EN

# WEINZIERL

Operation and installation manual

# KNX IP BAOS 774

(Art. # 5263)
*Compact bus powered Interface and ObjectServer between LAN and KNX bus*

KNX IP BAOS 774

## Application

The KNX IP BAOS 774 is a universal interface to the KNX bus. BAOS is an acronym for "Bus Access and Object Server". Communication to KNX is possible both on telegram level (KNXnet/IP Tunneling) and on data point level (KNX Application Layer). Clients can directly access KNX Group Objects via either a Binary Protocol (over TCP/IP or UDP/IP) or via JSON (Java Script Object Notation) Web Services.

The device is configured with the ETS and supports up to 1000 Group Objects. The main purpose of the KNX IP BAOS device is connecting non-KNX devices and applications to the KNX bus. Implementing the BAOS protocol enables a full integration into the KNX system including ETS support.

The generic ETS entry provides a flat list of data points and parameters. It can be used for rapid integration and for development purpose. For dedicated applications individual ETS entries can be created by OEM manufacturers.

The buttons are for diagnostic purposes. The LEDs indicate the operating status and communication errors on the bus. Power is supplied via the KNX bus

### KNX IP BAOS 774 as Programming Interface

The KNX IP BAOS 774 can be used as an interface to KNX. The KNX bus can be accessed from any point in the LAN. For this purpose, an additional individual address must be assigned. This is described in the following sections.

### KNX IP BAOS 774 as Object Server

The KNX system is based on a specific protocol that is difficult to implement for non-KNX devices. The KNX IP BAOS 774 maps KNX data to an IT-friendly API (Application Programming Interface). It greatly reduces the effort to connect e.g. control or visualization tools to KNX.

The KNX IP BAOS protocol is available in the following versions:

- *KNX IP BAOS Binary V2*: A binary protocol that is especially suitable for small microcontroller.

- *KNX IP BAOS Web Services*: A URL-based protocol with JSON syntax

Protocol descriptions can be downloaded at the KNX IP BAOS 774 product site at www.weinzierl.de.

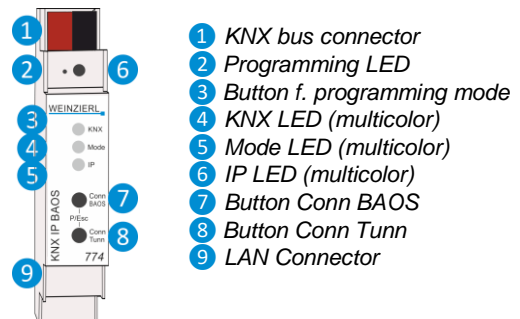## KNX IP BAOS 774 as application specific Gateway

To connect to non-KNX systems, the KNX IP BAOS 774 can be used as an application specific Gateway (e.g. to connect heating devices, audio applications and many more). For development purposes the generic ETS product entry (with up to 1000 data points as a flat list) is available. Of course, individual product entries can be developed.

## BAOS SDK

For the development of application-specific solutions the BAOS protocol must be implemented in the client. For a quick and easy integration of BAOS Binary Services a free SDK is available. More information about the BAOS SDK and the free download can be found at www.weinzierl.de

## Installation and Connection

The KNX IP BAOS 774 is designed for installation on a DIN rail with a width of 1 unit (18mm). It features the following controls and displays:

① KNX bus connector
② Programming LED
③ Button f. programming mode
④ KNX LED (multicolor)
⑤ Mode LED (multicolor)
⑥ IP LED (multicolor)
⑦ Button Conn BAOS
⑧ Button Conn Tunn
⑨ LAN Connector

The KNX IP BAOS 774 is powered by the KNX bus. An external power supply is not necessary.

*The device is not working without bus power.*

### KNX Programming mode

The KNX programming mode is activated/deactivated either by pressing the flushed KNX programming button ③ or by simultaneously pressing the buttons ⑦ and ⑧.

### Status display

The KNX LED ④ lights up green if the device is successfully powered by the KNX bus. This LED indicates telegram traffic on the KNX bus by flickering.

Communication failures (e.g. repetitions of telegrams or telegram fragments) are indicated by a short change of the LED color to red.

Overview of the different indications of the KNX LED 4:

| LED Status | Meaning |
|---|---|
| LED lights green | KNX bus voltage available. |
| LED flickers green | Telegram traffic on the KNX bus |
| LED shortly red | Communication failures on the KNX bus |

The IP LED 6 lights up when an Ethernet link is active. This LED is green if the device has valid IP settings (IP address, Sub net and Gateway). With invalid or nonexistent IP settings the LED is red. This is also the case if e.g. the device has not yet received the IP settings by a DHCP server.

