

Application KNX / IP-Router 7125/1.0

Function overview

The KNX/IP router REG-K (referred to below as KNX/IP router) enables KNX telegrams of a TP line to be forwarded to a LAN (IP) as a rapid backbone. The KNX telegrams are forwarded in both directions. In a KNX system, you can use KNX/IP routers, couplers or both devices in mixed operation.

The KNX/IP router can also be used as an interface for bus access via IP (e.g. for ETS programming).

With version 0C and higher (see the back of the device), a total of up to 5 simultaneous connections is supported.

The KNX/IP router supports the DHCP Internet protocol. The IP address can be automatically assigned via a DHCP server or manually via the ETS setting.

Other supported Internet protocols are ARP, ICMP, IGMP and UDP/IP. The KNX/IP router operates in accordance with the KNXnet/IP specification using core, device management and tunnelling.

An external power supply powers the KNX/IP router. If available in your network, you can alternatively use power over Ethernet (IEEE 802.3af).

Coupler function (KNXnet/IP routing)

The KNX/IP router can work as a line coupler or area coupler. In both cases the LAN (IP) is used as a backbone.

The assignment of the physical address of the KNX/IP router determines if the device works as a line coupler or an area coupler.

If the physical address has the form (X.Y.0), the router functions as a **line coupler**.

X = 1 to 15 = area

Y = 1 to 15 = line

0 = line coupler

If the physical address has the form (X.0.0), the router functions as an **area coupler**.

X = 1 to 15 = area

0.0 = area coupler

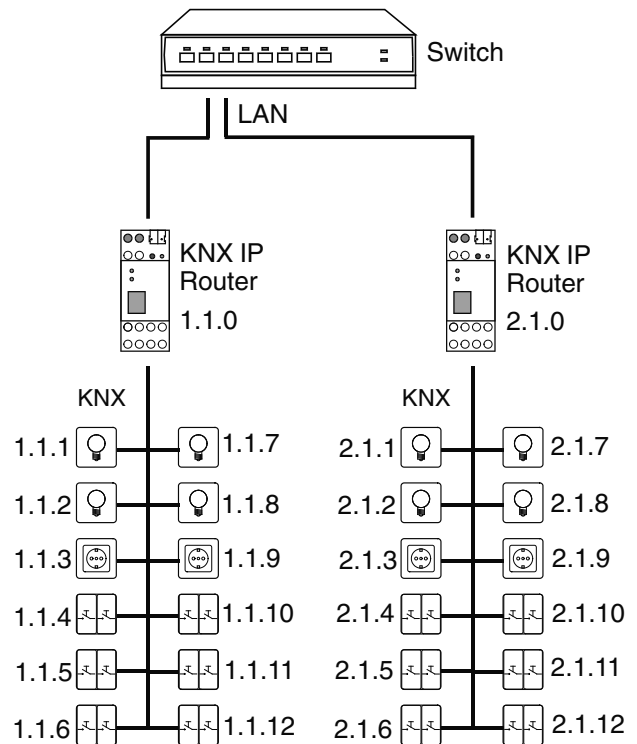
i Note: If the KNX/IP router is used as an area coupler (X.0.0), no KNX/IP router may be located topologically below it. For example, if a KNX/IP router has the physical address 1.0.0, a KNX/IP router with the address 1.1.0 is not permitted.

i Note: If the KNX/IP router is used as a line coupler (X.Y.0), no KNX/IP router may be located topologically above it. For example, if a KNX/IP router has the physical address 1.1.0, a KNX/IP router with the address 1.0.0 is not permitted.

The KNX/IP router has a filter table and thus helps reduce the bus load. The filter table is automatically generated by the ETS in the preconfiguration.

