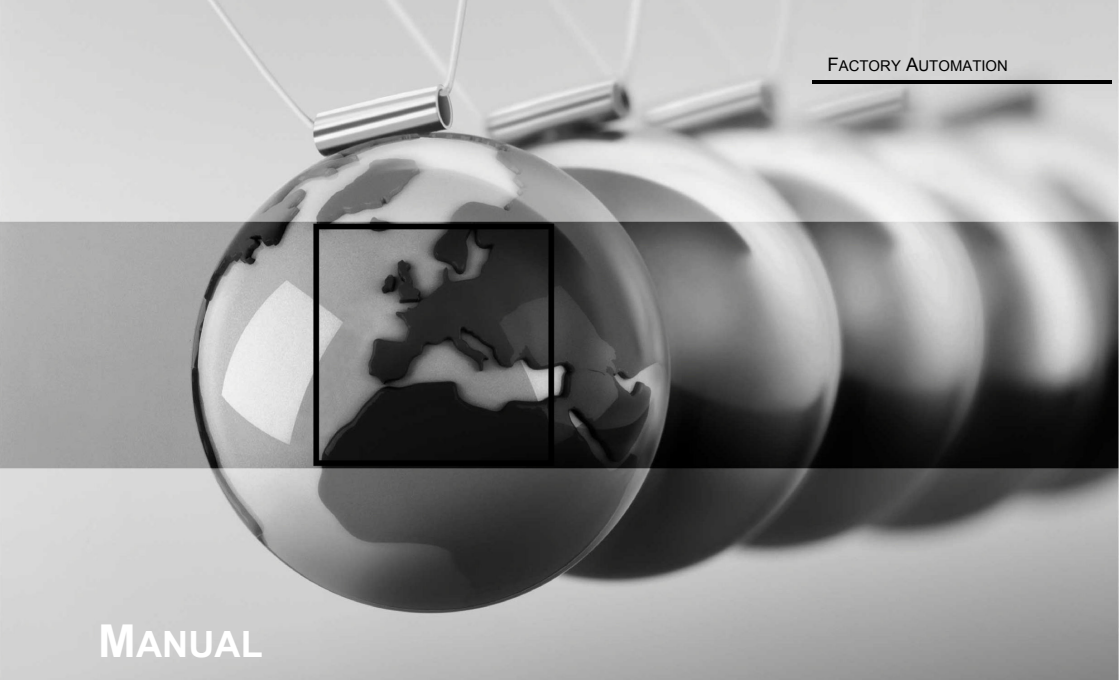
FACTORY AUTOMATION



MANUAL

AS-I CC-LINK GATEWAY

PEPPERL+FUCHS
SENSING YOUR NEEDS

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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AS-i CC-Link Gateway

14.4.2015

1. Introduction

Congratulations

You have chosen a device manufactured by Pepperl+Fuchs. Pepperl+Fuchs develops, produces and distributes electronic sensors and interface modules for the market of automation technology on a worldwide scale.

Before installing this equipment and put into operation, read this manual carefully. This manual containes instructions and notes to help you through the installation and commissioning step by step. This makes sure bring such a trouble-free use of this product. This is for your benefit, since this:

- ensures the safe operation of the device
- helps you to exploit the full functionality of the device
- avoids errors and related malfunctions
- avoids costs by disruptions and any repairs
- increases the effectiveness and efficiency of your plant

Keep this manual at hand for subsequent operations on the device.

After opening the packaging please check the integrity of the device and the number of pieces of supplied.

Symbols used

The following symbols are used in this manual:

Information!

This symbol indicates important information.

Attention!

This symbol warns of a potential failure. Non-compliance may lead to interruptions of the device, the connected peripheral systems, or plant, potentially leading to total malfunctioning.

Warning!

This symbol warns of an imminent danger. Non-compliance may lead to personal injuries that could be fatal or result in material damages and destruction.

Contact

If you have any questions about the device, its functions, or accessories, please contact us at:

Pepperl+Fuchs GmbH
Lilienthalstraße 200
68307 Mannheim
Telephone: +49 621 776-4411
Fax: +49 621 776-274411
E-Mail: fa-info@pepperl-fuchs.com

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2. Declaration of conformity

2.1 Declaration of conformity

This product was developed and manufactured under observance of the applicable European standards and guidelines.

Information!

A Declaration of Conformity can be requested from the manufacturer.

The product manufacturer, Pepperl+Fuchs GmbH, D-68307 Mannheim, has a certified quality assurance system that conforms to ISO 9001.

3. Safety

3.1 Symbols relevant to safety

Information!

This symbol indicates important information.

Attention!

This symbol warns of a potential failure. Non-compliance may lead to interruptions of the device, the connected peripheral systems, or plant, potentially leading to total malfunctioning.

Warning!

This symbol warns of an imminent danger. Non-compliance may lead to personal injuries that could be fatal or result in material damages and destruction.

3.2 General notes on safety

Only instructed specialist staff may operate the device in accordance with the operating manual.

User modification and or repair are dangerous and will void the warranty and exclude the manufacturer from any liability. If serious faults occur, stop using the device. Secure the device against inadvertent operation. In the event of repairs, return the device to your local Pepperl+Fuchs representative or sales office.

The connection of the device and maintenance work when live may only be carried out by a qualified electrical specialist.

The operating company bears responsibility for observing locally applicable safety regulations.

Store the not used device in the original packaging. This offers the device optimal protection against impact and moisture.

Ensure that the ambient conditions comply with regulations.

3.3 Disposal

Information!

Electronic waste is hazardous waste. Please comply with all local ordinances when disposing this product!

The device does not contain batteries that need to be removed before disposing it.

4. General

4.1 Product information

This system manual applies to the following Pepperl+Fuchs equipment:

4.1.1 AS-i CC-Link Gateway

Article no.	field bus interface	number of AS-i Masters	RS 232 diagnostic interface	Recognition of duplicate addresses
VBG-CCL-K20-D-BV	CC-Link	1	–	–

Tab. 4-1. Function range of "AS-i CC-Link Gateway"

The AS-i CC-Link Gateways serve to connect AS-i systems to the superordinate CC-Link. The gateways act as a master for AS-i and as a slave on CC-Link.

4.2 AS-i 3.0 specification

The AS-i CC-Link Gateway is designed according to the AS-i 3.0 specification.

5. Specifications

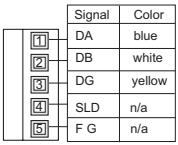
5.1 Technical data

The technical data are placed in the data sheet. Please view the current version on the web page: http://www.pepperl-fuchs.com.

5.1.1 Data sheet

Connection	
Connections	AS-i: COMBICON CC-Link: screw terminal blocks
Interface	
CC-Link interface	according to CC-Link specification
Baud rates	156 KBps up to 10 MBps
Type	remote device
Occupied stations	2-4 (depending on operating mode)
CC-Link functions	imaging of the AS-i slaves as RW data on CC-Link. complete diagnosis and configuration via CC-Link
AS-i	
Cycle time	150µs * (number of slaves + 2)
Operating current	power supply A, approx. 200 mA out of AS-i
Operating voltage	AS-i voltage 30V DC
Display	
LCD	menu, displaying AS-i slave addresses and error messages
LED power	voltage ON
LED cc-link	state of CC-Link
LED config error	configuration error
LED U AS-i	AS-i voltage o.k.
LED AS-i active	AS-i in normal operation
LED prg enable	automatic address programming enabled
LED prj mode	configuration mode active
Environment	
Applied standards	EN 61 000-6-2 EN 61 000-6-4
Housing	Stainless Steel
Operating temperature	0°C … +55°C
Storage temperature	-25°C … +85°C
Protection category (EN 60 529)	IP20
Allowable shock -and vibration stress	according to EN 61 131-2
Voltage of insulation	≥ 500V
Dimensions (L / W / H in mm)	85 / 120 / 83
Weight	520 g

Pin assignment:



Signal	Color
DA	blue
DB	white
DG	yellow
SLD	n/a
F G	n/a

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6. Installation

Read instruction:

Before working with this unit: read these instructions carefully and completely. All notes on safety and specifications of the device manual and the manual for the configuration software are to be considered!

6.1 Safety notes

Ensure appropiate installation:

Electrical installation is to be performed by trained expert personnel. During installation care must be taken that supply and signal leads and also the AS-i bus cable are laid separately from power cables. In the switchgear cabinet it must be ensured that appropriate spark-quenching equipment is used with contactors. Where drive motors and brakes are used, attention must be paid to the installation instructions in the corresponding operating instructions. Please note that the maximum line length of the AS-i bus cable is 100 m. Cables above that length require the use of a suitable circuit extension.

HAZARDOUS VOLTAGE:

Before any installation, maintenance or modification work: Disconnect your system from the supply network. Ensure that it cannot be reconnected inadvertently!

You are requested to make sure that the unit will be recycled by the end of its service life.

6.2 Installing in the control cabinet

The AS-i CC-Link Gateway is installed in the control cabinet on 35mm DIN rails per DIN EN 50 022.

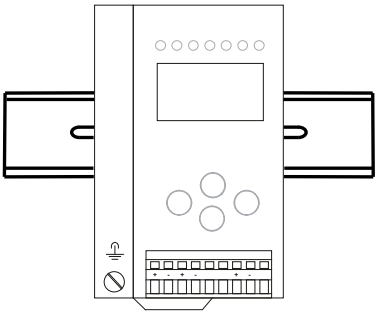
Information!

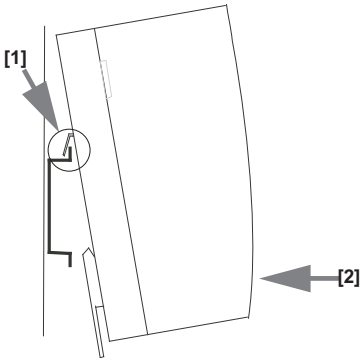
The enclosure of the AS-i/Gateway is made of stainless steel. The unit is also suitable for exposed wall mounting.

Warning!

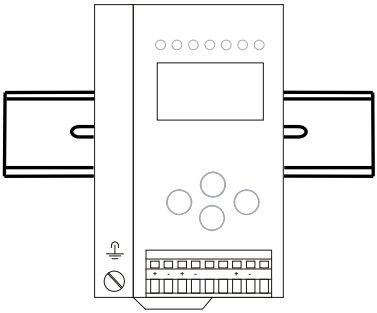
Cover the top of the gateway when doing any drilling work above the unit. No particles, especially metal chips, should be allowed to enter the housing, since this could cause a short circuit.

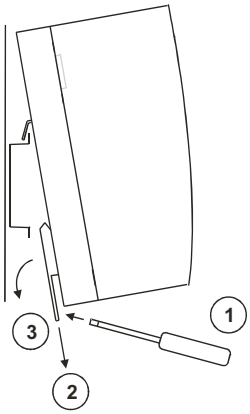
To install, place the unit on the upper edge of the DIN rail and then snap in the lower edge.





6.3 Removing





To remove, press the holding clamps [2] down using a screwdriver [1], press the unit firmly against the upper rail guide and lift out.

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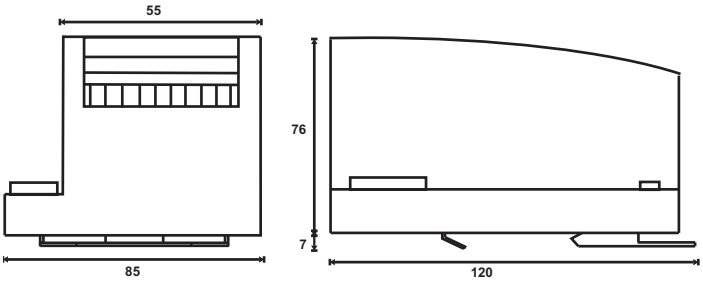
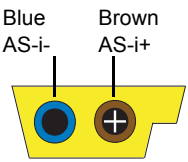
6.4 Dimensions [mm]

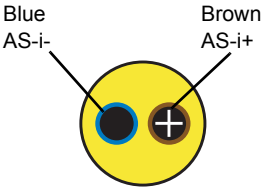


7. Electrical connection

7.1 AS-i bus connection



Yellow ASi ribbon cable



2-conductor AS-i round cable
(Recommended: flexible power cable
H05VV-F2x1,5 per DIN VDE 0281)

Information!

Electrical work is to be performed only by electrical technicians.

