



# **INSTRUCTION MANUAL**

## **DIGITAL Electro-pneumatic Regulator**

### **Series ER100**

#### **ANALOG INPUT TYPE ER104 - x0/1/2xx**

#### **PARALLEL INPUT TYPE ER104-xPxx**

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

## Safety instructions

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (ISO 4414 \*1 JIS B 8370 \*2).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.


This since this product is used in a vast range of applications and therefore not possible for us to have full knowledge in all of them.


Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to properly use it.


This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents please **read this operation manual carefully for proper operation.**

Please observe the cautions on handling described in this manual, as well as the following instructions:

Additionally, the caution is classified into the following three groups, "CAUTION", "WARNING", and "DANGER", in order to identify the degree of the danger it presents and possible hazard.

 **DANGER:** Failure to pay attention to DANGER notices in extreme conditions may cause a situation that results in serious injury or loss of life.

 **WARNING:** Failure to pay attention to WARNING notices may result in serious injury or loss of life.

 **CAUTION:** Failure to pay attention to CAUTION notices may result in injury or equipment damage.

\*1) ISO 4414 : Pneumatic fluid power ●●● Recommendations for the application of equipment to transmission and control systems.

\*2) JIS B 8370 : General rule for pneumatic systems

# INDEX

## ER100 series Digital Electro-Pneumatic Regulator ANALOG INPUT TYPE PARALLEL INPUT TYPE

<b>1.</b>	<b>DESIGN AND SELECTION</b> .....	<b>4</b>
<b>2.</b>	<b>INSTALLATION</b> .....	<b>7</b>
2.1.	Option Bracket Installation .....	9
2.2.	Wiring .....	10
2.3.	Connecting the D-SUB .....	15
2.4.	D-SUB Connector/Cable - Colour coding .....	16
<b>3.</b>	<b>PRODUCTS</b> .....	<b>17</b>
3.1.	Parts name .....	17
3.2.	Dimensions .....	18
3.3.	Internal structure .....	19
<b>4.</b>	<b>OPERATION METHOD</b> .....	<b>20</b>
4.1.	Name and Function of Display/Operation Part .....	20
4.2.	Function List .....	21
4.3.	RUN Mode – How to operate .....	22
4.3.1.	Input Signal Check and Pressure Monitor .....	22
4.3.2.	Zero- and Span Adjustment .....	23
4.3.3.	LED - Auto Power-Off .....	23
4.3.4.	Switch Output Function "F4" .....	23
4.3.5.	Proportional Value Change Function "F5" .....	24
4.4.	Setting Method .....	25
4.4.1.	Input Signal Setting .....	25
4.4.1.1.	Analog Type Input Signal Selection .....	25
4.4.1.2.	Parallel Type Input Signal Selection .....	26
4.4.1.3.	Preset memory Input Setting .....	26
4.4.1.4.	Direct Memory Input Setting .....	26
4.4.2.	Zero- and Span Settings .....	27
4.4.3.	Auto Power-Off Setting .....	27
4.4.4.	Switch Output Setting .....	28
4.4.5.	Proportional Value Change .....	29
4.5.	Key Lock .....	30
4.6.	Setting Range of Each Function .....	31
4.7.	Return to factory Settings (Reset) .....	32
<b>5.</b>	<b>MAINTENANCE</b> .....	<b>33</b>
5.1.	Error Code .....	34
5.2.	Troubleshooting .....	35
<b>6.</b>	<b>SPECIFICATIONS AND PRODUCT CODE</b> .....	<b>37</b>
6.1.	Specifications ER-104-5* e ER-104-9* .....	37
6.2.	Specifications ER-104-1* .....	38
6.3.	How to order .....	39
6.4.	Optional individual code .....	40
<b>7.</b>	<b>REFERENCE</b> .....	<b>42</b>
7.1.	Relationship between parallel type input signal and control pressure .....	42
7.2.	Relationship between preset memory and input signal .....	42

# 1. DESIGN AND SELECTION



## WARNING:

- Supply only "compressed air".
- For compressed air, always use clean air that does not contain corrosive gas.
- Be sure to use non lubricated, filtrated dry air (equivalent to Class 1, 3, 2 – ISO 8571-3).
- With a thorough understanding of compressed air characteristics, design a pneumatic circuit.
  - Where instantaneous stop holding at emergency stop is required, the same function as in the mechanical or hydraulic or electrical units cannot be expected.
  - There arise pop-up, jet-out and leaking phenomena caused by compressibility and expansibility, which are air characteristics.
- Prior to use, always ensure that the product withstands the operating environment.
  - The product cannot be used in corrosive gas, chemical liquid solvent, water, water vapour (steam) and ozone atmosphere. When a product is exposed to water droplets, oil or metallic powder, such as spatters and chips, be sure to protect it.
  - No product can be used in the explosive gas atmosphere.
- Always pay extra attention to the electric circuit during emergency stop, and cylinder operation, etc. during power failure.
- Attach a "pressure switch" and "residual pressure discharge valve" to the compressed air inlet of the equipment.
  - The pressure switch controls operation so that it cannot be carried out where the set pressure is not reached.
  - The residual pressure discharge valve discharges compressed air remaining inside the pneumatic circuit, to prevent accidents caused by pneumatic equipment operation due to residual pressure.
- If the product is left as it is with the supply pressure when no power is turned ON, the secondary side pressure may increase up to the supply pressure.
  - If any concerns regarding safety; take proper safety measures in the system; for example, use an extra valve on inlet or outlet.



## CAUTION:

- Use the product correctly at the indicated working pressure range.
- Note the maintenance conditions clearly in the equipment instruction manual.
  - The functionality of the product may be significantly reduced, depending on the operating condition, operating environment and maintenance situation, thereby safety might not be secured. If this maintenance work is conducted accurately and correctly, it is possible to maintain a sufficient product functionality and performance.
- Use a constant voltage power supply.
- Check the leak current to avoid a malfunction caused by such leakage from other control equipment.
  - The ER may show malfunction under the influence of leak current when a programmable controller or the like is used.

In case of 24 V DC:
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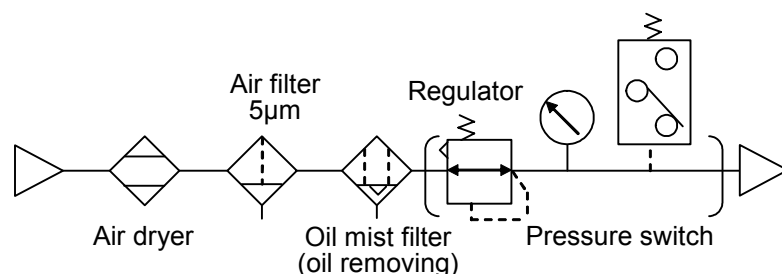
1.8mA or less
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- The response time is affected by the supply pressure and load capacity. When stable response time is required, install an extra pressure regulator before the Electro – Pneumatic pressure regulator Series ER.



## CAUTION:

- To avoid malfunction caused by electrical noise:
  - Insert a line filter into the AC power line.
  - Use a surge suppresser like a CR or diode on the inductive load (solenoid valve, relay and so on) to remove any noise on the source.
  - Keep cables connected to this product as far away as possible from power line.
  - Use a shielded cable to connect a device.
  - The shielded wire should be grounded on the power supply side.
  - Wire the power line as short as possible.
  - Don't share the power with devices that generate the noise, such as inverter motor.
  - Avoid to wire the power line or input signal line in parallel with other lines.
- When the current input type is wired, the power ground and signal common are shared.
  - When driving several electro pneumatic regulators with one PLC and D/A -unit, depending on the D/A-unit circuit, this wiring could cause some malfunction on the input signal. Consult your PLC maker and check whether it is possible to do this type of wiring or not.
- The current input type can be used with input signal 1 to 5V, but as opposed to other voltage input types, the input impedance is small ( $250\Omega$ ). Use an appropriate voltage generator.
- Please observe that bad air quality affects its characteristics, functionality and durability in a negative way.
  - For the pneumatic source, use cleaned air from which the solids, water and oil contents were eliminated sufficiently, using an air dryer, filter and oil mist filter.  
Do not use lubricated air as it may compromise the characteristics and functionality.



- When the secondary pressure is reduced with an input signal, etc., secondary air passes through the product inside and is discharged from the main exhaust port (EXH). Contamination of secondary piping and the inside of the load will therefore compromise the characteristics and functionality etc. Keep the inside of the piping as clean as possible.
- If the power is turned off under pressure, the secondary pressure is held at its last value. However, this maintained pressure is not guaranteed to last for very long.
  - In this case, if you need to exhaust the secondary side, reduce the control pressure by reducing the control voltage/current first and then turn off the power or use the exhaust valve.
- Since the supply pressure is supposed to provide the exact control pressure, it is important for the working pressure not to drop below "set secondary pressure + 0,5 Bar " for model ER104-1\* or drop below "set secondary pressure + 1 Bar " for all other models.
- **N.B.** If the supply pressure is not supplied for a long time while power is ON, product life is reduced. Avoid therefore this type of use.



## CAUTION:

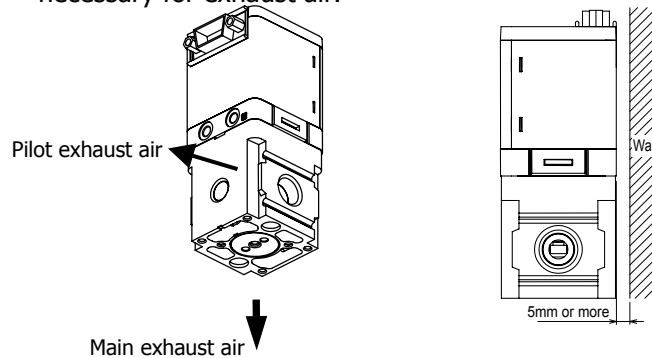
- When the secondary side control pressure is used with the port left open (in applications using nozzles for blowing etc.), pressure fluctuations may occur depending on the piping conditions and the blow conditions. Though it requires some extra efforts, please either verify via testing using the actual use conditions or consult Camozzi.
- When selecting a dryer, air filter, oil mist filter or regulator, select a device with a flow rate higher than that used by proportional pressure controls.
- Operating environment
  - Avoid operating the product in places where it may be affected by direct sunlight, water or oil.  
For operation in other than the specification requirements or for special purposes, please contact Camozzi.
- Drip-proof environment
  - The protective structure of this product is equivalent to that of the IP40. Do not install this product at places where exposed to moisture, salt, dust or chips or under positive or negative pressure. Do not operate at places with steep temperature fluctuations or in high humidity because dew condensation inside the main body will cause problems.
- With this product, even if the pressure is set to 0 bar, the secondary pressure is not completely released. It remains at a value less than 1% of F.S. of maximum control pressure. If 0 Bar is required, bleed the secondary side, or install a 3/2-way valve on the secondary side to switch to atmosphere, etc.

## 2. INSTALLATION

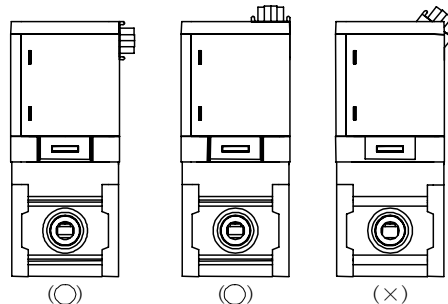


### CAUTION:

- Keep a sufficient space for operation & re-installation, wiring and piping work around the product.
- Provide a pneumatic filter just in the pre-stage of the circuit in which the pneumatic equipment is used.
- **IMPORTANT.** Do never block the exhaust port. Always reserve space necessary for exhaust air.

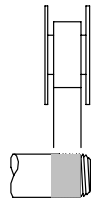


- The rotation mechanism of the D-sub connector is not to be considered as a flexible joint for moving units (continuous oscillation). Use at either the top or side position (do not use at an angle in between), and fix the cable if the cable moves.

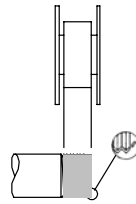


- Do not detach the port seal until piping work is started.
  - If the port seal is removed before piping work, dirt may enter into the interior from the piping port, thus causing trouble and malfunctions, etc.
- Sufficiently flush/blow air pipes before connecting to the Electro-pneumatic regulator Series ER. Check that sealing tape is not caught when piping.
- When applying a seal tape, start from a position 2-mm or more away from the end of the thread portion on the tube, to a direction opposite to the tip of the tube, and wind the tape around the tube in a direction reverse to the direction of the thread.
  - If a part of the seal tape is positioned closer to the tip of the tube than the thread portion, the tape may be threaded into pieces as the tube is screwed into the joint; they may go into the pneumatic equipment and cause trouble.

Seal Tape



○



×

Solid and liquid sealant

Solid and liquid sealant



○

Solid and liquid sealant



×





## CAUTION:

- Correct pressure control is not possible if the exhaust port is plugged. Always keep this port in contact with the atmosphere.
- Tighten pipes with the appropriate torque force.
- Pipes must be connected with the appropriate torque force to prevent air leakages and screw damage.
- First tighten the fitting by hand to prevent damage to the threads, then use a tool.