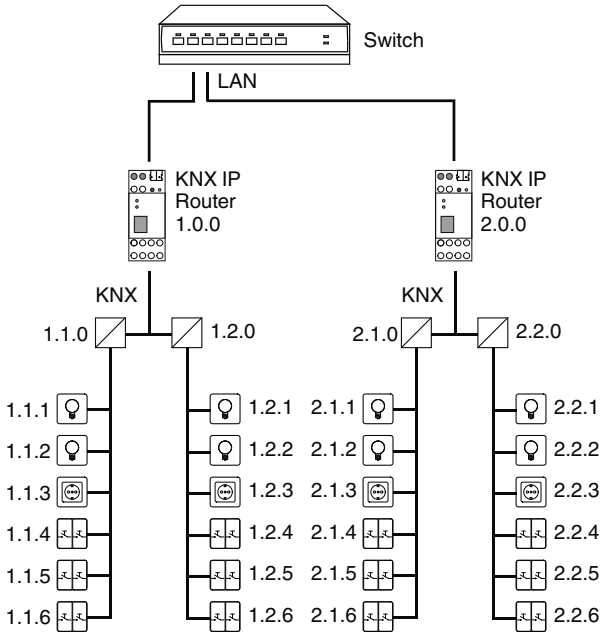
Because of the speed difference between Ethernet (10 Mbit/s) and KNX (9.6 kbit/s), far more telegrams can be transmitted on IP. If there are several telegrams in quick succession for the same line, they must be buffered in the router in order to avoid telegram losses. For this purpose, the KNX/IP router has memory for 150 telegrams (from IP to KNX).

KNX/IP router as a line coupler



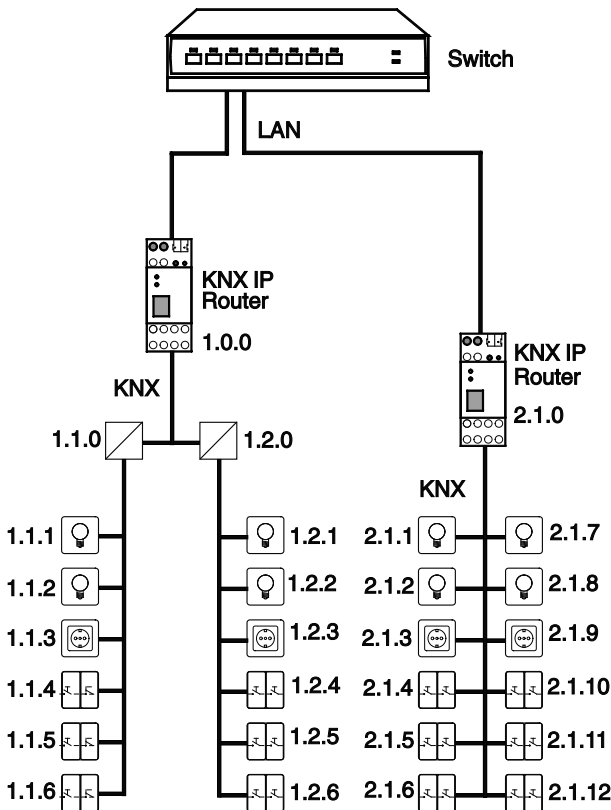
Example with lines 1.1 and 2.1

KNX/IP router as an area coupler



Example with areas 1 and 2

KNX/IP router as an area coupler and line coupler



Example with area 1 and line 2.1

Interface function (KNXnet/IP tunnelling)

The KNX/IP router can be used as an interface to the KNX. The KNX can be accessed from any point in the LAN. A second physical address must be assigned for this purpose.

With version 0C and higher (see the back of the device), a total of up to 5 simultaneous connections is supported.

i Many parameters and their settings are dependent on the settings you have already made for other parameters. This means that some parameters will appear or disappear and the values available for selection will change according to settings you have already made. These dependencies have not been shown in the table for reasons of clarity. All settings are always shown.

i The **bold** values in a table are the values set during factory configuration.

General tab

Device name

You can choose any name for the KNX/IP router REG-K. The name may be at most 30 characters long. The name is used to identify individual devices in a network. The device name should be informative (e.g. KNX/IP_router_line_1.1.x), so that when several KNX/IP routers are used, each device can be uniquely identified and assigned to a line.

Support of unparameterised interfaces

An interface with a physical address that does not match the line topology can be used (e.g. for startup).

Parameters: block, enable

Monitoring of bus voltage failure:

If KNX failure is detected, this is reported to IP. The bus voltage recovery is reported in the same way. This is a status telegram according to the KNX specification (PID_LINE_STATUS).

Parameters: disable, enable

IP address assignment

Automatic (DHCP):

The IP address is automatically assigned via DHCP, i.e. no additional settings are necessary for it. In order for this function to be used, there must be a DHCP server located in the LAN (e.g. many DSL routers have an integrated DHCP server).

Manual:

Here the IP address, the subnetwork and the gateway IP address must be entered by hand.

