

**Series 3710**  
**Type 3710 Reversing Amplifier**



Type 3710 Reversing Amplifier in standard version with pressure gauges for Y<sub>1</sub> and Y<sub>2</sub>

**Mounting and  
Operating Instructions**

**EB 8392 EN**

Edition December 2012

## Note on these mounting and operating instructions

These mounting and operating instructions (EB) assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service department (aftersaleservice@samson.de).

## Referenced documentation

The documents for the devices used in combination with the reversing amplifier apply in addition to these mounting and operating instructions.

The mounting and operating instructions for all supplied devices are included in the delivery. The latest versions of the documents are available on our website at [www.samson.de](http://www.samson.de) > Product documentation.

### Definition of signal words



#### **DANGER!**

*Hazardous situations which, if not avoided, will result in death or serious injury*



#### **NOTICE**

*Property damage message or malfunction*



#### **WARNING!**

*Hazardous situations which, if not avoided, could result in death or serious injury*



#### **Note:**

*Additional information*



#### **Tip:**

*Recommended action*

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# 1 General safety instructions

For your own safety, follow these instructions concerning the mounting, start-up, and operation of the device:

- The device is to be mounted, started up or operated only by trained and experienced personnel familiar with the product. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

**To avoid damage to any equipment, the following also applies:**

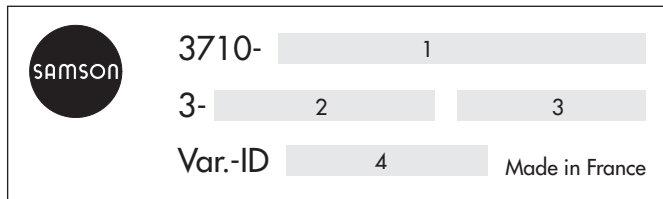
- Proper shipping and storage are assumed.

## 2 Markings on the device

### 2.1 Article code

Reversing amplifier	Type	3	7	1	0	x	x	0
Housing material								
Aluminum		0						
Stainless steel		1					3	
Connecting thread								
ISO 228/1-G ¼			1					
¼-18 NPT			2					
Ambient temperature range								
-25 to +80 °C					0			
-50 to +80 °C					1		3	
-60 to +80 °C					2		3	
Degree of protection								
IP 65, filter check valve made of polyamide							2	
IP 65, filter check valve made of stainless steel 1.4305							3	

### 2.2 Nameplate



- 1 Article code
- 2 Production ID
- 3 Permissible ambient temperature
- 4 Configuration ID

### 3 Design and principle of operation

The reversing amplifier allows double-acting pneumatic actuators to be operated using single-acting positioners or limit switches.

The positioner creates an output signal pressure  $Y_1$ , to which the air pressure  $Y_2$  is added. The reversing amplifier uses the supply pressure  $Z$  as auxiliary power.

The following rule applies:

