Manual

AUTOMATION

WAGO-I/O-SYSTEM 750

KNX/EIB/TP1 Module

753-646

Device Mode

Version 1.0.9

WAGO®
INNOVATIVE CONNECTIONS

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally protected by trademark or patent.

Table of Contents

1 Notes about this Documentation 5
1.1 Validity of this Documentation 5
1.2 Copyright 5
1.3 Symbols 6
1.4 Number Notation 8
1.5 Font Conventions 8
2 Important Notes 9
2.1 Legal Bases 9
2.1.1 Subject to Changes 9
2.1.2 Personnel Qualifications 9
2.1.3 Use of the 750 Series in Compliance with Underlying Provisions 9
2.1.4 Technical Condition of Specified Devices 10
2.2 Safety Advice (Precautions) 11
3 Device Description 13
3.1 View 15
3.2 Connectors 16
3.3 Display Elements 17
3.4 Operating Elements 18
3.5 Schematic Diagram 19
3.6 Technical Data 20
3.6.1 Device Data 20
3.6.2 Supply 20
3.6.3 KNX Communication 20
3.7 Approvals 21
3.8 Standards and Guidelines 21
4 Mounting 22
4.1 Mounting Sequence 22
4.2 Inserting and Removing Devices 23
4.2.1 Inserting I/O Module 23
4.2.2 Removing the I/O Module 24
4.3 I/O Modules with Pluggable Wiring Level (Series 753) 25
4.3.1 Coding 26
4.3.2 Connector Removal 28
5 Function Description 29
5.1 Process Data and Data Transfer 29
5.2 Application of Module 753-646 with Programm. Fieldbus Controllers 30
5.2.1 Overview Function Blocks 31
5.2.2 Data Point Types (DPTs) 32
5.3 Data Exchange between KNX/EIB/TP1 Module and IEC Application 33
5.4 Startup Behavior of the KNX/EIB/TP1 Module in Device Mode 33
5.5 Installation Notes 35
List of Figures 38
List of Tables 39

1 Notes about this Documentation

Note

Keep this documentation!
The operating instructions are part of the product and shall be kept for the entire lifetime of the device. They shall be transferred to each subsequent owner or user of the device. Care must also be taken to ensure that any supplement to these instructions are included, if applicable.

1.1 Validity of this Documentation

This documentation is only applicable to the I/O module 753-646 (KNX/EIB/TP1 Module) of the WAGO-I/O-SYSTEM 750 series.

The I/O module 753-646 shall only be installed and operated according to the instructions in this manual and in the manual for the used fieldbus coupler/controller.

NOTICE

Consider power layout of the WAGO-I/O-SYSTEM 750!
In addition to these operating instructions, you will also need the manual for the used fieldbus coupler/controller, which can be downloaded at www.wago.com. There, you can obtain important information including information on electrical isolation, system power and supply specifications.

1.2 Copyright

1.3 Symbols

⚠ DANGER

Personal Injury!
Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ DANGER

Personal Injury Caused by Electric Current!
Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Personal Injury!
Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Personal Injury!
Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Damage to Property!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

NOTICE

Damage to Property Caused by Electrostatic Discharge (ESD)!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

Note

Important Note!
Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.

Information

Additional Information:
Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

1.4 Number Notation

Table 1: Number notation

Number code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

1.5 Font Conventions

Table 2: Font conventions

Font type	Indicates
italic	Names of paths and data files are marked in italic-type. e.g.: *C:\Programme\WAGO-I/O-CHECK*
Menu	Menu items are marked in bold letters. e.g.: **Save**
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: **File** > **New**
Input	Designation of input or optional fields are marked in bold letters, e.g.: **Start of measurement range**
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under **Start of measurement range**.
[Button]	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: **[Input]**
[Key]	Keys are marked with bold letters in square brackets. e.g.: **[F5]**

2 Important Notes

This section includes an overall summary of the most important safety requirements and notes that are mentioned in each individual section. To protect your health and prevent damage to devices as well, it is imperative to read and carefully follow the safety guidelines.

2.1 Legal Bases

2.1.1 Subject to Changes

WAGO Kontakttechnik GmbH & Co. KG reserves the right to provide for any alterations or modifications that serve to increase the efficiency of technical progress. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

2.1.2 Personnel Qualifications

All sequences implemented on Series 750 devices may only be carried out by electrical specialists with sufficient knowledge in automation. The specialists must be familiar with the current norms and guidelines for the devices and automated environments.

All changes to the coupler or controller should always be carried out by qualified personnel with sufficient skills in PLC programming.

2.1.3 Use of the 750 Series in Compliance with Underlying Provisions

Couplers, controllers and I/O modules found in the modular WAGO-I/O-SYSTEM 750 receive digital and analog signals from sensors and transmit them to the actuators or higher-level control systems. Using programmable controllers, the signals can also be (pre-) processed.

The components have been developed for use in an environment that meets the IP20 protection class criteria. Protection against finger injury and solid impurities up to 12.5 mm diameter is assured; protection against water damage is not ensured. Unless otherwise specified, operation of the components in wet and dusty environments is prohibited.

Operating 750 Series components in home applications without further measures is only permitted if they meet the emission limits (emissions of interference) according to EN 61000-6-3. You will find the relevant information in the section on "WAGO-I/O-SYSTEM 750" → "System Description" → "Technical Data" in the manual for the used fieldbus coupler/controller.

Appropriate housing (per 94/9/EG) is required when operating the WAGO-I/O-SYSTEM 750 in hazardous environments. Please note that a prototype test certificate must be obtained that confirms the correct installation of the system in a housing or switch cabinet.

