MIZCON™ Plus
Cooling Tower Controller
Model R7010W

General

MIZCON™ Plus (also written as 'MIZCON+') Model R7010W is a conductivity and temperature controller for cooling water.

MIZCON Plus keeps the conductivity of the cooling water at the optimum level and thus precisely controls makeup water. This enables the following:

- Saves makeup water and chemical.
- Ensures operating efficiency of chiller and compressor.
- Prevents high-pressure cut-out of chiller and critical damage of condenser.
- Prevents cooling tower and pipes from being clogged with scale and other substances.

MIZCON Plus maintains the temperature of the cooling water at the optimum level by controlling the operations of cooling tower fan and electric heater. This allows the chiller to operate at maximum efficiency and prevents the cooling water from being frozen.

Model R7010W (controller) with
Part No. 81301430-001 (4-electrode sensor)

Note:
For the 4-electrode sensor, be sure to separately order by its part number (Part No. 81301430-001 for 4 m long cable or Part No. 81301430-002 for 20 m long cable).

Features

- Contamination resistant 4-electrode sensor:
  4-electrode sensing element is resistant to contamination serving long operation life with high measuring accuracy.
- Conductivity temperature compensation:
  Conductivity measuring accuracy is assured even with temperature change, preventing over-concentration and over-blowdown (overfeed) of the cooling water.
- Easy installation of the immersion sensor:
  The sensor is immersion-type and thus facilitates the installation.
- Conductivity alarm:
  Cooling water conductivity out of the preset value (high limit alarm setpoint) is reported with alarm.
- Conductivity / temperature PV (process value) output:
  Measured conductivity and temperature are output via 4-20 mA DC analog output. Water quality is thus constantly monitored for precise quality control.
- Temperature control:
  Cooling water temperature can be controlled with DO (2 points max.).
- Interlock operation:
  Input for interlock with the cooling water pump is equipped.
- Wide conductivity range:
  Measuring range can be switched between 0-200 and 0-400 mS/m.
- Easy installation of the controller main unit:
  Quick-fit screwless (clamp) terminals are provided except power supply line. This facilitates the wiring work. Besides, DIN rail mounting or screw mounting is selectable for the controller (main unit) installation.

Safety Instructions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual near by for ready reference.

Usage Restrictions

This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in a clean room or a place where reliability or control accuracy is particularly required, please contact Azbil Corporation's sales representative. Azbil Corporation will not bear any responsibility for the results produced by the operators.

⚠ WARNING

- DANGER: To prevent the risk of severe or fatal electrical shock, always disconnect power source from the controller power supply terminals before performing any wiring.
- Before replacing the controller (main unit), disconnect the power supply of the valve and other equipment connected to the controller. Electrical shock may result.
- Before replacing the 4-electrode sensor, be sure to turn off the controller. Electrical shock may result.
- Do not disassemble the product. Electrical shock and equipment damage may result.
- Make sure all the wires are tightly connected. Fire and smoke due to heat generation of the equipment, electrical shock, and equipment damage may result.
- Be sure to ground. Improper grounding may cause electrical shock and equipment damage.
- Do not detach the terminal cover except when connecting or disconnecting the wires. Be sure to reattach the terminal cover after connecting or disconnecting the wires. Before detaching and attaching the terminal cover, make sure all the wires and terminals are disconnected from the power source.

⚠ CAUTION (1/2)

- Installation must be performed by qualified personnel in accordance with all applicable safety standards.
- Installation must be carried out according to the operating conditions specified in this manual to prevent equipment damages.
- All wiring must comply with local codes of indoor wiring and electric installation rules.
- Use crimp terminals with insulation for electric wires.
- Wire stripping length to be connected to the quick-fit screwless (clamp) terminal block must be 10 mm. If the wire is stripped longer than 10 mm, the conductor will be exposed causing electrical shock and short-circuit between adjacent terminals. If shorter, the conductor may not contact the terminal.
- If more than the rated power supply voltage is applied to the controller, controller replacement is required for safety.
- Do not peel off the label with ⚠ symbol.
- Lightning protection is required based on regional characteristics and building structure in order to minimize lightning damage.
- After completing the wiring, be sure to peel off the protective sheet.
- Install the controller under the cooling tower, on a wall under an eave, and other locations unexposed to direct sunlight and rain.
- For the controller installation, avoid weathered locations, and install the controller inside the rain-proof case if necessary.
- When temperature control output is set to N.C. for anti-freeze electric heater, temperature control does not interlock with the electric heater operation. Provide an additional circuit to prevent the heater from heating when no water is left.
- Install the 4-electrode sensor inside the water tank or in a location (close to the tank) where water flows well.
- For the 4-elecrode sensor installation, do not allow the 4-elctrode sensor to directly contact the inner wall or bottom of the water tank. Leave approx. 10 cm away from the inner wall and from the bottom.

⚠ CAUTION (2/2)
• Position the cable connected between the controller and the 4-elecrode sensor away from heavy-current wiring and circuit to avoid induction current.
• Controller power needs to be supplied from the single-phase power source for noise reduction. If the controller receives noise from the power supply line, provide isolating transformer and line filter.
• Do not position the cable connected between the controller and the 4-elecrode sensor or the wires for PV output close to the inverter.
• Do not incinerate the controller or the 4-electrode sensor for waste disposal (the housings produce toxic gas when incinerated). Do not recycle all or part of them, either.
• Dispose of the controller and the 4-electrode sensor in accordance with local regulations.

Trademark information:
MIZCON is a registered trademark of Azbil Corporation in Japan.

Model Numbers

Controller (main unit)

Base model number	Fixed	Temperature PV*1 output	Fixed	Temperature control output	Description
R7010W					MIZCON Plus - Control output of blowdown valve for cooling water: potential free N.O./N.C.*2 contact - Conductivity PV output: 4-20 mA DC - Alarm output: potential free N.O. contact (for sensor error or conductivity over the high limit) - Interlock input: potential free contact
	1				—
		0			No temperature PV output
		4			Cooling water temperature PV output: 4-20 mA DC
			0		—
				0	No temperature control output
				1	Temperature control output: potential free N.O. or N.C. contact × 1 pt.
				2	Temperature control output: potential free N.O. or N.C. contact × 2 pts.

Notes:
∗1 PV: Process Value
∗2 N.O: Normally Open / N.C: Normally Closed

4-electrode sensor

Separate order is required for the sensor. Be sure to select your applicable sensor and order by its part number.

Part number	Description
81301430-001	Immersion type 4-electrode sensor: For Model R7010W (MIZCON Plus) / R7010B (MIZCON), with temperature sensing, with 4 m long cable
81301430-002	Immersion type 4-electrode sensor: For Model R7010W (MIZCON Plus) / R7010B (MIZCON), with temperature sensing, with 20 m long cable

Specifications

Controller (main unit)

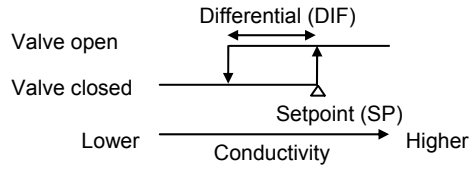
(1/2)

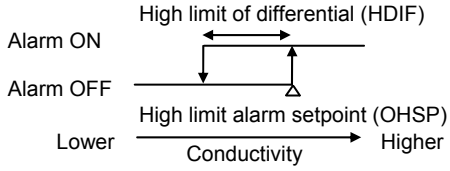
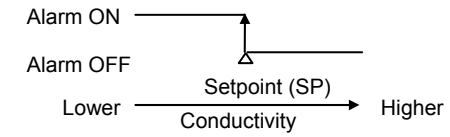
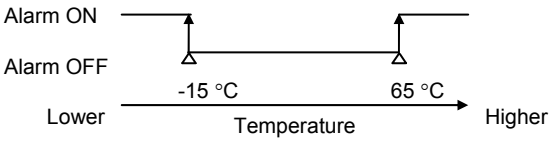
Item			Specification
Power supply		Rated voltage	100 V AC to 240 V AC at 50 Hz/60Hz
		Operating voltage	85 V AC to 264 V AC
		Power consumption	10 VA or less
Environmental conditions	Rated operating conditions	Ambient temperature	-20 °C to 50 °C
		Ambient humidity	10 %RH to 90 % RH (Non-condensing)
		Vibration	Max. 5.9 m/s^2 (0.6 G) at 10 Hz to 150 Hz
	Transport / storage conditions	Ambient temperature	-20 °C to 60 °C
		Ambient humidity	5 %RH to 95 % RH (Non-condensing)
		Vibration for transport	Max. 5.9 m/s^2 (0.6 G) at 10 Hz to 150 Hz
		Vibration for storage	Max. 9.8 m/s^2 (1 G) at 10 Hz to 150 Hz
LED operations	Indication	Power supply ('power')	Green LED ON: Power ON, OFF: Power OFF
		Operation standby ('standby')	Green LED ON: Operation in standby state (DI contact is open.)
		Blow-down operation ('blowdown')	Green LED ON: Cooling water being blown down
		Temperature control outputs 1 and 2 ('do1(temp)' and 'do2(temp)')*1	Green LED 'do1(temp)' or 'do2(temp)' ON: Temperature control DO contact is closed.
		Alarm ('alarm')	Red LED ON: Alarm output (DO) contact is closed.
		PV and SP ('pv' and 'sp')	Orange LED 'pv' or 'sp' ON: Process value or setpoint is indicated.
		Control data (window for 7-segment LEDs)	Red 7-segment LEDs: control data is indicated (to set or to display).
		Units ('mS/m' and '°C')	Orange LED 'mS/m' or '°C' ON: mS/m or °C is indicated.
Weight			Approx. 500 g
Material / color			Polycarbonate resin / light gray
Terminal connection		Power supply terminals	M3.5 screw terminal connection
		Terminals except power supply	Quick-fit screwless (clamp) terminal connection
Conductivity measuring range			Changeable between: 0 mS/m to 200 mS/m and 0 mS/m to 400 mS/m ranges
Interlock input (When DI contact is open)			Potential free contact input Rating: Max. 10 V DC, 5 mA Temperature control set to N.O. : Temperature control is stopped by opening DO contact. Temperature control set to N.C.: Temperature control is continued. Cooling water blow-down valve output: Valve is fully closed.
Control output			Rating: 100 V AC / 240 V AC, 3 A ($\cos \phi = 0.4$) - Cooling water blow-down valve: Potential free N.O./N.C. contact (SPDT) - Alarm output contact: Potential free N.O. contact (SPST) - Temperature control output contacts 1 and 2 (optional) Potential free N.O. contacts (SPST)
Measuring (PV) output (AO signals are isolated from power supply.)		Conductivity	4 mA DC to 20 mA DC (0 mS/m to 200 mS/m or 0 mS/m to 400 mS/m), 300 Ω or lower load resistance
		Temperature	4 mA DC to 20 mA DC (0 °C to 50 °C), 300 Ω or lower load resistance
Measuring range to display		Conductivity	10 mS/m to 200 mS/m (200 mS/m range) or 20 mS/m to 400 mS/m (400 mS/m range)
		Temperature	0 °C to 50 °C
Accuracy		Conductivity	For 20 mS/m to 200 mS/m or 40 mS/m to 400 mS/m and 25 °C, Control accuracy: ± 4 %FS Measuring output: ± 5 %FS Ambient temperature effect: ± 0.2 %/°C Tc*2
		Temperature	Control accuracy: ± 0.5 °C Measuring output: ± 1.0 °C Ambient temperature effect: 0.02 °C/°C Tc*2