This LED indicates IP telegram traffic by flickering.

Overview of the different indications of the IP LED 6:

| LED Status | Meaning |
|---|---|
| LED lights green | The device has an active Ethernet link and valid IP settings. |
| LED lights red | The device has an active Ethernet link and invalid IP settings or not yet received the IP settings by a DHCP server. |
| LED flickers green | IP telegram traffic |

The Mode LED 5 can visualize the status of each BAOS and KNXnet/IP tunneling connection.

With the button Conn BAOS 7 you can chose each single BAOS connection. Pressing the button Conn BAOS 7 counts the connection numbers up. The actually selected connection number is indicated by flashing (1x…10x) of the Mode LED 5. An available BAOS connection is indicated by a green LED and a used BAOS connection is indicated by an orange LED.

With the button Conn Tunn 8 you can chose each single KNXnet/IP Tunneling connection. Pressing the button Conn Tunn 8 counts the connection numbers up. The actually selected connection number is indicated by flashing (1x…5x) of the Mode LED 5. An available KNXnet/IP Tunneling connection is indicated by a green LED and a used tunneling connection is indicated by an orange LED.

Via the Escape function (Esc) this indication can be ended by simultaneously pressing the buttons Conn BAOS / Conn Tunn 7 8.

If neither programming mode nor manual mode are active the LED 5 can visualize configuration errors.

Overview of the different indications of the Mode LED 5:

| LED Status | Meaning |
|---|---|
| LED lights green | Device is working in standard operation mode. |
| LED light red | Programming mode is active. |
| LED flashes green 1x..10x | Programming mode is not active. Manual operation is active. The selected BAOS conn. (1-10) is not used and free. |
| LED flashes orange 1x…10x | Programming mode is not active. Manual operation is active. The selected BAOS conn. (1-10) is used. |
| LED flashes green 1x..5x | Programming mode is not active. Manual operation is active. The selected tunnel (1-5) is not used and free |
| LED flashes orange 1x…5x | Programming mode is not active. Manual operation is active. The selected tunnel (1-5) is used |
| LED flashes red | Programming mode is not active. Manual operation is not active. The device is not properly loaded e.g. after an interrupted download. |

## Factory default settings

The following configuration is set by factory default:

| | |
|---|---|
| Individual device address: | **15.15.255** |
| Number of configured KNXnet/IP tunneling con.: | **1** |
| Individual address of tunneling con.: | **15.15.250** |
| IP address assignment: | **DHCP** |

### Reset to factory device settings

It is possible to reset the device to its factory settings:

- Disconnect the KNX Bus connector 1 from device
- Press the KNX programming button 3 and keep it pressed down
- Reconnect the KNX Bus connector 1 of device
- Keep the KNX programming button 3 pressed for at least another 6 seconds
- A short flashing of all LEDs (2 4 5 6) visualizes the successful reset of the device to factory default settings.

## Interface settings with ETS

Within the ETS KNX interfaces can be selected and set up via the ETS menu "Bus Interfaces".

The ETS can access configured KNX IP BAOS even without a database entry. If the setup of the KNX IP BAOS does not comply with the conditions of the KNX installation it must be configured via an ETS project. See the ETS database section for more information.

As factory default the assignment of the IP address is set to "automatically via DHCP" and thus no further settings are necessary. To use this feature a DHCP server on the LAN must exist (e.g. many DSL routers have an integrated DHCP server).

After connecting the KNX IP BAOS to the LAN and the KNX bus, it should automatically appear in the ETS within the menu "Bus" under "Discovered interfaces".

By clicking on the discovered interface it is selected as the current interface. On the right side of the ETS window all specific information and options of the connection appear.

The indicated device name and the "Host Individual Address" (individual address of the device) can be changed within your ETS project then.

Like all programmable KNX devices the KNX IP BAOS 774 has an individual address which can be used to access the device. This is used, for example, of the ETS when downloading to the KNX IP BAOS via the bus.
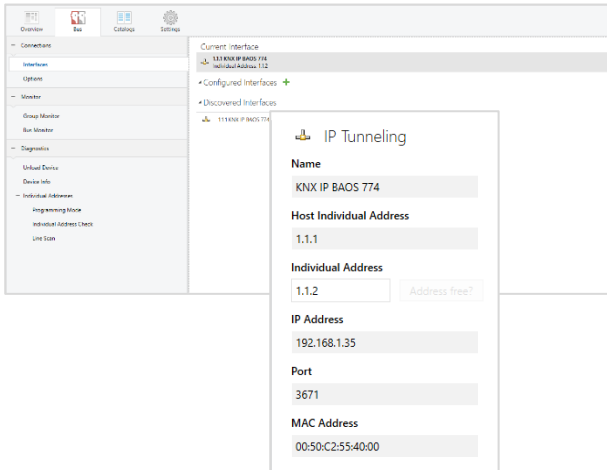
For the interface function the device contains additional individual addresses that can be set in the ETS (ETS 4.2 or higher). When a client (e.g. ETS) sends via the KNX IP BAOS telegrams to the bus, they contain a sender address as one from the additional addresses. Each address is associated with a connection. Thus response telegrams can be clearly transmitted to the respective client.