2.1.4 Technical Condition of Specified Devices

The components to be supplied Ex Works, are equipped with hardware and software configurations, which meet the individual application requirements. WAGO Kontakttechnik GmbH & Co. KG will be exempted from any liability in case of changes in hardware or software as well as to non-compliant usage of components.

Please send your request for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

2.2 Safety Advice (Precautions)

For installing and operating purposes of the relevant device to your system the following safety precautions shall be observed:

DANGER

Do not work on components while energized!
All power sources to the device shall be switched off prior to performing any installation, repair or maintenance work.

DANGER

Installation only in appropriate housings, cabinets or in electrical operation rooms!
The WAGO-I/O-SYSTEM 750 and its components are an open system. As such, install the system and its components exclusively in appropriate housings, cabinets or in electrical operation rooms. Allow access to such equipment and fixtures to authorized, qualified staff only by means of specific keys or tools.

NOTICE

Not for use in telecommunication circuits!
Only use devices equipped with ETHERNET or RJ-45 connectors in LANs. Never connect these devices with telecommunication networks.

NOTICE

Replace defective or damaged devices!
Replace defective or damaged device/module (e.g., in the event of deformed contacts), since the long-term functionality of device/module involved can no longer be ensured.

NOTICE

Protect the components against materials having seeping and insulating properties!
The components are not resistant to materials having seeping and insulating properties such as: aerosols, silicones and triglycerides (found in some hand creams). If you cannot exclude that such materials will appear in the component environment, then install the components in an enclosure being resistant to the above-mentioned materials. Clean tools and materials are imperative for handling devices/modules.

NOTICE

Cleaning only with permitted materials!
Clean soiled contacts using oil-free compressed air or with ethyl alcohol and leather cloths.

NOTICE

Do not use any contact spray!
Do not use any contact spray. The spray may impair contact area functionality in connection with contamination.

NOTICE

Do not reverse the polarity of connection lines!
Avoid reverse polarity of data and power supply lines, as this may damage the devices involved.

NOTICE

Avoid electrostatic discharge!
The devices are equipped with electronic components that you may destroy by electrostatic discharge when you touch. Pay attention while handling the devices to good grounding of the environment (persons, job and packing).

3 Device Description

The KNX/EIB/TP1 module 753-646, a.k.a. KNX module, provides the integration of two-wire TP1 networks or individual KNX devices into all relevant WAGO building automation controllers.

The KNX module can be operated in the operating modes Device mode or Router mode. In a KNX IP controller, the module can assume either the device or router mode. When using a different WAGO controller, the module will operate in device mode only.

If one or more KNX modules are operated in a KNX IP controller, it behaves as a normal KNX device (device mode) within the TP1 network. This is also the case when used with a different WAGO controller. The position, upstream or downstream, of the KNX module is irrelevant.

The controller and the module are coupled via the internal data bus. The module also features four termination points for the connection of the KNX bus line (two **KNX +** in red and two **KNX –** in dark gray). As per EIBA/KNX Association, a standard MSR conductor (e.g., PYCYM 2x2x0.8) or a telecommunications cable (e.g., J-Y(St)Y 2x2x0.8) is recommended for the KNX bus line (red and black wires). The bus line is installed in free topology (ring topologies may not be created). In addition, the conductor length of the bus line is limited, and maximum conductor lengths between bus devices may not be exceeded, therefore, general KNX directives must be adhered to (see also KNX Standard 3/2/2).

The I/O module has two programming buttons for parameterization in device mode.
The engineering tool software (ETS) requests the actuation during activation of the KNX module. And, together with the WAGO-specific ETS3 PlugIn, this software is used for the activation and configuration of KNX devices.

Eight colored LED's on the modules’ enclosure signal active and inactive operating modes, the data transfer via KNX and the module bus, the presence of a KNX bus voltage, and internal states or fault conditions of the module (see chapter „Display Elements“).

Note

Note the compatibility with couplers/controllers!
Not all controllers are supported by the KNX/EIB/TP1 module 753-646 at the moment (update 08/2010).

The KNX module does **not** work with the following controllers:

- INTERBUS controller (750-804)
- DeviceNet controller (750-806)
- MODBUS controller (750-812, -814, -815, -816)

The utilization of the module on couplers is excluded.

Information

Additional Information
Detailed notes to the WAGO ETS3 PlugIn and the PlugIn itself can be found on the website http://www.wago.com in Downloads → Building automation

3.1 View

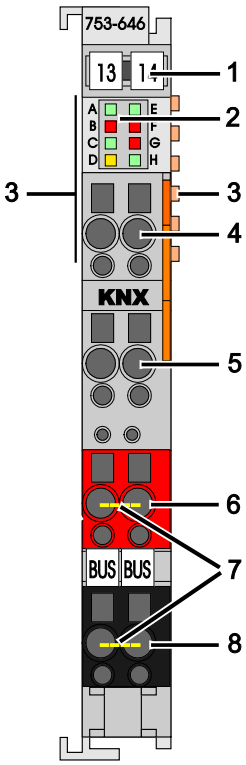


Figure 1: View

Table 3: Legend for "View" figure

No	Description	Meaning	For details see Section
1	---	Marking options using the Mini-WSB	---
2	A...H	Status LEDs	“Device Description” > “Display Elements”
3	---	Data contacts	“Mounting” > “Connect Devices”
4	1, 5	Not connected	---
5	2, 6	Programming button	“Device Description” > “Operating Elements”
6	3, 7	+ KNX bus	“Device Description” > “Connectors“
7	---	Attention: Plug internally bridged	---
8	4, 8	- KNX bus	“Device Description” > “Connectors”

