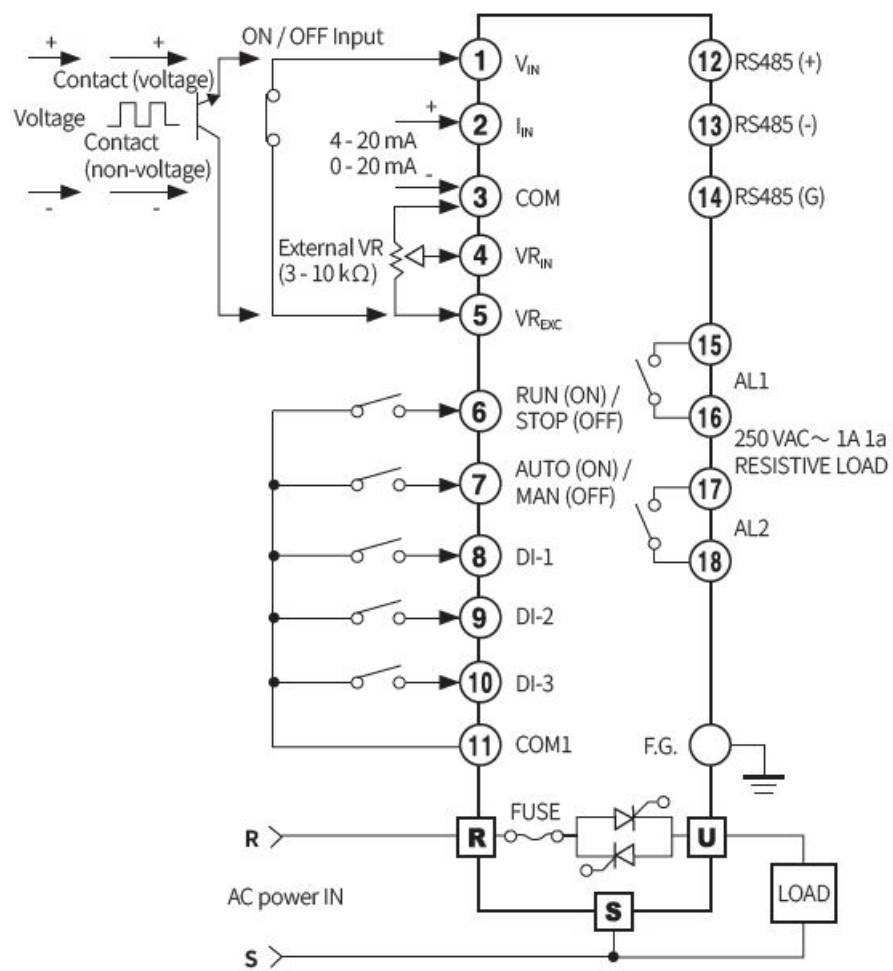
Rated short circuit test is evaluated as a recommended fuse

Rated load current [A]	DPU1		DPU3	
	Rec. fuse	Manufacturer	Rec. fuse	Manufacturer
25	50FE		50FE	
40	63ET		63ET	
		BUSSMANN		
50	80ET		80ET	
70	100FE		170M1367	
80	660GH-125		170M1368	
100	660GH-160		170M1369	
120	660GH-160		170M1369	
		HINODE		
150	660GH-200		170M1370	BUSSMANN
180	660GH-250		170M1370	
200	660GH-250		170M1372	
250	170M2620		170M2620	
		BUSSMANN		
350	170M2621		170M2621	
400	A60X500-4(TA)		170M3471	
500	A60X600-4(TA)	MERSEN	170M4466	
600	A60X600-4(TA)		170M4466	