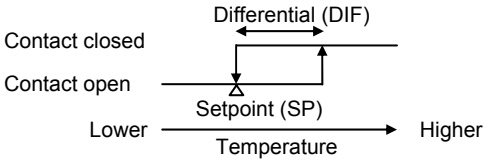
Notes:

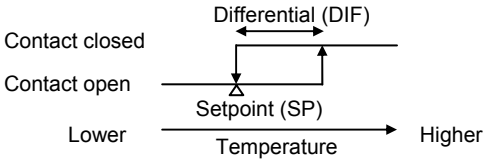
∗ 1 LEDs for temperature control ouputs 1 and 2 are equipped depending on the models.
(do1(temp) LED is equipped with Model R7010W1X01, do1(temp) and do2(temp) LEDs are equipped with Model R7010W1X02.)

∗2 Tc: Temperature of the controller

<table>
<tr><th colspan="2">Item</th><th>Specification</th></tr>
<tr><td colspan="2">Blow-down valve control operation</td><td> 
</td></tr>
<tr><td rowspan="3">Alarm output operation

Either of these alarms is output to the external device</td><td>Conductivity high limit alarm (Alarm is turned on by the conductivity over OHSP for 3 consecutive minutes.)</td><td> 
</td></tr>
<tr><td>Conductivity error detection (for sensor damage/ malfunction detection)
<table><tr><th>Range</th><th>SP</th></tr><tr><td>200 mS/m</td><td>10 mS/m</td></tr><tr><td>400 mS/m</td><td>20 mS/m</td></tr></table></td><td> 
</td></tr>
<tr><td>Temperature error detection (for sensor damage/ malfunction detection)</td><td> 
</td></tr>
<tr><td rowspan="2">Temperature control DO contacts operation
(Temperature control DOs are optional depending on the model numbers.)</td><td>Setting to N.O.

• Closes when temperature error is input.
• Opens when interlock input (DI) contact opens.</td><td> 
</td></tr>
<tr><td>Setting to N.C.

• Opens when temperature error is input.
• Continues open and close operation when interlock input (DI) contact opens.</td><td> 

* Setting N.C. is for anti-freeze electric heater. Operating status therefore is maintained even when the cooling water pump is shut down. To prevent the heater from heating when no water is left, provide an additional circuit.</td></tr>
<tr><td colspan="2" rowspan="2">Accessories</td><td>4 mounting screws (M4)</td></tr>
<tr><td>1 label for the maintenance history of the 4-electrode sensor</td></tr>
<tr><td rowspan="8">Parts and auxiliary device requiring separate order</td><td>Rain-proof case</td><td>Part No. DY3001A2002</td></tr>
<tr><td>Extension cable for 4-electrode sensor</td><td>Part No. 81301475-001 (10 m long) / 81301475-002 (20 m long) / 81301475-003 (30 m long)</td></tr>
<tr><td>DIN rail mounting bracket</td><td>Part No. 83104567-001</td></tr>
<tr><td>Replacement plates</td><td>Part No. 83167610-001
2 plates, for mounting inside the former version of the rainproof case (sold until March 31, 2005)</td></tr>
<tr><td>Varistor assembly</td><td>Part No. 83167751-001
(To connect the varistor to MIZCON Plus, connect the ring terminals of the varistor to the terminals 1 to 3 of the MIZCON Plus.)
Provide the varistor if the MIZCON Plus is installed in a location where thunder often occurs.</td></tr>
<tr><td>Converter</td><td>Model RYY792A3077 (Conversion between 4-20 mA current output and 0-100 mV voltage output)
The converter is used to replace MIZCON Model RY7010B1008 with the MIZCON Plus.</td></tr>
<tr><td>4-electrode sensor</td><td>Part No. 81301430-001 (4 m long cable) / 81301430-002 (20 m long)</td></tr>
<tr><td>Resistor for field inspection</td><td>Part No. 83167745-001</td></tr>
</table>

4-electrode sensor

Item			Specification
Environmental conditions	Rated operating conditions	Ambient temperature	Cooling water: 0 °C to 50 °C (Non-freezing) Atmospheric air: -10 °C to 50 °C
		Ambient humidity	0 %RH to 100 % RH
		Vibration	Max. 9.8 m/s^2 (1 G) at 10 Hz to 150 Hz
	Transport / storage conditions	Ambient temperature	-20 °C to 60 °C
		Ambient humidity	5 %RH to 95 % RH (Non-condensing)
		Vibration for transport	Max. 9.8 m/s^2 (1 G) at 10 Hz to 150 Hz
		Vibration for storage	Max. 9.8 m/s^2 (1 G) at 10 Hz to 150 Hz
Internal resistance temperature detector (RTD)			JIS* JPt100
Weight			Part No. 81301430-001 (4 m long cable): 700 g Part No. 81301430-002 (20 m long cable): 3000 g
Materials			Stainless steel, polycarbonate resin

∗Note: JIS: Japanese Industrial Standards

Wire Specifications

Item	Wire specifications	Max. wiring length	Condition
Power supply	JIS* IV or JIS CVV 2.0 mm^2 or greater	—	—
Ground	JIS IV or JIS CVV 2.0 mm^2 or greater	—	100 Ω or lower ground resistance
I/O (inputs/outputs)	JIS IV, JIS CVV, or KPEV* (for low power circuit) 0.5 mm^2, 0.75 mm^2, 0.9 mm^2, or 1.25 mm^2	100 m	—
4-electrode sensor	Accessory cable and extension cable (0.5 $mm^2 \times 6$ cores)	34 m	—

∗Note: KPEV is a wiring standard provided by Furukawa Electric Co., Ltd.