$$Y_1 + Y_2 = Z$$

**Example:**

$Y_1$ of the positioner	1 bar
Supply pressure $Z$	6 bar
Resulting $Y_2$	5 bar

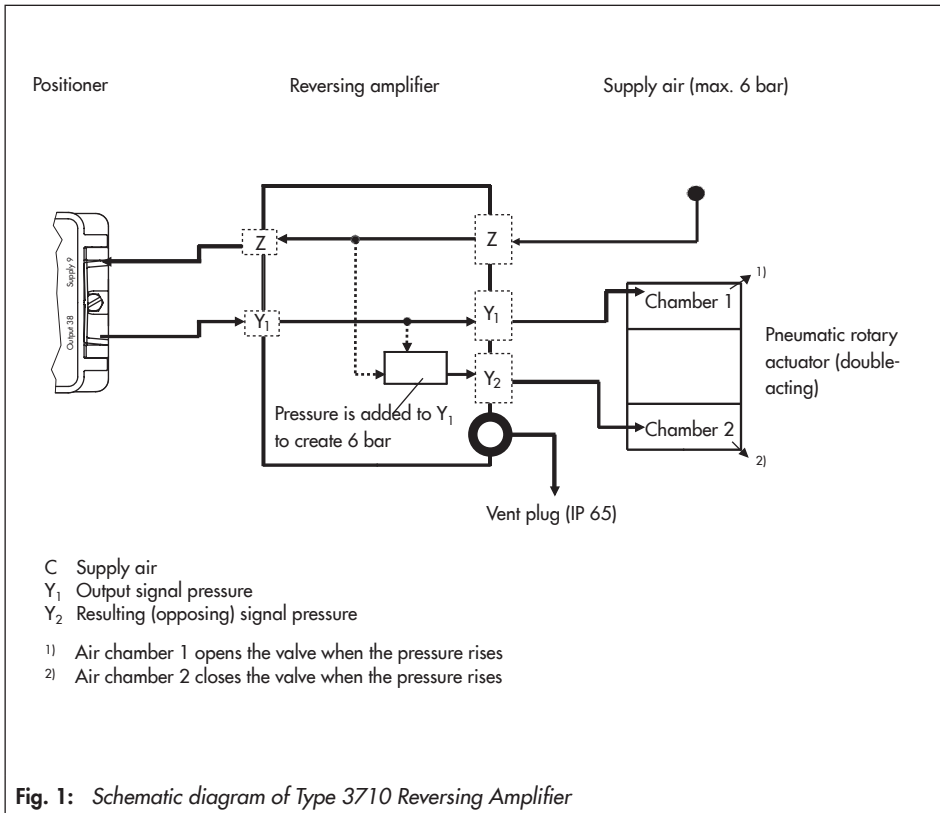


Fig. 1: Schematic diagram of Type 3710 Reversing Amplifier

### 3.1 Technical data

Type 3710 Reversing Amplifier		
Permissible supply pressure	6 bar	
K <sub>v</sub> coefficient	to fill the actuator with air	0.11
	to vent the actuator	0.12
Leakage	Z to Y <sub>2</sub>	≤20 l/h when Y <sub>2</sub> = 0 bar and Z = 6 bar
	Y <sub>2</sub> to vent plug	≤40 l/h when Y <sub>1</sub> = 0 bar and Y <sub>2</sub> = 6 bar
Connections	¼-18 NPT · ISO 228/1-G ¼	
Degree of protection	IP 65	
Compliance	<b>CE</b>	
Permissible ambient temperature	-25 to +80 °C · -13 to +176 °F	
	Low-temperature version:	
	-50 to +80 °C · -58 to +176 °F -60 to +80 °C · -67 to +176 °F	
Weight	0.5 kg · 1.2 kg for stainless steel version	

### 3.2 Materials

Materials	
Housing and cover	Powder-coated aluminum Special version in stainless steel 1.4404
Diaphragm plate	Aluminum, yellow chromated
Seat and plug	Brass
Diaphragms	Silicone rubber FVMQ · PTFE for low-temperature version

## 4 Attachment to positioners and limit switches

The description in section 4.1 and 4.2 applies to the following devices:

- Type 3730 Positioner
- Type 3731 Positioner
- Type 3766 Positioner
- Type 3767 Positioner
- Type 3768 Limit Switch

→ **Check device index before attachment.**



**Note:**

See the last two figures of the configuration ID written on the nameplate for the device index.

### 4.1 Attachment to positioners and limit switches (device index .05 and higher)

1. Fasten the reversing amplifier directly to the positioner/limit switch using two M5 screws.

→ On mounting the device, make sure that the two O-rings (1.2 in Fig. 2 left) are inserted properly into their groove.



**Tip:**

If you lose any O-rings for the reversing amplifier, you can order more (order number 8421-9064).

### 4.2 Attachment to positioners and limit switches (below device index .05)

**Required accessories:**

Connecting plate (1400-9621) (2 in Fig. 2)

1. Screw the special nuts (1) included in the accessories for the connecting plate (2) into the holes of the positioner.
2. Insert the O-rings (1.2) into the grooves of the connecting plate (2). Slide the hollow bolts (1.3) into the threaded ports and fasten tight.
3. Fit O-rings (1.2) on the reversing amplifier. Place it on the connecting plate (2) and fasten tight.