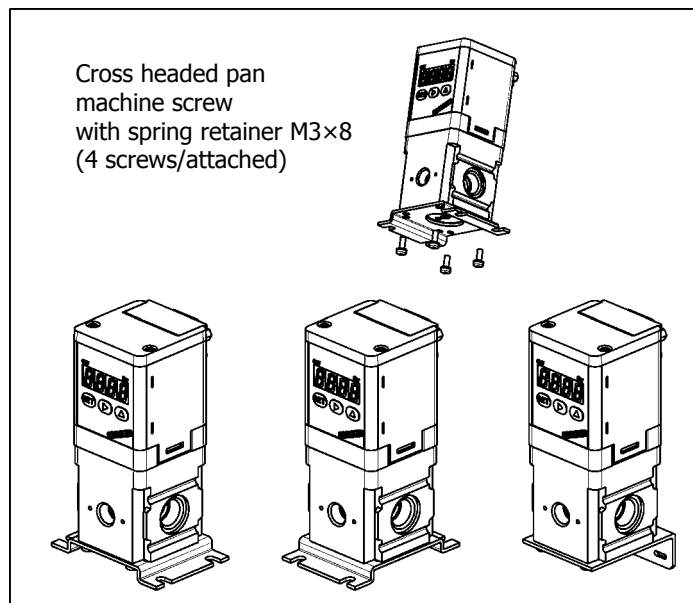
R Recommended tightening torque

Port screw	Tightening torque N·m
G1/4	6 to 8

- When supplying compressed air after connecting pipes, check that high pressure is not supplied instantly.
- Before supplying compressed air after connecting pipes, check that there are no air leaks at any pipe connections.
- If necessary, apply leakage detection fluid onto pipe connections, and check for air leaks.

## 2.1. Option Bracket Installation

Use the mounting screws which come with the bracket, to fix on the bottom face of the main body.



B1-type can be installed in both directions.

B1 type bracket  
(Attached option: -B1)

B2 type bracket  
(Attached option: -B2)

\* For the option bracket, refer to Section 6.3 "Optional individual code".

## 2.2. Wiring



### **WARNING:**

- When performing wiring, check the connector pin and cable conductor colour when connecting a cable.

Connection of a wrong cable may cause breakage, failure or malfunction.

- Check if the wiring is properly insulated.

• Avoid contacting other circuits, ground faults, and terminal-to-terminal continuity.

This could an excessive current (short circuit), possibly causing breakage.

- Use a rated DC regulated power supply isolated from the commercial alternating current power source. A non-isolated power supply may cause electric shock.

With an unregulated power supply, the peak value may exceed the maximum rating, causing breakage of this product or poor accuracy.

- Stop the controllers and mechanical equipment and turn the power off before connecting wiring.

Sudden activation may cause unexpected actions, possibly causing danger.

First, while leaving controllers and mechanical equipment stopped, perform a power-on test. Discharge static electricity from human bodies, tools and equipment before and during work. Connect a flexible cable, such as the one for robots, to moving parts.

- Do not exceed the source voltage range during operation. An excessive voltage or an alternating current power supply (100VAC) will cause damage or fire.
- Do not short-circuit the load since this may cause damage or fire.



### **CAUTION:**

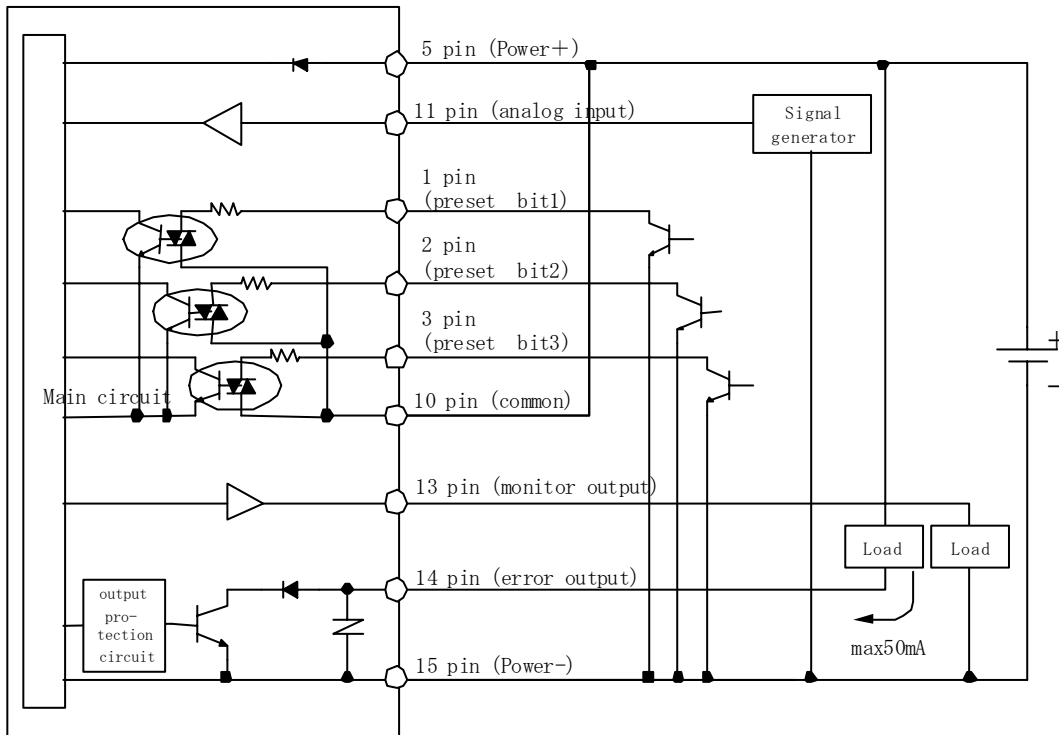
- The optional shield cable connector is a shield wire.

• When not using the wire, insulate so that there is no contact with other wires (including the shield wire). If misconnecting wires to the ground, it will lead to malfunction or destroy the product.

### < Internal circuit and connection >

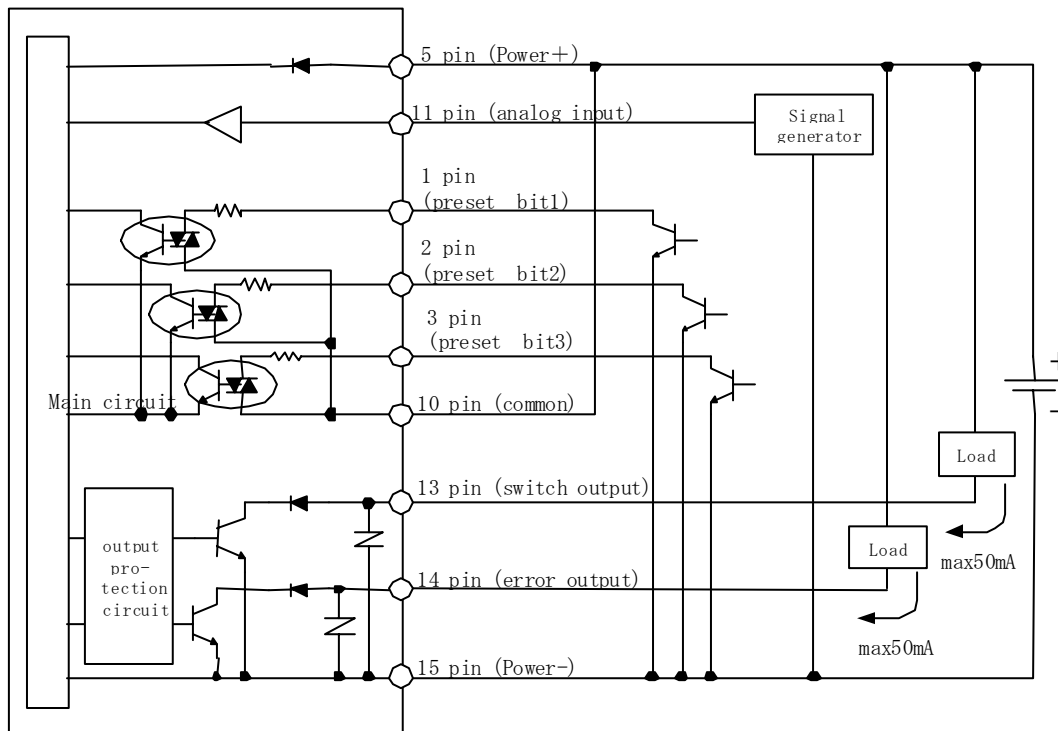
[Analog input type ER]

- Product code-AN: Analog output + Error<NPN>Output type



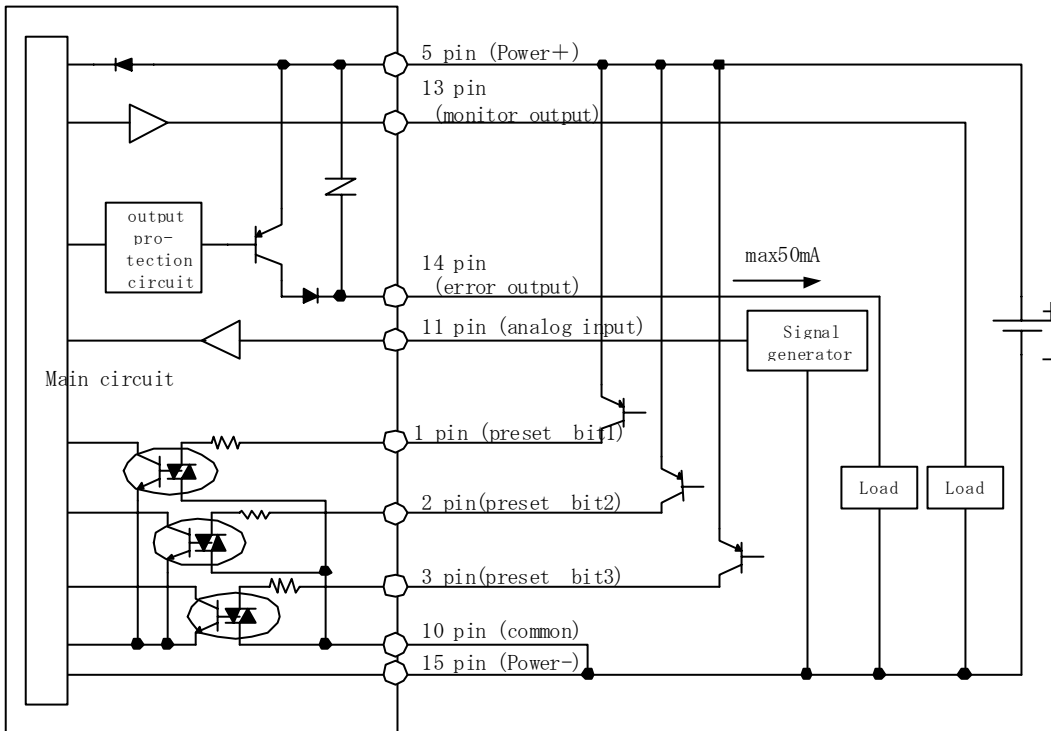
[Analog input type ER]

- Product code-SN: Switch output<NPN> + Error<NPN>Output type



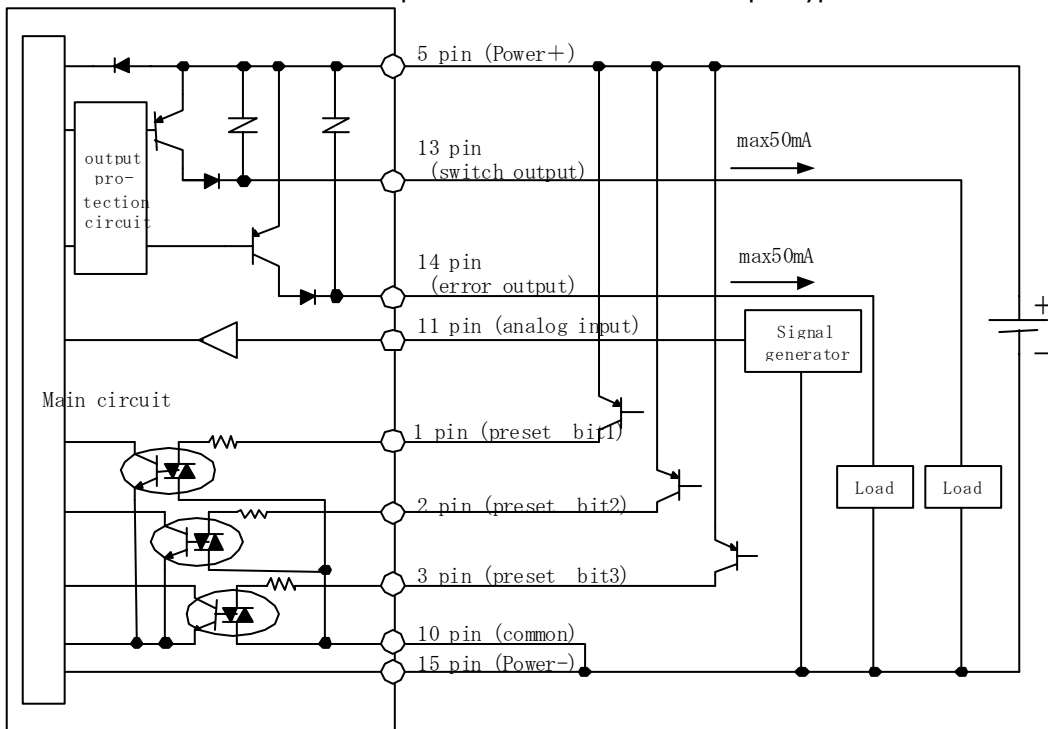
[Analog input type ER]

