

AG24 EtherNet/IP™

RSLogix™ 5000
Add-On Instruction

Software Description



Table of contents

1	General Information	3
1.1	Trademarks	3
1.2	Liability	3
1.3	Limitations	3
1.4	Requirements	3
1.5	List of Abbreviations	4
1.6	Versions Overview	4
1.7	Video-Tutorial	4
1.8	Document History	4
2	Description of AG24 A0I	5
2.1	General	5
2.2	Input Parameter	7
2.3	Output Parameter	8
2.4	InOut Parameter	9
2.5	Limitations	9
3	Counter Values and Error Codes.....	10
3.1	Counter Values	10
3.2	Errors.....	13
3.2.1	Manufacturer Specific Error Code	13
3.2.2	Other Error Codes	13

1 General Information

1.1 Trademarks

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1.3 Limitations

The Add-On Instruction and its function were tested on a CompactLogix™ 1769-L16ER. The module was programmed using RSLogix™ 5000 version V20.01.00 (CPR 9 SR 5).

The Add-On Instruction is using unconnected CIP generic messages to read and write parameters. If you want to enable more than 16 unconnected messages at one time, use a management strategy to control the number of unconnected messages that are enabled at one time.

1.4 Requirements

- Basic knowledge of handling and programming Allen-Bradley® systems.
- Familiarity with EtherNet/IP™.

1.5 List of Abbreviations

Abbreviation	Definition
AOI	Add-On Instruction
CW	Control word
EIP	EtherNet/IP™
PLC	Programmable logic controller
SW	Status word

1.6 Versions Overview

This manual is related to the following library.

- AG24_RSL5000_V20.01.00_1.0.3.L5X

1.7 Video-Tutorial

On our homepage in the area "Video and Tutorial" or on our YouTube channel, we have film instructions ready in which we demonstrate the use and functionality of the libraries.

SIKO - Adding SIKO AG24 to RSLogix™ 5000:

Environment	Link
SIKO Homepage	https://www.siko-global.com/video/34769/hinzufuegen-von-siko-ag24-zu-rslogix-5000-beschleunigte-und-vereinfachte-integration-mit-aoi-en.mp4
SIKO YouTube Channel	https://www.youtube.com/watch?v=oBnnbsQ8zo

SIKO - Configuration Assembly in RSLogix™ 5000:

Environment	Link
SIKO Homepage	https://www.siko-global.com/video/34770/andern-von-baugruppen-parameter-in-rslogix-5000-vereinfachter-parameterzugriff-von-ag24-ethernet-ip-en.mp4
SIKO YouTube Channel	https://www.youtube.com/watch?v=F-qRr18icWk

1.8 Document History

Version	Date	Description
1.0	03.02.2022	Document created

2 Description of AG24 AOI

2.1 General

This AOI is used to establish communication between one of the above-mentioned PLCs from Allen Bradley and the SIKO AG24 EtherNet/IP™ device via I/O messages (class-1 connection). It extracts the input data from the device in each PLC cycle and makes it available at its outputs. The inputs of the AOI are combined and transferred to the device as output data in each PLC cycle.

The AOI is supporting the naming of the control and status word bits of the SIKO AG24 EtherNet/IP™ device in positioning mode.



Fig. 1: AOI SIKO_AG24

Further this AOI is used to read and write parameters from and to the SIKO AG24 EtherNet/IP™ device via explicit messages (class-3 connection). A read or write command takes several PLC cycles. The AOI can read all or write parameter differences acyclic. For this purpose, an instance must be passed to the AOI.

Parameters that can be changed (read/write) exist in programming as actual value (_r) and as target value (_w) as well. Furthermore, it is differentiated between pure read parameters (only indicated as actual value) and pure write parameters (only indicated as target value). A rising edge must be applied either to the "bcStartRead" or to the "bcStartWrite" input on the module described here in order to enable a read or write process of one of the variables. For a clear assignment, all parameters have a prefix followed by the instance in decimal number format (pXXXX...).

