

BAUMÜLLER
OPTIONAL BOARD
16-BIT A/D CONVERTER

Technical Description and
Operation Manual

E	5.98052.01
----------	------------

Edition: 30 July 1998

BAUMÜLLER

OPTIONAL BOARD 16-BIT A/D CONVERTER

Technical Description and Operation Manual

Edition: 30 July 1998

5.98052.01

PLEASE READ AND PAY ATTENTION TO SAFETY INSTRUCTIONS AND OPERATING GUIDE PRIOR TO COMMISSIONING
--

This manual contains the necessary information for normal operation of the products described therein. The drives may only be used, maintained and repaired by personnel familiar with the operation manual and the applicable regulations on working safety and accident prevention. The devices are manufactured to a high technical specification and are operationally safe. Provided that all safety instructions have been adhered to, there will be no personal danger during the installation and commissioning stages.

The commissioning is prohibited until it has been positively determined that the machine, into which these components are to be incorporated, complies with EC machine regulations.

This technical description replaces and nullifies all previous description. In order to provide the best possible service, we reserve the right to alter information without notice.

Manufacturer and Baumüller Nürnberg GmbH

Supplier's address: Ostendstr. 80
90482 Nürnberg
Germany
Tel. (++49-911) 5432 - 0 Fax (++49-911) 5432 - 130

Copyright: The technical description and the operation manual may not be copied or duplicated without our permission.

Country of origin: Made in Germany

Date of manufacture: Determined from the serial number on the machine/motor.

TABLE OF CONTENTS

1	Technical Data	1
1.1	General	1
1.2	Electrical Data	1
2	Installation	2
3	Addition to V-Controller Parameter Description	3

1 TECHNICAL DATA

1.1 General

You adapt the drive controller to various requirements by fitting plug-in expansion boards.

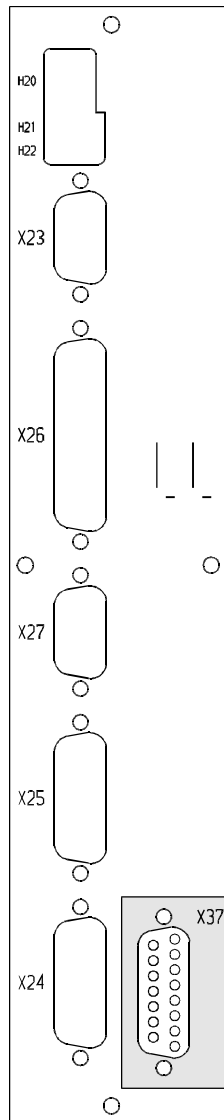
An option board 16-bit A/D converter is available.

1.2 Electrical Data

input voltage range	$\pm 10 \text{ V}$
resolution	16 bit
type	differential input
input resistance	$> 20 \text{ k}\Omega$

2 INSTALLATION

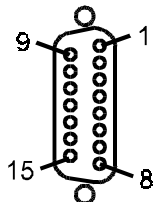
Optional board with 16-bit A/D converter



Connector Pin Assignment

X37 Sub-D plug 15-pin

plug



Pin no.	Assignment
1	ground analog input
2 ... 7	not assigned
8	analog input +
9 ... 14	not assigned
15	analog input -

3 ADDITION TO V-CONTROLLER PARAMETER DESCRIPTION

Above software version 3.04 of the V-Controller the function module "analog inputs" was adapted to the optional board A/D converter as follows:

