

# Z SERIES MICRO CONTROLLER "H"

DATA SHEET

PYH

Micro Controller "H", Fuji's upgraded Z-series controller incorporating a micro processor, provides the digital communication and high speed operation cycle (100 ms). It is ideally suited for small scale plant or small scale FA (Factory Automation).

## FEATURES

1. **Unique 2-size micro controller**  
(48×96mm, 96×96mm)  
RS-485 digital communication has been realized with these 3-size controllers.
2. **High controllability**  
High speed operation cycle (100 ms) has been attained.
3. **PID auto-tuning function**  
PID parameters can be automatically computed and set by the controller.
4. **Dust/drip-proof front panel**  
Front panel of dust/drip-proof construction conforms to IEC IP55 standards.
5. **Multi-input, programmable range**  
Several inputs can be handled by a single controller.
6. **Full variety of operation and alarm functions**  
Various operations and alarms are possible due to the multiple input/output functions.
7. **Full variety of control types**  
Inverter control type, position feedback control type and dual control type are available for selection according to final control devices.
8. **Wide range of power supply**  
The controller operates on power sources within the range of AC 85 to 265V.



PYH5



PYH9

## SPECIFICATIONS

### 1. Control operation functions

- (1) **PID control:** Proportional band (P): 0 to 3276% (ON-OFF operation of controller with dead band at P=0)  
Integral time (I): 0.1 to 3276 sec  
Derivative time (D): 0 to 900sec
- (2) **PID auto-tuning**
- (3) **Operation cycle:**  
100 msec (operation cycle is variable within the range of 0.1 to 3276 sec)
- (4) **Input filter:** Setting range: 10.0 to 900.0 sec (set to 10.0 sec prior to delivery)
- (5) **Square-root extraction (router):**  
In differential pressure conversion, the flow rate is treated as "0" by the router cut point. (CUT point is "unused" prior to delivery.)
- (6) **Input shift function:**  
Shift of actual measured value (PV) is possible by this function.
- (7) **Intermittent PID control:**  
Control cycle and control with/without cycle can be designed without changing 100 msec (normal) of operation cycle.
- (8) **Non-linear gain:**  
A function to make a gain non-linearity by reducing the gain in the vicinity of set value (SV).

## 2. Table of input/output specifications and alarm output

Item	Rating	Type					
		Fixed set Point control type (PYH5, 9)	Inverter control type (PYH9 only)	Position feedback control type (PYH5, 9)	Dual control type (PYH5, 9)		
Input (measured value)	Thermocouple, resistance bulb, voltage, current	○	○	○	○		
	With transmitter power supply DC 4 to 20mA (PYH9 only) mV input: leak current: 3μA	-	○	-	-		
Control output 1	Relay contact	AC 220V, 3A (resistive load), 1c contact	○	-	-	○	
	Current	DC 4 to 20mA, load resistance 600Ω or less	○	-	-	○	
	SSR/SSC drive	DC 10 to 27V at ON, 0.5V DC or less at OFF, max. current DC 20mA.	○	-	-	○	
	Motor-driven valve operation	AC 200V, 3A (resistive load), 1a contact × 2	-	-	○	-	
Control output 2 (dual control type only)	Relay contact	AC 220V, 3A (resistive load), 1c contact	-	-	-	○	
	Current	DC 4 to 20mA, load resistance 600Ω or less	-	-	-	○	
	SSR/SSC drive	DC 10 to 27V at ON, DC 0.5V or less at OFF, max. current DC 20mA.	-	-	-	○	
Auxiliary	Analog	DC 1 to 5V, input resistance 1MΩ or more	○	○	○	○	
	Valve position	100 to 1000Ω, 3-wire potentiometer	-	-	○	-	
	Digital 1	Contact, DC 24V, 15mA (R-ACK or SV selection)	○	○	○	○	
	Digital 2	Ditto (EX-MV command)	○	○	○	○	
	Digital 3	Ditto (PYH9 only) (CAS-SV)	○	○	○	○	
Auxiliary output	PV/SV/MV transmission output	Analog	DC 1 to 5V, input impedance of connected device 500kΩ or more	○	○	○	○
	Auxiliary alarm output	Digital 1	DC 30V, 0.1A, 1a contact (PYH5: opencollector, DC 30V, 0.1A)	○	○	○	○
		Digital 2	Ditto (PYH9 only)	○	○	○	○
		Digital 3	Ditto (PYH9 only)	○	○	○	○
Main alarm output	AC 220V, 1A, 1a contact × 2	○	○	○	○		
Heater break alarm output	AC 220V, 1A, 1a contact (PYH5: opencollector, DC 30V, 0.1A)	○	-	-	○		
Fault output	DC 30V, 0.1A, 1a contact	○	○	○	○		