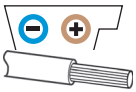
7.2 Connections

	0,2 ... 2,5 mm^2
	0,2 ... 2,5 mm^2
AWG	24 ... 12

Ambient air temperature **0 °C … +55 °C**

Temperature rating for cable **60/75 °C**

Use copper conductors only



7.2.1 AS-i and power supply terminal assignments

Caution!

At the black cable for power supply no slaves or repeaters may be attached. At the yellow cable for AS-i circuit no power supplies or further masters may be attached. Even in case of a fault, the output voltage of the power supply shall be 42 V or less.

Information!

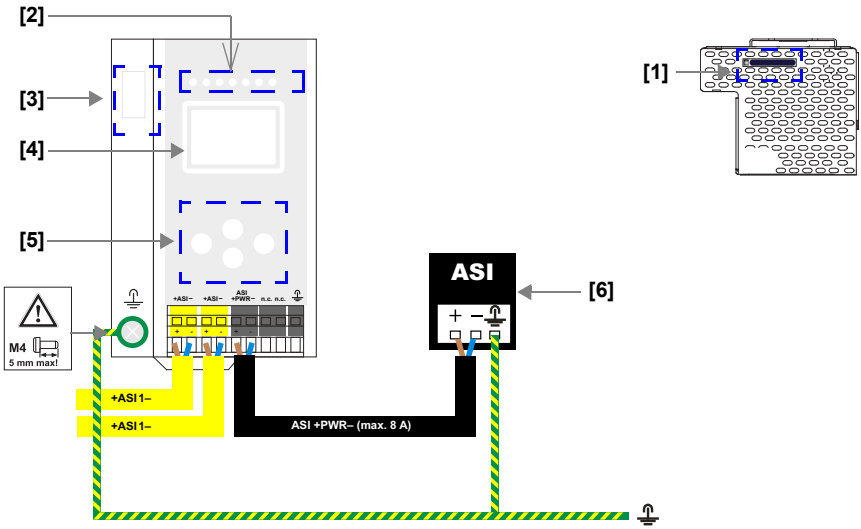
The function ground can be connected either to the grounding screw or to the terminal.

The function ground should be made with as short a cable as possible to ensure good EMC characteristics.

Therefore function grounding using the grounding screw is preferred.

7.3 Front view and connections

7.3.1 Electrical connection: VBG-CCL-K20-D-BV



+ASI–
Connection AS-i circuit

ASI +PWR– (max. 8 A)
Supply voltage AS-i circuit

[1]	Chip card
[2]	LED status display
[3]	Fieldbus interface
[4]	LC display
[5]	Buttons for hand operation
[6]	Power supply

Information!

For additional information, please refer to the sections: <AS-i and power supply terminal assignments>.

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7.4 CC-Link interface

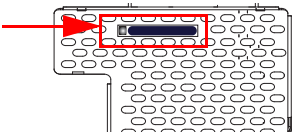
Signal	color
DA	blau/ blue/ bleu/ blu/ azul
DB	weiss/ white/ blanc/ bianco/ blanco
DG	gelb/ yellow/ jaune/ giallo/ amarillo
SLD	n/a
FG	n/a

The CC-Link interface connector is designed as a 5-pin COMBICON connector. It is located on the left hand side of the front panel (see section <Overview of terminals, indicators and operating elements>).

Information!

For better noise performance, SLD (cable shield) should be grounded separately in 10 cm distance to the COMBICON connector.

7.5 Chip card



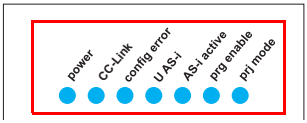
The configuration is stored in a fixed installed EEPROM and can be overwritten by the chip card. The chip card does not have to be inserted in operation.

Warning!

Power must always be turned off when removing or inserting the chip card!

7.6 Indicators and operating elements

7.6.1 LED indicators – master



The LED's on the front panel of the device indicate:

Power

The AS-i master is receiving sufficient power.

CC-Link (CC-Link status LED)

Flashing sample see chap. <CC-Link status LED (green/red) flashing sample>.

config error

Configuration error.
At least one configured slave is missing, or at least one detected slave is not configured, or for at least one configured and detected slave the actual configuration data does not match the nominal configuration data, or the master is in the startup process.
This LED flashes if a peripheral fault has been detected for at least one AS-i slave on the AS-i network. If there are configuration errors as well as periphery faults, only the configuration error is displayed.

U AS-i

The AS-i network is sufficiently powered.

AS-i active

Normal operation is active

prg enable

Automatic single node replacement is enabled.
Exactly one slave is missing in the protected operating mode. The slave can be replaced by another slave of the same type with address zero. The master automatically addresses the new slave to the faulty address and thus corrects the configuration error

prj mode

The AS-i master is in configuration mode.

7.6.1.1 CC-Link status LED (green/red) flashing sample

C-Control mode (C-Control active)

CC-Link LED	CC-Link Error	CC-Link Run
flashing green	off	off
flashing green/red	on or flashing	off
green	off	on
flashing green/red	on or flashing	on

Tab. 7-2.

Standard mode (C-Control inactive)

CC-Link LED	CC-Link Error	CC-Link Run
off	off	off
red	on or flashing	off
green	off	on
red	on or flashing	on

Tab. 7-3.

7.6.2 Buttons

The buttons are used for the following:

Mode/⇑
Switching between configuration mode and protected operating mode, and saving the current AS-i configuration as the nominal configuration.

Set/⇓
Selecting the address of and assigning an address to a slave.

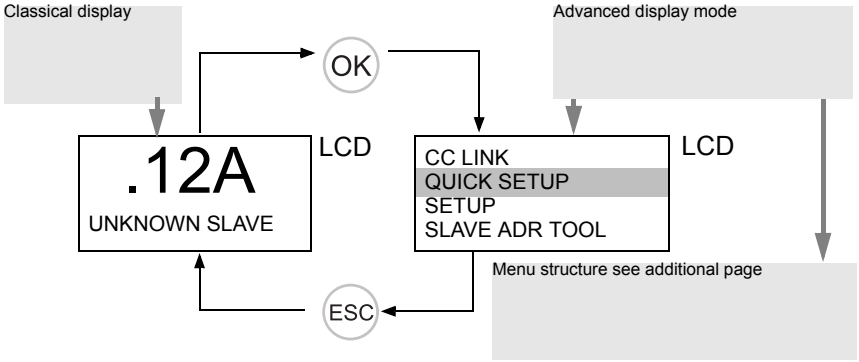
OK, ESC
Changing to the advanced display mode.

For additional information see section <Operation in advanced display mode>.

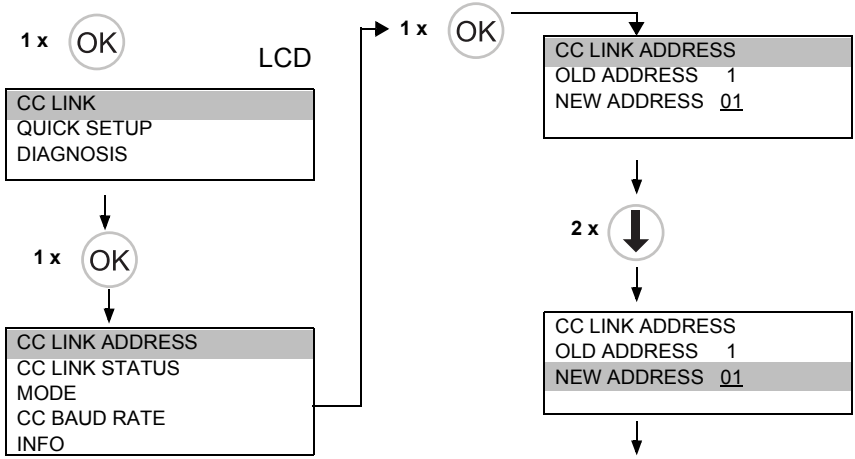
8. Commissioning

8.1 Commissioning via the device

8.1.1 Switching to advanced display mode



8.1.2 Setting the CC-Link address 14



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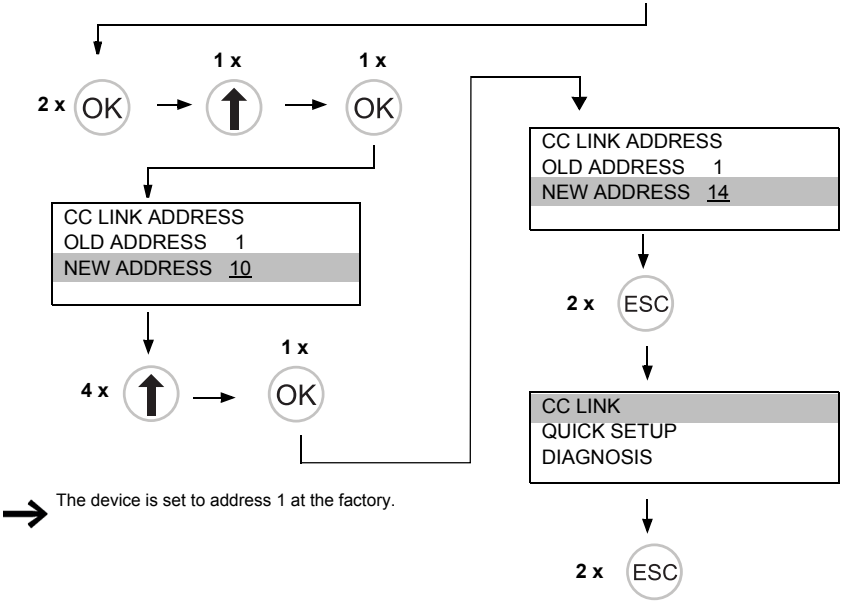
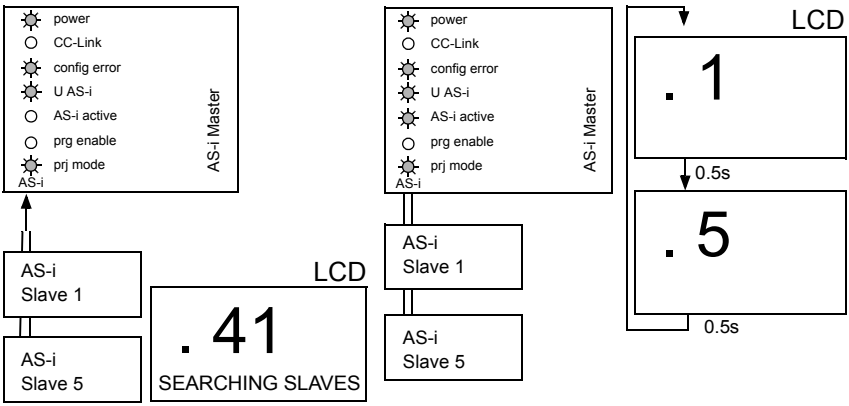


→ The device is set to address 1 at the factory.

