

ADM 333SF: Motorised actuator with positioner

How energy efficiency is improved

Electric cut-off in end position to save energy

Features

- Actuation of final control elements such as butterfly valves, gates and air dampers
- For controllers with continuous output (0(2)...10 V/0(4)...20 mA)
- Synchronous motor with two limit switches and integrated positioner
- Menu-led configuration via an internal TFT display
- Positional feedback signal via 0(2)...10 V/0(4)...20 mA
- Potential-free fault signal output
- Configurable direction of operation
- Control unit to be actuated can be moved to any intermediate position
- Maintenance-free metal gearbox
- Three cable inlets with M16 × 1.5 cable gland for cables Ø 4.5 to 10 mm



ADM333SF122



Technical data

Power supply	
Voltage measurement	24 VAC, ±20%, 50...60 Hz
Power consumption with 50 Hz	4 VA
Power consumption in stand-by mode	MANUAL: 1.26 VA AUTO: 0.4 VA
Parameters	
Rotation angle ¹⁾	90°
Nominal torque	30 Nm
Holding torque	20 Nm
Running time for 90°	60 s
Admissible damper area ²⁾	10 m ²
Control signal ³⁾	0(2)...10 V 0(4)...20 mA, load 250 Ω
Positional feedback signal ⁴⁾	0(2)...10 V, max. 10 mA 0(4)...20 mA, max. load 500 Ω
Fault signal output	Relay contacts, potential-free, max. 24 V, 500 mA
Ambient conditions	
Ambient temperature ⁵⁾	-15...60 °C
Ambient humidity	5...95% rh
Storage and transport temperature	-20...70 °C
Construction	
Cable inlet	3 pieces, M16 × 1.5
Screw terminals	For electrical cables up to 1.5 mm ²
Housing material	Cast aluminium, RAL 9005 Cover: powder-coated aluminium, RAL 1018
Transmission system	Hardened steel
Dimensions W × H × D	86 × 167 [137] × 153 mm []: height without end shaft
Weight	2.3 kg

¹⁾ Angle of rotation of end shaft is adjustable from min. 10° to max. 330° by means of a switching cam (starting point is freely selectable)

²⁾ Admissible damper area: The recommended admissible damper area refers to equal-sided, smooth-running air dampers

³⁾ Control signal is protected against reversed polarity

⁴⁾ The positional feedback signal is protected against short circuit. If the power supply is incorrectly connected, there is no external voltage protection

⁵⁾ At temperatures under 0 °C, use heating resistor (accessory)

With a media temperature of up to 110 °C in the final control element, an ambient temperature of up to 60 °C is permitted. With a media temperature above 110 °C, the ambient temperature must not exceed 55 °C



Standards, directives		
	Ingress protection ⁶⁾	IP65 (EN 60529)
	Protection class	I (EN 60730-1)
	Degree of contamination	III
CE conformity according to	EMC Directive 2014/30/EU	EN 61326-1 EN 55011 Group 1, Class A (industry)
	Low-Voltage Directive 2014/35/EU	EN 60730-1, EN 60730-2-14
	RoHS-D 2011/65/EU & 2015/863/EU	EN IEC 63000

Overview of types

Type	Features
ADM333SF122	Synchronous motor with positioner

Accessories

Type	Description
0510510012	Heating resistor for ADM 333, 24 V, 3 W
0510240031	Mounting kit for ADM 333 with butterfly valve DEF, DN 25...65
0510240032	Mounting kit for ADM 333 with butterfly valve DEF, DN 80...125
0510240033	Mounting kit for ADM 333 with butterfly valve DEF, DN 150...200
0510240041	Mounting kit for ADM 333 with butterfly valve DEF, DN 25...65, hand lever
0510240042	Mounting kit for ADM 333 with butterfly valve DEF, DN 80...125, hand lever
0510240043	Mounting kit for ADM 333 with butterfly valve DEF, DN 150...200, hand lever

Description of operation

The built-in positioner controls the ADM 333SF motorised actuator depending on controller signal y . The input and output signal, starting position (U_0/I_0) and control span ($\Delta U/\Delta I$), direction of operation and start/stop hysteresis can be parameterised. The required input and output signals can be selected using a DIP switch.