### 3. Setting and indication

- (1) Accuracy: ±0.2% FS, ±1 digit  
Temperature compensation: ±1°C
- (2) Remote setting input accuracy: ±0.2% FS
- (3) Setting method:  
Key switch
- (4) Indicating method:  
7-segment LED, 4 digits × 2, mode indication (LED lamp)

### 4. Power failure backup

Set point values and PID parameters are stored in non-volatile memory for automatic re-start

### 5. Status function

Self-diagnosis using watchdog timer

### 6. Digital communication function

Universal interface:  
PS-485: Used for PYH5 and PYH9 as an option.

### 7. Operation mode

Remote mode operation, auto mode operation, manual mode operation

### 8. Alarm functions

- (1) Main alarm: Absolute value upper/lower limit, deviation upper/lower limit, absolute value lower limit with lower limit hold, deviation lower limit with lower limit hold, deviation upper/lower limit with lower limit hold, deviation upper/lower limit.
- (2) Heater break alarm: Alarm output with connection to separately installed current transformer (CT).
- (3) Auxiliary alarm/limiter: Measured value upper/lower limit, manipulated output upper/lower limit, set point value upper/lower limiter, manipulated output upper limiter

## 9. Operating and storage conditions

- (1) Allowable ambient temperature:  
-10 to 50°C
- (2) Allowable ambient humidity:  
90% RH or less (no condensation)
- (3) Storage temperature:  
-10 to 70°C

## 10. General specifications

- (1) Power supply: 100(-15%) to 240(+10%)VAC, 50/60Hz
- (2) Power consumption:  
Approx. 30VA (AC 220V)
- (3) Dielectric strength:  
Power terminal to ground : 1500VAC 1min.  
Power terminal to relay contact output : 1500VAC 1min.  
Grand to relay contact output : 1500VAC 1min.  
Others : 500VAC 1min.
- (4) Insulation resistance:  
20MΩ or more (at DC 500V)

## (5) Life of output relay:

- Mechanical, 10<sup>7</sup> operations (100 ON-OFF operations/min)  
Electrical, 10<sup>5</sup> operations (20 ON-OFF operations/min at rated load)

## 11. Structure

- (1) Installation: Panel flush mounting
- (2) Enclosure case:  
Plastic housing

## (3) Outline dimensions

Type	Outline dimensions (H × W × D)	Mass (weight)
PYH5	96 × 48 × 150mm	Approx. 0.5kg
PYH9	96 × 96 × 150mm	Approx. 0.8kg

IEC (DIN standards)