3.2 Connectors

Table 4: Connectors

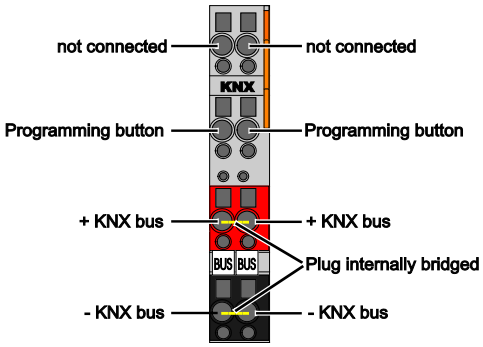


Figure 2: Connectors

Connector	Channel	Function
1	---	Not connected
2	---	Programming button
3	*	+ KNX bus
4	*	- KNX bus
5	---	Not connected
6	---	Programming button
7	*	+ KNX bus
8	*	- KNX bus

* The KNX module is equipped with a bidirectional, logical communication channel via the terminals KNX+/KNX-.

3.3 Display Elements

Table 5: Display elements

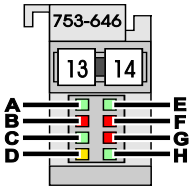


Figure 3:
Display elements

LED	Name	State	Function
A green	Router mode	off	Operating mode Router not active
		on	Operating mode Router active
		flashing	Synchronization
B red	KNX programming mode	off	KNX programming mode not active
		on	KNX programming mode active
		flashing	Checksum error
C green	Data transfer internal bus	off	Internal data bus data transfer not active
		flashing	Internal data bus data transfer active
D yellow	Data transfer KNX	off	KNX data transfer not active
		flashing	KNX data transfer active
E green	Device mode	off	Device mode not active
		on	Device mode active
		flashing	Synchronization
F red	Buffer overflow	off	No buffer overflow
		on	Overflow
G red	Internal fault	off	No fault
		on	Checksum error / device not configured
H green	KNX bus voltage	off	KNX bus voltage not available
		on	KNX bus voltage available

3.4 Operating Elements

The I/O module has two programming button connections (see figure below) for parameterization of the KNX module in the device mode.

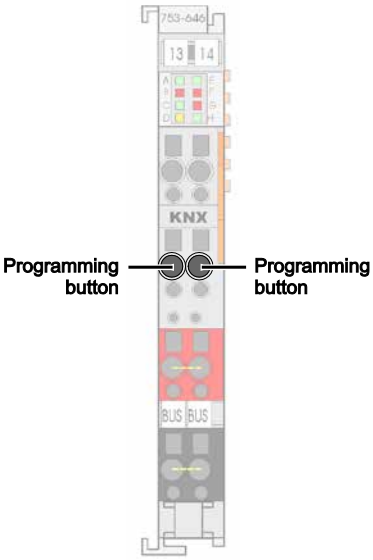


Figure 4: Programming button

Actuation of the buttons is requested by the engineering tool software (ETS) during startup of the module.

A temporary electrical connection is established between these two programming button connectors (2 and 6), via a wire jumper for example, activating the programming mode.

3.5 Schematic Diagram

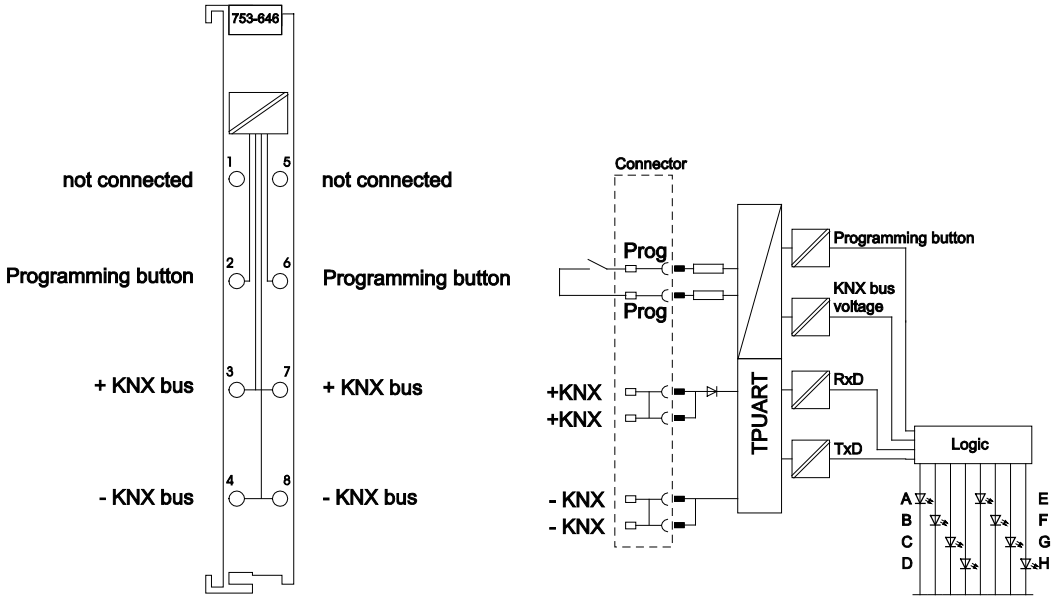


Figure 5: Schematic Diagram

3.6 Technical Data

3.6.1 Device Data

Table 6: Technical data – Device data

Width	12 mm
Weight	approx. 55 g (incl. connector)