The additional individual addresses must be selected from the address range of the bus line in which the KNX IP BAOS is installed and may not be used by another device.

*Example:*

| | | |
|---|---|---|
| Device address | 1.1.1 | (address within ETS topology) |
| Connection 1 | 1.1.250 | (1. additional address) |
| Connection 2 | 1.1.251 | (2. additional address) |
| Connection 3 | 1.1.252 | (3. additional address) |
| Connection 4 | 1.1.253 | (4. additional address) |
| Connection 5 | 1.1.254 | (5. additional address) |

The section "Individual Address" enables you to change the individual KNX address of the currently used KNXnet/IP Tunneling connection. To check if the address you want to assign is unique within your KNX installation you can click the button "Address free?"



The individual KNX device address and the individual KNX addresses for additional tunneling connections can be changed within the ETS project, after the device has been added to the project.

## ETS database

The ETS database (for ETS 4.2 and ETS 5) can be downloaded from the product website of the KNX IP BAOS 774 (www.weinzierl.de).

When using the ETS® product database for ETS 4 / 5 some settings are displayed in addition to the parameter dialog of the Properties dialog (on the right side of the ETS window). So the IP settings can be done here. In the ETS 4 also the additional individual addresses will appear. In the ETS 5 those addresses appear in the topology view.
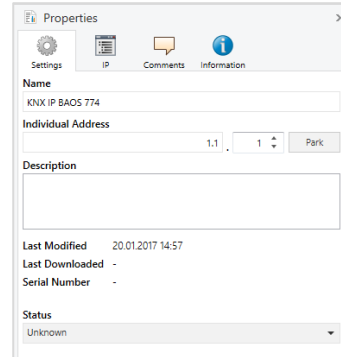


Each individual KNX address can be changed by clicking on the list entry and typing in the desired address into the "Individual Address" text-field. If the text-field frame switches to color red after entering the address, the address is already taken within your ETS project.

ⓘ *Make sure that none of the addresses above are already present in your KNX installation.*

By clicking on the KNX IP BAOS 774 device entry within your ETS projects topology view, an information column 'Properties' will appear on the right side of the ETS window. Within the 'Settings' overview, you can change the name of the device.
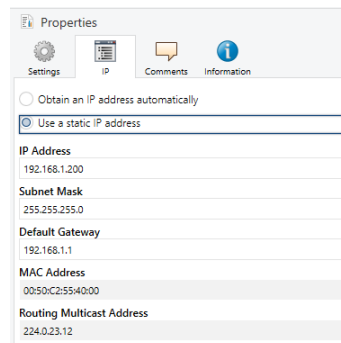


Within the "IP" overview the IP network specific options of the KNX IP BAOS 774 can be changed.

By changing "obtain an IP address automatically (via DHCP)" to "Use a static IP address" (static IP address) the IP address, subnet mask, and default gateway can be set freely.

ⓘ *All changes in the properties menu become effective only after a successful application download.*



**IP address**

Here the IP address of the KNX IP BAOS 774 can be entered. This is used to address the device via the IP network (LAN). The IP addressing should be coordinated with the administrator of the network.

**Subnet mask**

Enter the subnet mask here. The device uses the values entered in this mask to determine whether there is a communication partner in the local network. If there is no partner in the local network, the device will not send the telegrams directly to the partner but to the gateway that routes the telegram.

**Default gateway**

Enter the IP address of the gateway here, e.g. the DSL router of the installation.

**Example of assigning IP addresses**

A PC is to be used to access the KNX IP BAOS 774.

| | |
|---|---|
| IP address of the PC: | 192.168.1.30 |
| Subnet of the PC: | 255.255.255.0 |

The KNX IP BAOS 774 is located in the same LAN, i.e. it uses the same subnet. The subnet constrains the IP addresses that can be assigned. In this example, the IP address of the KNX IP BAOS must be 192.168.1.xx, where xx can be a number from 1 to 254 (with the exception of 30, which is already taken by the client PC). It must be ensured that no IP addresses are assigned twice.

IP address of the KNX IP BAOS    192.168.1.31

Subnet of the KNX IP BAOS:    255.255.255.0

### Remote access

Remote access via Internet is possible with the KNX IP BAOS 774. More details can be found in the document "Remote access with the ETS" at www.weinzierl.de

# ETS parameter dialogue

The generic ETS product entry provides a flat list of up to 1000 data points. The data point types can be configured separately via ETS parameters.