### 4.3 Attachment to Type 3725 Positioner

**Required accessories:**

Connecting plate (1402-0512) (1 in Fig. 3)

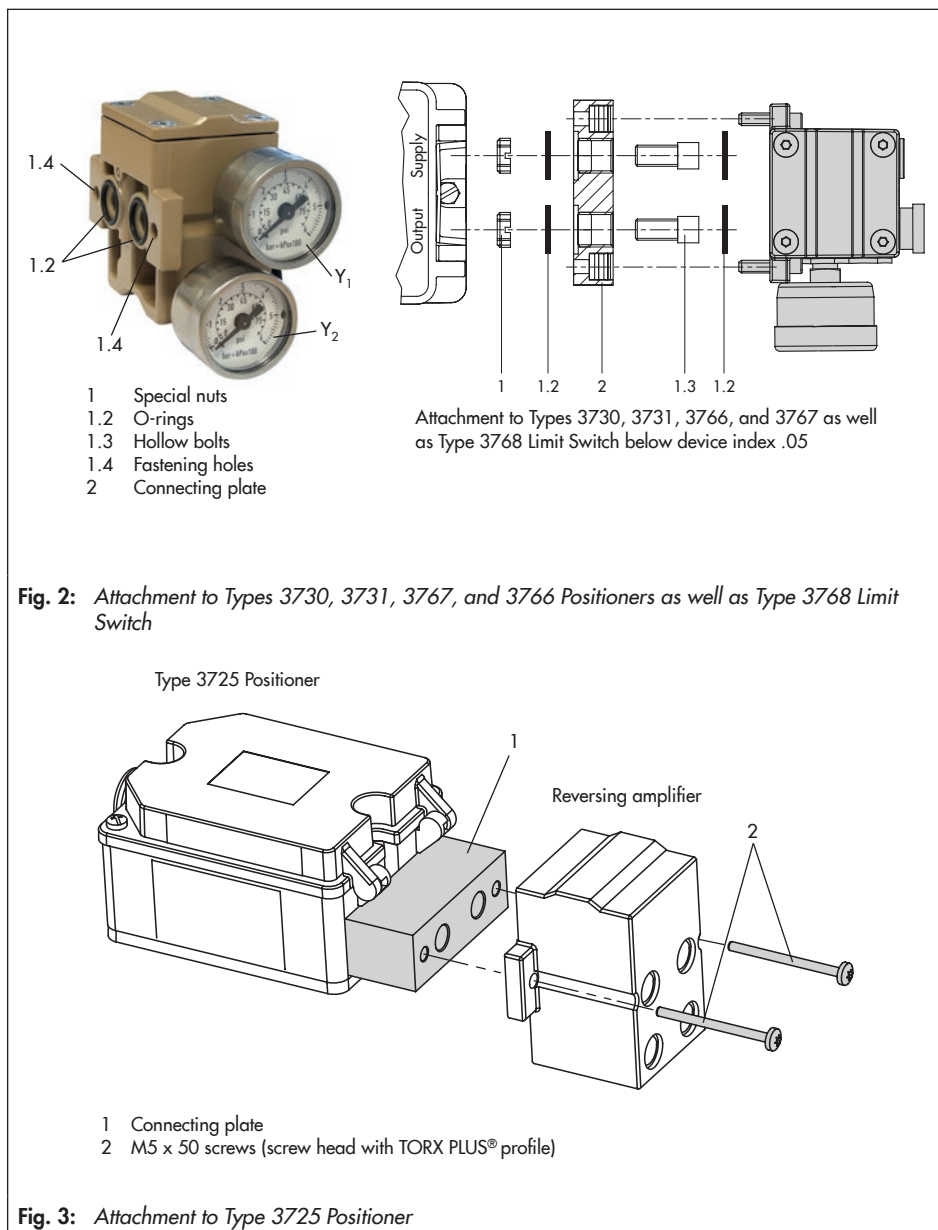
1. Fasten the connecting plate (1) between the positioner and the reversing amplifier using two M5 x 50 screws (2).



**Note:**

The screws supplied with the connecting plate have a TORX PLUS® profile and must be tightened using a suitable tool.





#### 4.4 Note on attachment to rotary actuators according to VDI/VDE 3845

The description applies to the following devices:

- Type 3730 Positioner (angle of rotation  $>90^\circ$ )
- Type 3766 Positioner
- Type 3767 Positioner
- Type 3768 Limit Switch

→ For the attachment of the reversing amplifier to the above listed devices with mounting kit 1400-8815, remove the vent plug (6) from the intermediate piece (5) and insert into the positioner (see Fig. 4):

1. Place the O-ring (3) onto the screw plug (1).

2. Screw the screw plug (1) into the vent opening of the intermediate piece (5).
3. Thread the threaded bushing (2) and retaining washer (4) into the free cable gland of the positioner.
4. Screw vent plug (6) into the threaded bushing (2).
5. Fasten the reversing amplifier directly to the positioner/limit switch using two M5 screws.



