Bihl + Wiedemann

EtherNet/IP + Modbus TCP-Gateways

Part 1: EtherNet/IP

Manual

Revision date: 2023-10-18

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The absence of any such references does
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Floßwörthstr. 41
D-68199 Mannheim

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Part 1: EtherNet/IP

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1. Setting up the ASi bus

- ☐ Connect the unit to power.
- ☐ Connect the ASi cable to the unit.
- ☐ One after the other connect the ASi nodes to the ASi cable and set the node addresses.

⇒ You may set the addresses directly on the node using a hand addressing device or by using the option `[SLAVE ADDR TOOL]` in the display menu of your gateway.

- ☐ In the display menu select `[QUICK SETUP]` to use the configuration of all ASi circuits connected to the unit.
- ☐ Confirm with `[STORE+RUN]`.
- ☐ Set the EtherNet/IP address and connect the gateway to the host fieldbus controller.

⇒ You can set the addresses directly using the option `[ETHERNET/IP]` in the display menu of your gateway or through the PC using the ASIMON360 software with integrated ASi Control Tools360.

For more detailed information please refer to the installation guide for your gateway which is included with the unit.

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2. Configuration and Start-up of the Safety Monitor

Configuration and start-up of the ASi Safety Monitor is accomplished using a PC/ notebook running the ASIMON360 configuration software.

Note!

For more detailed information please refer to the separate manual for the ASIMON360 configuration software.

Configuration should be performed only by a qualified and authorized person. All safety-related commands are password protected.

The correct safety functioning of the unit must absolutely be verified in the system!

Note!

Quick Start Guides for commissioning and service are provided on the Bihl+Wiedemann website available for download.

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3. EtherNet/IP

3.1 ASi-3/ASi-5 Overview of the main connections

	Assembly instance				Data item							
	Input	Length (byte)	Output	Length (byte)	Digital AS-i3/ASi-5	Analog ASi-3	Command interface	Fieldbus Bits	Safety Status	Monitor and I/O Data (1)	min. RPI (ms) (2)	min. RPI (ms) with DLR
ASi-3 Single Gateway	109	32	145	32	ASi-3 circuit 1, all nodes	ASi-3 circuit 1, analog nodes 29 ... 31					6	12
	112	56	148	56							7	15
ASi-3 Double Gateway	127	64	163	64	ASi-3 circuits 1+2, all nodes						8	16
	133	112	169	112		ASi-3 circuits 1+2, analog nodes 29 ... 31					11	24
ASi-3 Double Gateway with Safety Monitor	176	98	177	66	ASi-3 circuits 1+2, all nodes			2 bytes In / Out	32 bytes In		10	20
	180	146	181	114		ASi-3 circuits 1+2, analog nodes 29 ... 31					13	26
ASi-3 Single Gateway with Safety Monitor	186 (1)	66	187	34	ASi-3 circuit 1, all nodes			2 bytes In / Out	32 bytes In		8	16
	190 (1)	90	191	58		ASi-3 circuit 1, analog nodes 29 ... 31					8	16
ASi-3 Double Gateway with Safety Monitor	196 (1)	191	183	152	ASi-3 circuits 1+2, all nodes	ASi-3 circuits 1+2, analog nodes 29 ... 31	38 bytes In / Out	2 bytes In / Out	32 bytes In	7 bytes In	15	30
ASi-3 Single Gateway with Safety Monitor	197 (1)	135	193	96	ASi-3 circuit 1, all nodes	ASi-3 circuit 1, analog nodes 29 ... 31					10	20
all ASi-5/ASi-3 Gateways with variably configurable Assembly Objects (see data sheet)	254	vc (3)	255	vc (3)							conf. (4)	

Tab. 3-1. Connections

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	Assembly instance				Data item							
	Input	Length (byte)	Output	Length (byte)	Digital AS-i3/ASi-5	Analog ASi-3	Command interface	Fieldbus Bits	Safety Status	Monitor and I/O Data (1)	min. RPI (ms) (2)	min. RPI (ms) with DLR
ASi-5/ASi-3 Single Gateway	240	160	241	160	ASi-3 circuit 1, all nodes ASi-5 circuit 1, 128 bytes (3)	N/A					conf. (4)	
ASi-5/ASi-3 Double Gateway	242	320	243	320	ASi-3 circuits 1+2, all nodes ASi-5 circuits 1+2, 128 bytes each circuit (3)	N/A					conf. (4)	
ASi-5/ASi-3 Single Gateway with Safety Monitor	244	239	245	200	ASi-3 circuit 1, all nodes ASi-5 circuit 1, 128 bytes (3)	N/A	38 bytes In / Out	2 bytes In / Out	32 bytes In	7 bytes In	conf. (4)	
ASi-5/ASi-3 Double Gateway with Safety Monitor	246	399	247	360	ASi-3 circuits 1+2, all nodes ASi-5 circuits 1+2, 128 bytes each circuit (3)	N/A	38 bytes In / Out	2 bytes In / Out	32 bytes In	7 bytes In	conf. (4)	
ASi-5/ASi-3 Single/Double Gateway with Safety Monitor	248 (5)	496	248	496	ASi-5 circuit 1 496 bytes	N/A					conf. (4)	
ASi-5/ASi-3 Double Gateway with Safety Monitor	249 (5)	496	249	496	ASi-5 circuit 2 496 bytes	N/A					conf. (4)	
ASi-5/ASi-3 Double Gateway with Safety Monitor	250 (5)	496	250	496	ASi-5 circuit 1 248 bytes + ASi-5 circuit 2 248 bytes	N/A					conf. (4)	

Tab. 3-1. Connections

(1) Available only for gateways from Ident.-No. ≥ 15864 (see lateral label)!
(2) The minimum times for the RPI shown in the table do not represent the worst case values. Depending on the Gateway load greater minimum times for the RPI than indicated here may be needed.
(3) Variably configurable via ASIMON360 (gateways without a monitor via ASi Control Tools360).
(4) Devices with improved response times have a min. RPI value depending on configuration.
(5) Only available in BWU3851 from SPID (Software Package ID) 192185!