Dimensions and Parts Identifications

Controller (main unit): Model R7010W

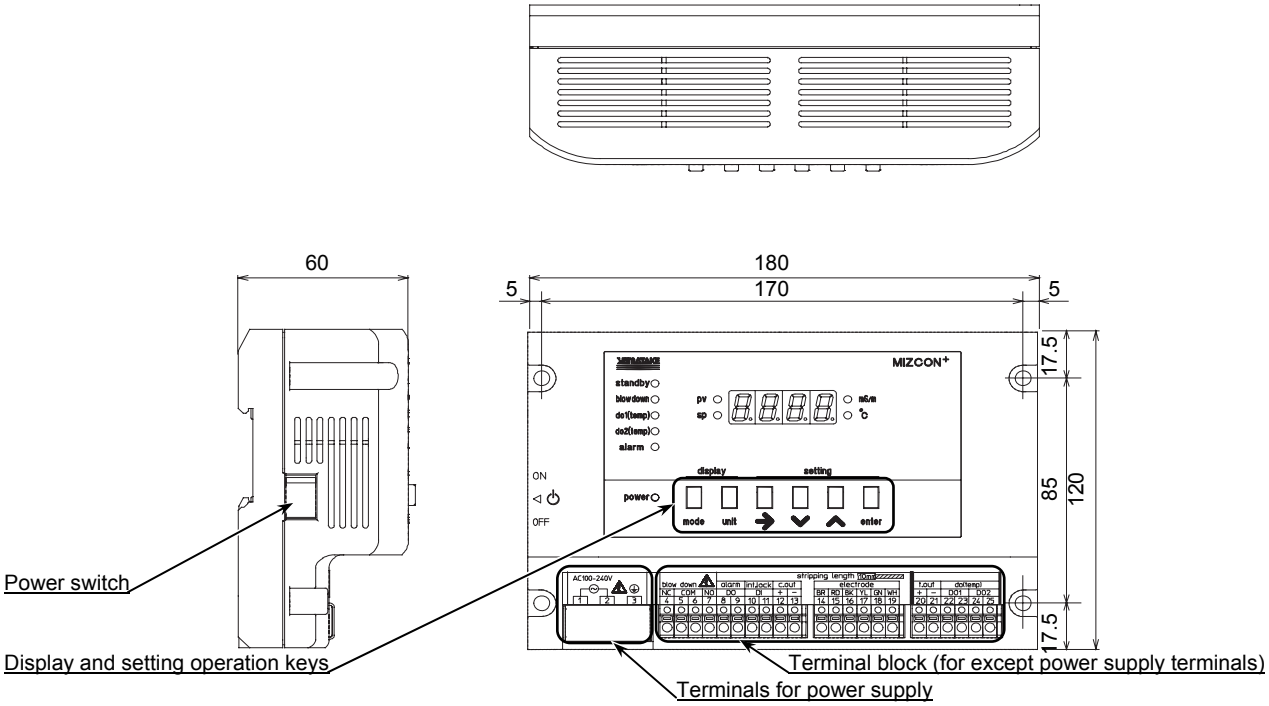
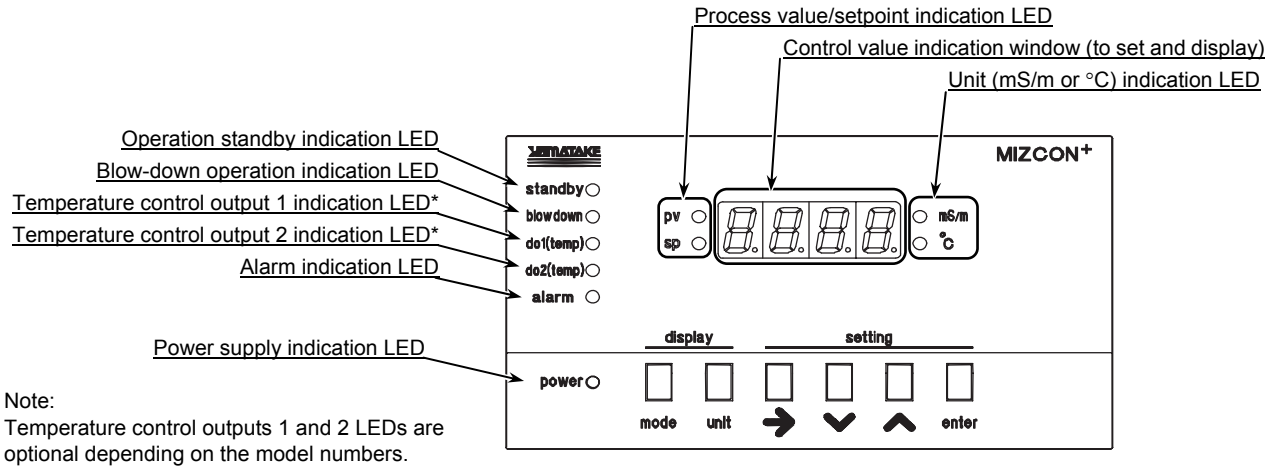


Figure 1. Dimensions and parts identification: Controller (mm)



Note:
Temperature control outputs 1 and 2 LEDs are optional depending on the model numbers.

Figure 2. LEDs of the controller

4-electrode sensor: Part No. 81301430-001 (4 m long cable) / 81301430-002 (20 m long cable)

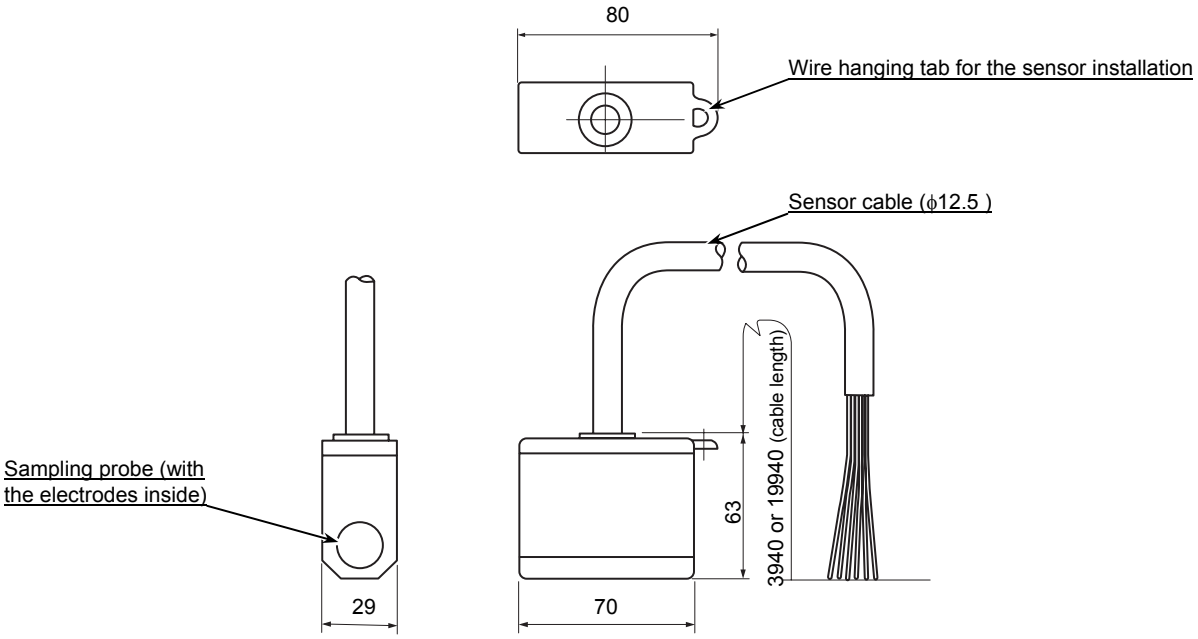


Figure 3. Dimensions and parts identification: 4-electrode sensor (mm)

Rain-proof case: Part No. DY3001A2002

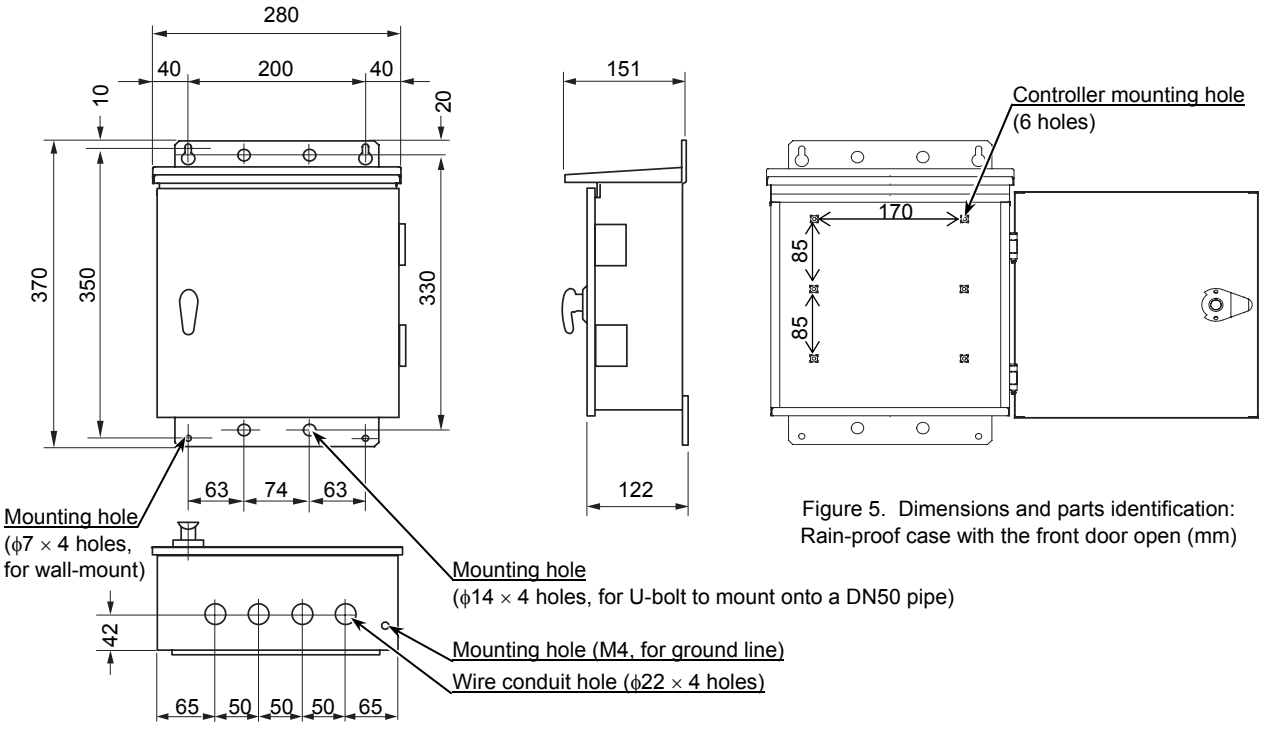


Figure 5. Dimensions and parts identification: Rain-proof case with the front door open (mm)

Figure 4. Dimensions and parts identification: Rain-proof case with the front door closed (mm)

Installation

1. Controller

Precautions for installation

- Install the controller main unit inside the rain-proof case (Part No. DY3001A2002) or mount onto DIN rail. To install the controller inside the former version of the rain-proof case (sold on March 31, 2005 or before), replacement plates (Part No. 83167610-001, 2 plates/set) are required. Since the former version is designed for MIZCON, not for MIZCON Plus, the intervals between the mounting holes of the controller (MIZCON Plus) and of the case are different.
- Install in a location with the specified environmental conditions (-20 to 50 °C, 10 to 90 %RH).
- The cable of the 4-electrode sensor can be extended up to 34 m. Install therefore the controller within the radius of 34 m the cooling water tank (where the sensor is installed).

Installation procedure:
MIZCON Plus controller inside the latest version of the rain-proof case (Part No. DY3001A2002)

Install the controller on the inside wall of the rain-proof case with four M4 screws (supplied with the MIZCON Plus controller). The controller can be mounted either on the higher part of the wall or on the lower part of the wall. (See Figs. 6 and 7.)