New address/baud rate will be used after rebooting the Gateway

8.1.3 Connecting AS-i Slaves



8.1.4 Quick setup

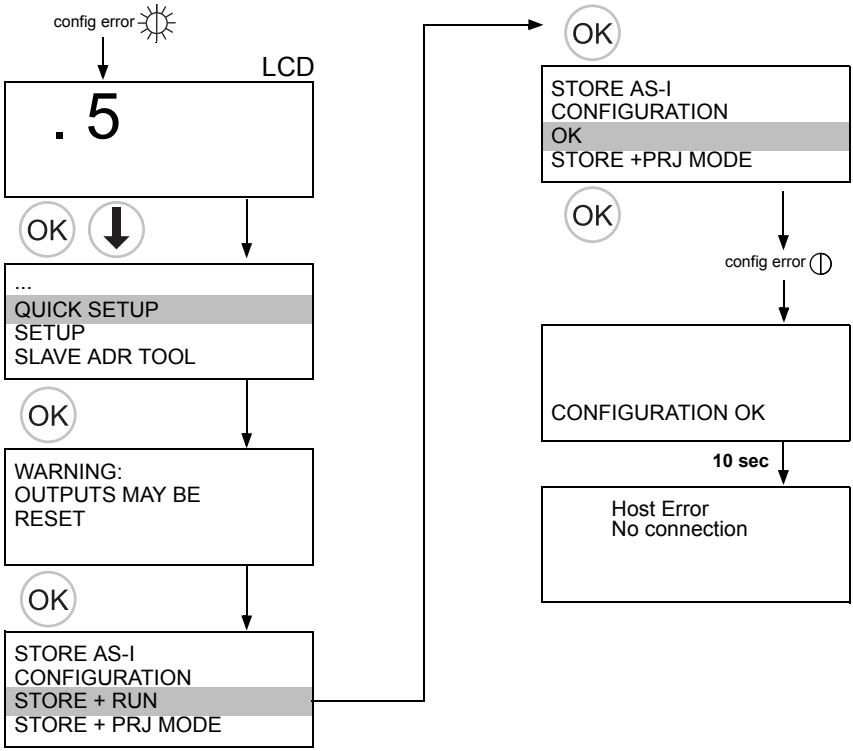
The function **[QUICK SETUP]** *enables simple and quick configuration of all AS-i circuits connected to the AS-i gateway:*

[STORE+RUN]

Saves the current configuration of the connected AS-i slaves as a ***target configuration*** *and moves the gateway to the* ***protected operating mode****.*

[STORE+PRJ MODE]

Saves the current configuration of the connected AS-i slaves as a ***target configuration*** *and moves the gateway to the* ***configuration mode****.*



Hotkey

[STORE+RUN]

config error → Mode **5 sec** → Mode **5 sec** → **CONFIGURATION OK**

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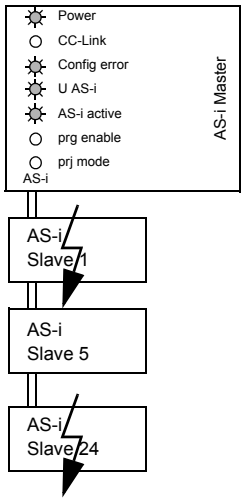
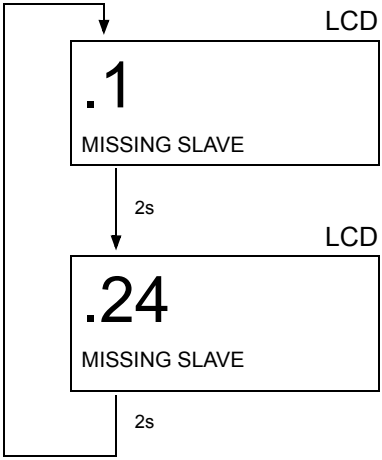
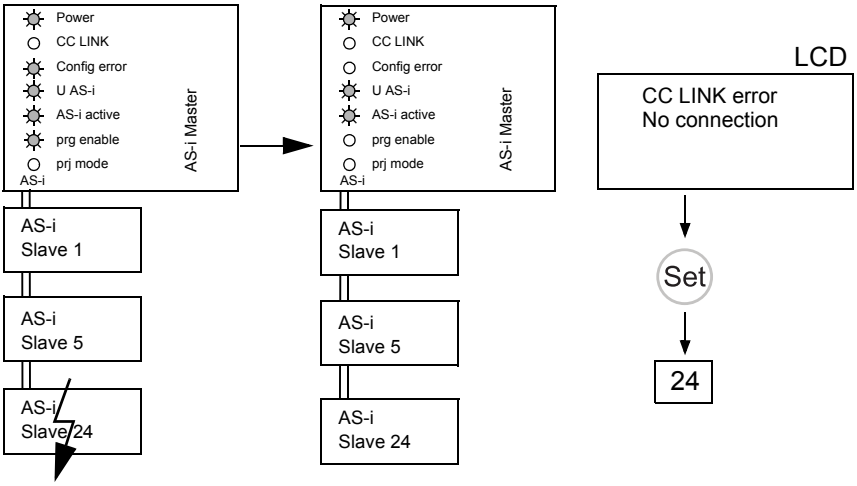
8.2 Error tracing

8.2.1 Faulty slaves





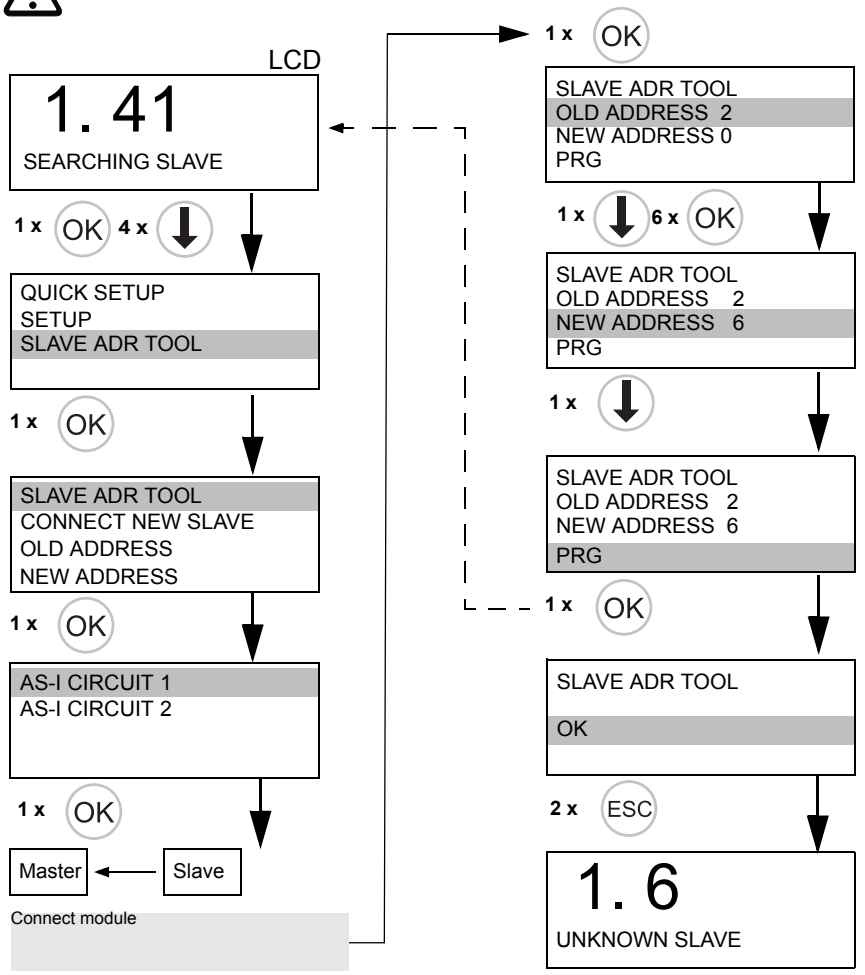
8.2.2 Error display (last error)



8.2.3 Addressing

8.2.3.1 Assigning address 6 to slave currently at address 2

Disconnect field bus!



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- Karte nicht formatiert // Chip card not formatted // Carte à puce pas formatée // Scheda chip non formattata // Tarjeta chip no formateada

NEW CHIPCARD WILL BE FORMATTED DATA WILL BE SYNCHRONIZED

- Karte wird formatiert // Chip card will be formatted // Carte à puce sera formatée // Scheda chip verrà formattata // Tarjeta chip se formateará
- Keine Aktion erforderlich // No action required // Aucune action requise // Nessuna azione richiesta // Ninguna acción requrida

- Konfiguration auf Karte nicht kompatibel mit Gerät // Configuration on chip card not compatible with device // Configuration sur carte à puce non compatible avec dispositif // Configurazione sulla scheda chip non compatibile con il dispositivo // Configuración en la tarjeta chip no compatible con el dispositivo

CHIPCARD NOT COMPATIBLE

- Karte löschen // Clear the card // Supprimer carte // Cancellare scheda chip // Borrar tarjeta chip

- Konfiguration kompatibel (Werkskonfiguration) // Configuration compatible (factory settings) // Configuration compatible (configuration d'usine) // Configurazione compatibile (configurazione di fabbrica) // Configuración compatible (configuración de fábrica)

DATA FROM CHIPCARD TAKEN

- Daten von Karte auf Gerät übertragen // Data transferred from chip card to device // Données transférées de la carte à puce au dispositif // Dati trasferiti dal chip card al dispositivo // Datos transferidos desde chip card de dispositivo
- Keine Aktion erforderlich // No action required // Aucune action requise // Nessuna azione richiesta // Ninguna acción requrida

- Karte leer + formatiert // Chip card empty + formatted // Carte à puce vide + formatée // Scheda chip vuota + formattata // Tarjeta chip vacía + formateada

CHIPCARD FOUND DATA WILL BE SYNCHRONIZED

- Daten werden vom Gerät auf Karte übertragen // Data transferred from device to chip card // Données transférées du dispositif à la carte à puce // Dati trasferiti dal dispositivo al chip card // Datos transferidos desde dispositivo de chip card
- Keine Aktion erforderlich // No action required // Aucune action requise // Nessuna azione richiesta // Ninguna acción requrida

- Konfiguration auf Karte + Gerät gleich // Configuration on chip card + device identical // Configuration sur carte à puce + dispositif identiques // Configurazione sulla scheda chip + sul dispositivo identici // Configuración en el tarjeta chip + dispositivo idénticos

Keine Meldung // No message // Aucun message // Nessun messaggio // Ningún mensaje

- Keine Aktion erforderlich // No action required // Aucune action requise // Nessuna azione richiesta // Ninguna acción requrida

- Konfiguration auf Karte + Gerät ungleich (Werkskonfigration geändert) // Configuration on chip card + device not identical (factory settings changed) // Configuration sur carte à puce + dispositif pas identiques (configuration d'usine modifié) // Configurazione sulla scheda chip + sul dispositivo non identici (configurazione di fabbrica modificate) // Configuración en el tarjeta chip + dispositivo no idénticos (configuración de fabrica modificado)

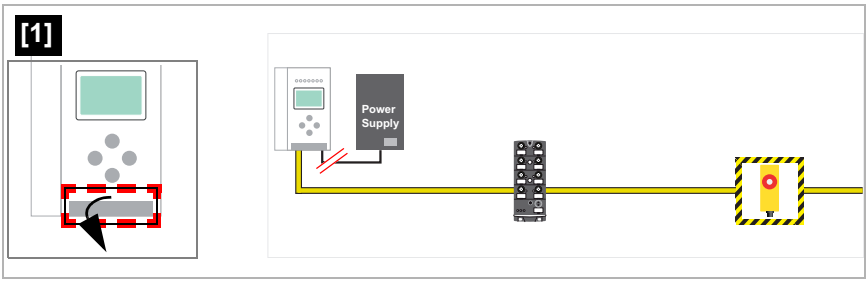
CHIPCARD AND DATA DIFFERENT
CARD->MASTER
MASTER->CARD

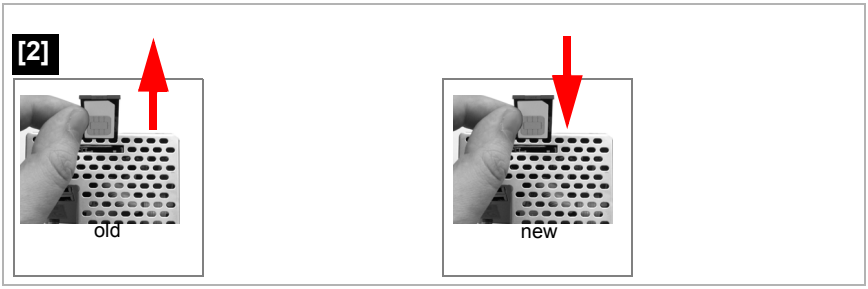
- Daten kopieren
  Karte -> Master oder
  Master -> Karte //
  Copy data
  Card -> Master or
  Master -> Card //
  Copiez données
  Carte -> Maître ou
  Maître -> Carte //
  Copiare dati
  Chipcard -> Master o
  Master -> Chipcard //
  Copiar datos
  TarjetaChip -> Maestro o
  Maestro -> TarjetaChip

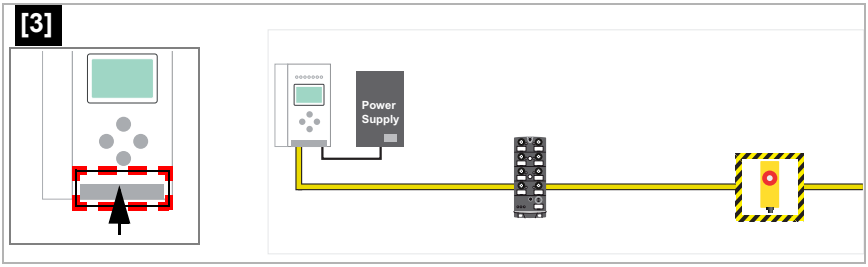
8.2.5 Replacing the chip card

Caution!

