

## KNX IP LineMaster 760

Operating and installation manual



### Application

The KNX LineMaster combines the essential functions of a KNX bus line: Power supply with choke, IP Router and IP Interface.

In addition to the bus voltage the power supply offers an auxiliary voltage of 24 V. The IP Router in the LineMaster allows forwarding of telegrams between different lines through a LAN (IP) as a fast backbone. Using the embedded IP Interface, the KNX line can be connected directly to a PC (e.g. by ETS).

This device works according to the KNXnet/IP specification using the core, the device management, the tunneling and the routing part. The router included in the KNX LineMaster 760 has a filter table and is able to buffer up to 150 telegrams.

### Coupler function (KNXnet/IP routing)

The KNX IP LineMaster 760 can operate as a line and/or backbone coupler. In both cases, the LAN (IP) acts as a backbone.

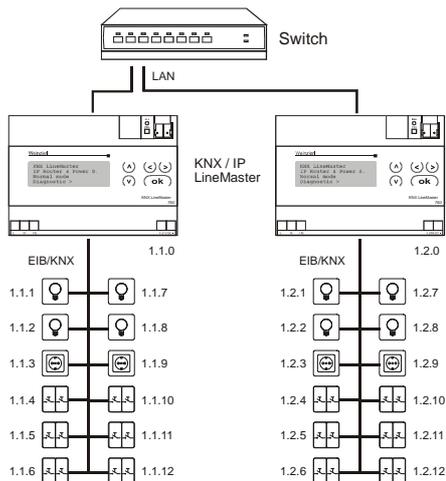


Fig. 1: KNX IP LineMaster as a line coupler

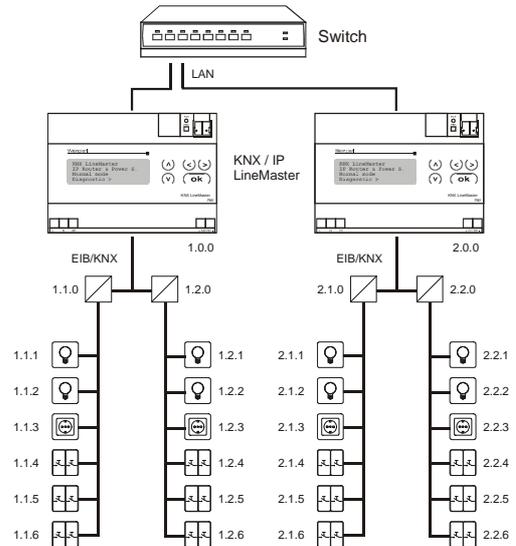


Fig. 2: KNX IP LineMaster as a backbone coupler

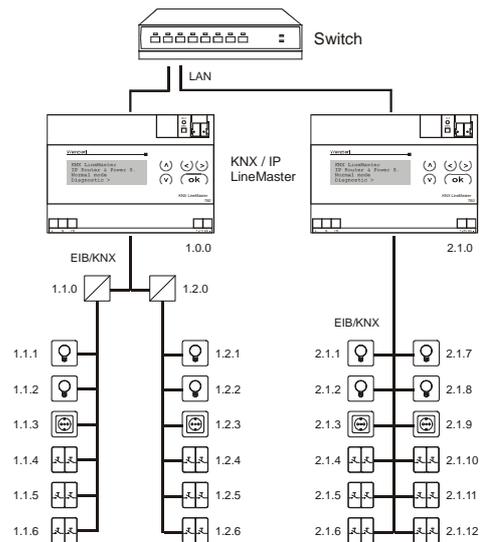


Fig. 3: KNX IP LineMaster as a backbone and line coupler

The physical address assigned to the KNX IP LineMaster 760 determines whether the device operates as a line or backbone coupler. If the physical address is in the form of x.y.0 (x, y: 1..15), the LineMaster operates as a line coupler. If it is in the form of x.0.0 (x: 1..15), the LineMaster acts as a backbone coupler.

#### Attention:

If the KNX IP LineMaster 760 is used as a backbone coupler (x.0.0), there must be no KNX IP LineMaster in the topology beneath it. For example, if a KNX IP LineMaster has the physical address of 1.0.0, there must be no KNX IP LineMaster with the address 1.1.0.

If the KNX IP LineMaster 760 is used as a line coupler (x.y.0), there must be no KNX IP LineMaster in the topology above it. For example, if a KNX IP LineMaster has

the physical address of 1.1.0, there must be no KNX IP LineMaster with the address 1.0.0.

The KNX IP LineMaster has a filter table and thus contributes to reducing bus load. The filter table is automatically generated by the ETS.

