

11.4 AO352

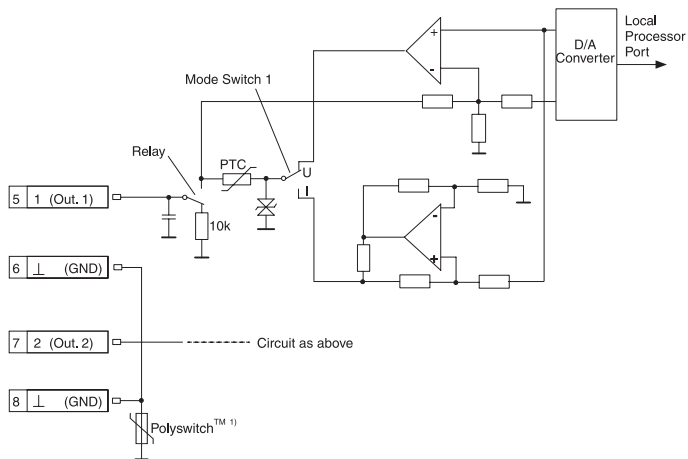
11.4.1 Technical Data



Module ID	AO352	
General Information		
Model Number	7AO352.70	
Short Description	2003 Analog Output Module, 2 outputs, +/- 10 V or 0 -20 mA, 12 Bit, screw-in module, Order TB712 terminal block separately!	
C-UL-US Listed	Yes	
B&R ID Code	\$0E	
Slot	AF101 adapter module, CP interface	
Static Characteristics		
Module Type	B&R 2003 screw-in module	
Number of Outputs	2	
Output Signal Current Voltage	Can be set for each channel using a switch 0 - 20 mA ± 10 V	
Digital Converter Resolution	12Bit	
Short Circuit Protection	Yes	
Precision at 25 °C Offset Gain Linearity Error	Voltage Max. ±5.2 mV Max. 0.3 % Max. ±0.13 % of final value	Current Max. ±5.3 μA Max. ±0.06 % Max. ±0.13 % of final value
Power Consumption	Max. 1.2 W	
Current Output		
Load	Max. 400 Ω	
LSB Value (12 Bit)	5.16 μA ±2.4 % / LSB	
Temperature Drift	±122 ppm / °C ±4 μA / °C	

Module ID	AO352
Voltage Output	
Load	Max. 10 mA
LSB Value (12 Bit)	5.15 mV \pm 0.8% / LSB
Temperature Drift	\pm 60 ppm / $^{\circ}$ C \pm 1.4 mV / $^{\circ}$ C
Operating Characteristics	
Electrical Isolation Output - PCC Output - Output	No No
Mechanical Characteristics	
Dimensions	B&R 2003 screw-in module

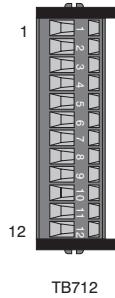
11.4.2 Output Circuit Diagram



¹⁾ Polyswitch™ is a registered trademark of RAYCHEM.

This is a polymer PTC protective element that functions as overload and short circuit protection. If an overload or short circuit occurs, the protective element becomes highly resistive and breaks the flow of current. In order to activate the output again, the external supply must be turned off and the error (overload or short circuit) must be removed. After a reset time > 10 seconds, the protective element returns to the conductive state.

11.4.3 Connections

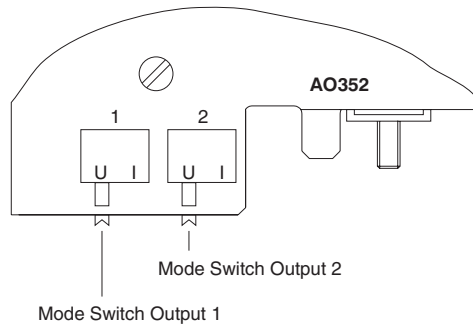


Pin	Assignment
1	Output 1
2	GND
3	Shield
4	Output 2
5	GND
6	Shield
7	n. c.
8	n. c.
9	n. c.
10	n. c.
11	n. c.
12	n. c.

11.4.4 Connection Example

The analog output module AO352 has two analog outputs which may be used as either voltage or current output. Mixed operation is also possible.

Mode Switch

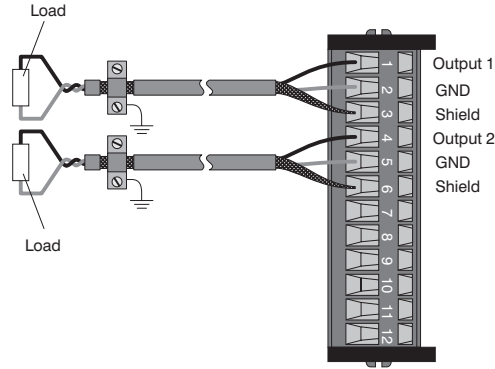


An output can be used as either voltage or current output. The selection is made with the respective mode switch on the back of the module. Place the switch in the respective position for the desired signal:

- U** Voltage output
- I** Current output

Module Wiring

In the following example, output 1 is operated as voltage output and output 2 as current output.