Always turn off power before inserting or removing the card!







8.2.6 Using the chip card

The chip card integrated in the AS-i master is used to read-out and to store configuration data.

8.2.6.1 Card unformatted

If an unformatted card is found when the device is started, the following is displayed:

```
NEW CHIPCARD
WILL BE FORMATED
AS-I DATA WILL
BE SYNCHRONIZED
```

The chip card is formatted and then the data copied to the chip card.

8.2.6.2 Data not compatible

If a card is found whose data are incompatible with the device, the following error message is displayed:

```
CHIPCARD NOT
COMPATIBLE
```

8.2.6.3 Card empty

The following message is displayed for an empty card:

```
CHIPCARD FOUND
AS-I DATA WILL
BE SYNCHRONIZED
```

From this time on all changes are made both in the device and on the chip card.

8.2.6.4 Data compatible

When starting with an empty device (e.g. after a factory reset) a non-empty card is found whose data are compatible with the device, the following message is displayed:

```
AS-I DATA FROM
CHIPCARD TAKEN
```

The card configuration is written to the device. From this time on all changes are made both in the device and on the chip card.

8.2.6.5 Data in the device and on the chip card identical

If the card and device are not empty at start and the data are identical, no message is displayed.

8.2.6.6 Data in the device and on the chip card not identical

If the card and device are not empty at start and the data are not identical, an error message is displayed and the card is not synchronized with the device. The following menu is then automatically opened:

```
CHIPCARD AND
AS-I DATA
DIFFERENT
CARD->MASTER
MASTER->CARD
CONTINUE
```

Description

CHIP CARD>MASTER:	Chip card data are copied to the master
MASTER->CHIPCARD:	Master data are copied to the chip card
NEXT:	No change to the data

The menu can be exited by pressing the ESC/Service key without changing the data.

9. Operation in display mode

Information!

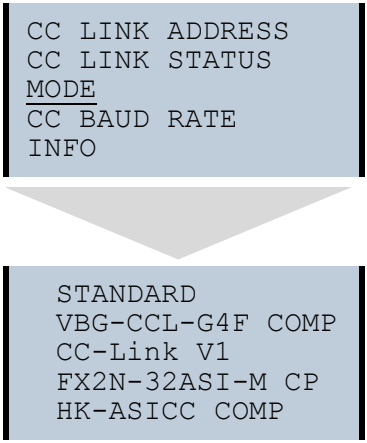
You will find a description of the display menu in the separate document ***"Display_Menue"****.*

10. Data transmission modes

10.1 Selecting the data transmission mode

The selection of the respective data transmission mode takes place in the menu of the AS-i CC-Link Gateway using the buttons and the display.

Main menu || CC-LINK || **MODE** ||



Following modes are supported:

- Standard
- Compatibility modes for:
  - VBG-CCL-G4F COMP
  - CC-Link V1
  - FX2N-32ASI-M CP
  - HK-ASICC COMP

10.2 Summary of modes

	Standard	VBG-CCL-G4F	CC-Link V1	FX2N-32ASI-M	HK-ASICC
Occupied Stations	3	3	4	4	2
Cycle Setting	2	1	1	1	1
Required CC-Link Master	V2	V1	V1	V1	V1
Support of 2 AS-i Circuits	No	No	No	No	No
Support of B-Slaves	Yes	(Yes)	Yes	No	No
Support of AS-i Safety	No	No	No	No	No
Support of Analog Slaves	Yes	Yes	Yes	No	No
Support of AS-i Configuration via CC-Link	Yes	Yes	Yes	No	No

Tab. 10-4. Summary of modes

10.3 Standard mode

- In standard mode, the Gateway occupies 3 stations and has a double cycle setting.
- The last 2 words are reserved for "Message Transmission".
- The AS-i process data is mapped into the Buffer Memory Area (BFM).
- All acyclic requests are handled by "Message Transmission" using cyclic data.

10.3.1 Remote IO Points

Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RXm	reserved															
RXm+1	AS-i Circuit 1: EC-Flags and Fault Detector															
RXm+2	reserved															
…																
RXm+9																

Tab. 10-5. Remote IO Points

Bit	Short Name	Name
0	Cfg. OK	Configuration OK
1	S0	Slave Address 0 Detected
2	Aaasn	Auto Address Assign
3	Aaavail	Auto Address Available
4	CM	Configuration Mode active
5	NA	Normal Operation active
6	APF	AS-i Power fail (AS-i Voltage below 19V)
7	Offl	Offline
8	NPF	No Peripheral Fault
9	reserved	reserved
10	PWRw	Power Warning (AS-i Voltage below 22.5V)
11	reserved	reserved
12	EF	Earth Fault
13	OV	Over-voltage on AS-i
14	Noise	Noise
15	reserved	reserved

Tab. 10-6. EC-Flags and Fault Detector

Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RYm													PM	CM	AAE	OFL
RYm+1	reserved															
…																
RYm+9																

Tab. 10-7. Remote IO Points

Bit	Short Name	Name
0	OFL	Offline
1	AAE	Auto Address Enable
2	CM	Enter Configuration Mode on rising edge
3	PM	Enter Protected Mode on rising edge
4 … 15		reserved

Tab. 10-8. Flags in RYm

10.3.2 Buffer Memory Area

Address	1 Master	
	Read	Write
0 … 7	AS-i 1, Input A+Single Slaves	AS-i 1, Output A+Single Slaves
8 … 15	AS-i 1, Input B Slaves	AS-i 1, Output B Slaves
16 … 23	reserved	

Tab. 10-9. Overview Memory Mapping

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	AS-i 1: Inp. Slv3	AS-i 1: Inp. Slv2	AS-i 1: Inp. Slv1	Flags AS-i 1
RWrm1	AS-i 1: Inp. Slv7	AS-i 1: Inp. Slv6	AS-i 1: Inp. Slv5	AS-i 1: Inp. Slv4
RWrm2	AS-i 1: Inp. Slv11	AS-i 1: Inp. Slv10	AS-i 1: Inp. Slv9	AS-i 1: Inp. Slv8
RWrm3	AS-i 1: Inp. Slv15	AS-i 1: Inp. Slv14	AS-i 1: Inp. Slv13	AS-i 1: Inp. Slv12
RWrm4	AS-i 1: Inp. Slv19	AS-i 1: Inp. Slv18	AS-i 1: Inp. Slv17	AS-i 1: Inp. Slv16
RWrm5	AS-i 1: Inp. Slv23	AS-i 1: Inp. Slv22	AS-i 1: Inp. Slv21	AS-i 1: Inp. Slv20
RWrm6	AS-i 1: Inp. Slv27	AS-i 1: Inp. Slv26	AS-i 1: Inp. Slv25	AS-i 1: Inp. Slv24
RWrm7	AS-i 1: Inp. Slv31	AS-i 1: Inp. Slv30	AS-i 1: Inp. Slv29	AS-i 1: Inp. Slv28
RWrm8	AS-i 1: Inp. Slv3B	AS-i 1: Inp. Slv2B	AS-i 1: Inp. Slv1B	
RWrm9	AS-i 1: Inp. Slv7B	AS-i 1: Inp. Slv6B	AS-i 1: Inp. Slv5B	AS-i 1: Inp. Slv4B
RWrm10	AS-i 1: Inp. Slv11B	AS-i 1: Inp. Slv10B	AS-i 1: Inp. Slv9B	AS-i 1: Inp. Slv8B
RWrm11	AS-i 1: Inp. Slv15B	AS-i 1: Inp. Slv14B	AS-i 1: Inp. Slv13B	AS-i 1: Inp. Slv12B
RWrm12	AS-i 1: Inp. Slv19B	AS-i 1: Inp. Slv18B	AS-i 1: Inp. Slv17B	AS-i 1: Inp. Slv16B
RWrm13	AS-i 1: Inp. Slv23B	AS-i 1: Inp. Slv22B	AS-i 1: Inp. Slv21B	AS-i 1: Inp. Slv20B
RWrm14	AS-i 1: Inp. Slv27B	AS-i 1: Inp. Slv26B	AS-i 1: Inp. Slv25B	AS-i 1: Inp. Slv24B
RWrm15	AS-i 1: Inp. Slv31B	AS-i 1: Inp. Slv30B	AS-i 1: Inp. Slv29B	AS-i 1: Inp. Slv28B
RWrm16	reserved			
…				
RWrm23				

Tab. 10-10. Buffer Memory (Read)

Bit	Name
0	0: No Config Error
1	0: AS-i Power OK
2	0. Normal Operation active
3	0: Protected Mode active

Tab. 10-11. Bits in Flags

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	AS-i 1: Outp. Slv3	AS-i 1: Outp. Slv2	AS-i 1: Outp. Slv1	
RWwm1	AS-i 1: Outp. Slv7	AS-i 1: Outp. Slv6	AS-i 1: Outp. Slv5	AS-i 1: Outp. Slv4
RWwm2	AS-i 1: Outp. Slv11	AS-i 1: Outp. Slv10	AS-i 1: Outp. Slv9	AS-i 1: Outp. Slv8
RWwm3	AS-i 1: Outp. Slv15	AS-i 1: Outp. Slv14	AS-i 1: Outp. Slv13	AS-i 1: Outp. Slv12
RWwm4	AS-i 1: Outp. Slv19	AS-i 1: Outp. Slv18	AS-i 1: Outp. Slv17	AS-i 1: Outp. Slv16
RWwm5	AS-i 1: Outp. Slv23	AS-i 1: Outp. Slv22	AS-i 1: Outp. Slv21	AS-i 1: Outp. Slv20
RWwm6	AS-i 1: Outp. Slv27	AS-i 1: Outp. Slv26	AS-i 1: Outp. Slv25	AS-i 1: Outp. Slv24
RWwm7	AS-i 1: Outp. Slv31	AS-i 1: Outp. Slv30	AS-i 1: Outp. Slv29	AS-i 1: Outp. Slv28
RWwm8	AS-i 1: Outp. Slv3B	AS-i 1: Outp. Slv2B	AS-i 1: Outp. Slv1B	
RWwm9	AS-i 1: Outp. Slv7B	AS-i 1: Outp. Slv6B	AS-i 1: Outp. Slv5B	AS-i 1: Outp. Slv4B
RWwm10	AS-i 1: Outp. Slv11B	AS-i 1: Outp. Slv10B	AS-i 1: Outp. Slv9B	AS-i 1: Outp. Slv8B
RWwm11	AS-i 1: Outp. Slv15B	AS-i 1: Outp. Slv14B	AS-i 1: Outp. Slv13B	AS-i 1: Outp. Slv12B
RWwm12	AS-i 1: Outp. Slv19B	AS-i 1: Outp. Slv18B	AS-i 1: Outp. Slv17B	AS-i 1: Outp. Slv16B
RWwm13	AS-i 1: Outp. Slv23B	AS-i 1: Outp. Slv22B	AS-i 1: Outp. Slv21B	AS-i 1: Outp. Slv20B
RWwm14	AS-i 1: Outp. Slv27B	AS-i 1: Outp. Slv26B	AS-i 1: Outp. Slv25B	AS-i 1: Outp. Slv24B
RWwm15	AS-i 1: Outp. Slv31B	AS-i 1: Outp. Slv30B	AS-i 1: Outp. Slv29B	AS-i 1: Outp. Slv28B
RWwm16	reserved			
…				
RWwm23				

Tab. 10-12. Buffer Memory (Write)

Bit	Name
0	0: No Config Error
1	0: AS-i Power OK
2	0. Normal Operation active
3	0: Protected Mode active

Tab. 10-13. Bits in Flags

10.3.3 Message Transmission

By "Message Transmission", all command interface commands are available (see the separate manual „AS-i 3.0 Command interface“). No commands other than Mailbox commands are supported.

Information!

For details on the Message Transmission protocol, please refer to the CC-Link specification. For more information or PLC program examples, how to use Message Transmission, please refer to the documentation of your CC-Link master in use.

10.4 Compatibility mode for VBG-CCL-G4F

In this mode, 3 stations are occupied using a single cycle setting.

No "Message Transmission" is supported.

All functions of VBG-CCL-G4F are implemented

The AS-i process data or the mailbox is mapped into the Buffer Memory Area (BFM) as done in the VBG-CCL-G4F.

"Message Transmission" is not supported, since VBG-CCL-G4F does not use it.