Because of the speed difference between the Ethernet (10 Mbit/s) and KNX (9.6 kbit/s), a far greater number of telegrams can be transmitted on IP. If several consecutive telegrams are transmitted on the same line, they must be buffered in the LineMaster to avoid telegram loss. The KNX IP Linemaster 760 has a memory for 150 telegrams (from IP to KNX).

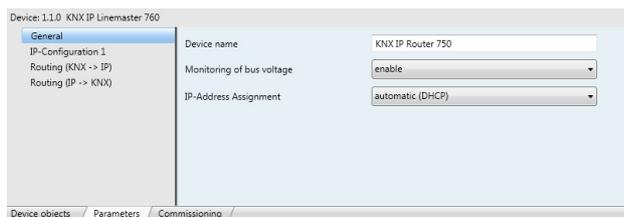
## Bus access function (KNXnet/IP Tunneling)

The KNX IP Linemaster 760 can be used as an interface to KNX. KNX can be accessed from any point in the LAN. For this purpose, a second physical address must be assigned as described in the ETS Connection Manager section.

## ETS database

The following parameters can be set on the ETS:

### General:



### Device name:

The KNX IP LineMaster 760 can be assigned a name of your choice. The device name should be descriptive (e.g. Line TF). It is used to search for and recognize a device.

### Monitoring bus voltage failure:

If a KNX failure is detected, it is reported on the IP. Return of the bus voltage is also reported.  
Parameters: *disable, enable*

### IP address assignment:

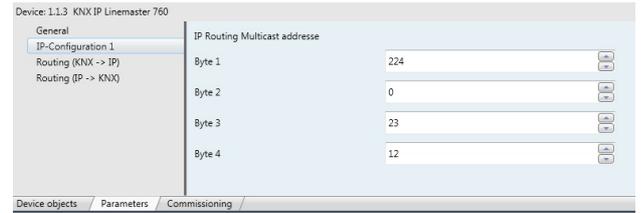
#### Automatic

(DHCP): The IP address is automatically assigned on the DHCP, i.e. additional settings are not required. To be able to use this function, there must be a DHCP server in the LAN (many DSL routers have an integrated DHCP server).

#### Manual:

In this case, the IP address, the subnet and the gateway IP address must be entered manually.

## IP configuration:

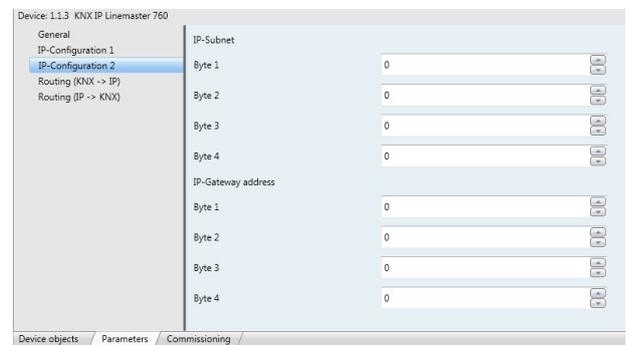


### IP Routing Multicast Address:

This address is used for routing telegrams on IP. The multicast IP address 224.0.23.12 was reserved (KNXnet/IP) at the IANA (Internet Assigned Numbers Authority) for this purpose. If a different multicast IP address is required, it must lie within the range of 239.0.0.0 to 239.255.255.255.

### IP address:

This is the IP address of the KNX IP LineMaster 760.



### IP subnet:

Enter the subnet mask here. The device uses the values entered in this mask to determine whether there is a communications 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.

### IP gateway address:

Enter the IP address of the gateway here.

Note: If the KNX IP LineMaster will only used in the local LAN, the entry of 0.0.0.0 can remain unchanged.

### Example of assigning IP addresses:

A PC is to be used to access the KNX IP LineMaster 760.

IP address of the PC: 192.168.1.30

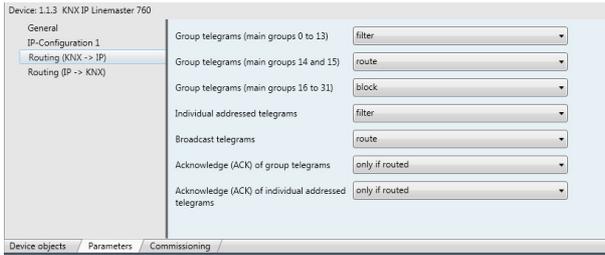
Subnet of the PC: 255.255.255.0

The KNX IP LineMaster 760 is located in the same local 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 IP LineMaster must be 192.168.1.xx, where xx can be a number from 1 to 254 (with the exception of 30, which is already in use). It must be ensured that no numbers are assigned twice.