## (4) Protective structure:

- Front panel, IEC IP55  
Terminal, IEC IP00

## (5) Finish color: Munsell N 1.5 (black)

## (6) Terminal: Compression type terminal (AWG 14)

## 12. Scope of delivery

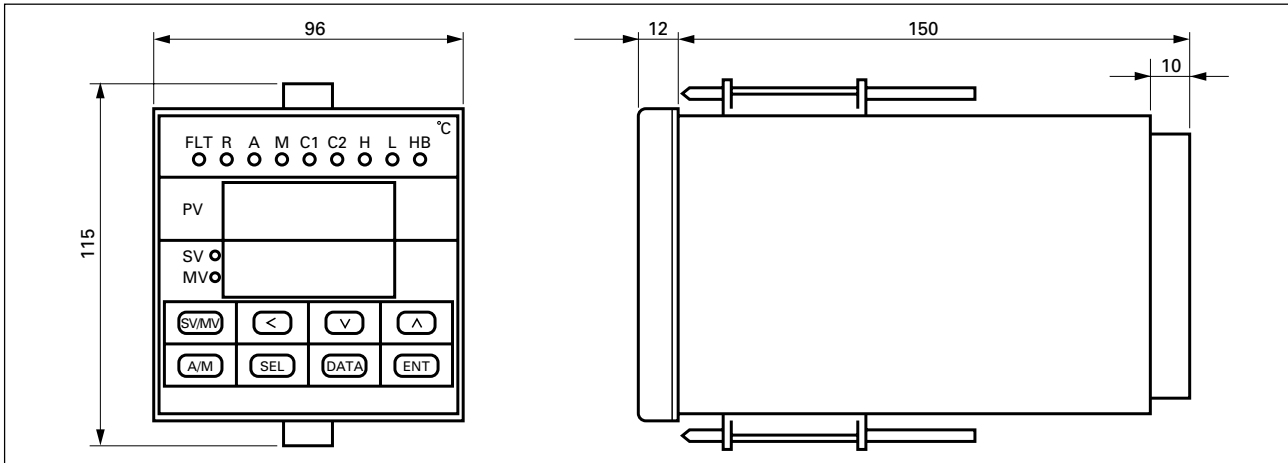
Controller, mounting bracket operation manual

## CODE SYMBOLS

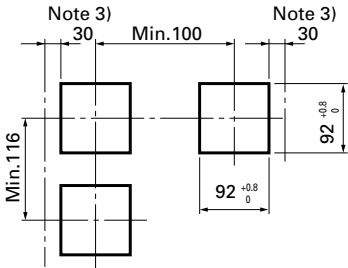
1 2 3 4 5 6 7 8 9 10 11 12 13													Description
P	Y	H						-					Size of front panel 48 × 96mm 96 × 96mm
				5									Control functions Fixed set point control type Fixed set point control type (SV select type) Inverter control type (SV select type)...PYH9 only Position feedback control type Position feedback control type (SV select type) Dual control type Dual control type (SV select type)
				9									
					A								Control output 1 Relay contact output SSR/SSC drive output DC 4 to 20mA output Pulse output (position feedback control type only)
					B								
					C								
					D								
					E								
					F								
					G								
													Control output 2 (dual control type only) None Relay contact output SSR/SSC drive output DC 4 to 20mA output
					1								
					2								
					3								
													Additional specifications 1 None With heater break alarm (control output, relay contact output only)
					0								
													Additional specifications 2 None With external set value input (5th digit B, C, E, G not acceptable) With external transmission output A + B (5th digit B, C, E, G not acceptable)
					2								
					3								
													Input specification type mV/resistance bulb/thermocouple multi-input type DC 1 to 5V/DC 4 to 20mA multi-input type DC 4 to 20mA input type with transmitter power supply (5th digit C: inverter control only)
													Digital output None DO1 DO1-2 } PYH9 only DO1-3 }