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Note!

The following EtherNet/IP ports are assigned for communication as shown:

- *Implicit Messaging UDP: 2222*
- *CIP Explicit Messaging TCP/UDP: 44818*

3.1.1 ASi-3 Data blocks examples

The ASi-3 data blocks (digital data, analog data, …) are arranged one after another in the input data image (IDI). Their order is according to the arrangement of Tab. 3-1.<Connections> from left to right.:

Byte 0 ... 31	Byte 32 ... 55
ASi-3 digital data	ASi-3 analog data
ASi-3 circuit 1 all nodes	ASi-3 circuit 1 analog nodes 29 ... 31

Tab. 3-2. Assembly instance 112

Byte 0 ... 63	Byte 64 ... 111	Byte 112 ... 113	Byte 114 ... 145
ASi-3 digital data	ASi-3 analog data	ASi-3 fieldbus bits	ASi-3 safety status
ASi-3 circuits 1+2 all nodes	ASi-3 circuits 1+2 analog nodes 29 ... 31	2 bytes In / Out	32 bytes In

Tab. 3-3. Asembly instance 180

3.1.2 ASi-5 Data blocks examples

The ASi-5 data blocks (digital data, analog data, …) are arranged one after another in the input data image (IDI). Their order is according to the arrangement of Tab. 3-1.<Connections> from left to right.:

Byte 0 ... 31	Byte 32 ... 159
ASi-3 digital data	ASi-5 digital data
ASi-3 circuit 1 all nodes	ASi-5 circuit 1 128 bytes

Tab. 3-4. Assembly instance 240

Byte 0 ... 63	Byte 64 ... 319	Byte 320 ... 357	Byte 358 ... 359	Byte 360 ... 391	Byte 392 ... 398
ASi-3 digital data	ASi-5 digital data	command interface	fieldbus bits	safety status	monitor and I/O data
ASi-3 circuits 1+2 all nodes	ASi-5 circuits 1+2, 128 Byte each circuit	38 bytes In / Out	2 bytes In / Out	32 bytes In	7 bytes

Tab. 3-5. Asembly instance 246

Note!

For an facilitated access to the data blocks of a Rockwell-Automation PLC please use the Add-On-Instructions (AOI) to convert the raw data into structured tags.
The Add-On-Instructions are available together with the application examples at the support/download section of our homepage.

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3.1.3 ASi-3 digital data

These data must be integrated into the control in order to access the nodes in the ASi circuits.

In- and output data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	F3	F2	F1	F0	D3	D2	D1	D0
	flags				node 1/1A			
1	node 2/2A				node 3/3A			
2	node 4/4A				node 5/5A			
3	node 6/6A				node 7/7A			
4	node 8/8A				node 9/9A			
5	node 10/10A				node 11/11A			
6	node 12/12A				node 13/13A			
7	node 14/14A				node 15/15A			
8	node 16/16A				node 17/17A			
9	node 18/18A				node 19/19A			
10	node 20/20A				node 21/21A			
11	node 22/22A				node 23/23A			
12	node 24/24A				node 25/25A			
13	node 26/26A				node 27/27A			
14	node 28/28A				node 29/29A			
15	node 30/30A				node 31/31A			
16	reserved				node 1B			
17	node 2B				node 3B			
18	node 4B				node 5B			
19	node 6B				node 7B			
20	node 8B				node 9B			
21	node 10B				node 11B			
22	node 12B				node 13B			
23	node 14B				node 15B			
24	node 16B				node 17B			
25	node 18B				node 19B			
26	node 20B				node 21B			
27	node 22B				node 23B			
28	node 24B				node 25B			
29	node 26B				node 27B			
30	node 28B				node 29B			
31	node 30B				node 31B			

Tab. 3-6.

Flags

	Input data	Output data
F0	ConfigError	Offline
F1	APF	LOS MasterBit

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Flags

	Input data	Output data
F2	PeripheryFault	→ ConfigurationMode
F3	ConfigurationActive	→ ProtectedMode

ConfigError:	0 = ConfigOK	1 = ConfigError
APF:	0 = ASi Power OK	1 = ASi Power Fail
PeripheryFault:	0 = PeripheryOK	1 = PeripheryFault
ConfigurationActive:	0 = ProtectedMode	1 = ConfigurationMode
Offline:	0 = Online	1 = Offline
LOS-Master-Bit:	0 = Offline by ConfigError deactivated	1 = Offline by ConfigError activated

3.1.4 ASi-5 I/O data and flags

ASi-5 In- and output data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	ASi-5 flags							
1	ASi-5 process data starting from ASi node no. 001 (max. 96 nodes, with 1 ... 32 Byte process data each)							
2	...							
...	...							
126	...							
127	...							

Tab. 3-7.

ASi-5 flags

Bit	Input data	Output data
F0	ASI5CFG_NOK	reserved
F1	ASI5CFG_MODE	reserved
F2	ASI5NOP_INACTVE	reserved
F3	ASI5APF	reserved
F4	ASI5PF	reserved
F5	ASI5PS_INCONSISTENT	reserved
F6	ASI5PS_INACTIVE	reserved
F7	reserved	reserved

Tab. 3-8. ASi-5 Flags

Input data	Name	Description
ASI5CFG_NOK	ASi-5 configuration error	**0**: ASi-5 configuration is ok **1**: ASi-5 configuration is *not* ok
ASI5CFG_MODE	ASi-5 configuration mode	**0**: protected mode **1**: configuration mode
ASI5NOP_IN-ACTVE	ASi-5 normal mode	**0**: ASi-5 master is in normal mode **1**: ASi-5 master is *not* in normal mode
ASI5APF	ASi-5 ASi power fail	**0**: power supply is ok **1**: power supply is *not* ok

Tab. 3-9. Description of the ASi-5 flags

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Input data	Name	Description
ASI5PF	ASi-5 peripheral fault	**0**: no ASi-5 node has a peripheral fault **1**: at least one ASi-5 node has a peripheral fault
ASI5PS_INCONSISTENT	ASi-5 parameter image inconsistent	**0**: the parameter image of all ASi-5 modules is identical to the backup in the ASi-5 master **1**: the parameter image of at least one ASi-5 module is different from the corresponding backup in the ASi-5 master.
ASI5PS_INACTIVE	ASi-5 parameter image server inactive	**0**: ASi-5 parameter image server active **1**: ASi-5 parameter image server inactive

Tab. 3-9. Description of the ASi-5 flags

Note!
Using these flags it is possible to implement effective ASi diagnostics in the control with very little effort.