- Product code-AP: Analog output + Error<PNP>Output type



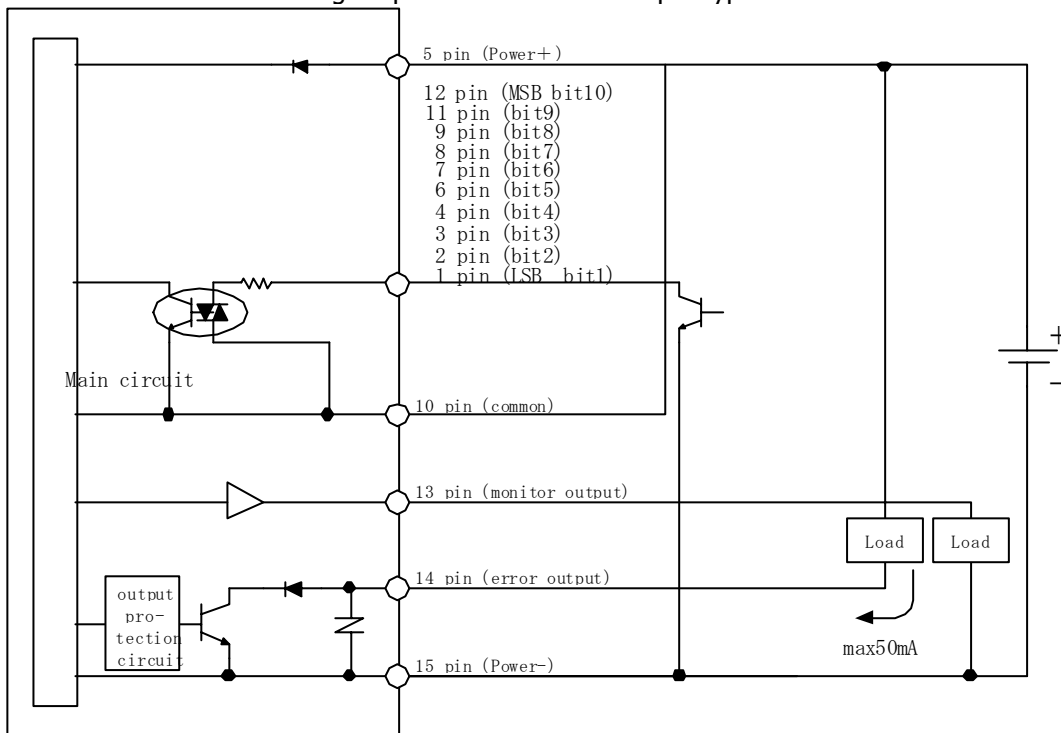
[Analog input type ER]

- Product code-SP: Switch output<PNP> + Error<PNP>Output type



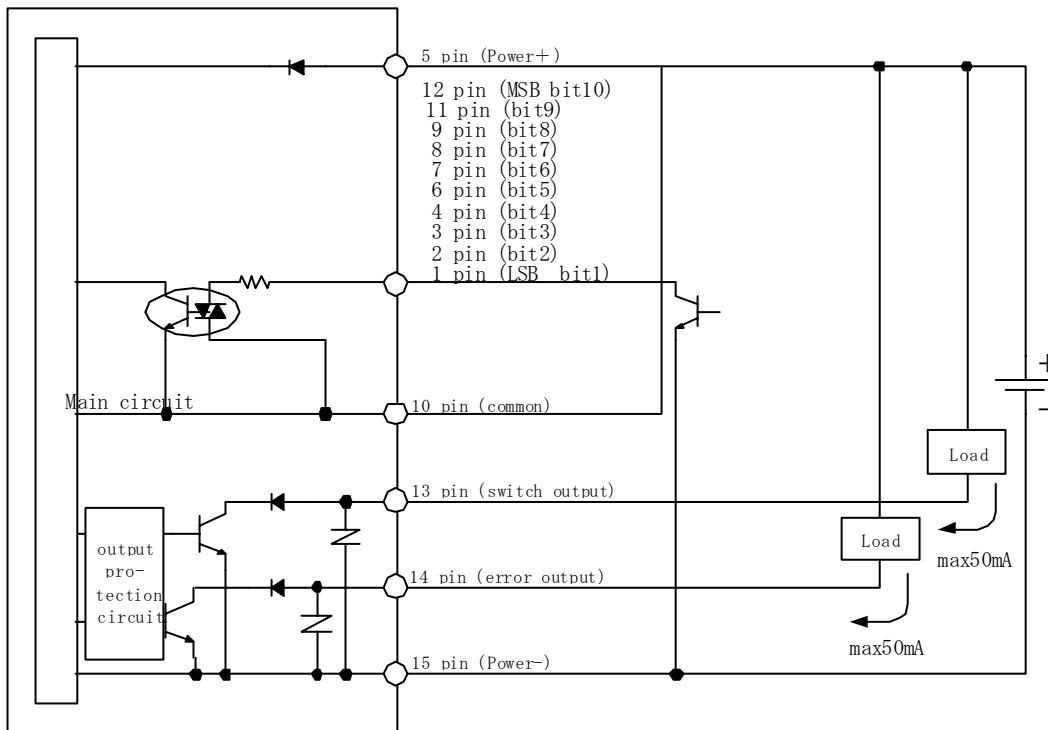
[PARALLEL input type ER]

- Product code-AN: Analog output + Error<NPN>Output type



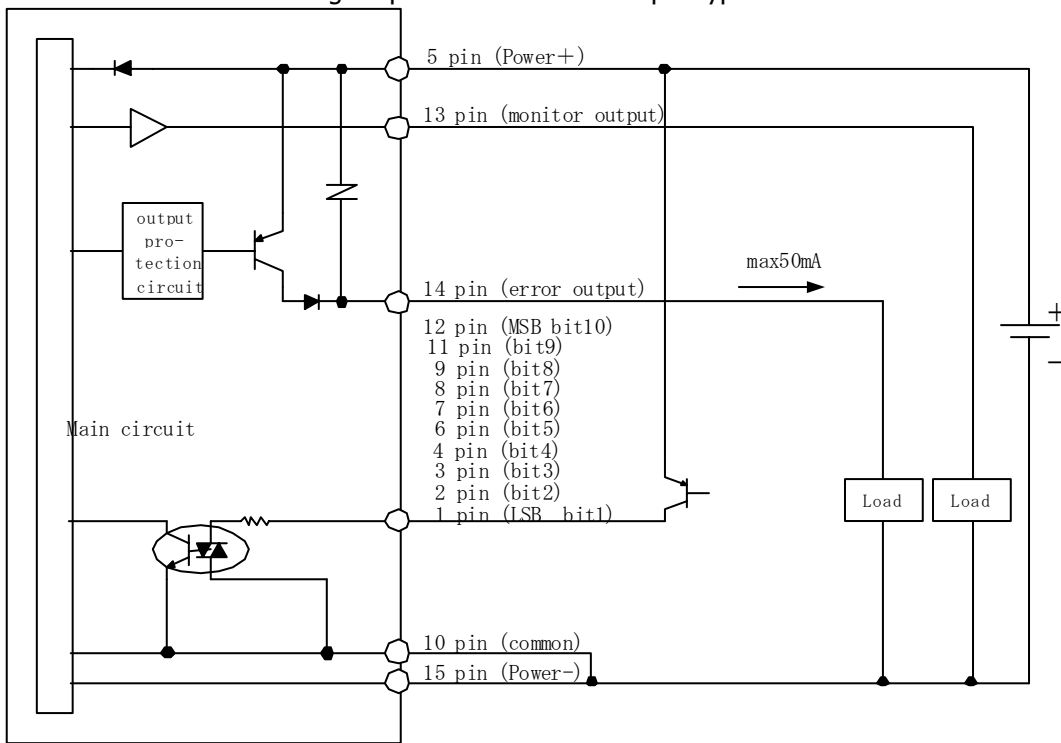
[PARALLEL input type ER]

- Product code-SN: Switch output<NPN> + Error<NPN>Output type



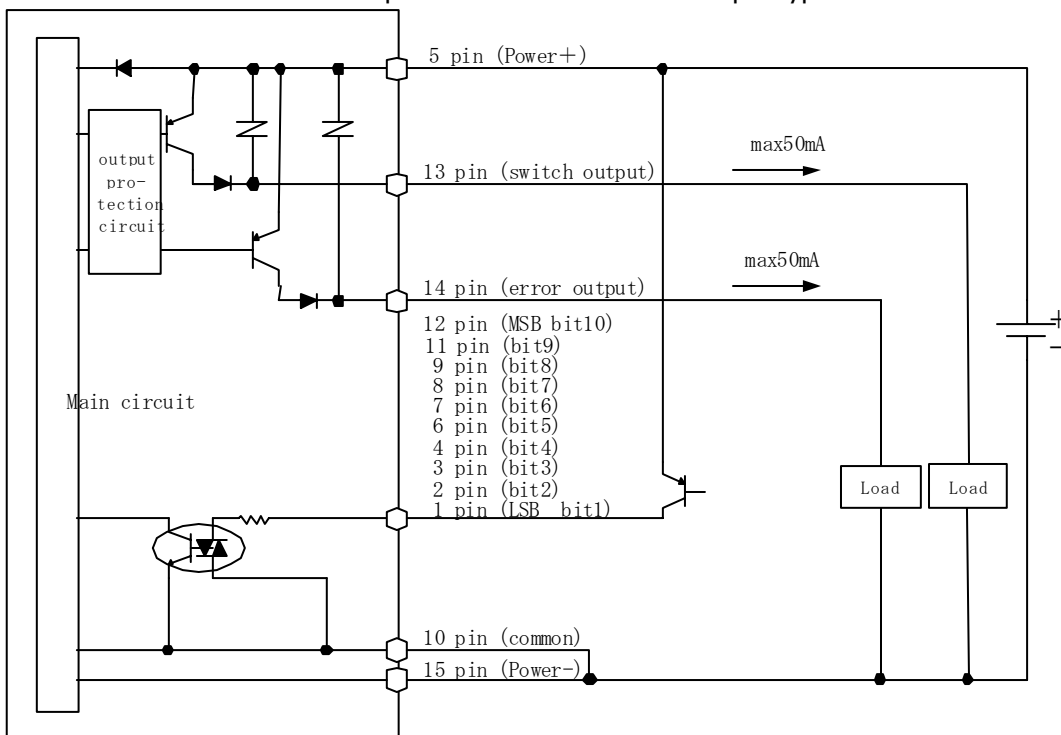
[PARALLEL input type ER]

- Product code-AP: Analog output + Error<PNP>Output type



[PARALLEL input type ER]

- Product code-SP: Switch output<PNP> + Error<PNP>Output type

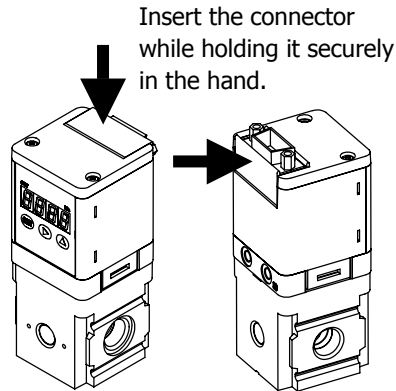


### 2.3. Connecting the D-SUB

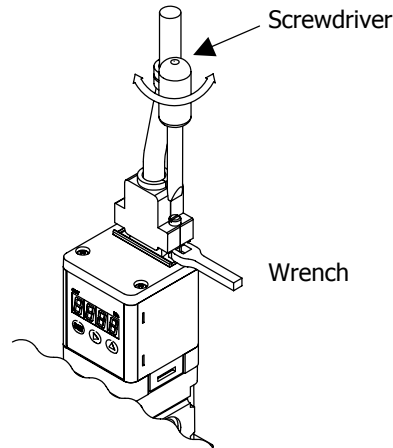


#### CAUTION:

- Insert the D-sub connector to the socket securely.
- The D-sub connector has a mechanism for turning 90°. When connecting the D-sub connector, insert it at the top or side position while holding it securely in the hand.



- Lock the D-sub connector so that it does not come off. To unlock, hold the fixing base with a wrench or similar while unscrewing with a screwdriver.



#### <Connector pin array> (Product body side)



Refer to Section 2.4 “Connecting” for the wiring method.

No pin is provided for the analog input type at positions marked ④ ⑥ ⑦ ⑧ ⑨ ⑫

## 2.4. D-SUB Connector/Cable - Colour coding



### CAUTION:

- Check the product code and take sufficient care of connection.
- Handle the unused monitor output, switch output or preset input so that it does not make contact with other cables (including the shield).
- Ground the shield wire on the power (-) side.