10.4.1 Remote IO Points

	Remote to Host															
Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RXm	reserved										BfEAck	MbAck	reserved			
RXm+1 … RXm+5	reserved															

Tab. 10-14. Remote IO Points Remote to Host

Bit	**Short Name**	**Name**
0 … 3		reserved
4	MbAck	Acknowledge Bit for Y4
5	BfEAck	Acknowledge Bit for Y5
4 … 15		reserved

Tab. 10-15. Flags in RXm

	Host to Remote															
Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RYm	reserved										BfE	Mb	PM	CM	AAE	OFL
RYm+1 … RYm+5	reserved															

Tab. 10-16. Remote IO Points Host to Remote

Bit	**Short Name**	**Name**
0	OFL	Offline
1	AAE	Auto Address Enable
2	CM	Enter Configuration Mode on rising edge
3	PM	Enter Protected Mode on rising edge
4	Mb	0: BFM used for IO Data only 1: BFM used for Mailbox
5	BfE	0: Enable Use of BFM
4 … 15		reserved

Tab. 10-17. Flags in RYm

10.4.2 Buffer Memory Area

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	AS-i 1: Inp. Slv3	AS-i 1: Inp. Slv2	AS-i 1: Inp. Slv1	Flags
RWrm1	AS-i 1: Inp. Slv7	AS-i 1: Inp. Slv6	AS-i 1: Inp. Slv5	AS-i 1: Inp. Slv4
RWrm2	AS-i 1: Inp. Slv11	AS-i 1: Inp. Slv10	AS-i 1: Inp. Slv9	AS-i 1: Inp. Slv8
RWrm3	AS-i 1: Inp. Slv15	AS-i 1: Inp. Slv14	AS-i 1: Inp. Slv13	AS-i 1: Inp. Slv12
RWrm4	AS-i 1: Inp. Slv19	AS-i 1: Inp. Slv18	AS-i 1: Inp. Slv17	AS-i 1: Inp. Slv16
RWrm5	AS-i 1: Inp. Slv23	AS-i 1: Inp. Slv22	AS-i 1: Inp. Slv21	AS-i 1: Inp. Slv20
RWrm6	AS-i 1: Inp. Slv27	AS-i 1: Inp. Slv26	AS-i 1: Inp. Slv25	AS-i 1: Inp. Slv24
RWrm7	AS-i 1: Inp. Slv31	AS-i 1: Inp. Slv30	AS-i 1: Inp. Slv29	AS-i 1: Inp. Slv28
RWrm8	AS-i 1: Inp. Slv3B	AS-i 1: Inp. Slv2B	AS-i 1: Inp. Slv1B	
RWrm9	AS-i 1: Inp. Slv7B	AS-i 1: Inp. Slv6B	AS-i 1: Inp. Slv5B	AS-i 1: Inp. Slv4B
RWrm10	AS-i 1: Inp. Slv11B	AS-i 1: Inp. Slv10B	AS-i 1: Inp. Slv9B	AS-i 1: Inp. Slv8B
RWrm11	AS-i 1: Inp. Slv15B	AS-i 1: Inp. Slv14B	AS-i 1: Inp. Slv13B	AS-i 1: Inp. Slv12B

Tab. 10-18. Buffer Memory (Read) when using IO Data only Mode

Bit	Name
0	0: No Config Error
1	0: AS-i Power OK
2	0. Normal Operation active
3	0: Protected Mode active

Tab. 10-19. Bits in Flags

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	Mailbox: Circuit		Mailbox: Command	
RWrm1	Mailbox: Response Byte 2		Mailbox: Response Byte 1	
RWrm2	Mailbox: Response Byte 4		Mailbox: Response Byte 3	
RWrm3	Mailbox: Response Byte 6		Mailbox: Response Byte 5	
RWrm4	Mailbox: Response Byte 8		Mailbox: Response Byte 7	
RWrm5	Mailbox: Response Byte 10		Mailbox: Response Byte 9	
RWrm6	Mailbox: Response Byte 12		Mailbox: Response Byte 11	
RWrm7	Mailbox: Response Byte 14		Mailbox: Response Byte 13	
RWrm8	Mailbox: Response Byte 16		Mailbox: Response Byte 15	
RWrm9	Mailbox: Response Byte 18		Mailbox: Response Byte 17	
RWrm10	Mailbox: Response Byte 20		Mailbox: Response Byte 19	
RWrm11	Mailbox: Response Byte 22		Mailbox: Response Byte 21	

Tab. 10-20. Buffer Memory (Read) when using Mailbox Mode

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	AS-i 1: Outp. Slv3	AS-i 1: Outp. Slv2	AS-i 1: Outp. Slv1	Flags
RWwm1	AS-i 1: Outp. Slv7	AS-i 1: Outp. Slv6	AS-i 1: Outp. Slv5	AS-i 1: Outp. Slv4
RWwm2	AS-i 1: Outp. Slv11	AS-i 1: Outp. Slv10	AS-i 1: Outp. Slv9	AS-i 1: Outp. Slv8
RWwm3	AS-i 1: Outp. Slv15	AS-i 1: Outp. Slv14	AS-i 1: Outp. Slv13	AS-i 1: Outp. Slv12
RWwm4	AS-i 1: Outp. Slv19	AS-i 1: Outp. Slv18	AS-i 1: Outp. Slv17	AS-i 1: Outp. Slv16
RWwm5	AS-i 1: Outp. Slv23	AS-i 1: Outp. Slv22	AS-i 1: Outp. Slv21	AS-i 1: Outp. Slv20
RWwm6	AS-i 1: Outp. Slv27	AS-i 1: Outp. Slv26	AS-i 1: Outp. Slv25	AS-i 1: Outp. Slv24
RWwm7	AS-i 1: Outp. Slv31	AS-i 1: Outp. Slv30	AS-i 1: Outp. Slv29	AS-i 1: Outp. Slv28
RWwm8	AS-i 1: Outp. Slv3B	AS-i 1: Outp. Slv2B	AS-i 1: Outp. Slv1B	
RWwm9	AS-i 1: Outp. Slv7B	AS-i 1: Outp. Slv6B	AS-i 1: Outp. Slv5B	AS-i 1: Outp. Slv4B
RWwm10	AS-i 1: Outp. Slv11B	AS-i 1: Outp. Slv10B	AS-i 1: Outp. Slv9B	AS-i 1: Outp. Slv8B
RWwm11	AS-i 1: Outp. Slv15B	AS-i 1: Outp. Slv14B	AS-i 1: Outp. Slv13B	AS-i 1: Outp. Slv12B

Tab. 10-21. Buffer Memory (Write) when using IO Data only Mode

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	Mailbox: Circuit		Mailbox: Command	
RWwm1	Mailbox: Request Byte 2		Mailbox: Request Byte 1	
RWwm2	Mailbox: Request Byte 4		Mailbox: Request Byte 3	
RWwm3	Mailbox: Request Byte 6		Mailbox: Request Byte 5	
RWwm4	Mailbox: Request Byte 8		Mailbox: Request Byte 7	
RWwm5	Mailbox: Request Byte 10		Mailbox: Request Byte 9	
RWwm6	Mailbox: Request Byte 12		Mailbox: Request Byte 11	
RWwm7	Mailbox: Request Byte 14		Mailbox: Request Byte 13	
RWwm8	Mailbox: Request Byte 16		Mailbox: Request Byte 15	
RWWm9	Mailbox: Request Byte 18		Mailbox: Request Byte 17	
RWwm10	Mailbox: Request Byte 20		Mailbox: Request Byte 19	
RWwm11	Mailbox: Request Byte 22		Mailbox: Request Byte 21	

Tab. 10-22. Buffer Memory (Write) when using Mailbox Mode

10.5 CC-Link V1 Mode

In this mode, 4 stations are occupied using a single cycle setting.

No "Message Transmission" is supported.

This mode is an extended version of the Compatibility Mode for VBG-CCL-G4F.

The AS-i process data or the mailbox is mapped into the Buffer Memory Area (BFM) as done in the VBG-CCL-G4F.

"Message Transmission" is not supported.

10.5.1 Remote IO Points

	Remote to Host															
Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RXm	reserved										BfEAck	MbAck	reserved			
RXm+1 … RXm+7	reserved															

Tab. 10-23. Remote IO Points Remote to Host

Bit	**Short Name**	**Name**
0 … 3		reserved
4	MbAck	Acknowledge Bit for Y4
5	BfEAck	Acknowledge Bit for Y5
4 … 15		reserved

Tab. 10-24. Flags in RXm

	Host to Remote															
Address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RYm	reserved										BfE	Mb	PM	CM	AAE	OFL
RYm+1 … RYm+7	reserved															

Tab. 10-25. Remote IO Points Host to Remote

Bit	**Short Name**	**Name**
0	OFL	Offline
1	AAE	Auto Address Enable
2	CM	Enter Configuration Mode on rising edge
3	PM	Enter Protected Mode on rising edge
4	Mb	0: BFM used for IO Data only 1: BFM used for Mailbox
5	BfE	0: Enable Use of BFM
4 … 15		reserved

Tab. 10-26. Flags in RYm

10.5.2 Buffer Memory Area

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	AS-i 1: Inp. Slv3	AS-i 1: Inp. Slv2	AS-i 1: Inp. Slv1	Flags
RWrm1	AS-i 1: Inp. Slv7	AS-i 1: Inp. Slv6	AS-i 1: Inp. Slv5	AS-i 1: Inp. Slv4
RWrm2	AS-i 1: Inp. Slv11	AS-i 1: Inp. Slv10	AS-i 1: Inp. Slv9	AS-i 1: Inp. Slv8
RWrm3	AS-i 1: Inp. Slv15	AS-i 1: Inp. Slv14	AS-i 1: Inp. Slv13	AS-i 1: Inp. Slv12
RWrm4	AS-i 1: Inp. Slv19	AS-i 1: Inp. Slv18	AS-i 1: Inp. Slv17	AS-i 1: Inp. Slv16
RWrm5	AS-i 1: Inp. Slv23	AS-i 1: Inp. Slv22	AS-i 1: Inp. Slv21	AS-i 1: Inp. Slv20
RWrm6	AS-i 1: Inp. Slv27	AS-i 1: Inp. Slv26	AS-i 1: Inp. Slv25	AS-i 1: Inp. Slv24
RWrm7	AS-i 1: Inp. Slv31	AS-i 1: Inp. Slv30	AS-i 1: Inp. Slv29	AS-i 1: Inp. Slv28
RWrm8	AS-i 1: Inp. Slv3B	AS-i 1: Inp. Slv2B	AS-i 1: Inp. Slv1B	
RWrm9	AS-i 1: Inp. Slv7B	AS-i 1: Inp. Slv6B	AS-i 1: Inp. Slv5B	AS-i 1: Inp. Slv4B
RWrm10	AS-i 1: Inp. Slv11B	AS-i 1: Inp. Slv10B	AS-i 1: Inp. Slv9B	AS-i 1: Inp. Slv8B
RWrm11	AS-i 1: Inp. Slv15B	AS-i 1: Inp. Slv14B	AS-i 1: Inp. Slv13B	AS-i 1: Inp. Slv12B
RWrm12	AS-i 1: Inp. Slv19B	AS-i 1: Inp. Slv18B	AS-i 1: Inp. Slv17B	AS-i 1: Inp. Slv16B
RWrm13	AS-i 1: Inp. Slv23B	AS-i 1: Inp. Slv22B	AS-i 1: Inp. Slv21B	AS-i 1: Inp. Slv20B
RWrm14	AS-i 1: Inp. Slv27B	AS-i 1: Inp. Slv26B	AS-i 1: Inp. Slv25B	AS-i 1: Inp. Slv24B
RWrm15	AS-i 1: Inp. Slv31B	AS-i 1: Inp. Slv30B	AS-i 1: Inp. Slv29B	AS-i 1: Inp. Slv28B

Tab. 10-27. Buffer Memory (Read) when using IO Data only Mode

Bit	Name
0	0: No Config Error
1	0: AS-i Power OK
2	0. Normal Operation active
3	0: Protected Mode active