concerning 7.23 Analog Inputs

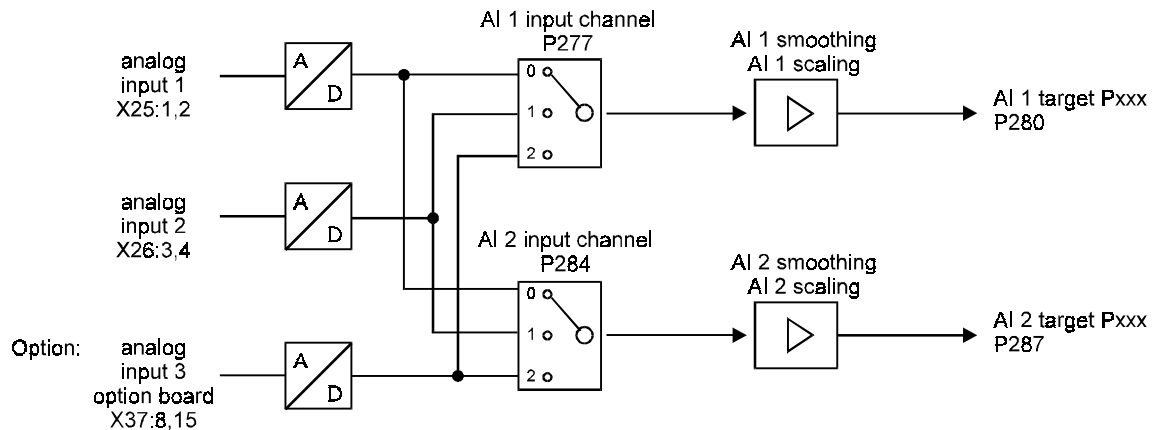
Function

The function module in combination with the analog inputs enables the programming of 2 byte length parameters.

Cycle time of the analog inputs: 1 ms

Six parameters are assigned to each input:

- *AI input channel:* input channel entry
- *AI smoothing:* smoothing time constant [ms].
- *AI scaling:* scaling factor entry
- *AI offset:* offset entry
- *AI threshold value:* sensitivity of inputs
- *AI target Pxxx:* target parameter number entry
- *AI value:* current output value.



Parameter overview

Parameter	Name	Range min. ... max.	Unit	Display only
P302	AI 1 input channel	0000 ... FFFF		×
P277	AI 1 smoothing	0 ... 2		
P278	AI 1 scaling	0 ... 30	ms	
P279	AI 1 target Pxxx	-2.00 ... 2.00		
P280	AI 1 offset	0 ... 700		
P281	AI 1 threshold value	-100.00 ... +100.00	%	
P282	AI 1 value	0.00 ... 100.00	%	
P283	AI 2 input channel	-100.00 ... +100.00	%	×
P284	AI 2 smoothing	0 ... 2		
P285	AI 2 scaling	0 ... 30	ms	
P286	AI 2 target Pxxx	-2.00 ... 2.00		
P287	AI 2 offset	0 ... 700		
P288	AI 2 threshold value	-100.00 ... +100.00	%	
P289	AI 2 value	0.00 ... 100.00	%	
P290	AI 1 input channel	-100.00 ... +100.00	%	×



NOTE

The sequence of the parameter setting is irrelevant. Switching is carried out as soon as the target parameter number has been set.

The target parameter number must be reset to zero in order to deactivate an input. However, the target parameter still contains the last output value. If AI target Pxxx is deactivated or newly set, the parameter „AI x offset“ is additionally set to zero.

Parameter description

P 302 AI state

This parameter displays the state of the function module.

Bit no.	Meaning
0	0: evaluation analog input 1 inactive 1: evaluation analog input 1 active
1	0: evaluation analog input 2 inactive 1: evaluation analog input 2 active
2 ... 7	reserve
8 ... 15	identification of the option board 00: no option board connected 04: option board with one analog input channel and 16 bit resolution detected (adjustable with AI x input channel = 2) all other values are reserve

P 277 AI 1 input channel

P 284 AI 2 input channel

Entry of the analog input for respective channel.

The two hardware implemented analog inputs 1 and 2 can be connected with each input channels. It is further possible to connect an analog input with different input channels.



NOTE

Set AI x input channel = 2 only if option board with identification 04 is detected.

P 278 AI 1 smoothing

P 285 AI 2 smoothing

In order to smooth interference on the analog input signal a smoothing time constant can be entered in ms. Smoothing is switched off if the respective parameter is set to its minimum value (0 ms) or to the value of the cycle time of the analog inputs (1 ms).

P 279 AI 1 scaling

P 286 AI 2 scaling

These parameters enable scaling of the analog input variable.

The output values (see parameters P283, P290, P297, P304) of unsigned parameters are 0 till +100% and of signed parameters are -100 till +100%. Which analog input voltage this maximum values achieved depends on the scaling factor.

P 2 8 0 AI 1 target Pxxx

P 2 8 7 AI 2 target Pxxx

The receiver address for the output value can be set via this parameter.



NOTE

No target parameter number check is carried out.