The integrated cut-off system with switching cams and micro-switches automatically switches off the actuator at the end positions. The retaining torque is ensured by the self-locking system.

In manual operation, the connected final control element can be moved to any intermediate position by pressing the "R" and "L" buttons.

The alarm output can be used to detect wire break if the input signal is set to 2...10 V or 4...20 mA. In the event of a fault, the final control element can be automatically moved to a predefined position.

The fault signal is active when the actuator is in manual mode.

Intended use

As per EN 55011, the ADM 333 motorised actuator is, only suitable for use in the industrial sector.

The actuator may only be used for controlling and regulating VAC systems in buildings. The device is for actuating control and shut-off devices (dampers, taps, gates etc.). It is particularly suitable for use in combination with SAUTER DEF butterfly valves. Other uses require the prior consent of the manufacturer.

The "Description of operation" section and all product instructions in this data sheet must be observed.

Modifying or converting the product is not permitted.

Improper use

The motorised actuator ADM 333 may not be used:

- For safety functions
- In potentially explosive atmospheres
- In transport applications or at altitudes above 2000 metres

⁶⁾ Type of protection IP65 only with M16 × 1.5 cable gland

**NOTICE!**

Warning: The motorised actuator is not intended for use in residential premises. It cannot ensure adequate protection for radio reception in such environments.

**Notice in accordance with California Proposition 65**

The product contains lead and bisphenol A (BPA). To be marketed in North America, the appropriate warnings must be affixed to the product or packaging.

Engineering and fitting notes

**Note**

Only qualified specialists are permitted to fit and connect the device.

The actuator generates operating noise. Plan and select the place of installation accordingly. Mount the motorised actuator on the final control element according to the fitting instructions. Mounting kits are available for fitting the actuator on SAUTER butterfly valves; see Accessories. The actuator is mounted on the final control element using a bracket and a coupling. The bracket is fastened to the underside of the actuator with screws (M6).

Fitting position

The motorised actuator can be fitted in any position. Adjustment and display elements must be safely and easily accessible.

Outdoor fitting

When fitted outdoors, the device must be protected from the weather, for example with a canopy.

Electrical connection

Open and connect the actuator according to fitting instructions P100020637. It is advisable to lay signal and power cables separately to minimise interference.

Use the ring lug provided to connect the earth conductor. The cross-section of the earth conductor must be at least that of the largest cross-section of the other conductors.

Open, unused cable entries must be properly sealed. Protection class IP65 is only ensured if a cable gland suitable for the cable diameter is used. The cable glands and seals used must ensure at least IP65.

**NOTICE!**

Overloading the motor and blocking the final control element will damage the actuator.

Parameterisation

The following parameters are available for configuring the motorised actuator:

Parameter	Setting range	Factory setting	Note
Control signal (Y)	0...10 V / 0...20 mA	0...10 V	DIP switch, do not set unless power is off
Control signal (Y)	0(2)...10 V / 0(4)...20 mA	0(2)...10 V	Controller menu
Positional feedback signal (Y ₀)	0...10 V / 0...20 mA	0...10 V	DIP switch, do not set unless power is off
Positional feedback signal (Y ₀)	0(2)...10 V / 0(4)...20 mA	0(2)...10 V	Controller menu
0% end position (direction of operation)	Left = 0%, Right = 0%	Left = 0%	Controller menu
Start hysteresis	1...9	2	Controller menu
Stop hysteresis	1...5	2	Controller menu
Wire break	Deactivated, to 0%, stop, to 100%	Deactivated	Controller menu

Limit switches and potentiometers

The limit switches, potentiometers and controllers are set at the factory.

The limit switches and the potentiometer must be set to the travel of the connected final control element. This is done on the controller by means of parameterisation. The end position setpoints can

be set anywhere between 0° and 90° (with at least 18° difference) using the integrated display and the “R”, “M” and “L” buttons.

The rotation angle may not be set to more than 90° using the switching cams and limit switches, as otherwise the torque limiter of the potentiometer will be damaged.

The end positions are set using the cams and moved to using the menu. The end positions that are moved to are saved by means of the cam. End positions in front of and between the cams can also be saved. The cams switch off the motor independently of the electronics in the event of a fault.