**Note:**

The vent plug included in the mounting kit (1400-8815) has IP 54 degree of protection. For a higher degree of protection, select a suitable vent plug from the accessories listed in section 7.

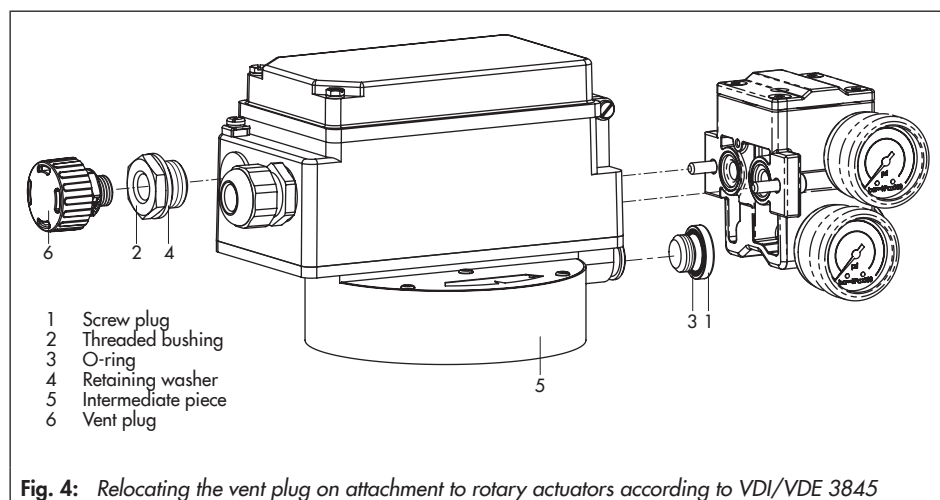
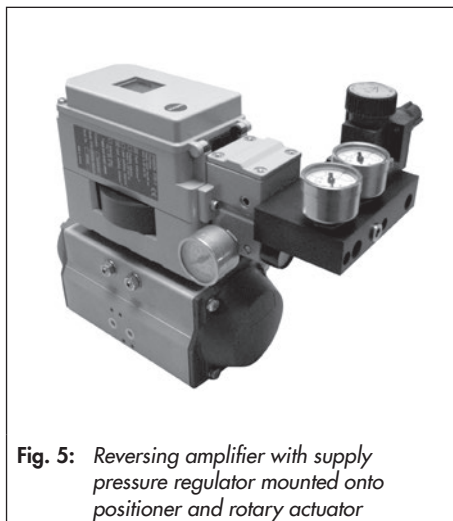


Fig. 4: Relocating the vent plug on attachment to rotary actuators according to VDI/VDE 3845

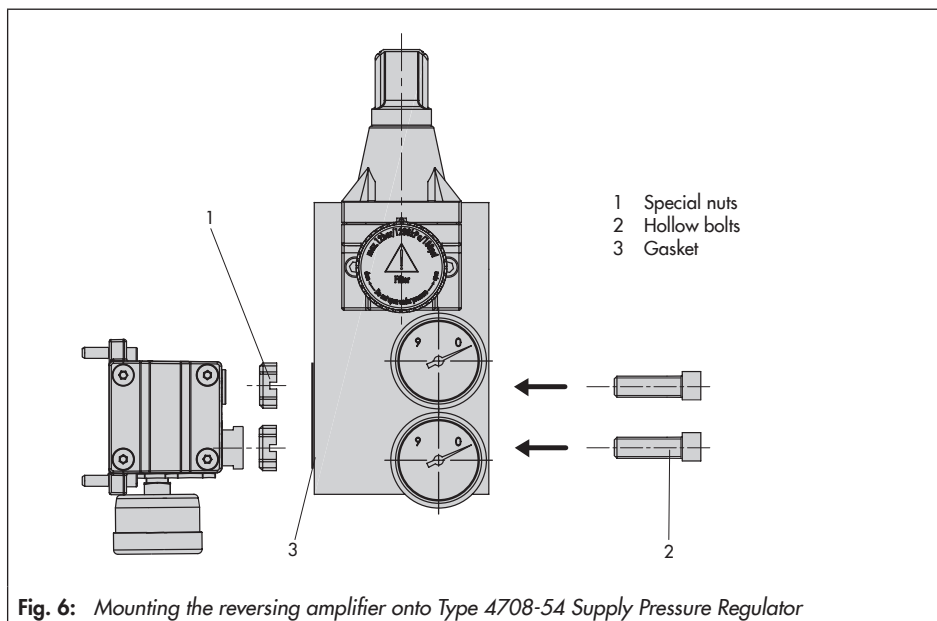
## 4.5 Attachment with Type 4708-54 Supply Pressure Regulator