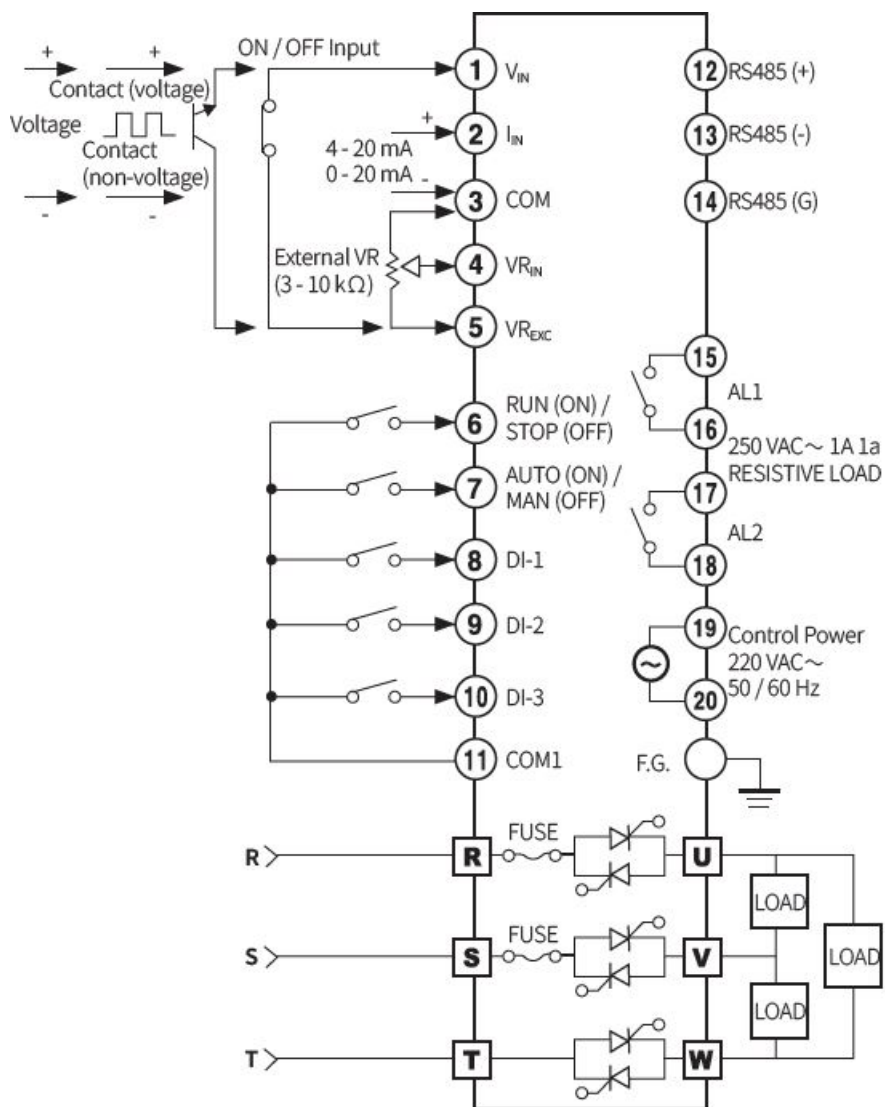
Connections

Terminal configuration by model may differ depending on the supported spec.

DPU1 Series



DPU3 Series



Suitable specification

The following connectors can be used with equivalent or substitute

	Connector configuration		
Connector type			Manufacturer
	DPU1	DPU3	
Control input (current, voltage)	TS 05 515B	TS 05 515B	
Alarm output / control power (DPU3)	TS 04 515B	TS 06 515B	ANYTEK
Control input (contact) / RS485 commun ication	TS 09 515B	TS 09 515B	

Cautions during Wiring

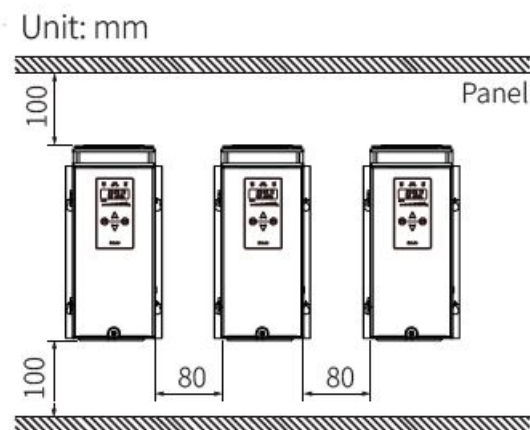
- DI input switch: For low current, ON resistance: 20Ω or less (including wiring resistance).
- Do not arbitrarily replace the display – main body connector of the remote display model.
- For crimp terminals of load input/output connectors, use the following UL approved terminals. Be sure to use crimp terminals with an insulating sleeve (tube).