If a cam is in front of the end position and the motor switches off too early, the controller cannot reach the end position. The controller remains in this state until it receives another command. This might mean that 0 V or 4 mA is not displayed, but a higher value that does not correspond to 0%.

Adjusting the limit switches

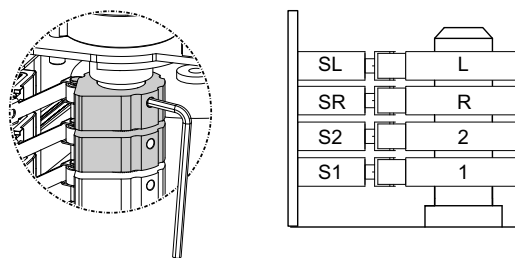


WARNING!

Risk of electrocution. The device contains live parts.

- ▶ Observe the safety and fitting instructions and prevent unauthorised access to the working area.
- ▶ Use insulated tools.
- ▶ The following tasks may only be carried out with another person watching.
- ▶ Do not put the actuator into operation until the limit switches have been adjusted.

1. Set the Manual/Automatic switch to “Manual”.
2. Press the “Menu” button for at least one second.
 - > The controller menu opens.
3. In the “End Position” → “Left End” menu, activate the “Left Process” function with the “M” button.
4. The “L” button moves the actuator anticlockwise (looking from the actuator to the shaft) to the first end position of the final control element.
5. Rotate switching cam L by hand until the limit switch SL shuts off the motor in the required final position.
 - Tighten the grub screw on switching cam L and secure with threadlocker (optional).
6. In the “End Position” → “Right End” menu, activate the “Right Process” function with the “M” button.
7. The “R” button moves the actuator clockwise to the second end position of the final control element.
8. Rotate switching cam R by hand until the limit switch SR shuts off the motor in the required final position.
 - Tighten the grub screw on switching cam R and secure with threadlocker (optional).
9. Press the “Menu” button for at least one second.
 - > The controller menu closes.
 Set the Manual/Automatic switch to “Automatic”.



The switching contacts are set using the switching cam of the potentiometer shown above, which is directly mechanically connected to the end shaft. During setup, the arrows on the display must rotate in the same direction as the axis of the switching camshaft.

Once parametrisation is complete, any positions between the end positions can be moved to.

Possible errors

“Error 11” is displayed during parameterisation when the right end position is physically to the left of where it should be. Because there is no mechanical stop and the end points can be approached from either side (multi-turn actuator), it must be approached from the correct direction. During parameterisation, the arrows on the display must rotate in the same way as the axis of the potentiometer.

Do not move the actuator beyond the left end position as seen from the right end position. The 0% assignment for the end position must be made by parameterisation in the controller menu and not via the control cam setting.

Adjusting the auxiliary switches

The auxiliary switches S1 and S2 can be set by simply turning the switching cams. The positions are moved to by switching to manual mode and positioning the motorised actuator using the “R” and “L” buttons.

Note



The auxiliary switches must be operated in the same voltage range as the motorised actuator. Do not mix low voltage and extra low voltage.

Analogue input/output

In the controller menu, the analogue input and output signals are set using the “Analog Input” and “Analog Output” functions. Each submenu item of “Analog Input” can be combined with each of the four menu items of “Analog Output”.

NOTICE!



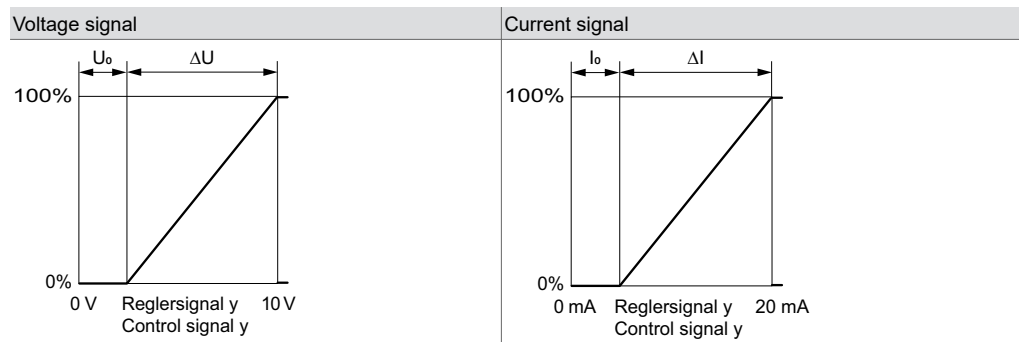
Risk of malfunctions or damage to the electronics.