Note!
The ASI5CFG_NOK bit is to be understood as a global enable flag for the input data and evaluated accordingly in the controller before the process input data is accessed.
If the ASI5CFG_NOK bit is set, the transferred process input data is invalid (substitute values) and not identical to the actual value in the input module. In the control program, this must be taken into consideration in order to ensure a defined procedure in the system, even in the case of a configuration error.
It is possible to operate ASi without having to program further diagnostics.
For extended diagnostics, the list of ASi-5 configuration errors can be used to subsequently determine the exact node number that caused the configuration error.
If the ASi-5 flags indicate errors, we recommend using our PC software (see <chap. 6.1>).

Note!
The mapping of the ASi-5 process data image, e.g. which node number is corresponding with which byte(s), is available via the display menu of the ASi Master, as well as via the ASi Control Tools360 or the ASIMON360 software.

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3.1.5 ASi-3 analog data

This section describes the analog process data. If you have analog ASi nodes in your ASi network, incorporate them as described in the following.

Analog data for ASi nodes 29 … 31

Byte	Data item
0	node 31 channel 1 high byte
1	node 31 channel 1 low byte
2	node 31 channel 2 high byte
3	node 31 channel 2 low byte
4	node 31 channel 3 high byte
5	node 31 channel 3 low byte
6	node 31 channel 4 high byte
7	node 31 channel 4 low byte
8	node 30 channel 1 high byte
9	node 30 channel 1 low byte
10	node 30 channel 2 high byte
11	node 30 channel 2 low byte
12	node 30 channel 3 high byte
13	node 30 channel 3 low byte
14	node 30 channel 4 high byte
15	node 30 channel 4 low byte
16	node 29 channel 1 high byte
17	node 29 channel 1 low byte
18	node 29 channel 2 high byte
19	node 29 channel 2 low byte
20	node 29 channel 3 high byte
21	node 29 channel 3 low byte
22	node 29 channel 4 high byte
23	node 29 channel 4 low byte

Tab. 3-10. Analog data for nodes 29 … 31

Note!
A-nodes map the data on channels 1 and 2.
B-nodes map the data on channels 3 and 4.

8 byte analog In (1 ASi node)

Note!
Available only for gateways with ***variably configurable Assembly Objects*** *(see data sheet)!*

Byte	Data item
0	node channel 1, high byte
1	node channel 1, low byte
2	node channel 2, high byte

Tab. 3-11. 8 byte analog In (1 ASi node)

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Byte	Data item
3	node channel 2, low byte
4	node channel 3, high byte
5	node channel 3, low byte
6	node channel 4, high byte
7	node channel 4, low byte

Tab. 3-11. 8 byte analog In (1 ASi node)

Note!
A-nodes map the data on channels 1 and 2.
B-nodes map the data on channels 3 and 4.

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3.1.6 ASi-3 Flags + Fault Detector

Note!
*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

EC-flags (16-bit)															
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}
DA	NSE	OV	EF	–	–	–	Pok	OR	APF	NA	CA	AAv	AAs	S0	Cok

Tab. 3-12.

DA (double_address):	**ASi duplicate address detection** *0: no duplicate address* *1: duplicate address*
NSE (noise):	**ASi noise detection** *0: no noise* *1: noise fault*
OV (overvoltage):	**ASi overvoltage detection** *0: no overvoltage* *1: overvoltage fault*
EF (earth_fault):	**ASi earth fault detection** *0: no earth fault* *1: earth fault*
PoK (periphery_ok):	**Periphery is OK** *0: Periphery is not OK* *1: Periphery is OK*
OR (offline_ready:	**The off-line phase is active**
APF (ASi-power_fail):	**An ASi power fail is occured**
NA (normal_operation_active):	**The normal operation mode is active** *0: normal operation is not active* *1: normal operation is active*
CA (configuration_active):	**The configuration-mode is active**
AAv (Auto_Address_Available):	**Automatic programming is possible** *0: Auto-address is not possible* *1: Auto-address is possible*
AAs (Auto_Address_Assign):	**Automatic programming is allowed**
S0 (LDS.0):	**There is an ASi node with address '0'**
Cok (config_ok):	**Configuration error:** *0: error* *1: no error*

Note!
Using this data module it is possible to implement effective ASi diagnostics in the control with very little effort.

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3.1.7 List of ASi-3 peripheral faults

Note!
*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

The list of ASi-3 peripheral faults contains ASi addresses which indicate peripheral faults. The cause for the peripheral fault report (e.g. broken wire) can be found in the documentation of the ASi node.

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	7A	6A	5A	4A	3A	2A	1A	-
1	15A	14A	13A	12A	11A	10A	9A	8A
...	...							
7	31B	30B	29B	28B	27B	26B	25B	24B

Tab. 3-13.

Note!
Using this data module it is possible to implement effective ASi diagnostics in the control with very little effort.

3.1.8 List of ASi-5 peripheral faults

Note!
*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

The list of ASi-5 peripheral faults contains node numbers which indicate peripheral faults. The cause for the peripheral fault report (e.g. broken wire) can be found in the documentation of the ASi node.

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	node no. 008	node no. 007	node no. 006	node no. 005	node no. 004	node no. 003	node no. 002	node no. 001
1	...	...	...	...	...	...	...	node no. 009
…	…							
10	node no. 088	...	...	...	...	...	...	...
11	node no. 096	node no. 095	node no. 094	node no. 093	node no. 092	node no. 091	node no. 090	node no. 089

Tab. 3-14.