3.6.2 Supply

Table 7: Technical data – Supply

Voltage supply (KNX)	via KNX power supply unit
Current consumption (KNX)	5 mA
Voltage supply (internal)	via system voltage DC/DC
Current consumption (internal)	max. 25 mA
Isolation	2,5 kV rms

3.6.3 KNX Communication

Table 8: Technical data – KNX

KNX specification	1.0
Internal data width	24 byte, of which 14 byte for KNX data
Data transmission rate (KNX)	9,6 KBaud
Programming	with WAGO-I/O-*PRO* CAA
Commissioning (KNX side)	with ETS3 PlugIn; programming button bridge 2/6
Diagnostic information	via FbKNX_Master_646 function block
Fault behavior	via FbKNX_Master_646 function block
Device mode	
Number of communication objects	253
Number of group addresses	254
Number of associations	254
Supported DPTs	All (*acc. to KNX Specification 03_07_02 Data Point Types V 1.0)

3.7 Approvals

The following approvals have been granted to 753-646 I/O modules:

Conformity Marking

KNX certified

The following approvals are pending for 753-646 I/O modules:

$_{C}UL_{US}$	UL508	
GL (Germanischer Lloyd)		Cat. A, B, C, D (EMC 1)

Information

More Information about Approvals
Detailed references to the approvals are listed in the document "Overview Approvals **WAGO-I/O-SYSTEM 750**", which you can find on the DVD “AUTOMATION Tools and Docs” (order no. 0888-0412) or via the internet under: www.wago.com → Documentation → WAGO-I/O-SYSTEM 750 → System Description.

3.8 Standards and Guidelines

EMC CE-Immunity to interference	acc. to EN 61000-6-2: 2001
EMC CE-Emission of interference	acc. to EN 61000-6-3: 2007

4 Mounting

4.1 Mounting Sequence

All system components can be snapped directly on a carrier rail in accordance with the European standard EN 50022 (DIN 35).

The reliable positioning and connection is made using a tongue and groove system. Due to the automatic locking, the individual components are securely seated on the rail after installation.

Starting with the coupler/controller, the I/O modules are mounted adjacent to each other according to the project design. Errors in the design of the node in terms of the potential groups (connection via the power contacts) are recognized, as the I/O modules with power contacts (male contacts) cannot be linked to I/O modules with fewer power contacts.

⚠ CAUTION

Risk of injury due to sharp-edged male contacts!
The male contacts are sharp-edged. Handle the module carefully to prevent injury.

NOTICE

Connect the I/O modules in the required order!
Never plug I/O modules from the direction of the end terminal. A ground wire power contact, which is inserted into a terminal without contacts, e.g. a 4-channel digital input module, has a decreased air and creepage distance to the neighboring contact in the example DI4.

NOTICE

Assemble the I/O modules in rows only if the grooves are open!
Please take into consideration that some I/O modules have no or only a few power jumper contacts. The design of some modules does not allow them to be physically assembled in rows, as the grooves for the male contacts are closed at the top.

Note

Don't forget the end module!
Always plug an end module 750-600 onto the end of the fieldbus node! You must always use an end module at all fieldbus nodes with the WAGO I/O System 750 fieldbus couplers/controllers to guarantee proper data transfer.

4.2 Inserting and Removing Devices

DANGER

Use caution when interrupting the PE!
Make sure that people or equipment are not placed at risk when removing an I/O module and the associated PE interruption. To prevent interruptions, provide ring feeding of the ground conductor, see section "Grounding/Ground Conductor" in manual "System Description WAGO-I/O-SYSTEM 750".

NOTICE

Perform work on devices only if the system is de-energized!
Working on devices when the system is energized can damage the devices. Therefore, turn off the power supply before working on the devices.

4.2.1 Inserting I/O Module

1. Position the I/O module so that the tongue and groove joints to the fieldbus coupler/controller or to the previous or possibly subsequent I/O module are engaged.

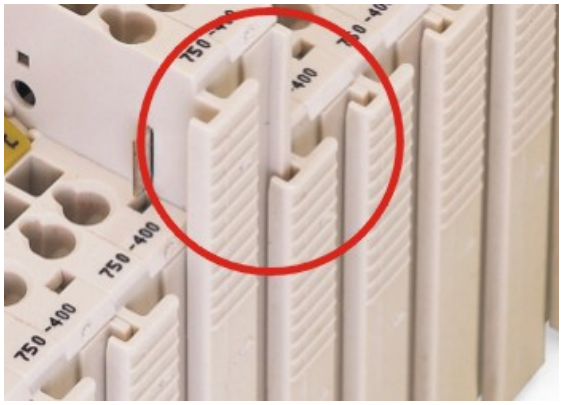


Figure 6: Insert I/O module

2. Press the I/O module into the assembly until the I/O module snaps into the carrier rail.

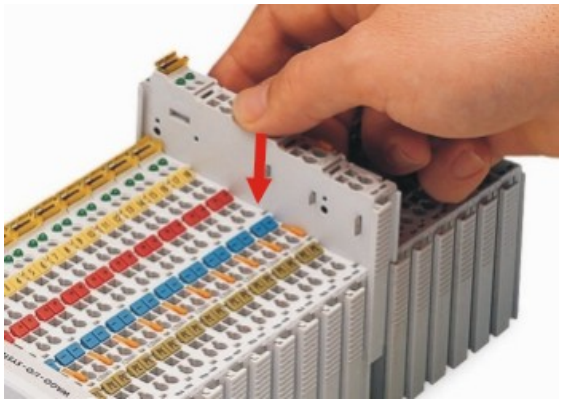


Figure 7: Snap the I/O module into place

With the I/O module snapped in place, the electrical connections for the data contacts and power contacts (if any) to the fieldbus coupler/controller or to the previous or possibly subsequent I/O module are established.