**Required accessories:** Bolts with special nuts (1400-7806) (1 in Fig. 6)

1. Screw special nuts (1) into the holes in the reversing amplifier.
2. Insert gasket (3) into the recess of the supply pressure regulator and slide the special hollow bolts (2) into the holes for Output and Supply.
3. Position reversing amplifier and fasten using the hollow bolts (2).



**Fig. 5:** Reversing amplifier with supply pressure regulator mounted onto positioner and rotary actuator



**Fig. 6:** Mounting the reversing amplifier onto Type 4708-54 Supply Pressure Regulator

### 4.5.1 Note on attachment to Type 3275 Piston Actuator

When mounting the reversing amplifier with the Type 4708-54 Supply Pressure Regulator and positioner onto a Type 3275 Piston Actuator:

- Mount the positioner in such a manner that the pneumatic connections are located on the left side (Fig. 7). The supply pressure regulator can only be mounted onto the reversing amplifier in this mounting position.



**Fig. 7:** Type 3710 Reversing Amplifier, Type 4708-54 Supply Pressure Regulator with Type 3730 Positioner mounted on Type 3275 Piston Actuator

## 5 Pneumatic connections

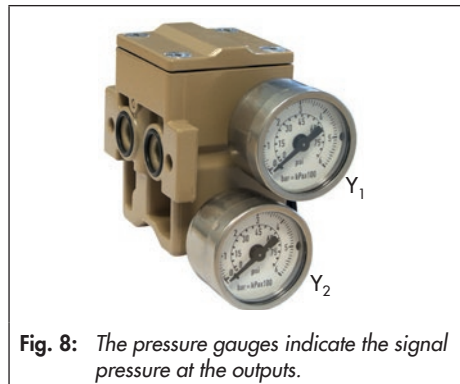
The air connections are designed either with 1/4-18 NPT or G 1/4 threads. Customary fittings for metal or copper tubing or plastic hoses can be used.

### Signal pressure connections

- See dimension diagram on page 15 for connections
- Y<sub>1</sub>: Connect output Y<sub>1</sub> to the signal pressure connection on the actuator that causes the valve to open when the pressure rises.
- Y<sub>2</sub>: Connect output Y<sub>2</sub> to the signal pressure connection on the actuator that causes the valve to close when the pressure rises.

## 5.1 Pressure gauges

The Type 3710 Reversing Amplifier is designed with connections for two pressure gauges on both sides. The connections are sealed with screw plugs G 1/8 when a pressure gauge is not installed.



**Fig. 8:** The pressure gauges indicate the signal pressure at the outputs.

### Technical data

Pressure gauge Ø 40 mm	
Indicating range	0 to 6 bar · 0 to 90 psi
Connection	G 1/8
Materials	
Housing	Stainless steel, device free of copper
Measuring unit and connection	Stainless steel, free of copper Nickel-plated brass connection

### Mounting the pressure gauges

1. Remove the screw plug G 1/8 from the reversing amplifier.
  2. Insert the seals supplied with the reversing amplifier.
  3. Screw the pressure gauges into the corresponding connections.
  4. Tighten the lock nuts of the pressure gauges leaving a 2 to 3 mm gap between the lock nut and pressure gauge's square end.
- Always use screw plugs G 1/8 to seal any unused pressure gauge connections.

## 6 Malfunctions

The reversing amplifier is maintenance-free.