Device size	DPU1/3 wire thickness	Crimp terminal spec.	Bolt tightening torque
A	$\geq 25 \text{ mm}^2$	25-S6 (1)	5.6 to 6.0 Nm
B	$\geq 95 \text{ mm}^2$	95-8 (1)	13.6 to 14.5 Nm
C	$\geq 2 \times 70 \text{ mm}^2$	70-8 (2)	13.6 to 14.5 Nm
D	$\geq 2 \times 185 \text{ mm}^2$	185-12 (2)	47.0 to 50.0 Nm

Cautions during Installation

High Temperature Caution

While supplying power to the load or right after turning off the power of the load, do not touch the body and heatsink. Failure to follow this instruction may result in a burn due to the high temperature



Mount space

When installing multiple power controllers, keep space between power controllers for heat radiation.

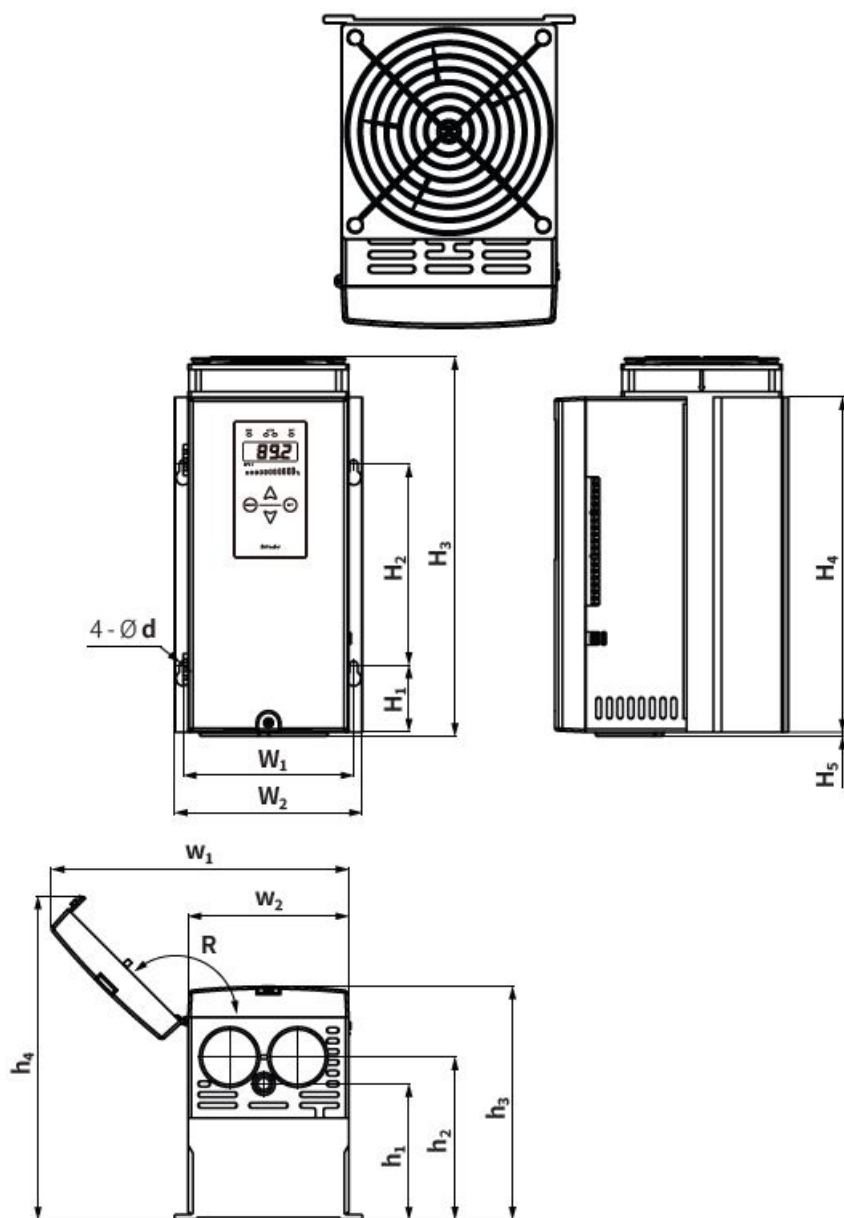
- **Horizontal:** $\geq 80 \text{ mm}$
- **vertical:** $\geq 100 \text{ mm}$

