

AG03/1 IO-Link

RSLogix™ 5000
Add-On Instruction

Software Description



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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 IO-Link.

1.5 Versions Overview

This manual is related to the following AOIs.

- SIKO_AG03_IOL_COM_RSL5000_V20.01.00_1.0.0.L5X

- SIKO_AG03_IOL_CSW_POS_RSL5000_V20.01.00_1.1.0.L5X
- SIKO_IOL_PRM_RSL5000_V20.01.00_1.1.0.L5X

1.6 List of Abbreviations

Abbreviation	Definition
AOI	Add-On Instruction
CW	Control word
IOL	IO-Link
ISDU	Indexed service data unit
PLC	Programmable logic controller
SW	Status word

1.7 Document History

Version	Date	Description
1.0	15.10.2020	Document created
1.1	30.03.2021	from FW-V1.02 upwards Chapter 1.5, 3.1 updated Chapter 3.3 bs13_CalibrationRequest added Chapter 4.2 description of bcExecute changed

2 Description of SIKO_AG03_IOL_COM AOI

2.1 General

This AOI is used to establish communication between one of the above mentioned PLC's from Allen Bradley and the SIKO IO-Link device. 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 naming of the inputs and outputs is independent of the operating mode.

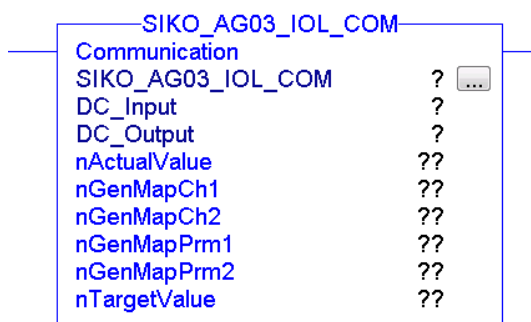


Fig. 1: AOI SIKO_AG03_IOL_COM

2.2 Input Parameter

Name	Type	Description
bc00	BOOL	Controlword Bit 0
bc01	BOOL	Controlword Bit 1
bc02	BOOL	Controlword Bit 2
bc03	BOOL	Controlword Bit 3
bc04	BOOL	Controlword Bit 4
bc05	BOOL	Controlword Bit 5
bc06	BOOL	Controlword Bit 6
bc07	BOOL	Controlword Bit 7
bc08	BOOL	Controlword Bit 8
bc09	BOOL	Controlword Bit 9
bc10	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	BOOL	Controlword Bit 15
nTargetValue	DINT	Target Value
nGenMapPrm1	SINT	Generic Mapping Parameter 1
nGenMapPrm2	SINT	Generic Mapping Parameter 2

2.3 Output Parameter

Name	Type	Description
bs00	BOOL	Statusword Bit 0
bs01	BOOL	Statusword Bit 1
bs02	BOOL	Statusword Bit 2
bs03	BOOL	Statusword Bit 3
bs04	BOOL	Statusword Bit 4
bs05	BOOL	Statusword Bit 5
bs06	BOOL	Statusword Bit 6
bs07	BOOL	Statusword Bit 7
bs08	BOOL	Statusword Bit 8
bs09	BOOL	Statusword Bit 9
bs10	BOOL	Statusword Bit 10
bs11	BOOL	Statusword Bit 11
bs12	BOOL	Statusword Bit 12
bs13	BOOL	Statusword Bit 13
bs14	BOOL	Statusword Bit 14
bs15	BOOL	Statusword Bit 15
nActualValue	DINT	Actual value

Name	Type	Description
nGenMapCh1	SINT	Generic Mapping Channel 1
nGenMapCh2	SINT	Generic Mapping Channel 2

2.4 InOut Parameter

Name	Type	Description
SIKO_AG03_IOL_COM	SIKO_AG03_IOL_COM	Instance of this AOI, created as controller tag
DC_Input	SINT[8]	Reference to the input data
DC_Output	SINT[8]	Reference to the output data

3 Description of SIKO_AG03_IOL_CSW_POS AOI

3.1 General

This AOI is used to control and receive status information of the SIKO IO-Link device in positioning mode. It extends the functionality of the SIKO_AG03_IOL_COM AOI by supporting the naming of the control and status word bits according to the positioning mode. It requires an existing instance of the SIKO_AG03_IOL_COM AOI, created as controller tag.