- ▶ The DIP switches must be set with the power off.
- ▶ Never set DIP switches 1 and 2, or DIP switches 3 and 4, to “ON” at the same time.

Current input and voltage output can also be combined, as well as voltage input and current output.

Input/output

0(2)...10 V	0(4)...20 mA																
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AO	AO	AI	AI														
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U_0/I_0 : Start position

$\Delta U/\Delta I$: Control span

Setting the analogue input and output

1. Set the Manual/Automatic switch to “Manual”.
2. Press the “Menu” button for at least one second.
 - > The controller menu opens.
3. Select the “Analog Input” function and activate with the “M” button.
4. Use the “L” and “R” buttons to select the required input signal (4...20 mA, 0...20 mA, 0...10 V, 2...10 V) and press the “M” button to confirm.
5. Select the “Analog Output” function and activate with the “M” button.
6. Use the “L” and “R” buttons to select the required output signal (4...20 mA, 0...20 mA, 0...10 V, 2...10 V) and press the “M” button to confirm.
7. Press the “Menu” button for at least one second.
 - > The controller menu closes.
8. Set the Manual/Automatic switch to “Automatic”.

**Note**

The setting of the DIP switches has priority over the setting in the menu. Only the starting point 0 or 2 V for voltage signals or 0 or 4 mA for current signals is set using the controller menu.

0% end position (direction of operation)

Setting the start position for the 0% end position

1. Set the Manual/Automatic switch to "Manual".
2. Press the "Menu" button for at least one second.
 - > The controller menu opens.
3. Select the "0% Set" function and activate with the "M" button.
4. Use the "L" and "R" buttons to select the required start position (Left = 0%, Right = 0%) and confirm with the "M" button.
5. Press the "Menu" button for at least one second.
 - > The controller menu closes.
6. Set the Manual/Automatic switch to "Automatic".

Start/stop hysteresis

Because the motorised actuator operates as a two-point controller, the hysteresis setting is essential for positioning accuracy.

The stop hysteresis corresponds to the remaining control deviation when approaching the setpoint. The setting range is from 1 to 9 (factory setting: 2), although experience shows that values from 2 to 4 are sufficient. Principle: The higher the set value, the earlier the motor stops. An incorrect setting can cause the actuator to vibrate.

The start hysteresis specifies the deviation from the setpoint after which the actuator corrects itself. The values range from 1 to 5 (factory setting: 2), where 1 is the smallest deviation. If the motor overcompensates, the next higher level should be selected.

**NOTICE!**

If the both hystereses are set too low, there is a risk that the controller will not reach the setpoint precisely, but will switch back and forth continuously.

**Note**

Maximum positioning accuracy is achieved when the final control element moves along its entire path. The actuator has a 10-bit input. This refers to the travel path of 90°. The smallest travel path that can be set is 18°.

To avoid uneven steps of the actuator, the stop hysteresis should not be greater than the start hysteresis.

Setting the start and stop hystereses


1. Set the Manual/Automatic switch to "Manual".
2. Press the "Menu" button for at least one second.
 - > The controller menu opens.
3. Select the "Stop Hysteresis" function and activate with the "M" button.
4. Use the "L" and "R" buttons to select the required value (1 to 9) and press the "M" button to confirm.
5. Select the "Start Hysteresis" function and activate with the "M" button.
6. Use the "L" and "R" buttons to select the required value (1 to 5) and press the "M" button to confirm.
7. Press the "Menu" button for at least one second.
 - > The controller menu closes.
8. Set the Manual/Automatic switch to "Automatic".