### Device Description

This page provides a general description of the device and the wiring scheme.



### General settings



### Prog. mode on device front

In addition to the normal programming button ❸ the device allows activating the programming mode on the device front without opening the switchboard cover. The programming mode can be activated and deactivated via pressing simultaneously both buttons ❼ and ❽.

This feature can be enabled and disabled via the parameter "Prog. mode on device front". The recessed programming button ❸ (next to the Programming LED ❷) is always enabled and not influenced by this parameter.

### Manual operation on device

This parameter sets the duration of the manual mode. Upon completion the normal display mode is restored.

### Sending of Indications

When this parameter is activated a client will receive asynchronous data point value indications.

### Data points

Up to 1000 data points can be parameterized. Each data point can be linked with a group address, in order to send to the bus. More than one group address can be set for one object for receiving.



### Data point type

For each data point the associated type (DPT) can be set. The following data points types are available:

DPT 1 (1 Bit, Boolean)
DPT 2 (2 Bit, Control)
DPT 3 (4 Bit, Dimming, Blinds)
DPT 4 (8 Bit, Character Set)
DPT 5 (8 Bit, Unsigned Value)
DPT 6 (8 Bit, Signed Value)
DPT 7 (2 Byte, Unsigned Value)
DPT 8 (2 Byte, Signed Value)
DPT 9 (2 Byte, Float Value)
DPT 10 (3 Byte, Time)
DPT 11 (3 Byte, Date)
DPT 12 (4 Byte, Unsigned Value)
DPT 13 (4 Byte, Signed Value)
DPT 14 (4 Byte, Float Value)
DPT 15 (4 Byte, Access)
DPT 16 (14 Byte, String)
DPT 17 (1 Byte, Scene Number)
DPT 18 (1 Byte, Scene Control)

For data point types that are not known (or not yet defined) it is possible to explicitly set the data point length. The following data point lengths are available:

1 Bit
2 Bit
3 Bit
4 Bit
5 Bit

6 Bit
7 Bit
1 Byte
2 Byte
3 Byte
4 Byte
6 Byte
8 Byte
10 Byte
14 Byte

The data point type descriptions can be found in the download area of the KNX Association (www.knx.org).

**Parameter**

The device has 1000 bytes available for user defined parameters which can be accessed via the BAOS protocol.



**Parameter Byte**

For each of the parameter bytes a value between 0 and 255 can be entered.

## Programming

The KNX IP BAOS 774 can be programmed in different ways by the ETS:

### Via KNX Bus

The device only needs to be connected to the KNX bus. The ETS requires an additional interface (for example, USB) to have access to the bus. Via this way both the individual address and the entire application including IP configuration can be programmed. Programming via the bus is recommended if no IP connection can be established.
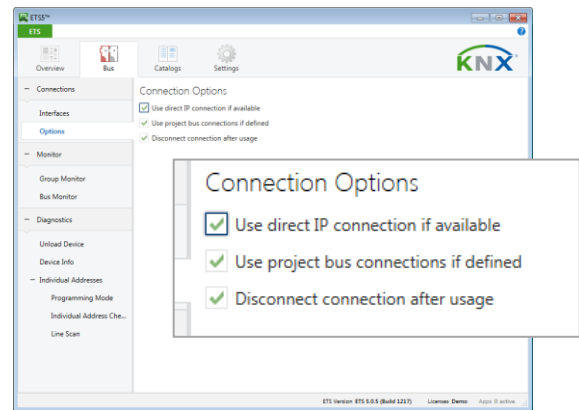
### Via KNXnet/IP Tunneling

No additional interface is required. Programming via KNXnet/IP Tunneling is possible if the device already has a valid IP configuration (e.g. via DHCP). In this case the device is displayed in the interface configuration of the ETS and must be selected. The download is executed via the ETS project as with many other devices.

### Via direct IP connection

While KNXnet/IP Tunneling and is limited to the speed of KNX TP the device can be loaded via a direct IP connection at high speed. The direct IP connection is possible if the device already has a valid IP configuration as well as an individual address. To do this select "Use direct IP connection if available" in the ETS menu "Bus – Connections - Options". The download is then directly performed in the device and is not visible in the ETS group monitor.



ℹ️ *Due to the significantly shorter transmission times it is recommended to perform downloads via IP.*

⚠️ **WARNING**

- The device must be mounted and commissioned by an authorized electrician.
- The prevailing safety rules must be heeded.
- The device must not be opened.
- For planning and construction of electric installations, the relevant guidelines, regulations and standards of the respective country are to be considered.

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