If a rising edge is applied to the "bcStartRead" input, then all parameters will be read and can be used for further programming. If "nCounterRead" value is not reset to "0" the read cycle was interrupted by read failure. This indicates to a communication failure.

If a rising edge is applied to the "bcStartWrite" input of the module, then all target value parameters which differ from corresponding actual value parameters will be transferred to the module. If "nCounterWrite" value is not reset to "0" the write cycle was interrupted by a write failure. This indicates to a communication failure or parameter value is beyond range of value acceptance.

If a rising edge is applied to the "bcStartCopy" input of the module, then all actual values (_r) are copied to their corresponding target values (_w).

2.2 Input Parameter

Name	Type	Description
nTargetValue	DINT	Target Value
bc00_Off1	BOOL	Controlword Bit 0
bc01_Off2	BOOL	Controlword Bit 1
bc02_Off3	BOOL	Controlword Bit 2
bc03_IntermediateStop	BOOL	Controlword Bit 3
bc04_StartTravelJob	BOOL	Controlword Bit 4
bc05_AckError	BOOL	Controlword Bit 5
bc06_InchingMode1	BOOL	Controlword Bit 6
bc07_Inching2Pos	BOOL	Controlword Bit 7
bc08_Inching2Neg	BOOL	Controlword Bit 8
bc09_KeyEnable	BOOL	Controlword Bit 9
bc10_MoveRelative	BOOL	Controlword Bit 10
bc11	BOOL	Controlword Bit 11
bc12	BOOL	Controlword Bit 12
bc13	BOOL	Controlword Bit 13
bc14	BOOL	Controlword Bit 14
bc15_Cal	BOOL	Controlword Bit 15
bcDigitalOutput1	BOOL	Control of the Digital Output 1 (by default)
bcStartRead	BOOL	AOI control - Rising edge executes command, if nCounterWrite = "0" AND nCounterCopy = "0"
bcStartWrite	BOOL	AOI control - Rising edge executes command, if nCounterRead = "0" AND nCounterCopy = "0"
bcStartCopy	BOOL	AOI control - Rising edge executes command, if nCounterRead = "0" AND nCounterWrite = "0"
nTimeout	DINT	AOI specific max. time for a message exchange

2.3 Output Parameter

Name	Type	Description
nActualValue	DINT	Actual value
bs00_Supply	BOOL	Statusword Bit 0
bs01_ReadinessToTravel	BOOL	Statusword Bit 1
bs02_UpperLimit	BOOL	Statusword Bit 2
bs03_LowerLimit	BOOL	Statusword Bit 3
bs04_ActuatorTravels	BOOL	Statusword Bit 4
bs05_InPos	BOOL	Statusword Bit 5
bs06_ActiveTravelJob	BOOL	Statusword Bit 6
bs07_Error	BOOL	Statusword Bit 7
bs08_OperationEnabled	BOOL	Statusword Bit 8
bs09_SwitchLock	BOOL	Statusword Bit 9
bs10_TravelJobAck	BOOL	Statusword Bit 10
bs11	BOOL	Statusword Bit 11
bs12_CurrentLimiting	BOOL	Statusword Bit 12
bs13_LimitSwitch1	BOOL	Statusword Bit 13
bs14_LimitSwitch2	BOOL	Statusword Bit 14
bs15_CalAck	BOOL	Statusword Bit 15
bsDigitalInput1	BOOL	Status of the Digital Input 1 (by default)
bsDigitalInput2	BOOL	Status of the Digital Input 2 (by default)
bsDigitalInput3	BOOL	Status of the Digital Input 3 (by default)
bsDigitalInput4	BOOL	Status of the Digital Input 4 (by default)
bsBusy	BOOL	AOI status - busy
bsError	BOOL	AOI status – error
bsDone	BOOL	AOI status – done
nReadError	DWORD	Error code if read message exchange fails
nWriteError	DWORD	Error code if write message exchange fails
nCounterRead	UInt	Process step of the read cycle
nCounterWrite	UInt	Process step of the write cycle
nGenMapCh	DINT	Generic Mapping Channel