Tab. 10-28. Bits in Flags

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Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	Mailbox: Circuit		Mailbox: Command	
RWrm1	Mailbox: Response Byte 2		Mailbox: Response Byte 1	
RWrm2	Mailbox: Response Byte 4		Mailbox: Response Byte 3	
RWrm3	Mailbox: Response Byte 6		Mailbox: Response Byte 5	
RWrm4	Mailbox: Response Byte 8		Mailbox: Response Byte 7	
RWrm5	Mailbox: Response Byte 10		Mailbox: Response Byte 9	
RWrm6	Mailbox: Response Byte 12		Mailbox: Response Byte 11	
RWrm7	Mailbox: Response Byte 14		Mailbox: Response Byte 13	
RWrm8	Mailbox: Response Byte 16		Mailbox: Response Byte 15	
RWrm9	Mailbox: Response Byte 18		Mailbox: Response Byte 17	
RWrm10	Mailbox: Response Byte 20		Mailbox: Response Byte 19	
RWrm11	Mailbox: Response Byte 22		Mailbox: Response Byte 21	
RWrm12	Mailbox: Response Byte 24		Mailbox: Response Byte 23	
RWrm13	Mailbox: Response Byte 26		Mailbox: Response Byte 25	
RWrm14	Mailbox: Response Byte 28		Mailbox: Response Byte 27	
RWrm15	Mailbox: Response Byte 30		Mailbox: Response Byte 29	

Tab. 10-29. Buffer Memory (Read) when using Mailbox Mode

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	AS-i 1: Outp. Slv3	AS-i 1: Outp. Slv2	AS-i 1: Outp. Slv1	Flags
RWwm1	AS-i 1: Outp. Slv7	AS-i 1: Outp. Slv6	AS-i 1: Outp. Slv5	AS-i 1: Outp. Slv4
RWwm2	AS-i 1: Outp. Slv11	AS-i 1: Outp. Slv10	AS-i 1: Outp. Slv9	AS-i 1: Outp. Slv8
RWwm3	AS-i 1: Outp. Slv15	AS-i 1: Outp. Slv14	AS-i 1: Outp. Slv13	AS-i 1: Outp. Slv12
RWwm4	AS-i 1: Outp. Slv19	AS-i 1: Outp. Slv18	AS-i 1: Outp. Slv17	AS-i 1: Outp. Slv16
RWwm5	AS-i 1: Outp. Slv23	AS-i 1: Outp. Slv22	AS-i 1: Outp. Slv21	AS-i 1: Outp. Slv20
RWwm6	AS-i 1: Outp. Slv27	AS-i 1: Outp. Slv26	AS-i 1: Outp. Slv25	AS-i 1: Outp. Slv24
RWwm7	AS-i 1: Outp. Slv31	AS-i 1: Outp. Slv30	AS-i 1: Outp. Slv29	AS-i 1: Outp. Slv28
RWwm8	AS-i 1: Outp. Slv3B	AS-i 1: Outp. Slv2B	AS-i 1: Outp. Slv1B	
RWwm9	AS-i 1: Outp. Slv7B	AS-i 1: Outp. Slv6B	AS-i 1: Outp. Slv5B	AS-i 1: Outp. Slv4B
RWwm10	AS-i 1: Outp. Slv11B	AS-i 1: Outp. Slv10B	AS-i 1: Outp. Slv9B	AS-i 1: Outp. Slv8B
RWwm11	AS-i 1: Outp. Slv15B	AS-i 1: Outp. Slv14B	AS-i 1: Outp. Slv13B	AS-i 1: Outp. Slv12B
RWwm12	AS-i 1: Outp. Slv19B	AS-i 1: Outp. Slv18B	AS-i 1: Outp. Slv17B	AS-i 1: Outp. Slv16B
RWwm13	AS-i 1: Outp. Slv23B	AS-i 1: Outp. Slv22B	AS-i 1: Outp. Slv21B	AS-i 1: Outp. Slv20B
RWwm14	AS-i 1: Outp. Slv27B	AS-i 1: Outp. Slv26B	AS-i 1: Outp. Slv25B	AS-i 1: Outp. Slv24B
RWwm15	AS-i 1: Outp. Slv31B	AS-i 1: Outp. Slv30B	AS-i 1: Outp. Slv29B	AS-i 1: Outp. Slv28B

Tab. 10-30. Buffer Memory (Write) when using IO Data only Mode

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	Mailbox: Circuit		Mailbox: Command	
RWwm1	Mailbox: Request Byte 2		Mailbox: Request Byte 1	
RWwm2	Mailbox: Request Byte 4		Mailbox: Request Byte 3	
RWwm3	Mailbox: Request Byte 6		Mailbox: Request Byte 5	
RWwm4	Mailbox: Request Byte 8		Mailbox: Request Byte 7	
RWwm5	Mailbox: Request Byte 10		Mailbox: Request Byte 9	
RWwm6	Mailbox: Request Byte 12		Mailbox: Request Byte 11	
RWwm7	Mailbox: Request Byte 14		Mailbox: Request Byte 13	
RWwm8	Mailbox: Request Byte 16		Mailbox: Request Byte 15	
RWwm9	Mailbox: Request Byte 18		Mailbox: Request Byte 17	
RWwm10	Mailbox: Request Byte 20		Mailbox: Request Byte 19	
RWwm11	Mailbox: Request Byte 22		Mailbox: Request Byte 21	
RWwm12	Mailbox: Request Byte 24		Mailbox: Request Byte 23	
RWwm13	Mailbox: Request Byte 26		Mailbox: Request Byte 25	
RWwm14	Mailbox: Request Byte 28		Mailbox: Request Byte 27	
RWwm15	Mailbox: Request Byte 30		Mailbox: Request Byte 29	

Tab. 10-31. Buffer Memory (Write) when using Mailbox Mode

10.6 Compatibility Mode for FX2N-32ASI-M

To ease the migration of applications using the obsolete Mitsubishi FX2N-32ASI-M Module (AS-i Master 2.04) for FX2N PLCs, a compatibility mode is implemented.

In this mode, 4 stations are occupied using a single cycle setting (CC-Link V1).

No "Message Transmission" is supported.

Not all functions of FX2N-32ASI-M are implemented:

- No Command Buffer
- No List of Slaves with Configuration Differences
- No Module Error Status, no Module Identifier (Specific to FX2N Series)

10.6.1 Remote IO Points

not used

10.6.2 Buffer Memory Area

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	AS-i 1: Inp. Slv3	AS-i 1: Inp. Slv2	AS-i 1: Inp. Slv1	Flags
RWrm1	AS-i 1: Inp. Slv7	AS-i 1: Inp. Slv6	AS-i 1: Inp. Slv5	AS-i 1: Inp. Slv4
RWrm2	AS-i 1: Inp. Slv11	AS-i 1: Inp. Slv10	AS-i 1: Inp. Slv9	AS-i 1: Inp. Slv8
RWrm3	AS-i 1: Inp. Slv15	AS-i 1: Inp. Slv14	AS-i 1: Inp. Slv13	AS-i 1: Inp. Slv12
RWrm4	AS-i 1: Inp. Slv19	AS-i 1: Inp. Slv18	AS-i 1: Inp. Slv17	AS-i 1: Inp. Slv16
RWrm5	AS-i 1: Inp. Slv23	AS-i 1: Inp. Slv22	AS-i 1: Inp. Slv21	AS-i 1: Inp. Slv20
RWrm6	AS-i 1: Inp. Slv27	AS-i 1: Inp. Slv26	AS-i 1: Inp. Slv25	AS-i 1: Inp. Slv24
RWrm7	AS-i 1: Inp. Slv31	AS-i 1: Inp. Slv30	AS-i 1: Inp. Slv29	AS-i 1: Inp. Slv28
RWrm8	EC-Flags			
RWrm9	reserved			
RWrm10	LDS Slave 15 … 12	LDS Slave 11 … 8	LDS Slave 7 … 4	LDS Slave 3 … 0
RWrm11	LDS Slave 31 … 28	LDS Slave 27 … 24	LDS Slave 23 … 20	LDS Slave 19 … 16
RWrm12	LAS Slave 15 … 12	LAS Slave 11 … 8	LAS Slave 7 … 4	LAS Slave 3 … 0
RWrm13	LAS Slave 31 … 28	LAS Slave 27 … 24	LAS Slave 23 … 20	LAS Slave 19 … 16
RWrm14	LPS Slave 15 … 12	LPS Slave 11 … 8	LPS Slave 7 … 4	LPS Slave 3 … 0
RWrm15	LPS Slave 31 … 28	LPS Slave 27 … 24	LPS Slave 23 … 20	LPS Slave 19 … 16

Tab. 10-32. Buffer Memory (Read)

Bit	Name
0	0: No Config Error
1	0: AS-i Power OK
2	0. Normal Operation active
3	0: Protected Mode active

Tab. 10-33. Bits in Flags

Bit	Short Name	Name
0	Cfg. Err	Configuration Error
1	S0	Slave Address 0 detected
2	Aaasn	Auto Address Assign
3	Aaavail	Auto Address Available
4	CM	Configuration Mode active
5	!NA	Normal Operation not active
6	APF	AS-i Power fail (AS-i Voltage below 19V)
7	Offl	Offline
8	NPF	No Peripheral Fault
9 … 15		reserved

Tab. 10-34. EC-Flags

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	AS-i 1: Outp. Slv3	AS-i 1: Outp. Slv2	AS-i 1: Outp. Slv1	Flags
RWwm1	AS-i 1: Outp. Slv7	AS-i 1: Outp. Slv6	AS-i 1: Outp. Slv5	AS-i 1: Outp. Slv4
RWwm2	AS-i 1: Outp. Slv11	AS-i 1: Outp. Slv10	AS-i 1: Outp. Slv9	AS-i 1: Outp. Slv8
RWwm3	AS-i 1: Outp. Slv15	AS-i 1: Outp. Slv14	AS-i 1: Outp. Slv13	AS-i 1: Outp. Slv12
RWwm4	AS-i 1: Outp. Slv19	AS-i 1: Outp. Slv18	AS-i 1: Outp. Slv17	AS-i 1: Outp. Slv16
RWwm5	AS-i 1: Outp. Slv23	AS-i 1: Outp. Slv22	AS-i 1: Outp. Slv21	AS-i 1: Outp. Slv20
RWwm6	AS-i 1: Outp. Slv27	AS-i 1: Outp. Slv26	AS-i 1: Outp. Slv25	AS-i 1: Outp. Slv24
RWwm7	AS-i 1: Outp. Slv31	AS-i 1: Outp. Slv30	AS-i 1: Outp. Slv29	AS-i 1: Outp. Slv28
RWwm8	reserved			
RWwm9	reserved			
RWwm10	reserved			
RWwm11	reserved			
RWwm12	reserved			
RWwm13	reserved			
RWwm14	reserved			
RWwm15	reserved			

Tab. 10-35. Buffer Memory (Write)

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10.7 Compatibility Mode for HK-ASICC

To ease the migration of existing Applications with HK-ASICC a Mode with compatible IO-Data mapping is integrated.

In this mode, 2 stations are occupied using a single cycle setting (CC-Link V1).

No "Message Transmission" is supported.

Not all functions of HK-ASICC are implemented

- No Status Command Area

AS-i input/output area is supported in compatibility mode.