Dimensions

Unit: mm, For the detailed drawings, follow the Autonics website.

DPU1 Series

The figure is based on the B size.

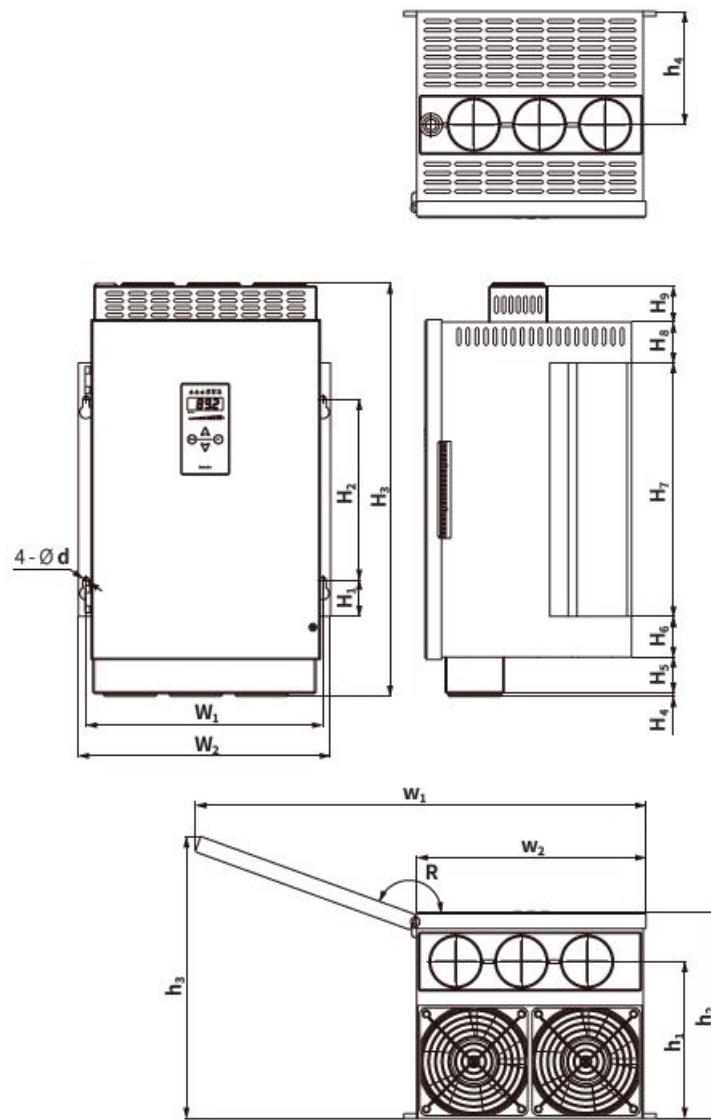


Size	d	R	W ₁	W ₂	H ₁	H ₂	H ₃	H ₄	H ₅	w ₁	w ₂	h ₁	h ₂	h ₃	h ₄
A	6	135°	82	97	40	150	233 01)	230	3	154	80	90	110	170. 3	209. 5
B	6	135°	127	140	50	150	283	250	3	222	120	101 .5	121. 5	174	241. 5
C	7	160°	193	213	50	200	342	300	4	368	185. 6	131	132	179	244
D	7	160°	261	278	40	200	422	380	4	497	252. 7	138	156	212	296