2.4 InOut Parameter

Name	Type	Description
SIKO_AG24	SIKO_AG24	Instance of this AOI, created as controller tag
DC_Input	SINT[12]	Reference to the input data
DC_Output	SINT[8]	Reference to the output data
DC_GetMsg	MESSAGE	Instance of a message object for reading
DC_GetMsgData	SINT[4]	Reference to the message reading data
DC_SetMsg	MESSAGE	Instance of a message object for writing
DC_SetMsgData	SINT[4]	Reference to the message writing data

2.5 Limitations

All parameters are treated as signed integers by the AOI during input and output. In the devices, however, there are also parameters in unsigned representation. If these parameters do not exceed the positive value range of a signed integer, the value in the variable is displayed correctly.

These value ranges are:

Type	Range MIN	Range MAX
int8_t	-128	127
int16_t	-32768	32767
int32_t	-2147483648	2147483647

3 Counter Values and Error Codes

3.1 Counter Values

If "nCounterRead" value is not "0" a read cycle is in process. If "nCounterWrite" value is not "0" a write cycle is in process. The respective processed step or parameter can be assigned according to the following table.

Read	Write	Prefix	Description	Type
1	1	p0545_	Service Interface Baud Rate	USINT
2	2	p0546_	Generic Mapping Parameter	USINT
3	3	p0577_	Peak Current Limit	INT
4	4	p0578_	Peak Current Time	INT
5	5	p0579_	Continuous Current	INT
6	6	p0769_	Digital Output 1 Functionality	USINT
7		p0770_	Digital Output Functionalities State	UDINT
8	7	p0771_	Digital Outputs Polarity	USINT
9	8	p1025_	Digital Input 1 Functionality	USINT
10	9	p1026_	Digital Input 2 Functionality	USINT
11	10	p1027_	Digital Input 3 Functionality	USINT
12	11	p1028_	Digital Input 4 Functionality	USINT
13		p1029_	Digital Input Functionalities State	UDINT
14	12	p1030_	Digital Inputs Polarity	USINT
15	13	p1537_	Controller Parameter P	INT
16	14	p1538_	Controller Parameter I	INT
17	15	p1539_	Controller Parameter D	INT
18	16	p1540_	A-Pos	INT
19	17	p1541_	V-Pos	INT
20	18	p1542_	D-Pos	INT
21	19	p1543_	A-Rot	INT
22	20	p1544_	A-Inch	INT
23	21	p1545_	V-Inch	INT
24	22	p1546_	Pos Window	INT
25	23	p1547_	Gear Ratio Numerator	INT
26	24	p1548_	Gear Ratio Denominator	INT
27	25	p1549_	Spindle Pitch	DINT
28	26	p1550_	Calibration Value	DINT
29	27	p1551_	Software Limit 1	DINT
30	28	p1552_	Software Limit 2	DINT
31	29	p1553_	Delta Inch	DINT
32	30	p1554_	Sense of Rotation	USINT
33	31	p1555_	Pos Type	USINT

