AP20(S) EtherNet/IP™

RSLogix™ 5000
Add-On Instruction

Software Description

V1.0

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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 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 AOIs.

- AP20_AP20S_COM_RSL5000_V20.01.00_1.0.0.L5X
- AP20_AP20S_CSW_POS_RSL5000_V20.01.00_1.0.0.L5X
- AP20_AP20S_CSW_TXT_RSL5000_V20.01.00_1.0.0.L5X
- AP20_AP20S_PRM_RSL5000_V20.01.00_1.1.0.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 AP20(S) to RSLogix™ 5000:

Environment	Link
SIKO Homepage	https://www.siko-global.com/video/35797/adding-siko-ap20s-to-rslogix-5000-accelerated-and-simplified-integration-with-aoi.mp4
SIKO YouTube Channel	https://www.youtube.com/watch?v=PUyfQgC18cs

1.8 Document History

Version	Date	Description
1.0	19.10.2021	Document created

2 Description of AP20_AP20S_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 AP20(S) 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 naming of the inputs and outputs is independent of the operating mode.

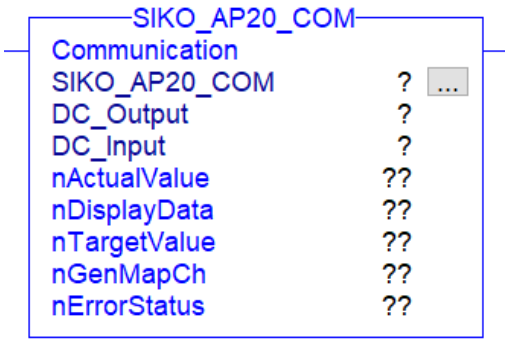

Fig. 1: AOI SIKO_AP20_COM

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
nDisplayData	DINT	Text Value

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
nGenMapCh	DINT	Generic Mapping Channel
nErrorStatus	INT	Error status of AOI

2.4 InOut Parameter

Name	Type	Description
SIKO_AP20_COM	SIKO_AP20_COM	Instance of this AOI, created as controller tag
DC_Input	SINT[12]	Reference to the input data
DC_Output	SINT[10]	Reference to the output data

3 Description of AP20_AP20S_CSW_POS AOI

3.1 General

This AOI is used to control and receive status information of the SIKO AP20(S) EtherNet/IP™ device in positioning mode. It extends the functionality of the SIKO_AP20_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_AP20_COM, created as controller tag.

Fig. 2: AOI SIKO_AP20_CSW_POS

3.2 Input Parameter

Name	Type	Description
bc00_Cal	BOOL	Calibration execute
Bc01_Reserved	BOOL	Reserved
bc02_Reserved	BOOL	Reserved
bc03_DisplayRange	BOOL	Display range
bc04_Reserved	BOOL	Reserved
bc05_ErrorAck	BOOL	Error acknowledge
bc06_Reserved	BOOL	Reserved
bc07_Reserved	BOOL	Reserved
bc08_Reserved	BOOL	Reserved
bc09_TargetValueActive	BOOL	Target value activation
bc10_Reserved	BOOL	Reserved
bc11_Led1Green	BOOL	LED1 green
bc12_Led1Red	BOOL	LED1 red
bc13_Led2Green	BOOL	LED2 green
bc14_Led2Red	BOOL	LED2 red
bc15_LedBlinking	BOOL	LED blinking

3.3 Output Parameter

Name	Type	Description
bs00_DirIndicationCW	BOOL	Direction indication CW
bs01_DirIndicationCCW	BOOL	Direction indication CCW
bs02_CalExec	BOOL	Calibration executed
bs03_TarWinExtReached	BOOL	Target window extended reached
bs04_Reserved	BOOL	Reserved
bs05_TarWinReached	BOOL	Target window reached
bs06_Deviation	BOOL	Deviation
bs07_GeneralError	BOOL	General error
bs08_Reserved	BOOL	Reserved
bs09_IncMeasurement	BOOL	Actual value = incremental measurement
bs10_TargetValueState	BOOL	Target value activation
bs11_BatteryState	BOOL	Battery state
bs12_SensorError	BOOL	Sensor error
bs13_KeyConfiguration	BOOL	Key Configuration
bs14_KeyCalibration	BOOL	Key Calibration
bs15_KeyIncremental	BOOL	Key Incremental

3.4 InOut Parameter

Name	Type	Description
SIKO_AP20_CSW_POS	SIKO_AP20_CSW_POS	Instance of this AOI, created as controller tag
DC_Com	SIKO_AP20_COM	Instance of SIKO_AP20_COM, created as controller tag

4 Description of AP20_AP20S_CSW_TXT AOI

4.1 General

This AOI is used to control and receive status information of the SIKO AP20(S) EtherNet/IP™ device in alpha-numeric display mode. It extends the functionality of the SIKO_AP20_COM AOI by supporting the naming of the control and status word bits according to the alpha-numeric display mode. It requires an existing instance of the SIKO_AP20_COM, created as controller tag.