Note!
Using this data module it is possible to implement effective ASi diagnostics in the control with very little effort.

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3.1.9 List of ASi-3 configuration errors

Note!
*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

The list of ASi-3 configuration errors contains the ASi addresses with configuration errors.

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	7A	6A	5A	4A	3A	2A	1A	-
1	15A	14A	13A	12A	11A	10A	9A	8A
...	...							
7	31B	30B	29B	28B	27B	26B	25B	24B

Tab. 3-15.

Note!
Using this data module it is possible to implement effective ASi diagnostics in the control with very little effort.

3.1.10 List of ASi-5 configuration errors

Note!
*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

The list of ASi-5 configuration errors contains the node numbers with configuration errors.

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	node no. 008	node no. 007	node no. 006	node no. 005	node no. 004	node no. 003	node no. 002	node no. 001
1	...	...	...	...	...	...	...	node no. 009
…	…							
10	node no. 088	...	...	...	...	...	...	...
11	node no. 096	node no. 095	node no. 094	node no. 093	node no. 092	node no. 091	node no. 090	node no. 089

Tab. 3-16.

Note!
Using this data module it is possible to implement effective ASi diagnostics in the control with very little effort.

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3.1.11 Fieldbus Bits

The **Fieldbus Bits** enable communication between the controller and the safety program. The fieldbus bits can be used to pass any acknowledgment signals or similar to the safety program and provide status information to the controller.

The states of the ASi Safety in- and outputs are sent to the controller via the input data image (see par. <Safety diagnostics in the Input Data Image (IDI)>).

3.1.11.1 2 Byte Fieldbus Bits

Output data (device Fieldbus Bit in ASIMON360)																
													SI4	SI3	SI2	SI1
	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB
Byte	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Tab. 3-17.

The bits of the output data bytes are ORed with the real and homonymous hardware inputs of the device.

Input data (output assignment for Fieldbus Bit in ASIMON360)																
	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB
Byte	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Tab. 3-18.

FB: Fieldbus Bit

SI 4, SI 3, SI 2, SI 1 Monitor Inputs

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3.1.11.2 16 Byte Fieldbus Bits

Note!
This feature is only available for certain devices. Further information can be found in the documentation of your device.

Output data (device Fieldbus Bit in ASIMON360)																
	FB	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Byte	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	FB	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Byte	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
									…							
	FB	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Byte	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Tab. 3-19.

The bits of the output data bytes are ORed with the real and homonymous hardware inputs of the device.

Input data (output assignment for Fieldbus Bit in ASIMON360																
	FB	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Byte	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	FB	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Byte	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
									…							
	FB	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**	**FB**
Byte	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Tab. 3-20.

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3.1.12 Safety Status

Input Data

Byte	Meaning
0	Safety Status OSSD 1
1	Safety Status OSSD 2
...	…
n	Safety Status OSSD n

Tab. 3-21.

The table shows the color coding as represented in the ASIMON360 software.

***Safety Status per OSSD** (release circuit)*

Bit value [0 ... 2]	Status or color	Description
0	continuous green	output on
1	flashing green	Wait time for **Stop cat. 1** running
2	continuous yellow	Start-up / Restart block active
3	flashing yellow	External test required / Acknowl-edgment / Turn-on delay active
4	continuous red	output off
5	flashing red	error
6	grey or off	output not projected
7	reserved	
Bit value [3 ... 5]	**status or color**	
	reserved	
Bit value [6]	**status or color**	
0	no device flashing yellow	
1	at least one device flashing yellow	
Bit value [7]	**status or color**	
0	no device flashing red	
1	at least one device flashing red	

Tab. 3-22. Coding of status bytes

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3.1.13 Monitor and I/O Data

The module contains 6 bytes of information about the current switching states of the local in- and outputs on the gateway as well as 1 byte of monitor information. These are encoded as follows:

Input data

Byte	Description
1	Monitor Info
2	Status SI1/SI2
3	Status SI3/SI4
4	Status SI5/SI6
5	Status SO1/SO2
6	Status SO3/SO4
7	Status SO5/SO6

Coding of the monitor info

Bit 0	Description
0	Monitor in configuration mode
1	Monitor in protection mode
Bit 1	Description
0	24V missing
1	24V o. k.
Bit [2…5]	**Reserved**
Bit 6	**Description**
0	No component in the Test state (yellow flashing)
1	At least one component in the Test state (yellow flashing)
Bit 7	**Description**
0	No component in the Error state (red flashing)
1	At least one component in the Error state (red flashing)

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Coding the status byte

Bit 0	Description
0	Depending on byte SI 1/3/5 or SO 1/3/5 Off
1	Depending on byte SI 1/3/5 or SO 1/3/5 On
Bit 1	Description
0	Depending on byte SI 2/4/6 or SO 2/4/6 Off
1	Depending on byte SI 2/4/6 or SO 2/4/6 On
Bit [2…3]	**Description** (only if clamping terminals are used as a safety input)
0	Color of the associated safety-relevant component: red, green or gray
1	Color of the associated safety-relevant component: yellow ("wait")
2	Color of the associated safety-relevant component: yellow flashing ("test")
3	Color of the associated safety-relevant component: red flashing ("error")
Bit 4	**Description**
0	Clamping terminals configured as outputs or standard inputs
1	Clamping terminals configured for safety-relevant input
Bit [5…7]	**Reserved**

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3.1.14 Diagnostics Safe Link

Note!
*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

The Safe Link process data diagnostics allows you to visualize the status of the safe link between the various gateways in the controller.

	Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Node overview	1	st. addr 4		st. addr 3		st. addr 2		st. addr 1	
	2	st. addr 8		st. addr 7		st. addr 6		st. addr 5	
	3	st. addr 12		st. addr 11		st. addr 10		st. addr 9	
	4	st. addr 16		st. addr 15		st. addr 14		st. addr 13	
	5	st. addr 20		st. addr 19		st. addr 18		st. addr 17	
	6	st. addr 24		st. addr 23		st. addr 22		st. addr 21	
	7	st. addr 28		st. addr 27		st. addr 26		st. addr 25	
	8	reserved		st. addr 31		st. addr 30		st. addr 29	
	9	node status				node address			
	10	domain no.				manager address			

Tab. 3-23. Node overview

St. Adr. data assignment out of the list 'Node overview' (bytes 1-8) and node status:

Bit-combination	Meaning
11	active
01	*not* active
10	*not* taught (only in the manager, message with the highest priority)
00	*not* used

node status:	status of current nodes
St. Addr.	status address
node address:	node address within the Safe Link cluster
manager address:	node address of the Safe Link cluster manager
domain no.:	Safe Link cluster address *Only the 3 rear bits of the address are specified in the 'domain no.' !*

Note!
All Safe Link participants must be in the same subnet.

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4. CIP Safety via EtherNet/IP

4.1 General CIP Safety requirements

For CIP Safety devices the following requirements must be observed:

- The replacement of safety devices requires that the replacement device be configured properly and operation of the replacement device shall be user verified.
- If you choose to configure safety connections with an SCID=0, you are responsible for ensuring that originators and targets have the correct configurations.
- The user should assign SNN numbers for each safety network or safety subnet that are unique system-wide.
- If used, the SCID of the configuration log should be compared with the SCID in the device after download.
- All configured safety features have to be verified through testing.
- The IP address have to be set prior to installing it onto a safety network.
- Consider the implication of mixing different SIL devices on the network.
- Test the safety connection after they are applied in the originator to confirm the target connection is operating as intended.
- LEDs are NOT reliable indicators and cannot be guaranteed to provide accurate information. They should ONLY be used for general diagnostics during commissioning or troubleshooting.
- Do not attempt to use LEDs as operational indicators.

Note!
An ASi gateway operated as CIP Safety master does not replace the EtherNet/IP master / controller.
Thus, an additional EtherNet/IP control is required in any case, regardless of whether the gateway is operated as CIP Safety master or CIP Safety node.

4.2 Overview of CIP Safety Connections

Assembly Instance		Data Item		
Input	**Output**	**Length (byte)**	**Data**	**Min. RPI (ms) (1)**
1024	1279	8	8 byte safety input	10
1279	1056	8	8 byte safety output	10
–	1088	–	configuration	–

Tab. 4-24.

(1) The minimum times for the RPI shown in the table do not represent the worst case values. Depending on the Gateway load greater minimum times for the RPI than indicated here may be needed.

4.3 CIP Safety in- and output data (8 bytes)

The assignment of the in- and output data bits depends on the configuration of the Safety Monitor. We recommend to use automatic configuration.

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Note!
*A detailed description of the address assignment for the automatic configuration can be found in the manual of the ASIMON360 software, chapter "**8 Byte PROFIsafe / CIP-Safety / FSoE / openSAFETY Assignment**".*

4.4 CIP Safety Status indicator

In protected operating mode the message **CS** (1) with a corresponding error message appears in the device display:

Status message	Meaning
CIP "Instance" inactive	The CIP-Safety connection of the instance "Instance" is not active
Monitor stopped	Safety Monitor stopped

Tab. 4-25.

If the gateway is in Projecting mode and there is activated CIP-Safety communication, **CS** (1) with CIP "Instance activated".

(1) The letters 'CS' mean 'CIP-Safety'.

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5. Selection of Mode of Safe Operation via Fieldbus

Note!
This feature is only available for certain devices. Further information can be found in the documentation of your device.

The configuration of the **Selection of Mode of Safe Operation** takes place in the ASIMON360 software.

OPC UA is recommended for communication between the safety monitor and the input device. Alternatively, communication in the ASIMON360 software can also be set via the fieldbus.

Note!
Available only for gateways with **variably configurable Assembly Objects** *(see data sheet)!*

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6. Diagnostics

6.1 System diagnostics on the PC

In the event of problems, we recommend starting the Bihl+Wiedemann Suite.

The online bus information contained in ASIMON360 and ASi Control Tools360 provides a quick overview.

The diagnostics software enables detailed analysis of the system and provides the user with immediate solutions to known problems.

6.1.1 Software for diagnostics, service and release measurements

The intuitively constructed software for diagnostics, service and release measurements enables PC-assisted measurement using the high-level measuring technology built into the Bihl+Wiedemann masters.

This specially developed software assists both machine and systems builders in release measurements and preventive troubleshooting as well as end users in preventive maintenance and fast, self-performed error elimination. As an option the analysis data can also be sent to our technical support group and used as the basis for fast, reliable help with problem handling.

6.1.2 ASi Control Tools360

The Software ASi Control Tools360 provide you with all the key testing and configuration possibilities of your ASi circuit in organized fashion on your PC.

A graphic representation of your ASi network provides you with a quick overview of the system status, showing for example any missing or unprojected nodes. In addition, peripheral errors and the status of the "ASi Monitors" integrated into the Masters. The **diagnostic buffer** (not available with all devices!) stores with a time stamp in a ring buffer up to 1024 events. The ASi Control Tools360 software also provides a simple and convenient way to configure new ASi circuits or modify already existing configurations. This software is also a component of the ASIMON360 software.

6.1.3 ASIMON360

The ASIMON360 software is used to configure the safety unit. Already configured systems can be diagnosed live using the software. The status of all in- and outputs is graphically represented as are the results of the preparatory processing.

When projecting the user has the ability to assign unique identifiers to the individual devices. These also appear in the device displays in connection with error messages. To prevent errors in the projecting stage the ASIMON360 software provides advance warning at the relevant points.

6.1.4 Online bus information

The online bus information (function in ASIMON360/ASi Control Tools360) is used for easy diagnostics of the modules and for live monitoring and testing of inputs and outputs. Errors in the ASi circuit, e.g. non-projected nodes, are visible at a glance as simple, easily understandable symbols.