Rated current capacity 70 A model: 263

DPU3 Series

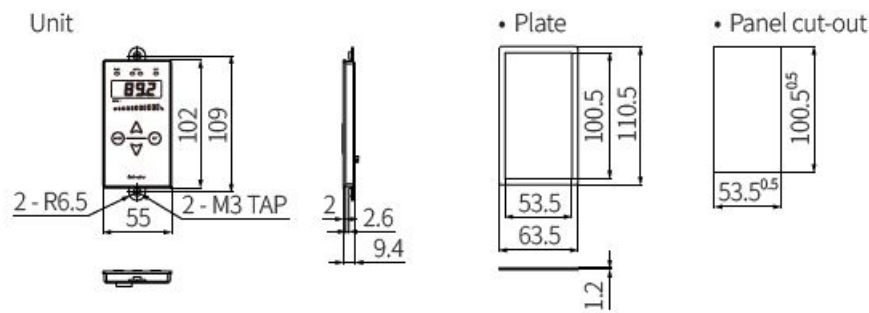
The figure is based on the C size



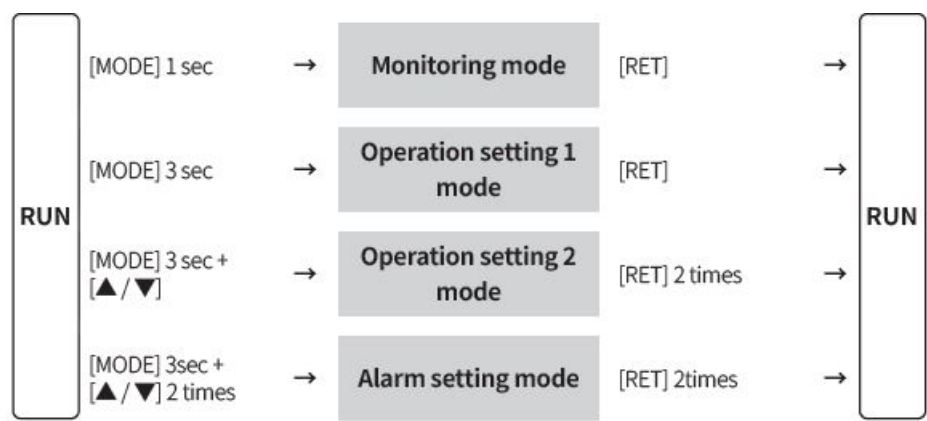
Size	d	W ₁	W ₂	H ₁	H ₂	H ₃	H ₄	H ₅	H ₆	H ₇	H ₈	H ₉
A	6	127	140	63.5	150	309	H ₄ + H ₅ = 29		H ₆ + H ₇ + H ₈ = 277			—
B	7	195	213	40	200	367	3.5	—	40	280	40	—
C	7	261	278	40	200	457	3.3	40	45	280	45	40
D	8.5	405	427	66.5	330	536	4	32.5	H ₆ + H ₇ + H ₈ + H ₉ = 495.5			

Size	R	w ₁	w ₂	h ₁	h ₂	h ₃	h ₄
A	160°	244	122.6	138	200	239	116
B	160°	366	185.6	176	217	278	126
C	160°	497	252.6	173	227.5	311	125
D	160°	755	385.6	204.5	275.5	405	204.5

Remote display
Unit



Mode Setting



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Documents / Resources

	Autonics TCD220050AB DPU3 Series Single-Phase-3-Phase Digital Power Controllers [pdf] Instruction Manual TCD220050AB DPU3 Series Single-Phase-3-Phase Digital Power Controllers, TCD220050AB, DPU3 Series Single-Phase-3-Phase Digital Power Controllers, 3-Phase Digital Power Controllers, Digital Power Controllers, Power Controllers, Controllers
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- www.autonics.com