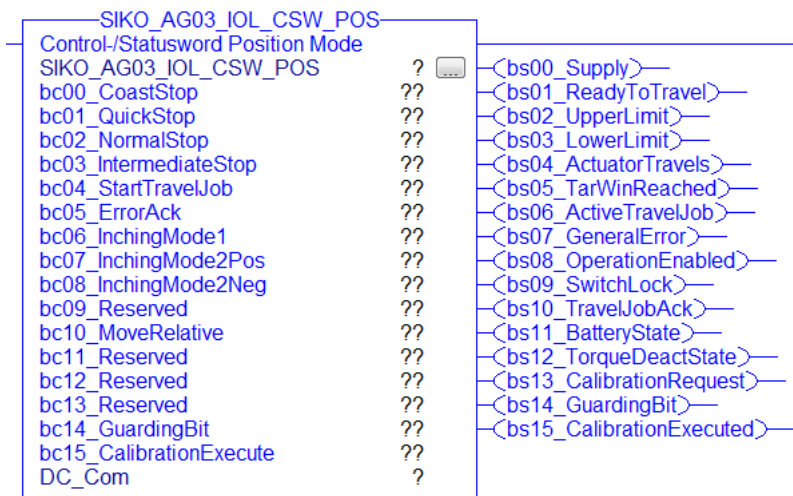


Fig. 2: AOI SIKO_AG03_IOL_CSW_POS

3.2 Input Parameter

Name	Type	Description
bc00_CoastStop	BOOL	Coast stop command
bc01_QuickStop	BOOL	Quick stop command
bc02_NormalStop	BOOL	Normal stop command
bc03_IntermediateStop	BOOL	Interrupt active travel job
bc04_StartTravelJob	BOOL	Rising edge starts travel job

Name	Type	Description
bc05_ErrorAck	BOOL	If true, the actual error is acknowledged
bc06_InchingMode1	BOOL	Inching with positioning steps
bc07_InchingMode2Pos	BOOL	Inching in positive direction
bc08_InchingMode2Neg	BOOL	Inching in negative direction
bc09_Reserved	BOOL	Reserved
bc10_MoveRelative	BOOL	Select absolute or relative positioning
bc11_Reserved	BOOL	Reserved
bc12_Reserved	BOOL	Reserved
bc13_Reserved	BOOL	Reserved
bc14_GuardingBit	BOOL	Communication guarding
bc15_CalibrationExecute	BOOL	If true calibration becomes executed

3.3 Output Parameter

Name	Type	Description
bs00_Supply	BOOL	Output stage voltage status
bs01_ReadyToTravel	BOOL	True if ready to travel
bs02_UpperLimit	BOOL	True if upper limit is violated
bs03_LowerLimit	BOOL	True if lower limit is violated
bs04_ActuatorTravels	BOOL	True if actuator travels
bs05_TarWinReached	BOOL	True if target window is reached
bs06_ActiveTravelJob	BOOL	True if travel job is active
bs07_GeneralError	BOOL	True if error is active
bs08_OperationEnabled	BOOL	True if operation is enabled
bs09_SwitchLock	BOOL	True if switch-lock is active
bs10_TravelJobAck	BOOL	True if travel job is acknowledged
bs11_BatteryState	BOOL	True if battery state is critical or low
bs12_TorqueDeactState	BOOL	True if torque deactivation is active
bs13_CalibrationRequest	BOOL	True if calibration is required
bs14_GuardingBit	BOOL	Communication guarding
bs15_CalibrationExecuted	BOOL	True if calibration command is executed

3.4 InOut Parameter

Name	Type	Description
SIKO_AG03_IOL_CSW_POS	SIKO_AG03_IOL_CSW_POS	Instance of this AOI, created as controller tag
DC_Com	SIKO_AG03_IOL_COM	Instance of SIKO_AG03_IOL_COM, created as controller tag

4 Description of SIKO_IOL_PRM AOI

4.1 General

This AOI is used to read and write parameters (IO-Link ISDU) from and to the SIKO IO-Link device. A read or write command takes several PLC cycles. The AOI can read or write an individual parameter acyclically. For this purpose, an index and a subindex must be passed to the AOI. The input value is transformed to a DINT (nReceiveValue) and the output value nWriteValue is converted from a DINT to the native format of the parameter.

The following parameters are interpreted as strings by the AOI. The parameters sReadString and sWriteString are automatically used for write and read accesses.