**OUTLINE DIAGRAM (Unit:mm)**

**PYH9 (96 × 96mm)**

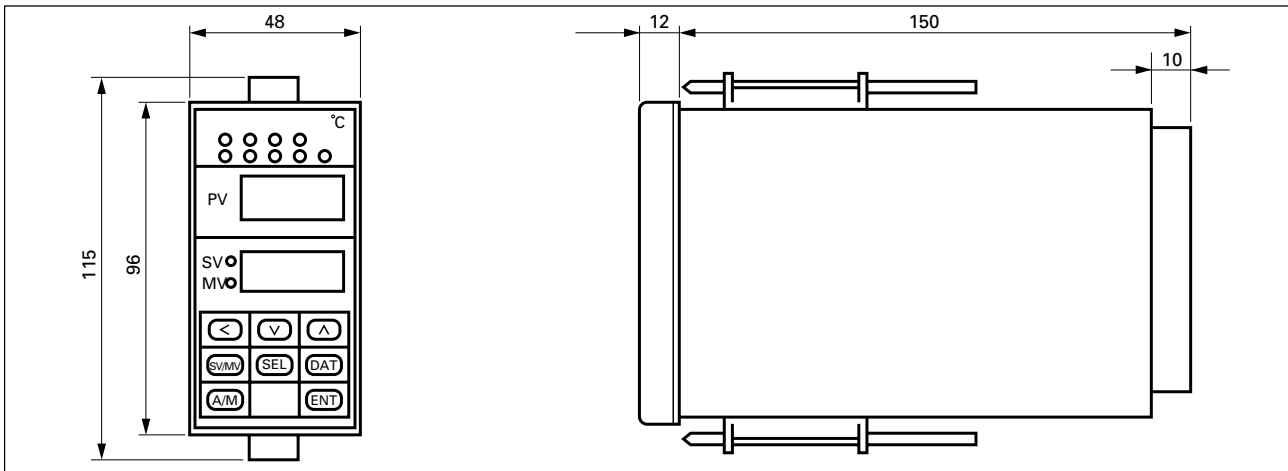


**Panel cutout**

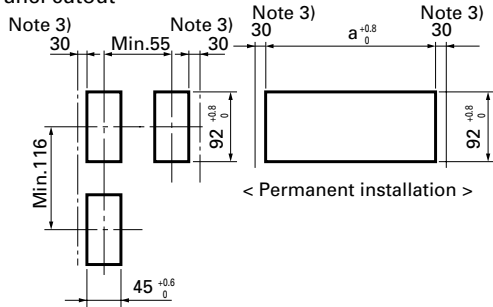


- Note 1) Panel thickness: 1 to 8mm
- Note 2) Permanent sidewise installation is possible. For vertical installation, a minimum space for installation the bracket should be provided as shown in the above diagram.
- Note 3) When a device with extensive depth is installed on both sides of the controller, allow a space of more than 30mm.
- Note 4) Install the fan in the permanent PYH5 installation.

**PYH5 (48 × 96mm)**



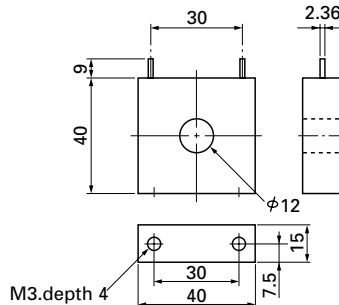
**Panel cutout**



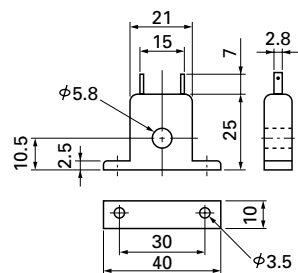
**Accessory(CT)**

**Current transformer for heater break alarm**

- Heater current: For 20 to 50A
- Type: CTL-12-S36-8F



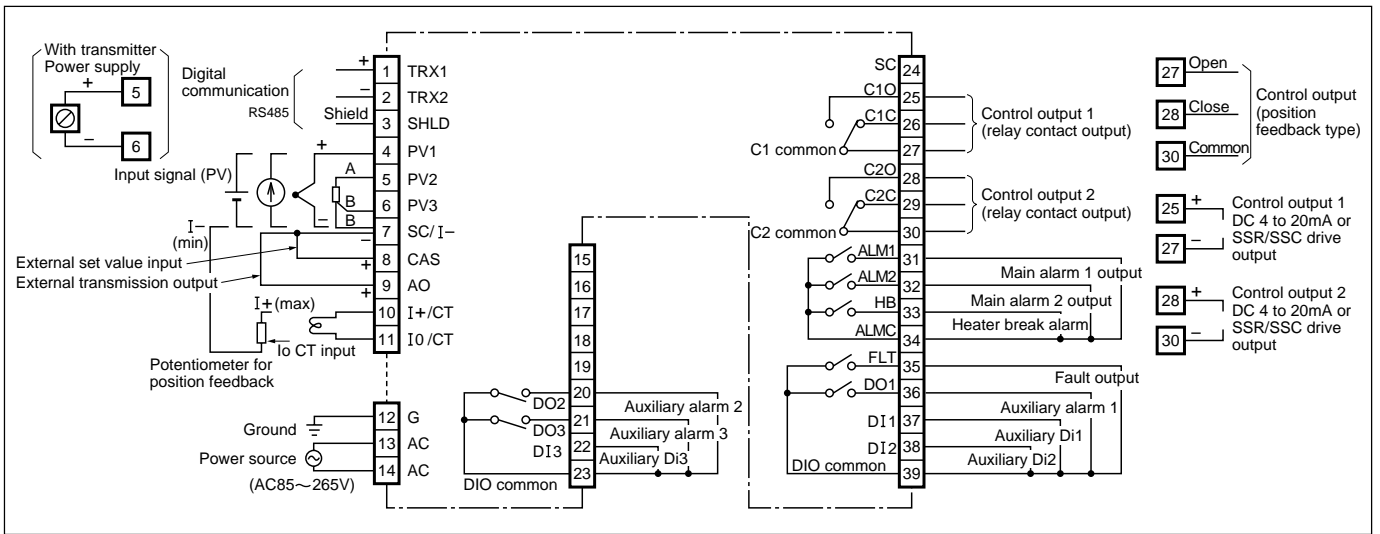
- Heater current: For 1 to 30A
- Type: CTL-6-S-H