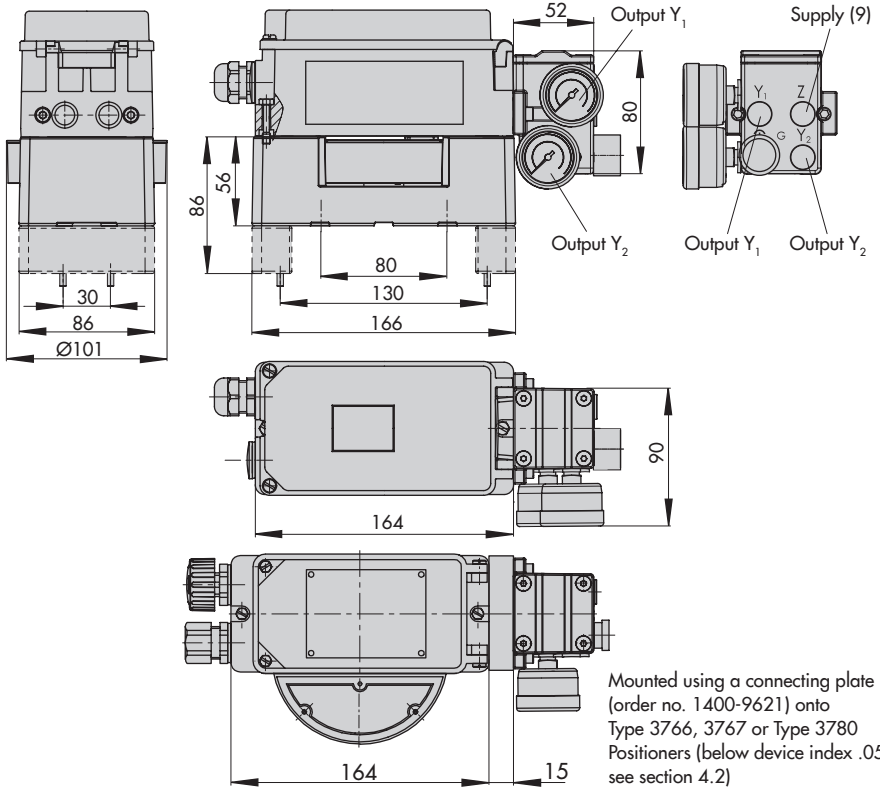
- If there is leakage between reversing amplifier and pneumatic connections, check the pipe fittings for leaks.
- If there is leakage between reversing amplifier and positioner, check correct seating of O-rings and replace them with new ones, if necessary.
- In case of other malfunctions, contact SAMSON's After-sales Service department: [aftersaleservice@samson.de](mailto:aftersaleservice@samson.de)

## 7 Accessories for Type 3710

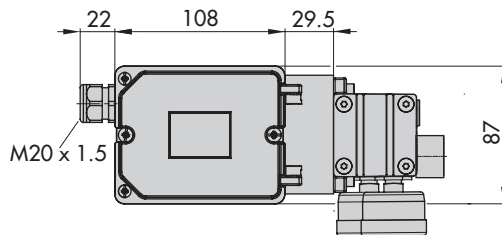
Accessories	Order number
O-rings (included in the scope of delivery). See Fig. 2 on page 9.	8421-9064
<b>Accessories for attachment to Type 3725 Positioner</b>	
Connecting plate (including two self-tapping screws M5 x 50)	1402-0512
<b>Pressure gauge (order number applies to one piece)</b>	
Pressure gauge 0 to 6 bar/psi/kPa; completely made of stainless steel, including pressure compensation element	1402-1337
Pressure gauge 0 to 6 bar/psi/kPa; stainless steel/nickel-plated brass connection, including pressure compensation element	1402-1338
Seal with spacer	1099-4305
<b>Mounting kit for Type 4708-54 Supply Pressure Regulator with Type 3710 Reversing Amplifier</b>	
Bolts with special nuts	1400-7806
<b>Filter check valves</b>	
IP 65, 1.4404	1790-7253
NEMA 4, polyamide	1790-9645
NEMA 4, 1.4404	1790-9646
IP 65, polyamide	1790-7408
<b>Connecting plate for older models of Types 3766, 3767, and 3780 Positioner as well as Type 3768 Limit Switch (below device index .05)</b>	
Connecting plate	1400-9621

## 8 Dimensions in mm

**Type 3710 Reversing Amplifier with pressure gauges, mounted on Type 3730 Positioner**



**Type 3710 Reversing Amplifier with pressure gauges, mounted on Type 3725 Positioner**





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