Index	Name
16	VendorName
17	VendorText
18	ProductName
19	ProductID
20	ProductText
21	SerialNumber
22	HardwareRevision
23	FirmwareRevision
24	ApplicationSpecificTag
25	FunctionTag
26	LocationTag
95	DisplayData
180	ProductionDate

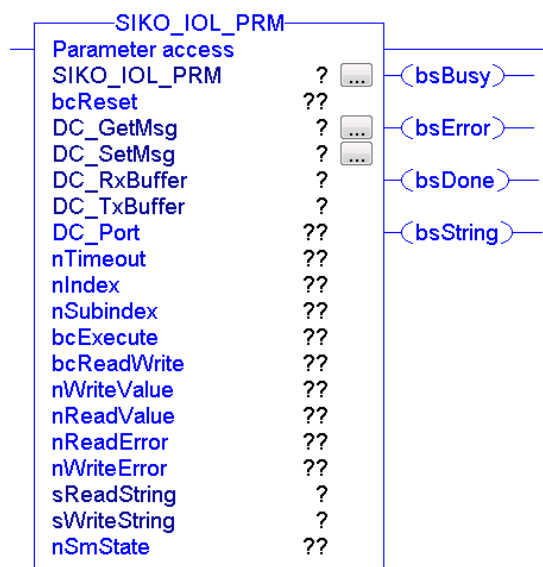


Fig. 3: AOI SIKO_IOL_PRM

4.2 Input Parameter

Name	Type	Description
DC_Port	SINT	IO-Link port number
nTimeout	DINT	Timeout message instruction
nIndex	DINT	IO-Link index
nSubindex	SINT	IO-Link subindex
bcReset	BOOL	Reset AOI
bcExecute	BOOL	Rising edge executes command 0 = Reset AOI (same as bcReset = 1)
bcReadWrite	BOOL	Command type 0 = read / 1 = write
nWriteValue	DINT	Value to write

4.3 Output Parameter

Name	Type	Description
bsBusy	BOOL	AOI status - busy
bsError	BOOL	AOI status – error
bsDone	BOOL	AOI status – done
bsString	BOOL	AOI status – response is a string
nReadError	DINT	Read error code
nWriteError	DINT	Write error code
nReadValue	DINT	Value read
nSmState	INT	Status of the AOI internal state machine 0: No action active 1: Start reading job 2: Evaluate response of read job 3: Start write job 4: Evaluate response of write job

4.4 InOut Parameter

Name	Type	Description
SIKO_IOL_PRM	SIKO_IOL_PRM	Instance of this AOI, created as controller tag
DC_GetMsg	MESSAGE	Instance of a message object for reading
DC_SetMsg	MESSAGE	Instance of a message object for writing
DC_RxBuffer	SINT[32]	Buffer that is needed to receive a message
DC_TxBuffer	SINT[34]	Buffer that is needed to write a message
sReadString	STRING	If a string was read, it is stored here
sWriteString	STRING	String to write

4.5 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#BBBB_AAAA

BBBB = Extended message error code

AAAA = Message error code

4.5.1 IO-Link Specific Error Codes

IO-Link specific extended error codes are displayed together with message error code 16#001E (Embedded service error):

Error Code	Description
16#0000_001E	Device application error, no details
16#0011_001E	Index not available
16#0012_001E	Subindex not available
16#0020_001E	Service temporarily not available
16#0021_001E	Service temporarily not available, local control
16#0022_001E	Service temporarily not available, device control
16#0023_001E	Write access denied
16#0030_001E	Parameter value out of range
16#0031_001E	Parameter value above limit
16#0032_001E	Parameter value below limit
16#0033_001E	Parameter length overrun
16#0034_001E	Parameter length underrun
16#0035_001E	Function not available
16#0036_001E	Function temporarily not available
16#0040_001E	Invalid parameter set
16#0041_001E	Inconsistent parameter set
16#0082_001E	Application not ready

4.5.2 Manufacturer Specific Error Codes

Error Code	Description
16#0000_F001	Text Timeout error A message instruction could not be executed within the specified timeout.
16#0000_F002	Data size too large The response of a read command contains too much data. This could be the case if the corresponding parameter is a record.

4.5.3 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.

4.6 Limitations

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

These value ranges are:

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

The reading and writing of parameters of the data type Record is not supported. If more than 4 characters are returned when reading a numeric parameter, the outputs bsError = 1, bsString = 1 and sReadString = "ERROR: DATA_SIZE_TOO_LARGE" are set.



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