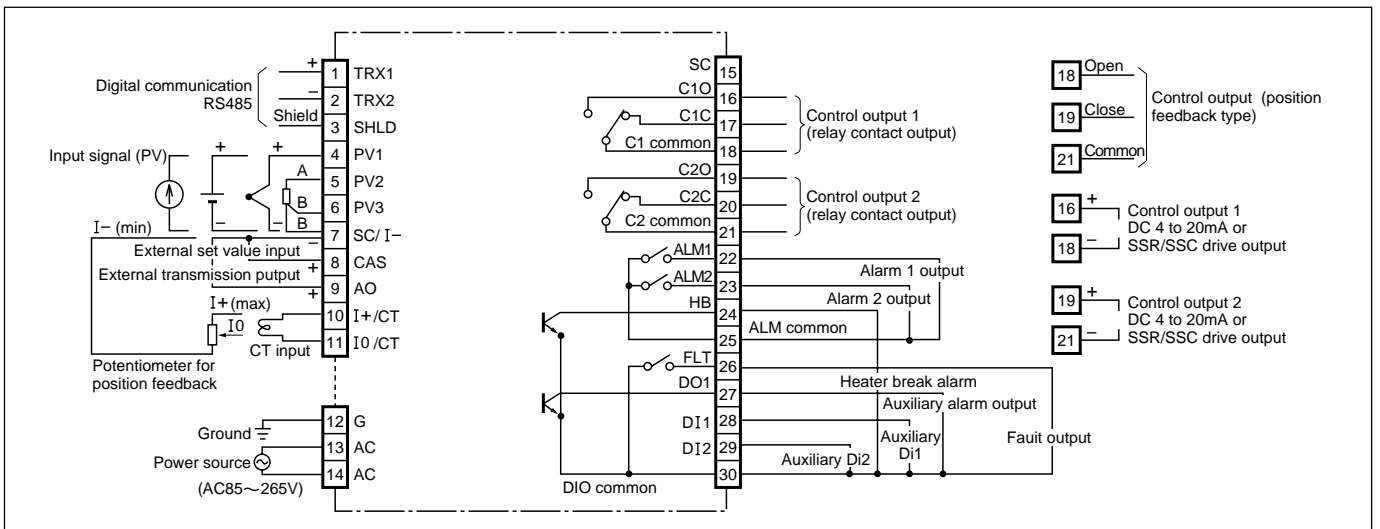
Quantity	2	3	4	5	6
a	93	141	189	237	285

# CONNECTION DIAGRAM

## PYH9



## PYH5



Connecting terminal No. varies with types.

Connect terminals in reference to the terminal nameplate attached to the body.

Note 1) Power fuse is not installed in the controller. It should be connected exteriorly.

2) Ensure G terminal is connected to the ground.

3) Do not use open terminals.

4) Connect thermocouple, resistor tube, potentiometer input signal directly to PYH.

⚠ Caution on Safety

\*Before using this product, be sure to read its instruction manual in advance.

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