4.2.2 Removing the I/O Module

1. Remove the I/O module from the assembly by pulling the release tab.

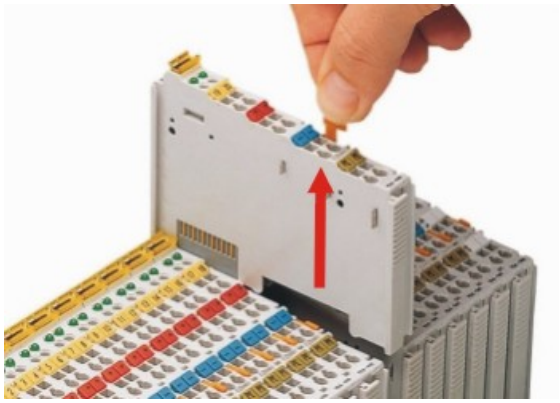


Figure 8: Removing the I/O module

Electrical connections for data or power contacts are disconnected when removing the I/O module.

4.3 I/O Modules with Pluggable Wiring Level (Series 753)

Series 753 I/O modules feature a pluggable connector for I/O wiring. This connector is simply plugged into the bottom of the module.
The connector can be completely removed together with the wiring, simplifying replacement of defective modules from the assembly.

Figure 9: Connector and module

Miniature WSB marking tags ensure that the right connector is matched up with the right I/O module (see figure below).

Figure 10: Assignment of module to connector using Mini-WSB tags

This connector provides an option for attaching cable binders.

Figure 11: Attachment of cable binders

4.3.1 Coding

Coding using small plastic pins and sockets facilitates mating of the module with the appropriate connector.

1. Insert the pin into the socket.

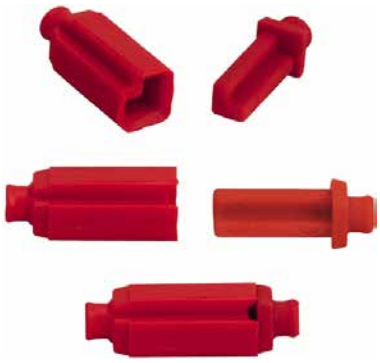


Figure 12: Assembling the coding pins

2. Position the assembled coding pins in the I/O module. Due to its design, each pin allows four different coding options (i.e.; 16 different options using two pins).

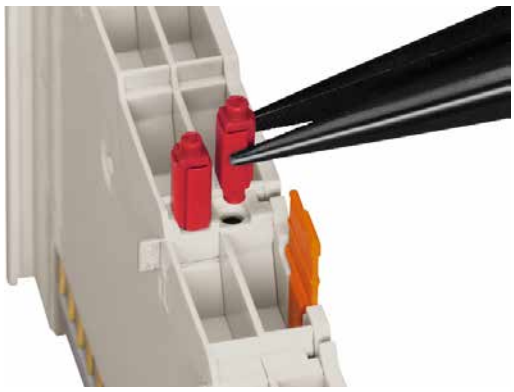


Figure 13: Inserting the coding pins

3. Place the connector onto the I/O module.

Figure 14: Plugging the connector into place

4. When the connector is removed the sockets remain in the I/O module. The coded connector can only fit in the corresponding coded I/O module (see figures below).

Figure 15: "Sure match" coding pins

4.3.2 Connector Removal

1. Remove the connector from the I/O module by pulling the orange pull tab on the connector toward the top of the module.

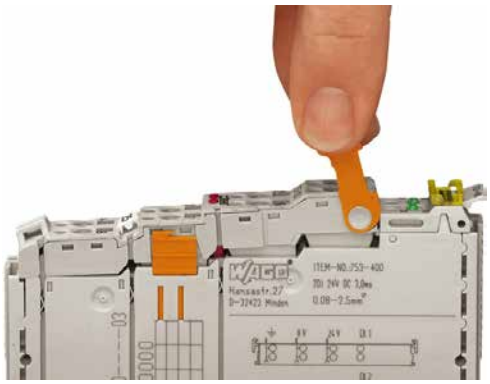


Figure 16: Pulling the pull tab

The connector detaches from the module.

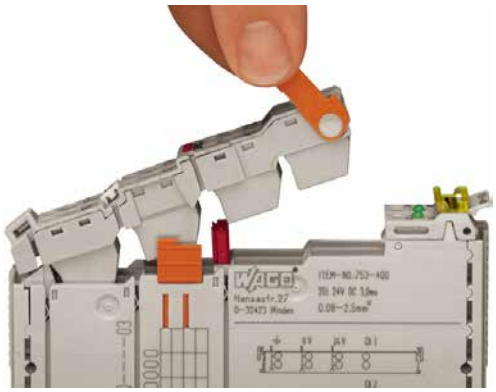


Figure 17: Removing the connector without tools

2. Alternatively, you can also use a standard screwdriver at the position shown (in the figure below) to remove the connector.

Figure 18: Removing the connector using a screwdriver

5 Function Description

When using one or more KNX modules in a KNX IP controller (or other WAGO controller), the module can exchange KNX telegrams with the IEC-61131-3 application.