Mounting onto the higher part

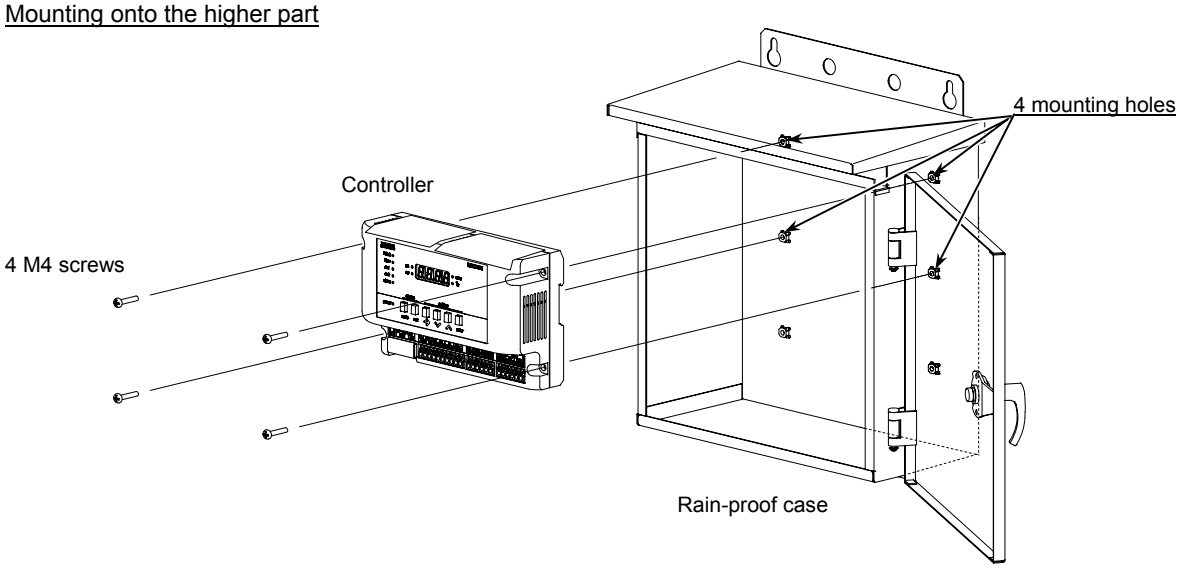


Figure 6. Controller installation inside the latest version of the rain-proof case (higher part)

Mounting onto the lower part

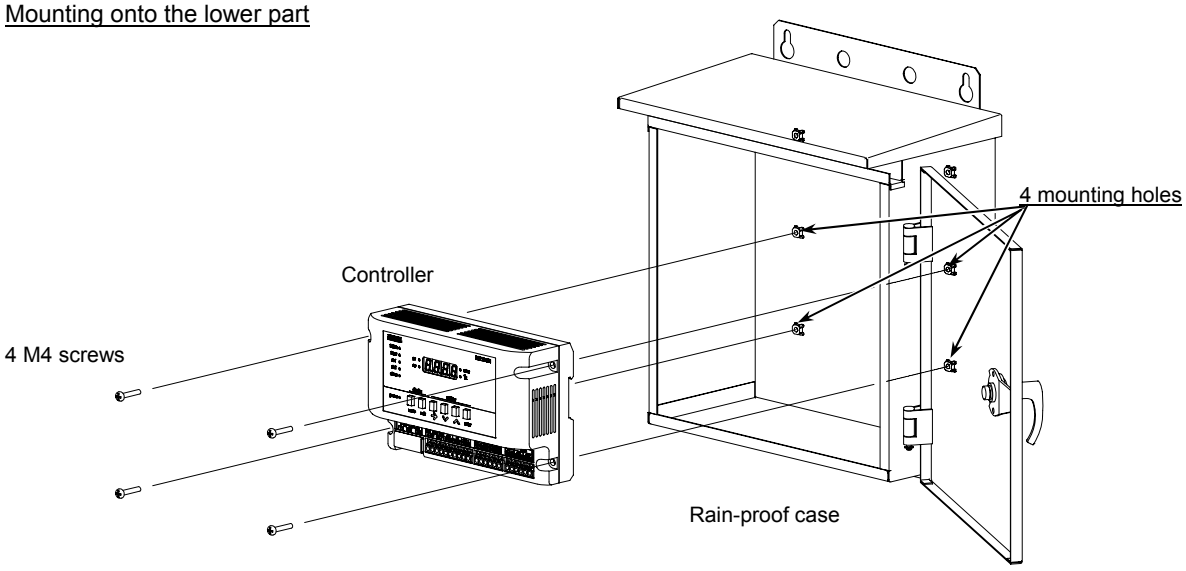


Figure 7. Controller installation inside the latest version of the rain-proof case (lower part)

Installation procedure:

MIZCON Plus controller replacing MIZCON inside the former version of the rain-proof case (Part No. DY3001A2002)

To install the controller inside the former version of the rain-proof case sold on March 31, 2005 or before, to replace MIZCON with MIZCON Plus in other words, replacement plates (Part No. 83167610-001, 2 plates/set) are required because the intervals between the mounting holes of the controller and of the case are different. Be sure to separately order the replacement plates.

Install the controller on the inside wall of the rain-proof case with four M4 screws (supplied with the MIZCON Plus controller) and the 2 replacement parts. For the replacement parts installation, reuse two M4 screws supplied with the MIZCON controller. The controller can be mounted either on the higher part of the wall or on the lower part of the wall. (See Figs. 8 and 9.)

Mounting onto the higher part

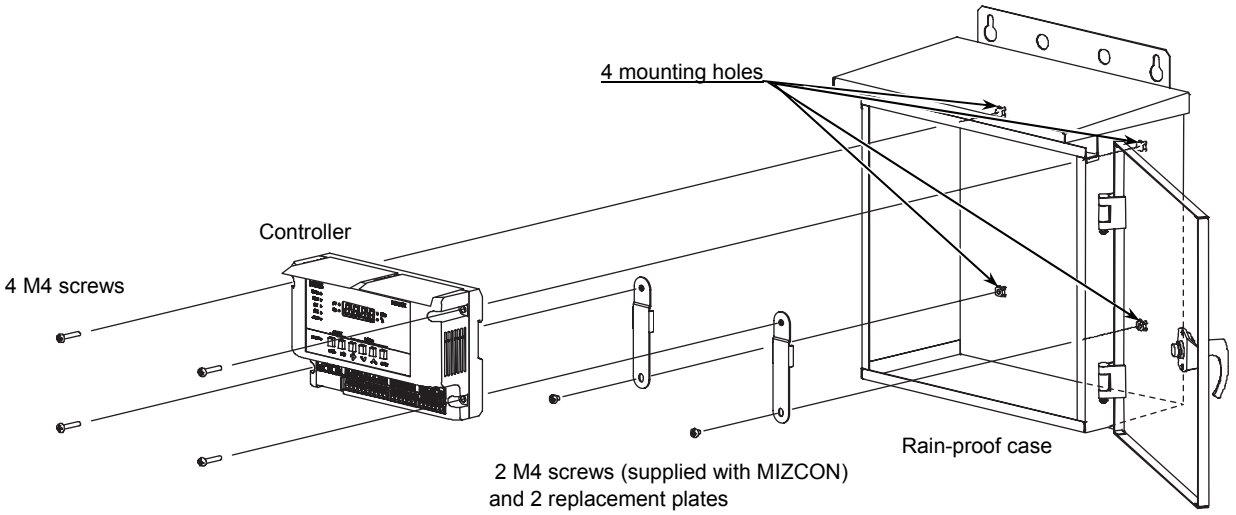


Figure 8. Controller replacement inside the former version of the rain-proof case (higher part)

Mounting onto the lower part

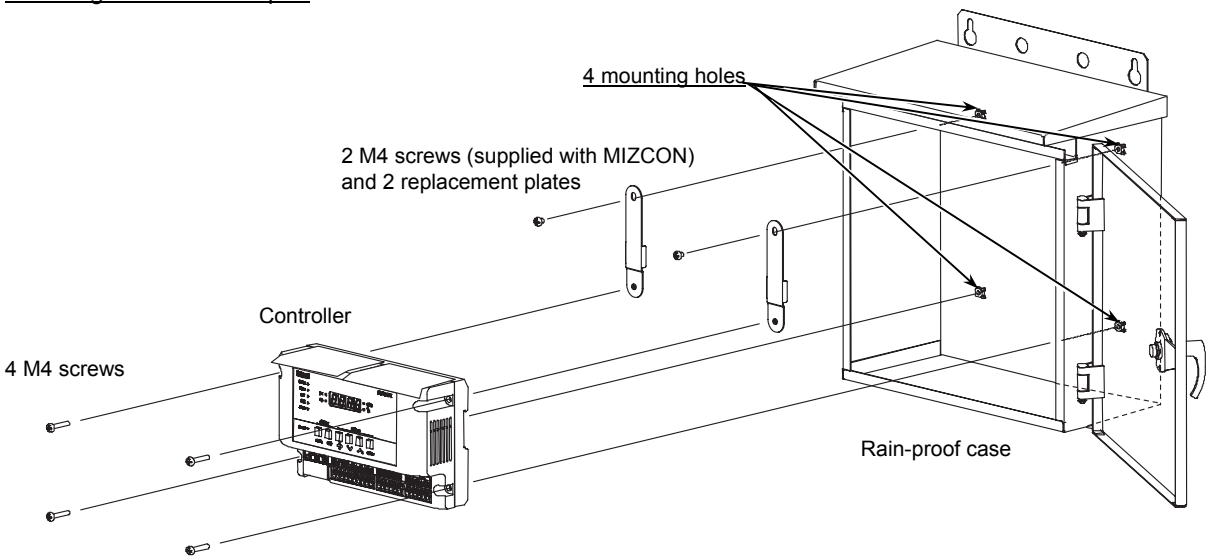


Figure 9. Controller replacement inside the former version of the rain-proof case (lower part)

Installation procedure: Controller onto DIN rail

To mount onto DIN rail, DIN rail mounting brackets (Part No. 83104567-001) are required. Be sure to separately order the brackets.