#### [Analog input type ER]

D sub socket pin No.	1	2	3	4	5	6~9	10	11	12	13	14	15	
Option cable isolator color	Brown	Orange	Yellow	—	Red	—	Gray	White	—	Green	Blue	Black	
Type of input	Preset input signal			N/A	Power + +24 VDC	N/A	Common	Input signal	N/A	Monitor output Output 1-5VDC	Switch output NPN or PNP output	Error output NPN or PNP output	Power - (0V)
	1 bit	2 bit	3 bit					0-10 VDC 0-5V DC 4-20 mAADC					

#### [PARALLEL input type ER]

D sub socket pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Option cable isolator color	Brown	Orange	Yellow	Purple	Red	Pale blue	Pink	White (with black line)	Red (with black line)	Gray	White	Green (with black line)	Green	Blue	Black
Name	Parallel input signal				Power +	Parallel input signal				Common	Parallel input signal	Monitor output Output 1-5VDC	Switch output NPN or PNP output	Error output NPN or PNP output	Power - (0V)
Type of input	1 bit	2 bit	3 bit	4 bit	+24 VDC	5 bit	6 bit	7 bit	8 bit		9 bit	10 bit			

**POSSIBLE COLOUR MODIFICATIONS WILL BE INDICATED ON THE CABLE'S PACKAGING**



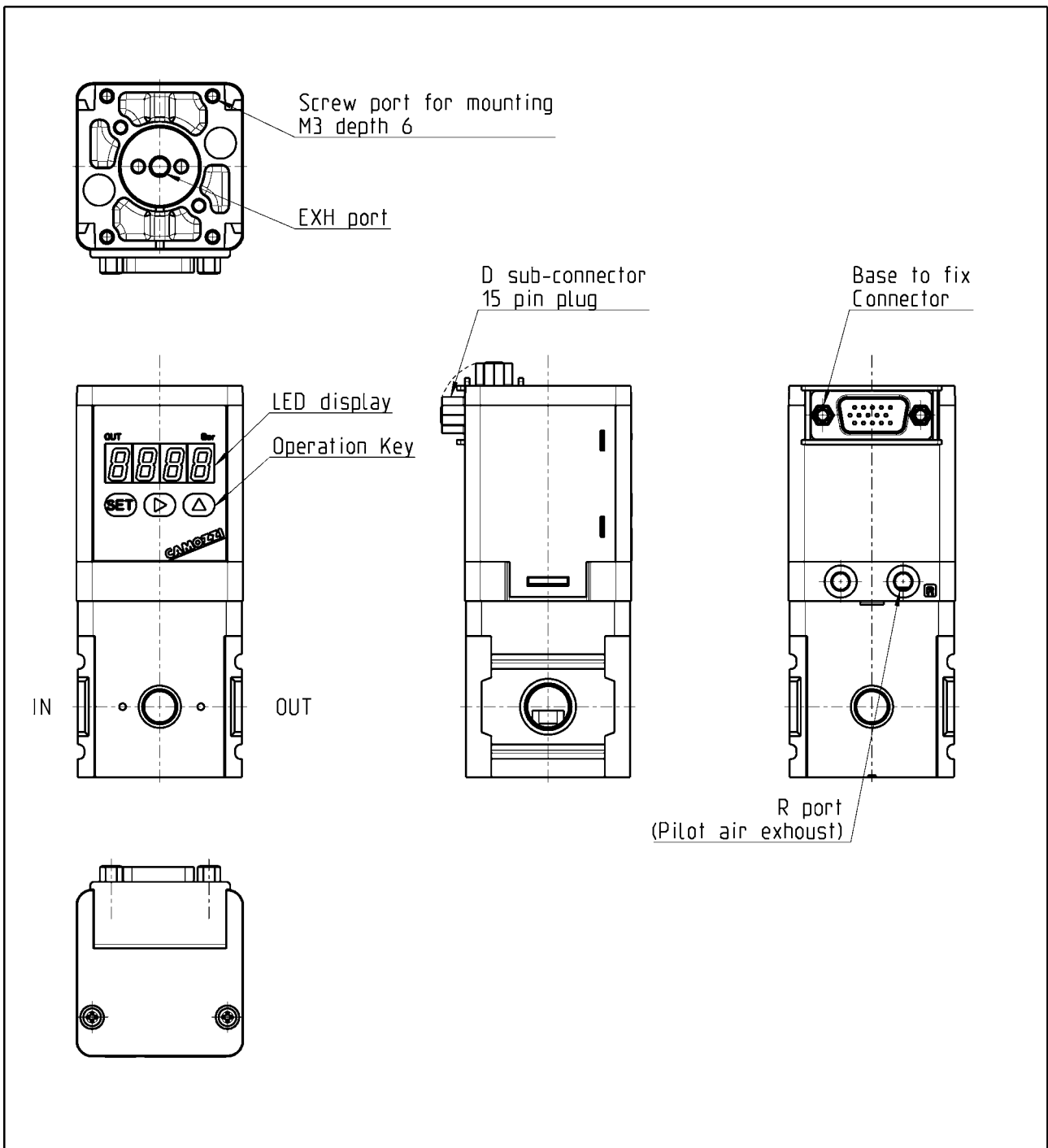
### 3. PRODUCTS



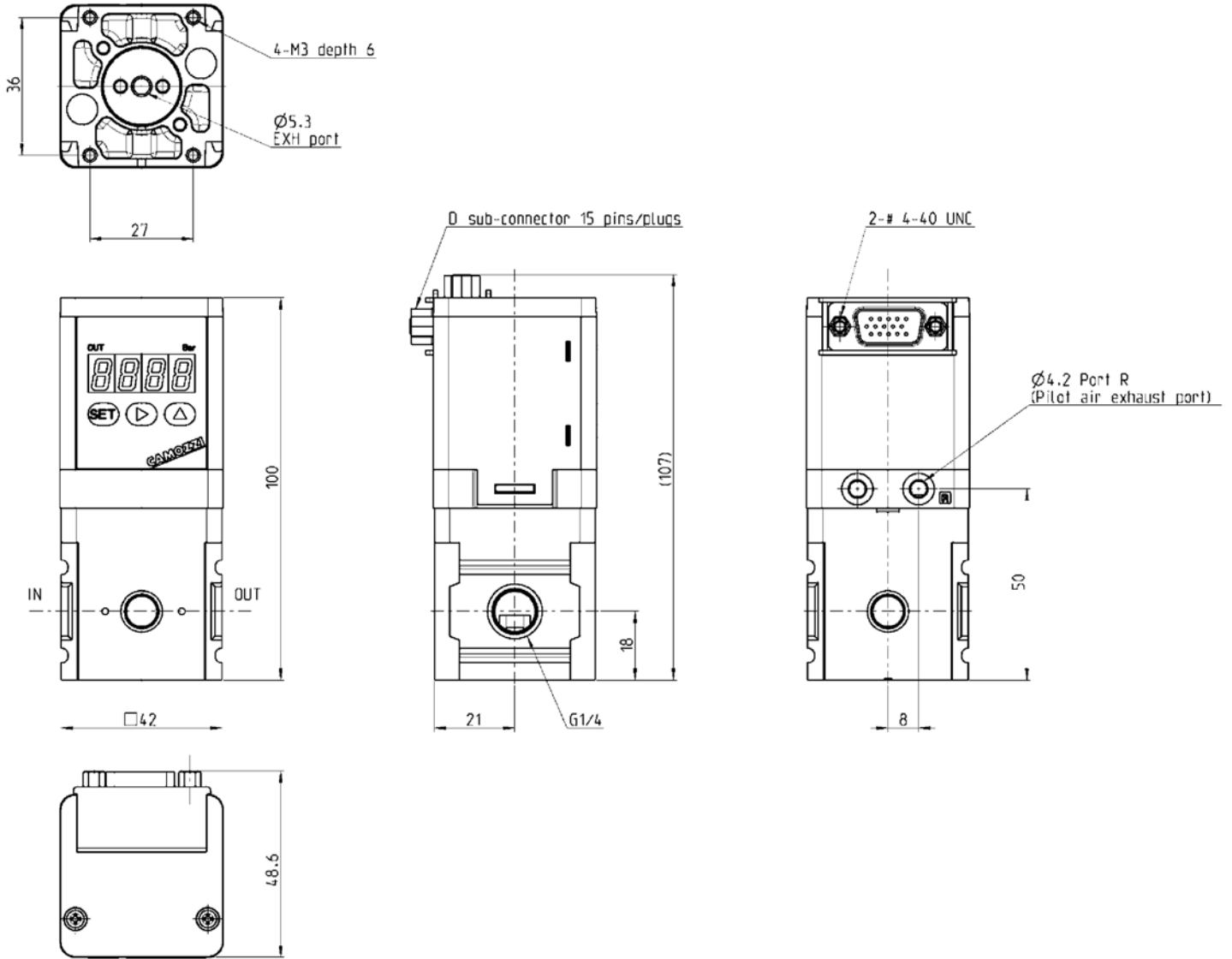
#### **DANGER :**

- Use the specified voltage for the source voltage and output. If an excessive voltage is connected, malfunction, breakage of the sensor, electric shock and/or fire may be caused. Also, do not use loads exceeding the output rating, since this may cause damage of the output or fire.

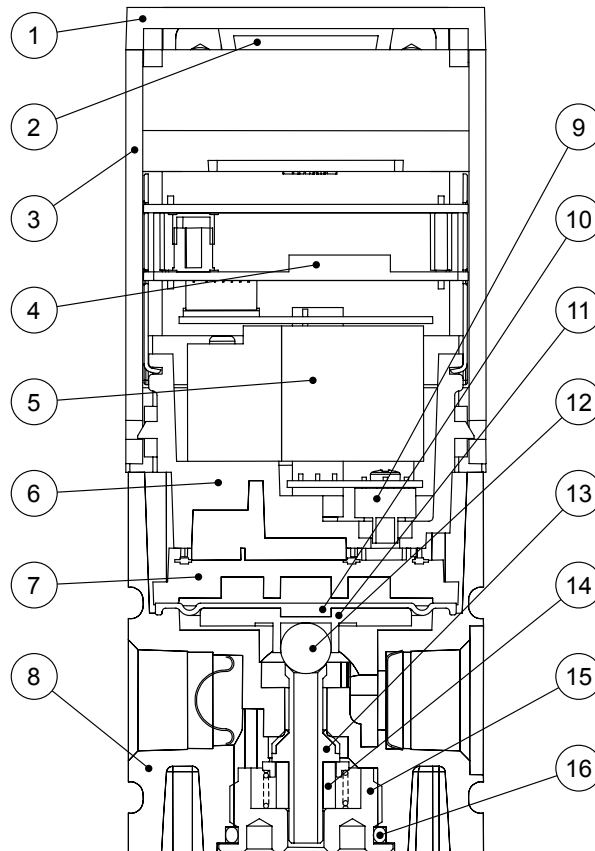
#### 3.1. Parts name



### 3.2. Dimensions



### 3.3. Internal structure



No.	Name of parts	Materials
1	Plate	Resin
2	D sub connector	-
3	Housing	Resin
4	Controller substrate	-
5	Poilot valve	-
6	Valve base	Polyphenylen sulfite resin
7	Pilot chamber	Polyphenylen sulfite resin
8	Body	Aluminium alloy die-casting
9	Pressure sensor	-
10	Diaphragm	Special nitrile rubber
11	Relief seat	Aluminium alloy
12	Steel ball (Exhaust port)	Stainless steel
13	Valve	Special nitrile rubber, Stainless steel
14	Bottom rubber	Silicone rubber
15	Bottom plug	Brass, Chemical nickel plating
16	O ring	Fluoro rubber

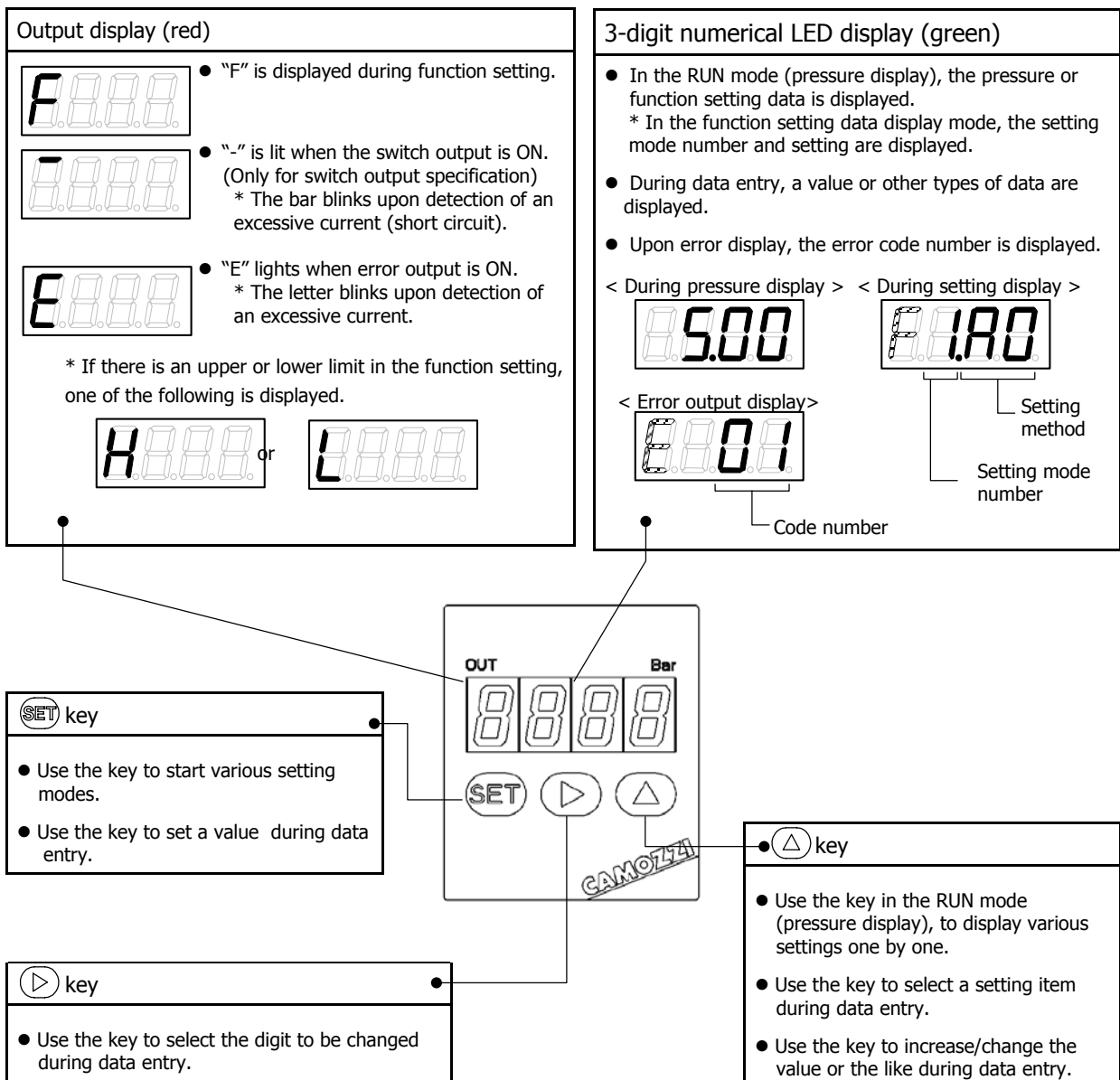
## 4. OPERATION METHOD



### CAUTION:

- This product does not conduct pressure control during around two seconds while carrying out self diagnosis immediately after it is turned on. Therefore build a control circuit or program to ignore signals for about two seconds immediately after power-on.
- To change output settings, stop the equipment to avoid unintended actions caused to the equipment in the control system.