General	
Parameter	Setting
Device name	KNX/IP-Router REG-K
Support for unparameterised interfaces	disable
	enable
Monitoring for bus voltage failure	disable
	enable
IP address assignment	manual
	automatic (DHCP)

IP configuration tab

IP routing multicast address

This address is used for routing telegrams to IP. The multicast IP address 224.0.23.12 was reserved for this purpose (KNXnet/IP) by the IANA (Internet Assigned Numbers Authority). If a different multicast IP address is desired, it must be in the range between 239.0.0.0 and 239.255.255.255.

IP address

This is the IP address of the KNX/IP router REG-K. It is only displayed if the IP address assignment in the "General" tab is set to manual.

IP subnet

The subnet mask is to be entered here. This mask allows the device to determine if a communication partner is located in the local network. If there is no partner in the local network, the device does not send the telegrams directly to the partner, but to the gateway, which takes over the routing.

IP gateway address

The gateway's IP address is to be provided here.

i Note: If the KNX/IP router is only used in the local LAN, the entry 0.0.0.0 can remain.

Example for assigning IP addresses

A PC should be used to access the KNX/IP router.

IP address of the PC: 192.168.1.30

Subnetwork of the PC: 255.255.255.0

The KNX/IP router is located in the same local LAN, i.e. it uses the same subnetwork. The assignment of the IP address is limited by the subnetwork, i.e. in this example the IP address of the KNX/IP router must be 192.168.1.xx, where xx can be a number from 1 to 254 (except 30, which is already used). Make sure that no address is assigned twice.

IP address of the KNX/IP router: 192.168.1.31

Subnetwork of the KNX/IP router: 255.255.255.0

IP configuration 1	
Parameter	Setting
IP routing multicast address	
Byte 1	0-255, 224 default setting
Byte 2	0-255, 0 default setting
Byte 3	0-255, 23 default setting
Byte 4	0-255, 12 default setting
IP address	
Byte 1	0-255, 0 default setting
Byte 2	0-255, 0 default setting
Byte 3	0-255, 0 default setting
Byte 4	0-255, 0 default setting

If the IP address assignment in the "General" tab is set to manual:

IP configuration 2	
Parameter	Setting
IP subnet	
Byte 1	0-255, 0 default setting
Byte 2	0-255, 0 default setting
Byte 3	0-255, 0 default setting
Byte 4	0-255, 0 default setting
IP gateway address	
Byte 1	0-255, 0 default setting
Byte 2	0-255, 0 default setting
Byte 3	0-255, 0 default setting
Byte 4	0-255, 0 default setting

Register routing (KNX -> IP)

Group telegrams (main groups 0 to 13)

- Block:** No group telegram of these main groups is routed to IP.
- Route:** All group telegrams of these main groups are routed to IP independently of the filter table. This setting should be used only for test purposes.
- Filter:** Here the filter table is used to check if the received group telegram is routed to IP.

Group telegrams (main groups 14 to 15)

- Block:** No group telegram of the main groups 14 and 15 is routed to IP.
- Route:** All group telegrams of the main groups 14 and 15 are routed to IP.

Group telegrams (main groups 16 to 31)

- Block:** No group telegram of these main groups is routed to IP.
- Route:** An additional page appears where the routing of the main groups 16 to 31 can be blocked or enabled in pairs.

i **Note:** The group addresses of main groups 16 to 31 were originally reserved for special applications (e.g. in Easy mode). They can currently not be used for the KNX-IP router.

Individual addressed telegrams

- Block:** No individual addressed telegram is routed to IP.
- Route:** All individual addressed telegrams are routed to IP.
- Filter:** The individual address is used to check if the received physically addressed telegram is routed to IP.

Broadcast telegrams

- Block:** No received broadcast telegram is routed to IP.
- Route:** All received broadcast telegrams are routed to IP.

Acknowledgement (ACK) of group telegrams

- Always:** An acknowledgement is always generated when group telegrams are received (from KNX).
- Only when routing:** When group telegrams are received (from KNX), an acknowledgement is only generated in case of routing to IP.

Acknowledgement (ACK) of individual addressed telegrams

- Always:** An acknowledgement is always generated when individual addressed telegrams are received (from KNX).
- Only when routing:** When individual addressed telegrams are received (from KNX), an acknowledgement is only generated in case of routing to IP.
- Answer with NACK:** Every individual addressed telegram received (from KNX) is answered with NACK (not acknowledge). That means communication with physically addressed telegrams on the corresponding KNX line is no longer possible. The group communication (group telegrams) is not affected by it. This setting can be used to prevent manipulation attempts.

i **Note:** In the case of "Answer with NACK", the parameterisation must take place via IP.