Mount the controller onto the DIN rail so that it does not fall from the DIN rail. Fix the bilateral sides of the controller with DIN rail mounting brackets.

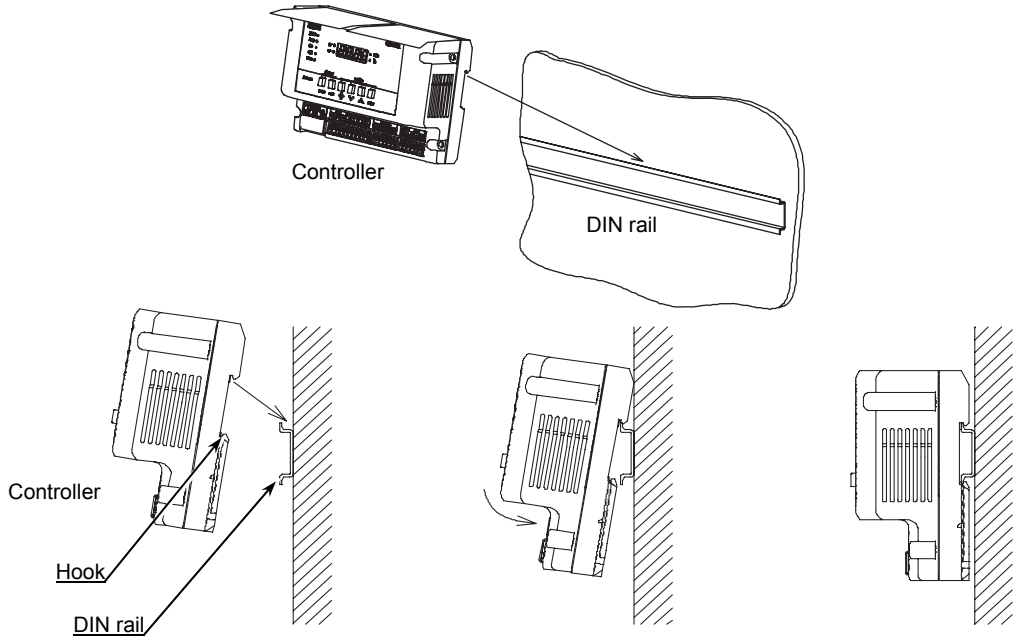


Figure 10. Controller installation onto DIN rail

Detaching procedure: Controller from DIN rail

To detach the controller from DIN rail, unhook the controller by pulling the DIN rail holder downward using a screwdriver and lifting the lower part of the body as shown in Fig. 11. Do not strongly pull the DIN rail holder. If DIN rail holder comes off from the controller, reinsert it until it clicks.

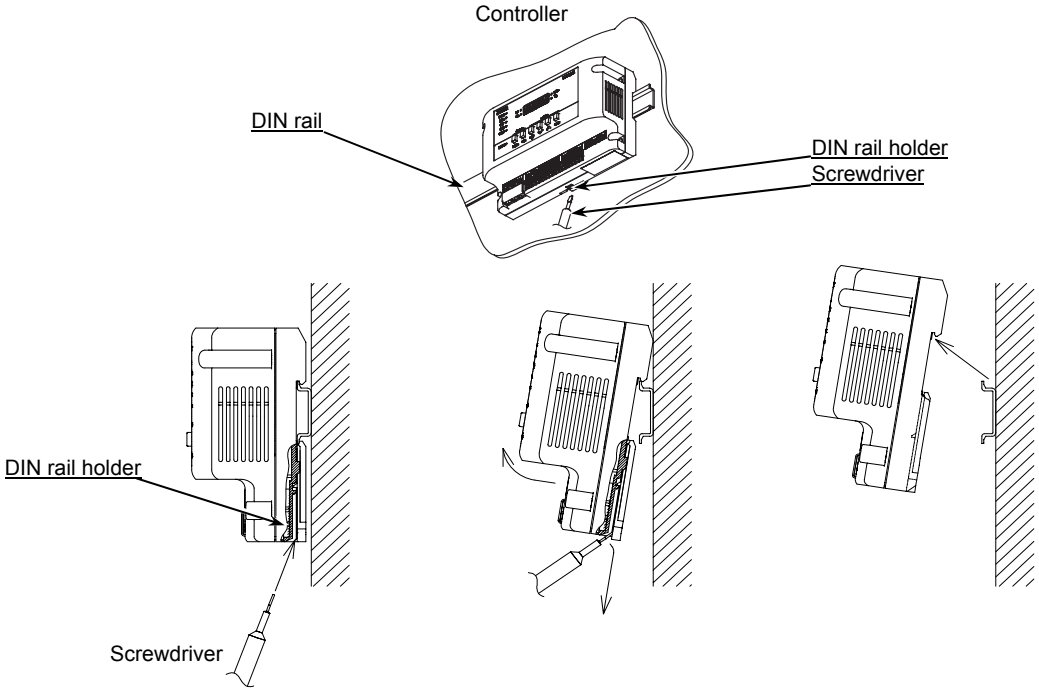


Figure 11. Controller detaching from DIN rail

Clearance of the controller inside the rain-proof case / onto DIN rail

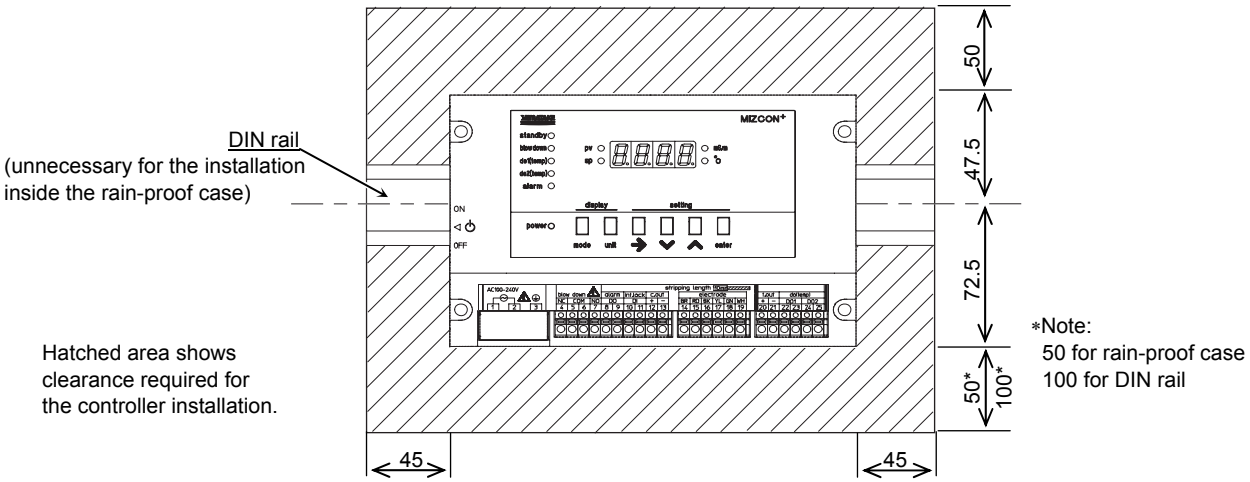


Figure 12. Clearance of the controller

2. 4-Electrode Sensor

Precautions for installation

- Install the 4-electrode sensor inside the sump of the water tank or in a location (close to the tank) where water flows well. Avoid installing the sensor close to the water feeding point.
- Do not allow the 4-elctrode sensor to directly contact the inner wall or the bottom of the water tank. Leave approx. 10 cm away from the inner wall and from the bottom for installation.

Installation procedure: 4-electrode sensor

Fix the 4-electrode sensor with ϕ2-4 mm wire inside the sump of the water tank. Roll one end of the wire and hang the 4-electrode sensor . (Lead the wire end through the wire hanging tab of the sensor.) Tie the other end of the wire to the cooling tower.

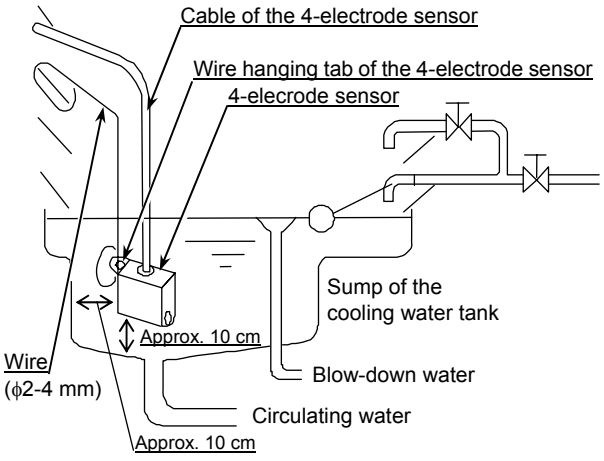


Figure 13. 4-electrode sensor installation in the water tank

3. Rain-Proof Case

Precautions for installation

- Install the rain-proof case (with the controller inside) under the cooling tower, on a wall under an eave, and other locations unexposed to direct sunlight and rain.

Installation procedure: Rain-proof case

Mount the rain-proof case on a wall with screws or on a DN50 pipe with a u-bolt.
(See Fig. 4 for the mounting hole dimensions.)

Fan Multiple Units Control

MIZCON Plus is not applicable to the multiple units control of fans. That is, MIZCON Plus alone cannot control the cooling tower composed of multiple cells since the cooling water temperature of each cell may differ.