Read	Write	Prefix	Description	Type
34	32	p1556_	Operating Mode	USINT
35	33	p1557_	Inching 2 Stop Mode	USINT
36	34	p1558_	Inpos Mode	USINT
37	35	p1559_	Loop Length	INT
38	36	p1560_	Contouring Error Limit	INT
39	37	p1562_	Inching 2 Offset	USINT
40	38	p1563_	Inching 2 Acceleration Type	USINT
41	39	p1564_	Offset Value	DINT
42	40	p1793_	Display Divisor	USINT
43	41	p1794_	Display Divisor Application	USINT
44	42	p1795_	Display Orientation	USINT
45	43	p1796_	Decimal Places	USINT
46	44	p1797_	Direction Indication Function	USINT
47	45	p1798_	Displayed Value 2nd Line	USINT
48	46	p1799_	Key Enable Time	USINT
49	47	p1800_	Key Function Enable	USINT
50	48	p1801_	PIN change	DINT
51	49	p2049_	Travel Against Load Trigger	INT
52	50	p2050_	Travel Against Load Direction	USINT
53	51	p2338_	PCM Position 1	DINT
54	52	p2339_	PCM Position 2	DINT
55	53	p2340_	PCM Position 3	DINT
56	54	p2341_	PCM Position 4	DINT
57	55	p2342_	PCM Position 5	DINT
58	56	p2343_	PCM Position 6	DINT
59	57	p2344_	PCM Position 7	DINT
60	58	p2370_	PCM Acceleration 1	INT
61	59	p2371_	PCM Acceleration 2	INT
62	60	p2372_	PCM Acceleration 3	INT
63	61	p2373_	PCM Acceleration 4	INT
64	62	p2374_	PCM Acceleration 5	INT
65	63	p2375_	PCM Acceleration 6	INT
66	64	p2376_	PCM Acceleration 7	INT
67	65	p2402_	PCM Velocity 1	INT
68	66	p2403_	PCM Velocity 2	INT
69	67	p2404_	PCM Velocity 3	INT
70	68	p2405_	PCM Velocity 4	INT
71	69	p2406_	PCM Velocity 5	INT
72	70	p2407_	PCM Velocity 6	INT
73	71	p2408_	PCM Velocity 7	INT

Read	Write	Prefix	Description	Type
74	72	p2434_	PCM Deceleration 1	INT
75	73	p2435_	PCM Deceleration 2	INT
76	74	p2436_	PCM Deceleration 3	INT
77	75	p2437_	PCM Deceleration 4	INT
78	76	p2438_	PCM Deceleration 5	INT
79	77	p2439_	PCM Deceleration 6	INT
80	78	p2440_	PCM Deceleration 7	INT
81		p2561_	Output Stage Temperature	INT
82		p2562_	Voltage of Control	INT
83		p2563_	Voltage of Output Stage	INT
84		p2565_	Motor Current	INT
85		p2566_	Actual Position	DINT
86		p2567_	Actual Rotational Speed	INT
87		p2568_	Serial Number	DINT
88		p2569_	Production Date	DINT
89		p2570_	SW Motor Controller	DINT
90		p2571_	Gear Reduction	INT
91		p2572_	System Status Word	UINT
92		p2573_	Encoder Resolution	INT
93		p2574_	Device ID	USINT
94		p2575_	Virtual Motor Temperature	INT
95		p2576_	Output Stage Overload	USINT
96		p2577_	Actual Contouring Error	DINT
97		p2817_	Number of Errors	USINT
98		p2818_	Error Number 1	USINT
99		p2819_	Error Number 2	USINT
100		p2820_	Error Number 3	USINT
101		p2821_	Error Number 4	USINT
102		p2822_	Error Number 5	USINT
103		p2823_	Error Number 6	USINT
104		p2824_	Error Number 7	USINT
105		p2825_	Error Number 8	USINT
106		p2826_	Error Number 9	USINT
107		p2827_	Error Number 10	USINT
108	79	p2849_	Configuration	UINT
109	80	p3073_	S-Command	USINT

3.2 Errors

If a communication error occurs, the output "bsError" will be set. Additionally, an error code will be generated and displayed at the outputs "nReadError" or "nWriteError". The error code outputs are a combination of message error code and extended message error code.

Format of the outputs "nReadError" and "nWriteError":

16#xxxx_yyyy

xxxx = Extended message error code

yyyy = Message error code

3.2.1 Manufacturer Specific Error Code

Error Code	Description
16#0000_F001	Timeout error A message instruction could not be executed within the specified timeout.

3.2.2 Other Error Codes

For all other error codes please refer to the RSLogix™ 5000 help system (keyword: Error codes, message) for a complete description of these error codes.



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