IP address of the IP LineMaster: 192.168.1.31

Subnet of the IP LineMaster: 255.255.255.0

**Routing (KNX -> IP)**



Group telegrams (main group 0 to 13):

**Block:** No group telegrams of this main group are routed to IP.

**Route:** All group telegrams of this main group are routed to IP independent of the filter table. This setting is for testing purposes only.

**Filter:** The filter table is used to check whether or not the received group telegram should be routed to IP.

Group telegrams (main groups 14 and 15):

**Block:** No group telegrams of main groups 14 and 15 are routed to IP.

**Route:** All group telegrams of main groups 14 and 15 are routed to IP.

Group telegrams (main groups 16 to 31):

**Block:** No group telegrams of these main groups are routed to IP.

**Route:** An additional page appears on which the routing of main groups 16 to 31 can be disabled or enabled in pairs.

**Note:**

The group addresses of main groups 16 to 31 are reserved addresses that can be used for special applications (e.g. in Easy Mode). These group addresses are not available in the ETS.

Physically addressed telegrams:

**Block:** No physically addressed telegrams are routed to IP.

**Route:** All physically addressed telegrams are routed to IP.

**Filter:** The physical address is used to check whether the received physically addressed telegram should be routed to IP.

Broadcast telegrams:

**Block:** No received broadcast telegrams are routed to IP.

**Route:** All received broadcast telegrams are routed to IP.

Acknowledge (ACK) of group telegrams:

**Always:** An acknowledge is generated for every received group telegram (from KNX).

**Only if routed:** An acknowledge is only generated for received group telegrams (from KNX) if they are routed to IP.

Acknowledge (ACK) of physically addressed telegrams:

**Always:** An acknowledge is generated for every received physically addressed telegram (from KNX).

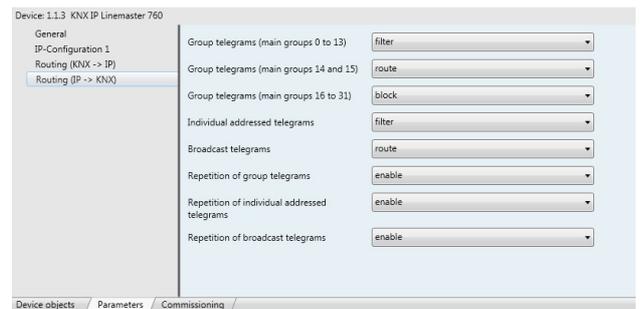
**Only if routed:** An acknowledge is only generated for received physically addressed group telegrams (from KNX) if they are routed to IP.

**Answer with NACK:** Every received physically addressed telegram (from KNX) is responded to with NACK (not acknowledge). This means that communication with physically addressed telegrams on the corresponding KNX line is not possible. Group communication (group telegrams) is not affected. This setting can be used to block attempts at manipulation.

**Attention:**

The setting *Answer with NACK* disables parameterisation with ETS via the subline (KNX). To reenable parameterisation via the subline (KNX), the device has to be set into delivery status.

**Routing (IP -> KNX)**



Group telegrams (main groups 0 to 13):

**Block:** No group telegrams of these main groups are routed to KNX.

**Route:** All group telegrams of this main group are routed to KNXG independent of the filter table. This setting is used for testing purposes only.

**Filter:** The filter table is used to check whether the received group telegram should be routed to KNX.

Group telegrams (main groups 14 and 15):

**Block:** No group telegrams of main groups 14 and 15 are routed to KNX.

**Route:** All group telegrams of the main groups 14 and 15 are routed to KNX.

Group telegrams (main groups 16 to 31):

**Block:** No group telegrams of these main groups are routed to KNX.

**Route:** An additional page appears on which the routing of main groups 16 to 31 can be disabled or enabled in pairs.

Physically addressed telegrams:

**Block:** No physically addressed telegrams are routed to KNX.

**Route:** All physically addressed telegrams are routed to KNX.

**Filter:** The physical address is used to check whether the received physically addressed telegram should be routed to KNX.