Note:

Keeping to run the cooling tower fan until the cooling water temperature drops down to the low limit increases the chiller COP (Coefficient of Performance). Multiple units control of the fans therefore is not recommended even with an additional controller based on the representative temperature.

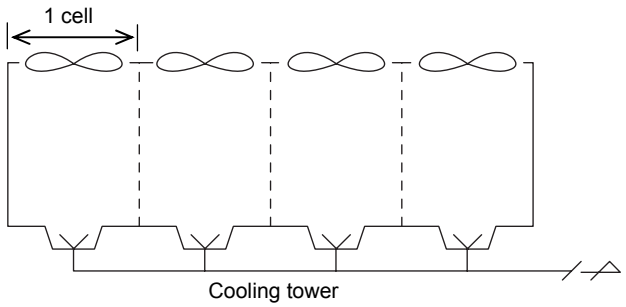


Figure 14. Cooling tower composed of multiple cells

Wiring

⚠ WARNING

- Be sure to disconnect the power source from MIZCON Plus before wiring the 4-electrode sensor. Electrical shock may result.

⚠ CAUTION

- Before activating the MIZCON Plus, make sure all the wires are correctly connected. Faulty wiring may cause equipment damage.

Wiring procedure

Power supply line (for M3.5 screw terminal connection):

Crimp the M3.5 crimp terminals on the wire ends, and connect them to the power supply terminal block.

Lines except the power supply line (for clamp terminal connection):

For the lines except the power supply line, the quick-ft screwless terminal blocks are provided. Follow the procedure below for the wire connection.

1) Strip 10 mm sheath of a wire end.
2) Make sure that there is no wire fiber protruded from the bare wire (stripped part).
3) Insert the wire end while pressing the clamp release button using a slotted screwdriver. (Button-pressing force: 23 N)
4) Pull out the screwdriver with the wire end inserted. Then, lightly pull the wire to make sure it is tightly connected. Again, make sure that there is no wire fiber protruded from the bare wire connected.

Protective sheet:

After all the wires are completely connected, peel off the protective sheets until MIZCON Plus is activated.

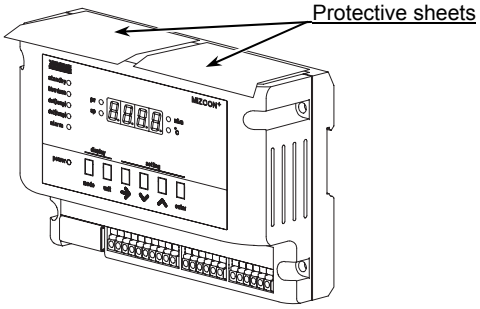


Figure 15. Protective sheets

Wire arrangement

1) Power supply (3 terminals)

Terminal number	Terminal indication	Description	
1	~	Power supply input	Screw terminals
2	~	Power supply input	
3	⏚	Ground	

2) Signals 1 (10 terminals)

Terminal number	Terminal indication		Description	
4	blow down	NC	Motorized ball valve N.C.	Quick-fit screwless (clamp) terminals
5	blow down	COM	Motorized ball valve common	
6	blow down	COM	Motorized ball valve common	
7	blow down	NO	Motorized ball valve N.O.	
8	alarm	DO	High limit alarm output	
9	alarm	DO		
10	int.lock	DI	Interlock contact input	
11	int.lock	DI		
12	c.out	+	Conductivity 4-20 mA output (+)	
13	c.out	-	Conductivity 4-20 mA output (-)	

3) 4-electrode sensor (6 terminals)

Terminal number	Terminal indication		Description	
14	electrode	BR (brown)	Current electrode (+)	Quick-fit screwless (clamp) terminals
15	electrode	RD (red)	Voltage electrode (+)	
16	electrode	BK (black)	Voltage electrode (-)	
17	electrode	YL (yellow)	Current electrode (-) / Temperature (B2)	
18	electrode	GN (green)	Temperature (B1)	
19	electrode	WH (white)	Temperature (A)	

4) Signals 2 (6 terminals)

Terminal number	Terminal indication		Description	
20	t.out	+	Temperature 4-20 mA output (+)	Quick-fit screwless (clamp) terminals
21	t.out	-	Temperature 4-20 mA output (-)	
22	do(temp)	DO1	Temperature contact output 1	
23	do(temp)	DO1		
24	do(temp)	DO2	Temperature contact output 2	
25	do(temp)	DO2		

Wiring to motorized ball valve

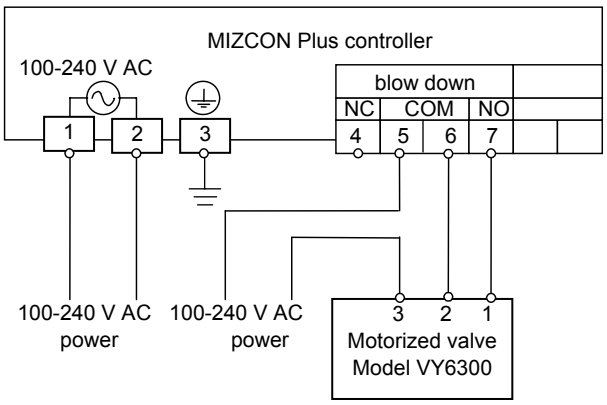


Figure 16. Wiring to Model VY6300

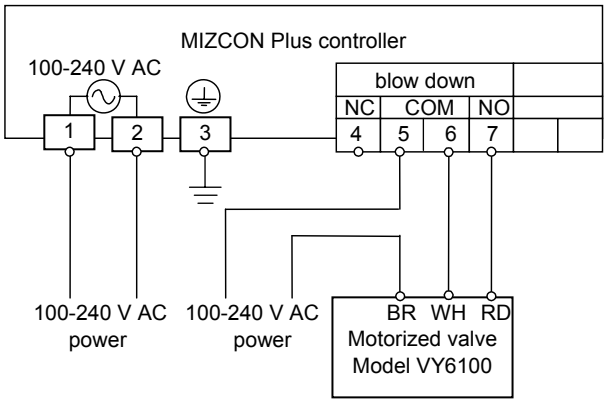


Figure 17. Wiring to Model VY6100

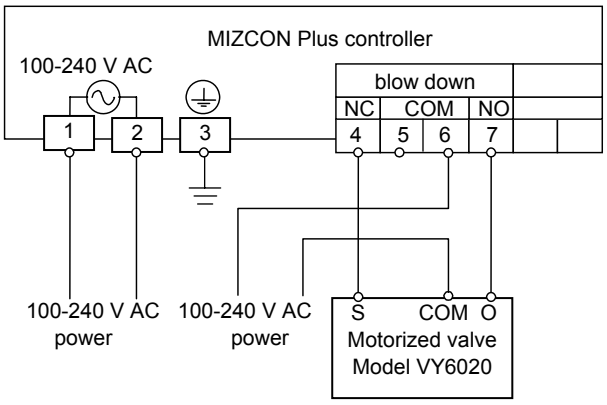


Figure 18. Wiring to Model VY6020

Operation

⚠ CAUTION

- Set the temperature setpoints that satisfy your chiller manufacturer.

Default values and setting ranges of the setpoints

1) Default values and setting ranges of the setpoints (for 200mS/m conductivity range)

Item	Description	Indication	Default value	Setting range
Conductivity	Range	rEng (RENG)	200 mS/m	200 mS/m range or 400 mS/m range
	Setpoint	SP	80 mS/m	5-200 mS/m ∗ Set the value greater than DIF. SP < DIF is automatically changed to SP = DIF. SP > OHSP is automatically changed to SP = OHSP.
	Differential	dIF (DIF)	5 mS/m	5-15 mS/m ∗ Set the value smaller than SP. DIF > SP is automatically changed to DIF = SP. DIF < HDIF is automatically changed to DIF = HDIF.
	High limit alarm	oHSP (OHSP)	100 mS/m	5-200 mS/m ∗ Set the value greater than SP. OHSP < SP is invalid.
	High limit alarm differential	HdIF (HDIF)	5 mS/m	5-15 mS/m ∗ Set the value smaller than DIF. HDIF > DIF is invalid.
Temperature control output 1	Temperature output 1 Setpoint	SP1	25 °C	0-48.3 °C ∗ Set the value smaller than [50 - DIF1]. SP1 > [50 - DIF1] is automatically changed to SP1 = [50 - DIF1].
	Temperature output 1 Differential	dIF1 (DIF1)	2.0 °C	1.7-5.6 °C ∗ Set the value smaller than [50 - SP1]. DIF1 > [50 - SP1] is automatically changed to DIF1 = [50 - SP1].
	Temperature output 1 N.O. or N.C. contact	STT1	no (N.O.)	Switch the contact between N.O and N.C.
Temperature control output 2	Temperature output 2 Setpoint	SP2	4 °C	0-48.3 °C ∗ Set the value smaller than [50 - DIF2]. SP2 > [50 - DIF2] is automatically changed to SP2 = [50 - DIF2].
	Temperature output 2 Differential	DIF2	2.0 °C	1.7-5.6 °C ∗ Set the value smaller than [50 - SP2]. DIF2 > [50 - SP2] is automatically changed to DIF2 = [50 - SP2].
	Temperature output 2 N.O. or N.C. contact	STT2	nc (N.C.)	Set the contact to no or nc. ∗ Switch the contact between N.C. and N.O. N.C. setting is for anti-freeze electric heater. Operating status therefore is maintained even when the cooling water pump is shut down. To prevent the heater from heating when no water is left, provide an additional circuit.