11.4.5 Variable Declaration

The variable declaration is valid for the following controllers:

- 2003 PCC CPU
- Remote I/O Bus Controller
- CAN Bus Controller

The variable declaration is made in PG2000. The variable declaration is described in Chapter 4, "Module Addressing".

Automation Studio™ Support: See Automation Studio™ Help starting with V 1.40

Accessing screw-in modules is also explained in the sections "AF101" and "CPU".

Data access takes place using data and configuration words. The following table provides an overview of which data and configuration words are used for this module.

Data Access	VD Data Type	VD Module Type	VD Chan.	R	W	Description
Data word 0	INT16	Analog Out	1		●	Analog output value channel 1
Data word 1	INT16	Analog Out	2		●	Analog output value channel 2
Data word 2	INT16	Analog Out	3		●	Analog output value channel 3 (switching channel for channel 1)
Data word 3	INT16	Analog Out	4		●	Analog output value channel 4 (switching channel for channel 2)
Configuration word 12	WORD	Transp. In	24	●		Module status
Configuration word 14	WORD	Transp. In	28	●		Module type
	WORD	Transp. Out	28		●	Module configuration (optional)

11.4.6 Access Using CAN IDs

Access via CAN Identifiers is used if the slave is being controlled by a device from another manufacturer. Access via CAN Identifiers is described in an example in Chapter 4, "Module Addressing". The transfer modes are explained in Chapter 5, "CAN Bus Controller Functions".

Data cannot be packed on the AO352. Therefore one CAN object is transferred per screw-in module. If an adapter module AF101 is equipped with a four AO352 modules, the CAN object has the following structure:

Slot	CAN ID ¹⁾	Word 1		Word 2		Word 3	Word 4
1	1054	Chan. 1L	Chan. 1H	Chan. 2L	Chan. 2H	Not used (4 byte objects)	
2	1055	Chan. 1L	Chan. 1H	Chan. 2L	Chan. 2H	Not used (4 byte objects)	
3	1056	Chan. 1L	Chan. 1H	Chan. 2L	Chan. 2H	Not used (4 byte objects)	
4	1057	Chan. 1L	Chan. 1H	Chan. 2L	Chan. 2H	Not used (4 byte objects)	

¹⁾ CAN ID = 1054 + (nd - 1) x 16 + (ma - 1) x 4 + (sl - 1)

nd Node number of the CAN slave = 1

ma Module address of the AF101 = 1

sl Slot number of the screw-in module on the AF101 (1 - 4)



B&R 2000 users have to exchange the data so that the high data is first (Motorola format)!

For more information on ID allocation, see Chapter 5, "CAN Bus Controller Functions".

11.4.7 Description of Data and Configuration Words

Data Words 0 and 1 (write)

The 16 bit standardized values for voltage or current are written to the module output channel.

Data Words 2 and 3 (write)

These data words are only used if TPU operation is switched on (see Configuration Word 14). The module must be operated on the CP interface.

For active change over operation, these data words are used to define the standardized 16 bit values for voltage or current for logical channels 3 and 4. Depending on the status of the TPU-IN line, either the value from channel 1 or 3 is written to physical channel 1 or the value from channel 2 or 4 is written to physical channel 2 of the module.

Level of the TPU-IN connection	Physical channel 1	Physical channel 2
1	Log. channel 1	Log. channel 2
0	Log. channel 3	Log. channel 4

Configuration Word 12 (read)

Configuration word 12 contains the module status.

		Bit	Description
		2 - 15	x.... Not defined, masked out
		1	0.... Channel 1: Current output 1.... Channel 1: Voltage output
		0	0.... Channel 2: Current output 1.... Channel 2: Voltage output
15	8 7	0	

Configuration Word 14 (read)

The High Byte of configuration word 14 defines the module code.

		Bit	Description
		8 - 15	Module code = \$0E
		0 - 7	x.... Not defined, masked out
15	8 7	0	

Configuration Word 14 (write)

The module is configured using configuration word 14.

		Bit	Description
		15	0.... TPU operation switched off 1.... TPU operation switched on To be able to use TPU operation, the module must be operated on the CP Interface.
		13 - 14	0
		12	Only if bit 15 = 1 0.... Normal operation 1.... Switching operation In ^this type of operation, logical channels 1 and 3 or 2 and 4 are switched between depending on the TPU-IN line (also see data words 2 and 3). The TPU IN line can be operated using LTX functions (e.g. LTXdo0()). Before switching, channels 3 and 4 must be set to a correct value by writing to data words 2 and 3. If this does not happen, the data from channel 1 is copied to channel 3 or the data from channel 2 is copied to channel 4 before switching the first time. The data is no longer copied when the channel is switched until the next time the PCC is turned on.
		0 - 11	0
15	8 7	0	