Special function blocks are required for communication between the IEC and the KNX application programs, creating the interface between the KNX objects and the IEC variables. One master function block processes the protocol to be used for the communication with the corresponding module via the internal data bus.

The function blocks are designed for easy, convenient management and monitoring of KNX devices. The function blocks are made available in a library.

Information

Further Information
The function blocks used for the IEC-KNX communication are listed in both "KNX_Standard.lib" (standard DPTs library) and "KNX_Advanced.lib" (library of all DPTs) libraries. Both libraries and the "KNX_d.pdf" library description can be found at http://www.wago.com under Downloads → Building Automation → WAGO-I/O-*PRO* Libraries.
For application notes please refer to http://www.wago.com under Downloads → Building Automation → Application Notes.

5.1 Process Data and Data Transfer

The KNX/EIB/TP1 modules 753-646 support acyclic services and acknowledgements. An opcode is used for the read/write command of data and the triggering of specific functions. With the opcodes defining the structure and content of the data bytes via their value.

The data transfer through the KNX module is bidirectional, via confirmed services with integrated flow control. Because KNX is a multi master system, commands are not only transmitted from controller to module, but also sent actively and internally from the module to the controller. For example, when an event of a switch, connected to the KNX module, is sent internally via the module bus to the PFC application of the controller.

Using the KNX module, a 24-byte input and output process image can be transferred to the controller via a logical channel. Two status bytes and two control bytes provide the control of the data flow. The byte length of solely KNX telegrams varies between 7-byte minimum and 64-byte maximum (typical length is 7-byte to 24-byte). Furthermore, the internal data bus communication offers 24-byte maximum for each module bus telegram, of which 14-byte can be used for KNX telegrams.

5.2 Application of Module 753-646 with Programmable Fieldbus Controllers

For accessing KNX group addresses with a programmable fieldbus controller (PFC), the corresponding IEC-61131-3 function blocks are available for the WAGO-I/O-*PRO* programming tool. These function blocks provide the interface between the KNX communication objects of the module and the IEC application.

The data formats of the function blocks are represented by data point types (DPT's). A DPT_SWITCH function block (1 bit format) may be used for, e.g., switch objects (on/off). For each DPT a separate function block is available. This enables not only the scaling, but also the individual input and output of the DPT datasets. Depending on the application, these modules may be used in the IEC application. The WAGO-ETS3 PlugIn filters the addresses of these function blocks from the SYM_XML file generated by the WAGO-I/O-*PRO*. Thus, an assignment between KNX group addresses and DPT function blocks can be created in the ETS3 PlugIn.

In addition, the library provides a master function block controlling the communication between the KNX module and the IEC application. The data of the previously mentioned DPT modules are processed here.

Note

Provide instance names with a prefix, when using more than one module!
When more than two KNX 753-646 modules are used on one fieldbus controller, then the DPT module instance names must be provided with a prefix. This makes it possible to recognize the assignment of the DPT modules in the SYM_XML file.
The following syntax must be maintained:

No prefix	→	First 753-646 module
KNX2_xxx	→	Second 753-646 module
KNX3_xxx	→	Third 753-646 module etc.

NOTICE

Do not operate the 753-646 I/O Module on devices with enabled “Online Change” function!
Do not operate the 753-646 I/O Module on devices with enabled “Online Change” function (adjustable in WAGO-I/O-*PRO* under Target System Settings > “General” tab > Online Change).No synchronization can be performed with the I/O module using the “Online Change” function, so that address permutations will not be detected.

5.2.1 Overview Function Blocks

In addition to the two "master function blocks", a separate function block is available for every data point type (DTP).

Table 9: Overview Function Blocks

Function blocks	Task
FbKNX_Master_646	For communication with the KNX module 753-646 on fieldbus controllers 750-8xx. This function block detects all queued commands of the other KNX function blocks in the program and causes their execution. The function block contains an output for the display of various status and fault messages, as, e.g., internal data bus faults, KNX bus voltage interruption, etc. **Important:** This function block may be used only once per installed KNX module.
FbKNX_Master_IPC	For communication with the KNX module 753-646 on WAGO I/O IPC 758-870. This function block detects all queued commands of the other KNX function blocks in the program and causes their execution. The function block contains an output for the display of various status and fault messages, as, e.g., internal data bus faults, KNX bus voltage interruption, etc. **Important:** This function block may be used only once per installed KNX module.
FbDPT_xxx	Provides for the data exchange and scaling with a KNX object of the module 753-646. **Important:** This function block may be used only in combination with the function blocks "FbKNX_Master_646".

Information

Further information

The function blocks for the WAGO-I/O-*PRO* can be downloaded from the website http://www.wago.com. The files are available under the gate Downloads → Building automation → WAGO-I/O-*PRO* Libraries.

5.2.2 Data Point Types (DPTs)

DPTs describe defined formats of communication objects and are assigned to the same via the ETS3.

- DPT 1 – Boolean (1 bit)
- DPT 2 – 1 Bit Controlled (2 bit)
- DPT 3 – 3 Bit Controlled (4 bit)
- DPT 4 – Character Set (8 bit)
- DPT 5 – 8 Bit Unsigned Value (8 bit)
- DPT 6 – 8 Bit Signed Value (8 bit)
- DPT 6 – Status with Mode (8 bit)
- DPT 7 – 2 Octet Unsigned Value (2 Byte)
- DPT 8 – 2 Octet Signed Value (2 Byte)
- DPT 9 – 2 Octet Float Value (2 Byte)
- DPT 10 – Time (3 Byte)
- DPT 11 – Date (3 Byte)
- DPT 12 – 4 Octet Unsigned Value (4 Byte)
- DPT 13 – 4 Octet Signed Value (4 Byte)
- DPT 13 – 4 Octet Float Value (4 Byte)
- DPT 15 – Access 4 Octet (4 Byte)
- DPT 16 – String 14 Octet (14 Byte)

Information

Further information

The exact data structure of the listed data types are found in the documentation to the WAGO-ETS3-PlugIn on the website http://www.wago.com under Documentation → WAGO-I/O-SYSTEM 759 → WAGO-ETS3-PlugIn

5.3 Data Exchange between KNX/EIB/TP1 Module and IEC Application

The KNX module and IEC application differ in their communication method. To ensure data exchange, the KNX module requires configuring.