2) Setpoints and setting ranges for 400 mS/m conductivity range

Item	Description	Indication	Default value	Setting range
Conductivity	Setpoint	SP	200 mS/m	10-400 mS/m ∗ Set the value greater than DIF. SP < DIF is automatically changed to SP = DIF. SP > OHSP is automatically changed to SP = OHSP.
	Differential	dIF (DIF)	10 mS/m	10-30 mS/m ∗ Set the value smaller than SP. DIF > SP is automatically changed to DIF = SP. DIF < HDIF is automatically changed to DIF = HDIF.
	High limit alarm	oHSP (OHSP)	240 mS/m	10-400 mS/m ∗ Set the value greater than SP. OHSP < SP is invalid.
	High limit alarm differential	HdIF (HDIF)	10 mS/m	10-30 mS/m ∗ Set the value smaller than DIF. HDIF > DIF is invalid.

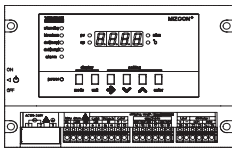
Setting Operations

7-segment LEDs indication

0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9
A a	A	C c	c	D d	d	E e	E	F f	F	G g	G	H h	h	I i	i	L l	L	N n	n
O o	o	P p	P	R r	r	S s	S	T t	t										

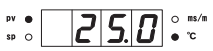
The settings on this page are available for all the models of MIZCON Plus series.

When power is turned on…



Conductivity PV

Temperature PV



Indication changes by pressing [unit] key

Press [mode] key.

Continued to P.18.

Press [mode] key.

Changeover of PV range : conductivity (To change 200 to 400 mS/m)

Conductivity PV range setting menu

Press [enter] key.

Press [enter] key.

The PV range currently set is displayed.

Press [→] key.

PV range setting mode

All the digits flash.

Change the range (200 mS/m or 400 mS/m) with [↑] and [↓] keys.

Press [enter] key.

The PV range newly set is displayed.

Press [enter] key.

Press [mode] key.

Setting of blow-down SP :conductivity (To change 80 to 120 mS/m)

* If setpoint (SP) smaller than differential (DIF) is entered, SP equal to DIF is automatically set regardless of the entered SP.
If SP greater than OHSP (high limit alarm SP) is entered, SP equal to OHSP is automatically set regardless of the entered SP.

Conductivity SP setting menu

Press [enter] key.

Press [enter] key.

The SP currently set is displayed.

Press [→] key.

SP setting mode

The first digit (left '0' in this case) flashes.

Select the digit to change with [→] key, and change the value with [↑] and [↓] keys.

Press [enter] key.

The range newly set is displayed.

Press [enter] key.

Press [mode] key.

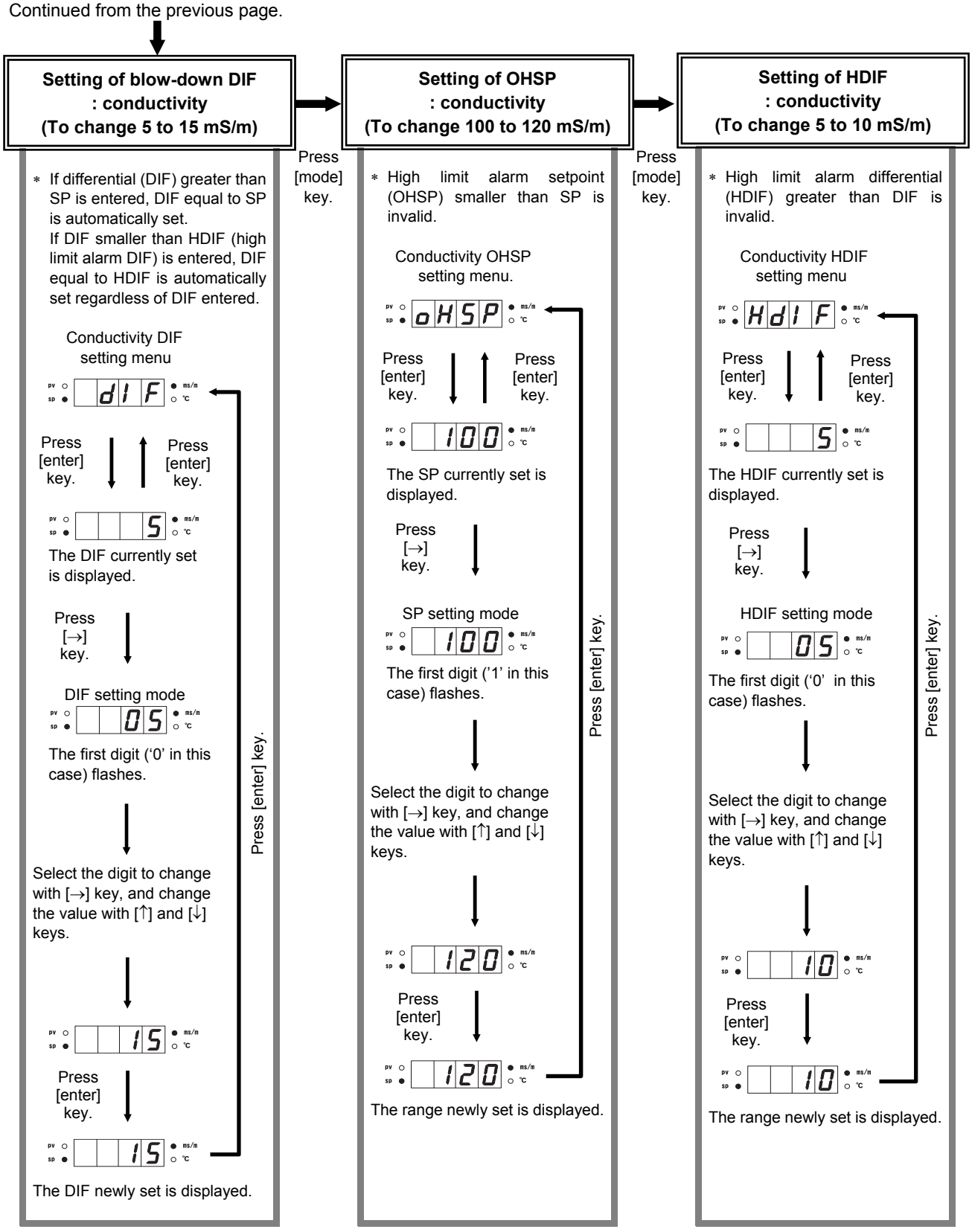
Continued to the following page.

unit :
Changes over between conductivity.

enter :
Displays the conductivity range. (The range 200.mS/m or 400 mS/m currently set is displayed for 2 seconds.)

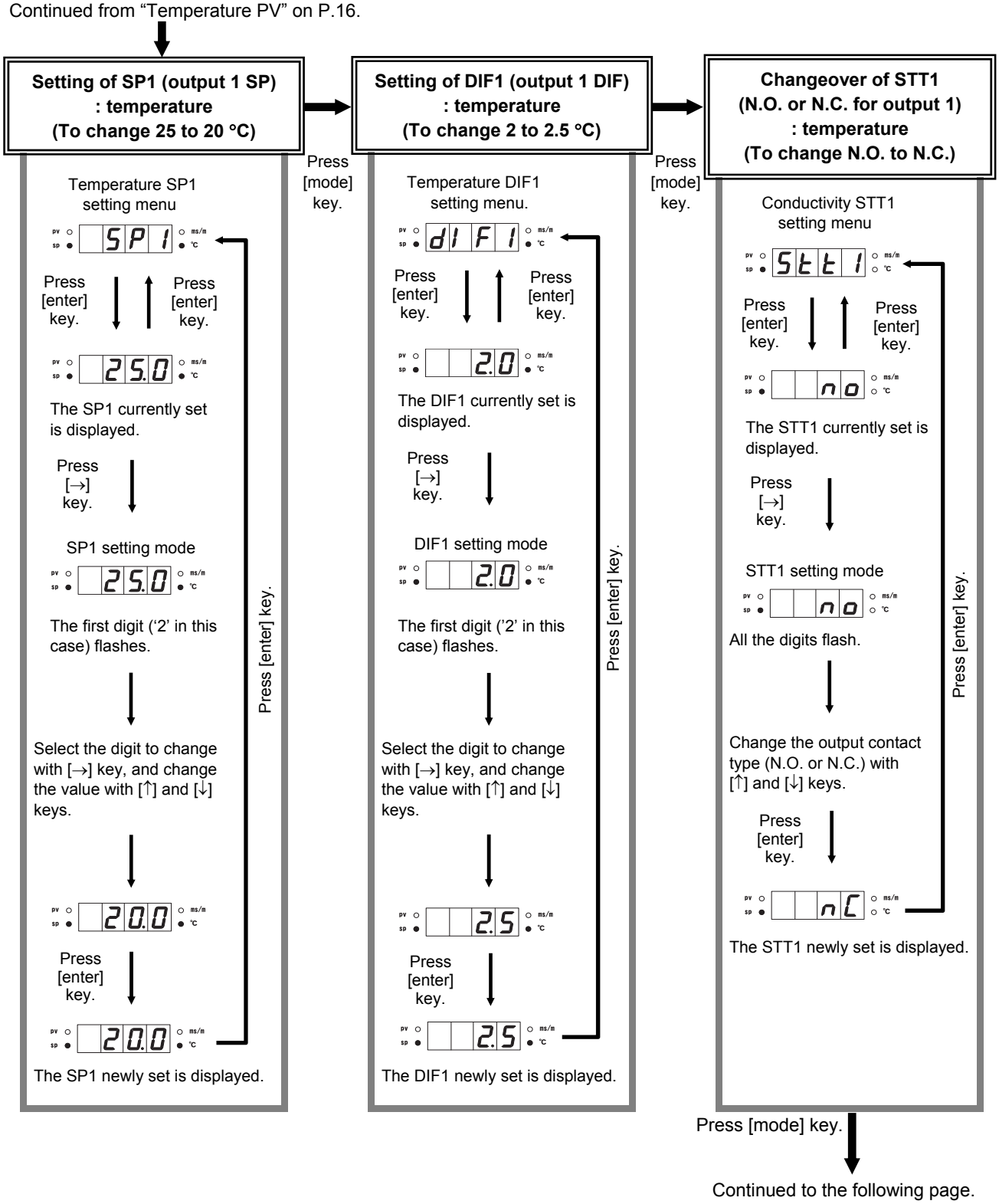
The settings on this page are available for all the models of MIZCON Plus series.