**Broadcast telegrams:**

**Block:** No received broadcast telegrams are routed to KNX.

**Route:** All received broadcast telegrams are routed to KNX.

**Resending of group telegrams:**

**Disable:** Group telegrams are not resent to KNX in case of a fault.

**Enable:** Group telegrams are resent up to three times in case of a fault.

**Resending of physically addressed telegrams:**

**Disable:** Physically addressed telegrams are not resent to KNX in case of a fault.

**Enable:** Physically addressed telegrams are resent up to three times in case of a fault.

**Resending of broadcast telegrams:**

**Disable:** Broadcast telegrams are not resent to KNX in case of a fault.

**Enable:** Broadcast telegrams are resent up to three times in case of a fault.

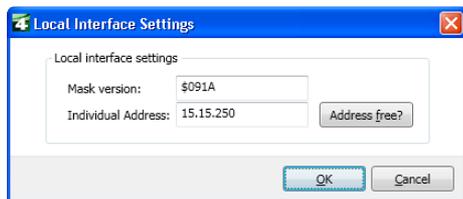
## ETS Connection Manager

The KNX IP LineMaster 760 can only act as an interface to KNX when the IP-configuration is valid.

The following configuration steps are required:

Select the button 'Settings' on the tab 'Communication' in the main window of ETS4. All available connections are listed under 'Discovered connections'. Select the desired connection.

The KNX IP LineMaster 760 supports up to 5 simultaneous tunneling connections. Each connection uses its own physical address. The address of the first tunneling connection can be changed within the 'Local Interface Settings'.



Physical addresses of the additional tunneling connections can be assigned directly on the device. This is done by pressing the programming key on the device (2) longer than one second. After that, the Learn-LED will start blinking, which indicates that the assignment of the additional addresses was successful.

The additional addresses are assigned as follows:

Tunneling connection 2 receives the next higher address than tunneling connection 1, tunneling connection 3 the next higher address than tunneling connection 2 etc..

**For example:**

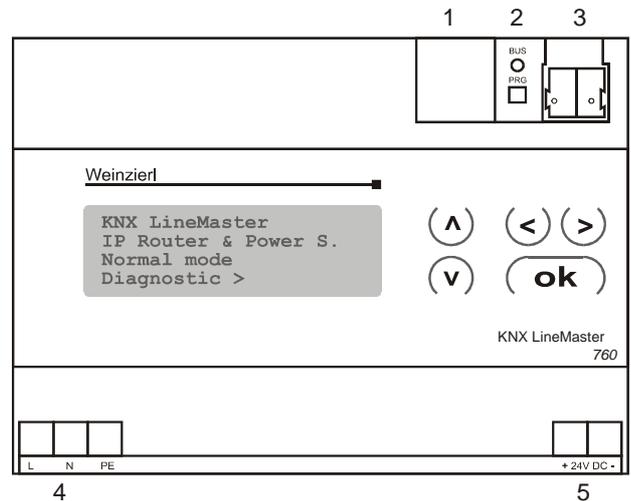
- Device address: 1.1.0 (address within ETS topology)
- Connection 1: 1.1.250 (address within local settings)
- Connection 2: 1.1.251 (assigned by programming key)
- Connection 3: 1.1.252 (assigned by programming key)
- Connection 4: 1.1.253 (assigned by programming key)
- Connection 5: 1.1.254 (assigned by programming key)

All addresses have to be unique and valid within the LineMaster's sub line. Note: be careful not to assign the same address as the device address for a connection. The device address can be changed within the topology view of the ETS software.

For new devices (i.e. in the factory settings state), only the additional individual address of the first connection is active with the address 15.15.250. To support multiple concurrent connections additional address assignment is required.

## Installation and connection

The KNX IP LineMaster 760 is designed for installation in a rack with a depth of 7 units (126 mm). It contains the following display and control elements:



- 1: LAN socket (RJ45, for Ethernet patch cable)
- 2: Programming key and programming – LED
- 3: Bus connection (KNX clamp)
- 4: Input for mains voltage, 230V AC / 50 Hz, L / N / PE
- 5: Output auxiliary voltage, 24V DC

**Operation (Settings at the device)**

**Basic settings of the display**

```
KNX LineMaster
IP Router & Power S.
Normal Operation
Diagnostics >
```

The following may be read off and set on the display of the KNX Linemaster:

- Reset of a line
- Recall of the data memory with operating hours, overcharge, external electrical surge, internal electrical surge, short circuit and excess temperature
- Recall of the operating data bus voltage, bus current and temperature
- Language of display

The background lighting of the display will switch off automatically if the temperature in the housing exceeds 50°C. This avoids an excessive thermal stress of the device.

**Line Reset**

**Basic setting**

```
KNX LineMaster
IP Router & Power S.
Normal Operation
Diagnostics >
```

The section „Diagnostics“ will be shown when the  $\triangleright$  button is pressed once.

```
Line Reset > #
Data Memory >
Operating Data >
Language >
```

The section „Line Reset“ will be shown when the  $\triangleright$  button is pressed twice.

```
Reset: Yes #
      No
      30 seconds
Reset not active!
```

The cursor (flashing rectangle at right edge) can be moved to the desired setting with the buttons  $\nabla$  or  $\triangle$ . It can be confirmed with **OK** button.