### 4.1. Name and Function of Display/Operation Part



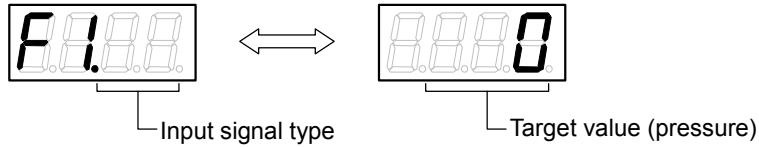
## 4.2. Function List

Display	Name	Displayed data (in run mode)	Setting (in setting mode)
	Pressure display	The pressure on the secondary side (outgoing pressure) is shown through the three-digit number LED display. Unit : Bar 1digit = 0,01Bar	
 Display F1 	Input signal selection	Shows the selected input signal type. * When preset memory mode is selected (the 8 setting points), the currently selected preset number and target value are displayed.	<In case of analog type> The analog input, preset memory input or direct memory input can be selected. In case of the preset or direct memory input, enter the setting in this mode.  <In case of parallel type> The parallel input or direct memory input can be selected. In case of the direct memory input, enter the target value in this mode.
 Display F2 	Zero/span adjustment	With "F2" it is possible to activate the Zero/Span adjustment mode. When activating this function, "F2." is displayed, followed by the adjusted zero point setting (L) and the adjusted span point setting (H).  The factory setting is set to the full scale which means that the display will be shown  not activated.	Use in the full scale or adjust the zero and span settings upon selection. If zero/span adjustment is selected, adjust the values in this mode to the desired values.
 Display F3 	Auto power-off	With "F3" it is possible to activate the energy saving function. If activated, the LED display is automatically switched OFF after approx. 1 minute. The display is switched ON again simply by touching any of the keys.  * The factory setting is set to de-activated and on the display will be shown	Select whether the auto power-off function activated or not.  Note: The interval to auto power-off is about one minute. The interval may not be changed.
 Display F4 	Switch output *Function "F4" available for regulator with switch output only.	With "F4" it is possible to activate/de-activate the Switch Output function. When activating this function, the switching mode and limits have to be selected. There are two modes available. If "mode 1" is selected, "F4.1" is displayed, followed by the "negative" limit setting point (L) and "positive" limit setting point (H) in one sequence. If "mode 2" is selected, "F4.2" is displayed, followed by the lower limit setting point (L) and the upper limit setting point (H) in one sequence.  ※ The factory setting is set to de-activated and on the display will be shown	Select whether the switch output function should be activated or not. If the function is activated, you can select either "mode 1" or "mode 2." Enter the desired positive and negative limits (for mode 1) or the upper and lower limits (for mode 2).  Note: The hysteresis cannot be adjusted.
 Display F5 	Proportional value change  * only for model ER104-1	Proportional value change and the setting level can be checked. In case of "proportional value increase", "F5.H" is displayed. In case of "proportional value decrease", "F5.L" and the setting level are displayed alternately.  * In the factory shipmentstate, the standard value (-) is specified.	Operate in the standard value state, or operate with a desired proportional value upon selection.  Only when "proportional value decrease" is selected, the desired proportional value level can be specified in this mode (in 10 steps).

### 4.3. RUN Mode – How to operate

#### 4.3.1. Input Signal Check and Pressure Monitor

The input signal type and the target value in sequence.



##### < Analog input type >

ER104-x0xx  
ER104-x1xx  
ER104-x2xx

Input signal type symbol	Description
	Analog* 0-10VDC input
	Analog* 0-5VDC input
	Analog* 4-20mADC input
	Preset memory input Selected preset number is displayed.
	Direct memory input

□ [F1.A0], [F1.A1], or [F1.A2] is displayed according to the model.

##### < Parallel input type >

ER104-xPxx

Input signal type symbol	Description
	Parallel 10-bit input
	Direct memory input

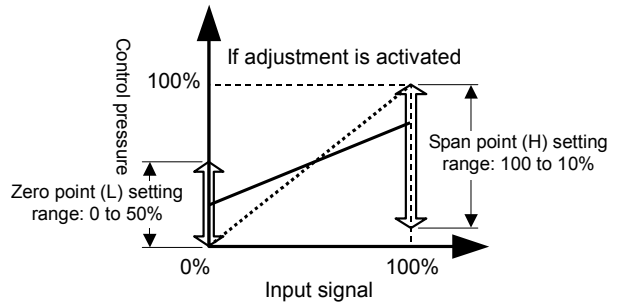
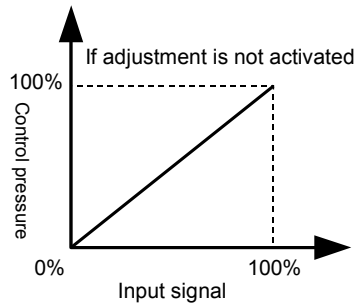
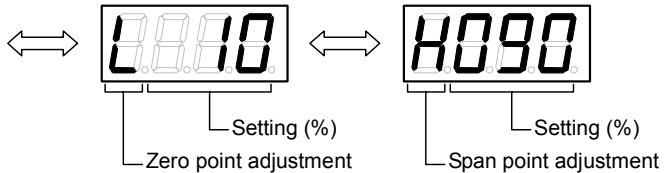
### 4.3.2. Zero- and Span Adjustment

Control and activation of the zero/span adjustment with the respective settings.

Note: This function is not available if the preset memory input or direct memory input function is selected in the "F1 mode."

If adjustment is not activated

If adjustment is activated:



### 4.3.3. LED - Auto Power-Off

Control and activation of the LED auto power-off function with "F3" .

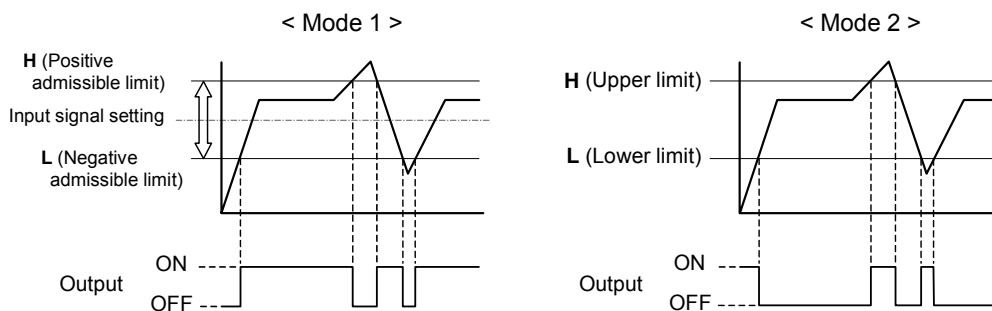
If the function is not activated:

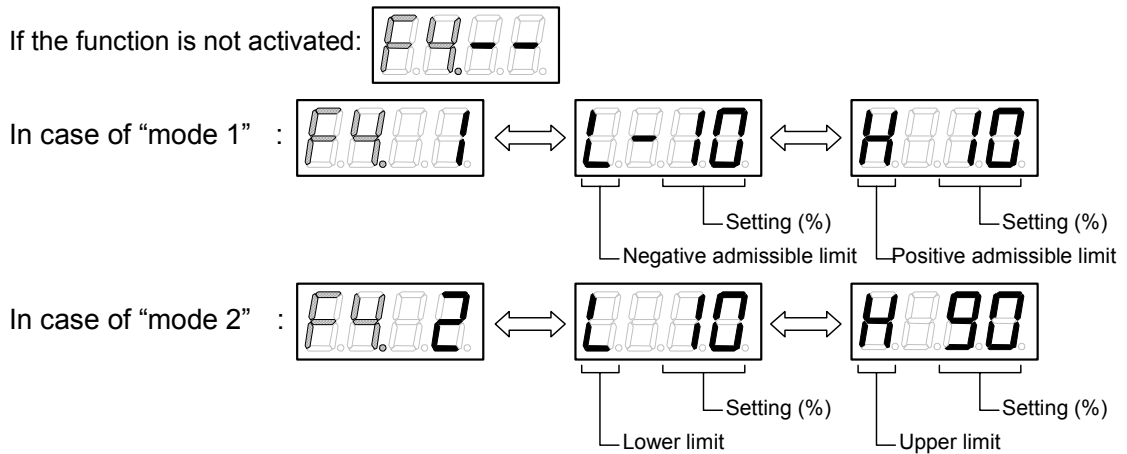
If the function is activated:

### 4.3.4. Switch Output Function "F4"

Control and activation/de-activation of the switch output function.

Note: This function is not available for the analog output specification.





### 4.3.5. Proportional Value Change Function "F5"

Control and activation of proportional value change function with "F5" .

Note: This function is available only for model ER104-1\*.

The proportional value change validity setting and the setting level can be checked

- If adjustment is invalid: The control uses the standard value (factory shipment setting)
- If adjustment is valid: "Proportional value increase" or "proportional value decrease" can be selected. Only when "proportional value decrease" is selected, the setting level can be selected among 10 steps.

< Effect of proportional value increase >

According to some operation conditions (such as piping and load capacity), more accurate control can be obtained. However, hunting is likely to be caused. Be careful when using the function.

< Effect of proportional value decrease >

According to some operation conditions (such as piping and load capacity), more stable control can be obtained. The option is effective in particular for systems with large fluctuation of the control pressure or hunting.

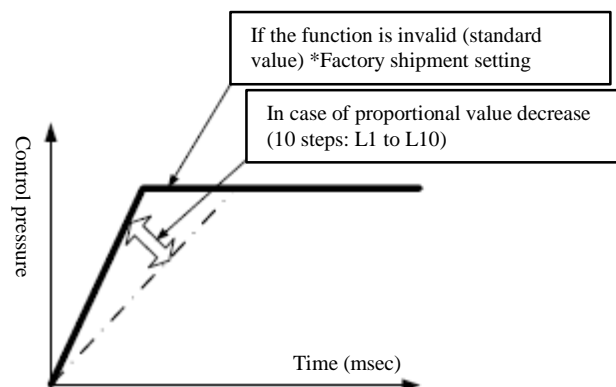


Image drawing of proportional value change function

Note. The actual effect is not like the image drawing. It varies according to piping and load conditions.



Se la funzione  
non è valida



Nel caso di valore  
proporzionale  
incrementato (H)



Nel caso di valore  
proporzionale  
decrementato (L)



Valore impostato

## 4.4. Setting Method



### CAUTION:

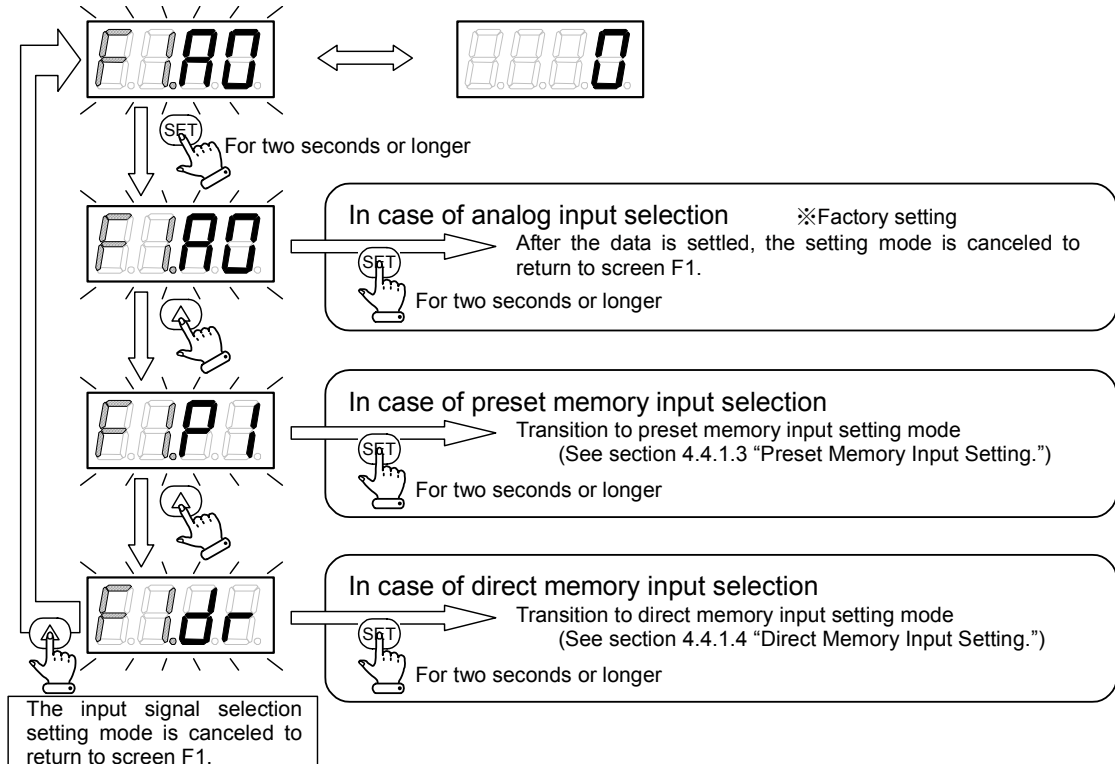
- Before changing the setting, unlock the key.