Continued from the previous page.



The settings on this page are available for Models R7010WX01 and R7010WX02..

Continued from “Temperature PV” on P.16.



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The settings on this page are available for Model R7010WX02..

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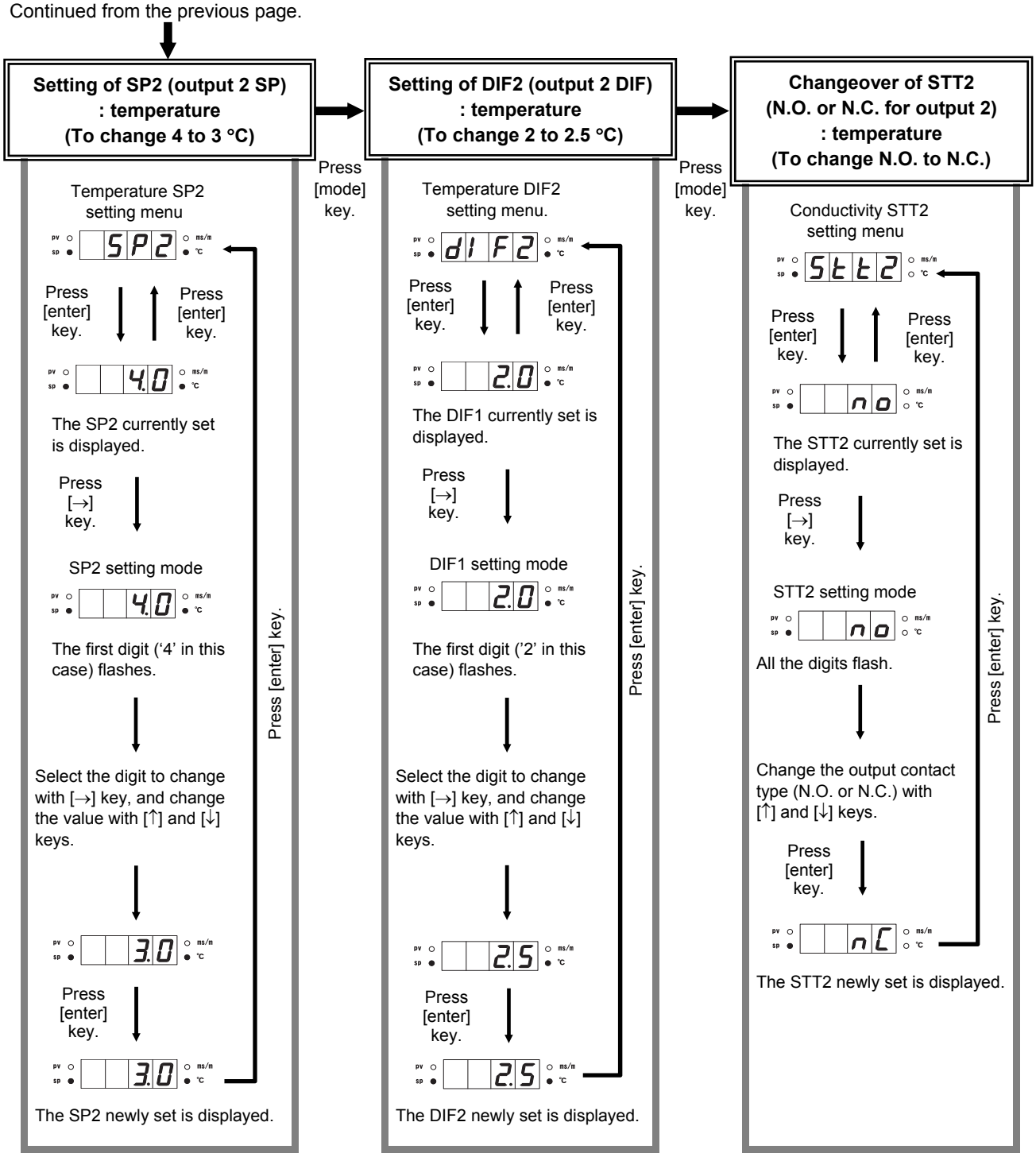

Inspection and Maintenance

Controller

MIZCON Plus controller does not require to be periodically cleaned. Remove the dust covered the top and bottom vent holes (slits) of the controller housing if necessary.

4-electrode sensor

Scale and slime coated the electrodes may prevent the electrodes to contact water. Periodically take the 4-electrode sensor out of the cooling water tank to inspect and cleanse.

1. Inspecting and cleansing period
   - For the MIZCON Plus used for a general cooling tower, inspect and cleanse the sensor once every 2 months.
   - For other than the above, inspect and cleanse the sensor 1 month after the sensor activated. Then, schedule the next inspection based on the results of the first inspection. (Once every 2 months in general.)
2. Inspection

   Check the water sampling probe. If the inside of the probe including the electrodes are coated with slim, scale, and other substances, cleanse the probe. See Fig. 19.

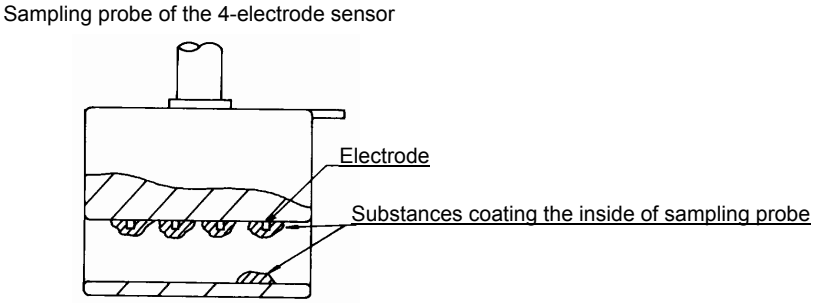

Figure 19. Inspection of the 4-electrode sensor (sampling probe)

⚠ CAUTION
• Be sure to turn off the power switch of the controller before replacing the 4-electrode sensor.
• MIZCON Plus requires 2 hours after the power is turned on to stably operate.

3. Cleansing
   - Lightly brush the inside of the sampling probe using toothbrush with alkaline cleanser to remove the substances coating there. Then rinse well with water. Do not use metal brush.
   - Brush the 4 electrodes well to remove all the substances. The substances coating the electrodes may cause measuring error.

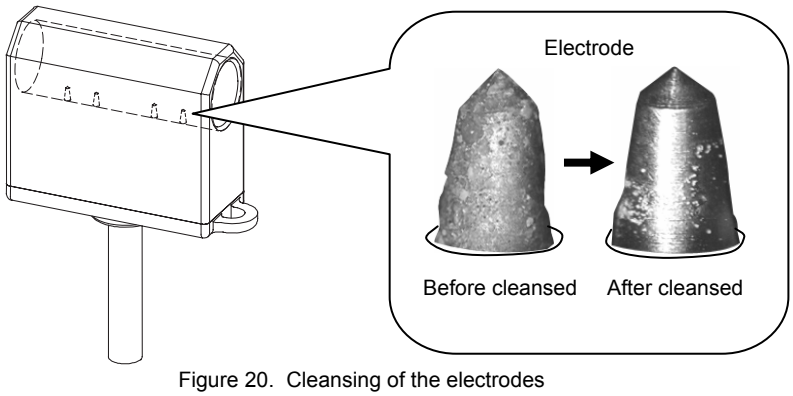

Figure 20. Cleansing of the electrodes

4. MIZCON Plus in long-term shutdown

   To deactivate MIZCPON Plus for a long term, take the 4-electrode sensor out of the cooling water tank, cleanse, rinse, dry, and then put it in a plastic bag for storage. Cleans and rinse the sensor beforehand when using it again.
5. Replacement

   Replace the 4-electrode sensor every 3 to 5 years.
   Be sure to turn off the power switch of the controller before replacing the sensor.

Troubleshooting

For any problem that is not solved by the corresponding action in the following list, please consult our sale personnel.

Problem	Action
Controller is not turned on.	Is the power source (breaker) connected (turned on)?
Temperature control DO1 and DO2 are not output.	• Is the controller tuned on? • Is the interlock input (DI) contact open? • Is the temperature differential (DIF1 / DIF2) correct?
Blow-down valve is not closed when the conductivity reaches the setpoint (SP).	• Is the blow-down differential correct? • Is the motorized valve operating normally?
PV (measured value) of conductivity is lower than the standard value of makeup water.	• Cleanse and rinse the sampling probe of the 4-electrode sensor, referring to P. 20. • In case that the problem is not solved by the action above, check the controller with the resistor for field inspection (Part No. 83167745-001). If the controller operates normally, replace the 4-electrode sensor.

Error Indication

Error indication	Description	
CHAL	Conductivity high limit alarm	Cooling water conductivity out of the high limit alarm setpoint (OHSP) is detected.
C-Er	Conductivity error for sensor damage/malfunction detection	The cooling water conductivity out of the range is measured. Note: When the conductivity drops below 10 mS/m for 200 mS/m range or 20 mS/m for 400 mS/m range, C-Er is indicated.
t-Er	Temperature error for sensor damage/malfunction detection	The cooling water temperature out of the range is measured. Note: When the temperature rises above 65 °C or drops below -15 °C, t-Er is indicated.
C-AL	Conductivity unmeasurable	Replace the 4-electrode sensor.

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Specifications are subject to change without notice.

Azbil Corporation

Building Systems Company

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