In the IEC application, special function blocks are created for the KNX communication; their variables are imported in the KNX configuration tool ETS3. Using this tool, KNX group addresses and IEC variables are connected with each other and loaded as a mapping table into the module. Thus, the IEC application and KNX module / TP1 network are configured for a common communication.

5.4 Startup Behavior of the KNX/EIB/TP1 Module in Device Mode

In order for the KNX module to operate in device mode, a node is created between one WAGO controller and at least one KNX module with voltage applied. The following startup behavior is also present when the bus node is already operational and the IEC application has yet to be modified.

LED A, indicating the router mode of the module, will be flashing for 30 seconds. LED E (device mode) is also flashing. The flashing signals the initialization phase of the module. At this time, functions are not yet available.

In order for the KNX module to communicate with other stations in the network, an IEC program is loaded into the controller. In this program, function blocks are created which are required for the module communication. All relevant variables will be exported as network variables as a SYM_XML file from the finished program.

The SYM_XML file with the IEC network variables is imported using the configuration software ETS3 and the WAGO-specific ETS3-PlugIn.

The imported network variables need to be linked with the KNX group addresses and loaded as a mapping table into the module. Telegrams are sent in the KNX net via the KNX group addresses.

A checksum (CRC) is created within the controller. A fault-free download and successful check is indicated by the permanent green light of LED E. If the LED is still flashing, the IEC application requires verification.

If the module has been configured and has moved into device mode, group telegrams, which were previously assigned the function "Send at reset:", are sent via the bus.

The KNX module is now ready to function, enabling a communication between the IEC application and KNX module and - via the module - with connected TP1 networks.