10.7.1 Remote IO Points

not used

10.7.2 Buffer Memory Area

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWrm0	AS-i 1: Inp. Slv3	AS-i 1: Inp. Slv2	AS-i 1: Inp. Slv1	reserved
RWrm1	AS-i 1: Inp. Slv7	AS-i 1: Inp. Slv6	AS-i 1: Inp. Slv5	AS-i 1: Inp. Slv4
RWrm2	AS-i 1: Inp. Slv11	AS-i 1: Inp. Slv10	AS-i 1: Inp. Slv9	AS-i 1: Inp. Slv8
RWrm3	AS-i 1: Inp. Slv15	AS-i 1: Inp. Slv14	AS-i 1: Inp. Slv13	AS-i 1: Inp. Slv12
RWrm4	AS-i 1: Inp. Slv19	AS-i 1: Inp. Slv18	AS-i 1: Inp. Slv17	AS-i 1: Inp. Slv16
RWrm5	AS-i 1: Inp. Slv23	AS-i 1: Inp. Slv22	AS-i 1: Inp. Slv21	AS-i 1: Inp. Slv20
RWrm6	AS-i 1: Inp. Slv27	AS-i 1: Inp. Slv26	AS-i 1: Inp. Slv25	AS-i 1: Inp. Slv24
RWrm7	AS-i 1: Inp. Slv31	AS-i 1: Inp. Slv30	AS-i 1: Inp. Slv29	AS-i 1: Inp. Slv28

Tab. 10-36. Buffer Memory (Read)

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	AS-i 1: Outp. Slv3	AS-i 1: Outp. Slv2	AS-i 1: Outp. Slv1	reserved
RWwm1	AS-i 1: Outp. Slv7	AS-i 1: Outp. Slv6	AS-i 1: Outp. Slv5	AS-i 1: Outp. Slv4
RWwm2	AS-i 1: Outp. Slv11	AS-i 1: Outp. Slv10	AS-i 1: Outp. Slv9	AS-i 1: Outp. Slv8
RWwm3	AS-i 1: Outp. Slv15	AS-i 1: Outp. Slv14	AS-i 1: Outp. Slv13	AS-i 1: Outp. Slv12
RWwm4	AS-i 1: Outp. Slv19	AS-i 1: Outp. Slv18	AS-i 1: Outp. Slv17	AS-i 1: Outp. Slv16
RWwm5	AS-i 1: Outp. Slv23	AS-i 1: Outp. Slv22	AS-i 1: Outp. Slv21	AS-i 1: Outp. Slv20
RWwm6	AS-i 1: Outp. Slv27	AS-i 1: Outp. Slv26	AS-i 1: Outp. Slv25	AS-i 1: Outp. Slv24
RWwm7	AS-i 1: Outp. Slv31	AS-i 1: Outp. Slv30	AS-i 1: Outp. Slv29	AS-i 1: Outp. Slv28

Tab. 10-37. Buffer Memory (Write)

11. Advanced Diagnostics for AS-i Masters

The advanced AS-i diagnostics is intended to localize occasionally occurring configuration errors and to determine the quality of data transmission on AS-i without using additional diagnostics tools.

AS-i Control Tools, a MS-Windows software designed to simplify AS-i installation and used to program AS-i Control, enables operation of the advanced diagnostics functions (LCS, error counters, and LOS).

11.1 List of corrupted AS-i Slaves (LCS)

The **LCS** contains the information from the list of slaves with configuration error (**Delta list**). In addition to the list of configured slaves (**LPS**), the list of detected slaves (**LDS**), and the list of activated slaves (**LAS**), the AS-i master creates a fourth list, the list of corrupted slaves (**LCS**) containing advanced diagnostics data used to diagnose the causes for intermittently occurring configuration errors on AS-i. This list contains entries for all AS-i slaves that were responsible for at least one intermittent configuration error since the list was last read or since the AS-i master was turned on. Furthermore, intermittent AS-i power failures are listed in the **LCS** at the position of AS-i slave with address ’0’.

Information!

Whenever the LCS is read it is deleted from memory.

Information!

The last intermittent configuration error can also be displayed on the AS-i master:

Pressing the "Set" button on the AS-i master initiates the display of the AS-i slave responsible for the last intermittent configuration error. If a intermittent AS-i power failure occurred, the display shows 39 after pressing the "Set" button.

This function is only available if the device is in normal operating mode of the protected mode (display empty) or in the off-line phase (Display: "40").

11.2 Protocol analysis: Counters for corrupted data telegrams

The AS-i master with advanced diagnostics provides a counter for telegram repetitions for each AS-i slave. The counter counts up every time a corrupted data telegram has been found, making it possible to determine the quality of the transmission if only a few telegrams are corrupt and the AS-i slave never caused a configuration error.

Information!

The counter values are read via the host interface and will be deleted after they were read.

Displaying the protocol analysis is possible through the AS-i Control Tools software by using the command "Master | AS-i Diagnostics".

11.3 Clear the diagnostic buffer

The diagnostic buffer in the device can only be deleted when there is **no** field bus connection to the higher-level controller. If in an existing bus connection yet the 'clear diagnostic buffer' is pressed, the diagnosis can only be deleted in the web interface and not on the device.

11.4 Offline Phase for Configuration Errors

The AS-i masters with advanced diagnostics offer the possibility to set themselves into the offline phase when a configuration error occurs and thus are able to transition the AS-i network into a safe operational state. This ensures a quick reaction to a configuration error and the host can be relieved from this task. If any problems occur on the AS-i network, the AS-i masters can independently switch the AS-interface into a safe state.

There are two different ways to parameterize the AS-i master for this feature:

- Any configuration error occurring on AS-i switches the master from regular operation in protected mode into the offline phase.
- o . A list with the addresses of slaves that can potential initiate the off-line phase is defined (list of offline slaves LOS).

The user can decide how the system should react to a configuration error on AS-i. Thus, the AS-i master can be set to the offline phase for critical AS-i slaves, whereas for less critical slaves only the error message is sent to the host, but AS-i is still running.

Like the advanced diagnostics, the parameterization "offline phase on configuration error" is also supported by "AS-i-Control-Tools"
(Command | Characteristics | Offline because of configuration error).

There are two options to reset the error message "OFFLINE BY LOS:

1. Deleting the complete LOS list on the affected AS-i network ("CLEAR ALL").
2. Power reset on the affected AS-i network.

11.5 Functions of the AS-i Fault Detector

11.5.1 Earth/Ground Fault Detector

An Earth/Ground Fault exists when the voltage $\mathbf{U_{GND}}$ (Nominal value of U_{GND}=0,5 U_{AS-i}.) is outside of the following range:

$$\mathbf{10\%\ U_{AS-i} \leq U_{GND} \leq 90\%\ U_{AS-i}}$$

This error substantially limits the noise immunity of the AS-i communication.

Ground faults are indicated on the master´s display as well as in AS-i Control Tools.

Information!

To recognize ground faults the master must be grounded with its machine ground connection.

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11.5.2 Noise Detector

The noise detector detects AC voltages on AS-i, that are not initiated by an AS-i master or AS-i slaves. These interference voltages can cause telegram disturbances.

A frequent cause are insufficiently shielded frequency inverters or improperly routed cables.

Noises is indicated on the master´s display as well as in AS-i Control Tools.

11.5.3 Over-voltage Detector

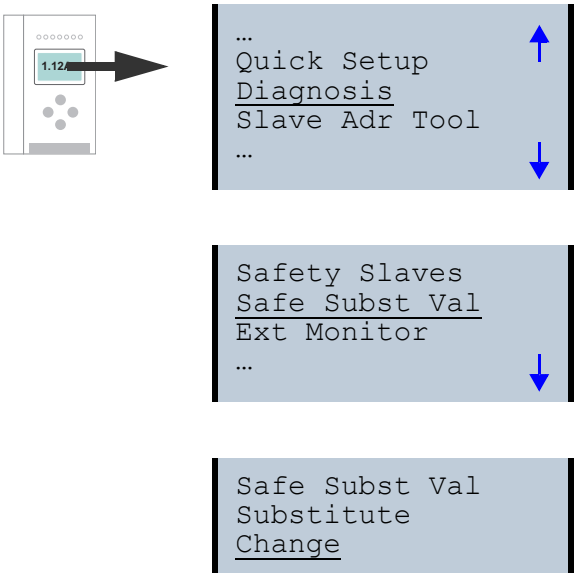
Over-voltages are present if the conductors of an AS-i network that normally are routed electrically symmetrical with respect to machine ground, are strongly electrically raised. A cause can for example be startup procedures of large consumers.

However, over-voltages do generally not interfere with the AS-i communication, but can under certain circumstances cause incorrect sensor signals.

Over-voltages are indicated on the master´s display as well as in the AS-i Control Tools.

11.6 Substitute values

SAFE SUBST VAL (Substitute values for input data from safe slaves)



No Substitute

This function enables activation/deactivation of the code substitute function for safe slaves.

The status can be changed by selecting **Change**.

SUBSTITUTE (values)

The safety code sequences are replaced by the following values:

Both channels are in the safe state:	0000bin
Channel 1 is in the safe state:	0011bin
Channel 2 is in the safe state:	1100bin
No channel is in the safe state:	1111bin

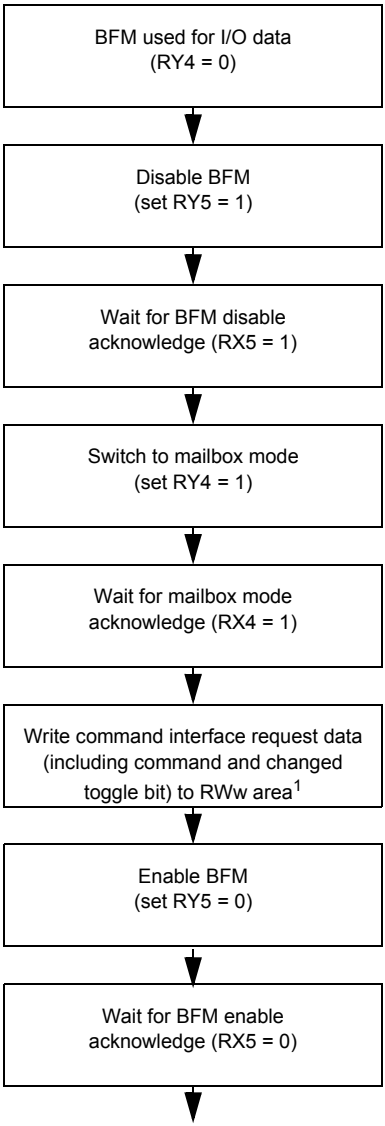
NO SUBSTITUTE

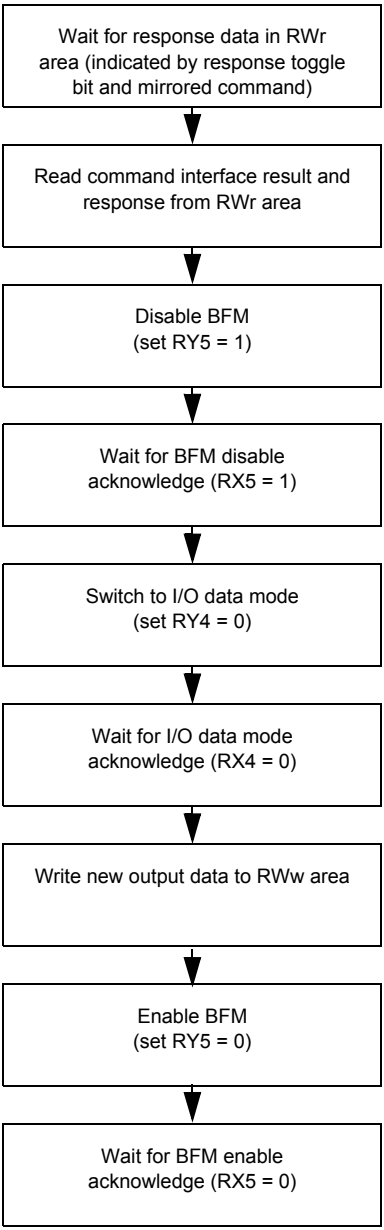
The safety code sequences are transmitted via the input data.

12. Accessing command interface

12.1 Using BFM

This example shows one method to access command interface when it is mapped into the cyclic Buffer Memory Area (when using VBG-CCL-G4F mode or CC-Link V1 mode):




Wait for response data in RWr area (indicated by response toggle bit and mirrored command)
Read command interface result and response from RWr area
Disable BFM (set RY5 = 1)
Wait for BFM disable acknowledge (RX5 = 1)
Switch to I/O data mode (set RY4 = 0)
Wait for I/O data mode acknowledge (RX4 = 0)
Write new output data to RWw area
Enable BFM (set RY5 = 0)
Wait for BFM enable acknowledge (RX5 = 0)

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1.) For example, when the first command used is reading the list of detected slaves (command 0x46), write the following to the RWw area:

Address	Bit 15 … 12	Bit 11 … 8	Bit 7 … 4	Bit 3 … 0
RWwm0	0x80 (command interface: toggle bit and circuit)		0x46 (command interface: command)	

Tab. 12-38.

The rest of the RWw area is unused for this command since there are no further request bytes necessary.

If there is no error during command execution and there are slaves 1A, 2A and 3A detected, the response data in the RWr area will be:

Address	Bit 15..12	Bit 11..8	Bit 7..4	Bit 3..0
RWrm0	0x80 (command interface: mirrored toggle bit and result)		0x46 (command interface: mirrored command)	
RWrm1	0x00 (command interface: response byte 2)		0x0E (command interface: response byte 1)	
RWrm2	0x00 (command interface: response byte 4)		0x00 (command interface: response byte 3)	
RWrm3	0x00 (command interface: response byte 6)		0x00 (command interface: response byte 5)	
RWrm4	0x00 (command interface: response byte 8)		0x00 (command interface: response byte 7)	

Tab. 12-39.