- Yes: Reset is activated. The line is switched to neutral and shorted. The basic setting displays: “Reset is active!”
- No: Reset not activated. The power supply system works in normal operation.
- 30 seconds: A reset of 30 seconds is started. Afterwards, the line is supplied with voltage as usual. During the reset state, which lasts 30 seconds, the basic setting displays: “Reset active: XX sec” (countdown).

The  $\triangleleft$  button returns to the previous menu level.

**Data memory**

**Basic setting**

```
KNX LineMaster
IP Router & Power S.
Normal Operation
Diagnostics >
```

The section „Diagnostics“ will be shown when the  $\triangleright$  button is pressed once.

```
Line Reset >
Data Memory >#
Operating Data >
Language >
```

Move the cursor (flashing rectangle at right edge) to the “Data memory” menu with the buttons  $\nabla$  and  $\triangle$  and confirm with key  $\triangleright$ .

```
Hours ofOperation >#
Overload >
Ext. Overvoltage >
Int. Overvoltage >
```

```
Short circuit >
Excess Temperat. >
```

The cursor (flashing rectangle at right edge) can be moved to the desired setting with the buttons  $\nabla$  and  $\triangle$ . It can be confirmed with  $\triangleright$  button.

**Operating hours**

```
Run time: 0 years
          0 day 0 hrs.
<= Back
```

The operating hours of the power supply system are displayed in years, days and hours. The  $\triangleleft$  button returns to the previous menu level.

**Overload**

```
Overload detected
0 times. Duration:
0 day. 0 hrs. 0 min
<= Back
```

The number of overload incidents and the total time in days, hours and minutes are displayed. The  $\triangleleft$  button returns to the previous menu level.

**External Overvoltage**

```
External Overvoltage
was detected
0 times.
<= Back
```

The number of external overvoltage incidents is displayed. The  $\triangleleft$  button returns to the previous menu level.

**Internal Overvoltage**

```
Internal Overvoltage
was detected
0 times.
<= Back
```

The number of internal overvoltage incidents is displayed. The ◀ button returns to the previous menu level.

**Short Circuit**

```
A short at the bus
was detected
0 times
<= Back
```

The number of short circuit incidents at the bus is displayed. The ◀ button returns to the previous menu level.

**Excess Temperature**

```
Excess Temperature
on the board
was detected
0 times!
```

The number of excess temperature incidents on the circuit board of the device is displayed. The ◀ button returns to the previous menu level.

**Operating data**

**Basic setting**

```
KNX LineMaster
IP Router & Power S.
Normal Operation
Diagnostics >
```

The section „Diagnostics“ will be shown when the ▷ button is pressed once.

```
Line Reset >
Data Memory >
Operating Data >#
Language >
```

Move the cursor (flashing rectangle at right edge) to the “Operating Data” menu with the ▾ and ▴ buttons and confirm with ▷ button.

```
Bus Voltage 29,4 V
Bus Current 320 mA
Temperature 42.1°C
```

The current values of

- Bus voltage
- Bus current
- Temperature on the circuit board of the device

are displayed.

The ◀ button returns to the previous menu level.

**Language**

**Basic setting**

```
KNX LineMaster
IP Router & Power S.
Normal Operation
Diagnostics >
```

The main section will be shown when the ▷ button is pressed once.

```
Line Reset >
Data Memory >
Operating Data >
Language >#
```

Move the cursor (flashing rectangle at right edge) to the “Language” menu with the ▾ and ▴ buttons and confirm with the ▷ button.

```
Sprache: Deutsch #
Language: English
Idioma: Espanol
Taal: Hollands
```

Move the cursor to the desired language with the ▾ and ▴ buttons and press the **OK** button. The display automatically jumps to the previous menu in the desired language. With key you get back by one menu level to the basic setting.

**Factory reset**

Factory default configuration:

Physical device address: **15.15.0**

Number of configured tunneling connections: **1**

Physical address of tunneling connection 1: **15.15.250**

IP address allocation: **DHCP**

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

**Resetting to the factory state:**

- Disconnect the power cable to the device 230V~ (4)
- Press and hold down the programming key (2).
- Reconnect the power to the device.
- Hold down the programming key (2) for at least 6 seconds.
- A blinking programming-LED indicates the successful restore of the factory configuration.



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