### 4.4.1. Input Signal Setting

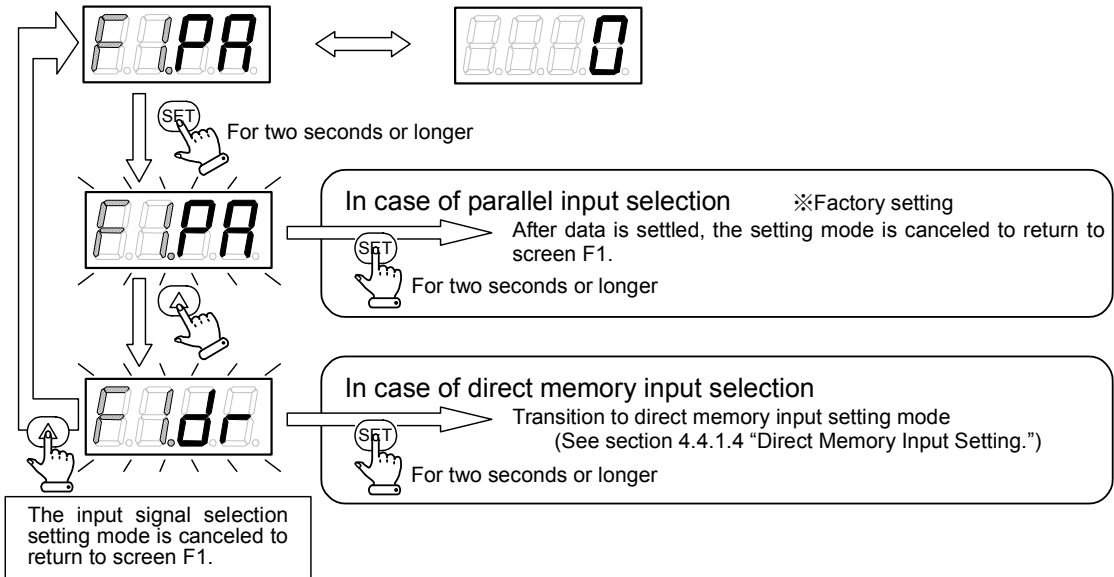
Press and hold the [SET] key at least for two seconds in the state of screen F1.  
The "F1 setting mode" starts.

#### 4.4.1.1. Analog Type Input Signal Selection

Note: The analog input specification may not be changed.



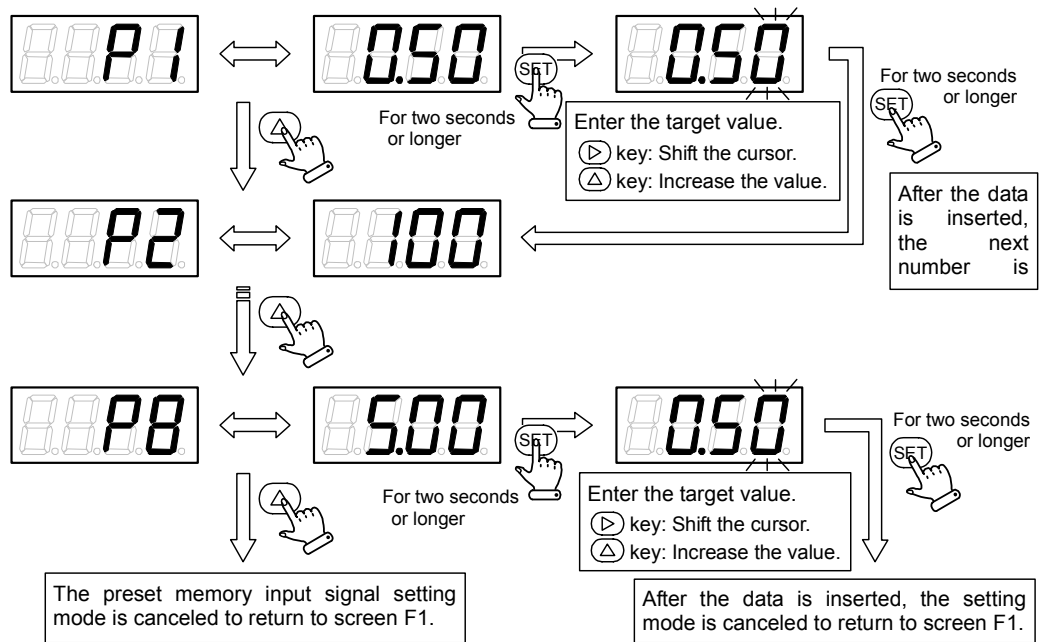
### 4.4.1.2. Parallel Type Input Signal Selection



\*For the relationship between the input signal and control pressure, refer to Section 7.1 "Relationship Between Parallel Type Input Signal and Control Pressure."

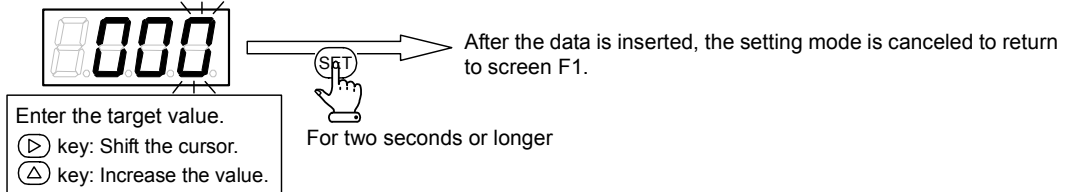
### 4.4.1.3. Preset memory Input Setting

Note: In the state of screen F1 preset memory input, press and hold the [SET] key at least for two seconds.



\*For the relationship between the input signal and preset memory, refer to Section 7.2 "Relationship Between Preset Memory and Input Signal."

### 4.4.1.4. Direct Memory Input Setting

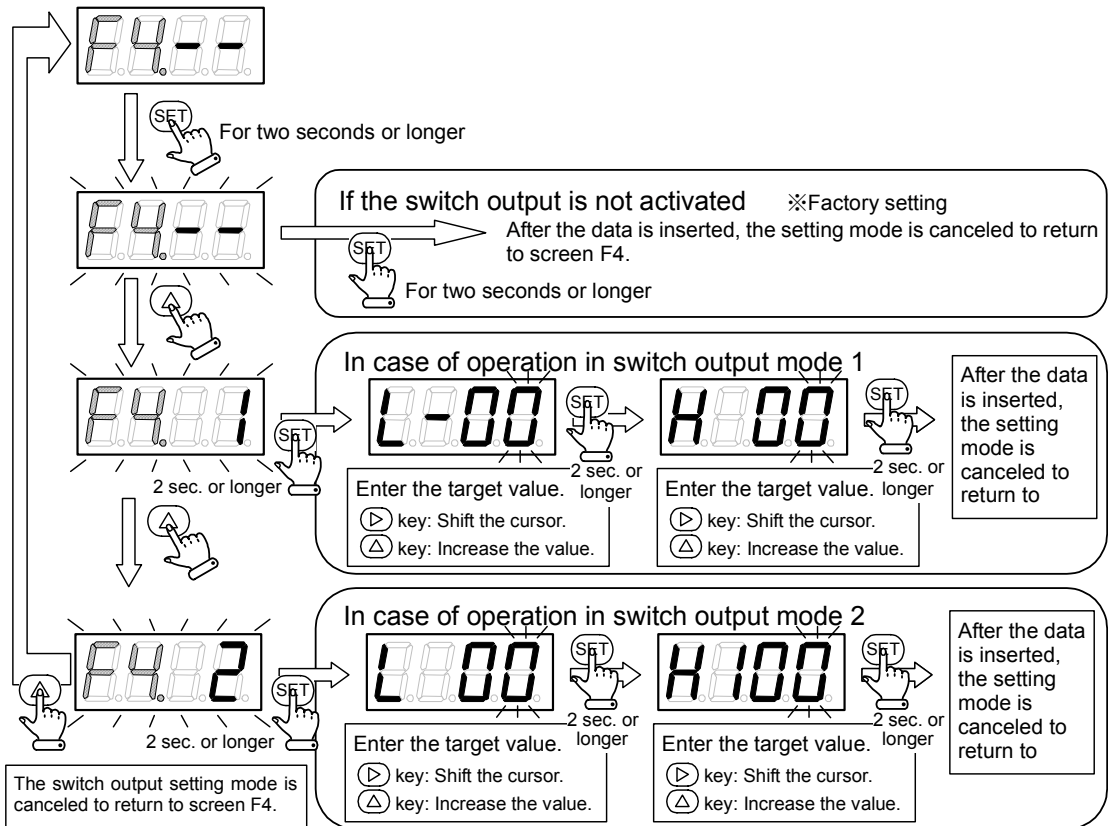


\*In the state of screen F1 "Direct Memory Input," press and hold the [SET] key at least for two seconds.



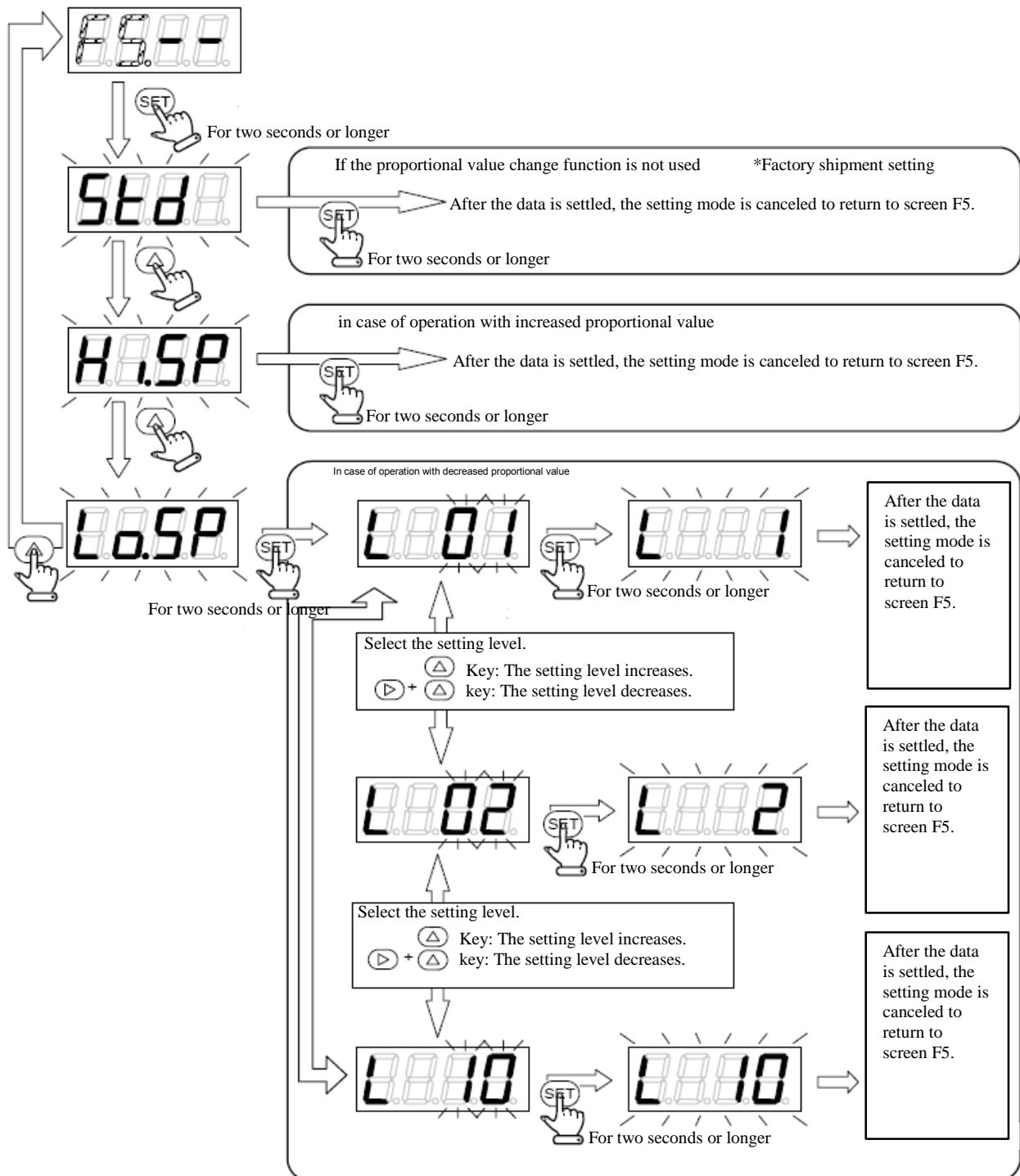
## 4.4.4. Switch Output Setting

At function "F4", press and hold the [SET] key at least for two seconds.  
The "F4 setting mode" starts.



## 4.4.5. Proportional Value Change

In the state of screen F5, press and hold the [SET] key at least for two seconds.  
The "F5 setting mode" starts.



\* In case of operation with decreased proportional value, the action follows the setting level displayed on the screen even during setting level selection.

To settle the setting level, press and hold the [SET] key for two seconds.