Routing (KNX -> IP)	
Parameter	Setting
Group telegrams (Main groups 0 to 13)	block
	route
	filter
Group telegrams (Main groups 14 to 15)	block
	route
Group telegrams (Main groups 16 to 31)	block
	route
Individual addressed telegrams	block
	route
	filter
Broadcast telegrams	block
	route
Acknowledgement (ACK) of group telegrams	always
	only if routed
Acknowledgement (ACK) of physically addressed telegrams	only if routed
	always
	Answer with NACK

Register routing (IP -> KNX)

Group telegrams (main groups 0 to 13)

- Block:** No group telegram of these main groups is routed to IP.
- Route:** All group telegrams of these main groups are routed to IP independently of the filter table. This setting should be used only for test purposes.
- Filter:** Here the filter table is used to check if the received group telegram is routed to IP.

Group telegrams (main groups 14 to 15)

- Block:** No group telegram of the main groups 14 and 15 is routed to IP.
- Route:** All group telegrams of the main groups 14 and 15 are routed to IP.

Group telegrams (main groups 16 to 31)

- Block:** No group telegram of these main groups is routed to IP.
- Route:** An additional page appears where the routing of the main groups 16 to 31 can be blocked or enabled in pairs.



Note: The group addresses of main groups 16 to 31 were originally reserved for special applications (e.g. in Easy mode). They can currently not be used for the KNX-IP router.

Individual addressed telegrams

- Block:** No individual addressed telegram is routed to the KNX.
- Route:** All individual addressed telegrams are routed to the KNX.
- Filter:** The individual address is used to check if the received physically addressed telegram is routed to the KNX.

Broadcast telegrams

- Block:** No received broadcast telegram is routed to the KNX.
- Route:** All received broadcast telegrams are routed to the KNX.

Repetition of group telegrams

- Disable:** In the event of an error, the received group telegram is not sent repeatedly to the KNX.
- Enable:** In the event of an error, the received group telegram is repeated up to three times.

Repetition of individual addressed telegrams

- Disable:** In the event of an error, the received individual addressed telegram is not sent repeatedly to the KNX.
- Enable:** In the event of an error, the received individual addressed telegram is repeated up to three times.

Repetition of broadcast telegrams

- Disable:** In the event of an error, the broadcast telegram is not sent repeatedly to the KNX.
- Enable:** In the event of an error, the broadcast telegram is repeated up to three times.

Routing (IP -> KNX)	
Parameter	Setting
Group telegrams (Main groups 0 to 13)	block
	route
	filter
Group telegrams (Main groups 14 to 15)	block
	route
Group telegrams (Main groups 16 to 31)	block
	route
Individual addressed telegrams	block
	route
	filter
Broadcast telegrams	block
	route
Repetition of group telegrams	disable
	enable
Repetition of individual addressed telegrams	disable
	enable
Repetition of broadcast telegrams	disable
	enable

Communication settings in the ETS

With a valid IP configuration the KNX/IP router can act as interface to KNX.

Therefore the following settings are required:

- ① In ETS4 choose the area „Settings“, then the item „Communication“.

All available connections are listed at „Discovered connections“.

- ② Click on the desired connection.
- ③ At „Local connections“ you can assign the physical address for access to the bus.

In ETS3 you need to firstly configure the interface with the „ETS Connection Manager“. Then you can assign the physical address at „Settings“.

The individual address „15.15.250“ is set as default.

i **Note:** Make sure that this address is topologically in the same line but is not used by another device. If necessary, insert a dummy device in the ETS project to reserve this address.

Assignment of additional individual addresses

With version 0C and higher (see the back of the device), a total of up to 5 simultaneous connections is supported.

The KNX/IP router supports the simultaneous access of up to 5 devices. For each connection you need to assign one additional physical address.

The first physical address is assigned in the ETS. The KNX/IP router can assign the additional individual addresses itself directly. To achieve this, push the programming button at the device for more than one second.

Afterwards the assignment of the additional individual addresses is done in ascending order.

Example:

- Connection 1: 15.15.250 (set in the ETS)
- Connection 2: 15.15.251 (assigned automatically)
- Connection 3: 15.15.252 (assigned automatically)
- Connection 4: 15.15.253 (assigned automatically)
- Connection 5: 15.15.254 (assigned automatically)

The programming LED at the device flashes during the assigning.

i To make sure that these addresses were not assigned to other devices in a project, you can add dummy devices with these addresses to reserve them.

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