The rest of the RWr area is unused for this command since the response data does not need all of the RWr area.

For a list of all command interface commands and the request/response data structures, please refer to the separate manual "AS-i 3.0 Command interface".

When using standard mode, the command interface commands can be accessed by using message transmission.

12.2 Using message transmission

Message transmission is a method to map acyclic requests into the cyclic CC-Link process data. All data transfers are initiated by the CC-Link master module. To find out whether message transmission is supported or not by the master, please refer to the documentation of the CC-Link master in use.

For example, the Mitsubishi CC-Link master module QJ61BT11N for the Mitsubishi Q-series supports the dedicated instruction G(P).RDMSG to perform message transmission. A detailed description of this instruction can be found in the user's manual of the QJ61BT11N.

This instruction needs various parameters such as the CC-Link station number of the target remote device and a buffer to hold the response data. These are described in the QJ61BT11N user's manual.

The send data and response data structure of the command interface commands is independent of the CC-Link master in use and is described in the separate manual "AS-i 3.0 Command interface".

For example, when reading the list of detected slaves (command 0x46) and the register D1 of the Mitsubishi QCPU is given as parameter to G(P).RDMSG as start number of the device that stores the data to be sent, the following data must be stored in D1:

Address	Bit 15..12	Bit 11..8	Bit 7..4	Bit 3..0
D1	0x00 (command interface: toggle bit and circuit)		0x46 (command interface: command)	

Tab. 12-40.

Note that the toggle bit doesn't have to be changed for each new request.

The send data size in bytes must be set to 2 and given as parameter to G(P).RDMSG.

When the register D10 of the Mitsubishi QCPU is given as parameter to G(P).RDMSG as start number of the device to store the received data, the receivable data size in bytes for G(P).RDMSG is set to at least 10, there is no error during command execution and there are slaves 1A, 2A and 3A detected the following will be stored starting from register D10:

Address	Bit 15..12	Bit 11..8	Bit 7..4	Bit 3..0
D10	0x00 (command interface: mirrored toggle bit and result)		0x46 (command interface: mirrored command)	
D11	0x00 (command interface: response byte 2)		0x0E (command interface: response byte 1)	
D12	0x00 (command interface: response byte 4)		0x00 (command interface: response byte 3)	
D13	0x00 (command interface: response byte 6)		0x00 (command interface: response byte 5)	
D14	0x00 (command interface: response byte 8)		0x00 (command interface: response byte 7)	

Tab. 12-41.

The device given as parameter to G(P).RDMSG to store the received data size in bytes will be set to 10 by the system.

For a list of all command interface commands and the request/response data structures, please refer to the separate manual "AS-i 3.0 Command interface".

13. Codes indicated by the display

In the basic state of the configuration mode, the addresses of all detected slaves are displayed in two-second intervals. A blank display indicates that the LDS (List of Detected Slaves) is empty, no slaves were detected.

In the basic state of the protected operating mode, the display is either blank or displays the address of a faulty assignment.

During manual address programming, the slave address display has a different meaning (see also chapter "Operating in advanced display mode").

All displayed numbers bigger than 31 which can not be interpreted as a slave address are status or error messages of the master. They have the following meanings:

39	Advanced AS-i diagnostics, error is displayed after pressing the "Set" button: it is a short-term voltage breakdown on AS-i occurred.
40	The AS-i master is in offline phase.
41	The AS-i master is in detection phase.
42	The AS-i master is in activation phase.
43	The AS-i master starts the normal operating mode.
68	Hardware error: disturbed internal communication.
69	Hardware error: disturbed internal communication.
70	Hardware error: The AS-i master's EEPROM cannot be written.
71	Wrong PIC-type.
72	Hardware error: wrong PIC-processor.
73	Hardware error: wrong PIC-processor.
74	Checksum error in the EEPROM.
75	Error in the internal RAM.
76	Error in the external RAM.
77	AS-i control software error: Stack overflow (AS-i control II)
78	AS-i control software error: checksum error in the control program. "control checksum": checksumm in Control III C program (bin.file) not correct. The file is possibly damaged. "control exec err": error in Control III C program. "control watchdog": watchdog predetermined in Control III C program has expired . "control incomp": Control III C program from another gateway type loaded (e.g. Ethernet IP in Profibus gateway).

79	Checksum error in the data menu. "breakpoint": Control III C program in break point.
80	Error while attempting to exit the configuration mode: A slave with address zero exists.
81	General error while changing a slave address
82	The front panel operation is blocked. Until repowering-up the device can only be accessed from the host via the interface.
83	Program reset of the AS-i Control program: The AS-i Control program is being read from the EEPROM and copied into the RAM.
88	Display test while starting up the AS-i master
90	Error while changing a slave address in protected operating mode: No slave with address 0 existing.
91	Error while changing slave address: Target address is already used.
92	Error while changing slave address: New address could not be set.
93	Error while changing slave address: New address could only be stored volatile in the slave.
94	Error while changing the slave address in protected operating mode: Slave has wrong configuration data.
95	The error 95 is caused by a superfluous slave and not by a missing slave. That is why the slave address is occupied by this superfluous slave. (In the protected mode the slave addresses which caused any configuration error can be displayed by pressing the SET button. AS-i master without graphical display are not able to differentiate between a missing slave, an incorrect slave or a redundant slave. All incorrect addresses are displayed. By pressing the SET button 5 sec. the displayed address starts to flash. Pressing the SET button again the master attempts to program the slave at the address 0 to the incorrect address.)

14. Glossary

A/B slave

An AS-i slave with extended addressing. The address range of an A/B slave extends from 1A to 31A and 1B to 31B. As the master needs the fourth output data bit for switching between A and B address, A/B slaves only have three output data bits maximum.

Activation phase

In the activation phase the detected slaves are activated by sending the parameter. This is indicated by a "42" on the Master's Display. This phase takes only 10 ms, tops, to short to be displayed.

AS-i Power Fail

Voltage drop on the AS-i line; If the voltage drops below a specific value, the master changes to the ⇒ Offline phase.

Initiation phase

After the initial data exchange with all AS-i slaves the master is looking for new slaves. For this purpose an inquiring call is sent to one AS-i address. If a reply is received, the master tries to read the ⇒ current configuration of the slave. Depending on the mode (⇒ protected mode or ⇒ configuration mode) and on the current configuration, the detected slave will be activated.

After each data exchange with all AS-i slaves exactly one inquiring call is sent to one slave address. Hence, the AS-i cycle always includes one more telegram than the number of activated slaves (⇒ LAS).

Autoprog flags

Auto Address Enable; flag from the operating system to the AS-i Master.
With this flag, automatic addressing can be enabled or disabled. This flag is saved in non-volatile memory in the Master.

Auto Address Assign, Auto Address Possible; flag from the AS-i Master to the operating system.
Automatic programming is not disabled and no configuration error was found.
If a slave fails, it could be addressed automatically.

Auto Address Available, flag from the AS-i Master to the operating system. Exactly one AS-i slave is missing and the automatic single node replacement is not disabled.
If at this point a slave with the address 0 and the profile of the missing slave is connected, it automatically receives the address of the missing slave.

I/O code

The first digit of the slave profile, which indicates how many in- and outputs the slave has. A 4I/4O slave has for example a “7”, and a slave with 4 digital inputs a "0".

Detection phase

In the detection phase, after the startup the master is scanning for AS-i slaves. The master remains in this phase until at least one slave was detected. If the master remains in the detection phase no slave was found. Most of the time, the reason for this is a wrong power supply or a wiring error.

The detection phase is indicated by code "41".

Protected mode

In protected operating mode only those slaves that are registered in the ⇒ LPS and whose current configuration matches the target configuration are activated.

Also see ⇒ configuration mode. This mode is intended for normal operation, since all AS-i protective measures are activated.

ID code

The ID code is set by the slave manufacturer and cannot be changed. The AS-i Association determines the ID codes which are assigned for a particular class of slaves. For example, all ⇒ *A/B slaves* have ID code “A“.

ID1 Code, extended ID1 code

The ID1 code is set by the slave manufacturer. In contrast to the other codes, which determine the profile, it can be changed from the master or using an addressing device. The user should however only use this feature in exceptional circumstances, since otherwise *configuration errors* may occur.

In the case of A/B slaves, the MSB of the ID1 code is used for distinguishing between the A and the B address. Therefore, only the lowest 3 bits are relevant for these slaves.

Since this code was not introduced until AS-i Specification 2.1, it is also referred to as extended ID1 code.

ID2 Code, extended ID2 code

The ID2 code is set by the slave manufacturer and cannot be changed. The AS-i Association determines the ID2 codes, which are assigned for a particular class of slaves. For example, all 2-channel 16 bit input slaves having an S-7-3 bit code use ID2 code “D”. Since this code was not introduced until AS-i Specification 2.1, it is also referred to as extended ID2 code.

Current configuration

The configuration data of all slaves detected by the master. The configuration data of a slave, the ⇒ slave profile, consists of:

⇒ IO code, ⇒ ID code, ⇒ extended ID1code , ⇒ extended ID2 code.

Current parameter

The AS-i parameter that have most recently been sent to the AS-i slave, as opposed to ⇒ permanent parameters.

Configuration Error/Config Error

An configuration error is displayed if the target and the current configuration of the connected slaves do not match. A configuration error could be due to the following:

Missing slave:A slave entered in the ⇒ LPS is not available

Wrong type of slave:The ⇒ slave profile of the connected slave does not comply with the configuration.

Unknown slave: A connected slave is not entered in the ⇒ LPS.

LAS - List of Activated Slaves

The master exchanges I/O data with the slaves entered in the LAS. In protected mode only the detected slaves (⇒ LDS) that are expected by the master and are entered in the ⇒ LPS are activated. In configuration mode all slaves entered in the ⇒ LDS are activated.

LDS - List of Detected Slaves

If the master was able to read the ⇒ slave profile, the slave is entered in the LDS.

LPF - List of Peripheral Faults

The list of peripheral faults was introduced with specification 2.1. This list includes an entry for each slave that signals a ⇒ peripheral fault.

LPS - List of Projected Slaves

The list of projected slaves includes all slaves expected by the master. When saving the current configuration all entries in the ⇒ LDS are stored in the LPS (except for a slave with address 0).

Offline phase

In the offline phase all input and output data is reset. This phase is entered after the startup of the master, after a ⇒ AS-i power fail, and during the transition from the ⇒ configuration mode to the ⇒ protected mode.

Furthermore, the master can actively be transfered into the offline phase by setting the offline flag.

During the offline phase, masters with a LED display show code "40".

Peripheral fault

A peripheral fault is indicated by a red flashing LED on the master and on the slave.

Depending on the slave type this indicates an overflow, an overload of the sensor's power supply, or another fault regarding the periphery of the slave.

Permanent configuration

The configuration data of all expected slaves stored in the master (⇒ slave profile). If the ⇒ permanent configuration differs from the ⇒ actual configuration, a configuration error exists.

Permanent parameter

The parameters saved in the master and sent to the slave after startup of the master during the ⇒ activation phase.

Configuration mode

During the configuration mode the master exchanges data with all connected slaves, no matter which of the slaves were configured. Thus, in this mode it is possible to operate a system without the necessity to configure it before.

See also ⇒ protected mode.

Single Slave

A single slave can in contrast to a ⇒ *A/B slave* only be addressed from range 1 to 31; the fourth output data bit can be used. All slaves as defined by the older AS-i Specification 2.0 are single slaves.

There are however also single slaves as defined by Specification 2.1, for example the new 16 bit slaves.

Slave profile

Configuration data for a slave, consisting of:

⇒ *I/O configuration* and ⇒ *ID-Code*, as well as ⇒ *extended ID1-Code* and ⇒ *extended ID2-Code*.

The slave profile is used to distinguish between various slave classes. It is specified by the AS-i Association and set by the slave manufacturer.

14.4.2015

AS-i 2.0 slaves do not have extended ID1 and ID2 codes. A 2.1 or 3.0 AS-interface master enters in this case an “F” for each of the extended ID1 and ID2 codes.

15. Reference List

15.1 Manual: “AS-i 3.0 Command Interface“

This Manual contains a detailed description of the AS-i 3.0 Command Interface.

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