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6.1.5 Web server

Units having an Ethernet port provide all the diagnostics data through a web server (1). If necessary this also allows the system information to be viewed from any PC connected to the network without any additional software, simply using a standard internet browser and Java.

To be able to take advantage of the full scope of diagnostics functions and configuration possibilities of the ASi Masters from Bihl+Wiedemann, you will however need the ASIMON360 software with integrated ASi Control Tools360 and ideally also the software for diagnostics, service and release measurement.

Please note that the called up IP address is disabled by a timeout of 2 minutes for users with a different IP address. This timeout was implemented for reasons of access security and network stability.

The master is protected against unauthorized access and menu changes by using the default pin "0000". For safety reasons this pin should always be changed after the first login. The default pin can be changed in the master's display under: [SETUP] –> [WEBSERVER] –> [WEBSERVER PIN CHANGE].

6.2 Diagnostics on the host controller

All the diagnostics information is also provided on the host controller.

6.2.1 Diagnostics through process data

Diagnostics through the process data provides a very simple means of incorporating diagnostics information into the controller program and displaying it on a control panel.

For useful diagnostics we recommend use of the following modules:

6.2.1.1 Diagnosing the ASi circuits

- Only for gateways with **variably configurable Assembly Objects**:
  - Flags + Fault Detector (see <*chap. 3.1.6*>)
  - List of configuration errors (see <*chap. 3.1.9*>)
  - List of peripheral faults (see <*chap. 3.1.7*>).
- For all other gateways:
  - Flags in the digital data (see <*chap. 3.1.3*>)

Additionally with ASi-5 gateways:

- List of the ASi-5 configuration errors (see <*chap. 3.1.10*>)
- List of the ASi-5 peripheral faults (see <*chap. 3.1.8*>)
- Evaluate all ASi-5 flags (see < *Tab. 3-8.*> and <*tab. 3-9*>) in the control.

(1) Default PIN of the web server: '0000'

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When a configuration error is reported, e.g. because an ASi node has failed, the ASi master continues to communicate with the remaining nodes. In many cases however a good and simple solution is to terminate running of the PLC program in case of a configuration error.

For further diagnostics, we recommend our PC software (see <*chap. 6.1*>).

6.2.1.2 Diagnosing the Safety Monitor

- ☐ Safety diagnostics in the Input Data Image
  Diagnostics for the states of the safety ASi in- and outputs. To obtain diagnostics information for a safety ASi output the associated ASi diagnostics node address must be incorporated (see < Paragraph A:>).
- ☐ Safety Status
  Diagnosing the states of the release circuits (see <chap. 3.1.11>)
- ☐ Monitor and I/O Data
  Status of the safety monitor and of the local safety in- and outputs (see <chap. 3.1.13>)
- ☐ Fieldbus bits
  Manufacturer specific diagnostics (see <chap. 3.1.11>)
- ☐ Diagnostics Safe Link
  In case safe coupling of multiple safety monitors is used via Safe Link (see <chap. 3.1.14>).

Paragraph A: Safety diagnostics in the Input Data Image (IDI)

☐ Safety diagnostics of safe ASi inputs

Diagnostics in the IDI is a way of sending the key diagnostics functions to the controller without a command interface (Mailbox) or any additional effort. The diagnostics information is sent in the input data image, coded for the input bits of the address of the safety input module.

The switching state of Channels 1 and 2 of the safety input is shown with negligible time lag in bits 0 and 1 and can be directly read:

Bit3	Bit2	Bit1	Bit0	Description
X	X	0	0	Both channels open
X	X	0	1	2nd channel open, 1st channel closed
X	X	1	0	2nd channel closed, 1st channel open
X	X	1	1	Both channel closed

Tab. 6-26.

Bits 2 and 3 are used to send the status of the safety input (the device color of the ASIMON360):

Bit3	Bit2	Bit1	Bit0	Description
0	0	X	X	Device color: red, green or gray
0	1	X	X	Device color: yellow ("waiting")
1	0	X	X	Device color: yellow flashing ("testing")
1	1	X	X	Device color: red flashing ("Error")

Tab. 6-27. Stae of safety input

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☐ Safety diagnostics of safe ASi outputs

The diagnostic informations are transfered via the Input Data Image, coded to the input bits of the diagnostic address (diagnostic node) of an ASi safety module. The diagnostics information for the safety output is encoded to the input data of the diagnostics node of the respective safety output.

Bit value of the input bits of the diagnostic nodes

Bit	ASi input
E0	diagnostics (see table device colors)
E1	
E2	
E3	reserved for EDM input

Tab. 6-28. Bit value of input bits of the diagnostic nodes

Device colors

The colors refer to the diagnostics in the ASIMON360.

Value	Color	Description	state change	LED "OUT" (1)
0	green	output on	–	on
1	green flashing	–	–	–
2	yellow	restart inhibit	auxiliary signal 2	1 Hz
3	yellow flashing	–	–	–
4	red	output off	–	off
5	red flashing	waiting for reset of error condition	auxiliary signal 1	8 Hz
6	gray	connection or internal error	only via **Power On** on device	all LEDs flashing
7	green/yellow	output released, but not switched on	switched on by setting the output bit[1]	off

Tab. 6-29. Device colors

(1) See documentation of the ASi node.

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Important!

The following points must be noted for processing:

- The color information of the device is only available if the safe input is also used within the Safety Monitor.
- The information for switching state and error status are not processed time-synchronous.
- When there is a configuration error all bits having value 0 are sent; this must be noted when processing the data.
- When the Monitor is stopped the device color is "gray".
- When regularly switching, the status "yellow flashing" can be recognized as a transition status. This depends on the component model set. This status cannot be understood as a testing request until it is stably reported (see Monitor Info and Safety Control/Status Byte). This is not the case until bit '6' is set in the Monitor Info and Safety Control/Status Byte ("At least one module in Test status"). This means the diagnostics information in the input data image does not serve as a trigger for the testing request, but rather only as detailed information after the Monitor Info and Safety Control/Status byte have indicated that at least one component has reported a testing request.