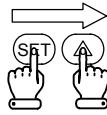
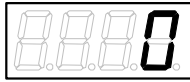
## 4.5. Key Lock



### CAUTION:

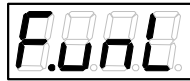
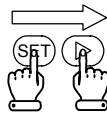
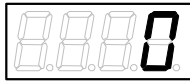
- This function locks the keys against erroneous operation.  
Unlock when changing settings.

- Key locking method



Press and hold at least for two seconds at the same time.

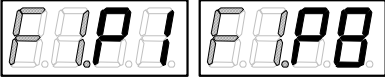

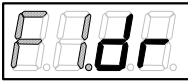

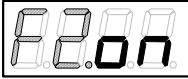


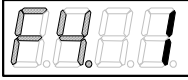

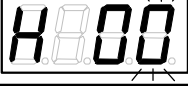
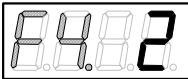


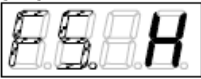
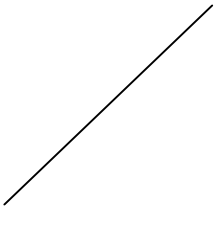
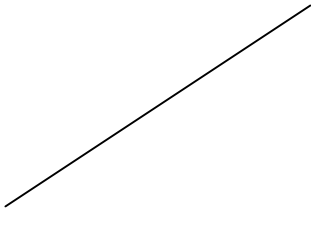


- Key unlocking method



Press and hold at least for two seconds at the same time.

\* N.B. The key lock is activated every time the power is turned on.

## 4.6. Setting Range of Each Function

Function	Setting display screen	Setting	Setting specification
F1: Input signal selection function ~ In case of preset memory input ~ 		Enter the target value (pressure).	Range: <sup>(Note 1)</sup> ER104-5xxx / 0,00 to 5,00 ER104-9xxx / 0,00 to 9,00 Minimum input increment: 0,01Bar
F1: Input signal selection function ~ In case of direct memory input ~ 		Enter the target value (pressure).	Range: <sup>(Note 1)</sup> ER104-5xxx / 0,00 to 5,00 ER104-9xxx / 0,00 to 9,00 Minimum input increment: 0,01Bar
F2: Zero/span adjustment function 		Enter the zero point adjustment value.	Range: 00 to 50 <sup>(Note 2)</sup> Minimum input increment: 1%
		Enter the span point adjustment value.	Range: 100 to 10 <sup>(Note 2)</sup> Minimum input increment: 1%
F4: Switch output function ~ In case of mode 1 ~ 		Enter the "negative" allowable limit.	Range: -00 to -50 Minimum input increment: -1%
		Enter the "positive" allowable limit.	Range: 00 to 50 Minimum input increment: 1%
F4: Switch output function ~ In case of mode 2 ~ 		Enter the lower limit value.	Range: 00 to 90 <sup>(Note 2)</sup> Minimum input increment: 1%
		Enter the upper limit value.	Range: 100 to 10 <sup>(Note 2)</sup> Minimum input increment: 1%
F5 : Proportional Value Change ~In case of operation with increased proportional value~ 		Modification of the level setting is disabled.	
F5 : Proportional Value Change ~In case of operation with decreased proportional value~ 		The desired setting level can be designated..	Range: 01~10 Minimum input increment: 1

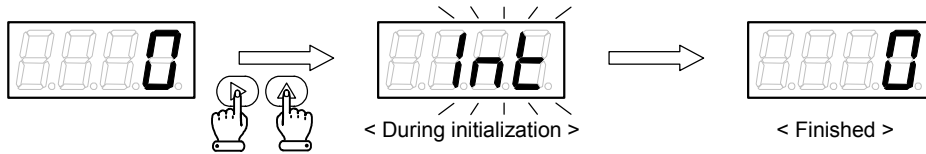
Note 1: If 1%F.S. or a smaller pressure is entered, pressure control may be disabled due to the effects of residual pressure.

Note 2: According to some settings, there may be limitation in the setting range.

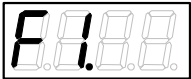

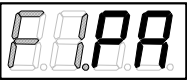

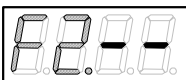






Applicable models: ER104-1\*.

## 4.7. Return to factory Settings (Reset)

< Initialization method >



Press and hold at least for three seconds at the same time.

Screen display	Name	Setting display	Description of setting
Screen F1 	Input signal setting	Analog type  Parallel type  A0, A1, A2	Analog*/parallel input
Screen F2 	Zero/span adjustment		Full scale (zero-/span adjustment non activated)
Screen F3 	Auto power-off		Auto power-off non activated
Screen F4 	Switch output * Switch output specification only		Switch output non activated
Screen F5 	Proportional Value Change (ER104-1* model only)		Standard setting (Proportional value change invalid)

\* One of A0, A2 and A3 is displayed according to the model.



## 5. MAINTENANCE



### **WARNING:**

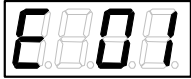
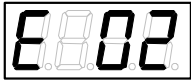
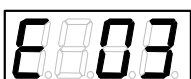



- Prior to maintenance work, be sure to turn the power off and remove the compressed air supply to ensure that no residual pressure is present.
- These operations are the conditions required for securing operational safety.



### **CAUTION:**

- Carry out routine and periodic checking as planned so that maintenance control is implemented correctly.
  - Unless this maintenance control is satisfactory, the product functionality may be remarkably reduced, leading to equipment malfunction and accidents, such as short service life, damage and malfunctioning.
1. Pressure control to supply compressed air
    - Check to see if the set pressure is supplied.  
Check to see if the pressure gauge during equipment operation is pointing to the set pressure.
  2. Pneumatic filter control
    - Check to see if drain is removed.
    - Check to see if the bowl and element fouling condition is normal.
  3. Control for compressed air leak in the piping connection part
    - Check to see if the condition of the connection section especially in the movable part is normal.  
Leakage from piping may compromise correct operation.
  4. Operating condition control
    - Check for operation delay and check to see if the exhaust status is normal.
  5. Control for pneumatic actuator operating condition
    - Check to see if the pneumatic actuator is working smoothly. Check to see if the stopped condition at the stroke end is normal.
    - Check to see if the section coupled with the load is normal.
- If an error is found during operation, turn the power off and stop the compressed air supply immediately and stop operation.
  - Perform periodic inspection at least once every year to check for correct operation.
  - The case is made of resin. Do not use solvent, alcohol, detergent or other chemicals when removing dirt. They may cause damage to the resin. Use a slightly wet cloth with neutral detergent.

## 5.1. Error Code

Error display	Cause	Remedy
	The source voltage is out of the rated range.	<ul style="list-style-type: none"> <li>● Check the power supply specifications of this product. Restore the source voltage within the rated range and turn the power on again.</li> </ul>
	The input signal is supplied outside the rated range.	<ul style="list-style-type: none"> <li>● Check the input signal type of this product and restore it within the rated range. Turn the power on again.</li> </ul>
	An error is caused when EEPROM is read or written.	<ul style="list-style-type: none"> <li>● Contact the nearest Camozzi sales office or agency.</li> </ul>
	An error is caused when memory is read or written.	<ul style="list-style-type: none"> <li>● Contact the nearest Camozzi sales office or agency.</li> </ul>
	The secondary pressure does not reach the setting continuously for five seconds.	<ul style="list-style-type: none"> <li>● Check the supply pressure of the primary circuit and supply the pressure within the rated range, turn the power on again.</li> <li>● Check leakage from the piping, joints and other devices are free, connect correctly and turn the power on again.</li> <li>● Contact the nearest Camozzi sales office or agency.</li> </ul>
	The overcurrent protective circuit for the switch output is activated.	<ul style="list-style-type: none"> <li>● Check if the load current does not exceed the rated current, connect correctly and turn the power on again.</li> </ul>

If one of above errors occurs, the error digital output is activated together with error display.

## 5.2. Troubleshooting

Symptom	Cause	Solution
The setting does not change.	The keys are locked.	The keys are locked immediately after the power is turned on (or after it is turned on again). To change various settings, unlock the keys, see Section 4.5 "Key Lock."
	Broken operation key	Replace the product.
The pressure is not displayed.	The auto power-off function is activated.	Press any operation key. If the display is recovered but it is turned off after one minute, the auto power-off function is activated. To cancel the auto power-off function, see Section 4.4.3 "Auto Power-Off Setting."
	The power supply is not connected correctly.	Connect the rated power supply correctly.
	Broken wire inside ER	Replace the product.
An excessive pressure is displayed.	Insufficient supply pressure	Supply the primary air at least at the minimum operating pressure.
	Leakage from secondary piping	Check the piping for leaks.
	Failure of pressure sensor	Replace the product. Check if routing from another piping causes an excessive pressure in the secondary circuit.
The switch output is not turned on.	The switch output function is not activated.	See Section 4.4.4 "Switch Output Setting."
	Failure of ER	Replace the product.
The switch output is not turned off.	Failure of ER	Replace the product.
There is loud beep.	Leakage at larger rate than the maximum flow rate	Continuation of operation in this state causes substantial reduction of the life. Examine the operation method.
	Air beyond the relief performance flows into the secondary piping.	Continuation of operation in this state causes substantial reduction of the life. Examine the operation method.
	While no primary pressure is supplied, the power is turned on and input signals are supplied.	Supply the primary pressure when supplying power and setting the input signal.
	The input signal setting is higher than the primary pressure.	Supply the primary pressure at least at the minimum operating pressure.
	The primary pressure falls below the minimum operating pressure.	Supply the primary pressure at least at the minimum operating pressure.
Even after the power is turned off, 0,05 bar or a larger pressure is output.	The zero point is adjusted high with zero/span adjustment.	Upon a high zero point, the set pressure is output even after the power is turned off. If the atmospheric pressure is necessary, install a 3/2-way valve or similar in the secondary circuit.
	The power is turned off while the input signal remains supplied.	Turn the power on and reduce the input signal to 0%.
	This product is left for a long time while the power is turned off and the primary pressure is supplied.	If this product is not operated for a long time, release the primary pressure to zero. If the secondary pressure should rise, turn the power on and reduce the input signal to 0%.
	Failure of ER	Check the piping and wiring for faults and replace the product.

Symptom	Cause	Solution
The supply pressure is output without change.	Failure of ER	Check the piping and wiring for faults and replace the product.
The pressure is out of control.	Error in input signal	In case of an analog type, check if the common of input signals is connected to the ground of the power supply. In case of a parallel type, check the relationship between the input bit and wiring again.
	Failure of pressure sensor	Replace the product. Check if routing from another piping causes an excessive pressure in the secondary circuit.
No pressure on the output.	The primary pressure is not supplied.	Check the supply pressure.
	Wiring error	Check the wiring again. Check if connectors are connected securely.
The pressure does not rise to the setting.	Low supply pressure	Supply the primary pressure at least at the minimum operating pressure.
The pressure does not descend.	The exhaust port path is blocked.	Examine the layout so that exhaust air is discharged from the R and EXH ports.
The pressure is unstable.	The source voltage is unstable.	Use a stabilized power supply matching the specifications of the product.
	The input signal is unstable.	Check the effects of noise. Connect the shield to the ground of the power supply.
	The primary pressure is unstable.	Install a regulator in the primary circuit to stabilize the primary pressure of ER.
	Leakage from piping	Check for leaks from primary and secondary piping.
Pulsating pressure	The supply pressure is too large when compared with the control pressure.	Supply the primary pressure at least at the minimum operating pressure while lowering it as far as possible.
	Mismatch of secondary piping volume, leakage, entry of dirt, etc.	Pulsation is avoided in some cases through modification of the piping condition. If possible, examine the piping diameter, modification of the load volume, examination of leakage and so on of the secondary circuit.

## 6. SPECIFICATIONS AND PRODUCT CODE

### 6.1. Specifications ER-104-5\* and ER-104-9\*

Item	Analog type ER104-x0xx ER104-x1xx ER104-x2xx	Parallel type ER104-xPxx	Analog type ER104-x0xx ER104-x1xx ER104-x2xx	Parallel type ER104-xPxx		
Media	Cleaned air (equivalent to ISO 8571-3 Class 13 32 2)					
Max. Inlet working pressure	7 Bar		10 Bar			
Min. working pressure	control pressure + 1 Bar					
Pressure control range	0 to 5 Bar		0 to 9 Bar			
Power supply voltage	DC 24V±10% (stabilized power supply with a ripple rate 1% or less)					
Consumption current	0.15 A or less r rsh current 0.6 A or less when the power is turned on					
Input signal   Input impedance	0-10VDC(6.7kΩ) 0-5VDC(10kΩ) 4-20mADC(250Ω)	10bit	0-10VDC(6.7kΩ) 0-5VDC(10kΩ) 4-20mADC(250Ω)	10bit		
Preset input	8 points		N/A		8 points	N/A
Output signal	Analog output 1 1-5VDC (load to be connected impedance 500kΩ or more)					
Error output signal	Switch output N NPN or PNP, open collector output, 30V or less, 50mA or less, voltage drop 2.4V or less, compatible for usage in PLC and Relay					
Direct memory set	0,05 to 5 Bar (setting min. width 0,01Bar,setting resolution 0,01Bar)		0,09 to 9 Bar (setting min. width 0,01Bar,setting resolution 0,02Bar)			
Hysteresis	0.5% F.S. or less					
Linearity	±0.3% F.S. or less					
Resolution	0.2% F.S. or less					
Repeatability	0.3% F.S. or less					
Temperature characteristic	Zero point fluctuation		0.15% F.S. / °C or less			
	Span fluctuation		0.07% F.S. / °C or less			
Max. flow rate (ANR)	400 L / min					
Step response 5	No load		0.2sec. or less			
	1000 cm <sup>3</sup> load		0.8sec. or less			
Mechanical vibration proof	98m/s <sup>2</sup> or less					
Ambient temperature	5 to 50					
Fluid temperature	5 to 50					
Connecting port size	G1/4					
Mounting direction	Free					
Mass (body)	250g					
Protective circuit	Power reverse protect, Switch output reverse protect, Switch output load short protect					

- 1 : Even when set to 0%,secondary pressure remains within 1%F.S. or less.
- 2 : Select either analog output or switch output by product code
- 3 : Above characteristics are values where power voltage is 24VDC, and working pressure is "maximum control pressure + 1 Bar "[ER105-5xxx:6 Bar, ER105-9xxx:10 Bar], and control pressure is 10 to 90%.  
Also, limited to a closed circuit in the secondary side and the pressure may vary if used as air blow, etc.
- 4 : Working pressure : Maximum working pressure, Control pressure : Maximum control pressure
- 5 : Working pressure : Maximum working pressure, Step rate :
 

50% F.S.	→	100% F.S.
50% F.S.	→	60% F.S.
50% F.S.	→	40% F.S.