P 2 8 1 AI 1 offset

P 2 8 8 AI 2 offset

These parameters can compensate for a possibly existing input voltage offset.

P 2 8 2 AI 1 threshold value

P 2 8 9 AI 2 threshold value

The sensitivity of the inputs can be set via the threshold values.

P 2 8 3 AI 1 value

P 2 9 0 AI 2 value

The AI value displays the respective current output value taking scaling and offset compensation into consideration.

Basics of equation:

Maximum target parameter value:

MAX_value

Analog input voltage:

$U_{in} \{ -10 \dots +10 \text{ V} \}$;

$U_{inmax} = +10\text{V}$;

Equation:

- Unsigned parameters:

$$AE_value[\%] = \frac{U_{in}[\text{V}] + 10\text{V}}{2 \cdot U_{inmax}[\text{V}]} * \text{Scaling} * 100\% + \text{Offset}$$

if AI-value > 100 % → AI-value = 100 %

- Signed parameters:

$$AE_value[\%] = \frac{U_{in}[\text{V}]}{U_{inmax}[\text{V}]} * \text{Scaling} * 100\% + \text{Offset}$$

if AI-value > 100 % → AI-value = 100 %

if AI-value < -100 % → AI-value = -100 %

Addition to V-Controller Parameter Description

Both for signed and unsigned parameters

$|AI_value [\%]| < \text{threshold value} [\%]$ then $AI_value = 0 \%$

Written to the target parameter:

$$\text{Valuetarget} = \frac{AE_value[\%]}{100\%} \cdot \overline{\text{MAX_value}}$$

Examples:

Input voltage ↔ **AI-value [%] * MAX_value**
→ target parameter value

scaling = 1; offset = 0%; threshold value = 0%;

Unsigned target parameter:

10 V ↔ 100 % * MAX_value
5 V ↔ 75 % * MAX_value
0 V ↔ 50 % * MAX_value
- 5 V ↔ 25 % * MAX_value
- 10 V ↔ 0 % * MAX_value

Signed target parameter:

10 V ↔ 100 % * MAX_value
5 V ↔ 50 % * MAX_value
0 V ↔ 0 % * MAX_value
- 5 V ↔ -50 % * MAX_value
- 10 V ↔ -100 % * MAX_value

scaling = 2; offset = -100%; threshold value = 0%;

Unsigned target parameter:

10 V (100 % * MAX_value
5 V (50 % * MAX_value
0 V (0 % * MAX_value
- 5 V (0 % * MAX_value (limitation !)
- 10 V (0 % * MAX_value (limitation !)

Signed target parameter:

10 V (100 % * MAX_value
5 V (0 % * MAX_value
0 V (-100 % * MAX_value
- 5 V (-100 % * MAX_value (limitation !)
- 10 V (-100 % * MAX_value (limitation !)

scaling = 1; offset = 0; threshold value = 10.1%;

Unsigned target parameter:

10 V (100 % * MAX_value
5 V (75 % * MAX_value
0 V (50 % * MAX_value
-5 V (25 % * MAX_value
- 9 V (0 % * MAX_value (threshold !)
- 10 V (0 % * MAX_value

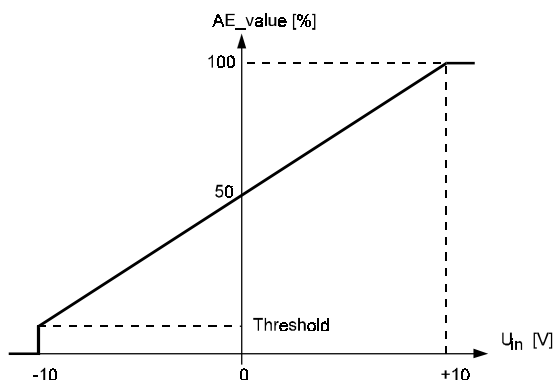
Signed target parameter:

10 V (100 % * MAX_value
5 V (50 % * MAX_value
1 V (0 % * MAX_value (threshold !)
- 1 V (0 % * MAX_value (threshold !)
- 5 V (-50 % * MAX_value
- 10 V (-100 % * MAX_value

Examples of characteristic curves:

Unsigned target parameter

Offset = 0 %; scaling = 1



Signed target parameter

Offset = 0 %; scaling = 1