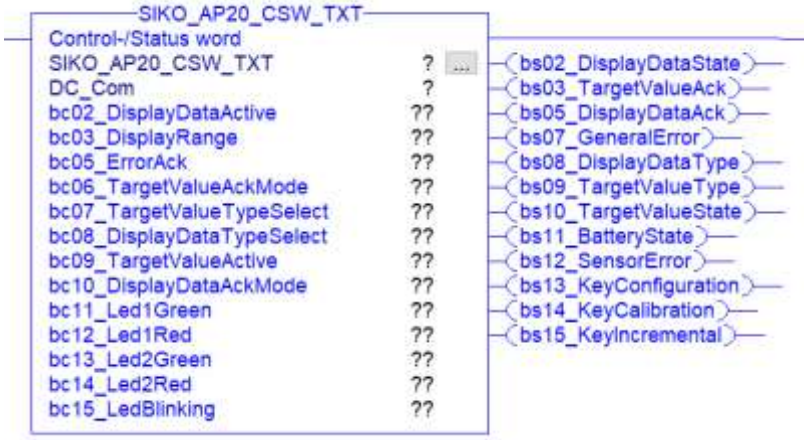

Fig. 3: AOI SIKO_AP20_CSW_TXT

4.2 Input Parameter

Name	Type	Description
bc00_ Reserved	BOOL	Reserved
Bc01_Reserved	BOOL	Reserved
bc02_DisplayDataActive	BOOL	Display data activation (display line 1)
bc03_DisplayRange	BOOL	Display range
bc04_Reserved	BOOL	Reserved
bc05_ErrorAck	BOOL	Error acknowledge
bc06_TargetValueAckMode	BOOL	Target value acknowledgment mode (display line 2)
bc07_TargetValueTypeSelect	BOOL	Target value data type (display line 2)
bc08_DisplayDataTypeSelect	BOOL	Display data type (display line 1)
bc09_TargetValueActive	BOOL	Target value activation (display line 2)
bc10_DisplayDataAckMode	BOOL	Display data acknowledgment mode
bc11_Led1Green	BOOL	LED1 green
bc12_Led1Red	BOOL	LED1 red
bc13_Led2Green	BOOL	LED2 green
bc14_Led2Red	BOOL	LED2 red
bc15_LedBlinking	BOOL	LED blinking

4.3 Output Parameter

Name	Type	Description
bs00_Reserved	BOOL	Reserved
bs01_Reserved	BOOL	Reserved
bs02_DisplayDataState	BOOL	Display data activation (display line 1)
bs03_TargetValueAck	BOOL	Target value acknowledged (display line 2)
bs04_Reserved	BOOL	Reserved
bs05_DisplayDataAck	BOOL	Display data acknowledged (display line 1)
bs06_Reserved	BOOL	Reserved
bs07_GeneralError	BOOL	General error
bs08_DisplayDataType	BOOL	Display data format (display line 1)
bs09_TargetValueType	BOOL	Target value format (display line 2)
bs10_TargetValueState	BOOL	Target value activation (display line 2)
bs11_BatteryState	BOOL	Battery state
bs12_SensorError	BOOL	Sensor error
bs13_KeyConfiguration	BOOL	Key Configuration
bs14_KeyCalibration	BOOL	Key Calibration
bs15_KeyIncremental	BOOL	Key Incremental

4.4 InOut Parameter

Name	Type	Description
SIKO_AP20_PRM	SIKO_AP20_PRM	Instance of this AOI, created as controller tag
DC_GetMsg		
DC_SetMsg		

5 Description of AP20_AP20S_PRM AOI

5.1 General

This AOI is used to read and write parameters from and to the SIKO AP20(S) EtherNet/IP™ device via explicit messages (class-3 connection). A read or write command takes several PLC cycles. The AOI can read or write an individual parameter acyclically. For this purpose, an instance 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.

Fig. 4: AOI SIKO_AP20_PRM

5.2 Input Parameter

Name	Type	Description
nTimeout	DINT	Timeout message instruction
nInstance	DINT	EtherNet/IP instance “0” AND NOT bcExecute = Reset AOI
bcReadWrite	BOOL	Command type 0 = read / 1 = write
nWriteValue	DINT	Value to write
bcExecute	BOOL	Rising edge executes command

5.3 Output Parameter

Name	Type	Description
bsBusy	BOOL	AOI status - busy
bsError	BOOL	AOI status – error
bsDone	BOOL	AOI status – done
nReceiveValue	DINT	Value read
nReadError	DINT	Read error code
nWriteError	DINT	Write error code

5.4 InOut Parameter

Name	Type	Description
SIKO_AP20_PRM	SIKO_AP20_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

5.5 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

5.5.1 Manufacturer Specific Error Codes

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

5.5.2 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.

5.6 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 nReceiveValue 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.

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