Changing the base setting

Setting and changing the diagnostics type is done using the device display (`[SAFETY]` –> `[ASI SAFETY]` –> `[SAFE SUBST VAL]`)

6.2.2 Diagnosing the safety unit using the command interface

All the diagnostics data can also be queried individually and acyclic using the command interface commands. This method does however involve greater programming effort.

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6.3 Error indication directly on the device

6.3.1 LEDs

The LEDs located on the device allow you to quickly see the status of the main function parameters, such as power, communication with the host controller, communication on the ASi circuit and state of the safety in- and outputs.

6.3.2 LC-Display

In the display of the Gateways plain text messages are shown spontaneously for any detected errors (e.g. missing nodes, earth fault, duplicate address…).

6.3.3 ASi Monitor

Bihl+Wiedemann ASi masters are equipped with an integrated measurement technology as standard. This makes it possible to localize even sporadically occurring configuration errors and sources of interference that affect ASi communication easily.

6.3.3.1 Description of flags and error bits

Configuration error

The actual configuration found on ASi does not match the projected configuration, or the ASi master performs startup operations.

Node 0 detected

There is an ASi node with zero address.

No auto address assignment

Automatic address assignment would not be possible.

Auto address assignment available

As soon as an appropriate node is connected, its address will be automatically assigned.

Configuration mode

The ASi master is in configuration mode.

No normal operation

ASi master is performing startup operations

ASi power fail

ASi power supply is insufficient

Off-line

ASi master doesn't send telegrams on ASi

Peripheral fault

At least one ASi node reports a peripheral fault, or the ASi master performs startup operations.

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24V AUX

External 24 V voltage is present.

Power-Fail 24V

External 24 V voltage is *not* present.

Earth fault

The earth fault monitor checks the symmetry of the ASi voltage. If the voltage is no longer sufficiently symmetrical, the noise immunity of data transmission is compromised.

Overvoltage

Normally UASi+ and UASi- are in symmetry with system ground. If this potential rises significantly, the overvoltage detector reports this anomaly.

Noise voltage

Noise voltages on the ASi cable can cause telegram errors. The noise voltage detector monitors the ASi circuit for AC voltages which have been generated by neither the ASi Master nor the nodes.

Duplicate address

The Master detects when two nodes having the same address are present in the ASi circuit.

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7. Appendix

7.1 Quick Start Guides

Quick Start Guides for commissioning and service are provided on the Bihl+Wiedemann website available for download.

7.2 Extended List of Assembly Objects

Note!

*Older ASi-3 gateways (Art.no. < BWU23XX) do not support all **Assembly Objects**.*

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	Assembly instance				Data Item							improved response times (1)	
Available with (2)	Input	Size (byte)	Output	Size (byte)	Digital	Analog	Command interface	Safety FB Bits	Safety Status	Monitor and I/O Data (3)	min. RPI (ms)	min. RPI (ms) with DLR (4)	min. RPI (ms)	min. RPI (ms) with DLR
ASi-3 Single Gateway	100 (0x64)	16	136 (0x88)	16	ASi circ. 1, single- and A-nodes						5	10		
	101 (0x65)	28	137 (0x89)	28			short				5	10		
	102 (0x66)	54	138 (0x8A)	54			long				6	14		
	103 (0x67)	40	139 (0x8B)	40		ASi circ. 1, analog nodes 29 ... 31					6	14		
	104 (0x68)	52	140 (0x8C)	52			short				6	14		
	105 (0x69)	78	141 (0x8D)	78			long				8	18		
ASi-3 Double Gateway	106 (0x6A)	64	142 (0x8E)	64		ASi circ. 1+2, analog nodes 29 ... 31					8	16		
	107 (0x6B)	76	143 (0x8F)	76			short				8	18		
	108 (0x6C)	102	144 (0x90)	102			long				10	22		
ASi-3 Single Gateway	**109 (0x6D)**	32	145 (0x91)	32	ASi circ. 1, all nodes						6	12	1	1
	110 (0x6E)	44	146 (0x92)	44			short				6	14		
	111 (0x6F)	70	147 (0x93)	70			long				8	16		
	112 (0x70)	56	148 (0x94)	56		ASi circ. 1, analog nodes 29 ... 31					7	15		
	113 (0x71)	68	149 (0x95)	68			short				8	16		
	114 (0x72)	94	150 (0x96)	94			long				9	18		
ASi-3 Double Gateway	115 (0x73)	80	151 (0x97)	80		ASi circ. 1+2, analog nodes 29 ... 31					9	18		
	116 (0x74)	92	152 (0x98)	92			short				9	18		
	117 (0x75)	118	153 (0x99)	118			long				11	24		
ASi-3 Double Gateway	118 (0x76)	32	154 (0x9A)	32	ASi circ. 1+2, single- and A-nodes						6	12		
	119 (0x77)	44	155 (0x9B)	44			short				6	14		
	120 (0x78)	70	156 (0x9C)	70			long				8	16		
	121 (0x79)	56	157 (0x9D)	56		ASi circ. 1, analog nodes 29 ... 31					7	15		
	122 (0x7A)	68	158 (0x9E)	68			short				8	16		
	123 (0x7B)	94	159 (0x9F)	94			long				9	18		
	124 (0x7C)	80	160 (0xA0)	80		ASi circ. 1+2, analog nodes 29 ... 31					9	18		
	125 (0x7D)	92	161 (0xA1)	92			short				9	18		
	126 (0x7E)	118	162 (0xA2)	118			long				11	24		

Tab. 7-30.