Wire break

When the input signal is configured as 2...10 V or 4...20 mA, the actuator can move to a safe position. An error message is generated via the potential-free fault signal contact (terminal 56/57) if the input signal falls below 1.9 V or 3.8 mA. The function can be set using the menu. The actuator switches back to normal operation as soon as the limit value is exceeded again. The error message is reset.

Possible safe positions in the event of a wire break

Deactivated	The actuator moves to the 0% end position. The switching output is not activated
to 0%	The actuator moves to the 0% end position. The switching output is activated when the end position is reached
Stop	The actuator remains in the current position. The switching output is activated
to 100%	The actuator moves to the 0% end position and then to the 100% end position. The switching output is activated when the 0% end position is reached

 The setting has no effect with the 0...10 V and 0...20 mA input signals. If the signal is lost, the actuator always goes to the 0% end position. The potential-free fault signal contact is not activated

Setting the safe position in the event of a wire break

1. Set the Manual/Automatic switch to "Manual".
2. Press the "Menu" button for at least one second.
 - > The controller menu opens.
3. Select the "Broken Wire" function and activate with the "M" button.
4. Use the "L" and "R" buttons to select the required start position (Deactivated, to 0%, Stop, to 100%) and press the "M" button to confirm.
5. Press the "Menu" button for at least one second.
 - > The controller menu closes.
6. Set the Manual/Automatic switch to "Automatic".

Design and materials

The motorised actuator has a maintenance-free steel transmission system and an end shaft made of stainless steel 1.4021.

The lower housing section with the mounting bracket is made of cast aluminium and is powder-coated in RAL 9005 (jet black).

The cover is made of impact-resistant, corrosion-proof aluminium and is powder-coated in RAL 1018 (zinc yellow).

Additional information

	Document no.
Fitting instructions for ADM 333SF	P100020637
Fitting instructions for mounting kit 05102400**	P100020351
Declaration on materials and the environment	MD 51.349

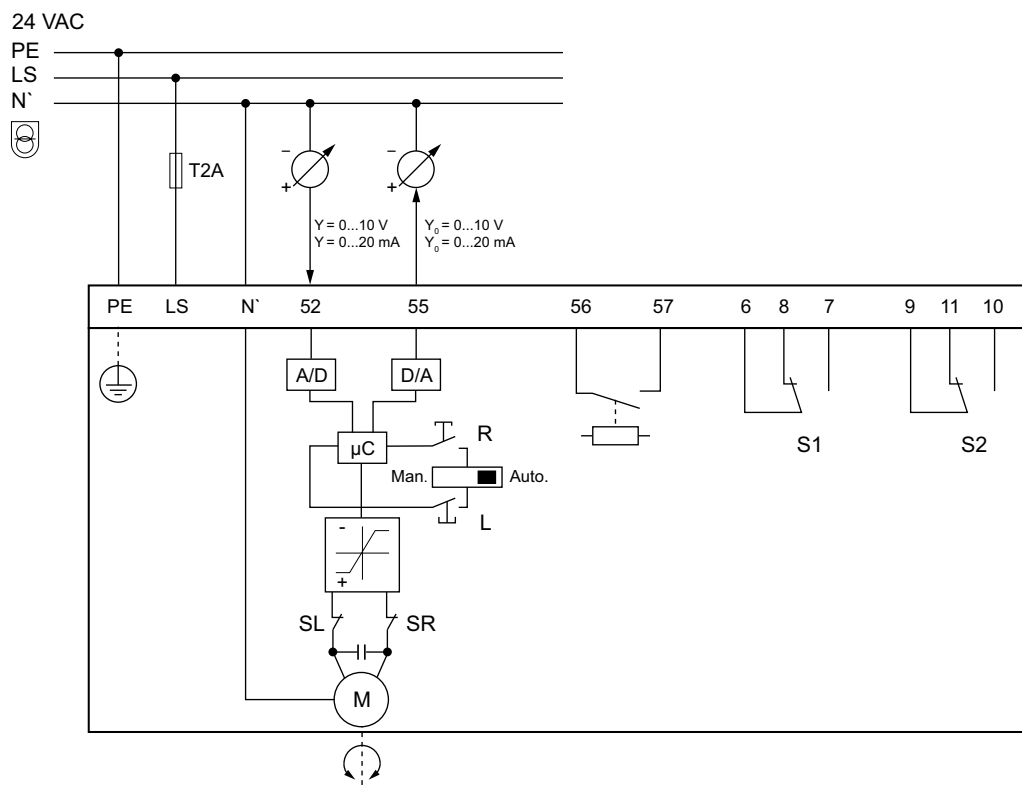
Disposal

When disposing of the product, observe the currently applicable local laws.