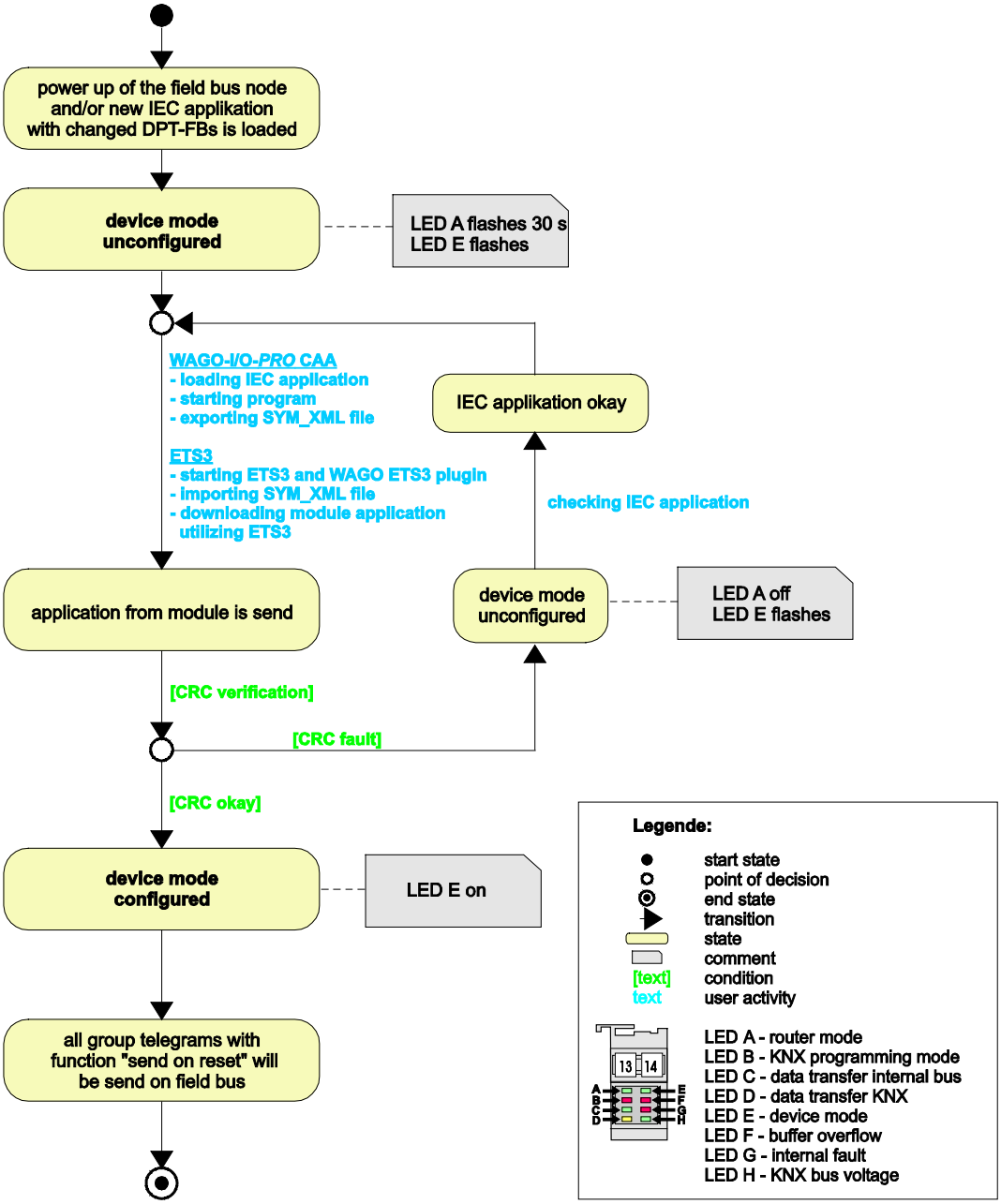


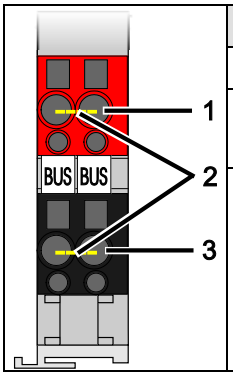
Figure 19: Startup behavior of the KNX module in device mode

5.5 Installation Notes

NOTICE

KNX plug only for use with KNX/EIB/TP1 module 753-646!
The KNX plug is intended exclusively for the KNX/EIB/TP1 module 753-646, because the plug is bridged between the two KNX bus conductors "+" and the two KNX conductors "-". If the plug is operated at a different module, a short-circuit may occur.

Table 10: Internal bridge in plug



No	Description
1	+ KNX bus
2	Plug internally bridged
3	- KNX bus

.

Note

KNX module is bridged internally!
The plug of the KNX module is bridged internally, because the bus conductors may not be interrupted when the wiring of a module has been disconnected.

Note

Use internal system supply module for supply of further modules!
The bus module is supplied via the module bus with the necessary operating voltage and does not have power contacts for the reception and transmission of FE (functional earthing/screen). If an additional 24 V supply voltage or FE is required for other bus modules, an internal system supply module must be connected on the line side of the next module.

Note

Use separate KNX supply module!
The KNX module does not have its own KNX supply module. Hence, the connection of a separate KNX supply module is required.

Note

Note the different operation modes!
If one or more KNX/EIB/TP1 modules, 753-646, are operated on a KNX IP controller, it will work in device mode. The first module inserted, however, will be automatically operated in router mode. If the KNX module is operated with a different WAGO controller, the module will always be in device mode.

Note

First KNX module at KNX IP Controller 750-849 works in router mode!
If any controller is exchanged with a KNX IP controller 750-849, the first KNX module inserted will automatically enter the router mode. It will be impossible to access the module from the IEC application.

Note

Router function can be deactivated in the Web-Based Management system!
The router function is enabled by default. However, you have the option of disabling the router function in the web based management system on the "KNX" page. In this case, all connected KNX modules including the first one are operated in device mode.

Note

In operating mode loss of telegrams is possible!
Configuration performed with WAGO-I/O-*CHECK* in operating mode can lead to the loss of telegrams.

Information

Further information

To install a KNX module to a programmable fieldbus controller, and program the function blocks, the WAGO-I/O-*PRO* software is required, as is the ETS3 engineering tool software containing the WAGO product database and the WAGO-ETS3-PlugIn for the configuration of the module.

The WAGO-I/O-*PRO* software can be downloaded from the website http://www.wago.com under Documentation → WAGO-I/O-SYSTEM 759 → WAGO-I/O-*PRO*.

The ETS3 can be obtained from the KNX Association (http://www.konnex.org/).

The WAGO-ETS3-PlugIn can be found on the website http://www.wago.com under Downloads → Building automation

The documentation to the WAGO-ETS3-PlugIn can be obtained from the website http://www.wago.com under Documentation → WAGO-I/O-SYSTEM 759 → WAGO-ETS3-PlugIn

The function blocks used for the IEC-KNX communication are listed in both "KNX_Standard.lib" (standard DPTs library) and "KNX_Advanced.lib" (library of all DPTs) libraries. Both libraries and the "KNX_d.pdf" library description can be found at http://www.wago.com under Downloads → Building Automation → WAGO-I/O-*PRO* Libraries.

For application notes please refer to http://www.wago.com under Downloads → Building Automation → Application Notes → KNX/EIB/TP1-module 753-646.

List of Figures

Figure 1: View 15
Figure 2: Connectors 16
Figure 3: Display elements 17
Figure 4: Programming button 18
Figure 5: Schematic Diagram 19
Figure 6: Insert I/O module 23
Figure 7: Snap the I/O module into place 23
Figure 8: Removing the I/O module 24
Figure 9: Connector and module 25
Figure 10: Assignment of module to connector using Mini-WSB tags 25
Figure 11: Attachment of cable binders 25
Figure 12: Assembling the coding pins 26
Figure 13: Inserting the coding pins 26
Figure 14: Plugging the connector into place 26
Figure 15: "Sure match" coding pins 27
Figure 16: Pulling the pull tab 28
Figure 17: Removing the connector without tools 28
Figure 18: Removing the connector using a screwdriver 28
Figure 19: Startup behavior of the KNX module in device mode 34

List of Tables

Table 1: Number notation 8
Table 2: Font conventions 8
Table 3: Legend for "View" figure 15
Table 4: Connectors 16
Table 5: Display elements 17
Table 6: Technical data – Device data 20
Table 7: Technical data – Supply 20
Table 8: Technical data – KNX 20
Table 9: Overview Function Blocks 31
Table 10: Internal bridge in plug 35

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