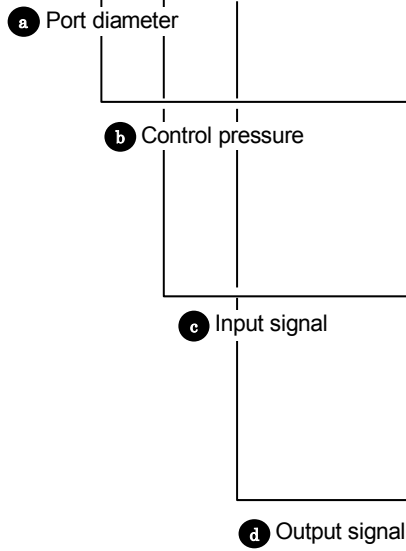
## 6.2. Specifications ER-104-1\*

Item	Analog type ER104-10xx ER104-11xx ER104-12xx	Parallel type ER104-1Pxx
Media	Cleaned air (equivalent to ISO 8571-3 Class 13 32 2)	
Max. Inlet working pressure	1,6 Bar	
Min. working pressure	control pressure + 0,5 Bar	
Pressure control range	1 1	0 to 1 Bar
Power supply voltage	DC 24V±10% (stabilized power supply with a ripple rate 1% or less)	
Consumption current	0.15 A or less r rush current 0.6 A or less when the power is turned on	
Input signal I Input impedance	0-10VDC(6.7kΩ)	10bit
	0-5VDC(10kΩ)	
	4-20mADC(250Ω)	
Preset input	8 points	N/A
Output signal	2 2	Analog output 1 1-5VDC (load to be connected impedance 500kΩ or more)
		Switch output N NPN or PNP, open collector output, 30V or less, 50mA or less, voltage drop 2.4V or less, compatible for usage in PLC and Relay
Error output signal	NPN or PNP, open collector output, 30V or less, 50mA or less, voltage drop 2.4V or less, compatible for usage in PLC and Relay	
Direct memory set	0,01 to 1 Bar (setting min. width 0,01Bar,setting resolution 0,01Bar)	
Hysteresis	3 3	0.5% F.S. or less
Linearity	3 3	±0.3% F.S. or less
Resolution	3 3	0.2% F.S. or less
Repeatability	3 3	0.3% F.S. or less
Temperature characteristic	Zero point fluctuation	0.15% F.S. / °C or less
	Span fluctuation	0.07% F.S. / °C or less
Max. flow rate (ANR)	4 4	60 L / min
Step response 5	No load	0.2sec. or less
	1000 cm <sup>3</sup> load	0.8sec. or less
Mechanical vibration proof	98m/s <sup>2</sup> or less	
Ambient temperature	5 to 50	
Fluid temperature	5 to 50	
Connecting port size	G1/4	
Mounting direction	Free	
Mass (body)	250g	
Protective circuit	Power reverse protect, Switch output reverse protect, Switch output load short protect	

- 1 : Even when set to 0%,secondary pressure remains within 1%F.S. or less.
- 2 : Select either analog output or switch output by product code
- 3 : Above characteristics are values where power voltage is 24VDC, and working pressure is "maximum control pressure + 0,5 Bar "[1,5 Bar], and control pressure is 10 to 90%.  
Also, limited to a closed circuit in the secondary side and the pressure may vary if used as air blow, etc.
- 4 : Working pressure : Maximum working pressure, Control pressure : Maximum control pressure
- 5 : Working pressure : Maximum working pressure, Step rate :
- |          |   |           |
|----------|---|-----------|
| 50% F.S. | → | 100% F.S. |
| 50% F.S. | → | 60% F.S.  |
| 50% F.S. | → | 40% F.S.  |

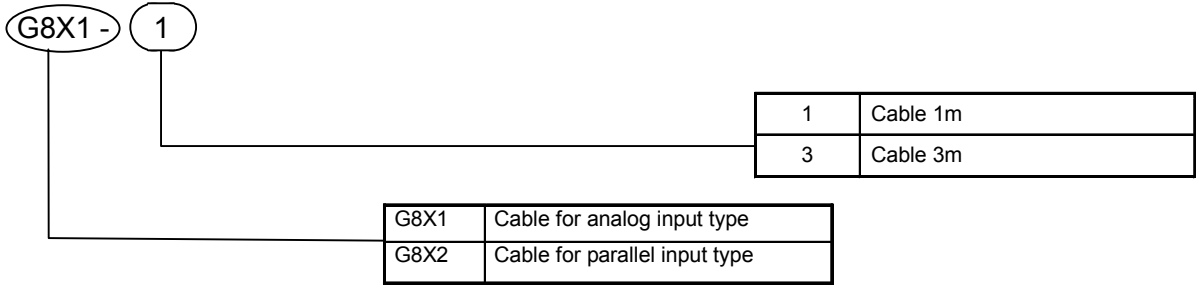
### 6.3. How to order

ER 1 (04) - (5) (0) (AN)

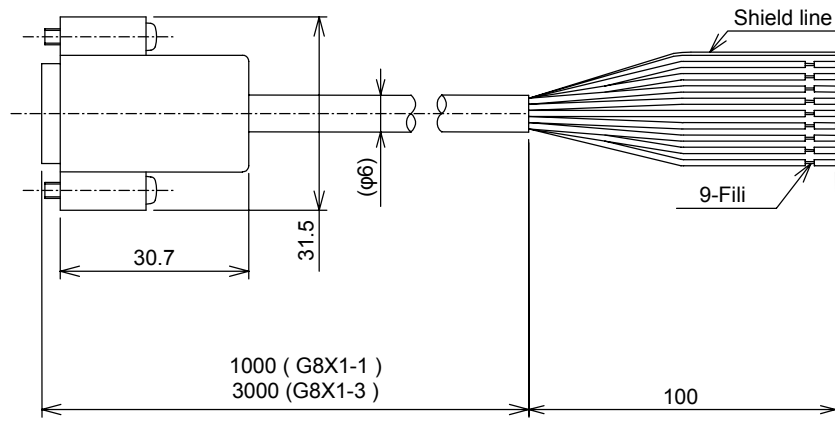


Symbol	Description
<b>a Port diameter</b>	
04	Rc1/4
<b>b Control pressure</b>	
1	1 Bar
5	5 Bar
9	9 Bar
<b>c Input signal</b>	
0	0-10VDC
1	0-5VDC
2	4-20mADC
P	Parallel 10bit
<b>d Output signal</b>	
AN	1-5V analog, errorN NPN
AP	1-5V analog, errorP PNP
SN	switchN NPN, , errorN NPN
SP	switchP PNP, , errorP PNP

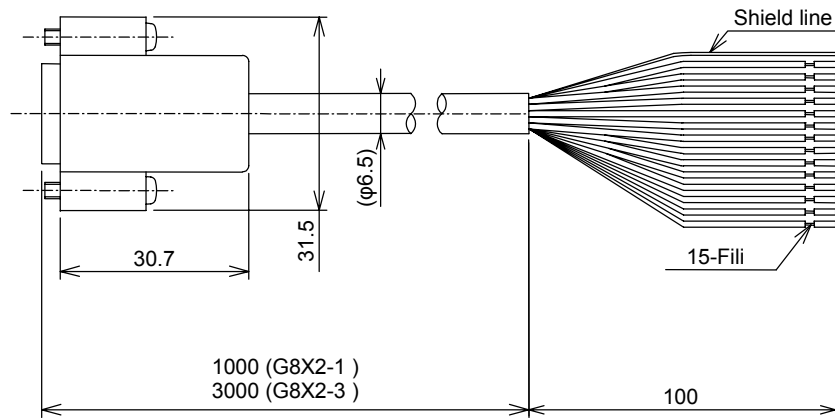
### 6.4. Optional individual code



- G8X1-x



- G8X2-x

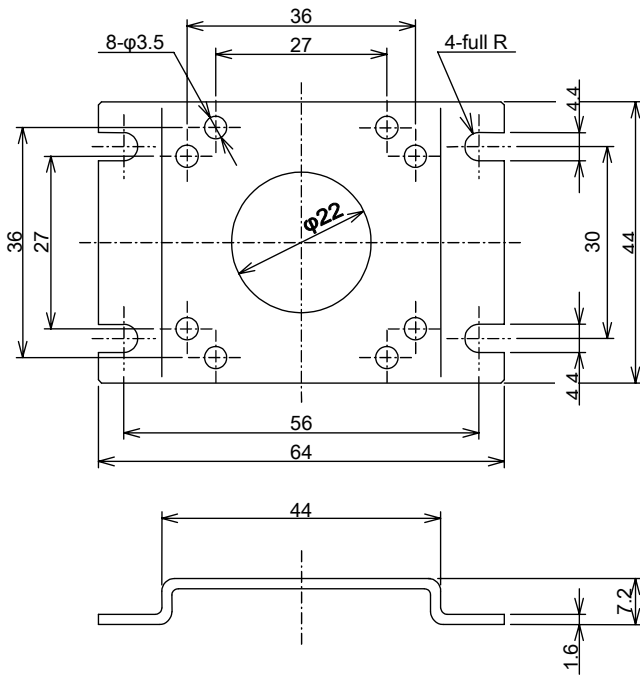




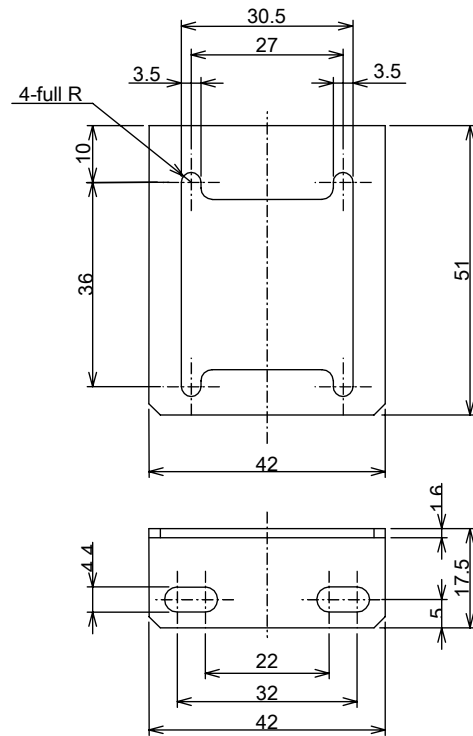
ER 1 - B1

B1	B1 type bracket, Floor installation type
B2	B2 type bracket, Wall installation type

ER1-B1



ER1-B2



## 7. REFERENCE

### 7.1. Relationship between parallel type input signal and control pressure

The parallel type input signal is 10 bit width. The signal ranges from 0 to 1023 when converted into a decimal.

$$\text{Input signal} = \text{ER set pressure (Bar)} / \text{Max. control pressure (Bar)} \times 1023$$

$$\left( \begin{array}{l} \text{Max. control pressure ER104-5: 5 Bar} \\ \text{ER104-9: 9 Bar} \end{array} \right)$$

Example: In the case of setting 3 Bar to ER104-5xxx.

$$3(\text{Bar}) / 5(\text{Bar}) \times 1023 = 613,8 \quad 614$$

$$\left( \begin{array}{l} \text{The inverse operation with "614" is:} \\ 5(\text{Bar}) \times 614 / 1023 \cong 3(\text{Bar}) \end{array} \right)$$

"614" (decimal) converted into a binary is 1001100110. Turn the input signal on at "1" and turn it off at "0." (See the table below.)

D sub socket pin No.	12	11	9	8	7	6	4	3	2	1
Cable option Isolator color	Green (with black line)	White	Red (with black line)	White (with black line)	Pink	Pale blue	Purple	Yellow	Orange	Brown
Input type	10 bit MSB	9 bit	8 bit	7 bit	6 bit	5 bit	4 bit	3 bit	2 bit	1 bit LSB
Binary code [ 614(decimal) ]	1	0	0	1	1	0	0	1	1	0
Input signal	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF

### 7.2. Relationship between preset memory and input signal

D-sub socket pin No.	3	2	1	Preset memory
Cable option Isolator color	Yellow	Orange	Brown	
Input type	3 bit	2 bit	1 bit	
Input signal	OFF	OFF	OFF	P1
	OFF	OFF	ON	P2
	OFF	ON	OFF	P3
	OFF	ON	ON	P4
	ON	OFF	OFF	P5
	ON	OFF	ON	P6
	ON	ON	OFF	P7
	ON	ON	ON	P8