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Available with [2]	Assembly instance				Data Item								improved response times [1]	
	Input	Size (byte)	Output	Size (byte)	Digital	Analog	Command interface	Safety FB Bits	Safety Status	Monitor and I/O Data [3]	min. RPI (ms)	min. RPI (ms) with DLR [4]	min. RPI (ms)	min. RPI (ms) with DLR
ASi-3 Double Gateway	**127 (0x7F)**	64	163 (0xA3)	64	ASi circ. 1+2, all nodes						8	16	1	1
	128 (0x80)	76	164 (0xA4)	76			short				8	18		
	129 (0x81)	102	165 (0xA5)	102			long				10	22		
	130 (0x82)	88	166 (0xA6)	88		ASi circ. 1, analog nodes 29 ... 31					9	18		
	131 (0x83)	100	167 (0xA7)	100			short				10	22		
	132 (0x84)	126	168 (0xA8)	126			long				12	25		
	133 (0x85)	112	169 (0xA9)	112		ASi circ. 1+2, analog nodes 29 ... 31					11	24		
	134 (0x86)	124	170 (0xAA)	124			short				12	25		
	135 (0x87)	150	171 (0xAB)	150			long				13	26		
ASi-3 Single Gateway	172 (0xAC)	246	173 (0xAD)	246	ASi circ. 1, all nodes	ASi circ. 1, analog nodes 10 ... 31	long				17	32		
ASi-3 Double Gateway	174 (0xAE)	454	175 (0xAF)	454	ASi circ. 1+2, all nodes	ASi circ. 1+2, analog nodes 10 ... 31	long				25	50		
ASi-3 Double Gateway with integrated Safety Monitor	**176 (0xB0)**	98	177 (0xB1)	66	ASi circ. 1+2, all nodes			2 bytes In / Out	32 bytes In		10	20		
	178 (0xB2)	136	179 (0xB3)	104			long				12	25		
	180 (0xB4)	146	181 (0xB5)	114		ASi circ. 1+2, analog nodes 29 ... 31					13	26		
	182 (0xB6)	184	183 (0xB7)	152			long				15	30		
	184 (0xB8)	488	185 (0xB9)	456		ASi circ. 1+2, analog nodes 10 ... 31	long				27	52		

Tab. 7-30.

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Available with [2]	Assembly instance: Input	Size (byte)	Output	Size (byte)	Data Item: Digital	Analog	Command interface	Safety FB Bits	Safety Status	Monitor and I/O Data [3]	min. RPI (ms)	min. RPI (ms) with DLR [4]	improved response times [1]: min. RPI (ms)	improved response times [1]: min. RPI (ms) with DLR
ASi-3 Double Gateway with integrated Safety Monitor	**186 (0xBA)** [3]	66	187 (0xBB)	34	ASi circ. 1, all nodes			2 bytes In / Out	32 bytes In		8	16	1	1
	188 (0xBC) [3]	104	189 (0xBD)	72			long				8	16		
	190 (0xBE) [3]	90	191 (0xBF)	58		ASi circ. 1, analog nodes 29 ... 31					8	16		
	192 (0xC0) [3]	128	193 (0xC1)	96			long				10	20		
	194 (0xC2) [3]	280	195 (0xC3)	248		ASi circ. 1, analog nodes 10 ... 31	long				14	28		
ASi-3 Double Gateway with integrated Safety Monitor	**196** [3]	191	183	152	ASi circ. 1+2, all nodes	ASi circ. 1+2, analog nodes 29 ... 31	long	2 bytes In / Out	32 bytes In	7 bytes In	15	30		
ASi-3 Single Gateway with integrated Safety Monitor	**197** [3]	135	193	96	ASi circ. 1, all nodes	ASi circ. 1, analog nodes 29 ... 31	long				10	20		
ASi-5/ ASi-3 Single-Gateway	**240**	160	241	160	ASi-3 circ. 1, all nodes / ASi-5 circ. 1, 128 bytes [6]	N/A							conf. [5]	
ASi-5/ ASi-3 Double Gateway	**242**	320	243	320	ASi-3 circ. 1+2, all nodes / ASi-5 circ. 1+2, 128 bytes each circ. [6]	N/A							conf. [5]	

Tab. 7-30.

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	Assembly instance				Data Item								improved response times (1)	
Available with (2)	Input	Size (byte)	Output	Size (byte)	Digital	Analog	Command interface	Safety FB Bits	Safety Status	Monitor and I/O Data (3)	min. RPI (ms)	min. RPI (ms) with DLR (4)	min. RPI (ms)	min. RPI (ms) with DLR
ASi-5/ ASi-3 Single Gateway with Safety Monitor	**244**	239	245	200	ASi-3 circ. 1, all nodes ASi-5 circ. 1, 128 bytes (6)	N/A	38 bytes In / Out	2 bytes In / Out	32 bytes In	7 bytes In			conf. (5)	
ASi-5/ ASi-3 Double Gateway with Safety Monitor	**246**	399	247	360	ASi-3 circ. 1+2, all nodes ASi-5 circ. 1+2, 128 bytes each circ. (6)	N/A	38 bytes In / Out	2 bytes In / Out	32 bytes In	7 bytes In			conf. (5)	
all Gateways with variably configurable Assembly Object (see data sheet)	**254**	vc (6)	255	vc (6)							not available			

Tab. 7-30.

(1) Valid only for devices with **variably configurable Assembly Objects** and improved response times (see data sheet).
(2) Recommended Assembly Instances are highlighted.
All Assembly Instances for Single Gateways are also available for Double Gateways.
All Assembly Instances for standard Gateways are also available for Gateways with Safety Monitor.
All Assembly Instances for ASi-3 Gateways are also available for ASi-5/ASi-3 Gateways.
(3) Available only for gateways from Ident.-No. ≥ 15864 (see lateral label)!
(4) Minimum times for RPI -as indicated within the table- do not correspond to worst-case values. Depending on the workload of the gateway higher minimum times than indicated ones may be required for RPI.
(5) Devices with improved response times have a min. RPI value depending on configuration.
(6) Variably configurable via ASIMON360

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Note!

*Available only for gateways with **variably configurable Assembly Objects** (see data sheet)!*

Following objects are variably configurable:

- ASi Master
- ASi node
- I/O Data
- Advanced Diagnostics
- Short Command Interface
- Long Command Interface
- Safety Control/Status
- Monitor and I/O Data
- Safe Link Diag.

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