More information on materials can be found in the Declaration on materials and the environment for this product.

Connection diagrams

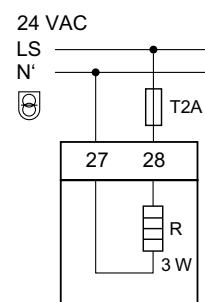
ADM333SF122



- SL Limit switch (anticlockwise)
- SR Limit switch (clockwise)
- S1 Auxiliary switch 1
- S2 Auxiliary switch 2
- 56/57 Fault signal output

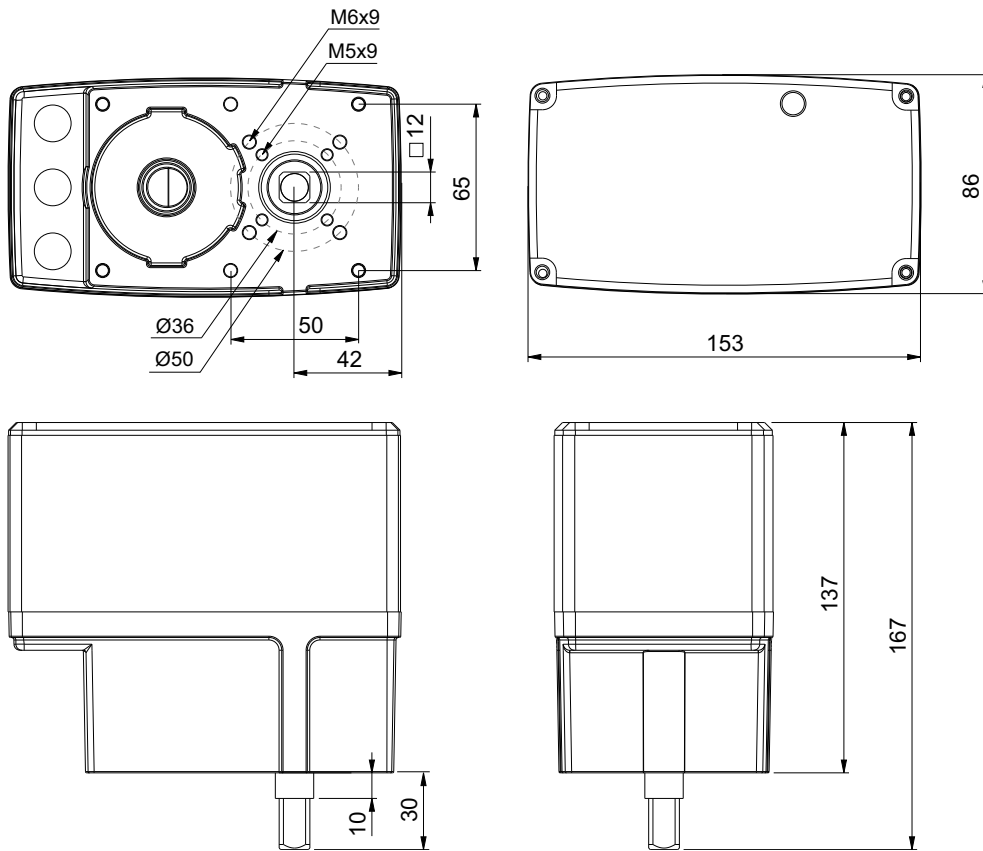
Accessories

Heating resistor 0510510012



Dimension drawing

All dimensions in mm.



Accessories

<p>Mounting kit 0510240031 / 0510240032 Overall height: 58.5 mm</p>	<p>Mounting kit 0510240041 / 0510240042 Overall height: 66 mm</p>
<p>Mounting kit 0510240033 Overall height: 53 mm</p>	<p>Mounting kit 0510240043 Overall height: 69 mm</p>